Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



ECAN-E01-V2

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Content

1. Product Introduction 2
1.1. Product Introduction 2
1.2. Features 2
2. Quick Start 3
3. Technical indicators 5
3.1. General Specifications 5
3.2. Mechanical dimensions and pin definition 6
4. Product Features 8
4.1. Basic Functions 8
4.1.1. SOCKET function 8
4.1.2. Relay Enable 9
4.1.3. CAN protocol conversion format 11
4.1.4. CAN Function 12
4.2. Features 13
4.2.1. Heartbeat packet function 13
4.2.2. Registration package function 14
4.2.3. Short connection function 14
4.2.4. Timeout restart function 15
4.2.5. Clear cache function 15
4.3. Restore factory settings 17
5. Important Notice 17
6. Revision History 17

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1. Product Introduction

1.1. Product Introduction

ECAN-E01-V2 is a high-performance industrial Ethernet and CAN-bus data conversion device developed by Ebyte. It integrates 2 CAN-bus interfaces and 1 EtherNet interface, supports TCP/UDP protocol, and can easily complete the intercommunication between CAN-bus network and Ethernet network.

ECAN-E01-V2 has a built-in 120 ohm resistor, which can be enabled by dialing; it supports working in the temperature range of -40℃～85℃. It has a 10M /100M Ethernet interface, high protection of CAN interface, and increased isolation; the maximum baud rate of the 2-way 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 2-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 5Kbps and 1Mbps ;
- Dual-channel CAN transceiver, support dual-channel server, support up to 14 connections
- The CAN-bus interface adopts electrical isolation, and the isolation module insulation voltage is DC 2500 V ;
- Maximum data transmission rate: 8000 frames/second; Maximum data reception rate: 14000 frames/second
- The timestamp accuracy of the CAN-side received message can reach 1us;
- Support registration package, heartbeat package, short connection function
- Support DHCP, DNS;
- Support restart after network disconnection/timeout restart;
- Support cache clearing function;
- Support host computer configuration;
- Contains 120 ohm resistor;
- Built-in watchdog;
- Network port upgrade function;
- Operating temperature range: -40℃~+85℃.

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2. Quick Start

You need to prepare ECAN-E01-V2 *1 Power adapter *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 192.168.4.101; for example, the computer IP address is 192.168.4.193.



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

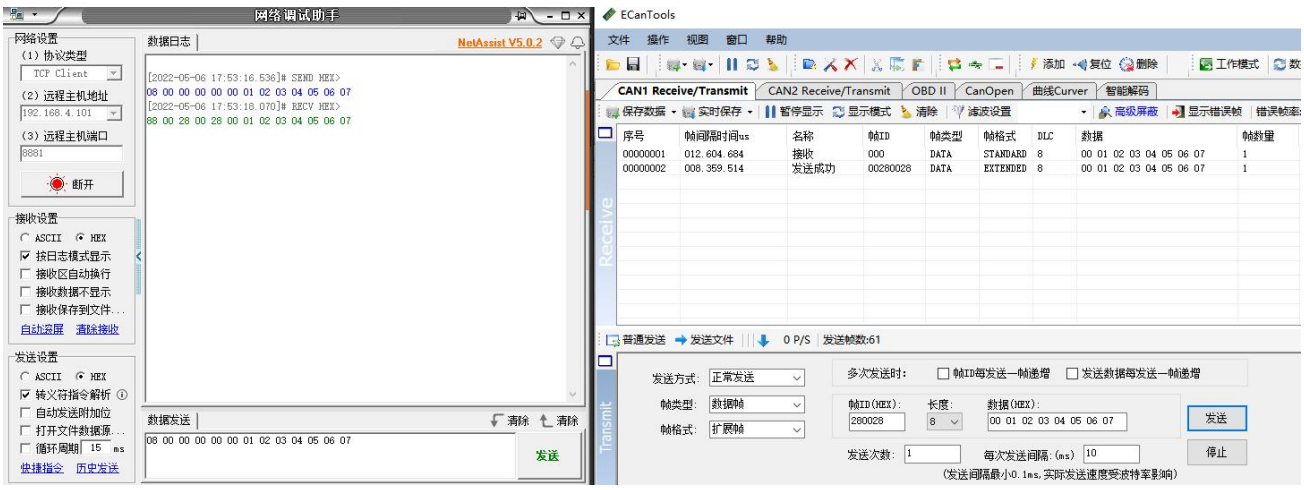


Connect CAN1 of ECAN-E01-V2 to the CAN analyzer. When ECAN-E01-V2 is connected to the CAN bus, just connect CAN_H to CAN_H and CAN_L to CAN_L.

