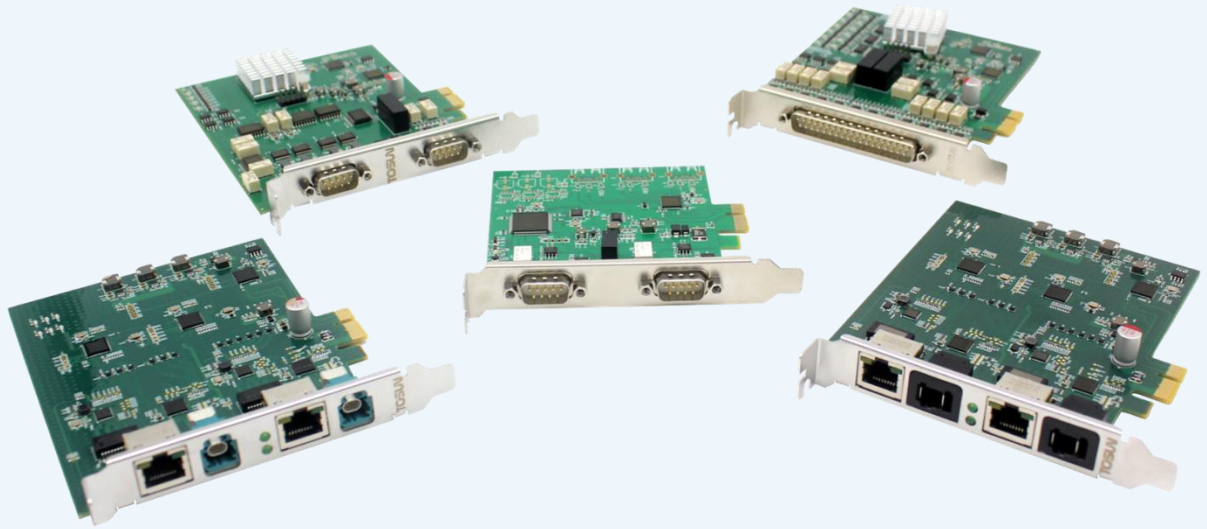




TP Series Product Family

Version: V1.0 | English

tosunai.com

Copyright Information

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What Is the TP Series Product Family?

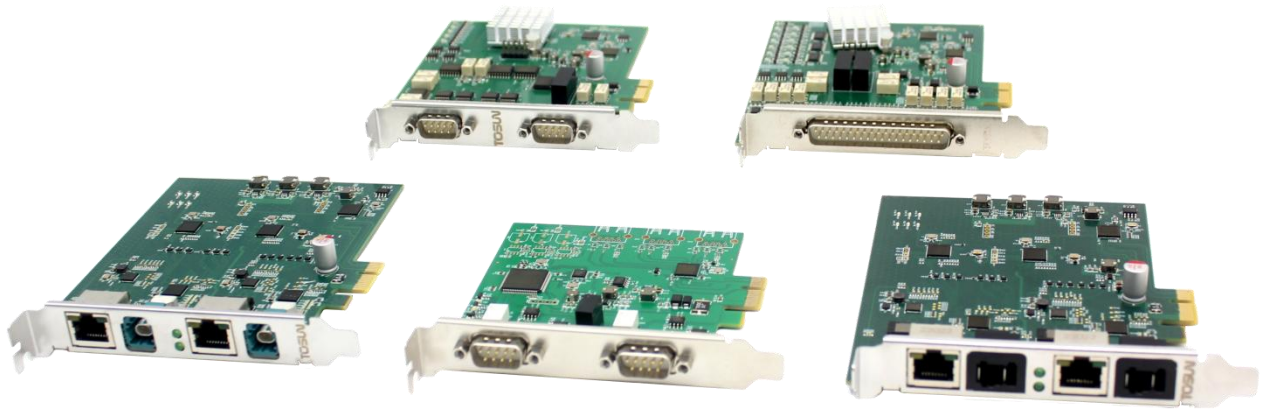
TOSUN has a wide range of product series, such as the TC series, TP series, TE series, TLog series, TTS series, and so on. Among them, to meet the market demand for PCIe interface, TP series is derived from the TC and TE series by changing the connection interface with the PC. As the derivative product of TC and TE series, TP series also cover tools for CAN/CAN FD communication protocol, LIN communication protocol, FlexRay communication protocol, and Ethernet communication protocol

What Products Are Included in the TP Series?

TP1013	TP1018	TP1026P	TP1034
TP1051	MP1013		

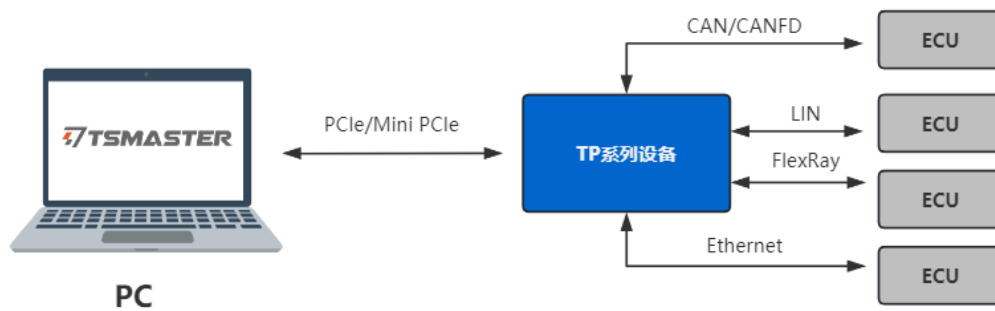
What Can They Do?

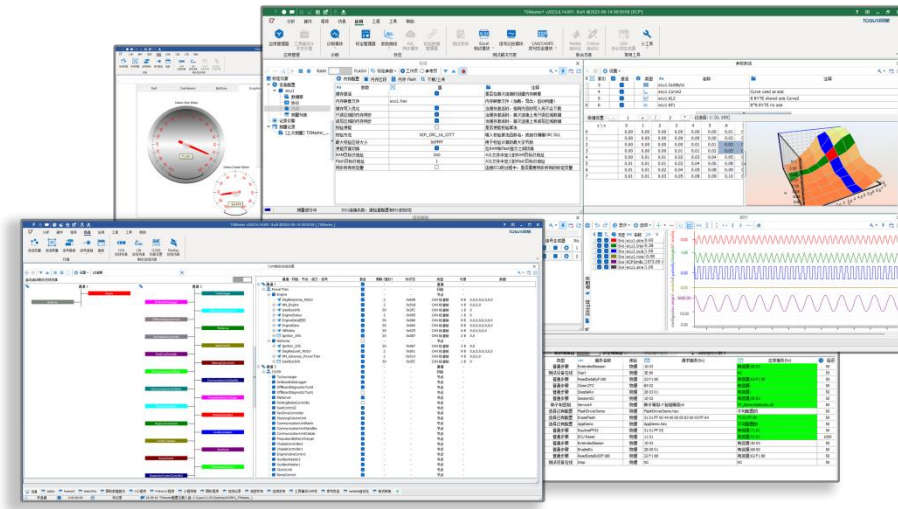
- Bus data collection;
- Domain controller testing;
- Various automated testing systems;
- UDS diagnostics and calibration with CCP and XCP;
- Offline/online replay for blf and asc format files;
- ECU flashing;
- Vehicle Ethernet communication testing;
- Vehicle Ethernet bus simulation;
- ..



How to Use TP Series Product?

Once connected the TP series products to a PC via PCIe or Mini PCIe interface, on the PC side, with the powerful TSMaster software, users can control the device to perform communication with the ECUs using CAN/CAN FD, LIN, FlexRay, Ethernet protocols.





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1.About this User Manual

1.1 Warranty

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2.Product Overview

2.1 Multi-channel CAN/LIN Bus Products



	MP1013	TP1013	TP1018	TP1026P
Channel	2x CAN FD	2x CAN FD	12x CAN FD	1x CAN FD 6x LIN
Baud Rate	CAN: 125k-1Mbps CAN FD: max 8Mbps	CAN: 125k-1Mbps CAN FD: max 8Mbps	CAN: 125k-1Mbps CAN FD: max 8Mbps	CAN: 125k-1Mbps CAN FD: max 8Mbps LIN: 0-20Kbps
Transmission Rate (CAN)	20000fps	20000fps	20000fps	20000fps
PC Interface	Mini PCIe interface	Standard PCIe interface	Standard PCIe interface	Standard PCIe interface
Bus Interface	PH-6	DB9	DB37	DB9/DB15
Galvanic Isolation	2500V	2500V	2500V	2500V
EMC Compatibility	*	EFT: ±1kV Surge: *	EFT: ±2kV Surge: *	EFT: ±2kV Surge: *
Power Supply	Mini PCIe power supply	PCIe power supply	PCIe power supply	PCIe power supply or DC power supply (12V)

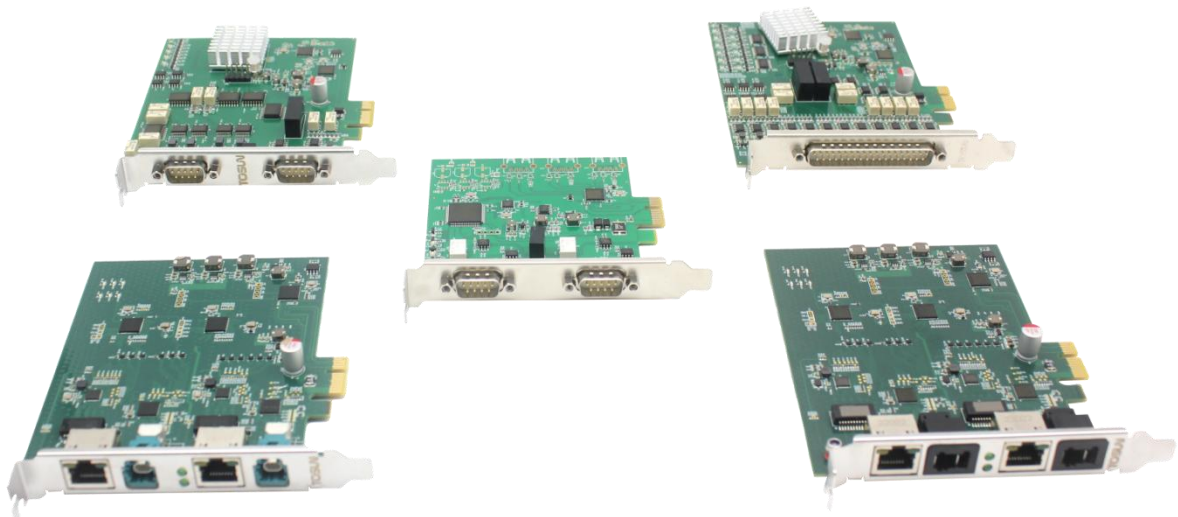
Dimension s	Approx. 51*30*10mm	Approx. 120*110*22mm	Approx. 124*141*22mm	Approx. 124*141*22mm
Weight	Approx. 8g	Approx. 92g	Approx. 115g	Approx. 100g

*Surge protection can be achieved through the CAN surge protection device described in 2.4 CAN Surge Protection Device.

The EMC Electromagnetic Compatibility test standards in the table are as follows: for ESD, the test standard complies with IEC61000-4-2; for EFT, the test standard complies with IEC61000-4-4; and for Surge, the test standard complies with IEC61000-4-5.

To meet the market demand for devices with PCIe interface, TOSUN developed the TP series product. As the derivative product of TC and TE series, the TP series leverages the high bandwidth characteristics of the PCIe interface to achieve faster and more stable data transmission. Whether in automotive electronics, industrial automation, or intelligent transportation systems, the TP series provide stable and reliable support.

The TP series has further expanded the application scenarios of TOSUN's equipment. Thanks to its compact design, the TP series can be conveniently embedded in most computing platforms with a PCIe slot, such as in-vehicle industrial PC, single-board computer (SBC), portable industrial PC, and industrial laptop. It is easy to install and simple to use.



2.2 Multi-channel CAN FD/FlexRay Bus Products



TP1034

	TP1034
Channel	2x CAN FD 2x FlexRay
Baud Rate	CAN: 125k-1Mbps CAN FD: max 8Mbps
Transmission Rate (CAN)	20000fps
PC Interface	Standard PCIe interface
Interface Type	2x DB9
Galvanic Isolation	2500V
EMC Compatibility	EFT: $\pm 2\text{kV}$ Surge: *
Power Supply	PCIe power supply
Dimension	Approx. 124*141*22mm

Weight	Approx. 112g
--------	--------------

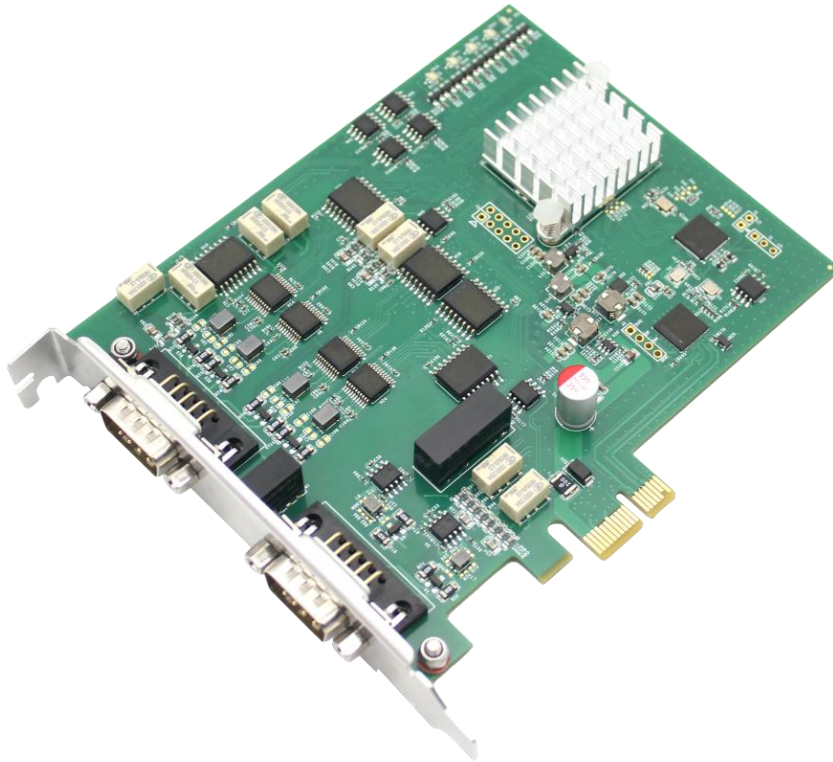
*Surge protection can be achieved through the CAN surge protection device described in 2.4 CAN Surge Protection Device.

