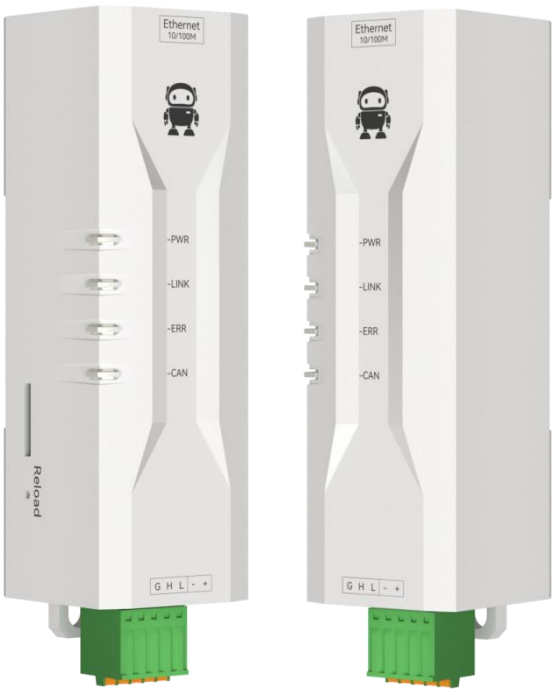


ECAN-E02

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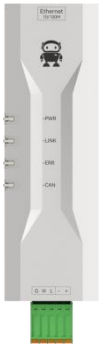
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1. Product Introduction

1.1. Product Introduction



ECAN-E02 is a high-performance industrial Ethernet and CAN-bus data conversion device developed by Ebyte. It integrates 1 CAN-bus interface and 1 EtherNet interface, supports TCP/UDP protocol, and can easily complete the intercommunication between CAN-bus network and Ethernet network.

ECAN-E02 supports working in the temperature range of -40℃～85℃. It has one 10M /100M Ethernet interface, high protection of CAN interface, and increased isolation; the maximum baud rate of 1 CAN port communication is 1Mbps, with multiple working modes such as TCP Server, TCP Client, UDP, etc., and the parameters can be configured through the host computer configuration software.

1.2. Features

- Integrated 1- way CAN-bus interface, using plug-in terminal wiring method;
- Supports CAN2.0A and CAN2.0B frame formats, compliant with ISO/DIS 11898 specifications;
- CAN-bus communication baud rate is programmable between 12.5 Kbps and 1Mbps ;
- Single-channel CAN transceiver, dual-link mode, support TCP/UDP, including TCP server, TCP client, UDOS, UDPC, MQTTC, maximum number of connections
- The CAN-bus interface adopts electrical isolation, and the isolation module insulation voltage is DC 2500 V ;
- Support registration package, heartbeat package, short connection function
- Support DHCP, DNS;
- Supports network disconnection restart/timeout restart (60-65535s, default 1800);
- Support cache clearing function, link cache clearing in client mode;
- Support web page configuration and host computer configuration;
- Built-in watchdog;
- Operating temperature range: -40℃~+85℃.

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2. Quick Start

You need to prepare ECAN-E02 *1 , network cable *1

After the device is powered on, connect the computer to the device via a network cable and set the computer IP address to the same network segment as the device IP. The default IP address of the device is 192.168.3.7; for example, the computer IP address is 192.168.3. 101 .



Open the computer's network debugging assistant, set it to TCP Client, set the remote host IP to 192.168.4.101, and set the remote host port number to 8881.

