Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



EID091-A601 & EID091-A601-S User Maunal

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1 Overview

1.1 Product Introduction



The EID091-A601 & EID091-A601-S are CANFD to Ethernet devices independently developed by Chengdu EBYTE Electronics Technology Co., Ltd. These products use DC 8-28V power, support ISO and Bosch CANFD protocols, and are compatible with CAN 2.0 A/B . The devices have a built-in 120-ohm resistor, which can be enabled via a host computer configuration. They support 3-channel CANFD and TCP/UDP protocols, easily enabling interoperability between CAN(FD) and Ethernet networks.

EID091-A601 is the isolated version; EID091-A601-S is the non-isolated version.

1.2 Functional Features

- Supports DC 8～28V wide voltage supply and supports reverse connection protection;
- Supports CANFD and is compatible with CAN;
- Supports ISO and Bosch CANFD protocols;
- Supports CAN 2.0 A/B protocol;
- Supports indicator lights to show the device's operating status;
- Built-in 120Ω matching resistor;
- Supports factory reset;
- Supports TCP/UDP protocols;
- Supports registration package, heartbeat package, and short connection functions.
- Supports DHCP and DNS;
- Supports restarting after network disconnection/restarting after timeout;
- Supports cache clearing functionality;
- Arbitration domain baud rate support : 5K~1Mbps, default 500Kbps;
- Data domain baud rate support : 100K~5Mbps, default 2Mbps (invalid in CAN mode);
- Supports custom baud rate settings and has a built-in baud rate calculator ;
- Supports both software and hardware settings;
- Supports configuration through web page or host computer .
- Industrial-grade design, operating temperature: -40℃~85℃;

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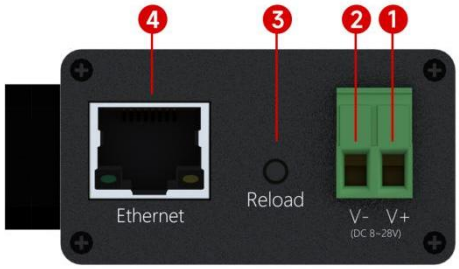
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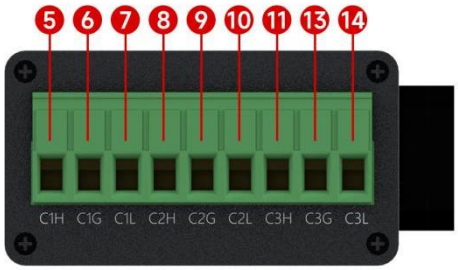
2 Introduction to Hardware Parameter Design

2.1 Basic Parameters

Main parameters	Specification
Power Supply Voltage	DC 8V～28V, exceeding 28V may burn it out, 12V or 24V power supply is recommended.
Number of network ports	1
Network port specifications	Standard RJ45, supports 10/100Mbps
Number of CAN ports	3
CAN port specifications	Supports CANFD ISO/BOSCH, compatible with CAN2.0 A/B
Arbitration Domain Baud Rate	5K~1Mbps, default 500Kbps
Data domain baud rate	100K~5Mbps, default 2Mbps (invalid in CAN mode)
Simple transparent transmission	TCP Server, TCP Client, UDP Server, UDP Client
TCP Server Connection	Each connection supports a maximum of 5 client accesses.
IP Acquisition Method	Static IP, DHCP
Domain name resolution	Support
User Configuration	Host computer configuration, web page configuration
Operating temperature	-40 to +85℃, industrial grade
Operating humidity	10%–90% relative humidity, non-condensing