The EMC Electromagnetic Compatibility test standards in the table are as follows: for ESD, the test standard complies with IEC61000-4-2; for EFT, the test standard complies with IEC61000-4-4; and for Surge, the test standard complies with IEC61000-4-5.

A high-performance CAN FD/FlexRay bus analyzer, designed specifically to meet the testing and analysis needs of high-speed, high-reliability communication networks in the automotive industry.

FlexRay uses dual-line redundancy for data transmission, with each line having its own transmitter and receiver, while also providing extremely low latency and a flexible bandwidth allocation mechanism.

It supports a variety of data types and rich topological structures, and can be used not only as a bus system but also as an element in star or tree network structure.



2.3 Multi-channel Ethernet Interface Products

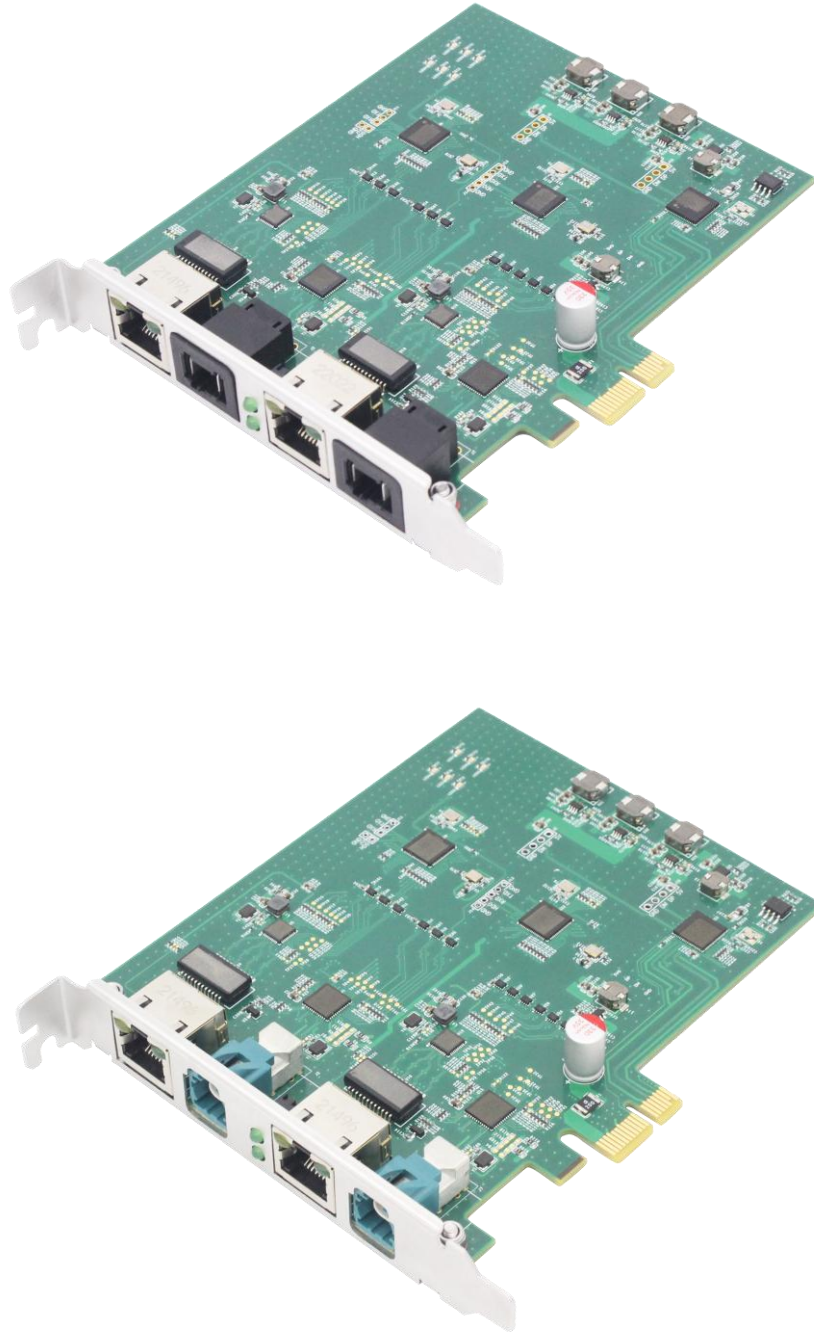


TP1051

	TP1051
Channel	Standard Ethernet 100Base-Tx, 1000Base-T, or Vehicle Ethernet 100/1000Base-T1

PC Interface	Standard PCIe interface
Ethernet Interface	RJ45+TE MATEnet or Rosenberger H-MTD
Timestamp Accuracy	100 us level hardware message timestamp, can meet advanced requirements
Terminal Resistor	Network transformer / capacitive isolation
Power Supply	PCIe power supply
Dimension	Approx. 124*141*22mm
Weight	Approx. 112g

A high-performance hardware device specifically designed for Vehicle Ethernet to achieve data exchange between Vehicle Ethernet and computing platforms. By leveraging the high bandwidth of the PCIe interface, it achieves high-speed transmission of Vehicle Ethernet data. It supports various Ethernet standards, including standard Ethernet 100Base-Tx, 1000Base-T, and Vehicle Ethernet 100/1000Base-T1. Meanwhile, it supports real-time data capture and analysis of Vehicle Ethernet, making it an ideal choice for the development, testing, and validation of automotive networks.



2.4 CAN Surge Protection Device

The CAN surge protection device is a device used to protect the CAN bus system from damage caused by surges (sudden overvoltage or overcurrent). This device does not require an external power source and is designed with a DB9 interface for good compatibility. It is easy to install and can be used immediately without affecting communication quality.

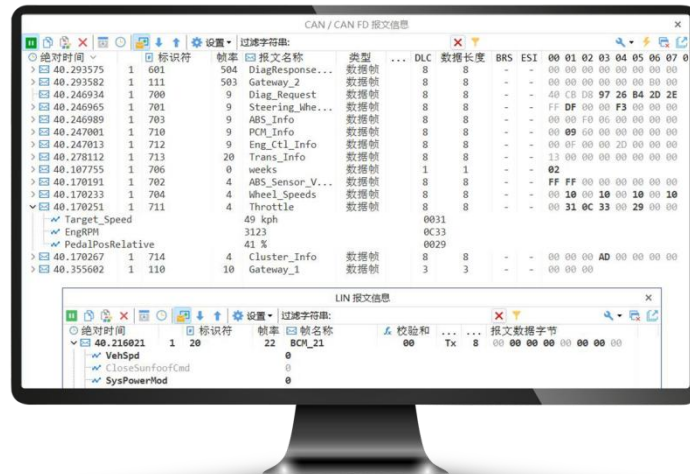
For the TOSUN products that do not support surge protection, you can achieve CAN channel surge protection by installing the TOSUN DB9 surge protection device, model number TCA00011.

Dimension	Approx. 76*38*25mm
Weight	Approx. 71g
Surge Protection Level	±2KV



3.General Information

3.1 Bus Data Collection and Analysis



With the TSMaster software, functions such as message sending/monitoring/replay, bus statistics/logging, digital data/graphic form display and analysis, and so on can be achieved.

- Bus Statistics

Bus statistics include: bus load rate, peak load rate, data frame rate, data frame count, error frame rate, error frame count, controller status, and send error count.

- Database

Supports loading databases in formats such as DBC, LDF, XML, ARXML, and can display database structure views, signal communication matrix views, and message communication matrix views.

- Message Replay

Supports offline and online replay of recorded files in formats such as BLF and ASC.

- Message Transmission

Supports manual sending, hotkey sending, and periodic sending. It also supports signal generators and allows for the creation of customized messages and database-based messages.

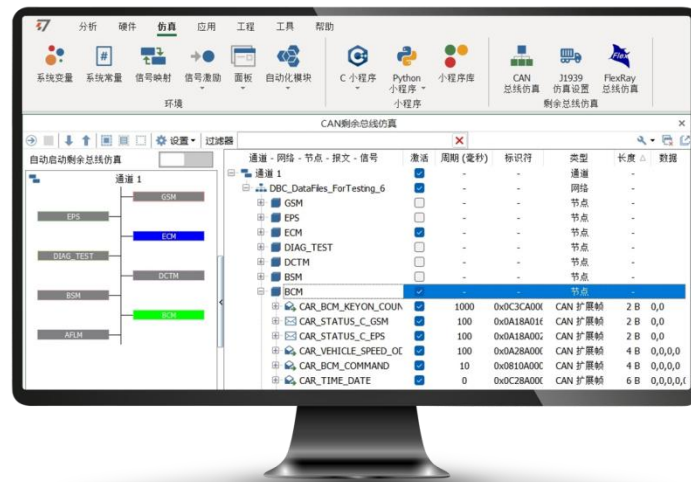
- Message Monitoring

Supports multiple display modes, DBC parsing to view signal values, channel filtering, and ID filtering.

- Graphical Value Display

The signal's Y-axis is flexible and configurable, supporting multi-axis mode and separated display mode, with the option to precisely display data points, which facilitates user data analysis.

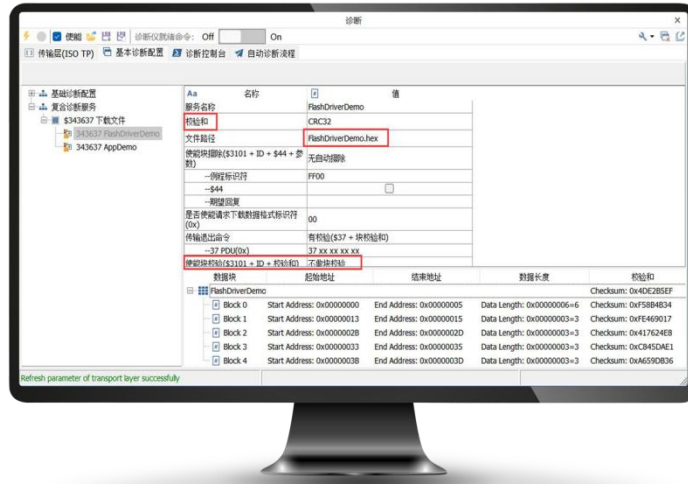
3.2 Bus Simulation



With the TSMaster software, it is possible to achieve multiple buses simulation such as CAN, LIN, and FlexRay. ECU code simulation can also be achieved through soft HIL. The Panel feature built into TSMaster allows bus signals association in the panel to achieve graphical display.

- Supports CAN bus simulation
- Supports LIN bus simulation
- Supports J1939 bus simulation
- Supports FlexRay bus simulation

3.3 Diagnostic



Diagnostic is an important function of automotive ECUs. When the vehicle is in operation, sensors distributed throughout the vehicle can track various potential faults that may occur at any time in the vehicle's electrical or electronic systems. The TOSUN toolchain assists users in conveniently developing and verifying fault diagnosis-related functions, and performing flashing based on the UDS protocol.

- Diagnostic Parameter Configuration

The configuration includes timeout parameter configuration, TesterPresent configuration, and SeedKey DLL configuration. With a built-in SeedKey algorithm editor, user can implement SeedKey algorithms directly without the need for external development tools.

- Basic Diagnostic Configuration

Users can edit the diagnostic database by themselves, including: the settings for various services, the parameters related to requests and responses and so so.

- Diagnostic Console

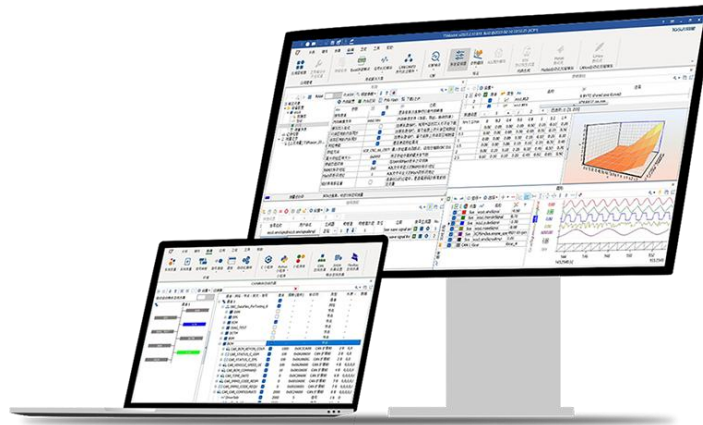
Execute the configured diagnostic services, and user can set up automatic comparison to

check if the response results are correct.

