TOSUN同星

TOSUN-TC1052
User Manual

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Product Features & Interface Overview

CAN FD and T1S to USB Interface

Product Name	Channel
TC1052	CAN FD * 2 10BASE-T1S * 1

Typical Application

- Vehicle-level CAN (FD)/T1S network data acquisition and analysis
- Simulation, testing, and diagnostics of intelligence domain controllers (e.g., cockpit, ADAS)
- Building high-reliability automated test systems and endurance test benches
- Vehicle diagnostics, ECU calibration, and flash programming

Product Highlights

- High Precision

Hardware-level timestamp accuracy in the microsecond range, providing precise timing references for advance simulation and diagnostics.

- Plug-and-Play Compatibility

USB driver-free design. Fully plug-and-play under Windows and Linux with excellent system compatibility.

- Safe and Reliable

2500 VDC galvanic isolation per CAN channel. Automotive-grade design ensures stability under harsh conditions.

- Flexible Configuration

Software-configurable 120Ω CAN termination for easy adaptation to different network topologies. For 10BASE-T1S, a built-in software-configurable 100Ω termination resistor is provided, along with configurable node IDs, node count, and timeout parameters—allowing rapid and flexible T1S network deployment.

- Ecosystem Integration

Fully supports mainstream database formats such as DBC and seamlessly interoperates with all licensed features of TSMaster.

The device captures raw Ethernet frames at the hardware level, enabling protocol simulation, analysis, and testing within TSMaster for upper-layer Ethernet stacks.

- Professional Toolset

Supports BLF data logging and playback, UDS diagnostics, CCP/XCP calibration, and Flash Bootloader operations.

- Open and Extensible

Provides cross-platform APIs for secondary development, enabling deeply customized applications.

Contents

1. Introduction

The TC1052 is a communication interface that integrates one 10BASE-T1S channel and two CAN FD channels into a single USB device.

It enables users to transmit raw frame data from 10BASE-T1S or CAN FD networks to a PC via USB, and likewise send raw frames from the PC back to these networks.

When used together with TSMaster, the TC1052 supports monitoring, simulation, analysis, and testing of Ethernet data, and enables protocol-level features such as DoIP and SOME/IP.

In addition to its core 10BASE-T1S capabilities, the TC1052 provides two CAN FD channels with data bit rates up to 8 Mbps. It supports loading DBC and ARXML database files, allowing users to monitor, analyze, and simulate CAN FD traffic. UDS diagnostics, ECU flashing, and CCP/XCP calibration workflows are also fully supported.

The TC1052 connects to the PC via USB and requires no external power supply, offering a convenient and user-friendly operating experience.

Included resources:

- CAN FD, T1S 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	USB 2.0
Timestamp Precision	Microsecond-level high-precision timestamps
Driver	Cross-platform, driver-free design
Connector	Standard D-Sub, 9-pin

License	Supports all TSMaster paid licenses
Power Supply	USB-powered
Power Consumption	2 W
ESD Protection	±8 kV contact discharge, ±15 kV air charge
Enclosure Material	Metal
Dimensions	Approx. 113 * 98* 38 mm
Weight	Approx. 236.7 g
Operating Temperature	-40℃ to +80℃
Operating Humidity	10% ~ 90% RH (no 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	Transmit: 15,000 frames/s; Receive: 20,000 frames/s (single channel, 1Mbps, remote frame, 0 data bytes)
Termination Resistor	120 Ω per CAN channel
Relay Type	Magnetic latching relay
Surge Protection	Built-in surge protection components

➢ T1S

Parameter	Description
Data Rate	Supports up to 10 Mbps
Termination Resistor	10BASE-T1S channel integrates a 100 Ω termination resistor, software-configurable
Relay Type	Magnetic latching relay
Collision Control	Collision management implemented via PLCA
Communication Mode	Half-duplex, multi-drop communication
Ethernet Technology	Single-pair Ethernet (SPE)

1.2. Electrical Specifications

➢ Power Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Operating Voltage	USB power supply	4.8	5.0	5.2	V
Power Consumption	USB power supply	--	2	--	W

➢ CAN Interface Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Termination Resistance	Enabled	--	120	--	Ω
	Disabled	--	∞	--	--
Isolation Voltage	Insulation resistance test	2500	--	--	VDC

➢ 10BASE-T1S Interface Characteristics

Parameter	Condition	Min	Typ.	Max	Unit

Termination Resistance	Enabled	--	100	--	Ω
	Disabled	--	∞	--	--

➢ EMC Performance

Test Item	Standard	Condition	Level	Unit
ESD	IEC 61000-4-2	Contact discharge	±8	kV
		Air discharge	±15	kV
EFT	IEC 61000-4-4	Electrical fast transient (burst)	±2	kV
SURGE	IEC 61000-4-5	Surge	±2	kV

