Hardware IFU—TC1013

Version: V1.10 | English

tosunai.com

Document Revision History:

Documentation Edition	date	Update content	remarks
V1.00	2023.5.5	Create a document	
V1.10	2023.7.5	Modify the document	

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In line with the principle of providing better service to users, Shanghai TOSUN Intelligent Technology Co., Ltd. (hereinafter referred to as "TOSUN Intelligence") will present detailed and accurate product information to users as much as possible in this manual. However, since the content of this manual has a certain timeliness, the same star intelligence can not fully guarantee the timeliness and applicability of the document at any time period.

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catalogue

1. Product profile

1.1 Product Overview

TC1013 Is a portable, easy to install 2-way CANFD bus to USB interface device, the highest rate of 8 Mbps, the product uses high-speed USB2.0 interface and PC connection, Windows system drive design makes the device has excellent system compatibility.

With the powerful TSMaster software, support loading DBC and ARXML database files, can easily monitor, analyze, simulate CAN FD bus data, can also support UDS diagnosis, ECU brush, CCP / XCP calibration and other functions.

Can be used for the secondary development API of Windows and Linux, can support various development environments, such as C + +, C #, LabView, Python, etc., convenient integration into various test systems, efficient and easy to use.

1.2 Typical applications

- ✓ Vehicle multi-channel CAN FD / CAN bus data acquisition
- ✓ Domain Controller Test
- ✓ Various automated test systems

1.3 Functions and parameters

1.3.1 Functional characteristics

- ✓ US (microsecond) level hardware message timestamp to meet higher order requirements.
- ✓ Portable design, unique designed mounting holes for easy integration into various devices or instrument panels.
- ✓ High-speed USB2.0 interface, Windows, Linux system drive-free design, with excellent system compatibility.
- ✓ CAN channel DC2500V sequestration.
- ✓ Automotive grade design, support dbc file, a2l file, blf file, asc file.
- ✓ CAN channel port rate 125 Kbps- -8Mbps tunable.
- ✓ Support for blf, asc format data recording and offline / online playback.
- ✓ The UDS diagnosis and CCP calibration can be supported.
- ✓ Support for the UDS-based Flash Bootloader.

- ✓ Support Windows, Linux system secondary development interface.
- ✓ Built-in 120 euro terminal resistance can be used in software configuration.
- ✓ Loadable TSMaster all charge license.

1.3.2 Technical parameters

channel	2 *CAN FD
PC terminal interface	High-speed of USB2.0
CAN terminal interface	DB9
drive	Windows, Linux system free drive design, with excellent system compatibility
cache	Hardware cache, each channel sends buffer support to 1000 frames CAN / CANFD
CAN	Support CAN2.0A, B protocol, comply with ISO11898-1 specification, port rate 5 Kbps- -1Mbps
CAN FD	Support for ISO and non-ISO standard CAN FD, port rate 125 Kbps- -8Mbps
Time stamp accuracy	1us, the hardware message timestamp, to meet the high-order requirements
terminal resistance	Built-in 120 euro terminal resistance can be used in software configuration
Send a message per second *	Maximum of 20,000 frames / s
Receipt of message messages per second *	Maximum of 20,000 frames / s
insulate	CAN channel DC 2500V isolation, electrostatic grade contact discharge ± 8KV
supply electricity	USB supply electricity
material quality	plastics
working temperature	-40℃～80℃
Working humidity	10% ~ 90% (no condensation)
work environment	Stay away from the corrosive gases

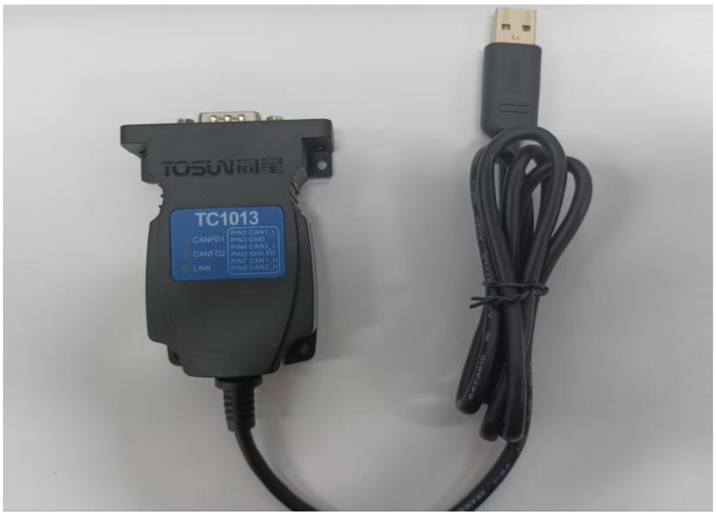
* Single-channel 1Mbps, 0-byte data domain case

1.3.3 Electrical parameters

parameter		test condition	least value	representative value	crest value	Unit
working voltage	USB supply electricity	Two CAN delivery channels	5.09	5.10	5.11	V
working current	USB supply electricity	Two CAN delivery channels	0.14	0.17	0.22	A
power	USB supply electricity	Two CAN delivery channels	0.71	0.87	1.12	W
CAN joggle	Bus pin pressure resistance	CANH、CAHL	-42	--	42	V
	terminal resistance	Enable terminal resistance	--	120	--	Ω
	Isolation and pressure resistance	The leakage current is less than 1 mA	2500	--	--	VDC

1.4 Shipping list

- ✓ TC1013 Host machine

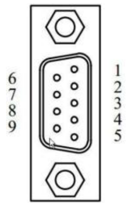


2. Hardware interface description

2.1 Description of the hardware interface

- USB high-speed 2.0 interface;
- DB9 Male：

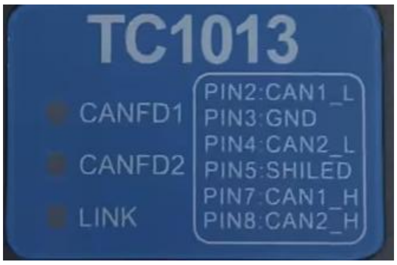
DB9 pin definition:

DB9 pin	pin	definition
	PIN2	CANFD1_Low
	PIN3	CANFD_GND
	PIN4	CANFD2_Low
	PIN5	CANFD_Shield
	PIN7	CANFD1_High
	PIN8	CANFD2_High

Note: Pin PIN 2 is low CAN, and pin PIN 7 is high CAN, which is consistent with the international standard.

2.2 LED indicator light instructions

Physical picture of the indicator light:



Instructions for indicator light:

pilot lamp	definition
CANFD 1	The CANFD channel 1 indicator lamp
CANFD 2	The CANFD channel 2 indicator lamp
LINK	Hardware connection indicator light

Description of the color of the indicator light:

pigment	description
LINK green light	The device hardware is connected
CAN FD green light	CAN FD Channel data frames are sent or received correctly
CAN FD red light	CAN FD The channel sends or receives incorrect frames, configuration, protocol, or wiring errors

Note: The flicker frequency depends on the bus load.

3. Quick use

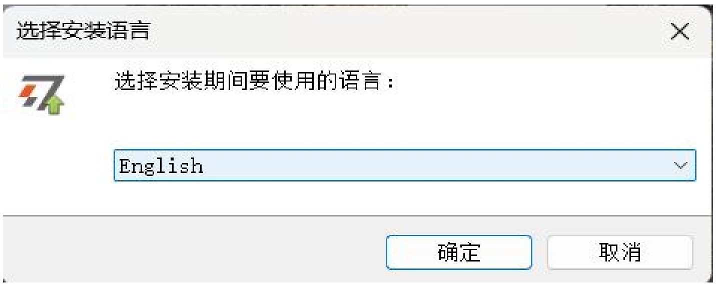
3.1 Download and install the TSMaster host computer

TSMaster Software download link： .

http://www.tosun.tech/TOSUNSoftware/TSMaster_Setup_beta.exe

If not accessible, you can contact the corresponding sales staff or log in to the official website of the same star to get the upper machine, and you can also scan the code to follow the public account to get the download link.

Step 1:

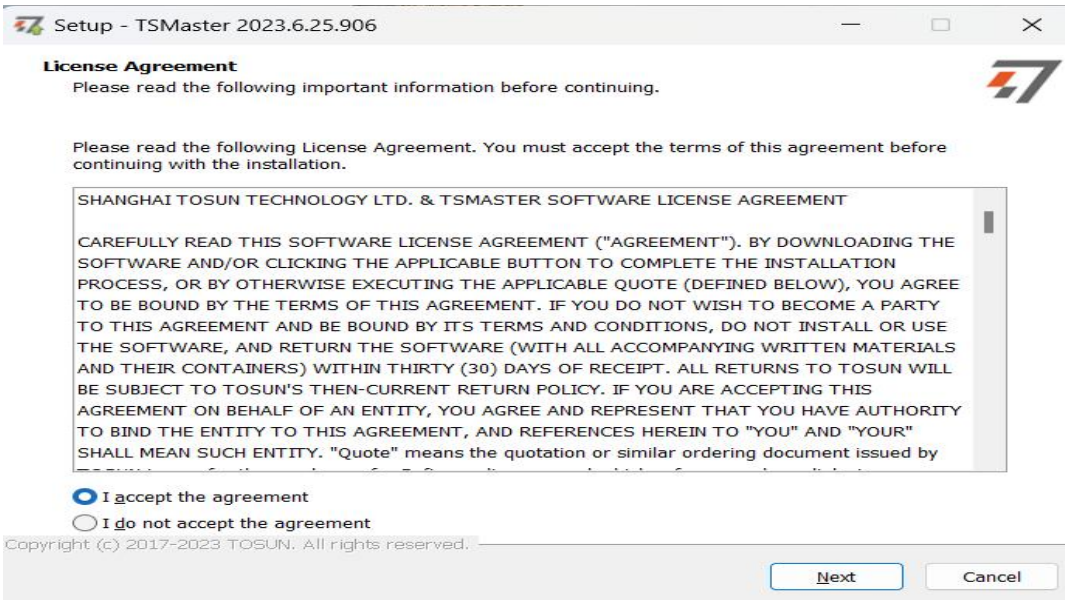


选择安装语言

选择安装期间要使用的语言：

English

Step 2:



Setup - TSMaster 2023.6.25.906

License Agreement

Please read the following important information before continuing.

Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.

