Smart Code Reader (5000P)

User Manual

V1.0.0

Foreword

Overview

This manual introduces the configuration and operations of 5000 Pro smart code reader (hereinafter referred to as the "the Reader"). Read carefully before using the device, and keep the manual safe for future reference.

Safety Instructions

The following categorized signal words with defined meaning might appear in the manual.

Signal Words	Description
 DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
 CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, reductions in performance, or unpredictable results.
	Provides methods to help you solve a problem or save time.
	Provides additional information as the emphasis and supplement to the text.

Revision History

Version	Revision Content	Release Date
V1.0.0	First release.	Jun. 2025

Important Safeguards and Warnings

This section introduces content covering the proper handling of the device, hazard prevention, and prevention of property damage. Read carefully before using the device, and comply with the guidelines when using it.

Operating Requirements

- Do not install or place the device in a location that exposes it to sunlight or heat sources.
- Keep the device away from dampness, dust or soot.
- Install the switch horizontally on a stable surface to prevent it from falling.
- Do not drip or splash liquid onto the device, and make sure that there is no object filled with liquid on the device to prevent liquid from flowing into it.
- Install the Parking Detector in a well-ventilated place, and do not block the ventilation of the Parking Detector.
- Operate the Parking Detector within the rated range of power input and output.
- Do not dissemble the device.
- Transport, use, and store the Parking Detector under the allowed humidity and temperature conditions.
- The device is a class I electrical appliance. Make sure that the power supply of the device is connected to a power socket with protective earthing.

Power requirements

- Use the power cords that are recommended for the region and conform to the rated power !
- Use the standard power adapter. We will assume no responsibility for any problems caused by the use of a nonstandard power adapter.
- Use power supply that meets SELV (extra low voltage) requirements, and supply power with rated voltage that conforms to Limited Power Source in IEC60950-1. For specific power supply requirements, please refer to device labels.
- The device is a class I electrical appliance. Make sure that the power supply of the device is connected to a power socket with protective earthing.

Table of Contents

1 Introduction

1.1 Overview

The 5000 Pro series smart code reader is a highly reliable and cost-effective device for industrial use. The 5000 Pro series smart code reader adopts the new optical design, which has the excellent imaging capability. Also, the 5000 Pro has the advantage of higher accuracy of code reading and faster code reading speed. The supported code types and communication protocols can meet the most requirements of the industrial-grade application, which means it can work stably in the complex industrial environment.

1.2 Features

- Supports integrated light source. Red and white light sources are available and can be controlled separately.
- Supports the electric focusing function and multiple focal lengths.
- Adopts industrial-grade Ethernet connector, IP67 rated.
- Supports multiple ports, such as IO port, Ethernet port, RS-232 port and GPIO port, and multiple communication protocols.
- Supports multiple options of code types, and code quality evaluation function
- Built-in deep learning algorithm and multi-parameter polling are supported to ensure the higher recognition efficiency in the complex scenes.

1.3 Appearance and Interface

1.3.1 Dimensions

The dimensions of the 5000 Pro smart code reader is in the figure below.

Figure 1-1 Vertical interface (mm)

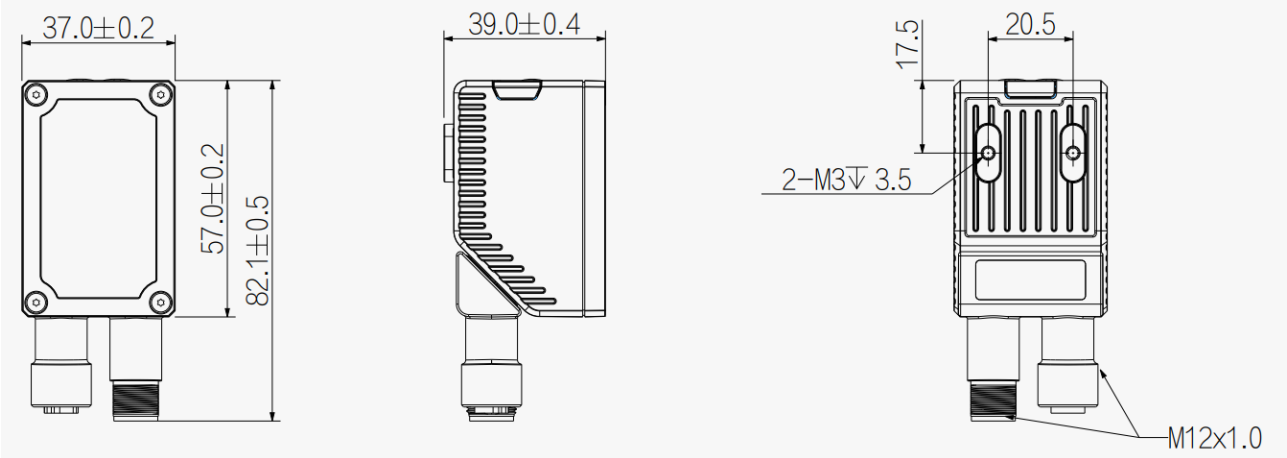
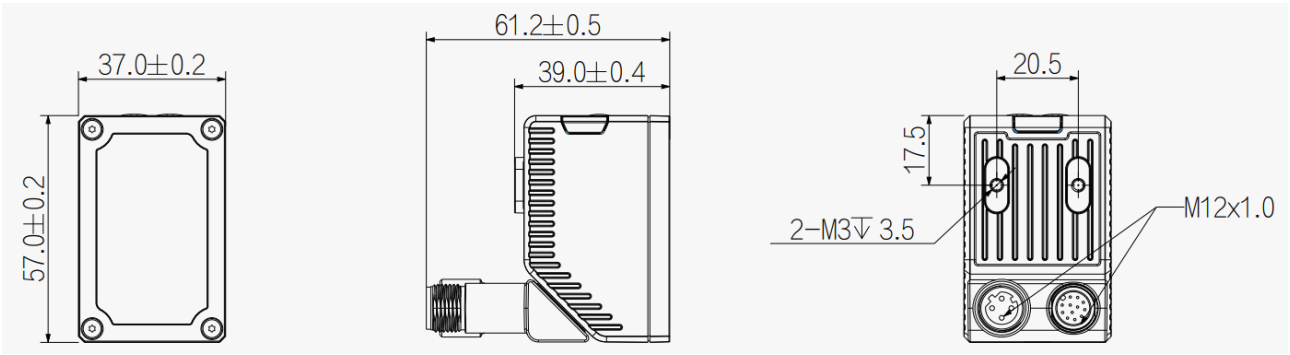


Figure 1-2 Horizontal interface (mm)



1.3.2 Appearance

See the following figures.

Figure 1-3 Appearance diagram

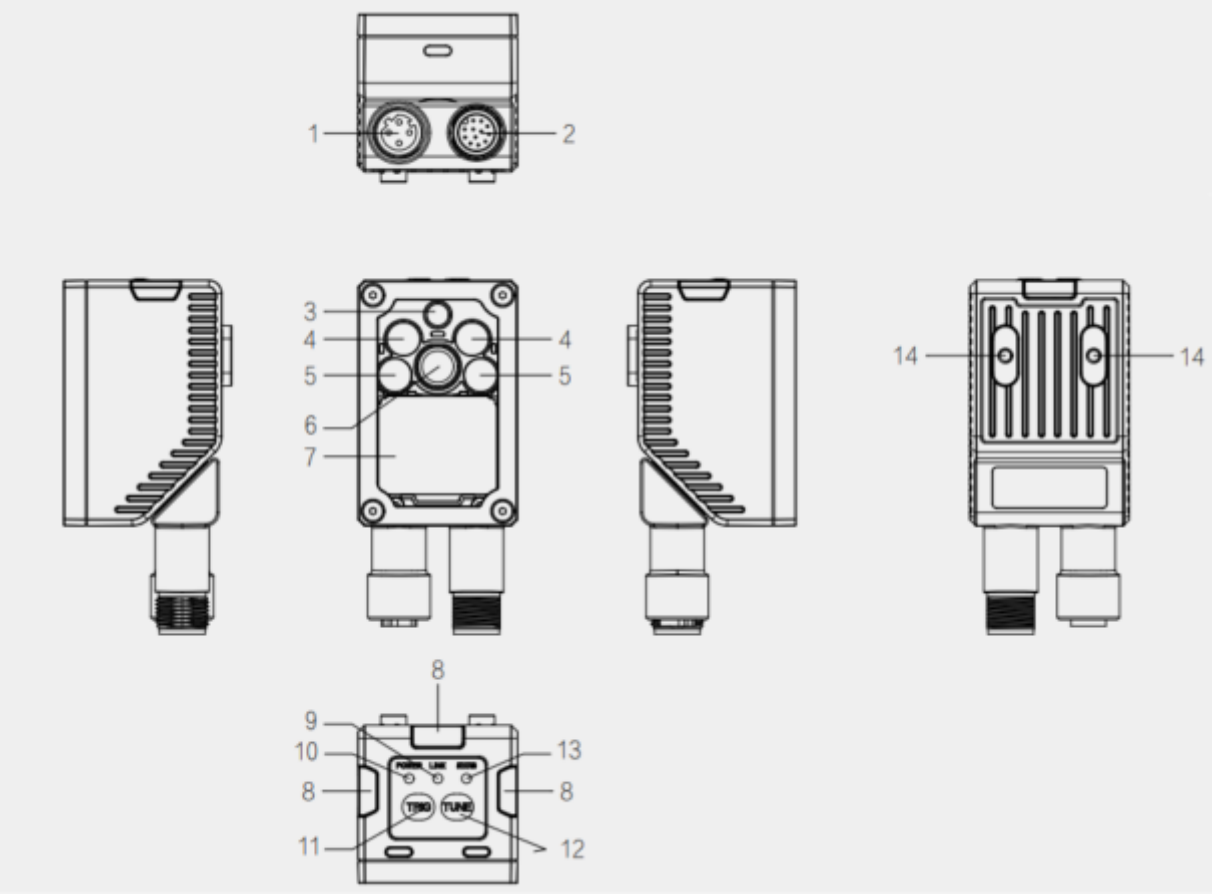


Table 1-1 Device component introduction

No.	Item	Description
1	Network Port	4 Gigabit ports
2	Power Port	12-Core I/O ports including power supply, I/O port, RS-232, etc.
3	Sighting Light	Physical positioning
4	Light Source	Non-polarized fill light.
5	Polarized Lights	Polarized fill light.
6	Sensor	For acquiring images.
7	Diffused Lights	Diffuse reflection fill light.
8	OK/NG Indicator	If the decoding result is OK, the indicator is solid green; if the decoding result is NG, the indicator is solid red.
9	LINK Indicator	If the network connection is normal, the indicator is solid green; when the data transmission is performed, the indicator is flashing green.
10	POWER Indicator	Power indicator is solid green after power supply port is connected normally.
11	TRIG Button	When the device is in the trigger mode, press the TRIG button once to trigger the reader once.
12	TUNE Button	Long press the button for 3 seconds, quickly press the button once after hearing the beep sound, the reader will perform smart adjustment of image parameters.
13	STATUS Indicator	ON: the sensor is in the trigger mode which means that the reader is streaming; OFF: the reader is not streaming.
14	Screw Hole	For fixing the device, and user can use the M3 screws packed in the package.

1.3.3 Interface

- 4-Core: M12 D-CODE female receptacle, including 100M network port.
- 12-Core: M12 A-CODE male connector, including power port, I/O trigger ports, and RS-232 serial port.

Figure 1-4 Port diagram

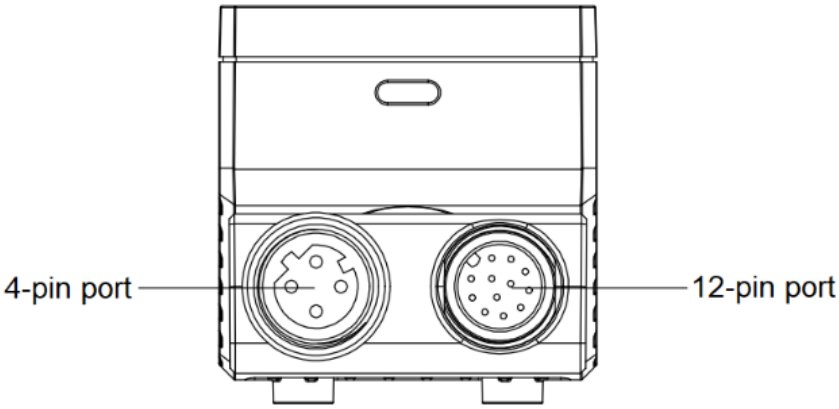
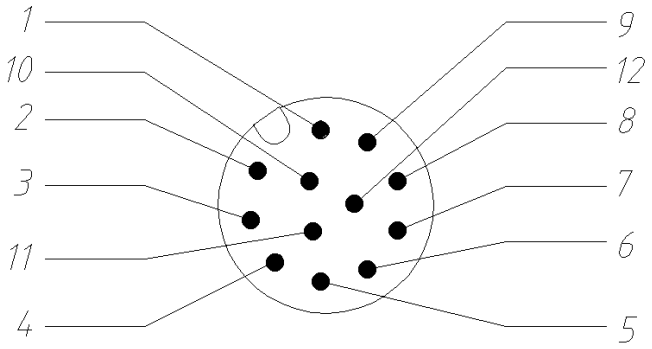


Figure 1-5 Pin definition of 12-Core port



The definitions of pins of the 12-core port are described as follows:

Table 1-2 Definition description

No	Item	Description	Recommend Cable Description	Recommend Cable Color	
1	OPT_OUT2	Opto-isolated output 2	Brown-White scattered wire		Brown-White
2	RS-232_TXD	RS-232 serial port for sending	DB9 female serial port		Grey
3	RS232_RXD	RS-232 serial port for receiving	DB9 female serial port		Purple
4	SIGNAL_GND	RS-232 serial port for grounding	DB9 female serial port		Black and white (casing)
5	OPT_IN1	Opto-isolated input 1	Yellow scattered wire		Yellow
6	OPT_IN_GND	Opto-isolated input GND	Purple-White scattered wire		Purple-White
7	POWER	Camera power	DC 5.5V female receptacle		Red

No	Item	Description	Recommend Cable Description	Recommend Cable Color	
8	POWER_GND	Power ground of camera.	DC 5.5V female receptacle	■	Black
9	OPT_OUT_GND	Opto-isolated output GND	Green scattered wire	■	Green
10	OPT_IN0	Opto-isolator input 0	Orange scattered wire	■	Orange
11	OPT_OUT0	Opto-isolated output 0	Blue scattered wire	■	Blue
12	OPT_OUT1	Opto-isolator output 1		■	Brown
-	-	Shielding GND	White scattered wire	□	White (casing)

Figure 1-6 I/O cable

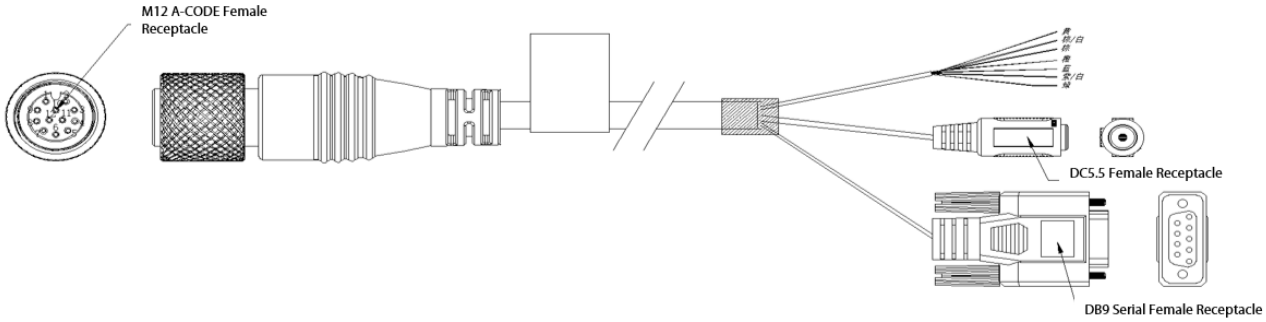


Figure 1-7 Serial port female receptacle

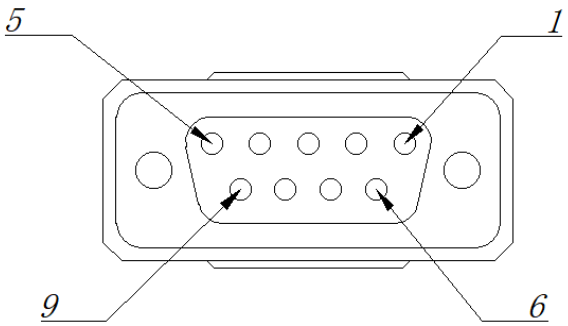


Table 1-3 Definition description

Pin	Item	Description	Color
2	RS232_TXD	RS-232 serial port for sending	■ Grey
3	RS232_RXD	RS-232 serial port for receiving	■ Purple
5	SIGNAL_GND	RS-232 serial port for grounding	■ Black and white (casing)

- When using the device, it is recommended to use the cable as shown above.
- The ports of cable for supplying power connecting to pin 7 and pin 8 have been made into DC 5.5 female receptacles, therefore no additional wiring is required.
- The pins of cable corresponding to the RS-232, such as Pin 2, Pin 3, and Pin 4, have been made

into DB9 female receptacle; therefore, no additional wiring is required.

- Other pins of cable can be wired according to the actual demands.

2 Electrical Specifications

2.1 Power and Network Port

Table 2-1 Power and Network Port

Parameter	Description
Power Supply	DC +16V~+24V, <1% ripple, powered through 12-core M12 connector. 24AWG cable or thinner cable.
Data Output Ports	100M Ethernet
I/O Port	One RS-232 serial port (non-isolated) Two opto-isolated input ports (LINE0 and LINE1) Three opto-isolated output ports (LINE2~LINE4)
Certification	CE

2.2 I/O Ports

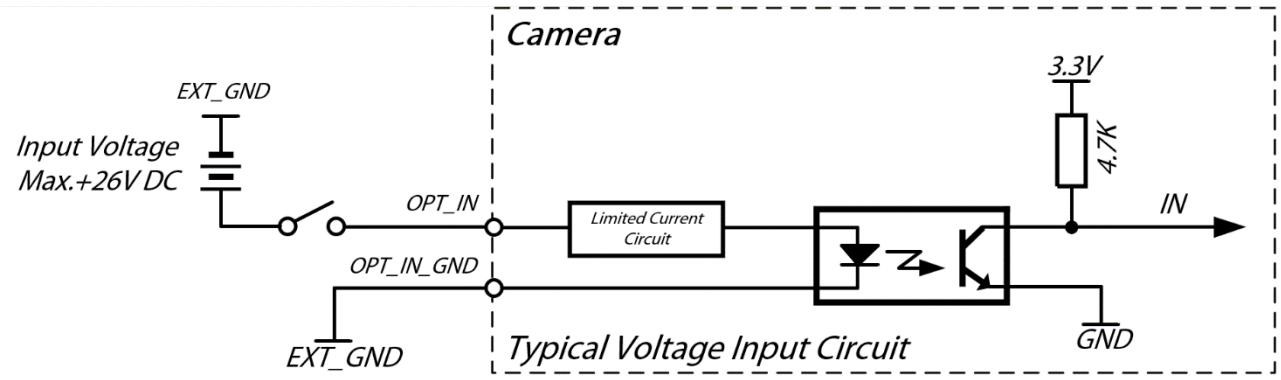
2.2.1 Opto-isolated Input

Table 2-2 Voltage Parameters

Input Voltage	Description
+26 VDC	Extreme voltage. The input voltage cannot exceed the value. Otherwise, the device might be damaged.
0VDC~+24VDC	Security working voltage range of I/O input
0VDC~+6VDC	Logic 0
+6VDC ~+9 VDC	The input status changes and the logic status is unsteady within this voltage range
>+9VDC	Logic 1

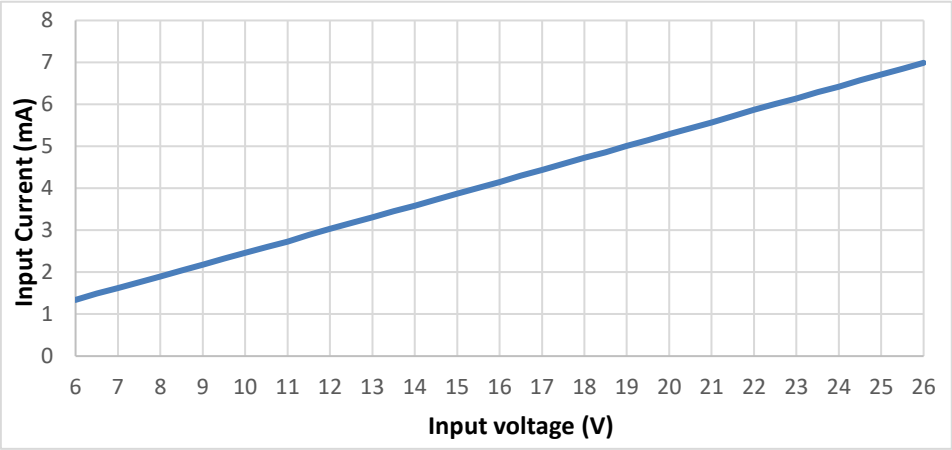
The typical circuit diagram of opto-isolated input port is as follows.

Figure 2-1 Opto-isolated output typical circuit



The relationship between the sink current and input voltage of opto-isolated input port is as follows.

Figure 2-2 Opto-isolated input chart



- The maximum sink current of the opto-isolated input is 7mA.
- Values in the line chart are obtained at an environmental temperature of 25°C (77°F). Therefore, the actual values may vary among the different models of camera in the different environments.

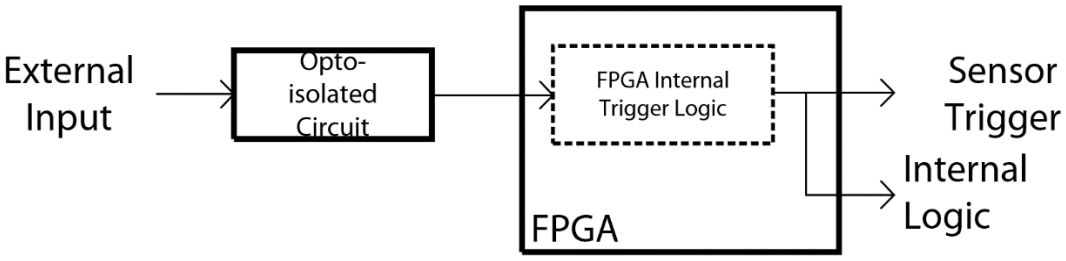
The relationship between the input signal amplitude and trigger delay is as follows.

Table 2-3 Opto-isolated input signal amplitude and trigger delay

Input signal Amplitude (Vp-p)	Rising Edge Trigger Delay tDR (us)	Falling Edge Trigger Delay tDF (us)
9	18.80	23.70
12	7.20	31.30
20	3.00	38.40
24	2.40	40.10
26	2.20	41.40

The trigger input delay measures the time delay value from external opto-isolated input port to the FPGA input pin, which means the internal logic delay of the FPGA is not included.

Figure 2-3 Delay logic diagram



Minimum input pulse width of trigger input signal is described in the table below.

Table 2-4 Opto-isolated input signal and minimum pulse width

Input Signal Amplitude (Vp-p)	Minimum positive pulse width (us)	Minimum negative pulse width (us)
9	36.00	90.00
12	10.10	90.00
20	3.10	90.00
24	2.40	90.00
26	2.10	90.00

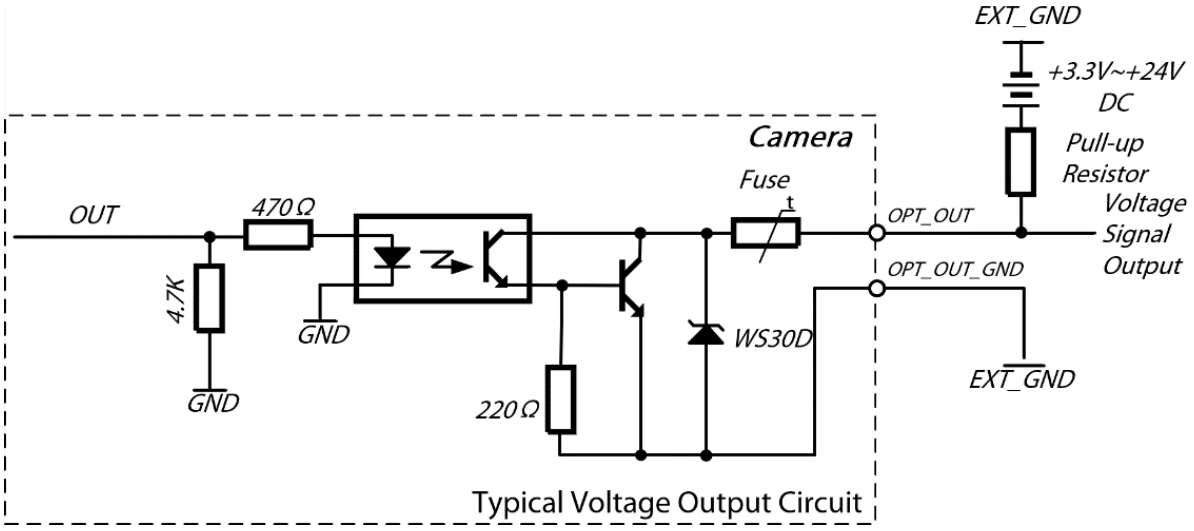
2.2.2 Opto-isolated Output

Table 2-5 Opto-isolated Output

Voltage	Description
+26 VDC	Limiting voltage. Input voltage must not exceed this limit. Otherwise, it may cause damage to the equipment.
<+3.3VDC	Possible error on I/O output.
+3.3VDC~+24 VDC	Security working range of I/O output

The typical circuit diagram of opto-isolated output is as follows.

Figure 2-4 Opto-isolated output typical circuit



The rising/falling time and rising/falling edge trigger delay time when using the 1 kΩ pull-up resistor are described in the table below.

Figure 2-5 Voltage output and delay diagram

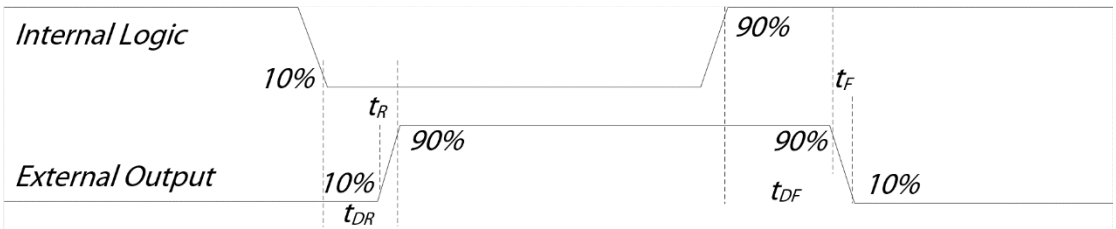


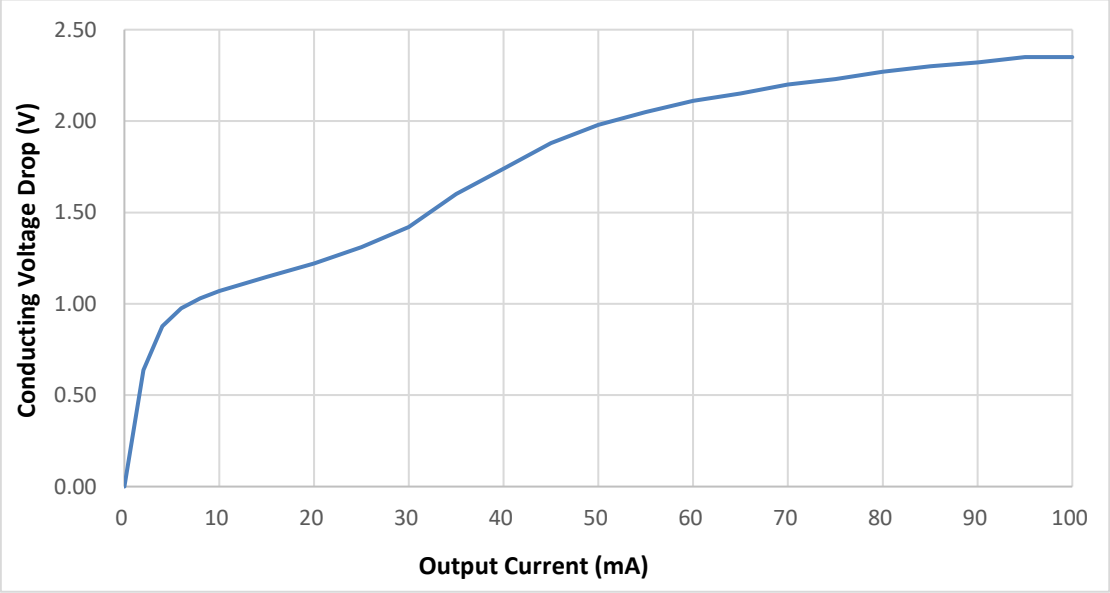
Table 2-6 Opto-isolated output signal amplitude and trigger delay

External Power Voltage (V)	Rising Time tR (us)	Falling Time tF (us)	Rising edge Trigger Delay tDR (us)	Falling Edge Trigger Delay tDF (us)
5	19.70	3.20	39.9	8.06
12	24.06	5.22	44.8	11.8
24	30.11	8.10	44.8	53.2

- The output delay measures the delay time value from FPGA internal logic output to the external opto-isolated output pin, which means the FPGA internal logic delay is not included.
- Values in the line chart are obtained at an environmental temperature of 25°C (77°F). Therefore, the actual values may vary among the different models of camera in the different environments.

