TOSUN同星



TOSUN-GW2208
User Manual

tosunai.com

Product Features & Interface Overview

CAN FD and Digital I/O to RJ45 Interface

Product Name	Channel
GW2208	CAN FD * 8 DO * 2 DI * 4

Copyright Information

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In an effort to provide users with the best possible service, Shanghai TOSUN Technology Ltd. (hereinafter referred to as "TOSUN Technology") has made every attempt to present accurate and detailed product information as possible in this manual. However, due to the time-sensitive nature of the content, TOSUN Technology cannot guarantee the timeliness and applicability of the information at all times.

The information and data contained in this manual are subject to change without prior notice. For the latest updates, please visit the official website of TOSUN Technology or contact our support team directly. We appreciate your understanding and continued support!

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Typical Application

- Multi-node CAN/CAN FD bus data forwarding, protocol conversion, and digital signal interaction
- Simulation of vehicle digital signal inputs and acquisition of digital signal logic levels
- Vehicle-level CAN (FD) network synchronized data acquisition and analysis
- Vehicle diagnostics, ECU calibration, and software flashing
- Simulation, testing, and diagnostics of intelligence domain controllers (e.g., cockpit, ADAS)
- Building high-reliability automated test systems and endurance test benches
- Industrial bus networking and automation control, enabling interconnection between low-speed sensor CAN networks and high-speed CAN FD master networks

Product Highlights

- High Precision

Microsecond-level hardware message timestamps provide an accurate timing reference for advanced simulation and diagnostics.

- Driver-free & Compatible

Ethernet-based driver-free design using an RJ45 interface. Supports plug-and-play operation on Windows and Linux, ensuring excellent system compatibility.

- Safe and Reliable

Each CAN channel provides DC 2500 V galvanic isolation, designed with automotive-grade quality to withstand harsh operating environments.

- Flexible Configuration

Each CAN channel includes a built-in 120 Ω termination resistor, which can be enabled or disabled via software.

- Rich Interface Configuration

Integrates 8 CAN FD channels, 2 digital outputs (DO), and 4 digital inputs (DI).

- Integrated Ecosystem

Fully supports mainstream file formats such as DBC and A2L, and seamlessly integrates with all licensed features of TSMaster.

- Professional Toolchain

Includes BLF data logging and replay, UDS diagnostics, CCP/XCP calibration, and Flash Bootloader functionality.

- Flexible & Open

Provides cross-platform development APIs for advanced customization.

- Relay Expansion

Increases the number of load nodes and extends communication distance.

- Message Routing

Supports ID filtering and intelligent forwarding based on CAN message IDs, reducing redundant communication and improving efficiency.

- Bitrate Adaptation

Equipped with CAN protocol parsing and buffering, enabling interconnection and data conversion between CAN networks operating at different bitrates.

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1. Introduction

The GW2208 is a high-performance multi-channel CAN/CAN FD communication gateway. The device integrates:

- 8 CAN FD channels
- 2 digital outputs (DO)
- 4 digital inputs (DI)

The device connects to a PC via an Ethernet interface, and features a driver-free design for both Windows and Linux, ensuring excellent system compatibility.

All CAN channels inside the GW2208 are fully electrically isolated at the circuit level, effectively eliminating ground potential differences and cross-channel interference. This significantly improves system stability and safety. This design is particularly suitable for multi-ECU, multi-power-domain, and complex automotive or industrial network environments.

When used with the powerful TSMaster software, the device supports loading DBC and ARXML database files, enabling convenient monitoring, analysis, and simulation of CAN FD bus data. It also supports UDS diagnostics, ECU flashing, and CCP/XCP calibration.

Included resources:

- CAN FD monitoring software TSMaster
- Cross-platform secondary development library (with a dedicated programming manual)

> This document covers the operation of the device on Windows. For usage on Linux and other operating systems, please refer to the separate user manual.

1.1. Technical Specifications

➢ Device Specifications

Parameter	Description
PC Interface	RJ45 Ethernet interface
Timestamp Precision	Microsecond-level high-precision timestamps

Driver	Cross-platform, driver-free design
Connector	Pluggable connector
License	Supports all TSMaster paid licenses
Power Supply	2-Pin Phoenix terminal
Power Consumption	6.5 W
Enclosure Material	Metal
Dimensions	Approx. 155.5 * 158.21 * 32 mm
Weight	Approx. 530 g
Operating Humidity	10% ~ 90% RH (non-condensing)

➢ CAN Specifications

Parameter	**Description**
Connection Standard	High-speed CAN (ISO 11898-2 compliant)
Supported Protocols	Full support for CAN and CAN FD (ISO 11898-1 compliant)
CAN Baud Rate	125 kbps ~ 1 Mbps
CAN Frame Data Length	Up to 8 bytes
CAN FD Baud Rate	125 kbps ~ 8 Mbps
CAN FD Frame Data Length	Up to 64 bytes; supports BRS frames
Max Frame Rate	TX: 20,000 frames/s, RX: 20,000 frames/s (single channel, 1 Mbps, 0-byte remote frame)
Termination Resistor	Built-in 120Ω resistor for each CAN channel
Controller Modes	Normal mode, No-ACK mode, Restricted mode, Internal loopback, External loopback, Self-ACK
Relay Type	Latching relay

Electrical Isolation	Complete electrical isolation between CAN channels

➢ I/O

Parameter	Description
DO	Output state = 1: DO connected to COM_DO Output state = 0: DO disconnected from COM_DO
DI	Input state = 1: High-level detected Input state = 0: Low-level detected

➢ Hardware TAC

Parameter	Description
On startup	Executed only once when the device powers on; typically used for initializing CAN channel configurations
Rx	Triggered when a message is received on the specified CAN channel; forwarding rules can be defined (target channel, ID modification, data modification)
PreTx	Triggered before message transmission; used for final modification of the message content or to determine whether the message should be sent
TxDone	Triggered after message transmission is completed; used to implement multi-stage forwarding
Dynamic deployment of forwarding rules	Hardware TAC scripts can be downloaded via the host tool TSMaster without firmware updates, allowing flexible adaptation to different application scenarios

Note: When deploying TAC, ensure that the device is connected to the PC and that TSMaster is not connected to the device via TCP; otherwise, the deployment will fail.

