ZEBEX
www.zebex.com

User's Manual



2D Image Fixed Industrial Scanner

Revision History

Changes to the original manual are listed below:

Version	Date	Description of Version
1.0	01/05/2025	Initial release
1.1	08/14/2026	M12 A Code pin define updated

Important Notice

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Guidance for Printing

This manual is in A5 size. Please double check your printer setting before printing it out.

Adjustments: Do not attempt any adjustments or alteration of this product. Do not remove the protective housing of the scanner. There are no user-serviceable parts inside.

Optical: The use of optical instruments with this product will increase the eye hazard. Optical instruments include binoculars, magnifying glasses, and microscopes but do not include normal eye glasses worn by the user.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

For CE-countries

This scanner is in conformity with CE standards. Please note that an approved, CE-marked power supply unit should be used in order to maintain CE conformance.

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Product Overview

Product Description

The **ZX-3050 Intelligent Code Reader** is a versatile device designed for industrial applications, including:

- Electronics
- Food and pharmaceuticals
- Semiconductor manufacturing
- Automotive production
- Spare parts and other industries

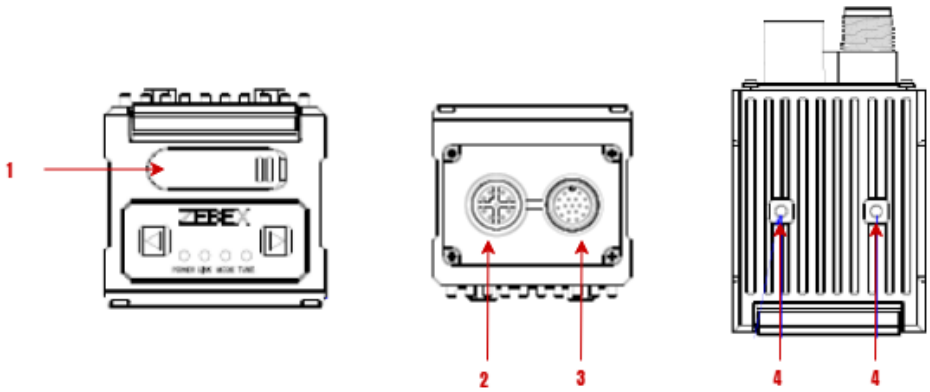
The ZX-3050 captures images of objects using integrated sensors and optical components, then processes them with its internal barcode recognition algorithm. Test results can also be transmitted via multiple communication interfaces.

Key Features

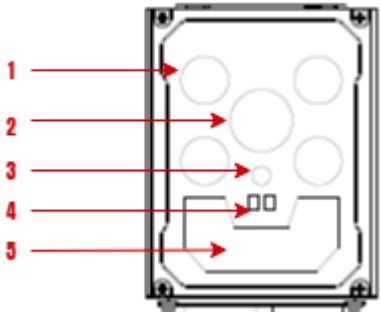
- **Compact design**: ideal for installation in tight spaces.
- **Advanced TLENS with auto-focus**: enables fast zooming and precise focusing.
- **One-touch parameter tuning**: the Tune button automatically optimizes settings, saving setup time.

- **High-precision barcode reading**: supports ultra-small codes at various distances.
- **Dual-color illumination**: red and white light for complex environments.

Device Overview

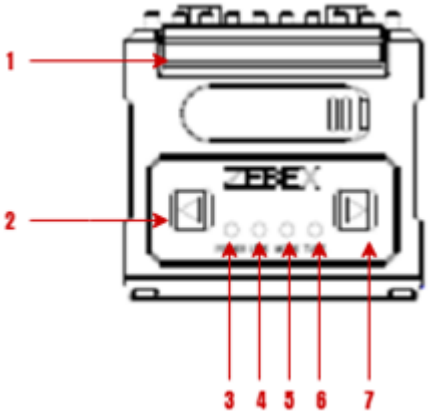


#	Component	Description
1	Rubber & Type C USB	USB 2.0
2	M12 X Code-8PIN	Connects 1G Ethernet.
3	M12 A Code-17PIN	Connects power, IO Control and RS232.
4	Mounting hole	Secures the ZX-3050 to a surface or bracket. (M3*3.5mm)



Optical Functions

#	Indicator	Description
1	Red light source	4 Red LED for normal image capture
2	Image sensor	Captures images for processing.
3	Aiming light	Indicates image center for easier targeting.
4	TOF	Integrated with TLENS technology for fast and precise autofocus
5	White LED Light source	Equipped with 10 white LEDs, optimized for reflective surfaces



Indicator Functions

#	Indicator	Description
1	Status (OK/ NG)	Blue = code read successfully; Red = read failed.
2	TRIG key	Triggers image capture.
3	Power	Red = device running normally.
4	Link	Flashes green when 1G network is active.
5	Mode	The white LED flashes once per second, indicating the device is decoding
6	Tune	The blue LED stays steadily on, indicating the device is performing automatic calibration
7	Tune key	Automatic parameter adjustment.

