

User Manual



OPT ID Viewer

Smart Code Reader Client

* For best performance, please read this manual before using this product
Please keep this manual so that you can consult it at any time.

Preface

The purpose of this section is to ensure that users can use the product correctly through this manual to avoid danger or property damage during operation. Before using this product, please read the product manual carefully and keep it for future reference.

About this manual

This manual applies to the OPT Smart Code Reader. Use this manual as a guide. The images, charts, graphs and illustrations provided in the manual are only used for explanation. There may be differences with specific products. Please refer to the actual product. Due to product version upgrade or other needs, the company may update this manual. If you need the latest version of the manual, please visit the company's official website (<http://www.optmv.com>). We recommend that you use this manual under the guidance of a professional.

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Chapter1 Software Overview

OPT ID Viewer is the 1 professional debugging and configuration software for OPT Smart Code Reader. It integrates functions such as image acquisition, barcode recognition, barcode filtering and result output, providing a comprehensive solution for debugging the code reading process.

The client can set the code reader acquisition parameters and illuminant parameters. For each scheme, the client can set up to 5 sets of spare hardware parameters to improve the decoding rate of the code reader. If continuous decoding of the current hardware parameters fails, the group of parameters that can be decoded is found out by polling the hardware parameters set by the user, and continues to be decoded by using them. For the solution of the bar code, you can set certain rules according to customer requirements to output the desired bar code format and bar code data.

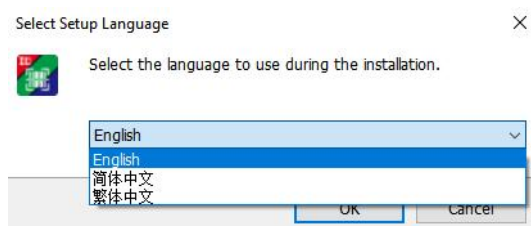
The client supports multiple trigger modes and multiple communication methods to output the result configuration. After configuring the scheme, the client downloads the scheme to the barcode reader device through the barcode reader management tool. The reader management tool can also back up the scheme, control the operation of the reader, stop the scheme and set the scheme of the reader device self-start operation.

1-1 Software Installation

The device can perform image debugging and parameter setting through the OPT ID Viewer client. The client supports installation on Windows7 10-32/64bit operating systems.

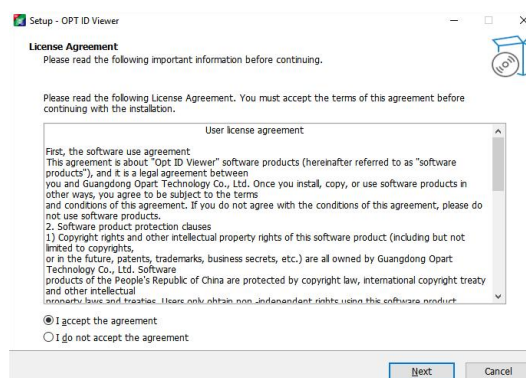
1 Select the installation language.

Double-click the installation package OPT ID Viewer_Setup.exe, or select OPT ID Viewer_Setup.exe with the right mouse button to open and select the software installation language, and click OK to enter the software installation interface.



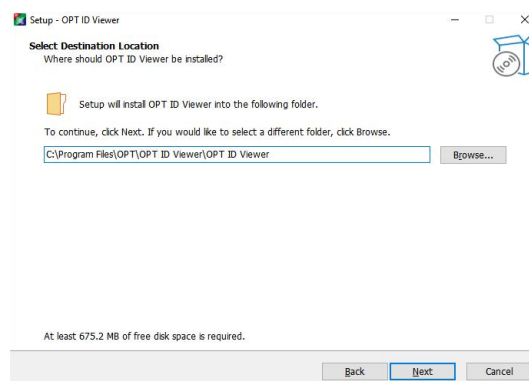
2 Read the license agreement.

Select "I agree to this agreement" and click the "Next" button to select the software installation path.



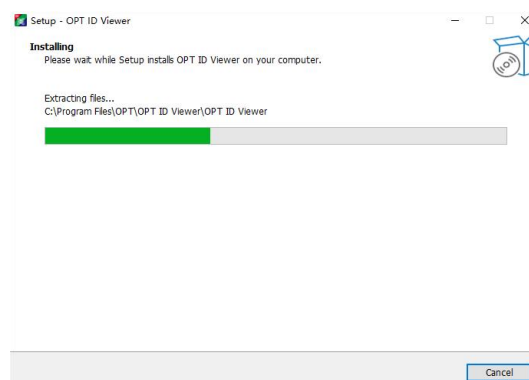
3 Installation path selection.

Click the "Browse" button to re-select the installation path of OPT ID Viewer software; click "Next" to enter the software installation information confirmation interface.



4 Installation information confirmation.

Click the "Install" button to enter the program installation interface.



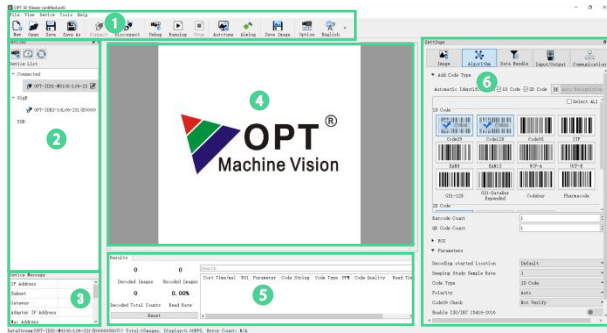
5 Installation is complete.

After the installation is completed, the installation completion interface pops up, and click the "Finish" button to complete the installation of the client.

Chapter2 Basic Settings

2- 1 Software Interface

Double-click the shortcut on the desktop/find the location of the software installation package, and double-click the running program OPT ID Viewer.exe to enter the OPT ID Viewer main interface.



- ① **Toolbar:** New scheme, open and save, automatic equipment tuning, sight enabling and other functional operations can be performed.
- ② **Device list column:** Devices that can be connected to manage and display the connection status of the devices.
- ③ **Device Information:** Details of the device selected in the device list are displayed.
- ④ **Image window:** Preview the current image and barcode recognition results of the device in real time.
- ⑤ **Information output column:** Real-time decoding information, statistical information and code quality information of the barcode reader are displayed.
- ⑥ **Parameter setting column:** Configure the equipment parameters such as image, algorithm, data processing, input and output, communication, etc.

Menu bar parameter description

The menu bar contains the File, View, Device, Tools, and Help menus.

• Documents:

Icons	Name	Description
	New	New Scheme
	Open	Open Saved Scenario
	Save	Save existing programs
	Save as	Save as existing scheme

• View:

Icons	Name	Description
	Zoom in	Zoom in on the current image
	Zoom Out	Zoom out on the current image
	Fit Window	To fit the display window
	1:1	Displays the current image in a 1:1 scale
	Image channel	Picture window when setting multi-code reader
	Single channel	Display a single screen window
	Dual channel	Display the screen window of two barcode readers at the same time
	Four channels	Display the picture window of the 4 barcode reader at the same time
	Six channels	Display the picture window of six barcode readers at the same time
	Nine channels	Display the picture window of nine barcode readers at the same time
	Clear Log	Clear output log
	Save Log	Save the output log
	Equipment	Select whether to display the device interface
	Setup	Select whether to display the setting interface

• Equipment:

Icons	Name	Description
	Connection	Connecting the barcode reader device
	Disconnect	Disconnecting the barcode reader device
	Debugging	Enter code reader debug mode
	Run	Enter the code reader operating mode
	Stop	Stop a running scenario
	Sight	Auxiliary positioning of the bar code

• Tools:

Icons	Name	Description
	Scanning device	Scan existing barcode reader devices
	Refresh Device	Refresh the list of unconnected devices and device information
	Automatic tuning	Automatic recommend acquisition parameters and code system
	Management Tools	Manage solutions within equipment
	Batch Upgrade Tool	Upgrade the firmware of the device and support the upgrade of multiple devices at the same time.
	Variable management	Create or manage variables
	Remote command control	Switch scheme or IO control through TCP server or TCP client
	Networking	Configure parameters related to the master or slave
	CSV Server	Open the CSV server gadget and cooperate with the communication configuration-export to CSV for use
	FTP Server	Open the FTP server gadget and use it with communication configuration-image export.

	Options	Open Options Settings
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• **Help:**

Icons	Name	Description
	About	Version Description
	Help documentation	Procedure Instruction Manual
	Online upgrade	Online upgrade of barcode reader equipment
	Program Upgrade	Firmware upgrade for connected devices

Toolbar Parameter Description

The toolbar contains shortcut functions such as new program opening and saving, automatic device tuning, sight enabling, language selection, etc.

Icons	Name	Description
	New	New Scheme
	Open	Open Saved Scenario
	Save	Save existing programs
	Save as	Save as existing scheme
	Connection	Connecting the barcode reader device
	Disconnect	Disconnecting the barcode reader device
	Debugging	Enter code reader debug mode
	Run	Enter the code reader operating mode
	Stop	Stop a running scenario
	Automatic tuning	Automatic recommend acquisition parameters and code system
	Sight	Auxiliary positioning of the bar code
	Save Image	Save the image in the current image control
	Options	Open Options Settings
	Language	Language Settings

2-2 Configure IP

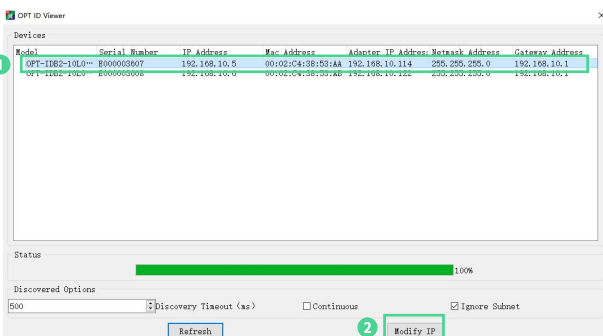
1 Enter the scanning device interface.

Click the " " icon on the device list page to enter the scanning device interface.



2 Enter the IP setting interface.

Select the barcode reader device whose IP needs to be modified, and click [Modify IP Address] to enter the IP setting interface.

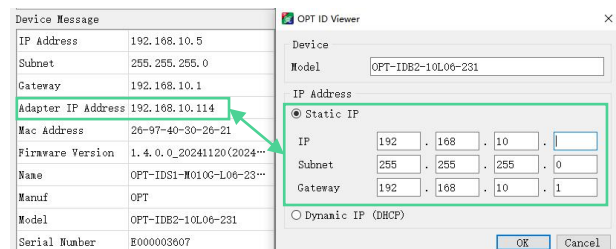


Parameter Description:

- **Discovery Timeout (ms):** The timeout period for a single search for devices.
- **Continuous:** Search for devices continuously after checking. By default, it is not checked.
- **Ignore Subnet:** The subnet mask of the device IP is ignored when the device search is checked.

3 Change the IP.

Select the IP configuration type according to your needs, which can be static IP or automatically assigned IP(DHCP). When static IP is selected, ensure that the modified IP address is in the same network segment as the host IP (adapter IP address). Click [Confirm] to complete the barcode reader IP configuration.



Parameter Description:

- **Static IP:** Set the camera's IP address, subnet mask, and default gateway.
- **Dynamic IP(DHCP):** If Auto-assign IP is selected, the IP address of the camera is automatically negotiated with the PC.

FYR The IP address /gateway the following conditions is abnormal and cannot be set.

- 1) Cannot be set to 0.0.0.0, 255.255.255.255, 169. x.x
- 2) The first or the last 1 bit cannot be 0 or 255
- 3) Cannot set addresses starting with 127 and greater than 223
- 4) IP address cannot be the same as adapter IP

Single network card multi-IP setting description:

When there is a single NIC with multiple IPs, if you want to specify the adapter IP, you can modify the reader IP address and subnet mask to match the specified IP segment and subnet mask on the NIC. If the network segment of the current device IP and subnet mask does not have an adapter IP in the NIC, the first available IP address in ascending order (i.e., the smallest IP address in the NIC) in the NIC will be automatically assigned to the reader.

Translated with DeepL.com (free version)

How to check whether the network card has more IP?

- Press "Windows + R" to open the Run dialog box. Type "cmd" and enter to open a command prompt window.
- Enter "ipconfig" in the command prompt window and enter.
- In the command prompt window, look up the IPv4 address of the Ethernet adapter, which is the IP address of the server network card.

2-3 Device Connections

Supports two ways to connect devices: device search connection and specified IP connection.

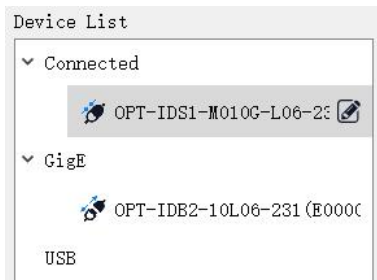
Device Search Connection

1 Refresh the device.

Click the "🔄" icon on the device page to refresh the device, and the devices that can be connected and used will be displayed in the device list interface.

2 Connect the device.

Double-click the name of the barcode reader device to connect. When the device icon changes from "🔍" to "🔗", the connection is successful. The barcode reader device can be found in "Connected" on the device list interface. The device name can be modified by clicking the "✎" icon on the right.



FYR When the connects the barcode reader device for the first time, if the device IP address and the host IP = are not in the same network segment, refer to the [configuration IP](#) to configure the device IP.

Specify IP Connection

If the IP address of a device is known, but the client cannot search for the device, you can add a device based on the device IP address. Make sure that the network of the device and the PC can ping each other.

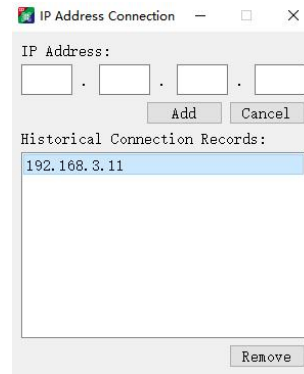
1 Enter the specified IP connection interface.

Click the "IP" icon on the device list page to enter the specified IP connection interface.



2 Enter the device IP address.

Enter the IP address of the device and click Add.



- **Historical connection record:** For devices that have been connected by IP before, double-click the IP in the historical connection record to quickly fill in the input box. Note that only the most recent ten entries are kept in the history, beyond which will be overwritten.
- **Remove:** To delete the selected IP address history, click.

3 Connect the device.

After the reader device IP is adapted, the device list displays the available devices. Double-click the barcode reader device name to connect. When the device icon changes from "🔍" to "🔗", the connection is successful.

View device information

The device can view the device details in the device information bar.

1 Select a device.

In the device list, click Select Device.

2 View device information.

At this time, the device information bar displays the basic information of the device, including IP address, subnet, gateway, adapter IP address, Mac address, firmware version, device name, manufacturer, model number, and serial number.

Device Message	
IP Address	192.168.10.5
Subnet	255.255.255.0
Gateway	192.168.10.1
Adapter IP Address	192.168.10.114
Mac Address	26-97-40-30-26-21
Firmware Version	1.4.0.0_20241120(2024081317010100)
Name	OPT-IDS1-M010G-L06-231(E000003607)
Manuf	OPT
Model	OPT-IDS2-10L06-231
Serial Number	E000003607

2-4 Automatic tuning

The automatic tuning function can realize one-key intelligent adjustment of the focusing position, exposure and gain parameters of the device, and supports bar code adaptive adjustment to achieve the best code reading effect and facilitate equipment debugging. The device supports key automatic tuning and client automatic tuning.

FYR Whether the device supports the function of automatic tuning is related to the device model and firmware program. Please refer to the specific model device. The parameters of different models and firmware versions are different. Please refer to the actual parameters for details.

Key automatic tuning

Automatic tuning is performed through the keys of the device. The following figure takes the D series barcode reader as an example.



1 Disconnect the device.

Disconnect the device from the software and ensure that the device is not connected to the software.

Note: Key auto-tuning is not supported when the device is connected.

2 Long press the AUTO key.

Press and press the AUTO button for 3 seconds to start automatic tuning.

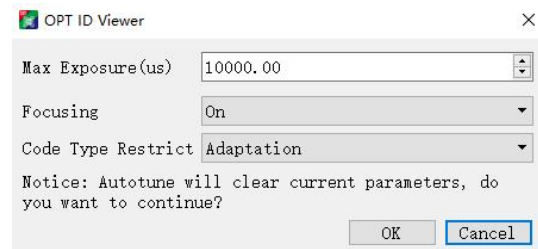
- During automatic tuning, the decoding indicator light flashes yellow continuously;
- When automatic tuning is successful, the decoding indicator light illuminates in green for 2 s;
- When auto tuning fails, the red decoding indicator light keeps on for 2 s;

Client Auto-Tune

Client Auto-Tuning Automatically tunes through relevant parameters set by the client.

1 Click Auto-tune.

Click the "Auto-tune" icon in the toolbar (or click "menu bar-tools-auto-tuning") to enter the auto-tuning setting interface.



2 Adjust the parameters.

Adjust the parameters according to actual requirements. The parameters are described as follows:

- Maximum Exposure (microseconds):** The maximum exposure value that can be reached when the device is automatically tuned.
- Focusing position adjustment:** If it is not enabled during auto-tuning, the existing focus position of the scheme will not be modified.
- Code Type Restriction:** The appropriate code type is automatically identified and added based on the image in the field of view during automatic tuning. If it is not enabled, the existing code type configuration of the scheme will not be modified. Optional adaptive/1 dimension code adaptive/two-dimensional code adaptive/stacked code adaptive/not enabled.

3 Start tuning.

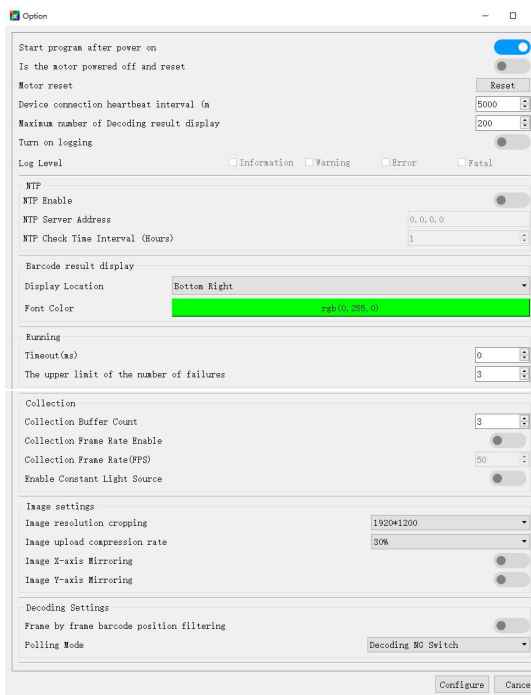
Click the OK button and the device starts auto-tuning.

FYR Automatic tuning will clear the current scheme configuration. During the automatic tuning process, the interface parameters cannot be set. After the automatic tuning is completed, the parameters will return to the settable state.

2-5 Options

Click "Tools-Options" in the menu bar to pop up the options interface, and you can set parameter settings such as program self-start after startup, motor reset, log level, NTP calibration, barcode result display, acquisition settings, image settings, decoding settings, etc.

FYR The parameters supported by different models and different firmware versions of the device vary, please refer to the actual parameters.



		of each other.
Maximum number of Decoding results display	200~20000	At the time of decoding, the maximum number of lines of the decoding result is displayed in the "information display column-result.
Turn on logging	On/Off	When enabled, log information is displayed in the information display area. Stop refreshing log information after closing, and the uploaded log information needs to be cleared by using menu bar-view-clear log.
Log Level	Detailed/Warning/Error/Fatal	Select whether to display the decoded details, warning information, error information, and fatal information in the log.

• NTP:

Parameters	Range or option	Description
NTP Enable	On/Off	Turn on enable, the device will perform NTP calibration according to the set parameters. Keep the reader device in time synchronization with other devices in the network.
NTP Server Address	Custom	IP address of the NTP server, that is, the adapter IP
NTP Check Time Interval(Hours)	1 to 99	Set the time interval for NTP calibration.

• Barcode result display:

Parameters	Range or option	Description
Display Location	Lower left/Upper left/Lower right/Upper right/Not displayed	The result is displayed in the position of the barcode area.
Font Color	Custom	Select the color of the image window barcode result font.

• Running:

Parameters	Range or option	Description
Timeout (ms)	0 to 999999999	Sets the total timeout for the runtime.
The upper limit of the number of failures	0 to 9999	Set the value of the upper limit. When the number of consecutive failed decoding NG reaches the upper limit, the order of the parameters will be automatically readjusted.