- Automated Diagnostic Process

Customize diagnostic processes and diagnostic services to facilitate the creation of various Flash Bootloader flashing processes

3.4 Calibration



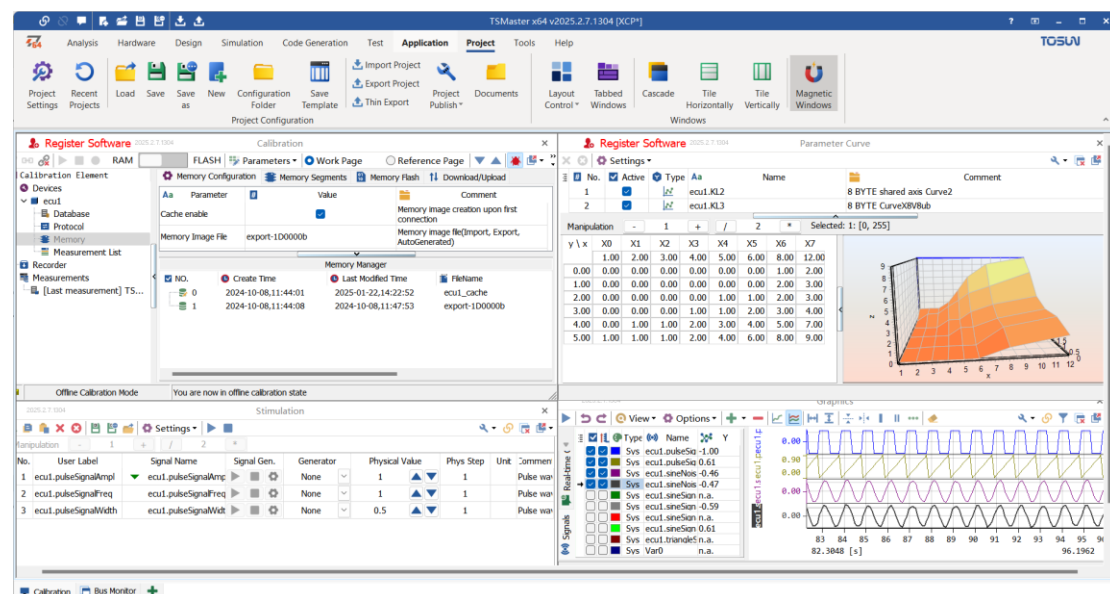
CCP: It is a communication protocol based on CAN (Controller Area Network), mainly used for the calibration and parameter settings of ECUs. It provides the ability to read and write ECU, allowing engineers to read the current parameter values, set new parameter values, and perform real-time testing and adjustments.

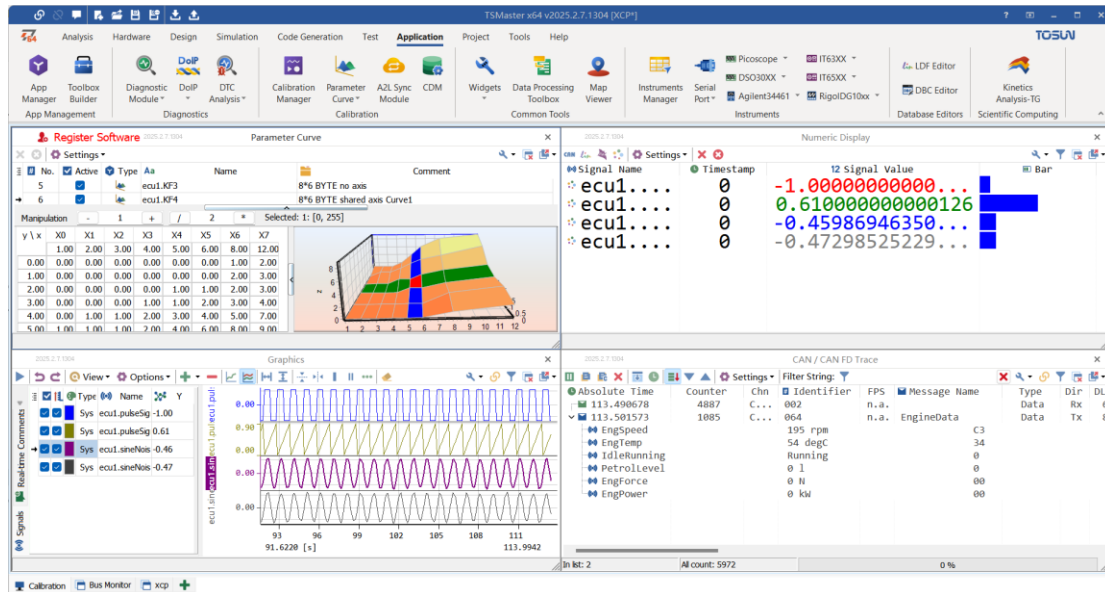
XCP: It is a universal measurement and calibration protocol applicable to various communication interfaces such as CAN and Ethernet. It offers higher transmission rates and more robust capabilities, allowing engineers to quickly read and write large volumes of data in a short period and perform advanced diagnostics and debugging operations.

Automotive calibration is a technique used in the development and diagnostics of automotive

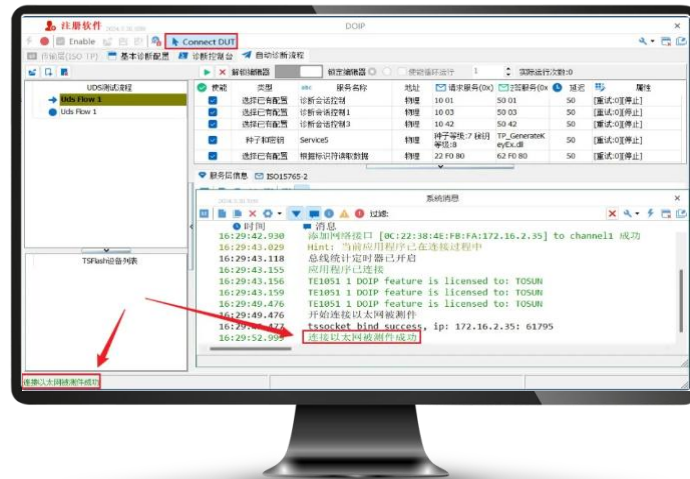
ECUs, which involves adjusting the parameters and calibration values of the ECU to optimize the vehicle's performance and functionality. CCP and XCP are common communication protocols used for communication with the ECU, and reading and modifying parameters. These technologies and tools enable vehicle manufacturers and engineers to better perform vehicle tuning and calibration work.

- Supports importing A2L files;
- Supports DAQ/Polling measurement;
- Memory settings, capable of loading images and configuring verification methods, etc;
- Supports characteristic parameter curves, MAP diagrams, etc;
- Supports MDF/MF4 file storage and playback;
- Supports graphical display of variable curves;
- Supports calibration parameter management in par or hex format;
- Built-in message information analysis, diagnostics, calibration, and system variable data are integrated into one, which facilitates a streamlined process of data analysis;
- Automated calibration functions can also be achieved by calling system variables;
- Supports single and multiple file downloads.





3.5 DoIP Function



The in-vehicle Ethernet diagnostic protocol, known as Diagnostics over Internet Protocol (DoIP), allows for automotive diagnostics through the Ethernet protocol. DoIP is a standard protocol for communication and diagnostics between vehicles or between vehicles and diagnostic equipment. With DoIP, diagnostic engineers can access and diagnose the vehicle's electronic systems via Ethernet or remotely, and can perform diagnostic access and flashing of Ethernet controllers.

- Supports remote access and diagnostics

Achieve remote access and diagnostics of the vehicle's electronic systems via Ethernet, including performing diagnostic access and flashing of Ethernet controllers.

- Diagnostics transport layer configuration

Offers flexible configuration for the diagnostics transport layer, including setting parameters for different types of diagnostic devices and network interfaces.

- Scalability and flexibility

DoIP has good scalability and flexibility, which allows it to be customized and configured according to specific diagnostic requirements and network topology.

- Improve diagnostic efficiency

Diagnosing via Ethernet protocol can enhance diagnostic efficiency and data transmission speed.

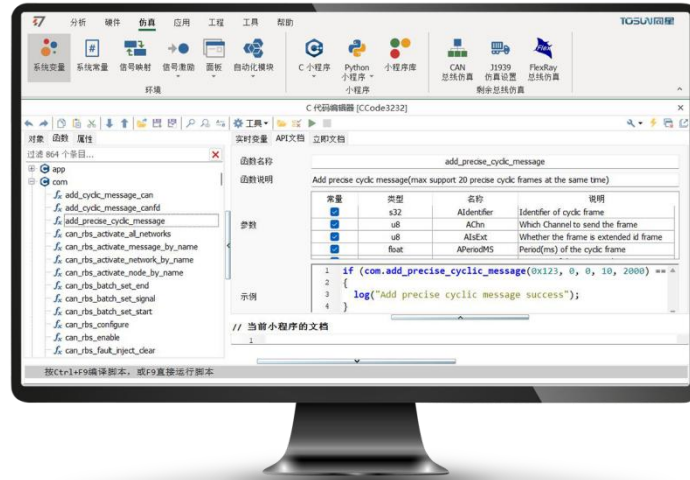
- Supports automated diagnostic processes

TSMaster provides automatic diagnostic process functionality, which can help users quickly perform diagnostic tasks, and offers a diagnostic console and automated diagnostic processes.

- Supports multiple hardware devices

To meet the needs of different application scenarios, a variety of hardware devices that support DoIP functions can be used, such as TE1051, TC1051, TC1054, etc.

3.6 Secondary Development



TSMaster provides a rich API library, allowing users to perform secondary development for TSCAN series tools based on different programming languages, calling API functions to achieve programmatic control of the devices, in order to add new functions and meet specific requirements.

- libTSCAN API C#
- libTSCAN API C and C++
- libTSCAN API Python
- ..

4.TP1013

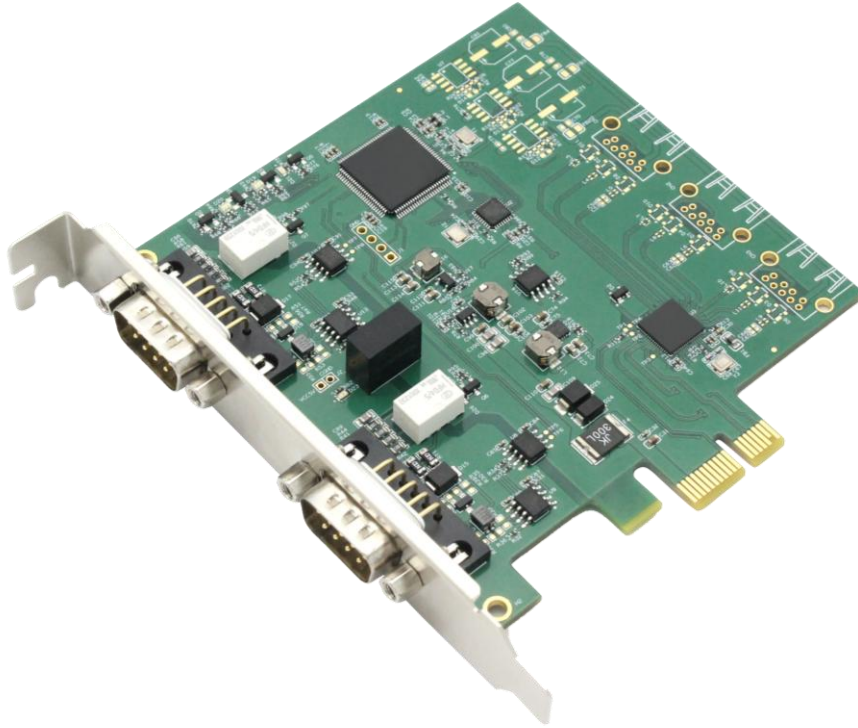
4.1 Overview

TP1013 converts a 2-channel CAN FD bus to PCIe. It is ideal for the development, simulation, and testing of CAN FD/CAN networks.

TP1013 allows a computer with a PCIe slot to easily connect to a CAN/CAN FD bus network, enabling real-time monitoring of multiple bus networks. It has a compact size, and can be conveniently embedded into in-vehicle industrial PC, single-board computer (SBC), portable industrial PC, and industrial laptop. It is easy to install and simple to use.

With the powerful TSMaster software, it is very convenient to monitor, analyze, and simulate CAN FD bus data. It also supports functions such as UDS diagnostics, ECU flashing, CCP/XCP calibration and so on.

The secondary development APIs for Windows and Linux can support various development environments such as C++, C#, LabView, Python, etc., making it highly efficient and easy to use, and is convenient to integrate into various testing systems.



4.2 Features

- ✓ us (microsecond) level hardware message timestamps to meet advanced requirements;
- ✓ Standard PCIe interface, with a driverless design for Windows and Linux systems, offering excellent system compatibility;
- ✓ CAN channel DC 2500V isolation;
- ✓ Automotive-grade design, supporting dbc files, a2l files, blf files, and asc files;
- ✓ CAN channel baud rate adjustable from 125Kbps to 1Mbps, and CAN FD supports a maximum of 8Mbps;
- ✓ Supports blf and asc format data recording and offline/online playback;
- ✓ Supports UDS diagnostics and CCP/XCP calibration;
- ✓ Supports UDS based Bootloader flashing;
- ✓ Supports secondary development interfaces for Windows and Linux systems;
- ✓ Built-in 120-ohm terminal resistor, with the resistance value configurable through software;
- ✓ Capable of loading all paid licenses for TSMaster.