1.2. Electrical Specifications

➢ Power Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Operating Voltage	Phoenix terminal supply	9	12.0	36	V
Power Consumption	Phoenix terminal supply	--	6.5	--	W

➢ CAN Interface Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Termination Resistance	Enabled	--	120	--	Ω
	Disabled	--	∞	--	--

➢ Mechanical Dimensions

Unit: mm

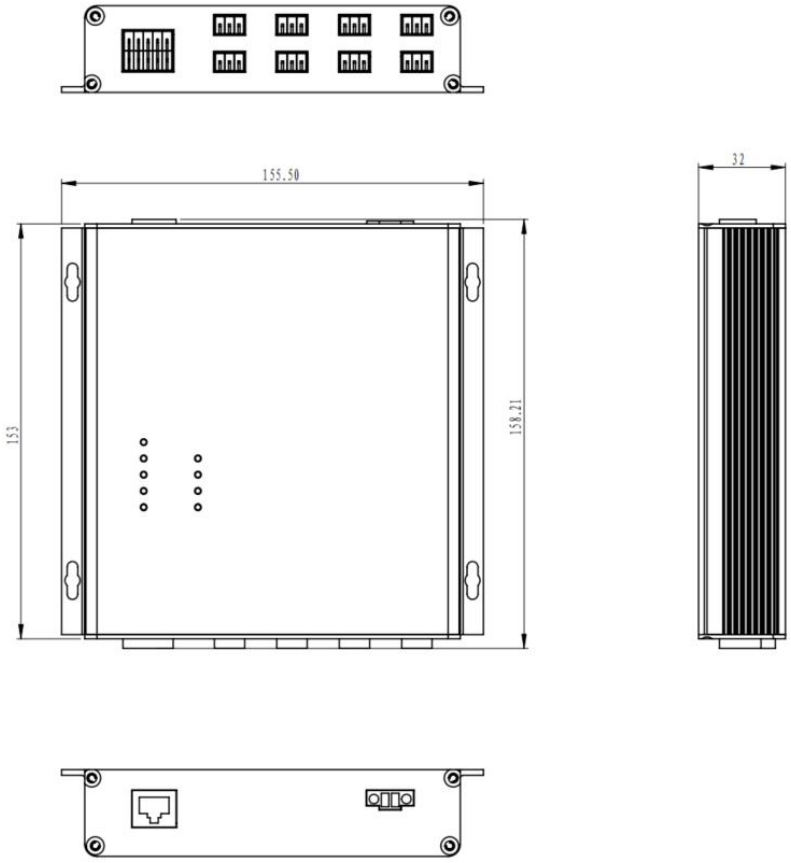


Figure 1-1 Mechanical Dimensions

1.3. Pin Definition

➢ CAN and I/O Pin Interfaces

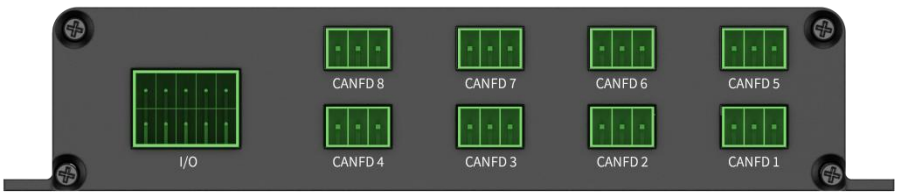


Figure 1-2 Hardware Interface (CAN FD and I/O)

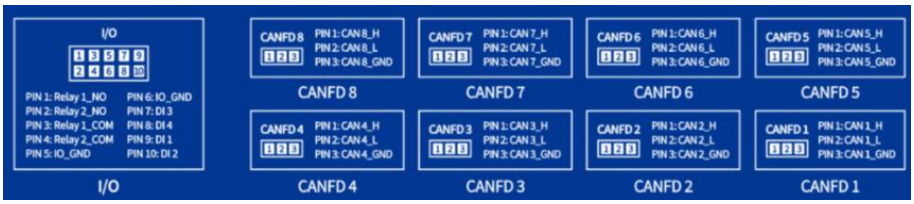


Figure 1-3 Pin Layout (CAN FD and I/O)

1.4. LED Indicators



Figure 1-4 Front Panel Layout

➢ LED Definitions

Indicator	Description
CAN FD 1 ~ 8	Status of CAN FD channel 1 ~ 8
Link	Hardware connection indicator

➢ LED Color Description

Indicator	Color	Description
CAN FD	Green	Normal frame transmission/reception
	Red	Frame transmission/reception error — configuration, protocol, or wiring fault
Link	Green	Device connected successfully

The blinking frequency depends on the bus load rate — the higher the bus load, the faster it blinks.

1.5. System Requirements

➢ PC Requirements

- Operating System: Windows or Linux
- One available RJ45 Ethernet port

➢ Driver Installation

- The GW2208 features a driver-free design, ensuring outstanding system compatibility. It can be used directly on Windows (7/8/10/11) or Linux without manual driver installation.

➢ Downloads

- TSMaster software
- PDF user manual
- Programming library (for secondary development)

The download link is available on the official website of Shanghai TOSUN Technology Ltd.: https://www.tosunai.com/

1.6. Packing List

Item	Qty.	Illustration	Standard/Optional
GW2208 Main Device	1		Standard
2-Pin Flange Locking Plug	1		Standard
Pluggable Connector (2x5P)	1		Standard
3-Pin Pluggable Terminal	8		Standard

2. Application Example in Windows



Figure 2-1 Example in Windows

For TSMaster installation instructions, please refer to the appendix.

2.1. Software Connection

1. Connect the device to the PC via the RJ45 Ethernet cable. In TSMaster, go to “Hardware” → “Channel Selection” to open the Channel Selector, and enable the Ethernet interface device.

