



TOSUN-TL1011

User Manual

Product Features & Interface Overview

1-Channel LIN to USB Interface

Product Name	Channel
TL1011	FastLIN × 1

Copyright Information

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Typical Application

- ECU data acquisition
- Various test benches
- ECU flashing

Product Highlights

- Microsecond-level hardware timestamping for high-precision message logging
- USB 2.0 interface with driver-free operation on both Windows and Linux, ensuring excellent system compatibility
- Unique free-send mode, significantly reducing the difficulty of LIN bus development and debugging
- Automotive-grade design, supporting DBC, LDF, XML and other database formats
- Supports UDS diagnostics over LIN
- Supports UDS-based Flash Bootloader programming
- Provides Windows and Linux APIs for secondary development
- LIN master/slave modes configurable via software
- Supports BLF and ASC formats for data logging and offline/online playback
- Built-in script editor, supporting virtual simulation and hardware-in-the-loop (HIL) simulation

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1. Introduction

The TL1011 is a portable USB-to-fastLIN bus interface device with one fastLIN channel. It supports a maximum LIN bus baud rate of 100 kbps (FastLIN). The device connects to a PC via a USB 2.0 interface and supports external DC power supply. With a driver-free design for both Windows and Linux systems, it offers excellent system compatibility.

When used together with the powerful TSMaster software, the device supports loading DBC and LDF database files, enabling convenient monitoring, analysis, and simulation of LIN bus traffic. It also supports UDS diagnostics, ECU flashing.

Cross-platform secondary development APIs are provided for both Windows and Linux, supporting a wide range of development environments including C++, C#, LabVIEW, Python, and more, making it easy to integrate into various automated test systems with high efficiency.

1.1. Technical Specifications

Parameter	Description
Channel	FastLIN × 1
PC Interface	USB 2.0
LIN Interface	DB9
Driver	Windows, Linux system free drive design, with excellent system compatibility
LIN	Supports LIN 1.3 and 2.x, with a maximum LIN bus baud rate of 100 kbps (FastLIN)
Timestamp Accuracy	1μs hardware timestamp, meeting advanced timing requirements
Schedule Table	Supports importing LDF files and executing their schedule tables, and also allows users to configure custom schedule tables
Relay Type	Signal Relay (not magnetic latching)
Power Supply	USB-powered, supports external DC power input (9 ~ 36 V)
Power Consumption	1 W (Typical)

Enclosure Material	Plastic
Dimensions	Approx. 94 × 48 × 24mm
Weight	Approx. 108 g (without packaging)/Approx. 303 g (with packaging and wiring)
Operating Temperature	-40°C ~ 80°C
Operating Humidity	10% ~ 90% RH (no condensation)
Operating Environment	Keep away from the corrosive gases

1.2. Electrical Specifications

➤ Power Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Operating Voltage (USB Power)	LIN transmission	--	5	--	V
Operating Voltage (External DC Power)	LIN transmission	9	12	36	V
Operating Current (USB Power)	LIN transmission	--	0.18	--	A
Operating Current (External DC Power)	LIN transmission	--	0.01	--	A
Power Consumption (USB/DC total)	LIN transmission	--	1	--	W

➤ LIN Interface Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
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Bus Pin Tolerance	LIN	-40	--	40	V
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➤ Mechanical Dimensions