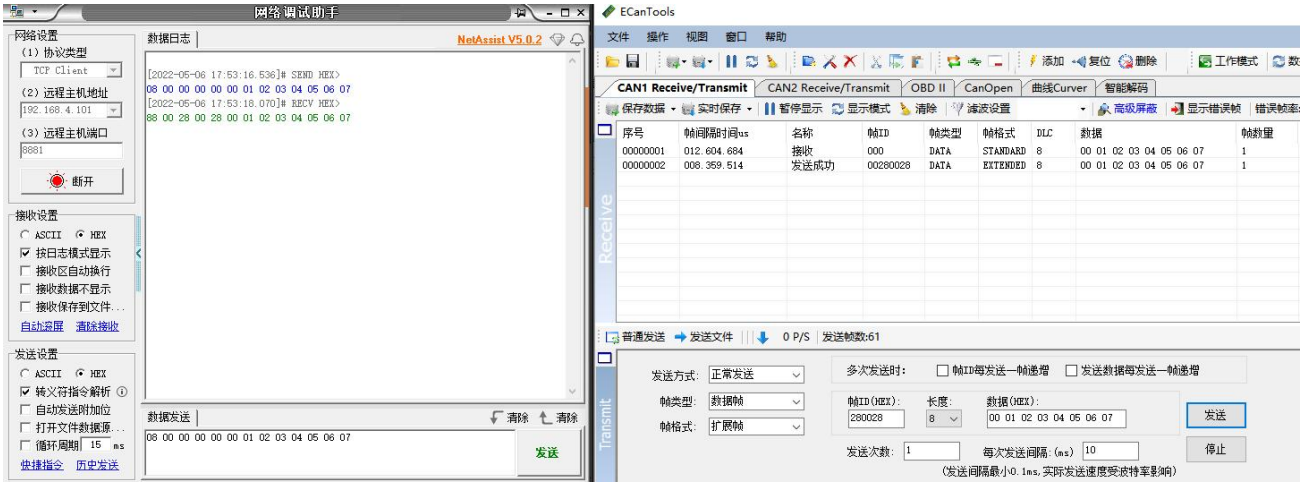
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ECAN-E02 to the CAN analyzer. When ECAN-E02 is connected to the CAN bus, just connect CAN_H to CAN_H and CAN_L to CAN_L.

Use the network assistant to achieve communication between the device and peripherals.



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3. Technical indicators

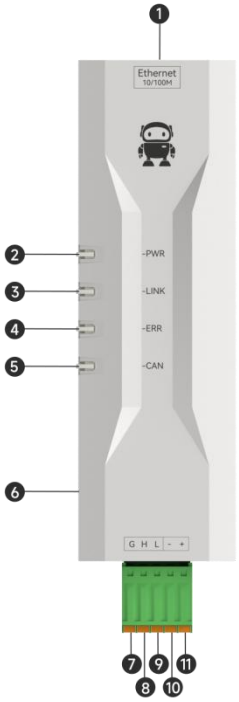
3.1. General Specifications

Serial number	project	Specification
1	Supply voltage	8V~28VDC, more than 28V may burn out, 12V or 24V power supply is recommended
2	Network port specifications	Standard RJ45, support 10M /100M
3	Network Protocol	IP, TCP/UDP, MQTT
4	Simple transparent transmission method	TCP Server, TCP Client, UDP Server, UDP Client
5	TCP Server Connection	Supports up to 10 TCP connections
6	How to obtain IP	Static IP, DHCP
8	User Configuration	Host computer configuration /web page configuration
10	Operating temperature	-40 ~ +85℃, industrial grade
11	Operating humidity	10% ~ 90%, relative humidity, non-condensing
12	Size	See dimensional drawing
14	Storage temperature	-40～+ 85 ℃, industrial grade

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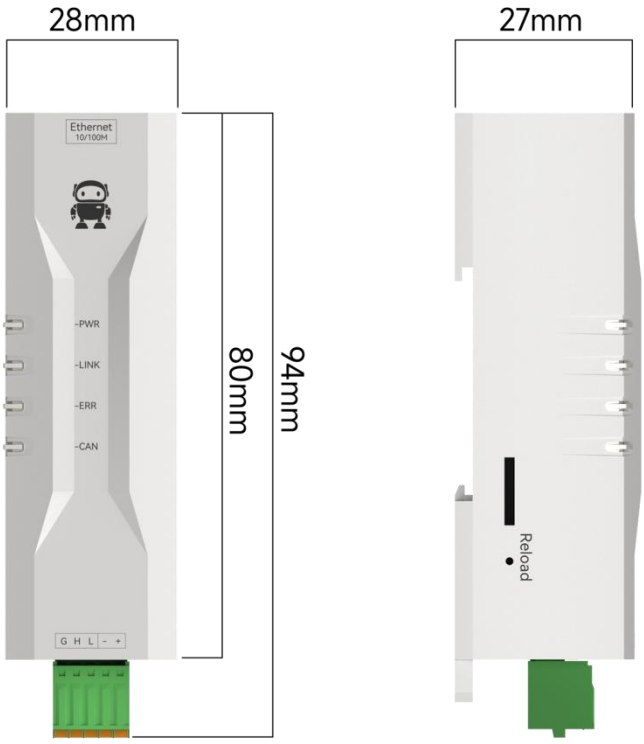
3.2. Mechanical dimensions and pin definition