The relationship between the output conducting voltage drop and output current is shown in the chart below.

Figure 2-6 Opto-isolated output chart



- The maximum conducting voltage drop at the opto-isolated output end is 2.35V. This result is obtained under the maximum output current 100mA.
- Values in the line chart are obtained at an environmental temperature of 25°C. Therefore, the actual values may vary among the different models of camera in different environment.

2.3 External I/O Wiring

2.3.1 Opto-isolated Input

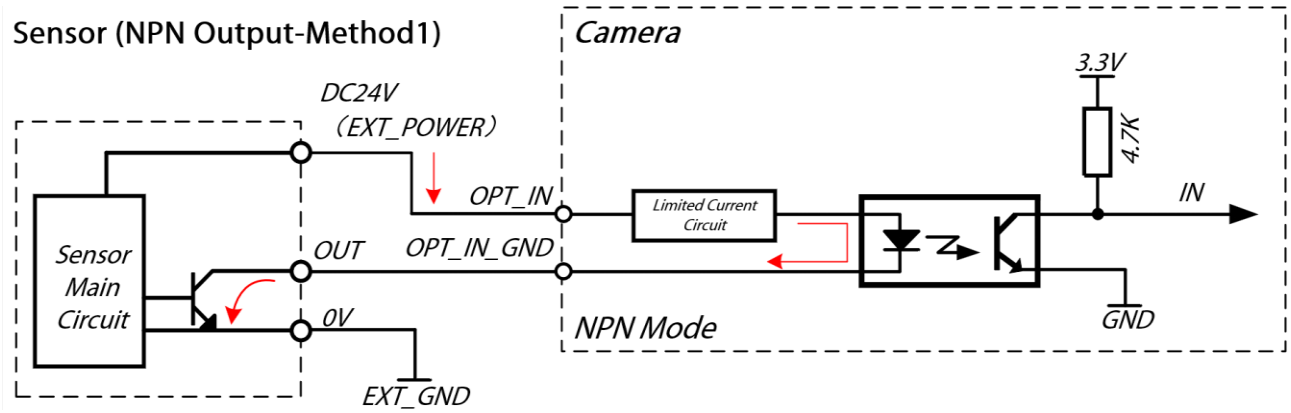
The opto-isolated input can be used with the sensors supporting the NPN, PNP, and push-pull output

structures.

2.3.1.1 NPN Output Structure

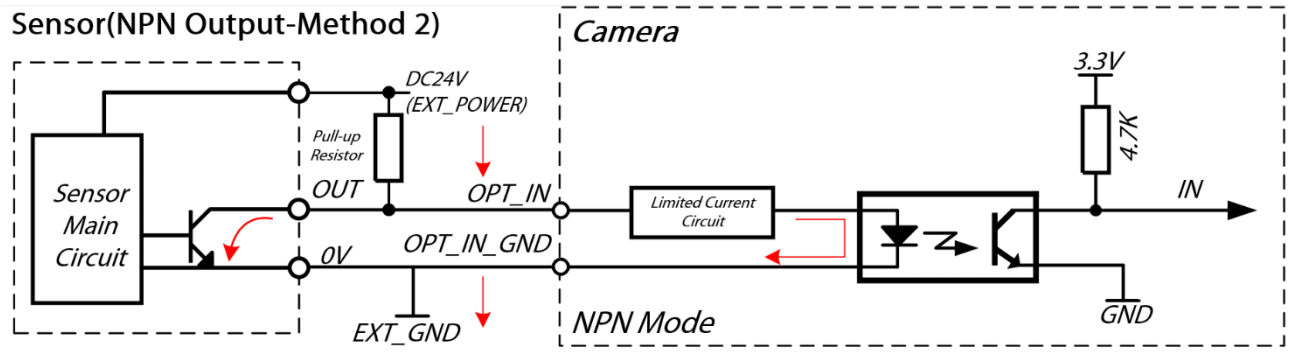
- Method 1: No Pull-up Resistor (Recommend)

Figure 2-7 Wiring Method of NPN Output Structure (1)



- Method 2: Add Pull-up Resistor

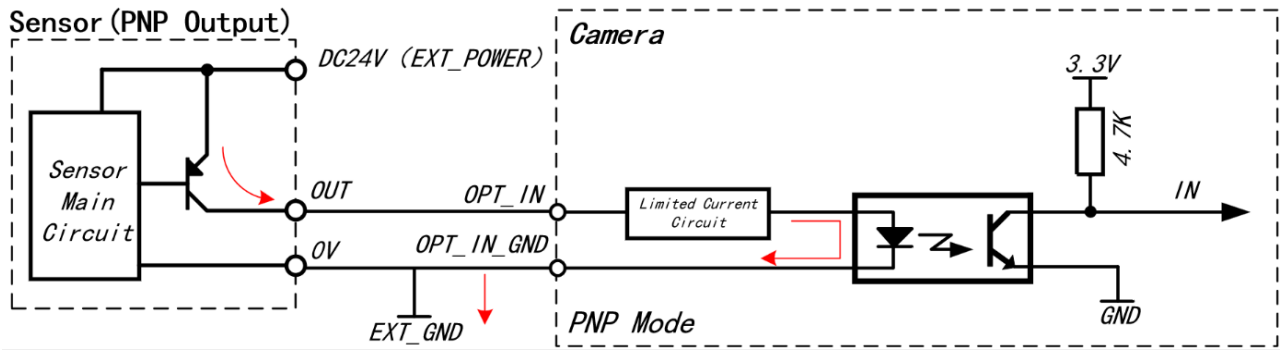
Figure 2-8 Wiring Method of NPN Output Structure (2)



- "EXT_POWER" refers to the external positive port of power supply; "EXT_GND" refers to the external power grounding port. The power supply can be the independent switch-type power supply, also can be the power supply of the sensor.
- This wiring method is suitable for the sensors with NPN open-collector output structure.
- If the external pull-up resistance is adopted, the voltage and pull-up resistance shall be 1kΩ at 3.3V, 1kΩ at 5V, 2.4kΩ at 12V, 4.7kΩ at 24V. If user needs to improve the current capacity, the pull-up resistor shall be less than 1kΩ, and the rated power of shall be more than 1W.
- In some models, the "OPT_IN_GND" and "OPT_OUT_GND" are integrated as one common port, namely "OPT_GND".

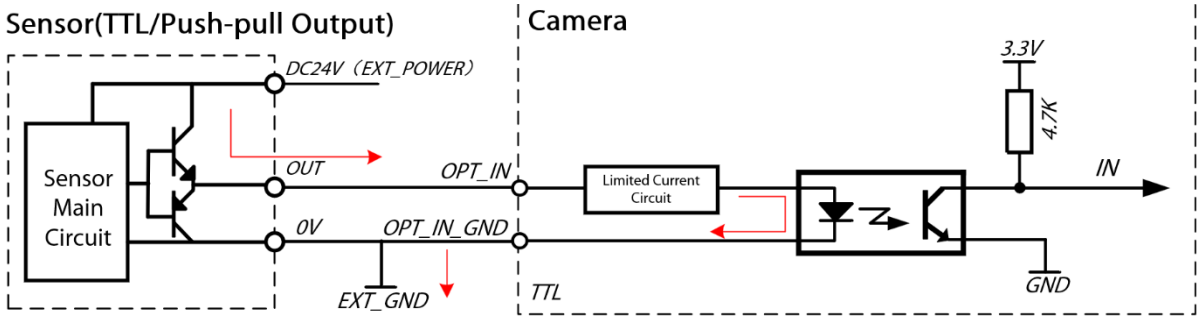
2.3.1.2 PNP Output Structure

Figure 2-9 Wiring Method of PNP Output Structure



2.3.1.3 TTL or Push-pull Output Structure

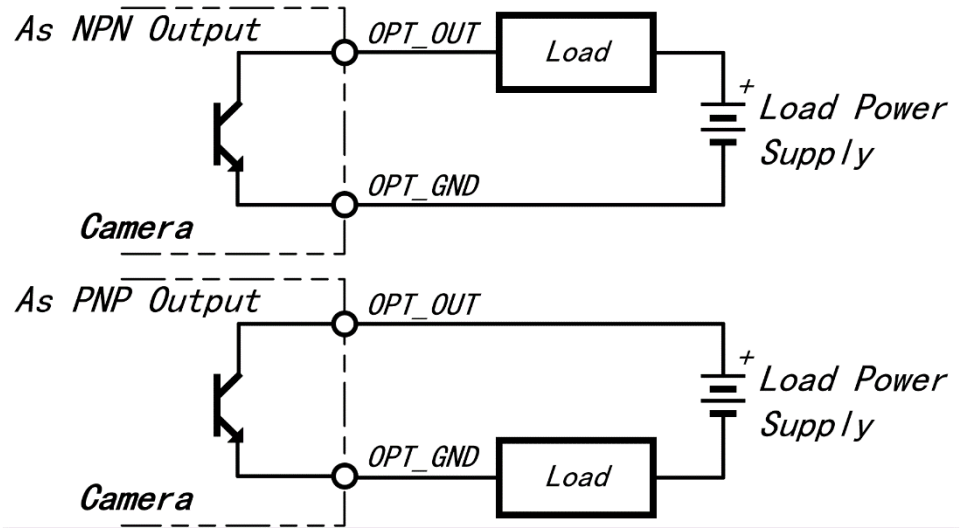
Figure 2-10 Wiring method of TTL/push-pull output structure



2.3.2 Opto-isolated Output

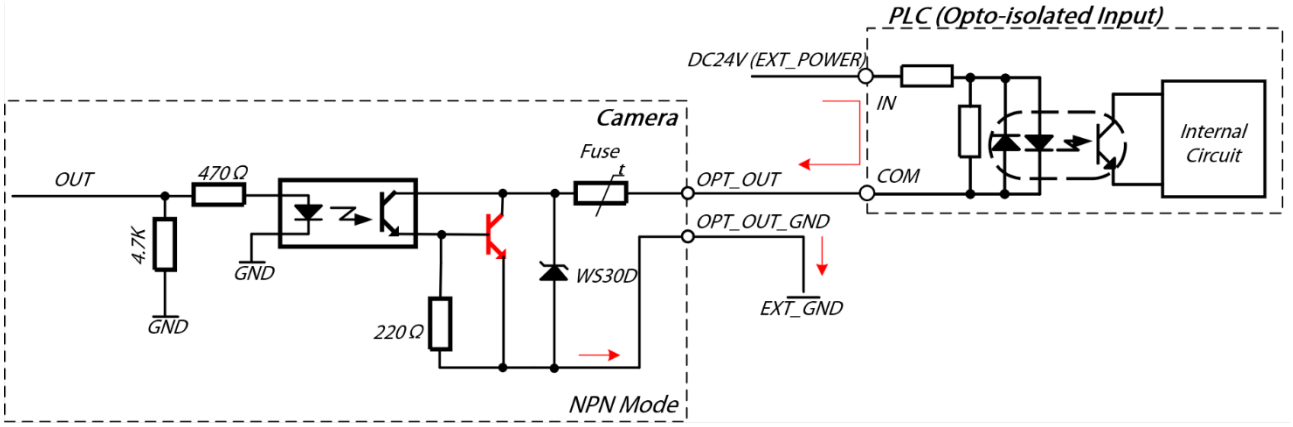
The transistor output of camera is separated from the internal loop by an opto-isolator. Therefore, the transistor output can be used as NPN output or PNP output.

Figure 2-11 Topology diagram of opto-isolated output structure



2.3.2.1 Code Reader as NPN Output

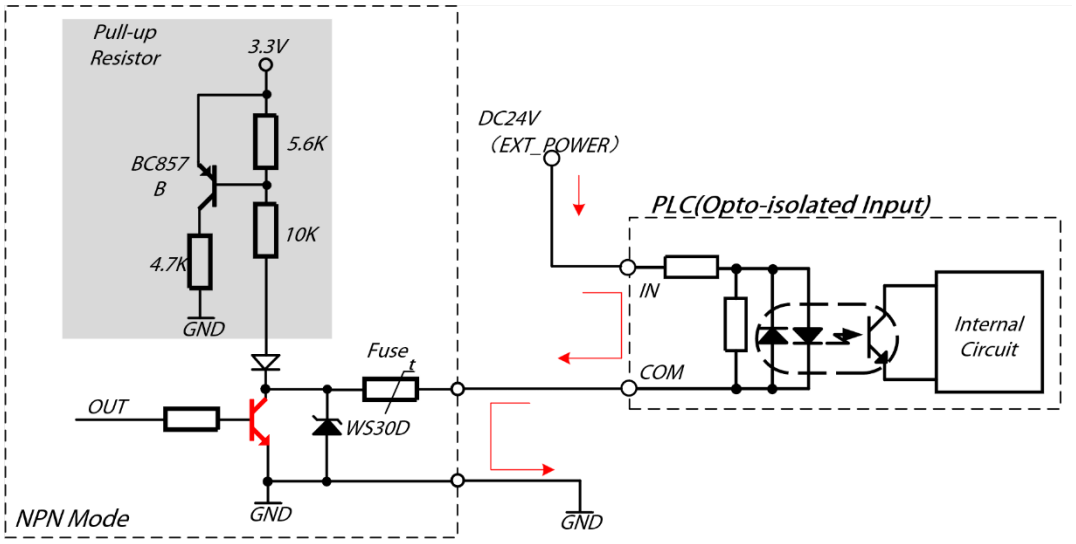
Figure 2-12 Wiring method of NPN output structure



2.3.2.2 GPIO as Output

The GPIO output is similar to the opto-isolated output, and the different between them is that the GPIO output should adopt the non-isolated wiring method, and the signal grounding port of GPIO and camera should connect to the common grounding port.

Figure 2-13 Wiring method of GPIO output structure



- Do not apply the voltage or connect load on the output terminals which exceeds the maximum value.
- Do not replace the fuse of the interface. If the fuse blows due to the overcurrent, such as short circuit, please contact our after-sales to provide the maintenance service.
- GPIO is the bidirectional port, and before connecting to the external power supply, please identify and set the correct the directions (output or input). Do not change the directions during the running of the camera after setting the directions. The wrong settings of directions will cause damages to the GPIO interface circuit.

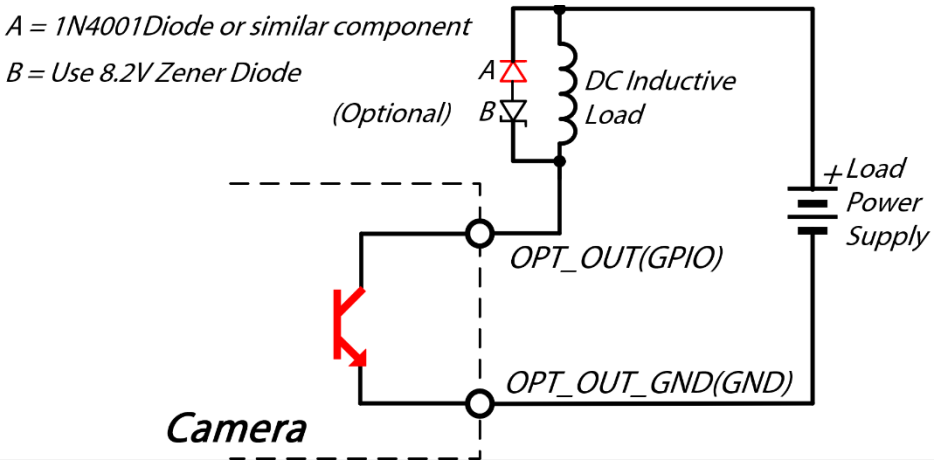
- Please do not use the GPIO output solution in the situation with serious electrical interference, because the GPIO is the non-isolated design which means its anti-inference performance is not good enough. We recommend you use the opto-isolated input or output interface.
- If the external pull-up resistance is adopted, the voltage and pull-up resistance shall be 1kΩ at 3.3V, 1kΩ at 5V, 2.4kΩ at 12V, 4.7kΩ at 24V. If user needs to improve the current capacity, the pull-up resistor shall be less than 1kΩ, and the rated power of shall be more than 1W.

2.3.2.3 Wiring Method of Relay

To drive the inductive load using camera output signals, such as relay, please use relay with built-in flyback diodes, or use the external flyback diodes. Otherwise, the overvoltage will cause damages on the output interface.

The diagram below is an example of the suppression circuit of DC inductive load. In most solutions, one additional diode A is required. If you need the faster shutdown speed, we recommend you use the Zener diode B. Ensure that the Zener diode can meet the current requirements of the circuit.

Figure 2-14 Wiring method of inductive load



2.4 How to Avoid EMI and ESD

In the industry environment, there are some equipment generating EMI, and the code reader is apt to be influenced by ESD situation. Serious EMI and ESD can lead to false triggering or streaming stopping suddenly. EMI and ESD will also bring instability to image quality, and interfere the reliability of image transmission between camera and PC.

For avoiding problem caused by EMI and ESD, following suggestions are put forward:

- Use high quality shielded cables, which can play a good effect on shielding EMI and ESD. Use high quality shielded cables, which can play a good effect on shielding EMI and ESD;
- Appropriate cable length is important. If the cable length is longer than expected, please fold the redundant part instead of looping it;
- Image data cable is suggested to be paralleled with power supply cable;
- Camera cable should **not be close to or paralleled with other cables** which are connected to high-power switch devices or high currents inside, such as stepper motor drive, solenoid valve;

- You are advised to connect all the grounding (GND) wires to a single point, i.e. single point grounding. For example, a distribution board can be used to connect the grounding wires of the whole system to a single point. This is done to avoid plenty of ground circuits (which are a major cause of EMI problems). Connect all the grounding (GND) wires to a single point. For example, a distribution board can be used to connect the grounding wires of the whole system to a single point. This is done to avoid plenty of ground circuits (which are a major cause of EMI problems).
- Adopt a line filter for the main power supply of the camera, or a separate power supply for camera is recommended.
- Please keep camera and corresponding cable away from the device generating sparks, such as brushed motors, relays, etc. A metal shielding shell is recommended if necessary.
- The following measures can be taken to reduce the risk of ESD:
  - ◇ Adopt a conductive material on the mounting surface;
  - ◇ Balance the environment humidity, the dry air may increase the risk of ESD discharge;

3 Installation

3.1 Installation Precautions

When installing, pay attention to static electricity, electromagnetic interference, lightning strike and surge as well as heat dissipation of the devices.

3.1.1 Safety Protection Conditions

Although the interior of the device is designed to protect against lightning, surge, EMI and ESD, from the perspective of safety, it is necessary to take measures to avoid or reduce these effects.

The followings are the basic protection methods:

- Adopt shielded network cables in SSTP structure. When meeting the usage requirements, please do not overly coil the network cable.
- The network cable should not be too long. If the network cable is too long, do not coil the redundant portion in an O-shape; it should be arranged in an S-shape to minimize the effect of electromagnetic interference.
- We recommend you use the power control cables with interference shielding function. It can be wired in parallel with the network cable, but should avoid winding each other.
- The power cable and network cable shall be far away from the equipment with large current, high voltage, frequent power on and off, start and stop, such as stepper motor. In particular, it shall not be wired in parallel with the cable of such equipment. This kind of equipment has strong electromagnetic radiation, which can be easily coupled to the transmission line of the equipment.
- The protective GND of all equipment shall be connected together, and then connected to the protective GND at a single point to avoid multi-point grounding. Multi-point grounding is easy to cause the voltage difference between each device, forming a loop, which is easy to couple electromagnetic interference.
- The AC power supply end of the switching power supply for the equipment and PC should come from the same AC socket, so that their protection GND can be connected together to avoid multi-point grounding. The high-power electromechanical equipment shall not connect to the same AC power.
- The magnetic ring can be adopted to the power control line of the equipment to absorb the electromagnetic interference signals.
- To reduce the ESD, the ESD wrist strap, anti-static clothing and shoes are recommended to wear, and the environment humidity shall be maintained in a proper range.

3.1.2 Heat Dissipation Requirements

The environmental requirements of handheld code reader are as follows:

- Temperature and humidity
  - ◇ The ambient temperature cannot exceed 50°C (122°F), and it is best to for the device to work

in an air-conditioned environment.

- ◇ Ambient Humidity: 20% to 80%, non-condensing.
- ◇ Storage Temperature: -30°C ~ +80°C (–22°F~+176°F).
- ◇ Storage Humidity: 20% to 80%, non-condensing.

- Do not coil the excessive cable into a loop, please bend it back and forth instead of coiling into a loop to ensure the performance of EMI.
- Do not bump the button during the transportation and assembly to prevent damage to the metal dome array.

3.2 Hardware Installation

3.2.1 Packing List

After unpacking the box, check if there are any obvious damages to the appearance of the equipment, and make sure the components are complete against the packing list, see the table below for more details.

Table 3-1 Packing list

No	Item	Quantity
1	Smart Code Reader	1
2	M3×6 Phillips-head screw	4

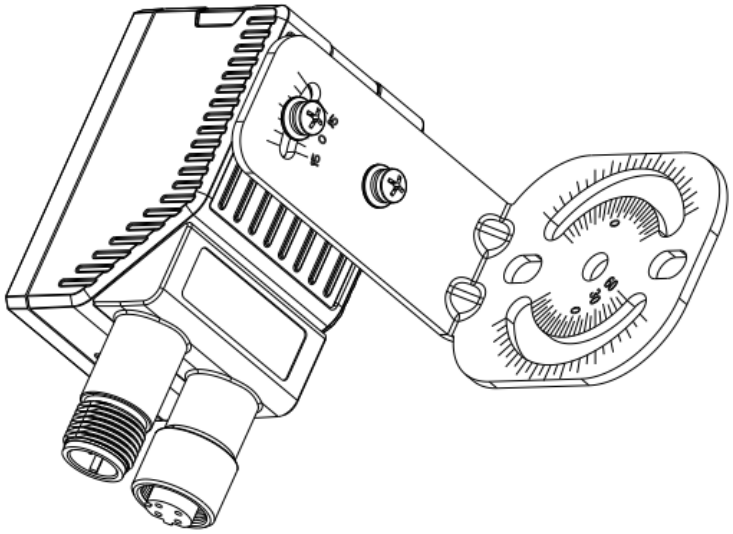
3.2.2 Installation

For the hardware installation, please prepare the items described in the list below.

Table 3-2 Device and materials list

No.	Name	Quantity	Description
1	Smart Code Reader	1	Device mentioned in this manual
2	Power Supply Cable and I/O Port Cable	1	Need to buy independently
3	Ethernet Cable	1	Need to buy independently
4	Power Adapter	1	Select the appropriate power adapter or switching power supply according to specifications of power supply and power consumption of the device. Please refer to the corresponding technical specification manual for more details. The power adapter and switching power supply are needed to be purchased separately.
5	Install Bracket	1	For fixing the device. Please refer to the figure 3-1 and 3-2.

Figure 3-1 Installation



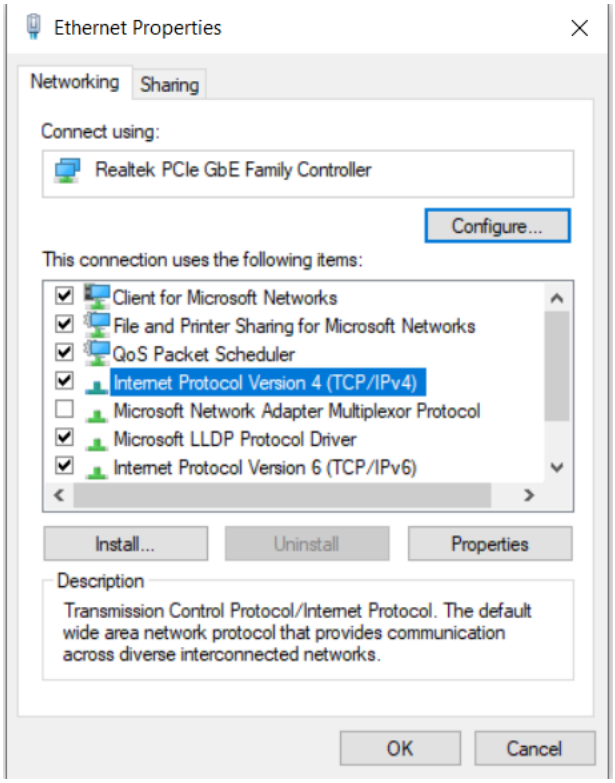
3.3 Network Settings

Procedure

Step 1 Select **Control Panel** > **Network and Internet** > **Network and Sharing Center** > **Change Adapter Configuration**.

Step 2 Select the corresponding network port and right-click **Properties** from the shortcut menu. A dialog box is displayed.

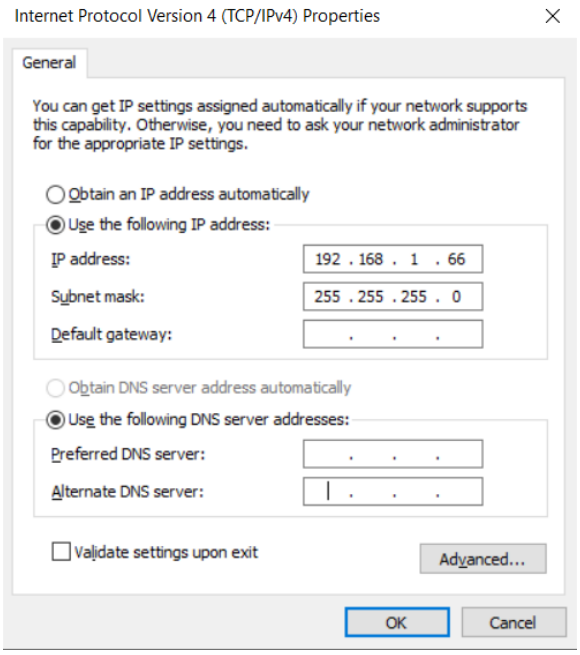
Figure 3-2 Attribute settings of NIC



Step 3 Double-click **Internet Protocol Version4 (TCP/IPv4)**, the IP address setting interface will pop

up, and configure the network port to automatically obtain an IP address or a static IP address. Ensure that the PC and the device are on the same LAN.

Figure 3-3 Windows NIC configuration



3.4 Software Installation

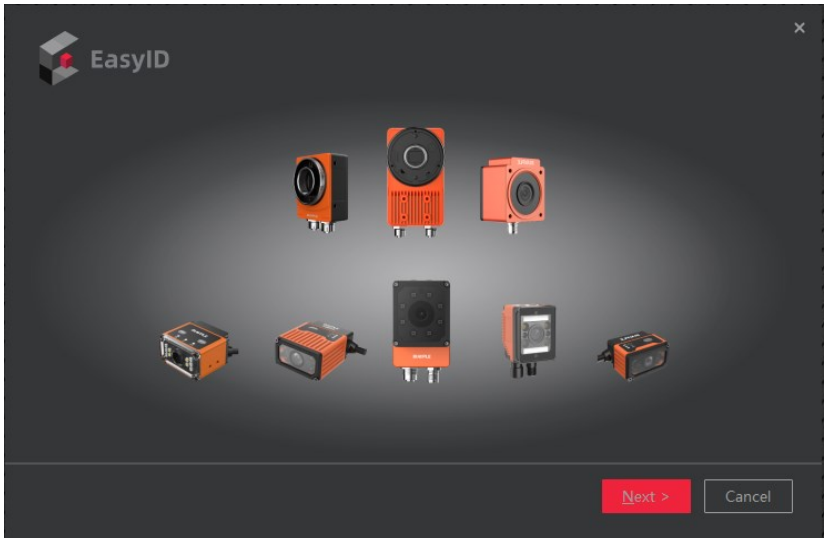
You can perform image debugging and parameters configuration through EasyID client. EasyID client can be installed on 32-/64-bit Windows 7.

- Contact technical support personnel to obtain the client program.
- Download Path: Visit the official website, and click the **Support** > **Download Center** > **Machine Vision** > **Software**.

