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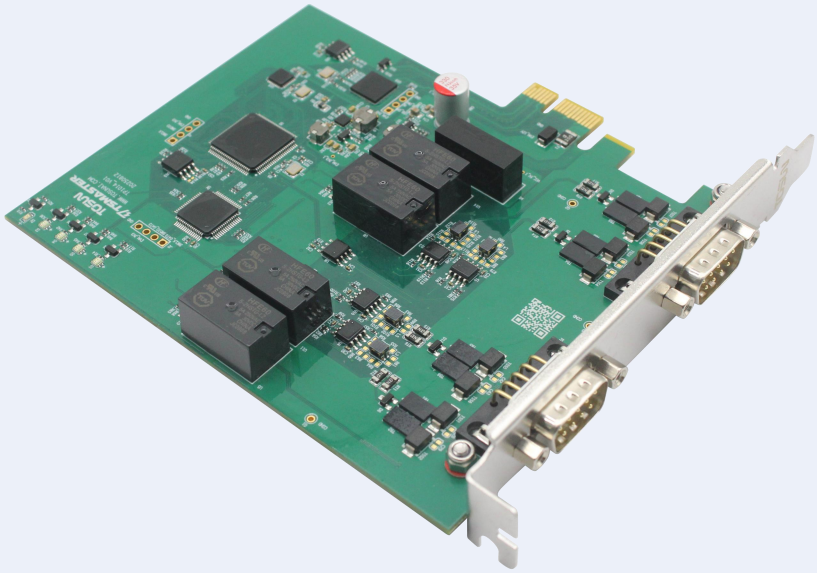


TOSUN-TP1014

User Manual

tosunai.com

Product Features & Interface Overview

CAN FD to PCIe Interface

Product Name	Channel
TP1014	CAN FD * 4

Typical Application

- Vehicle-level CAN (FD) 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

PCIe interface with driverless design for Windows and Linux, delivering 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.

- Ecosystem Integration

Fully compatible with mainstream formats such as DBC and A2L. Seamless integration with all TSMaster licensed features.

- 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.

Contents

1. Introduction

The TP1014 is a multi-channel CAN FD interface device.

It supports CAN FD bus speeds up to 8Mbps. The device connects to the PC via a PCIe interface, and features a driver-free design for both Windows and Linux, ensuring excellent system compatibility.

Used with the powerful TSMaster software, it supports loading DBC and ARXML database files for convenient monitoring, analysis, and simulating of CAN FD bus data. It also supports UDS diagnostics, ECU flashing, and CCP/XCP calibration functions.

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	PCIe interface
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	Powered via PCIe
Power Consumption	TBA
Enclosure Material	Metal

Dimensions	Approx. 109.5 * 120* 21.5 mm
Weight	Approx. 114.5 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	TBA
CAN FD Frame Data Length	Up to 64 bytes; supports BRS frames
Max Frame Rate	Transmit: 18,000 frames/s; Receive: 18,000 frames/s (single channel, 1Mbps, remote frame, 0 data bytes)
Termination Resistor	120 Ω per CAN channel
Relay Type	Magnetic latching relay

1.2. Electrical Specifications

➢ Power Characteristics

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

➢ CAN Interface Characteristics

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

➢ Mechanical Dimensions

Unit: mm

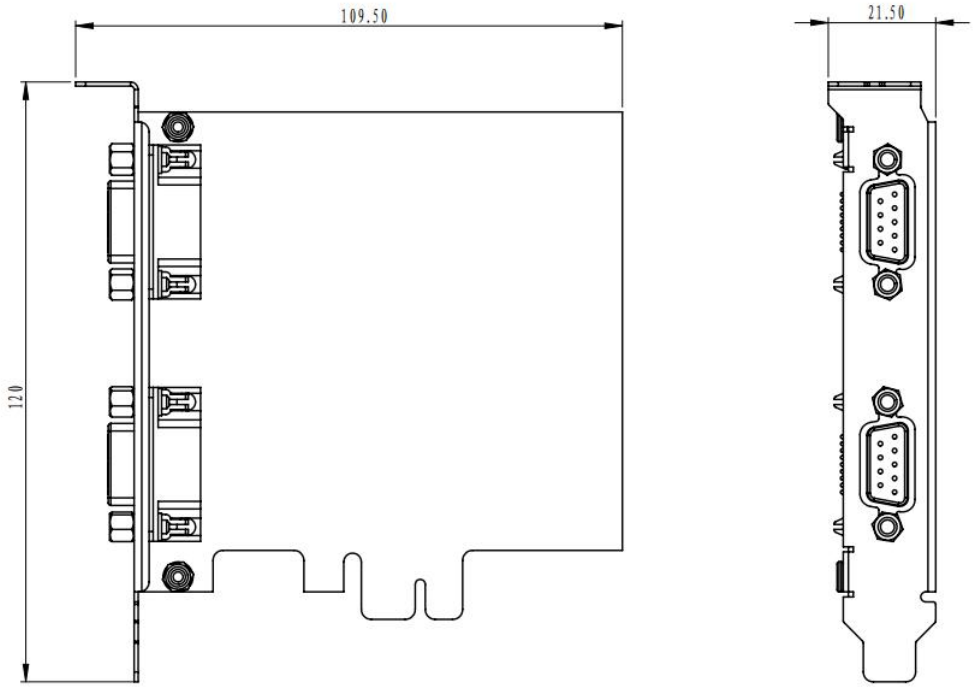


Figure 1-1 Mechanical Dimensions

1.3. Pin Definition

➢ CAN Interface

Figure 1-2 Hardware Interface (CAN FD)