4.3 Technical Data

Channel	2 *CAN FD
PC Interface	Standard PCIe interface
CAN Interface	DB9
Driver	Driverless design for Windows and Linux systems, offering excellent system compatibility
Cache	Hardware cache, with each channel's transmission buffer supporting up to 1000 CAN frames
CAN	Supports CAN 2.0 A and B protocols, compliant with the ISO 11898-1 standard, with baud rates from 125Kbps to 1Mbps
CAN FD	Supports CAN FD that complies with both ISO and non-ISO standards, with baud rates from 125Kbps to 8Mbps
Timestamp Accuracy	1 us, hardware message timestamp, can meet advanced requirements
Terminal Resistor	Built-in 120-ohm terminal resistor, with the resistance value configurable through software
Messages Sent per Second*	Up to 20,000 frames per second
Messages Received per Second*	Up to 20,000 frames per second
Galvanic Isolation	CAN channel DC 2500V isolation
Power Supply	PCIe power supply
Dimension	Approx. 120*110*22mm
Weight	Approx. 92g (without packaging)/Approx. 253g (with packaging)
Operating Humidity	10% ~ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

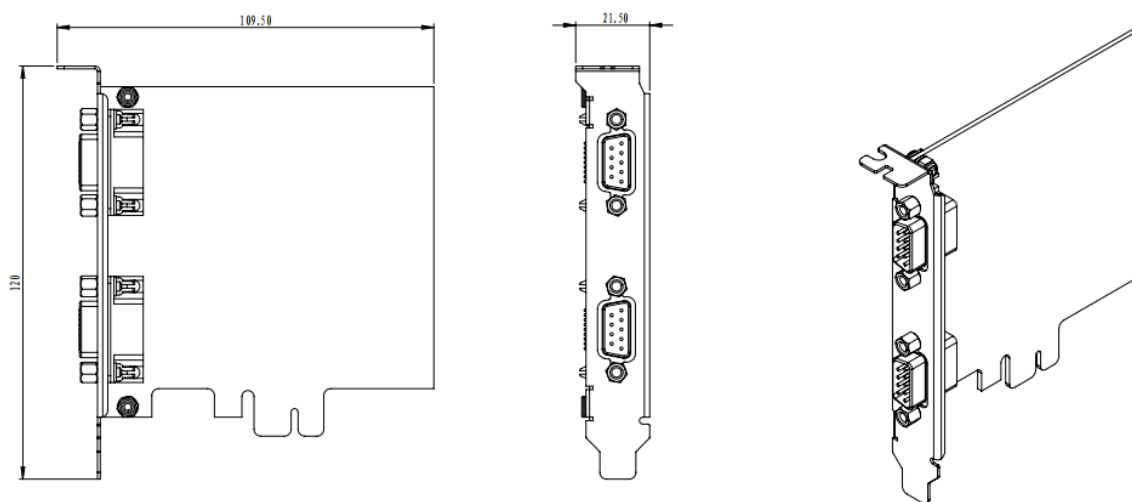
*Single channel 1Mbps, with a 0-byte data field.

4.4 Electrical Data

Parameter		Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
CAN Interface	Bus pin voltage resistance	CANH、CAHL	-58	--	58	V

	Terminal resistor	Terminal resistor enabled	--	120	--	Ω
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC
EMC Compatibility	EFT	IEC61000-4-4 standard	1	--	--	kV

4.5 Mechanical Data



4.6 Scope of Delivery

- ✓ Main device: TP1013



✓ Shield retaining screw * 2

✓ Screwdriver * 1



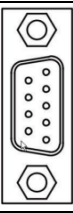
4.7 Hardware Interface



➤ Standard PCIe interface;

➤ DB9 male:

DB9 Pin	PIN Number	Definition
	PIN2	CAN FD_Low

	PIN3	CAN FD_GND
	PIN7	CAN FD_High

4.8 Optional Accessories

- 1.TCA00011 (CAN surge protection device)

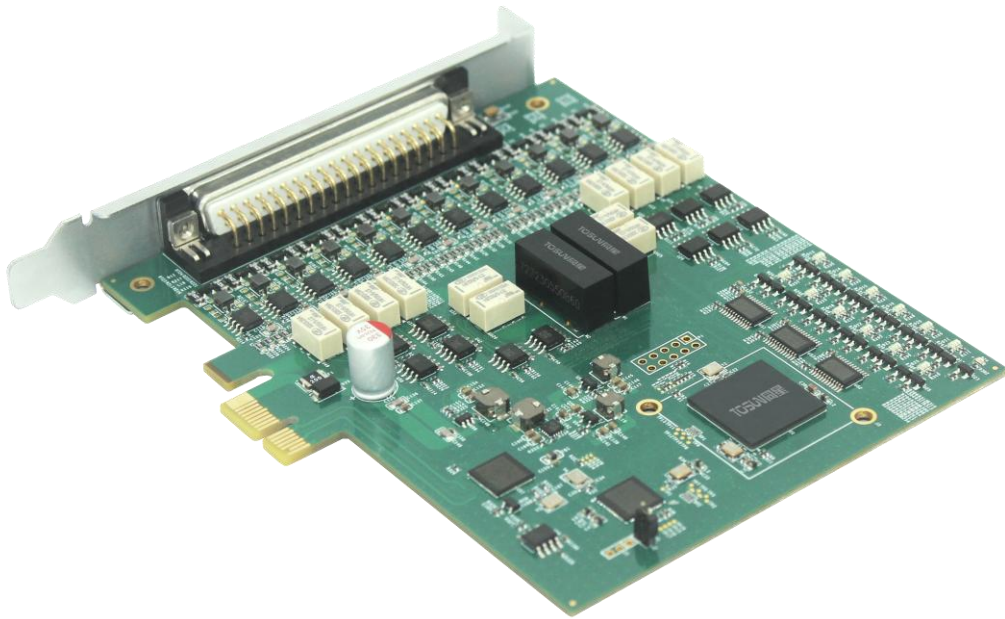
5.TP1018

5.1 Overview

TP1018 is developed by TOSUN to convert a 12-channel CAN FD bus to PCIe. It supports rates up to 8 Mbps and supports real-time monitoring of multiple bus networks. The product features a driverless design for Windows and Linux systems to ensure excellent system compatibility. It has a compact size, and can be conveniently embedded into in-vehicle industrial PC, single-board computer (SBC), portable industrial PC, and industrial laptop. It is easy to install and simple to use

With the powerful TSMaster software, it supports loading DBC and ARXML database files, making it very convenient to monitor, analyze, and simulate CAN FD bus data, and it also supports functions such as UDS diagnostics, ECU flashing, CCP/XCP calibration, etc.

The secondary development APIs for Windows and Linux can support various development environments such as C++, C#, LabView, Python, etc., making it highly efficient and easy to use, and is convenient to integrate into various testing systems.



5.2 Features

- ✓ us (microsecond) level hardware message timestamps to meet advanced requirements;
- ✓ Standard PCIe interface, with a driverless design for Windows and Linux systems, offering excellent system compatibility;
- ✓ CAN channel DC 2500V isolation;
- ✓ Automotive-grade design, supporting dbc files, a2l files, blf files, asc files, and arxml files;
- ✓ CAN channel baud rate adjustable from 125Kbps to 1Mbps, and CAN FD supports a maximum of 8Mbps;
- ✓ Supports blf and asc format data recording and offline/online playback;
- ✓ Supports UDS diagnostics and CCP/XCP calibration;
- ✓ Supports UDS based Bootloader flashing;
- ✓ Supports information security testing;
- ✓ Supports secondary development interfaces for Windows and Linux systems;
- ✓ Built-in 120-ohm terminal resistor, with the resistance value configurable through software;
- ✓ Capable of loading all paid licenses for TSMaster.

5.3 Technical Data

Channel	12 *CAN FD
PC Interface	Standard PCIe interface
CAN Interface	DB37
Driver	Driverless design for Windows and Linux systems, offering excellent system compatibility
Cache	Hardware cache, with each channel's transmission buffer supporting up to 700 CAN frames
CAN	Supports CAN 2.0 A and B protocols, compliant with the ISO 11898-1 standard, with baud rates from 125Kbps to 1Mbps
CAN FD	Supports CAN FD that complies with both ISO and non-ISO standards, with baud rates from 125Kbps to 8Mbps
Timestamp Accuracy	1 us, hardware message timestamp, can meet advanced requirements
Terminal Resistor	Built-in 120-ohm terminal resistor, with the resistance value configurable through software
Messages Sent per Second*	Up to 20,000 frames per second
Messages Received per Second*	Up to 20,000 frames per second
Galvanic Isolation	CAN channel DC 2500V isolation
Power Supply	PCIe power supply
Dimension	Approx. 124*141*22mm
Weight	Approx. 115g (without packaging)/Approx. 782g (with packaging)
Operating Humidity	10% ~ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

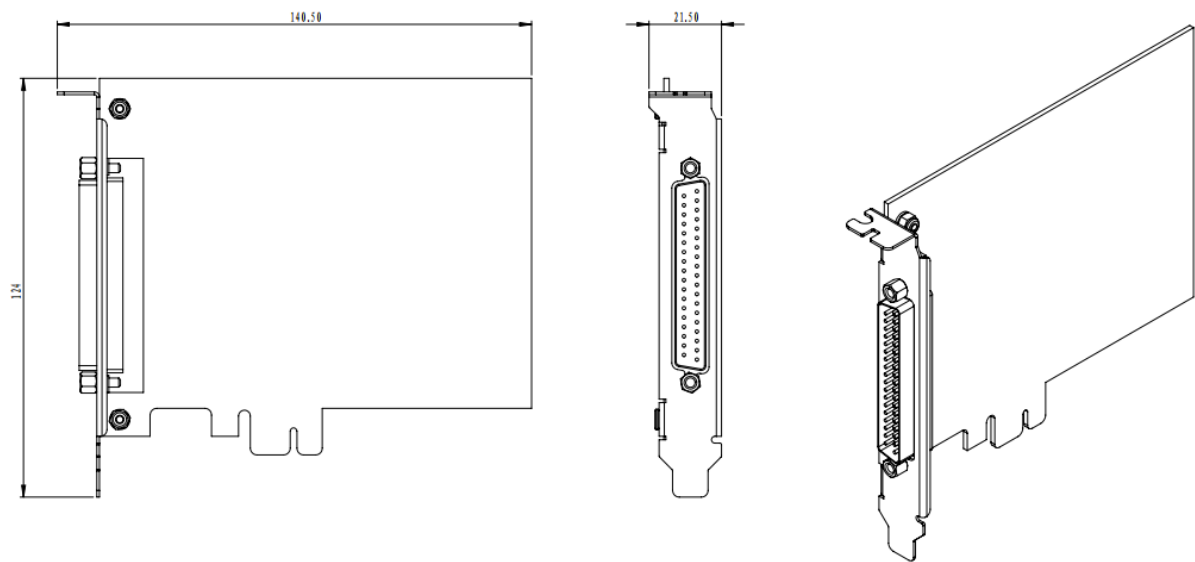
*Single channel 1Mbps, with a 0-byte data field.

5.4 Electrical Data

Parameter		Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
CAN Interface	Bus pin voltage	CANH、CAHL	-58	--	58	V

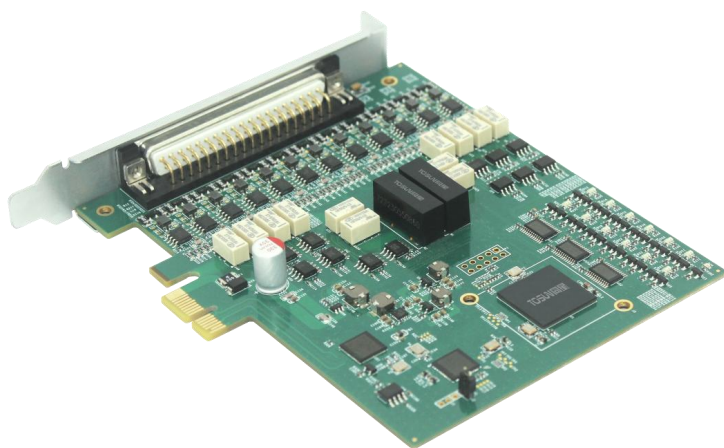
	resistance					
	Terminal resistor	Terminal resistor enabled	--	120	--	Ω
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC
EMC Compatibility	EFT	IEC61000-4-4 standard	2	--	--	kV

5.5 Mechanical Data



5.6 Scope of Delivery

- ✓ Main device: TP1018



✓ Shield retaining screw * 2

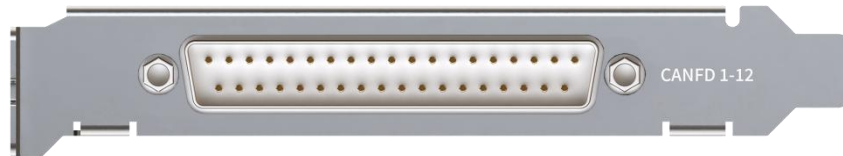
✓ Screwdriver * 1



✓ DB37 female to 12 male signal cable



5.7 Hardware Interface



➤ Standard PCIe interface;

➤ DB37 male:

PIN Number	Definition	PIN Number	Definition
PIN20	CAN FD1_High	PIN1	CAN FD1_Low
PIN21	CAN FD_Shield	PIN2	CAN FD_GND
PIN22	CAN FD2_High	PIN3	CAN FD2_Low
PIN23	CAN FD3_High	PIN4	CAN FD3_Low
PIN24	CAN FD_Shield	PIN5	CAN FD_GND
PIN25	CAN FD4_High	PIN6	CAN FD4_Low
PIN26	CAN FD5_High	PIN7	CAN FD5_Low
PIN27	CAN FD_Shield	PIN8	CAN FD_GND
PIN28	CAN FD6_High	PIN9	CAN FD6_Low
PIN29	CAN FD7_High	PIN10	CAN FD7_Low
PIN30	CAN FD_Shield	PIN11	CAN FD_GND

PIN31	CAN FD8_High	PIN12	CAN FD8_Low
PIN32	CAN FD9_High	PIN13	CAN FD9_Low
PIN33	CAN FD_Shield	PIN14	CAN FD_GND
PIN34	CAN FD10_High	PIN15	CAN FD10_Low
PIN35	CAN FD11_High	PIN16	CAN FD11_Low
PIN36	CAN FD_Shield	PIN17	CAN FD_GND
PIN37	CAN FD12_High	PIN18	CAN FD12_Low
		PIN19	CAN FD_GND

5.8 Optional Accessories

1.TCA00011 (CAN surge protection device)

6.TP1026P

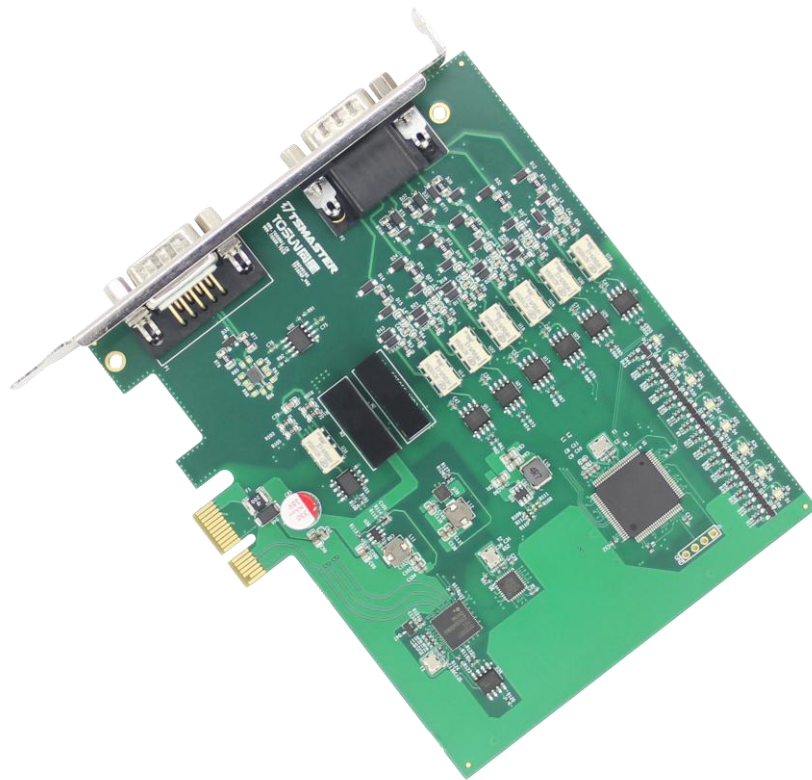
6.1 Overview

TP1026P interface card allows a computer with a PCIe slot to easily connect to a LIN/CAN/CAN FD bus network, enabling real-time monitoring of multiple bus networks.

