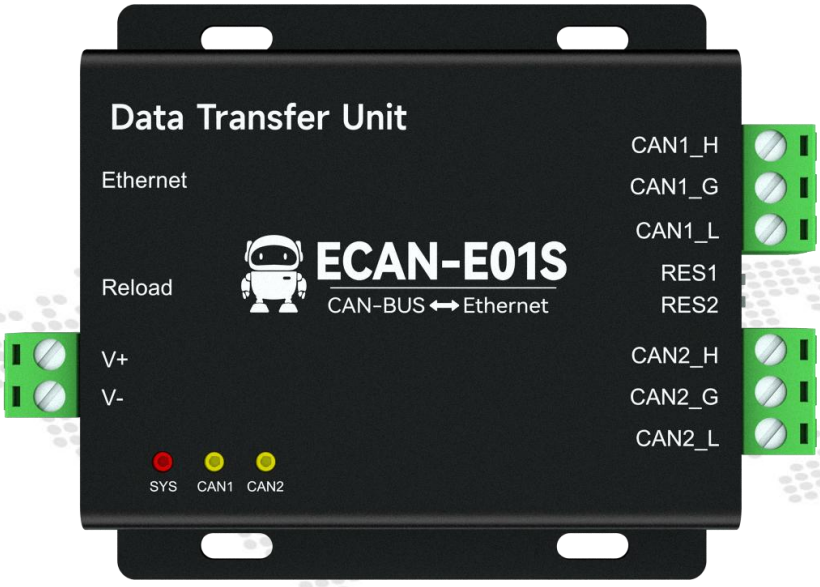
Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

ECAN-E01S-V2



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1 Introduction

1.1 Brief Introduction

ECAN-E01S-V2 is a high-performance industrial grade Ethernet and CAN-bus data conversion device developed by EVERBUILT. It integrates 2 CAN-bus interfaces and 1 EtherNet interface, and supports TCP/UDP protocols, which can easily complete the interoperability between CAN-bus and Ethernet networks.

ECAN-E01S-V2 has a built-in 120 ohm resistor, which can be enabled by dialing code; it supports operation in the temperature range of -40℃ to 85℃. It has one 10M/100M Ethernet interface, two CAN ports with a maximum baud rate of 1Mbps, TCP Server, TCP Client, UDP and other operating modes, and can be configured through the host computer configuration software.

1.2 Features

- Integrate 2 CAN-bus interfaces, using plug-in terminal wiring;
- Support CAN2.0A and CAN2.0B frame format, compliant with ISO/DIS 11898 specification;
- CAN-bus communication baud rate can be programmed between 5Kbps~1Mbps;
- Dual CAN transceiver, support dual servers, support a maximum of 14 connections
- Maximum sending data traffic: 8000 frames/sec; Maximum receiving data traffic: 14000 frames/sec.
- CAN end receive message timestamp accuracy up to 1us;
- Support registration packet, heartbeat packet, short connection function
- Support DHCP, DNS;
- Supports restart after disconnection/timeout;
- Supports clearing cache function;
- Supports host computer configuration;
- Includes 120 ohm resistor;
- Built-in watchdog;
- Upgrade function for network port;
- Operating temperature range: -40℃~+85℃.

2 Quick Start

You need to prepare ECAN-E01S-V2*1 Power adapter*1 Network cable 1

Connect your computer to the device through the network cable after powering up the device, set the IP address of the computer to the same network segment as the IP of the device, and the default IP address of the device is 192.168.4.101; e.g., the IP address of the computer is 192.168.4.193.

