



Hardware IFU—Tlog1002

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In line with the principle of providing better service to users, Shanghai TOSUN Technology LTD (hereinafter referred to as "TOSUN Technology") 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 TOSUN Technology can not fully guarantee the timeliness and applicability of the document at any time period.

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1. Product profile

1.1 Product Overview

TLog1002 is a multi-channel CAN (FD) bus, LIN bus interface logger device, CAN FD, CAN FD, bus rate support 8M bps, LIN bus rate 0 ~ 200 kbps, at the same time built-in multi-digital and analog IO interface, convenient for a variety of signal measurement and system integration, the product uses high-speed USB2.0 interface and PC connection, with 64G storage function. Windows System-drive free design makes the equipment have excellent system compatibility.

With the powerful TSMaster software, support loading DBC and ARXML database files, can easily monitor, analyze, simulate CAN 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 CAN FD / CAN / LIN bus data collection
- ✓ 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.
- ✓ High-speed USB2.0 interface, Windows system free drive design, with excellent system compatibility.
- ✓ CAN channel DC2500V sequestration.
- ✓ Automotive grade design, support dbc file, a2l file, blf file, asc file.
- ✓ Support for blf, asc format data recording and offline / online playback.
- ✓ Built-in script editing, support virtual simulation, semi-physical simulation.
- ✓ The UDS diagnosis and CCP calibration can be supported.

- ✓ Support for peer CAN / LIN Flash Bootloader series software.
- ✓ Support Windows, Linux system secondary development interface.
- ✓ The unique LIN message free sending mode can reduce the threshold of LIN bus development and debugging.
 - ✓ It can be used independently from the PC.
 - ✓ Support the GPS function

1.3.2 Technical parameters

channel	2 CANFD/2 LIN
PC terminal interface	High-speed of USB2.0
The CAN / LIN terminal interface	DB9
drive	Windows System drive-free design, with excellent system compatibility
cache	Hardware cache to ensure that no frames are lost
CAN	Support CAN2.0A, B protocol, comply with ISO11898-1 specification, port rate 125 Kbps- 1Mbps
CAN FD	Support for ISO and non-ISO standard CAN FD, port rate 125 Kbps- 8Mbps
LIN	Support LIN 1.3 and 2.x, port rate 0- 20 Kbps
Time stamp accuracy	1us, the hardware message timestamp, to meet the high-order requirements
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 \pm 8KV
supply electricity	USB power supply or external 9~36V power supply
working temperature	-20°C~60°C
Case material	aluferr

* 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	full load *	5.10	5.11	5.12	V
working current	USB supply electricity	full load *	0.18	0.19	0.20	A
power	USB supply electricity	full load *	0.92	0.97	1.02	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
LIN joggle	Bus pin pressure resistance	LINO、LIN1	0	--	24	V
	VBAT voltage		5	12	24	V

1.4 Shipping list

1.1 T log1002 host and usb line



2. TLog power supply cable-banana connector



3. TLog power supply cable-cigarette lighter connector



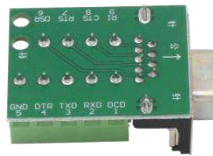
4. Beidou-2-generation GPS antenna



5. DB9 mother 9P banana head signal line



6. DB9 free welding head (head)



2. Description of the hardware interface



The USB high-speed 2.0 interface

DB 9 Male

EMMC 64G

DB9 pin definition:

DB9 pin	channel	pin	definition	channel	pin	definition	
	CANFD 1/2	PIN 5	CANFD_Shield	LIN 1/2 I/O	PIN 5	Digital_Out2	
		PIN 4	CANFD2_Low		PIN 9	Vbat	
		PIN 8	CANFD2_High		PIN4	Digital_Out1	
		PIN 3	CANFD_GND		PIN 8	LIN1	
		PIN7	CANFD1_High		PIN 3	GND	
		PIN 2	CANFD1_Low		PIN 7	Digital_In3	
						PIN2	Digital_In2
						PIN6	LIN1
						PIN1	Digital_In1

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
LIN1	The LIN channel 1 indicator light
LIN2	The LIN channel 2 indicator lamp
GPS	GPS pilot lamp
Log	Record the status indicator light
Mode	Record the module indicator light
LINK	Hardware connection indicator light

Description of the color of the indicator light:

pigment	description
LINK green light	The device hardware is connected
LINgreen light	The LIN channel data frame is sent or received correctly
LIN red light	The LIN channel sends or receives incorrect frames, configuration, protocol, or wiring errors
CAN FD green light	CAN FD Channel data frames are sent or received correctly
CAN FDred light	CAN FD The channel sends or receives incorrect frames, configuration, protocol, or wiring errors
Mode green light	Device enters the recording mode
Log green light	The device is recording the data on the bus
GPS green light	The GPS has been activated
GPS red lantern	GPS nonactivated

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

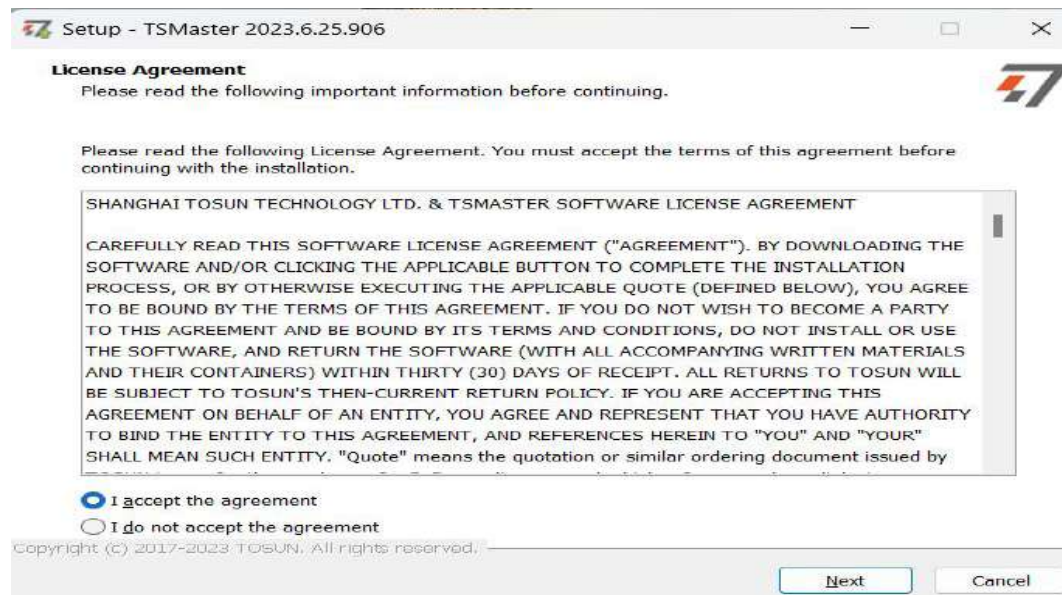
If not accessible, you can contact the corresponding sales staff or log in to the official website of the same star to get the upper machine, and you can also scan the code to follow the public account to get the download link.



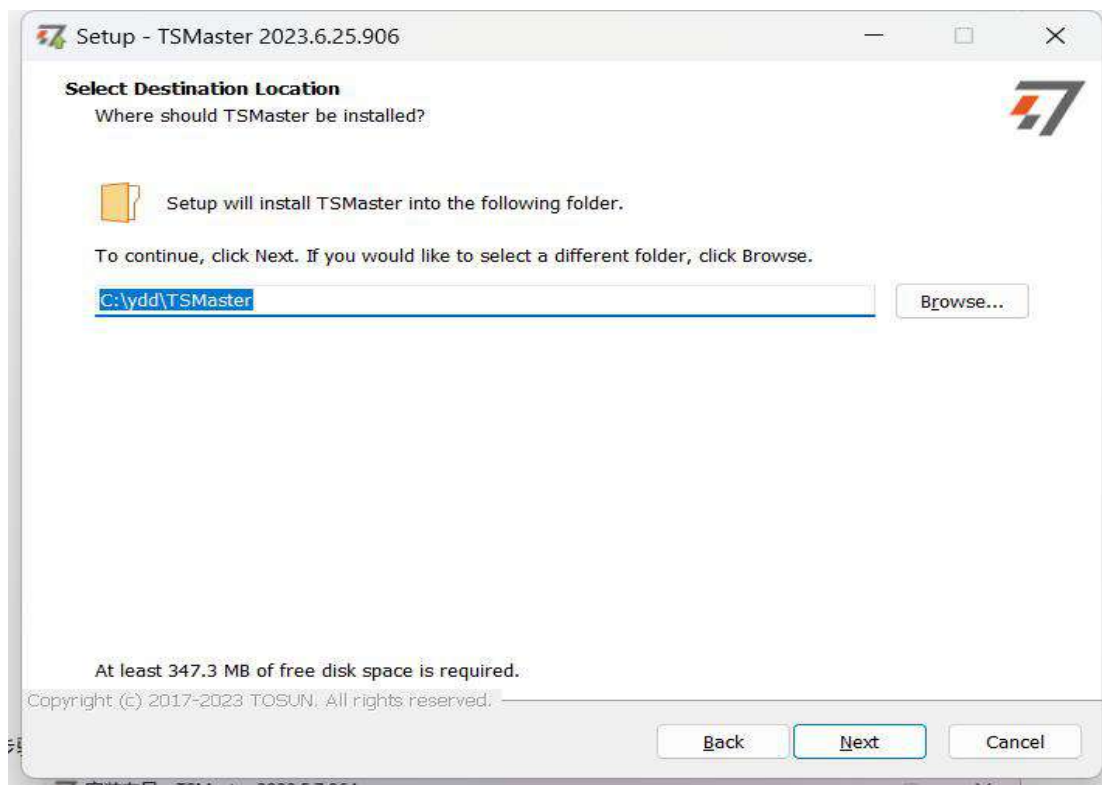
Step 1:



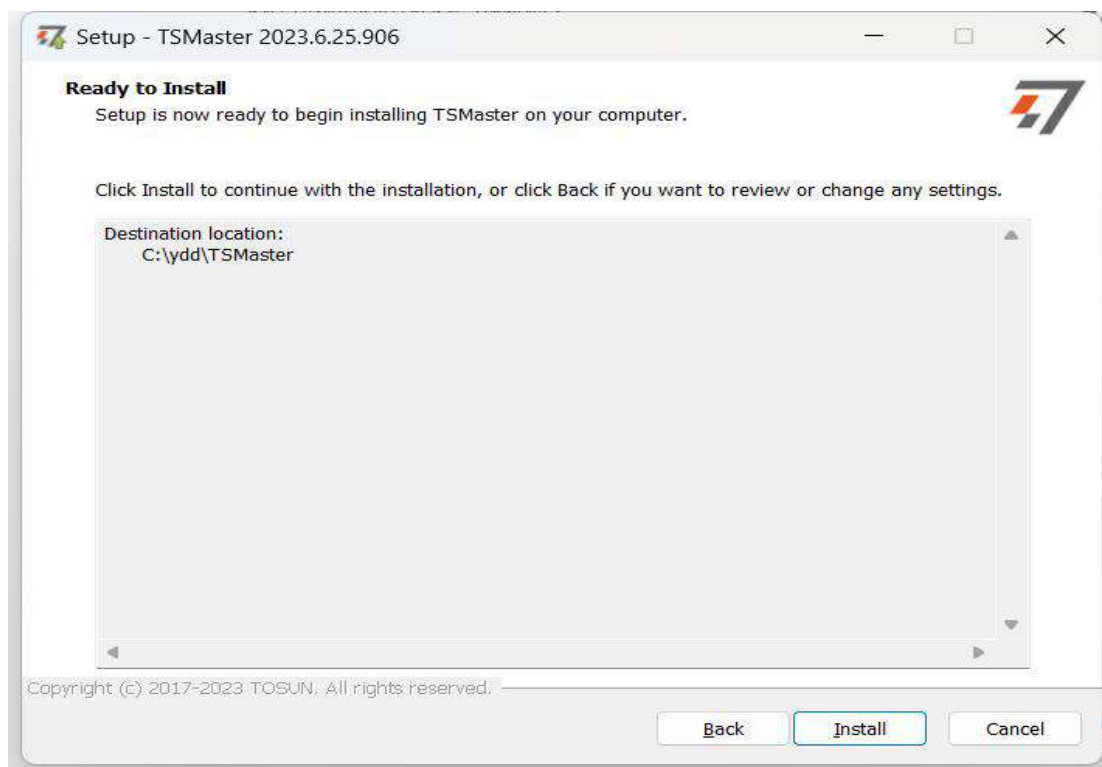
Step 2:



Step 3:



Step 4:



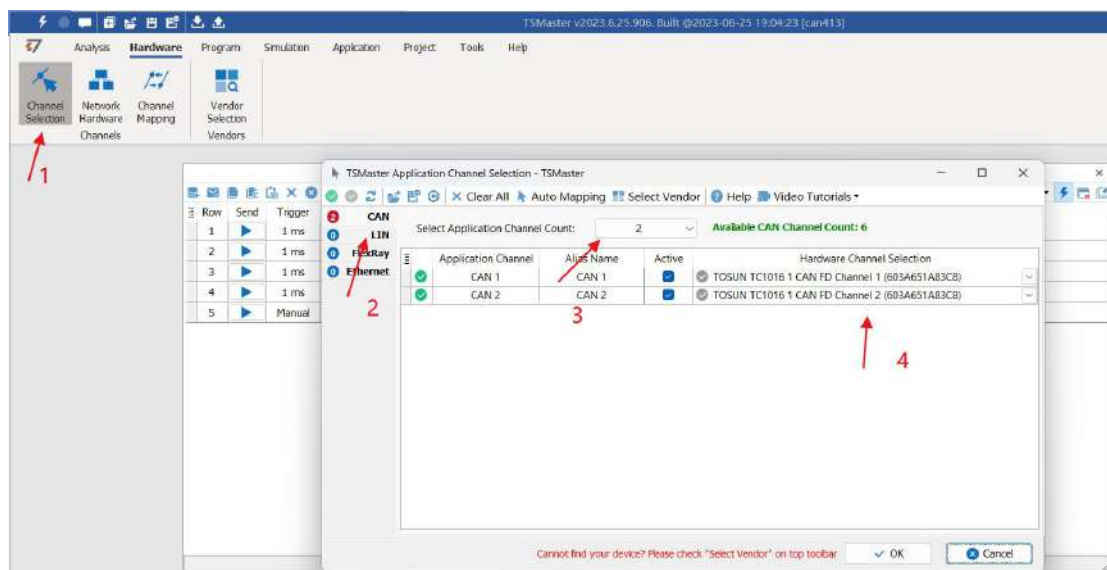
Complete installation:



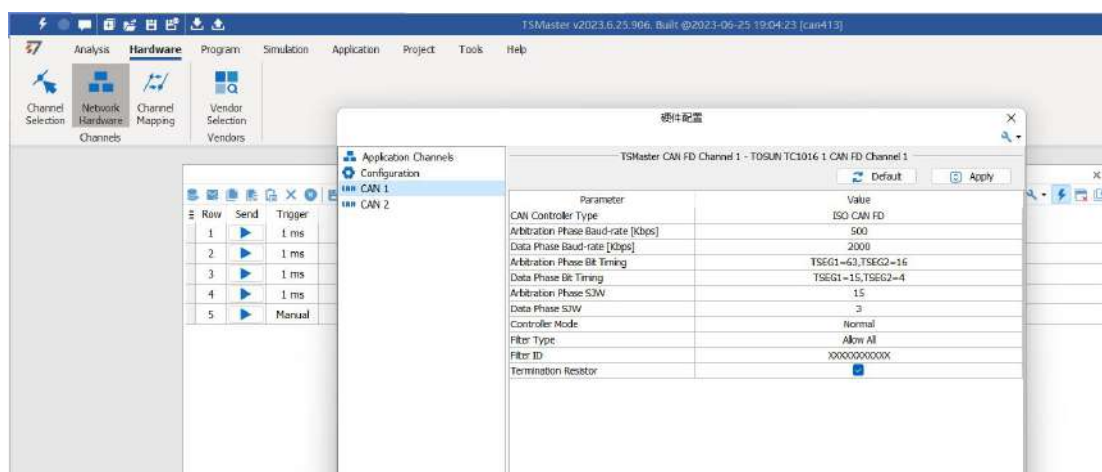
3.2 Connect devices and configure channels

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

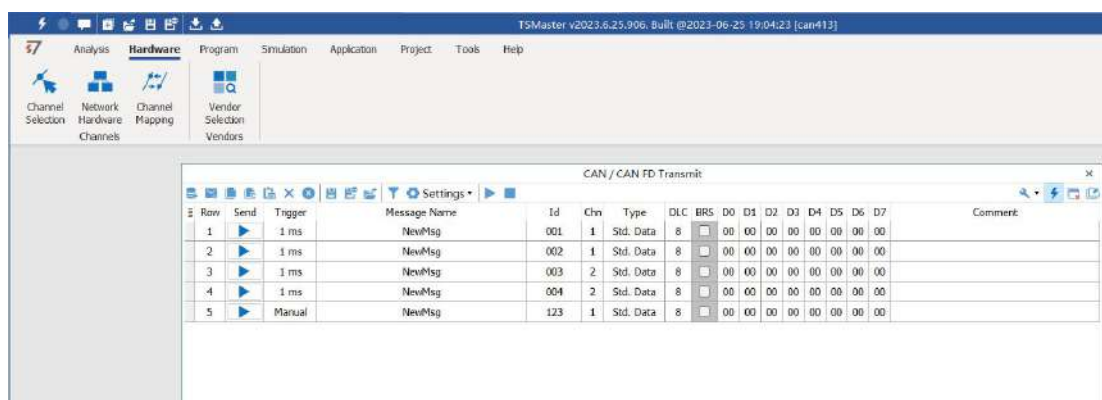
In TSMaster software interface: Click Hardware-click channel selection-drop-down box
 Select number of channels-select hardware channel-click OK



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.



3.3 Message sending



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

operating steps:

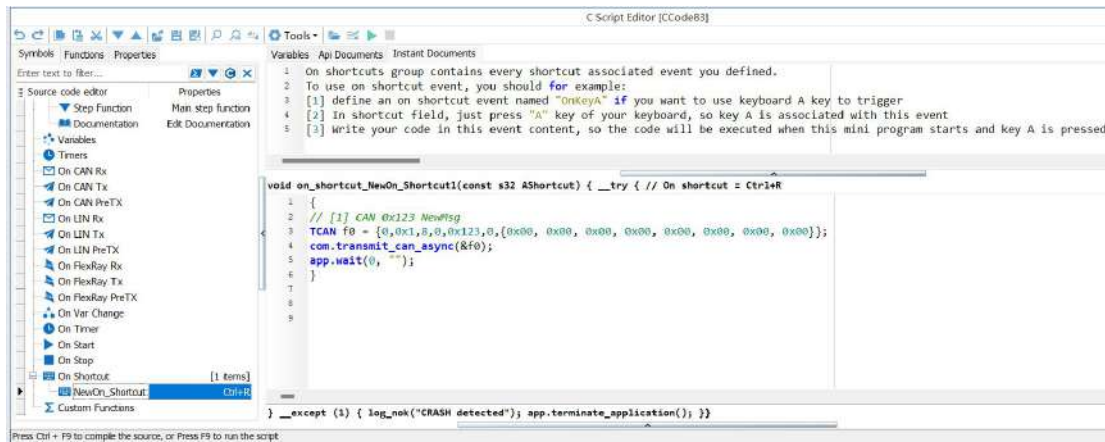
- a. Message sending-Add a CAN / CAN FD message for sending
- b. Right mouse button to create a new original message / add a message from the database, and set the message name / identifier / channel, etc
- c. Message am trigger setting, manual trigger / cycle trigger, cycle trigger can set the sending 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:

```

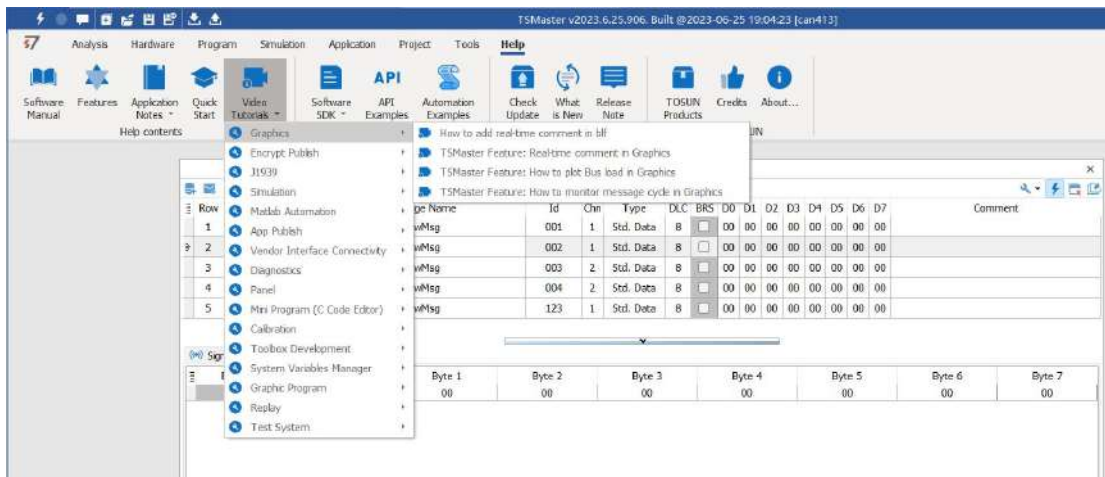
1  {
2  // [1] CAN 0x2 NewMsg
3  TCAN f0 = {0,0x1,8,0,0x2,0,{0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00};
4  com.transmit_can_async(&f0);
5  app.wait(0, "");
6  }
7
8
    
```

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



3.4 Help with documentation and video teaching

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

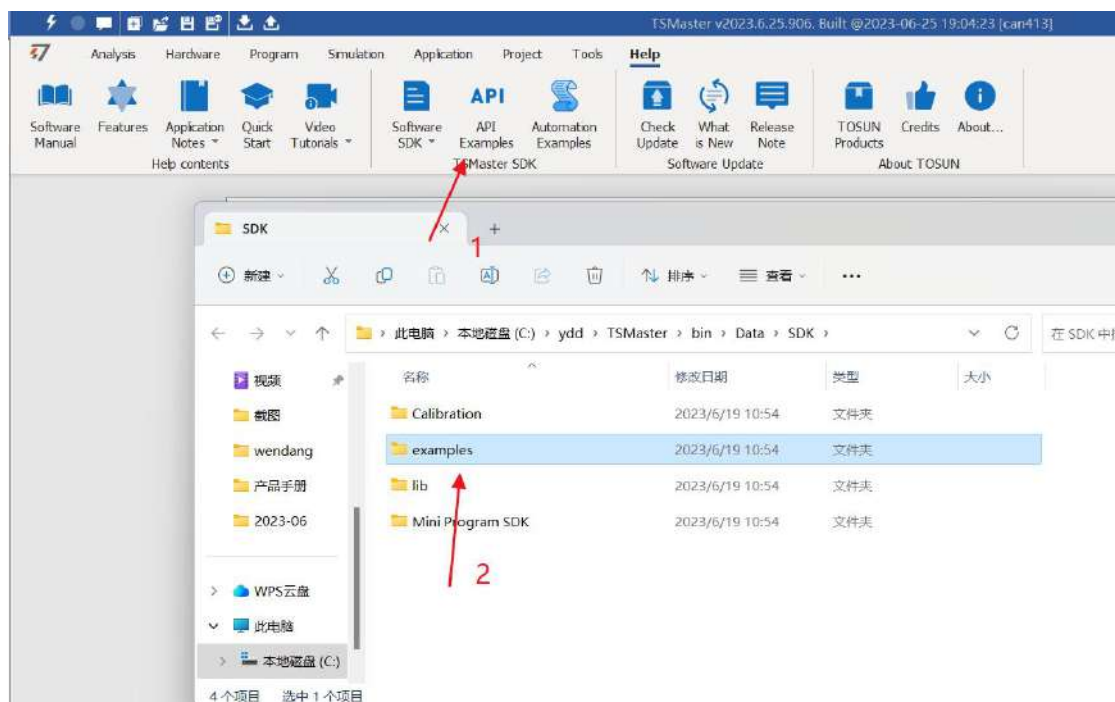


At the same time, a large number of teaching videos can enter B station

<http://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.



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.

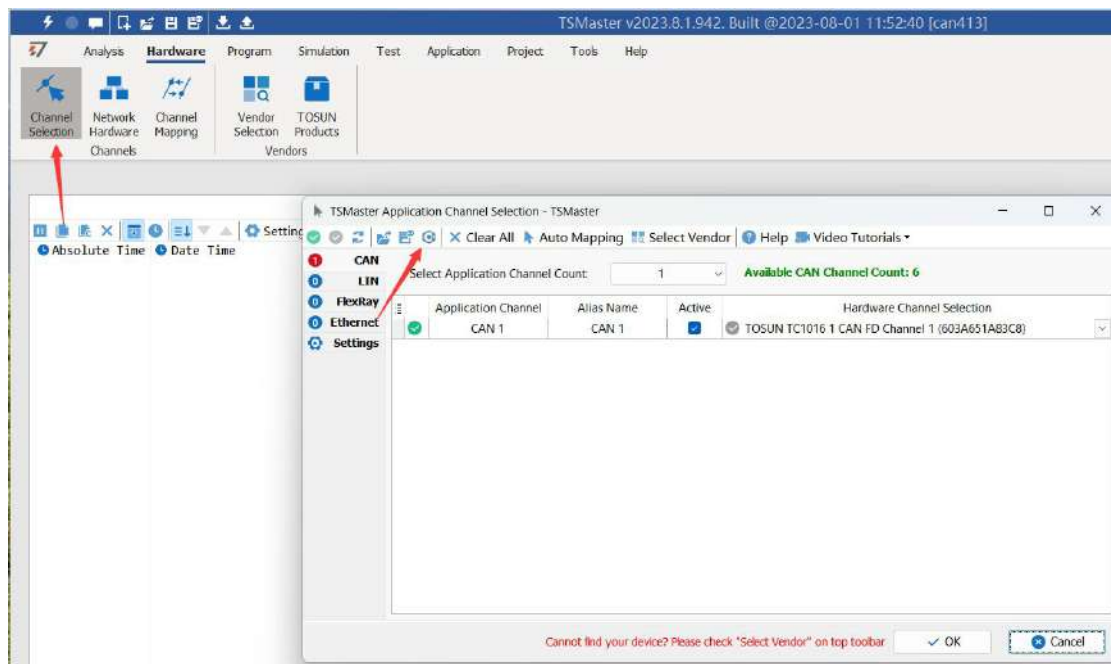
Such as: # include " TSMaster.h"

(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:



C Script Fragments:

```

C脚本片段
1 initialize_lib_tsmaster("TSMaster");
2 tsapp_set_can_channel_count(1);
3 tsapp_set_lin_channel_count(0);
4 tsapp_set_flexray_channel_count(0);
5 tsapp_set_ethernet_channel_count(0);
6
7 TLIBTSMapping m;
8
9 // TSMaster CAN FD 通道 1 - TOSUN TLog1002 1 CAN FD 通道 1
10 m.init();
11 sprintf_s(m.FAppName, "%s", "TSMaster");
12 sprintf_s(m.FHWDeviceName, "%s", "TOSUN TLog1002");
13 m.FAppChannelIndex = 0;
14 m.FAppChannelType = (TLIBApplicationChannelType)0;
15 m.FHWDeviceType = (TLIBBusToolDeviceType)3;
16 m.FHWDeviceSubType = 14;
17 m.FHWIndex = 0;
18 m.FHWChannelIndex = 0;
19 if (0 != tsapp_set_mapping(&m)) { /* handle error */ };
20
21 if (0 != tsapp_connect()){ /* handle error */ };
22
23 /* do your work here */
24
25 tsapp_disconnect();
26 finalize_lib_tsmaster();
27

```

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 T log1002 1 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 TC1016"); // Print the hardware device name

```

m. FAppChannelIndex = 0; // Application channel index
m. FAppChannelType = (TLIBApplicationChannelType) 0; // Application channel type
m. FHWDDeviceType = (TLIBBusToolDeviceType) 3; // Hardware device type
m. FHWDDeviceSubType = 14; // 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 0 mapping failure

