



TOSUN-GW1040

User Manual

Product Features & Interface Overview

CAN FD and LIN to RJ45 Gateway Platform with Built-in Hardware Protocol Conversion Capability

Product Name	Channel
GW1040	CAN FD × 8, LIN × 8, DI × 4, DO × 4, RS485 Serial Port × 1, EtherCAT × 1 Group

Copyright Information

Shanghai TOSUN Technology Ltd.

No. 9 Building, 1288 Jiasong North Road, Jiading District, Shanghai (Headquarters)

Buildings 14-17, Lane 4849 Cao'an Highway (Shanghai Research Institute)

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!

No part of this manual may be reproduced in any form or by any means without prior written permission from TOSUN Technology.

@ Copyright 2024-2026, Shanghai TOSUN Technology Ltd. All rights reserved.

Typical Application

- Vehicle-level CAN (FD)/LIN 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

Gigabit Ethernet connectivity with driver-free plug-and-play support for both Windows and Linux, delivering seamless system compatibility.

- Flexible Configuration

Software-configurable 120 Ω CAN termination; LIN channels support software switch between master and slave modes for versatile network topologies.

- Ecosystem Integration

Fully compatible with mainstream formats such as LDF, 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. LIN channels support flexible configuration of master/slave modes to meet advanced customization needs.

Contents

Product Features & Interface Overview	2
Typical Application	3
Product Highlights	3
1. Introduction	5
1.1. Technical Specifications	5
1.2. Electrical Specifications	7
1.3. Pin Definition	10
1.4. LED Indicators	11
1.5. System Requirements	12
1.6. Packing List	13
2. Application Example in Windows	15
2.1. Software Connection	15
2.2. Hardware Connection	17
2.2.1. CAN	18
2.2.2. LIN	20
2.3. Usage Example	20
2.3.1. Sending a CAN Frame	21
2.3.2. Sending a LIN Frame	25
2.3.3. Connecting the Device with TwinCAT3	28
3. Appendix	34
3.1. Software Installation	34
4. Inspection and Maintenance	38

1. Introduction

The GW1040 is a high-performance EtherCAT gateway device integrating multiple CAN FD and LIN bus interfaces. It enables efficient data exchange between EtherCAT networks and CAN FD/LIN buses through built-in hardware-based protocol conversion capabilities.

The CAN FD interface supports a maximum baud rate of 8 Mbps, while the LIN interface supports baud rates ranging from 0 to 20 kbps.

The device connects to a PC through an RJ45 Ethernet interface and supports two communication and control modes: Ethernet and 100BASE EtherCAT.

With a driver-free design for both Windows and Linux operating systems, the GW1040 provides excellent system compatibility and flexible deployment capability.

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/LIN bus data. It also supports UDS diagnostics, ECU flashing, and CCP/XCP calibration.

Included resources:

- CAN FD/LIN 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 × 3: 100BASE-T(X) Ethernet × 2, Ethernet × 1
Timestamp Precision	Microsecond-level high-precision timestamps
Driver	Cross-platform, driver-free design

Connector	2 × 5-pin pluggable terminal block
License	Supports all TSMaster paid licenses
Power Supply	2-pin power terminal, DC power supply; LIN interfaces support external power supply
Power Consumption	3 W
ESD Protection	± 8 kV contact discharge, ± 15 kV air charge
Enclosure Material	Metal
Dimensions	Approx. 155.5 × 124 × 32.5 mm
Weight	Approx. 248 g
Operating Temperature	-40°C to +80°C
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	Transmit: 11,000 frames/s; Receive: 11,000 frames/s (multi-channel, CAN FD BRS, 8 bytes, 4 Mbps data phase)
Termination Resistor	120 Ω per CAN channel
Relay Type	Magnetic latching relay

➤ LIN Specifications

Parameter	Description
Connection Mode	Master/Slave
Baud Rate	4.8 kbps ~ 20.0 kbp
Supported Protocols	LIN 1.3, LIN 2.0, LIN 2.1, LIN J2602
Schedule Table	Supports LDF schedule tables; load, create, and configure directly
External Power Supply	Supported, 12 V ~ 36 V input range

➤ DI/DO

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

1.2. Electrical Specifications

➤ Power Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Operating Voltage	2-pin terminal supply	9	12	15	V
Power Consumption	2-pin terminal supply	--	3	--	W

➤ CAN Interface Characteristics

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

	Disabled	--	∞	--	--
Isolation Voltage	Insulation resistance test	2500	--	--	VDC

➤ LIN Interface Characteristics

Parameter	Condition	Min	Typ.	Max	Unit
Bus Pin Tolerance Voltage	LIN to GND	-30	--	30	V

➤ EMC Performance

Test Item	Standard	Condition	Level	Unit
ESD	IEC 61000-4-2	Contact discharge	± 8	kV
		Air discharge	± 15	kV
EFT/Burst	IEC 61000-4-4	Electrical fast transient	± 2	kV

➤ Mechanical Dimensions

Unit: mm

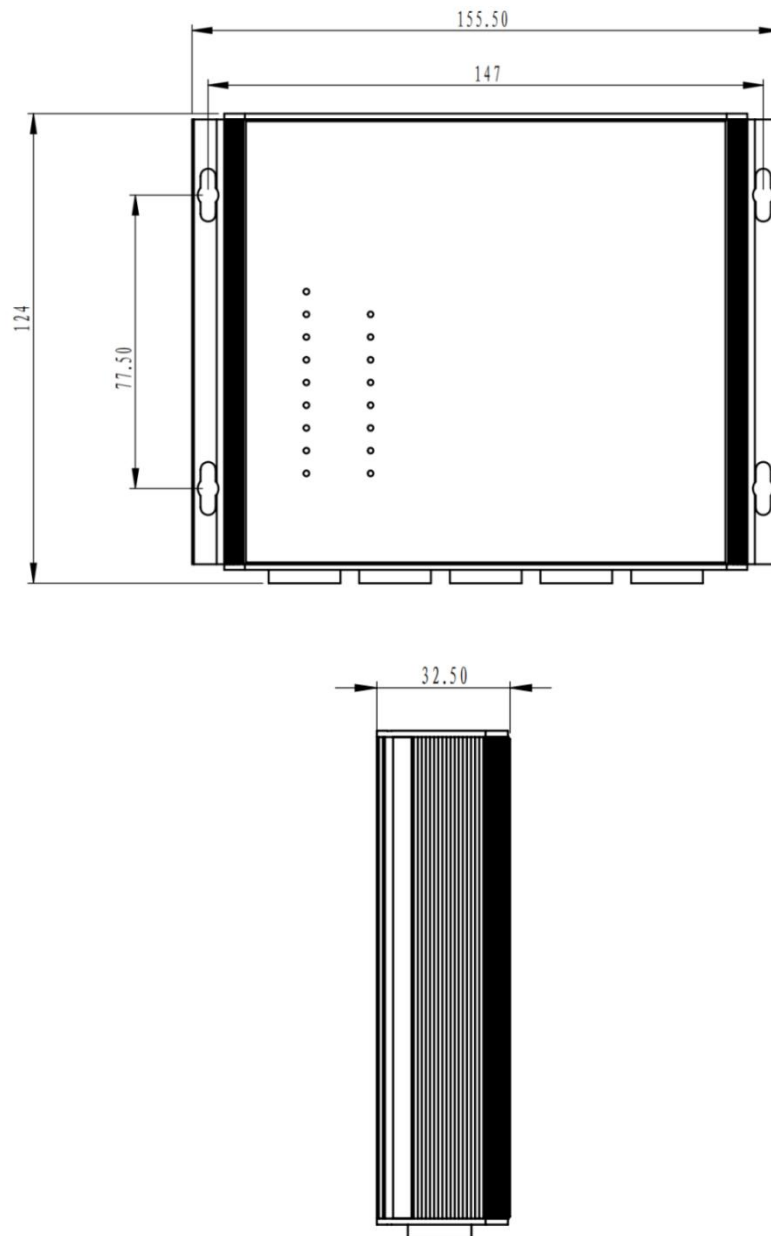


Figure 1-1 Mechanical Dimensions

1.3. Pin Definition

➤ Hardware Interface

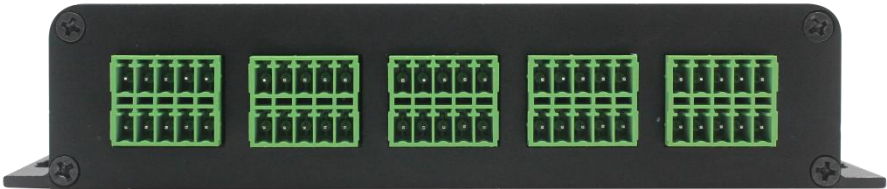


Figure 1-2 Hardware Interface

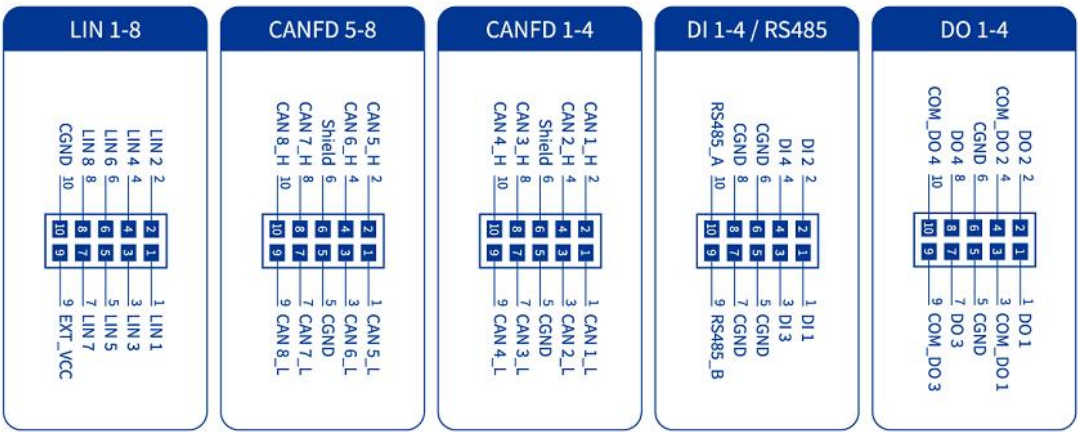


Figure 1-3 Pin Layout

1.4. LED Indicators



Figure 1-4 Front Panel Layout

➤ LED Definitions

Indicator	Color	Description
CAN FD 1 ~ 8	Green	Normal frame transmission/reception
	Red	Frame transmission/reception error — configuration, protocol, or wiring fault
LIN 1 ~ 8	Green	Normal frame transmission/reception
	Red	Frame transmission/reception error — configuration, protocol, or wiring fault
Link		Hardware connection indicator



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 GW1040 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
GW1040 Main Device	1		Standard
6 Category Cable	3		Standard
2-Pin Flange Locking Plug	1		Standard
12 V / 2 A Power Adapter (US/ EU/ CN)	1		Standard