Procedure

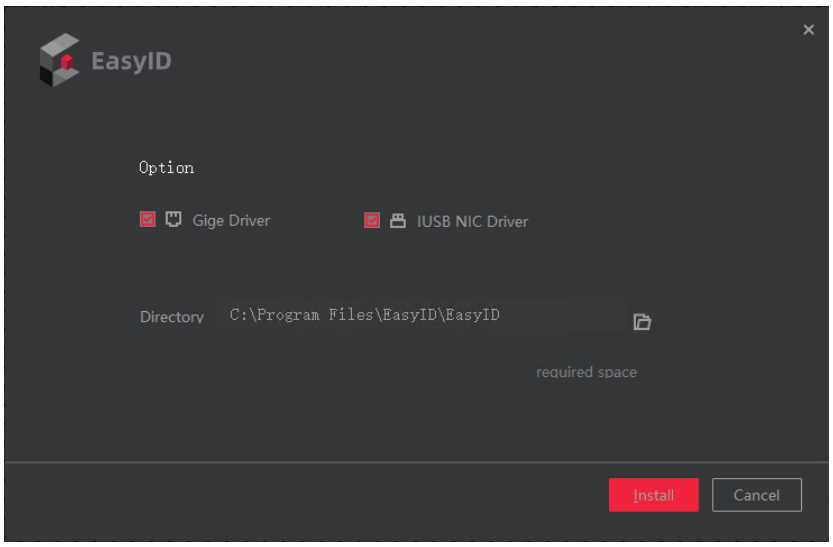
Step 1 Find the EasyID installation package on the desktop of Windows, double-click to run the program **EasyID_Vx.x.xx_xxxxxxxx.exe** or right-click it and click **Open**, the installation procedure will begin.

Figure 3-4 EasyID installation interface (1)



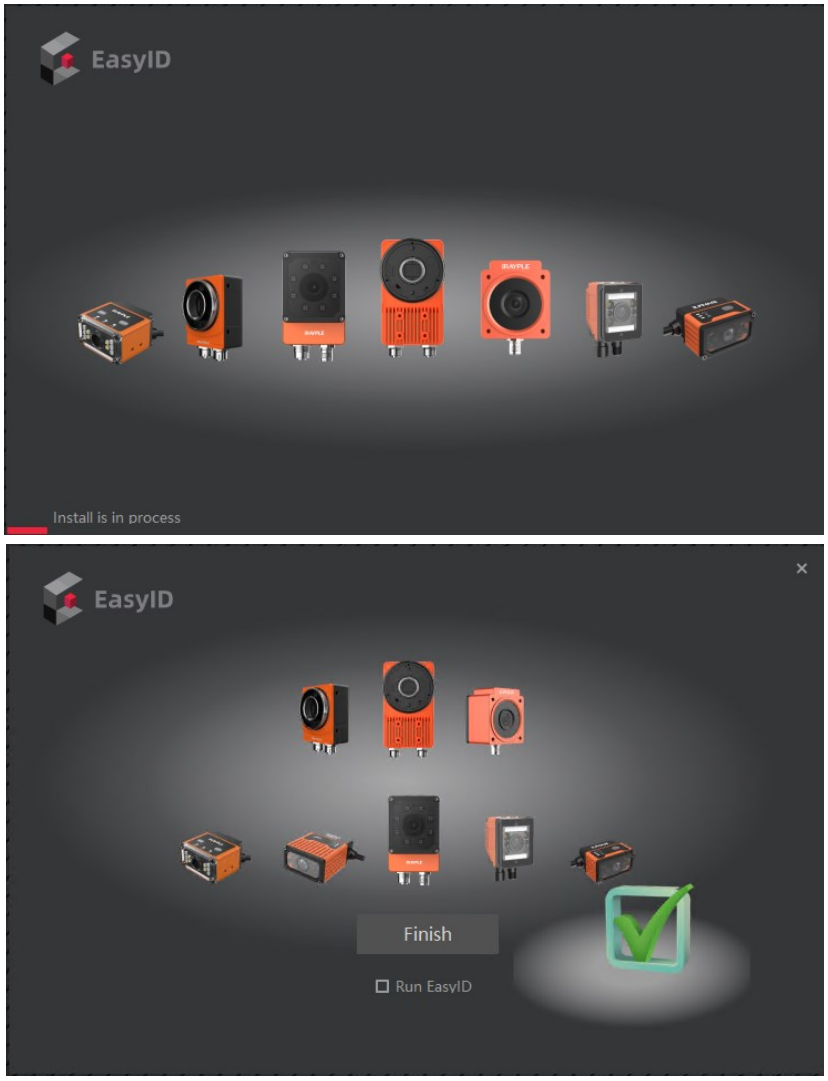
Step 2 Click **Next**, and then select the driver based on the device type. Click , and then select the installation path.

Figure 3-5 Drive and installation path selection



Step 3 Click **Install** to proceed automatic installation procedure, the automatic installation will take about one minute.

Figure 3-6 EasyID installation interface (2)



Step 4 After selecting **Run EasyID**, click **Finish**. After the installation finished, the software runs automatically.

Figure 3-7 EasyID Homepage

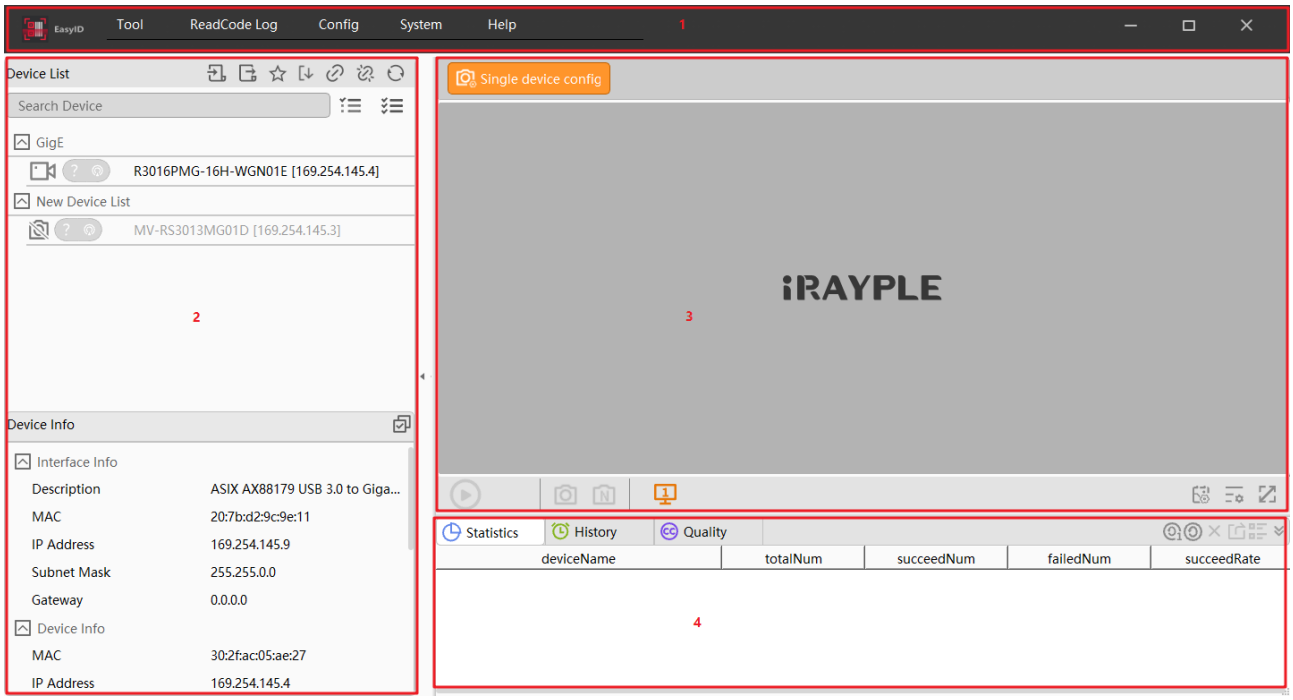


Table 3-3 Homepage Introduction

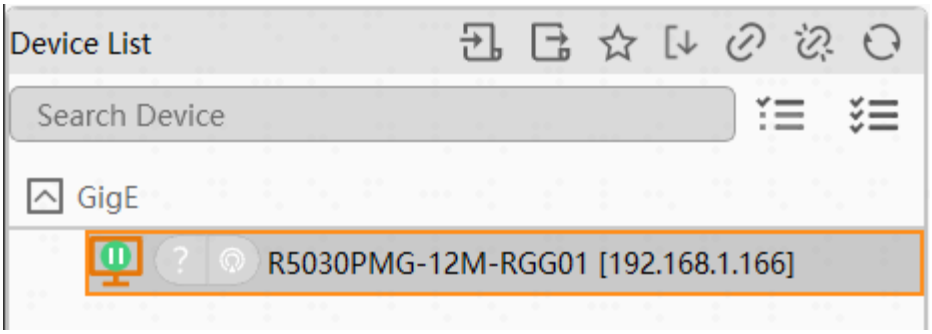
No.	Name	Description
1	Menu Bar	Common functions, including tools, logs, configuration, system and help.
2	Device List	The list of connected devices and device information.
3	Imaging Area	The image displaying area, which includes common-used configuration functions and image acquiring information, such as the received image quantity, network transmission speed, frame rate, image gray level, resolution, etc.
4	Result Area	Display the real-time information of decoding, statistics and code quality.

3.5 Device Connection

Procedure

Step 1 Connect the reader correctly, and ensure the powering and network of the device are normal; then, open the **EasyID**, and user can find the reader in the device list.

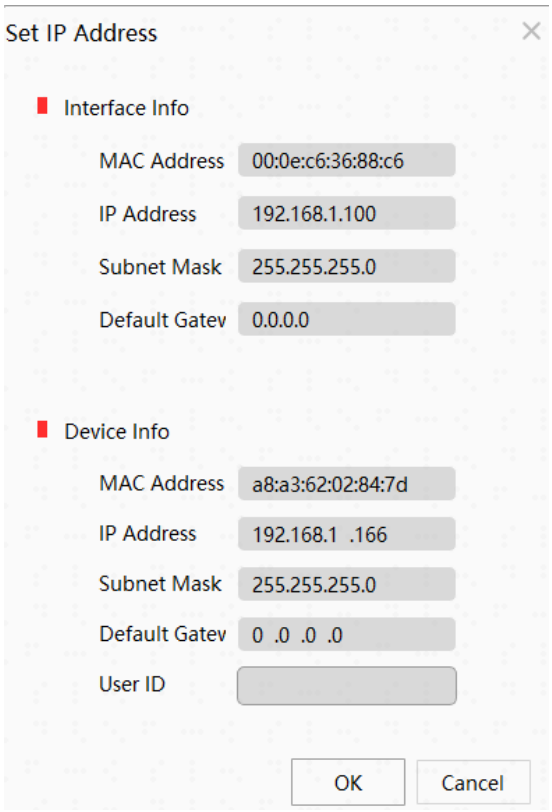
Figure 3-8 Device List



Devices in the same network segment with the PC will be displayed in the device list. When new devices come online, click to refresh the list.

Step 2 Click to enter the IP configuration interface. Make sure that the IP address of the device and the industrial computer are on the same network segment. Enter the IP address, and then click **OK**.

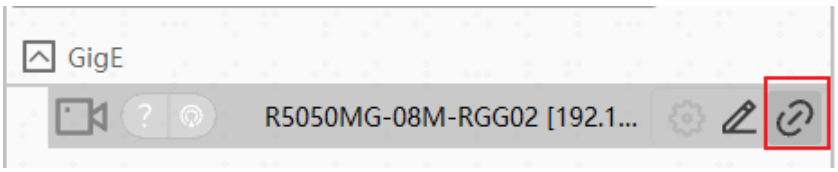
Figure 3-9 IP configuration of the Reader



You can modify the device name at the "User ID". The max character quantity can contain up to 16 bytes, and English, Chinese, and special characters are supported only.

Step 3 Click on the right side of the device list, or double-click the device in the device list to connect devices. After successfully connected, the status is shown as below.

Figure 3-10 Code Reader connected successfully

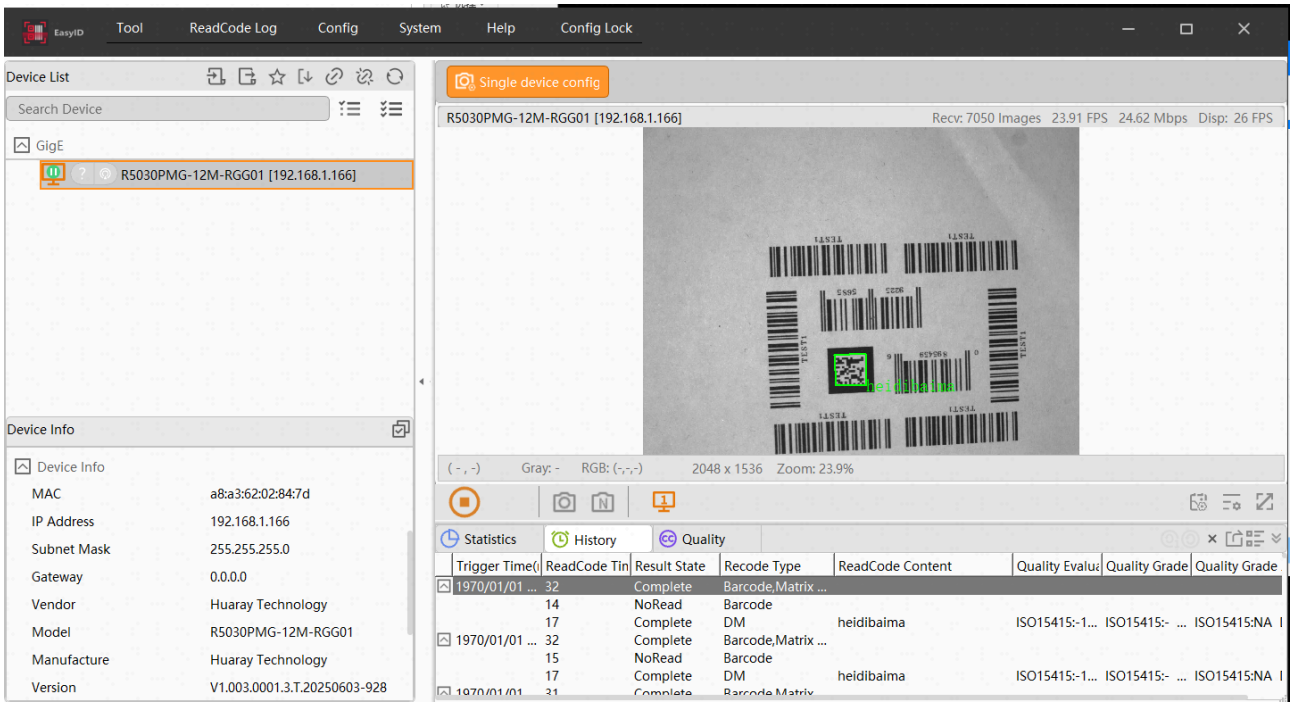


3.6 Client Operation

3.6.1 Basic Functions

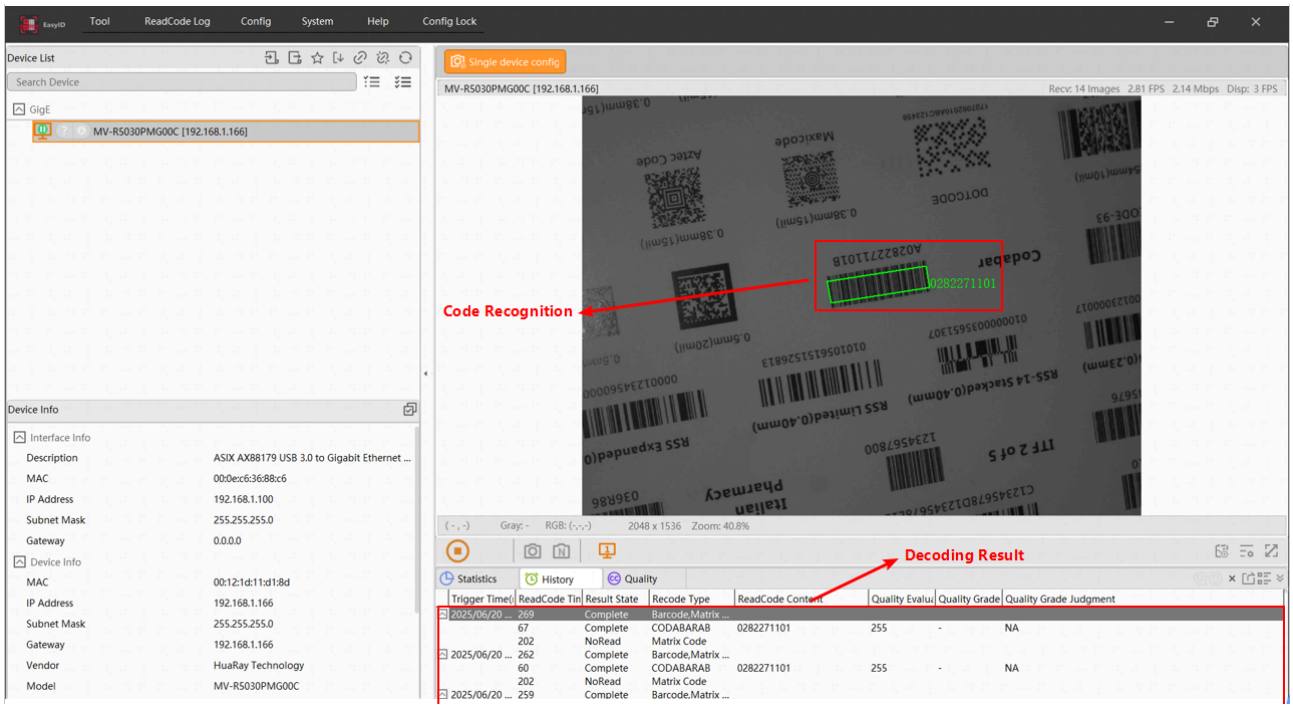
After the reader is connected, select the **FreeRun** mode and click to acquire the image.

Figure 3-11 Homepage



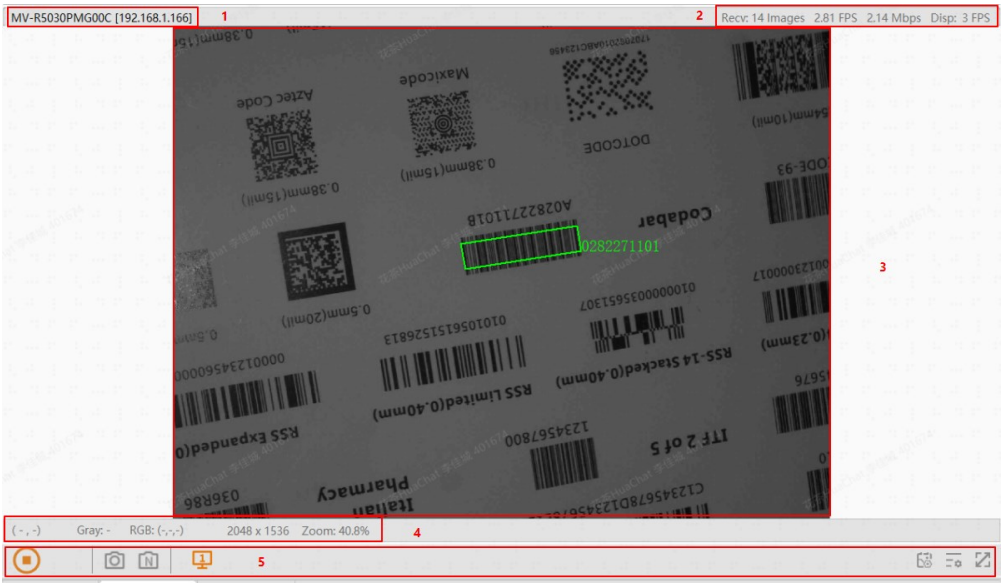
Place 1D/2D codes in appropriate places within the reader's field of vision to ensure that the image is not too blurry. The decoding function is enabled by default, so the device will automatically decode and display the results in real time on the client. Also, the decoding result will be updated in real time in the history information list, including Trigger Time (ms), ReadCode Time (ms), Recode Type, ReadCode Content, and more.

Figure 3-12 Real-time decoding



3.6.1.1 Image Displaying Area

Figure 3-13 Image Display Introduction

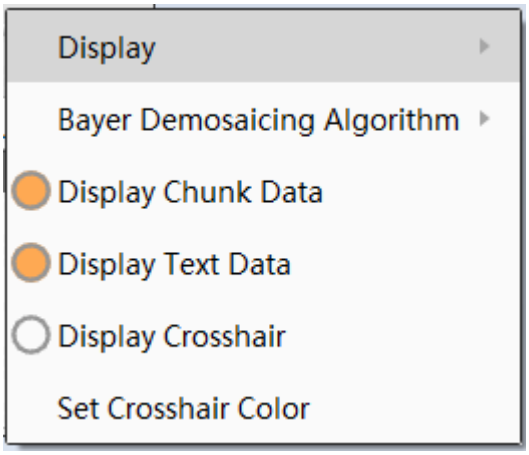


Hover the mouse on the Area 5 described in the figure above, the concealed default image tools will show up.

Figure 3-14 Concealed tools

Table 3-4 Parameter description

No.	Name	Icon/Button	Description
1	Basic Information	-	Display the model and IP address of the connected reader.

2	Real-Time Information	-	Display the received image quantity, frame rate, bandwidth, more.
3	Image Display Area	-	Display the image acquired by the reader. If the code reading mode is enabled and the code is identified, the code identified will be marked with the green box and its value will be displayed. Move the mouse over any part of the image and scroll the mouse wheel to zoom in or out the image.
4	Image Information	-	Mouse coordination, gray level, RGB value, resolution, zoom ratio etc., will be displayed in real time.
5	Operation Button		Play button, click it to display the acquired image.
			Snapshot, click it to capture the image.
			Capture button, click it to enable the image capturing. The captured images will be saved to the defined path. You can select System > Image Saving to configure the image saving path.
			Split screen button, the client can display the images from up to 16 devices in same time.
			Zoom-in button, click it to zoom in the image.
			Zoom-out button, click it to zoom out the image.
			Display scale button, click it to adjust the image displaying scale in 1:1.
			Display scale reset button, click it to reset the display scale.
			The central position of image displayed on the client will be restored after clicking it.
			Display setting button, the relevant display settings. 

			Global display button, display the image in full screen.

3.6.2 Device Information

Select the name of the device, and the device information will be displayed, including IP address, model, manufacturer, and firmware version, serial number, etc.

Figure 3-15 Device information

If an abnormal device needs to be checked by the vendor, please provide the device information, such as model, firmware version, and serial number to the sales or technical specialist.

4 Device Settings

4.1 Configuration List

4.1.1 Scan Settings

4.1.1.1 Common Configuration

Click the **Single Device Config** to the configuration interface, user can perform the exposure settings, ISP settings, fill light settings, etc.

Figure 4-1 Common configuration interface

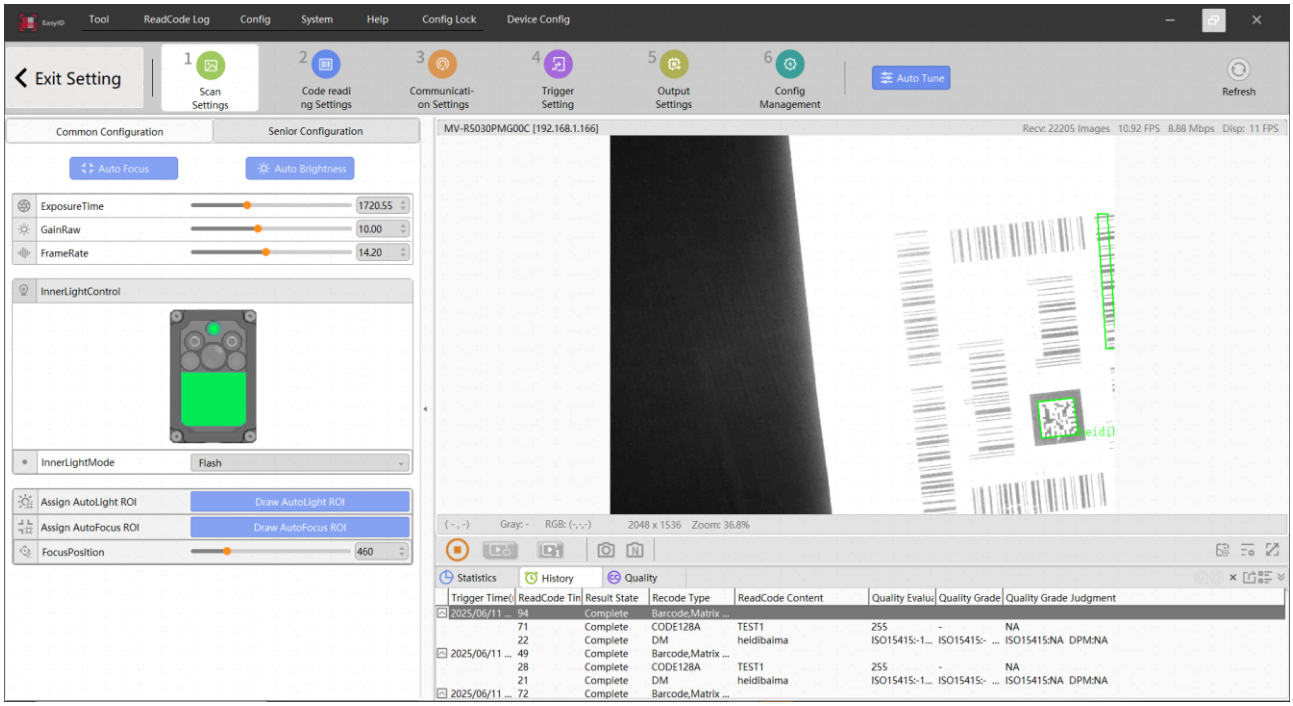


Table 4-1 Common configuration description

Parameter	Range/Option	Description
Auto Focus	-	The device will perform auto-focusing until the image is in focus.
Auto Brightness	-	The device will perform the brightness auto-adjustment until the brightness level of image reaches the target value.
Exposure Time	20μs~50000μs	Increasing the exposure time can enhance the brightness of the image, but it may also reduce the frame rate to some extent, and when capturing the moving objects, it is prone to motion blur.
Gain Raw	1~23	Increasing the gain value can enhance the brightness of the image, but it may also increase the image noise to some extent.
Frame Rate	0.5~maximum value	The frame rate range might be different depending on the device models.
Inner Light Control	Diffuse light, polarized light, or non-polarized light.	-
Inner Light Mode	Off /Strobe/High-speed strobe	-
Assign AutoLight ROI	-	To specify the area by drawing lines to define the ROI area for focusing. After clicking the Auto Brightness, the auto-brightness will be performed based on the defined ROI area to get the clearest images. This function can be used in the situations that the image has staggered heights in the camera's FoV.
Assign AutoFocus ROI	-	To specify the area by drawing lines to define the ROI area for focusing. After clicking the Auto Focus, the auto-focusing will be performed based on the defined ROI area to get the clearest images. This function can be used in the situations that the image has staggered heights in the camera's FoV.

Parameter	Range/Option	Description
Focus Position	0~MAX	When the device is not in the Auto Focus mode, user can drag the scroll bar, or enter the value to adjust the image definition.

- Too high exposure value will affect the device frame rate; therefore, user can adjust the parameters of gain, gamma, fill light brightness, etc. to maintain the high frame rate when the image brightness is high.
- To ensure the power consumption of the reader is in a normal range, there is a correlation between the exposure value and brightness level of the inner fill lights. If the brightness of fill light is too high, the upper limit value of exposure value will be lowered. The specific values may vary depending on the device model.

4.1.1.2 Senior Configuration

This configuration functions in the Senior Configuration interface include image format control, ISP control, exposure control, focus control, and auto light control.

Figure 4-2 Senior configuration

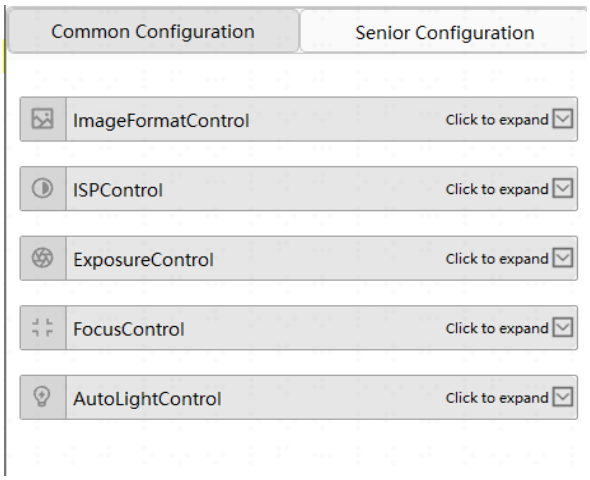


Image Format Control

Figure 4-3 ImageFormatControl

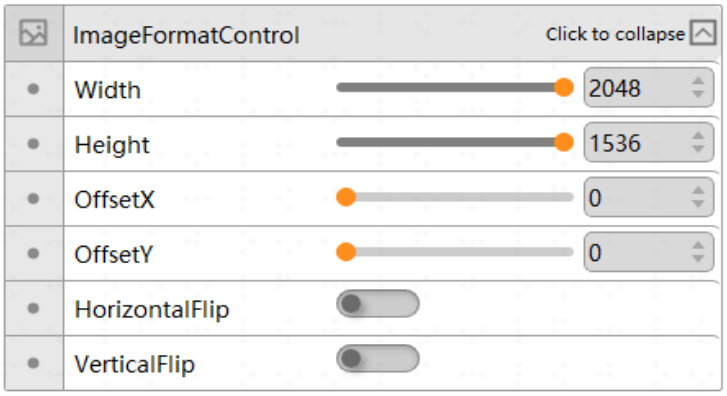


Table 4-2 Parameter description

Parameter	Range/Option	Description
Width	-	To manually modify the width parameter to crop the image.
Height	-	To manually modify the height parameter to crop the image.
OffsetX	-	To offset the cropped image vertically.
OffsetY	-	To offset the cropped image horizontally.
HorizontalFlip	Y/N	The image will be flipped on the Y-axis, which means the image is reversed from left to right.
VerticalFlip	Y/N	The image will be flipped on the X-axis, which means the image is reversed upside down.