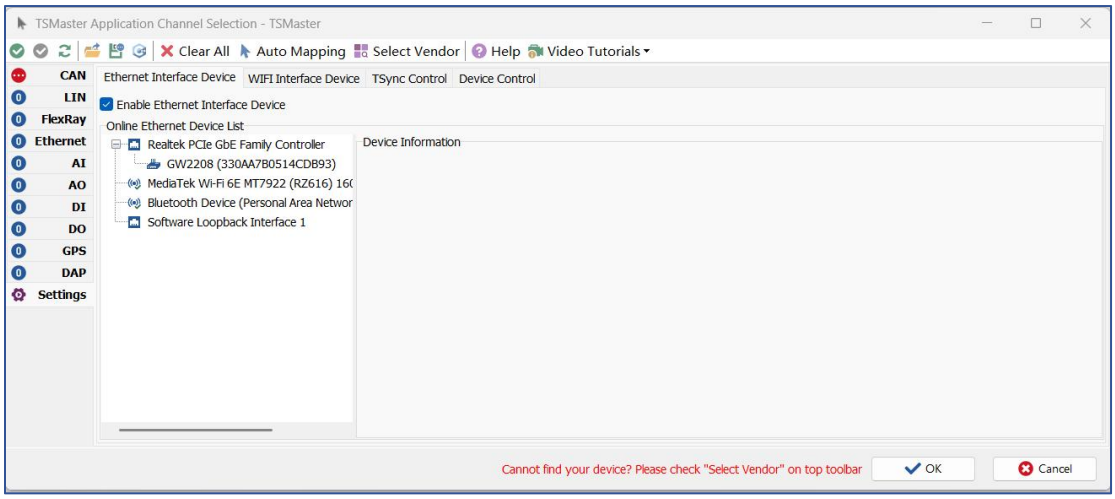


Figure 2-2 Enable Ethernet

2. Select the number of application channels. Here you can choose the CAN channels to be used.

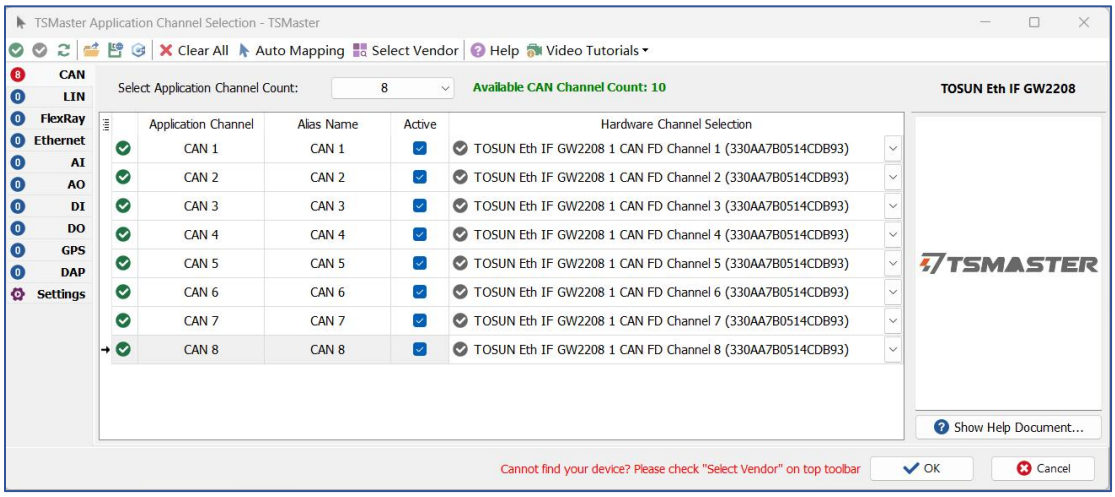


Figure 2-3 Channel Selection

3. Navigate to “Hardware” ➞ “Bus Hardware” to open the “Hardware Configuration” window, where you can configure CAN parameters.

CAN configuration window:

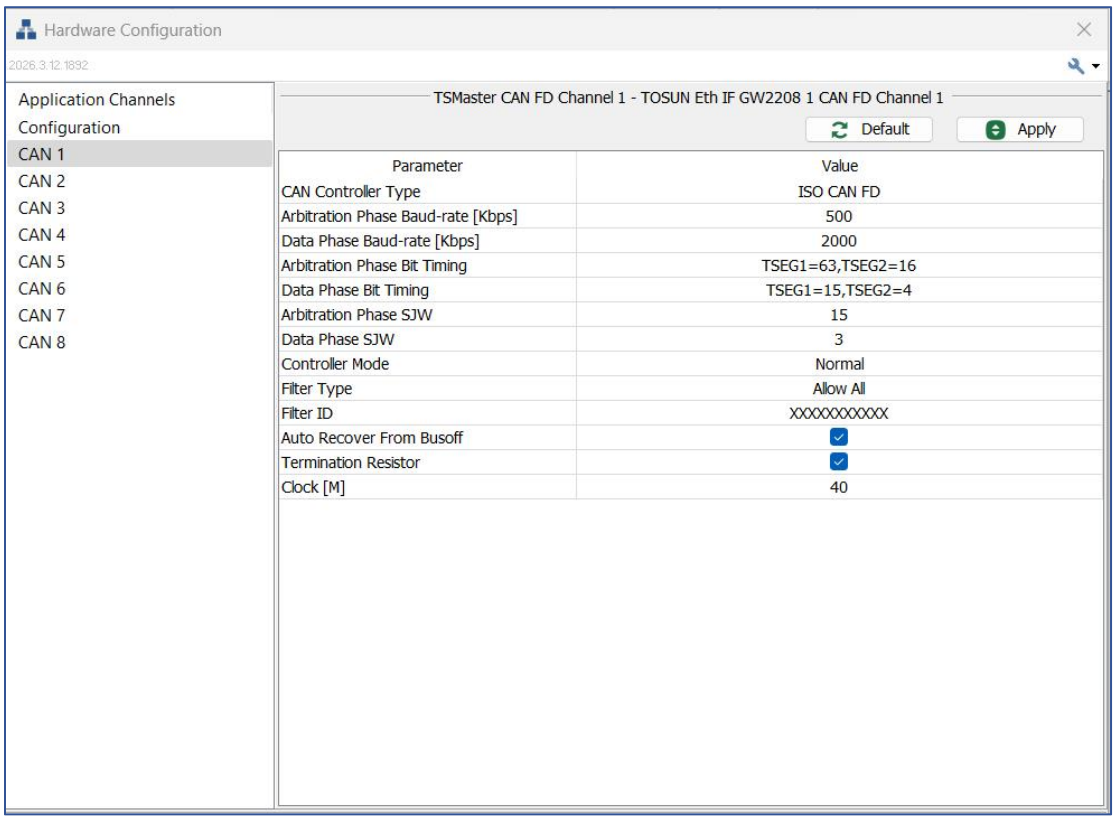


Figure 2-4 Channel Configuration (CAN)

4. Click “Analysis” ➞ “Start” to connect the device.

2.2. Hardware Connection

2.2.1. CAN

Use the 3-pin pluggable terminal included with the device to access four CAN channels.

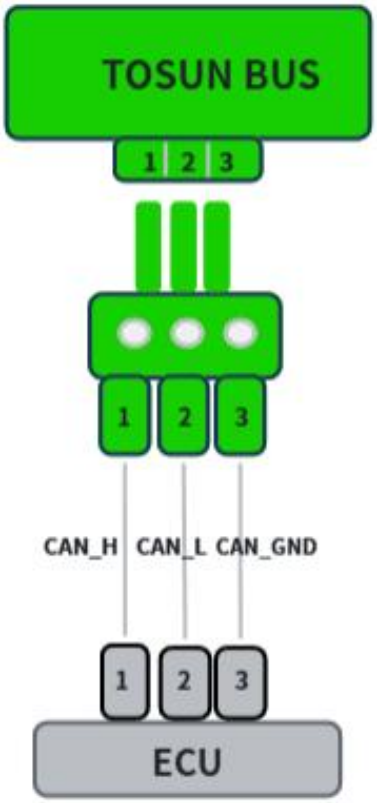


Figure 2-5 3-Pin Pluggable Terminal (CAN)

Pay attention to the termination-resistor enable settings. The GW2208 comes with built-in termination resistors, which can be enabled or disabled via the software or API. The recommended configuration is to enable one 120Ω termination resistor at each end of the CAN bus, ensuring that the total bus resistance stays at 60Ω.

