TOSUN

TF1011 Product Manual

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tosunai.com

Copyright Information

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If there are any changes to the information and data in this manual, no separate notice will be given. To obtain the latest version of the information, please visit the official website of TOSUN Technology or contact the staff of TOSUN Technology. Thank you for your understanding and support!

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What Is the TF1011?

The TF1011 is an offline handheld ECU flashing device launched by TOSUN. It has a lot of application scenarios and advantages. It can be paired with TSMaster to write UDS diagnostic flows, bootloader programs, chip app programs, and more into the device's memory, enabling offline ECU diagnostic services and updates for ECU programs and firmware. Additionally, it supports the Infineon TLE989x series chip for downloading updates without a bootram flow.

The TF1011 can be widely applied in various fields, providing a more efficient, flexible, and reliable solution for fault detection, diagnostics, and program flashing and updates.

What Can the TF1011 Device Do?

- Supports storing multiple HEX files for flashing as needed, improving work efficiency
- UDS protocol-based diagnostics
- UDS protocol-based Flash Bootloader program updates
- Download updates for Infineon TLE989x series chips using the bootram flow
- Supports APP program downloads and updates for UDS protocol chips
- ...

Contents

1. About this User Manual

1.1 Warranty

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2.TF1011

2.1 Overview

The TF1011 is a single-channel offline handheld ECU flashing device that can download and store three sets of flow configurations. It features physical button for switching between flashing files. When paired with the TSMaster software, users can edit UDS diagnostic flows (typically, UDS flashing flow) without the need to write code. The device offers one CAN FD interface, which is compatible with both Classic CAN and CAN FD, and it has built-in terminal resistors, eliminating the need for users to connect external terminal resistors.

With the TSMaster software, the TF1011 can use Usart_CAN to download updates for the Infineon TLE989x series chip programs, and it also supports UDS protocol for updating APP programs in conjunction with Bootload program.

2.2 Features

- ✓ Utilizes a DB9 interface, supporting power supply from the DB9 interface
- ✓ UDS flows are configured through the graphical interface of TSMaster software, eliminating the need for programming
- ✓ Seamless integration of development and production configuration flows
- ✓ Supports downloading custom seed key algorithms
- ✓ Flashing flows are configured via TSMaster software without the need of programming
- ✓ Can store up to three sets of diagnostic flows (including FBL flashing) at the same time, with switching via button
- ✓ Supports Infineon Uart on CAN protocol
- ✓ Supports binding periodic messages

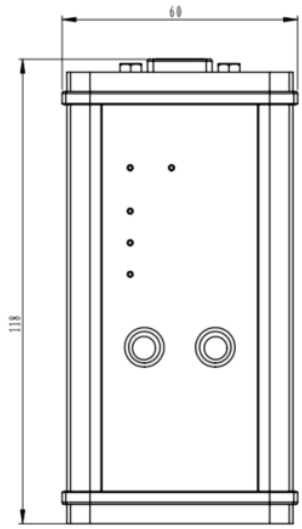
2.3 Technical Data

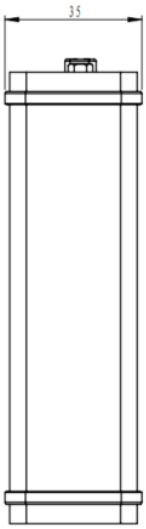
Channel	1* CAN FD
PC Interface	USB 2.0
CAN Interface	DB9
Driver	Driverless design, offering excellent system compatibility
Timestamp Accuracy	Message accuracy 1 us, and the timestamp accuracy for diagnostic commands is 10 us
Terminal Resistor	Built-in 120-ohm terminal resistor
Galvanic Isolation	CAN channel DC 2500V isolation, with an electrostatic discharge level of ±4KV for contact discharge and ±8KV for air discharge
Power Supply	USB power supply、DC power supply (9-32V)
Power Consumption	Typ.1W
Case Material	Metal
Dimension	Approx. 118*60*35mm
Weight	Approx. 185g (without packaging)/ Approx. 493g (with packaging)
Operating Temperature	-40℃～80℃
Operating Humidity	10% ～ 90% (non-condensing)
Operating Environment	Keep away from corrosive gases

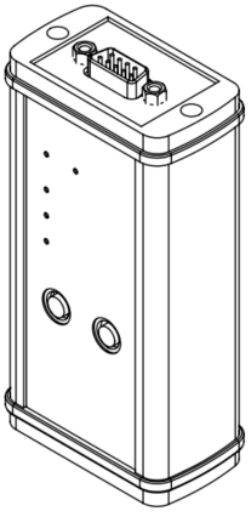
2.4 Electrical Data

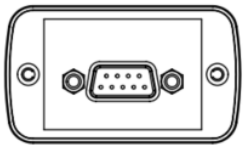
Parameter		Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
Operating Voltage	USB power supply	Download configuration	4.8	5	5.2	V
	External DC power supply	UDS offline diagnostics	9	12	32	V
Operating Current	USB power supply	Download configuration	--	0.18	--	A
	External DC power supply	UDS offline diagnostics	--	0.1	--	A
Power Consumption	USB power supply	Download configuration	--	1.0	--	W
	External DC power supply	UDS offline diagnostics	--	1.2	--	W
Output Voltage	Pin Output	--	--	12.0	--	V
CAN Interface	Bus pin voltage resistance	CANH、CAHL	-58	--	+58	V
	Isolation withstand voltage	Leakage current less than 1mA	2500	--	--	VDC

2.5 Mechanical Data









2.6 Scope of Delivery

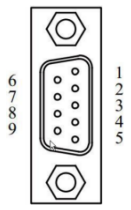
✓ Main device: TF1011

✓ USB cable

✓ 12V power adapter

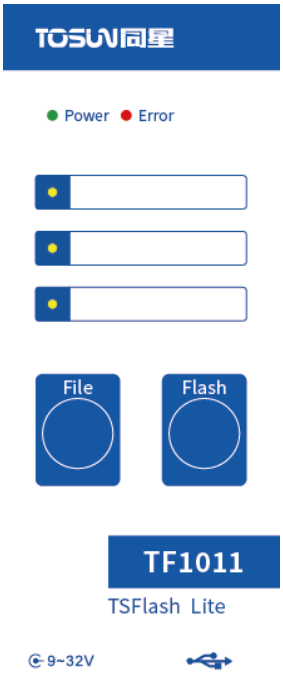
2.7 Hardware Interface

- DC power supply port;
- USB 2.0 interface;
- DB9 male:

DB9 Pin	PIN Number	Definition
	PIN1	Power_In
	PIN2	CAN_Low
	PIN3	GND
	PIN5	CAN_Shield
	PIN7	CAN_High
	PIN9	Power_Out

2.8 LED

Diagram of LED indicator:



Description of indicator:

Indicator	**Definition**
Power	Indicator for power. Always on when powered.
Error	Indicator for configuration error.
	Indicator for configuration, supporting three types of configuration flashing.
File	Button for switching configuration.
Flash	Button for flashing.