Pluggable (2x5P)	Connector	5		Standard
-----------------------------	------------------	----------	---	-----------------

2. Application Example in Windows

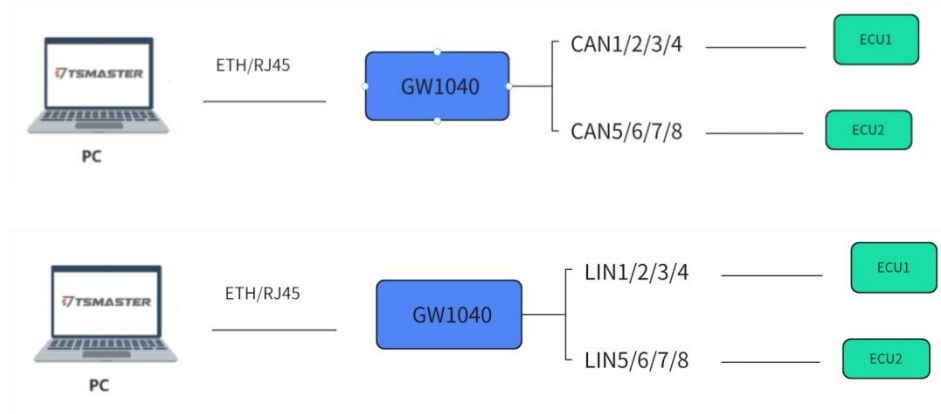


Figure 2-1 Example in Windows



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.
2. In TSMaster, go to “Hardware” → “Channel Selection” to open the Channel Selector, and enable the Ethernet interface device.
3. In TSMaster, go to “Hardware” → “Channel Selection” to open the Channel Selector. Choose the desired CAN or LIN channels.

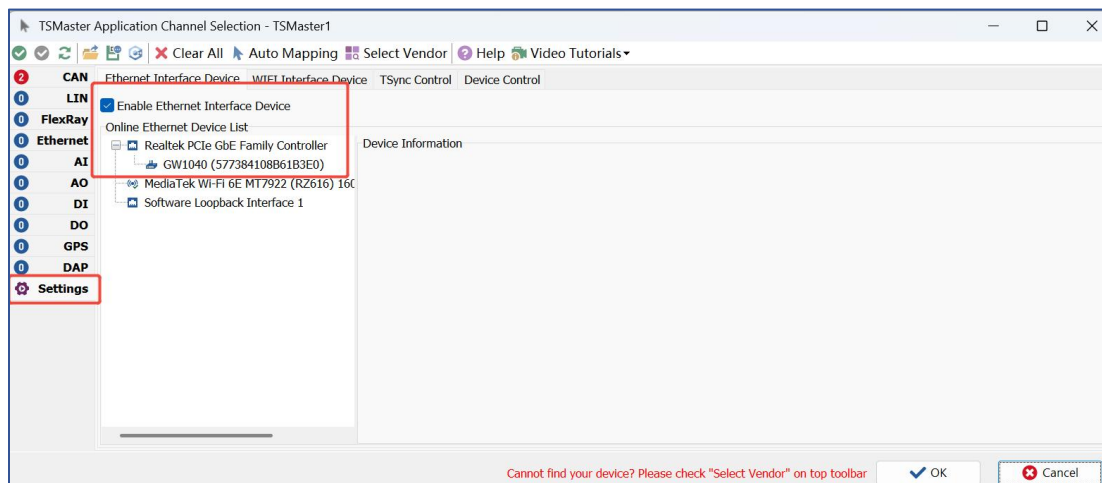


Figure 2-2 Enable Ethernet

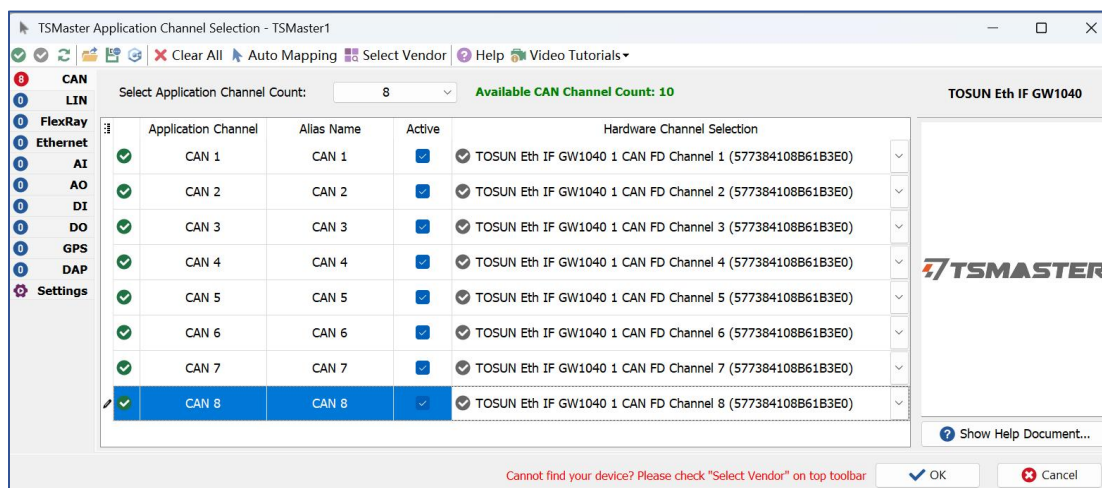


Figure 2-3 Channel Selection

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

CAN configuration window:

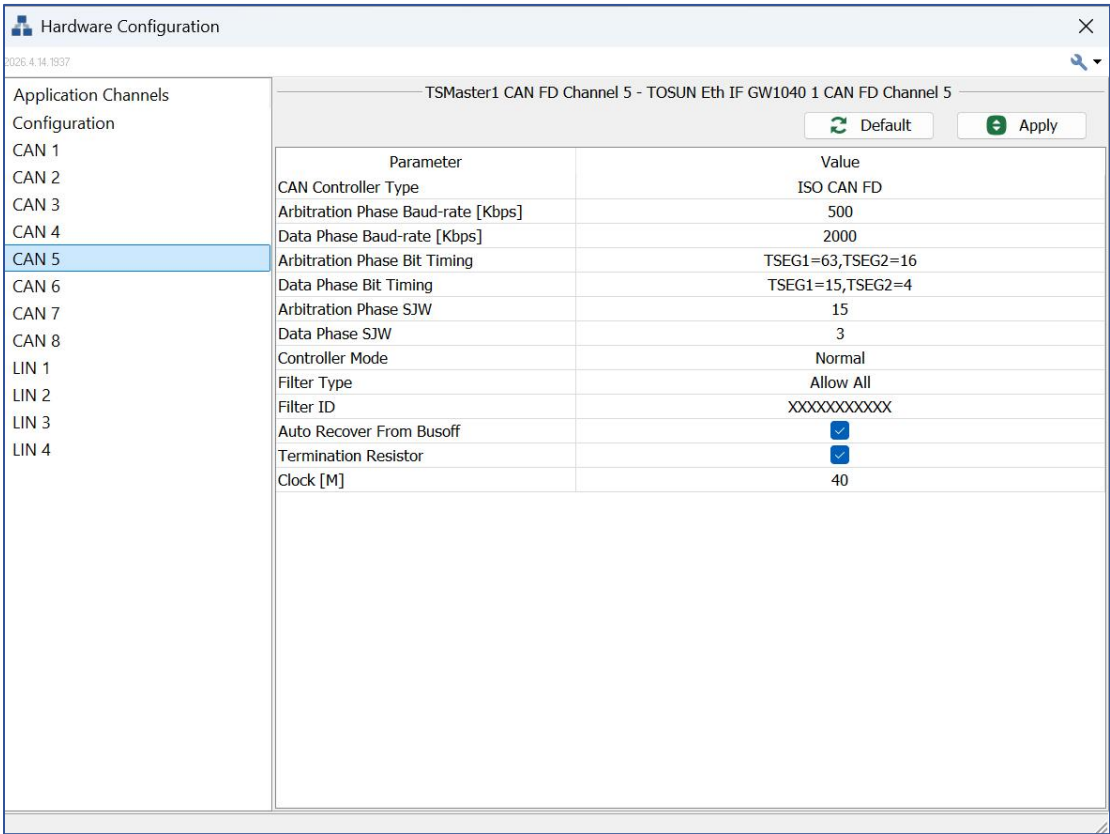


Figure 2-4 Channel Configuration (CAN)

LIN configuration window:

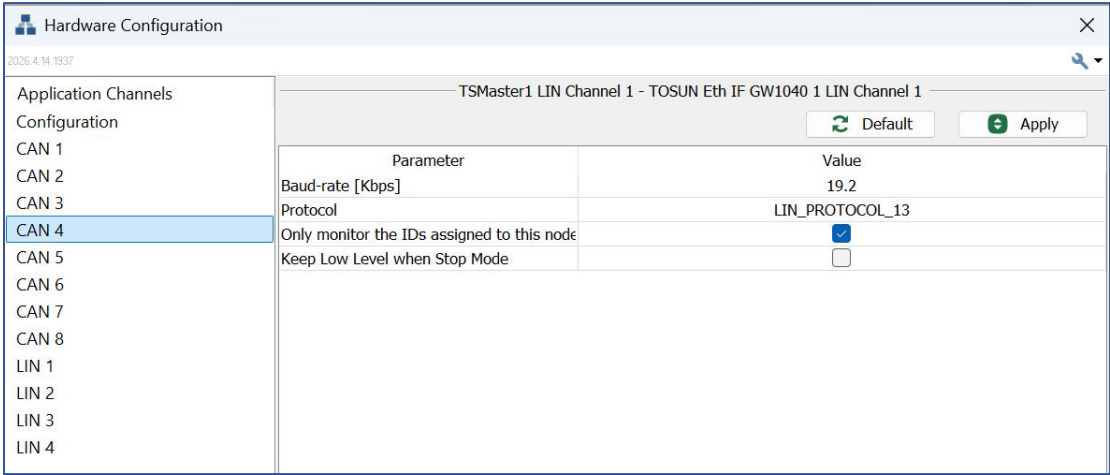


Figure 2-5 Channel Configuration (LIN)

5. Click “Analysis” → “Start” to connect the device.

2.2. Hardware Connection

2.2.1. CAN

Use the accessory “2×5P pluggable terminal block” to create a custom wiring harness. Connect the harness to D-Sub 9-pin connectors with corresponding CAN_H/CAN_L signals.

The completed wiring harness allows access to the two CAN channels through two independent D-Sub 9-pin connectors.