• Collection

Parameters	Range or option	Description
Start program after power on	On/Off	When enabled, the program will start by itself after the computer is turned on.
Is the motor powered off and reset	On/Off	The default is enabled, and the motor automatically resets to the default position when the device restarts. After shutdown, the focus position before restart will be retained when the device is restarted. Click the reset button to reset.
Motor Reset	/	After clicking, the motor will automatically reset once, and return to the current value position after returning to zero.
Device connection heartbeat interval (ms)	5000~600000	The heartbeat interval between the barcode reader and the PC, and the heartbeat packet is sent according to the set interval time, and the device and the server can confirm the connection status

Parameters	Range or option	Description
Collection Buffer Count	/	The maximum number of image buffers when the acquisition frame rate is greater than the decoding frame rate. Different equipment settings range.
Collection Frame Rate Enable	On/Off	Enables the acquisition frame rate control. If the acquisition frame rate is not enabled, it is equal to the decoding frame rate.
Collection Frame Rate(FPS)	5 to 50	The image acquisition speed of the barcode reader per second. After setting, you can control the image acquisition speed of the device. Different equipment settings range.
Enable Constant Illuminant	On/Off	After activation, the illuminant is always bright, and the brightness of the illuminant is 50% darker than that of the strobe.

• Image Settings:

Parameters	Range or option	Description
Image Resolution Cropping	/	Users can adjust the image resolution according to their needs, and the setting range of different pixel devices is different.
Image Upload Compression rate	30%/50%/70%/90%	Reduce the image upload size.
Image X-Axis Mirroring	On/Off	Mirror the image upside down when enabled.
Image Y-Axis Mirroring	On/Off	Turn left and right mirror the image when enabled.

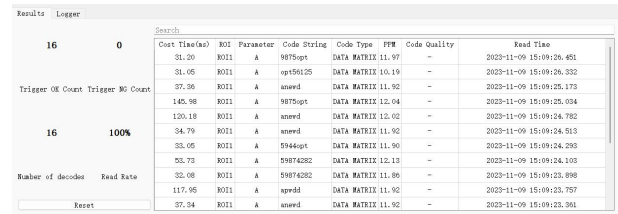
• Decoding Settings:

Parameters	Range or option	Description
Frame-by-frame barcode position filtering	On/Off	When enabled, the barcodes at the same position between frames during the same trigger are filtered. If the barcodes at this position have been decoded successfully once, the barcodes at this position will not be decoded in this trigger.

2-6 Information output

The information output displays relevant information such as results and logs. The resulting output can view information such as the number of decoded images, the number of undecoded images, the number of decodes, the decoding rate, and the decoding time of each piece of code reading information, the corresponding ROI sequence, the parameter set used, the code content, the PPM, and

the decoding time.



Parameter Description:

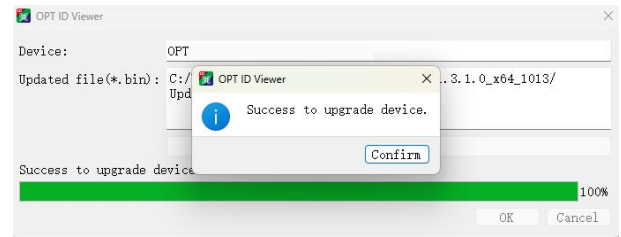
- **Decoded Images:** The number of successfully decoded images.
- **Undecoded Images:** The number of images that failed to decode.
- **Decoded Count:** The sum of the number of successfully decoded images involved in decoding.
- **Decoding Rate:** The total number of decoded images divided by the number of decoded images plus the number of undecoded images.
- **Reset:** Reset the current decoding result statistics.
- **Search:** Enter to search the result list, and the matching results are displayed in the list. When the input search is empty, all results are displayed.
- **Time (ms):** Time consumed in decoding.
- **ROI:** The ROI of the current decoding result.
- **Parameter:** The hardware parameter used for the current decoding.
- **Code String:** String of recognized barcode result is displayed.
- **Code Type:** Type of two-dimensional code or 1 dimension code.
- **PPM:** How many pixels are in a code result, and determines whether the reader has enough resolution to read the code.
- **Code Quality:** The quality rating of the current code. Use with the Algorithm-Quality Level Evaluation function. If the quality level evaluation in the algorithm is not enabled, it is displayed as "-"; if the algorithm-quality level evaluation is enabled, the corresponding quality level is displayed. Click the level score to display the score of a specific item.
- **Decoding Time:** The system time of the current decoding result.

2-7 Firmware Upgrade

To upgrade the reader firmware version, contact the relevant

technical support personnel. The upgrade files required for different models of equipment are different. Please refer to the specific model. Technical support personnel will provide you with the correct upgrade files based on specific information.

Support the use of online upgrade, batch upgrade tool 2 ways. For details of batch upgrade, see [the section of the batch upgrade tool](#).



Online upgrade

This feature allows users to upgrade the firmware of the reader device to which the software is connected through an online upgrade. Each upgrade operation is only supported on a single reader device.

1 Select a device.

Select the device that needs the firmware upgrade from the device list.

2 Open the online upgrade interface.

Click Menu-> Help-> Online Upgrade-> Program Upgrade to enter the online upgrade interface.



Parameter Description:

- **Device:** Name of the device to be upgraded.
- **Update File (*.bin):** Firmware file is selected.

3 Firmware upgrade.

Click Select File-> Select the same firmware file as the model of the device to be upgraded-> Click the OK button. The barcode reader can be upgraded, and the barcode reader will automatically disconnect after the upgrade is successful.

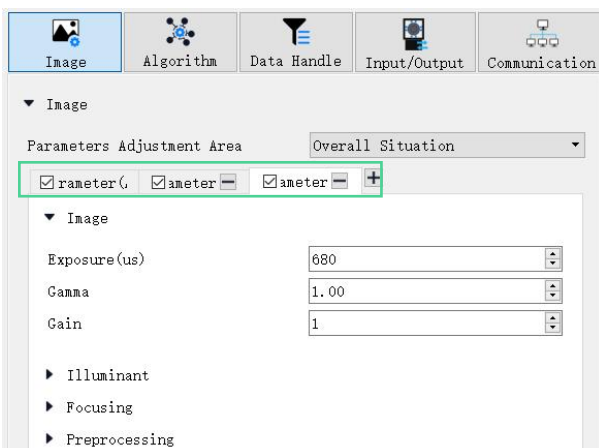
Chapter3 Image Configuration

The purpose of Image is to control the quality of the captured image by configuring the reader hardware parameters when the reader device is connected. Such as exposure, gain, gamma value, illuminant, the configuration of these hardware parameters focus, control the quality of the captured image, as well as the full image pre-processing of the image captured by the device.

FYR Different types and firmware versions of the device image configuration parameters and supported functions are different, please refer to the actual parameters for details.

3-1 Parameter Group

The device supports the parameter polling function. You can add, delete, and check parameter groups through the parameter group section under the image configuration module. You can configure up to 5 sets of parameters. The check box on the right side of the parameter group determines whether the group of parameters participates in polling. After the device runs, it will traverse the checked parameter groups for identification and decoding.



3-2 Image

The image part can set parameters such as exposure, gain, gamma, etc.

Parameter Description:

- Exposure (microseconds):** Increasing the exposure time can improve the brightness of the image, but it will reduce the acquisition frame rate to a certain extent, and it is prone to smear when shooting

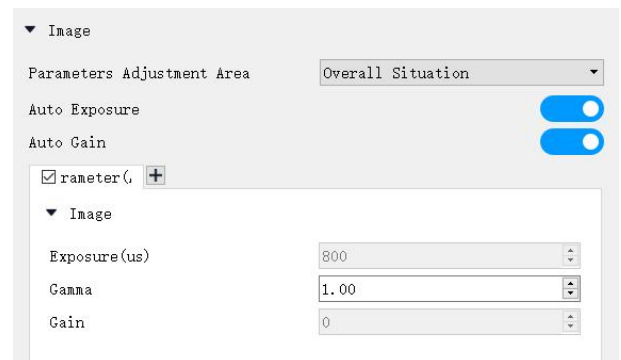
moving objects.

- Gamma :** The gamma value is used to adjust the contrast of the image. By changing the gamma value, the light and dark parts of the image can be more distinct or soft.
- Gain:** Gain can increase the brightness of the image, but to some extent will increase the noise of the image.

Auto Exposure and Auto Gain are supported and are enabled by default on handheld devices. When enabled, it only takes effect in free collection mode. If the trigger is enabled, the function does not take effect and reverts to the off state.

Parameter description:

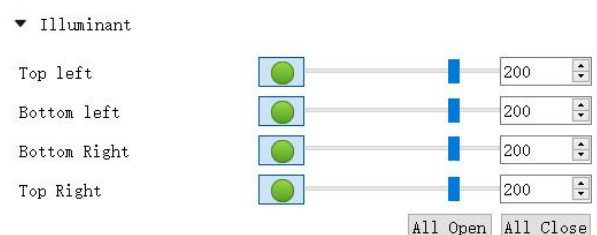
- Auto Exposure:** The device automatically adjusts the exposure value continuously according to the surrounding environment. The image-exposure (microseconds) parameter is grayed out and cannot be set to display the real-time exposure value.
- Auto Gain:** The device automatically adjusts the gain value continuously according to the surrounding environment. The image-gain parameter is grayed out and cannot be set to display the real-time gain value.



FYR The specific setting range of exposure time and gain is determined by the equipment, and in actual operation, it is recommended to reasonably adjust these parameters to obtain the best image effect according to the shooting scene and image quality requirements.

3-3 Illuminant

The illuminant part can set parameters such as illuminant channel and illuminant brightness.



Parameter Description:

- : Turn the light on/off.
-  200: Adjust the brightness of the illuminant by changing the value or the position of the slider.
- **Full On:** All channel lights are turned on.
- **Fully Off:** all channel lights are turned off.

FYR Depending on the device type, it can support one/three/four illuminant adjustment, and the specific settable parameters are also different.

3-4 Focusing

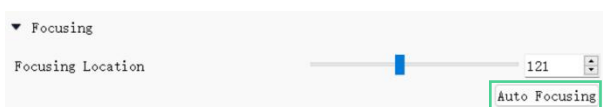
Part of the equipment can be based on the field of view of the bar code position, the lens auto-focus function. Currently, it supports three focusing modes: global automatic, global manual and ROI area automatic, which can be selected according to actual needs.

Global Focusing

Global focus is to focus the lens within the global range of the field of view. Please focus the lens in debug mode.

1 Perform auto focus.

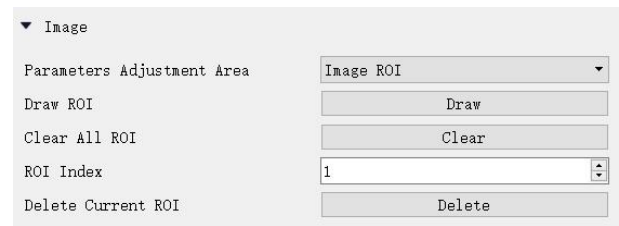
On the image configuration page, expand the focus attribute and click the [Auto Focus] button. The device will automatically adjust the focus according to the current environment to make the image achieve the clearest effect.



FYR If the [auto focus] way to complete the focus after the imaging screen is not clear enough, you can click on the "focus position" input box of the up and down adjustment keys to manually fine-tune the focal length to make the imaging screen to achieve a clearer effect.

ROI region in focus

ROI area focusing is only for ROI area to carry out automatic focusing, by drawing ROI area, realize the lens focus in this area.



1 Switch the parameter adjustment area.

On the image configuration page, switch the parameter adjustment area to Image ROI ".

2 Draw the image ROI.

Click the Draw button where the ROI is drawn. At this time the mouse in the preview window into a cross, long press the left mouse button to drag the red box. The framed portion at this time is set as a parameter adjustment region.

Parameter Description:

- **Clear all ROI:** To clear all drawn image ROI regions by clicking Execute.
- **ROI Index:** Search and select the ROI area by entering the image ROI number.
- **Delete current ROI:** Delete the currently selected ROI by clicking Execute.

FYR According to the actual needs to draw multiple ROI regions (maximum can draw 10), if you need to set multiple parameters to adjust the region, repeat this step.

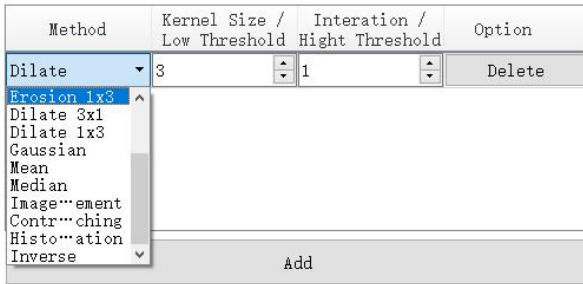
3 Focusing.

For focus setting procedures, see [the Global Focusing procedure](#).

3-5 Pretreatment

The pre-processing function integrates a variety of common image processing algorithms, such as expansion, corrosion, opening and closing operations, as well as Gaussian, mean, median filtering, etc., which can be used to process images collected by the reader device. For codes in special environments, the contrast between the target features and the background can be significantly enhanced by combining multiple algorithms, thereby improving the stability and accuracy of decoding.

▼ Preprocessing



Parameter Description:

- **Methods:** Algorithm of image preprocessing.
- **Kernel size:** The size of the convolution kernel, that is, the size of the pixel area processed at a time, is defined. A larger kernel size helps to capture larger features or patterns in the image, but may blur the details; a smaller kernel size pays more attention to preserving the details of the image, but may not be sensitive enough to a large range of patterns.
- **Iterations:** The number of repetitions of the preprocessing operation, and the choice of the number of iterations directly affects the fineness and accuracy of the processing results.
- **Low Threshold:** Which pixels in the image should be considered as foreground or target region, and pixels below a set value are considered as background and removed.
- **High Threshold:** Distinguish different parts of the foreground further, determining which pixels should be considered as strong edges or important features.
- **Delete:** You can click to delete the added preprocessing method.
- **Add:** To add a preprocessing method, click.

Pretreatment method description:

Method	Description
Expansion	The white areas in the image are expanded and the black areas are reduced. It is usually used to fill small holes or disconnected parts inside foreground objects.
Corrosion	The white areas in the image are reduced and the black areas are expanded. Usually used to remove small burrs or isolated spots on the edges of foreground objects.
Open operation	The corrosion operation is followed by the expansion operation, which is mainly used to remove small objects and noise in the image.
Closed operation	The expansion operation is carried out first and then the corrosion operation is carried out. The closing operation is mainly used to fill the small holes and gaps in the image.
Gauss	The Gaussian function is used to smooth the image, which is often used to reduce the high-frequency noise in the image.
Mean	Replace each pixel in the image with the average of its surrounding pixels, smoothing the image, reducing noise
Median	Replacing each pixel in the image with the median of its surrounding pixels is suitable for removing outlier noise such as salt and pepper noise.
Image enhancement	Make the image visually clearer, brighter and more contrasting.
Contrast	The contrast of the image is enhanced by mapping the pixel

Stretch	Values of the image to a larger range through a linear transformation.
Histogram equalization	By counting the pixel values of the image, the pixel values are remapped, so that the histogram of the image is more flat, thereby enhancing the contrast of the image.
Inverse color	Change the black pixels to white and the white pixels to black.

Pre-processing example

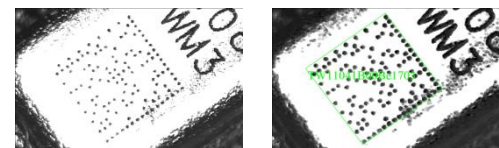
- A. The background point is eroded by the foreground, the reading is unstable, and the expansion pretreatment is added to expand the background point and stabilize the reading.



Original

Expansion 3*1

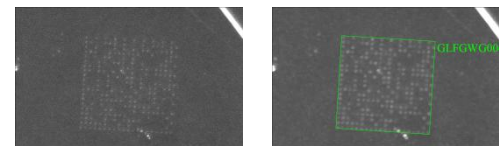
- B. The code point spacing is too large to read, and corrosion pretreatment is added to reduce the code point spacing and read stably.



Original

Corrosion 5*1

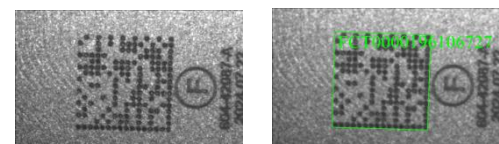
- C. The code point spacing is too large, plus noise interference, can not be read, first filter noise, and then expand the code point, read stable.



Original

Median 3*1 + expansion
5*1

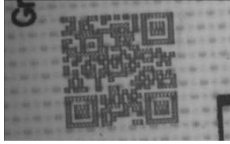
- D. The noise is too large, the reading is unstable, and the noise is filtered by filtering, and the reading is stable.



Original

Gauss 3*1

- E. There is white stripe interference in the code point, which cannot be read. Add operation to eliminate interference and read stably.



Original



Open operation 5*1

Chapter4 Algorithm Configuration

The algorithm configuration interface can add decoding algorithms, configure decoding areas, adjust algorithm parameters, enable bar code engraving verification evaluation, etc.

FYR The parameters that can be set and the functions supported by the device algorithm configuration are different for different types and firmware versions, please refer to the actual parameters for details.

4-1 Add Decoding Algorithm

The part of adding decoding algorithm can automatically identify or manually select the type of barcode that the device needs to read and set the number of barcodes.

➤ Automatic identification

Click the [Automatic Identification] button to automatically recommend all the barcode types that can be decoded in the image and the corresponding decoding number according to the check of the 1 dimension code and the two-dimensional code.

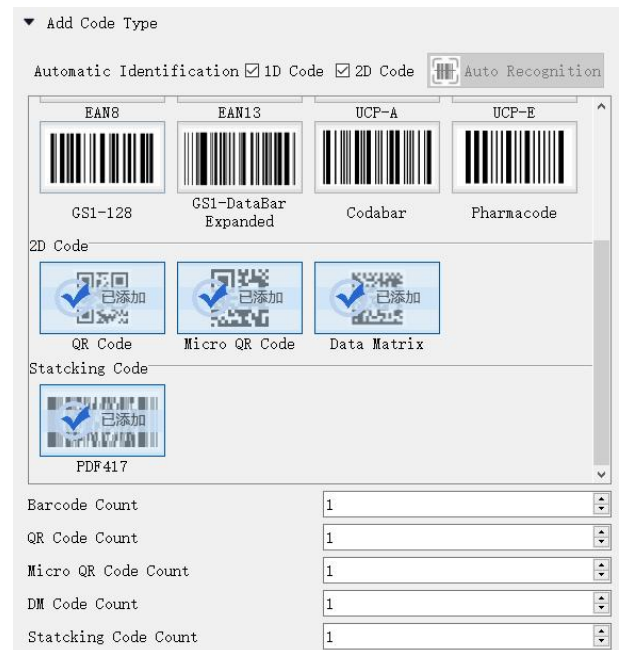
FYR Automatic identification does not support Pharmacode code system.

➤ Manual Settings

1 Select the code system.

Click the barcode image to select the code system that the device needs to read the barcode. You can select a 1 dimension code, a two-dimensional code, and a stacked code.

FYR The code system supports single selection and all selection. The more code systems added, the longer the algorithm takes to process. Please choose according to your needs to achieve the best results. The equipment type is different, and the supported code system is different, please refer to the actual equipment.



2 Set the number of barcodes.

Set the number of barcodes below. The number of 1 dimension codes is valid for 1 dimension codes, the number of QR codes is valid for QRCode, the number of MicroQR codes is valid for MicroQR codes, the number of DM codes is valid for DataMatrix codes, and the number of stacked codes is valid for stacked codes.

FYR The number of barcodes set for each picture can be identified and the output of the maximum number of barcodes, the actual number of barcodes output if the actual number of barcodes identified is less than the set value. The more the number of barcodes you set, the longer the algorithm takes to process. Please select according to your needs to achieve the best results.

4-2 Algorithm ROI

The algorithm ROI can only identify the selected region of interest, and other regions are not processed by the algorithm to improve the reading efficiency. At present, the device supports manual and checkerboard algorithms for ROI rendering.

Rendering algorithm ROI

From the algorithm configuration page, find and expand the algorithm ROI attribute. Click the Draw button where the ROI is drawn. At this time, the mouse in the preview window into a cross, long press the left mouse button to drag the blue box. At this time, the framed part is set as the algorithm recognition area.