Description of LED color:

Color	**Description**
Power Green	Device is connected to power.
Error Red	Configuration flashing error.
	Indicator for configuration, supporting three types of configuration flashing.

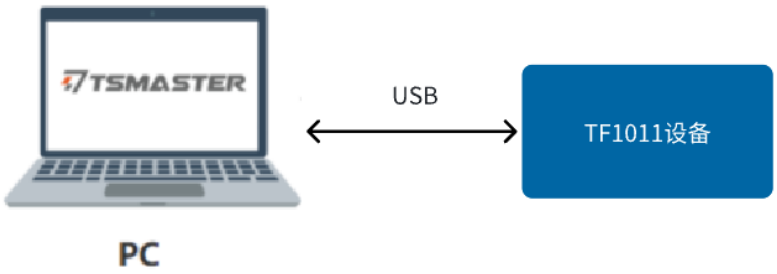
2.9 Optional Accessories

N/A

3. Quick Start

3.1 System Connection

◆ Download Configuration



Simply connect to the PC via a USB cable, and perform the configuration download in the diagnostic module of the TSMaster software.

◆ Offline flashing

For offline flashing of an ECU, the TF1011 device requires 12V DC power, which can be provided in two ways: using an external power adapter, or supplying power via the Power_In pin on the DB9 connector (with the positive connected to Power_In and the negative to the GND pin).

Additionally, if the ECU for flashing requires extra power, the TF1011 device's DB9 interface provides a Power_Out pin, which can supply power to the ECU.

3.2 Driver Installation

All TOSUN hardware adopts a driverless design, offering excellent system compatibility and allowing for direct use without the need for driver installation.

3.3 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 flow, 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.

3.4 Software Installation

TSMaster software download link:

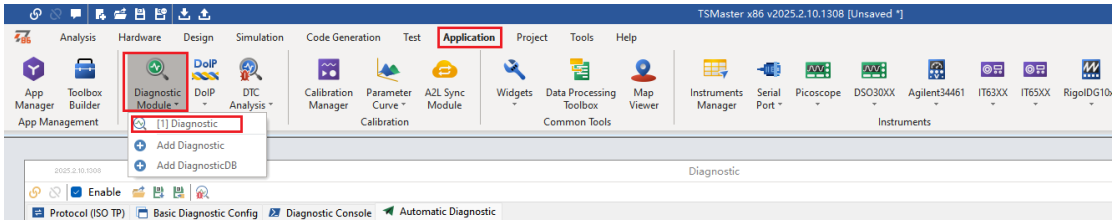
https://www.tosunai.com/downloads

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。

3.5 PC Configuration

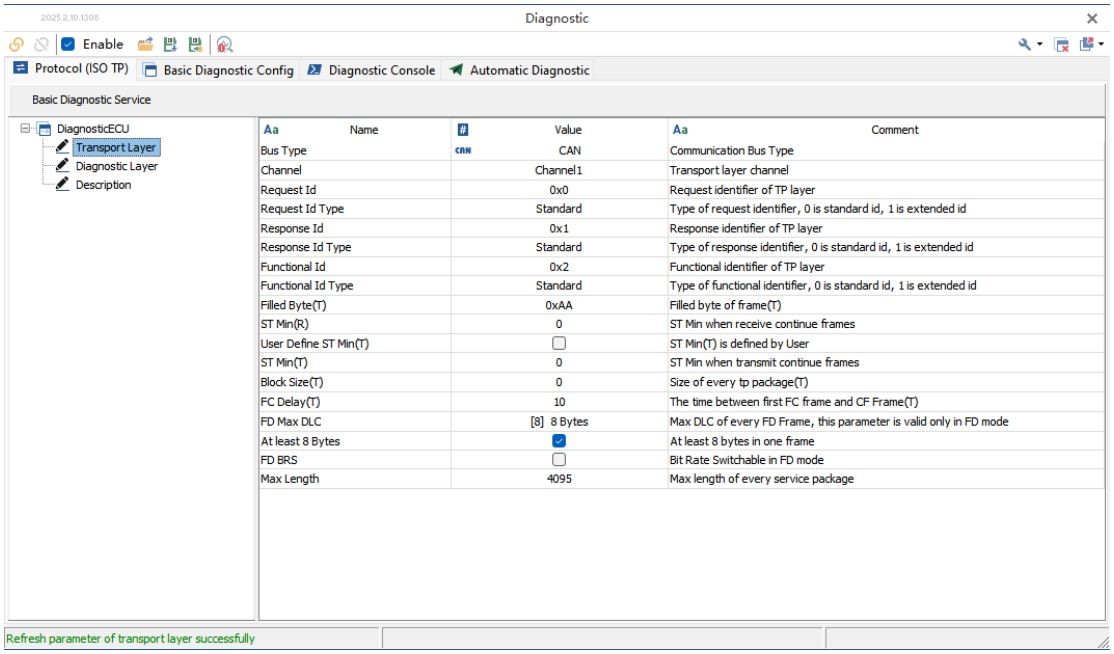
The diagnostic function configuration reuses the basic diagnostic configuration features in the TSMaster software.