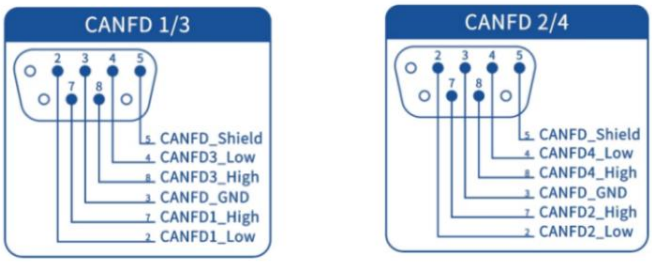


Figure 1-3 Pin Assignment (CAN FD)

1.4. LED Indicators

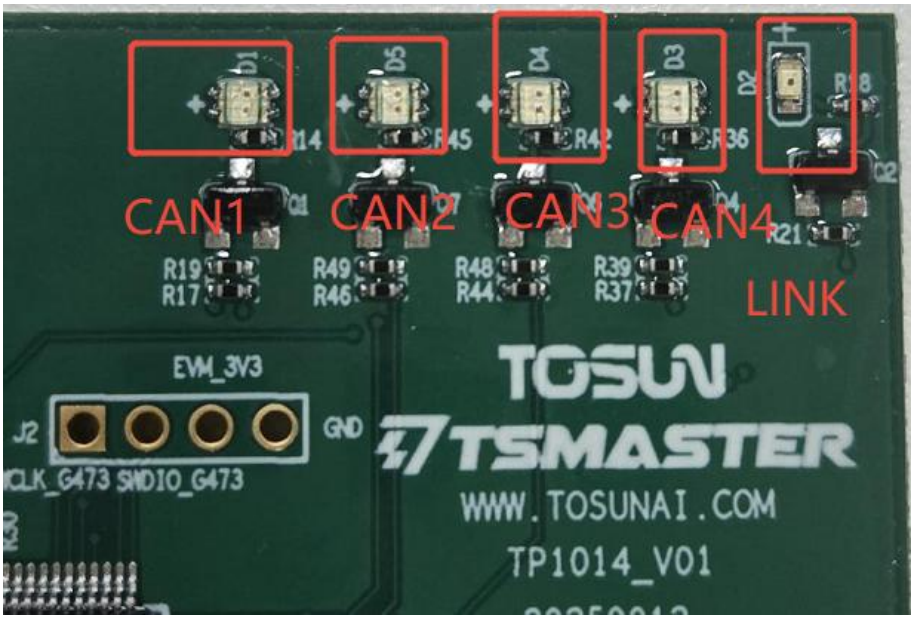


Figure 1-4 Front Panel Layout

- **LED Definitions**

Indicator	Description

CAN FD 1 ~ 4	Status of CAN FD channel 1 ~ 4
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 PCIe slot

➢ Driver Installation

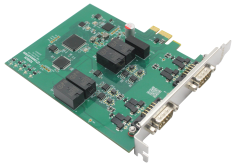
- The TP1014 features a driver-free design, ensuring outstanding system compatibility. It can be used directly on Windows (7/8/10/11) or Linux without manual driver installation.

➢ 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
TP1014 Main Device	**1**		**Standard**
DB9 Female-Dual Male Signal Cable (CAN)	**2**		**Standard**

2. Application Example in Windows

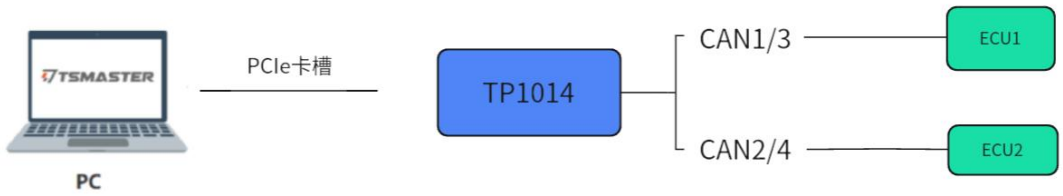


Figure 2-1 Example in Windows

For TSMaster installation instructions, please refer to the appendix.

2.1. Software Connection

1. Connect the device to the PC via the PCIe slot.

2. In TSMaster, go to “Hardware” → “Channel Selection” to open the Channel Selector. Choose the desired CAN channels.

Figure 2-2 Channel Selection

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

CAN configuration window:

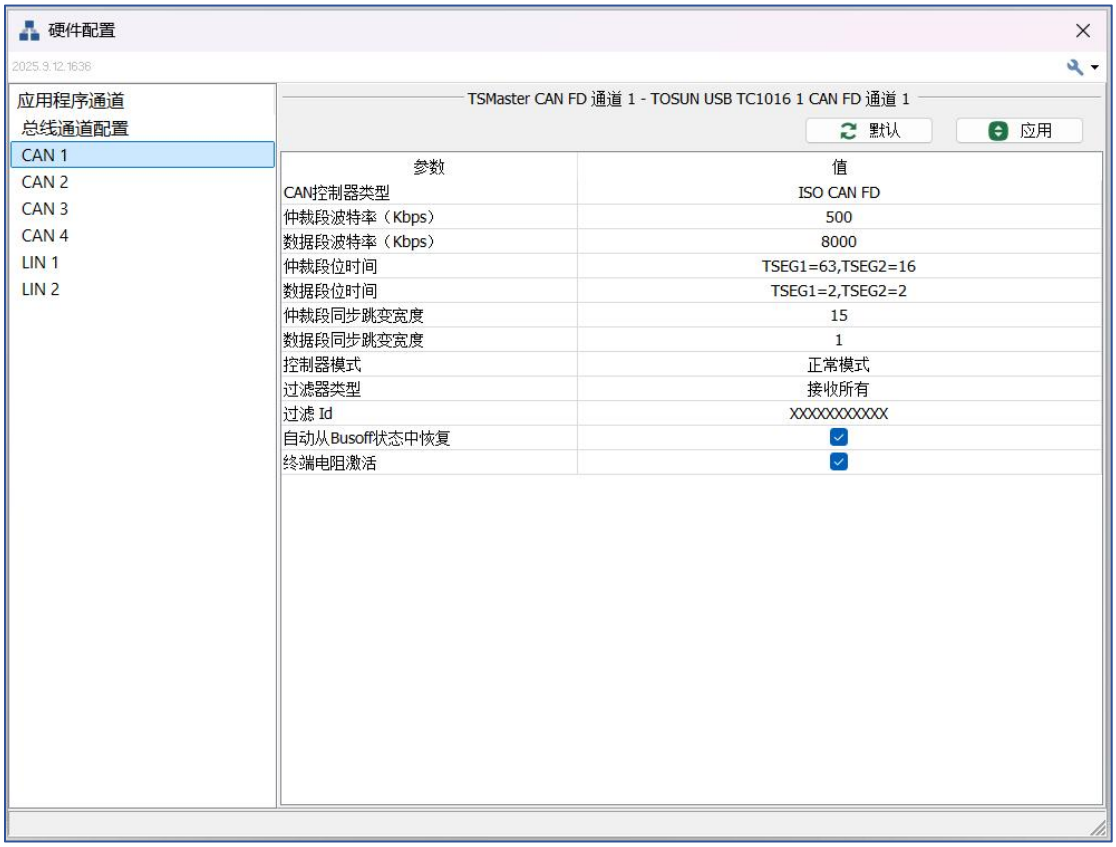


Figure 2-3 Channel Configuration (CAN)

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

2.2. Hardware Connection

2.2.1. 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:

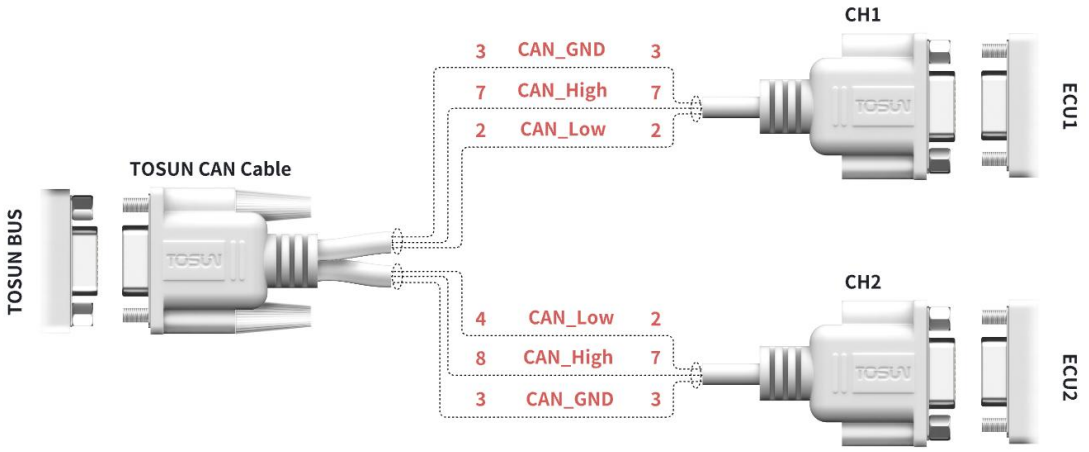


Figure 2-4 DB9 Female-Dual Male Signal Cable (CAN)

The TP1014 includes built-in termination resistors, which can be enabled or disabled in the software as required.

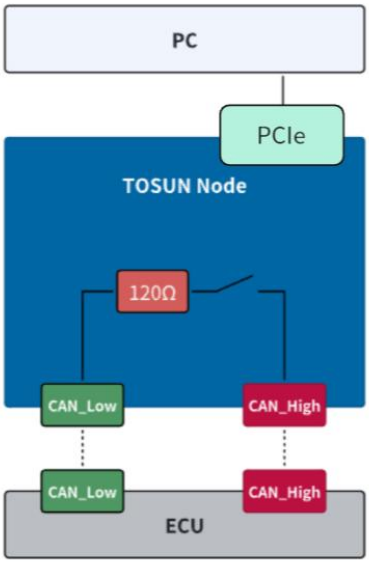


Figure 2-5 Using CAN

Pay attention to the termination-resistor enable settings. The TP1014 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.