The following figure shows the pin assignment of the “DB9 Female-to-Dual DB9 Male Signal Cable (CAN)” wiring harness:

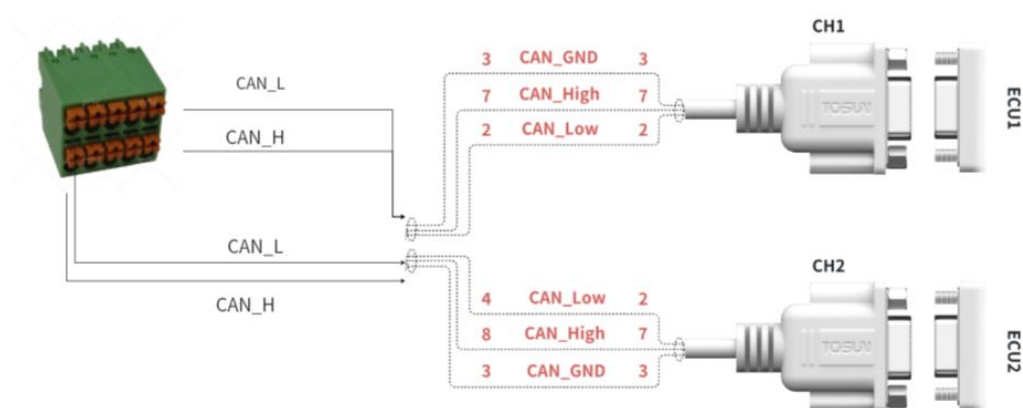


Figure 2-6 DB9 Female-to-Dual DB9 Male Signal Cable (CAN)

The GW1040 includes built-in termination resistors, which can be enabled or disabled in the software as required.

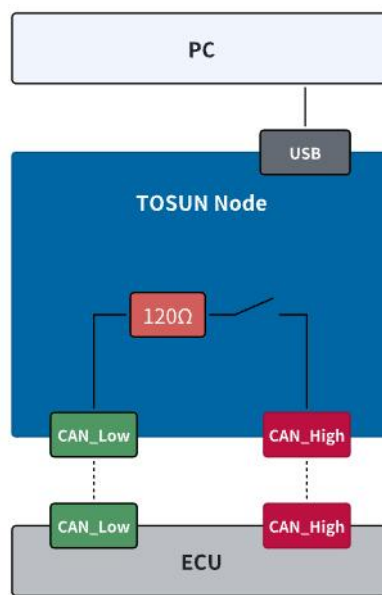


Figure 2-7 Using CAN



Pay attention to the termination-resistor enable settings. The GW1040 comes with built-in termination resistors, which can be enabled or disabled via the software or API. The recommended configuration is to enable one $120\ \Omega$ termination resistor at each end of the CAN bus, ensuring that the total bus resistance stays at $60\ \Omega$.

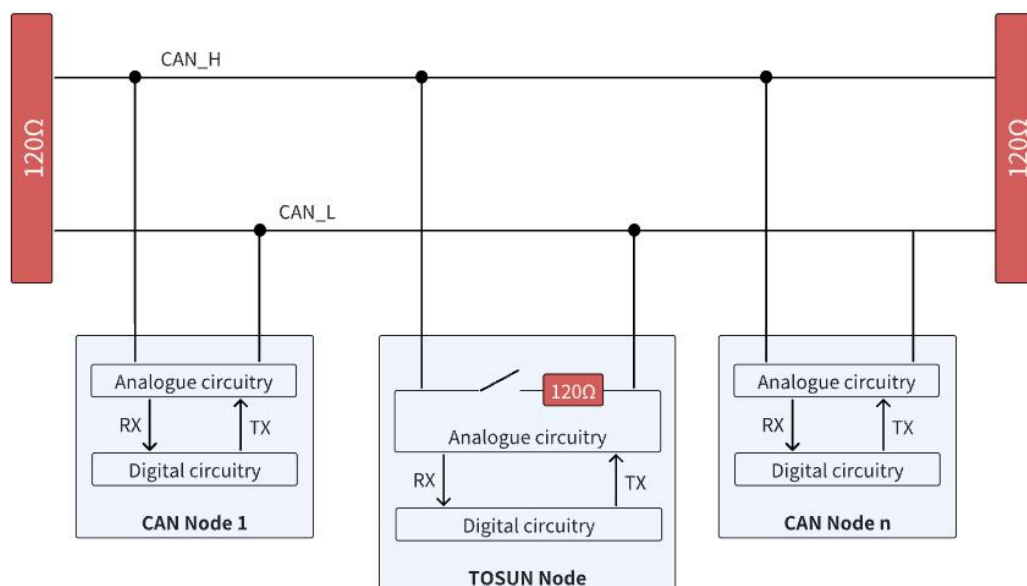


Figure 2-8 Connecting to the CAN Bus

2.2.2. LIN

The LIN interface includes an internal 12 V power source. Pins 2 and 3 share a common GND; pins 7 and 9 share the same V_Bat line. When external V_Bat exceeds 12 V, the device automatically switches to external power; otherwise, it uses the internal supply.

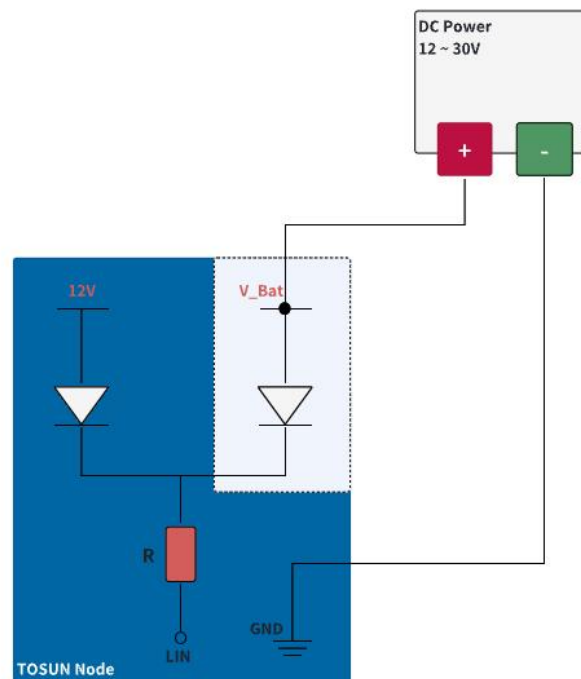


Figure 2-9 Using LIN

The GW1040 can operate as either a Master or Slave node on the LIN bus.

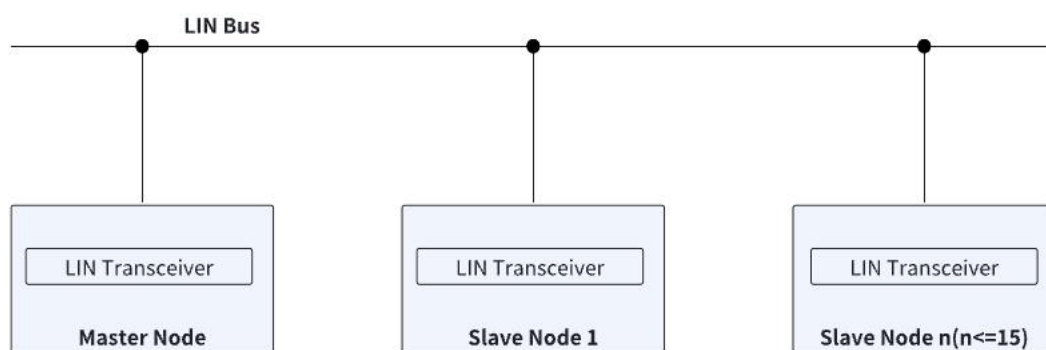


Figure 2-10 LIN Bus

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.

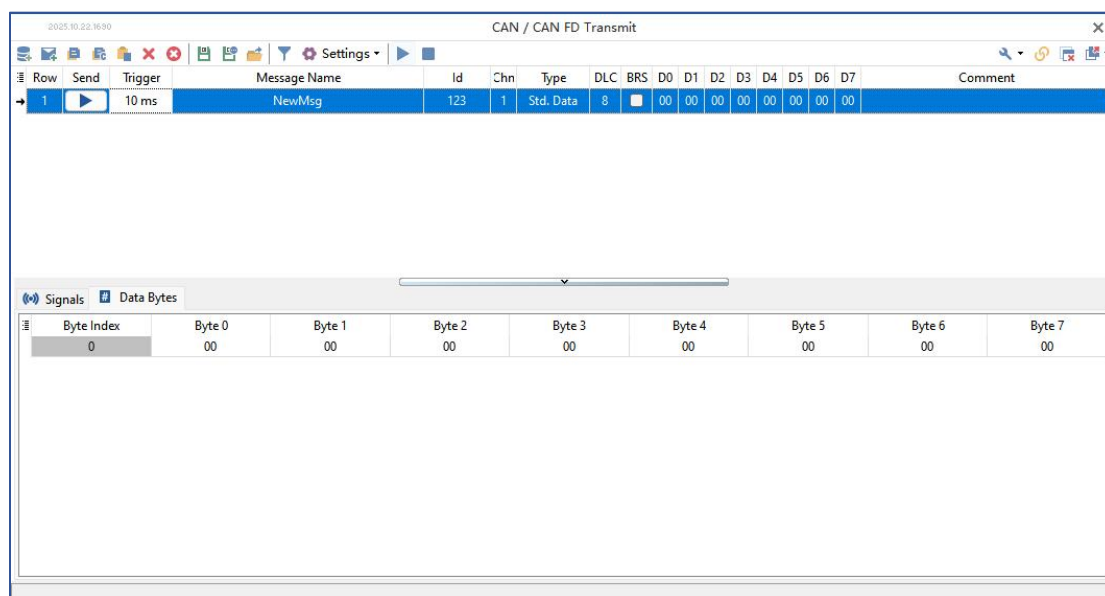


Figure 2-11 Adding CAN Message

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

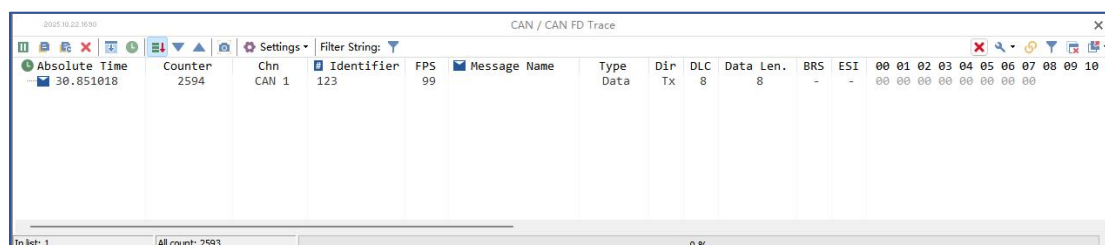


Figure 2-12 CAN Message Information

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

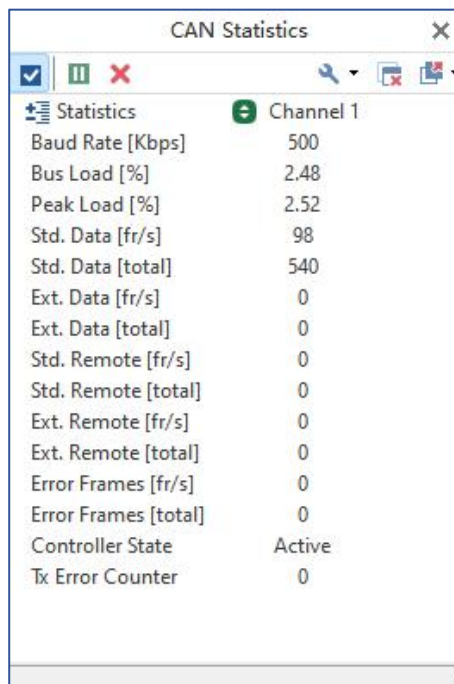


Figure 2-13 CAN Statistics

➤ 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.