Serial number	Identification Name	Functional Description
1	ETHERNET	Ethernet interface, standard RJ45 interface, connected to the device or PC
2	PWR	Power indicator light (steady blue)
3	LINK	Network cable access indicator (flashing green)
4	ERR	Error indicator light (red)
5	CAN	CAN data light (yellow)
6	Reload	Reload button, press and hold for 5s-10s to restore to factory settings
7	CAN_G	CAN2 channel bus ground
8	CAN_H	CAN2 channel bus high
9	CAN_L	CAN2 channel bus low
10	V-	Power input negative
11	V+	Power input positive

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4. Product Features

4. 1. Basic Functions

→Ethernet Part

4.1.1. SOCKET function

ECAN-E02 can establish two sockets, namely Socket 1 and Socket 2. Both sockets support all types of TCP Client, TCP Server, UDP Client, and UDP Server.
Two sockets run simultaneously. They can be connected to different networks for data transmission.

TCP Client Function
(1) TCP Client provides client connection for TCP network service. It actively initiates connection request to the server and establishes connection, which is used to realize the interaction between CAN data and server data. According to the relevant provisions of TCP protocol, TCP Client has the distinction between connection and disconnection, so as to ensure the reliable exchange of data. It is usually used for data interaction between devices and servers, and is the most commonly used network communication method.
(2) When ECAN-E02 attempts to connect to the server in TCP Client mode and the local port is 0, it initiates a connection with a random port each time.

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(3) ECAN-E02 supports short connection function.

(4) In the same LAN, if ECAN-E02 is set to a static IP, please keep the IP of ECAN-E02 and the gateway in the same network segment and set the gateway IP correctly, otherwise normal communication will not be possible.

TCP Server Function

(1) TCP Server. In TCP Server mode, ECAN-E02 listens to the local port, accepts and establishes a connection for data communication when a connection request is sent, and sends the data to all client devices that have established a connection with ECAN-E02 at the same time after receiving the data .

(2) Usually used for communication with TCP clients in a local area network. Suitable for scenarios where there is no server in the local area network and multiple computers or mobile phones request data from the server. Like TCP Client, it has the distinction between connection and disconnection to ensure reliable data exchange.

When ECAN-E02 acts as a TCP Server, the dual-channel socket supports up to 10 clients. The local port number is a fixed value and cannot be set to 0.

UDP Client Function

(1) UDP Client is a connectionless transmission protocol that provides simple, unreliable information transmission services for transactions. There is no connection establishment or disconnection. Data can be sent to the other party by specifying an IP and port. It is usually used in data transmission scenarios where there is no requirement for packet loss rate, the data packets are small and the sending frequency is fast, and the data needs to be transmitted to a specified IP.

(2) In UDP Client mode, ECAN-E02 will only communicate with the target port of the target IP. If the data does not come from this channel, the data will not be received by ECAN-E02 .

UDP Server Function

(1) UDP Server means that the source IP address is not verified on the basis of ordinary UDP. After receiving each UDP data packet, the target IP is changed to the data source IP and port number. When sending data, it is sent to the IP and port number of the most recent communication.

(2) This mode is usually used in data transmission scenarios where multiple network devices need to communicate with the module and do not want to use TCP due to the high speed and frequency.