Unit: mm

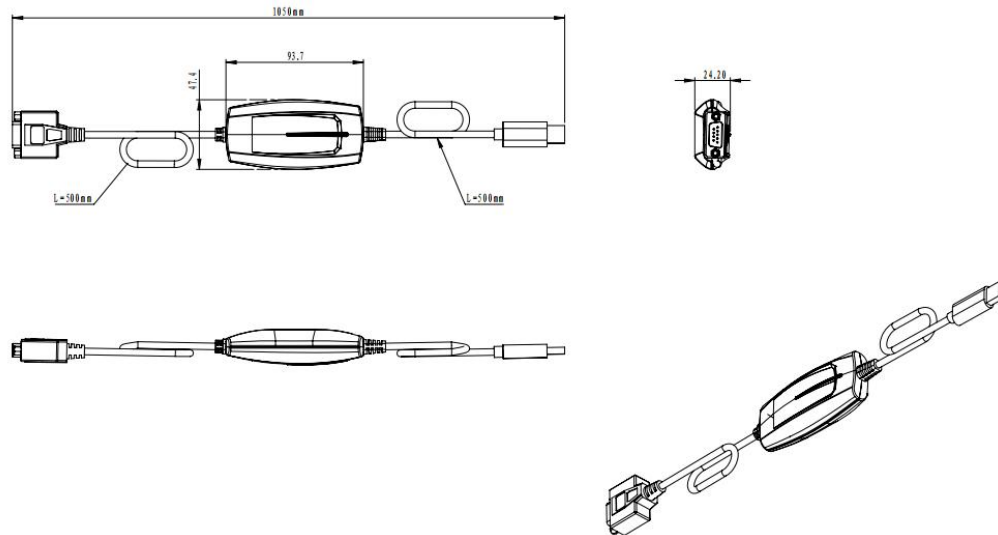


Figure 1-1 Mechanical Dimensions

1.3. Pin Definition



Figure 1-2 Hardware Interface (LIN)

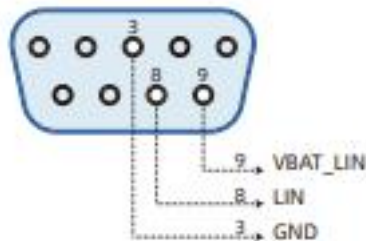


Figure 1-3 Pin Definition (LIN)

1.4. LED Indicators

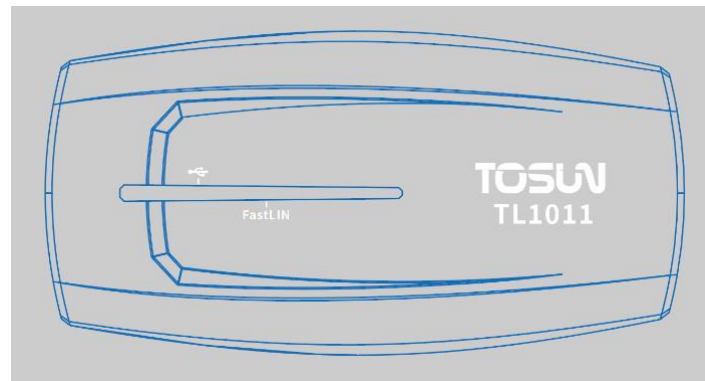


Figure 1-4 Front Panel Layout

➤ LED Definitions

Indicator	Description
FastLIN	Status of FastLIN channel
Link	Hardware connection indicator

➤ LED Color Description

Indicator	Color	Description
FastLIN	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. Packing List

Item	Qty.	Illustration	Standard/Optional
TL1011 Main Device	1		Standard
DB9 to 3 Banana LIN Cable	1		Standard
LIN Surge Protector - TLA00021-LIN	1		Optional

2. System Setup

Please download and install the TSMaster software.



For TSMaster installation instructions, please refer to the appendix.

2.1. Device Connection

Connect the TL1011 to a computer via the USB interface and connect the LIN communication interface to the ECU. Optionally, power the device using a DC power supply. Then on the PC side, users can control the LIN communication between the device and the ECU with the powerful TSMaster software.