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

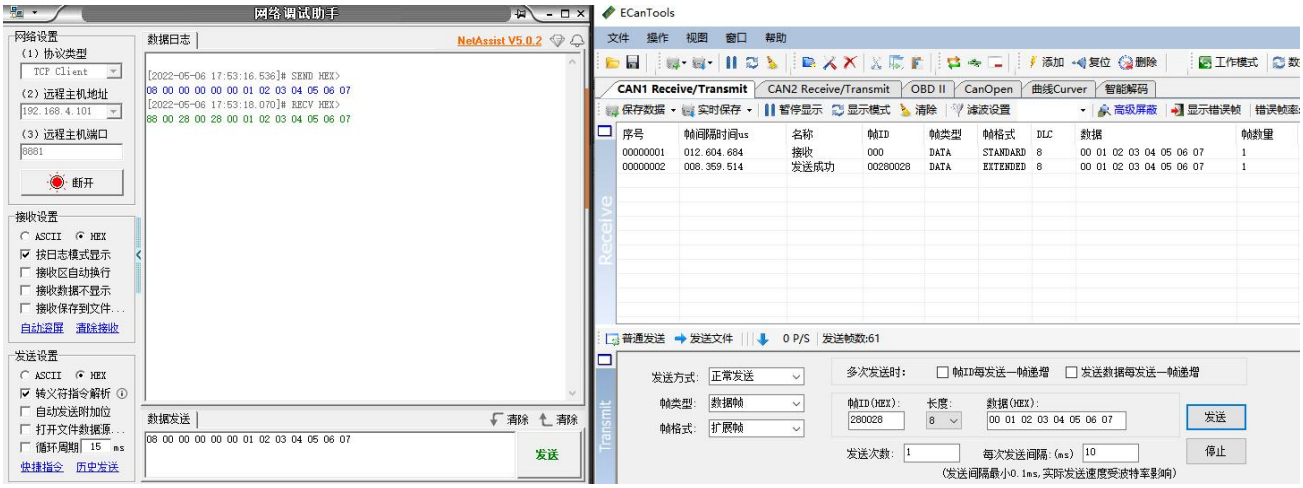


Connect CAN1 of ECAN-E01S-V2 to the CAN resolver, and ECAN-E01S-V2 can access the CAN bus by connecting CAN_H to CAN_H and CAN_L to CAN_L.

Communication between the device and the peripheral can be realized by using the network assistant.