```

```
The tsapp _ disconnect(); // Disconnect the device
```

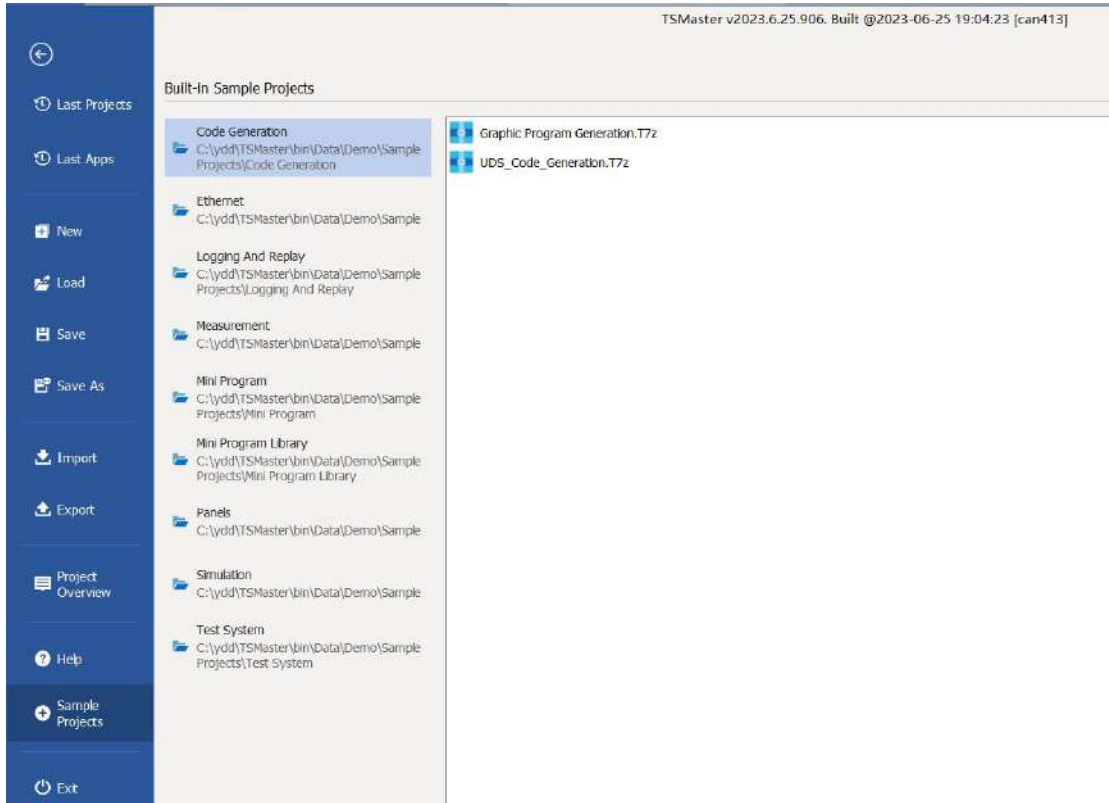
```
finalize _ lib _ tsmaster(); // Release the C script module
```

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

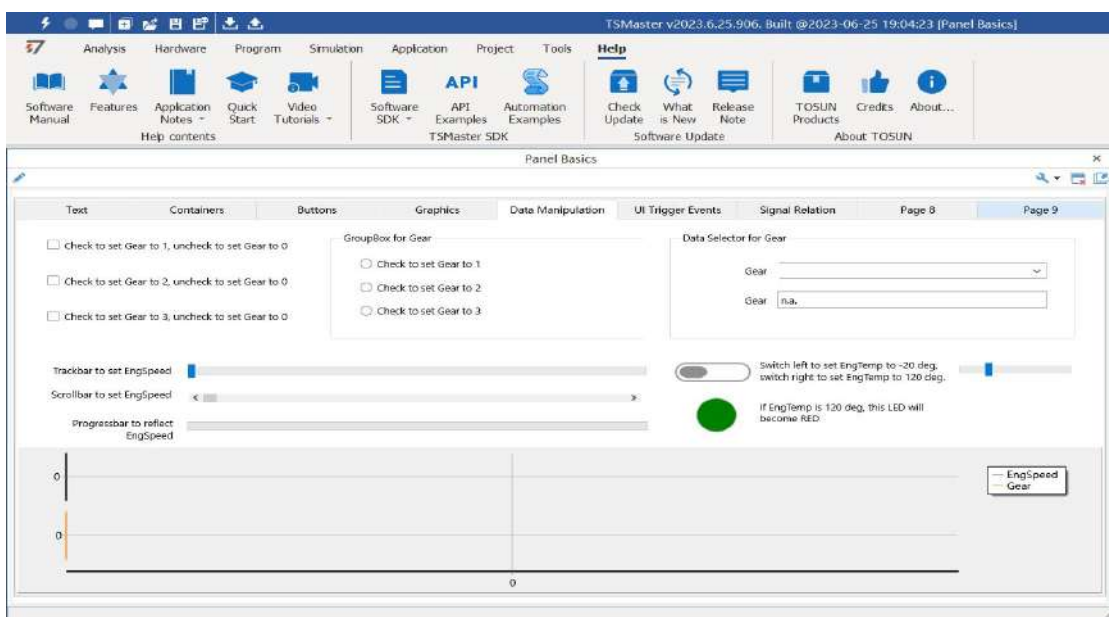


3.6 Sample Works

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



Sample project panel:



4. Recorder mode

. 41 Hardware configuration

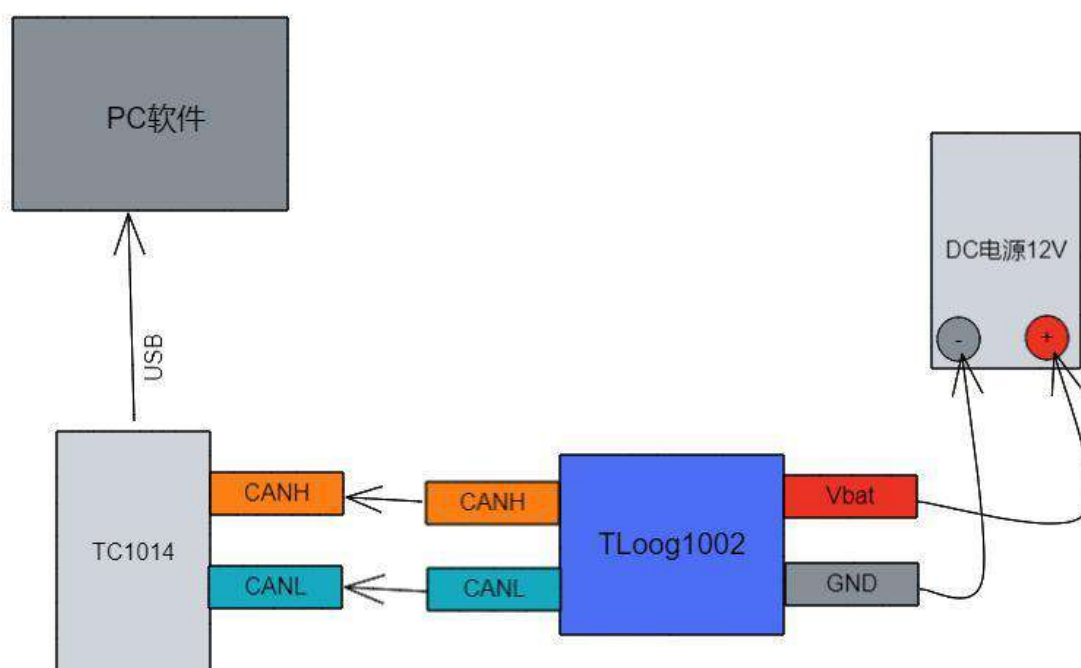
.1 4.1 Hardware connection

Step1: Connect the Tlog1002 CANFD channels CANH and CANL to the corresponding CAN ECU, the CANH and CANL of the device.

Step2: use the recorder mode Tlog1002 requires power supply 12V;

Step3: Connect the ninth foot Vbat and the third foot GND of Tlog1002 LIN 1 / 2 I / O to the 12V power positive and negative power respectively, and the device enters the recorder mode.

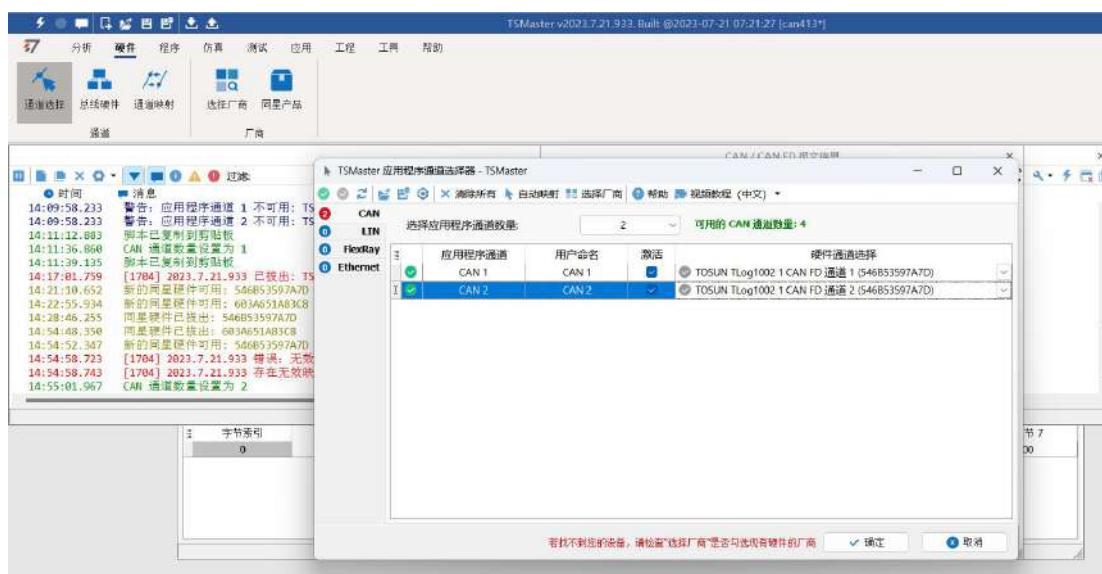
After entering the recorder mode, the Mode will illuminate, as shown in the figure below:



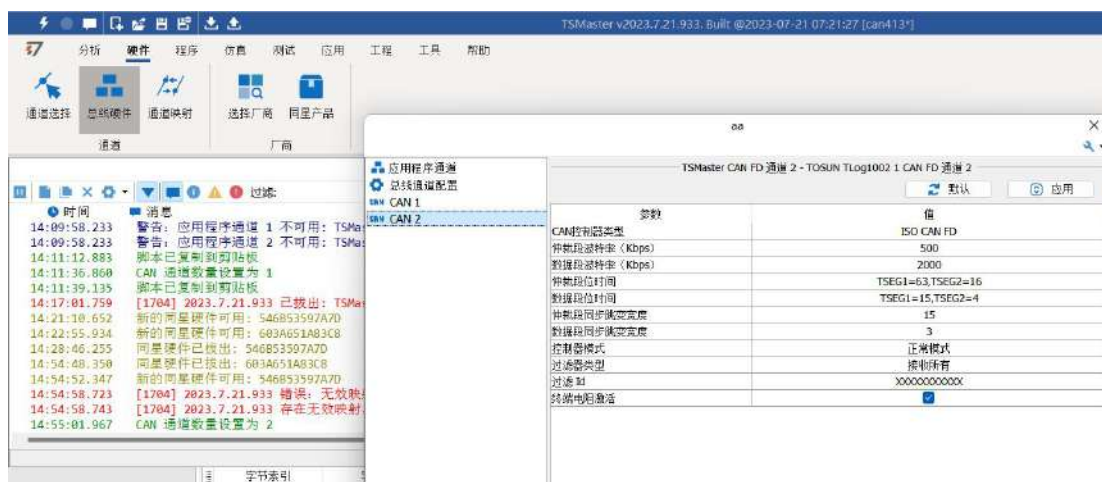
4.1.2 Tlog1002 Hardware configuration

The message data on the test bus system is received before recording the hardware parameters before accessing the network. If the red indicator light flashes after the recorder is inserted, the communication fails. You need to check whether the parameters such as baud rate are configured correctly. If not correctly, the device configuration follow the following steps:

Step1: After opening the TSMaster, connect the Tlog1002 USB directly to the computer device into the configuration state, and start the configuration of the hardware below.



Step2: The hardware channel parameter configuration should be consistent with the parameters of the system under test. After the configuration, click Apply.

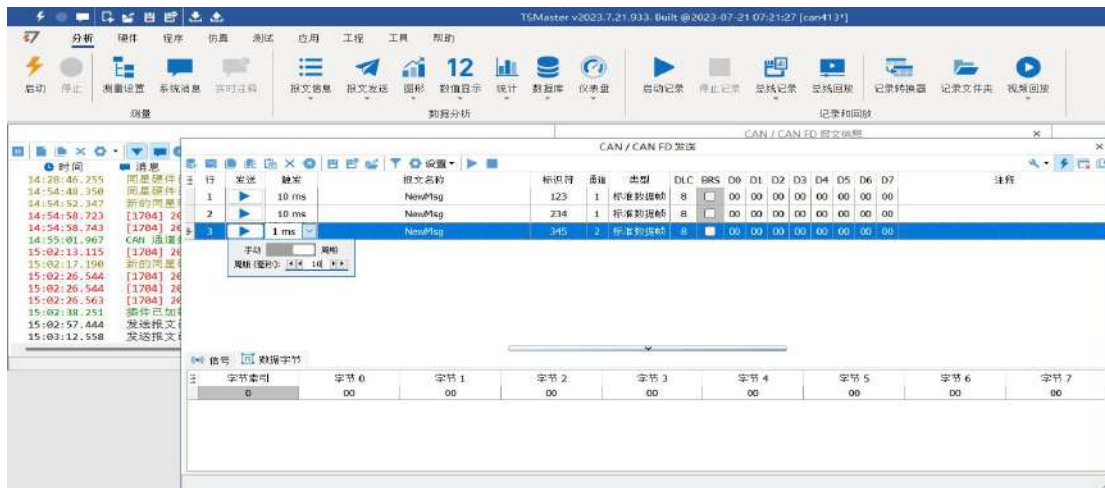


Step 3: Click the lightning button to connect the application. If the application is successfully connected, it means that the hardware parameters have been solidified in the device at this time. After completing the hardware parameter configuration, there is no need to reconfigure the hardware parameters unless the hardware baud rate changes.

4.1.3 Example TC1014 hardware configuration

Connect the TC1014 hardware channel in the same steps, create three test messages, 0x123,0x234,0x345, and set to 10ms, cycle sent, sent by TC1014 and received by Tlog1002.

Path: Analysis-message send-new original message-trigger to cycle 10ms-start project.



After starting the project, the message 0x123,0x234,0x345 will be sent in 10ms cycles, as shown in the figure below.

绝对时间	计数	通道	标识符	帧率	报文名称
23.745430	14245	CAN 1	123	99	
23.745430	14246	CAN 2	123	99	
23.745682	14247	CAN 1	234	99	
23.745682	14248	CAN 2	234	99	
23.745932	14249	CAN 1	345	100	
23.745933	14250	CAN 2	345	100	

4.1.4 Indicator light phenomenon when recording the data

If the configuration parameters are correctly connected to the hardware, Tlog1002 can observe the following Log and CANFD1 green lights flashing in the recording mode, and the Mode light is always green.