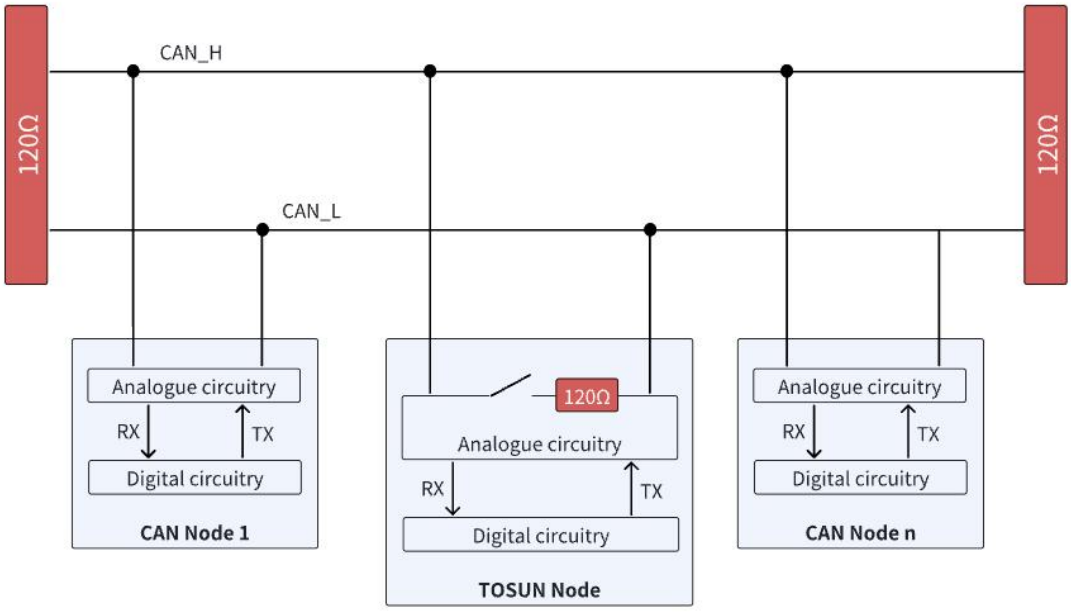


Figure 2-6 Connecting to the CAN Bus

2.2.2. I/O

Use the pluggable connector included with the device to access the I/O channels.

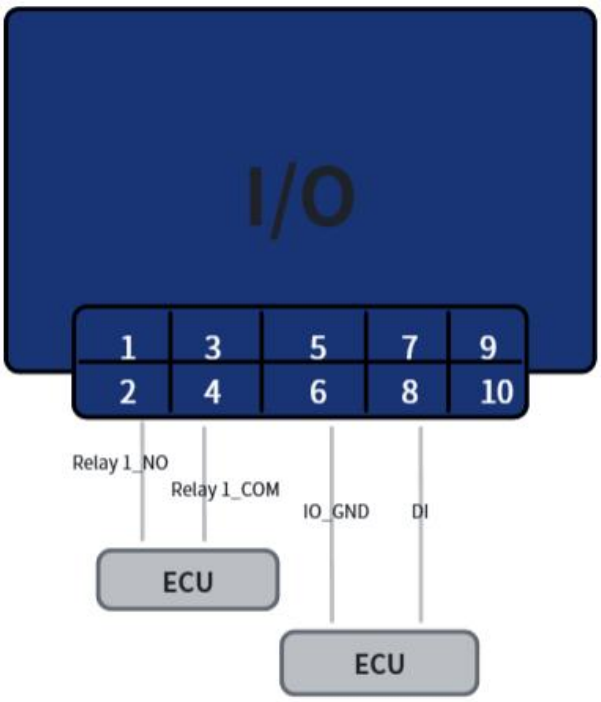


Figure 2-7 Pluggable Connector for I/O

2.3. Usage Example

2.3.1. Sending a CAN Frame

After configuring and connecting the software and hardware, messages can be sent through the "CAN/CAN FD Message Transmission" window in TSMaster or via a mini-program. Message details can be viewed in the "CAN/CAN FD Message Information" window.

➢ Via GUI

1. After configuration and connection, click "Analysis → Data Analysis → Message Transmission → Add CAN/CAN FD Transmission" to open the CAN/CAN FD Transmission window. Add a cyclic message as shown below, then click Send.

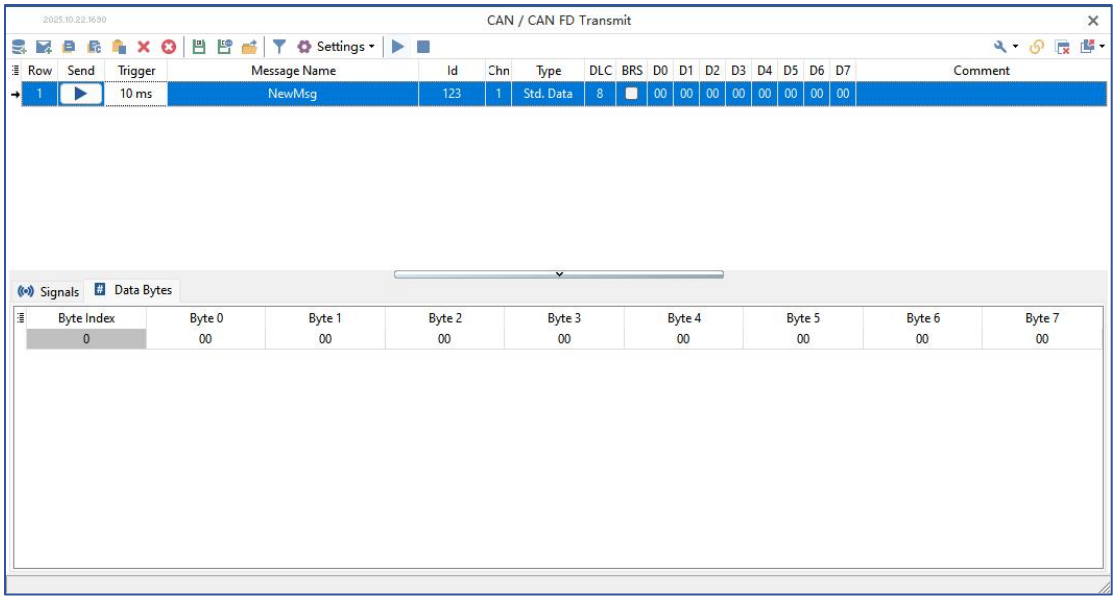


Figure 2-8 Adding CAN Message

2. Message information can be viewed under "Analysis → Data Analysis → Message Analysis → Add CAN/CAN FD Message Information."

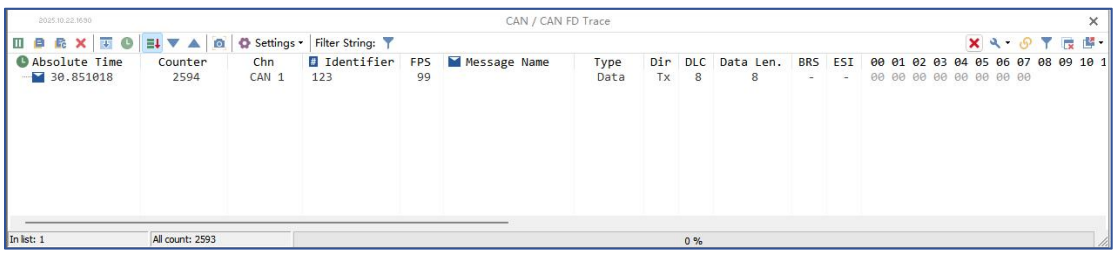


Figure 2-9 CAN Message Information

3. Bus statistics can be viewed under “Analysis → Data Analysis → Statistics → Show CAN Statistics” (example shows one channel).