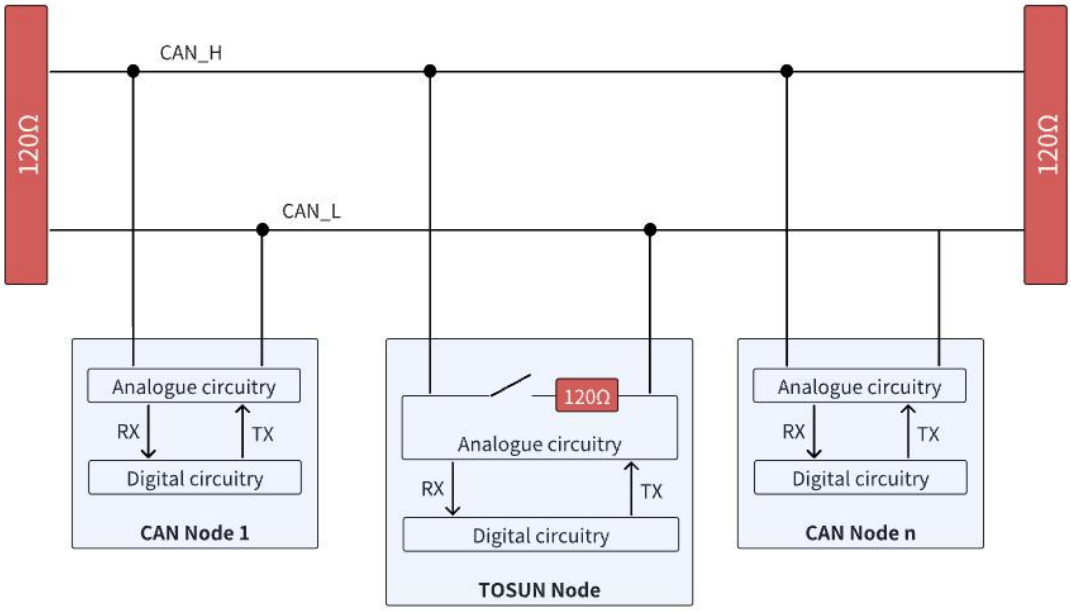


Figure 2-6 Connecting to the CAN Bus

2.3. 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 2-7 Adding CAN Message