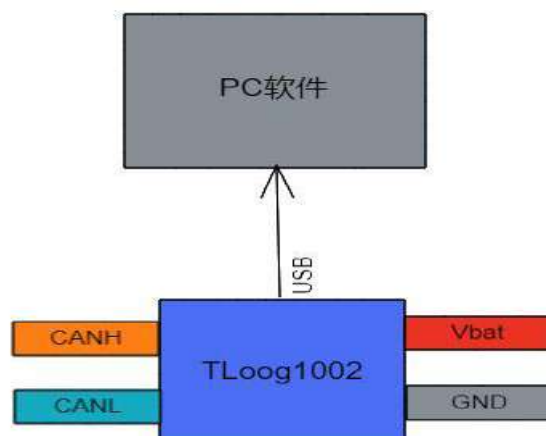


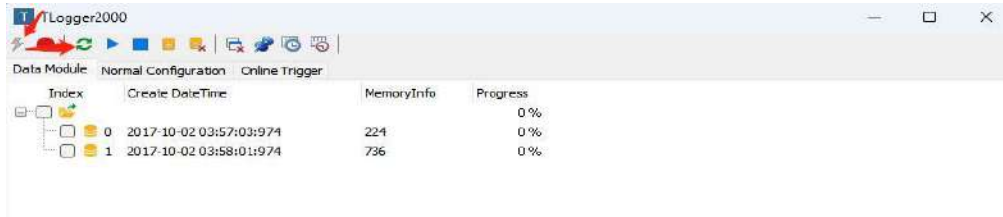
4.2 Export and playback of the recording data files

Export record files need to use TSLogger software, in the next chapter of the detailed instructions for TSLogger for the use, here first use the TSLogger file export function to complete the example.

4.2.1 TSLogger Software connection

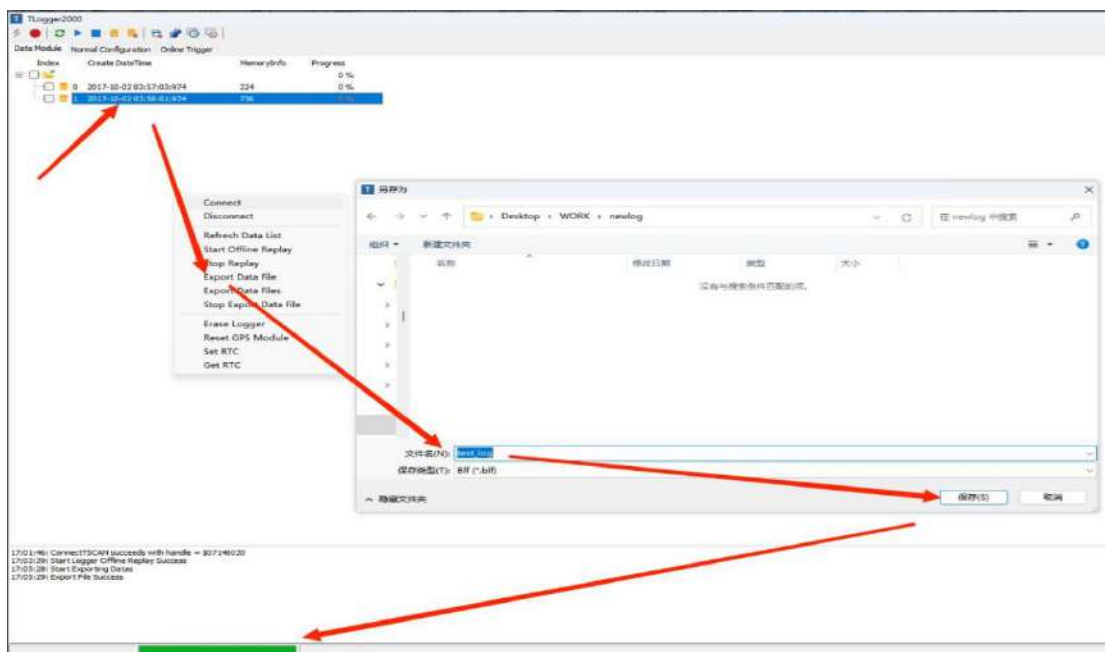
After the recording process, disconnect the Tlog1002 power supply, connect to the computer through the USB cable, open the TSLogger software, click the lightning button to connect, click the refresh data list, and can see the history record file.



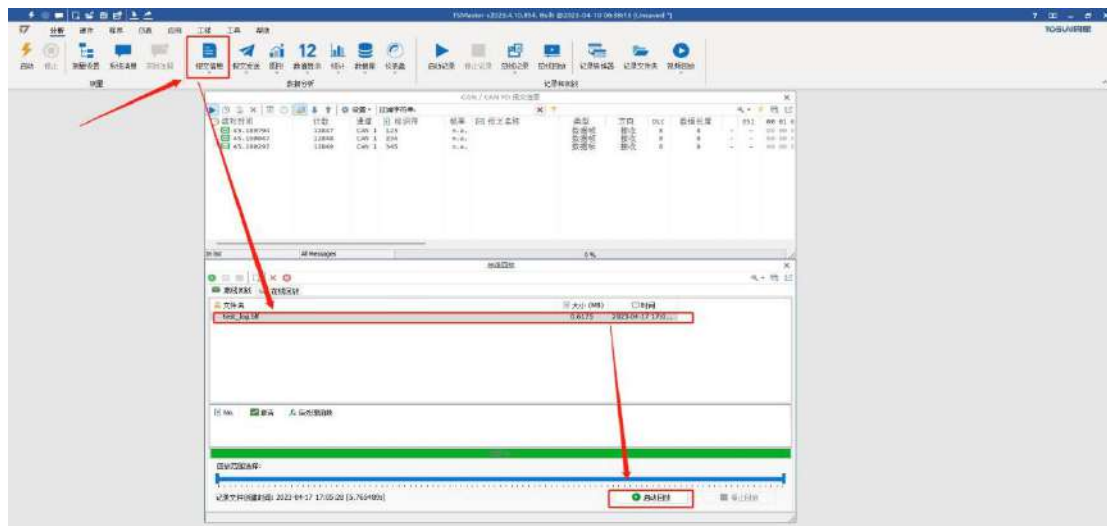


4.2.2 Export of record files

Select the data record file we need to export, right-click Start Offline Replay or click the toolbar icon, you can see the Start Logger Offline Success below to right-click Export BLF File, that is, export the BLF file to the specified folder.



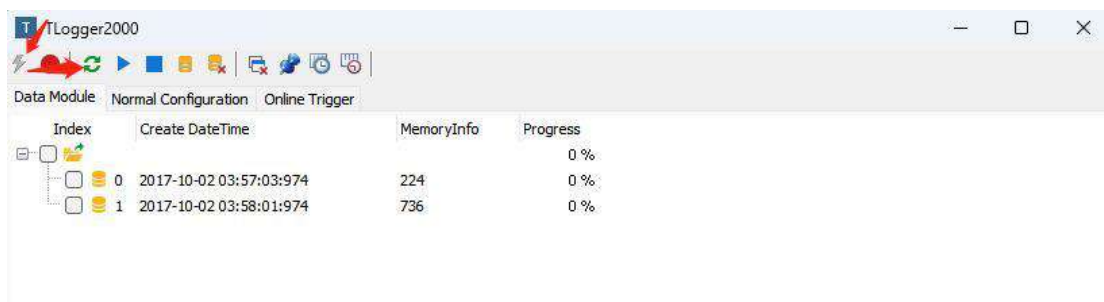
After waiting for the green progress bar below, the recorded BLF and file can be played back in TS Master.



5. The TSLogger software was used

. 51TSLogger linkage

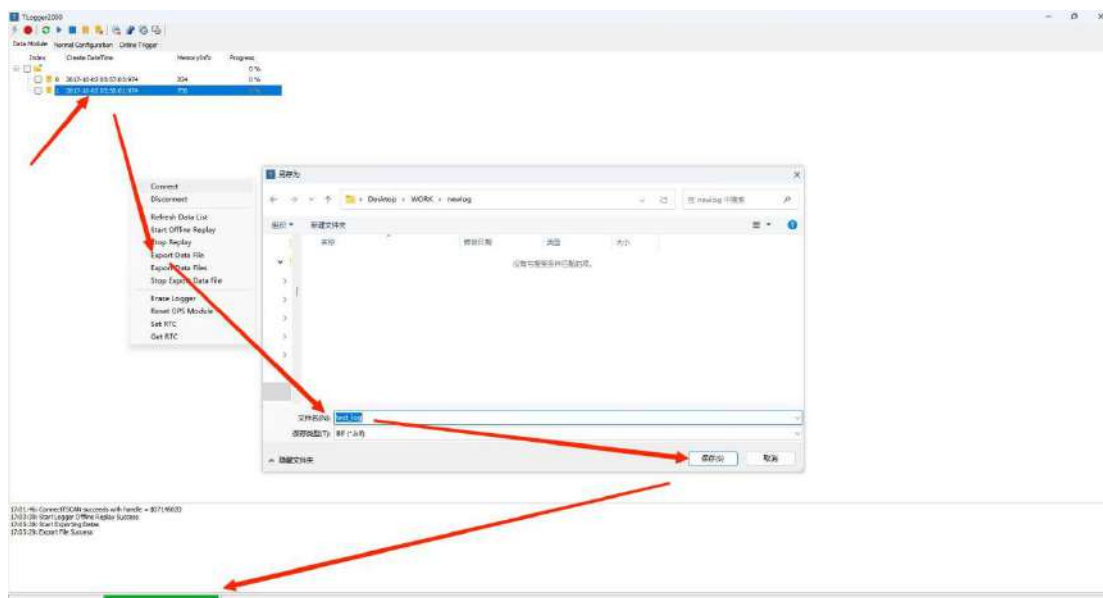
After the recording process, disconnect the Tlog1002 power supply, connect to the computer through the USB cable, open the TSLogger software, click the lightning button to connect, click the refresh data list, and can see the history record file.



. 52 Record file export

Select the data record file we need to export right click select Start Offline Replay or click the toolbar icon, you can see the Start Logger Offline Success below and right click

Export BLF File, that is, exporting the BLF file to the specified folder under.

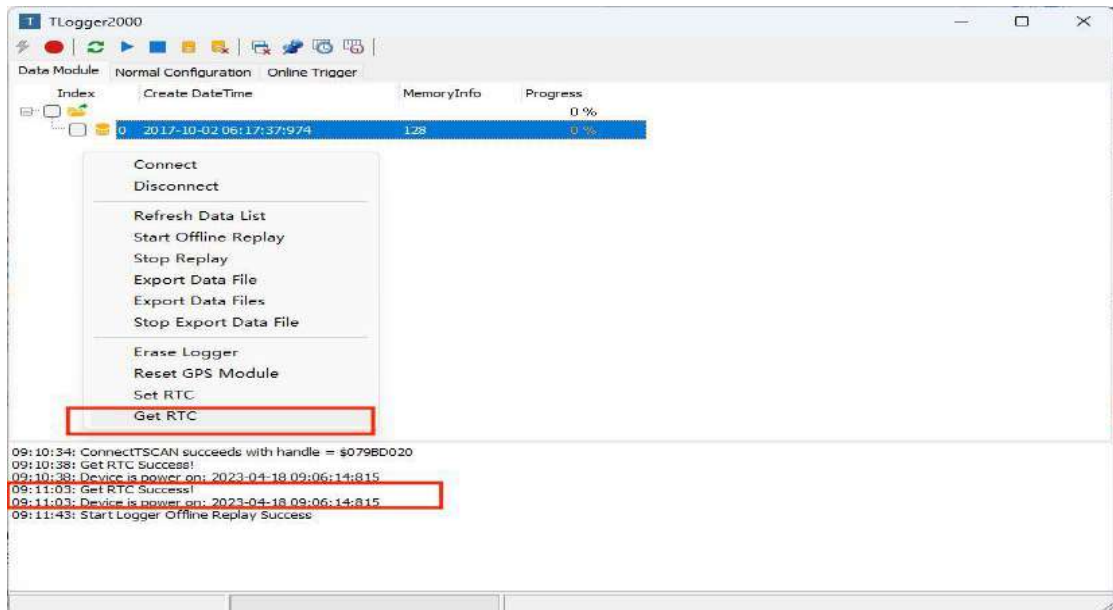


5.3 Initialize the internal clock RTC

5.3.1 Get the current internal clock

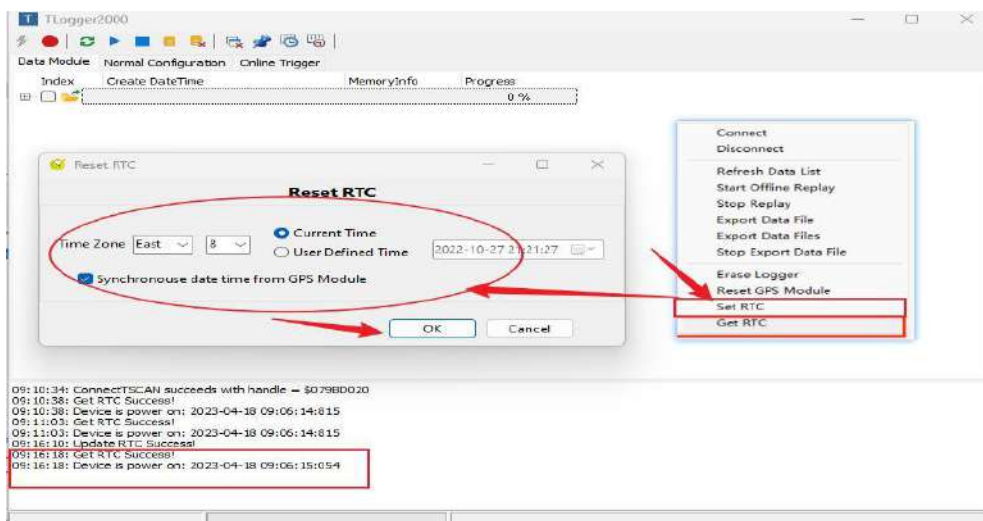
Step1: Insert the Tlog1002 through the USB into the PC to open the TSLogger.exe

Step2: Click the lightning button to connect TSLogger, select right-select Get RTC under Data Module to get the internal clock of the hardware. You can see that the time is 2023-04-18 09:06:14:815.