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

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3. Technical indicators

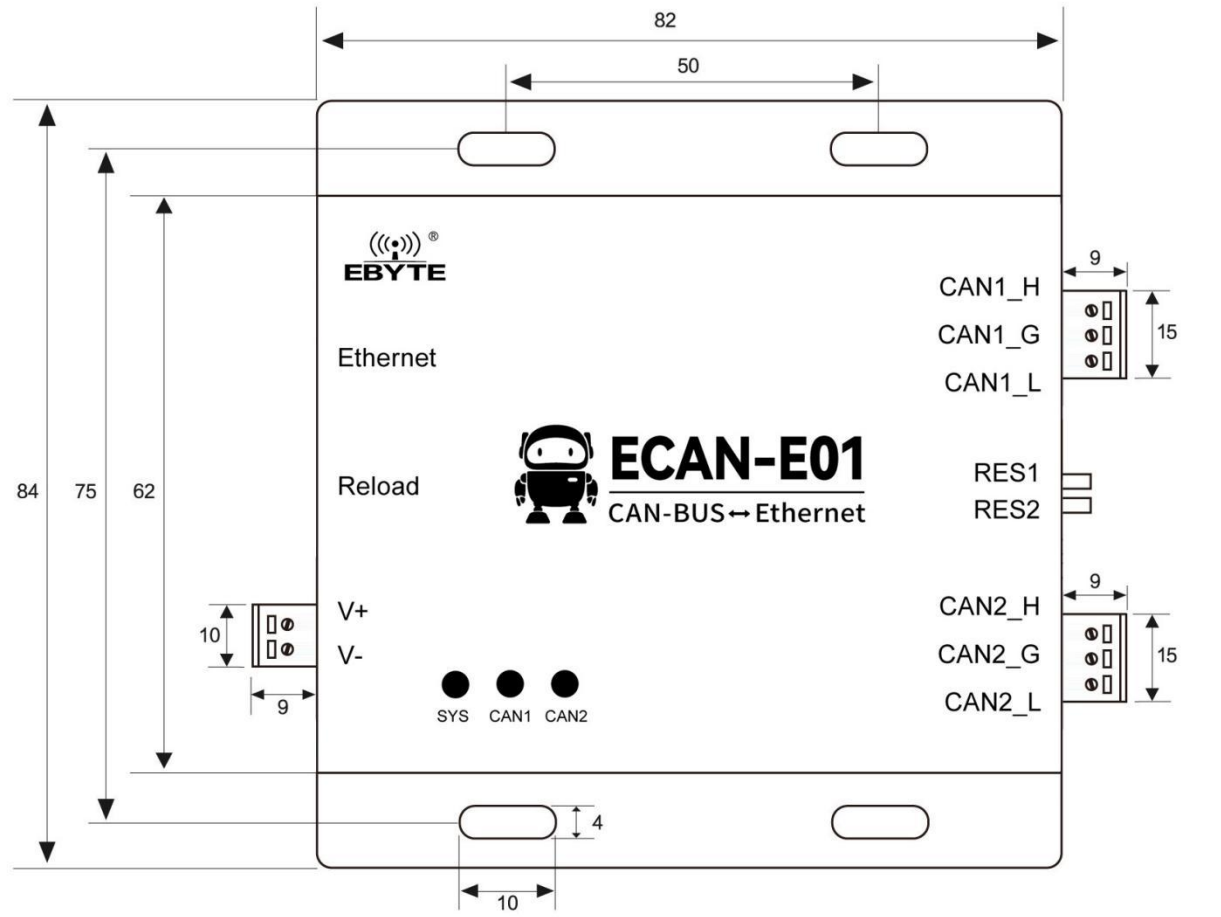
3.1. General Specifications

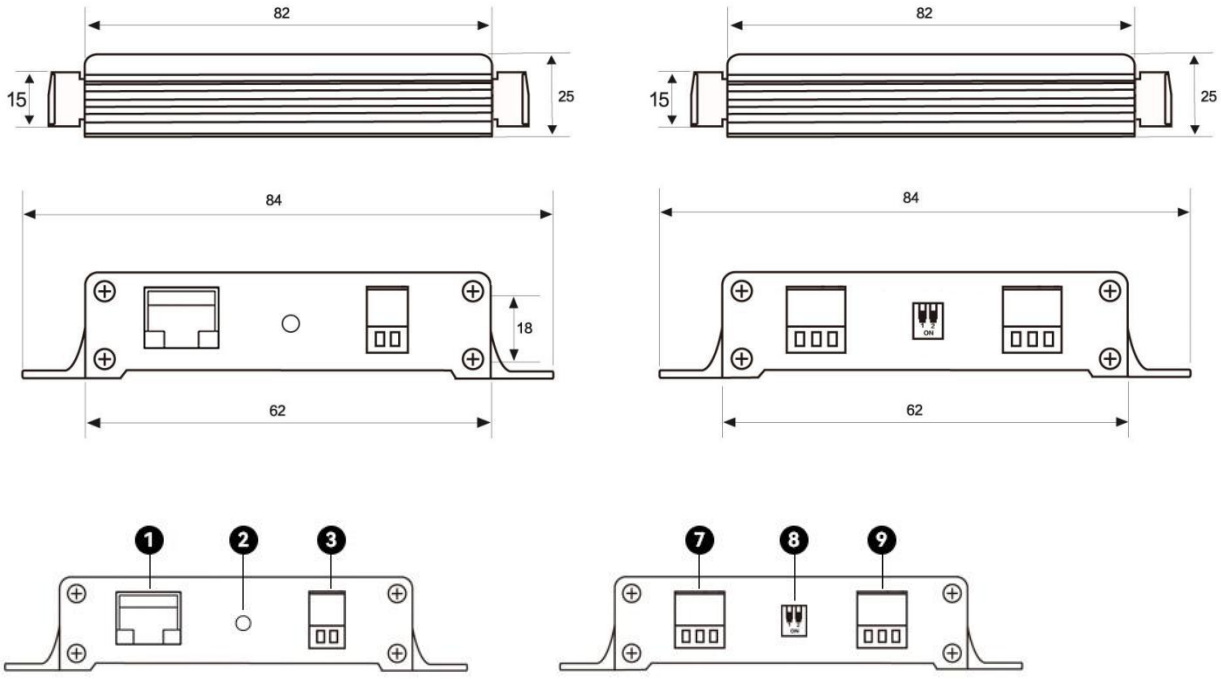
Serial number	project	Specification
1	Supply voltage	8V~28VDC, more than 28V may burn out, 12V or 24V power supply is recommended
2	Network port specifications	Standard RJ45, supports 10/100 Mbps
3	Network Protocol	IP, TCP/UDP,
4	Simple transparent transmission method	TCP Server, TCP Client, UDP Server, UDP Client
5	TCP Server Connection	Supports up to 14 TCP connections
6	How to obtain IP	Static IP, DHCP
7	Domain name resolution	support
8	User Configuration	Host computer configuration
10	Operating temperature	-40 ~ +85℃, industrial grade
11	Operating humidity	10% ~ 90%, relative humidity, non-condensing
12	Size	See dimensional drawing
13	Average weight	120 g
14	Storage temperature	-40～+ 85 ℃, industrial grade