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3 Technical indicators

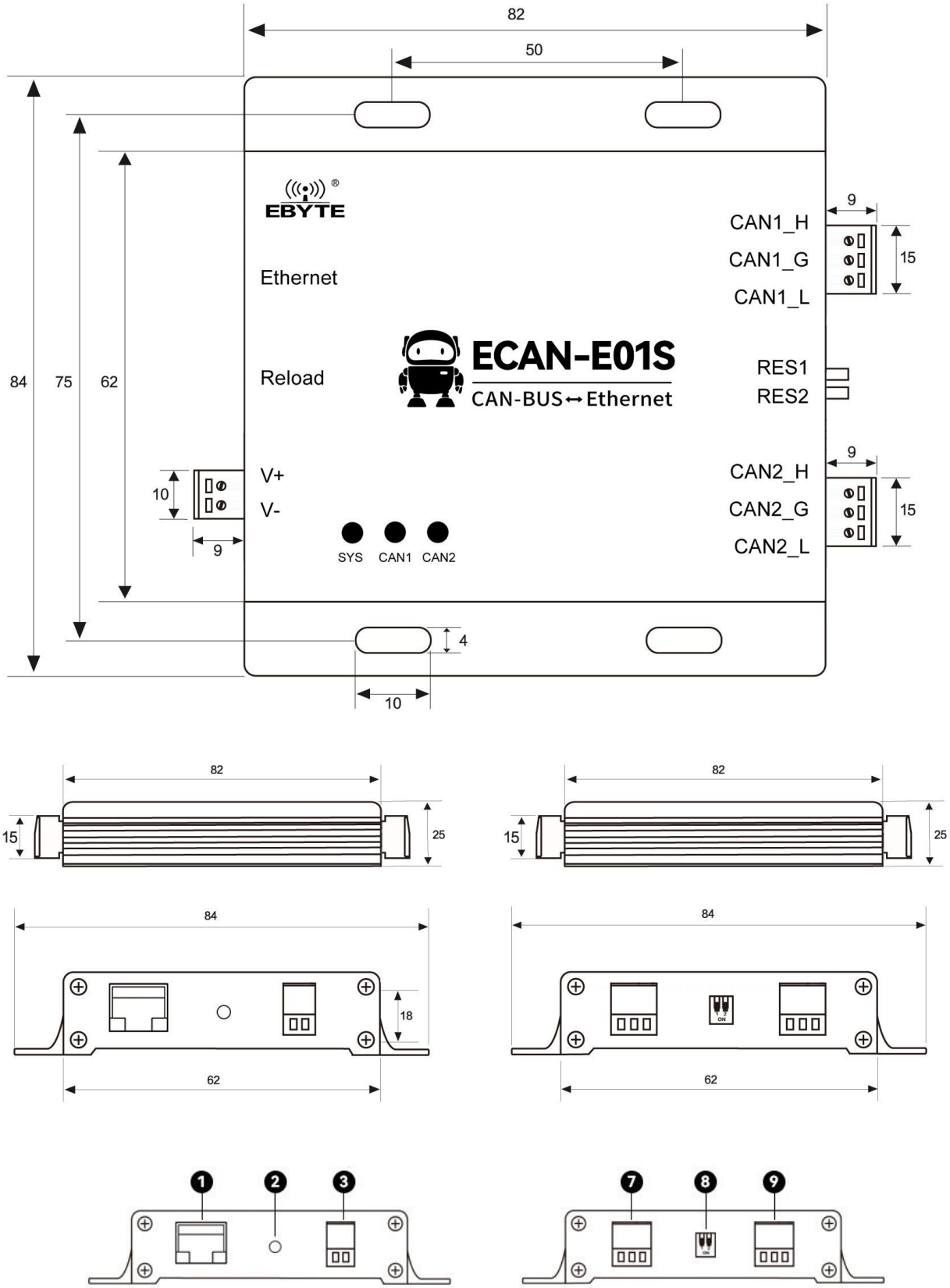
3.1 General specifications

Serial number	Item	Specification
1	Supply Voltage	8V~28VDC, over 28V may be burned, recommend 12V or 24V power supply.
2	Mesh specification	Standard RJ45, supports 10/100Mbps
3	network protocol	IP、 TCP/UDP、
4	Simple Transmission Method	TCP Server、TCP Client、UDP Server、UDP Client
5	TCP Server Connection	Supports up to 14 TCP connections
6	IP acquisition method	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 drawings
13	Average weight	120g
14	Storage temperature	-40～+85℃, Industrial Grade

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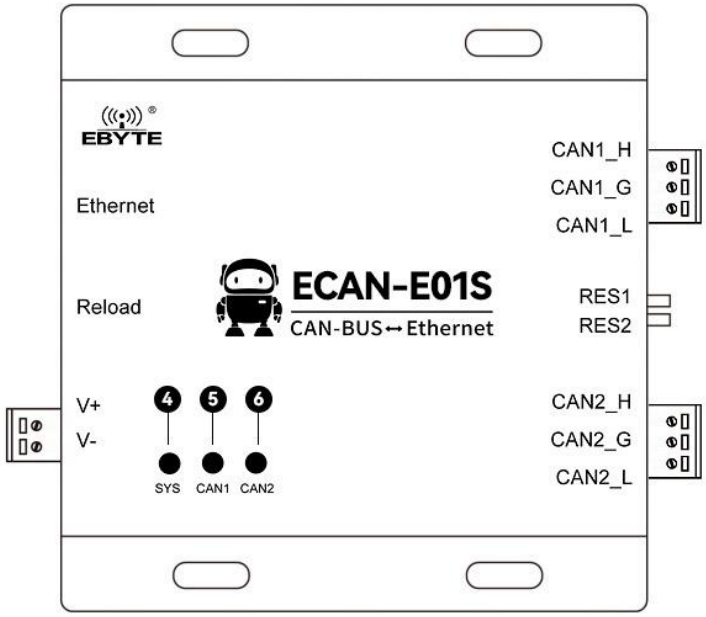
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3.1 Mechanical dimension drawing and pin definition



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Serial number	Name	Functional Description
1	ETHERNET	Ethernet interface, standard RJ45 connector for connection to a device or PC.
2	Reload	Reload button, long press for more than 5s to restore the factory
3	V+	Power positive connector, 5.08 Phoenix header, (default 8-28V), 12V/24V recommended
	V-	Power negative connector 5.08 Phoenix header
4	SYS	Power indicator (red), normal operation of the device (red and green flashing)
5	CAN1/ERR	CAN1 data lamp (green), data error lamp (red)
6	CAN2/ERR	CAN2 data lamp (green), data error lamp (red)
7	CAN2_H	CAN 2 Channel Bus High, 5.08 Phoenix Header
	CAN2_G	CAN2 Channel Bus Ground, 5.08 Phoenix Header
	CAN2_L	CAN2 Channel Bus Low, 5.08 Phoenix Header
8	Dial code RES1	CAN 1 Channel 120 Ohm Resistor DIP Switch
	Dial code RES2	CAN 2-Channel 120 Ohm Resistor DIP Switch
9	CAN1H	CAN1 Channel Bus High, 5.08 Phoenix Header
	CAN1G	CAN1 Channel Bus Ground, 5.08 Phoenix Header
	CAN1L	CAN1 Channel Bus Low, 5.08 Phoenix Header

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4 Product Features

4.1 Basic functions

→ Ethernet section

4.1.1 SOCKET Function

ECAN-E01S-V2 can create two sockets, Socket A1 and Socket B1, where both sockets support all types of TCP Client, TCP Server, UDP Client and UDP Server.

Both sockets run simultaneously. You can connect to different networks at the same time for data transmission.