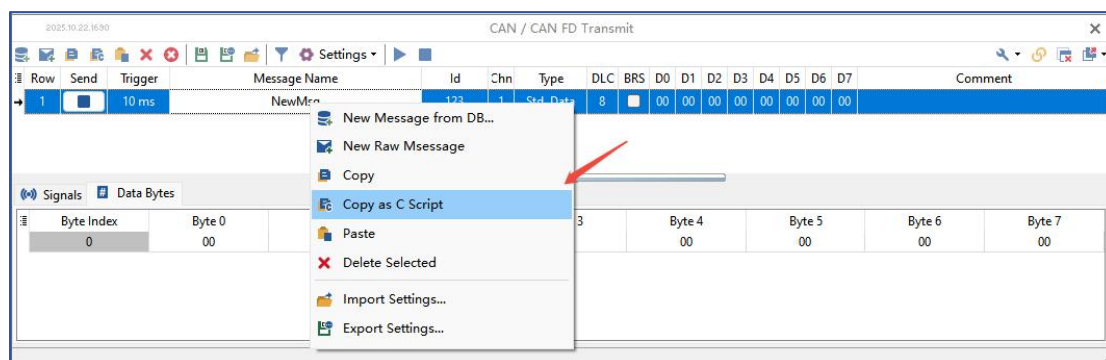


Figure 2-14 Quick Access to C Code

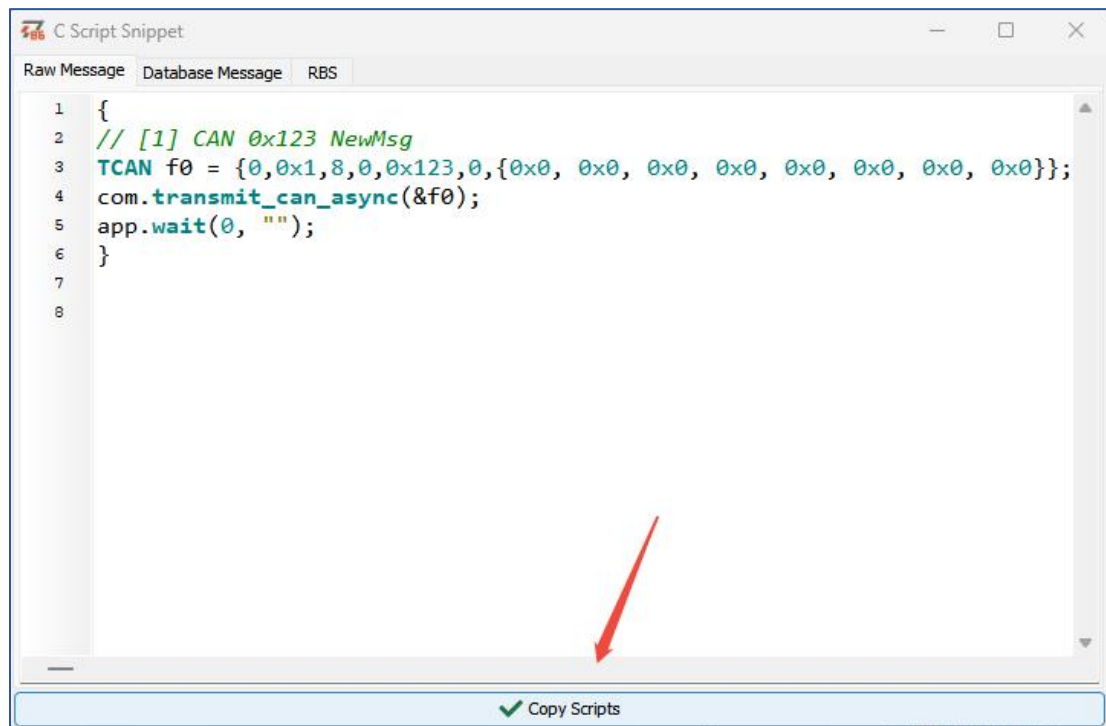


Figure 2-15 Copying the C Code

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

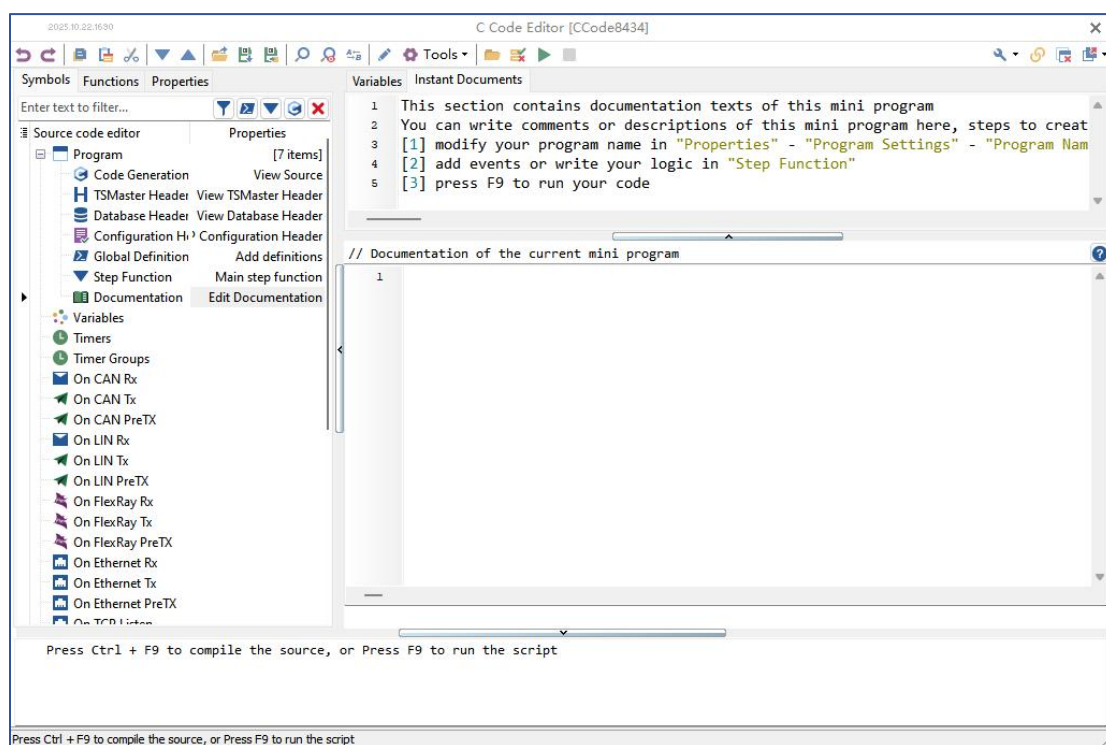


Figure 2-16 Adding a C Mini-Program Editor

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.

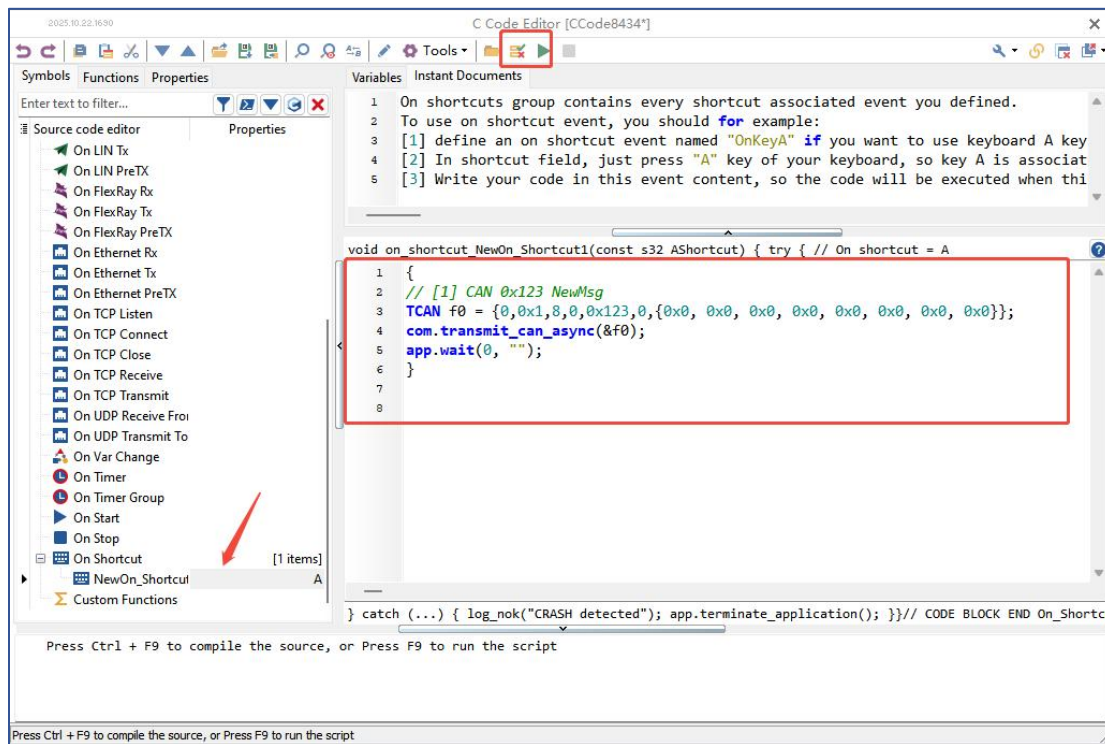


Figure 2-17 Building a C Mini-Program (CAN)