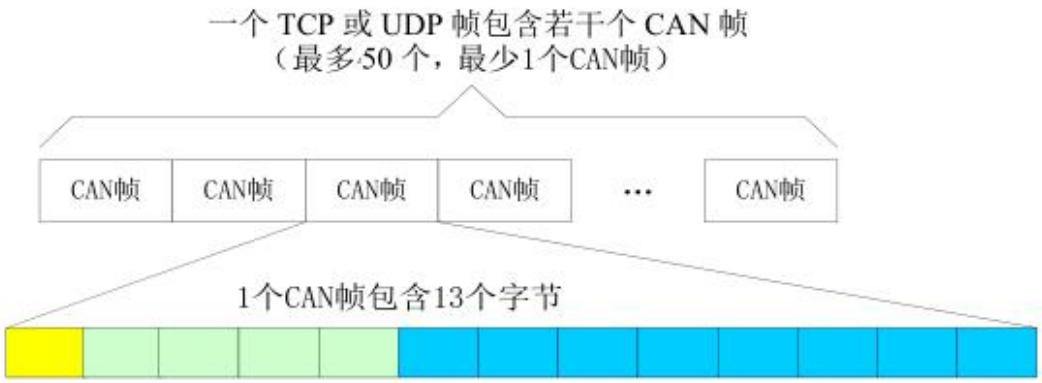
Note: UDP Server cannot actively send data. It can only send data to the IP and port with which data was recently exchanged after receiving the data.

→CAN Part

4.1.1. CAN protocol conversion format

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帧信息：长度1个字节，用于标识该CAN帧的一些信息，如类型、长度等

Bit7							Bit0
FF	RTR	保留	保留	D3	D2	D1	D0

FF：标准帧和扩展帧的标识，1为扩展帧，0为标准帧。
RTR：远程帧和数据帧的标识，1为远程帧，0为数据帧。
保留值为0，不可写入1。
D3～D0 ：标识该CAN帧的数据长度。

帧ID：长度4个字节，标准帧有效位是11位，扩展帧有效位是29位。

高字节			低字节
12h	34h	56h	78h

如上为扩展帧ID号
0x12345678的表示方式

高字节			低字节
00h	00h	03h	FFh

如上为标帧ID号
0x3FF的表示方式

帧数据：长度8个字节，有效长度由帧信息的D3～D0的值决定。

DATA1							DATA8
11h	22h	33h	44h	55h	66h	77h	88h

如上为8个字节有效数据
的表示方式

DATA1							DATA8
11h	22h	33h	44h	55h	66h	00h	00h

如上为6个字节有效数据
的表示方式

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以下例子是一个扩展数据帧，ID为0x12345678，包含8个字节数据（11h, 22h, 33h, 44h, 55h, 66h, 77h, 88h）的帧的表示方式

88h	12h	34h	56h	78h	11h	22h	33h	44h	55h	66h	77h	88h

以下例子是一个标准数据帧，ID为0x3ff，包含6个字节数据（11h, 22h, 33h, 44h, 55h, 66h）的帧的表示方式

06h	00h	00h	03h	FFh	11h	22h	33h	44h	55h	66h	00h	00h

用户在使用 PC 机发送 UDP 帧时，每个 UDP 帧包含的 CAN 帧数量不能大于 50 帧！而 UDP 帧的发送速度建议不要超过每秒 400 包，还有一个条件，假如用户每秒 400 包 UDP 帧，而每个 UDP 帧包含 50 帧 CAN 帧，用户可以计算出相当于每秒 20000 帧 CAN 帧了，就算是 1000Kbps 的波特率,CAN 也发不了这么快。所以建议用户每秒发送的 UDP 帧不要超过 400 帧，转换成 CAN 帧不要超过每秒 4000 帧。