➢ Mechanical Dimensions

Unit: mm

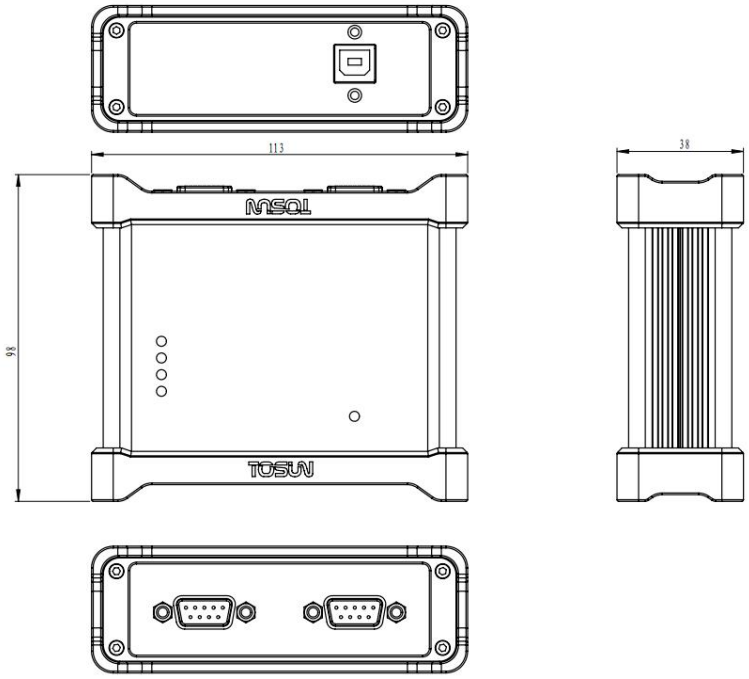


Figure 1-1 Mechanical Dimensions

1.3. Pin Definition

➢ CAN Interface

Figure 1-2 Hardware Interface

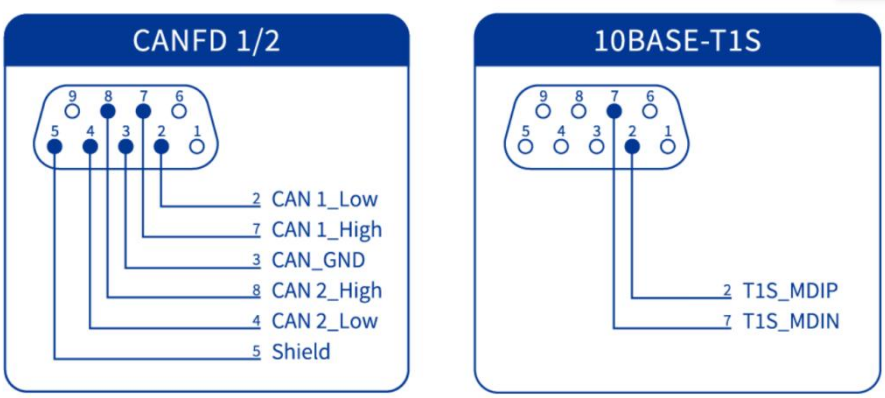


Figure 1-3 Pin Layout

1.4. LED Indicators

Figure 1-4 Front Panel Layout

➢ LED Definitions

Indicator	Description
CAN FD 1 ~ 2	Status of CAN FD channel 1 ~ 2
10BASE-T1S	Status of 10BASE-T1S
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
10BASE-T1S	Green	Normal Ethernet frame communication
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 USB port (USB 2.0 or higher), or a powered USB hub

➢ Driver Installation

- The TC1052 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
TC1052 Main Device	**1**		**Standard/Customized**
USB Cable	**1**		**Standard**
DB9 Female-Dual Male Signal Cable (CAN)	**1**		**Standard**

2. Application Example in Windows

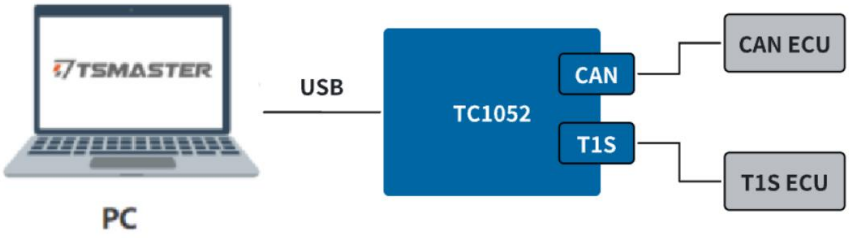


Figure 2-1 Example in Windows

For TSMaster installation instructions, please refer to the appendix.

2.1. Hardware Connection

2.1.1. CAN

Use the included DB9 Female–Dual Male Signal Cable (CAN) to access two independent channels via two D-Sub 9-pin connectors.

The following diagram shows the pin mapping of the “DB9 Female–Dual Male Signal Cable (CAN)” harness:

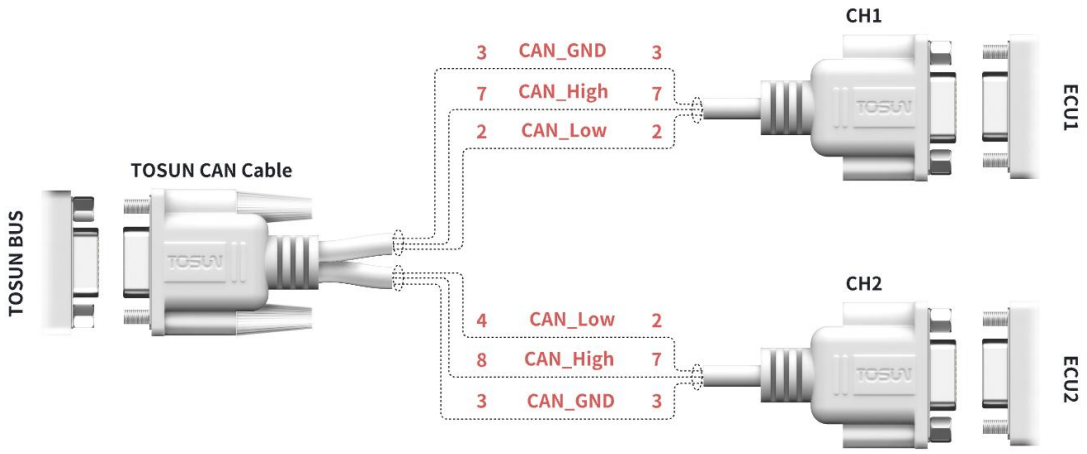


Figure 2-2 DB9 Female-Dual Male Signal Cable (CAN)

The TC1052 includes built-in termination resistors, which can be enabled or disabled in the software as required.