3.5.1 Transport Layer Configuration

◆ Transport layer configuration:

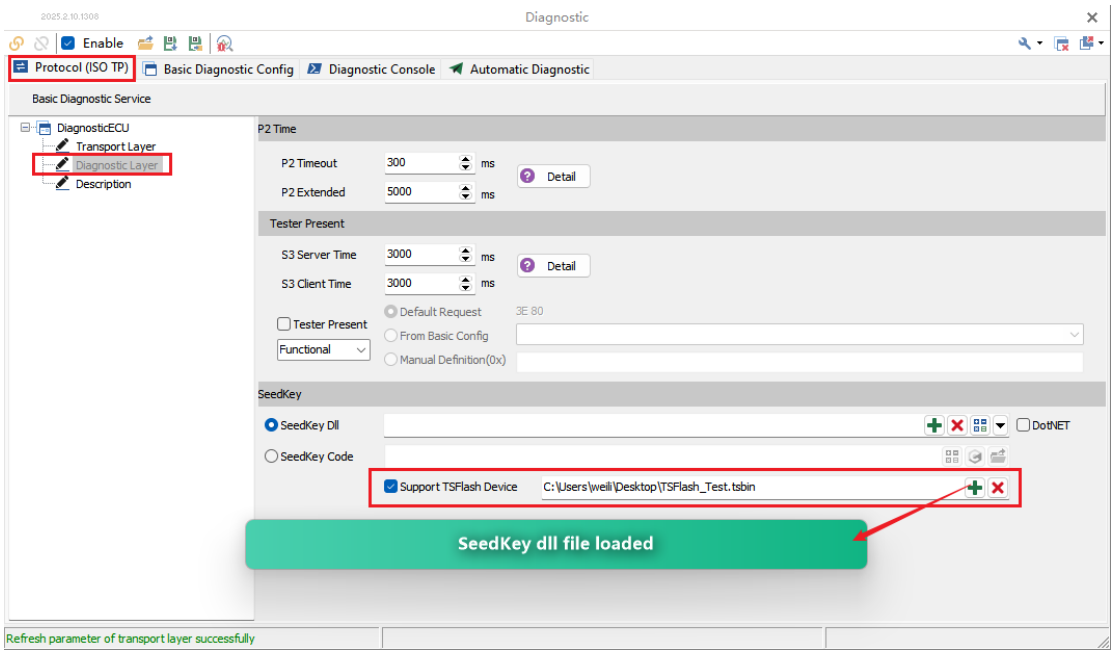
Each item has a corresponding comment following it:



◆ Diagnostic service layer configuration

When performing the configuration, if support for the TF1011 series devices is required, the option “Support TSFlash Device” must be selected, and the corresponding tsbin format file should be loaded.

Select the “Support TSFlash Device” option, click  to select the corresponding encrypted tsbin file:



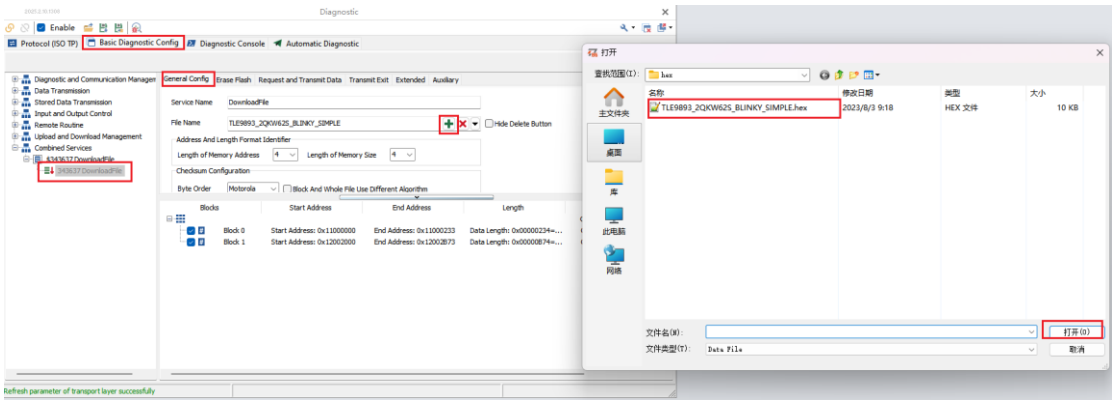
◆ Create tsbin file

For the generation of tsbin format file, TOSUN provides a standalone software tool called TSSKGen. Users can input the corresponding security algorithm code into the software to generate the tsbin file. For instructions on using the TSSKGen software, please refer to section 3.7 TSSKGen Installation and Usage.

3.5.2 Load HEX File

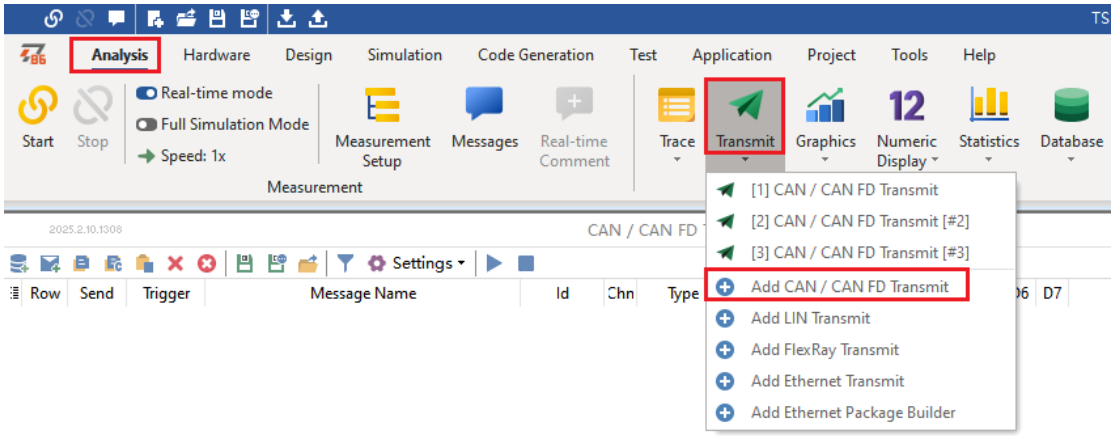
As shown in the figure below:

In “Basic Diagnostic Config”, add the “$343637” service, and load the corresponding hex file.