2.2 Interface Description



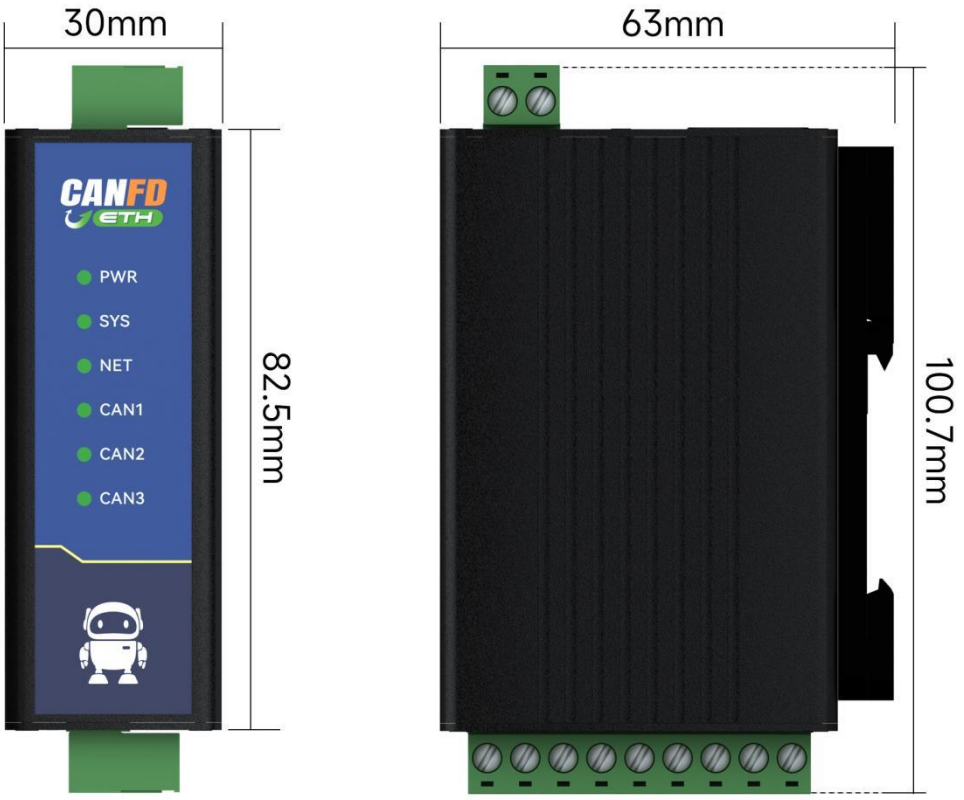


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Pin number	Pin Name	Pin Applications
1	V+	Power Positive, DC 8～28V
2	V-	Power Negative, DC 8～28V
3	Reload	Factory Reset Button, press and hold for 5 to 10 seconds to restore factory default settings
4	Network Port	RJ45 network port, supports 10M/100M
5	CAN1_H	CAN1 Bus High
6	CAN1_G	CAN1 Bus Ground
7	CAN1_L	CAN1 Bus Low
8	CAN2_H	CAN2 Bus High
9	CAN2_G	CAN2 Bus Ground
10	CAN2_L	CAN2 Bus Low
11	CAN3_H	CAN3 Bus High
12	CAN3_G	CAN3 Bus Ground
13	CAN3_L	CAN3 Bus Low

2.3 Dimensional Drawing



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3 Product Function Introduction

3.1 Basic Functions

3.1.1 Ethernet section

TCP Client Functions

(1) TCP Client provides client connections for TCP network services. It actively initiates connection requests to the server and establishes a connection to realize the interaction of CAN data and server data. According to the relevant provisions of the TCP protocol, TCP Client has the distinction between connection and disconnection, thereby ensuring reliable data exchange. It is usually used for data interaction between devices and servers and is the most commonly used network communication method.

(2) When EID091-A601/EID091-A601-S attempts to connect to the server in TCP Client mode and the local port is 0, it initiates the connection with a random port each time.

(3) EID091-A601/EID091-A601-S supports short connection function.

(4) When EID091-A601 and EID091-A601-S are assigned static IP addresses under the same LAN, their IP addresses and gateway must belong to the same network segment, and the gateway IP must be properly configured. Failure to do so will result in loss of normal communication.

TCP Server Function

(1) TCP Server stands for TCP server. In TCP Server mode, EID091-A601/EID091-A601-S listens on the local port. Upon receiving a connection request, it accepts the request and establishes a connection for data communication. When EID091-A601/EID091-A601-S receives data, it transmits the data simultaneously to all client devices that have established connections with it.

(2) It is typically used for communication between a local area network (LAN) and a TCP client. It is suitable for scenarios where there is no server within the LAN and multiple computers or mobile phones request data from the server. Like TCP Client, it supports connection establishment and disconnection mechanisms to ensure reliable data exchange.

(3) When EID091-A601/EID091-A601-S operates as a TCP server, each channel supports a maximum of 5 client connections. The local port number is a fixed value and cannot be set to 0.