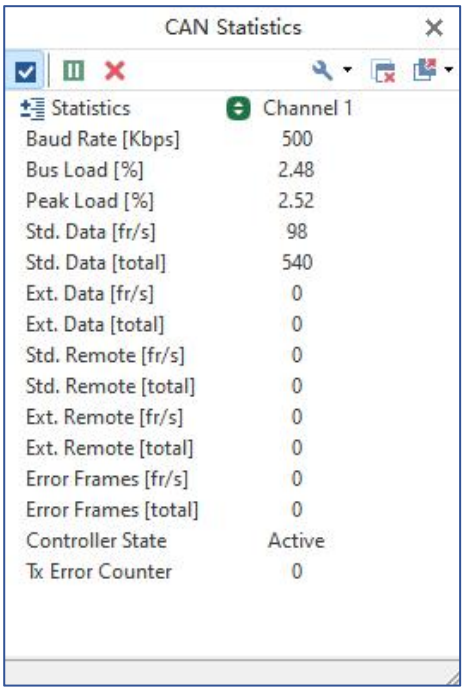


Figure 2-10 CAN Statistics

➢ Via C Script

1. In the “CAN/CAN FD Transmission” window, right-click a message and select “Copy as C Script” to display example code. Copy the generated code.

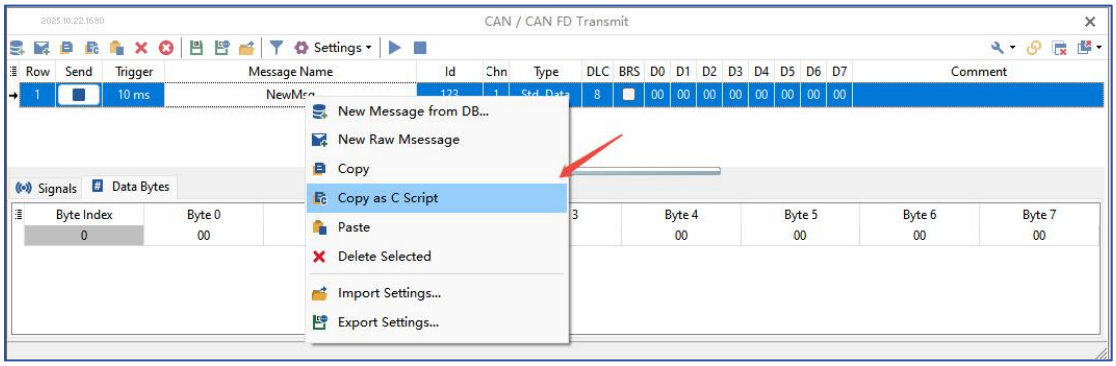


Figure 2-11 Quick Access to C Code

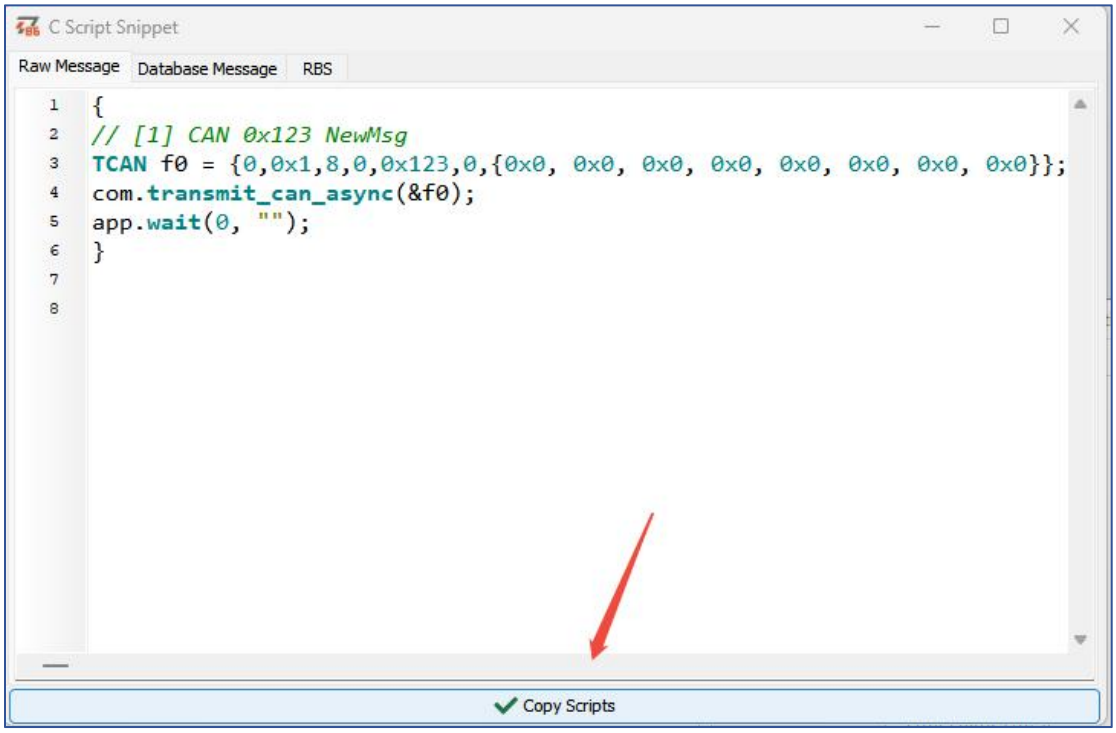


Figure 2-12 Copying the C Code

2. In the mini-program module, click “Design → Mini-program → Add C Mini-Program Editor” to open the C code editor.

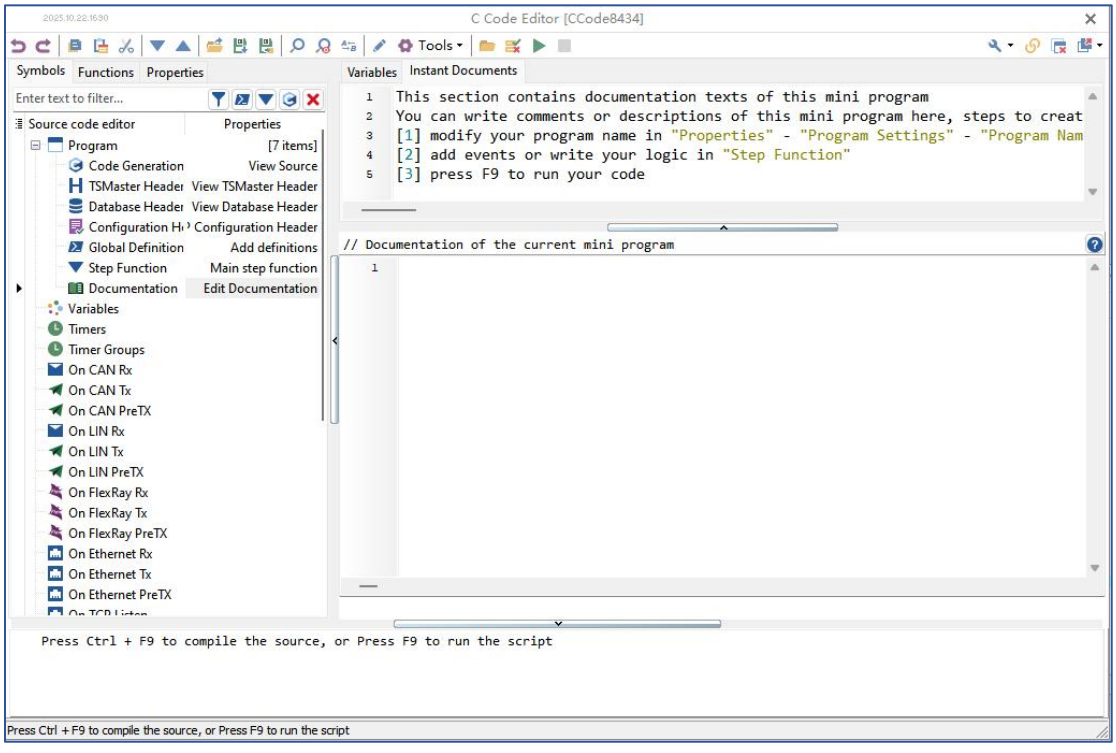


Figure 2-13 Adding a C Mini-Program Editor

3. In the C Code Editor, add a key event (e.g., Key A), paste the copied code into the event handler, then click Compile and Run.