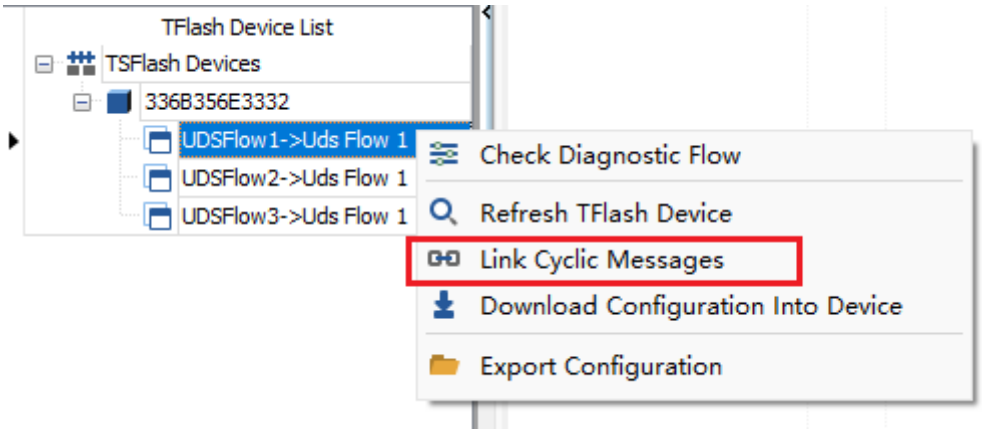


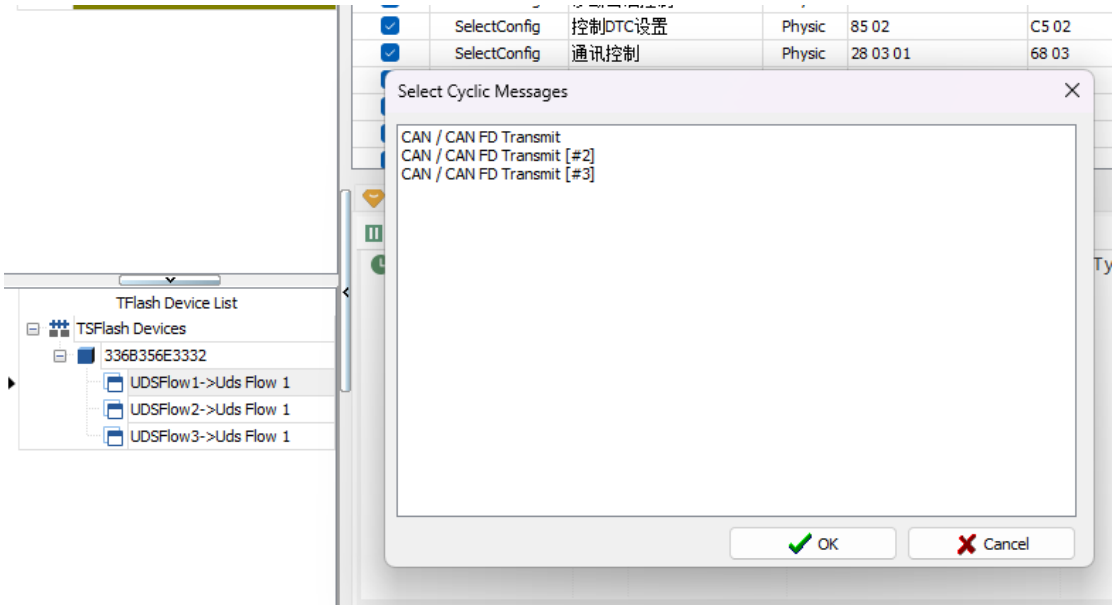
3.5.3 Link Cyclic Messages

As shown in the figure below, Add CAN/CAN FD Transmit:



Select the corresponding flow configuration and right-click, and select "Link Cyclic Messages", then choose the CAN message that needs to be transmitted in the pop-up window:



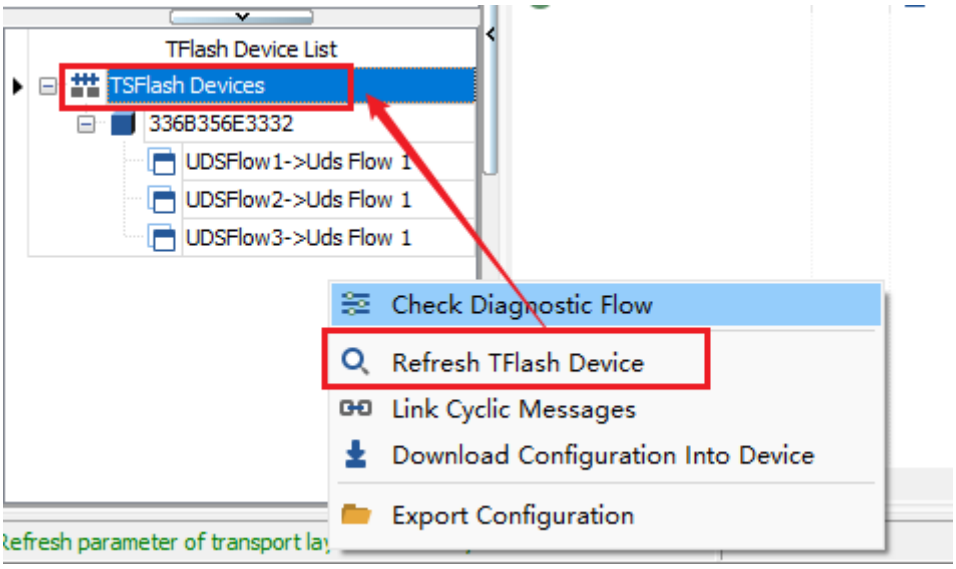


3.5.4 Download UDS Diagnostic Flow

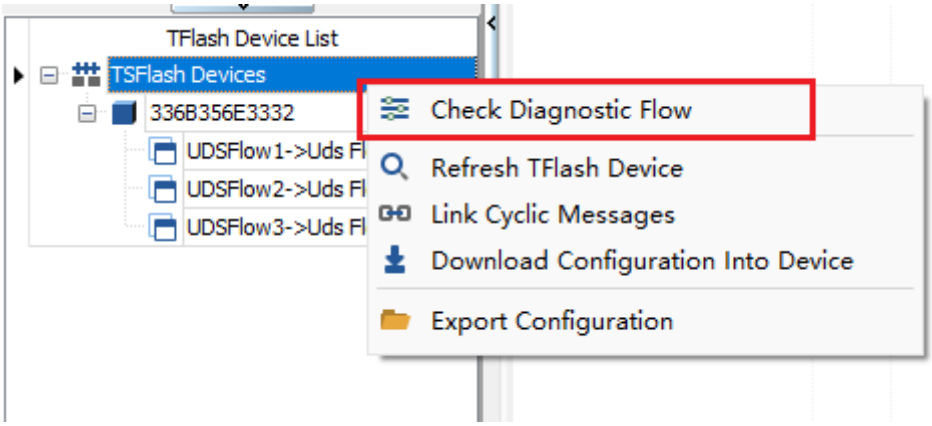
Before running and downloading the diagnostic flow, the TF1011 device must be connected to the PC via USB. Additionally, check whether the current configuration is suitable for downloading to the TF1011 series device.

◆ Refresh the device list

In "Automatic Diagnostic", right-click on the blank area of the "TFlash Device List" module and select "Refresh TFlash Device" to update the list of devices currently connected to the PC, as shown in the figure below:

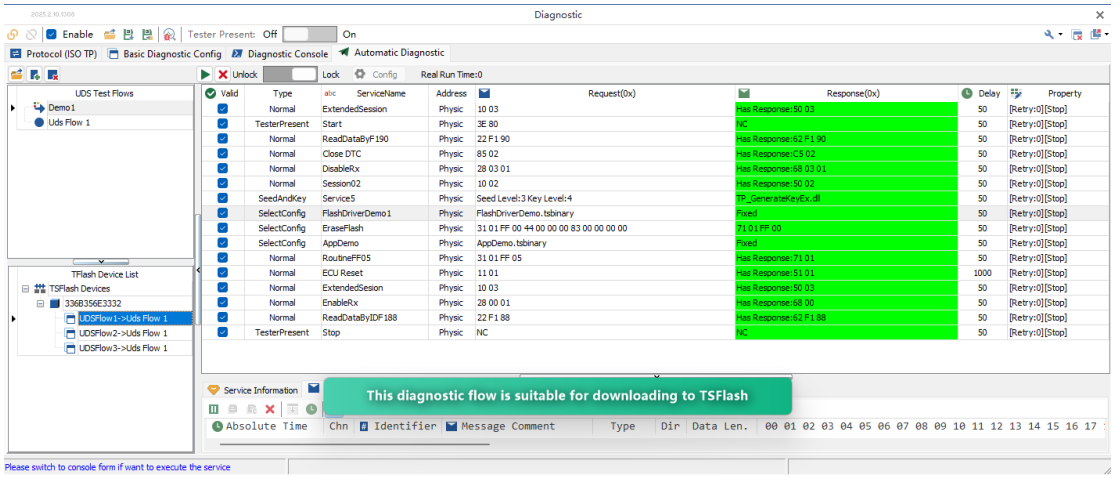


In the TF1011 device management interface, right-click to open the context menu and select the "Check Diagnostic Flow" option, as shown in the image below:

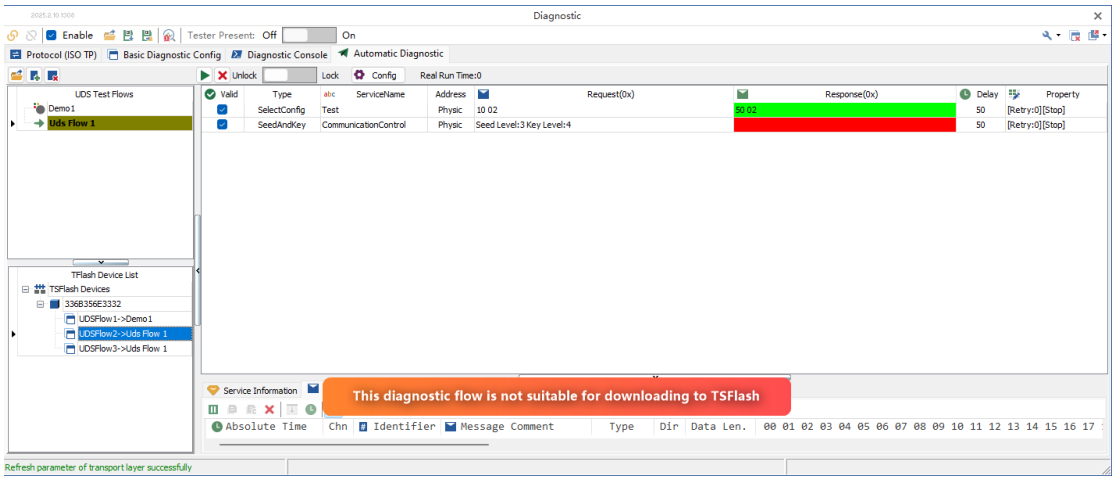


If the configuration fully meets the requirements, a prompt will indicate that the current configuration is suitable for downloading to the TF1011 device. Meanwhile, the diagnostic flow interface will display the following:

All the response services are green:



If there are unsuitable items in the configuration, an error message will be displayed, as shown below:

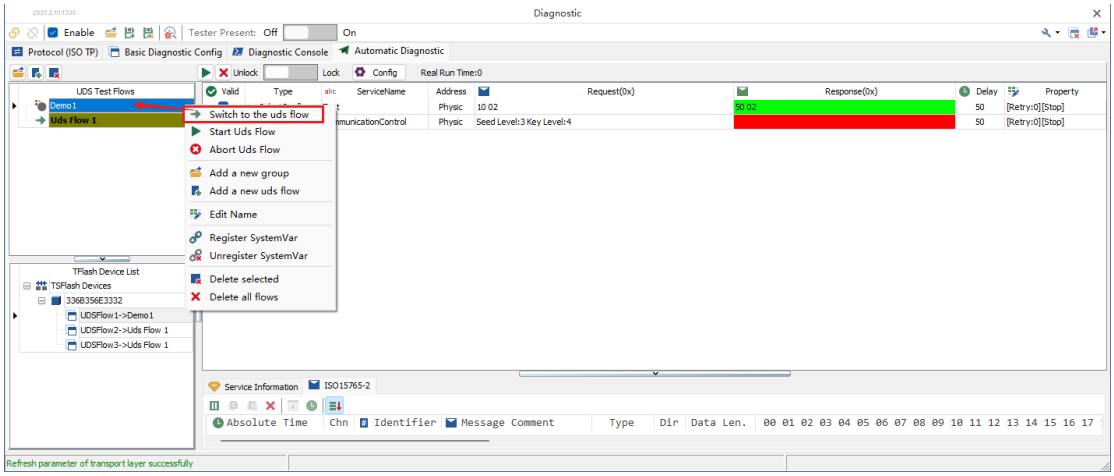


3.6 Download Configuration

After completing the above configuration, the configured flow needs to be downloaded to the device. The TF1011 device supports three sets of configuration flows simultaneously. Therefore, the user must select one of the configuration items and click "Download File" to complete the download process.

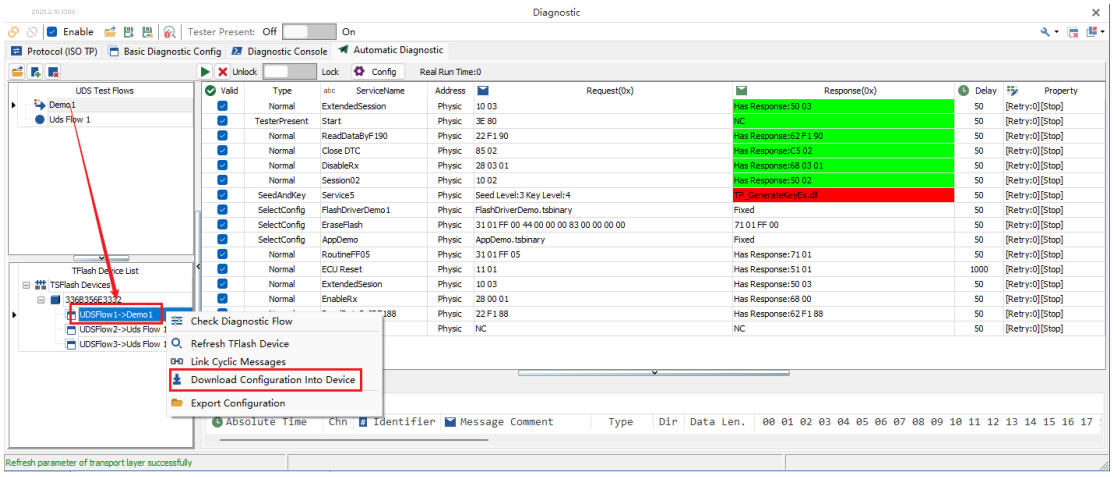
◆ Select UDS Test Flow

Right-click and select "Switch UDS Flow" to choose the flow:



◆ Download Flow Configuration

As shown in the figure below, after selecting the corresponding UDS flow configuration, right-click and choose "Download Configuration Into Device" to download the UDS flow to the device:



At this point, the device can be used for offline automated diagnostics (e.g., UDS FlashBootloader).

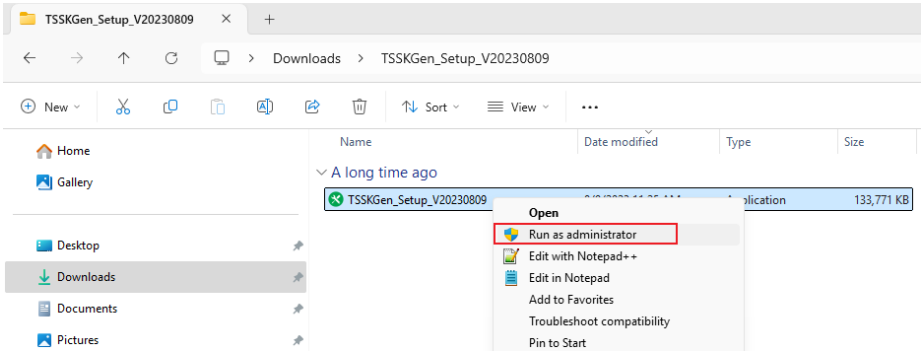
3.7 TSSKGen Installation and Usage

To facilitate users in generating the seed & keys algorithm for the 27 service, we provide the editing and generation software TSSKGen. It uses GCC and Make tools to generate an executable

bin file for the seed & keys algorithm.

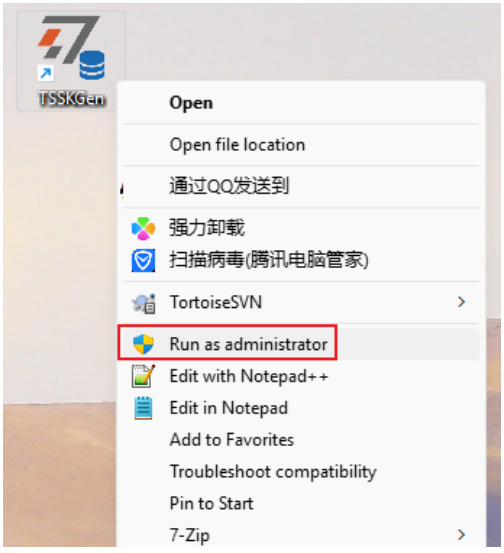
◆ Installation

Right-click to run the installer as an administrator, then click "Next" all the way through. Choose the default installation path on the C drive.