4.1.2. CAN Function

category	name	default value	illustrate
	CAN Baud Rate	1000K	from 12.5K to 1000K. Users can also fill in any baud rate value.
	CAN operating Mode	normal	Normal: The CAN port can respond to the received CAN frame normally;
	Number of packet frames	50	The values that can be filled in are: 1~39. When the CAN port receives data continuously (the interval is less than the packetization time interval), when the number of received CAN frames reaches the "packetization frame number", the received data is encapsulated into an Ethernet packet and sent to the network port. The packetization frame number refers to the maximum number of frames in the packet. If the packetization frame number is not reached during the receiving process, and the frame interval exceeds the packetization time interval, the received data will also be encapsulated into an Ethernet packet and sent. If the packetization frame number is set to 1, it means no packetization, and each CAN frame is sent as an Ethernet packet separately. At this time, the real-time performance is the strongest, but the network load is the highest; if the packetization frame number is set to 50, the channel flow is the largest and the network load is the smallest.

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	Packetization time interval (ms)	1	The values that can be filled in are: 1 ~ 255. When the CAN port does not receive a new data frame within the time defined by the "packetization time interval" (in ms) and the number of packetized frames has not been reached, all the data frames that have been received and not yet sent will be encapsulated into an Ethernet packet and sent to the network port.
	Clear CANBuffer	Optional Clear	This option is only valid in TCP working mode. It determines whether to clear the data in the CAN port buffer after the connection is established. If not, the data in the buffer will be sent after the connection is established. If you select Clear when TCP is connected, the saved CAN buffer will be cleared when the TCP connection is established.

category	name	default value	illustrate
CAN Configuration	Standard frame rate limit	7FF (HEX)	The upper and lower limits of the standard frame ID to be received set by the user together determine the range of the standard frame ID to be received.
	Standard frame limit	000 (HEX)	
	Extended frame rate limit	1FFFFFFFF	The upper and lower limits of the received extended frame ID set by the user together determine the range of the extended frame ID to be received.
	Extended frame limit	000000000	
	CAN Transmit Buffer Number (600 frames)	Not configurable	Because the speed of Ethernet is much higher than the sending speed of CAN, if the amount of data received by Ethernet is too large, CAN needs to buffer and send it, so as to ensure that no frame is lost, but such a large buffer may lead to poor real-time performance, that is, the data currently sent by Ethernet needs to wait for a certain period of time before it can be sent out from the CAN interface. In this case, the customer needs to control the sending speed of Ethernet to match the sending speed of the CAN port.

4.2. Features

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4.2.1. Heartbeat packet function

In the network transparent transmission mode, users can choose to let ECAN-E02 send heartbeat packets. Heartbeat packets can be sent to the network server. The main purpose of sending to the network is to maintain connection with the server. It is only effective in TCP Client and UDP Client modes. The ECAN-E02 module supports custom heartbeat packet content up to 128 bytes. Support custom heartbeat packets



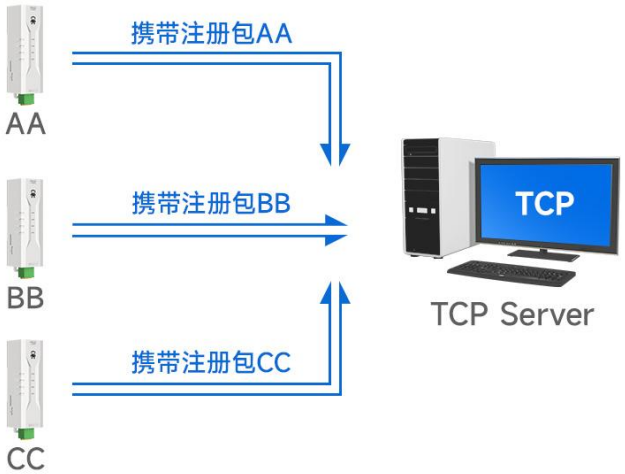
4.2.2. Registration package function

In the network transparent transmission mode, users can choose to let DTU send a registration package to the server. The registration package is to enable the server to identify the data source device, or as a password to obtain server function authorization. The registration package can be sent when the DTU establishes a connection with the server, or it can be spliced into the registration package data at the front end of each data packet as a data packet. The data of the registration package can be a MAC address or custom registration data, where the custom registration package setting content is up to 128 bytes. Support custom registration packages;

Establishing a connection and sending a registration packet is mainly used to connect to a server that requires registration.