Accessories

Item	Description
M12-17PIN Cable	Connects device to power, RS232 and Control IO
M12-X Code 8 PIN Cable	Connect device to Ethernet.
Type C to Type A USB cable	U2B2.0 Cable

Connections and Wiring

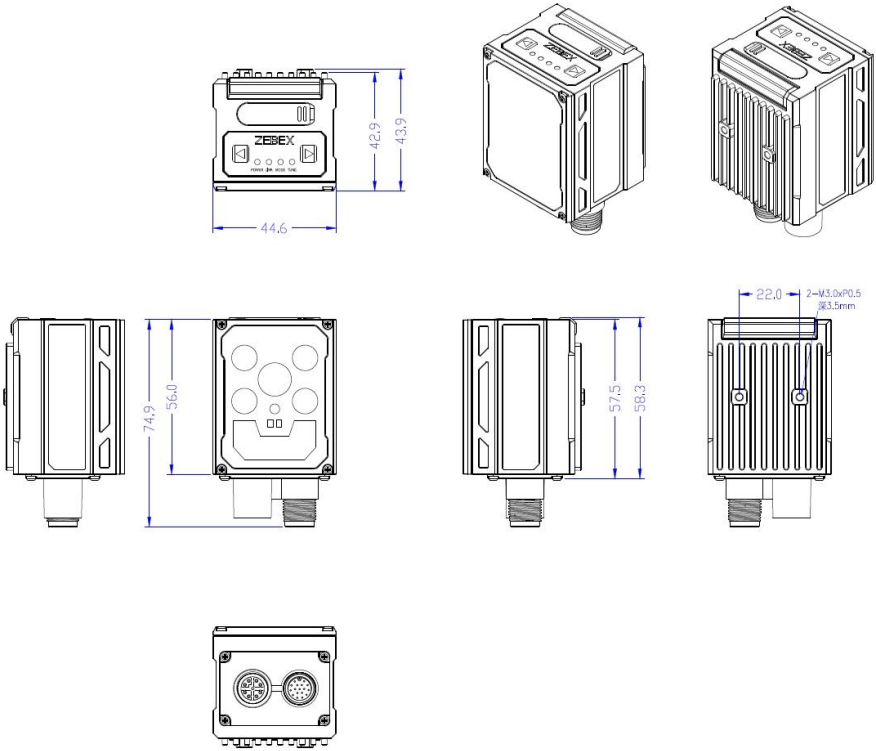
M12 A Code

Pin	Wire Color	Signal	Description
1	Black/ White		Option
2	Brown/ White		Option
3	Red/ White	IN2	Input signal2
4	Green/ White	IN1	Input signal1
5	Green	OUT_COM	Out common
6	Blue	GND	Power GND
7	Purple	OUT2	Output signal2
8	Gray	OUT1	Output signal1
9	White	RXD1	Option RS232C
10	Pink	RXD	RS232C Receiver
11	Light Blue	SGND	Signal GND
12	Light Green	IN_COM	Input common
13	Orange	OUT3	Output signal3
14	Yellow	TXD	RS232C send
15	Red	TXD1	Option RS232C
16	Brown	24V	24VDC
17	Black		Option
	Bare wire	FG	Frame GND

M12 X Code

M12 X	Signal	Color	RJ45 8P8C
1	BI_DA+	White	1
2	BI_DA-	Orange	2
3	BI_DB+	White	3
4	BI_DB-	Green	6
5	BI_DD+	White	7
6	BI_DD-	Brown	8
7	BI_DC-	White	5
8	BI_DC+	Blue	4
Shield	Drain	Drain wire	Shield

Dimension



Product Operation

Installing the Device

- Secure the ZX-3050 to the mounting bracket using screws.
- Attach the bracket to the surface or component.
- **Tip:** Install at a 10–15° angle to avoid glare.
- **Working distance:** Liquid zoom: 40–300 mm; Manual zoom: 30–300 mm

(Refer to diagrams for installation and field-of-view.)

Power Connection

- Operating voltage: 24V DC, max 3A
- Connection options: Direct 24V DC or 220V AC via adapter

Communication Connection

RS-232 Serial Port

- Default: 9600 baud, 8 data bits, no parity, 1 stop bit
- Settings can be adjusted during software configuration

Ethernet Connection

- Default IP: 169.254.153.0
- Default port: 15000

I/O Electrical & Wiring

Overview

- **2 optocoupler isolated inputs**
- **3 Photo MOS relay outputs**

Input Electrical Characteristics

Parameter	Symbol	Value
Input logic low voltage	VOL	8V
Input logic high voltage	VOH	12V
Input falling edge delay	TDF	10 µs
Input rising edge delay	TDR	47 µs

Note: Logic low/high = voltage threshold. Rise/fall delays indicate performance.

Output Electrical Characteristics

Parameter	Symbol	Value
Output logic low voltage	VOL	0.7V
Output logic high voltage	VOH	23.9V
Output falling edge delay	TDF	20.3 µs
Output rising edge delay	TDR	550 µs
Output fall time	TF	12 µs
Output rise time	TR	3.5 µs

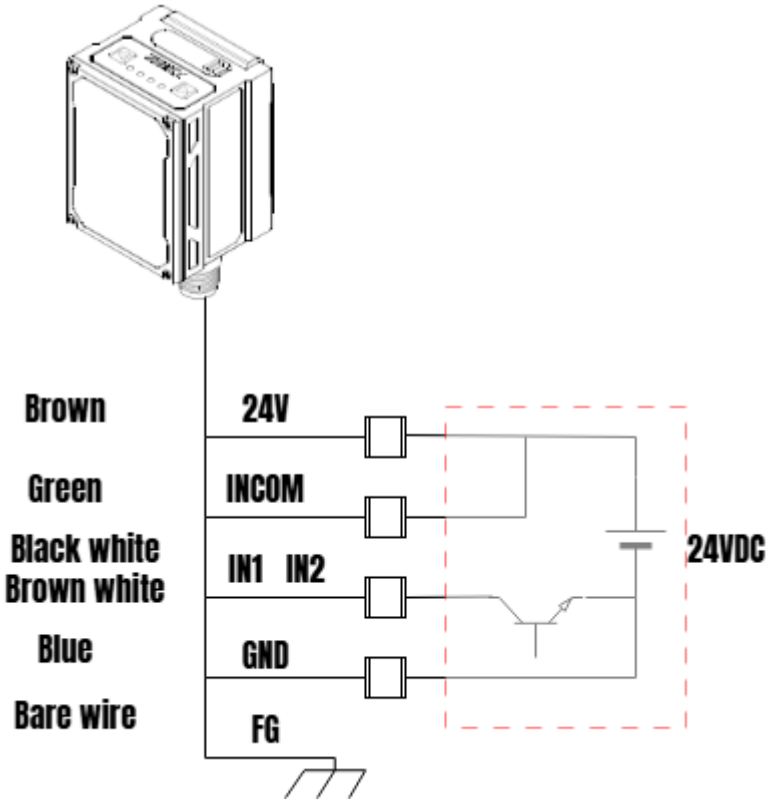
- Output voltage range: 15–30V
- Max output current: 50 mA