TCP Client Function

(1) The TCP Client provides a client connection for the TCP network service. It initiates a connection request to the server and establishes a connection, which is used to realize the interaction between CAN data and server data. According to the relevant provisions of the TCP protocol, TCP Client has the difference between connection and disconnection, so as to ensure the reliable exchange of data. It is usually used for data interaction between the device and the server, and is the most commonly used networking communication method.

(2) When the ECAN-E01S-V2 tries to connect to the server in TCP Client mode and the local port is 0, the connection is initiated with a random port each time.

(3) ECAN-E01S-V2 supports short connection function.

(4) In the same LAN, if ECAN-E01S-V2 is set as static IP, please keep the IP of ECAN-E01S-V2 and the gateway in the same network segment and set the gateway IP correctly, or it will not be able to communicate normally.

TCP Server Function

(1) TCP Server means TCP server. In TCP Server mode, ECAN-E01S-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 the client devices that have established a connection with ECAN-E01S-V2 at the same time when ECAN-E01S-V2 receives the data.

(2) Usually used for communication with TCP clients on a LAN. It is suitable for the scenario that there is no server in the LAN and there are many computers or cell phones requesting data from the server. Like TCP Client, there is a difference between connecting and disconnecting to ensure reliable data exchange.

(3) When ECAN-E01S-V2 is used as a TCP Server, it can support up to 14 Clients with two sockets, and the local port number is fixed and cannot be set to zero.

UDP Client Function

(1) UDP Client is a connectionless transport protocol that provides a simple and unreliable transaction-oriented messaging service. There is no connection to make or break, and only the IP and port need to be established to send data to the other party. It is usually used in data transmission scenarios where there is no requirement for packet loss, the packets are small and sent quickly, and the data is to be transmitted to a specified IP.

(2) In UDP Client mode, the ECAN-E01S-V2 will only communicate with the target port of the target IP, and if the

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data does not come from this channel, the data will not be received by the ECAN-E01S-V2.

(3) In UDP Client mode, if the destination address is set to 255.255.255.255, it can achieve the effect of UDP broadcasting in all network segments, and it can also receive the broadcasting data. The ECAN-E01S-V2 module supports broadcasting in the network segments supported, such as the broadcasting method of xxx.xxx.xxx.255.

UDP Server Function

(1) UDP Server means that the source IP address is not verified on the basis of normal UDP, and every time a UDP packet is received, the destination IP is changed to the IP and port number of the data source, and when the data is sent, 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 faster speed and frequency.

Note: The UDP Server cannot send data actively, but only after receiving data, it can send the data to the IP and port where the most recent data interaction took place.