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

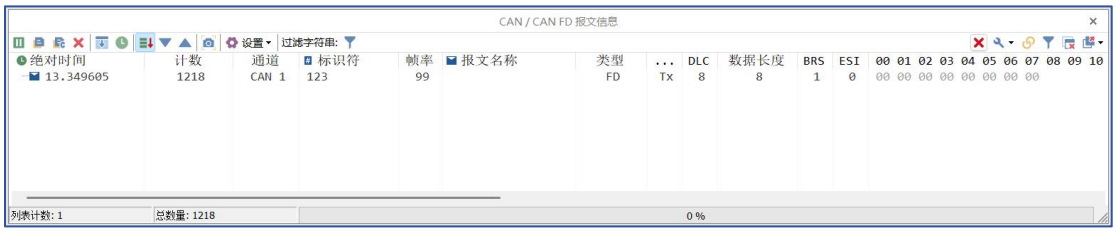


Figure 2-8 CAN Message Information

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

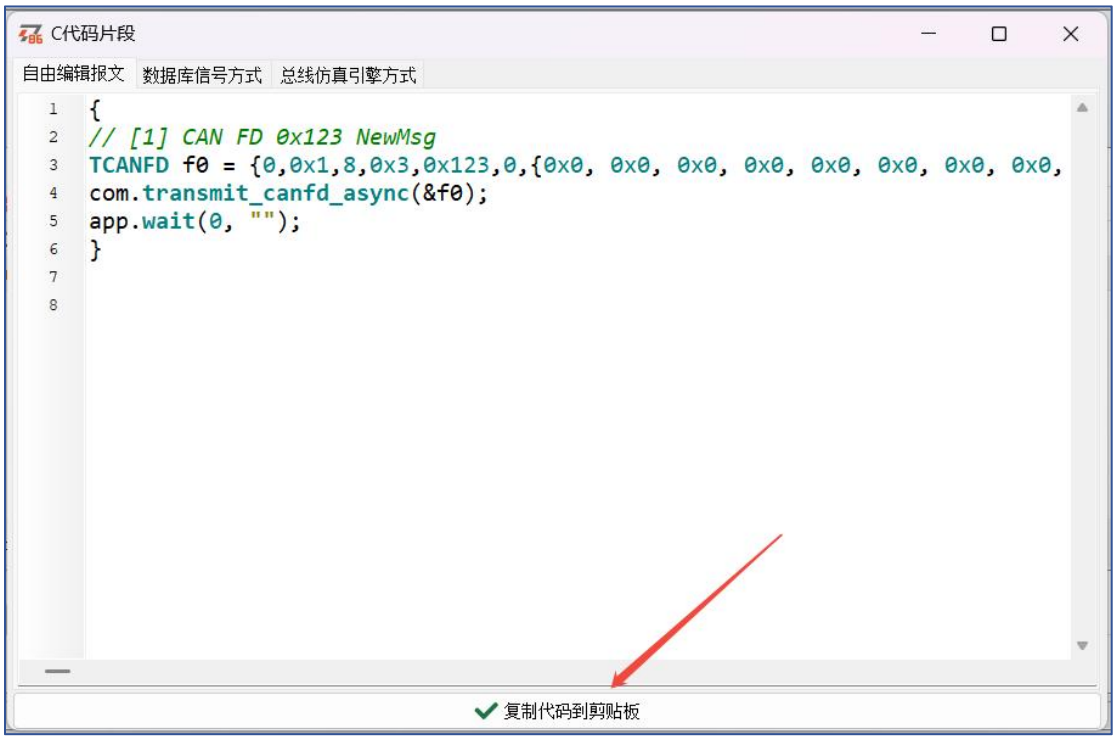


Figure 2-11 Copying the C Code

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

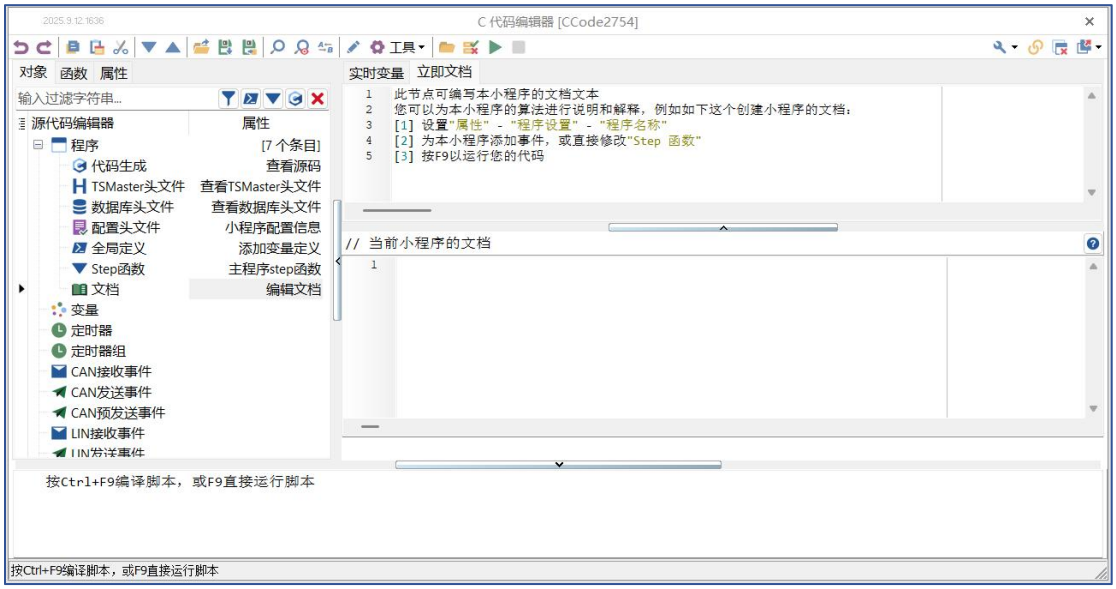


Figure 2-12 Adding a C Mini-Program Editor

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.

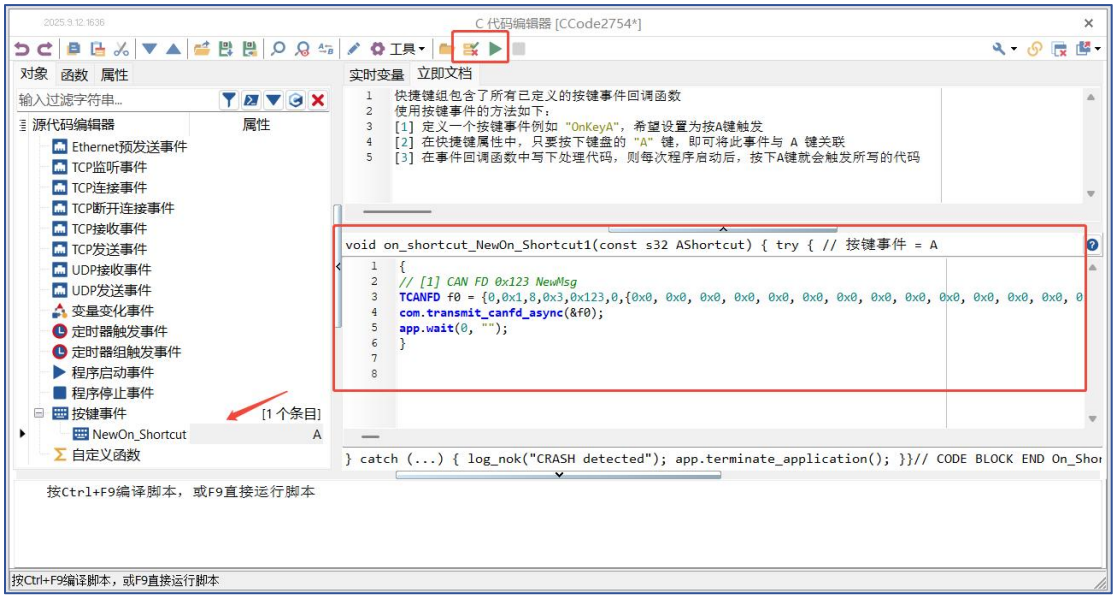


Figure 2-13 Building a C Mini-Program (CAN)

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

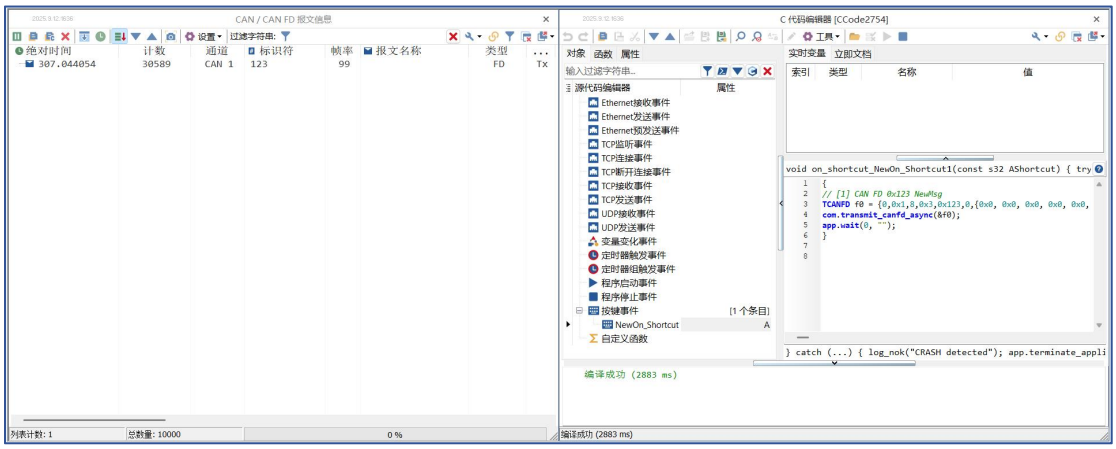


Figure 2-14 Sending CAN Messages via C Mini-Program

Note that at low baud rates, the delay time may affect message communication. Increase the delay time as needed based on actual conditions.