TP1026P converts an 1-channel CAN FD and a 6-channel LIN to PCIe. It has a compact size, and can be conveniently embedded into in-vehicle industrial PC, single-board computer (SBC), portable industrial PC, and industrial laptop. It is easy to install and simple to use.

With the powerful TSMaster software, it is very convenient to monitor, analyze, and simulate LIN and CAN FD bus data. It also supports functions such as UDS diagnostics, ECU flashing and so on.

The secondary development APIs for Windows and Linux can support various development environments such as C++, C#, LabView, Python, etc., making it highly efficient and easy to use, and is convenient to integrate into various testing systems.



6.2 Features

- ✓ us (microsecond) level hardware message timestamps to meet advanced requirements;
- ✓ Standard PCIe interface, with a driverless design for Windows and Linux systems, offering excellent system compatibility;
- ✓ CAN channel DC 2500V isolation;
- ✓ Automotive-grade design, supporting LDF, dbc files, a2l files, blf files, asc files, and arxml files;
- ✓ CAN channel baud rate adjustable from 125Kbps to 1Mbps, and CAN FD supports a

maximum of 8Mbps;

- ✓ The LIN bus primary and secondary nodes can be configured via software;
- ✓ Supports blf and asc format data recording and offline/online playback;
- ✓ Supports UDS diagnostics and CCP/XCP calibration;
- ✓ Supports UDS based Bootloader flashing;
- ✓ Supports LIN bus based UDS diagnostics;
- ✓ Supports information security testing;
- ✓ Supports secondary development interfaces for Windows and Linux systems;
- ✓ Built-in 120-ohm terminal resistor, with the resistance value configurable through software;
- ✓ Capable of loading all paid licenses for TSMaster.

6.3 Technical Data

Channel	1 *CAN FD/6 *LIN
PC Interface	Standard PCIe interface
CAN/LIN Interface	DB9/DB15
Driver	Driverless design for Windows and Linux systems, offering excellent system compatibility
Cache	Hardware cache, with each channel's transmission buffer supporting up to 1000 CAN frames
CAN	Supports CAN 2.0 A and B protocols, compliant with the ISO 11898-1 standard, with baud rates from 125Kbps to 1Mbps
CAN FD	Supports CAN FD that complies with both ISO and non-ISO standards, with baud rates from 125Kbps to 8Mbps
LIN	Supports LIN 1.3 and 2.0, with baud rate from 0 to 20Kbps
Schedule Table	Supports LDF files and running schedule tables, and also allows for self-configuration of schedule tables
Timestamp Accuracy	1 us, hardware message timestamp, can meet advanced requirements
Terminal Resistor	Built-in 120-ohm terminal resistor, with the resistance value configurable through software
Messages Sent per Second*	Up to 20,000 frames per second
Messages Received per Second*	Up to 20,000 frames per second
Galvanic Isolation	CAN channel DC 2500V isolation
Power Supply	PCIe power supply
Dimension	Approx. 124*141*22mm
Weight	Approx. 94g (without packaging)/Approx. 328g (with packaging)

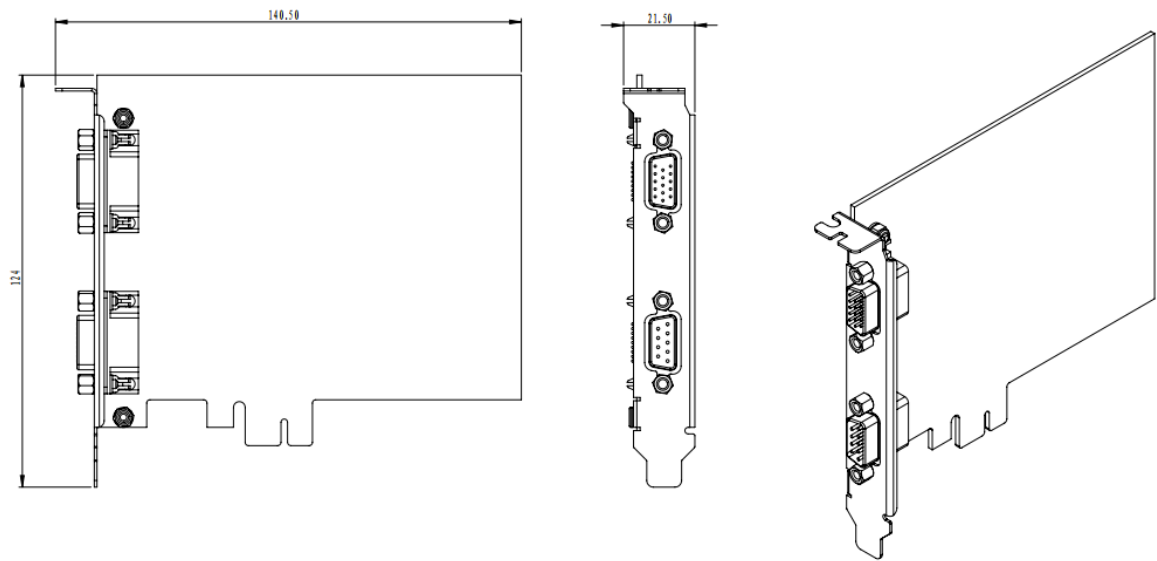
Operating Humidity	10% ~ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

*Single channel 1Mbps, with a 0-byte data field.

6.4 Electrical Data

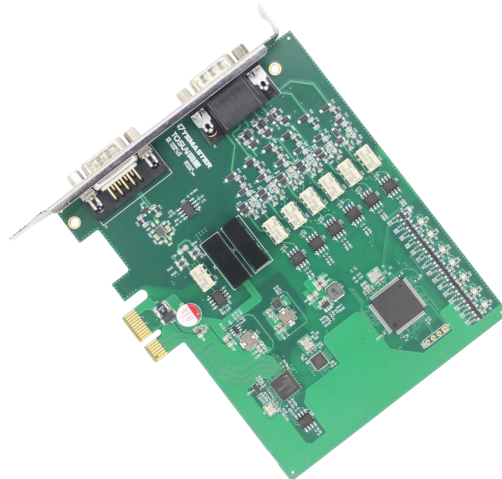
Parameter		Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
CAN Interface	Bus pin voltage resistance	CANH、CAHL	-58	--	58	V
	Terminal resistor	Terminal resistor enabled	--	120	--	Ω
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC
LIN Interface	Bus pin voltage resistance	LIN1、LIN2 LIN3、LIN4 LIN5、LIN6	-40	--	40	V
EMC Compatibility	EFT	IEC61000-4-4 standard	2	--	--	kV

6.5 Mechanical Data



6.6 Scope of Delivery

- ✓ Main device: TP1026P



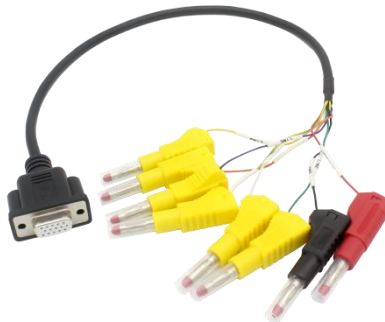
- ✓ Shield retaining screw * 2
- ✓ Screwdriver * 1



- ✓ DB9 female to 2 male signal cable



- ✓ DB15 female to 8 banana plugs cable

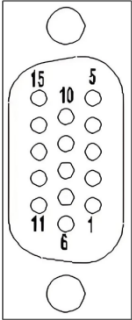


6.7 Hardware Interface

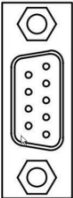


- Standard PCIe interface;
- DB15 male:

DB15 PIN	PIN Number	Definition

	PIN1	VCC_LIN
	PIN2	LIN5
	PIN3	VCC_LIN
	PIN4	LIN4
	PIN5	GND
	PIN6	VCC_LIN
	PIN7	LIN6
	PIN8	VCC_LIN
	PIN9	LIN2
	PIN10	VCC_LIN
	PIN11	LIN1
	PIN12	VCC_LIN
	PIN13	LIN3
	PIN14	GND
	PIN15	GND

➤ DB9 male:

DB9 PIN	PIN Number	Definition
	PIN2	CAN FD_Low
	PIN3	CAN FD_GND
	PIN5	CAN FD_Shield
	PIN7	CAN FD_High

6.8 Optional Accessories

- 1.TCA00011 (CAN surge protection device)

7.TP1034

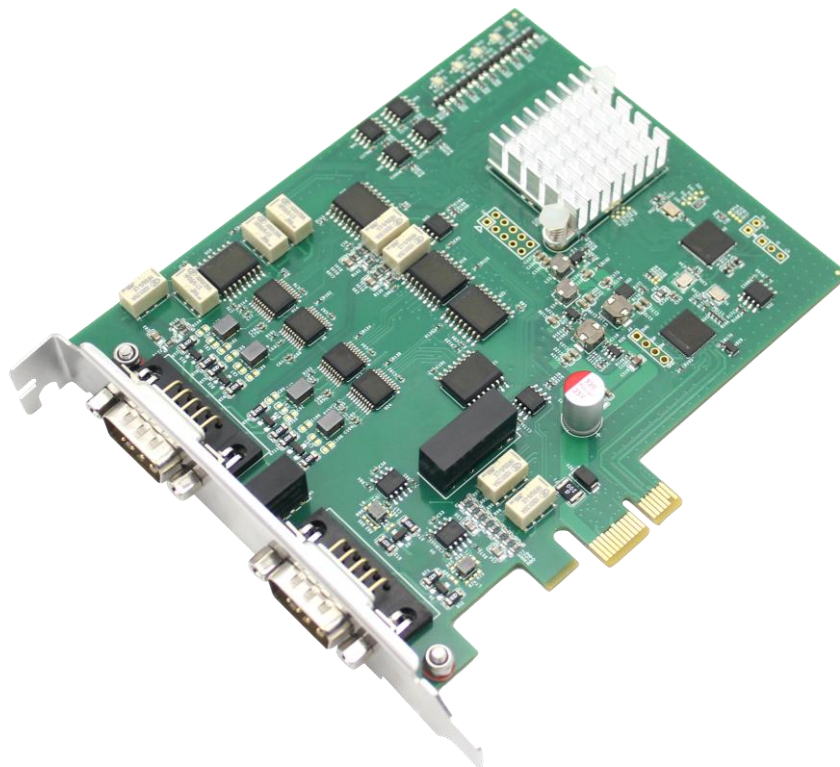
7.1 Overview

TP1034 is a high-performance multi-channel CAN FD and FlexRay bus interface device launched by TOSUN Technology. The CAN FD bus rate supports up to 8 Mbps, and FlexRay uses a dual-line redundant method for data transmission, providing very low latency and flexible bandwidth allocation mechanism. It supports various data types and rich topological structures, and can be used as a bus system or as an element in star/tree network structure. The product uses a standard PCIe interface to connect with the PC and features a driverless design for Windows and

Linux systems, ensuring excellent system compatibility.

With the powerful TSMaster software, it supports loading DBC and ARXML database files, making it very convenient to monitor, analyze, and simulate CAN FD/FlexRay bus data, and it also supports functions such as UDS diagnostics, ECU flashing, CCP/XCP calibration, etc. It can also easily handle tasks such as FlexRay network development, simulation, testing, etc.

The secondary development APIs for Windows and Linux can support various development environments such as C++, C#, LabView, Python, etc., making it highly efficient and easy to use, and is convenient to integrate into various testing systems.