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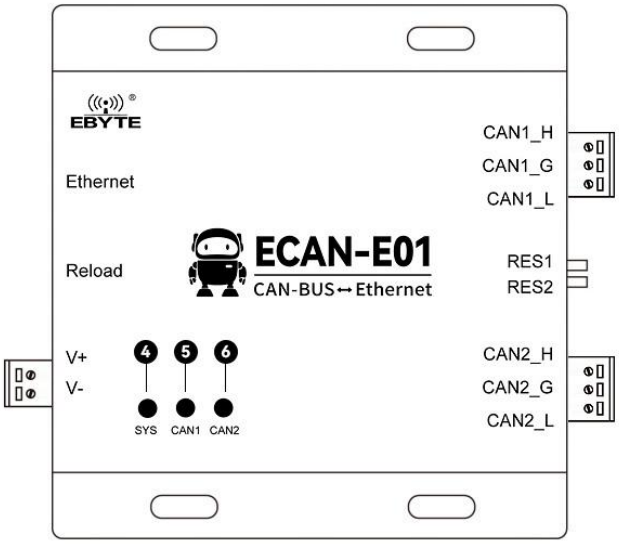
3.2. Mechanical dimensions and pin definition





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Serial number	Identification name	Functional Description
1	ETHERNET	Ethernet interface, standard RJ45 interface, connected to the device or PC
2	Reload	Reload button, press and hold for more than 5 seconds to restore to factory settings
3	V+	Power positive terminal interface, 5.08 Phoenix plug, (default 8-28V), recommended 12V/24V
	V-	Power negative terminal interface 5.08 Phoenix head
4	SYS	Power indicator light (red), device working normally (flashing red and green)
5	CAN1/ERR	CAN1 data light (green), data error light (red)
6	CAN2/ERR	CAN2 data light (green), data error light (red)
7	CAN2_H	CAN2 channel bus high, 5.08 Phoenix connector
	CAN2_G	CAN2 channel bus ground, 5.08 Phoenix connector
	CAN2_L	CAN2 channel bus low, 5.08 Phoenix connector
8	DIP switch RES1	CAN1 channel 120 ohm resistor DIP switch
	DIP switch RES2	CAN2 channel 120 ohm resistor DIP switch
9	CAN1H	CAN1 channel bus high, 5.08 Phoenix connector
	CAN1G	CAN1 channel bus ground, 5.08 Phoenix connector
	CAN1L	CAN1 channel bus low, 5.08 Phoenix connector

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4. Product Features

4. 1. Basic Functions

→Ethernet Part

4.1.1. SOCKET function

ECAN-E01-V2 can establish two sockets, namely Socket A1 and Socket B1. 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 at the same time 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-E01-V2 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.

(3) ECAN-E01-V2 supports short connection function.

(4) In the same LAN, if ECAN-E01-V2 is set to a static IP, please keep the IP of ECAN-E01-V2 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-E01-V2 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 -E01-V2 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.

(3) When ECAN-E01-V2 is used as TCP Server, the dual-channel socket supports up to 14 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-E01-V2 will only communicate with the target port of the target IP. If the data does

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not come from this channel, it will not be received by ECAN-E01-V2 .

(3) In UDP Client mode, if the destination address is set to 255.255.255.255, the UDP full-segment broadcast effect can be achieved, and broadcast data can also be received. The ECAN-E01-V2 module supports broadcast within the network segment, such as the broadcast mode of xxx.xxx.xxx.255.

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.