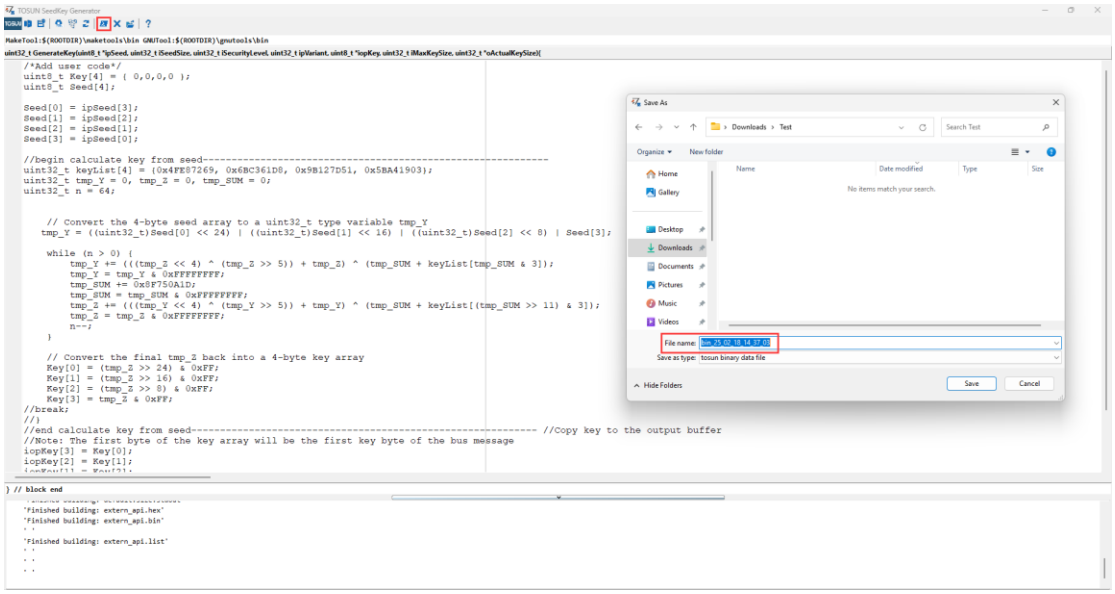


◆ Usage

After installation, right-click to launch the software with administrator privileges:

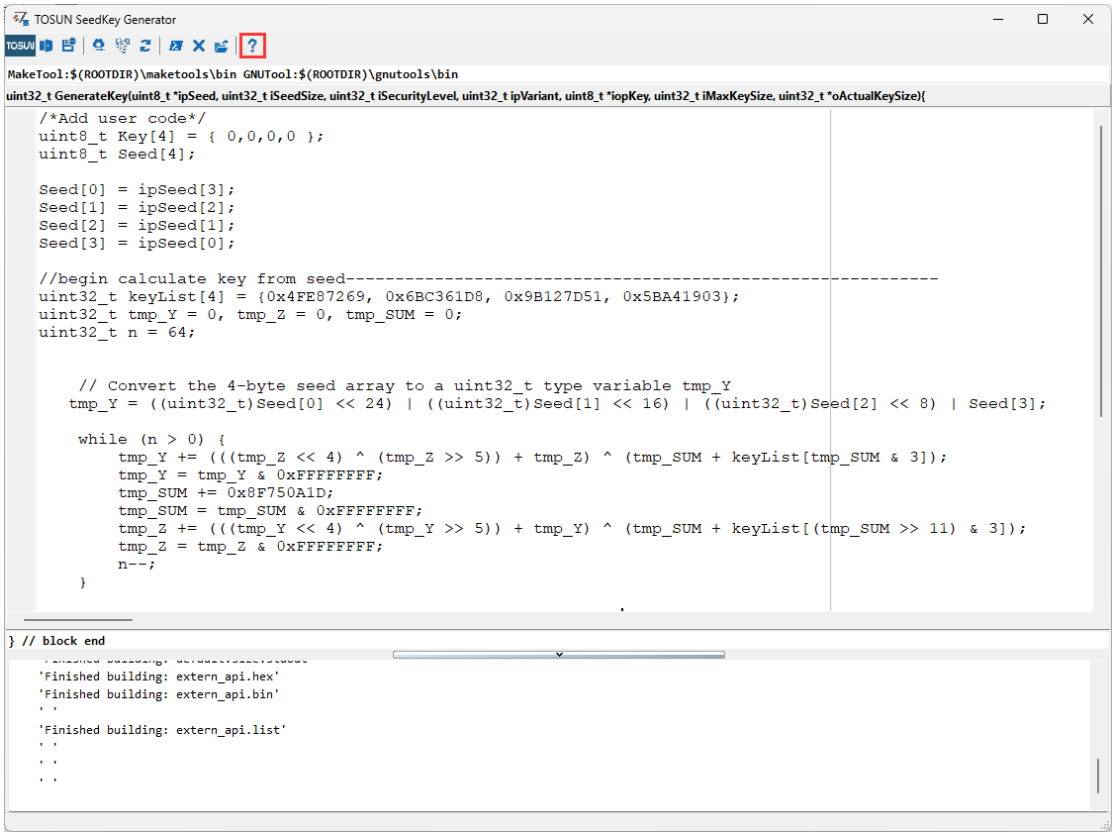


In the TSSKGen code editor, write the SeedKey code. After completing the code, click the "  " button to generate the corresponding ".tsbin" format file for the SeedKey, as shown in the figure below:



◆ Help Documentation

After opening the TSSKGen software with administrator privileges, click the  icon at the top of the software to open the user manual:



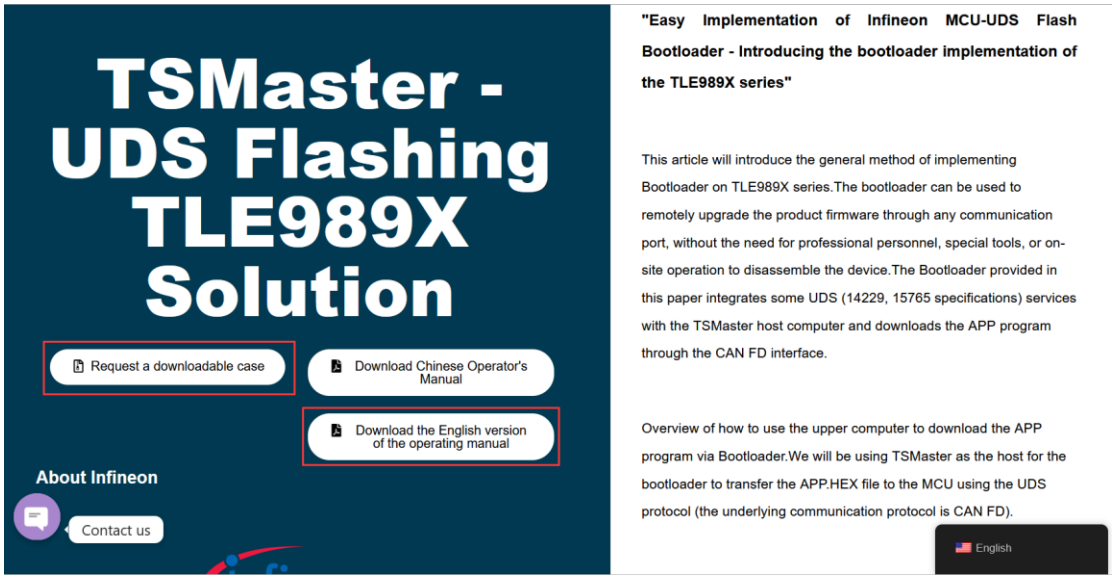
3.8 bootram Diagnostic Flow Download

Currently, the bootram diagnostic flow download supports only the Infineon TLE989X series chips.

To update the program of Infineon TLE989X series chips via the Bootram protocol, refer to the following link:

Infineon UDS Flashing – Shanghai TOSUN Technology Ltd. (tosunai.com)

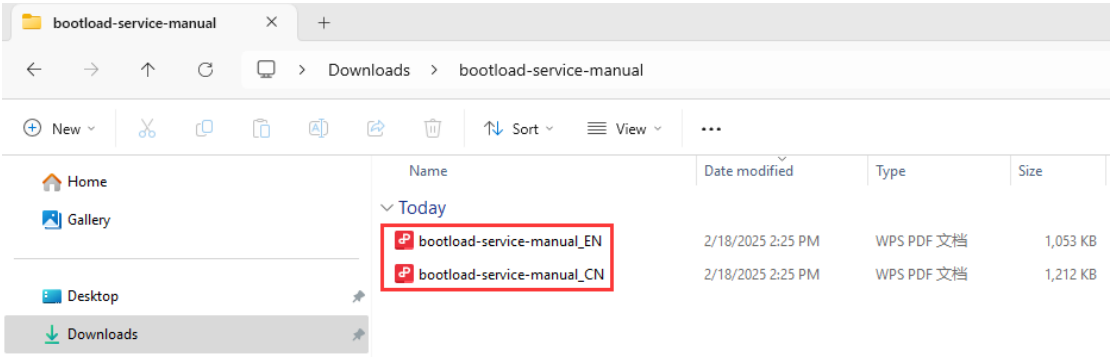
This link provides a free bootloader sample program based on the UDS protocol, which can update Infineon TLE989X series chips via the Bootram protocol.



Click "Request Sample Download", and enter your real information and email address. After a short wait, the relevant materials will be sent to the provided email.

Click the link in the email to download the materials. Make sure to check your browser's download history for the file.

After obtaining the downloaded file archive, extract it to view the contents. Inside the folder, you will find related materials and the corresponding documentation:



4. Inspection and Maintenance

The main electrical components of TF1011 product 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
Power Supply	Inspect for voltage fluctuations at the power supply end	Power supply port +12V DC	Use a voltage meter to check the power input end. Take necessary actions to keep the voltage fluctuations within the acceptable range.
Surrounding Environment	Check the ambient temperature of the surrounding environment. (Including the internal temperature of enclosed environments)	-40℃~+80℃	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 humidity of enclosed environments)	The relative humidity must be within the range of 10% to 90%	Use a hygrometer to check the humidity and ensure that 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	No contact	Clean and protect the

	water, oil, or chemical sprays on the equipment		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.

TOSUN

Engineer Everything !

Software

Support CAN(FD)/LIN/FlexRay/SOME/IP and DoIP

UDS diagnostics/ECU flashing/CCP/XCP calibration

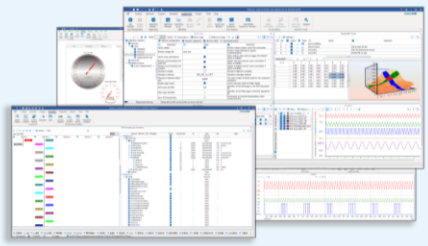
Embedded code generation/Application builder

Encrypted release/Logging and bus replay

Graphical programming/Residual bus simulation

C and Python scripting

Bus monitoring/Transmiting/Automated testing



TSMASTER

Hardware

1/2/4/8/12-channel CAN FD/CAN to USB/PCIe device

1/2/6-channel LIN to USB/PCIe device

Multi channel FlexRay/CAN FD to USB/PCIe device

Multi channel automotive Ethernet/CAN FD to USB/PCIe device

Automotive Ethernet media conversion device (T1 to Tx)

Multi-channel CAN FD/Ethernet/LIN datalogger

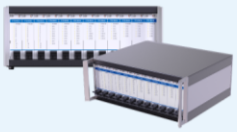
TTS test systems

-CAN FD/CAN/FlexRay/LIN communication boards

-Relay and fault injection boards

-Resistors for sensor simulation

-Digital I/O, Analog I/O boards available



CAN CAN FD lin FlexRay OPEN ALLIANCE

Solutions

- Bus Conformance
- Network Automation Testing System
- Charging Testing System
- EMB Calibration Testing Equipment
- Information Security Solutions
- Steer-by-Wire Chassis Testing Solutions
- EOL Testing Equipment
- Motor Performance
- Durability Testing Solutions
- FCT

About TOSUN

The core product, TSMaster, is a comprehensive tool for automotive R&D, testing, production, and after-sales. It integrates essential functions with hardware support to streamline processes and ensure precision, making it ideal for automotive professionals.

International Organization

ASAM CiA

Quality Assurance

ISO9001:2015

CE Certification

CE

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