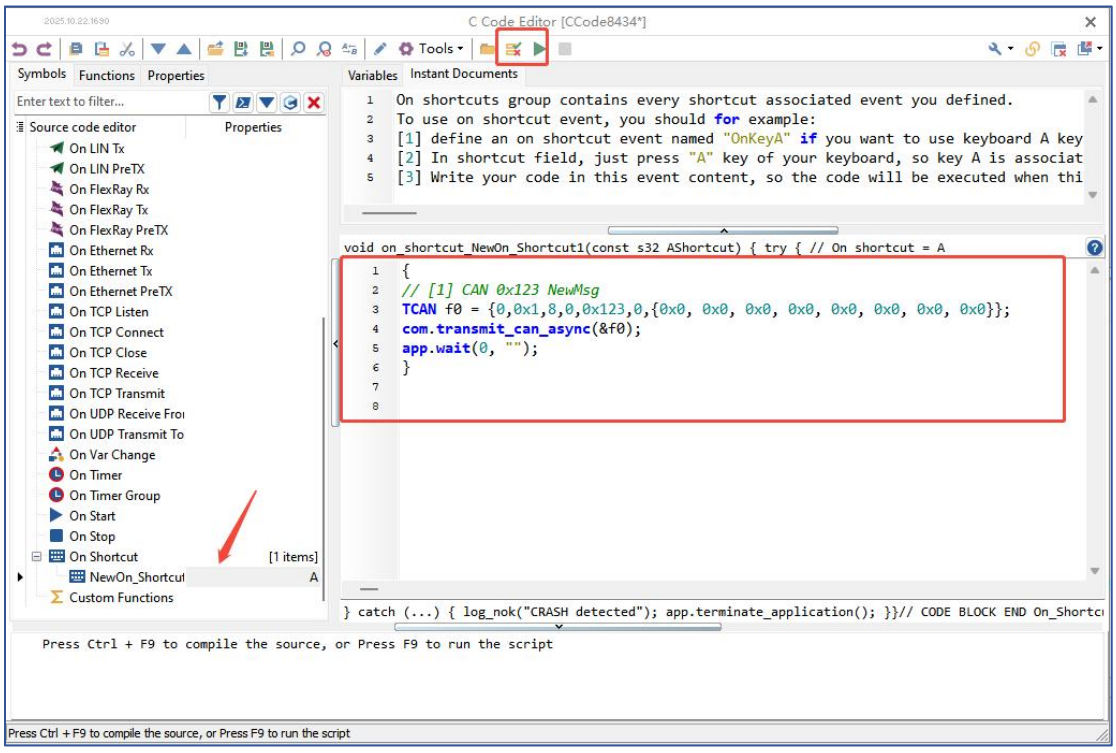


Figure 2-14 Building a C Mini-Program (CAN)

4. Each time Key A is pressed, a CAN message will be transmitted.

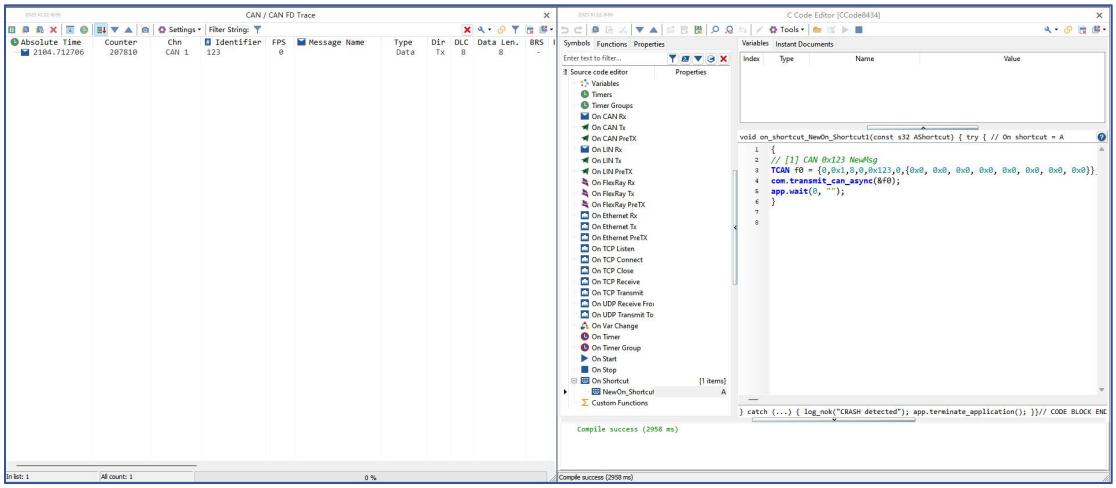


Figure 2-15 Sending CAN Messages via C Mini-Program

3. Appendix

3.1. Software Installation

The section describes the steps for installing the TSMaster software on a Windows PC.

➢ TSMaster Software Download

https://www.tosunai.com/downloads/

If the site is unavailable, contact your sales representative or visit the TOSUN official website.

You may also scan the QR code below to follow the official WeChat account and obtain download links.