7.2 Features

- ✓ us (microsecond) level hardware message timestamps to meet advanced requirements;
- ✓ Standard PCIe interface, with a driverless design for Windows and Linux systems, offering

excellent system compatibility;

- ✓ CAN channel DC 2500V isolation;
- ✓ Automotive-grade design, supporting dbc files, a2l files, blf files, asc files, and arxml files;
- ✓ CAN channel baud rate adjustable from 125Kbps to 1Mbps, and CAN FD supports a maximum of 8Mbps;
- ✓ Supports blf and asc format data recording and offline/online playback;
- ✓ Supports UDS diagnostics and CCP/XCP calibration;
- ✓ Supports UDS based Bootloader flashing;
- ✓ For CAN, built-in 120-ohm terminal resistor, with the resistance value configurable through software;
- ✓ For FlexRay, built-in 100-ohm terminal resistor, with the resistance value configurable through software;
- ✓ Auxiliary communication controller, eliminating the need to add extra nodes during cold starts;
- ✓ Perfectly adapts to FlexRay, CAN/CAN FD bus applications based on TSMaster;
- ✓ Supports secondary development interfaces for Windows and Linux systems;

7.3 Main Functions of FlexRay

- Flexible configuration for communication controller buffer;
- Capable to detect empty frame;
- Capable of forming composite communication modes through multiple cycles (Cycle multiplexing);
- Supports frame payloads up to a maximum of 254 bytes;
- Supports PDUs;
- Features a start-up monitoring function;
- Supports FlexRay message recording and replay;
- Supports using two FlexRay channels as two separate FlexRay nodes (parallel connected).

7.4 Technical Data

Channel	2 *FlexRay/2 *CAN FD
---------	----------------------

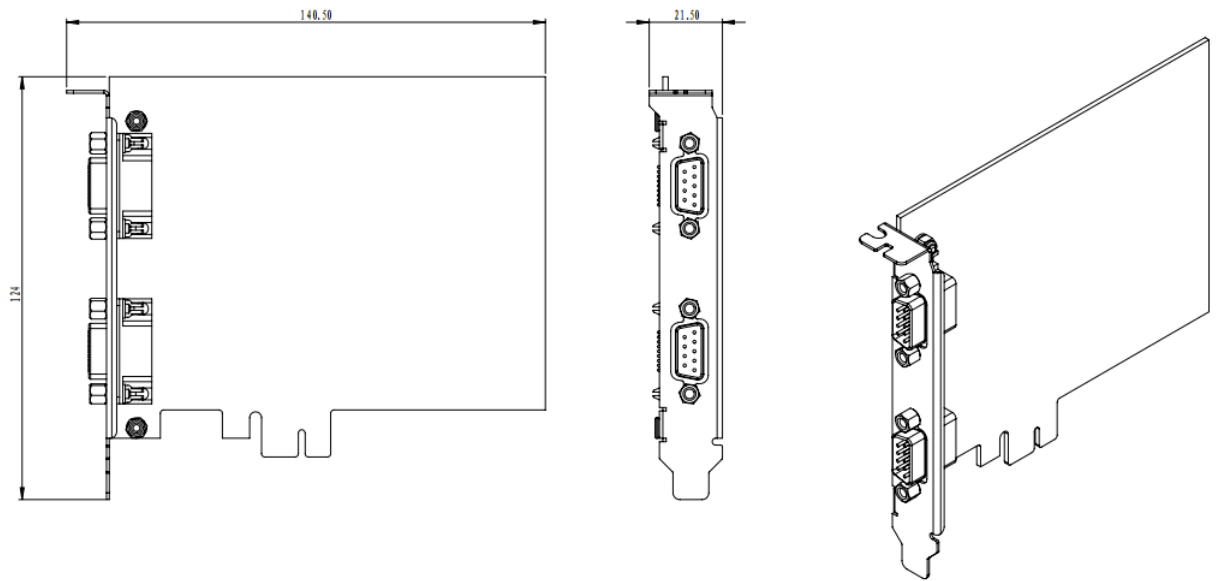
PC Interface	Standard PCIe interface
CAN/FlexRay Interface	DB9
Driver	Driverless design for Windows and Linux systems, offering excellent system compatibility
FlexRay	FlexRay channel (A and B)
Cold Start	Supported
CAN	Supports CAN 2.0 A and B protocols, compliant with the ISO 11898-1 standard, with baud rates from 125Kbps to 1Mbps
CAN FD	Supports CAN FD that complies with both ISO and non-ISO standards, with baud rates from 125Kbps to 8Mbps
Timestamp Accuracy	1 us, hardware message timestamp, can meet advanced requirements
CAN Terminal Resistor	Built-in 120-ohm terminal resistor, with the resistance value configurable through software
FlexRay Terminal Resistor	Built-in 100-ohm terminal resistor, with the resistance value configurable through software
Messages Sent per Second*	Up to 20,000 frames per second
Messages Received per Second*	Up to 20,000 frames per second
Galvanic Isolation	CAN channel DC 2500V isolation
Power Supply	PCIe power supply
Dimension	Approx. 124*141*22mm
Weight	Approx. 112g (without packaging)/Approx. 423g (with packaging)
Operating Humidity	10% ~ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

*Single channel 1Mbps, with a 0-byte data field.

7.5 Electrical Data

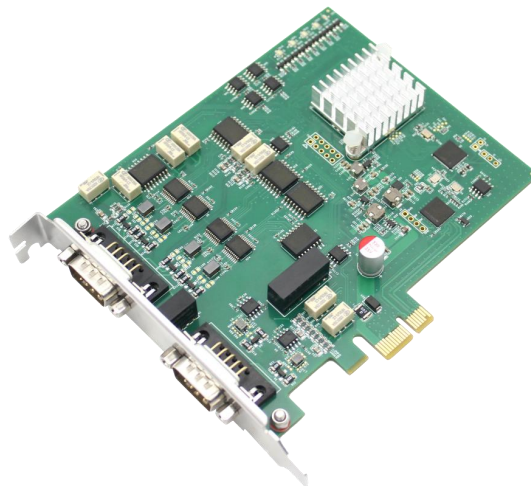
Parameter		Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
CAN Interface	Bus pin voltage resistance	CANH、CAHL	-58	--	58	V
	Terminal resistor	Terminal resistor enabled	--	120	--	Ω
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC
FlexRay Interface	Bus pin voltage resistance	FlexRay_BM、FlexRay_BP	-60	--	60	V
	Terminal resistor	Terminal resistor enabled	--	100	--	Ω
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC
EMC Compatibility	EFT	IEC61000-4-4 standard	2	--	--	kV

7.6 Mechanical Data



7.7 Scope of Delivery

- ✓ Main device: TP1034



- ✓ Shield retaining screw * 2

- ✓ Screwdriver * 1



- ✓ DB9 female to dual male signal cable (CAN)



- ✓ DB9 female to dual male signal cable (FlexRay)

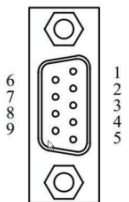


7.8 Hardware Interface



- Standard PCIe interface;

➤ DB9 male:

DB9 PIN	Channel	PIN Number	Definition	Channel	PIN Number	Definition
	Flexray 1/2	PIN1	Flexray_BM2	CAN FD 1/2	PIN2	CAN FD1_Low
		PIN2	Flexray_BM1		PIN3	CAN FD_GND
		PIN3	Flexray_GND		PIN4	CAN FD2_Low
		PIN4	Flexray_BM3		PIN5	CAN FD_Shield
		PIN5	Flexray_BM4		PIN7	CAN FD1_High
		PIN6	Flexray_BP2		PIN8	CAN FD2_High
		PIN7	Flexray_BP1			
		PIN8	Flexray_BP3			
		PIN9	Flexray_BP4			

7.9 Optional Accessories

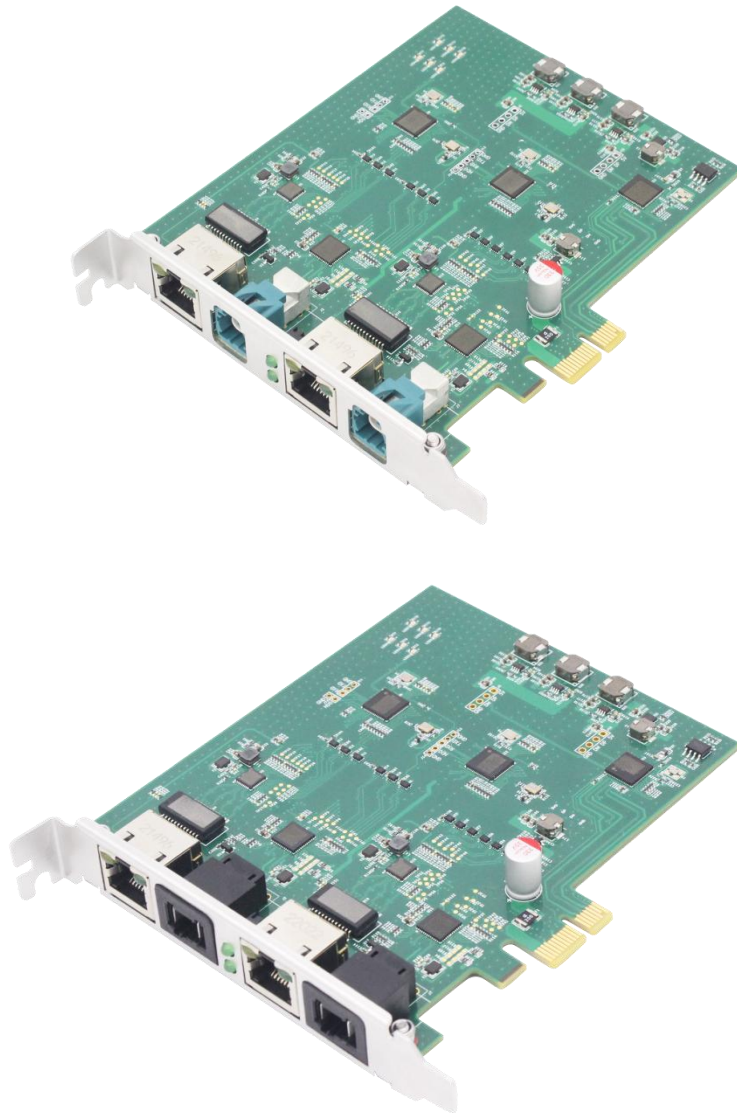
1.TCA00011 (CAN surge protection device)

8.TP1051

8.1 Overview

TP1051 converts two Ethernet interfaces to a PCIe interface. Users can transmit either standard Ethernet 100Base-Tx/1000Base-T data or Vehicle Ethernet 100/1000Base-T1 data to a PC via the PCIe interface, and achieve Ethernet data simulation, analysis, and testing through the TSMaster software. It can also realize functions such as DoIP and SOME/IP.

TP1051 allows a computer with a PCIe slot to easily connect to Vehicle Ethernet network. It has a compact size, and can be conveniently embedded into in-vehicle industrial PC, single-board computer (SBC), portable industrial PC, and industrial laptop. It is easy to install and simple to use.



8.2 Features

- us (microsecond) level hardware message timestamps to meet advanced requirements;
- PCIe interface, with a driverless design for Windows 10/11, driver installation is required for Windows 7;
- Two Ethernet interfaces for standard Ethernet 100Base-Tx/1000Base-T or Vehicle Ethernet 100/1000Base-T1, with the mode configurable through software;
- Vehicle Ethernet interface: TE MATEnet and Rosenberger H-MTD;
- Automotive-grade design, supports loading arxml files in TSMaster and analyzing Vehicle Ethernet packets;
- Supports DoIP and SOMEIP;
- Supports secondary development interfaces for Windows and supports Ethernet with

timestamps, facilitating secondary development;

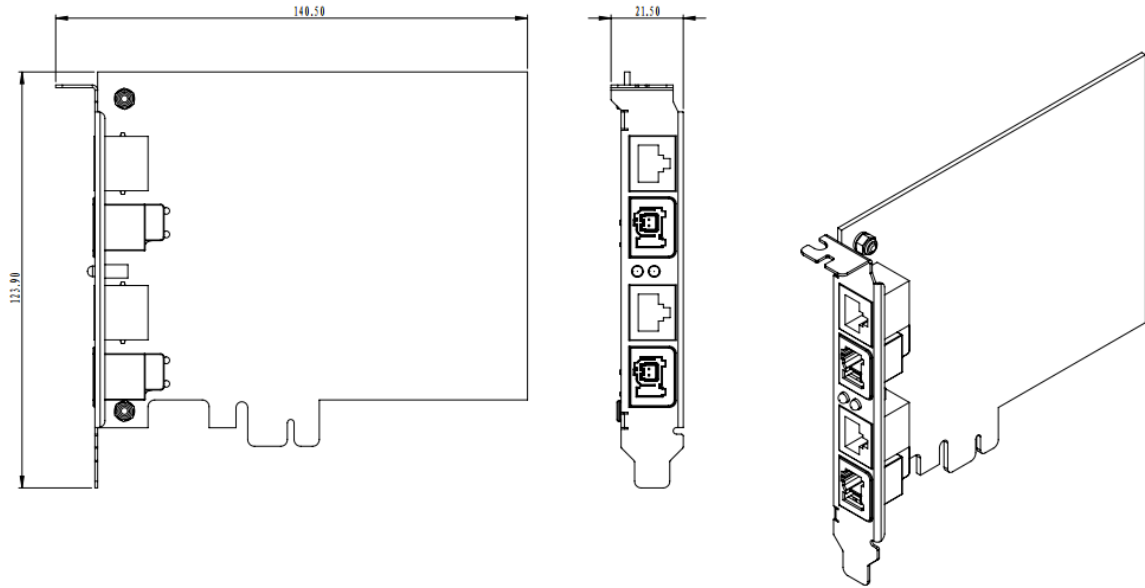
- Supports the transmission and reception of Ethernet packets in RAW format with timestamps, as well as sending completion events, and supports the modification of the packet's CRC;
- Supports hardware MAC filtering and software VLAN filtering;
- Provides TCP/IP sample projects based on API interfaces;
- The maximum loopback rate is approximately 7 Mbytes (full duplex).