SHANGHAI TOSUN TECHNOLOGY LTD. & TSMASTER SOFTWARE LICENSE AGREEMENT

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● I accept the agreement

○ I do not accept the agreement

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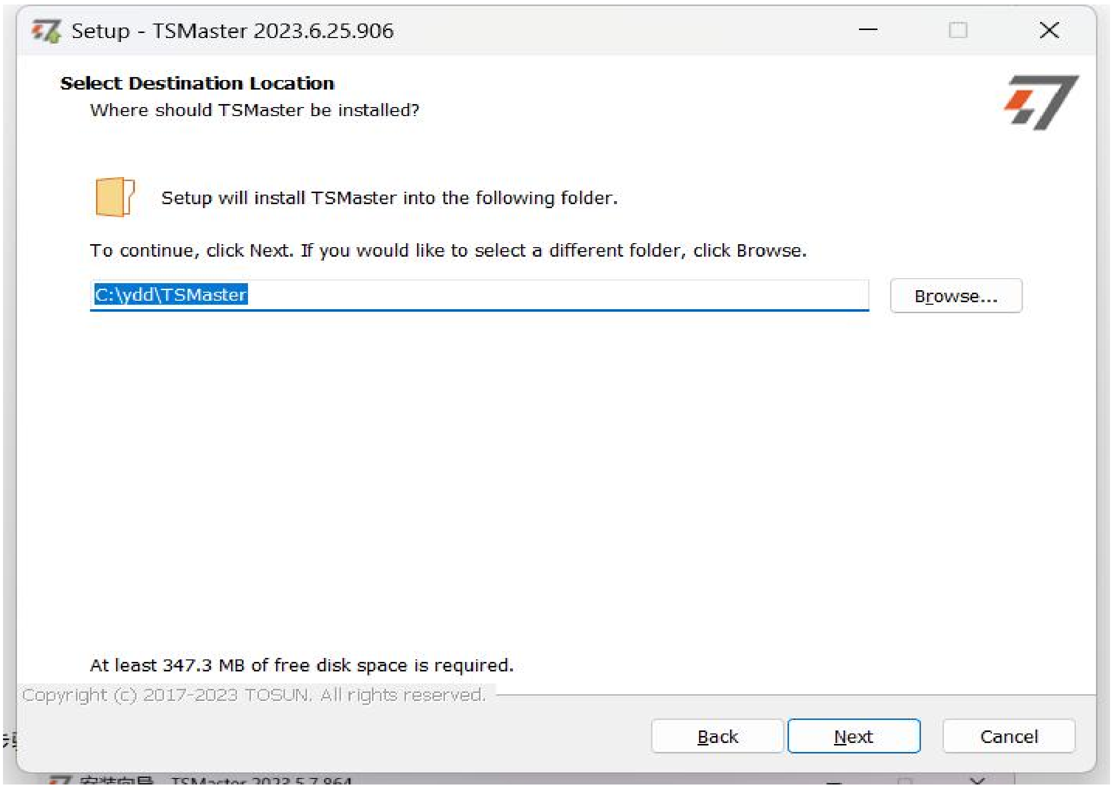
Step 3:



Setup - TSMaster 2023.6.25.906

Select Destination Location

Where should TSMaster be installed?

Setup will install TSMaster into the following folder.

To continue, click Next. If you would like to select a different folder, click Browse.

C:\ydd\TSMaster

At least 347.3 MB of free disk space is required.

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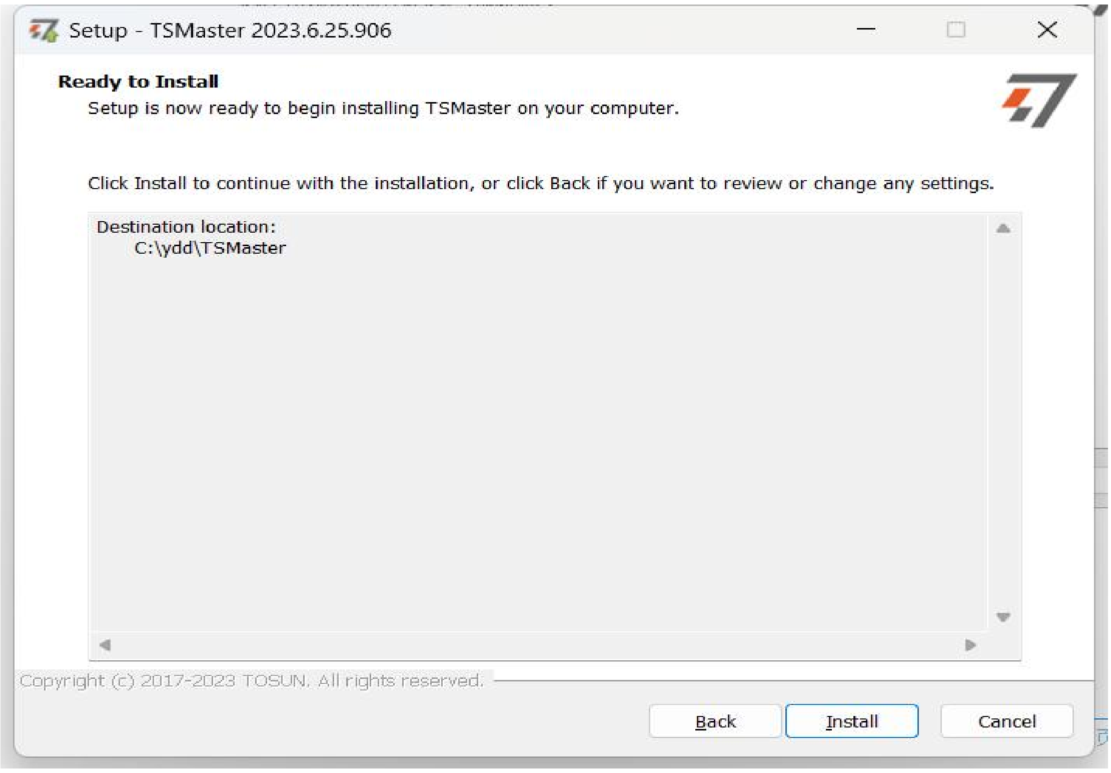
Step 4:



Setup - TSMaster 2023.6.25.906

Ready to Install

Setup is now ready to begin installing TSMaster on your computer.

Click Install to continue with the installation, or click Back if you want to review or change any settings.

Destination location:
C:\ydd\TSMaster

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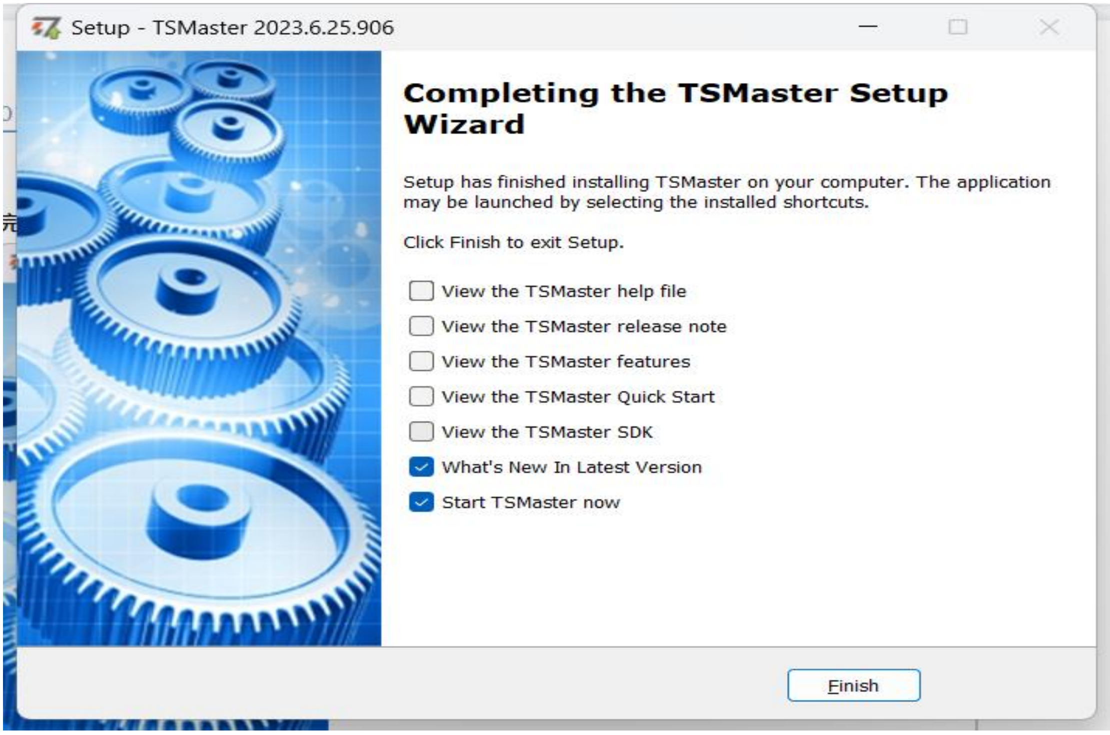
Complete installation:



Completing the TSMaster Setup Wizard

Setup has finished installing TSMaster on your computer. The application may be launched by selecting the installed shortcuts.

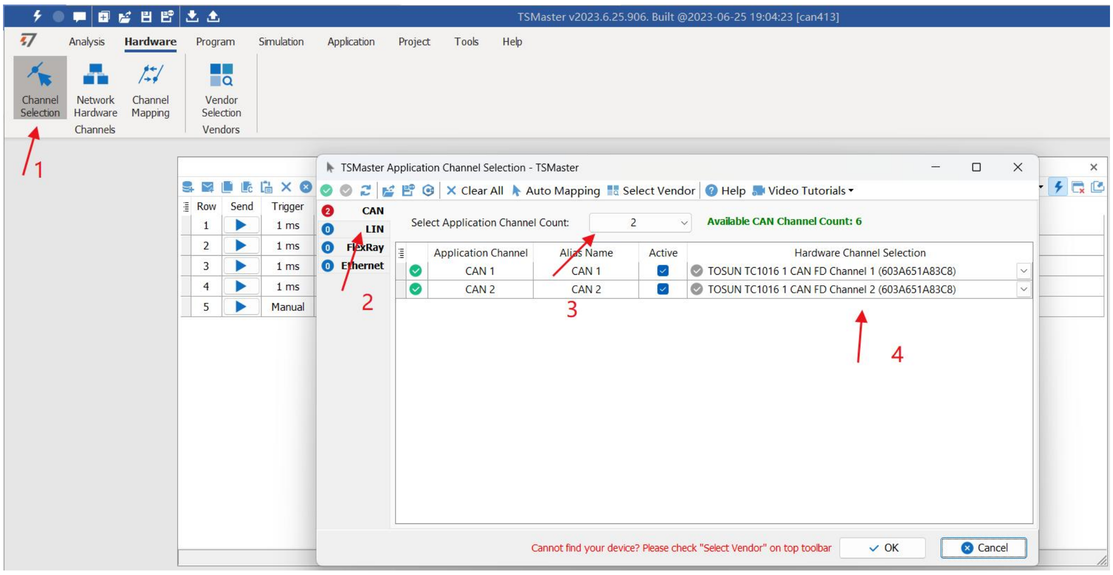
Click Finish to exit Setup.

- □ View the TSMaster help file
- □ View the TSMaster release note
- □ View the TSMaster features
- □ View the TSMaster Quick Start
- □ View the TSMaster SDK
- ☑ What's New In Latest Version
- ☑ Start TSMaster now

3.2 Connect devices and configure channels

All TOSUN devices are drive-free, and can connect directly without download driver.