5.3.2 Set up the internal clock of the hardware

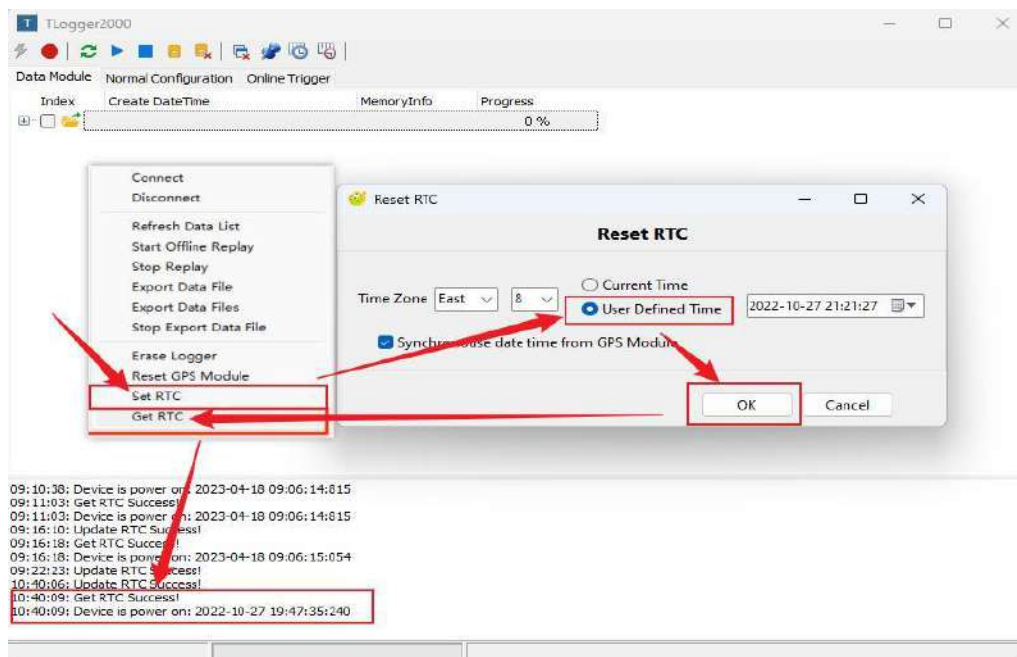
You can select Set RTC after the right click, you can select the time zone, set the time to Beijing time, click OK, get the hardware clock again, you can see the internal clock has been set for the current Beijing time,



5.3.3 Custom initialize the internal clock

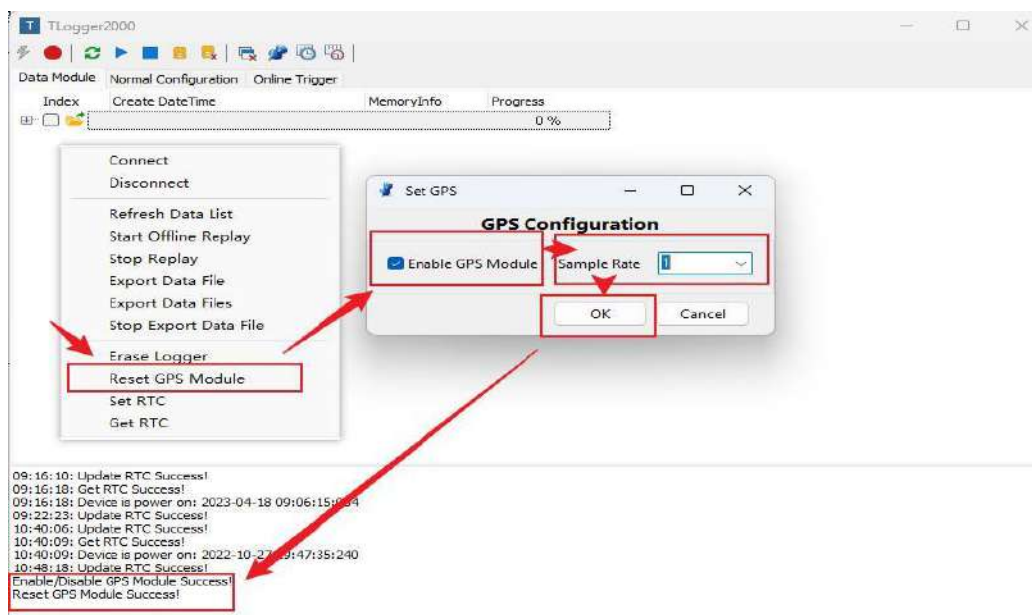
Customize and initialize the internal clock, check User Defined Time, you can set and set the time. After setting, we get the current internal clock through Get RTC to check whether the modification is successful.

Path: Set RTC>User Defined Time-Set the custom time-OK-Get RTC



5.4 Initialize the GPS module

In Data Module, right-select Reset GPS Module to enable GPS. In the configuration page, GPS sampling rate can select. If select 5, sample 5 times per second, select 1, and sample once per second.

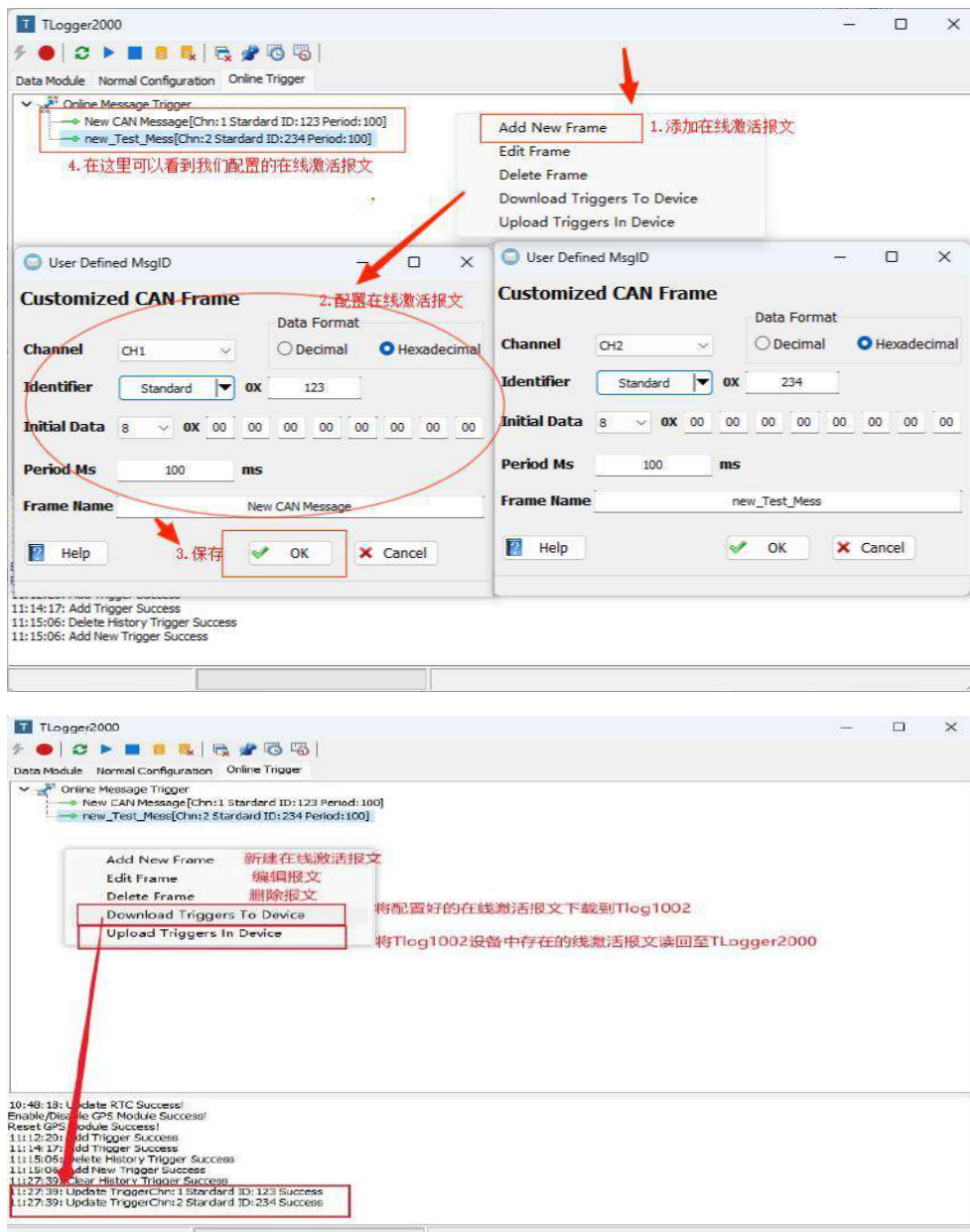


5.5 Activate the message module online

After the online activation message is configured, it is sent by Tlog1002 (a controller that can send messages periodically). It is often used in scenarios where a specific ECU needs to receive periodic messages to stay online.

5.5.1 Configuration line activation message

Open TSLogger, connect TSLogger, select online trigger, and right click to select Add New Frame. In the configuration page, you can see the configurable channel, frame format, frame ID, and packet data and packet cycle. Finally, name the frame message. After completion, the prompt window below will prompt to add to activate successfully

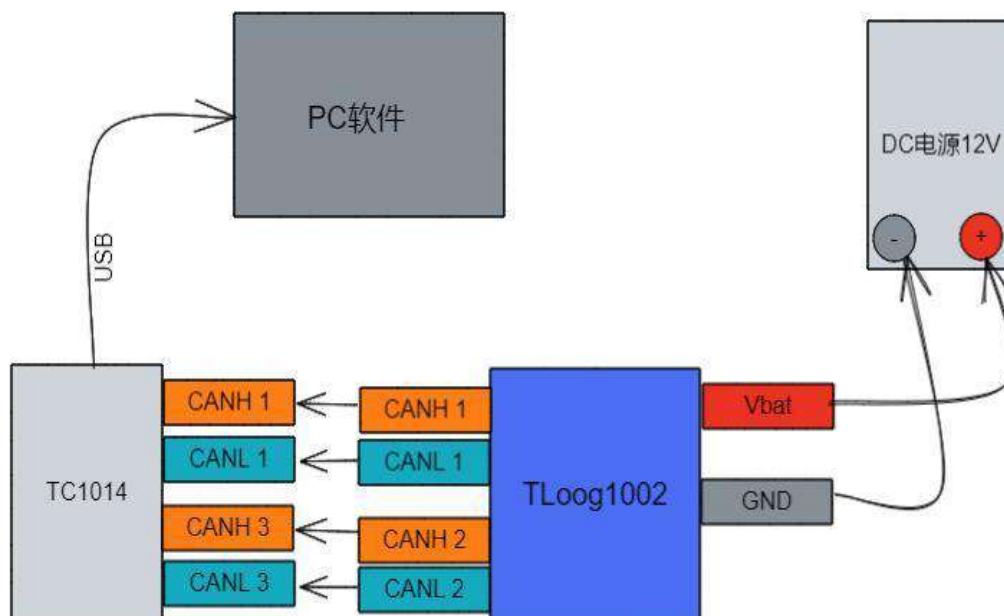


5.5.2 Hardware connection

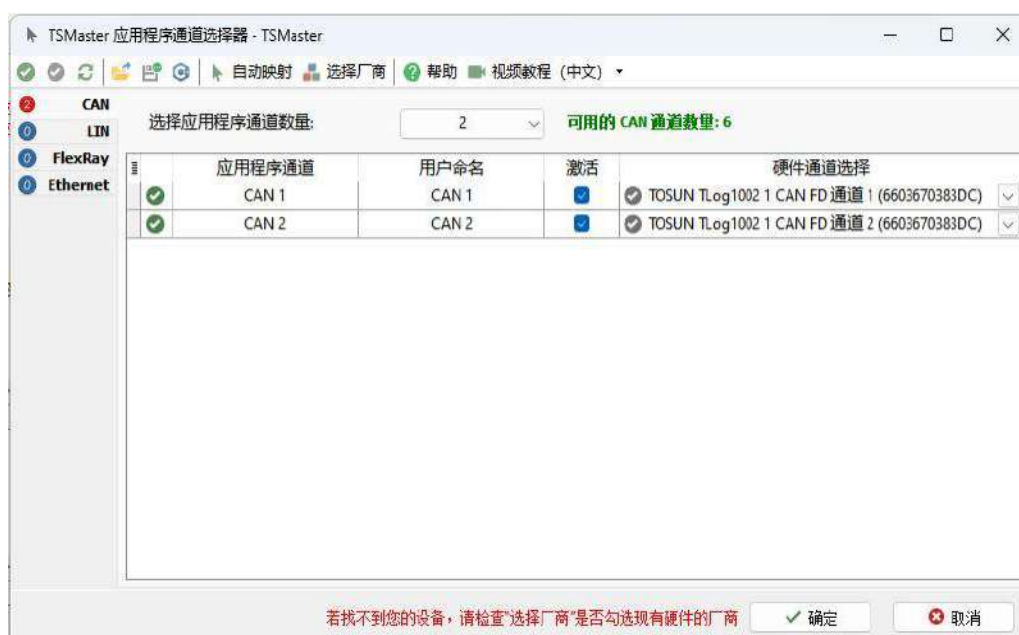
1 The CANFD1 and CANFD 2 of Tlog1002 are connected to the CANFD1 and CANFD 2 of TC1014, respectively.

2. The third foot and the ninth foot of DB9 of Tlog1002 are connected to the GND and VBAT of DC 12V, respectively.

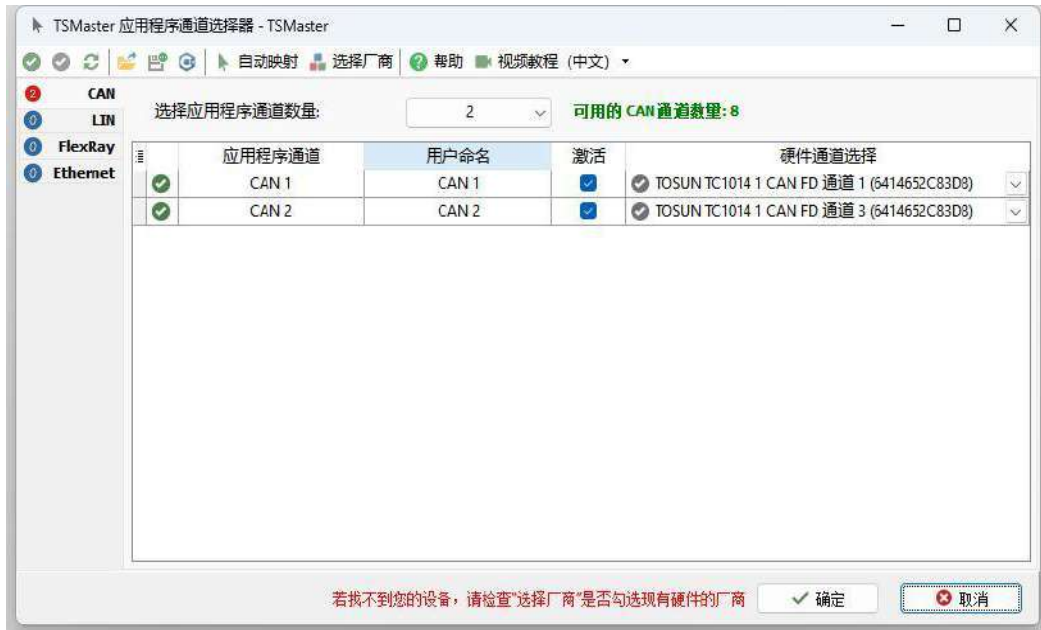
3. The received message information is viewed in the message information window of the TSMaster software on the PC.



5.5.3 Tlog1002 channel selection and hardware configuration



5.5.4 TC1014 channel selection and hardware configuration



After starting the project configured with TC1014, create the message information window. In the window, we can see the online activation message 0x123 and 0x234 sent by Tlog1002 offline.