▼ ROI

Draw ROI

ROI Custom Number

Checkerboard ROI

Clear All ROI

ROI Index

Delete Current ROI

Draw

2

Add

Clear

1

Delete

Parameter Description:

- **ROI Custom Number:** By default, the ROI area is sequentially numbered according to the value queue. You can enter a value to customize the number of the algorithm ROI, which can be entered in the range of 1 to 200.
- **Clear All ROI:** You can clear all drawn algorithm ROI regions by clicking Execute, including single drawn ROI and checkerboard ROI.
- **ROI Index:** Search and select the ROI area by entering the image ROI number.
- **Delete Current ROI:** Delete the currently selected ROI by clicking Execute.

FYR According to the actual needs to draw multiple ROI regions (up to 200), if you need to set up multiple algorithms to identify the region, repeat this step.

Add Checkerboard ROI

1 Add checkerboard ROI.

Click the "Add" button at the Checker ROI to enter the Checker ROI configuration page.

2 Configure checkerboard ROI parameters.

According to actual needs, set the number of rows and columns and sorting rules of the checkerboard on the configuration page. Here, three rows and three columns, ascending order in the Y direction, and ascending order in the X direction in the same row are taken as an example.



Checkerboard ROI

Row Count: 3

Column Count: 3

ROI Order: Regular

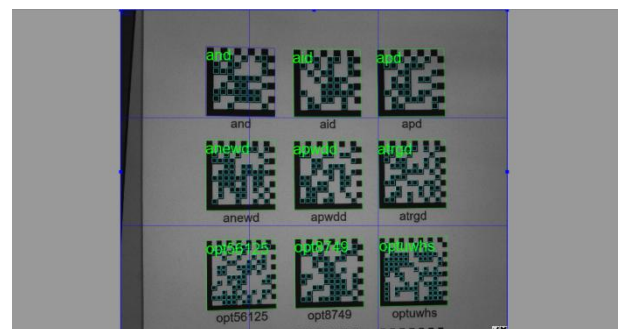
Confirm Cancel

Parameter Description:

- **Lines:** The number of ROIs per line.
- **Columns:** The number of ROIs per column.
-  :Y-direction ascending order, the same row according to the X-direction ascending order, generating checkerboard ROI.
-  :X-direction ascending order, the same column according to the Y-direction ascending order, generating checkerboard ROI.
-  :Y direction descending order, the same row according to the X direction descending order, generate checkerboard ROI.
-  :X direction descending order, the same column according to the Y direction descending order, generate checkerboard ROI.
-  :X direction ascending order, the same column according to the Y direction descending order, generate checkerboard ROI.
-  :Y direction descending order, the same row according to the X direction ascending order, generating checkerboard ROI.
-  :X direction descending order, the same column according to the Y direction descending order, generate checkerboard ROI.
-  :Y direction ascending order, the same row according to the X direction descending order, generate checkerboard ROI.

3 Adjust the checkerboard ROI.

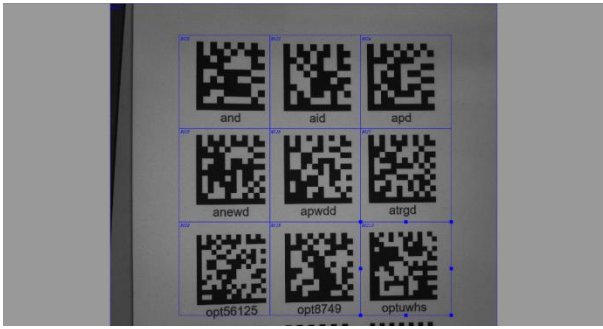
Click the "Confirm" button and an editable checkerboard ROI will be generated in the image control as shown below. Drag the ROI according to the specific position of the code to adjust the size and position of the checkerboard in the ROI matrix as a whole.



4 Save the checkerboard ROI.

Click the " " icon in the lower right corner to save the current changes and generate the checkerboard ROI in the image window.

Click the " " icon to cancel the current modification and delete the editable ROI matrix in the image control window.



4-3 Algorithm parameters

Select 1 dimension code, QR code, MicroQR code, DataMatrix code, or stacked code from the algorithm type parameter drop-down list to set relevant algorithm parameters.

Parameters
Decoding started location
Default
Deeping Study Sample Rate
1
Code Type
1D Code
Polarity
Auto
Enable ISO/IEC 15416-2016
Timeout
500

Parameter Description:

- **Decoding started location:** The direction in which the image area is to be decoded from, for example, from left to right, that is, from the left side of the image to the right side.
- **Deep Study Sampling Rate:** The default value is 1, which can be set to 0, 1, 2, and 3.

FYR Different device types or firmware versions of the algorithm parameters are different, please refer to the actual, algorithm parameter settings need to be combined with the actual application settings.

➤ 1 dimension code

When the 1 dimension code is selected for the algorithm type, the following algorithm parameters can be set.

Parameter Description:

- **Polarity:** The parameter of the black-and-white contrast relationship between the barcode and the background color. You can select Auto/Dark Symbol Light Background/Light Symbol Dark Background.
- **Code39 verification:** Code39 code verification is set.
 - ◆ None: No validation is performed.
 - ◆ Verify: Verify the barcode without outputting the check digit.
 - ◆ Verify and transmit: The barcode is verified and does not output a check digit.

- **ITF verification:** ITF code verification is set.
- **CodaBar verification:** CodaBar code verification is set.
- **Start/Terminator Send:** Output start/terminator when enabled.
- **Decoding direction:** The decoding direction of the Pharmacode. the decoding result of the Pharmacode code is correct only if the correct decoding direction is selected. Other directions have results but are incorrect.
- **Enable barcode engraving verification (ISO/IEC15416-2016):** After enabling, the quality of the code can be judged. After the device reads the code, the client will output the overall evaluation level. See Barcode Quality Assessment for details.
- **Timeout:** The decoding time of the current algorithm type exceeds this value. Unit: milliseconds. (When set to 0, the decoding time is unlimited.)

- FYR** 1) The displayed algorithm parameters are related to the added decoding algorithm. Please refer to the actual situation.
- 2) Turning on barcode verification will affect the decoding method. If the last 1 digit in the current barcode is a check digit, the recognition is successful. If the last 1 digit in the current barcode is not a check digit, the recognition fails.

➤ QR Code

When QR Code is selected as the algorithm type, you can set the following algorithm parameters.

Parameter Description:

- **Polarity:** The parameter of the black-and-white contrast relationship between the barcode and the background color. You can select Auto/Dark Symbol Light Background/Light Symbol Dark Background.
- **Mode:** In the QR Code type, the modes are Auto, Mode 1, and Mode 2.
- **Version:** The version number of the QR code, automatically or manually selected.
- **Mirror:** Auto/regular/Mirror can be selected.
- **Enable barcode engraving verification (ISO/IEC15415-2011):** After enabling, the quality of the code can be judged. After the device reads the code, the client will output the overall evaluation level. See Barcode Quality Assessment for details.
- **Enable barcode engraving verification (ISO/IEC TR 29158-2011(AIM-DPM-1-2006)):** After enabling, the quality of the code can be judged by grade. After the device reads the code, the client will output the overall evaluation grade. See Barcode Quality Assessment for details.
- **Timeout:** The decoding time of the current algorithm type exceeds this value. Unit: milliseconds. (When set to 0, the decoding time is unlimited.)

➤ MicroQR

When the algorithm type selection is MicroQR, the following

algorithm parameters can be set.

Parameter Description:

- **Polarity:** The parameter of the black-and-white contrast relationship between the barcode and the background color. You can select Auto/Dark Symbol Light Background/Light Symbol Dark Background.
- **Version:** The version number of the MicroQR code, which can be selected from the automatic or manual drop-down list.
- **Mirror:** Auto/regular/Mirror can be selected.
- **Timeout:** The decoding time of the current algorithm type exceeds this value. Unit: milliseconds. (When set to 0, the decoding time is unlimited.)

➤ DataMatrix

When the algorithm type selection is DataMatrix, the following algorithm parameters can be set.

Parameter Description:

- **Polarity:** The parameter of the black-and-white contrast relationship between the barcode and the background color. You can select Auto/Dark Symbol Light Background/Light Symbol Dark Background.
- **Style:** The length and width of the code, you can choose shape auto/square auto/rectangle auto and other specified options.
- **Mirror:** Auto/regular/Mirror can be selected.
- **Down-sampling rate:** 0 by default, can be set to 0, 1, 2, 3, 4.
- **Enable barcode engraving verification (ISO/IEC15415-2011):** After enabling, the quality of the code can be judged. After the device reads the code, the client will output the overall evaluation level. See Barcode Quality Assessment for details.
- **Enable barcode engraving verification (ISO/IEC TR 29158-2011(AIM-DPM-1-2006)):** After enabling, the quality of the code can be judged by grade. After the device reads the code, the client will output the overall evaluation grade. See Barcode Quality Assessment for details.
- **Enable barcode engraving verification (SAE AS 932-2002):** After enabling, the quality of the code can be judged by grade. After the equipment reads the code, the client will output the overall evaluation grade. See Barcode Quality Assessment for details.
- **Timeout:** The decoding time of the current algorithm type exceeds this value. Unit: milliseconds. (When set to 0, the decoding time is unlimited.)

➤ Stacking Code

When the algorithm type selects the stacking code, the following algorithm parameters can be set.

Parameter Description:

- **Polarity:** The parameter of the black-and-white contrast relationship between the barcode and the background color. You can select Auto/Dark Symbol Light Background/Light Symbol Dark

Background.

- **Mirror:** Auto/regular/Mirror can be selected.
- **Timeout:** The decoding time of the current algorithm type exceeds this value. Unit: milliseconds. (When set to 0, the decoding time is unlimited.)

4-4 Barcode Quality Assessment

The barcode quality evaluation function judges the quality grade of the barcode shot by the equipment according to the marking quality evaluation standard specified by the third party organization. After the code reading of the equipment is completed, the client will output and display the overall evaluation grade.

Judgment Criteria

The software provides the following barcode quality assessment functions in accordance with the engraving verification criteria.

Standard	Description
ISO/IEC15416-2016	The standards developed by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) for the quality evaluation of linear barcodes are mainly used to evaluate the quality and readability of one-dimensional barcodes.
ISO/IEC15415-2011	Quality assessment standard for two-dimensional code marking developed by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). It is mainly used to evaluate the two-dimensional barcode printed on the label.
ISO/IEC TR 29158-2011 (AIM-DPM-1-2006)	The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) based on ISO/IEC 15415, the development of direct parts marking two-dimensional code engraving quality evaluation standards.
SAE AS 9132-2002	Quality assessment standard for DataMatrix two-dimensional bar code engraving established by the SAE (Society of Automotive Engineers) and used by the aerospace industry.

➤ ISO/IEC15416-2016

Sub Level	Description
Decode Success/Failure	Evaluate whether it can be decoded.
Edge determination	Evaluate whether the number of edges read is equal to the number of edges assumed.
Character contrast	The difference between the maximum brightness value and the minimum brightness value of the barcode region is evaluated.

Minimum Reflectivity	Minimum reflectance in the scan waveform.
Minimum Edge Contrast	The minimum value of the difference between the reflectance of the blank area (including the blank area) and the adjacent bar.
Modulation	Ratio of minimum edge contrast to character contrast
Minimum blank area	Evaluate whether the blank width meets the standard.
Decodability	Decoding margin determined by the type of barcode. The size of the error between the ideal line width pattern and the actual line width pattern is evaluated.
Defects	Color spots within the component are evaluated.

➤ ISO/IEC15415-2011

Sub Level	Description
Decode Success/Failure	Evaluate whether it can be decoded.
Character contrast	The difference between the maximum brightness value and the minimum brightness value of the barcode region is evaluated.
Modulation	The degree of damage to the positioning graphic is evaluated according to the barcode type.
Locating graphics damaged	The degree of change in cell brightness is evaluated.
Reflectivity margin	According to the correct black and white unit, the degree of change in unit brightness is evaluated.
Unused error correction	Evaluate the error correction rate not used in decoding.
Ahaft heterogeneity	Evaluate the distortion of the vertical and horizontal dimensions of the barcode.
Non-uniform mesh	The maximum displacement of each unit is evaluated.
Format information is corrupted	Evaluate the format information of the QR barcode.
Version information is corrupted	Evaluate the version information of the QR barcode.

➤ ISO/IEC TR

29158-2011(AIM-DPM-1-2006)

Sub Level	Description
Decode Success/Failure	Evaluate whether it can be decoded.
cell contrast	The difference between the light and dark cell average luminance values is evaluated.
Unit modulation	The degree of damage to the positioning graphic is evaluated according to the barcode type.
Reflectivity margin	The degree of change in cell brightness is evaluated.
Locating graphics damaged	According to the correct black and white unit, the degree of change in unit brightness is evaluated.
Shaft heterogeneity	An error correction rate not used in decoding is evaluated.

Non-uniform mesh	Evaluate the distortion of the vertical and horizontal dimensions of the barcode.
Unused error correction	The maximum displacement of each unit is evaluated.
Format information is corrupted	Evaluate the format information of the QR barcode.
Version information is corrupted	Evaluate the version information of the QR barcode.

➤ SAE AS 9132-2002

Sub Level	Description
Blank area	Evaluate whether there are multiple silent area cells around the barcode.
Character contrast	The difference between the maximum brightness value of the dark cells and the minimum brightness value of the light cells of the barcode region is evaluated.
Deformation angle	The distortion of the 90-degree angle formed by the straight line in the L part is evaluated.
Fill modulus	Evaluate the distortion of the correct cell size.

Barcode Quality Evaluation Report Export

1 Enables barcode engraving verification.

Through the algorithm configuration page, find and expand the algorithm parameters to enable barcode engraving verification.

Enable ISO/IEC 15415-2011

Enable ISO/IEC TR 29158-2011(AIM-DPM-1-2006)

Enable SAE AS 9132-2002

Validation Mode
OPT Mode

ISO/IEC15415-2011
ISO/IEC TR 29158-2011(AIM-DPM-1-2006)
SAE AS 9132-2002

Subitem Level
Select All

☒ Decode
☒ SymbolContrast
☒ FixedPatternDamage
☒ Modulation

☒ ReflectanceMargin
☒ UnusedErrCorrection
☒ AxialNonuniformity
☒ GridNonuniformity

FYR By default, all sub-item grades participate in overall evaluation grade calculation. If you want to customize the sub-item grades, you can switch the barcode verification mode to "Custom Mode" and uncheck the sub-item grades not to participate in overall evaluation grade calculation.

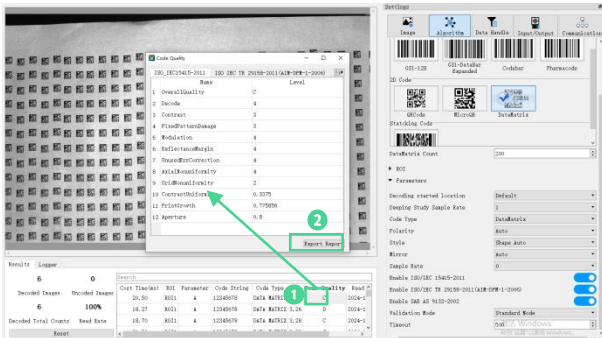
2 Run Decode.

Click the "Run" operation scheme to decode the collected image. After the code reading of the equipment is completed, the overall

evaluation level can be viewed through the code quality of the result in the client information display column.

3 Export the barcode quality assessment report.

Click the grade at the code quality to enter the code quality page, display the detailed score, click "Export Report" in the lower right corner, and save the PDF file of the quality grade report generated by the barcode data under the user-specified path.



Chapter5 Data Processing

The data processing interface filters and formats the barcode results read by the device.

FYR the data processing parameters and supported functions of different types and firmware versions of equipment are different, please refer to the actual parameters for details.

5-1 Code filter

Code filter can set filtering rules for the barcode results read by the device to filter the results, ensuring that only the expected code results are output and the unnecessary code results are filtered. Multiple filtering rules can be added, and only the code results that all meet the rules will be accumulated into the decoding number of the information display column and displayed in the image control.

▼ Code Filter

Prevent repeated reading time(ms) 20

History filter(times) 1

Read count threshold 1

Remove repeated code enable ☒

Remove repeated by frame enable ☒

Orientation filter ☐

String filter rule

Set

Read Threshold

Read the threshold number function can be used to improve the decoding accuracy and reliability, enable this function, the reader in a single frame image or trigger continuous process, the same bar code decoding times must reach the set reading times threshold, it is considered as a decoding success, and the output bar code results.

1 Set the read threshold.

On the data processing page, find the reading threshold, the default value is 1, and the range can be set from 1 to 200, according to actual needs.

2 Enable function.

Turn on enable, run the scheme, and align the barcode reader to scan the barcode. Within a single frame image or during the

duration of the trigger, the barcode reader will try to decode the same barcode multiple times until the set reading threshold is reached and the barcode result is output.

FYR Different trigger modes, read times threshold application may be different.

Functional example:

Assuming that the threshold for reading is set to "3", the following is an example of possible use of the function:

- **Example 1:**

In the case of free acquisition, hold trigger and single frame trigger, 3 same barcode results need to be decoded in the same frame image, which is regarded as successful decoding and output barcode results.

- **Example 2:**

In the case of multi-frame trigger, successful reading output, hardware trigger-high/low level-enable maximum decoding number, 3 same barcode results decoded in the same frame image or in different frame images during the trigger duration can be regarded as successful decoding and output barcode results.

Barcode Deduplication

The barcode deduplication function includes the duplicate barcode removal enable and the frame-by-frame barcode deduplication enable, the former is used to filter the same barcode results within the same frame, and the latter is used to filter the same barcode results between different frames.

FYR Frame-by-frame barcode deduplication enable is generally used for multi-frame trigger, read successful output, hardware trigger-high/low level-enable maximum decoding number.

Functional example:

The trigger signal remains as a multi-frame trigger, with the trigger capturing two frames of images assumed. The first frame image is decoded to two identical barcode results, both of which are "opt", and the second frame image is also decoded to two identical barcode results, both of which are "opt". The following are examples of possible feature usage:

- **Example 1: Enable Deduplicate Barcode Enable**

At this time, the duplicate barcode removal function filters the same barcode results in the same frame, and only one valid result is retained in each frame. Then the output result of this trigger is: opt (the valid result of the first frame),opt (the valid result of the second frame).

- **Example 2: Enable Frame-by-Frame Barcode deduplication**

At this time, the frame-by-frame barcode function filters the same barcode results between different frames and only retains the valid results of 1 frame. Then the output result of this trigger is: opt,opt (the valid result of the first frame).

- **Example 3: Enable deduplication and frame-by-frame barcode deduplication enable**
 - a. At this time, the function of removing duplicate barcodes filters the same barcode results in the same frame, and only one valid result is retained in each frame. The valid results are opt (the first frame valid result) and opt (the second frame valid result).
 - b. The frame-by-frame barcode function then filters the same barcode results from frame to frame, leaving only the valid results for 1 frame. Then the trigger output result is: opt (the first frame valid result).

- a. Barcode A is read for the first time and successfully output.
- b. Next, the barcode A is read again, at which point the system starts counting (1/3).
- c. The results of barcode A are not output until the 4 reading of barcode A.
- d. When the barcode A is read for the 4 time, the result of the barcode A is output again satisfying the set history filtering times, and the count is reset.

● Example 2:

If the system reads the barcode B before the barcode A reaches 3 times, since the barcode B is read for the first time, the system will immediately output the result of the barcode B and start to count the number of readings of the barcode B.

- a. After 1 second, scan the bar code again, because the set time interval has been reached, the bar code result is output normally.

History filtering

The history filter (times) function is used to filter duplicate data generated by scanning the same barcode in rapid succession. When a bar code is successfully read and output for the first time, the system will start counting, and the result of the bar code will not be output again until the number of reading times of the bar code reaches the number set by the user.

- FYR
- 1) The same frame recognized the same result bar code will not be counted.
 - 2) If the decoding process of the bar code is not successfully read, but set no read complement function and communication has output, complement the output results will be counted.

1 Set the history filtering times.

In the data processing interface, find the history filter (number of times), the default value is 1, and the range can be set from 1 to 1024, according to actual needs.

If the example is set to 3, the same barcode will have to wait for three more reads before being output again after being read for the first time.

2 Enable history filtering.

Turn on enable and run the scheme. The system will automatically filter out the same barcode results between consecutive frames according to the set historical filtering times.

Functional example:

Assuming that the set number of historical filters is "3", the following is an example of possible function usage:

- **Example 1:**

Prevention of duplicate reads

The Prevent Duplicate Read (ms) function is used to filter duplicate data generated by scanning the same barcode in rapid succession. Within the set time interval, if the barcode reader continuously reads the same barcode result for many times, the system will only count and output the first decoding result, and start timing, until the set time is reached, the same barcode is scanned again, and the barcode result will be re-output.