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

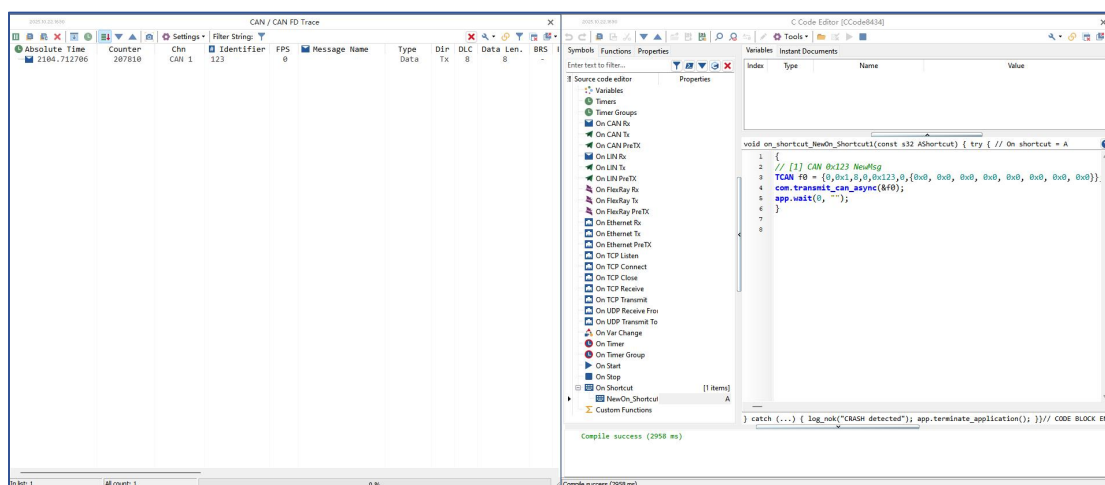


Figure 2-18 Sending CAN Messages via C Mini-Program

2.3.2. Sending a LIN Frame

➤ Via GUI

1. Click Analysis → Data Analysis → Message Transmission → Add LIN Transmission” to open the LIN Transmission window.

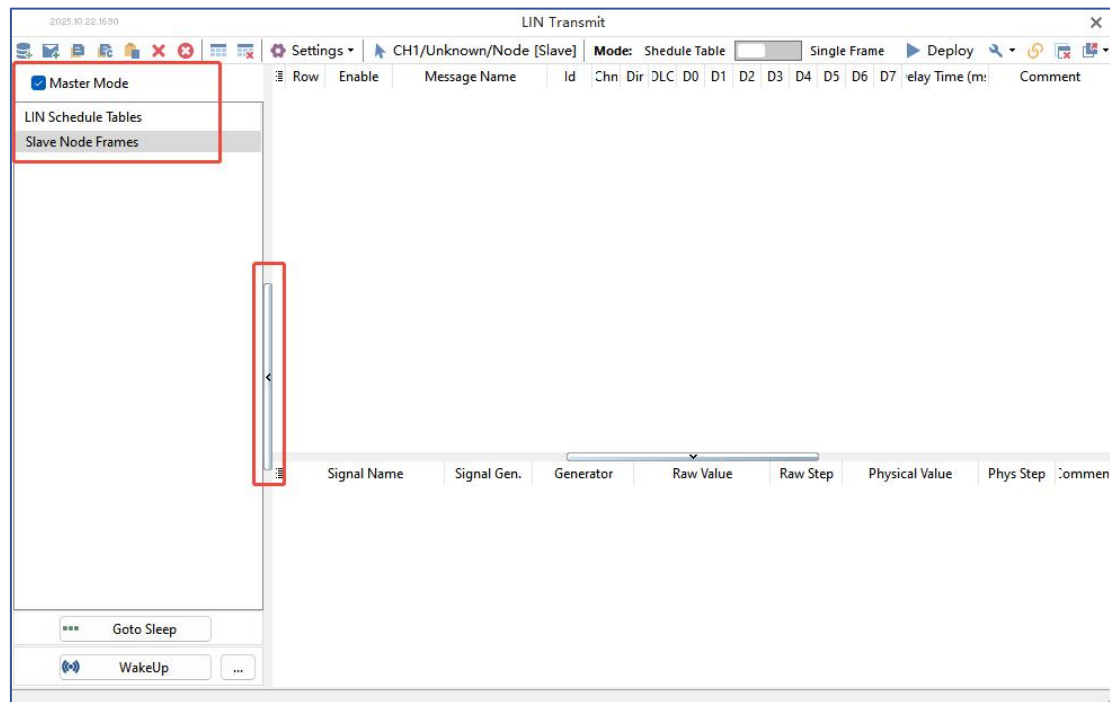


Figure 2-19 LIN Transmission Window

2. Use the buttons on the left side of the window to configure the current channel as either master or slave. Select “Master Mode” to set it as a master node; uncheck it to set it as a slave node.

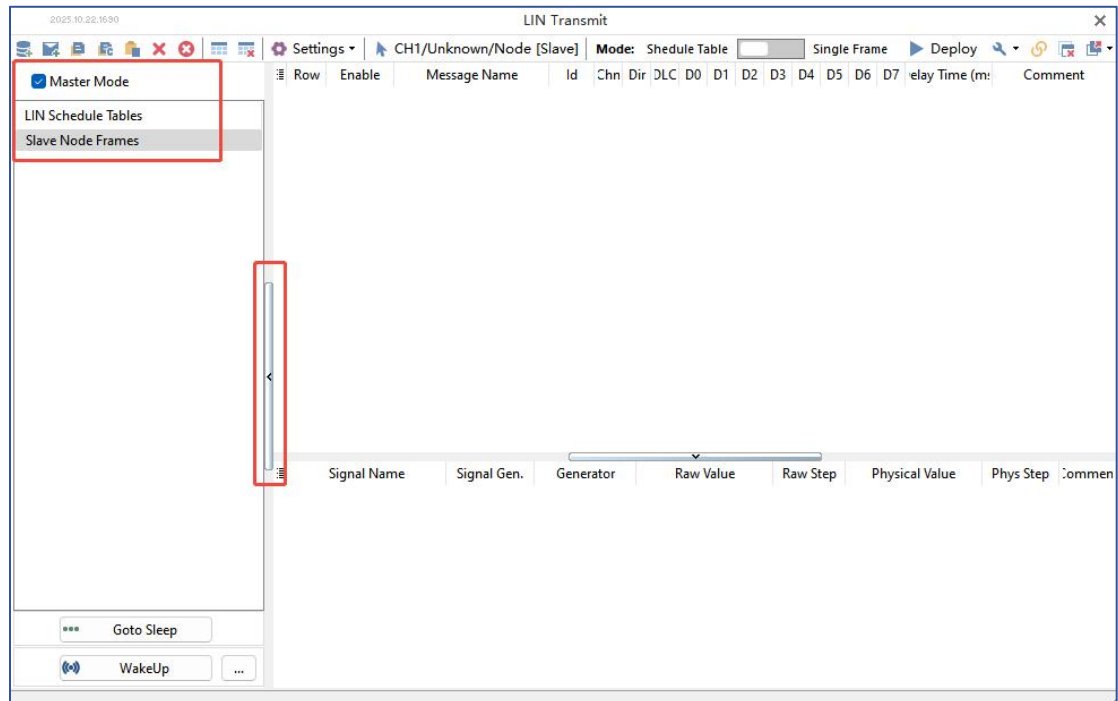


Figure 2-20 Configuring LIN Master/Slave Mode

3. Add a LIN message as shown (example uses master mode), then click Deploy.

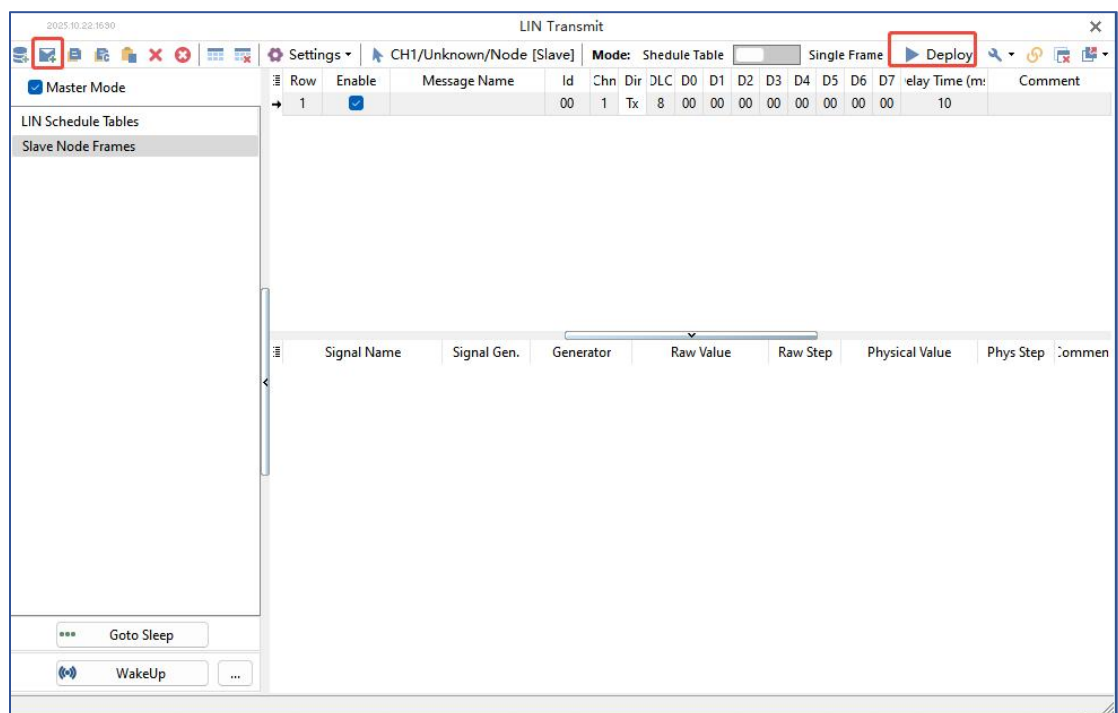


Figure 2-21 Adding a LIN Message



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

- Click “Analysis → Data Analysis → Message Information → Add LIN Message Information” to view LIN message details.

Absolute Time	Date Time	Counter	Chn	Identifier	FPS	Message Name	Checksum	Dir	DLC	Message Data Bytes
2621.017038	2025-10-28 17:29:02.339	1469	LIN 1	[80]00	99		FF	Tx	8	00 00 00 00 00 00 00 00

Figure 2-22 LIN Message Information

➤ Via C Script

- In the C Code Editor, add a key event (e.g., Key A) and enter the code shown below. Then click Compile and Run.