In TSMaster software interface: Click Hardware-click channel selection-drop-down box Select number of channels-select hardware channel-click OK



Row	Send	Trigger
1	▶	1 ms
2	▶	1 ms
3	▶	1 ms
4	▶	1 ms
5	▶	Manual

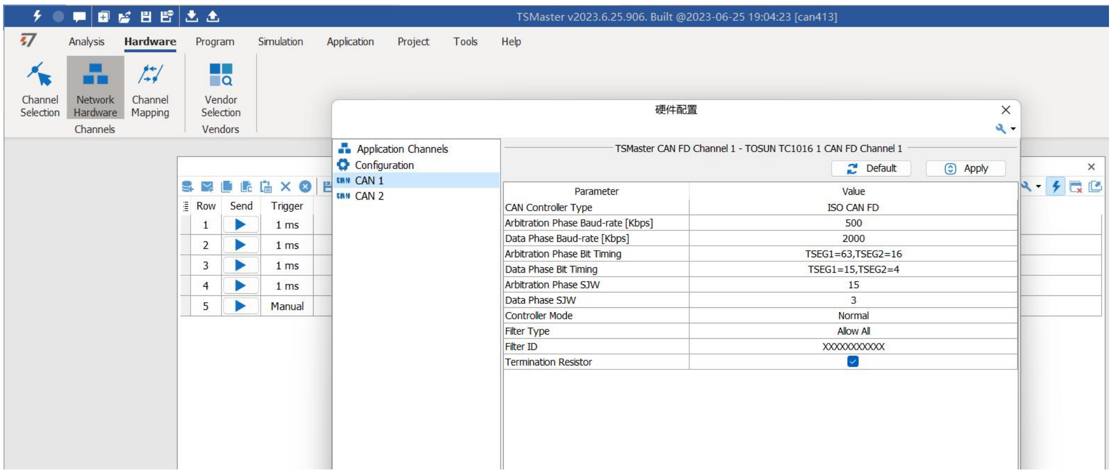
Select Application Channel Count: 2

Available CAN Channel Count: 6

	Application Channel	Alias Name	Active	Hardware Channel Selection
✓	CAN 1	CAN 1	☑	TOSUN TC1016 1 CAN FD Channel 1 (603A651A83C8)
✓	CAN 2	CAN 2	☑	TOSUN TC1016 1 CAN FD Channel 2 (603A651A83C8)

Cannot find your device? Please check "Select Vendor" on top toolbar

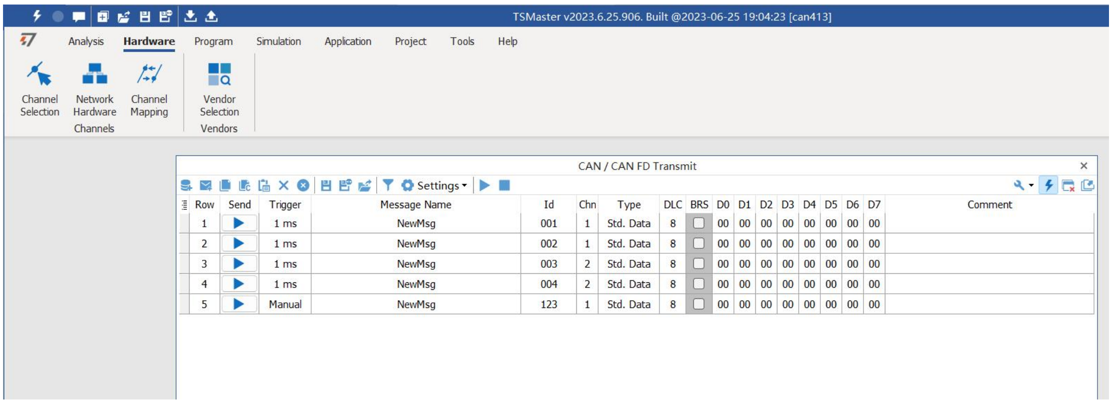
In the hardware configuration, the CAN / CAN FD protocol can be switched, and the baud rate and switch terminal resistance can be adjusted. After the configuration is completed, click application can take effect.



TSMaster CAN FD Channel 1 - TOSUN TC1016 1 CAN FD Channel 1

Parameter	Value
CAN Controller Type	ISO CAN FD
Arbitration Phase Baud-rate [Kbps]	500
Data Phase Baud-rate [Kbps]	2000
Arbitration Phase Bit Timing	TSEG1=63,TSEG2=16
Data Phase Bit Timing	TSEG1=15,TSEG2=4
Arbitration Phase SJW	15
Data Phase SJW	3
Controller Mode	Normal
Filter Type	Allow All
Filter ID	XXXXXXXXXXX
Termination Resistor	☑

3.3 Message sending



CAN / CAN FD Transmit

Row	Send	Trigger	Message Name	Id	Chn	Type	DLC	BRS	D0	D1	D2	D3	D4	D5	D6	D7	Comment
1	▶	1 ms	NewMsg	001	1	Std. Data	8	□	00	00	00	00	00	00	00	00	
2	▶	1 ms	NewMsg	002	1	Std. Data	8	□	00	00	00	00	00	00	00	00	
3	▶	1 ms	NewMsg	003	2	Std. Data	8	□	00	00	00	00	00	00	00	00	
4	▶	1 ms	NewMsg	004	2	Std. Data	8	□	00	00	00	00	00	00	00	00	
5	▶	Manual	NewMsg	123	1	Std. Data	8	□	00	00	00	00	00	00	00	00	

After the hardware connection is completed and the software is configured, the function of message sending can be realized:

operating steps:

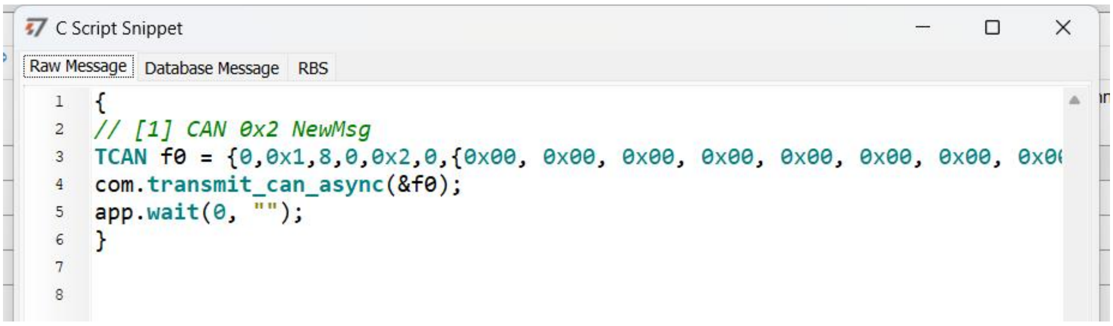
a. Message sending-Add a CAN / CAN FD message for sending

b. Right mouse button to create a new original message / add a message from the database, and set the message name / identifier / channel, etc

c. Message am trigger setting, manual trigger / cycle trigger, cycle trigger can set the sending cycle

d. Message information right click can generate a C script to quickly add to the C small program for programming

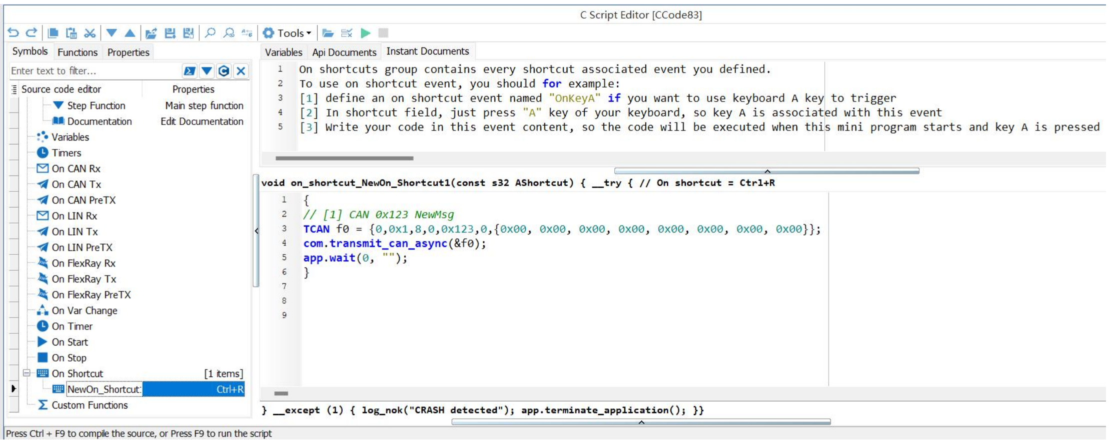
The following is an example of the build-C script:



C Script Snippet

```
{
// [1] CAN 0x2 NewMsg
TCAN f0 = {0,0x1,8,0,0x2,0,{0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x0
com.transmit_can_async(&f0);
app.wait(0, "");
}
```

Support for quick copy and paste to a C script to add send events:



C Script Editor [CCode83]

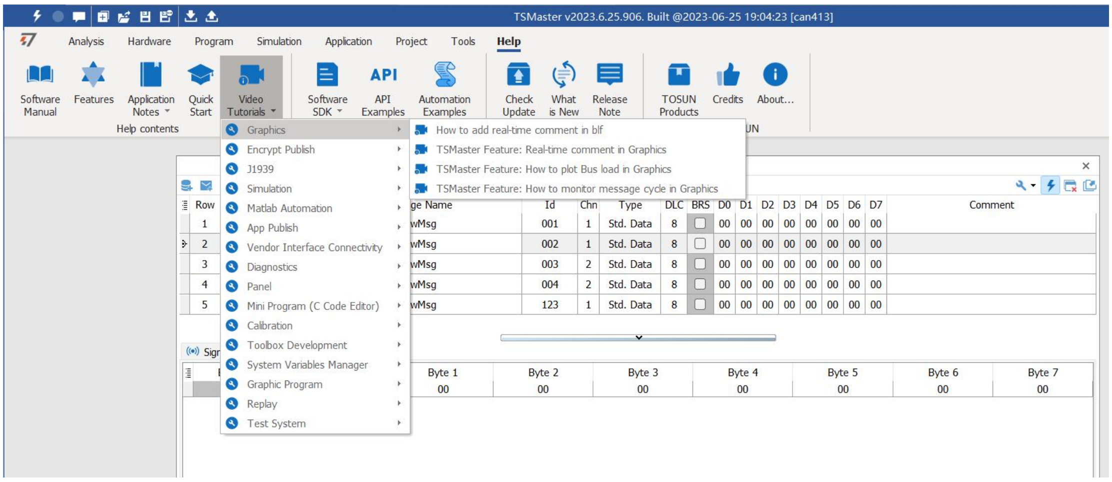
```
On shortcuts group contains every shortcut associated event you defined.
To use on shortcut event, you should for example:
[1] define an on shortcut event named "OnKeyA" if you want to use keyboard A key to trigger
[2] In shortcut field, just press "A" key of your keyboard, so key A is associated with this event
[3] Write your code in this event content, so the code will be executed when this mini program starts and key A is pressed
```

```
void on_shortcut_NewOn_Shortcut1(const s32 AShortcut) { __try { // On shortcut = Ctrl+R
{
// [1] CAN 0x123 NewMsg
TCAN f0 = {0,0x1,8,0,0x123,0,{0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00}};
com.transmit_can_async(&f0);
app.wait(0, "");
}
} __except (1) { log_nok("CRASH detected"); app.terminate_application(); }}
```

Press Ctrl + F9 to compile the source, or Press F9 to run the script

3.4 Help with documentation and video teaching

Various instructions and help manuals are provided in the TSMaster help bar.