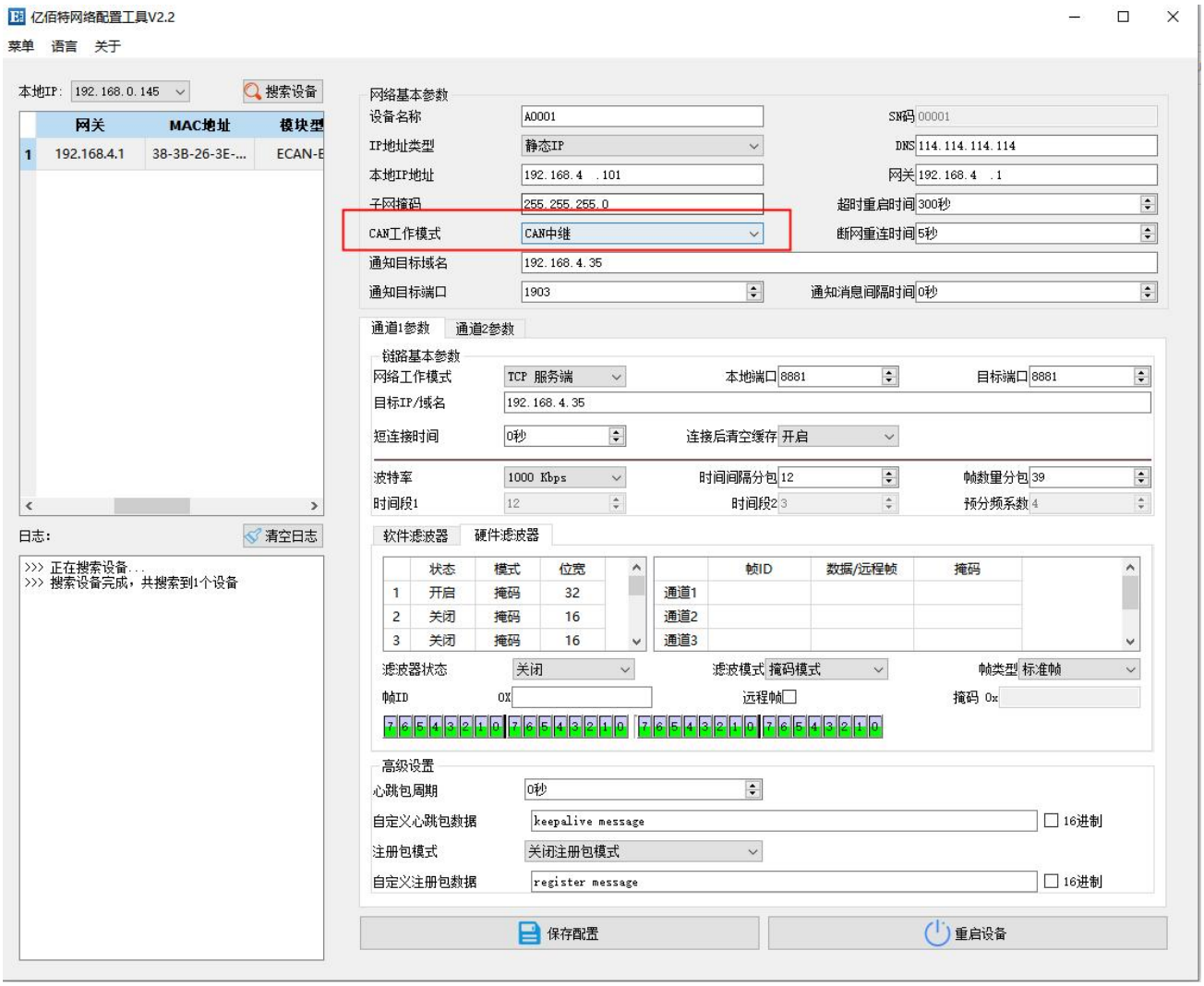
→CAN Section

4.1.2 Relay Enable

The device is equipped with the function of mutual transmission of two CAN channels, i.e. relay function. When the device is in relay mode, the data received by CAN1 in its network will be sent to the network of CAN2, and the data received by CAN2 in its network will be sent to the network of CAN1.

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Note: When the two CAN networks are at different baud rates, it is important to note that high baud rates need to be controlled for network utilization (if too high then there will be loss of data).

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4.1.3 CAN Protocol Conversion Format



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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

Type	Name	Default value	Instruction
	CAN Baud Rate	1000K	There are 10 options from 5K to 1000K. Users can also fill in any baud rate value by themselves.
	CAN working mode	Normal	Normal: The CAN port can answer the received CAN frames normally; Listen only: the CAN port is working in listen mode and does not answer;
	packet frame rate	50	The available values are from 1 to 39. When the CAN port receives data continuously (the interval is less than the packetization time interval), and the number of CAN frames received reaches the “packetization frame number”, the received data will be encapsulated into an Ethernet packet and sent to the network port. The packet frame count refers to the maximum number of frames in a packet. If the packet frame count is not reached during reception and the frame interval exceeds the packet interval, the received data is also encapsulated into an Ethernet packet and sent to the network port. If the number of packetized frames is set to 1, it means that there is no packetization and each CAN frame is sent in a separate Ethernet packet, which has the highest real-time performance but the highest network load; if the number of packetized frames is set to 50, the channel traffic is the highest and the network load is the lowest.

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	Subcontracting Interval (ms)	1	The available values are from 12 to 255. When the CAN port does not receive any new data frames within the time defined by the “Packetizing Interval” (in ms) and the number of packetized frames has not been reached, all the data frames that have not yet been sent are encapsulated into an Ethernet packet and sent to the port.
	Empty out CANBuffer	Optional Emptying	This option is only valid in TCP operation mode, it determines whether to empty the data in the CAN port Buffer after the connection is established or not, if not, then the data in the Buffer will be sent out after the connection is established. If Clear on TCP Connection is selected, the saved CAN buffer will be cleared when the TCP connection is established.

Type	Name	Default value	Instruction
CAN Configuration	Standard Frame Upper Limit	7FF（HEX）	The user-set Receive Standard Frame ID Upper Limit and Lower Limit values together determine the range of Standard Frame IDs to be received.
	Standard Frame Lower Limit	000（HEX）	
	Extended Frame Upper Limit	1FFFFFFF	The user-set Receive Extended Frame ID Upper Limit and Lower Limit values together determine the range of Extended Frame IDs to be received.
	Extended Frame Lower Limit	000000000	
	CAN transmit buffer number (600 frames)	Unconfigurable	Because the speed of Ethernet is much higher than the speed of CAN transmission, if the amount of data received by Ethernet is too large, CAN needs to buffer the transmission to ensure that no frames will be lost, but such a large buffer may lead to poor real-time, 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, it is necessary for the customer to control the speed of Ethernet sending to match the speed of CAN port sending.