ISP Control

Figure 4-4 ISP Control

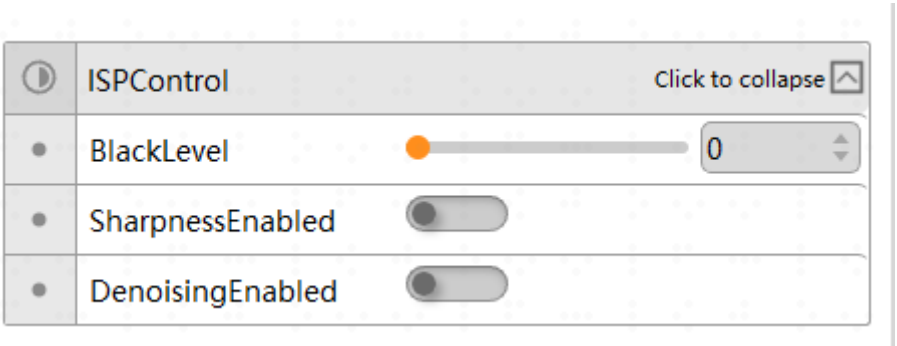


Table 4-3 Parameter description

Parameter	Range/Option	Description
Black Level	0~255	To adjust the brightness and contrast levels of the image. Increasing the value of the black level makes the image darker; decreasing the value of the black level makes the image brighter.
Sharpness Enabled	Y/N	To deblur the image, and the sides of the image will be sharped obviously.
Denoising Enabled	Y/N	To reduce the particles and discoloration in the image avoiding the image quality degradation to the greatest extent.

Exposure Control

Figure 4-5 Exposure Control

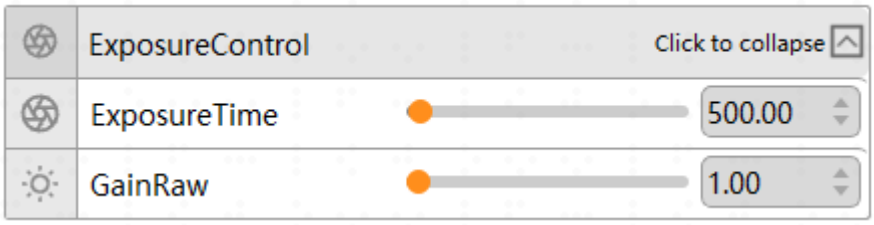


Table 4-4 Parameter description

Parameter	Range/Option	Description
Exposure Time	20μs~50000μs	Increasing the exposure time can enhance the brightness of the image, but it may also reduce the frame rate to some extent, and when capturing the moving objects, it is prone to motion blur.
Gain	1~23	Increasing the gain value can enhance the brightness of the image, but it may also increase the image noise to some extent.

Focus Control

Figure 4-6 Focus Control

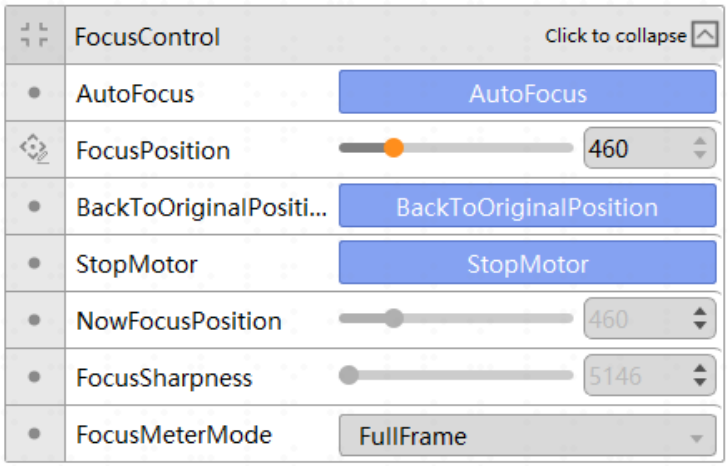


Table 4-5 Parameter description

Parameter	Range/Option	Description
Auto Focus	-	The device will perform auto-focusing until the image is in focus.
Focus Position	0~Max. Value	When the device is not in the Auto Focus mode, user can drag the scroll bar, or enter the value to adjust the image definition.
Back to Original Position	-	The electric focusing lens will automatically move to the Zero after clicking the Back to Original Position.
Stop Motor	-	The electric focusing lens will stop the focusing process after clicking the Stop Motor.
Now Focus Position	-	The stop position of the motor.
Focus Sharpness	-	It displays the image definition value calculated by the algorithm when the device is in the FreeRun mode. The greater the value, the clearer the image.
Focus Meter Mode	Full Frame	The device will focus based on the entire field of view in the Full Frame mode after clicking the Auto focus.
	ROI	After selecting the ROI, select the focusing area in the list, and then click the Auto Focus. The device will perform the automatic focusing on the selected area to obtain the clearest image. This function can be used in the situations that the image has staggered heights in the camera's FoV.

Auto Light Control

Figure 4-7 Auto Light Control

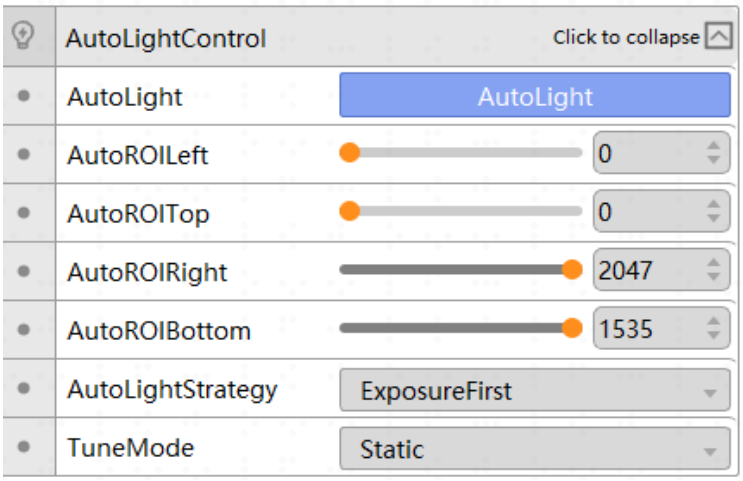


Table 4-6 Parameter description

Parameter	Range/Option	Description
Auto Light	-	The device will perform the automatic focusing until the image is clear after clicking the Auto Focus.
Auto ROI Left	Depends on the ROI range of the device.	Left boundary of the ROI. This function is only valid when the area, where needs to be performed auto-exposure, has been specified as the ROI.
Auto ROI Top	Depends on the ROI range of the device.	Upper boundary of the ROI. This function is only valid when the area, where needs to be performed auto-exposure, has been specified as the ROI.
Auto ROI Right	Depends on the ROI range of the device.	Right boundary of the ROI. This function is only valid when the area, where needs to be performed auto-exposure, has been specified as the ROI.
Auto ROI Bottom	Depends on the ROI range of the device.	Lower boundary of the ROI. This function is only valid when the area, where needs to be performed auto-exposure, has been specified as the ROI.
Auto Light Strategy	Exposure First/Gain First	User can set the exposure mode according to the actual condition. If it is set to the exposure first, the exposure value will be adjusted firstly in the process of the brightness training to meet the brightness requirement, and the gain value will be adjusted when the actual exposure value reaches the limit value.
Tune Mode	Static/Dynamic	To set the brightness training mode.

4.1.2 Code Reading Settings

User can configure the parameters of the code reading algorithm, including barcode process, matrix code process, image pre-process, quality evaluation, etc.

4.1.2.1 Common Configuration

See the following figures.

Figure 4-8 Code Reading Settings

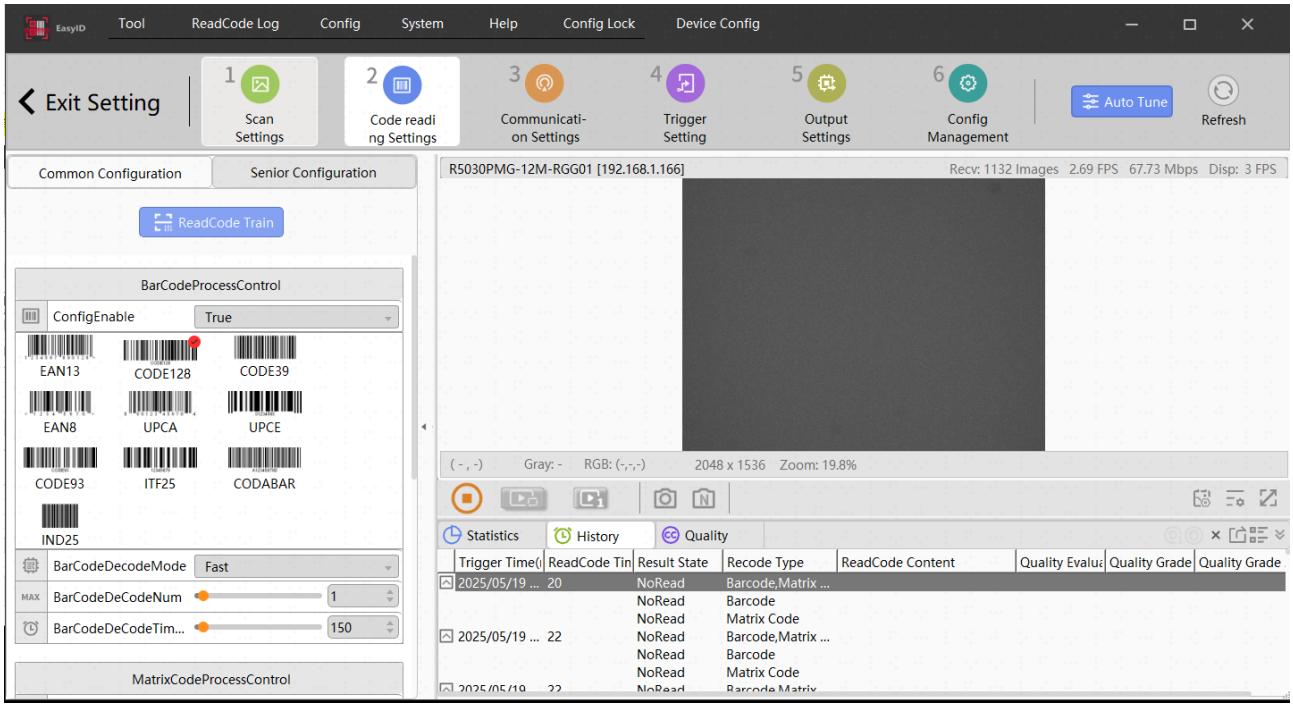


Table 4-7 Parameter description

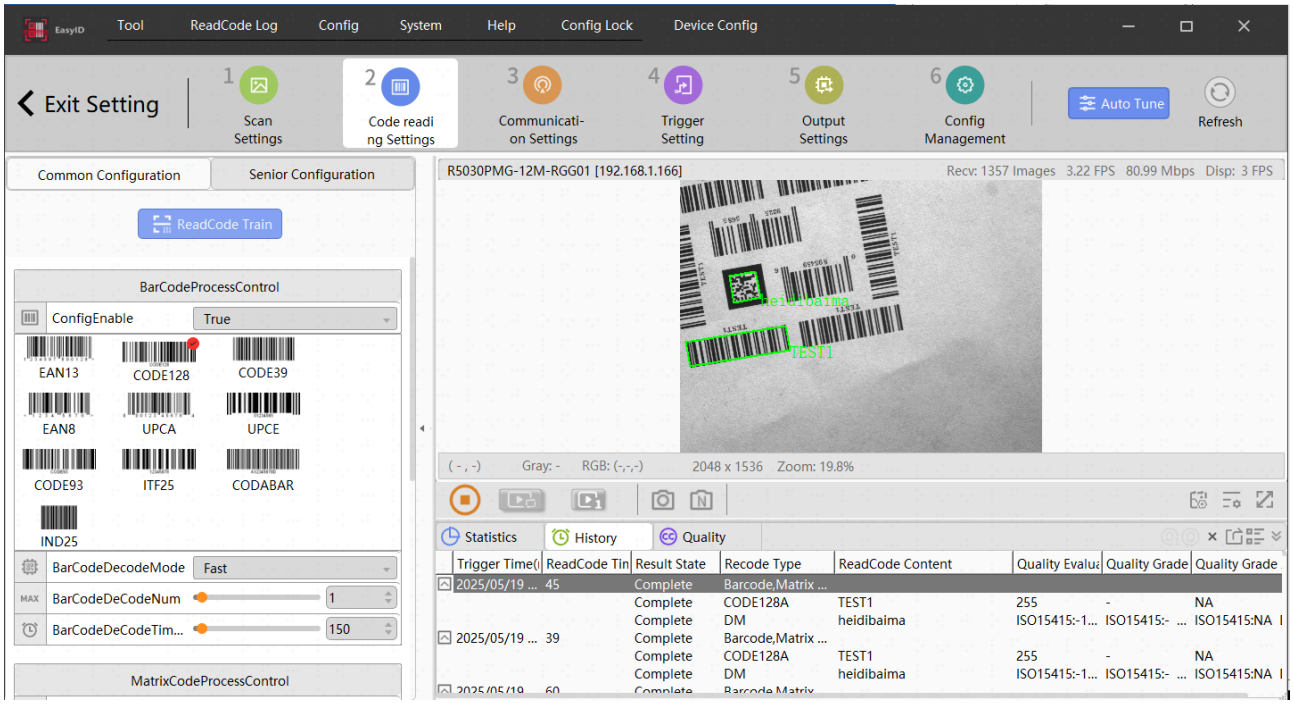
Parameter		Range/Option	Description
ReadCode Train		-	Device will automatically adjust the algorithm configuration to achieve the best effect of decoding.
Barcode Process Control	Config Enable	Y/N	To enable the barcode recognition function.
	Barcode Type	-	To select the barcode types needs to be recognized. It supports the single selection, multiple selection. Type: EAN13, CODE128, CODE39, EAN8, UPCA, UPCAE, CODE93, ITF25, and CODABAR.

Parameter		Range/Option	Description
	Barcode Decode Mode	Fast/Standard/ Enhanced	● Decoding Rate: Enhanced > Standard > Fast ● Decoding Time: Enhanced > Standard > Fast Different modes use different algorithms, not absolute inclusion relationships. As for the single image, the image may be decoded successfully in the standard mode, unsuccessfully in the enhanced mode.
	Barcode Decode Num	0~32	The maximum decoding quantity in one frame.
	Barcode Decode Timeout	0ms~5000ms	Default value is 150 ms. User can adjust the timeout value when code reading takes a long time due to the environment.
Matrix Code Process Control	Matrix Code Config Enable	Y/N	To enable the matrix code recognition function.
	Matrix Code Type	-	To select the matrix code types needs to be recognized. It supports the single selection, multiple selection. Type: QR, MQR, DM, etc.
	Decode Mode	Fast/Standard /Enhanced/ Maximum	● Decoding Rate: Maximum > Enhanced > Standard > Fast ● Decoding Time: Maximum > Enhanced > Standard > Fast Different modes use different algorithms, not absolute inclusion relationships. As for the single image, the image may be decoded successfully in the standard mode, unsuccessfully in the enhanced mode.
	Decode Num	0~16	The maximum decoding quantity in one frame.
	Decode Timeout	0ms~5000ms	Default value is 150 ms. User can adjust the timeout value when code reading takes a long time due to the environment.

- Barcode Type: Code 39, Code 93, Code128, CodaBar, EAN8, EAN13, UPCA, UPCE, ITF25, 2of5 (Industrial2of5), standard25, GS1-128.
- Matrix Code Type: QR, Data Matrix, Micro QR, GS1 DM, GS1 QR. If the other special types of barcodes and matrix code are needed to be displayed on EasyID, please contact our sales manager or technical specialist.

You can check the decoding results on the right side of the EasyID (the code will be marked with green box), and check the code information on history, including trigger time, read-code time, result state, code type, data, quality evaluation, etc.

Figure 4-9 Decoding successful



The acquired images could not meet the requirements of the code reading and inspection with high efficiency and stability due to the object material, object characteristics, light source, external environment, etc. For improving the code reading effect quickly and conveniently, user can perform the proper pre-procession on the raw images.

Figure 4-10 Image Pre-process Control

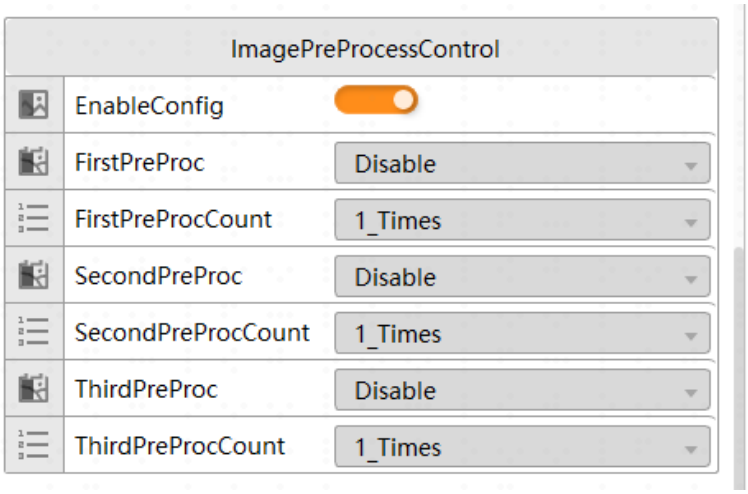
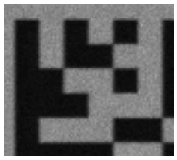
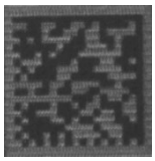
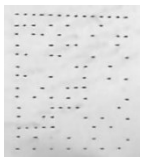
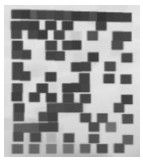
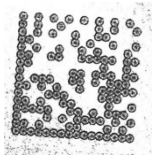
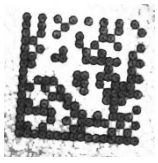


Table 4-8 Parameter description

Parameter		Range/Option	Description
Image Pre-procession	Enable Config	Y/N	Select **Single device config** > **Device Config** > **ImageOutputControl** > **EnableJPEGCompress** > **Disable**, then user can view the processing effect on the image displaying area in real time.
	First Pre-procession	-	For the codes in special environment, user can select the following pre-procession algorithm to achieve the better recognition effect, including Disable, Mean Filter, Median Filter, Erosion, Dilation, Opening, Closing, Sharpening, Inversion, Erosion 3x1, Dilation 3x1, Erosion 3x1, Dilation 3x1.
	First Pre-procession Count	1~6	The greater the value the more obvious the effect is achieved.

Table 4-9 Pre-procession effects description

Option	Description	Before Pre-procession	After Pre-procession
Median Filter	Noise suppression. Remove the black and white dot noise, and keep the sharpness of the module boundaries.		
Mean Filter	To blur the image. Remove the interferences in the code, and smooth the inner pixels of the module.		
Corrosion	Enlarge the black lumps.		
Expansion	Enlarge the white lumps.		
Opening Operation	Eliminate the white interferences in the module, and keep the size ratio of the white and black lumps.		

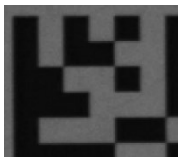
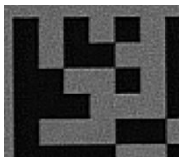
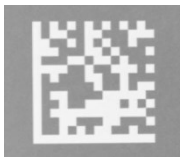
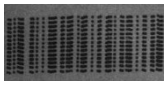
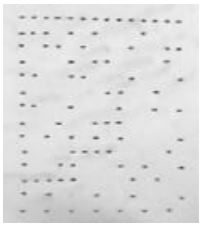
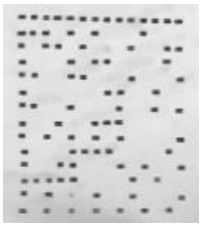
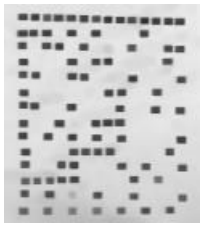
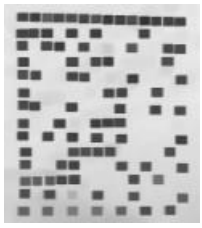
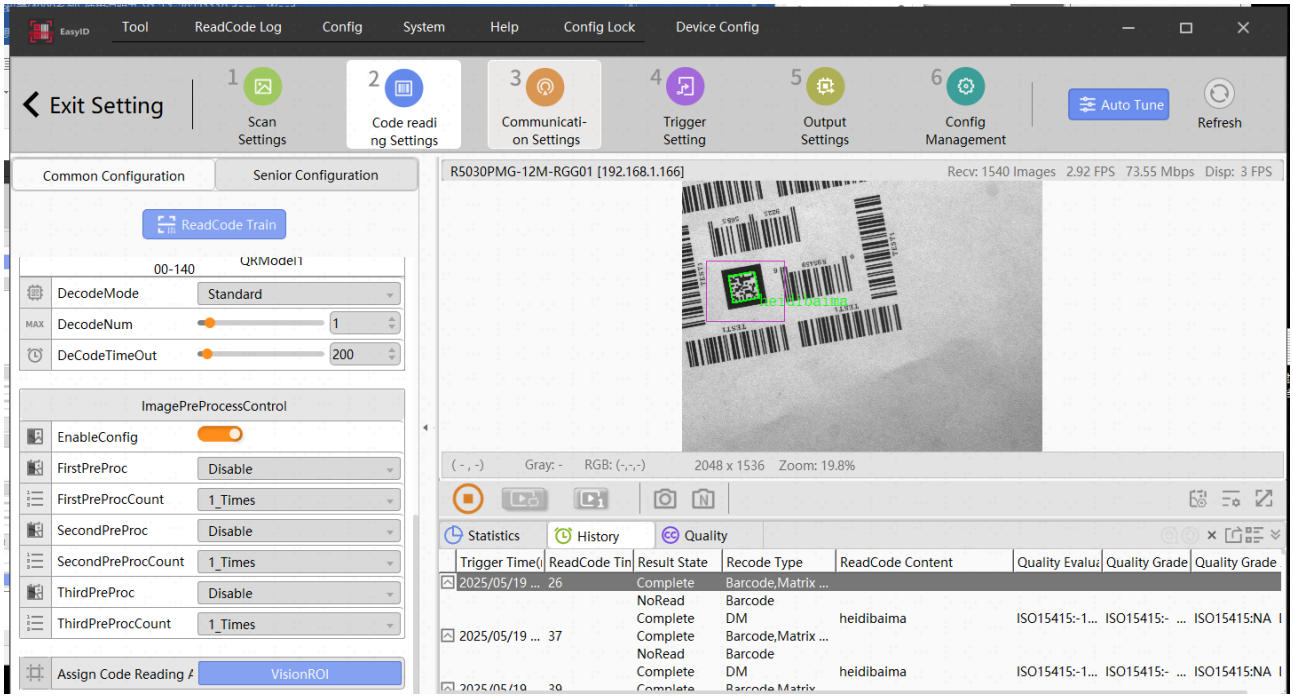
Option	Description	Before Pre-procession	After Pre-procession
Closing Operation	Eliminate the black interferences in the module, and keep the size ratio of the white and black lumps.		
Sharpening	De-blur the image. The boundaries of the module will be sharpened obviously.		
Inverse Color	Inverse the black color and white color in the image.		
Specific Direction Expansion Corrosion Horizontal*Vertical	Refer to the expansion and corrosion. It only acts at the single direction.		
Corrosion 3 Times				
	Original Image	1	2	3

Figure 4-11 ROI setting preview interface

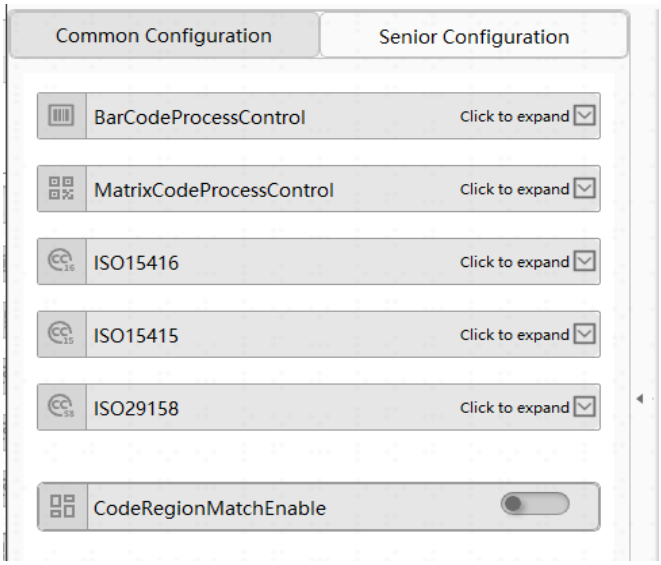
Figure 4-12 ROI code reading diagram



4.1.2.2 Senior Configuration

User can configure the parameters of the barcode, matrix code, quality evaluation, and enable the code region match function.

Figure 4-13 Senior Configuration



Barcode Process Control

Figure 4-14 Barcode Process Control

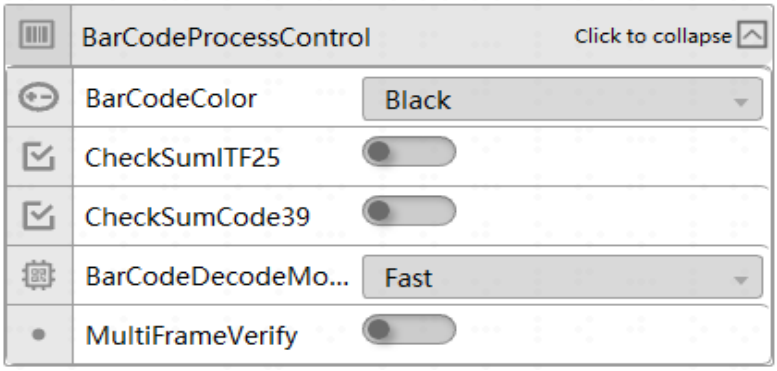


Table 4-10 Parameter description

Parameter	Range/Option	Description
Barcode Color	-	It includes the Black, White, and Any.
CheckSumITF25	Y/N	After enabling the CheckSumITF25 function, whether the CheckSumITF25 takes effect is depending on the code type. For example, for the ITF25 code with the verification function, the code can be decoded no matter the verification function is enabled or not, and the decoding content may have slightly differences (verification characters are not outputted); for the ITF25 code without the verification function, even if the CheckSumITF25 is enabled, the decoding content cannot pass the verification formula, and fail to decode.
CheckSumCODE39	Y/N	To enable the CheckSumCODE39 function.
Barcode Decode Mode	Fast/Standard/ Enhanced	● Decoding Rate: Enhanced > Standard > Fast ● Decoding Time: Enhanced > Standard > Fast Different modes use different algorithms, not absolute inclusion relationships. As for the single image, the image may be decoded successfully in the standard mode, unsuccessfully in the enhanced mode.
Multi Frame Verify	Y/N	When the error code rate is high, user can enable this function, and ensure that the code needs to be read for multiple times.

Matrix Code Process Control

Figure 4-15 Matrix Code Process Control

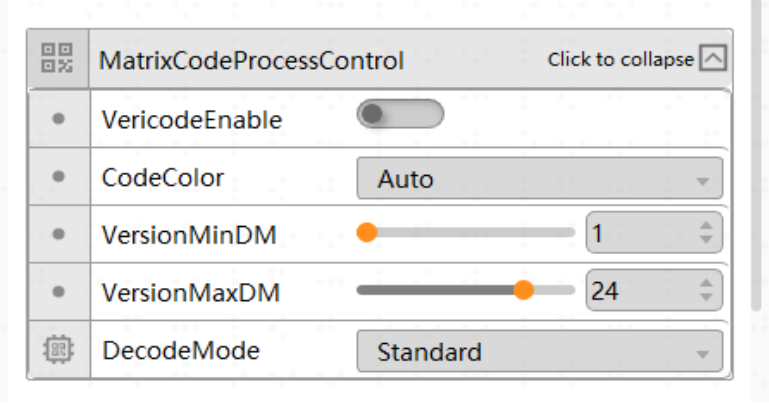


Table 4-11 Parameter description

Parameter		Range/Option	Description
Matrix Code Process Control	Vericode Enable	Y/N	The algorithm procession time can be reduced by narrowing the version range of the code. ● Code Type: Vericode ● Range: 1~20 ● Vercode Calculation Formula: VER = (modNum - 8) / 2 modNum refers to the module quantity at the row/column direction, for example, the modNum is 10 when the VER is 1, and the modNum is 48 when the VER is 20.
	Code Color	Auto/Black/White	Auto is preferred. It supports both black code and white code
	Image Mirror	Auto/No/Yes	It includes No (disable mirroring), Yes (enable mirroring), and Auto (auto-mirroring function). If user sets the Image Mirror to the Auto, it will traverse both possibilities to slightly increase the time consumption. Generally, we cannot tell whether the image is mirrored; therefore, we recommend you set the Image Mirror to the Auto, except for the scenes with strict requirement for the time consumption.
	Version Min DM	1~30	Minimum value of the code version range.
	Version Max QR	1~30	Maximum value of the code version range.