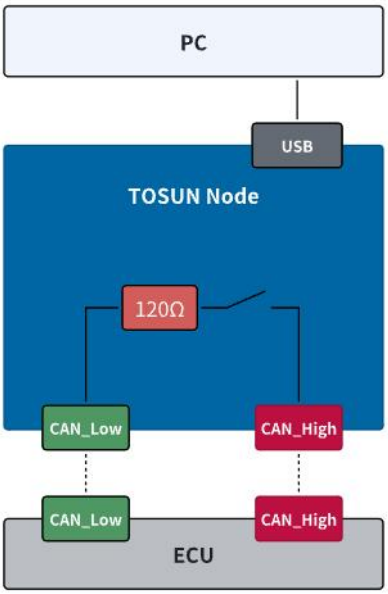


Figure 2-3 Using CAN

Pay attention to the termination-resistor enable settings. The TC1052 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.

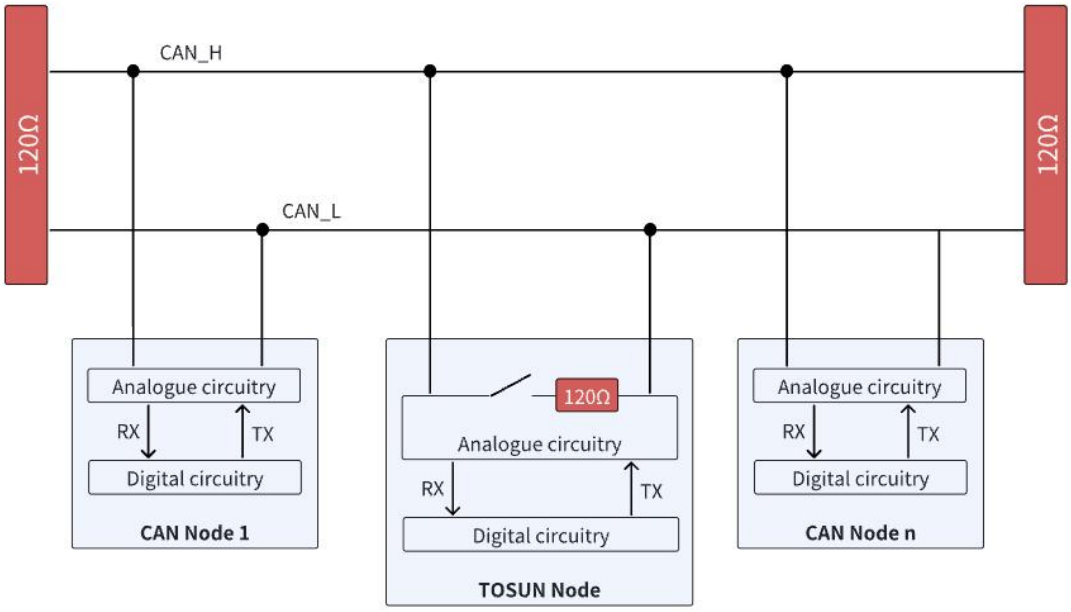


Figure 2-4 Connecting to the CAN Bus

2.1.2. 10BASE-T1S

The TC1052 includes built-in termination resistors, which can be enabled or disabled in the software as required.

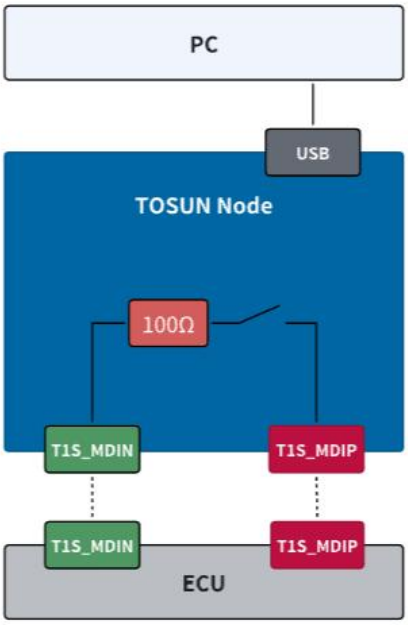


Figure 2-5 Using 10BASE-T1S

The TC1052 can be integrated into a 10BASE-T1S bus as any network node, supporting a total bus length of at least 25 meters and a maximum stub length of 10 cm for each node.

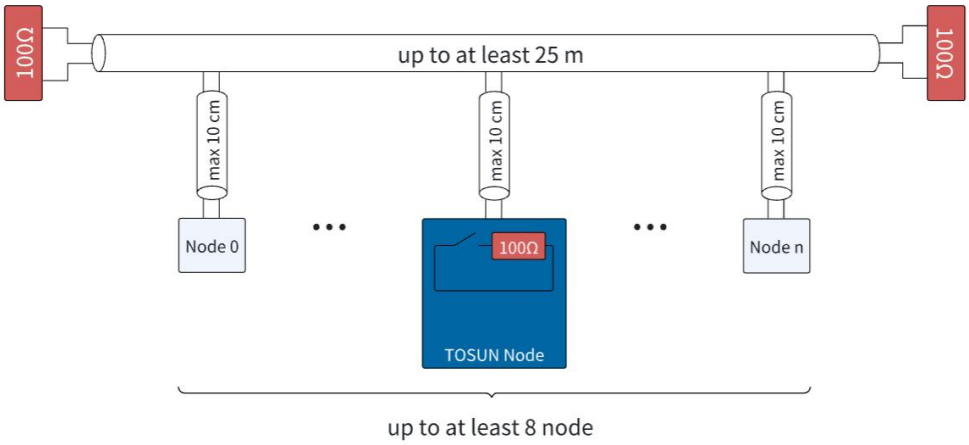


Figure 2-6 T1S

Please note the termination resistor settings. The TC1052 is equipped with a built-in termination resistor, which can be enabled or disabled through software or the API.

2.2. Usage Example

2.2.1. 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.