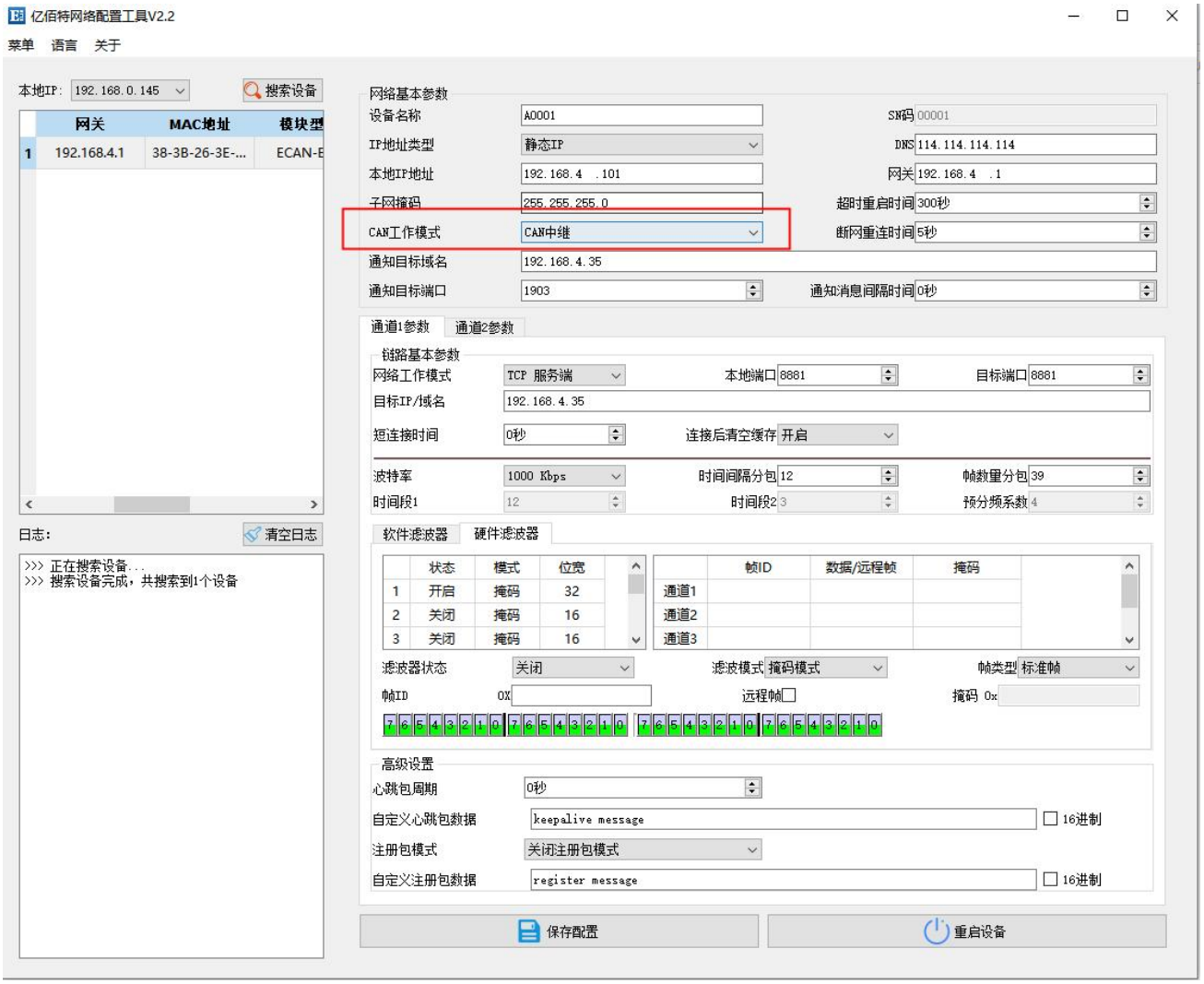
→CAN Part

4.1.2. Relay Enable

The device has the function of two-way CAN mutual transmission, that is, relay function. When the device is in relay mode, the data received by CAN1 in its network will be sent to the network where CAN2 is located, and the data received by CAN2 in its network will be sent to the network where CAN1 is located.

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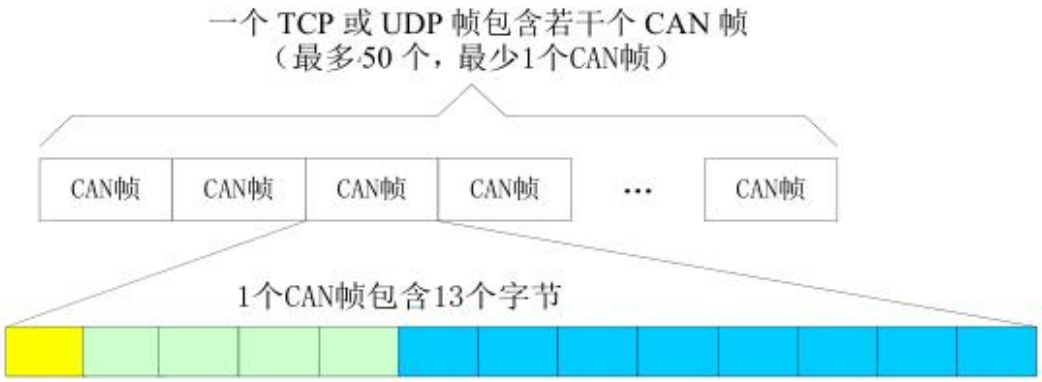


Note: When the baud rates of the two CAN networks are different, it is important to note that the high baud rate requires controlling the network utilization (if it is too high, data loss will occur).