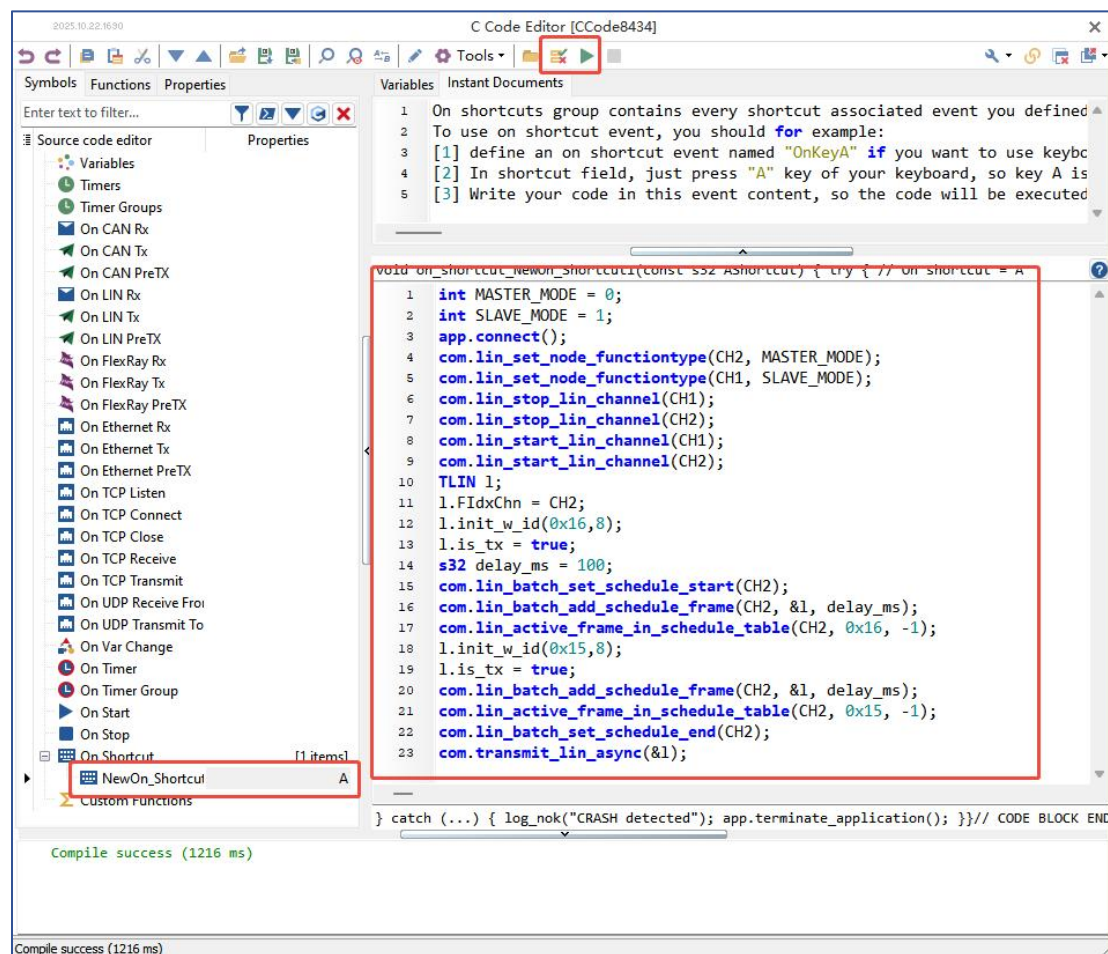
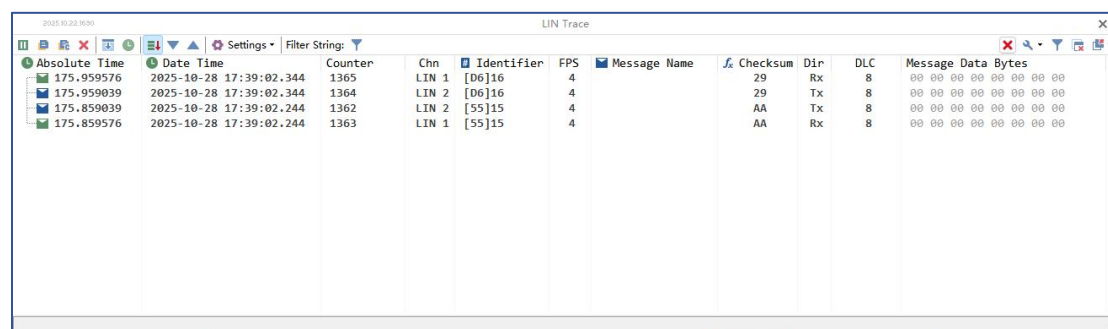


Figure 2-23 Building a C Mini-Program (LIN)

2. When Key A is pressed, the LIN node sends messages periodically according to the schedule table.



The screenshot shows the LIN Trace window with the following data:

Absolute Time	Date Time	Counter	Chn	Identifier	FPS	Message Name	Checksum	Dir	DLC	Message Data Bytes
175.959576	2025-10-28 17:39:02.344	1365	LIN 1	[06]16	4		29	Rx	8	00 00 00 00 00 00 00 00
175.959039	2025-10-28 17:39:02.344	1364	LIN 2	[06]16	4		29	Tx	8	00 00 00 00 00 00 00 00
175.859039	2025-10-28 17:39:02.244	1362	LIN 2	[55]15	4		AA	Tx	8	00 00 00 00 00 00 00 00
175.859576	2025-10-28 17:39:02.244	1363	LIN 1	[55]15	4		AA	Rx	8	00 00 00 00 00 00 00 00

Figure 2-24 Sending LIN Message via C Mini-Program

2.3.3. Connecting the Device with TwinCAT3

1. Import the ESI File

Copy the ESI file (such as an XML-format signal description file) to the TwinCAT installation directory. The default directory is: C:\TwinCAT3.1\Config\Io\EtherCAT



Figure 2-25 Import ESI File

2. Create an EtherCAT Project

Open TcXaeShell, and select: “File” → “New” → “Project” to create a new project.



Figure 2-26 Create EtherCAT Project

The project interface after creation is shown below:

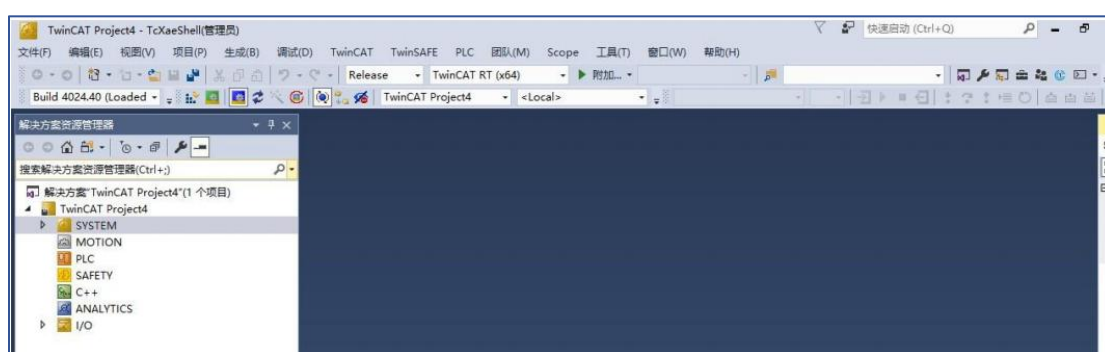


Figure 2-27 Project Interface

3. Scan for Devices

Right-click “Devices”, and then select “Scan”.

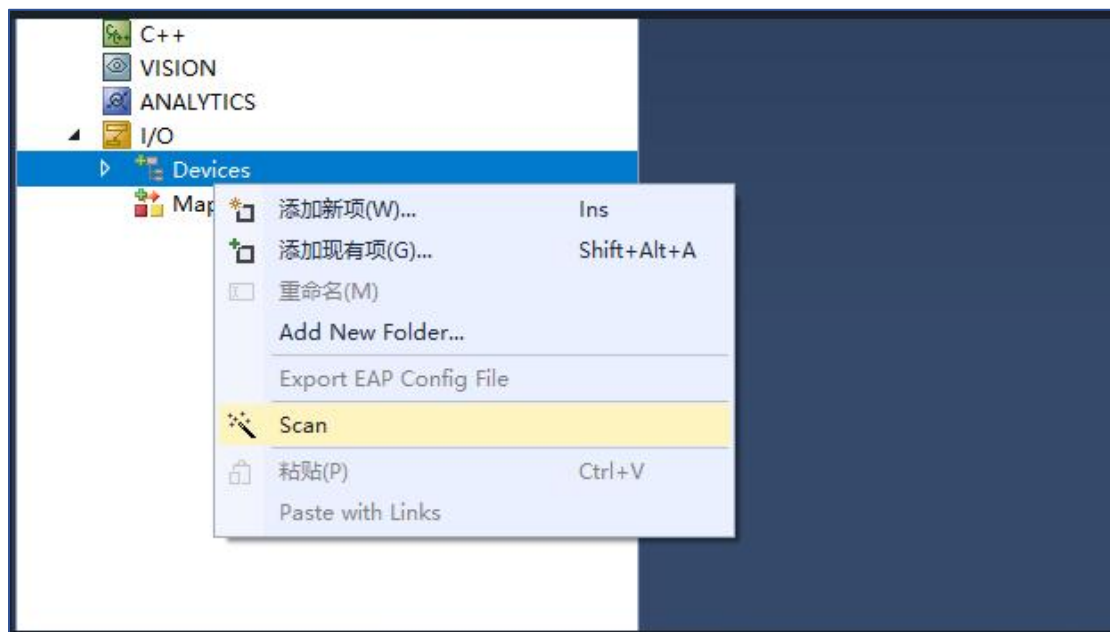


Figure 2-28 Scan Device Operation 1

Click “OK”.

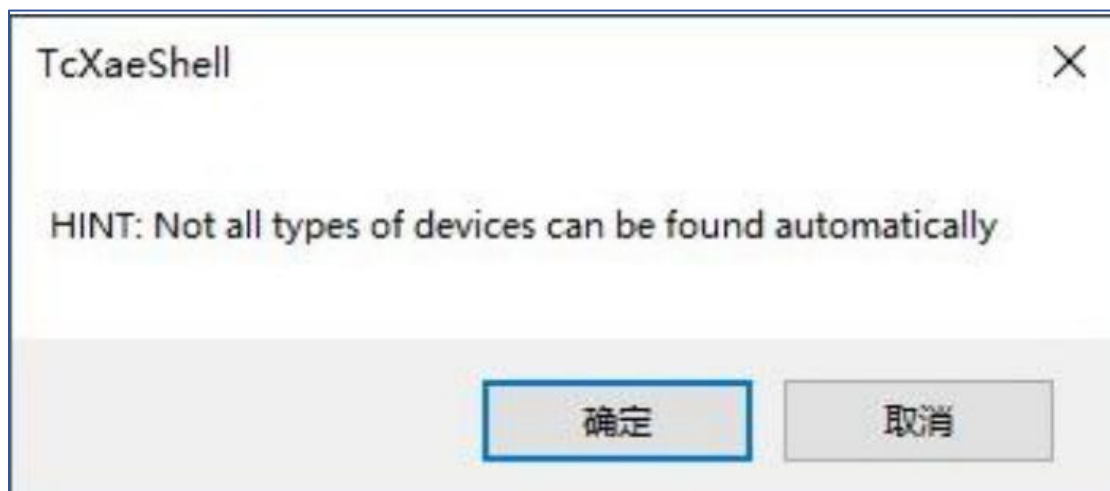


Figure 2-29 Scan Device Operation 2

Select the network adapter of the local computer, and click “OK”.