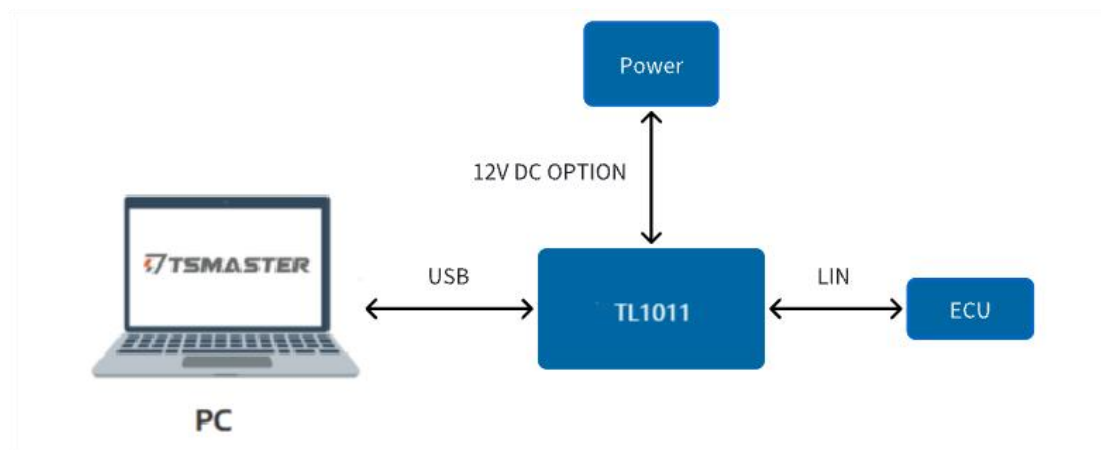


Figure 2-1 Device Connection Diagram

2.2. Driver Installation

All TOSUN hardware adopts a driverless design, offering excellent system compatibility. The hardware allow for direct use on various operating systems (Windows 7/8/10/11, Linux) without the need to install drivers.

2.3. Use TSMaster with the Device

In TSMaster, click “Hardware-Channel Selection”. In the channel selection GUI, select the device you want to connect.

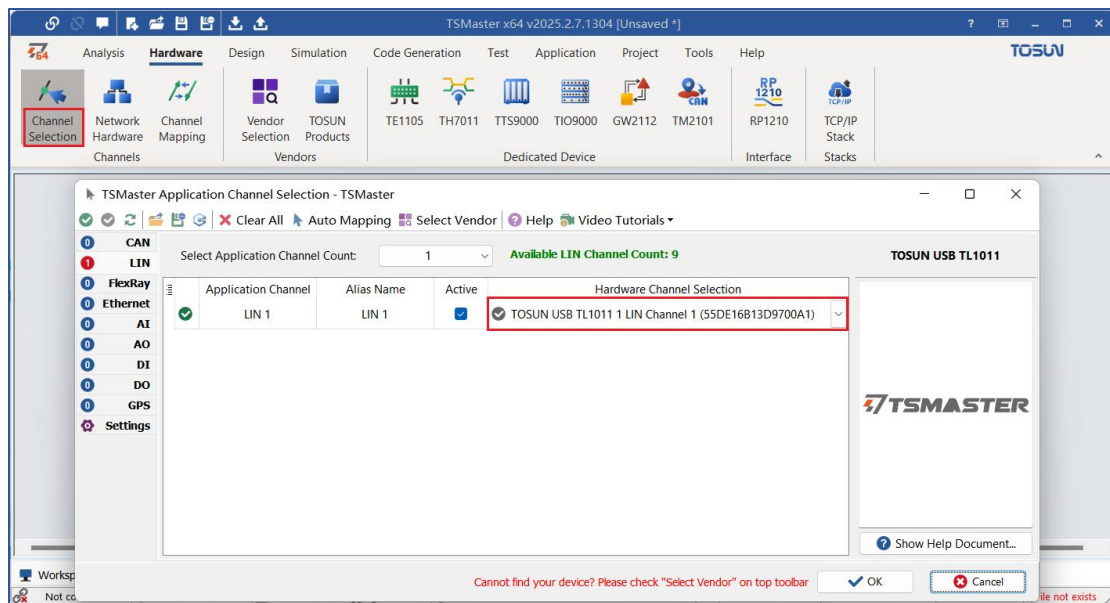


Figure 2-2 Channel Selection

In Network Hardware, a series of controller parameters can be configured, such as baud rate, protocol, etc.