- FYR
- The same frame recognizes the same result barcode is not filtered.

1 Set the time interval.

On the data processing page, find the prevention of repeated reading (milliseconds), the default value is 20, and the range can be set to 20~3600000, according to actual needs.

2 Enable the Prevent duplicate reading function.

Turn on enable and run the scheme. The system will automatically filter out the same barcode results read repeatedly according to the set time interval.

Functional example:

Assuming that the time interval is set to "1000", the following is an example of possible function usage:

- b. Barcode A is read for the first time and successfully output.
- c. In the next 1 second, the barcode of the goods is quickly scanned again, and the barcode result will not be output.

Direction Filtering

This function filters out barcode results that do not meet the requirements by setting a specific angle range.

1 Enable orientation filtering.

In the data processing interface, find the direction filter and enable it.

2 Set the initial direction (angle).

In the "Initial Direction (Angle)" input box, enter the initial angle of the code, which is the angle of the code relative to the X direction of the image window.

3 Set the allowable direction offset (angle).

In the "allowable direction offset (angle)" input box, enter the allowable error range of the algorithm positioning angle and the allowable rotation angle of the barcode. This is the offset that allows the barcode to be at the correct angle. Barcodes beyond this offset are filtered out and decoding fails.

Functional example:

It is assumed that the set initial direction (angle) is "0" and the allowable direction offset (angle) is "10".

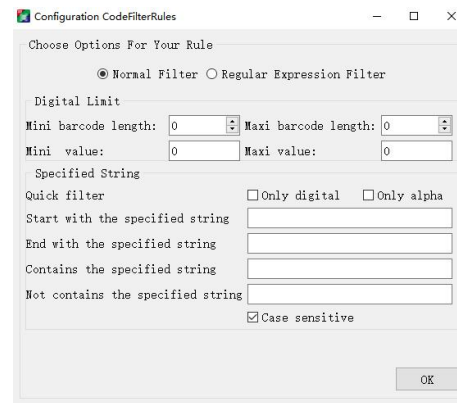
Only barcodes that are parallel to the X direction of the image window and whose rotation angle is within ± 10 degrees can be decoded successfully, as shown in the following figure.



String filtering rules

The barcode filtering rule function allows the user to filter the barcode read by the device according to the set rules to ensure that only the barcode that meets the rules can be output. This function provides two filtering methods: normal filtering and regular expression filtering. There is an AND relationship between multiple

rules, that is, the barcode must meet all the rules at the same time.



1 Enter the filtering rules interface.

On the data processing page, find the string filtering rule and click Settings to open the filtering rule configuration page.

2 Select the filtering method.

On the Filter Rule Configuration page, select a filter method: normal filter or regular expression filter.

A. Ordinary Filtration:

Description of the rule:

Rules	Description
Minimum barcode length	If the length of the code result is less than the value of the parameter, the code result is filtered. When set to 0, the length is unlimited.
Maximum barcode length	If the code result length is greater than the value of the parameter, the code result is filtered. When set to 0, the length is unlimited.
Minimum	Used when the decoding result is a number. If the code result value is less than the parameter value, the code result is filtered.
Maximum	Used when the decoding result is a number. If the code result value is greater than the parameter value, the code result is filtered.
Fast Filtration	The logical relationship between pure numbers and pure letters is or, that is, one of the two conditions can be established. At the same time, check pure numbers and pure English. The output barcode information is pure numbers or pure English information. Non-pure numbers or pure English information will be filtered. If other rules are set, the code result that meets all the set rules will be output.
Pure digital	If you select Pure Digital, the barcode information is pure digital. Non-pure digital information is filtered.
Pure Letters	If you select pure letters, the output barcode information is pure English. Non-pure English information is filtered.
Start with the specified string	Match the barcode information with a specific character starting position according to the set

	content. If not, the code result is filtered.
End with specified String	Match the bar code information whose end position is A specific character according to the setting content. If not, the code result is filtered.
Contains the specified string	Match barcode information containing specific characters according to the settings. If not, the code result is filtered.
Does not contain the specified string	Match barcode information that does not contain specific characters according to the set content. If included, the code result is filtered.
Match Case	By default, the configuration content is matched according to the case-sensitive keyword.

B.Regular expression:

Description of example:

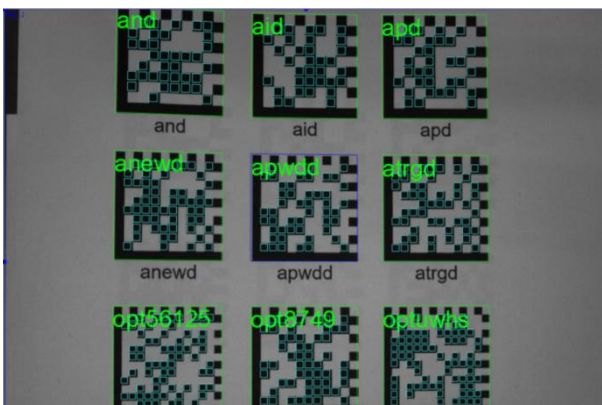
Syntax	Description
[a-z]	Matches any string that contains lowercase a-z
[A-Z]	Matches any string containing an uppercase letter A
[0-9]	Match any string containing the numbers 0-9
[abc]	Match any string containing lowercase letters a, B, c
[^abc]	Match any string that does not contain lowercase letters a, B, c
\w	Match any string containing a-zA-Z0-9 and underscores (ditto)
\W	Match any string without underscore and alphanumeric
\d	Matches any numeric character, same as [0-9]
\D	Matches any non-numeric character, same as [^ 0-9]
\s	Matches any whitespace character
\S	Matches any non-white space character

3 Save rules.

After completing the rule configuration, click OK to make the rule take effect.

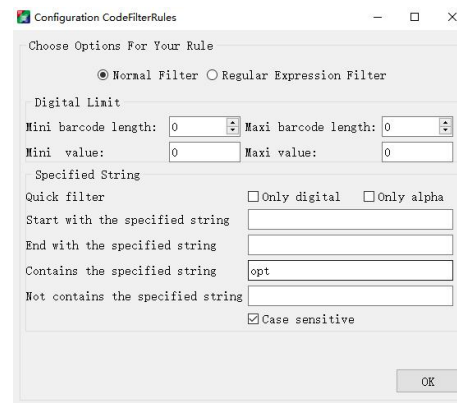
Functional example:

1. The current decoding result is shown in the following figure.

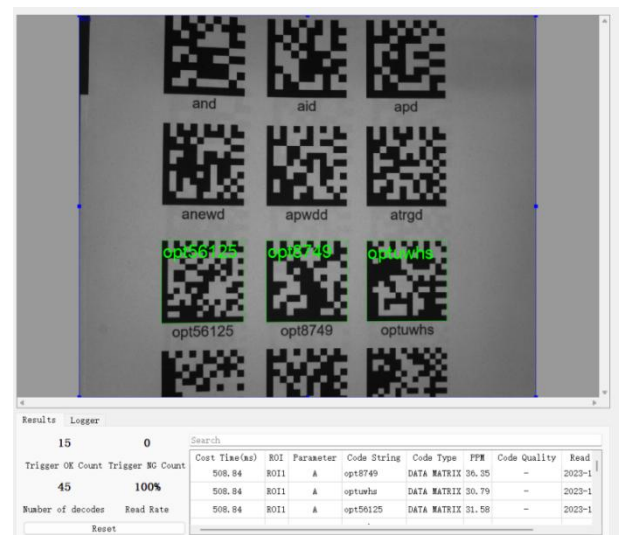


2. Click the "Configure" button, configure the Code filter rules as

shown in the figure below, and click the "OK" button.



3. Click the "Run" button to perform decoding. The image control only displays the code results that meet the rules, and the information display column only displays the code results that meet the filtering conditions.



5-2 Comparison control

The comparison control function can set bar code data content or continuous bar code rules, which can be preset online or offline through DI by software. After reading the bar code data, the device compares the real-time data with the preset data and outputs the comparison result. This function supports regular comparison and serial number comparison.

FYR If there are multiple codes in the image, the comparison data/preset data is the first barcode obtained when the algorithm decodes.

➤ Regular comparison

The regular comparison function allows the user to set the preset data and specify the starting position and the number of comparison bits. After reading the barcode data, the device compares the read data with the preset data and outputs the comparison result.

1 Enable the alignment control function. **f**

In the data processing interface, expand the comparison control attribute, turn on the comparison enable, and select the comparison rule parameter to regular the comparison.

2 Set the parameters.

Parameter Description:

- **Presets Data:** The basic value of comparison. After the function is enabled, the barcode read will be compared with the set value. When offline, the preset data can be updated through DI-comparison preset input function.
- **Start Position:** The initial position to start comparison, that is, the position from which the comparison starts. The default value is 1, and the input range is [1~1024]
- **Compare digits:** The range of comparison is set, that is, how many digits are compared from the initial position. The default value is 1, and the input range is [1~1024]

FYR If the is compared to Chinese characters, the starting position and the number of digits of the comparison are calculated by three bytes.

1	2	3	4	5	6	7	8	9
奥			普			特		

Functional example:

For example, the preset data is opt, the starting position is 3, and the comparison digit is 3. The example of the regular comparison function is as follows:

- For the first time, read code 66 optzydmq888, from the third character to extract 3 characters, get opt, comparison success, output comparison success event.
- Optdmq666 the code is read for the second time, three characters are extracted from the third character to obtain dmq, the comparison fails, and the comparison failure event is output.

➤ Comparison of serial numbers

The serial number comparison is used to check the serial number value and compare the first code read as the preset value. When the comparison is successful, the preset value is incremented/decremented according to the increment value.

When the comparison fails, the value of the comparison data will not be added (subtracted) until the correct serial number value appears.

1 Enable the alignment control function.

In the data processing interface, expand the comparison control attribute, turn on the comparison enable, and select serial number comparison for the comparison rule parameter.

2 Set the parameters.

Parameter Description:

- **Presets Data:** The basic value of comparison. After the function is enabled, the barcode read will be compared with the set value. When offline, the preset data can be updated through DI-comparison preset input function.
- **Start Position:** The initial position to start comparison, that is, the position from which the comparison starts. The default value is 1, and the input range is [1~1024]
- **Compare digits:** The range of comparison is set, that is, how many digits are compared from the initial position. The default value is 1, and the input range is [1~1024]
- **Incremental:** After each comparison, the preset value is incremented/decremented according to the increment value and then the next round of comparison is carried out. The default value is 1,

and the input range is [1~1024]]

Functional example:

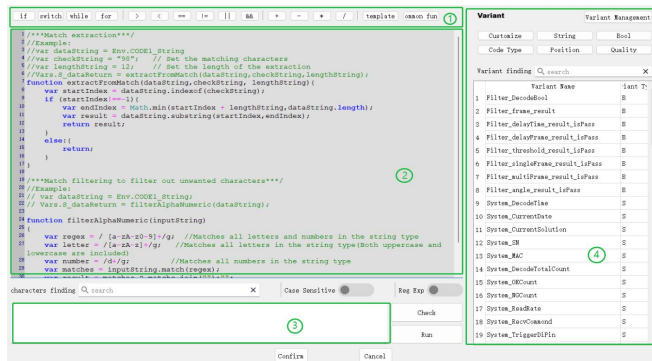
The starting position is 4, the number of comparison bits is 2, and the increment is 2. For example, use DI to preset comparison data offline. The example is as follows:

- Read code opt96 for the first time! , get the default value of 96. The default value is incremented to obtain 96+2=98.
- Abc98de the code is read for the second time, the comparison is successful and is a continuous code, and the comparison success event is output. At this time, the preset value is incremented again to obtain 98+2=100.
- The third read code fdc99chf, comparison failure, non-consecutive code, output comparison failure event. At this time, the preset value is not incremented until the next comparison is successful.
- Opt00zydmq the fourth read code, the comparison is successful, it is a continuous code, and the output comparison success event. At this time, the preset value is incremented again to obtain 100+2=102.

According to the above rules, and so on.

5-3 Script

The script function allows users to perform complex operations on variables by writing statements, and customize functions such as configuring device formatting output and data filtering.



Description of module:

Serial Number	Module Name	Description
1	Shortcut Button	Provides common conditional branch functions, loop functions, comparison operators, arithmetic operators, script templates, and common functions.
2	Code editing area	Use to edit script code.
3	Code analysis and Search area	Provides code search and syntax checking.
4	Variable List	Advanced filtering function is supported. You can select the variable type you want to filter. Click

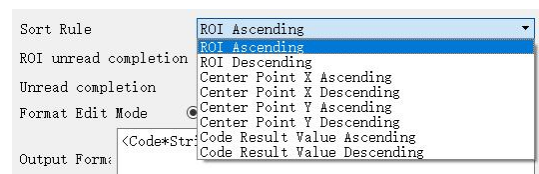
		the button to change to dark color to select it. Click again to cancel the selection. When no type is selected, all variables are displayed. Click the "Variable Management" button in the upper right corner to open the variable setting interface, where you can add and delete variables. The variable setting description can be viewed in the variable management section.
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5-4 Data editing

The data editing function allows users to customize and edit the barcode results output by the device. The device sends data as a string, a feature that ensures efficient and accurate data transfer between the reader software and other software.

Code Sort

Sorting rules can be used to sort the barcode results after Code filter according to the set rules.



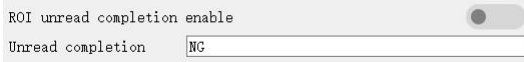
Description of the rule:

Rules	Description
ROI Ascending	Sort in ascending order based on the ROI number of the algorithm where the barcode is located.
ROI Descending	Sort in descending order based on the algorithm ROI number where the barcode is located.
Center coordinate X Ascending	Sorts in ascending order based on the X value of the barcode center point.
Descending center coordinate X	Sorts in descending order based on the X value of the barcode center point.
Center coordinate Y Ascending	Sorts in ascending order based on the Y value of the barcode center point.
Descending center coordinate Y	Sorts in descending order based on the Y value of the barcode center point.
Code result numerical size ascending order	Used to sort all results from small to large when the code result is numeric.
Descending code result value size	Used to sort all results from largest to smallest when the code result is numeric.

FYR If the ROI ascending/descending order is selected, when two or more codes are identified in a single ROI region, the results of the codes in the ROI are output according to the decoding order.

➤ No read completion

No read complement is used to handle the case where the device fails to decode successfully during the scanning process. There are two ways of regular without reading and ROI without reading. When the device does not successfully decode, it will output according to the preset non-read complement string.



Parameter Description:

- **ROI without read completion enable:** not enabled by default. When no barcode is decoded in the scanning area, the preset without read completion string is output. When enabled, the decision whether to do no-read completion is based on whether there is decoding in the ROI region.
- **No read completion:** set the output string when no read completion is required.

Functional example:

- **Example 1: regular no read completion**
 - Set the no-read complement string to "ng".
 - No barcode is decoded in the device scan area.
 - The output result is "NG".
- **Example 2: ROI without read completion**
 - Set the regular non-read complement string to "NG" and enable ROI non-read complement.
 - There is a decoded barcode (e. g. "12345") in ROI2, and no barcode is decoded in ROI1.
 - The output result is "NG, 123456".

➤ Data format editing

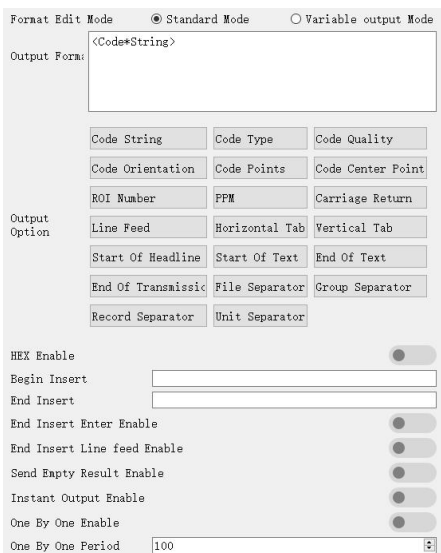
The data format editing function allows users to customize the output format of data according to their needs. This function provides two editing modes: standard mode and specified mode.

Description of the pattern:

- **Standard mode:** circular output according to the set output format. The output format can be set by the content provided by the output option, and clicking the button will add the corresponding content in the output format text box.
- **Specify mode:** Select and edit custom variables through the variable selection window to achieve flexible output formats.

Description of functions:

Function	Description
Hex enable	When enabled, insert the start and end strings in hexadecimal format.
Start Insert	Custom output start character.
End Insert	Custom output terminator.
Ending carriage return enable	When enabled, a carriage return is output at the end of the result output.
End line break enable	When enabled, a line break is output at the end of the result output.
Send empty result enable	When enabled, if the result is empty, it will also be output.
Immediate Output enable	When enabled, barcode data is output immediately after triggering. There is no need to wait for the continuous trigger to end in the hardware trigger-high/low-enable maximum number of decodes, multi-frame trigger, read successful output mode.
Send enable one by one	When enabled, the decoding result is divided in the case of multi-code, and only one barcode information is sent at a time. The content of each barcode is sent at intervals according to the set period.
Send cycle by cycle	Send time intervals one by one.



Chapter6 Input Output

The input and output part can set whether the device opens the trigger mode, select the trigger source and set the relevant parameters, set the output pin of the device, the output level, the output event, the output signal duration and the buzzer and other parameters.

FYR There are differences in the input and output parameters and supported functions of different types and firmware versions of equipment, please refer to the actual parameters for details.

6-1 Trigger Configuration

The trigger configuration supports the user to configure the trigger signal hold mode, which can be selected from single-frame trigger, multi-frame trigger, hold trigger and read successful output. At the same time, the device supports a variety of trigger sources, including hardware trigger, TCP trigger (server/client), UDP trigger, serial port trigger and soft trigger.

Parameter Description:

- **Trigger Mode:** Not enabled by default. After enabled, acquisition and decoding are performed through the set trigger signal retention and trigger source.
- **Trigger Delay (ms):** Set the trigger delay. The default value is 0, which triggers the device to collect the graph immediately after receiving the input signal. When the trigger delay is set to a non-zero value, the device will wait for the set delay time to elapse before triggering after receiving the input signal.
- **Trigger Signal Hold:** Single-frame trigger, multi-frame trigger, hold trigger or read successful output mode can be selected according to actual needs.

Trigger Signal Hold

➤ Single Trigger

Single-frame trigger means that the device only collects and processes 1 frame image each time it receives a trigger signal.

Functional example:

- Waiting for the trigger signal, the device acquires the 1 frame image and decodes it.
- If the decoding is successful, in the result statistics area, the number of decoded images is +1, the number of decoded images is increased by the corresponding number of decoded images, and the information display column outputs the result of successful decoding.
- If the decoding fails, the number of undecoded images is +1 in the result statistics area, and the information display field outputs UNKNOWN decoding failure information.

➤ Multi Trigger

Multi-frame trigger means that the device needs to keep triggering until the number of collection frames reaches the set number of trigger collection frames each time it receives a trigger signal.

Parameter Description:

- **Trigger collection frames:** the number of frames that trigger continuous collection of images. When the set number of trigger collection frames is reached, the trigger stops, the default is 1, and the range can be set from 1 to 1000.

Functional example:

Assuming that the set number of trigger collection frames is 5, the following is an example of possible function usage:

- **Example 1: Decoding During Trigger Persistent**
 - Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
 - The decoded image will be in the result statistics area, the number of decoded images will be increased by 1, the number of decoded images will be increased by the corresponding number of decoded images of the frame, and the information display column will output the result of successful decoding.
 - When the fifth frame image is collected, the collection is stopped and the trigger ends.
- **Example 2: No Decoding During Trigger Persistent**
 - Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
 - All images collected during the duration of the trigger fail to be

decoded.

- c. When the fifth frame image is collected, the collection is stopped and the trigger ends. In this case, in the result statistics area, the number of undecoded pictures is +1, and UNKNOWN decoding failure information is output in the information display field.

If it is used in combination with the reading times threshold, it is assumed that the set trigger collection frame number is 5 and the reading times threshold is 3. The following is an example of possible function usage:

- **Example 1: The same frame image is decoded to 3 the same barcode results**

- a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
- b. The device decodes the first frame of image, obtains a 3 identical barcode result, reaches the set reading times threshold, and succeeds in decoding. At this time, in the result statistics area, the number of decoded images +1, the number of decoded images +1, and the information display field outputs the result of successful decoding.
- c. When the fifth frame image is collected, the collection is stopped and the trigger ends.