绝对时间	计数	通道	标识符	频率	报文...	类型	方向	DLC	数据长度	BRS	ESI	00	01	02	03	04	05	06	07	08
60.587232	567	CAN 1	123	10		数据帧	接收	8	8	-	-	00	00	00	00	00	00	00	00	00
60.587235	568	CAN 2	234	10		数据帧	接收	8	8	-	-	00	00	00	00	00	00	00	00	00

6. File export configuration

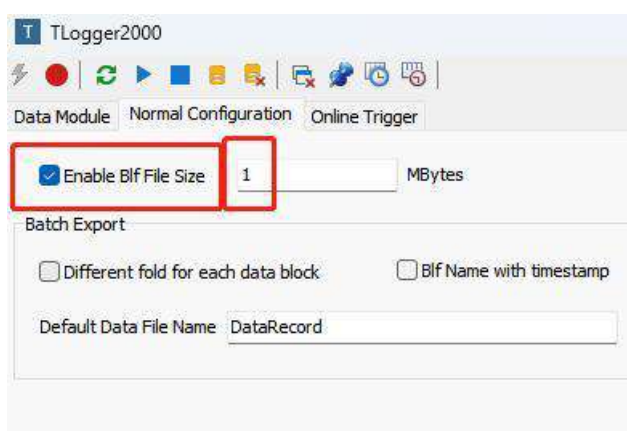
6.1 A single blf export configuration

Open the TSLogger software, connect to the TSLogger, and select the normal configuration

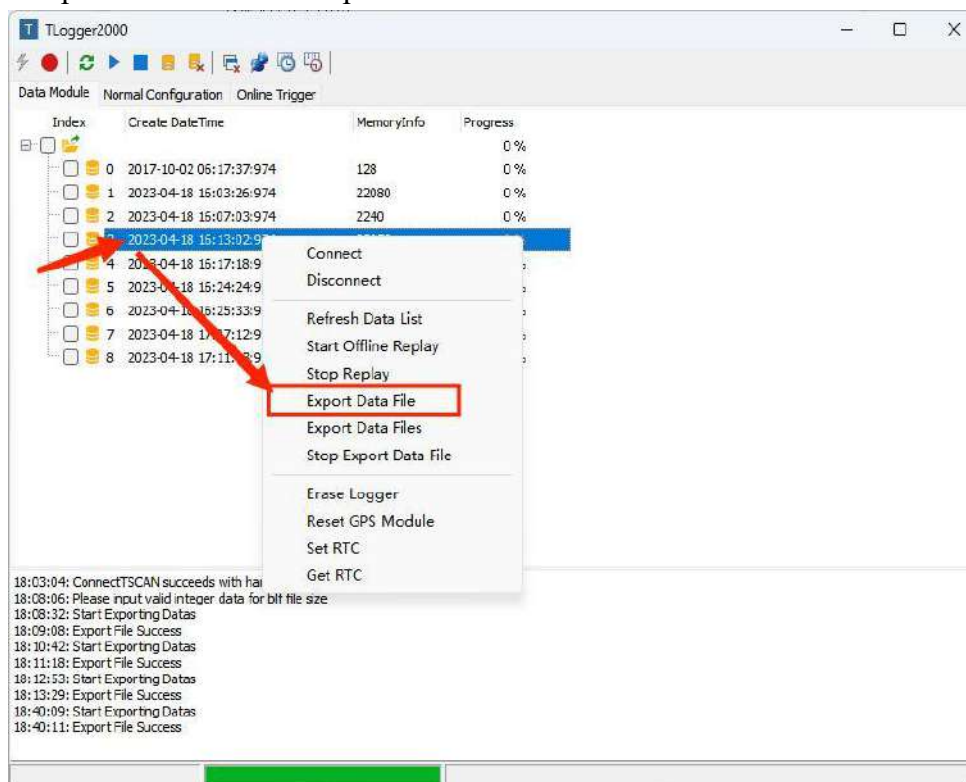
Enable Blf File Size: Check it out to enable a single Blf file to export multiple files according to the size of the configuration, and then export a file according to the original file size without checking it out;

Step 1: Enable the Enable Blf File Size

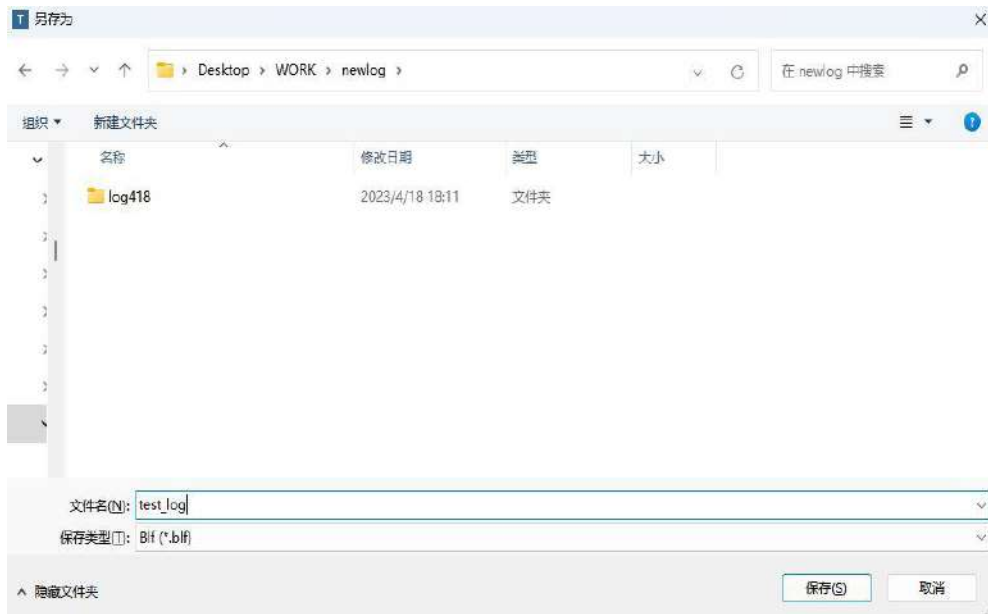
Step 2: Select the size of the file that you want to export



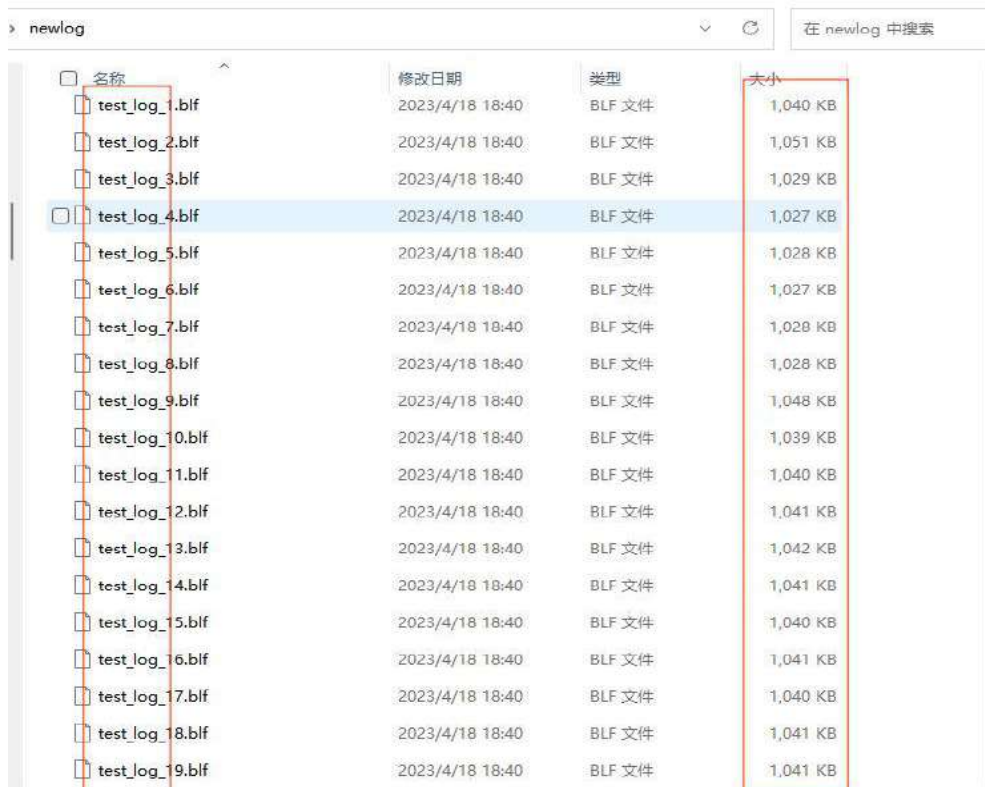
Step3: Select the file to open



Step4: Select the save path and name the BLF file



Step5: View the BLF files split by 1 Mbyte in the folder

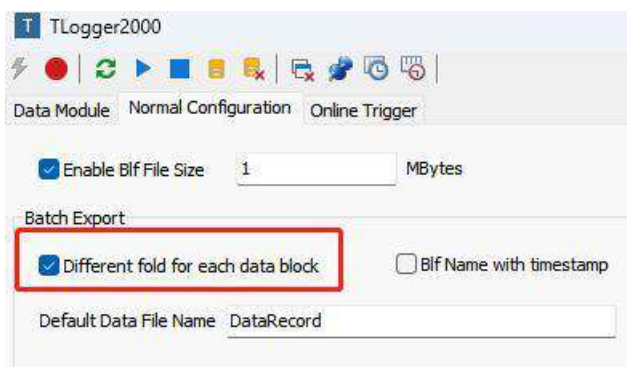


6.2 Batch Export Batch export configuration

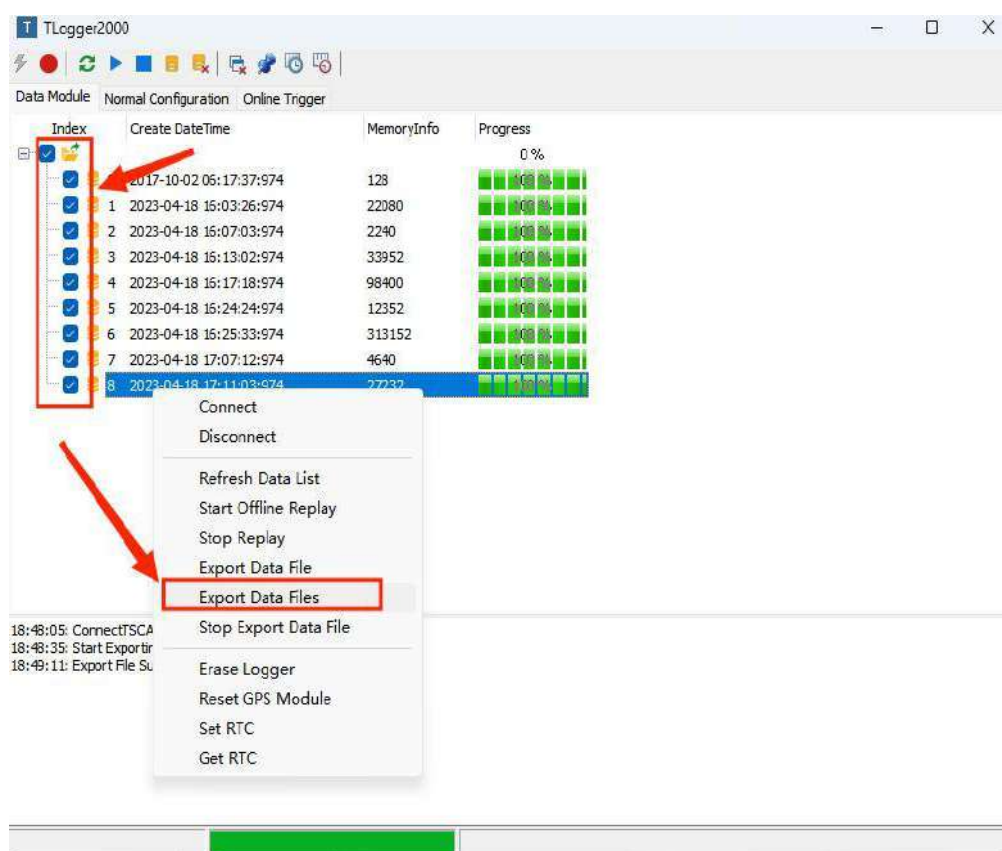
Different fold for each data block: Export each record file without checking, and merge all record files into a BLF file without export.

6.2.1 Check the Different fold for each data block

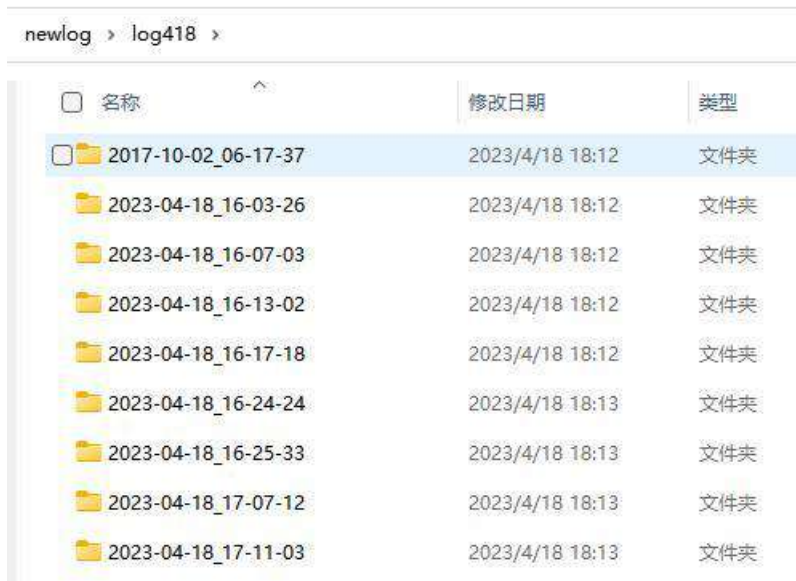
Step 1: Enable the Different fold for each data block



Step 2: Check the batch export in the Data Modul interface and right click Export DataFile