Input Wiring

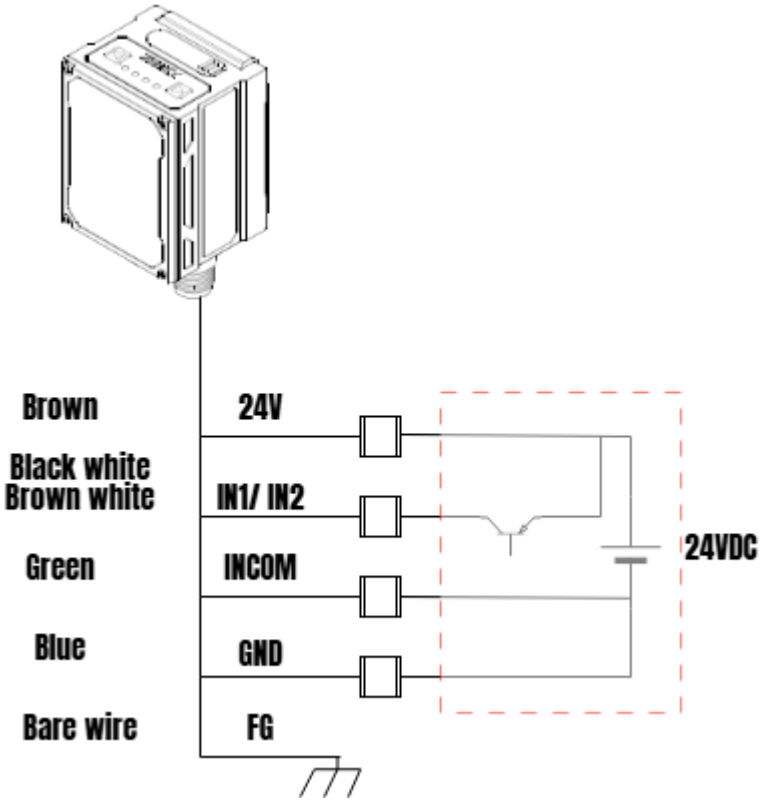
Input Circuit

- IN1 / IN2 / IN COM
- Voltage range: 0–28V DC

Input NPN Wiring Diagram



Input PNP Wiring Diagram

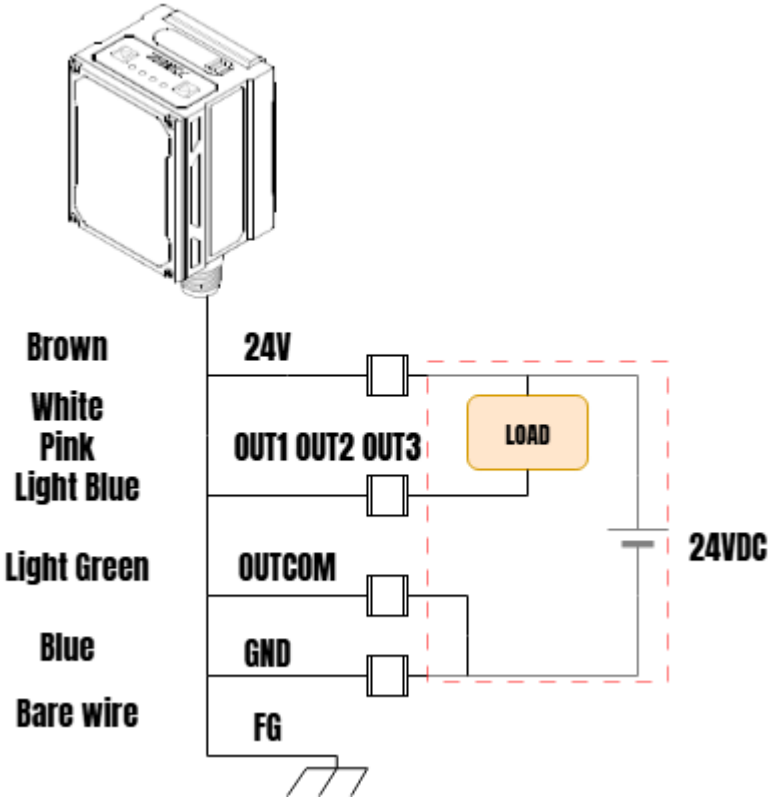


Output Wiring

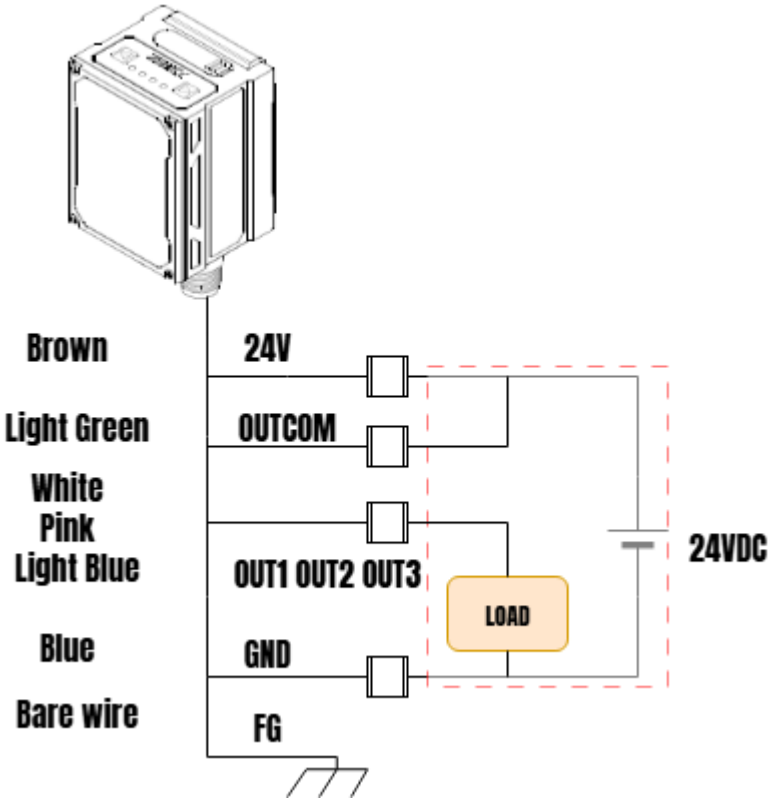
Output Circuit

- OUT1/ OUT2/ OUT3/ OUT COM: Photo MOS Relay
- Voltage range: 5–28V, max current 50 Ma

Output NPN Wiring Diagram



Output PNP Wiring Diagram



(Refer to internal wiring diagrams for logic levels.)

External I/O Wiring

Input Wiring

- Depends on external device type
- Examples: NPN or PNP input

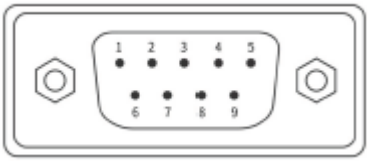
Output Wiring

- Depends on external device type
- Example: NPN device

Guidelines:

1. VCC must not exceed PWR voltage by more than 24V.
2. Output load must comply with specifications. Use a current-limiting resistor if needed.

RS-232 Serial Port



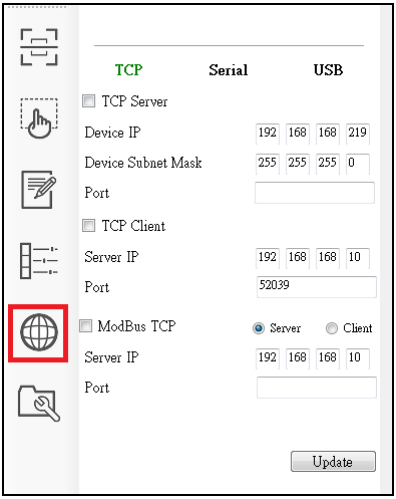
- Supports 9-pin male RS-232 connector for external communication.
- VCC must not exceed PWR voltage to prevent abnormal output.

D-sub female DTE pin out			M12 A Code Connector		