- **Example 2: Each frame decodes an identical barcode, the third frame reaches the threshold**

- a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
- b. The device collects the first frame image and decodes a barcode result.
- c. The device acquires the second frame image and decodes the same barcode result as the first frame.
- d. The device collects the third frame image, decodes the same barcode result as the first two frames, reaches the set reading threshold, and the decoding is successful. At this time, in the result statistics area, the number of decoded images +1, the number of decoded images +1, and the information display field outputs the result of successful decoding.
- e. When the fifth frame image is collected, the collection is stopped and the trigger ends.

➤ Hold Trigger

Keeping the trigger refers to continuously keeping the trigger after receiving the trigger signal, and continuously collecting until receiving the collection stop instruction.

Functional example:

- **Example 1: Decoding During Trigger Persistent**

- a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
- b. The decoded image will be in the result statistics area, the number of decoded images will be increased by 1, the number of decoded

images will be increased by the corresponding number of decoded images of the frame, and the information display column will output the result of successful decoding.

- c. The device receives a stop command, stops collecting, and triggers the end.

- **Example 2: No Decoding During Trigger Persistent**

- a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
- b. All images collected during the duration of the trigger fail to be decoded.
- c. The device receives a stop command, stops collecting, and triggers the end. In this case, in the result statistics area, the number of undecoded pictures is +1, and UNKNOWN decoding failure information is output in the information display field.

➤ Read OK Output

Read the successful output means that each time the device receives the trigger signal, it needs to keep the trigger until the decoding meets the set number of codes or reaches the set signal duration condition.

Trigger Signal Hold	☐ Single Trigger ☐ Multi Trigger ☐ Hold Trigger ☒ Read OK Output
Signal Hold Condition	Frames
Trigger Frame Count	1
Code Number	1

Parameter Description:

- **Signal Hold Condition:** the condition for triggering signal duration. The default value is the number of acquisition frames. You can select the number of acquisition frames or time. When the duration condition is selected as time, you need to set the trigger duration.
- **Trigger Frames Condition:** the number of frames that trigger continuous collection of images. When the set number of trigger collection frames is reached, the trigger stops, the default is 1, and the range can be set from 1 to 1000.
- **Trigger Duration (ms):** The duration of the trigger to acquire an image. The trigger stops when the set trigger duration is reached.
- **Code Number:** the number of barcodes to be read in the output mode of successful reading. If the number of decoding reaches the set number of codes during the continuous triggering process, the triggering stops.
- **Code number statistics enable:** the number of decoded codes must meet the set number of codes in the continuous trigger process after enabling.

Functional example:

Assuming that the number of trigger collection frames is set to 5, the number of codes is set to 3, and the code number statistics is

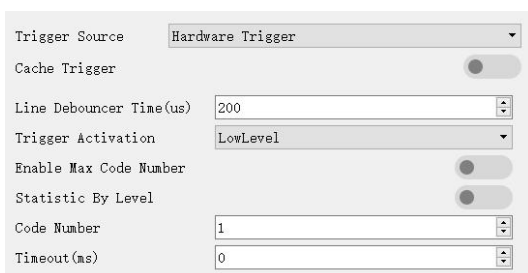
enabled, the following is an example of possible function usage:

- **Example 1: Number of codes reached during trigger duration**
 - a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
 - b. If the first frame in the image successfully decoded to 3 bar codes, the set number of codes, the stop acquisition, trigger the end.
 - c. At this time, in the result statistics area, the trigger OK number +1, the decoding number + 3, the information display column output decoding success results.
- **Example 2: Number of codes not reached during trigger duration**
 - a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
 - b. If in the first 5 frames only successfully decoded to 1 A bar code, when the 5th frame image is collected, the collection is stopped and the trigger ends.
 - c. At this time, in the result statistics area, the trigger NG number is +1, the decoding number is + 1, and the information display field outputs the decoding success result.
- **Example 3: No Decoding During Trigger Persistent**
 - a. Waiting for the arrival of the trigger signal, the device enters a continuous trigger state, the device starts to continuously collect images, and each frame of image is decoded.
 - b. All images collected during the continuous triggering process fail to be decoded. When the fifth frame of image is collected, the collection is stopped and the triggering ends.
 - c. At this time, in the result statistics area, the number of trigger NG +1, the information display column outputs the decoding failure information.

Trigger Source

➤ Hardware Trigger

The hardware trigger function allows external devices to connect to the device through the I/O interface, and when the external device sends a trigger signal, the device will be triggered to collect and decode.



Parameter Description:

- **Cache Trigger** : Not enabled by default. When it is not enabled, if a new trigger signal is received in the trigger process, it is not retained

and not processed. If a new trigger signal is received during the triggering process after enabling, the signal can be retained and processed. The trigger buffer enables a maximum of 4 trigger signals to be retained for processing.

- **Line Debouncer Time (us)** : False trigger signals caused by mechanical contact jitter or electromagnetic interference during hardware trigger signal input are eliminated.
- **Trigger Activation**: low level, high level, rising edge, falling edge can be selected. The trigger polarity selects low and high triggers only when the trigger signal remains single frame. When the trigger polarity is low/high, the device will continue to collect following the trigger signal.
- **Enable Max Code Number**: when the trigger polarity is at high/low level, if the decoding number meets the set number of codes during the trigger duration, the trigger will stop.
- **Statistics By Level**: the number of decoding codes must meet the set number of codes in the continuous trigger process after enabling.
- **Code Number**: the number of barcodes to be read during the triggering process.
- **Timeout (ms)**: setting of high and low level continuous acquisition time limit. When the input range is [0,999999] and the default value is 0, that is, the continuous acquisition time is not limited, and continuous acquisition is carried out according to the high and low level duration.
 - 1) If the set timeout time is less than the high and low level duration, stop the acquisition after reaching the set timeout time.
 - 2) If the set timeout time is greater than the duration of the high and low levels, the acquisition will be stopped after the high and low levels continue to stop.

Example of high and low level follow trigger function:

Assuming that the trigger polarity is set to "low level", the maximum decoding number is enabled, the statistical enable of the number of high and low level codes is enabled, the number of codes is "3", and the timeout is "500", the following is an example of possible function usage:

- **Example 1: Number of codes reached during trigger duration**
 - a. Continuous acquisition following the trigger signal, and each frame of image decoding.
 - b. If the first frame in the image successfully decoded to 3 bar codes, the set number of codes, the stop acquisition, trigger the end.
 - c. At this time, in the result statistics area, the trigger OK number +1, the decoding number + 3, the information display column output decoding success results.
- **Example 2: Number of codes not reached during trigger duration**
 - a. Following the trigger signal continuous acquisition, and decoding of each frame of image.
 - b. If only 1 barcode is successfully decoded during the trigger duration and the trigger signal is still low, the device will continue to collect until the trigger signal becomes high or the timeout time reaches 500 milliseconds.
 - c. After the trigger is completed, in the result statistics area, the trigger NG number is +1, the decoding number is + 1, the information

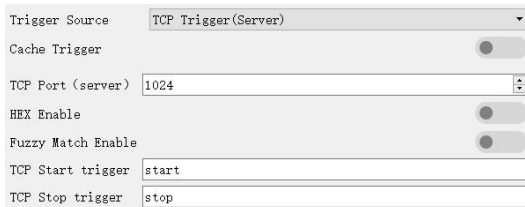
display bar output decoding results.

● Example 3: No Decoding During Trigger Persistent

- Following the trigger signal continuous acquisition, and decoding of each frame of image.
- The device will continue to collect until the trigger signal changes to a high level or the timeout time reaches 500 milliseconds, if all the images collected during the continuous triggering process fail to be decoded and the trigger signal is still in a low level state.
- After the trigger is completed, in the result statistics area, trigger NG number +1, the information display bar output decoding failure information.

➤ TCP Trigger (Server)

The TCP Trigger (Server) function allows external devices to connect to devices through the TCP protocol. When an external device sends a TCP command, it triggers the device to collect and decode.



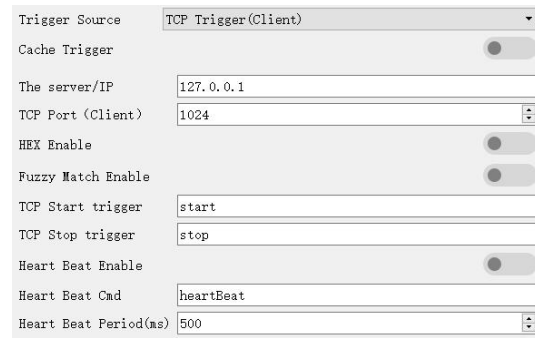
The screenshot shows the configuration for the TCP Trigger (Server). The 'Trigger Source' is set to 'TCP Trigger(Server)'. The 'Cache Trigger' is disabled. The 'TCP Port (server)' is set to 1024. 'HEX Enable' and 'Fuzzy Match Enable' are both disabled. The 'TCP Start trigger' is set to 'start' and the 'TCP Stop trigger' is set to 'stop'.

Parameter Description:

- **Cache Trigger** : Not enabled by default. When it is not enabled, if a new trigger signal is received in the trigger process, it is not retained and not processed. If a new trigger signal is received during the triggering process after enabling, the signal can be retained and processed. The trigger buffer enables a maximum of 4 trigger signals to be retained for processing.
- **TCP Port (Server)**: Port for communication. range [1,65535].
- **HEX Enable**: When enabled, start trigger and stop trigger strings are configured in hexadecimal format.
- **Fuzzy Match Enable**: Not enabled by default. If it is not enabled, the received start/stop trigger command must be completely consistent with the start/stop trigger string set below before the trigger is successfully triggered. When enabled, as long as the received start/stop trigger command contains the start/stop trigger string set below, it can be triggered. For example, if the start trigger string is start and the received trigger command is start or start1234, the trigger can be successfully triggered.
- **TCP Start trigger**: Start trigger command string is configured.
- **TCP Stop trigger**: Stop trigger command string is configured.

➤ TCP Trigger (Client)

The TCP trigger (client) function allows external devices to connect to devices through the TCP protocol. When an external device sends a TCP command, it triggers the device to collect and decode.



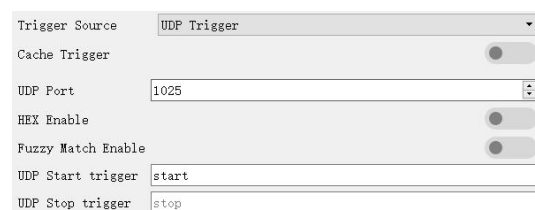
The screenshot shows the configuration for the TCP Trigger (Client). The 'Trigger Source' is set to 'TCP Trigger(Client)'. The 'Cache Trigger' is disabled. The 'The server/IP' is set to 127.0.0.1 and the 'TCP Port (Client)' is set to 1024. 'HEX Enable' and 'Fuzzy Match Enable' are both disabled. The 'TCP Start trigger' is set to 'start' and the 'TCP Stop trigger' is set to 'stop'. 'Heart Beat Enable' is disabled. The 'Heart Beat Cmd' is set to 'heartBeat' and the 'Heart Beat Period(ms)' is set to 500.

Parameter Description:

- **Cache Trigger** : Not enabled by default. When it is not enabled, if a new trigger signal is received in the trigger process, it is not retained and not processed. If a new trigger signal is received during the triggering process after enabling, the signal can be retained and processed. The trigger buffer enables a maximum of 4 trigger signals to be retained for processing.
- **The server/IP**: IP address of the server.
- **TCP Port (Client)**: The communication port is set. range [1,65535].
- **HEX Enable**: When enabled, start trigger and stop trigger strings are configured in hexadecimal format.
- **Fuzzy Match Enable**: Not enabled by default. If it is not enabled, the received start/stop trigger command must be completely consistent with the start/stop trigger string set below before the trigger is successfully triggered. When enabled, as long as the received start/stop trigger command contains the start/stop trigger string set below, it can be triggered. For example, if the start trigger string is start and the received trigger command is start or start1234, the trigger can be successfully triggered.
- **TCP Start trigger**: Start trigger command string configured.
- **TCP Stop trigger**: Stop trigger command string is configured.
- **Heart Beat Enable**: After enabled, the set heartbeat command is sent to the TCP server according to the heartbeat period set below to determine whether the communication is disconnected.
- **Heart Beat Cmd**: the string sent to the TCP server when heartbeat is enabled. The default value is heartBeat.
- **Heart Beat Period (ms)**: the interval between sending heartbeat commands to the TCP server when heartbeat enable is enabled. The unit is ms. The default sending period is 500ms.

➤ UDP Trigger

The UDP trigger function allows external devices to connect to the device through UDP, and when the external device sends a UDP command, it will trigger the device to collect and decode.



The screenshot shows the configuration for the UDP Trigger. The 'Trigger Source' is set to 'UDP Trigger'. The 'Cache Trigger' is disabled. The 'UDP Port' is set to 1025. 'HEX Enable' and 'Fuzzy Match Enable' are both disabled. The 'UDP Start trigger' is set to 'start' and the 'UDP Stop trigger' is set to 'stop'.

Parameter Description:

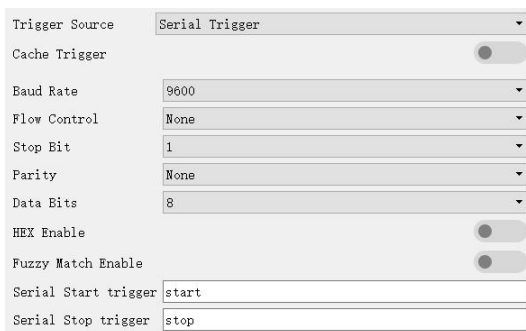
- **Cache Trigger** : Not enabled by default. When it is not enabled, if a

new trigger signal is received in the trigger process, it is not retained and not processed. If a new trigger signal is received during the triggering process after enabling, the signal can be retained and processed. The trigger buffer enables a maximum of 4 trigger signals to be retained for processing.

- **UDP Port:** The communication port is set. range [1,65535].
- **HEX Enable:** When enabled, start trigger and stop trigger strings are configured in hexadecimal format.
- **Fuzzy Match Enable:** Not enabled by default. If it is not enabled, the received start/stop trigger command must be completely consistent with the start/stop trigger string set below before the trigger is successfully triggered. When enabled, as long as the received start/stop trigger command contains the start/stop trigger string set below, it can be triggered. For example, if the start trigger string is start and the received trigger command is start or start1234, the trigger can be successfully triggered.
- **UDP Start trigger:** Start trigger command string is configured.
- **UDP Stop trigger:** Stop trigger command string is configured.

➤ Serial Trigger

The serial port trigger function allows external devices to connect to the device through the serial port. When the external device sends a UDP command, the device will be triggered to collect and decode.



The image shows a configuration window for the Serial Trigger function. It includes a dropdown for 'Trigger Source' set to 'Serial Trigger', a 'Cache Trigger' toggle switch, and fields for 'Baud Rate' (9600), 'Flow Control' (None), 'Stop Bit' (1), 'Parity' (None), and 'Data Bits' (8). There are also toggle switches for 'HEX Enable' and 'Fuzzy Match Enable'. At the bottom, there are text input fields for 'Serial Start trigger' (containing 'start') and 'Serial Stop trigger' (containing 'stop').

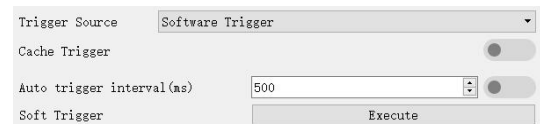
Parameter Description:

- **Cache Trigger :** Not enabled by default. When it is not enabled, if a new trigger signal is received in the trigger process, it is not retained and not processed. If a new trigger signal is received during the triggering process after enabling, the signal can be retained and processed. The trigger buffer enables a maximum of 4 trigger signals to be retained for processing.
- **Baud Rate:** the rate of serial communication, the number of data bits transmitted per second.
- **Flow Control :** Whether you want to control the flow of serial communication.
- **Stop Bit:** the flag of the completion of data transmission. When the stop bit is encountered, it indicates that the data to be transmitted has been transmitted and the transmission of the data is stopped.
- **Parity :** A check bit added after the transmitted data to check whether the data transmitted during the data transmission is erroneous.
- **Data Bits:** the number of bits of data. The unit is bits. By default, 8 is selected, indicating that 8 bits are one data unit.

- **HEX Enable:** When enabled, start trigger and stop trigger strings are configured in hexadecimal format.
- **Fuzzy Match Enable:** Not enabled by default. If it is not enabled, the received start/stop trigger command must be completely consistent with the start/stop trigger string set below before the trigger is successfully triggered. When enabled, as long as the received start/stop trigger command contains the start/stop trigger string set below, it can be triggered. For example, if the start trigger string is start and the received trigger command is start or start1234, the trigger can be successfully triggered.
- **Serial Start trigger:** Start trigger command string is configured.
- **Serial Stop trigger:** Command string configured to stop trigger.

➤ Software Trigger

The soft trigger function is used by the software to send a trigger signal to trigger the device to collect and decode, and supports manual soft trigger and automatic soft trigger.



The image shows a configuration window for the Software Trigger function. It includes a dropdown for 'Trigger Source' set to 'Software Trigger', a 'Cache Trigger' toggle switch, a field for 'Auto trigger interval(as)' set to 500, and a 'Soft Trigger' section with an 'Execute' button.

Parameter Description:

- **Cache Trigger :** Not enabled by default. When it is not enabled, if a new trigger signal is received in the trigger process, it is not retained and not processed. If a new trigger signal is received during the triggering process after enabling, the signal can be retained and processed. The trigger buffer enables a maximum of 4 trigger signals to be retained for processing.
- **Auto trigger interval (ms):** Not enabled by default. When it is not enabled, the trigger needs to be triggered by clicking the execution button at the soft trigger, and the trigger is triggered once every time. After enabling, click the execution button at the soft trigger to start triggering, trigger at intervals according to the set automatic triggering time, and turn off the enable switch/stop scheme to trigger automatically after running.
- **Soft Trigger:** Send a trigger signal after clicking the execute button.

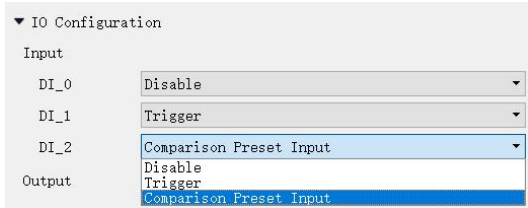
6-2 IO Configuration

The IO configuration section can set parameters such as input events, output pins, output levels, output events, output signal duration, and buzzer of the device.

➤ Input

Input events	clarification
Disable	The level signals received on the pins are not processed and the device does not perform barcode data acquisition and decoding operations.
Trigger	When the pin receives a preset level signal, it

	triggers the device to capture the decoding and output the decoding result.
Comparison Preset Input	When the pin receives a preset level signal, it will trigger the device to read the barcode data and set the read barcode data to the preset data of the comparison control with no result output.



Pin Configuration Logic:

- **When the pin input event is a trigger**
 - a. When the trigger source is configured as hardware trigger, you need to manually set the trigger pin event to trigger, and the trigger can be successfully triggered only if the trigger pin is set correctly.
 - b. According to the trigger polarity set by the hardware trigger, the device will be triggered to capture and decode and output the decoding result. That is, if the hardware trigger-trigger polarity is set to high level, the device will start to collect when the pin receives a high level signal.
- **When the pin input event is a comparison preset input**
 - a. Need to be used in combination with data processing - comparison control, when the pin receives a preset level signal, it will trigger the device to read the barcode data and set the read barcode data as the preset data of the comparison control, the comparison preset input only supports the use of the device when it is offline.
 - b. If the Hardware Trigger-Trigger Polarity setting is High or Rising Edge, the device will start acquisition when the pin receives a rising edge signal.
 - c. If the hardware trigger-trigger polarity setting is low or falling edge, the device will start acquisition when the pin receives a falling edge signal.

➤ Output

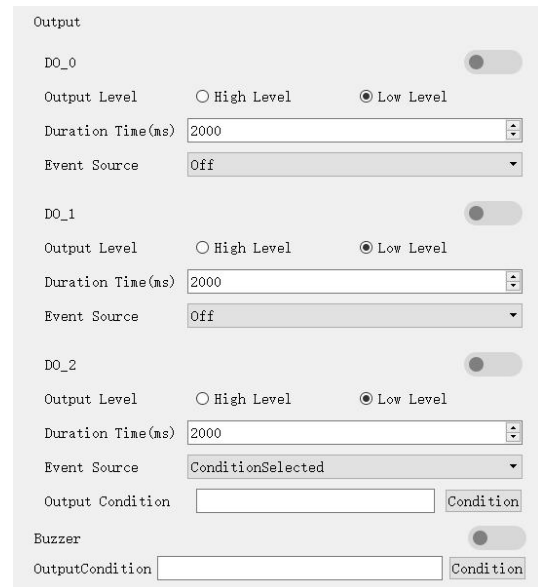
Parameters such as output pin, output level, output event, output signal duration, and buzzer can be configured.