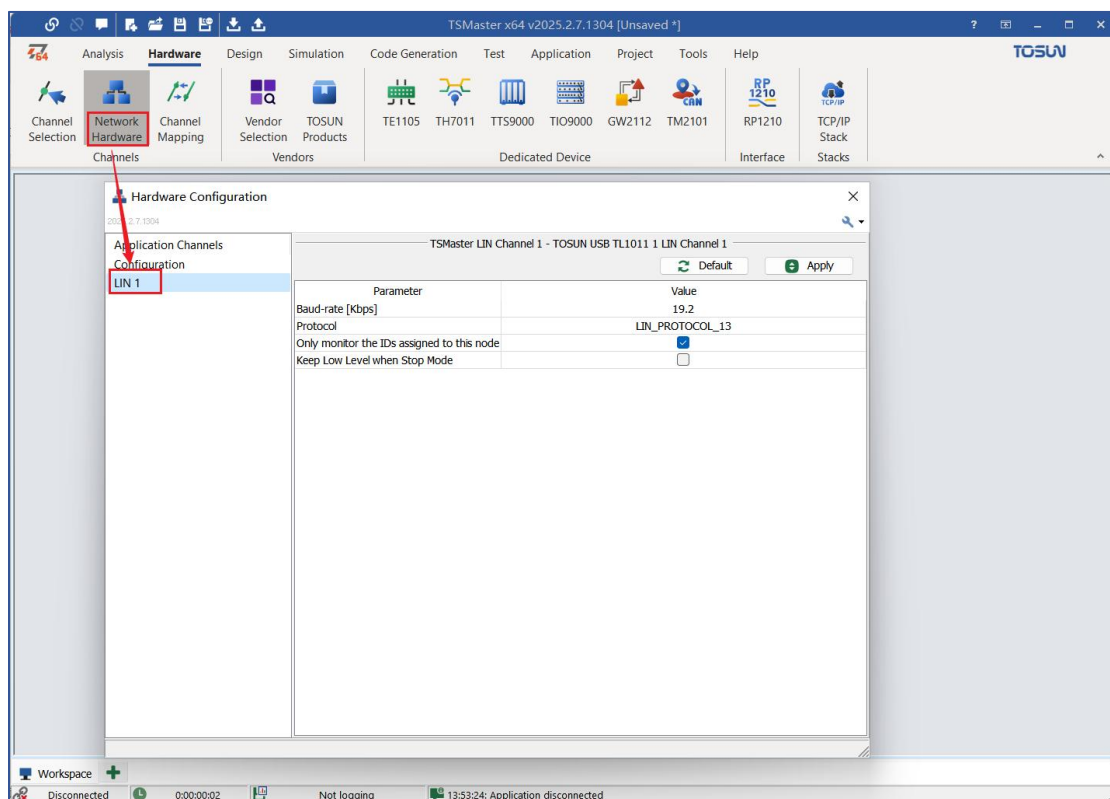


Figure 2-3 Hardware Configuration

After the configuration, click Analysis->Start and connect the hardware to efficiently carry out

works such as bus development, testing, ECU production line, etc. with the powerful TSMaster software. For more detailed instructions on using the TSMaster software, please refer to the TSMaster software manual and the quick start guide.