Figure 3-1 TOSUN Official WeChat Account

➢ Software Installation

1. Double-click the TSMaster installer and select the installation language.

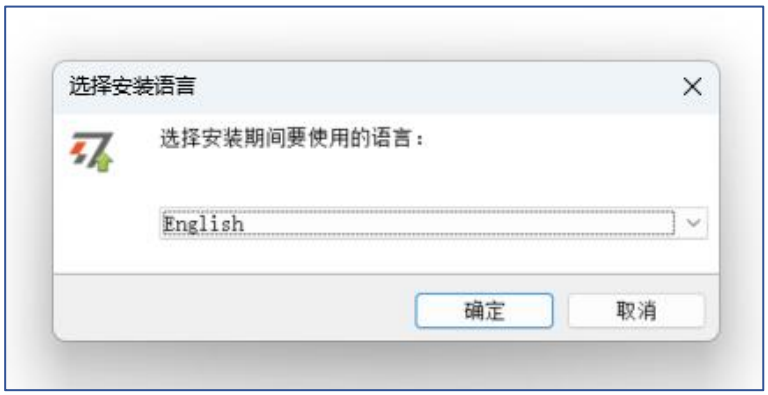


Figure 3-2 TSMaster Installation

2. Accept the license agreement and click “Next”.

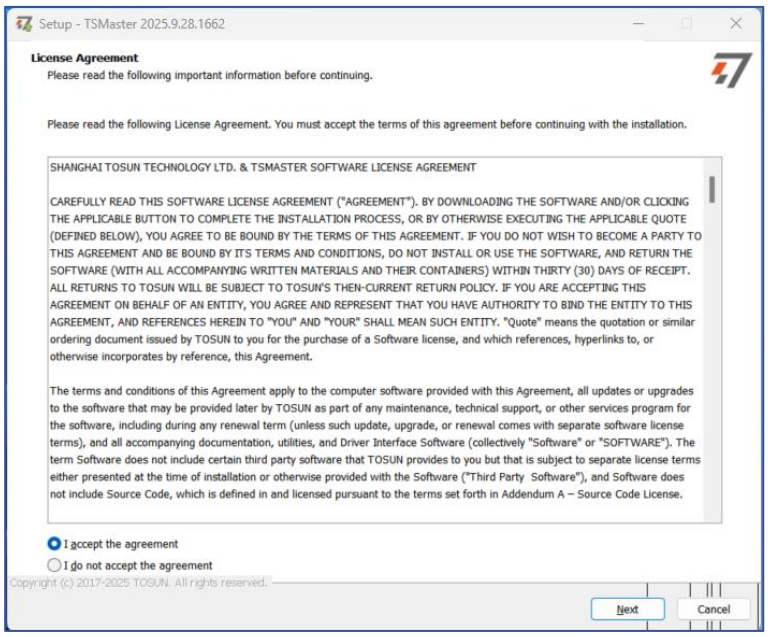


Figure 3-3 TSMaster Installation

3. Choose an installation directory and click “Next “.

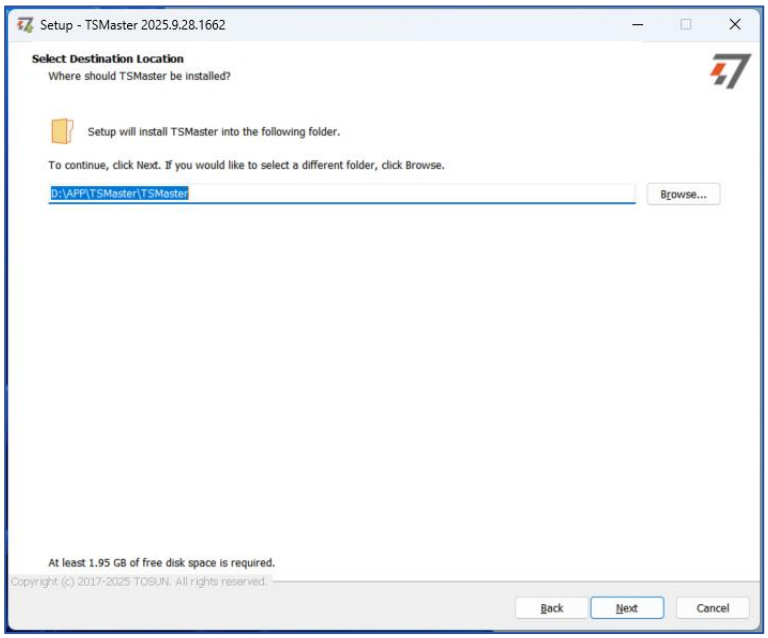


Figure 3-4 TSMaster Installation

4. Select additional tasks as needed and click “Next”.

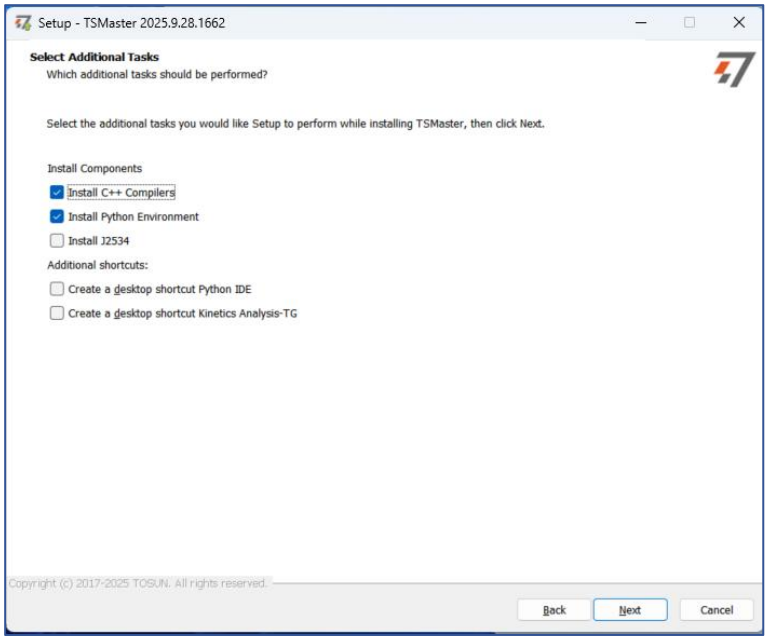


Figure 3-5 TSMaster Installation

5. Click “Install” and wait for completion.

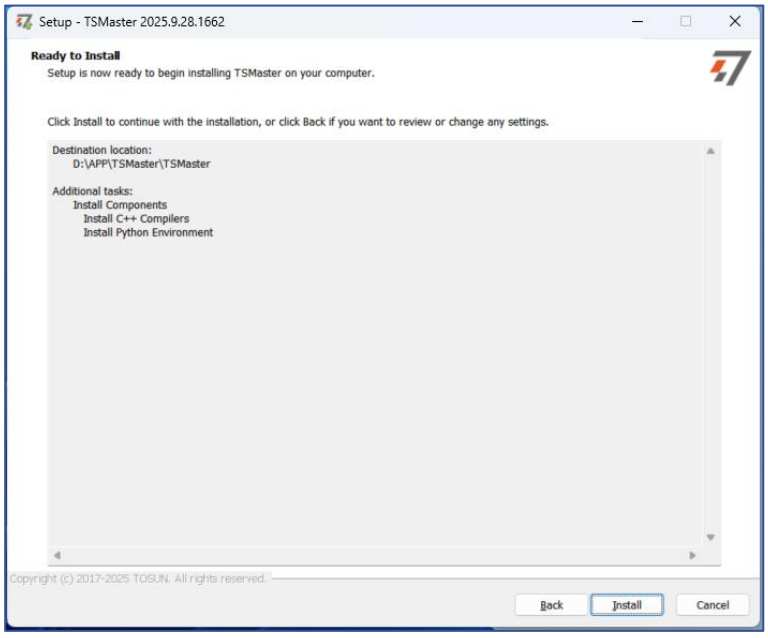


Figure 3-6 TSMaster Installation

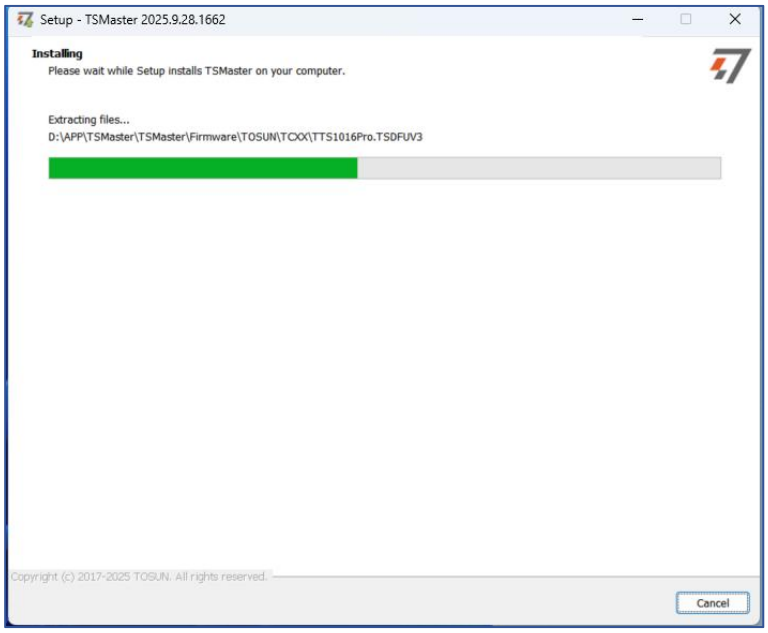


Figure 3-7 TSMaster Installation

6. Click “Finish” to complete installation.

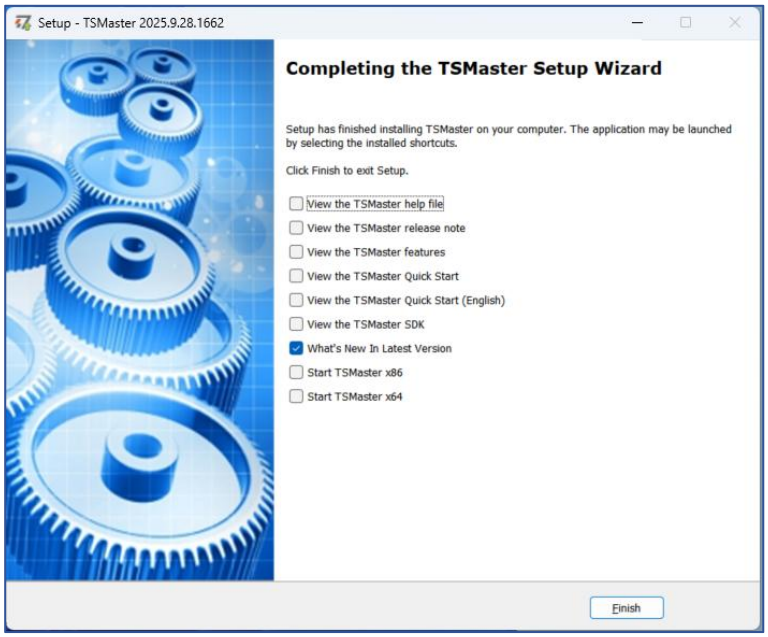


Figure 3-8 TSMaster Installation

4. Inspection and Maintenance

The GW2208 primarily contains semiconductor components, which typically have a long service life. However, adverse environmental conditions may accelerate aging and degrade performance. To ensure proper operation, regular inspections are recommended to maintain the required environmental conditions.

It is recommended to inspect the device at least once every 6 to 12 months. In harsher environments, inspections should be performed more frequently. Refer to the table below for inspection criteria and recommended actions. If issues persist, please contact Shanghai TOSUN Technology Ltd.

➢ Power Environment Inspection

Item	Check Content	Standard/ Range	Action/Measure
Power Supply	Check voltage fluctuation at power input	Phoenix port: +12V DC	Use a power meter or voltmeter at the input; ensure voltage fluctuation is within range
Ambient Conditions	Check ambient temperature (including internal temperature within enclosures)	-40℃ ~ +80℃	Use a thermometer to ensure temperature is within specified range
	Check the ambient humidity (including internal humidity within enclosures)	10% ~ 90% RH	Use a hygrometer to ensure humidity is within specified range

➢ Contamination & Protection Check

Item	Check Content	Standard/ Range	Action/Measure

Contamination	Check for accumulation of dust, powder, salt, and metal debris	None	Clean the device and prevent future contamination
	Check for exposure to water, oil, or chemicals	None	Clean and shield if necessary