Parameter		Range/Option	Description
	Decode Num	0~16	The maximum number of QR codes to be read. It might be different depending on device models.
	Decode Mode	Fast/Standard /Enhanced/Maximum	● Decoding Rate: Maximum > Enhanced> Standard > Fast ● Decoding Time: Maximum > Enhanced> Standard > Fast Different modes use different algorithms, not absolute inclusion relationships. As for the single image, the image may be decoded successfully in the standard mode, unsuccessfully in the enhanced mode.

Quality Evaluation (ISO 15416/ ISO 15415/ ISO 29158)

Figure 4-16 Quality Evaluation

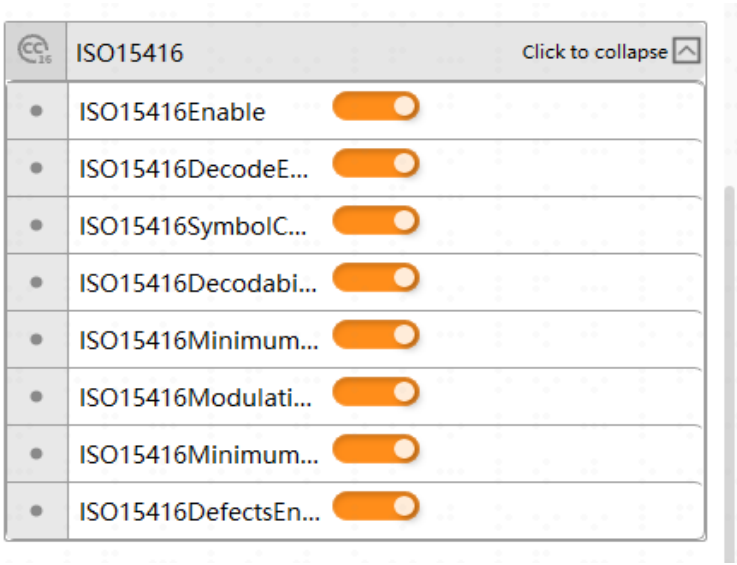


Figure 4-17 Quality String

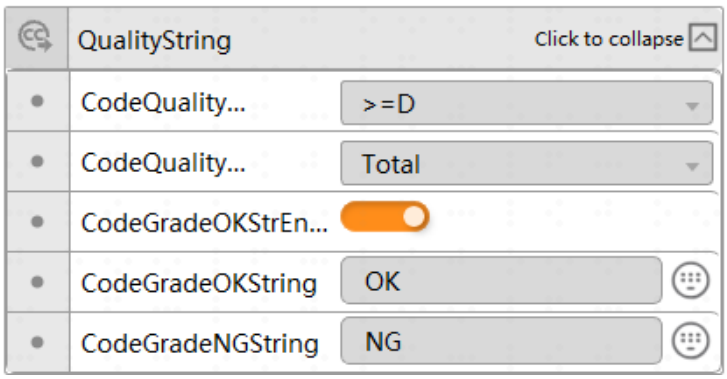


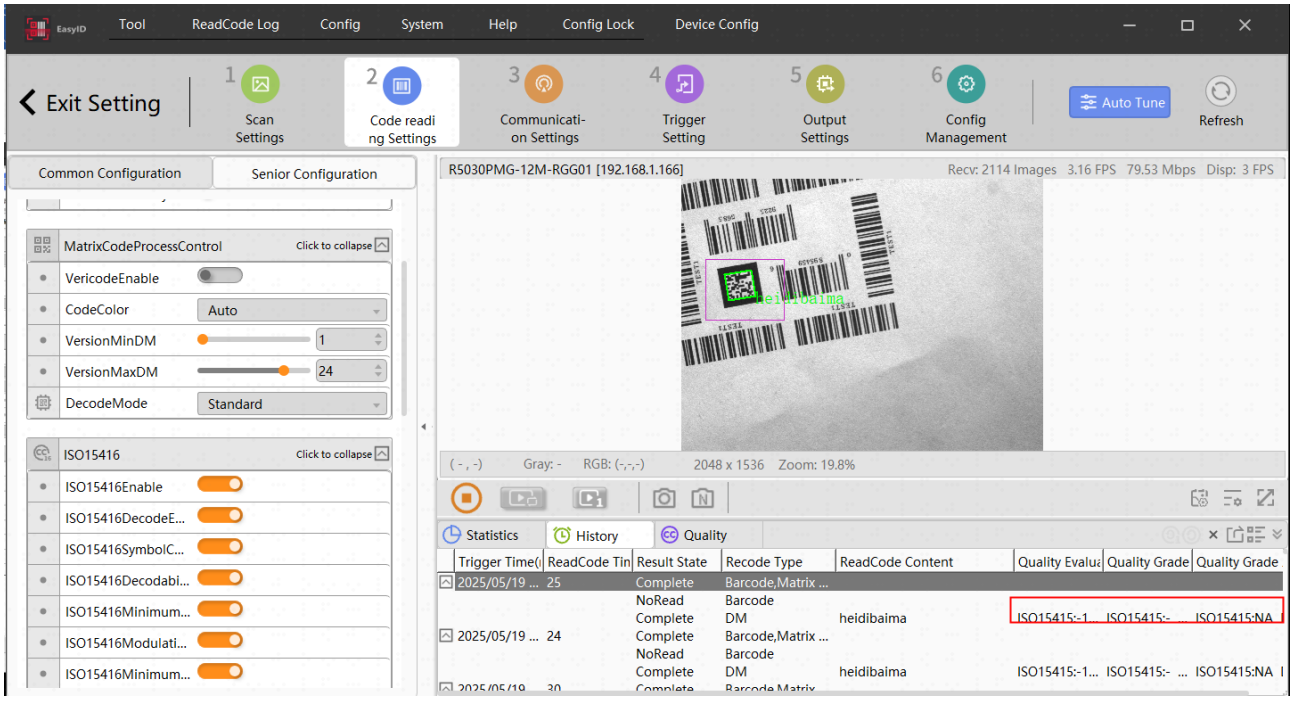
Table 4-12 Parameter description

Parameter		Option	Description
ISO15416	ISO15416 Enable	Y/N	Click the button to enable the function.
	ISO15416 Decode Enable	Y/N	
	ISO15416 Symbol Contrast Enable	Y/N	
	ISO15416 Decodability Enable	Y/N	
	ISO15416 Minimum Edge Contrast Enable	Y/N	
	ISO15416 Modulation Enable	Y/N	
	ISO15416 Minimum Reflectance Enable	Y/N	
	ISO15416 Defects Enable	Y/N	
ISO15415	ISO15415 Enable	Y/N	Click the enable button to configure the relevant parameters.
	ISO15415 SymbolContrastEnable	Y/N	
	ISO15415 Modulation Enable	Y/N	
	ISO15415 ReflectanceMarginEnable	Y/N	
	ISO15415 FixedPatternDamageEnable	Y/N	
	ISO15415 AxialNonuniformityEnable	Y/N	
	ISO15415 GradeNonuniformityEnable	Y/N	
	ISO15415 PrintGrowthHorizontalEnable	Y/N	
	ISO15415 PrintGrowthVerticalEnable	Y/N	
	ISO15415 UnusedErrorCorrectionEnable	Y/N	
	ISO15415 DecodeEnable	Y/N	
	ISO15415 FormatInformationDamageEnable	Y/N	
	ISO15415 VersionInformationDamageEnable	Y/N	
ISO29158	ISO29158 Enable	Y/N	Click the enable button to configure the relevant parameters.
	ISO29158 CellContrastEnable	Y/N	
	ISO29158 CellModulationEnable	Y/N	
	ISO29158 ReflectanceMarginEnable	Y/N	
	ISO29158 FixedPatternDamageEnable	Y/N	

Parameter		Option	Description
	ISO29158 AxialNonuniformityEnable	Y/N	
	ISO29158 GridNonuniformityEnable	Y/N	
	ISO29158 PrintGrowthHorizontalEnable	Y/N	
	ISO29158 PrintGrowthVerticalEnable	Y/N	
	ISO29158 UnusedErrorCorrectionEnable	Y/N	
	ISO29158 DecodeEnable	Y/N	
	ISO29158 FormatInformationDamageEnable	Y/N	
	ISO29158 VersionInformationDamageEnable	Y/N	
Quality String	Code Quality OK Grade	-	Option: A/ ≥B/ ≥C/ ≥D
	Code Quality String Item	-	Option: Total/Selected/Total+Selected
	CodeGradeOKStrEnable	Y/N	Code Grade OK Str Enable
	Code Grade OK String	Customizable	User can enter the up to 32 characters, and it supports the Chinese, English, and symbol.
	Code Grade NG String	Customizable	

Take the ISO15415 as an example, enable the ISO15415, and set the standard of code quality judgment, as shown in the figure below.

Figure 4-18 ISO15416 enabling and setting



Code Region Match Enable

You can check the decoding results on the right side of the EasyID (the code will be marked with green box), and check the code information on history, including trigger time, read-code time, result state, code type, data, quality evaluation, etc.

Figure 4-19 Code Region Match Enable

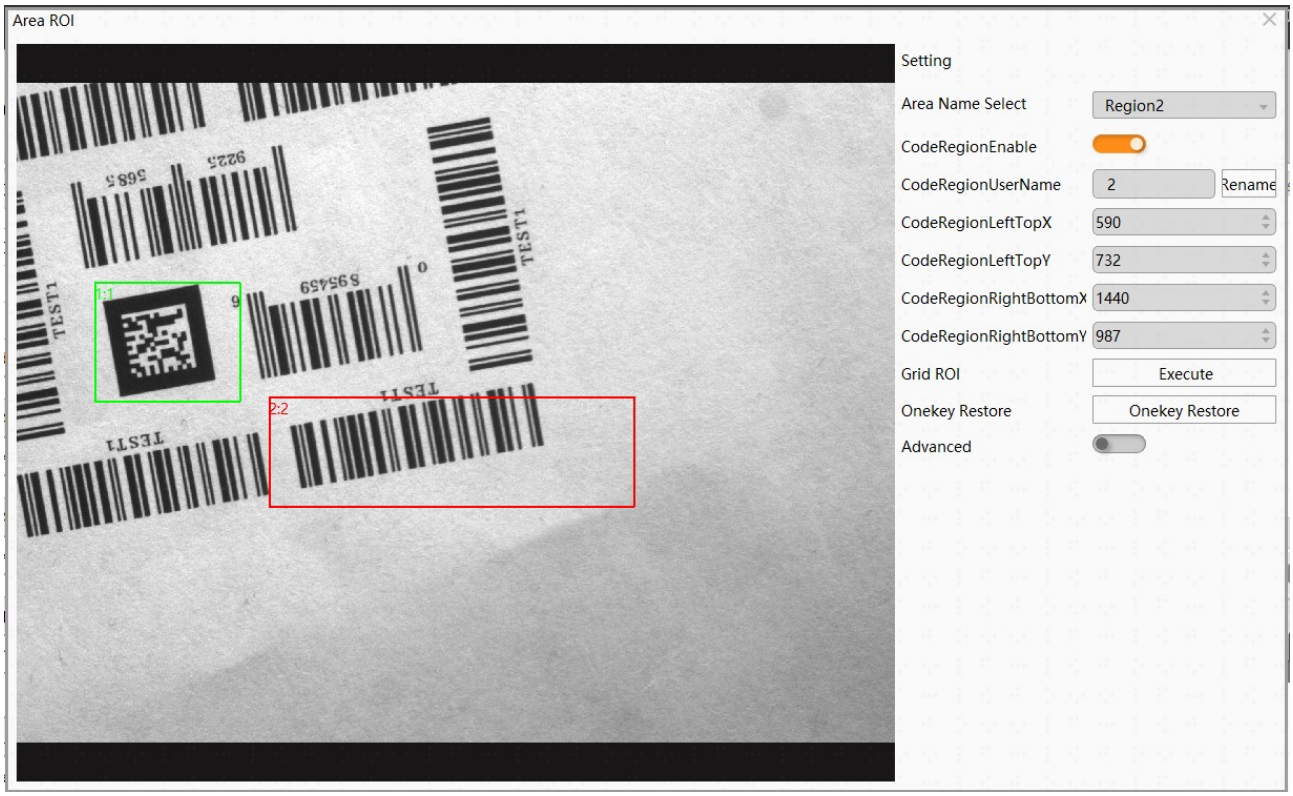


Figure 4-20 ROI code reading diagram

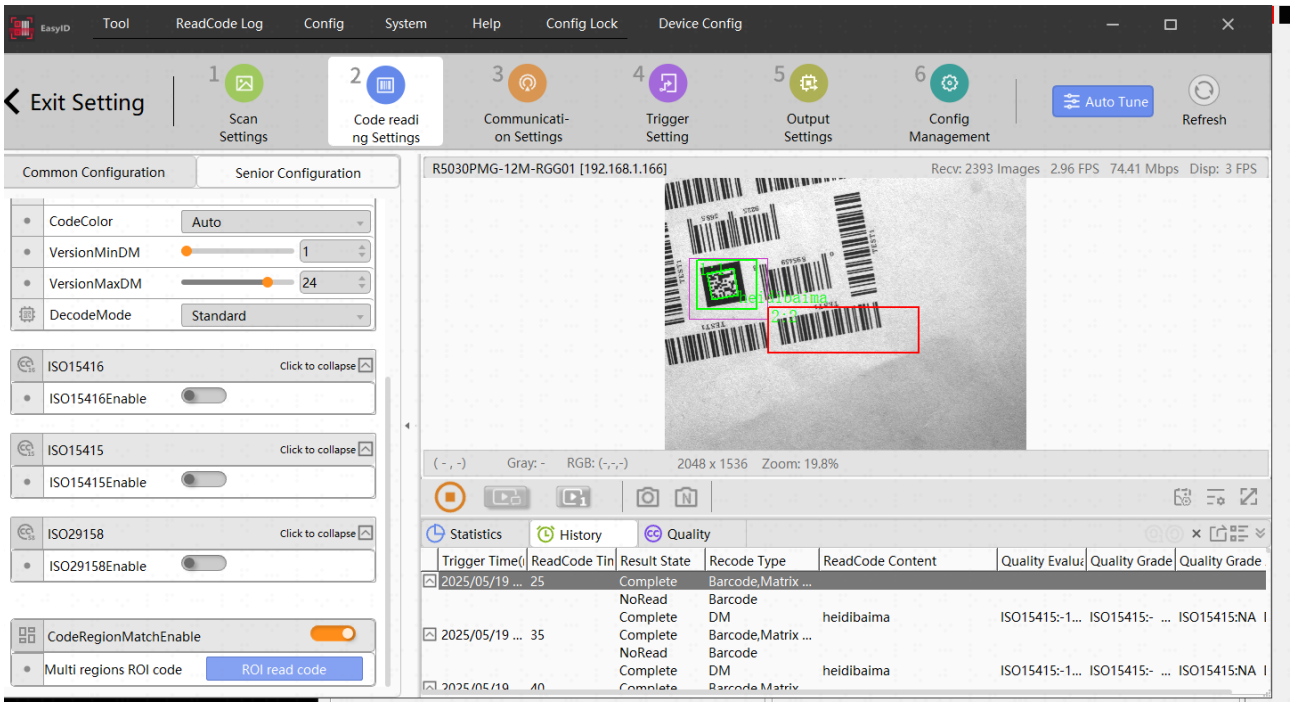


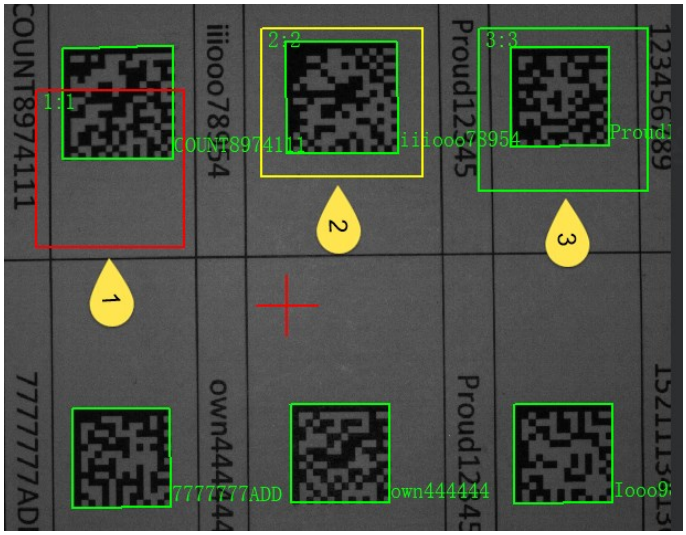
Table 4-13 Parameter description

Parameter		Range/Option	Description
Setting	Code Region Match Enable	Y/N	Enable or disable multi-region function.
	Area Name Select	Region 1~ Region 16	You can select the drop-down list to select the current operated region.
	Code Region Enable	Y/N	Enable or disable the currently operated region.
	Code Region Username	Customizable	You can customize the region name.
	Code Region Left Top X/Y Code Region Right Bottom X/Y	Related to the pixels of the device model	The coordinates of the upper left and lower right corners can be configured by directly selecting numbers or drawing box on the page.
	Grid ROI	-	User can set the row number and column number. The maximum values may vary depending on the device model.
Senior Configuration	Advanced		
	Code Region Match Criterion	4/3/2 Points in Region	It means that the number of corner points of the code successfully read in the area (there are 4 in total for one code). Take 3 points in region as an example. If all 3 points are in the region, the code reading is successful.
	Code Region Username Output Enable	Y/N	Enable or disable region name output.
	Code Region Expected Code Num	Related to the number of codes that can be read	The expected number of codes that should be read per region.
	Code Region No Read String	Customizable	Outputs characters when the code is not read. User can customize it or keep it as default.

Parameter		Range/Option	Description
	Code Region Partial Read String	Customizable	Outputs characters when the number of codes is less than the expected value. User can customize it or keep it as default.
	Code Region Over Read String	Customizable	Outputs characters when the number of codes exceeds the expected value. User can customize it or keep it as default.
	Code Region Good Read String	Customizable	Outputs characters when the number of codes is the expected value. It is usually the default value.

After completing the settings, close the ROI interface, the image preview area is as follows.

Figure 4-21 ROI recognition after settings

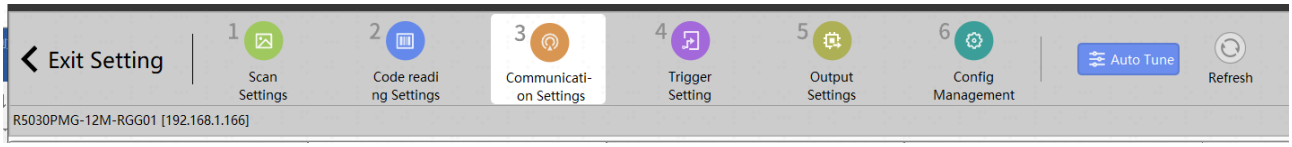


Red frame means that no code is recognized; yellow frame means that the partial code are recognized; green frame means that all codes are recognized. Codes can still be recognized in other areas of the device's FoV, but no processions are performed on their results.

4.1.3 Communication Settings

User can configure the parameters of the communication protocols, including Ethernet, serial port, and FTP.

Figure 4-22 Communication configuration interface



4.1.3.1 Ethernet Communication

Figure 4-23 Ethernet configuration interface

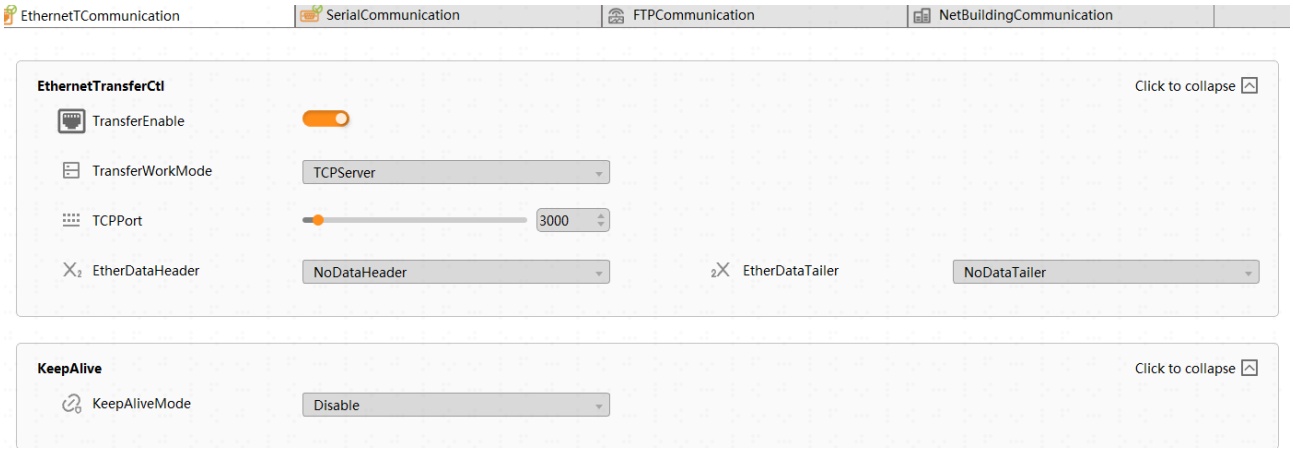


Table 4-14 Ethernet parameter description

Parameter		Range/Option	Description
Ethernet Transfer Control	Transfer Enable	Y/N	Click the enable button to configure the relevant parameters.
	Transfer Work Mode	TCP/Profinet/ModbusTcp/FINS/EthernetIP/MC	Select the transfer mode when outputting data. The transfer modes include TCP/Profinet/ModbusTcp/FINS/EthernetIP/MC, and each mode has different parameters that shall be configured.
	TCP Port	20~65535	When the transfer mode is selected with TCP server or TCP Client, user should configure the port number for the communication.
	Server IP Address	Customizable	When the transfer mode is TCP Client, the server IP shall be configured.
	Ethernet Data Header	No Data Header/Data STX/IP Address/Device User ID/Device Serial Number	When the communication mode is TCP server, the data is filled in the packet header.
	Ethernet Data Tailer	No Data Tailer/Data Tailer CR/Data Tailer LF/ Data Tailer CR_LF/Data Tailer ETX	When communication mode is TCP server, the data is filled at the end of the packet.

Parameter		Range/Option	Description
Network Keep-alive	TCP Keep-alive	Disable/Default/User Defined	When the transfer mode is TCP server or TCP Client, the Keep-alive will be enabled; After selecting the User Define, the keep Alive Time and Keep Alive Pkt Data can be configured.

4.1.3.2 Serial Communication

Figure 4-24 Serial communication interface

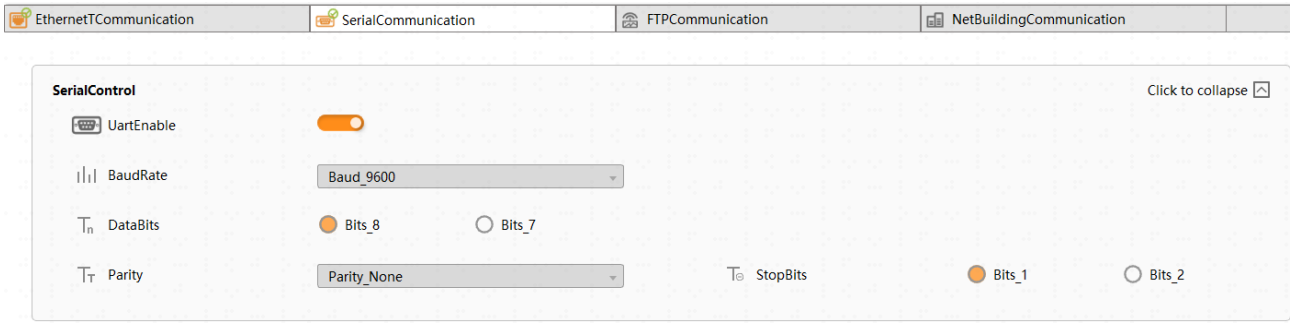


Table 4-15 Serial Port parameter description

Parameter		Range/Option	Description
Serial Control	Uart Enable	Y/N	Enable or disable serial port transmission.
	Baud Rate	600/1200/2400/4800/9600/19200/38400/57600/115200	The number of code element has been transmitted per unit time.
	Data Bits	Bits 8/Bits 7	Number of data bits
	Parity	None/Even/Odd	Parity method.
	Stop Bits	Bits 1/Bits 2	Number of stop bits

4.1.3.3 FTP Communication

Figure 4-25 FTP configuration interface

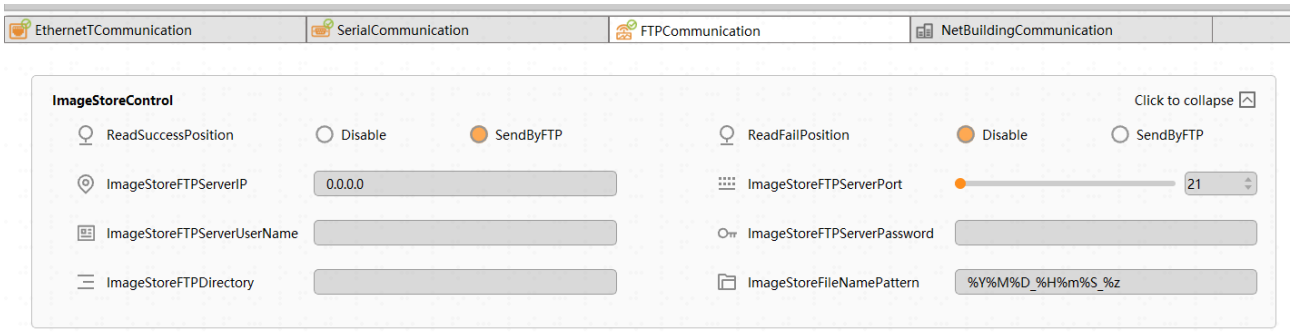


Table 4-16 FTP parameter description

Parameter		Range/Option	Description
ImageStoreControl	ReadSuccessPosition	Disable/Send by FTP	The image saving path of OKRead.
	ReadFailPosition	Disable/Send by FTP	The image saving path of NGRead.
	Image Store FTP Server IP	Customizable	IP address setting.
	Image Store FTP Server Port	1~65535	The configurable port number range is 1 to 65535.
	Image Store FTP Server User Name	Customizable	Username settings.
	Image Store FTP Server Password		Password setting
	Image Store FTP Directory		The path of image saving
	Image Store File Name Pattern		Naming rule setting.

4.1.3.4 Net Building Communication

The master device and slave device settings are as follows.