3. Appendix

3.1. Comparison of Rising Edge Between LIN and FastLIN

Waveforms

Ordinary LIN waveform rising edge time: approximately 5.8 μ s:



Figure 3-1 LIN

FastLIN waveform rising edge time: approximately 1.5 μ s:



Figure 3-2 FastLIN

3.2. 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 3-3 TOSUN Official WeChat Account

➤ Software Installation

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

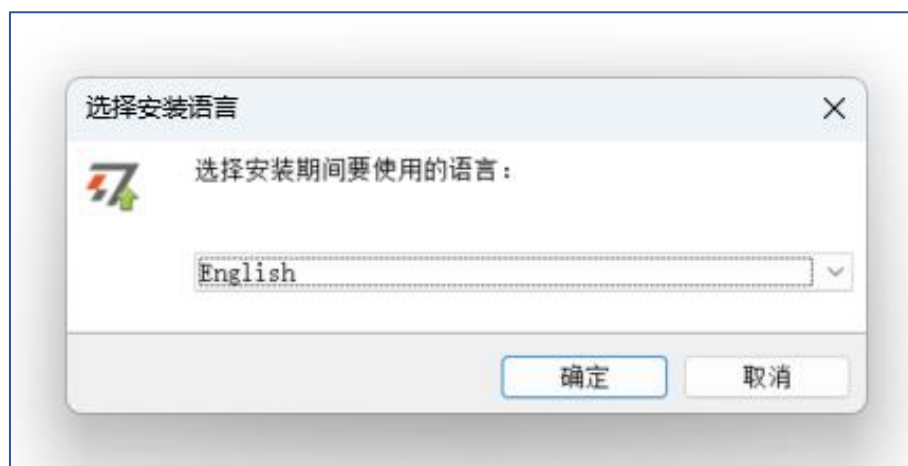


Figure 3-4 TSMaster Installation

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