Pin	**Function**	**Description**	**Pin**	**Wire Color**	**Color**
2	RXD	Receive data	14	Orange	TXD
3	TXD	Transmit data	10	Purple	RXD
5	GND	Signal Ground	1	Green/ White	SGND

Client Operation

Software Connection

- Double-click the software icon to launch the client.
- Ensure that the ZX-3050 intelligent barcode reader and the PC running the configuration software are within the same network segment.
- Default IP address: **169.254.153.0**; Subnet Mask: **255.255.0.0.**
- You can connect using either **DHCP** or a **static IP address**.

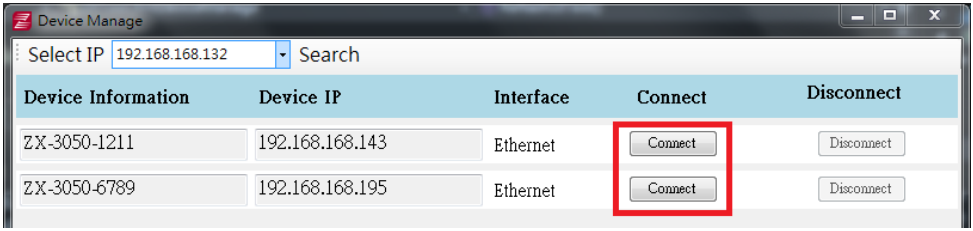


PC Network Configuration

Changing the PC IP Address

Using Windows 10 as an example:

1. Navigate to: **Start Menu > Settings > Network & Internet > Ethernet > Adapter Options**.
2. Right-click **Ethernet 3 > Properties > Internet Protocol Version 4 (TCP/IPv4)**.
3. Modify the IP address of the corresponding network card to:
    - **IP Address:** 169.254.153.16
    - **Subnet Mask:** 255.255.0.0
4. Open the configuration software, select the device, and click **Connect**.