Figure 4-26 Net Building Control

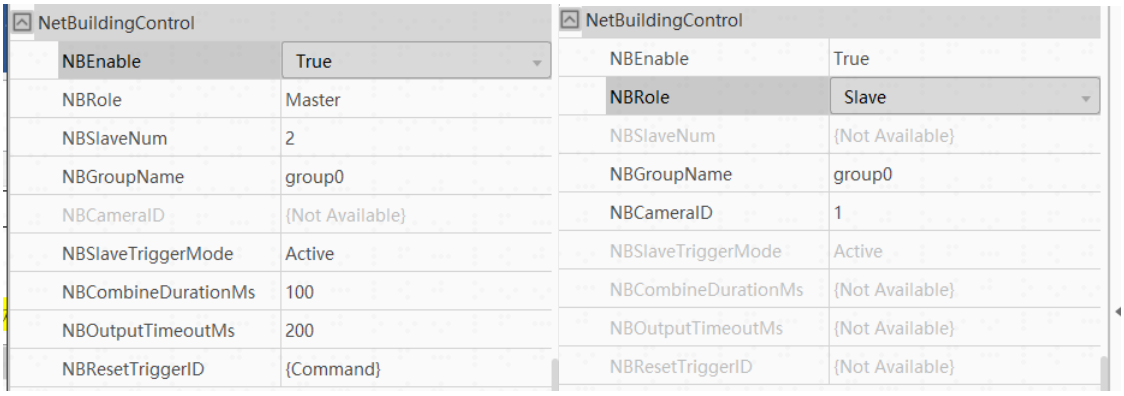


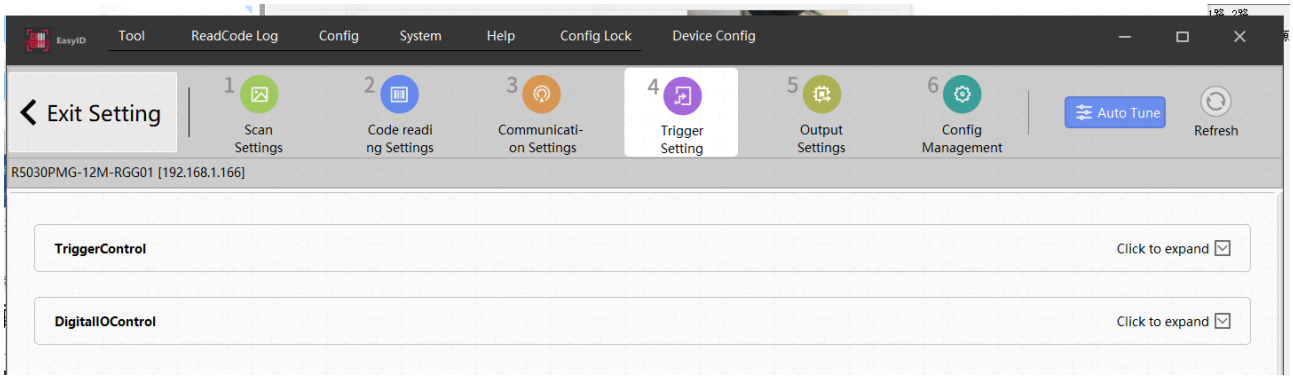
Table 4-17 Parameter description

Parameter		Range/Option	Description
Master Device	NBSlaveNum	1~16	Set the slave device quantity, which supports up to 16 slave devices.
	NBSlaveTriggerMode	Active/Passive	Optional
	NBCombineDurationMs	10~1000	Configurable.
	NBOutputTimeoutMs	50~5000	Configurable.
	NBResetTriggerID	-	User can use this function to reset the trigger ID when the net building is abnormal.
Slave Device	NBGroupName	Customizable	Set the IP address of the master device.
	NBCameraID	1~16	Configure the device ID according to the number of the slave device in the net building.

4.1.4 Trigger Settings

User can configure the parameters of three modules, including trigger control, stop trigger control, and digital IO control.

Figure 4-27 Trigger control interface



Trigger Control

Figure 4-28 Trigger Control

Table 4-18 Parameter description

Parameter	Range/Option	Description
TriggerType	FreeRun/SingleFrame/MultiFrame /PhaseMode/MotionDetect	● Free Run Mode: the device will continuously capture the image according to the set frame rate. ● Single Frame Mode: the device will capture one image after receiving the trigger signal. ● Multi-frame Mode: the device will capture the set frame number of images after receiving the trigger signal. ● Phase Mode: the device will continuously capture the image according to the set frame rate after receiving the phase signal, and stop capturing until the trigger signal ends ● Motion Detection Mode: the device only captures the image when a moving object is detected, otherwise the device is in the dormant state.
FrameRate	0.5~60	The default value is 30.
FrameRateMax	-	The maximum frame rate of the device, which is related to the exposure time and working mode of fill light.
Trigger Delay TriggerDelay	0μs~1000000μs	Trigger delay time
Trigger Burst Count	1~255	The maximum number of frames of the image captured by the device after receiving a trigger signal, which is valid only in multi-frame mode.
TriggerSource	Software/TCP/Serial/Line0	● Software: the device is triggered by receiving trigger signal sent from software. ● TCP: the device is triggered by receiving the specific characters based on the TCP. ● Serial: the device is triggered by receiving the specific characters sent from serial port. ● Line0: Triggered by external level signal.
TriggerStartCmd	Customizable	The device is triggered to start operating after receiving the set character, which is valid only in the TCP or Serial mode.
TriggerEndCmd	Customizable	The device is triggered to stop operating after receiving the set character, which is valid only in the TCP or Serial mode.

Parameter	Range/Option	Description
MotionDetectMode	Weak/Medium /Strong	For adjusting the sensitivity of motion detection, which is valid only in the motion detection mode.
MotionDetectWorkTime	10-3000	For adjusting the capturing duration. When device detects the picture moves, it will start to capture images, and stop capturing according to the set time. It is valid only in the motion detection mode.
MotionDetectGain	1~23	Configure the gain parameter when performing the detection.
MotionDetectExpTime	20~1000000	Configure the exposure parameter when performing the detection.
MotionDetectPreviewEnable	-	User can preview the images when performing the detection once this function is enabled.

Stop Trigger Control

The stop triggering function is available when in the multi-frame mode or level trigger mode.

Figure 4-29 Stop Trigger Control

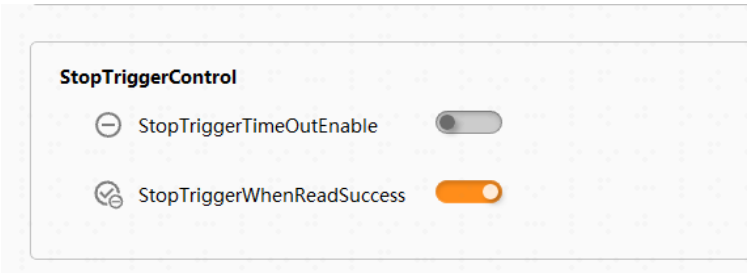


Table 4-19 Parameter description

Parameter		Range/Option	Description
Stop Trigger Control	StopTriggerTimeOutEnable	Y/N	For enabling the stop trigger timeout function, which is valid only in the multi-frame or phase mode.
	StopTriggerTimeOutMax	0~60000	For adjusting the stop trigger timeout value, which is valid only when the stop trigger timeout is enabled.
	StopTriggerWhenGoodRead	-	If the code reading is successful, the triggering will be stopped.

Y: Enable this function; N: Disable this function.

Digital IO Control

Figure 4-30 Digital IO Control

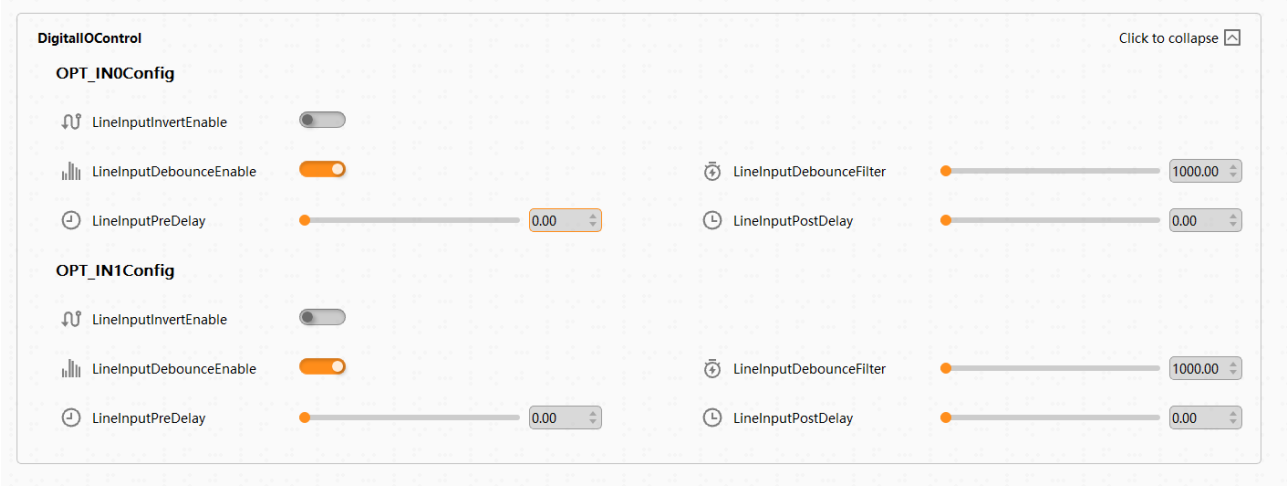


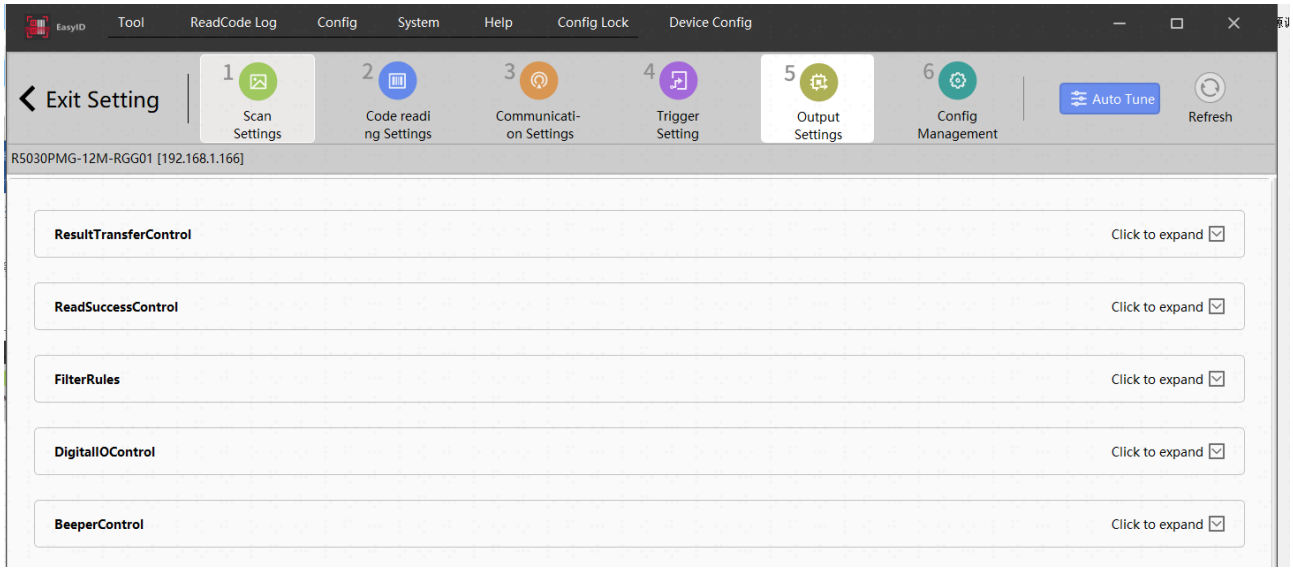
Table 4-20 Parameter description

Parameter		Range/Option	Description
IO Configuration	LineInputInvertEnable	Y/N	To invert the input signals, for example, if the input signal is high level, after inverting, the high level will be the low level.
	LineInputDebounceEnable	Y/N	To enable or disable the debounce function.
	LineInputPreDelay	0ms~1000ms	The delay arriving time of the input signal.
	LineInputDebounceFilter	1000μs-255000μs	Debounce time.

4.1.5 Output Settings

User can configure the parameters of the output modules in the Output Settings, including result transmission control, code reading success control, filter rules, digital IO control, and beeper control.

Figure 4-31 Output Settings



Result Transfer Control

Figure 4-32 Result Transfer Control

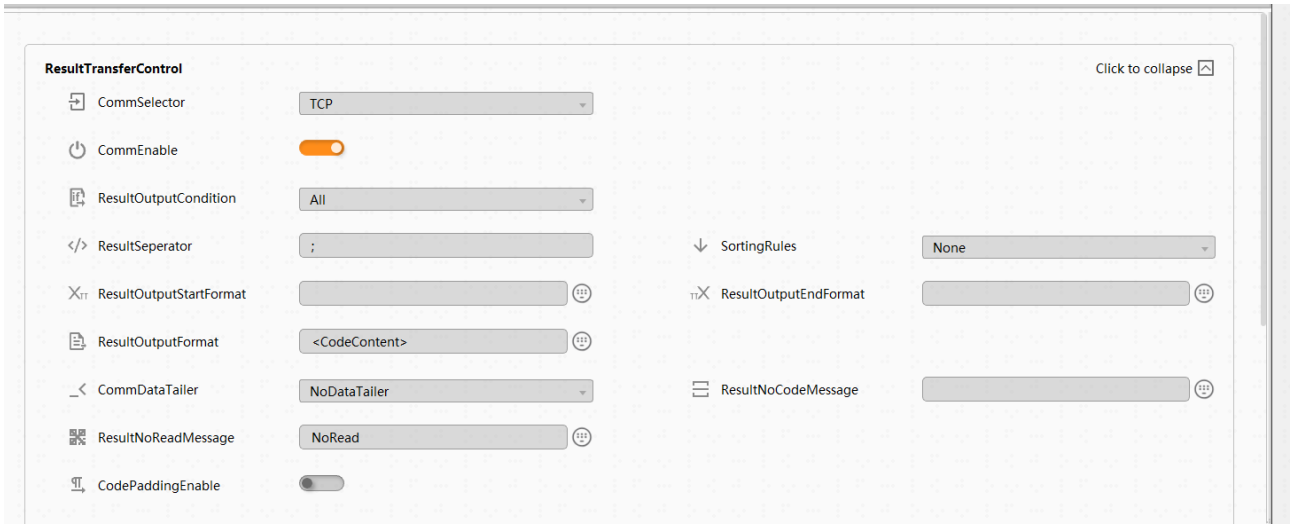


Table 4-21 Parameter description

Parameter		Range/Option	Description
ResultTransferControl	CommSelector	TCP/Profinet/ModbusTcp/FINS/EthernetIP/MC/Serial Port	Select the communication method when outputting data.
	CommEnable CommEnable	Y/N	Enable or disable the currently selected communication method.

Parameter		Range/Option	Description
	ResultOutputCondition	Disable/All/ReadFail/ReadSuccess/Customize	Control the data output logic according to the code reading results. ● Disable: Do not output results. ● All: Output all results no matter the result is success or failure. ● ReadFail: Only output the results when the code reading is failure. ● ReadSuccess: Only output the results when the code reading is success. ● Customize: Output results according to the associated script.
	ResultSeperator	Customizable	The characters between each string can be customized by manually entering or mini keyboard.
	ResultOutputStartFormat		TimeStamp, GroupID, FrameID, CodeNum, ReadStatus, MacAddr, SN, UserID, IPAddr, STX, ETX, CR, LF, etc.
	ResultOutputFormat		CodeContent, CodeType, Coordinate, CenterXY, Angle, CodeQuality, STX, ETX, CR, LF.
	CommDataTailer	NoDataTailer/DataTailer_CR/DataTailer_LF/DataTailer_CR_LF	The tail data of the whole set of data.
	ResultNoReadMessage	Customizable	STX, ETX, LF, CR.
	SortingRules	None/Coordinate_X_Ascending/Coordinate_X_Descending/Coordinate_Y_Ascending/Coordinate_Y_Descending	To sort the code reading results.

Parameter		Range/Option	Description
	ResultOutputEndFormat	Customizable	TimeStamp, GroupID, FrameID, CodeNum, ReadStatus, MacAddr, SN, UserID, IPAddr, STX, ETX, CR, LF.
	ResultNoCodeMessage	Customizable	The output content when the image has no codes.
	CodePaddingEnable	Y/N	If the length of code reading result does not reach the set length, the characters padding will be performed.
	FixedLength	1~64	The length of the transmitted code value.
	CodePaddingChar	Customizable	It can be customized or selected from the keypad list.

ReadSuccessControl

Figure 4-33 ReadSuccessControl

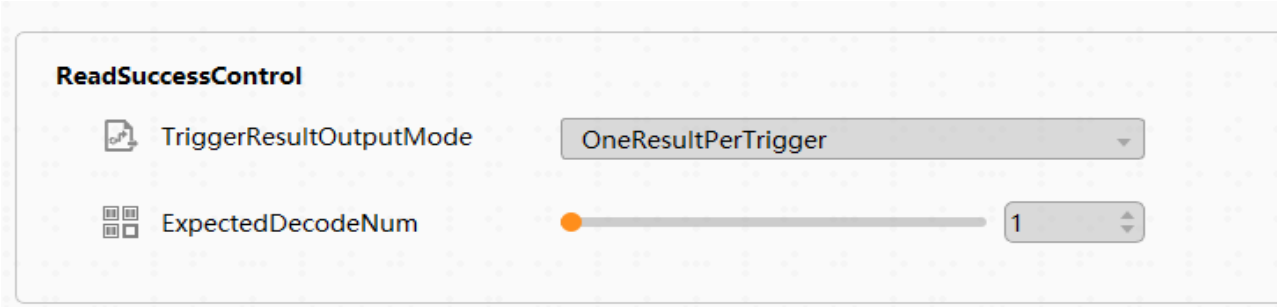


Table 4-22 Parameter description

Parameter		Range/Option	Description
GoodReadControl	TriggerResultOutputMode	EveryFrameResult/ OneResultPerTrigger/Test/OneResultPerTriggerByScript	● EveryFrameResult: Output one result per frame of image. ● OneResultPerTrigger: Output one result after performing the merging and deduplication to every result of image. ● Test: Output one result per frame of image, and output a summary result. ● OneResultPerTriggerByScript: Output the customized result processed by script.

Parameter		Range/Option	Description
	ExpectedDecodeNum	1~48	Set the expected number of codes. When the read number is greater than or equal to the set value, the code reading is success; otherwise, it is failure.

Filter Rules

Figure 4-34 Filter Rules

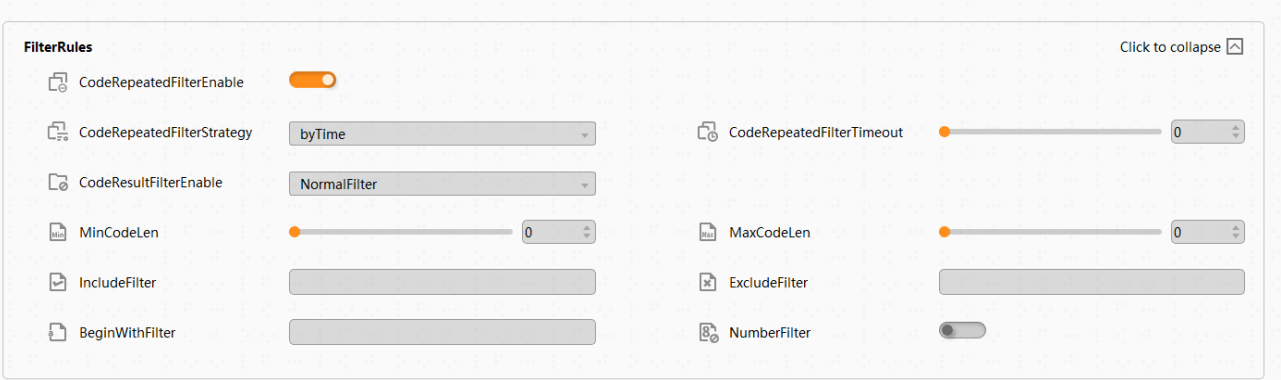


Table 4-23 Parameter description

Parameter	Range/Option	Description
CodeRepeatedFilterEnable	Y/N	-
CodeRepeatedFilterTimeout	0ms~20000ms	Customizable.
CodeResultFilterEnable CodeResultFilterEnable	None/NormalFilter /RegularFilter	Normal Filter, which provides some simple filtering options. Regular Expression Filter, which specifies filtering rules through regular expressions.
MinCodeLen MinCodeLen	0~max code length	To limit the min length of code value (only valid in NormalFilter)
MaxCodeLen MaxCodeLen	Min Code Length~256	To limit the max length of code value (only valid in NormalFilter)
NumberFilter	Y/N	Keep the reading results of pure numbers (only valid in NormalFilter)
IncludeFilter	Customizable	Keep the reading results which includes the specific characters (only valid in NormalFilter)

ExludeFilter	Customizable	Do not keep the reading results which includes the specific characters (only valid in NormalFilter).

DigitalIOControl

Figure 4-35 DigitalIOControl

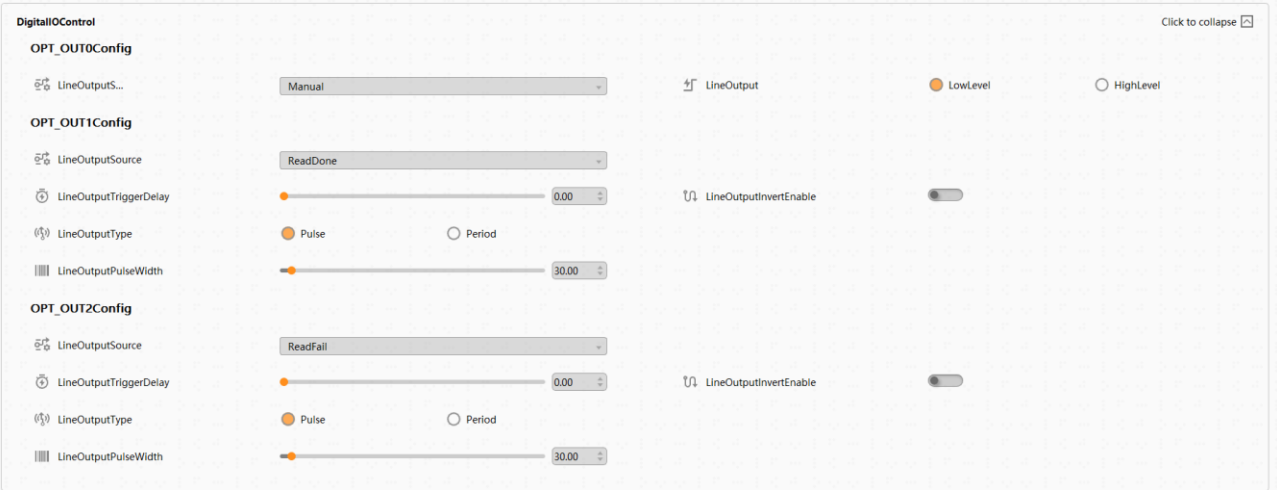


Table 4-24 Parameter description

Parameter	Range/Option	Description
LineOutputSource	Manual/ ReadDone/ ReadFail/ ReadSuccess	User can select the Manual mode, or output signals according to the code reading results.
LineOutput	LowLevel/ HighLevel	Select the level of the output signal.
LineOutputInvertEnable	Y/N	To invert the input signals, for example, if the input signal is high level, after inverting, the input signal will be low level.
LineOutputTriggerDelay	Range: 0ms~1000ms	Trigger Delay
LineOutputType	Pulse/ Period	Select the type of output IO signal.
LineOutputPulseWidth	1~1000	The width of output pulse. This function is only valid when outputting the pulse signals.
LineOutputDutyCycle	0~100	Control the duty ratio. This function is only valid when outputting the period signals.
LineOutputPeriod	1~1000	Control the period of signals. This function is only valid when outputting the period signals.

LineOutputPeriodCount	1~7	To enable the counting function of the signal outputting period.

BeeperControl

Figure 4-36 BeeperControl

Table 4-25 Parameter description

Parameter	Range/Option	Description
BeeperInputSource	Disable/ ReadDone/ ReadFail/ ReadSuccess	Control the Buzzer output logic according to the code reading results:
BeepTimes	1~7	The number of beeps.
BeepInterval	1~1000	Interval time.
BeeperTriggerDelay	0~1000	Delay time.
BeepDuration	1~1000	Duration time.

4.1.6 Config Management

After configuring the parameters, user can save or restore the configurations here as needed. In addition, you can perform the device restarting, default configuration restoring, and configuration files import and export.

Figure 4-37 Config Management

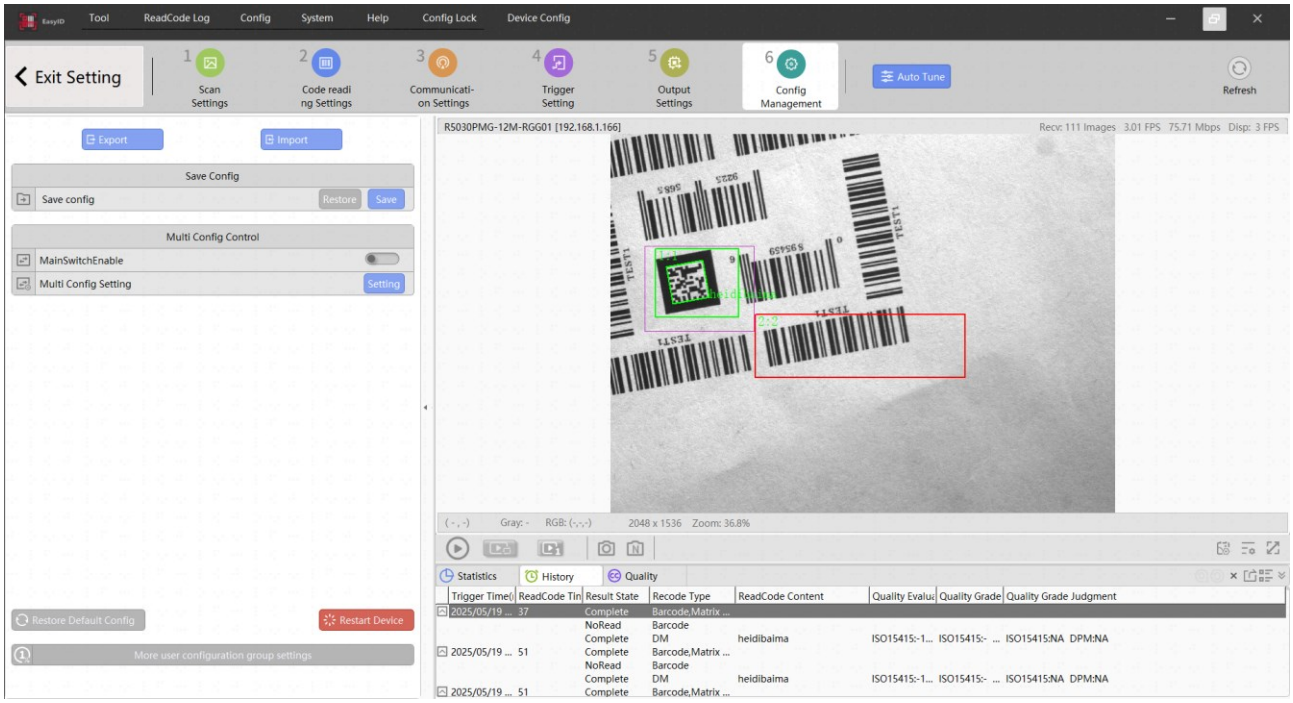


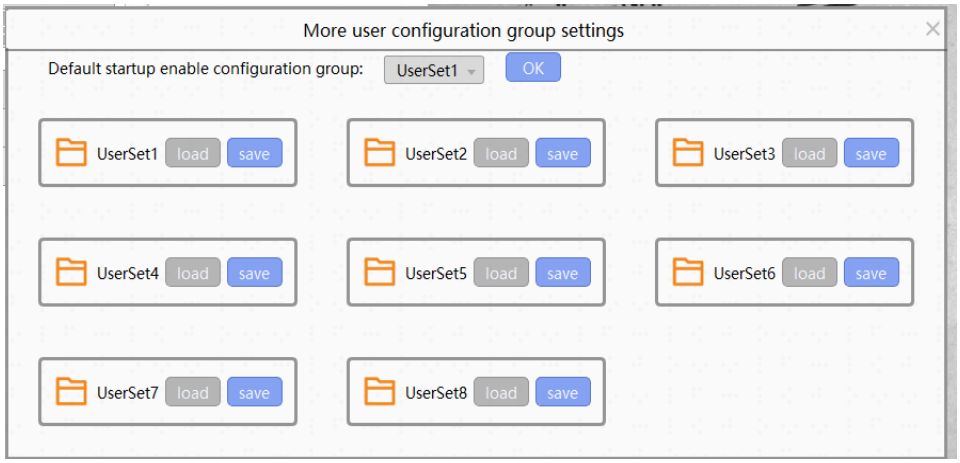
Table 4-26 Parameter description

Parameter	Description
Export	Click to export configuration files.
Import	Click to import configuration files.
Restore	Click to restore the last saved attribute configuration. User should disable the MainSwitchEnable function.
Save	Click to save the current attribute configuration. User should disable the MainSwitchEnable function.
MainSwitchEnable	To enable the MainSwitchEnable function, please refer to the **4.1.9 MainSwitchEnable**.
MultiConfig Setting	To adjust the each set of parameters in the MainSwitchEnable, please refer to the **4.1.9 MainSwitchEnable**.
Restore Default Config	Click Reset to restore the factory settings.
Restart Device	Click to restart the device.
More User Configuration Settings	Selectively load and save user configuration.

Procedure

Step 1 Click **More user configuration group settings**.

Figure 4-38 More User Configuration Group Setting



Step 2 Select any UserSet in **Default Startup Enable Configuration Group** and click OK. The configurations that user has configured will be saved to the selected UserSet.

1. Save the configurations in UserSet1.
2. Load the selected UserSet2 as the default configurations.
3. Set the selected UserSet2 which saves the user-defined configurations as the default

UserSet. When user powers on the device, it will automatically load the configurations of the UserSet2.