Data carrying registration package: The data sent is connected to the registration package at the front end of the data, which is mainly used for protocol transmission.

The registration packet mechanism is only applicable to TCP Client and UDP Client, and is invalid under TCP Server and UDP Server.



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4.2.3. Short connection function

The use of TCP short connections is mainly to save server resources and is generally used in multi-point to point scenarios. Using short connections can ensure that all existing connections are useful connections, without the need for additional control measures to screen.

The TCP short connection function is used in TCP Client mode. After the short connection function is turned on, if the serial port or network port does not receive data within the set time, the connection will be automatically disconnected. The short connection function is turned off by default, and the disconnection time can be set after the function is turned on. The setting range is 1 ~ 65535S.

4.2.4. Timeout restart function

The timeout restart (no data restart) function is mainly used to ensure the long-term stable operation of ECAN-E02. When the network port does not receive data for a long time, or the network does not receive data for a long time, ECAN-E02 will restart after exceeding the set time, so as to avoid abnormal conditions affecting communication. The time for the timeout restart can be set by the host computer. The normal working time of this function is set to 60~65535S, and the default value is 1800S . 0 is closed. When the setting is out of range, it returns to the default value.

4.2.5. Clear cache function

When the TCP connection is not established, the data received by the DTU will be placed in the buffer area. When the TCP connection is established, the network buffer data can be set to be cleared according to customer needs.

4.2.6. Reconnect after disconnection

Disconnection reconnection: The device periodically requests a connection after disconnection to ensure that the connection can be restored in the event of an accidental disconnection (note that this does not mean restarting the device);

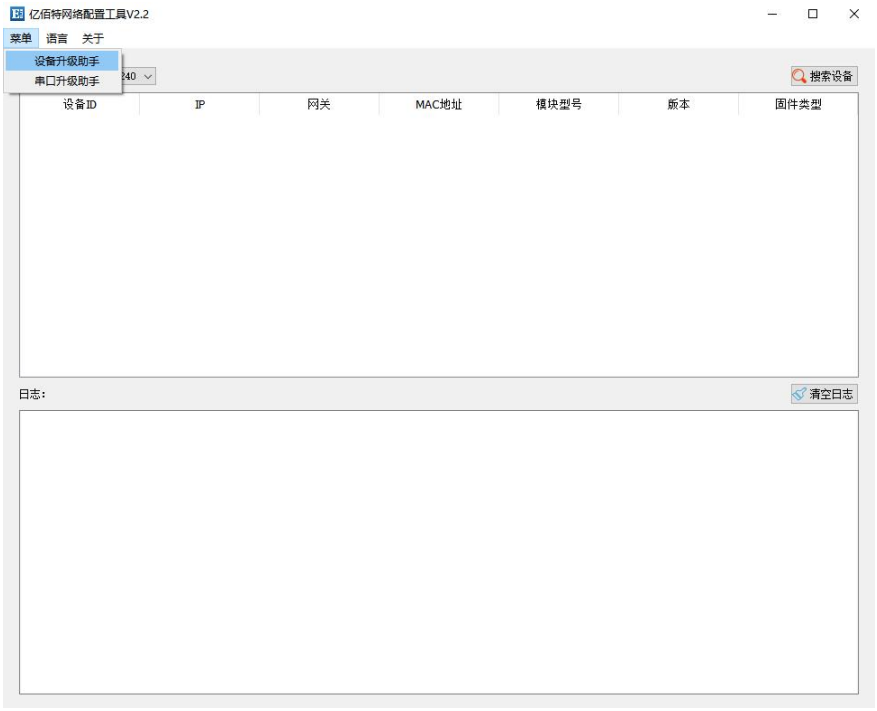
4.2.7. Network port upgrade

The device firmware can be upgraded and maintained through the serial port upgrade tool provided by our company.