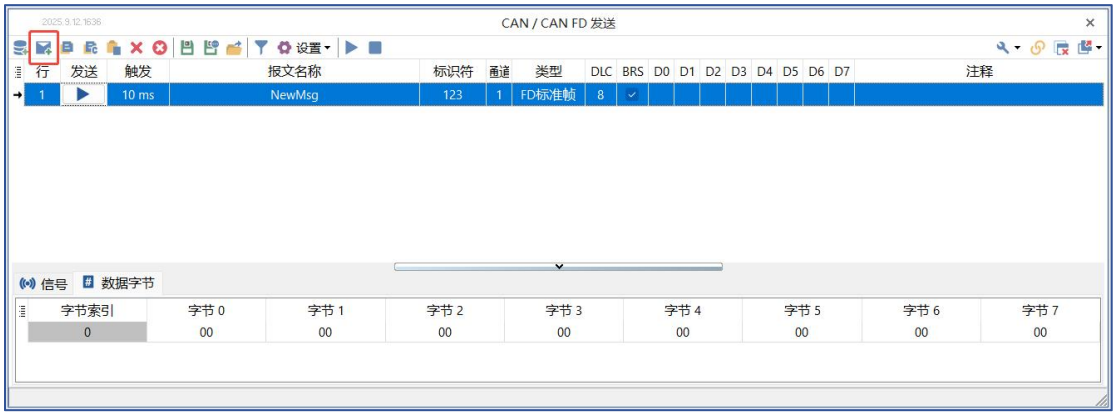


Figure 2-7 Adding CAN Message

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

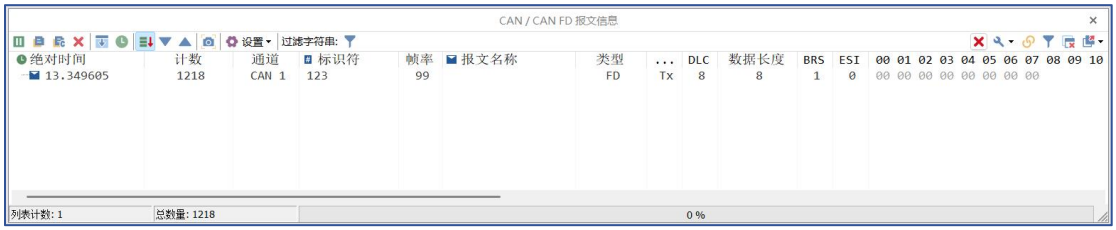


Figure 2-8 CAN Message Information

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

Figure 2-9 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.