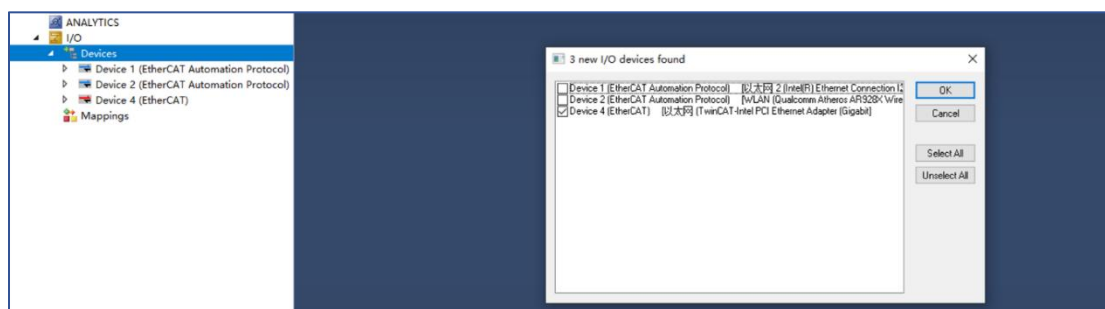


Figure 2-30 Select Local Network Adapter

The device will be successfully detected as shown below:

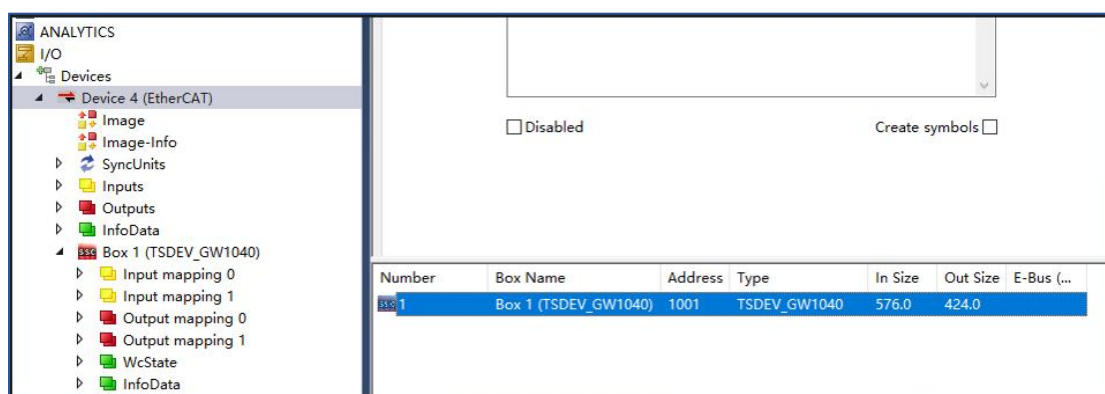


Figure 2-31 Device Scan Successful

4. EEPROM Update

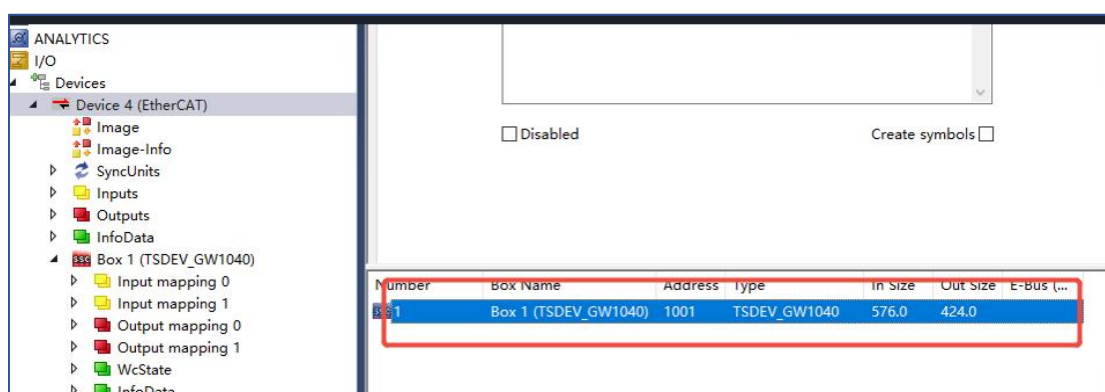


Figure 2-32 EEPROM Update

Select the device and click “EEPROM Update”.

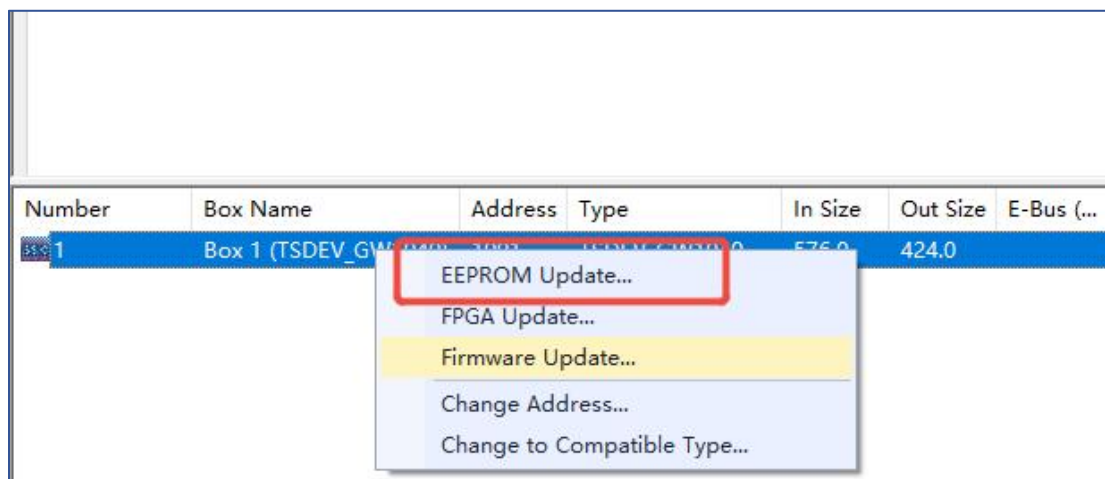


Figure 2-33 EEPROM Update

In the pop-up dialog box, select the device and click “OK” to start flashing the EEPROM.

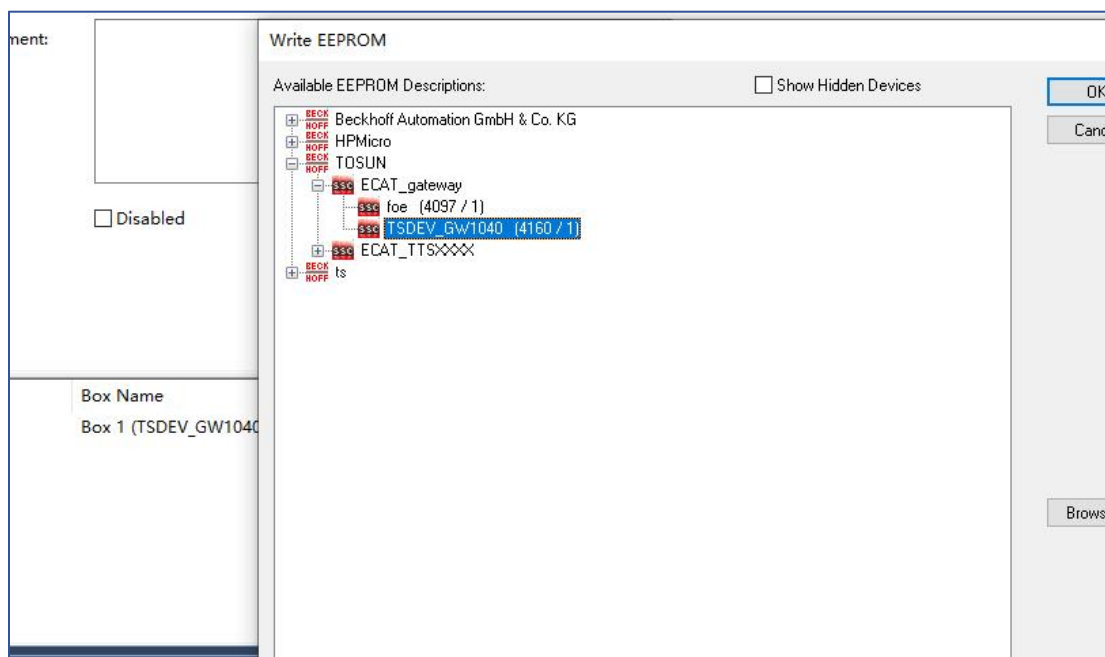


Figure 2-34 EEPROM Flashing

5. Check Device Status

The connection is established successfully when the device status changes to “OP” (Operational State).

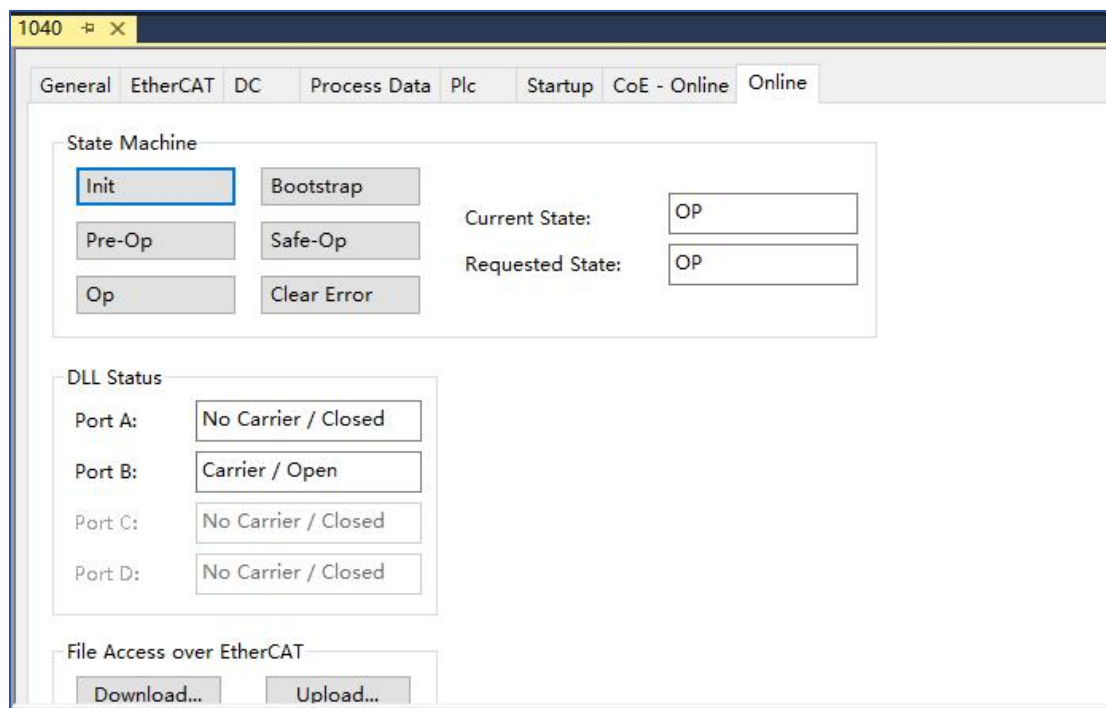


Figure 2-35 Check Device Status

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.