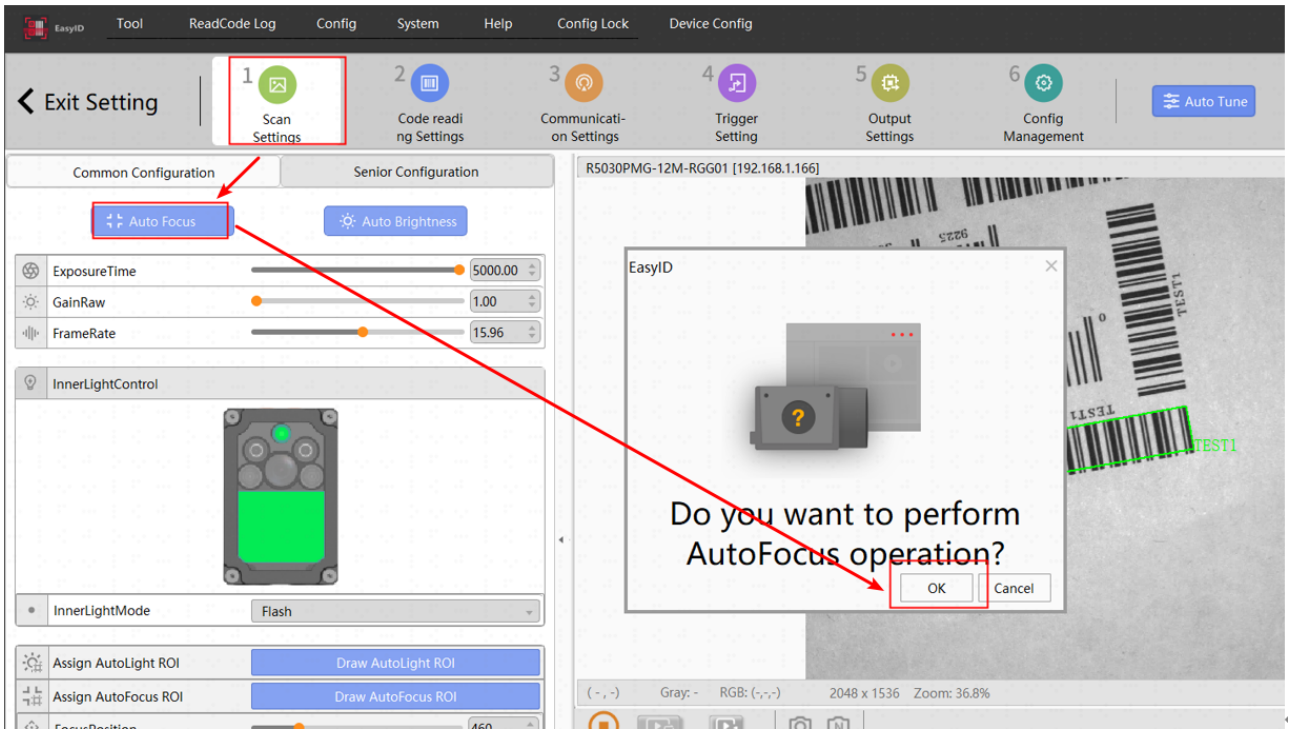
Step 3 Click **Load** to load the corresponding configuration as the default configuration. Click **Save** to save the all-current configurations into the corresponding UserSet.

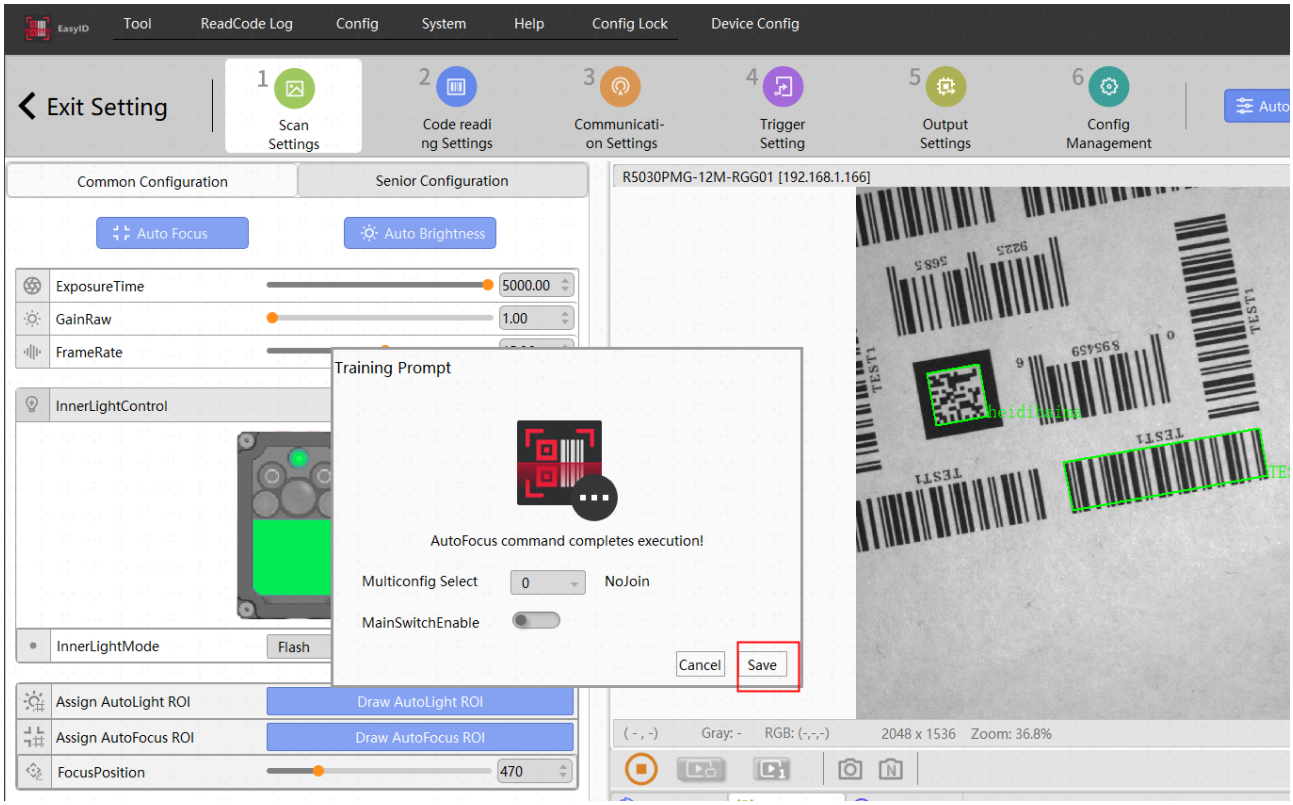
4.1.7 Auto Focus

After clicking the **Auto Focus**, the confirmation window will pop up, then click **OK**. The client will command the device to perform the auto-focusing until the image is clear, as shown in the figure below.

- If the device is streaming and in the **FreeRun** mode, the process of auto-focusing will be displayed in the image display area.
- If the device is working abnormally, user can click the **Stop** to cancel the auto-focusing.

Figure 4-39 Auto Focus

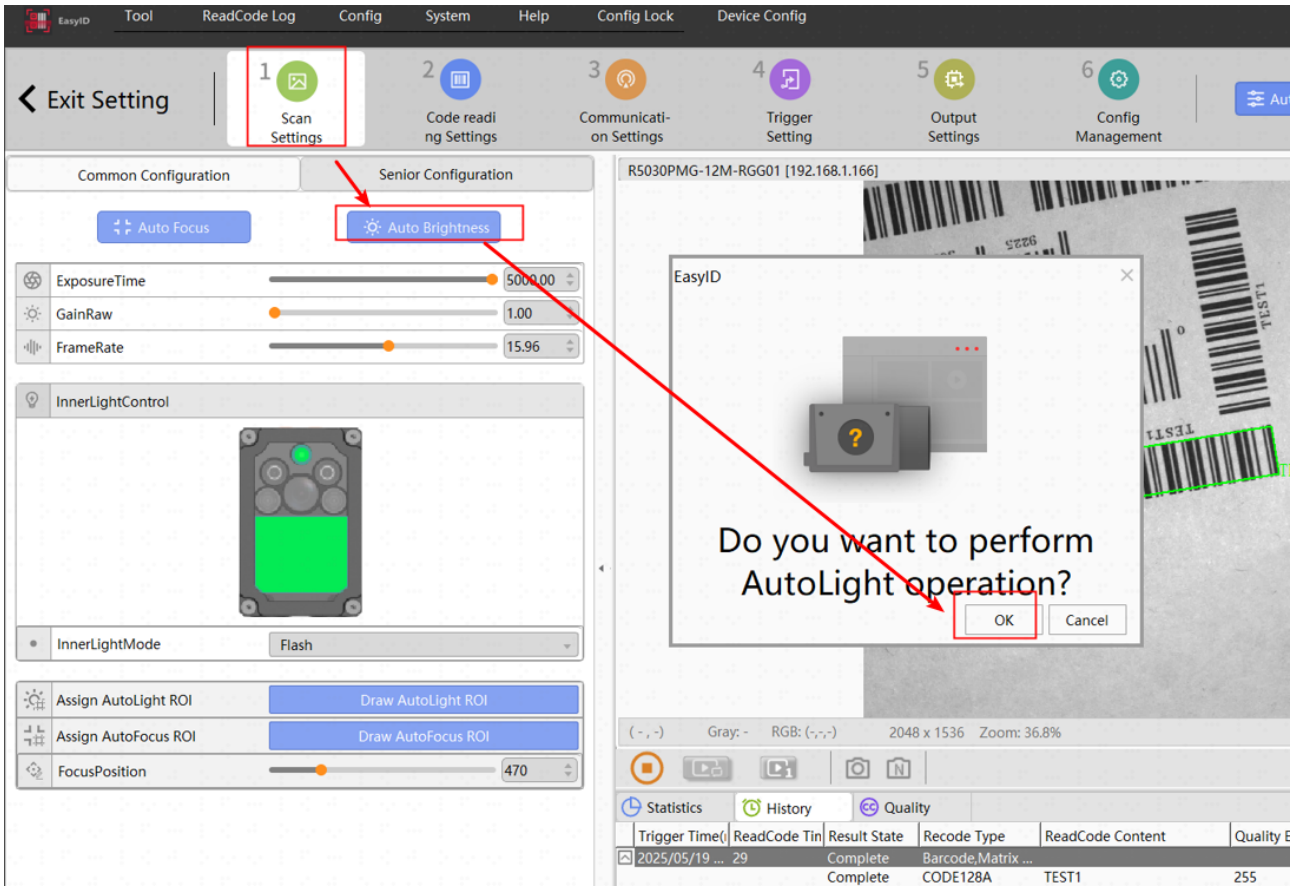


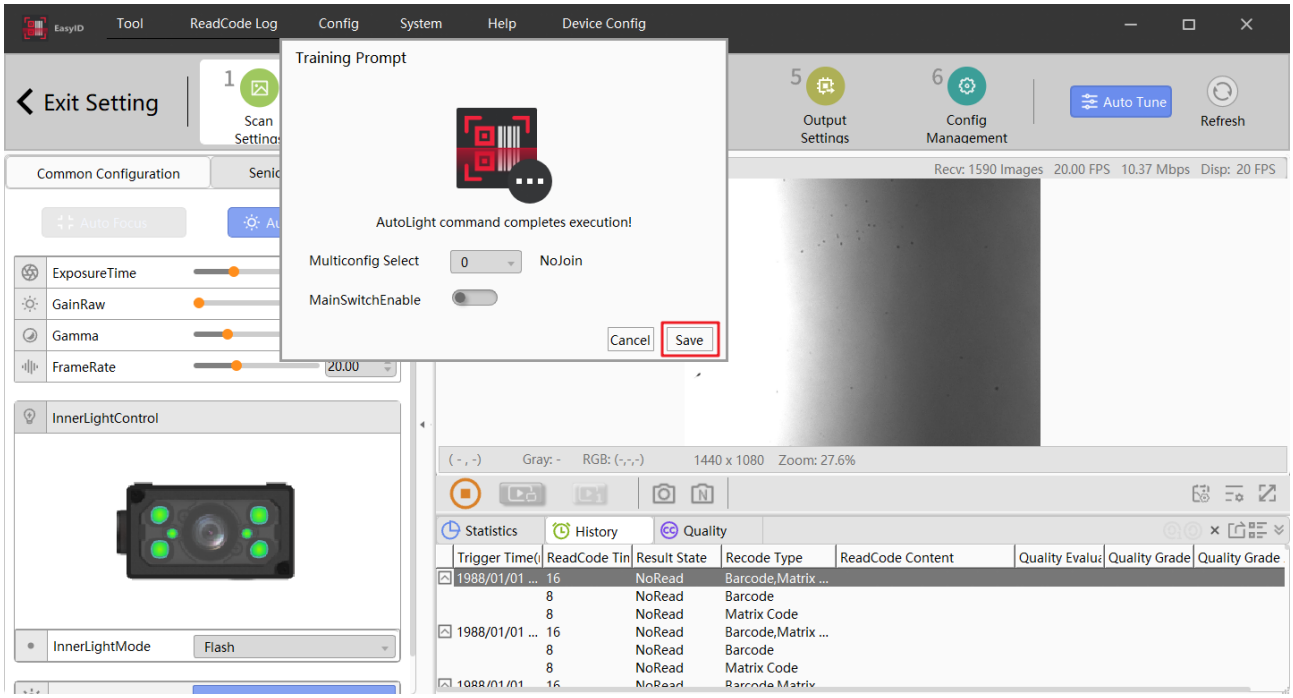


4.1.8 Auto Brightness

Smart code reader can automatically adjust brightness level of image according to the image effect by adjusting the exposure and gain, as shown in the figure below.

Figure 4-40 After performing Auto-Brightness





4.1.9 Multi Config Setting

Click **Setting** on the right side of the **Multi Config Setting** to enter the **MultiConfigPage**.

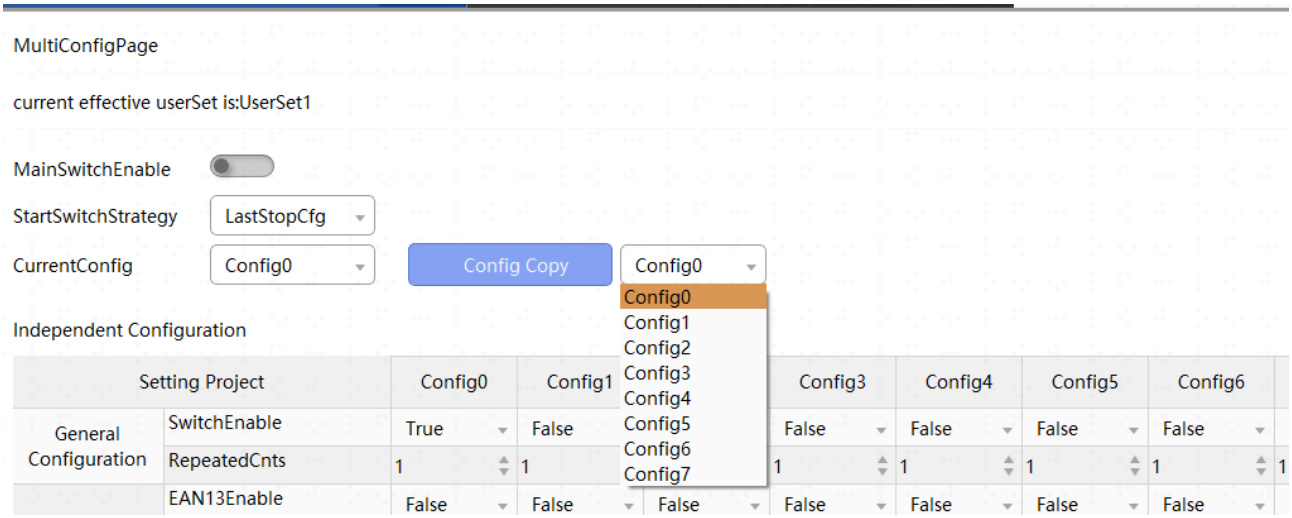
Figure 4-41 MultiConfigPage

Table 4-27 Parameter description

Parameter	Range/Option	Description
MainSwitchEnable	ON/OFF	Only when it is On can configuration switching take effect. There are eight groups of parameters. User can configure the parameters of Config 0~Config 7. After enabling it, the parameters of Config 0~Config 7 will be locked.
StartSwitchStrategy	LastStopCfg/ LastStopCfg	Continue the polling when user stopped polling last time/Start polling from the first group.

Parameter	Range/Option	Description
ConfigEnable	ON/OFF	Enable or disable bar code.
MatrixCodeConfigEnable	ON/OFF	Enable or disable matrix code.
ConfigSelector	Config 0~Config 7	8 configuration groups: The configuration groups that the reader is currently using.
Independent Configuration	Config 0~Config 7	Configure the parameters in every groups according to the actual situation.

Figure 4-42 Multi Config Setting



Setting Project		Config0	Config1	Config2	Config3	Config4	Config5	Config6	Config7
General Configuration	SwitchEnable	True	False	False	False	False	False	False	False
	RepeatedCnts	1	1	1	1	1	1	1	1
BarCode	EAN13Enable	False	False	False	False	False	False	False	False
	CODE128Enable	True	True	True	True	True	True	True	True
	CODE39Enable	False	False	False	False	False	False	False	False
	EAN8Enable	False	False	False	False	False	False	False	False
	UPCAEnable	False	False	False	False	False	False	False	False
	UPCEEnable	False	False	False	False	False	False	False	False
	CODE93Enable	False	False	False	False	False	False	False	False
	ITF25Enable	False	False	False	False	False	False	False	False
	CODABAREnable	False	False	False	False	False	False	False	False
	IND25Enable	False	False	False	False	False	False	False	False
	BarCodeDeCodeNum	1	1	1	1	1	1	1	1
	BarCodeDeCodeTimeOut	1000	150	150	150	150	150	150	150
Focus	FocusPosition	470	460	460	460	460	460	460	460
ISP	ExposureTime	1367.75us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us
	HDRMODE	stabdard	stabdard	stabdard	stabdard	stabdard	stabdard	stabdard	stabdard
	GainRaw	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ImagePreProc...	FirstPreProc	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
	FirstPreProcCount	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times
	SecondPreProc	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
	SecondPreProcCount	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times
	ThirdPreProc	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
	ThirdPreProcCount	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times
	FourthPreProc	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
	FourthPreProcCount	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times	1_Times
InnerLight	DiffusedLight	On	On	On	On	On	On	On	On
	NonPolarizedLight_Up	Off	Off	Off	Off	Off	Off	Off	Off
	PolarizedLight_Down	Off	Off	Off	Off	Off	Off	Off	Off
	InnerLightMode	Flash	Flash	Flash	Flash	Flash	Flash	Flash	Flash

4.1.10 Menu Bar

This section introduces the functions on the menu bar.

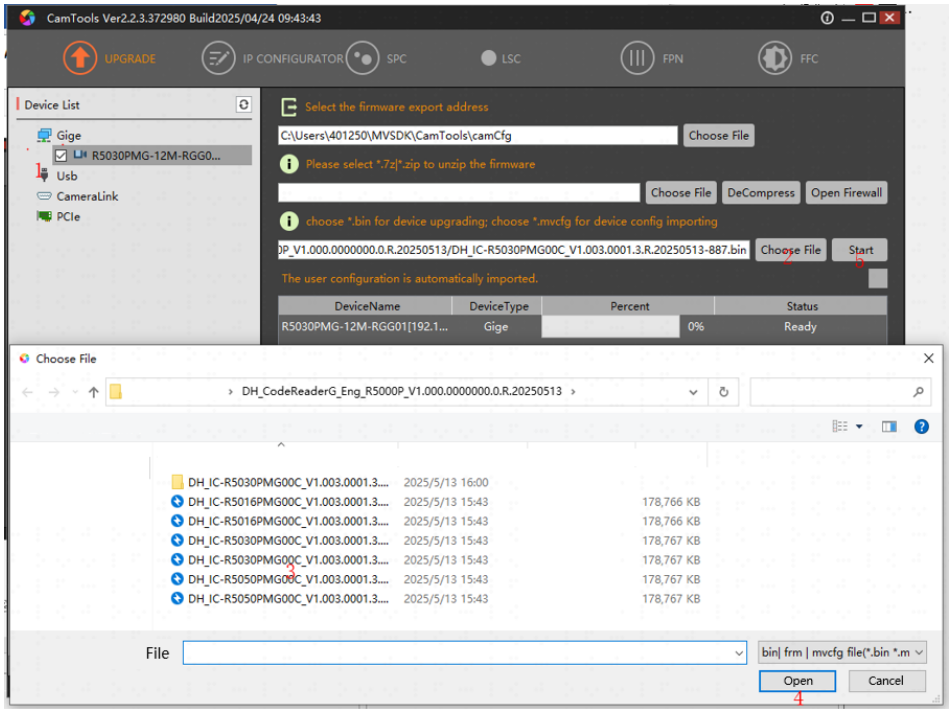
4.1.11 Tool

User can find the CamTools in the list of Tool. The CamTools is used for upgrading the firmware of the device.

Procedure

Step 1 Click **Tool** > **CamTools**. The CamTools window will pop up.

Figure 4-43 CamTools

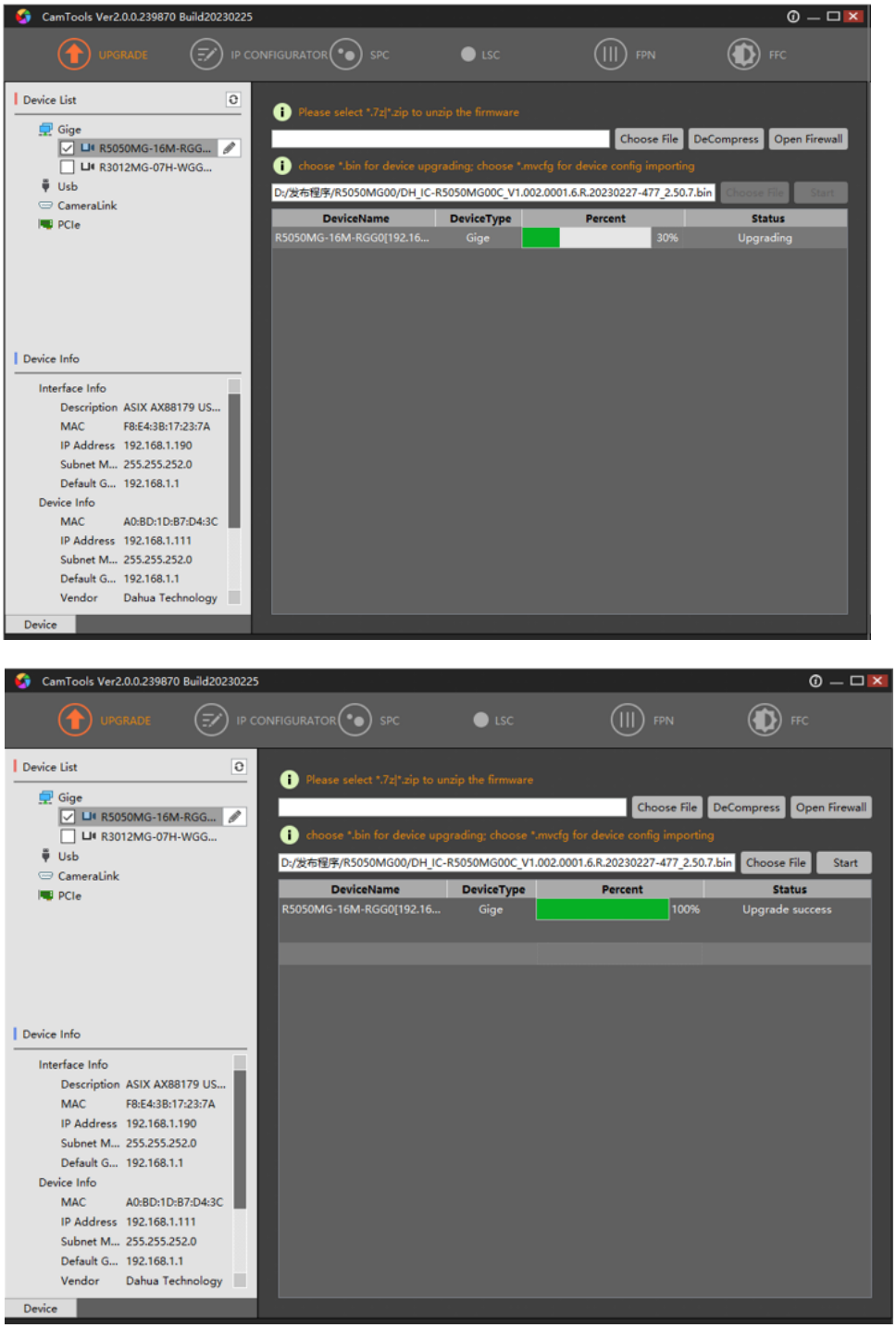


Step 2 Select the device to be upgraded in the device list on the left, and check the device IP address.

Step 3 Click **Choose File** on the right side of the configuration area, select the firmware file, and click **OK**.

Step 4 Click **Start** to start the firmware upgrading.

Figure 4-44 Device firmware upgrade



Step 5 After the firmware version is successfully upgraded, the device will automatically be powered off and restarted. You can check the firmware version on the homepage of EasyID.

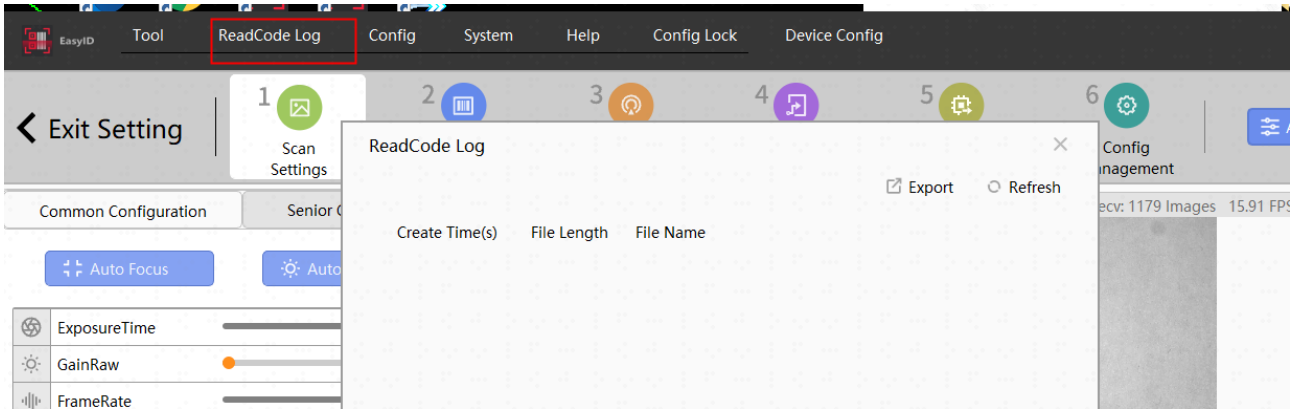
Before upgrading the firmware, please disconnect the connection between the device and EasyID; otherwise, it will prompt the “Connection Failed”.

4.1.12 ReadCode Log

This function records the operating logs of the device, if the device is abnormal, please provide related

logs to the technical specialist for help.

Figure 4-45 Logs Export



4.1.13 Config

Figure 4-46 Functions in Config list

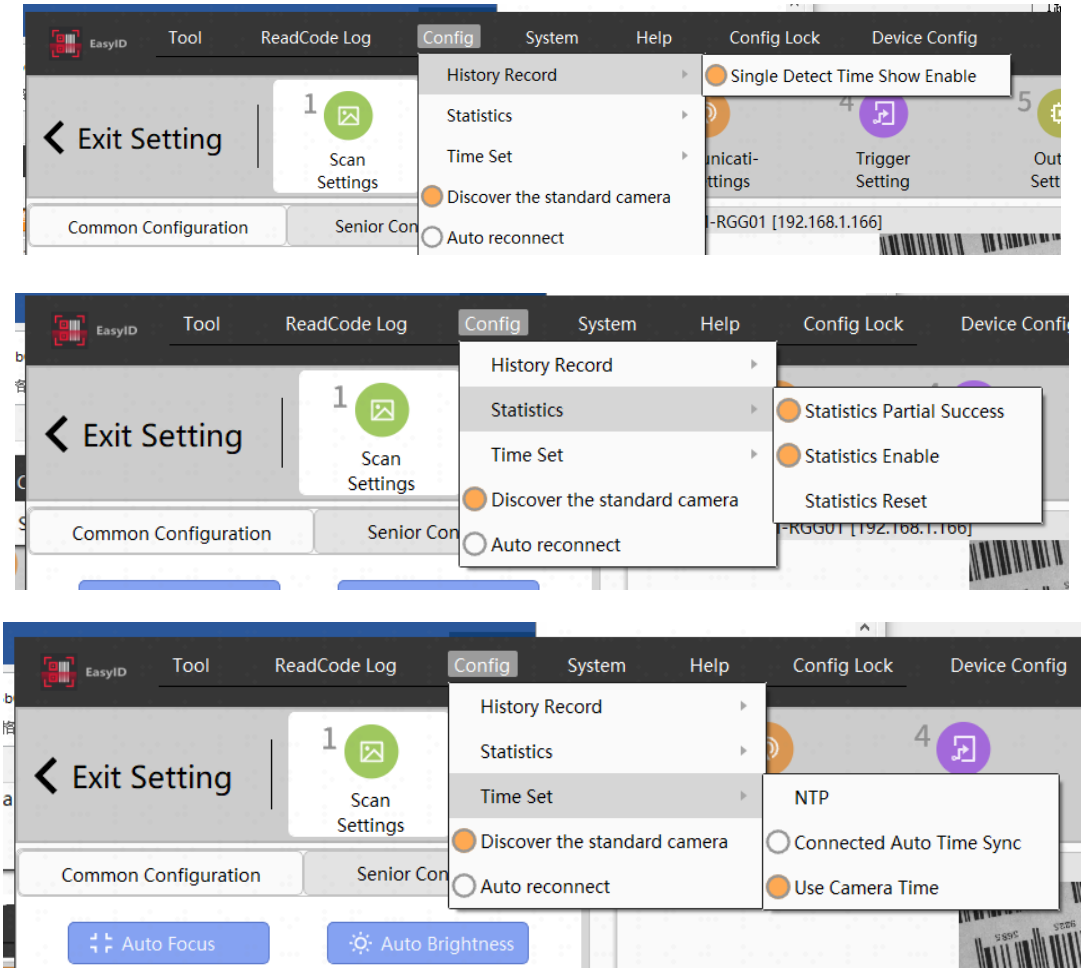


Table 4-28 Function description

Function	Description
History Record	Single Detect Time Show Enable
Statistics	Reading partial bar codes means the read is successful (when this function is disabled, if 10 bar codes need to be read and 8 bar codes are actually read, the bar code reading will fail). You can enable,

	disable, and clear statistics.
Time Set	NTP Mode, Get System Time, Auto Time Sync, Connected Auto Time Sync, and Use Camera Time are available.
Discover the Standard Camera	Select it to find earlier version cameras.
Auto Reconnect	After enabling this function, the device can be automatically reconnected after disconnection.