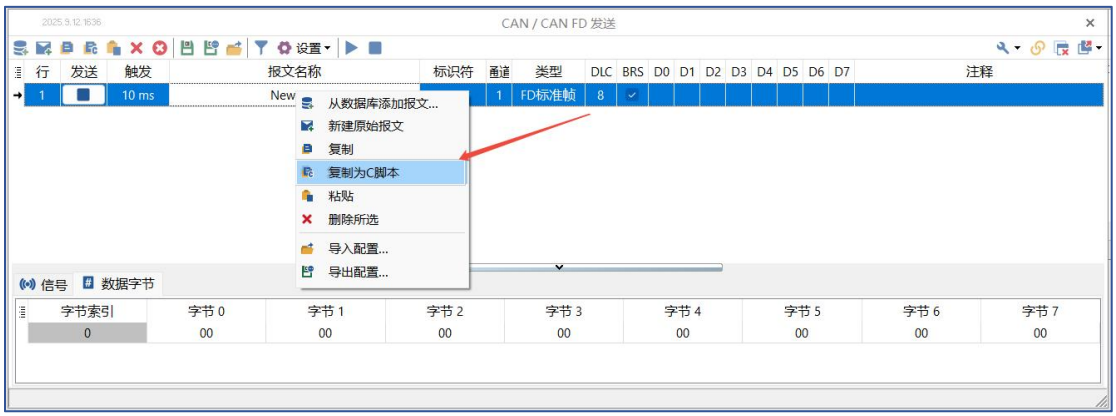


Figure 2-10 Quick Access to C Code

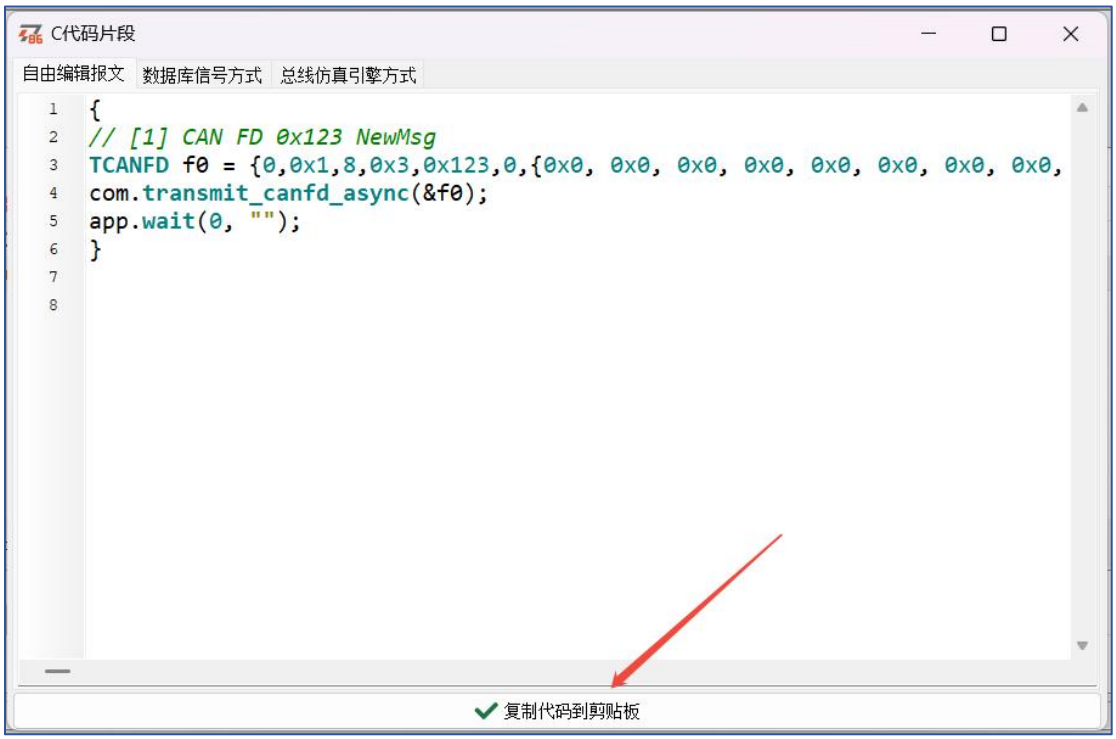


Figure 2-11 Copying the C Code

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

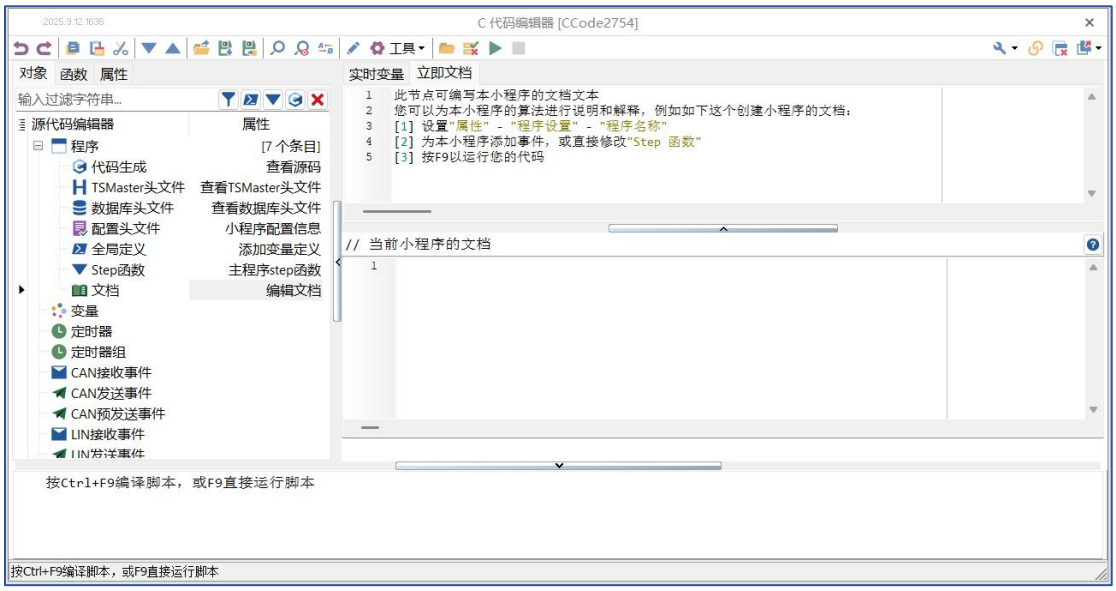


Figure 2-12 Adding a C Mini-Program Editor

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.

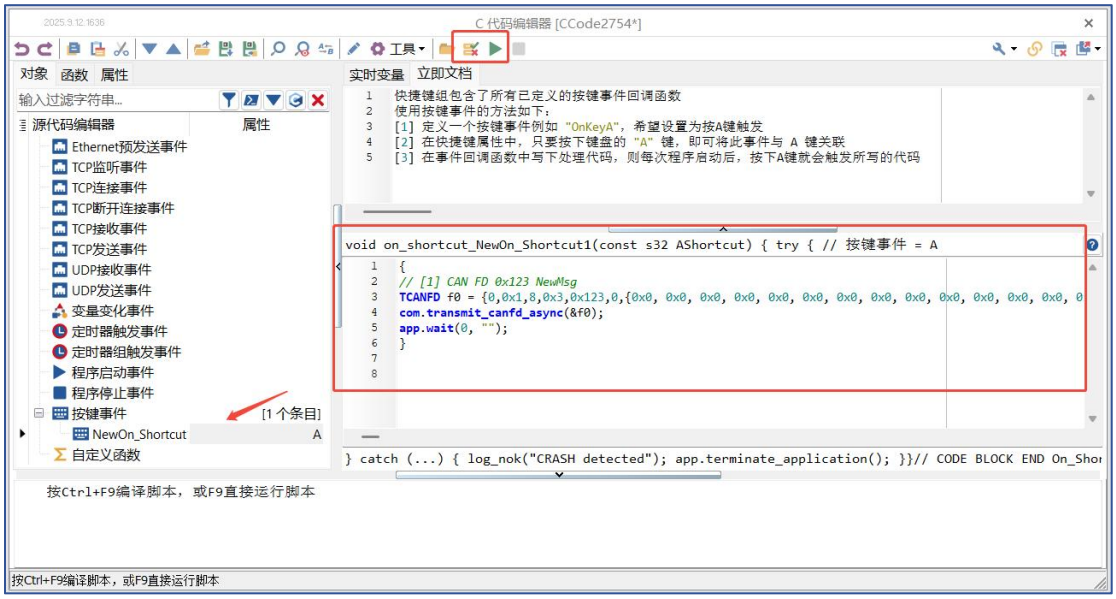


Figure 2-13 Building a C Mini-Program (CAN)