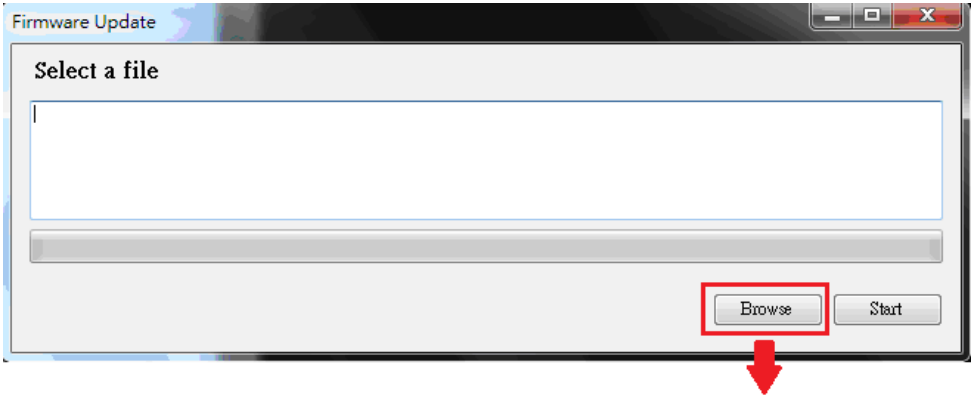


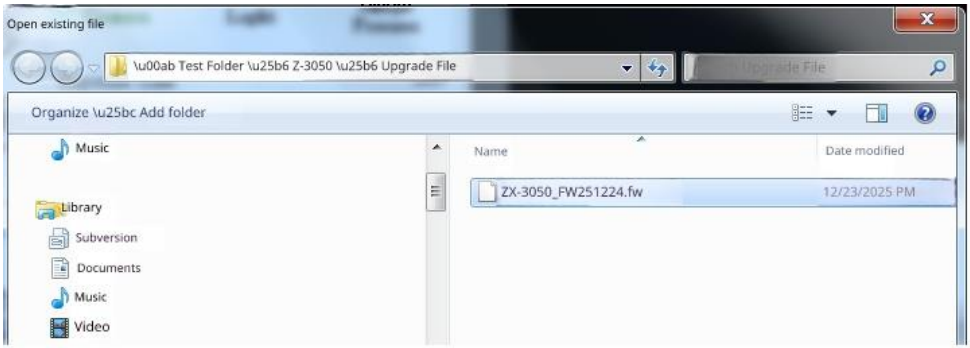
Changing the Barcode Reader IP Address

1. Open the configuration software and select the corresponding PC network card.
2. When the barcode reader is displayed, click **IP Settings > Use Static**.
3. Choose either **Dynamic IP** or **One-click Match**, then confirm.
4. Adjust the barcode reader IP address to match the same network segment as the PC.

Firmware Upgrade

1. Navigate to: **System > Firmware Update**.
2. Select the firmware file and click **Start**.
3. Wait for the device to reboot automatically.

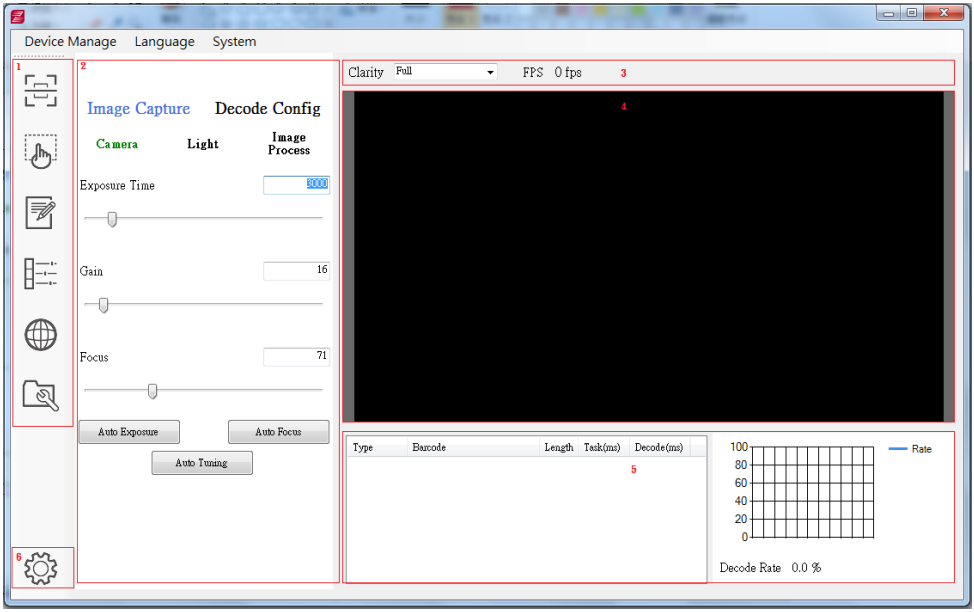




Function Introduction

Interface Overview

The ZX-3050 can be operated through the client interface.



1. **Menu Bar**: Access basic client functions. Second-level menus allow parameter settings, template selection, and module configuration.

2. **Reader Configuration**: Adjust algorithm parameters, start/stop image collection, ROI, etc.

3. **Toolbar**: Quick functions such as image operations.

4. **Preview Window**: Displays the live image, real-time decoding results, and ROI drawing effects.

5. **History Records**: Shows real-time barcode reading results.

6. **Basic Settings**: Change device name, buzzer settings, button settings.

Code Reading Configuration

Image Capture - Camera

- Adjust **Image Acquisition** parameters if recognition performance is poor: exposure time, gain, focus, light source settings.
- Automatically sets exposure, gain, light, and decoding parameters.
- ZX-3050 supports both manual and adaptive automatic adjustment.
- **Exposure Time**: Controls brightness. Longer exposure increases brightness but slows capture speed.
- **Gain**: Increases brightness but may introduce noise.