4.1.14 System

Figure 4-47 Functions in System list

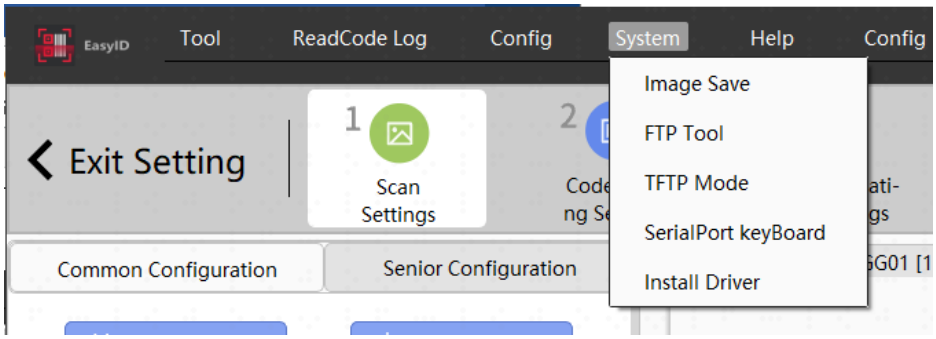


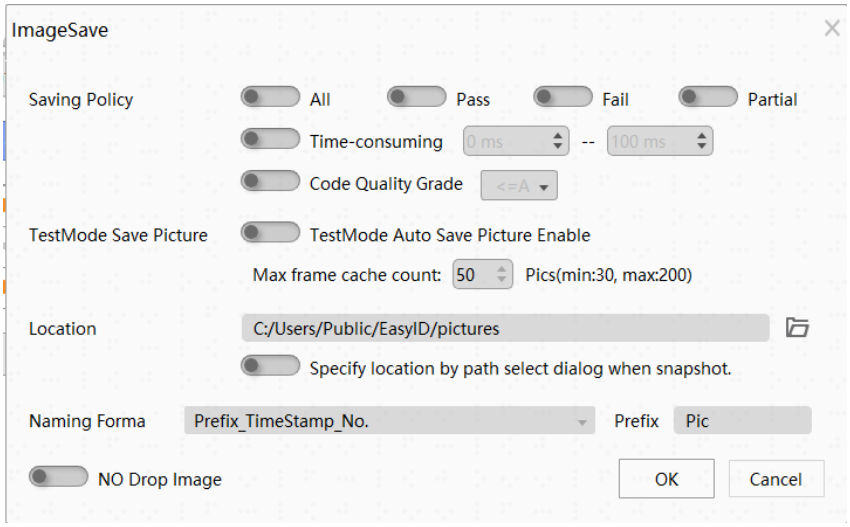
Table 4-29 Function description

Function	Description
Image Save	You can save images according to the reading status, and select the storage path.
FTP Mode	Start the FTP server that comes with EasyID, which is generally used with the FTP image storage function of the device. FTP Image Saving: You can save images according to the code reading status, and customize the image name and saving path.
TFPT Mode	Start the TFTP server that comes with EasyID. The commissioning function is encrypted.
SerialPort KeyBoard	Outputs focus information, or output to a certain position specified by mouse.
Install Driver	Used for installing drivers.

4.1.14.1 Image Save

Image Save is one of the most commonly used function, which can save all decoded images according to the actual situation for traceability. Besides, if the image is failed to decode, you can provide the images to sales manager or technical specialist for parameter adjustment or algorithm optimization.

Figure 4-48 Configuration interface of Image Save



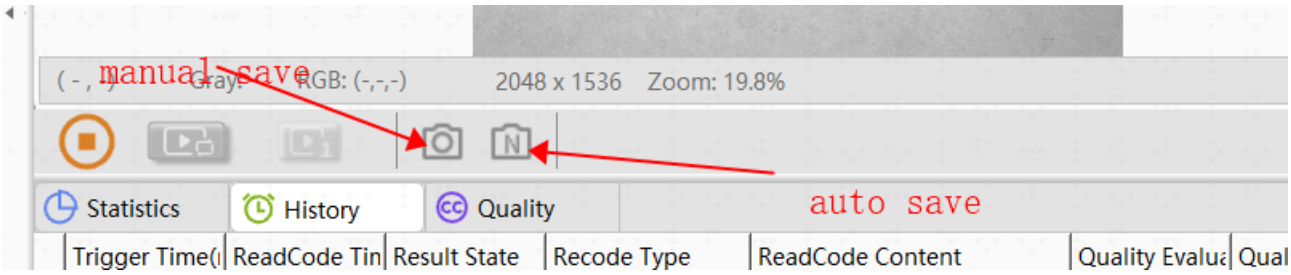
User can save the images in BMP or JPEG format.

User can select storage strategies including all pictures, decoding, decoding failure, partially decoded.

Save images in the following two methods:

- Click **Record** in the control bar of the image display area, and then every image acquired will be saved.
- Click **Snapshot** in the control bar of the image display area to save images manually.

Figure 4-49 Image saving buttons



4.1.14.2 SerialPort KeyBoard

Virtual keyboard of the EasyID client can debug device quickly.

Figure 4-50 Virtual Keyboard

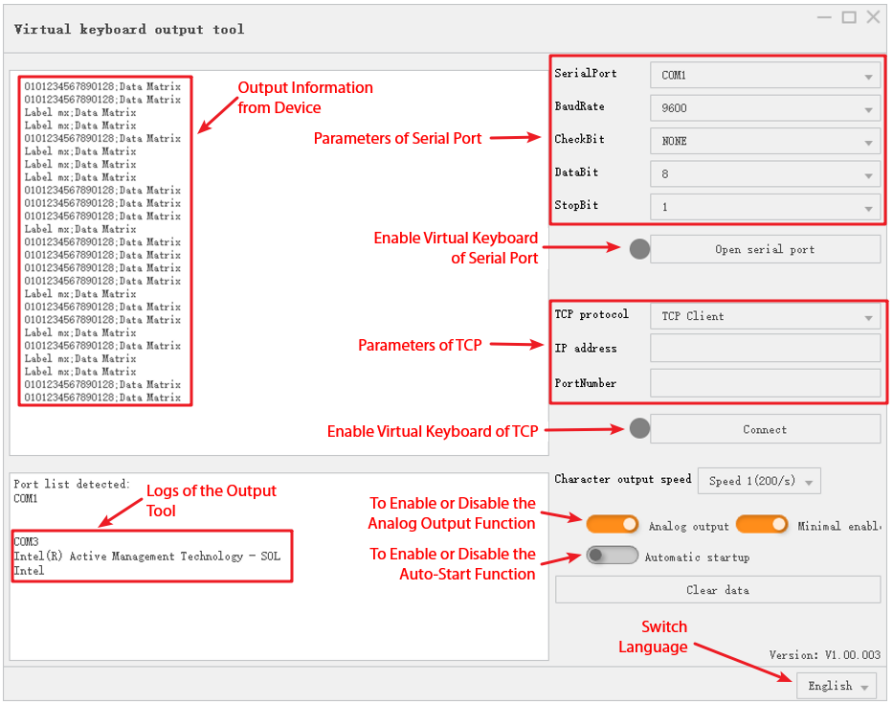


Table 4-30 Parameter description of virtual keyboard

Function	Description
Serial Port Virtual Keyboard	For details about serial port configuration, see "4.1.3 Communication Settings". You can click Open serial port, and then use virtual keyboard through serial port.
TCP Virtual Keyboard	For details about network port configuration, see "4.1.3 Communication Settings". Click Connect, and then use virtual keyboard through TCP protocol.
Character Output Speed	5 Level: Speed 1 (200/s), Speed 2 (250/s), Speed 3 (330/s), Speed 4 (500/s), Speed 5 (1000/s). We recommend you select the low-speed transmission, because the low transmission rate is more stable and reliable.
Analog Output	Enable or disable function of virtual keyboard output.
Minimal Enable	Enable or disable the minimization function.
Automatic Startup	Enable or disable the function of Automatic Startup.
Clear Data	Click it to clear the data.
Language	Switch the language between English and Chinese.
Display Column	On the left is the display bar for content display.

Serial Port Analog

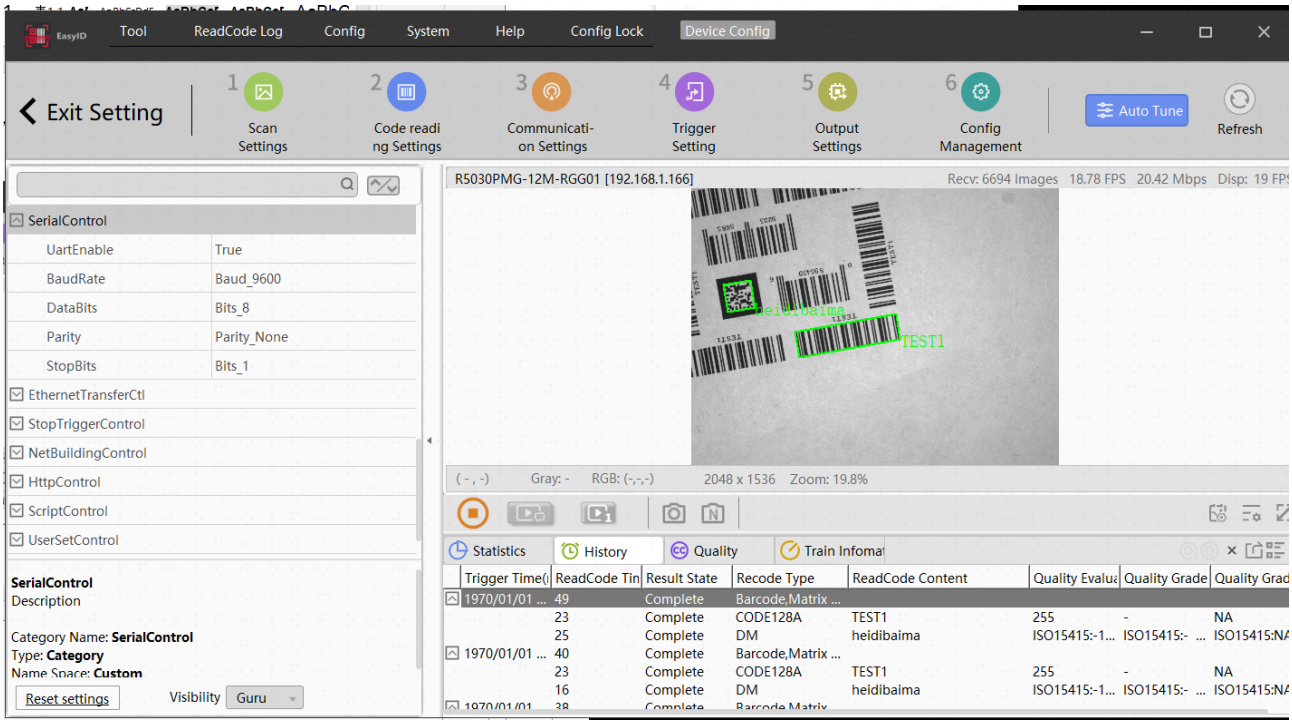
After connecting the cables, check the serial port number of the receiving end.

Procedure

Step 1 Click **Device Config** > **Serial Control**. Set the **UartEnable** to the **True**, and then user can configure the parameters of serial port.

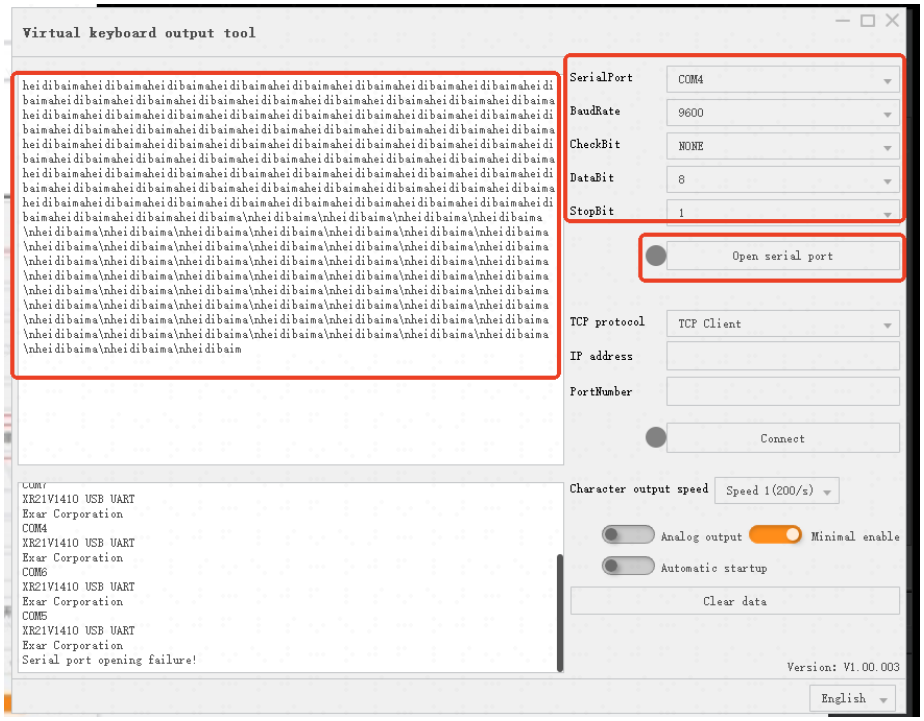
Step 2 Click **Device Config** > **Result Transfer Control**. Set the **Common Selector** to the **Serial** and set the **CommonEnable** to the **True**. After that, user can configure the parameters of result format.

Figure 4-51 Serial Control



Step 3 Click **System** > **Virtual Keyboard Output Tool**. After entering it, configure the **Serial Port** and check other parameters of serial port. Finally, click **Open Serial Port**. When the device recognizes the code, it will output data and display it on the left.

Figure 4-52 Serial port configuration



Please ensure that the configured parameters on EasyID and output tool are the same; otherwise, the serial port communication will be invalid, or the outputted result will be garbled.

TCP Analog

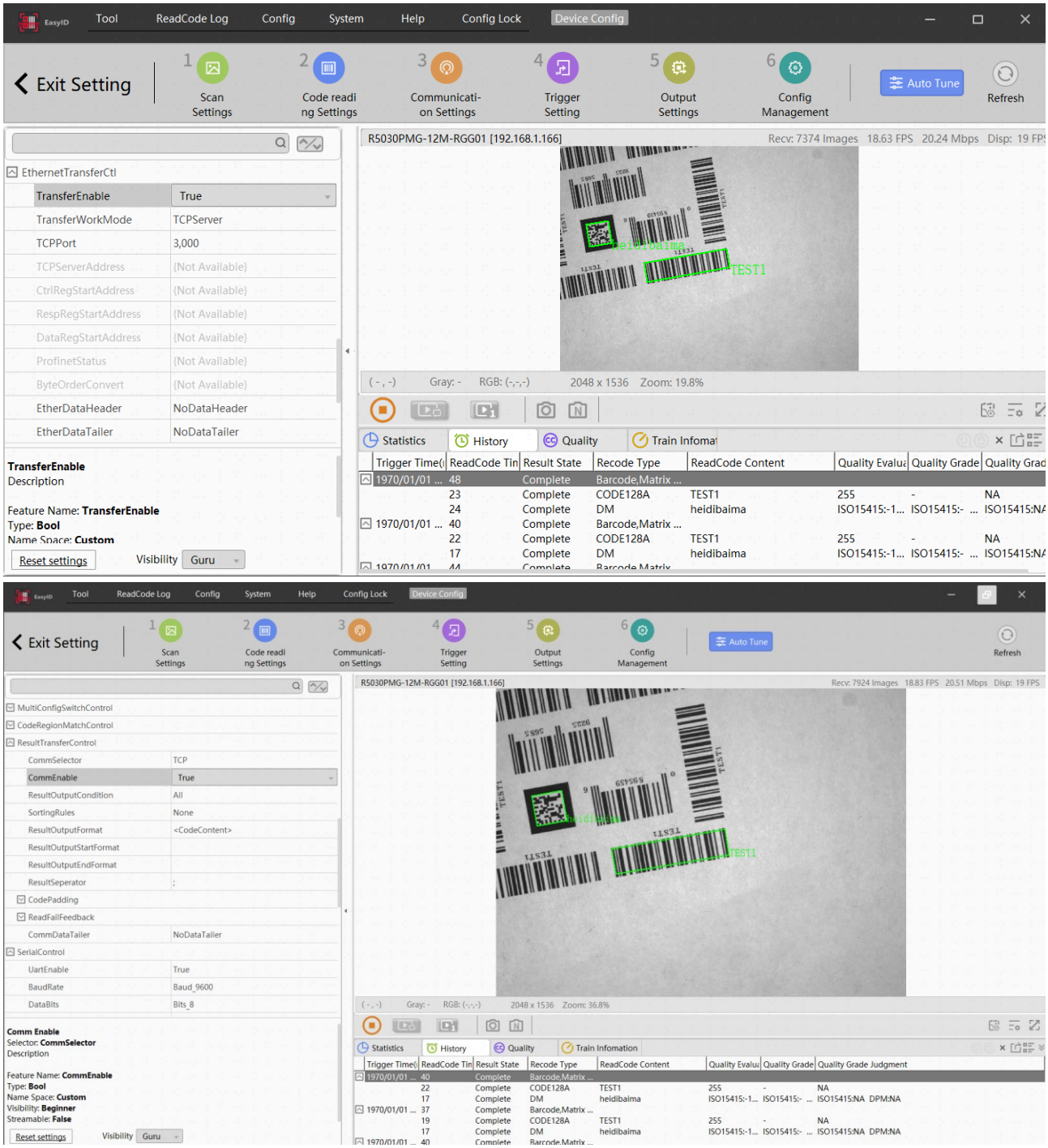
The reader can serve as either the TCP client or the TCP server.

Take the reader as the TCP client as an example, the setting procedures are similar to serial port analog.

Step 1 Click **Device Config** > **EthernetTransferCtl**. Set the **TransferEnable** to the **True** and **TransferWorkMode** to the **TCP Client**. Then, set the **TCP Port**, and configure the **TCPServerAddress**.

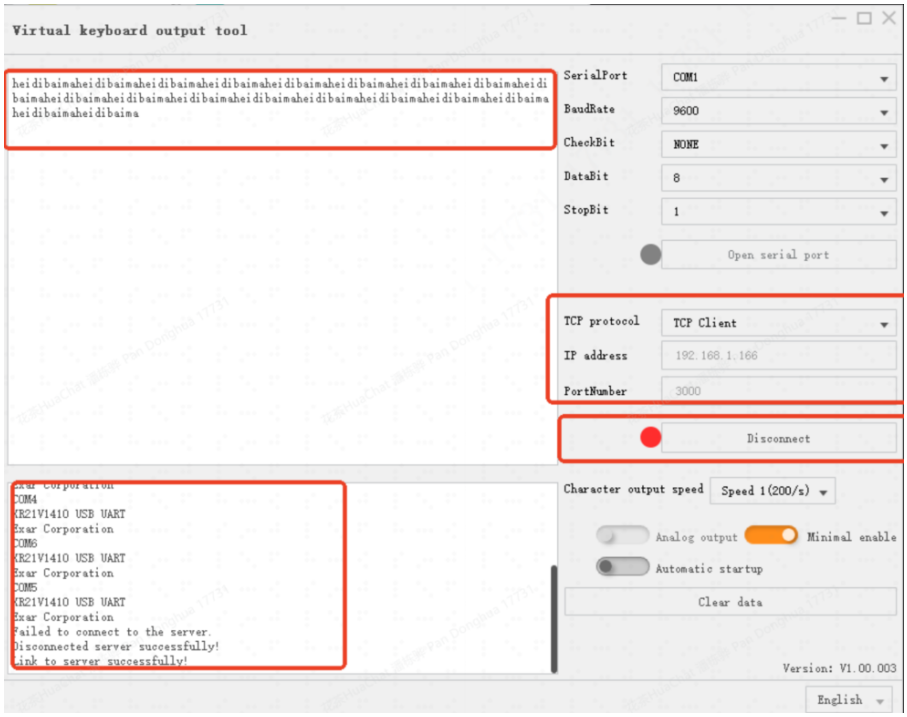
Step 2 Click **Device Config** > **ResultTransferControl**. Set **CommSelector** to the **TCP** and **CommEnable** to the **True**. Then, configure the parameters under the **CommEnable**.

Figure 4-53 TCP analog configurations



Step 3 Click **System** > **Virtual Keyboard Output Tool**. Set **TCP protocol** to the **TCP Client**, and enter the IP address and port number. After ensuring that configured parameters on the EasyID and output tool are the same, click **Connect**. When the device recognized the code, the data will be outputted on the display area, as shown in the figure below.

Figure 4-54 TCP transmission results



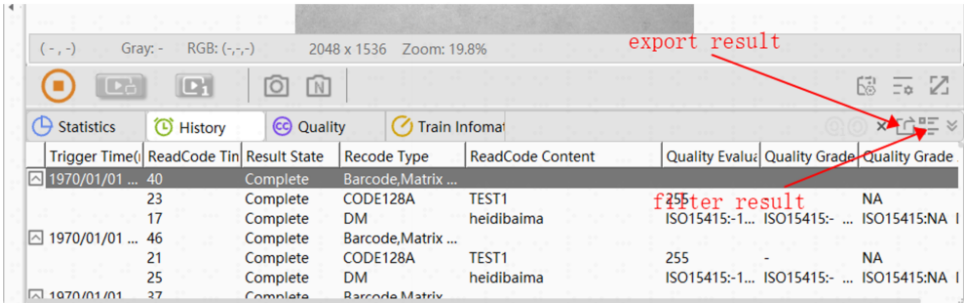
4.1.15 Help

Table 4-31 Function description

Parameter	Description
AutoRun	After selecting the Open, the client will be automatically started with the system starting.
Language	User can switch the languages between Chinese and English.
Context Help	To pop up the folder which stored the user manual and development manual.
About	To view the information of client version and company.

- Algorithm results can be displayed as a list on the results area.
- Click **Export** button to export the results in TXT format.
- Click **ResultFilt** to filter the results.

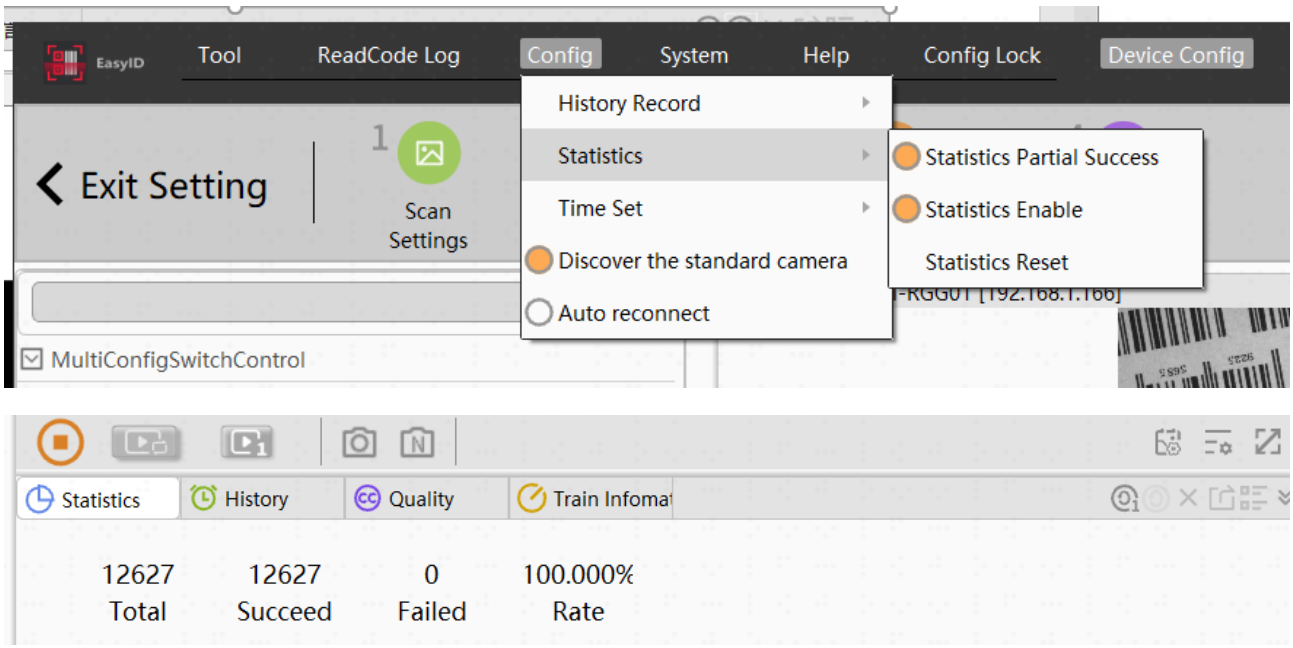
Figure 4-55 Algorithm result



When the device is reading the codes, user can click the statistics page to view the results in real time.

If user needs to clear the history records of the reading results, click **Config** > **Statistics** > **Statistics Reset** to reset the statistics.

Figure 4-56 Statistics Reset



5 FAQ (Frequently Asked Questions)

5.1 Client Cannot Find the Reader

Possible Reasons

- Reader is not enabled, and the power supply cannot meet the requirements.
- Abnormal network cable connection.
- The reader and the client are not under the same network segment.
- Non-standard protocol device.

Solutions

- Check Power Supply: Make sure that the power supply and cable are suitable.
- Check Network Connection: Check the indicator of the reader, and make sure the network is working normally, and the device and the client are on the same network segment.

5.2 Reader Found but Failed to Connect.

Possible Reasons

- Reader may not be started normally.
- Reader and client are not under the same network segment.
- Reader is connected with other clients.

Solutions

Restart the camera, try modifying IP to make it in the same LAN with the client. You can also try disconnect other connected clients and connect the current client again.

5.3 Reader Disconnection

Possible Reasons

- Hardware problems, such as poor contact of network card and network cable.
- Unmatched configurations of network card and reader.

Solutions

- Perform cross verification for hardware, if failure happens, replace the corresponding hardware.

- Check the NIC configuration.

5.4 Algorithm Procession Does Not Meet the Expectations

Possible Reasons

- The image FOV or illumination does not meet the requirements.
- Illogical parameter configuration or algorithm failed to start.
- The code has a defect.

Solutions

- Check the reader FoV and the illuminator. Review the reader parameters such as trigger mode, trigger delay, input smoothing, exposure and gain, and illumination.
- Check whether the algorithm is started. Review the algorithm parameters, including type, scale, timeout, number, filter and error code rate.

5.5 External Trigger is Abnormal

Possible Reasons

- Incorrect cable connection of external trigger.
- The trigger mode is not set to the external trigger.

Solutions

- Select the required trigger mode and make sure that the external cable connection is correct.

6 Clean and Maintenance

This section introduces the clean and replacement of the color filter.

To avoid dust on the image sensor, a piece of fully transparent glass is installed on mono cameras. A low-pass color filter, which lets colors with lower frequency than NIR (Near Infrared) pass, is installed in color cameras. If you want to use a different color filter or not use at all, replace the whole color filter bracket outside the image sensor (no need to disassemble the cover).

If the color filter surface requires cleaning, use special detergent made for optical materials so that no marks left after cleaning.