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

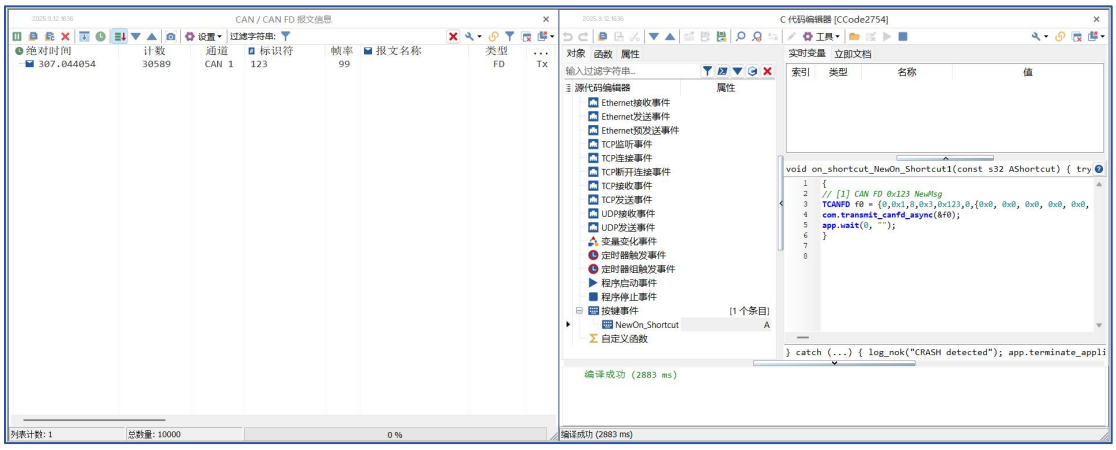


Figure 2-14 Sending CAN Messages via C Mini-Program

2.2.2. Sending a T1S Frame

The device currently does not support use under TSMaster. Support will be included in a future update.

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.