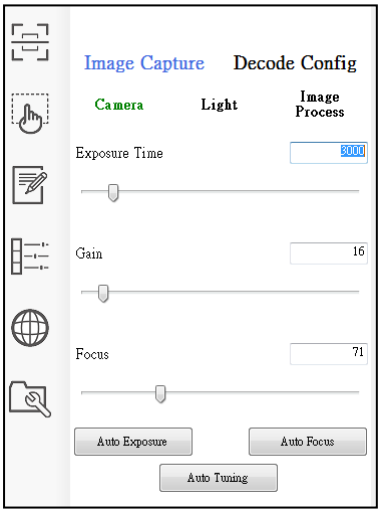


Image Capture - Light

Light Source Settings

- Controls the ON/OFF status of fill lights.

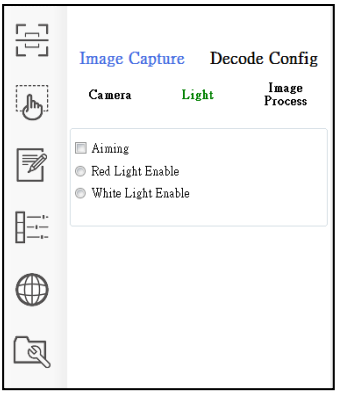
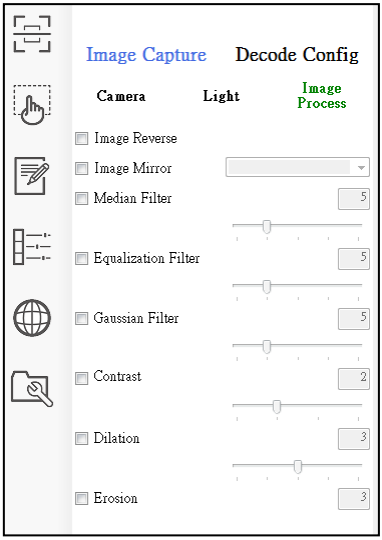


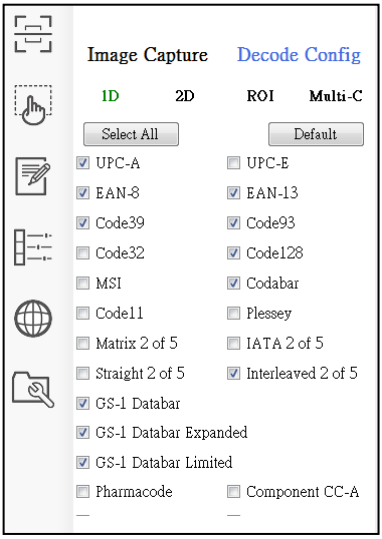
Image Capture – Image Process

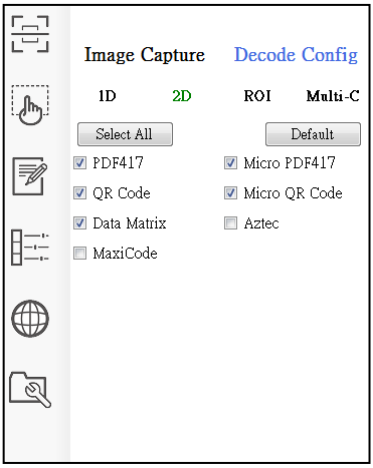
- Provides image processing functions.

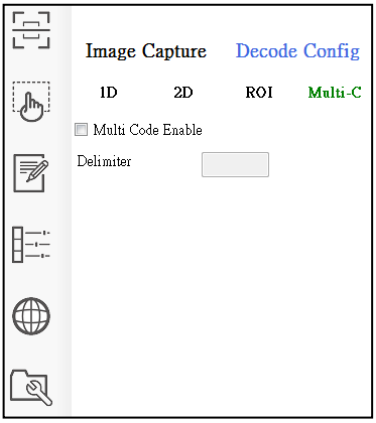


Code Reading Type

- Supports **1D** and **2D** barcode types. Multiple selections allowed.
- The more code systems selected, the longer decoding time; select only as needed.







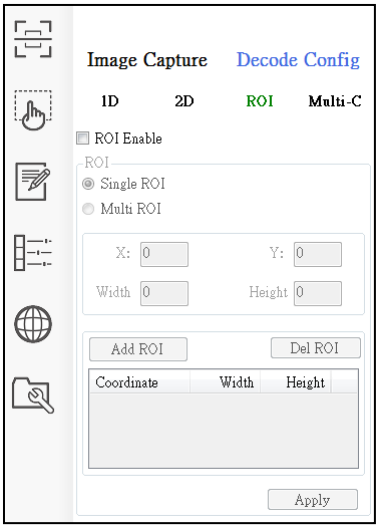
Algorithm Configuration

ROI (Region of Interest) Settings

- Define areas for decoding; ignore unnecessary regions.
- Multiple ROIs can be set and prioritized.
- If no code is detected, “noread” is output.

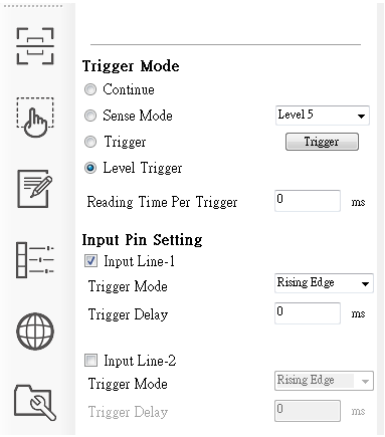
Manual ROI

- Manually drag an ROI or set parameters: Center X / Center Y, Width / Height



Trigger Configuration

- **Continuous Trigger**: The reader captures continuously.
- **Sense Mode**: Triggers decoding based on detected image changes.
- **Software Trigger**: Manually triggered via the client software.
- **Level Trigger**: Captured upon receiving an external I/O signal. Supports configuration for Timeout, Start/End Trigger, Delay, and Rising/Falling Edge.