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4.1.3. CAN protocol conversion format



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。

4.1.4. CAN Function

category	name	default value	illustrate
	CAN Baud Rate	1000K	There are 10 options from 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; Listen only: The CAN port works in monitoring mode
	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

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	Packetization time interval (ms)	1	The values that can be filled in are: 12~255. 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
	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,

category	name	default value	illustrate
CAN Configuration	Standard frame	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	000 (HEX)	
	Extended frame	1FFFFFFF	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	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

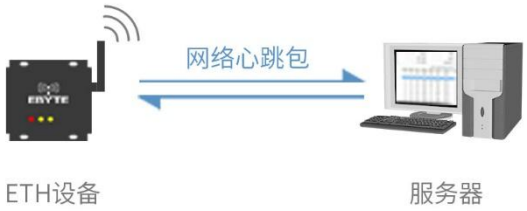
4.2.1. Heartbeat packet function

In the network transparent transmission mode, users can choose to let ECAN-E01-V2 send heartbeat packets. Heartbeat packets can be sent to the network server. The main purpose of sending to the network is to maintain

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connection with the server. It is only effective in TCP Client and UDP Client modes. ECAN-E01-V2 module supports custom heartbeat packet content up to 128 bytes. Support custom heartbeat packets



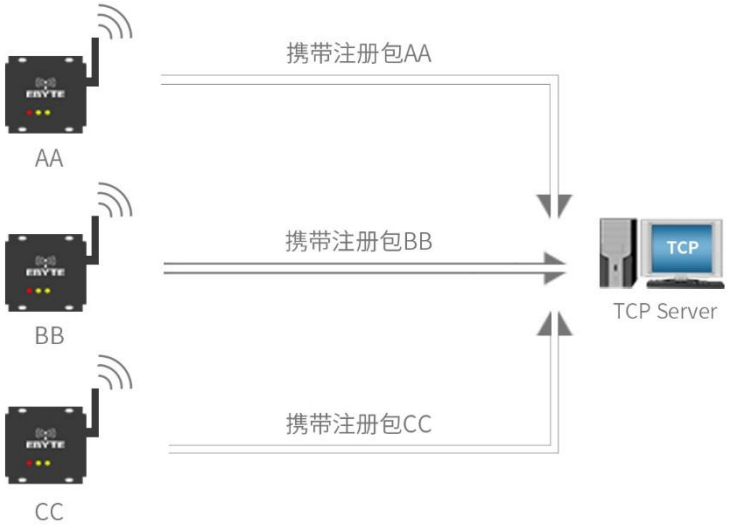
4.2.2. Registration package function

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.



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

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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 2~255S.

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-E01-V2 . When the network port does not receive data for a long time, or the network does not receive data for a long time, ECAN-E01-V2 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 300S. 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. The maximum receiving buffer of ECAN-E01-V2 is 3900 bytes. When the TCP connection is established, the network buffer data can be set to be cleared according to customer needs.

Support DHCP and domain name resolution :

DHCP : The device can automatically obtain an IP address through a router, and automatically configure the subnet mask and DNS server. Modification of the subnet mask and DNS server is not supported.

DNS : Automatically follow the router to configure the DNS server to meet the needs of custom domain name resolution.