TSMaster v2023.6.25.906. Built @2023-06-25 19:04:23 [can413]

Row	ge Name	Id	Chn	Type	DLC	BRS	D0	D1	D2	D3	D4	D5	D6	D7	Comment
1	wMsg	001	1	Std. Data	8	☐	00	00	00	00	00	00	00	00	
2	wMsg	002	1	Std. Data	8	☐	00	00	00	00	00	00	00	00	
3	wMsg	003	2	Std. Data	8	☐	00	00	00	00	00	00	00	00	
4	wMsg	004	2	Std. Data	8	☐	00	00	00	00	00	00	00	00	
5	wMsg	123	1	Std. Data	8	☐	00	00	00	00	00	00	00	00	

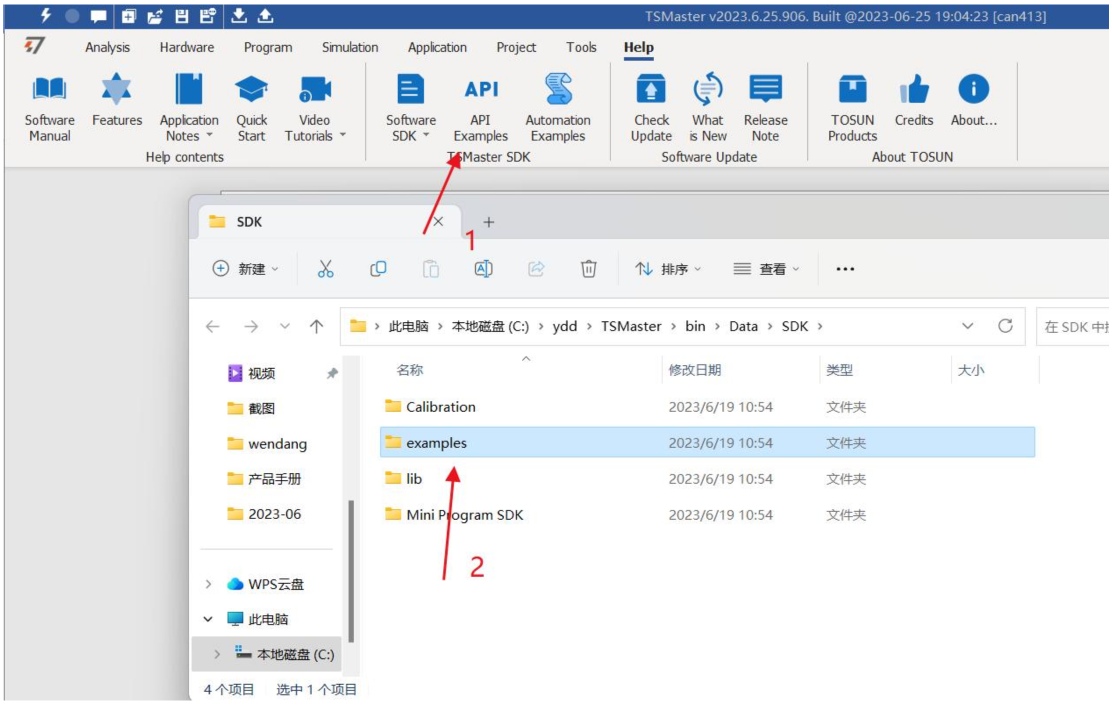
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
00	00	00	00	00	00	00

At the same time, a large number of teaching videos can enter B station

http s: / /space.bilibili.com / 2042371333, follow the tosun intelligent official number, watch all the teaching videos.

3.5 TSMaster API Secondary development

In the TSMaster help bar API routine, a variety of common language API is provided to facilitate users' secondary development. Efficient and easy-to-use secondary development functions that can support all kinds of development environments, such as C, Python, C #, Labview, etc.



名称	修改日期	类型	大小
Calibration	2023/6/19 10:54	文件夹	
examples	2023/6/19 10:54	文件夹	
lib	2023/6/19 10:54	文件夹	
Mini Program SDK	2023/6/19 10:54	文件夹	

3.5.1 Python calls the dynamic library

Windows32-Position Python:

（1） pip install TSMasterAPI

(2) Using the TSMasterAPI form TSMasterAPI import * for

(3) Example synchronous upload github, address: https: / / github.com/sy950915/TSMasterAPI.git

Windows64 bit Python / Li nux:

（1） pip install libTSCANAPI

(2) Using the TSMasterAPI form libTSCANAPIimport * for

(3) Example synchronous upload github, address: https: / / github.com/sy950915/ libTSCANAPI.git

3.5.2 C calls the dynamic library

(1) Include TSMaster in a file with a path of TSMaster \ bin \ Data \ SDK \ lib \ x86.h header file.

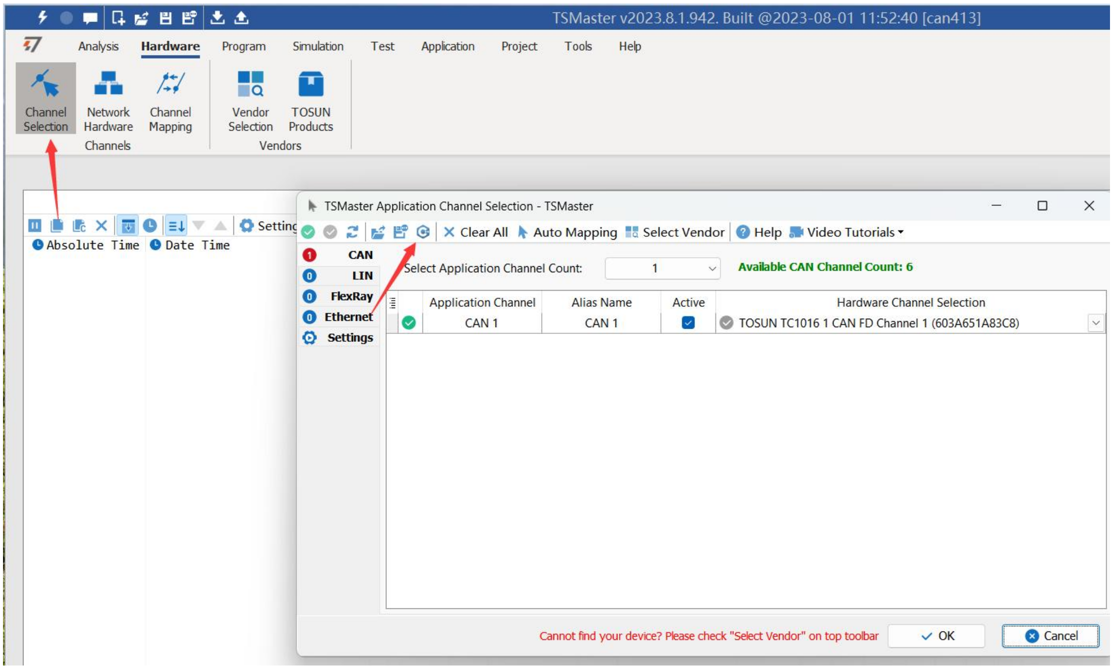
Such as: # include " TSMaster.h”

(2) Include TSMaster in a file with a path of TSMaster \ bin \ Data \ SDK \ lib \ x86. The lib file is connected to TSMaster.lib document.

In the C environment, add TSMaster to the Configuration Property connector input additional dependencies in the project property page.lib document.

3.5.3 Example of the calling of the interface

Windows, The Linux system provides the secondary development interface, easy to connect and use the equipment. The operation step are: select channel-generate C code-use C code / python code to call the interface. Take the code C as an example:



TSMaster v2023.8.1.942. Built @2023-08-01 11:52:40 [can413]

TSMaster Application Channel Selection - TSMaster

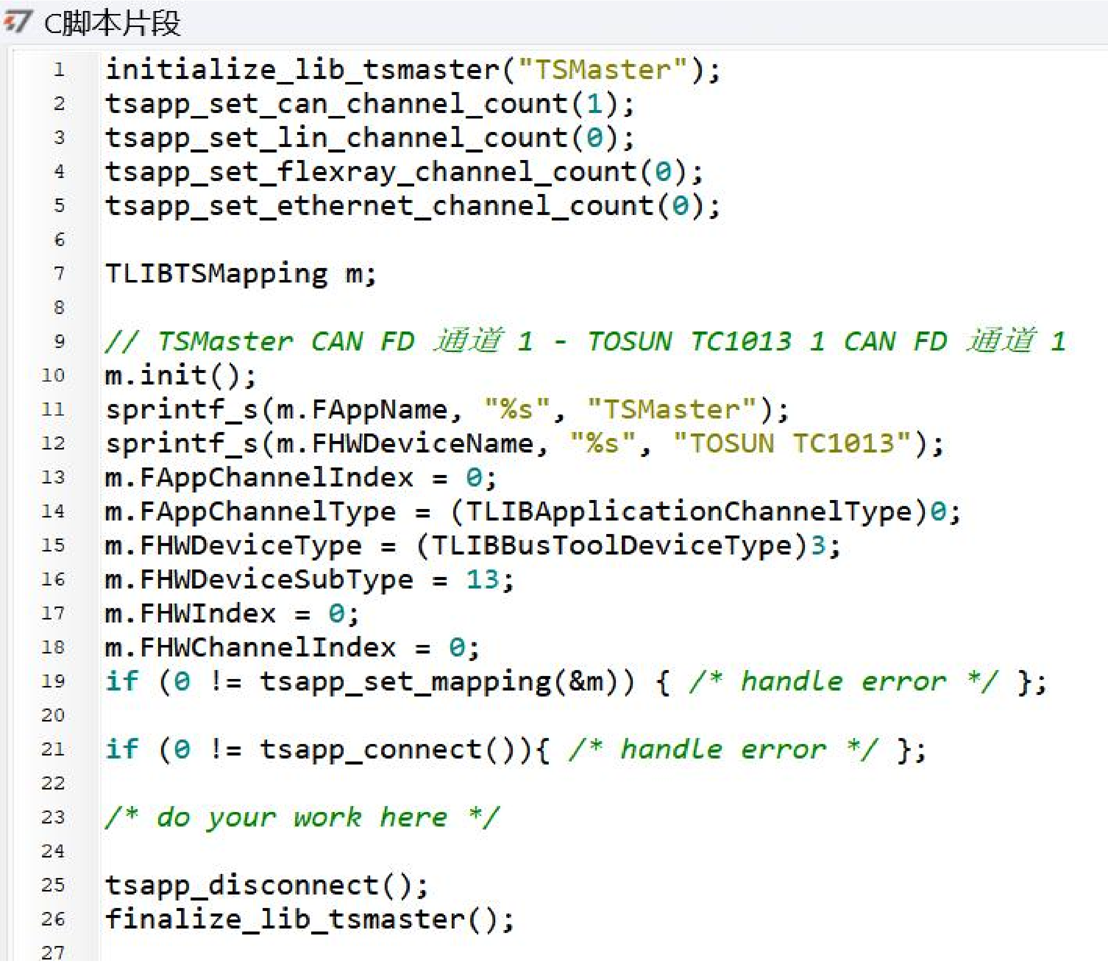
Select Application Channel Count: 1

Available CAN Channel Count: 6

Application Channel	Alias Name	Active	Hardware Channel Selection
CAN 1	CAN 1	☑	TOSUN TC1016 1 CAN FD Channel 1 (603A651A83C8)