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.

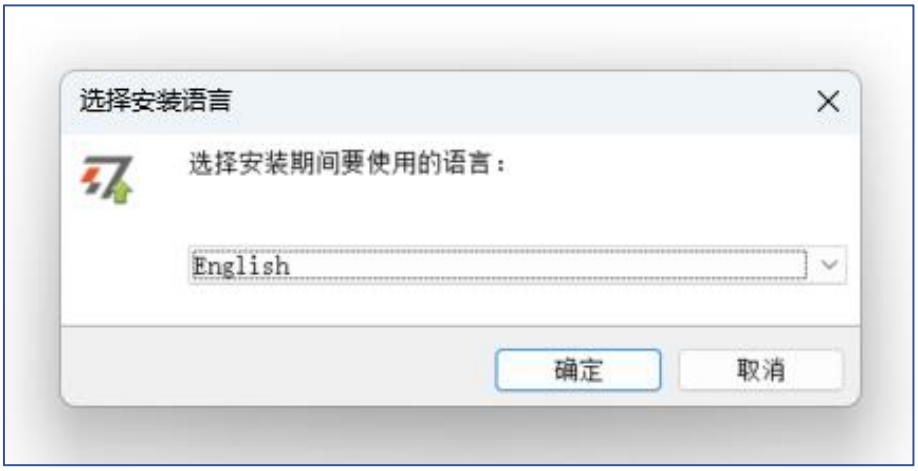


Figure 3-2 TSMaster Installation

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

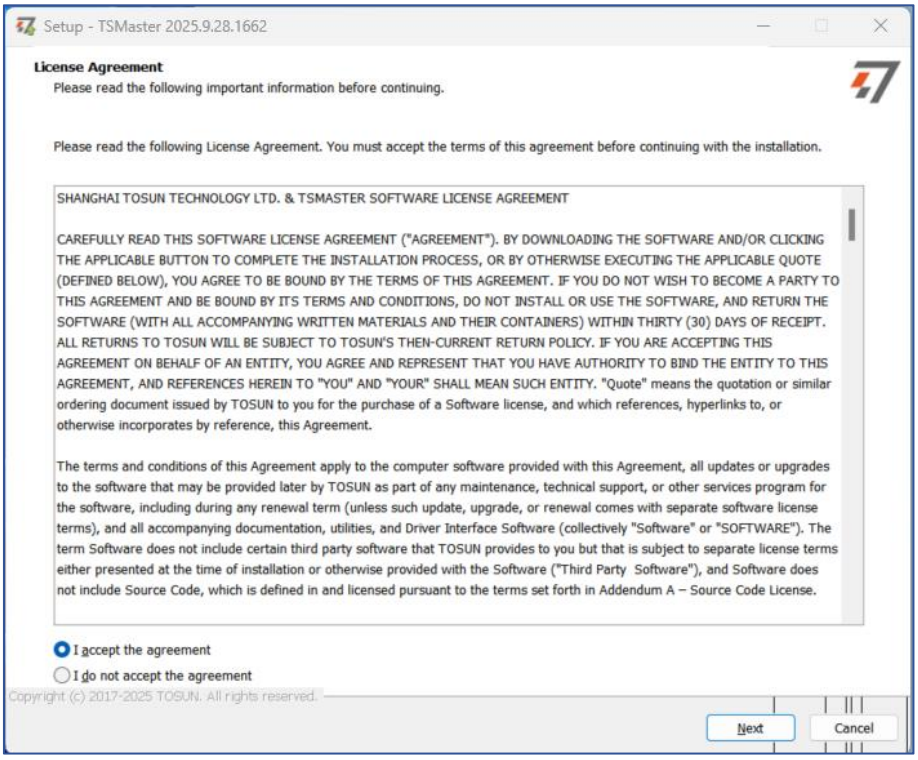


Figure 3-3 TSMaster Installation

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

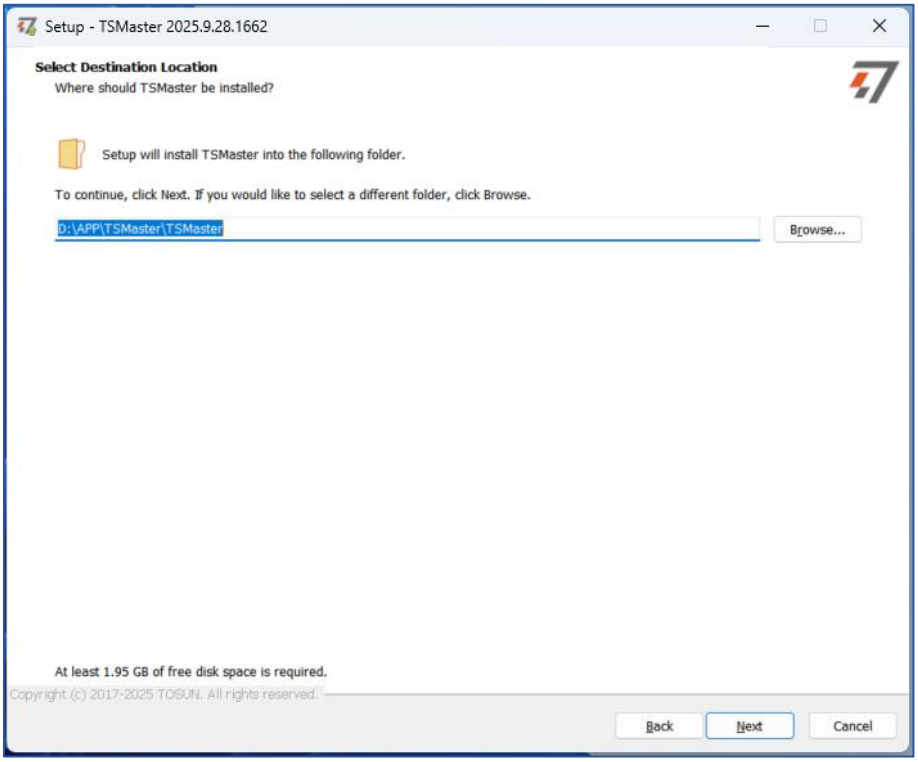


Figure 3-4 TSMaster Installation