4.2 Featured Functions

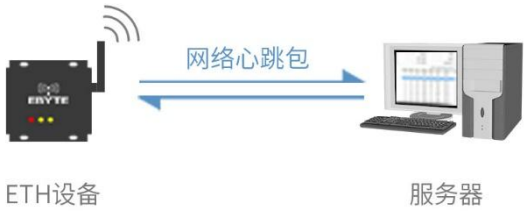
4.2.1 Heartbeat Packet Function

In network pass-through mode, the user can choose to have the ECAN-E01S-V2 send heartbeat packets. Heartbeat packets can be sent to the network server side. The main purpose of sending to the network side is to maintain connection with the server, which is only effective in TCP Client and UDP Client modes.The ECAN-E01S-V2 module supports

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customizing the heartbeat packet content up to 128 bytes. The ECAN-E01S-V2 module supports customizing the content of heartbeat packets up to 128 bytes.



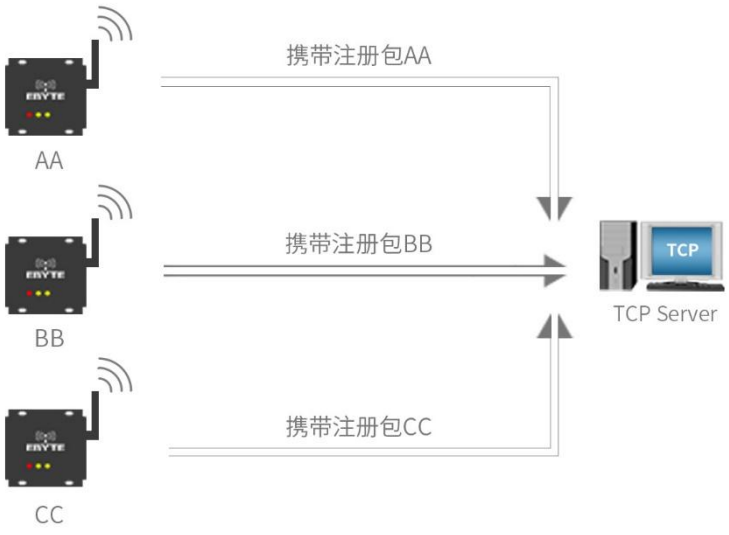
4.2.2 Registration Package Functions

In network pass-through mode, the user has the option of having the DTU send a registration packet to the server. The registration packet is intended to allow the server to identify the data source device, or as a password to obtain authorization for server functions. The registration packet can be sent when the DTU establishes a connection with the server, or the registration packet data can be spliced into the forefront of each packet as a single packet. The data in the registration packet can be MAC address or customized registration data, in which the customized registration packet is set to be up to 128 bytes long. Customized registration packets are supported;

Establishing Connection Sending Registration Packets is mainly used to connect to servers that need to be registered.

Data carrying registration package: send data in the data at the forefront of access to the registration package, mainly used for protocol transmission.

Registration packet mechanism only applies to TCP Client and UDP Client, invalid under TCP Server and UDP Server.



4.2.3 Short Connection Function

TCP short connections are used primarily to conserve server resources and are generally used in multipoint-to-point scenarios. The use of short connections ensures that the connections that exist are all useful connections and do not

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require additional controls for filtering.

The TCP short connection function is used in the TCP Client mode. When the short connection function is turned on and information is sent, if no more data is received from the serial port or the network port within a set period of time, the connection will be automatically disconnected. The short connection function is disabled by default, the disconnection time can be set after the function is enabled, the setting range is 2~255S.

4.2.4 Timeout Reboot Function

The timeout restart (no data restart) function is mainly used to ensure that the ECAN-E01S-V2 works stably for a long time. When the network port fails to receive data for a long time, or the network does not receive data for a long time, the ECAN-E01S-V2 will restart after exceeding the set time, so as to avoid the impact of abnormal conditions on communication. The timeout reboot time 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 off, and when the setting is out of range, it will return to the default value.

4.2.5 Clear Cache Function

When the TCP connection is not established, the data received by DTU will be put in the cache area, the maximum receiving cache of ECAN-E01S-V2 is 3900byte, when the TCP connection is established, the network cache data can be set to be cleared or not according to the customer's demand.

Support DHCP and domain name resolution:

DHCP: The device can automatically obtain IP through the router and automatically configure the subnet mask and DNS server, it does not support modifying the subnet mask and DNS server.

DNS: Automatically follow the router to configure DNS servers for customized domain name resolution.