UDP Client Function

(1) UDP Client adopts a connectionless transport protocol. It provides simple unreliable transaction-oriented information delivery service. There is no connection establishment or disconnection process. Data can be sent to the peer simply by specifying the IP address and port number. It is generally applied to data transmission scenarios with loose packet loss requirements, small-size packets, high transmission frequency, and requirements to transmit data to a designated IP address.

(2) In UDP Client mode, EID091-A601/EID091-A601-S 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 EID091-A601/EID091-A601-S.

(3) In UDP Client mode, the target address is set to 255.255.255.255, which can achieve the effect of UDP broadcasting across the entire network segment. At the same time, it can also receive broadcast data. The EID091-A601/EID091-A601-S module supports broadcasting within the network segment, such as the broadcasting mode of xxx.xxx.xxx.255.

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UDP Server Function

(1) A UDP server is a server that does not verify the source IP address on the basis of ordinary UDP. After receiving a UDP data packet, it changes the destination IP to the source IP and port number and sends the data to the IP and port number of the most recently communicated data packet.

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

Note: A UDP server cannot send data proactively; it can only send data to the IP address and port with which it recently exchanged data after receiving data.

3.1.2 CAN section

Protocol Mode

The protocol modes are divided into two categories: CAN format conversion and CANFD format conversion. The upper limit of the data payload length differs between the two types, and the overall message length dynamically changes with the actual data length. The data length received by the network interface is equal to the total number of bytes in the complete protocol frame.

A single frame message consists of three parts: frame information + frame ID + frame data. In this mode: the message identifier is filled by the 4-byte frame ID field within the transmission frame; the frame type is determined by the frame information field in the first byte of the message. Message structure:

CAN fixed-format serial frame (13 bytes)		
Frame information	Frame ID	Frame data
1 Byte	4 Byte	8 Byte

A single-frame message consists of three parts: frame information, frame ID, and frame data. In this mode: the message identifier is filled with a 4-byte frame ID field within the transmission frame; the frame type is determined by the frame information field in the first byte of the message. Message structure:

CAN FD fixed-format serial frame (13 bytes)		
Frame information	Frame ID	Frame data
1 Byte	4 Byte	64 Byte

The frame information is shown in the table below:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
FF	RTR	EDL	BRS	DLC3	DLC2	DLC1	DLC0

- FF: Identifier for standard frames and extended frames, 0 for standard frames and 1 for extended frames;
- RTR: Identifier for remote frames and data frames, 0 for data frames and 1 for remote frames. In CANFD, it can only be 0.
- EDL: CAN and CANFD identifiers, 0 for CAN, 1 for CANFD;
- BRS: Baud rate switching enable flag. 0 means no rate switching, 1 means variable rate switching. Only valid for

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CANFD. This bit should be 0 for CAN.

- DLC3～DLC0: Indicates the length of the CAN (CANFD) message data.

The frame ID is 4 bytes long, with 11 valid bits for a standard frame and 29 valid bits for an extended frame.

Extended frame ID number 0x12345678			
0x12	0x34	0x56	0x78

Standard frame ID number 0x3FF			
0x00	0x00	0x03	0xFF

- CAN Bus → Ethernet (CAN/CANFD Message Encapsulation and Upload): After a device captures a standard CAN or CANFD message from the CAN bus, it encapsulates it according to the protocol structure: 1 byte frame information + 4 bytes big-endian frame ID + actual valid data of the message. After encapsulation, it is directly output through Ethernet. The network port outputs a complete protocol packet of the corresponding length based on the actual number of bytes of data carried by the bus.

  Example: The CAN bus receives a standard CAN data frame, ID=0x123, data 0x110x22, frame information=0x02 (standard frame, data frame, CAN type, data length 2), 4-byte frame ID is 0x00000123, Ethernet outputs a complete data packet: 0x02000001231122.

- Ethernet → CAN bus (network packet parsing and sending): Ethernet packet sending must strictly follow the unified protocol structure of "1B frame information + 4B frame ID + N bytes of frame data"; the device first parses the first byte of frame information to distinguish whether it is CAN or CANFD, standard/extended frame, data length and other attributes, extracts the 4-byte frame ID as the message identifier, and extracts the corresponding length of valid data according to the DLC field. After stripping the protocol header, the original CAN/CANFD message is sent to the CAN bus.