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

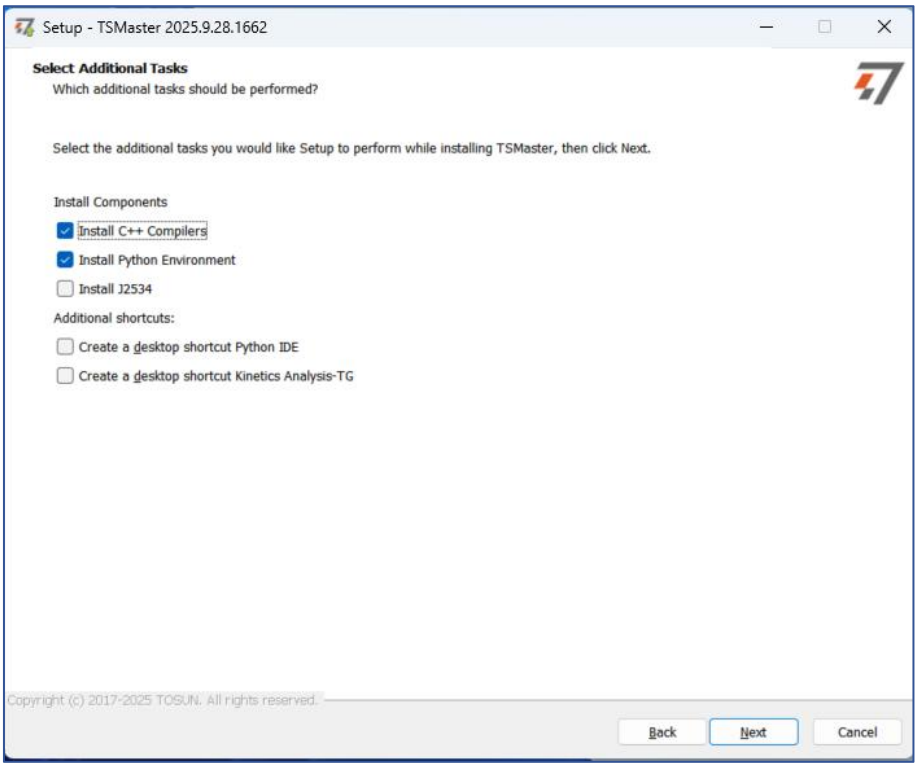


Figure 3-5 TSMaster Installation

5. Click “Install” and wait for completion.

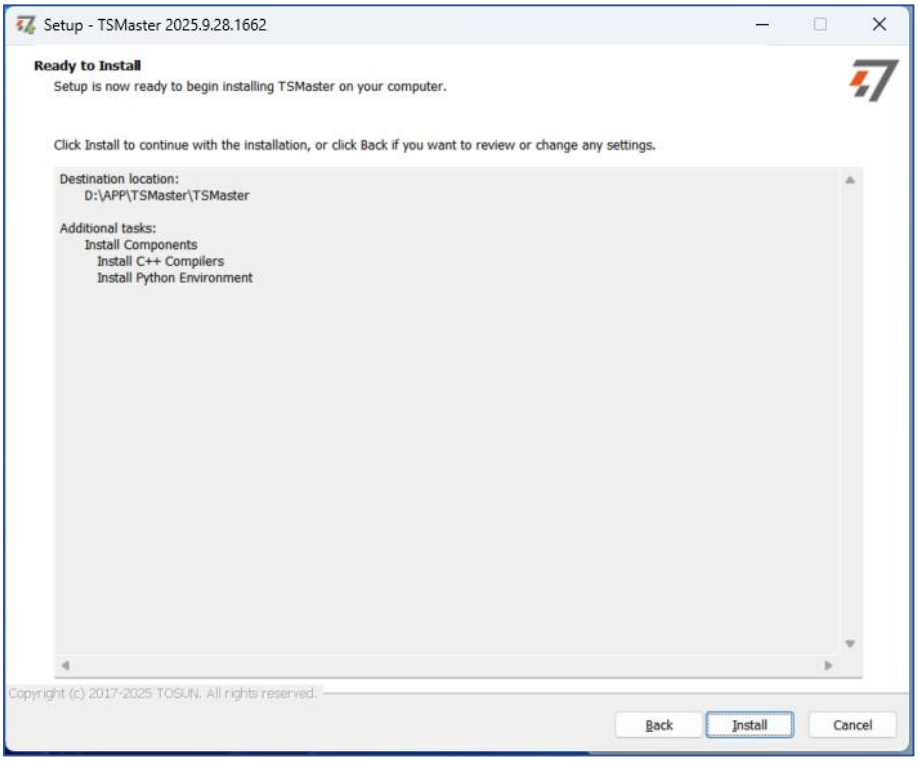


Figure 3-6 TSMaster Installation

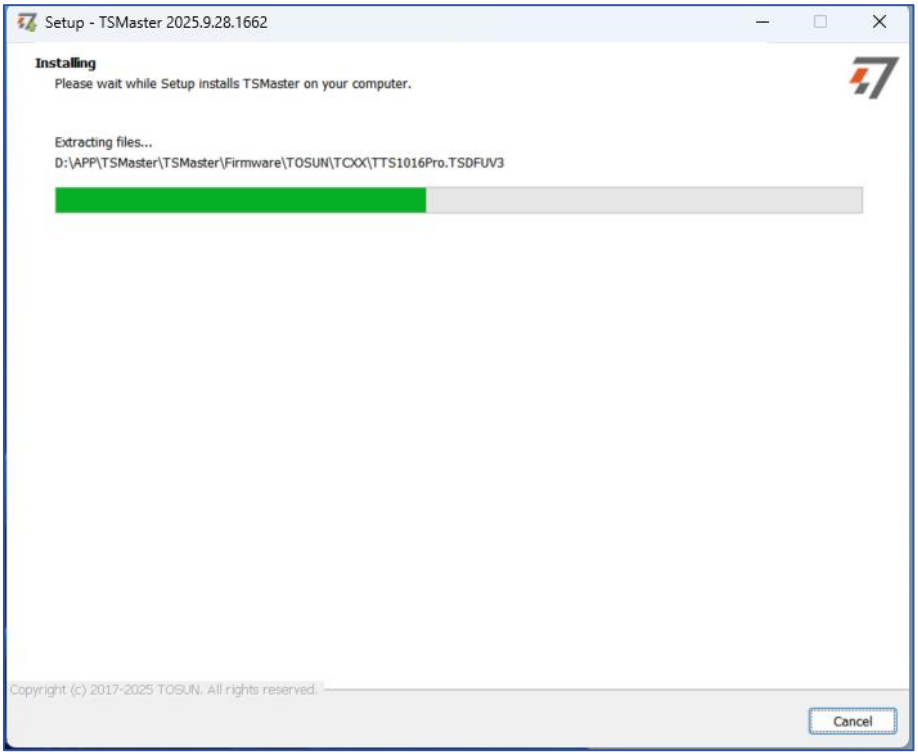


Figure 3-7 TSMaster Installation

6. Click “Finish” to complete installation.

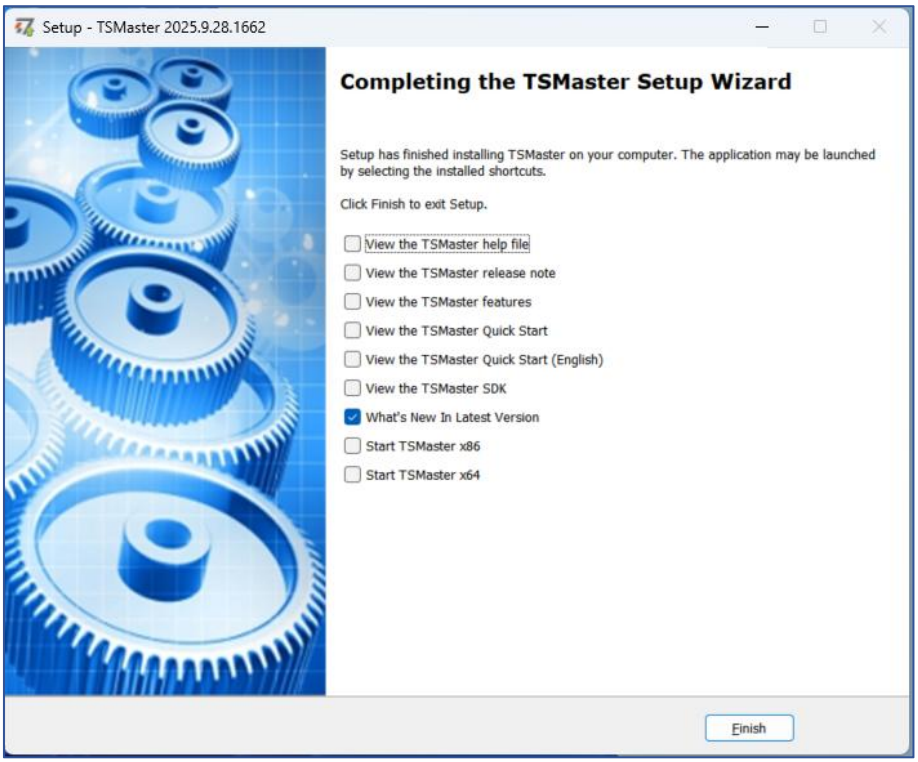


Figure 3-8 TSMaster Installation

4. Inspection and Maintenance

The TP1014 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 Power 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

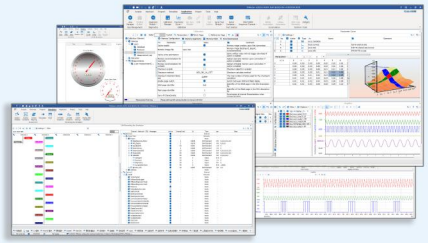
Embedded code generation/Application builder

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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