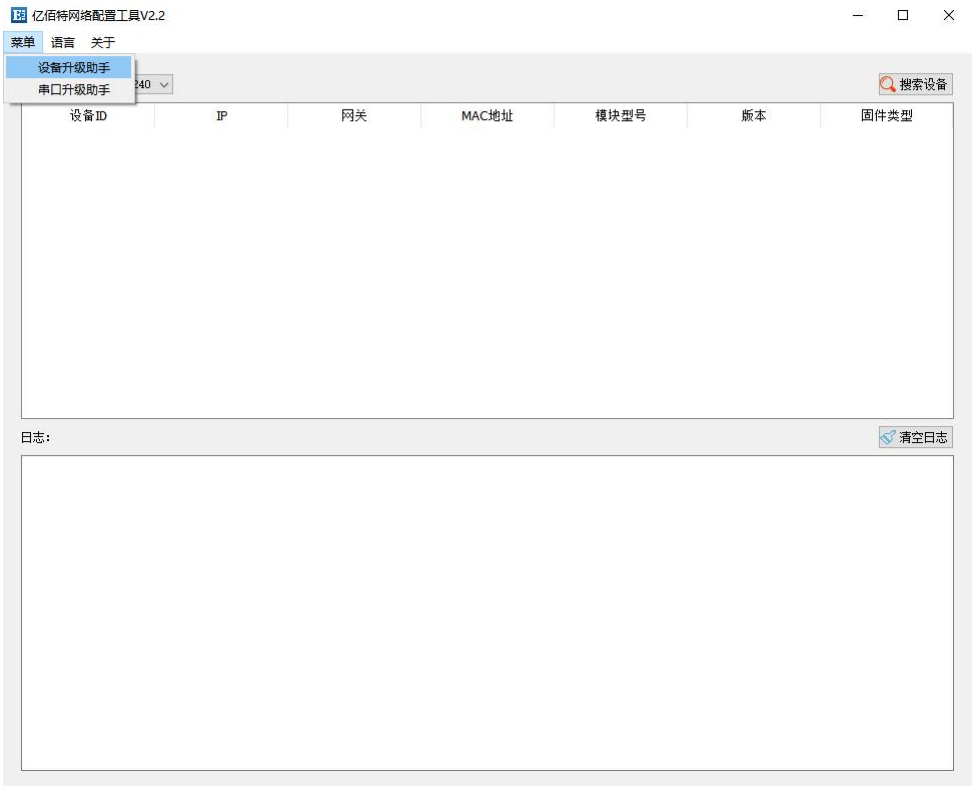
Disconnect Reconnect: the device periodically requests connection after disconnection to ensure that the connection can be restored in case of accidental disconnection (note that it is not a reboot of the device);

Network Port Upgrade: the device can be upgraded and maintained with firmware through the serial upgrade tool provided by the Division.

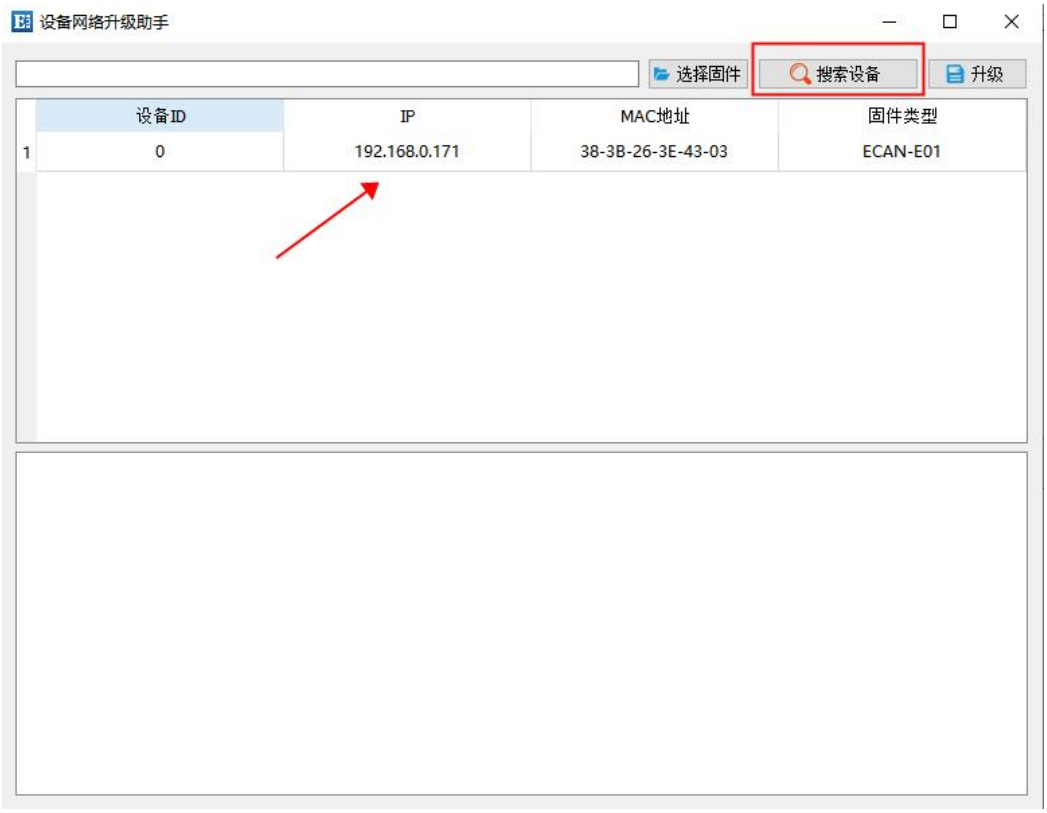
Step 1: Open the software, open the configuration of the host computer, click on the menu bar.