Parameter Description:

- **DO_0/DO_1/DO_2:** The output pin is enabled, and the enable switch is turned off by default. After enabled, it will prohibit the modification of related parameters such as output level, duration, event source, etc.
- **Output level:** whether a high level or a low level is selected as the initial state.
- **Duration (ms):** The duration of the output signal.
- **Event Source:** Select the corresponding event source according to the actual usage requirements, and the barcode reader will output according to the selected event source.
- **Output condition:** when the event source is selected as "condition

selection", the output condition will be displayed. Click the "condition" button to jump to the variable selection window, and the corresponding condition can be added. The added condition will be displayed in the output condition box.

- **Buzzer:** turn on the buzzer when the output condition is empty, and the device will sound when the decoding is successful; when the output condition is customized, turn on the buzzer, and when the condition is true, it will sound.



Chapter7 Communication Configuration

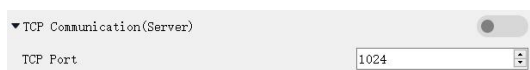
The communication configuration part can set the content related to the communication protocol, and can be connected with the corresponding tool to realize the transmission of information. The enable switch of each communication mode is turned off by default. When enabled, the modification of communication-related parameters will be prohibited, and the device will output data through the configured communication mode.

FYR The parameters that can be set and the functions supported by the communication configuration of different types and firmware versions are different, please refer to the actual parameters for details.

7-1Communication Protocol

➤ TCP Communication (Server)

The TCP Communication (Server) function allows the device to connect to the outside through TCP, and when enabled, it will output data through the TCP server.

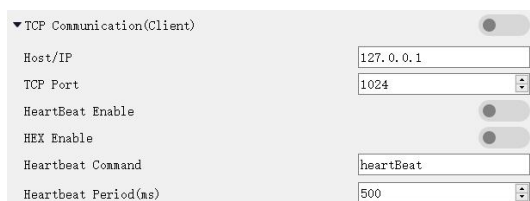


Parameter Description:

- **TCP Port:** The communication port is set. range [1,65535].

➤ TCP Communication (Client)

The TCP Communication (Client) function allows the device to connect to the outside through TCP, and when enabled, it will output data through the TCP client.



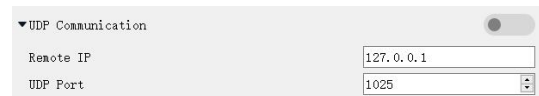
Parameter Description:

- **Host/IP:** IP address of the server.
- **TCP Port:** The communication port is set. range [1,65535].
- **Heart Beat Enable:** After enabled, the set heartbeat command is sent to the TCP server according to the heartbeat period set below to determine whether the communication is disconnected.

- **HEX Enable:** When enabled, configure the heartbeat command string in hexadecimal format.
- **Heartbeat Command:** The string sent to the TCP server when heartbeat is enabled. The default value is heartBeat.
- **Heartbeat Period (ms):** The interval between sending heartbeat commands to the TCP server when heartbeat enable is enabled. The unit is ms. The default sending period is 500ms.

➤ UDP Communication

The UDP communication function allows the device to connect to the outside through UDP, and when enabled, it will output data through UDP.

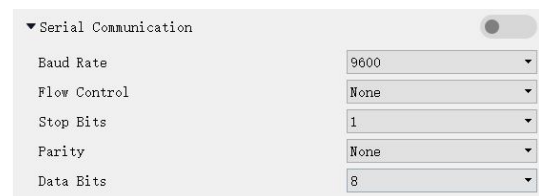


Parameter Description:

- **Remote IP:** Enter the IP address of the PC receiving the data.
- **UDP Port:** The communication port is set. range [1,65535].

➤ Serial Communication

The serial communication function allows the device to connect to the outside through the serial port, and when enabled, it will output data through the serial port.

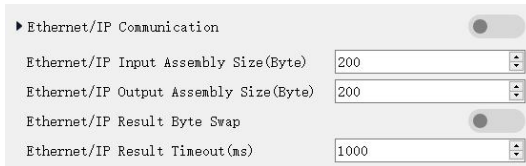


Parameter Description:

- **Baud Rate:** The rate of serial communication, the number of data bits transmitted per second.
- **Flow Control:** Whether you want to control the flow of serial communication.
- **Stop Bits:** The flag of the completion of data transmission. When the stop bit is encountered, it indicates that the data to be transmitted has been transmitted and the transmission of the data is stopped.
- **Parity :** A check bit added after the transmitted data to check whether the data transmitted during the data transmission is erroneous.
- **Data Bits:** The number of bits of data. The unit is bits. By default, 8 is selected, indicating that 8 bits are one data unit.

➤ Ethernet/IP Communication

The Ethernet/IP communication function allows the device to connect to the outside through Ethernet/IP, and when enabled, it will output data through Ethernet/IP.



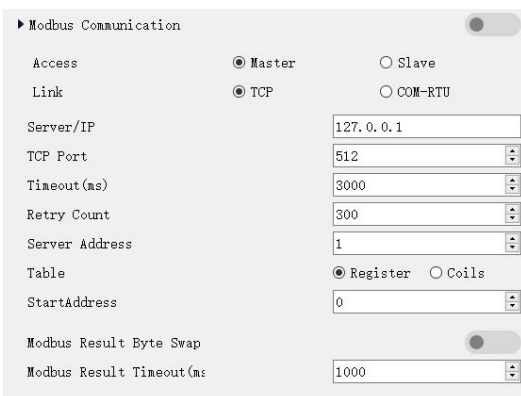
Ethernet/IP Communication ☒
 Ethernet/IP Input Assembly Size(Byte) 200
 Ethernet/IP Output Assembly Size(Byte) 200
 Ethernet/IP Result Byte Swap ☒
 Ethernet/IP Result Timeout(ms) 1000

Parameter Description:

- **Ethernet/IP Input Assembly Size(Byte):** Please set the input component to more than 40 bytes, the default "200", the input range [40,500].
- **Ethernet/IP Output Assembly Size(Byte):** Please set the output component to more than 40 bytes, the default "200", the input range [40,500].
- **Ethernet/IP Result Byte Swap:** Swap the high and low bytes of the result. By default, it is not enabled for little-endian mode, that is, the high byte of data is stored at the high address of memory, and the low byte of data is stored at the low address of memory; when enabled, it is for big-endian mode, that is, the high byte of data is stored at the low address of memory, and the low byte of data is stored at the high address of memory.
- **Ethernet/IP Result Timeout(ms):** The waiting time for the result timeout is set. The unit is ms. The default value is 1000. The range is 1000 and 999999999.

➤ Modbus Communication

The Modbus communication function allows the device to connect to the outside through Modbus, and when enabled, it will output data through Modbus.



Modbus Communication ☒
 Access ☒ Master ☐ Slave
 Link ☒ TCP ☐ COM-RTU
 Server/IP 127.0.0.1
 TCP Port 512
 Timeout(ms) 3000
 Retry Count 300
 Server Address 1
 Table ☒ Register ☐ Coils
 StartAddress 0
 Modbus Result Byte Swap ☒
 Modbus Result Timeout(ms) 1000

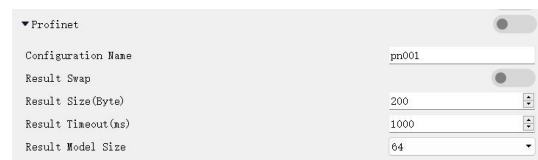
Parameter Description:

- **Access:** Modbus communication connection permission of the device, you can select the host and slave.
- **Link:** Select the connection protocol of the device. You can select TCP or COM-RTU.
- **Timeout (ms):** the waiting time for timeout is set. Unit: ms. Default value: 3000. Range: 0,50000.
- **Retry Count:** The number of resends when the transmission fails.
- **Server Address:** the address of the slave machine (in the master mode, it means the ID of the receiver slave machine, and in the slave mode, it means to modify the ID of the slave machine).

- **Table:** coil or register mode selectable.
- **Start Address:** indicates the start address of the host table in the host mode; indicates the start address of the written data in the slave mode.
- **Modbus Result Byte Swap:** Swap the high and low bytes of the result. By default, it is not enabled for little-endian mode, that is, the high byte of data is stored at the high address of memory, and the low byte of data is stored at the low address of memory; when enabled, it is for big-endian mode, that is, the high byte of data is stored at the low address of memory, and the low byte of data is stored at the high address of memory.
- **Modbus Result Timeout(ms) :** the waiting time for the result timeout is set. The unit is ms. The default value is 1000. The range is 1000 and 999999999.

➤ Profinet

The Profinet communication function allows the device to connect to the outside through the Profinet, and when enabled, it will output data in a Profinet manner.



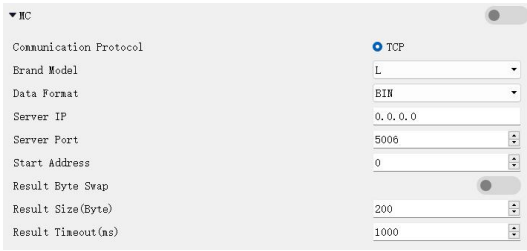
Profinet ☒
 Configuration Name pn001
 Result Swap ☒
 Result Size(Byte) 200
 Result Timeout(ms) 1000
 Result Model Size 64

Parameter Description:

- **Configuration Name:** Specify a unique device name for the device that is consistent with the configured device name.
- **Result Swap:** Exchange the high and low bytes of the result. By default, it is not enabled for little-endian mode, that is, the high byte of data is stored at the high address of memory, and the low byte of data is stored at the low address of memory; when enabled, it is for big-endian mode, that is, the high byte of data is stored at the low address of memory, and the low byte of data is stored at the high address of memory.
- **Result Size (Byte):** Maximum length of data sent.
- **Result Timeout (ms):** The waiting time for the result timeout is set. The unit is ms. The default value is 1000. The range is 1000 and 999999999.
- **Result Model size:** The size of the input and output data areas.

➤ MC

The MC communication function allows the device to connect to the outside through the MC, and when enabled, it will output data through the MC.

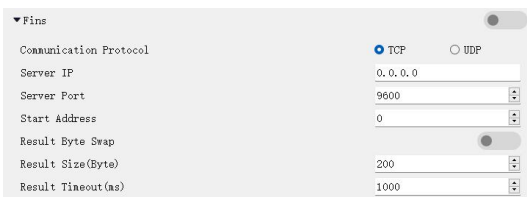


Parameter Description:

- **Brand Model:** Select the upper computer model from the drop-down.
- **Data Format:** The format of data transmission.
- **Server IP:** IP address of the server.
- **Server Port:** The communication port is set. range [1,65535].
- **Start Address:** Start location of the read/write operation memory.
- **Result Address:** Exchange the high and low bytes of the result. By default, it is not enabled for little-endian mode, that is, the high byte of data is stored at the high address of memory, and the low byte of data is stored at the low address of memory; when enabled, it is for big-endian mode, that is, the high byte of data is stored at the low address of memory, and the low byte of data is stored at the high address of memory.
- **Result Size (Byte):** The maximum length of data sent.
- **Result Timeout (ms):** The waiting time for the result timeout is set. The unit is ms. The default value is 1000. The range is 1000 and 999999999.

➤ Fins

The Fins communication function allows the device to connect to the outside through Fins, and when enabled, it will output data through Fins.



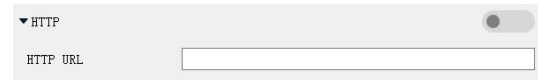
Parameter Description:

- **Communication Protocol:** There are two communication modes to choose from, namely UDP and TCP;
- **Server IP:** IP address of the server.
- **Server Port:** The communication port is set. range [1,65535].
- **Start Address:** Start location of the read/write operation memory.
- **Data Exchange:** exchange the high and low bytes of the result. By default, it is not enabled for little-endian mode, that is, the high byte of data is stored at the high address of memory, and the low byte of data is stored at the low address of memory; when enabled, it is for big-endian mode, that is, the high byte of data is stored at the low address of memory, and the low byte of data is stored at the high address of memory.
- **Result Size (Byte):** The maximum length of data sent.
- **Result Timeout (ms):** The waiting time for the result timeout is set.

The unit is ms. The default value is 1000. The range is 1000 and 999999999.

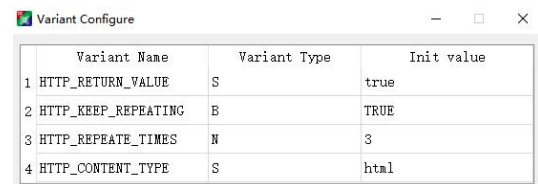
➤ HTTP

The HTTP communication function allows the device to connect to the outside through HTTP, and when enabled, it will output data through HTTP.



Parameter Description:

- **HTTP URL:** The HTTP communication address. If special configuration is required, add the following variables to the variable settings as required.



	Variant Name	Variant Type	Init value
1	HTTP_RETURN_VALUE	S	true
2	HTTP_KEEP_REPEATING	B	TRUE
3	HTTP_REPEAT_TIMES	N	3
4	HTTP_CONTENT_TYPE	S	html

Variable	Description
HTTP_RETURN_VALUE(S)	Configure the return value returned by the upper computer. Only after the value is configured can the results of the upper computer be compared. If the return value is inconsistent with the configured value, the value is sent repeatedly. If this variable is not configured, the host computer return value verification is not performed by default.
HTTP_KEEP_REPEAT-ING(B)	If the value is set to true, the verification result of the host computer fails to be sent until the verification is returned. If the value is set to false, it is sent according to the set number of times. If you do not configure the variable, the default value is false.
HTTP_REPEAT-TI-MES(N)	After the value is configured, if the host computer returns a result that fails to be verified and the HTTP_KEEP_REPEAT-ING is false, the maximum number of times of repeat sending is performed according to the value set by the variable. The value is not set by default to 0.
HTTP_CONTENT-TYPE(S)	Used to configure the header type of the sending report, supporting parameters (text, textXml, html, plain, xml, json), not configured by default.

Image Export

The image export function provides local and FTP storage of images, and can set image format, image quality and naming rules. The FTP image export step can be seen [in the FTP image export](#)

configuration.
Parameter Description:

- **Server IP:** IP address of the server receiving the data.
- **Server Port:** The port number of the server receiving the data.
- **User Name:** Enter the FTP user name if you need a user name and password to log in.
- **User Password:** Enter the FTP password if you need a user name and password to log in.
- **Image Format:** Export image format selection, optional BMP, JPG, PNG.
- **Image Quality:** the higher the level to the right of the slider, the clearer the picture and the larger the file.
- **Send Conditions:** NG save, full save, specify conditions, trigger NG save.
 - ng-save: when the decoded image is ng-save to a local folder.
 - Save All: All images are saved to the local folder. Images that fail to be decoded are stored in the NG_Image folder, and images that are successfully decoded are stored in the OK_Image folder.
 - Specify condition: you can enter it manually or click "condition" to select a Boolean variable in the variable selection window as the precondition for sending. If there is a vacancy, the default condition is true. If the condition is true, data is sent; if the condition is false, data is not sent.
 - Trigger NG Save: At the end of the trigger, the pictures in the trigger are saved according to whether the current trigger result is NG saved.
- **Save Image Strategy:** All frames, latest frame, specified frame, and specified range can be selected.
 - All Frames: Saves all images from the start to the end of the trigger.
 - Latest Frame: Only the last 1 frame image is saved.
 - Specified frame: Determine the number of images in the output trigger process by setting the specified frame number. If the number of images is less than the set frame number, no image is output.
 - Specify Range: Determine the image in the output trigger process by

setting the start frame number and end frame number. If the actual number of images is less than the set start frame number, no image is output. If the actual number of images is greater than the set start frame number and less than the end frame number, all images in the output range. Assuming that the parameters are set to start frame number 5, end frame number 10, and the actual number of images is 8, the 5th to 8th images (4 in total) are finally output.

- **Destination Path:** The path to save the image. Click the button to enter the FTP folder, you can select an existing folder, or you can create a new folder to save images.
- **Default Name:** The default name of the exported image.
- **Images Max:** The maximum number of saved images.
- **Renderings:** Whether the custom saved image renders the decoding box/decoding result.
- **Create folder with trigger number:** Create a folder with a trigger number when enabled.
- **Create folder with Barcode reader ID:** Create a folder with Reader ID when enabled. When multiple folder creation methods are enabled, the folder level is: Date <Reader ID <Trigger Number.
- **File name contains the serial number:** When enabled, the file name contains the sequence number.
- **File name contains the frame number:** When enabled, the file name contains the frame number.
- **File name contains timestamp:** When enabled, the file name contains the image export time.
- **Decoding Result Naming:** When enabled, the file name contains the decoding result of the current image.
- **File Name:** Name format of the current picture is previewed.

Monitor

The web page monitoring function allows users to connect to the device through the HTTP server, view the decoding results, count the results, preview the decoded image, and support switching the current running scheme of the device.

1 Parameter configuration.

In the communication configuration interface, find the webpage monitoring, configure the HTTP server port number, display content and other parameters for receiving data.

Parameter Description:

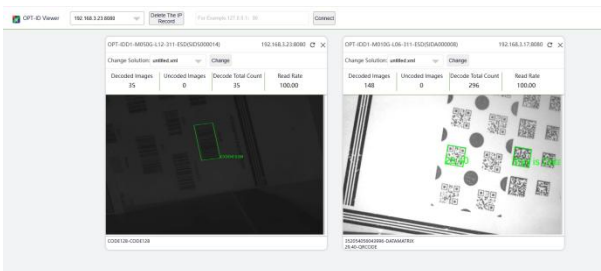
- **HTTP Server Port:** The port number of the HTTP server that receives the data.
- **Image Quality:** The higher the level to the right of the slider, the clearer the picture and the larger the file.
- **Display Content:** Display result and image can be selected. Click the "Open Web Page" button to jump to the web monitoring interface.
- **Select variable:** Enter the variable selection window by clicking the button, select the variable to be displayed on the monitoring page, and then click OK. If you select the "<Filter_DecodeBool>" variable in the variable window and click the "OK" button, you can view the selected variable in the variable text box and the current value of the variable in the preview.

2 Go to the page.

Enable the web page monitoring enable switch, click the "Open Web Page" button to jump to the web page monitoring interface.

3 Connect the equipment.

You can select the IP address to be monitored from the Quick Connect drop-down list. You can also enter the IP address and port number of the device to be monitored in the Please enter IP text box. Click the "Add" button to automatically connect the corresponding reader device.



Parameter Description:

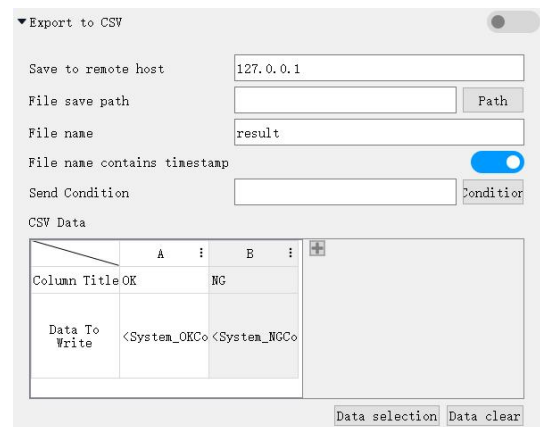
- **Delete IP Record:** Delete the selected IP address.
- **SN:** Serial number of the device.
- **Scenario Change:** Switches the scenario that the device is currently running. Click the drop-down box to select the name of the scheme to be switched to, and click the "Change" button to switch the current scheme in the device to the selected scheme.
- **Refresh:** The current monitoring window is refreshed.
- **Close:** Close the current monitoring window.

FYR A monitoring page supports monitoring up to 4 devices at the same time. if the number of devices to be monitored is large, you can add the number of monitoring pages by clicking the "open web page"

button, and add a monitoring web page every time you click "open web page."

Export to CSV

The Export to CSV feature allows users to export CSV data to a remote host through a CSV server. This function is applicable when the barcode reader is running offline and needs to export CSV data to a specified remote device. For CSV export, see [the CSV export configuration instance](#).