Cannot find your device? Please check "Select Vendor" on top toolbar

C Script Fragments:



C脚本片段

```
initialize_lib_tsmaster("TSMaster");
tsapp_set_can_channel_count(1);
tsapp_set_lin_channel_count(0);
tsapp_set_flexray_channel_count(0);
tsapp_set_ethernet_channel_count(0);

TLIBTSMapping m;

// TSMaster CAN FD 通道 1 - TOSUN TC1013 1 CAN FD 通道 1
m.init();
sprintf_s(m.FAppName, "%s", "TSMaster");
sprintf_s(m.FHWDeviceName, "%s", "TOSUN TC1013");
m.FAppChannelIndex = 0;
m.FAppChannelType = (TLIBApplicationChannelType)0;
m.FHWDeviceType = (TLIBBusToolDeviceType)3;
m.FHWDeviceSubType = 13;
m.FHWIndex = 0;
m.FHWChannelIndex = 0;
if (0 != tsapp_set_mapping(&m)) { /* handle error */ };

if (0 != tsapp_connect()){ /* handle error */ };

/* do your work here */

tsapp_disconnect();
finalize_lib_tsmaster();

```

C script call function description:

initialize _ lib _ tsmaster ("TSMaster"); / / TSMaster initialization function

Tsapp _ set _ can _ channel _ count (1); / / Set the number of can channels

The tsapp _ set _ lin _ channel _ count (0); / / Set the number of lin channels

The tsapp _ set _ flexray _ channel _ count (0); / / Set the number of flexray channels

The tsapp _ set _ ethernet _ channel _ count (0); / / Set the number of ethernet channels

TLIBTSMapping m; / / Initialize the construct

/ / Set the TSMaster CAN FD channel 1-TOSUN TC10131 CAN FD channel 1 channel mapping

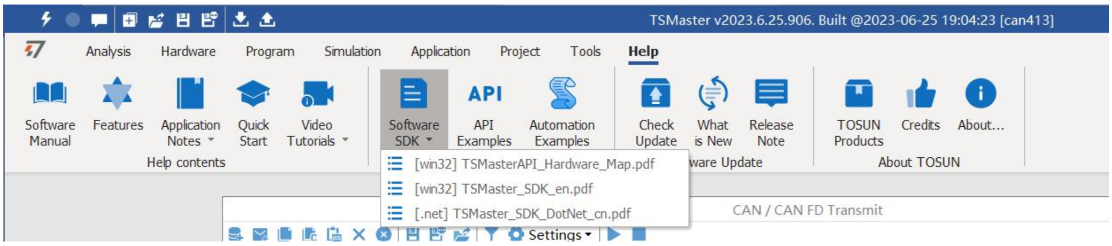
m. The init (); / / initial construct m

sprintf_s(m. FAppName, "%s", "TSMaster"); / / Print the application name "TSMaster"

sprintf_s(m. FHWDeviceName, "%s", "TOSUN TC1013"); / / Print the hardware device name

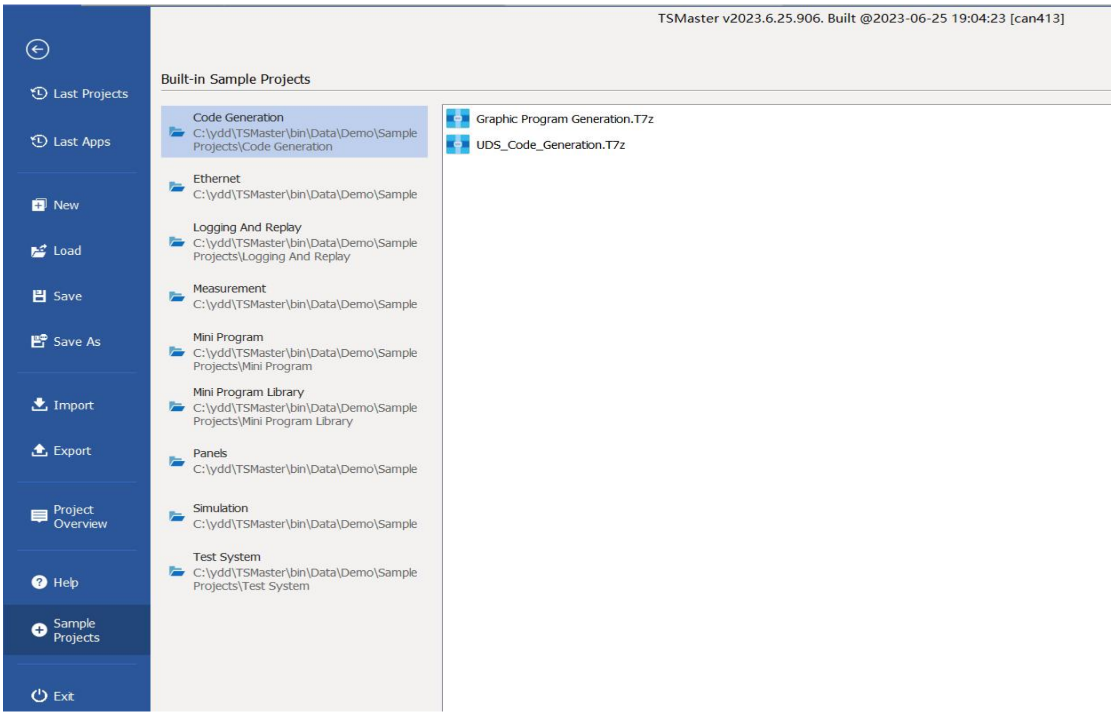
```
m. FAppChannelIndex = 0; / / Application channel index
m. FAppChannelType = (TLIBApplicationChannelType) 0; / / Application channel type
m. FHWDeviceType = (TLIBBusToolDeviceType) 3; / / Hardware device type
m. FHWDeviceSubType = 13; / / corresponding parameters of hardware equipment *
m. FHWIndex = 0; / / Hardware index
m. FHWChannelIndex = 0; / / Hardware channel index
if (0 != Tsapp _ set _ mapping (& m)) {/ * handle error * /}; / / If the return value is not equal to the 0 mapping failure

The tsapp _ disconnect(); / / Disconnect the device
finalize _ lib _ tsmaster(); / / Release the C script module
```

* Note: The corresponding parameters of the hardware equipment can be found in the TSMaster-Help-Software Development Package : TSMasterAPI_Hardware_Map.pdf



3. 6 Sample Works

The example project provides a lot of Demo for user reference, greatly improving the user development efficiency.



TSMaster v2023.6.25.906. Built @2023-06-25 19:04:23 [can413]

Built-in Sample Projects

Code Generation
C:\ydd\TSMaster\bin\Data\Demo\Sample Projects\Code Generation

Ethernet
C:\ydd\TSMaster\bin\Data\Demo\Sample

Logging And Replay
C:\ydd\TSMaster\bin\Data\Demo\Sample Projects\Logging And Replay

Measurement
C:\ydd\TSMaster\bin\Data\Demo\Sample

Mini Program
C:\ydd\TSMaster\bin\Data\Demo\Sample Projects\Mini Program

Mini Program Library
C:\ydd\TSMaster\bin\Data\Demo\Sample Projects\Mini Program Library

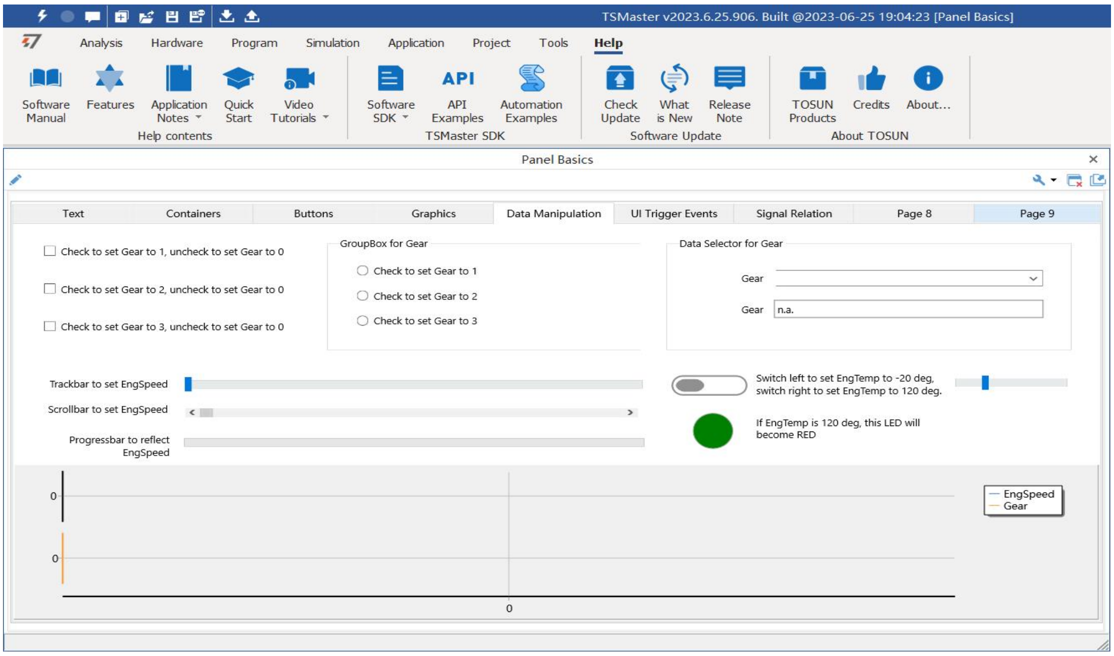
Panels
C:\ydd\TSMaster\bin\Data\Demo\Sample

Simulation
C:\ydd\TSMaster\bin\Data\Demo\Sample

Test System
C:\ydd\TSMaster\bin\Data\Demo\Sample Projects\Test System

Graphic Program Generation.T7z
UDS_Code_Generation.T7z

Sample project panel:



TSMaster v2023.6.25.906. Built @2023-06-25 19:04:23 [Panel Basics]

□ Check to set Gear to 1, uncheck to set Gear to 0
□ Check to set Gear to 2, uncheck to set Gear to 0
□ Check to set Gear to 3, uncheck to set Gear to 0

GroupBox for Gear
○ Check to set Gear to 1
○ Check to set Gear to 2
○ Check to set Gear to 3

Data Selector for Gear
Gear
Gear n.a.

Trackbar to set EngSpeed
Scrollbar to set EngSpeed
Progressbar to reflect EngSpeed

Switch left to set EngTemp to -20 deg, switch right to set EngTemp to 120 deg.

If EngTemp is 120 deg, this LED will become RED

4. Inspection and maintenance

TC1013 The main electrical component is the semiconductor component, although it has a long life, it may accelerate aging in the incorrect environment, greatly reducing the life. Therefore, regular inspections should be conducted during the use of the equipment to ensure that the use environment maintains the required conditions. It is recommended to check it up at least once every 6 months to a year. Under adverse environmental conditions, more frequent examinations should be performed. In the table below, if you encounter problems during maintenance, read below to find the possible cause of the problem. If the problem still cannot be solved, please contact Shanghai Tongxing Intelligent Technology Co., LTD.