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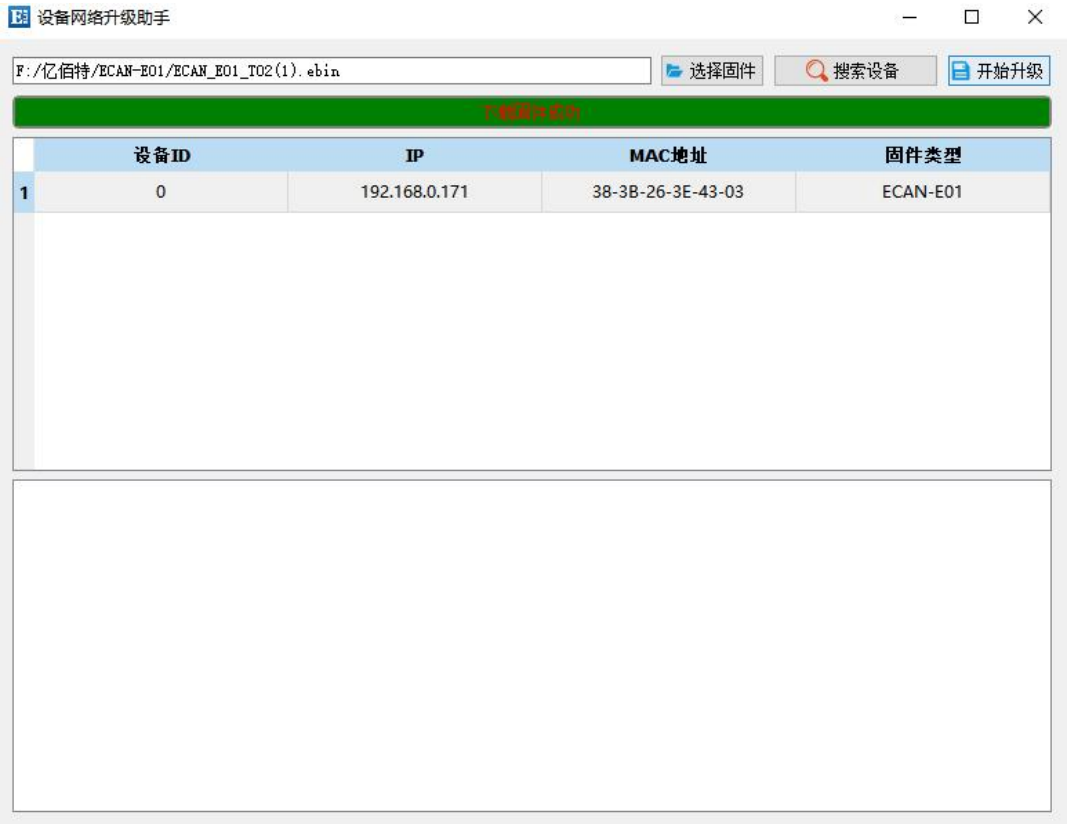
Step 2: Select Device Upgrade Assistant and click Search Device.



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

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4.3 Restore Factory Settings

The device has the function of restoring factory settings by pressing the key, and the hardware restoration of factory settings requires long pressing the reload button for more than 5s.

5 Important Statement

EBYTE reserves the right of final interpretation and modification of all contents of this manual.

Due to the continuous improvement of the hardware and software of the product, this manual may be changed without prior notice, and the latest version of the manual should prevail.

6 Revision history

Version	Date	Description	Issued by
1.0	2025-05-26	Initial version	ZYD

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