8.3 Technical Data

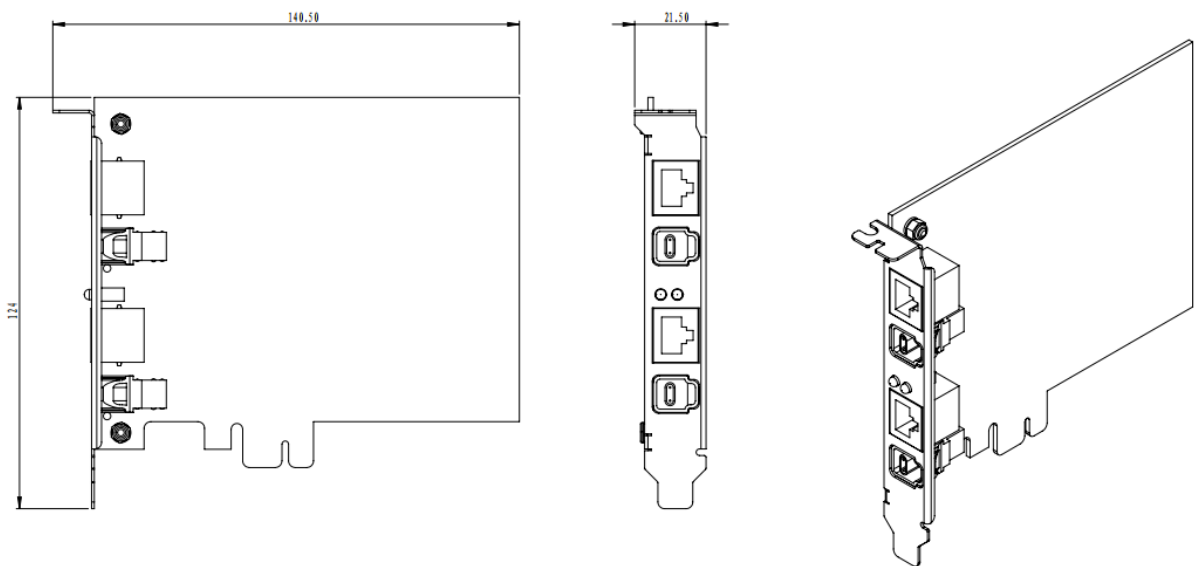
Channel	Standard Ethernet 100Base-Tx 1000Base-T or Vehicle Ethernet 100/1000Base-T1
PC Interface	Standard PCIe interface
Ethernet Interface	RJ45+TE MATEnet or Rosenberger H-MTD
Driver	Driverless design for Windows 10/11, and driver installation is required for Windows 7
Timestamp Accuracy	100 us level hardware message timestamp, can meet advanced requirements
Galvanic Isolation	Network transformer / capacitive isolation
Power Supply	PCIe power supply
Dimension	Approx. 124*141*22mm
Weight	Approx. 83g (without packaging)/Approx. 306g (with packaging)
Operating Temperature	-40°C~80°C
Operating Humidity	10% ~ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

8.4 Mechanical Data

TP1051 MATEnet:

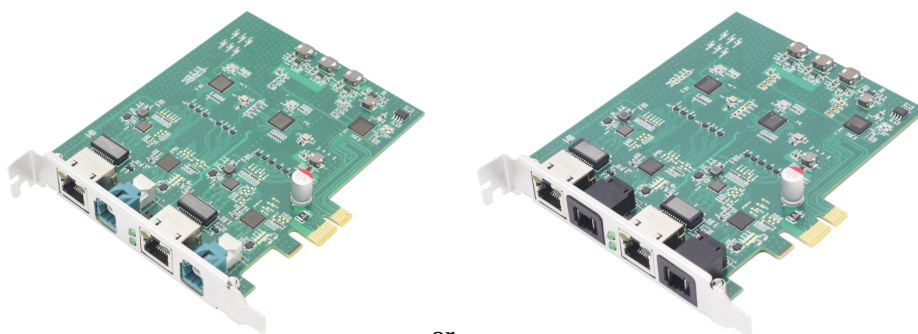


TP1051 H-MTD:



8.5 Scope of Delivery

- ✓ Main device: TP1051



or

- ✓ Shield retaining screw * 2
- ✓ Screwdriver * 1
- ✓ Category 6 Gigabit Ethernet cable



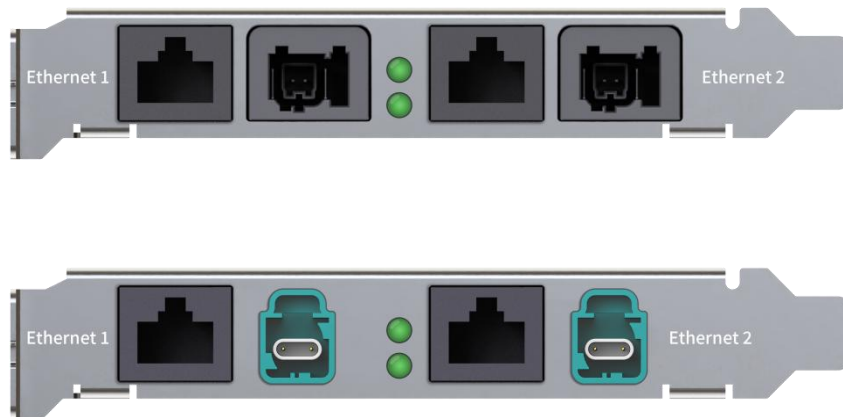
- ✓ MATENET Ethernet cable (optional)



- ✓ Rosenberger Ethernet cable (optional)



8.6 Hardware Interface



- Standard PCIe interface;
- Ethernet interface (MATENET or Rosenberger)

8.7 Optional Accessories

N/A.

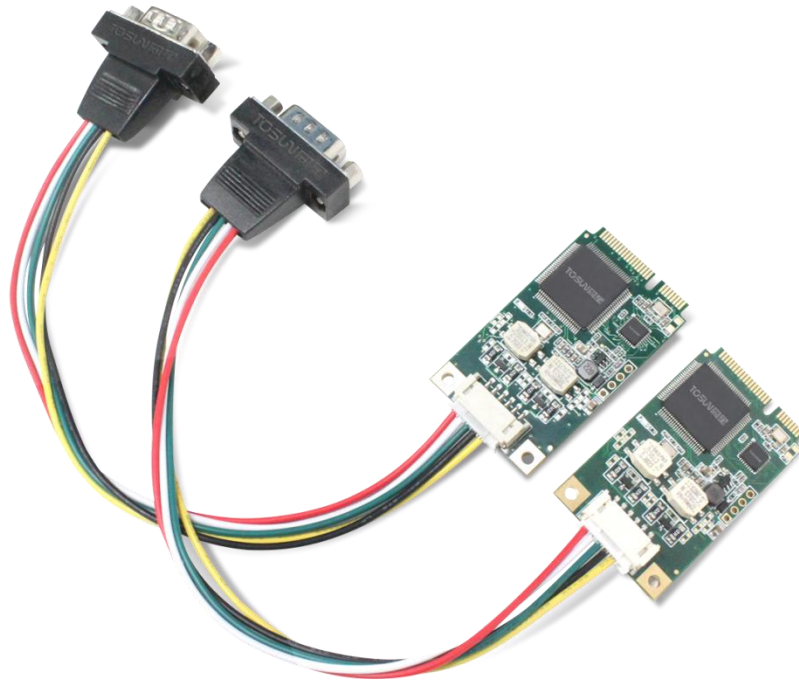
9.MP1013

9.1 Overview

MP1013 is a dual-channel CAN FD bus interface device developed by TOSUN. The CAN FD bus rate can support up to 8 Mbps. The product enables real-time monitoring of multiple bus networks. It uses a mini PCIe interface to connect with the PC and features a driverless design for Windows and Linux systems, ensuring excellent system compatibility. It has a compact size, and can be conveniently embedded into in-vehicle industrial PC, single-board computer (SBC), portable industrial PC, and industrial laptop. It is easy to install and simple to use.

With the powerful TSMaster software, it is very convenient to monitor, analyze, and simulate CAN FD bus data. It also supports functions such as UDS diagnostics, ECU flashing, CCP/XCP calibration and so on.

The secondary development APIs can support various development environments such as C++, C#, LabView, Python, etc., making it highly efficient and easy to use, and is convenient to integrate into various testing systems.



9.2 Features

- us (microsecond) level hardware message timestamps to meet advanced requirements;
- Mini PCIe interface, with a driverless design for Windows and Linux systems, offering excellent system compatibility;
- CAN channel DC 2500V isolation;
- Automotive-grade design, supporting dbc files, a2l files, blf files, and asc files;
- CAN channel baud rate adjustable from 125Kbps to 1Mbps, and CAN FD supports a maximum of 8Mbps;
- Supports blf and asc format data recording and offline/online playback;
- Supports UDS diagnostics and CCP/XCP calibration;
- Supports UDS based Bootloader flashing;
- Supports secondary development interfaces for Windows and Linux systems;

- Capable of loading all paid licenses for TSMaster.

9.3 Technical Data

Channel	2 *CAN FD
PC Interface	Mini PCIe interface
CAN Interface	DB9
Driver	Driverless design for Windows and Linux systems, offering excellent system compatibility
Cache	Hardware cache, with each channel's transmission buffer supporting up to 1000 CAN frames
CAN	Supports CAN 2.0 A and B protocols, compliant with the ISO 11898-1 standard, with baud rates from 125Kbps to 1Mbps
CAN FD	Supports CAN FD that complies with both ISO and non-ISO standards, with baud rates from 125Kbps to 8Mbps
Timestamp Accuracy	1 us, hardware message timestamp, can meet advanced requirements
Messages Sent per Second*	Up to 20,000 frames per second
Messages Received per Second*	Up to 20,000 frames per second
Galvanic Isolation	CAN channel DC 2500V isolation
Power Supply	Mini PCIe power supply
Dimension	Approx. 51*30*10mm
Weight	Approx. 8g (without packaging)/Approx. 144g (with packaging)
Operating Humidity	10% ~ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

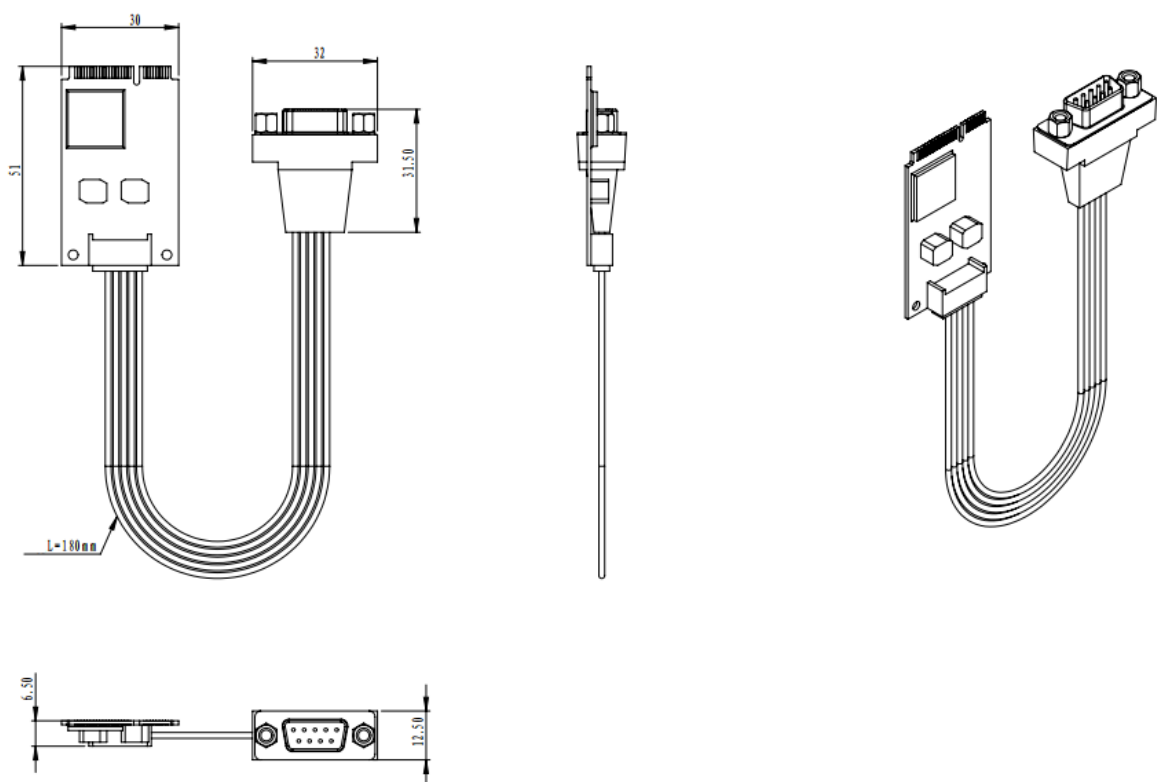
*Single channel 1Mbps, with a 0-byte data field.