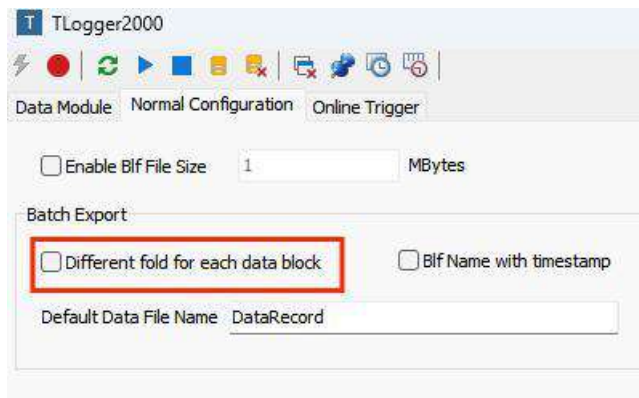


Step3: View the exported BLF file in the folder

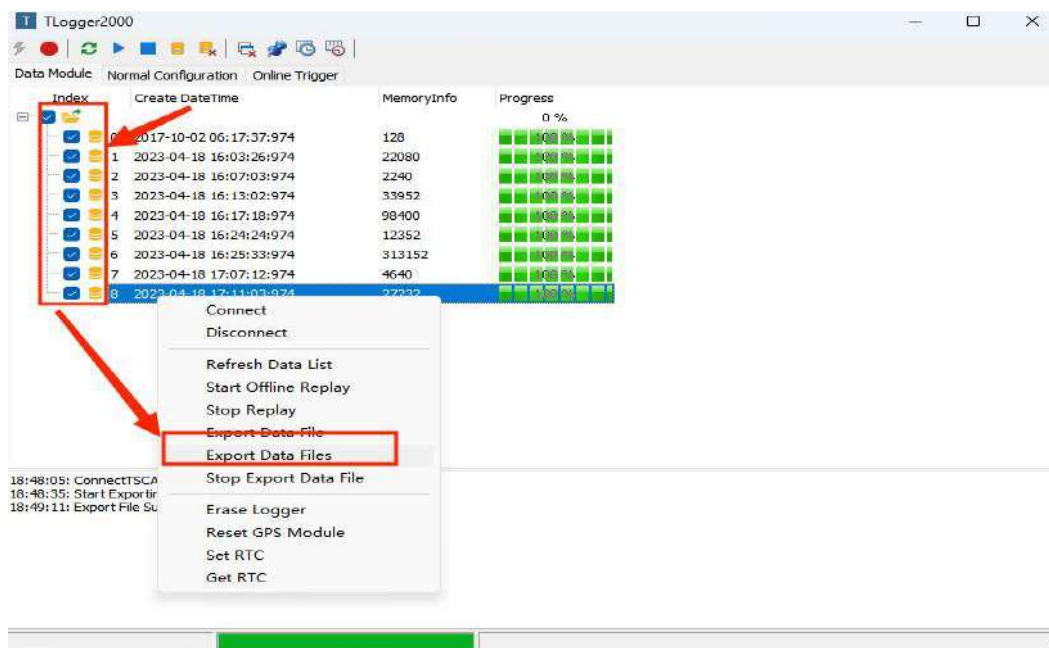


6.2.2 Do not check the Different fold for each data block

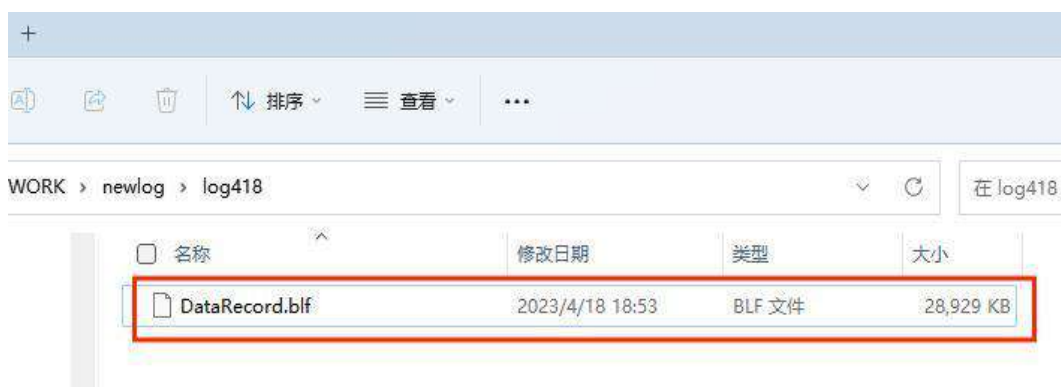
Step 1: Enable the Different fold for each data block



Step 2: Check the batch export in the Data Modoul interface and right click Export DataFile



Step3: View the exported BLF file in the folder

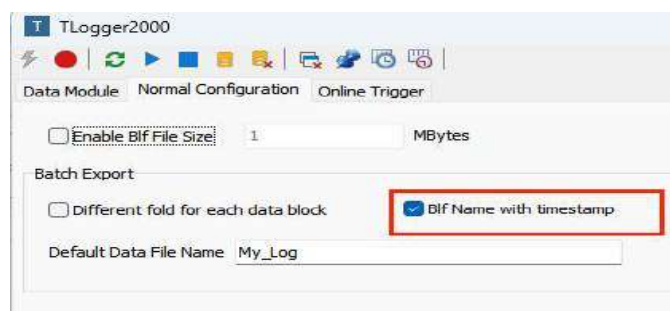


6.2.3 Check the Blf Nam with timestamp

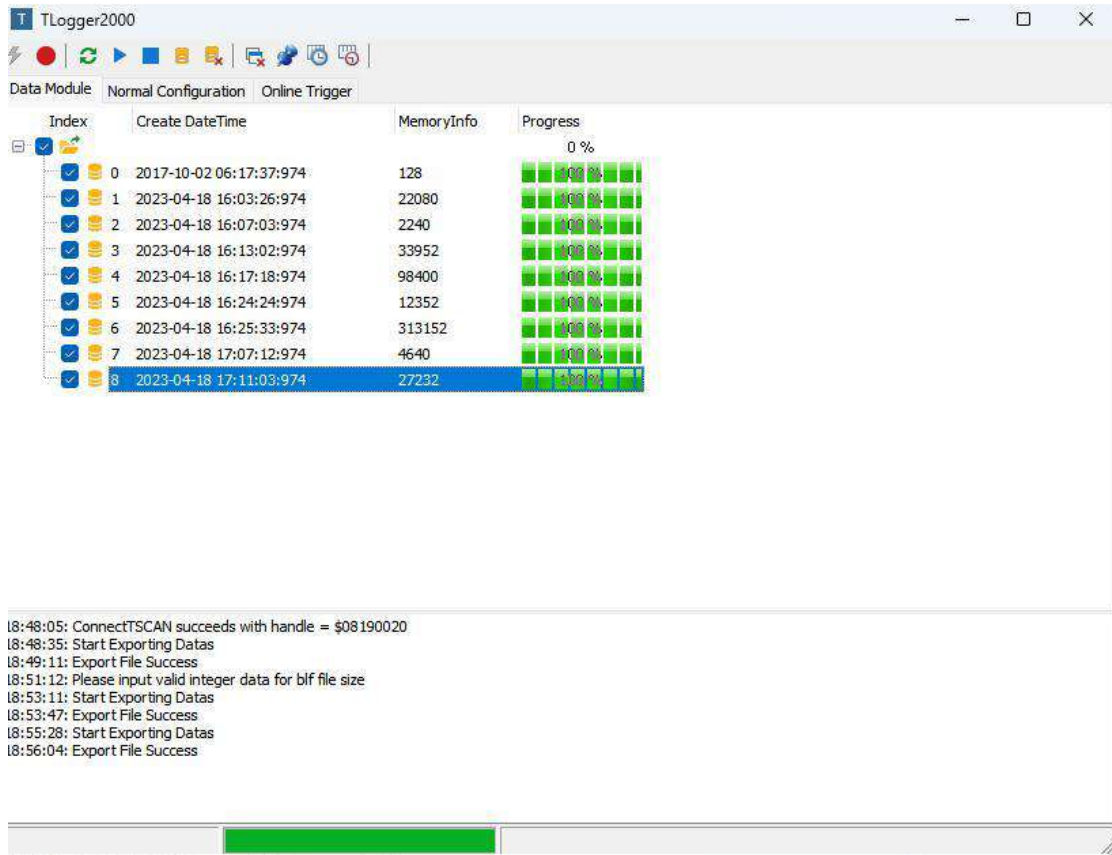
Blf Nam with timestamp: Check the exported file name with the Default Data File Name + record file time stamp file name.

Default Data File Name: Default file name setting.

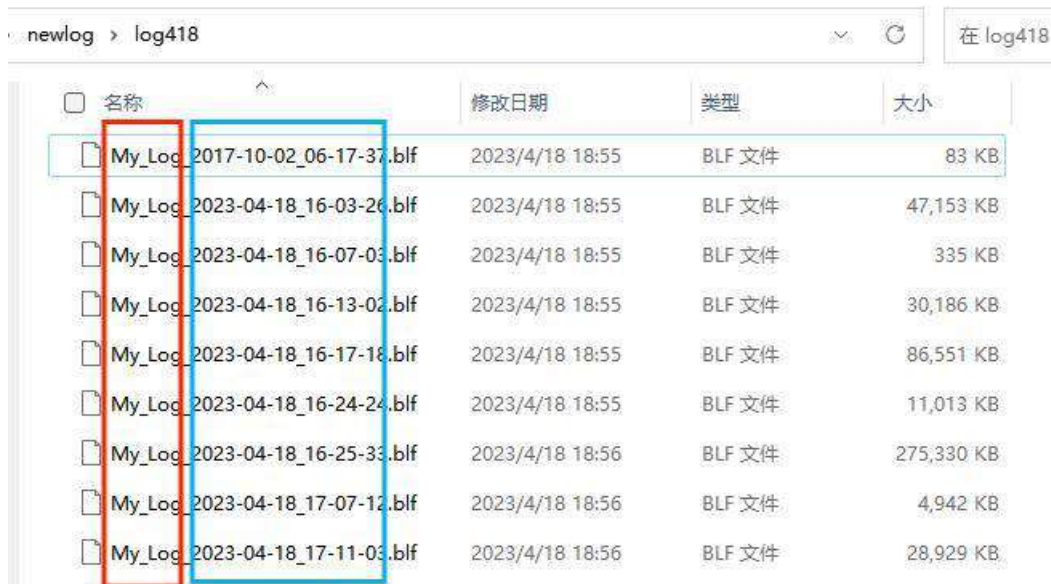
Step 1: Enable the Blf Nam with timest amp



Step 2: Check the batch export in the Data Modoul interface and right click Export DataFile

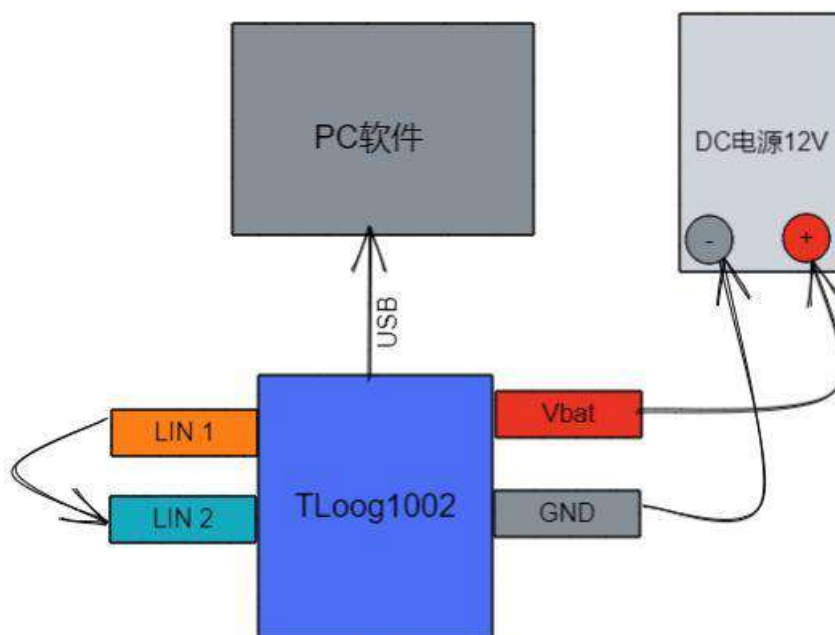


Step3: View the exported BLF file in the folder



7. Instructions for using the LIN

Using the LIN function requires an external power supply (3 minus 9 positive).



LIN message channel 1 and channel 2 are short connected, and channel 1 and channel 2 are respectively used as master and slave nodes to realize the self-test of LIN function.



8. Inspection and maintenance

T log1002 The main electrical component is the semiconductor element, although it has a long life, but 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.

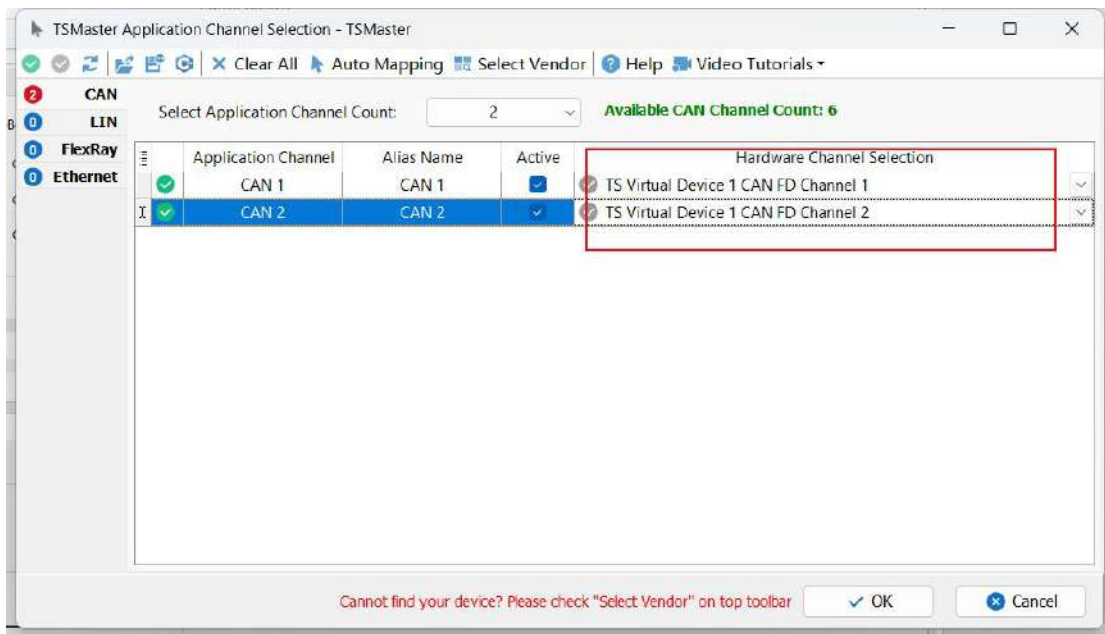
project	check up	standard	move about
power supply	Check the voltage fluctuation at the power supply side	7-18V DC	Use the voltmeter to check the source at the power supply input end. Take the necessary measures to make the voltage fluctuation within the range
surrounding environment	Check the ambient 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 easily corrosive	No easily	Check by smelling or using