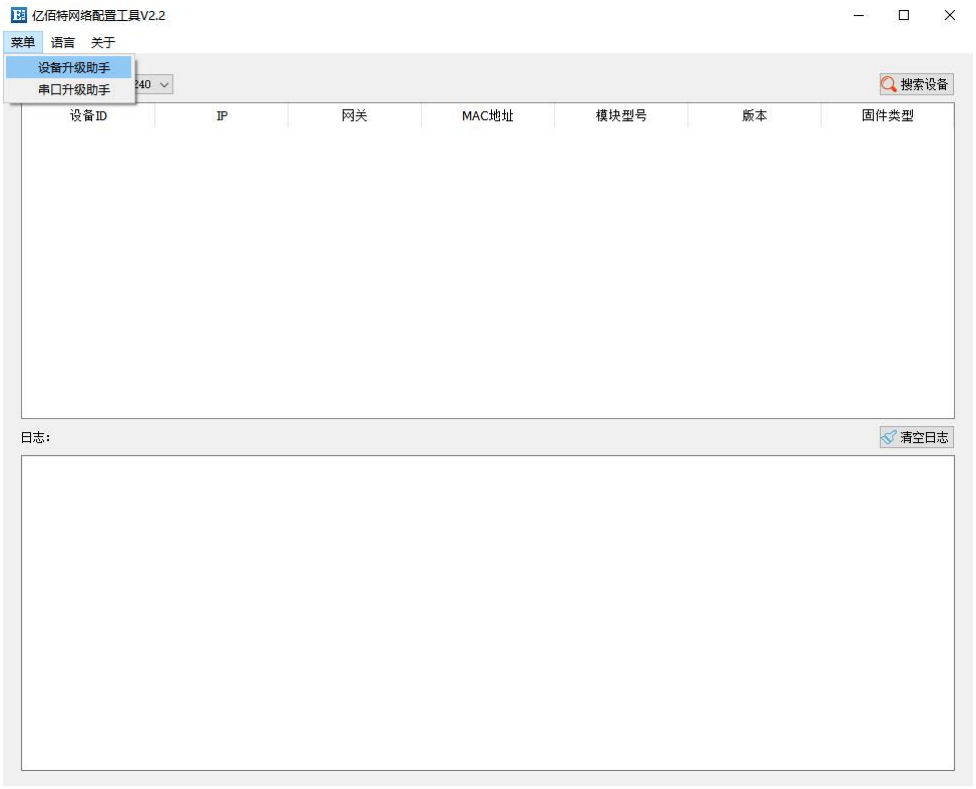
Disconnection reconnection : The device periodically requests a connection after disconnection to ensure that the connection can be restored in the event of an accidental disconnection (note that this does not mean restarting the device);

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

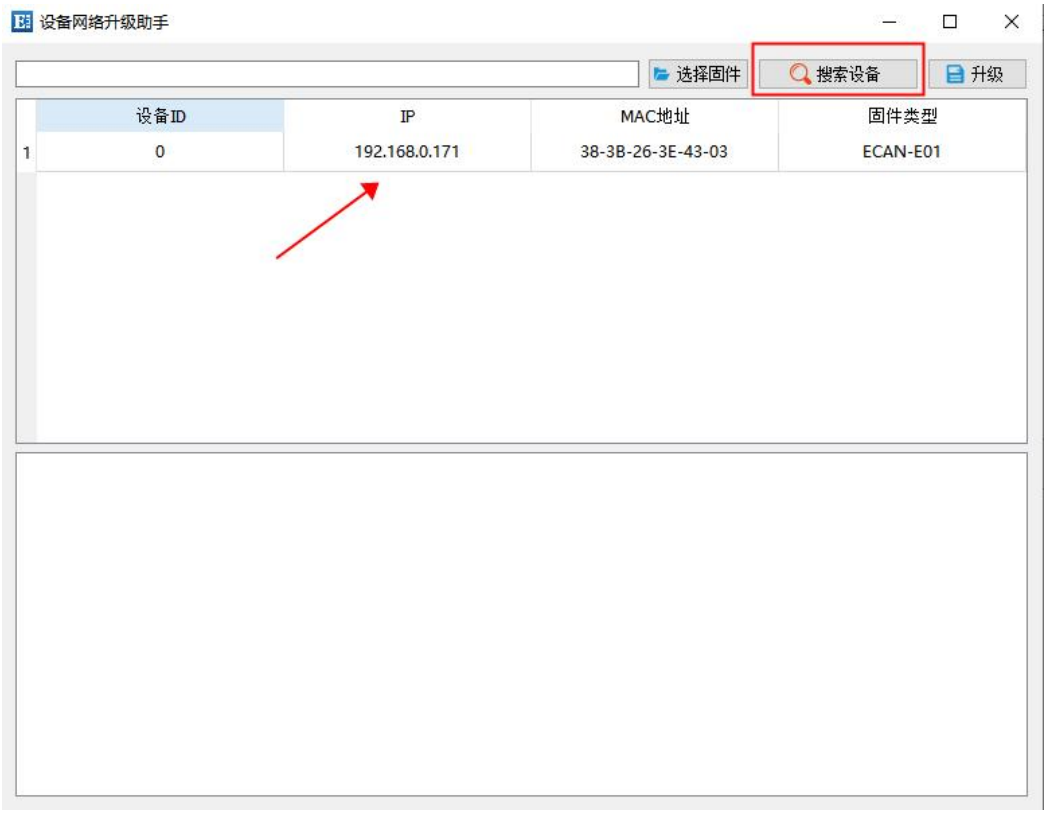
Step 1: Open the software, open the configuration host computer, and click the menu bar