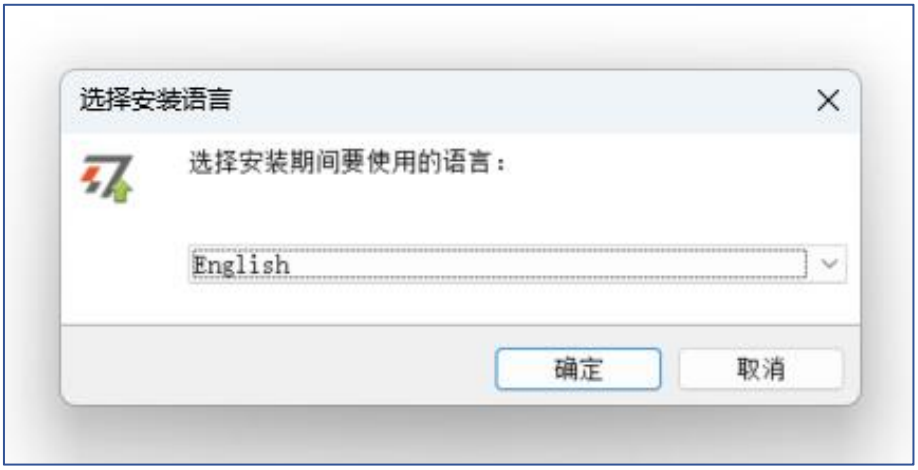


Figure 3-2 TSMaster Installation

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

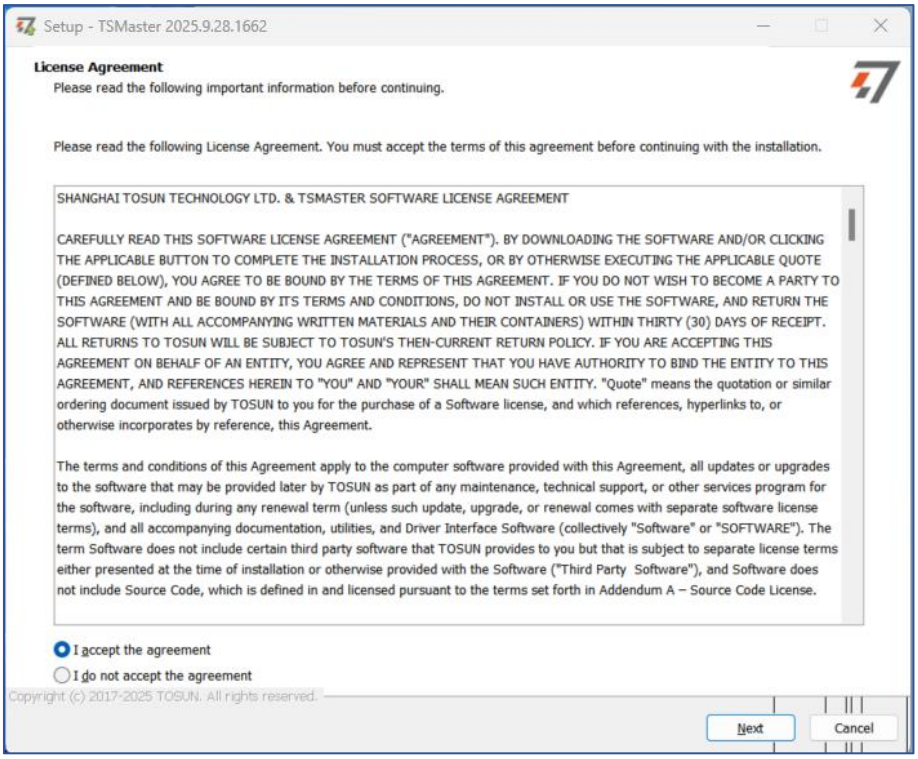


Figure 3-3 TSMaster Installation

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

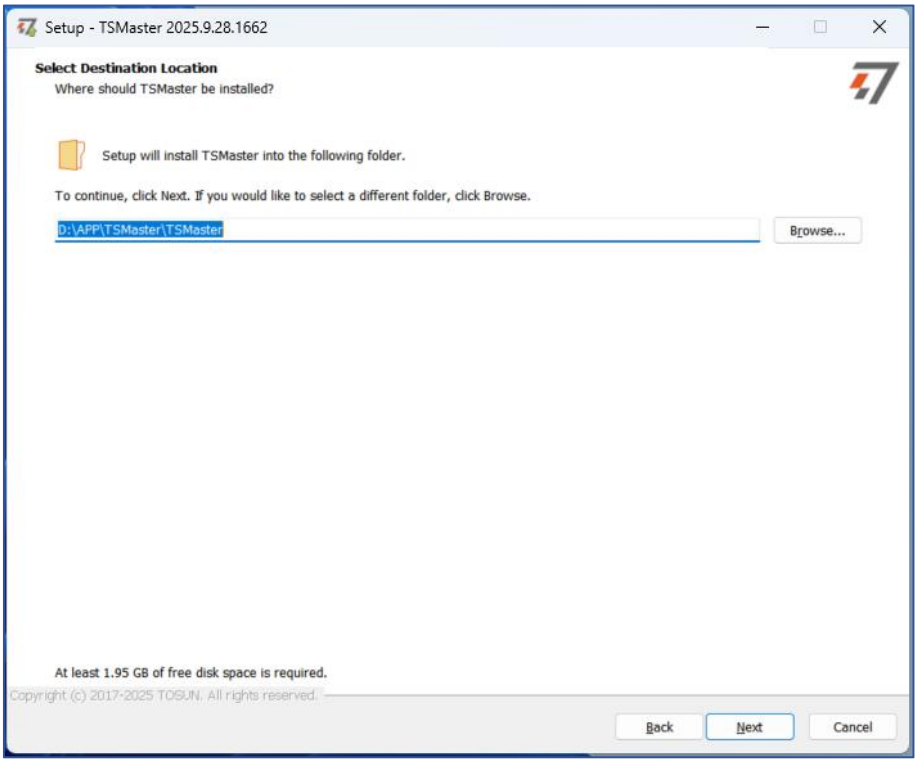


Figure 3-4 TSMaster Installation

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

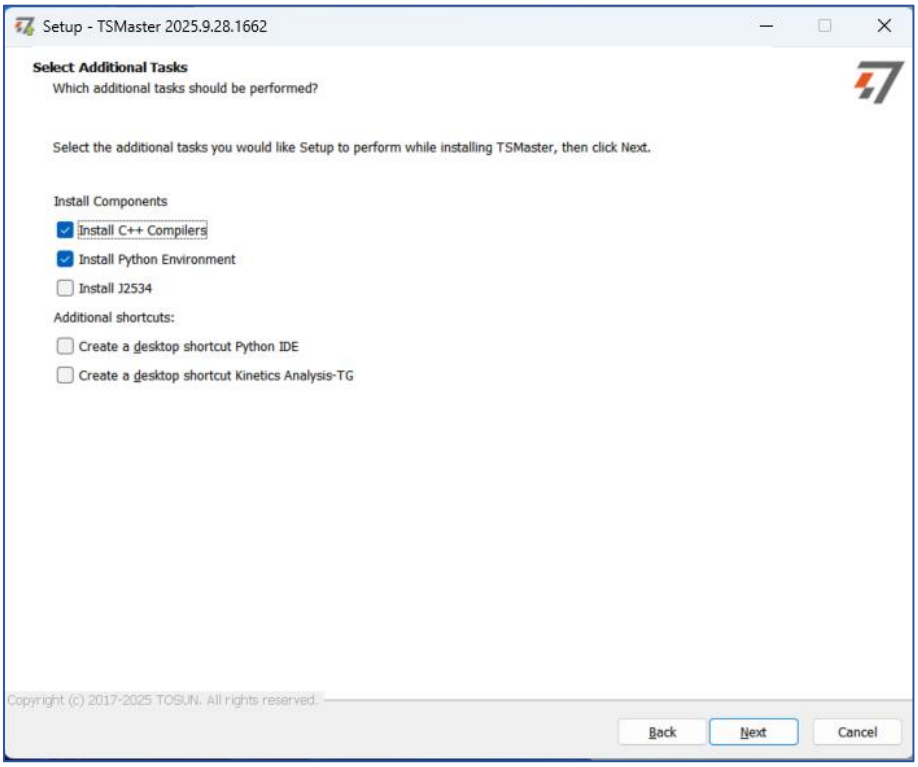


Figure 3-5 TSMaster Installation

5. Click “Install” and wait for completion.

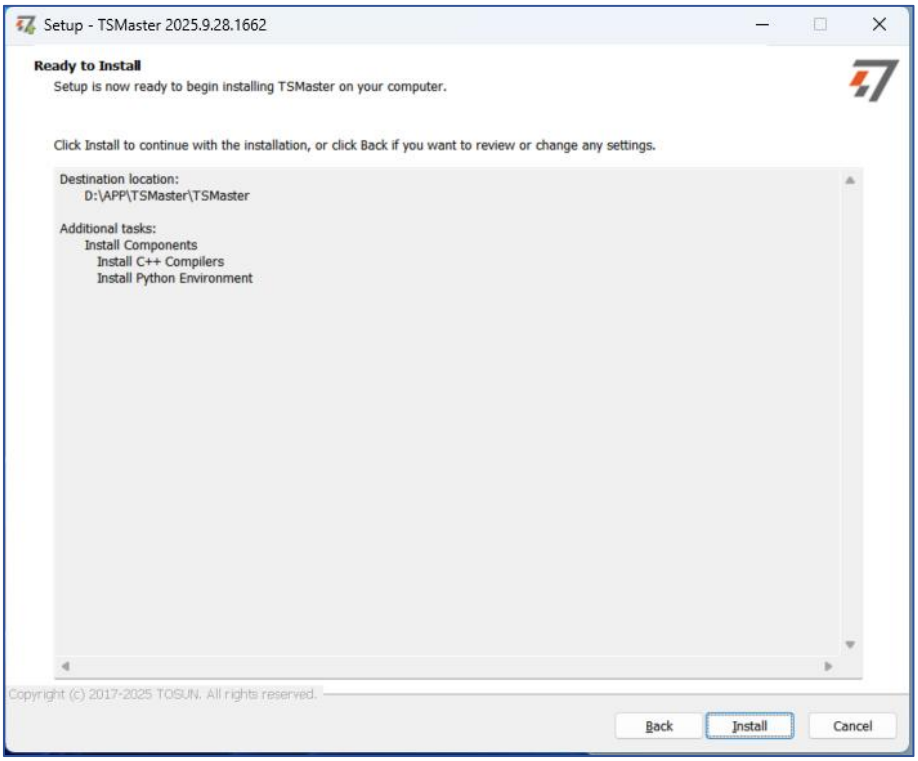


Figure 3-6 TSMaster Installation

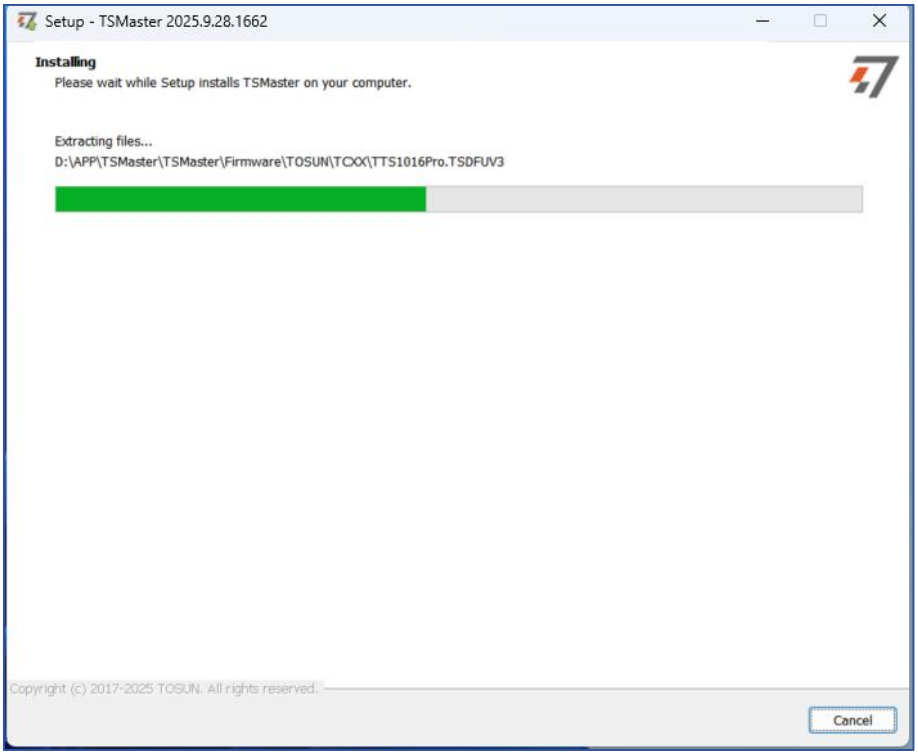