Hazardous Gases	Check for corrosive or flammable gases	None	Use sensors or odor detection to verify

➢ Mechanical Stress & EMI Check

Item	Check Content	Standard/ Range	Action/Measure
Mechanical Stress	Check vibration and shock levels	Within specified limits	Install padding or vibration isolation measures if necessary
Electromagnetic Environment	Check for noise sources near the device	No significant noise sources	Isolate or shield the device from noise sources

➢ Installation & Wiring Check

Item	Check Content	Standard/ Range	Action/Measure
Wiring	Check crimped connectors in external wiring	Adequate clearance between connectors	Visually inspect and adjust as needed
	Check for damage to external wiring	No damage	Visually inspect and replace damaged cables if necessary

TOSUN

Engineer Everything !

Software

Support CAN(FD)/LIN/FlexRay/SOME/IP and DoIP

UDS diagnostics/ECU flashing/CCP/XCP calibration

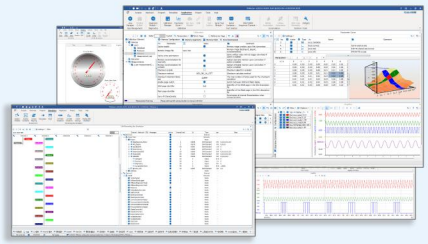
Embedded code generation/Application builder

Encrypted release/Logging and bus replay

Graphical programming/Residual bus simulation

C and Python scripting

Bus monitoring/Transmiting/Automated testing



TSMASTER

Hardware

1/2/4/8/12-channel CAN FD/CAN to USB/PCIe device

1/2/6-channel LIN to USB/PCIe device

Multi channel FlexRay/CAN FD to USB/PCIe device

Multi channel automotive Ethernet/CAN FD to USB/PCIe device

Automotive Ethernet media conversion device (T1 to Tx)

Multi-channel CAN FD/Ethernet/LIN datalogger



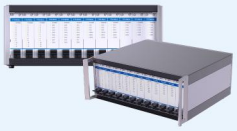
TTS test systems

-CAN FD/CAN/FlexRay/LIN communication boards

-Relay and fault injection boards

-Resistors for sensor simulation

-Digital I/O, Analog I/O boards available



CAN CAN FD LIN FlexRay OPEN ALLIANCE

Solutions

- Bus Conformance
- Network Automation Testing System
- Charging Testing System
- EMB Calibration Testing Equipment
- Information Security Solutions
- Steer-by-Wire Chassis Testing Solutions
- EOL Testing Equipment
- Motor Performance
- Durability Testing Solutions
- FCT







About TOSUN

The core product, TSMaster, is a comprehensive tool for automotive R&D, testing, production, and after-sales. It integrates essential functions with hardware support to streamline processes and ensure precision, making it ideal for automotive professionals.

International Organization

ASAM CiA

Quality Assurance

ISO9001:2015

CE Certification

CE



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