Parameter Description:

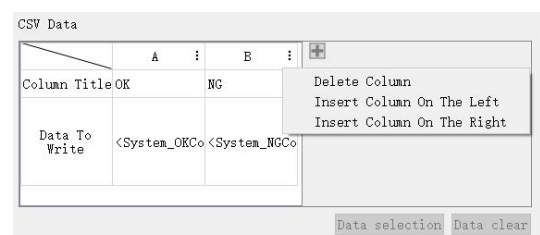
- **Save to remote host:** You can export CSV to the remote host by entering the IP address of the remote host.
- **File save path:** Set the main path for saving data. Click Path to select.
- **File name:** Name of the CSV table to be saved.
- **File name contains timestamp:** When enabled, the file name is output at the current time.
- **Send Condition:** a Boolean variable is selected as the precondition for sending. If it is empty, the default condition is true.
- **CSV Data:** Variables or constants to be output.

CSV data configuration operations:

A.Edit data columns.

Click  the CSV output data to add 1 columns.

Click the "⋮" button to expand the options menu, you can delete columns, insert columns on the left, insert columns on the right and other table operations.



B.Edit data.

Select the data column and double-click the data to be written to customize the modification settings. By default, there is no data to be written and the display is None.

You can also double-click and then click the "Data Selection" button to enter the variable selection window and select the variable to be written. At this time, the selected column of the data to be written is displayed as the selected variable name, and the column title changes to the selected variable name. You can double-click the CSV column title to select it for custom modification.

Click the "Data Clear" button to clear the data to be written in the selected column. After clearing, the selected column will be displayed as None.

Chapter8 Tool Application

Provides tool applications such as barcode reader management tools, variable management, remote command control, networking, CSV server, FTP service tools, and batch upgrade tools.

FYR The tool functions supported by different types and firmware versions are different, please refer to the actual parameters for details.

8-1 Batch Upgrade Tool

Upgrade tool supports multiple devices at the same time upgrade firmware upgrade.

1 Open the bulk upgrade tool.

Open the bulk upgrade tool in two ways:

A. Start via software

In the software interface, click "Tools" in the "Menu Bar" and select "Batch Upgrade Tool" to enter the Batch Upgrade Tool interface.

B. Run the Bulk Upgrade Tool

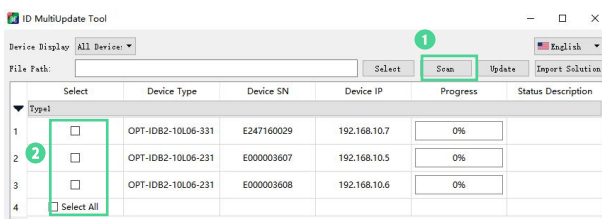
Under the software installation path, double-click to run the ID MultiUpdate Tool.exe program.

2 Select the device.

Click the [Scan] button to search for a barcode reader-> check the barcode reader to be upgraded.

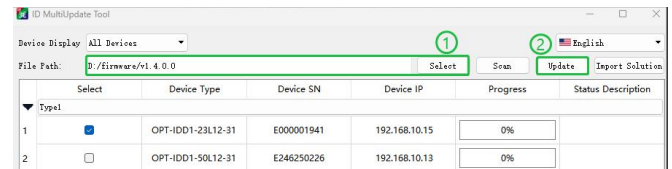
Parameter Description:

- **Device display:** All recognizable devices are displayed by default, and can be switched to "connectable devices". The list will only display devices that are in the same network segment as the host and can establish connections.
- **Type:** Devices of the same series and the same communication interface are classified into one category.
- **Select:** The device to be upgraded can be selected individually or all.



3 Firmware upgrade.

Click Select-> select the firmware file consistent with the model of the device to be upgraded-> click the [Upgrade] button. When the progress bar reaches 100, the status indicates that the device is upgraded successfully, which indicates that the firmware upgrade operation has been successfully completed.



8-2 Management Tools

The device reader management tool supports scheme management, real-time monitoring and log analysis, which is convenient for users to manage device schemes, monitor running status and quickly troubleshoot faults.

1 Start the management tool.

There are two ways to start the management tool:

A. Start via software

Software in the interface, click "menu bar" in the "tools", select "management tools", you can enter the management tools interface.

B. Run the management tool program

Under the software installation path, double-click to run the ID Management Tool.exe program.

2 Use management tools.

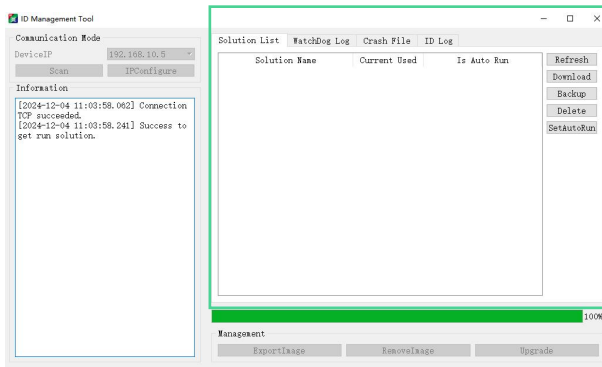
There are two ways to use management tools:

A. Use after connecting the device through the main interface of the software

Steps: 1) Connect the barcode reader in the main interface of the software. For details, please refer to [the equipment connection](#).

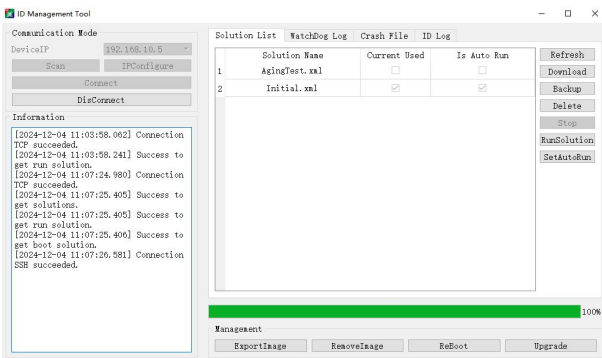
2) Click "Tools" in the "Menu Bar" and select "Manage Tools" to enter the management tool interface.

3) At this time, only the functions in the plan list can be used.



B. Connect devices directly in the Administrative Tools window using

- Step:
- 1) Open the code reader management tool window.
 - 2) Click on "Scan Device"-> select the IP address of the device to be scanned.
 - 3) Click the "Connect" button. After the device is successfully connected, all functions in the management tool can be used.

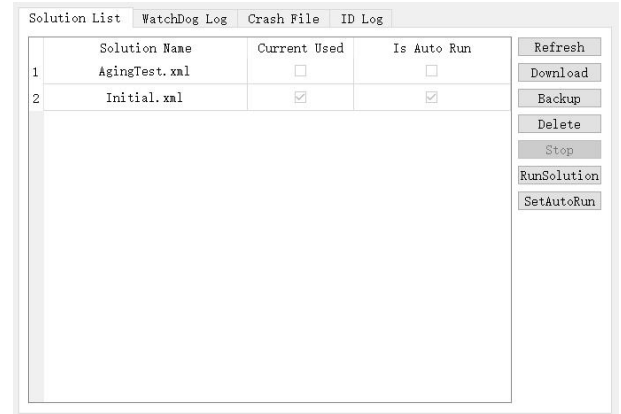


Parameter Description:

- **Device Address:** The IP address of the barcode reader. Select the device to connect or modify the IP address.
- **Scan device:** The scanned device IP will be automatically filled with the device address.
- **IP settings:** Click to enter the IP Settings page to modify the reader device IP.
- **Connect:** Establish a connection based on the device address after clicking.
- **Disconnect:** Disconnect the device after tapping.
- **Message:** Information indicating whether the device is successfully connected or disconnected. Prompts for operation related to the scheme are also displayed.
- **Export Image:** Used in conjunction with Communication Configuration-Image Export-Local to export images saved in the scheme.
- **Delete Image:** The saved image in the selected scheme is deleted.
- **Restart:** Reboot the reader device.
- **Upgrade:** The barcode reader device firmware is upgraded.

➤ Scheme List

The plan list allows the user to manage the plans within the reader device. After the device is successfully connected, the user can download the local scheme to the barcode reader device, or delete or back up the scheme in the barcode reader device to the local. At the same time, the user can also stop, run, and set the self-start of the scheme running on the device.



Parameter Description:

- **Scheme Name:** The name of the scheme within the reader device.
- **Current Use:** The scheme currently used by the barcode reader.
- **Automatic operation:** The scheme of starting and running the equipment since it is started.
- **Refresh:** Refresh the list of scenarios.
- **Download:** Download the local solution to the reader device.
- **Backup:** Back up the schema within the reader device locally.
- **Delete:** The scheme within the reader is deleted.
- **Stop:** The running scenario is stopped.
- **Operation Scheme:** Switch the operation scheme.
- **Set self-start:** Select the scheme in the scheme list and click the "Set Self-start" button. The scheme will automatically check "Whether to start self-start". After reconnecting the barcode reader device, the scheme will run automatically.

➤ Watchdog Log

Allows the user to view the system monitoring log of the barcode reader device, which records the detailed information of the operating status, abnormality detection and automatic recovery of the device, and helps the user to diagnose whether the device is running stably or has potential problems.

Parameter Description:

- **Refresh:** Refresh the watchdog log list.
- **Save:** Save the watchdog log locally.
- **Clear:** The watchdog log list is cleared. Optionally, the watchdog log in the reader is cleared.

➤ Crash file

A crash file is automatically generated when the reader encounters an unhandled exception that causes a crash. These files contain detailed error information that caused the crash, and users can analyze this information to locate the cause of the problem.

Parameter Description:

- **Refresh:** The crash file within the reader is refreshed and displayed in a table.
- **Upload:** Upload the selected crash file from the reader device to the local computer. After selecting the crash file, click "Upload" to pop up the Select File Path box, select the local path to be uploaded, and the progress bar below shows the upload progress.
- **Delete:** Delete the crash file inside the selected reader.

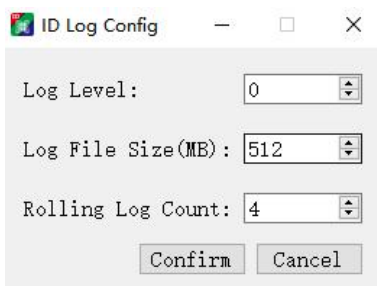
➤ Log File

Provide detailed operation records of the barcode reader, including user operations, device responses, error reports, etc., to help users track the historical behavior of the device.

Parameter Description:

- **Refresh:** The log file within the reader is refreshed and displayed in a table.
- **Configuration:** Parameters such as log level and log file size are configured. For more information, see Log File Configuration.
- **Download:** Download the selected log file from the reader device to your computer locally. After selecting the log file, click "Download" to pop up the Select File Path box, select the local path to be saved, and the progress bar below displays the download progress.
- **Kernel log:** Kernel printing is enabled and the refresh time is configured. For details, see the kernel file configuration.
- **Tcpdump:** Packet capture parameters are configured. For more information, see Packet capture parameter configuration.

1) Log file configuration:



Parameter Description:

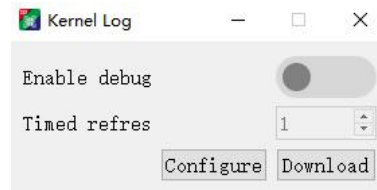
- **Log level:** Print output of limit level to log.
 - 0: All prints are output to log
 - 1: Print output of DEBUG grade and above to log
 - 2: Output of INFO grade and above to log
 - 3: Print output of WARN grade and above to log

4: Print output of ERR grade and above to log

5: CRITICAL grade and above printout to log

- **Log File Size (MB):** Limit the size of each log file.
- **Rolling log count:** The number of log files generated is limited.

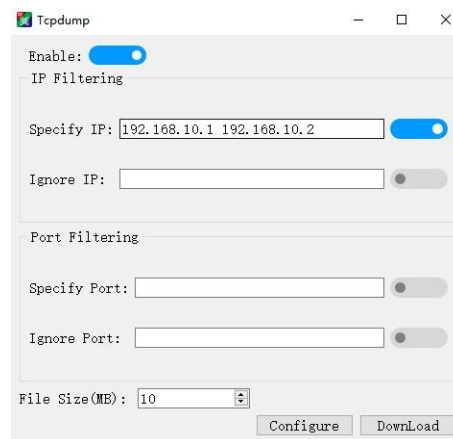
2) Kernel file configuration:



Parameter Description:

- **Enable printing:** After kernel printing is enabled, the kernel log is refreshed and output to the kernel_print.log file according to the configuration.
- **Timed Refresh (s):** Timed refresh time is set.

3) Packet capture parameter configuration:



Parameter Description:

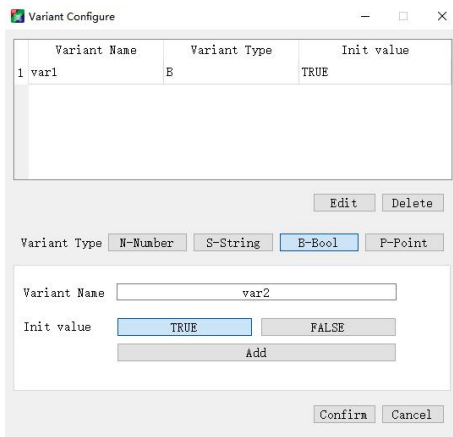
- **Open:** Whether to open the capture package.
- **Specify IP:** Specify the IP address of the device to capture the packet. Multiple specified IP addresses can be configured and separated by spaces. The enable switch after the input box is used to configure whether to enable the capture of the specified input IP. Note: The Specify IP and Ignore IP enable switches cannot be enabled at the same time.
- **Ignore IP:** The IP address of the input device is ignored. Multiple IPs can be configured and distinguished by spaces.
- **Specified Port:** Multiple specified ports can be configured to capture packets, separated by spaces. Note: The enable switches for the specified port and the ignore port cannot be enabled at the same time.
- **Ignore Port:** The set port is ignored to capture the packet. Multiple can be configured, separated by spaces.
- **File Size (MB):** The total size of the captured files is limited.
- **Configuration:** Apply the preceding configuration to the device.
- **Download:** Download the grab file present on the device.

8-3 Variable management

The variable management function allows users to customize various variables, store temporary data, configuration information, etc., during code reading to meet the needs of specific application scenarios.

1 Enter variable management.

Click "Menu Bar-Tools-Variable Management" to open the variable setting regular interface.



2 Variable settings.

a. Add variables.

Select the variable type, set the variable name and initial value, and click OK to add the variable. The variable types are described as follows:

- **N-Number:** A data type that can be numerically operated. Numeric data consists of numbers, decimal points, plus or minus sign, and the letter E, represented by the letter N. The value range of numerical data is $-0.9999999999E+19$ to $+0.9999999999E+20$, including plus and minus sign, decimal point and letter E, and its length is up to 20 digits. It is often used to represent real numbers.
- **S-string:** A 1 string of characters consisting of numbers, letters, and underscores. When used in a script, it needs to be quoted in English single quotation marks " or double quotation marks.
- **B- Boolean:** Boolean variables have only two values, false and true.
- **P-point:** It has two members, Point x and Point y.

b. Edit variables.

Click the row of the variable to make a selection of the current variable. Click the "Edit" button to enter the editing state and edit the selected variables. Modify the variable name or initial value and click Modify to save the modified content.

c. Delete the variable.

Click the row of the variable to make a selection of the current

variable. Click the Delete button to delete one or more selected variables.

8-4 Remote command control

Remote command control can perform operations such as scheme switching, parameter group switching, IO control, and instruction feedback by means of a TCP server or a TCP client.

Parameter Description:

- **Import:** Click Download to import the local configuration file and save it to the device.
- **Export:** Export the parameters set on the interface to the local.
- **Download:** Save the currently configured remote command control scheme file to the device.
- **Exit:** Exit the remote command control interface without saving the current parameters.

➤ Communication Settings

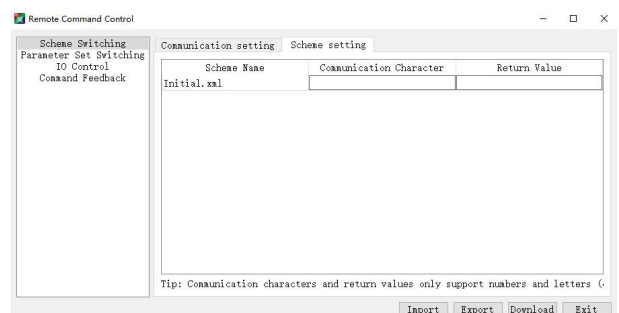
Communication for configuration scheme selection, parameter group switching, command feedback and IO control.

Parameter Description:

- **Communication:** The communication method can be selected from the TCP server or the TCP client.
- **TCP Communication Enable (Server):** When enabled, the TCP server is used for remote command control.
- **TCP Communication Enable (Client):** When enabled, uses a TCP client for remote command control.
- **TCP Port:** The TCP communication port.
- **Host/IP:** IP address of the host when TCP client is selected for communication.

➤ Scheme selection

When there are multiple sets of schemes in the device, you can switch schemes to the configured communication sending set communication characters.



Parameter Description:

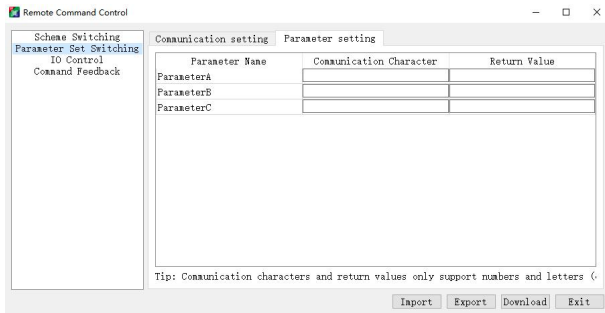
- **Scheme Name:** The names of all schemes within the currently

connected reader device are displayed.

- **Communication character:** The instruction to switch the scheme. Only numbers and English characters (case sensitive) are supported.
- **Return value:** The instruction returned after the scheme is successfully switched. If the switch fails, no instruction is returned. Only numbers and English characters (case sensitive) are supported.

➤ Parameter group switching

When multiple sets of parameters are configured, you can switch parameter groups to the configured communication by sending the set communication characters.

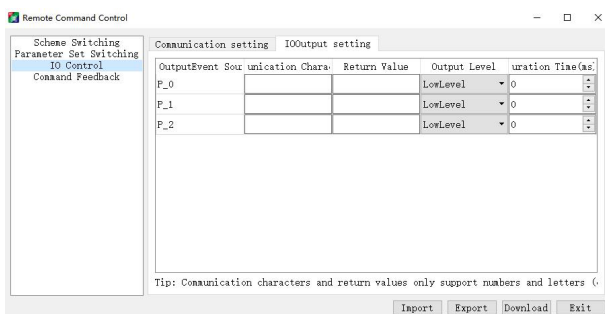


Parameter Description:

- **Parameter Groups:** All parameter groups configured in the scheme of the currently connected reader device are displayed.
- **Communication character:** The instruction to switch the scheme. Only numbers and English characters (case sensitive) are supported.
- **Return value:** The instruction returned after the parameter group switch is successful. If the switch fails, no instruction is returned. Only numbers and English characters (case sensitive) are supported.

➤ IO control

The output IO signal can be controlled by sending a set communication character to the configured communication.



Parameter Description:

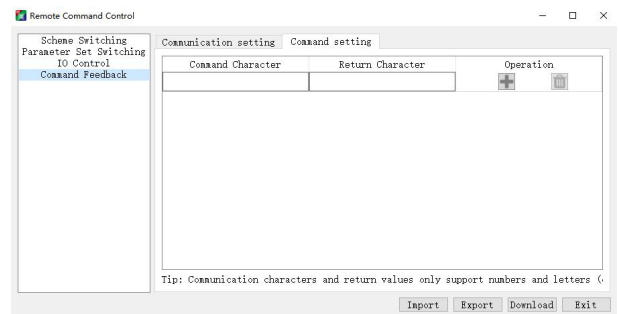
- **IO Output Event Source:** The pin event source in Output-DO is displayed.
- **Communication character:** Command used to control the output IO signal. Only numbers and English characters (case sensitive) are supported.
- **Return value:** The instruction returned after the IO signal is successfully output. If the IO signal fails to be output, no instruction

is returned. Only numbers and English characters (case sensitive) are supported.

- **Output level:** A state when a high level or a low level is selected as an output.
- **Duration (ms):** The duration of the output signal.

➤ Command feedback

Support devices configured to receive commands and return through the communication feedback, can be used for external access to the current connection of the reader device status information.