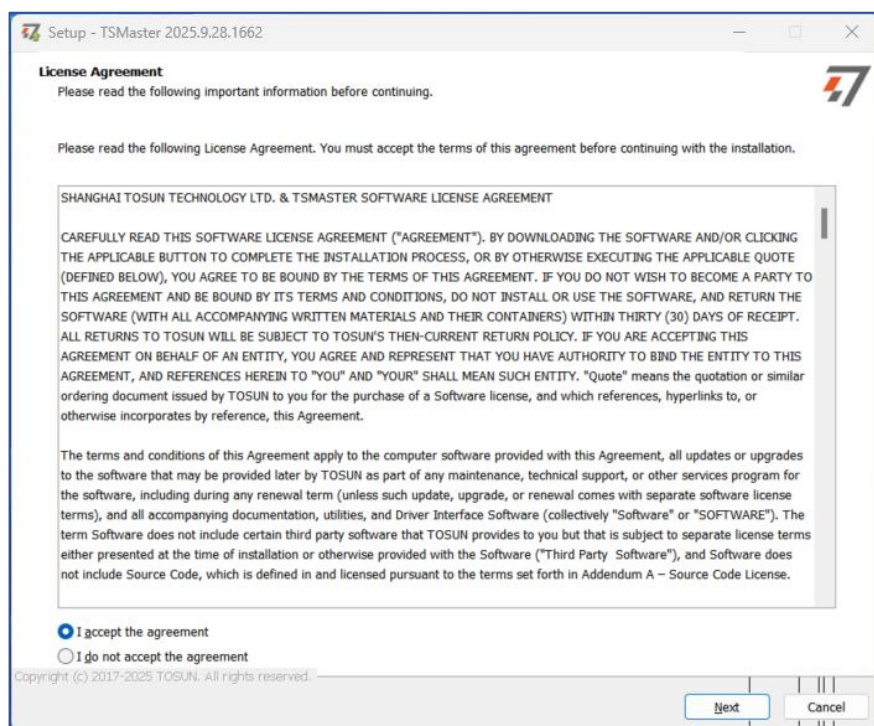


Figure 3-5 TSMaster Installation

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

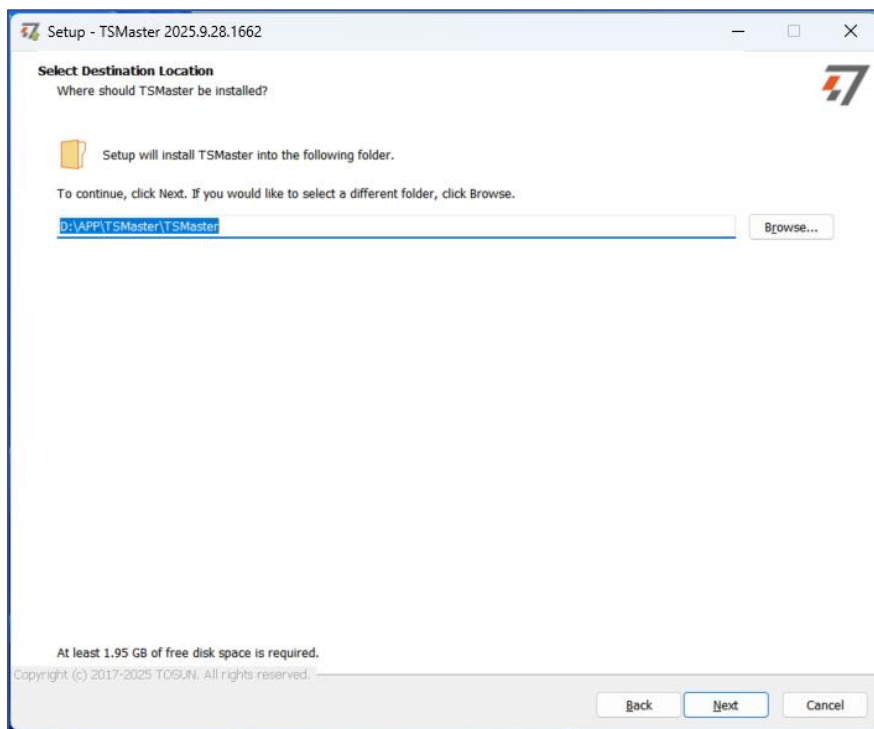


Figure 3-6 TSMaster Installation

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

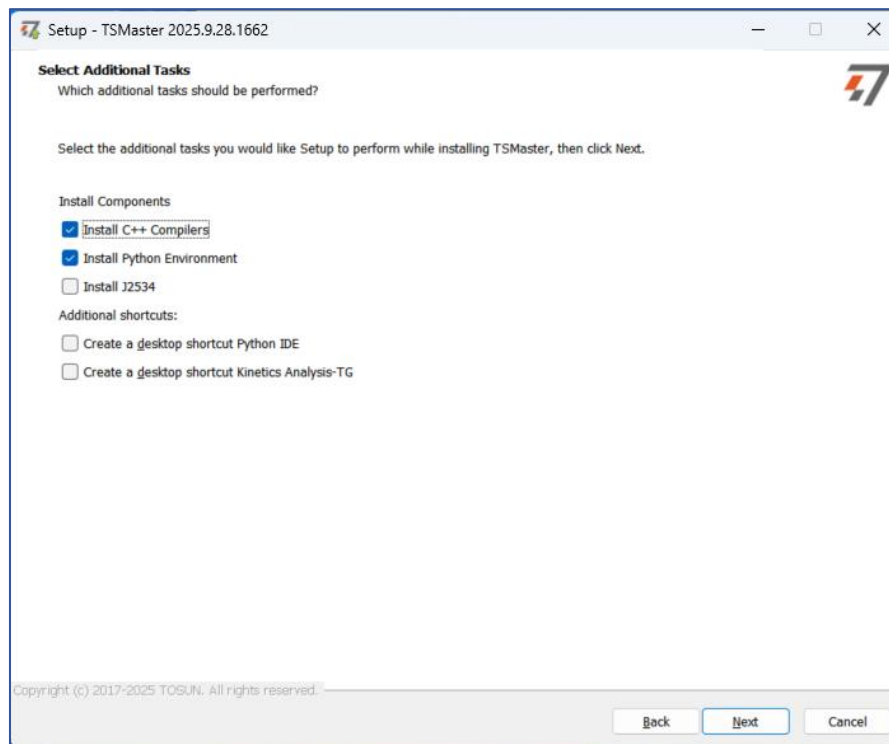


Figure 3-7 TSMaster Installation

5. Click “Install” and wait for completion.

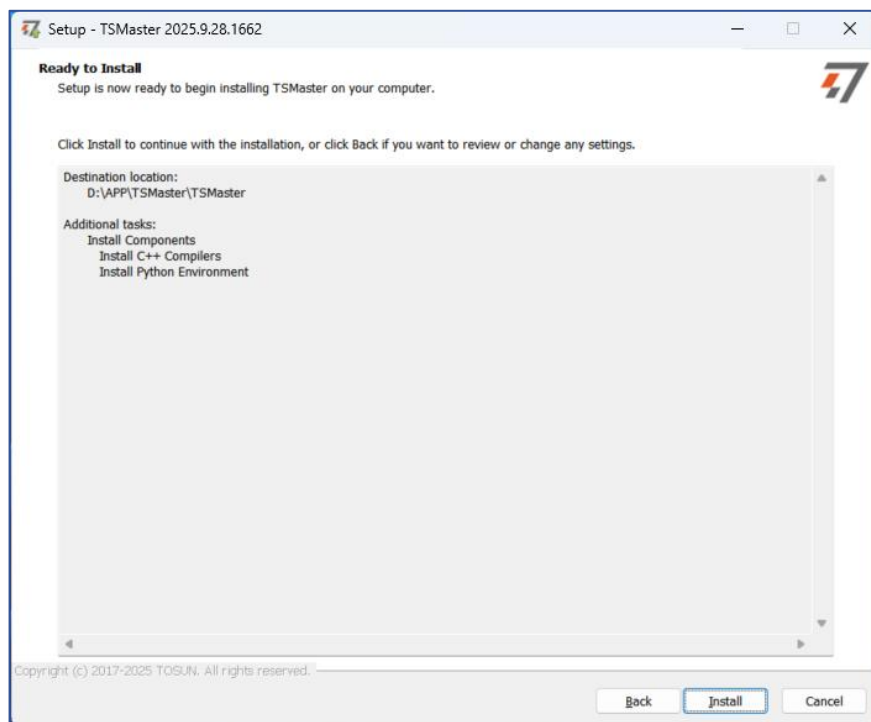


Figure 3-8 TSMaster Installation

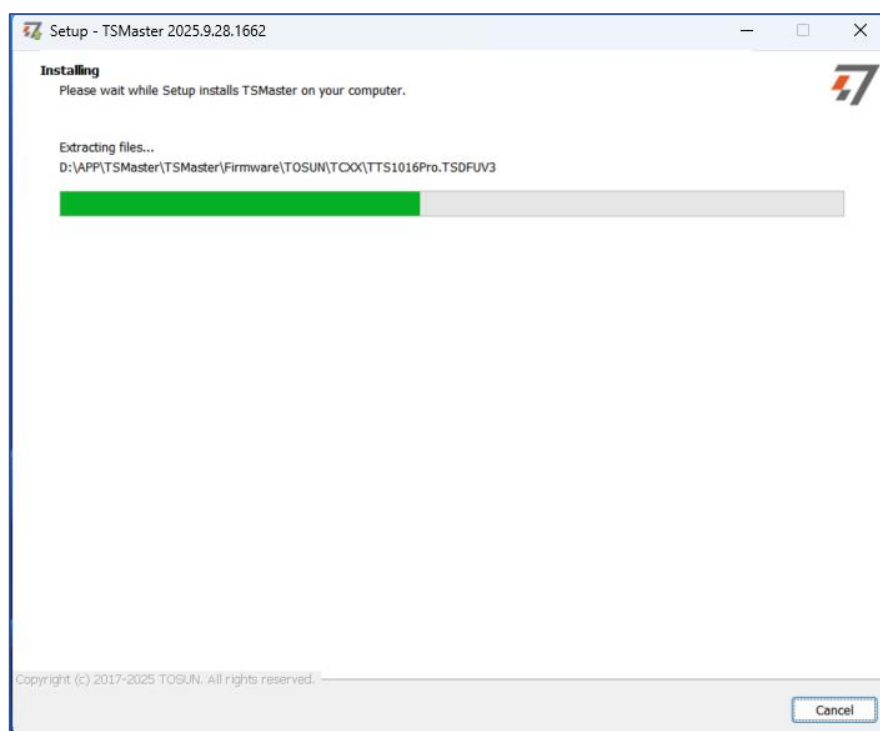


Figure 3-9 TSMaster Installation