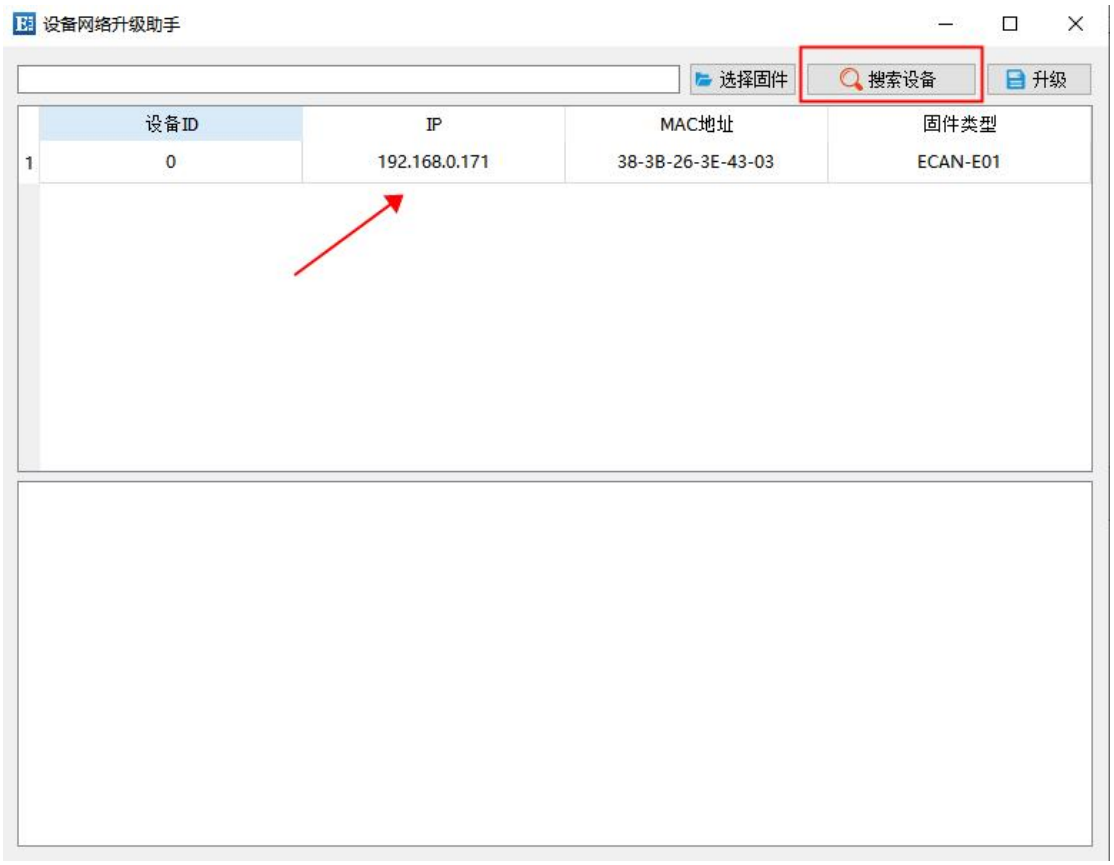
Step 1: Open the software, open the configuration host computer, and click the menu bar

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Step 2: Select Device Upgrade Assistant and click Search Device



Step 3: After selecting the firmware, click Upgrade to upgrade.

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It can also be updated via the web page.

Step 1: Open the browser and search for the local IP address of the data device. The default is 192.168.3.7 (the computer IP address must be in the same network segment as the device IP). Log in according to the set username and password. The default username and password are both admin.



Step 2: After selecting the firmware, click Upgrade to upgrade.

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4. 3. Restore factory settings

The device has a button reset function. To reset the hardware to factory settings, press and hold the reload button for 5s -10s .

5. Important Notice

Ebyte reserves the final right of interpretation and modification of all contents in this manual.
Due to the continuous improvement of the product hardware and software, this manual may be changed without prior notice. The latest version of the manual shall prevail.

6. Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2024-11-4	First edition	ZYD

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