Format Configuration

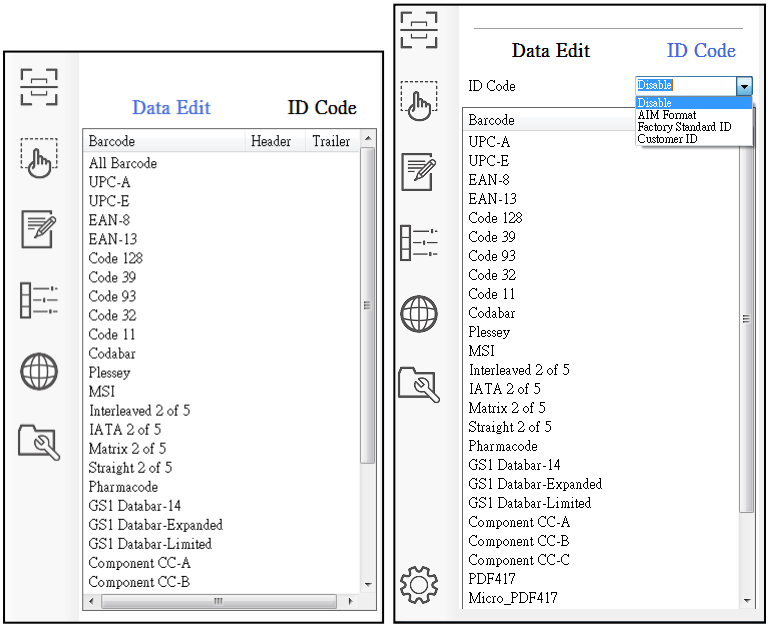
Includes **Data Edit** and **Code ID.**

Data Edit

Editing prefix/suffix.

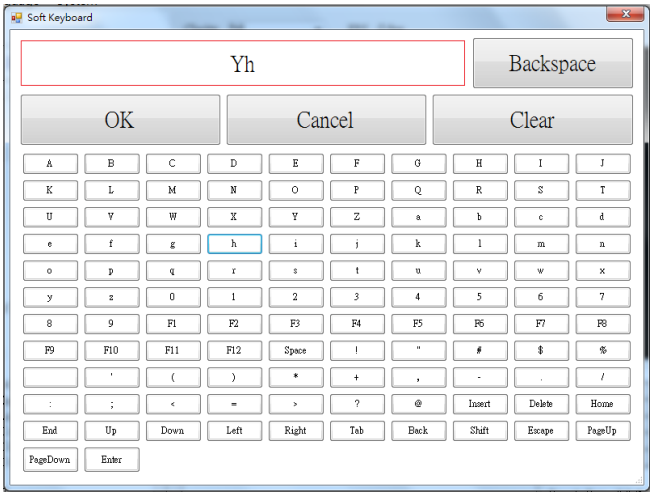
Code ID

- **Disable**: Turns off the Code ID function
- **AIM Format**: Uses AIM-standard Code ID encoding
- **Factory Standard ID**: Uses the default Code ID encoding format
- **Customer ID**: Uses a user-defined Code ID encoding format



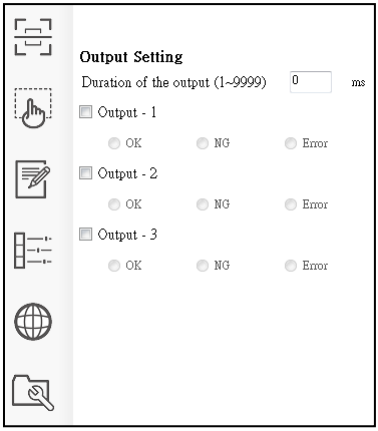
The figure below shows the on-screen keyboard for editing Prefix/Suffix and Code ID. The red area displays the edited content.

- **OK**: Confirms edits and sends them to the device.
- **Cancel**: Cancels the current edits without sending data.
- **Clear**: Clears all edited content.
- **Backspace**: Deletes the last edited character.