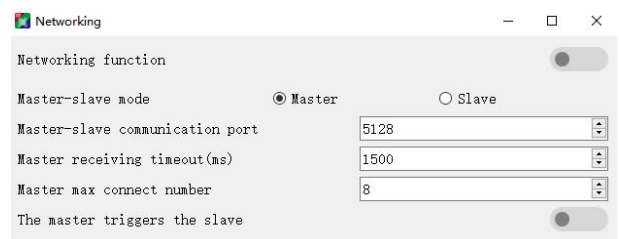


Parameter Description:

- **Command character:** Command received by the set device. Only numbers and English characters (case sensitive) are supported.
- **Return character:** The instruction returned after matching the set instruction character; If the instruction character is not matched, no instruction is returned. Only numbers and English characters (case sensitive) are supported.
-  : Add a line of instruction settings.
-  : Deletes the command settings for the current line.

8-5 Networking

The networking function is used to combine multiple barcode readers to read codes when the field of view of a single barcode reader device cannot meet the detection conditions, such as multi-faceted scanning codes used in the logistics industry. Click "Tools-Networking" in the menu bar, the host/slave configuration interface is displayed, and this function is not enabled by default.



Parameter description of host configuration:

- **Master-slave mode:** The barcode reader can be selected as the master or slave. In principle, the master and slave are in the same

LAN, and the authority of one barcode reader device is set at a time. The default is host mode.

- **Host-slave communication port:** The communication port connecting the master and slave. The default port number is 5128.
- **Host Receive Timeout (ms):** The default value is 1500 ms, which is the specified time to wait for the slave station to send data to the master station. If the data from the slave station is not received within the specified time, the master station directly outputs the result.
- **Host Maximum Connections:** The maximum number of slave connections that can be connected to the same host.
- **The host triggers the slave:** When enabled, the master station sends a trigger signal to trigger the slave station to collect and decode.

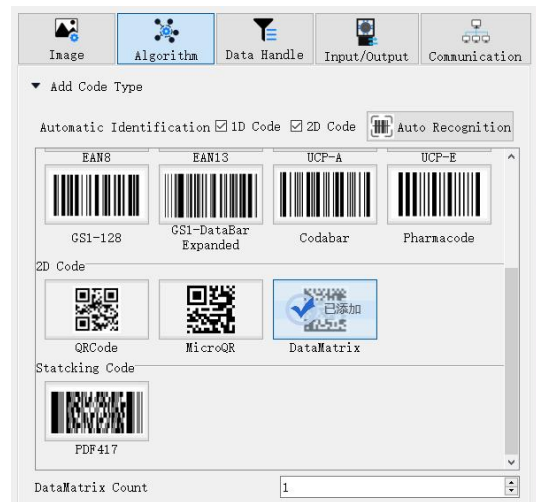
Parameter description of slave configuration:

- **Host IP:** IP address of the host to be connected.
- **Host-slave communication port:** The communication port connecting the master and slave. The default port number is 5128.
- **ID:** ID of the slave.
- **Receiving host trigger:** When this function is not enabled, the slave machine uses its own trigger signal to collect images after the trigger delay time (for example, if this function is not enabled, the trigger delay is 1ms, I.e. the slave machine collects images after the slave station itself is triggered for 1ms). If this function is enabled, the slave machine adopts the two trigger signal sources of the master station and itself to collect images after the trigger delay time (for example, if this function is enabled and the trigger delay is 1ms, the slave machine will collect images after the two trigger signals are delayed by 1ms respectively).
- **Trigger Delay (ms):** The trigger delay of the device.



4 Configure the decoding algorithm.

Configure a decoding algorithm on the Algorithms page based on the decoding requirements of the host to ensure successful decoding. In this example, DATA MATRIX is used as an example. For more information about the algorithm configuration, see [the section, Algorithm Configuration](#).



5 Set the data output format.

On the Data Processing page, configure the content and format of the data sent by the reader to the external device. For more information about data configuration, see [Data Processing](#).

Networking completion logic:

With host A, set up 3 ROI, numbered ROI1, ROI2, ROI3, From machine B, set up 3 ROI, numbered ROI2, ROI3, ROI4 as an example.

- **Example 1: Master and slave have no decoding results**
 - a. Default no read complement, output 1 NG.
 - b. Enable ROI without read completion and output 4 NG (output several NG if there are several ROI).
- **Example 2: master and slave partially decoded successfully**

Host A:ROI1 successfully decoded, ROI2 no decoding, ROI3 successfully decoded

slave B:ROI2 successfully decoded, ROI3 successfully decoded, ROI4 no decoding

 - a. By default, there is no read complement. After the master and slave results are fused, all decoding results are output as follows:
ROI1-master code result, ROI2-slave code result, ROI3-master code

Networking Configuration Instance

➤ Host Configuration

1 Select a device.

Select a barcode reader device as the host (remember the IP address of this barcode reader device, and the configuration slave and communication assistant need to create corresponding connections).

2 Open the networking configuration interface.

Click "Tools → Networking" in the menu bar to enter the networking configuration interface.

3 Configure host parameters.

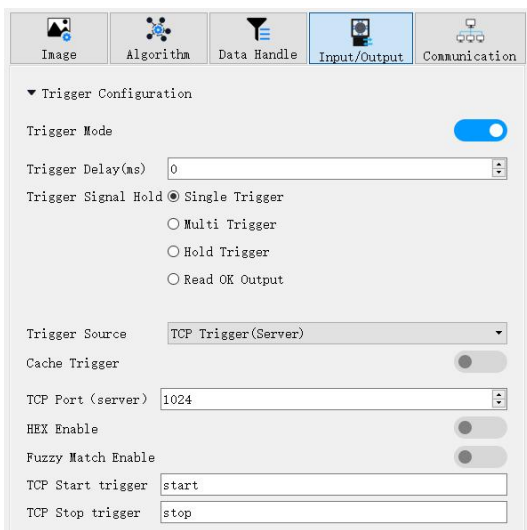
Set the host-slave mode to "host" and set parameters according to actual requirements. For specific parameters, see [the description of host configuration parameters](#). enable networking function switch.

result, and ROI3-slave code result.

- b. Enable ROI without read completion, the same ROI number of decoding results fusion, the fusion without decoding results of ROI without read completion. After the master and slave results are fused, the output results are: ROI1-host code result, ROI2-slave code result, ROI3-host code result, ROI3-slave code result, and ROI4-NG no-read complement.

6 Configure the host trigger mode.

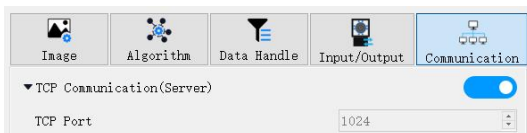
According to actual needs, configure the trigger method used to trigger the host on the "Input/Output" page. In this example, a single-frame trigger is used. The trigger source is TCP (server). For more information about the trigger configuration, see [the Input/Output-Trigger Configuration](#).



7 Configure the communication output mode.

Configure the communication output mode on the Communication Configuration page as required. In this example, TCP (server) is used as an example. For more information, see [Communication Configuration](#).

When networking, only the host is configured for communication output, and the slave data is output by the host.



8 Preservation programme.

Click the Save button to save the protocol to the reader device.



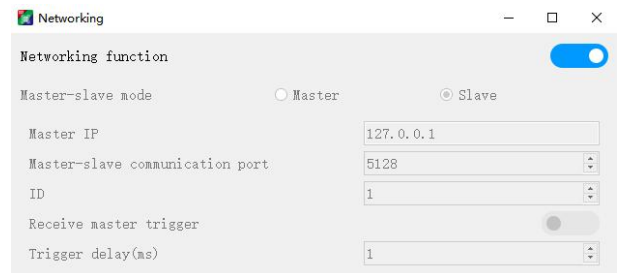
➤ Slight Configuration

1 Select a device.

Connect another reader device as a slave.

2 Configure slave parameters.

Set the master-slave mode to "slave" and set parameters according to actual requirements. For specific parameters, see [the description of slave configuration parameters](#). enable networking function switch.



3 Configure the decoding algorithm.

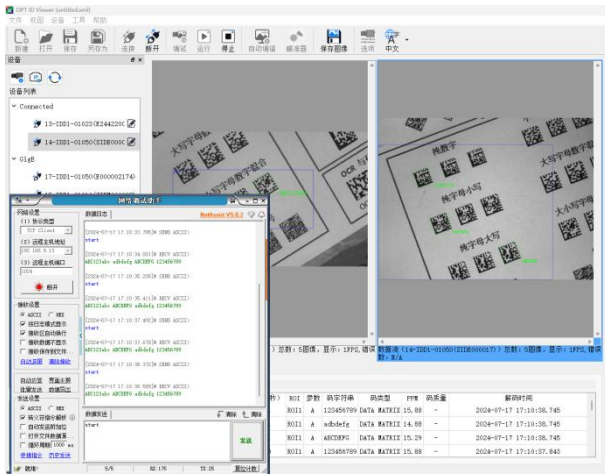
Configure the decoding algorithm on the Algorithms page based on the decoding requirements of the slave to ensure that the decoding is successful. In this example, DATA MATRIX is used as an example. For more information about the algorithm configuration, see [the section, Algorithm Configuration](#).

4 Preservation scheme.

Click the Save button to save the protocol to the reader device.

Communication Test

Open the communication assistant, select TCP client, the IP address is the IP address of the host barcode reader device, the port number is the port number that triggers the host drawing, send the start trigger instruction "start", and receive the output information of the host and slave at the same time, I .e. the networking configuration is successful.



8-6 CSV Server

The CSV server is capable of receiving data from the barcode reader device in real time. When the reader scans a barcode or QR code, it sends the decoded data to the CSV server. The server can process these data in real time and write them into CSV files according to predetermined rules or formats. With "Communication Configuration-Export to CSV", the server can use configurable CSV file formats and data to be written and export CSV files to remote hosts.

CSV export configuration instance

1 Configure CSV export.

On the communication configuration page, find Export to CSV and configure the parameters according to actual requirements. The specific parameter configuration content can be seen in the [Export to CSV](#) section. Sets the data to be output in the CSV file.

2 Start the CSV server.

The CSV server can be started in two ways:

A. Start via software

Software in the interface, click the "menu bar" in the "Tools", select "CSV Server ", you can enter the CSV Server interface.

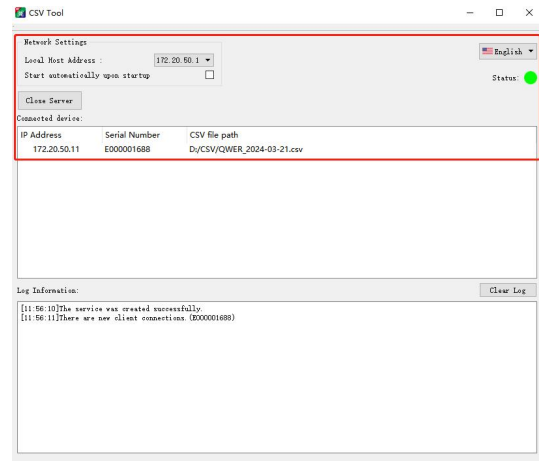
B. Running the CSV Server Program

Under the software installation path, double-click to run the CSV Tool.exe program.

3 Configure the CSV service.

Check whether the local host address is consistent with the remote host IP address exported to the CSV configuration, and click Create Service. Observe that the status light turns green and the connected

device list has device information, that is, the configuration is successful and can be used normally.



4 Tested.

Click Run Reader Decode. Open the set CSV file storage path on the computer, observe whether it is saved normally, and double-click to open the file to view the contents.

8-7 FTP Server

The FTP server is capable of receiving image files from the barcode reader device in real time. When the reader is running, it transfers the decoded image file to the FTP server. With the "communication configuration-image export (remote FTP)" can be used to set the image format, file name, sending conditions and save path and other configurations, and export the image file to the remote host.

FTP image export configuration instance

1 Configure image export (remote FTP).

On the communication configuration page, find the image export (remote FTP/local) and configure the parameters according to the

actual needs. The specific parameter configuration content can be found in the [image export](#) section.

2 Start the FTP Server.

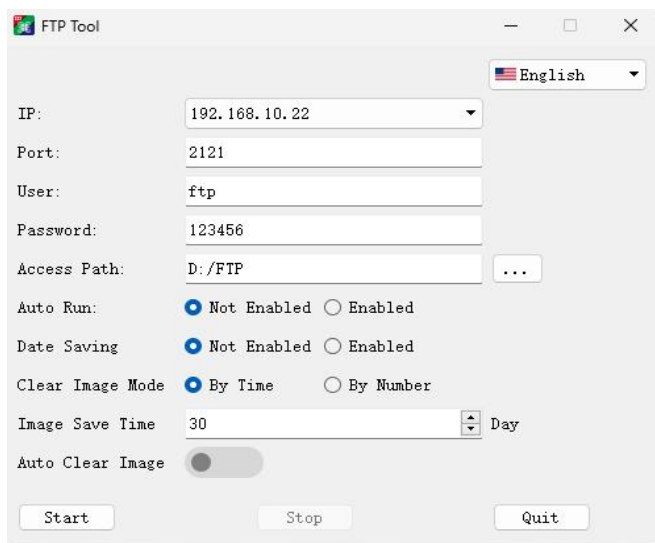
The FTP server can be started in two ways:

A. Start via software

Software in the interface, click the "menu bar" in the "tools", select "FTP server ", you can enter the FTP server interface.

B. Run the FTP server program

Under the software installation path, double-click to run the FTP Tool.exe program.



Parameter Description:

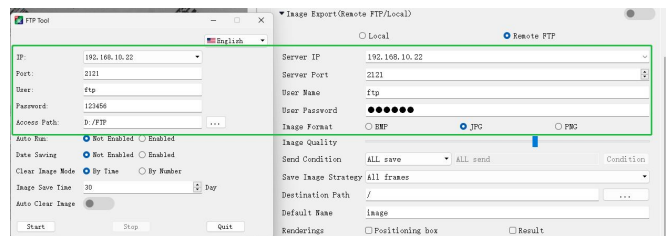
- **IP:** IP address of the host receiving the data.
- **Port:** Port number of the host receiving data.
- **User:** Enter a user name if FTP requires a user name and password to log in.
- **Password:** Enter a password if FTP requires a user name and password to log in.
- **Access Address:** File path to save the image.
- **Boot self-start:** FTP server boot self-start is set.
- **Save by date:** After enabling, a folder named by date will be automatically created under the set access address every day.
- **Chart Clearing Mode:** Chart Clearing Mode is set. You can select Chart Clearing by Time or Chart Clearing by Number.
- **Picture saving time:** when the picture cleaning mode is selected to clean the picture by time, after the automatic picture cleaning is enabled, the creation time of the picture in the access address folder or the picture in the subfolder is compared with the current time, and it is earlier than the set picture saving time, then it will be cleared. For example above, pictures created 30 days ago will be cleared.
- **Picture Saved Number:** In the picture cleaning mode, the number of pictures or subfolders in the access address folder exceeds the set number of pictures saved, and pictures will be deleted to create earlier pictures. Note: Since the clear picture is polled by a timer, the

number of pictures fluctuates and will not always remain at the set number of pictures to be saved.

- **Automatic cleaning:** the automatic cleaning button is turned on, and the cleaning function takes effect. And only clear jpg, bmp, png suffix of the picture. Note: If the folder named in yyyy-MM-dd format (for example, 2024-03-05) is empty after the picture is cleared, the 2024-03-05 folder and subfolders will be cleared.
- **Start:** Start the FTP server.
- **Stop:** The FTP server is stopped.
- **Exit:** Exit the FTP server.

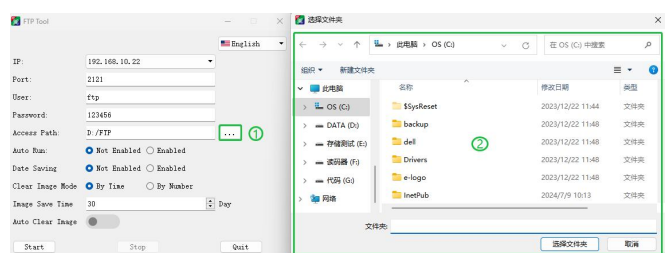
3 Configure the FTP Service.

Set the server IP, port, user name and user password, and ensure that the parameters configured in the software are consistent with those of the FTP server gadget.



4 Configure the storage path.

On the FTP server, set the image storage path and click  to select the file path.



Start the service.

According to the actual needs to enable the boot self-start, according to the date to save, automatic cleaning and other functions. Click  to start the FTP server.

5 Tested.

Run the code reader decode. Open the set image storage file path and observe whether it is saved normally. If the image is saved successfully, the configuration is successful.

Chapter9 FAQ

If the common problems still cannot be solved, please check the firmware details of the device and contact our relevant technical support.

FYR the firmware information of the device: open the OPT ID Viewer-> left device page-> device information-> firmware version.

1. Client cannot discover the reader device

Problem description:

The software cannot scan to the reader device.

Possible causes and solutions:

- ◆ **Cause 1:** Abnormal power supply or network connection of the device.
Solution: Observe the indicator light of the device to determine whether the power supply of the device and the network connection are normal.
- ◆ **Cause 2:** The firewall is not turned off.
Solution: Open the control panel, enter the system and security->Windows Defender firewall, in the firewall settings interface, select to close the firewall.
- ◆ **Cause 3:** The IP address of the device is occupied.
Solution: Search for the IP of the corresponding device through the management tool of the PC software, and click IP settings to modify the IP. For specific parameter configurations, see the [management tool](#).

2. Client cannot connect to the reader device

Problem description:

The software can scan to the reader device, but cannot connect properly.

Possible causes and solutions:

- ◆ **Cause 1:** The device and the client are not on the same LAN.
Solution: Modify the IP address so that the IP address of the device and the PC are in the same LAN.
- ◆ **Cause 2:** The device has been connected by another program.
Solution: After disconnecting the control of the device from other programs, reconnect it.

3. The barcode reader is disconnected

Problem description:

During normal work, the connection is suddenly lost and the computer or other terminal equipment cannot communicate normally.

Possible causes and solutions:

- ◆ **Reason 1:** Unstable or interrupted network signal.
Solution: Check the network connection, ensure that the network connection is stable, and check the network settings and configuration. You can try restarting the network device or router.
- ◆ **Reason 2:** Problems with hardware, such as poor network cable, loose and damaged interface, unstable power supply, etc.
Solution: Ensure that the power supply of the barcode reader is stable, check the hardware status of the barcode reader device, cross-verify the hardware, and replace it if it is defective.

4. Image window does not display image

Problem description:

After the device is connected normally, the client cannot capture the image or the screen is completely black.

Possible causes and solutions:

- ◆ **Reason 1:** Trigger mode is turned on.
Solution: Turn off the trigger mode on the input and output page or check the set trigger signal status.
- ◆ **Cause 2:** The software version does not match the device firmware version.
Solution: View the software version information through client-> menu bar-> help-> about. if it does not match the firmware version of the device, please contact technical support personnel to obtain the corresponding version software.
- ◆ **Reason 3:** Insufficient illuminant brightness or equipment exposure value is too small.
Solution: Adjust the brightness of the illuminant or manually increase the exposure value of the device.

5. Unable to recognize barcode

Problem description:

After the device is connected normally, the captured image can be previewed normally, but the barcode cannot be recognized.

Possible causes and solutions:

- ◆ **Reason 1:** Decoding algorithm is not added.
Solution: Through the client-> algorithm page, click automatic identification or manually add the code system to be read.

- ◆ **Cause 2:** The recognized barcode is an unsupported barcode type.

Solution: Contact technical support personnel to clarify the type of barcode you need to identify and its requirements.

- ◆ **Reason 3:** The image collected by the equipment does not meet the code reading requirements. For example, PPM, clarity, contrast and other indicators do not meet the requirements of the algorithm reading code.

Solution: Ensure that the barcode printing quality is good, try to adjust the lighting conditions of the equipment, and adjust the parameter settings of the equipment, such as exposure time, contrast, brightness, etc., to improve the image quality and increase the success rate of code reading.

6. The upper computer cannot trigger the barcode reader to scan the code.

Problem description:

When the host computer tries to trigger the barcode reader to scan the code, the barcode reader does not respond or cannot correctly perform the code scanning task.

Possible causes and solutions:

- ◆ **Reason 1:** Trigger mode is not turned on.

Solution: Check whether the trigger mode is enabled through the client-> input and output page, and check whether the port number and trigger command settings are consistent with the host computer.

- ◆ **Reason 2:** The communication protocol does not match or the settings are incorrect, causing the instructions to not be transmitted correctly.

Solution: Check whether the communication parameter settings of the host computer and the barcode reader are consistent, and modify the parameters to ensure that they match the communication protocol and parameters of the barcode reader.