Example: When the network port sends a data packet 0x02000001231122, the device parses it and obtains a standard CAN data frame with ID=0x123 and valid data 0x110x22. The device then sends the frame to the CAN bus.

3.2 Special features

3.2.1 Relay function

After enabling the relay function, the device's configured protocol mode will be disabled, and Ethernet protocol encapsulation and frame format conversion logic will no longer be executed. Data forwarding rules: When CAN1 receives a CAN message, it will forward it unchanged from both CAN2 and CAN3 channels; when CAN2 receives a message, it will only forward it to CAN1; when CAN3 receives a message, it will only forward it to CAN1. This function is used for interoperability relay of multiple CAN buses, enabling transparent data transmission and interaction between different CAN nodes.

3.2.2 Built-in controllable terminating resistor

Each of the device's three CAN channels has a built-in 120Ω terminating resistor, eliminating the need for external soldering. The terminating resistor's connection status can be freely enabled or disabled via a host computer or web-based configuration software. For short-distance, multi-node network scenarios, the terminating resistor can be disabled; however, for single-channel buses, the terminating resistors at both ends must be enabled to match the impedance, eliminating signal reflections and ensuring stable CAN/CANFD bus communication. Both the isolated version EID091-A601 and the non-isolated version EID091-A601-S support this software-controlled on/off function.

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3.2.3 Heartbeat Function

In network pass-through mode, users can choose to have the EID091-A601/EID091-A601-S send heartbeat packets. These heartbeat packets can be sent to the network server. Sending them to the network server is primarily for maintaining a connection and only works in TCP Client and UDP Client modes. The EID091-A601/EID091-A601-S supports custom heartbeat packet content up to 128 bytes.

3.2.4 Registration Package Function

In network pass-through mode, users can choose to have the DTU send a registration packet to the server. The registration packet allows the server to identify the data source device or serves as a password for obtaining server function authorization. The registration packet can be sent when the DTU establishes a connection with the server, or it can be appended to the beginning of each data packet as a single packet. The registration packet data can be a MAC address or custom registration data, with custom registration packet settings having a maximum length of 128 bytes. Custom registration packets are supported.

Establish connection and send registration packet: This is mainly used when connecting to a server that requires registration.

Data carries a registration packet: The registration packet is included at the very beginning of the data transmission and is mainly used for protocol transmission.

The registration packet mechanism only applies to TCP Clients and UDP Clients; it is ineffective under TCP Servers and UDP Servers.

3.2.5 Short connection function

The primary purpose of using short TCP connections is to conserve server resources, and they are generally used in multi-point-to-one scenarios. Using short connections ensures that all existing connections are valid, eliminating the need for additional filtering mechanisms.

The TCP short connection function is applied in TCP Client mode. When enabled, if no data is received from the serial port or network port within a set time after sending information, the connection will be automatically closed. The short connection function is disabled by default; the disconnection time can be set after enabling the function, with a setting range of 2–255 seconds.

3.2.6 Timeout restart function

The timeout restart (no data restart) function is primarily used to ensure long-term stable operation of the device. When the network port fails to receive data for an extended period, or when the network has not received data for a prolonged period, the device will restart after the set time has elapsed, thus preventing abnormal situations from affecting communication. The timeout restart period can be set via the host computer. The normal operating time for this function is set to 60~65535 seconds, with a default value of 300 seconds. 0 indicates it is off; if the setting is outside the range, it will revert to the default value.

3.2.7 Error Indication Function

If an error occurs during communication, the corresponding error code will be sent to the notification port. The notification port can be customized by the user as either TCPC or TPCS, with the default setting being TCPS. Target IP: 192.168.4.35, Local port: 1904.

Error code	Error Type
1	BUSOFF
2	Receive buffer full
3	Passive error
4	Active error

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3.3 Network upgrade

Open your network configuration tool software, click on the menu bar, select Device Upgrade Assistant, and the upgrade interface will automatically pop up. Add the upgrade package in the upgrade interface, click Search Device, and stop the search once a device is found. Click on the device, and then click Upgrade to perform the upgrade.

3.4 Factory reset

The device supports factory reset via button. To perform hardware factory reset, press and hold the Reload button for 5–10 seconds to restore factory defaults..

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Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2026-06-24	Initial version	ZYD

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