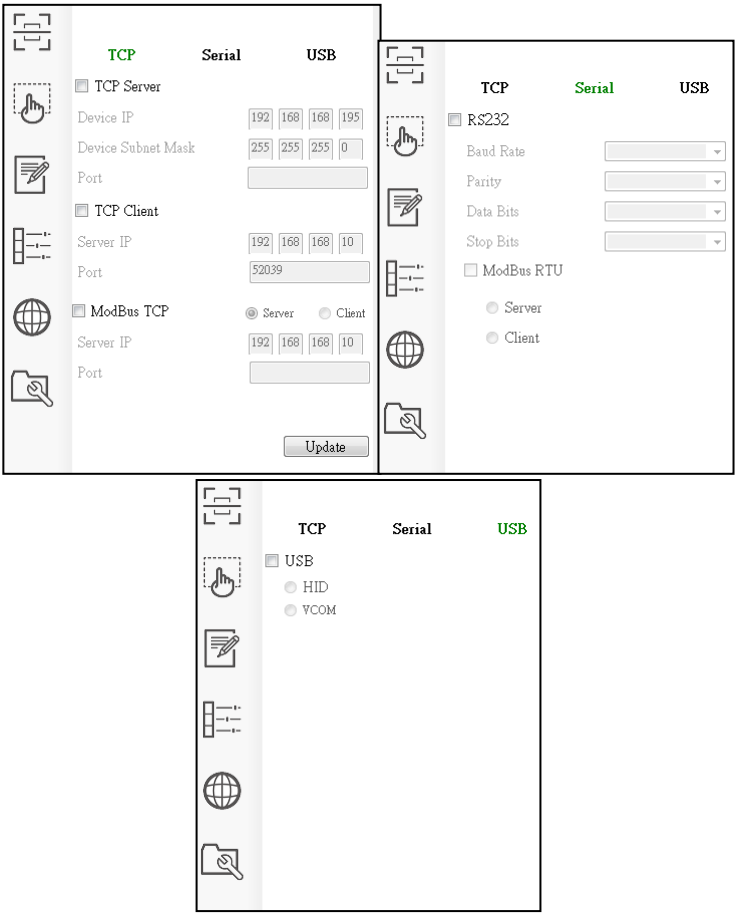
Output Configuration

- Supports **3 output channels (OUTLINE1–3)**.
- Configurable states: **OK, Read Failed, Abnormal**.
- Adjustable output duration: **1–9999 ms**.



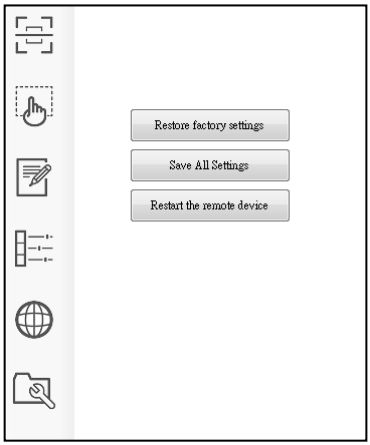
Communication Configuration

- Supports **TCPServer**, **ModbusTCP**, **Serial Port**, **ModbusRTU** and **USB**.
- Parameters include Service IP, Port, Device Station Number.



Configuration Management

- Restore defaults
- Save all settings
- Restart the remote device



Device Settings

- **Device Name**: Change the device name.
- **Buzzer**: Adjustable sound duration (40/80/120 ms).
- **Beep Frequency**: Adjustable sound frequency(Low/Medium/High).

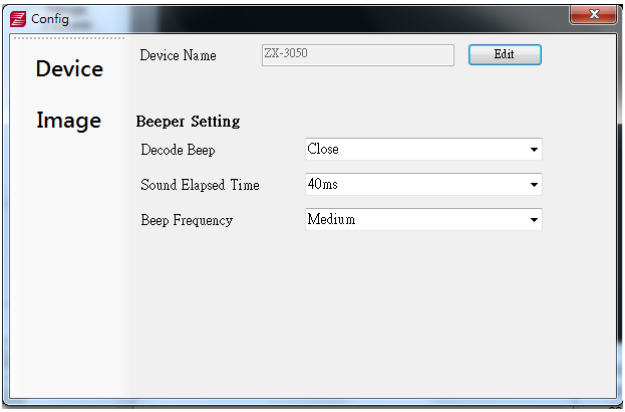
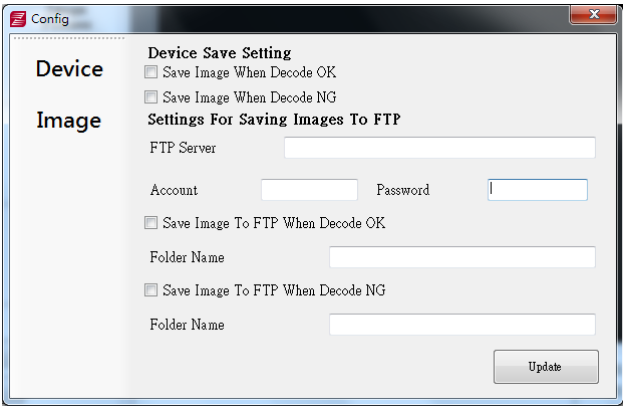


Image Settings

- **Device Save Setting**: Stores the image on the device after decoding according to the OK/NG result.
    - **Settings For Saving Images To FTP**: Sends the image to the FTP server after decoding according to the OK/NG result.
    - **FTP Server:** FTP server URL or IP address.
    - **Account:** FTP server URL or IP address.
    - **Password:** FTP server login password.


Config
Device
Image
Device Save Setting
Save Image When Decode OK
Save Image When Decode NG
Settings For Saving Images To FTP
FTP Server
Account
Password
Save Image To FTP When Decode OK
Folder Name
Save Image To FTP When Decode NG
Folder Name
Update

Frequently Asked Questions

Device Recognized but "Unreachable"

- Cause: Device IP and PC are in different segments, or PC has multiple IPs.
- Solution: Adjust IP to match network segment. Reset Winsock: netsh winsock reset then restart PC.

Debug Mode Settings Not Saved

- Cause: Temporary storage requires manual saving.
- Solution: **Configuration Management > Save All Configurations**.

Barcode on Metal/PCB Cannot Be Read

- Causes: Low brightness, high reflectivity.
- Solution: Increase **Light Source** or **Gain**, adjust angle and exposure.

Small Barcode Cannot Be Recognized

- Cause: Insufficient resolution (PPM too low). 1D codes require **PPM ≥ 2**, QR codes require **PPM ≥ 3**
- Solution: Move the reader closer.

Using Different Trigger Modes

- Network Trigger: Same port/IP, verify with third-party software
- IO Trigger: Connect lines, configure NPN/PNP

- Serial Port Trigger: Configure DB9, baud rate, data bits, stop bits
- Software Trigger: Ensure same network segment

Network Trigger Failure

- Cause: Device only supports client mode.
- Solution: Adjust PLC device network trigger mode.