Figure 3-7 TSMaster Installation

6. Click “Finish” to complete installation.

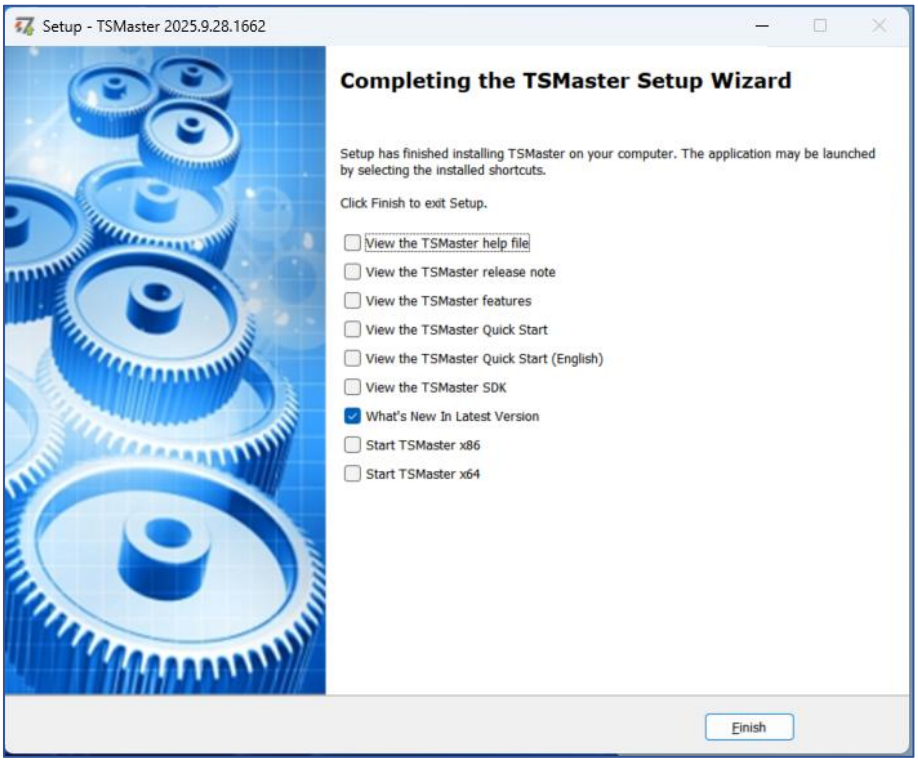


Figure 3-8 TSMaster Installation

4. Inspection and Maintenance

The TC1052 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	USB port:+5V 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

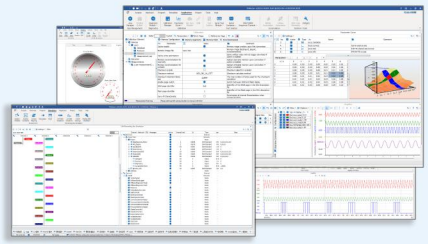
Embedded code generation/Application builder

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

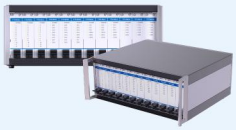
TTS test systems

-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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