9.4 Electrical Data

Parameter	Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
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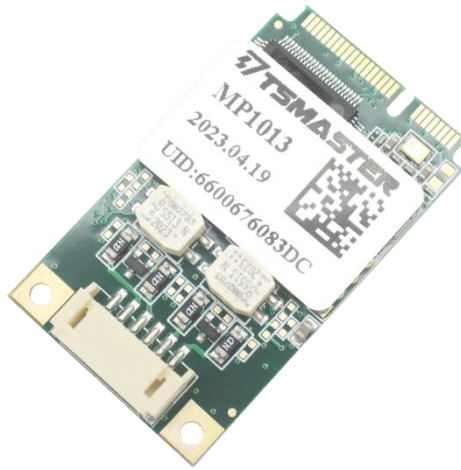
CAN Interface	Bus pin voltage resistance	CANH、CAHL	-58	--	58	V
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC

9.5 Mechanical Data

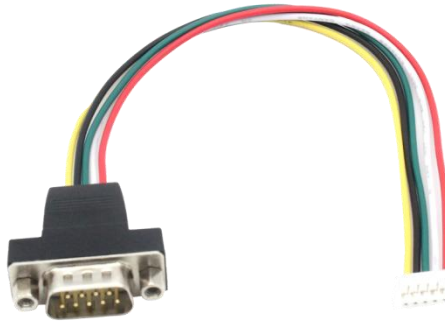


9.6 Scope of Delivery

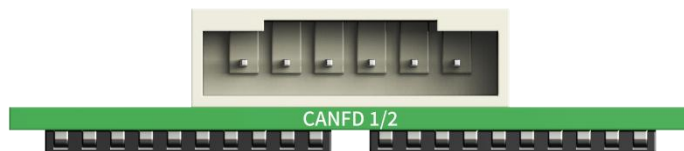
- ✓ Main device: MP1013



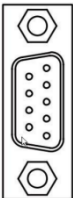
- ✓ DB9 male to PH-6 interface cable



9.7 Hardware Interface



- Mini PCIe interface;
- DB9 male (After conversion to the PH-6 interface):

DB9 PIN	PIN Number	Definition
	PIN2	CAN FD1_Low
	PIN3	CAN FD_GND
	PIN4	CAN FD2_Low
	PIN5	CAN FD_Shield
	PIN7	CAN FD1_High
	PIN8	CAN FD2_High

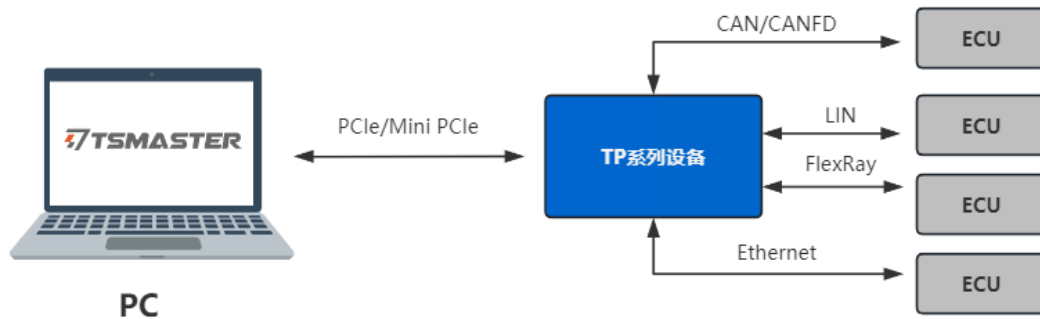
9.8 Optional Accessories

- 1.TCA00011 (CAN surge protection device)

10.Quick Start

10.1 System Connection

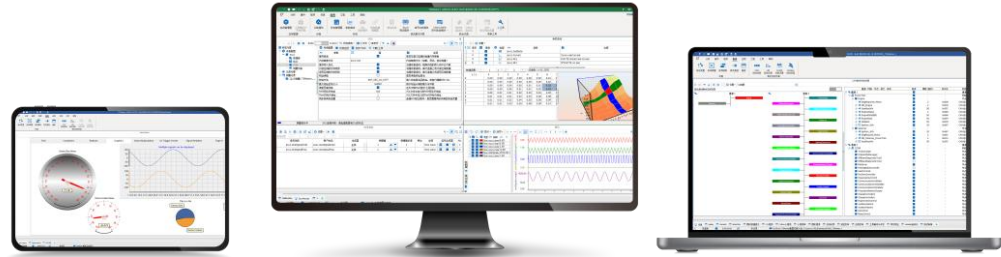
Connect the TP series devices to the computer via PCIe or Mini PCIe interface, and connect the communication interface to the ECU. With the powerful TSMaster software on the PC side, user can control the device to communicate with the ECU using CAN/CAN FD, LIN, FlexRay, and Ethernet protocols. The CAN/CAN FD interface of the TP series (except MP1013) devices comes with a software-configurable 120 Ω terminal resistor, eliminating the need for additional terminal resistor installation.



10.2 Driver Installation

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

10.3 Software Overview



TSMaster is a powerful and comprehensive tool that can connect, configure, and control all TOSUN hardware tools and devices, enabling functions such as automotive bus embedded code generation, monitoring, simulation, development, UDS diagnostics, CCP/XCP calibration, ECU flashing, I/O control, test measurement, and so on.

TSMaster supports Matlab Simulink co-simulation and CarSim dynamic model ECU algorithm simulation testing (soft real-time HIL). It provides users with a series of convenient functions and editors, allowing them to directly execute ECU code within TSMaster and supports C script and Python script editing. At the same time, TSMaster also offers a mini-program function, enabling users to customize the simulation test panel, test process, test logic, and even the entire test system, and automatically generate reports. The code written by users based on TSMaster is hardware-independent, and can be easily shared, referenced, and used on different hardware platforms.

TSMaster supports multiple commonly used bus tool brands, including Vector, Kvaser, PEAK, IXXAT, as well as mainstream instruments in the market (such as oscilloscopes, waveform generators, and digital multimeters) and boards (such as AI, DI, DO, etc.). Its design concept is to perfectly integrate with the test system to achieve joint simulation and testing of multiple hardware and multiple channels. This enables TSMaster to meet the PV/DV test verification needs for various automotive electronic components and assemblies, as well as the inspection requirements for the production line.

10.4 Software Installation

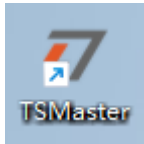
TSMaster software download link:

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

If the link is not accessible, you can contact the corresponding sales personnel or visit the official TOSUN website to obtain the software. Meanwhile, you can scan the QR code to follow the TOSUN official account to get the download link.

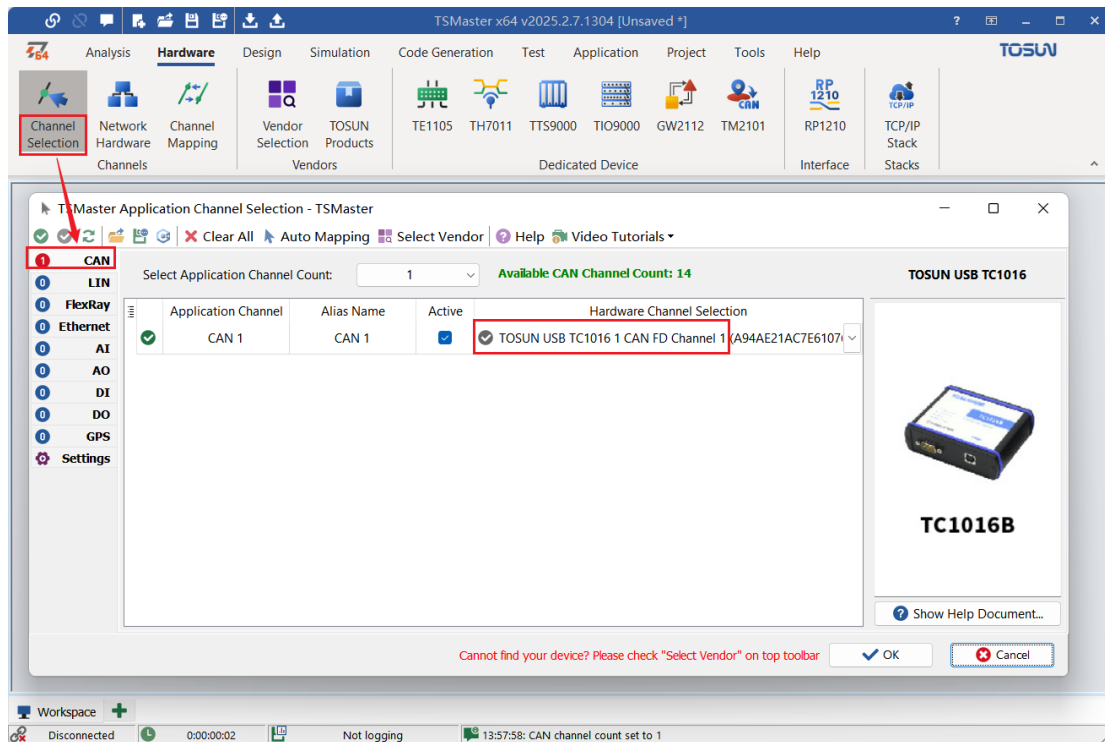


After the installation, you can see the following software on the PC.

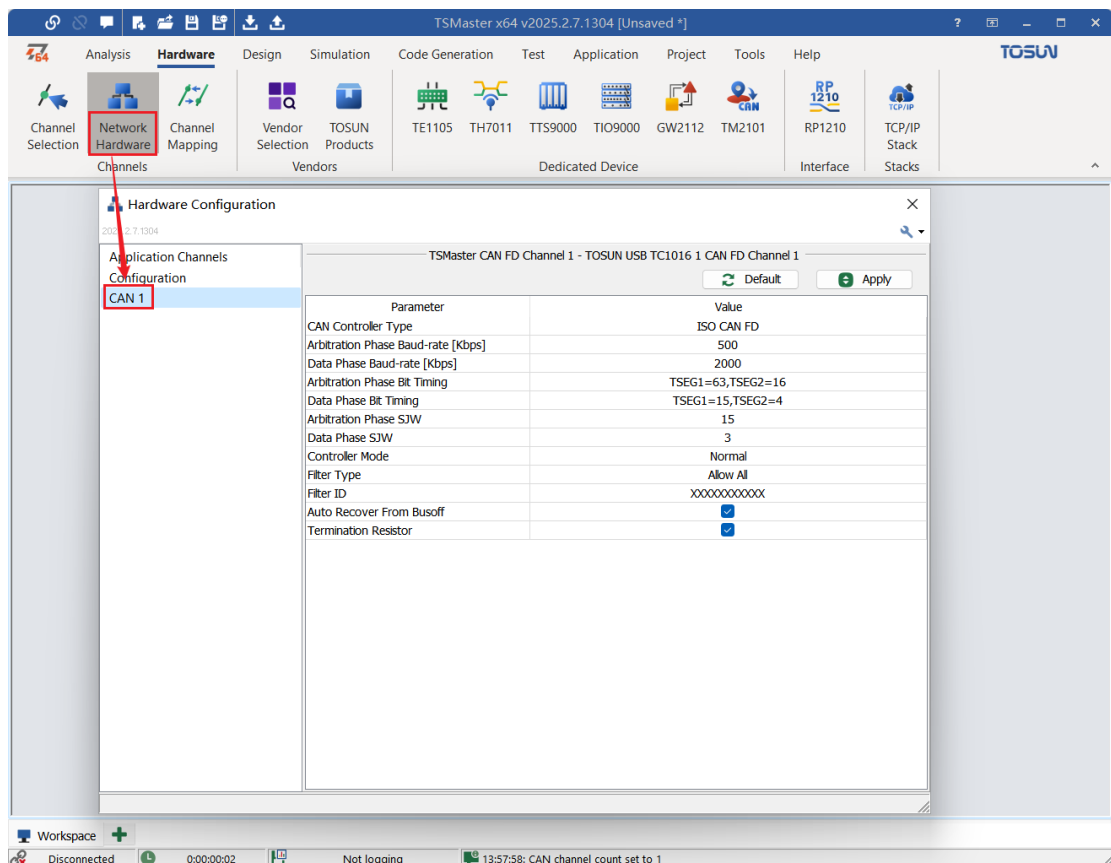


10.5 Use TSMaster with the Hardware

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



In Network Hardware, a series of controller parameters can be configured, such as protocol, baud rate, controller mode, and whether to enable the terminal resistor.



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.

11. Inspection and Maintenance

The main electrical components of TP series products are semiconductor components. Although the equipment has a long service life, they may also accelerate aging and significantly reduce their service life under an incorrect environment. Therefore, during the use of the equipment, periodic inspection should be carried out to ensure that the use environment maintains the required conditions.

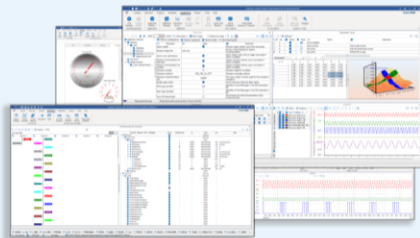
It is recommended to conduct inspections at least once every 6 months to 1 year. Under improper environmental, more frequent inspections should be conducted. As shown in the table below, if you encounter problems during maintenance, please read the following content to find the possible causes of the problem. If the problem still cannot be solved, please contact Shanghai TOSUN Technology Ltd.

Item	Inspection	Standard	Action
Surrounding Environment	Check the ambient temperature of the surrounding environment. (Including the internal temperature of enclosed environments)	-40°C~+80°C	Use a thermometer to check the temperature and ensure that the ambient temperature within in the acceptable range.
	Check the ambient humidity. (Including the internal	The relative humidity must be	Use a hygrometer to check the humidity and ensure that

	humidity of enclosed environments)	within the range of 10% to 90%.	the ambient humidity within the acceptable range.
	Check for the accumulation of dust, powder, salt, and metal shavings	No accumulation	Clean and protect the equipment.
	Check for any contact with water, oil, or chemical sprays on the equipment	No contact	Clean and protect the equipment if necessary
	Check for the presence of corrosive or flammable gases in the equipment area	No presence	Inspect by the smell, or using a sensor.
	Check for levels of vibration and shock	Vibration and shock are within the acceptable range	Install padding or other shock-absorbing devices if necessary.
	Check for noise sources near the equipment	No significant noise source	Isolate the equipment from noise sources or protect the equipment.
Wiring Installation	Check the crimped connectors in the external wiring	Ensure enough space between the connectors	Visually inspect and adjust if necessary.
	Check for damage in the external wiring	No damage	Visually inspect and replace the wiring 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

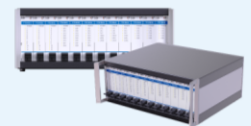
Hardware

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



CAN CAN

lin

FlexRay

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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



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