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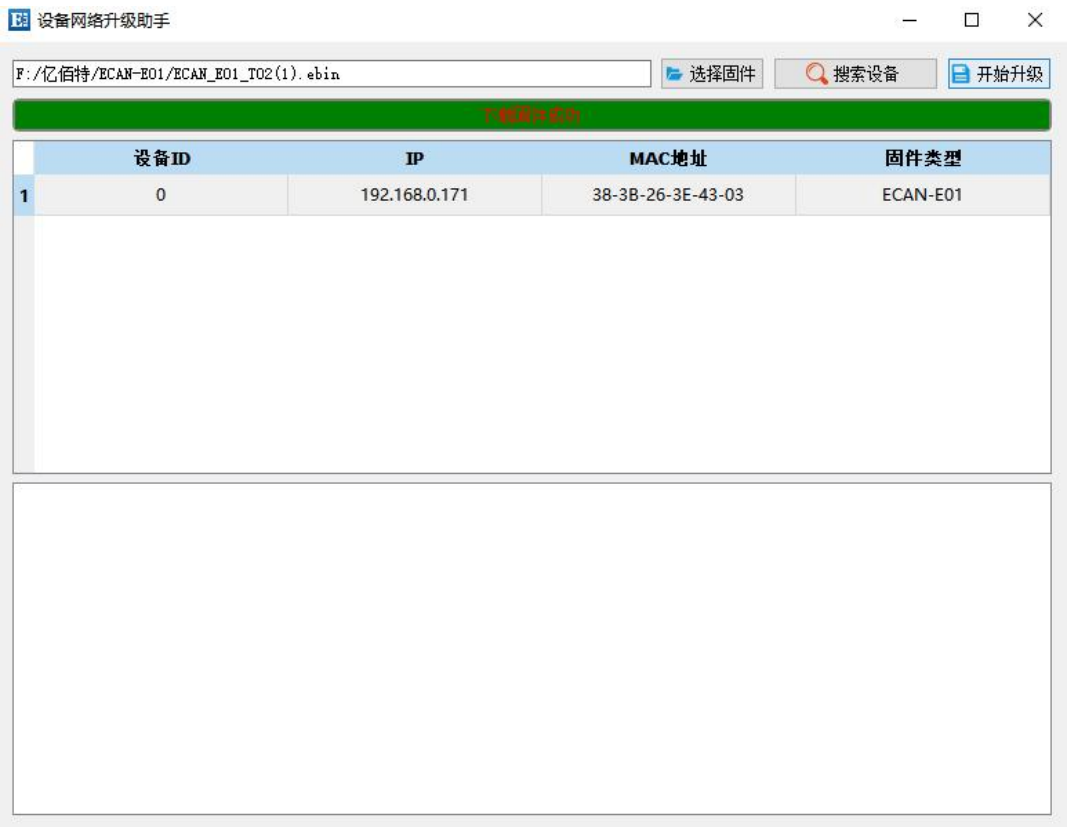
Step 2: Select Device Upgrade Assistant and click Search Device



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

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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 more than 5 seconds.

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	2025-05-26	first edition	ZD

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