	or 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

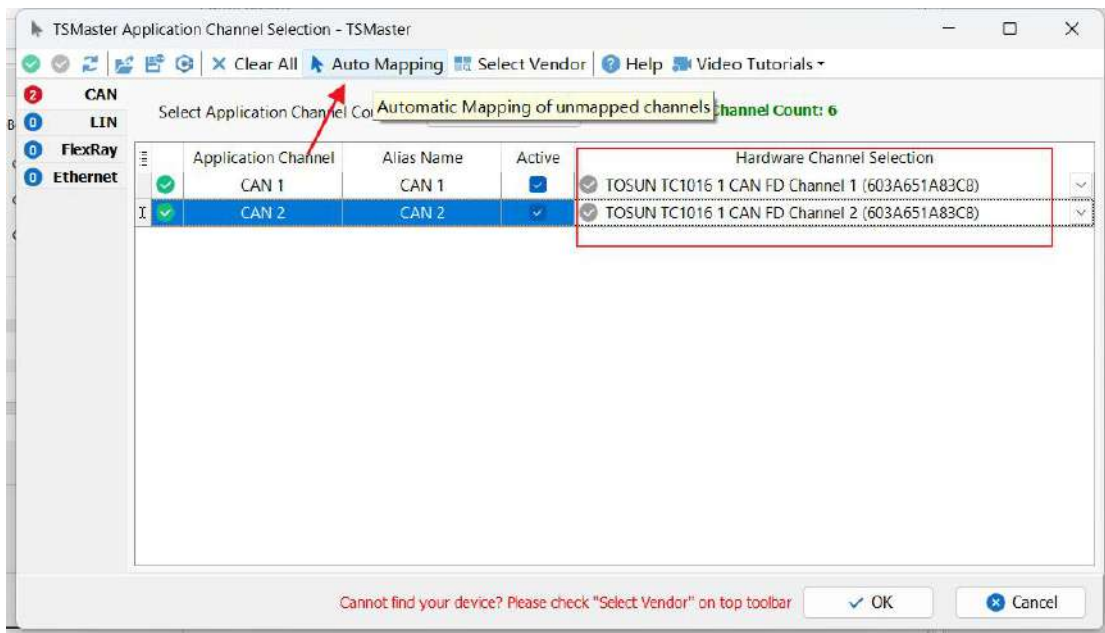
9. Common questions and answers

9.1 The line is connected correctly but cannot communicate properly:

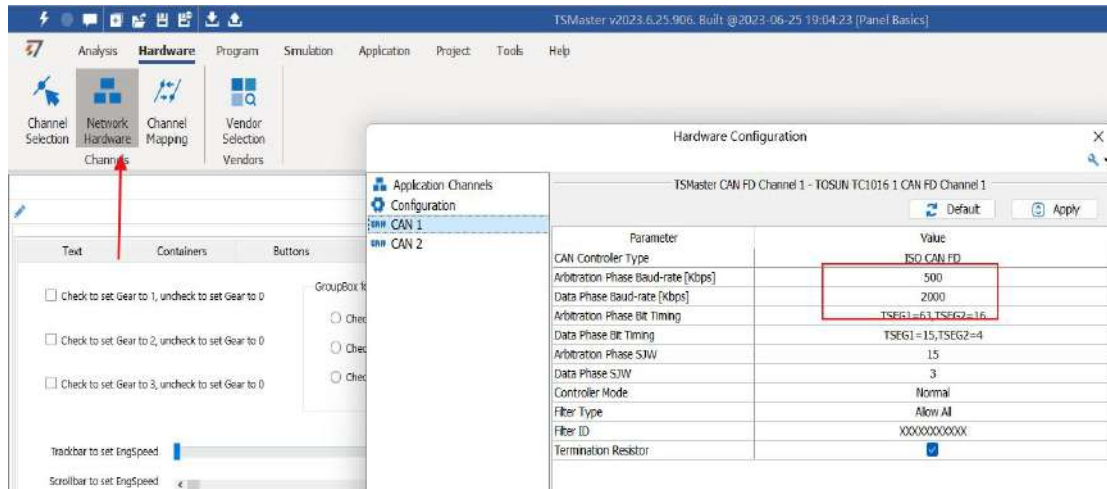
Solution: Check if the number of channels is set. If CAN Channel Count = 0, of course no online hardware cannot display. And the software is configured by default virtual channel, you need to select **the hardware real channel**.



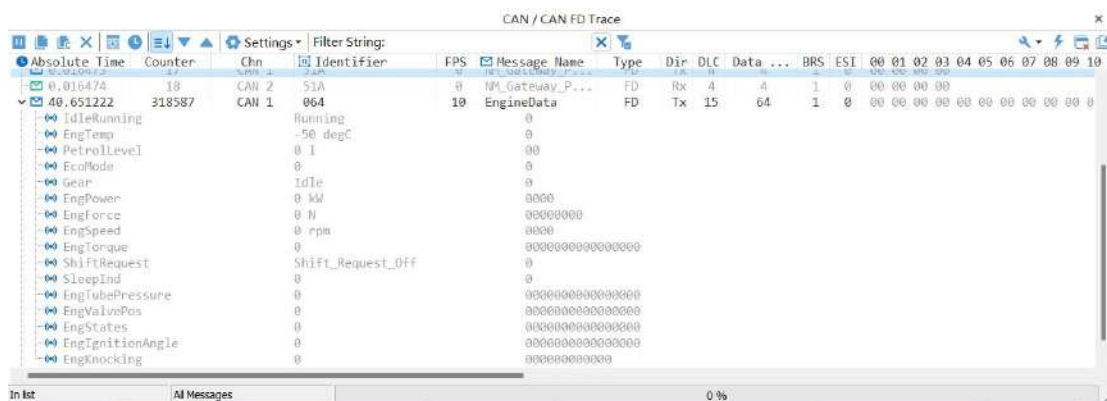
Automatically map or manually click to select the hardware real channel:



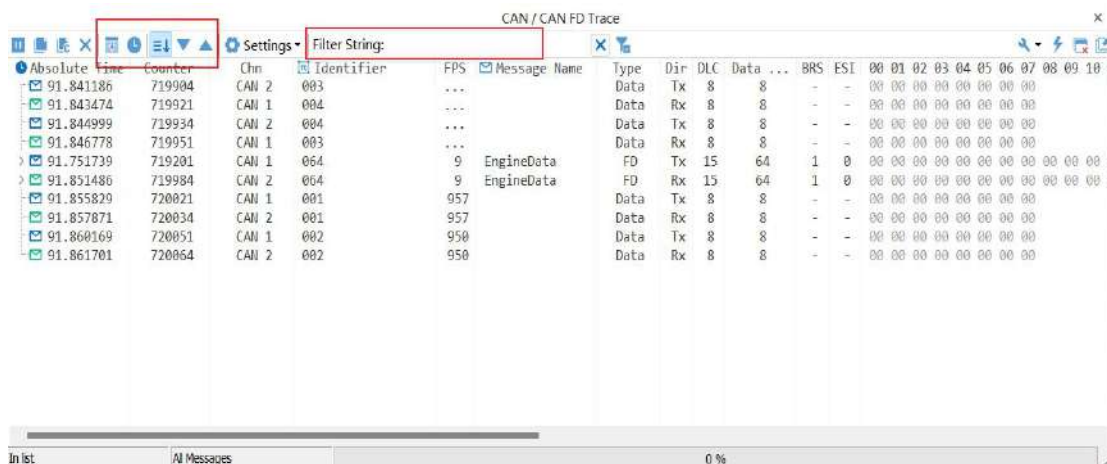
If the channel is selected correctly, it is necessary to ensure consistent port communication between the two channels, as shown in the figure below:



9.2 Inconvenient message observation and signal filtering:

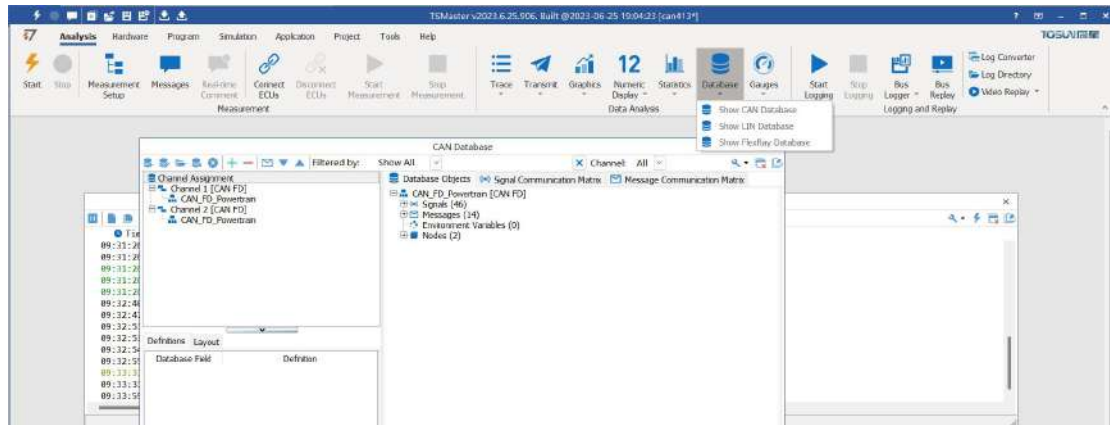


Solution: display in a fixed display or time order, expand or fold the signal display, and filter the string, click the following icon to operate:

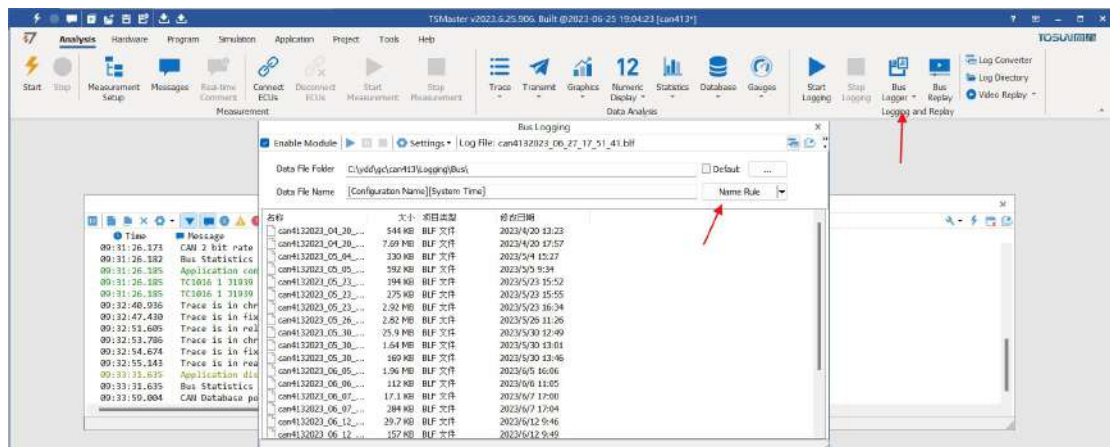


9.3 How to load the database:

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.



9.4 How to automatically record the message messages:

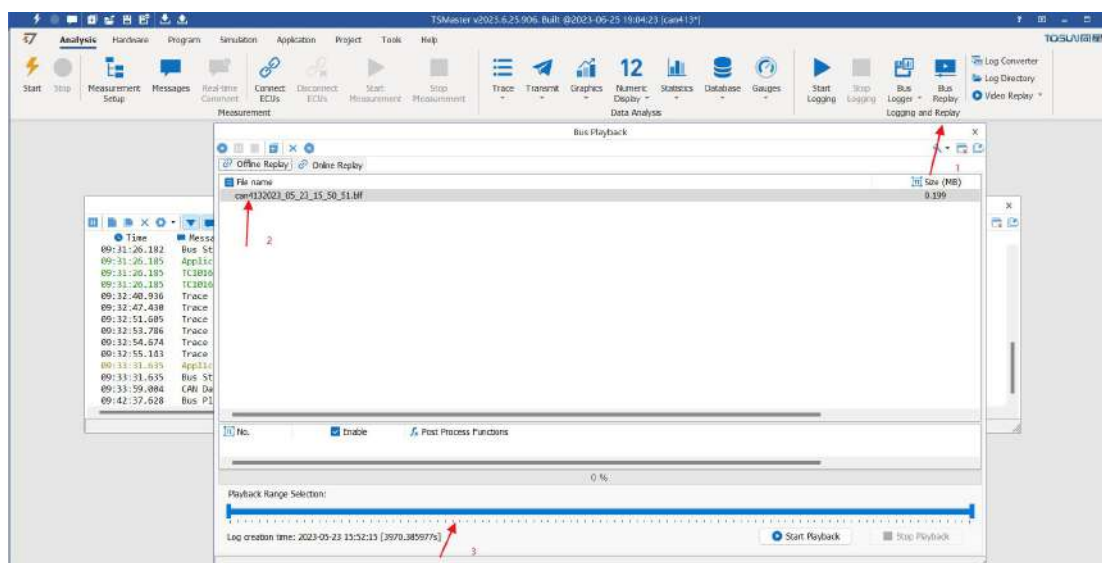


operating steps:

- Analysis- -bus record
- Add a name rule to distinguish between different save files
- Add the self-start function
- Start the record

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

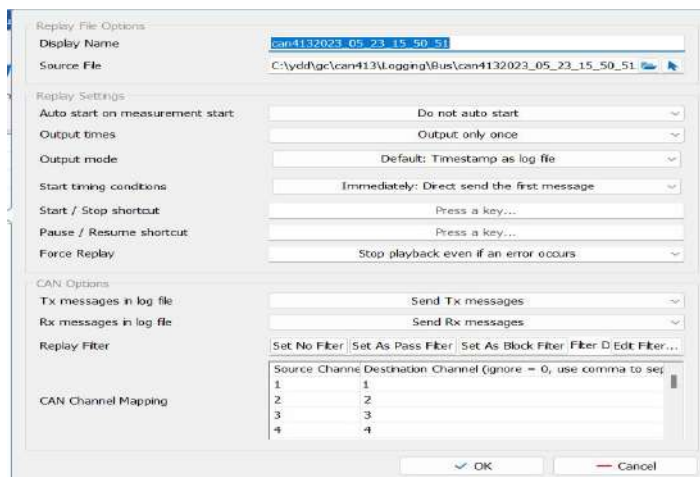
operating steps:



- 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



10. Appendix

10.1 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.

10.2 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.

10.3 CAN DB9 One-in-two wire harness definition



引脚对应关系		
DB9母头		DB9公头
Pin2	CH1	Pin2
Pin7		Pin7
Pin3		Pin3
Pin3	CH2	Pin3
Pin4		Pin2
Pin8		Pin7

10.4 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).

11 Disclaimer

Shanghai TOSUN Technology , 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, TOSUN Technology cannot fully guarantee the timeliness and applicability of the document in any period of time. TOSUN Technology 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 TOSUN Technology regularly or contact the staff of TOSUN Technology regularly. Thank you for your tolerance and support!



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同星智能的核心软件TSMaster及配套硬件设备，具备嵌入式代码生成、汽车总线分析、仿真、测试及诊断、标定等核心功能，覆盖了汽车整车及零部件研发、测试、生产、试验、售后全流程。

全球企业用户超4000家，用户覆盖：汽车整车厂、零部件供应商、芯片厂商、设备/服务供应商、工程机械、航空航天及舰船军工等领域。



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- CCP/XCP标定
- 嵌入式代码生成
- 应用发布/加密发布
- 记录与回放
- 图形化编程
- 剩余总线仿真
- C/Python脚本
- 总线监控/发送
- SOMEIP和DoIP

硬件

- 1/2/4/8/12通道CAN FD/CAN转USB工具
- 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



解决方案

- EOL测试设备
- FCT测试设备
- 汽车“四门两盖”试验解决方案
- 线控底盘测试解决方案
- 电机性能/耐久试验解决方案
- 新能源产线设备解决方案
- 总线一致性测试解决方案
- 信息安全解决方案