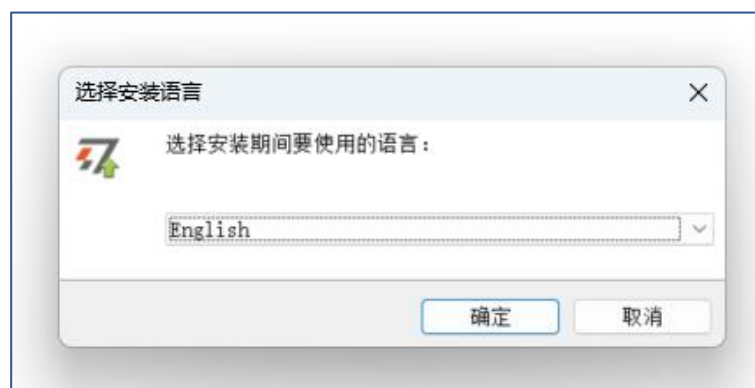


Figure 3-2 TSMaster Installation

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

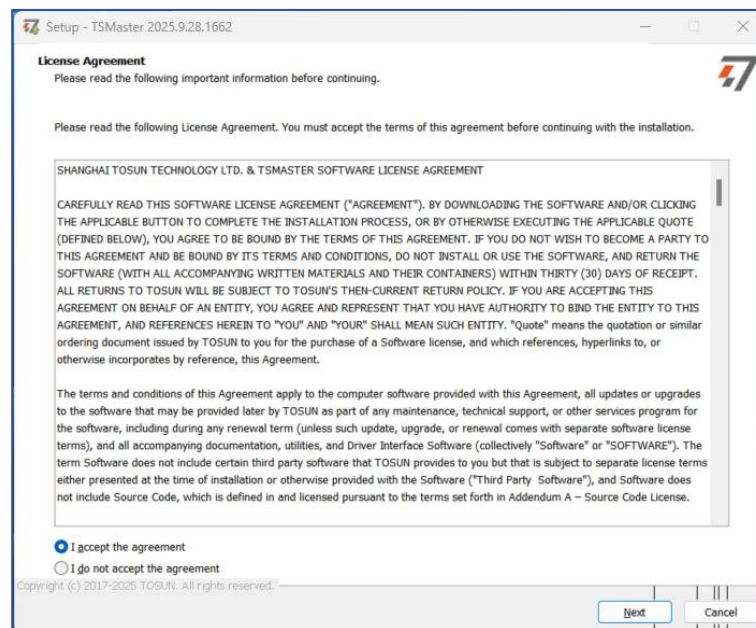


Figure 3-3 TSMaster Installation

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

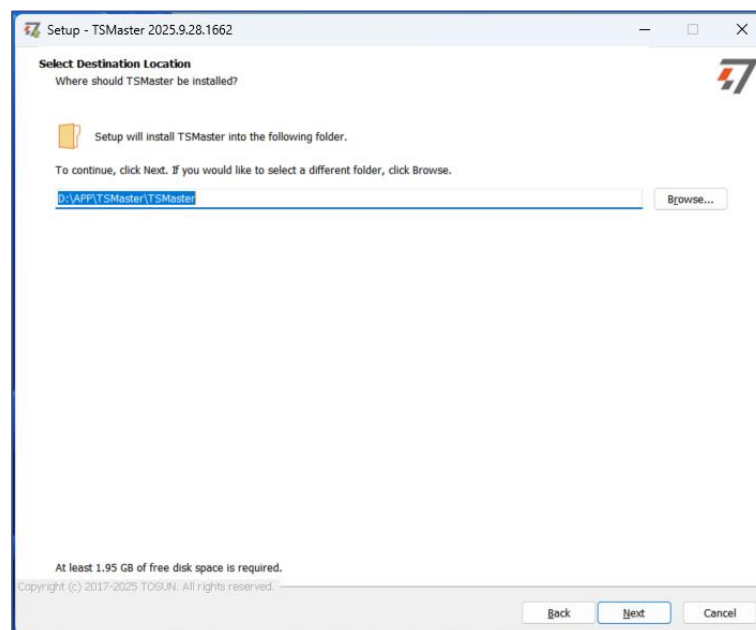


Figure 3-4 TSMaster Installation

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

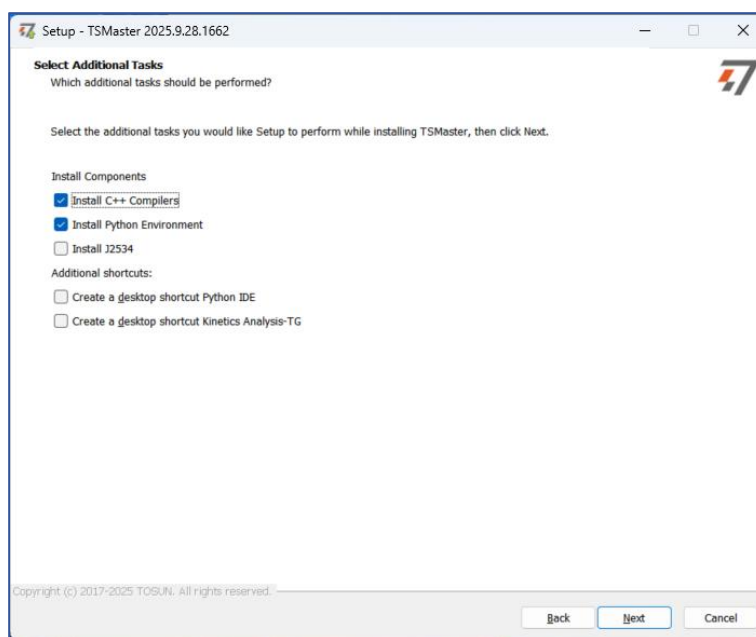


Figure 3-5 TSMaster Installation

5. Click “Install” and wait for completion.

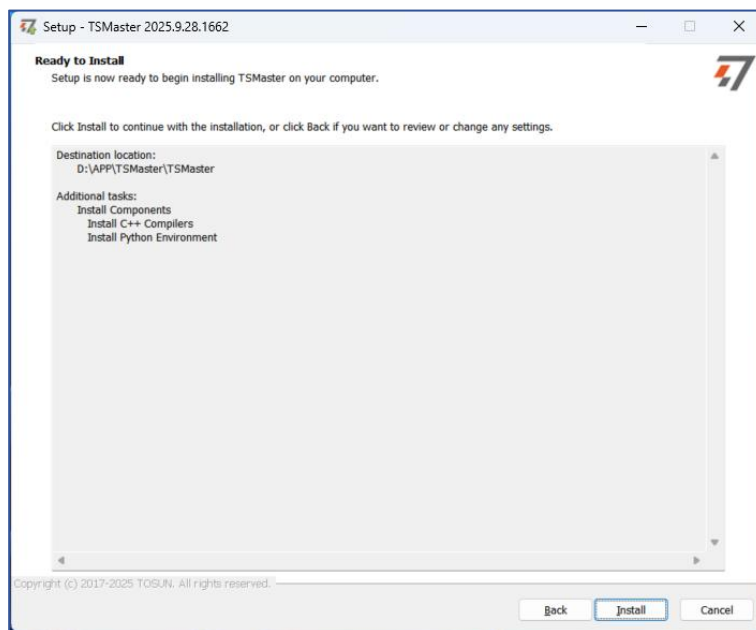


Figure 3-6 TSMaster Installation

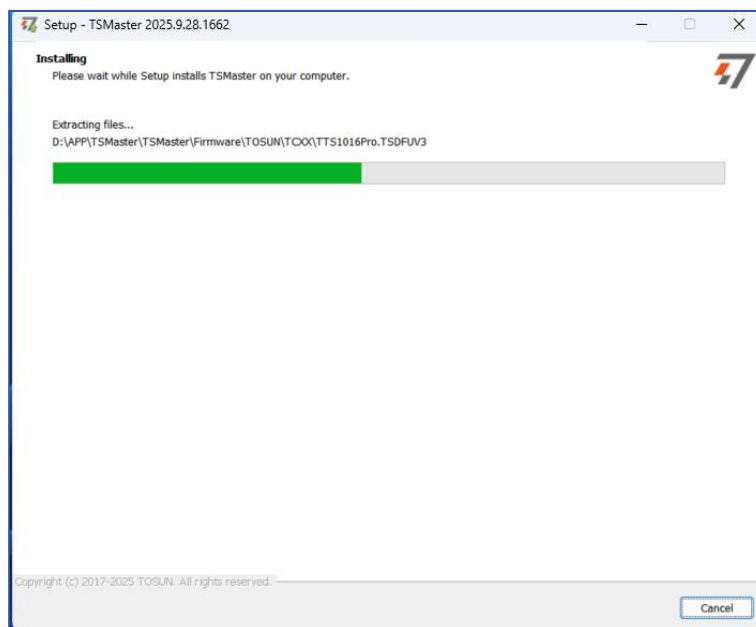


Figure 3-7 TSMaster Installation

6. Click “Finish” to complete installation.

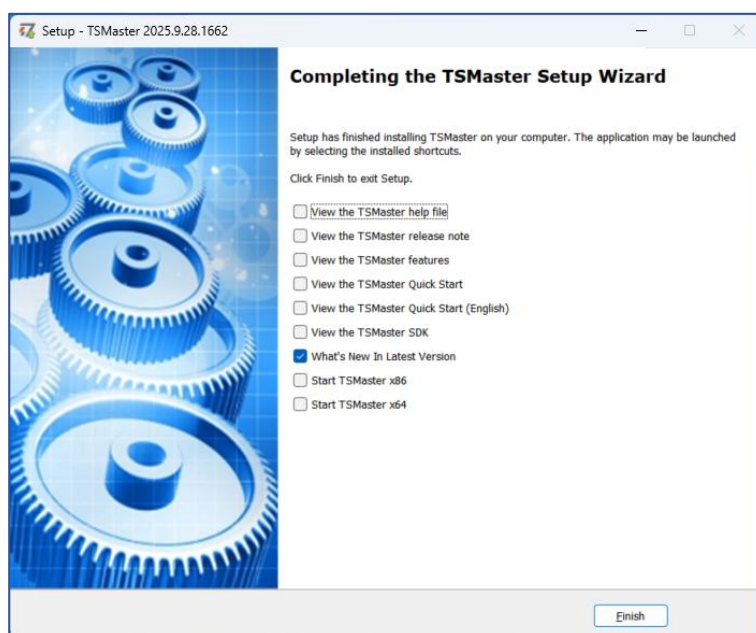


Figure 3-8 TSMaster Installation

4. Inspection and Maintenance

The GW1040 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
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
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**

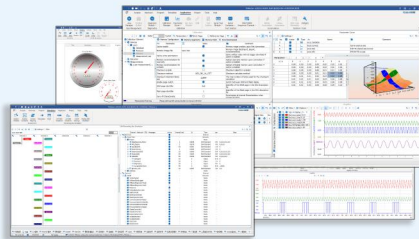
Item	Check Content	Standard/Range	Action/Measure
Mechanical Stress	Check vibration and shock levels	Within specified limits	Install padding or vibration isolation measures if necessary
Electromagnetic Environment	Check for noise sources near the device	No significant noise sources	Isolate or shield the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



Contact Us :

+86 21-5956 0506
 sales@tosunai.com

website :

www.tosunai.com