6. Click “Finish” to complete installation.

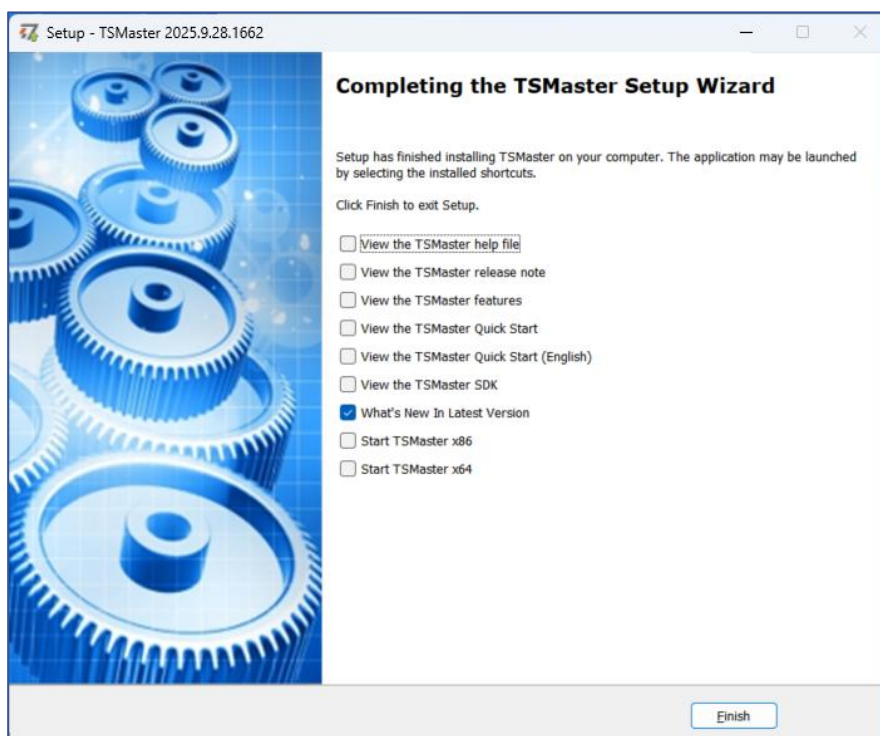


Figure 3-10 TSMaster Installation

4. Inspection and Maintenance

The TL1011 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:+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°C ~ +80°C	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
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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

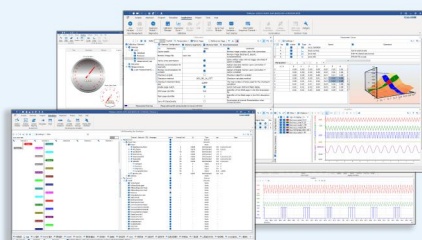
Item	Check Content	Standard/Range	Action/Measure
Mechanical Stress	Check vibration and shock levels	Within specified limits	Install padding or vibration isolation measures if necessary
Electromagnetic Environment	Check for noise sources near the device	No significant noise sources	Isolate or shield the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

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/Transmitting/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



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



Quality Assurance

ISO9001:2015

CE Certification



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