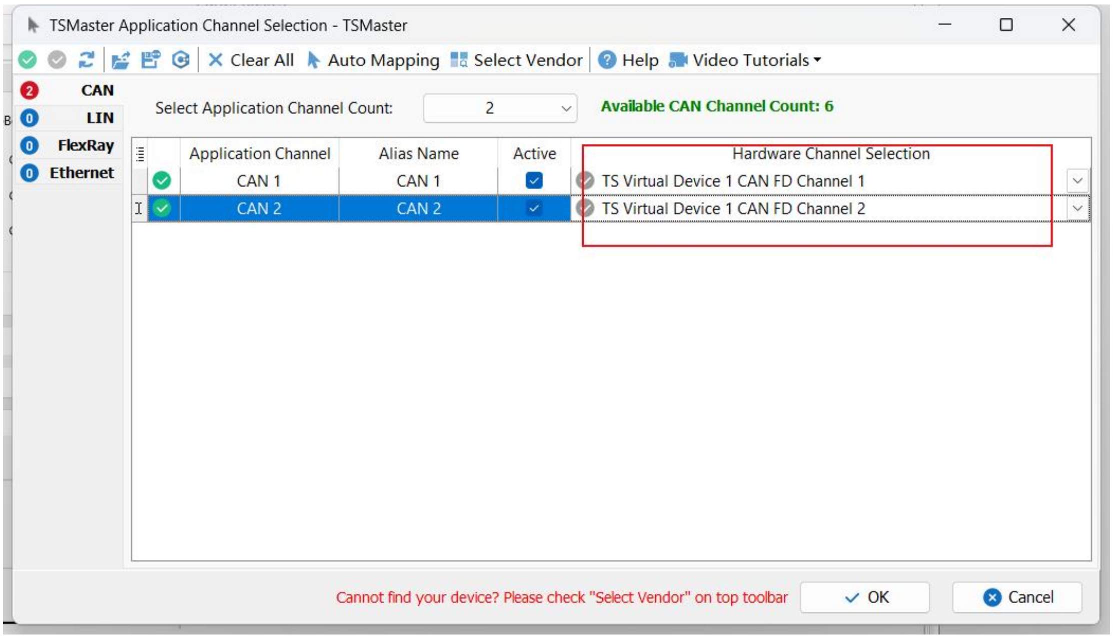
project	check up	standard	move about
power suppl	Check the voltage fluctuation at the power supply side	7~18V DC	Use the voltmeter to check the source at the power supply input end. Take the necessary measures to make the voltage fluctuation within the range
surrounding environment	Check the ambient temperature (Including the internal temperature of the enclosed environment)	-40℃~+80℃	Use the thermometer to check the temperature and ensure that the ambient temperature remains within the allowable range
	Check ambient humidity (Including the internal humidity in the closed environment)	Without air conditioning, the relative humidity must be at 10%~90%	Use a humidity meter to check the humidity and ensure that the ambient humidity remains within the allowable range
	Check for the accumulation of dust, powder, salt, and metal debris	No accumulation	Clean and protect the equipment
	Check water, oil, or chemical spray collision into the device	No spray touched the equipment	If the cleaning and protection equipment is required
	Check for corrosive or	No easily	Check by smelling or using

	flammable gases in the equipment area	corrosive or flammable gases	a sensor
	Check the vibration and shock levels	The vibration and shock are within the specified limits	Install the liner or other shock absorber, if required
	Check the noise sources near the equipment	There are no significant noise signal source	Isolation equipment and noise sources or protection equipment
Install wiring	Check the crimp connectors in the external wiring	There is sufficient space between the connectors	Visual scopic inspection adjust if necessary
	Check for the damage to the external wiring	No damage	Visual inspection and replace wiring if necessary

5. Common questions and answers

5.1 The line is connected correctly but cannot communicate properly:

Solution: Check if the number of channels is set. If CAN Channel Count = 0, of course no online hardware cannot display. And the software is configured by default virtual channel, you need to select the hardware real channel.



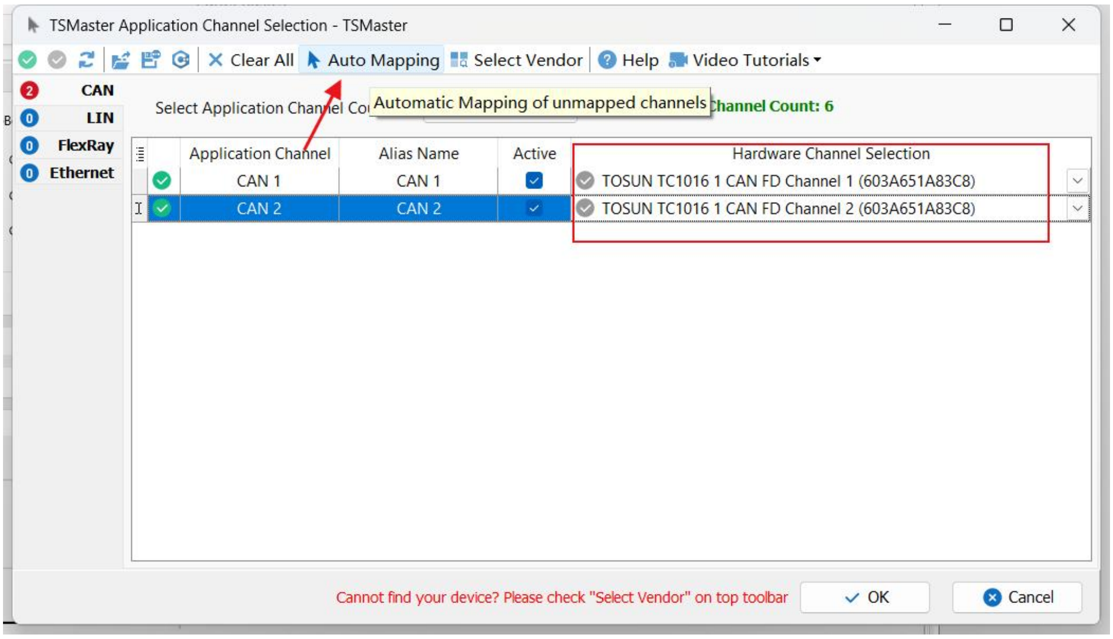
Select Application Channel Count: 2

Available CAN Channel Count: 6

	Application Channel	Alias Name	Active	Hardware Channel Selection
✓	CAN 1	CAN 1	☑	TS Virtual Device 1 CAN FD Channel 1
✓	CAN 2	CAN 2	☑	TS Virtual Device 1 CAN FD Channel 2

Cannot find your device? Please check "Select Vendor" on top toolbar

Automatically map or manually click to select the hardware real channel:



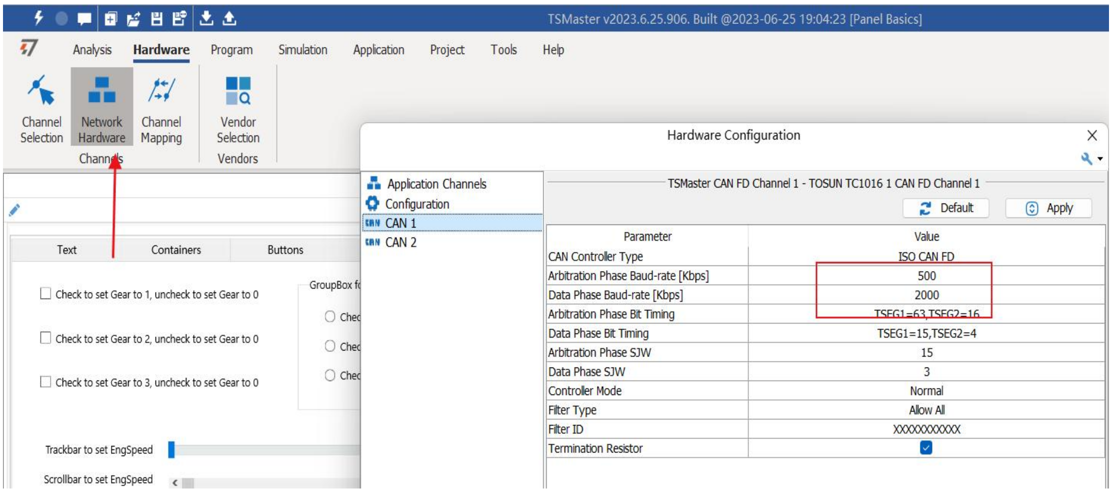
Select Application Channel Co

hannel Count: 6

	Application Channel	Alias Name	Active	Hardware Channel Selection
✓	CAN 1	CAN 1	☑	TOSUN TC1016 1 CAN FD Channel 1 (603A651A83C8)
✓	CAN 2	CAN 2	☑	TOSUN TC1016 1 CAN FD Channel 2 (603A651A83C8)

Cannot find your device? Please check "Select Vendor" on top toolbar

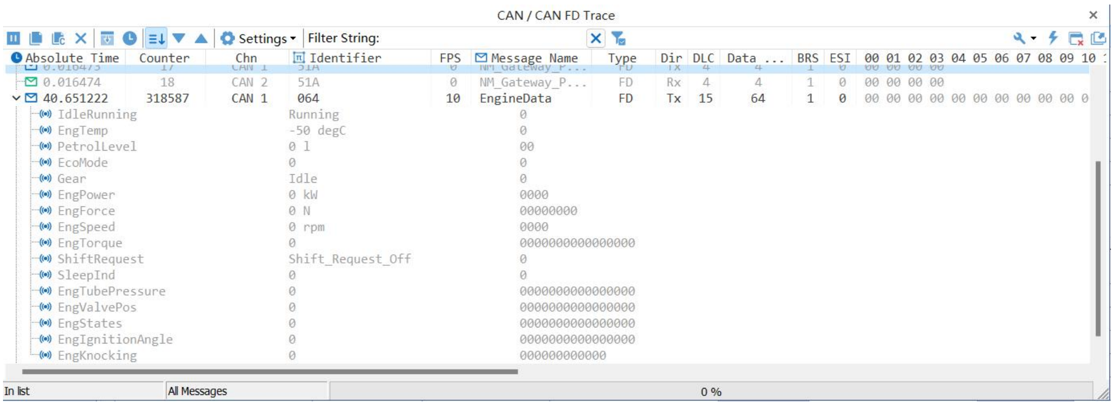
If the channel is selected correctly, it is necessary to ensure consistent port communication between the two channels, as shown in the figure below:



TSMaster CAN FD Channel 1 - TOSUN TC1016 1 CAN FD Channel 1

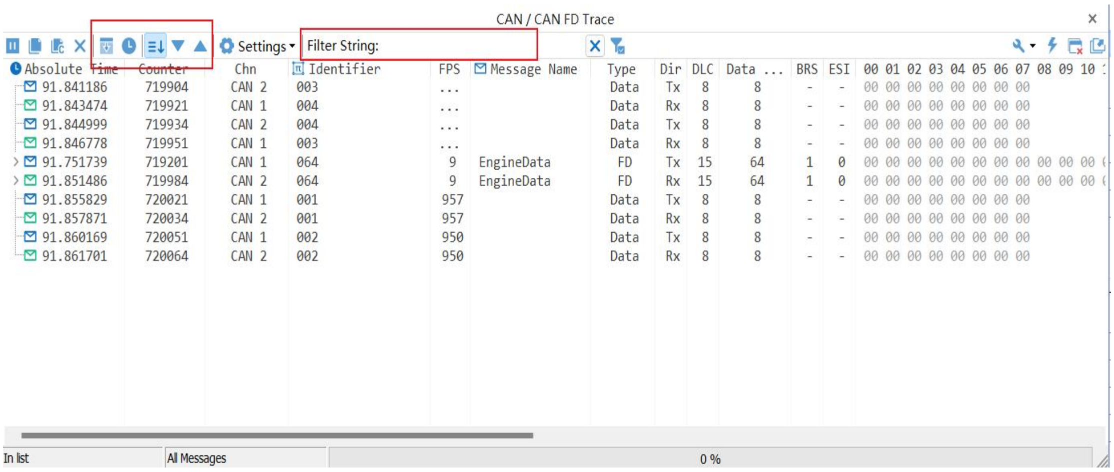
Parameter	Value
CAN Controller Type	ISO CAN FD
Arbitration Phase Baud-rate [Kbps]	500
Data Phase Baud-rate [Kbps]	2000
Arbitration Phase Bit Timing	TSEG1=63,TSEG2=16
Data Phase Bit Timing	TSEG1=15,TSEG2=4
Arbitration Phase SJW	15
Data Phase SJW	3
Controller Mode	Normal
Filter Type	Allow All
Filter ID	XXXXXXXXXXX
Termination Resistor	☑

5.2 Inconvenient message observation and signal filtering:



Absolute Time	Counter	Chn	Identifier	FPS	Message Name	Type	Dir	DLC	Data ...	BRS	ESI	00 01 02 03 04 05 06 07 08 09 10
0.016473	17	CAN 1	51A	0	NM_Gateway_P...	FD	Tx	4	4	1	0	00 00 00 00
0.016474	18	CAN 2	51A	0	NM_Gateway_P...	FD	Rx	4	4	1	0	00 00 00 00
40.651222	318587	CAN 1	064	10	EngineData	FD	Tx	15	64	1	0	00 00 00 00 00 00 00 00 00 00 0
IdleRunning			Running		0							
EngTemp			-50 degC		0							
PetrolLevel			0 l		00							
EcoMode			0		0							
Gear			Idle		0							
EngPower			0 kW		0000							
EngForce			0 N		00000000							
EngSpeed			0 rpm		0000							
EngTorque			0		0000000000000000							
ShiftRequest			Shift_Request_Off		0							
SleepInd			0		0							
EngTubePressure			0		0000000000000000							
EngValvePos			0		0000000000000000							
EngStates			0		0000000000000000							
EngIgnitionAngle			0		0000000000000000							
EngKnocking			0		000000000000							

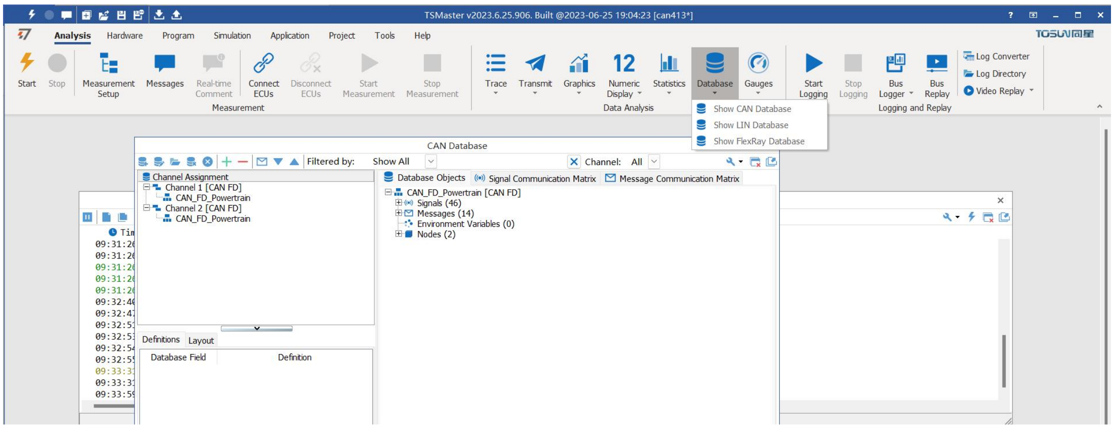
Solution: display in a fixed display or time order, expand or fold the signal display, and filter the string, click the following icon to operate:



Absolute Time	Counter	Chn	Identifier	FPS	Message Name	Type	Dir	DLC	Data ...	BRS	ESI	00 01 02 03 04 05 06 07 08 09 10
91.841186	719904	CAN 2	003	...		Data	Tx	8	8	-	-	00 00 00 00 00 00 00 00
91.843474	719921	CAN 1	004	...		Data	Rx	8	8	-	-	00 00 00 00 00 00 00 00
91.844999	719934	CAN 2	004	...		Data	Tx	8	8	-	-	00 00 00 00 00 00 00 00
91.846778	719951	CAN 1	003	...		Data	Rx	8	8	-	-	00 00 00 00 00 00 00 00
91.751739	719201	CAN 1	064	9	EngineData	FD	Tx	15	64	1	0	00 00 00 00 00 00 00 00 00 00 00
91.851486	719984	CAN 2	064	9	EngineData	FD	Rx	15	64	1	0	00 00 00 00 00 00 00 00 00 00 00
91.855829	720021	CAN 1	001	957		Data	Tx	8	8	-	-	00 00 00 00 00 00 00 00
91.857871	720034	CAN 2	001	957		Data	Rx	8	8	-	-	00 00 00 00 00 00 00 00
91.860169	720051	CAN 1	002	950		Data	Tx	8	8	-	-	00 00 00 00 00 00 00 00
91.861701	720064	CAN 2	002	950		Data	Rx	8	8	-	-	00 00 00 00 00 00 00 00

5.3 How to load the database:

Select the can / lin / flexray database, click the upper left corner icon to add the database file, or drag the file directly into this window to be automatically loaded, and then click the left channel to associate the database.



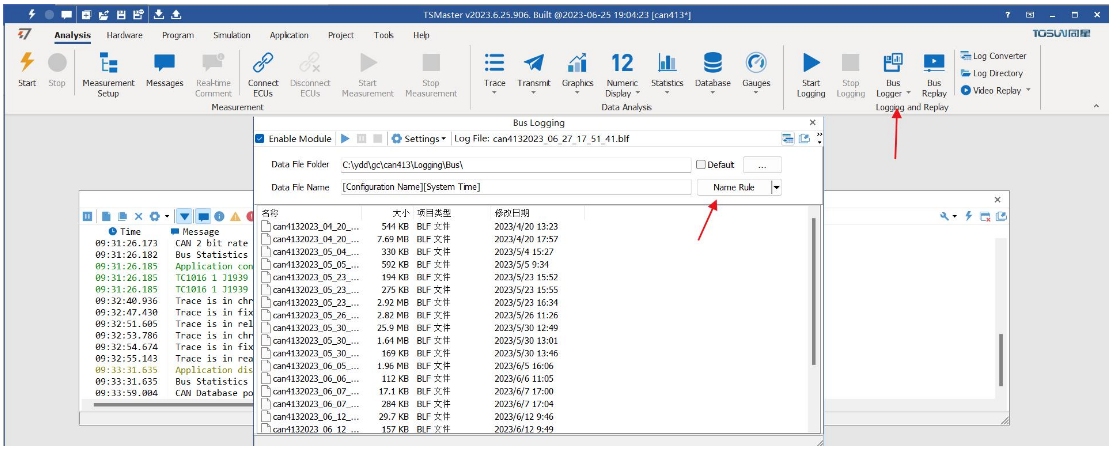
TSMaster v2023.6.25.906. Built @2023-06-25 19:04:23 [can413*]

CAN Database

Channel Assignment
- Channel 1 [CAN FD]
  - CAN_FD_Powertrain
- Channel 2 [CAN FD]
  - CAN_FD_Powertrain

Database Objects
- CAN_FD_Powertrain [CAN FD]
  - Signals (46)
  - Messages (14)
  - Environment Variables (0)
  - Nodes (2)

5.4 How to automatically record the message messages:



TSMaster v2023.6.25.906. Built @2023-06-25 19:04:23 [can413*]

Bus Logging

☑ Enable Module | Settings | Log File: can4132023_06_27_17_51_41.blf

Data File Folder: C:\ydd\gc\can413\Logging\Bus\ ☐ Default

Data File Name: [Configuration Name][System Time] Name Rule

名称	大小	项目类型	修改日期
can4132023_04_20_...	544 KB	BLF 文件	2023/4/20 13:23
can4132023_04_20_...	7.69 MB	BLF 文件	2023/4/20 17:57
can4132023_05_04_...	330 KB	BLF 文件	2023/5/4 15:27
can4132023_05_05_...	592 KB	BLF 文件	2023/5/5 9:34
can4132023_05_23_...	194 KB	BLF 文件	2023/5/23 15:52
can4132023_05_23_...	275 KB	BLF 文件	2023/5/23 15:55
can4132023_05_23_...	2.92 MB	BLF 文件	2023/5/23 16:34
can4132023_05_26_...	2.82 MB	BLF 文件	2023/5/26 11:26
can4132023_05_30_...	25.9 MB	BLF 文件	2023/5/30 12:49
can4132023_05_30_...	1.64 MB	BLF 文件	2023/5/30 13:01
can4132023_05_30_...	169 KB	BLF 文件	2023/5/30 13:46
can4132023_06_05_...	1.96 MB	BLF 文件	2023/6/5 16:06
can4132023_06_06_...	112 KB	BLF 文件	2023/6/6 11:05
can4132023_06_07_...	17.1 KB	BLF 文件	2023/6/7 17:00
can4132023_06_07_...	284 KB	BLF 文件	2023/6/7 17:04
can4132023_06_12_...	29.7 KB	BLF 文件	2023/6/12 9:46
can4132023_06_12_...	157 KB	BLF 文件	2023/6/12 9:49

```
Time           Message
09:31:26.173   CAN 2 bit rate
09:31:26.182   Bus Statistics
09:31:26.185   Application con
09:31:26.185   TC1016 1 J1939
09:31:26.185   TC1016 1 J1939
09:32:40.936   Trace is in chr
09:32:47.430   Trace is in fix
09:32:51.605   Trace is in rel
09:32:53.786   Trace is in chr
09:32:54.674   Trace is in fix
09:32:55.143   Trace is in rea
09:33:31.635   Application dis
09:33:31.635   Bus Statistics
09:33:59.004   CAN Database po
```

operating steps:

a. Analysis- -bus record

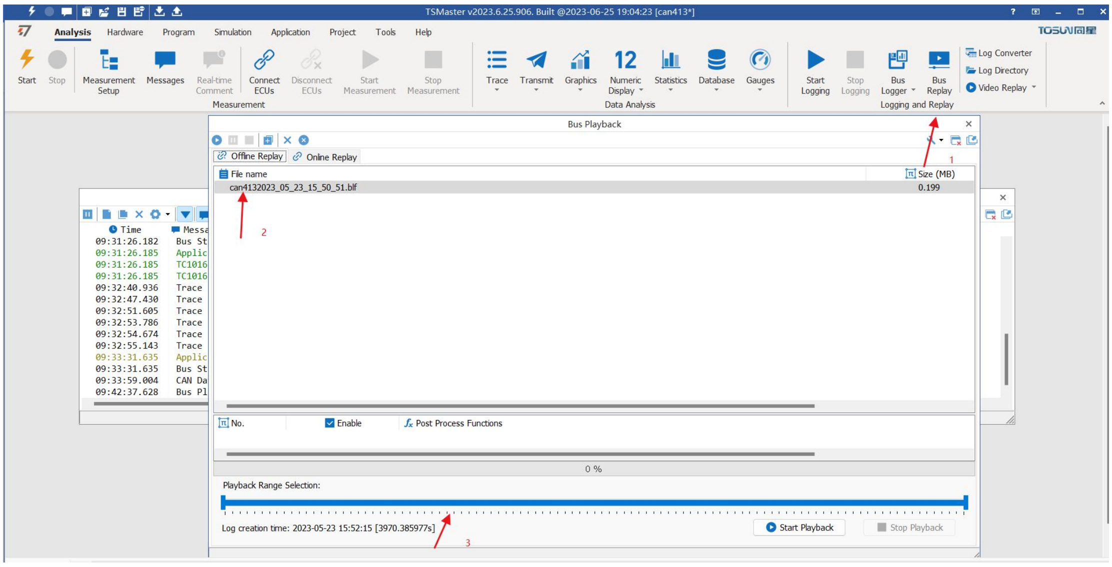
b. Add a name rule to distinguish between different save files

c. Add the self-start function

d. Start the record

5.5 How to replay messages (offline and online playback):

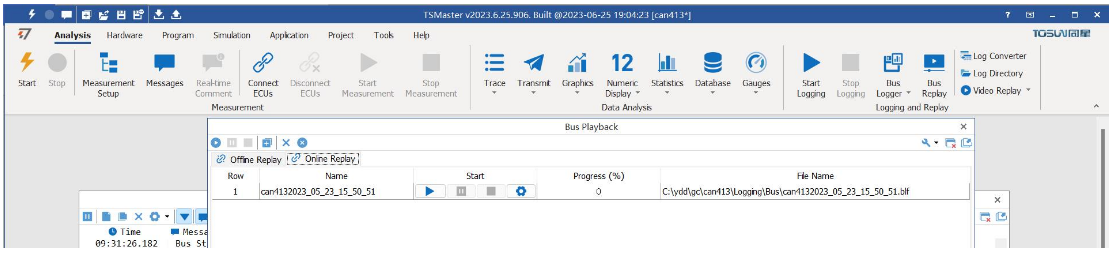
operating steps:



a. Bus playback

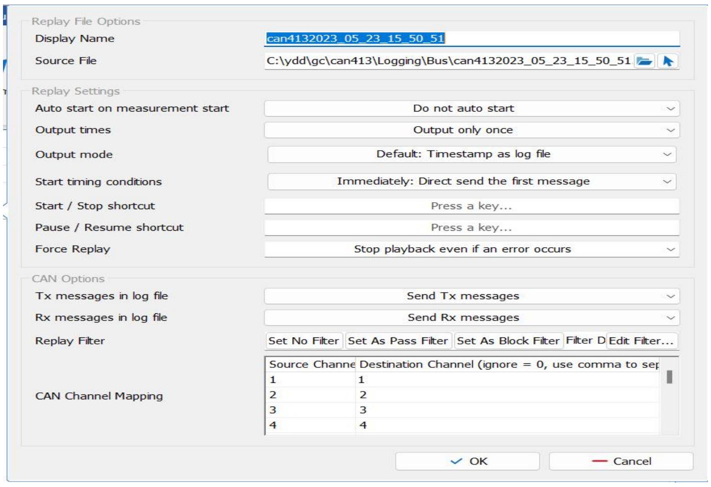
b. Offline playback, add the need to be played packets, can drag and drop file add directly

c. Select the range of message playback. Since the number of message display window is limited, you can choose the time period required for the message



d. Bus playback-online playback-add recording files

e. Online playback can playback the message according to the acquisition time stamp,and set the playback data


Replay File Options

Display Name	can4132023_05_23_15_50_51
Source File	C:\ydd\gc\can413\Logging\Bus\can4132023_05_23_15_50_51

Replay Settings

Auto start on measurement start	Do not auto start
Output times	Output only once
Output mode	Default: Timestamp as log file
Start timing conditions	Immediately: Direct send the first message
Start / Stop shortcut	Press a key...
Pause / Resume shortcut	Press a key...
Force Replay	Stop playback even if an error occurs

CAN Options

Tx messages in log file	Send Tx messages
Rx messages in log file	Send Rx messages
Replay Filter	Set No Filter | Set As Pass Filter | Set As Block Filter | Filter D | Edit Filter...

CAN Channel Mapping

Source Channe	Destination Channel (ignore = 0, use comma to sep
1	1
2	2
3	3
4	4

6. Appendix

6.1 CAN 2.0 Standard Frame:

The CAN standard frame information is 11 bytes, consisting of two parts: information and data parts. The first 3 bytes are for the information section.

	7	6	5	4	3	2	1	0
Bytes 1	FF	RTR	x	x	DLC (Data Length)			
Bytes 2	(Message identification code) ID.10-ID.3							
Bytes 3	ID.2-ID.0			x	x	x	x	x
Bytes 4	Data 1							
Bytes 5	Data 2							
Bytes 6	Data 3							
Bytes 7	Data 4							
Bytes 8	Data 5							
Bytes 9	Data 6							
Bytes 10	Data 7							
Bytes 11	Data 8							

Byte 1 is the frame information. The 7th bit (FF) represents the frame format, in the standard frame, FF=0; the 6th bit (RTR) represents the type of frame, RTR = 0 is a data frame, RTR = 1 is a remote frame; the DLC represents the actual length of data at the data frame.

Bytes 2 and 3 are message identification codes, and 11 bits are valid.

Bytes 4~11 is actual data of data frame, remote frame is invalid.

6.2 CAN 2.0 Expansion Frame:

CAN extended frame information for 13 bytes, including two parts, information and data parts. The first 5 bytes are for the information section.

	7	6	5	4	3	2	1	0
Bytes 1	FF	RTR	x	x	DLC (Data Length)			
Bytes 2	(Message identification code) ID.28-ID.21							
Bytes 3	ID.20-ID.13							
Bytes 4	ID.12-ID.5							
Bytes 5	ID.4-ID.0					x	x	x
Bytes 6	Data 1							
Bytes 7	Data 2							
Bytes 8	Data 3							
Bytes 9	Data 4							
Bytes 10	Data 5							
Bytes 11	Data 6							
Bytes 12	Data 7							
Bytes 13	Data 8							

Byte 1 is the frame information. The 7th (FF) indicates the frame format, FF = 1; the 6th (RTR)

It represents the type of frame, RTR = 0 as a data frame and RTR = 1 as a remote frame; DLC represents the actual data length at the data frame.

Byte 2~5 is the message identification code, and its high 29 bits is valid.

Bytes 6~13 is actual data of data frame, remote frame is invalid.

6.3 matters need attention

① Connect the lines to avoid short circuit.

② Before using the equipment, please carefully check the pin information in the product manual.

③ During the operation of the equipment, be sure to connect the power cord correctly and avoid plugging and unplugging.

④ Attention! Damage caused by electrostatic discharge (ESD).

7. Disclaimer

Shanghai TOSUN Intelligent Technology Co., Ltd., based on the principle of providing better service for users, will present detailed and accurate product information for users as much as possible in this manual. However, since the content of this manual has a certain timeliness, Shanghai Tongxing cannot fully guarantee the timeliness and applicability of the document in any period of time. Shanghai TOSUN has the right to update the contents of this manual without notice. In order to get the latest version of the information, please visit the official website of Shanghai Tongxing regularly or contact the staff of Shanghai TOSUN regularly. Thank you for your tolerance and support!

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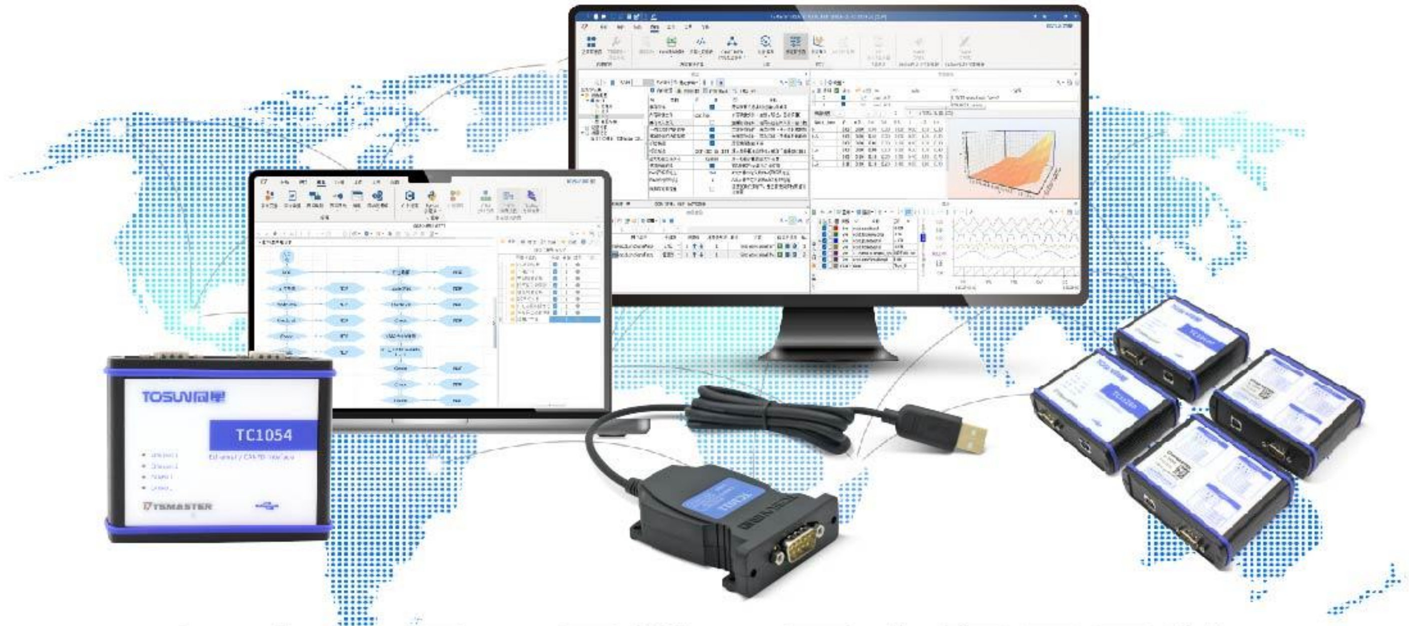

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- 1/2/6通道LIN转USB工具
- 10通道CAN FD/CAN转以太网工具
- 多通道Flexray/CAN FD转USB工具
- 多通道车载以太网/CAN FD转USB工具
- 车载以太网介质转换工具（T1转Tx）
- 多通道CAN FD/Ethernet/LIN记录仪

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- FCT测试设备
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- 线控底盘测试解决方案
- 电机性能/耐久试验解决方案
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