



Hardware IFU—GW2112

Version: V1.00 | English

Document Revision History:

Documentation Edition	date	Update content	remarks
V1.00	2023.9.5	Create a document	

Copyright information

Shanghai TOSUN Technology LTD

6 / 8,4801, Jiading District, Shanghai

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.

The information and data in this user manual are subject to change without notice. In order to get the latest version, please visit the official website of the company or contact the staff. Thank you for your tolerance and support! Any part of this manual shall not be reproduced in any form or in any manner without written permission of TOSUN Technology.

@ Copyright 2023, Shanghai TOSUN Technology LTD. All rights reserved.

catalogue

1. Product profile	1
1.1 Product Overview	1
1.2 Typical applications	1
1.3 Functions and parameters	1
1.3.1 Functional characteristics	1
1.3.2 Technical parameters	2
1.4 Shipping list	3
2. Hardware interface description	4
2.1 Interface description	4
2.2 LED indicator light instructions	5
3. CAN port configuration	6
4. Filter configuration	8
5. Routing configuration	10
5.1 Mapping	11
5.2 Split	12
5.3 Consolidation	13
5.4 Group forwarding	14
6. Download & Read	15
7. Inspection and maintenance	16
8. Appendix	17
8.1 CAN 2.0 Standard Frame:	17
8.2 CAN 2.0 Expansion Frame:	18
8.3 Precautions	18
9. Disclaimer	19

1. Product profile

1.1 Product Overview

GW2112 Off-line gateway is a CAN (FD) relay, CAN (FD) message conversion device. It can increase the load capacity of the bus and extend the communication distance, match the CAN (FD) networks with different port rates, and can support the conversion of CAN and CANFD networks.

GW2112 With two CAN ports, CAN 1 and CAN 2, When CAN 1 (CAN 2) receives the CAN (FD) message, Users can freely set the conversion rules through the USB interface through the supporting software, GW2112 Provide multiple conversion rules for users to choose from, And the configured conversion rules can be persisted in GW2112 without loss due to power failure, The last stored conversion rule is read each time the boot, At the same time, the conversion rules can be converted into local files and stored locally, The next time you want to use it, you can read it instead of configure it again, Users can also read the conversion rules stored above directly from the GW2112.

GW2112 At the same time, it supports the configuration of the basic information of two CAN ports, such as CAN mode, port rate, filtering, etc., but also takes into account the security performance, message encryption, configuration encryption and other functions, to ensure the security of user information.

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.
- ✓ High-speed USB2.0 interface, Windows system, Linux system drive-free design, with excellent system compatibility.
- ✓ CAN channel DC2500V sequestration.
- ✓ CAN channel port rate 125 Kbps- 1Mbps tunable.
- ✓ Support for blf, asc format data recording and offline / online playback.

- ✓ Support for information security testing.
- ✓ Support the secondary development interface of Windows and Linux system (supported in later versions).
- ✓ Built-in 120 euro terminal resistance can be used in software configuration.

1.3.2 Technical parameters

channel	2 *CAN FD
PC terminal interface	High-speed of USB2.0
drive	Windows, Linux system free drive design, with excellent system compatibility
CAN	Support for protocol CAN2.0A and B, comply with ISO11898-1 specification, and baud rate of 125 Kbps-1Mbps
CAN FD	Supporting the CAN FD with ISO and non-ISO standards, with a baud rate of 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
Message forwarding ability	At 10,000 frames / s
The way of forwarding messages	store-and-forward
Forward delay	<0.1ms
Isolation voltage	CAN channel DC 2500V sequestration
power supply mode	DC 9-36V
Case material	aluminium product
size	128mm*120mm*21.5mm
working temperature	-40°C~80°C
Working humidity	10% ~ 90% (no condensation)
work environment	Stay away from the corrosive gases

1.4 Shipping list

- ✓ GW2112 Host machine
- ✓ The USB power cable
- ✓ Phoenix terminal power cord (optional)



2. Hardware interface description

2.1 Interface description

- USB high-speed 2.0 interface;
- 6. PIN Phoenix terminal;



Phoenix terminal pin definition:

channel	pin	definition
CANFD 1/2	PIN 1	CANFD2_Low
	PIN 2	C_GND 2
	PIN 3	CANFD2_High
	PIN 4	CANFD1_Low
	PIN 5	C_GND1
	PIN 6	CANFD1_High

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
Config	Configure the indicator light

Description of the indicator light color:

pigment	description
Config green light	Configuration success
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. CAN port configuration

After opening the GW2112 configuration software, it is necessary to configure the configuration related to each CAN port, and configure the CAN channel related parameters according to the need. Failure in the CAN parameter configuration will cause the CAN message to fail to receive or appear wrong frames.



GW2112 The channel configuration is described as follows:

1. Porter rate of the arbitration section: GW2112 provides 125,250,500 and 1000 kbps for selection. GW2112 can receive the message from the sender at the same as the port rate set by the GW2112 receiving channel.

2. Data segment port rate: GW2112 provides 125,250,500,1000,2000,4000,5000,8000 for selection. Only the GW2112 can receive the sending terminal data segment port rate and the port rate set by the GW2112 receiving channel.

3. Synchronous jump width of the arbitration section: used to receive the port rate within a tolerance range is less than the arbitration period time.

4. Data segment synchronous jump width: used to receive the port rate within a tolerance range is less than the arbitration period time.

5. Controller type: CAN 0 and CAN 1 provide CAN type and CAN FD type for selection. When the controller type selects CAN FD type, it can receive both CAN message and CAN FD message, but when the controller type selects CAN type, it can only receive CAN FD message.

6. Controller mode: CAN 0 and CAN 1 support the selection of restricted operation mode and bus listening mode besides normal operation mode, the controller can receive data frames and remote frames and confirm valid frames, but do not support the sending of data frames, remote frames, active error frames and overload frames; in bus listening mode, the controller can receive valid data frames and valid remote frames, and does not support the confirmation of valid frames.

7. Terminal resistance activation: Both CAN 0 and CAN 1 are equipped with the built-in terminal resistance, and when the terminal resistance is hooked, the built-in terminal resistance is not enabled.

8. Basic routing: CAN 0 and CAN 1 both support basic forwarding. The message to be received is forwarded from another channel. When the basic routing is hooked, the basic routing is not enabled.

9. Encryption algorithm, encryption, decryption, key, encryption filling: CAN 0 and CAN 1 all support message encryption and decryption, The encryption algorithm represents the algorithm used by the channel, GW2112 Provide multiple encryption algorithms for choice, But it is

important to note that, The DES series algorithm requires a multiple of the message length of 8, The AES series algorithm requires a multiple of the message length of 16, The ARC 4 algorithm does not require the message length, but the running speed is slow and the safety factor is relatively low; The encryption check indicates that the messages sent by the channel are all encrypted messages; The decryption check indicates that the message received by the channel will be decrypted and processed; The key indicates the password used by the channel, Password is selected in the left encryption, GW2112 Support for saving 7 keys, The user can freely choose the key used by the channel; Encryption fill indicates that when encryption or decryption is enabled, When the message length is insufficient, it will automatically fill in according to the selected encryption algorithm, The value of the complement is determined by the value filled by the encrypted fill bit, The default is 0 without filling.

10. Configuration password: used to store the read configuration password. When the supporting software is opened again, you can connect the computer and the device through USB, click the read button in the upper left corner, enter the password configured in the last configuration password, and you can read the configuration stored in the device.

4. Filter configuration

Both GW2112 CAN0 and CAN 1 have the hardware to perform acceptance filtering, Selective receipt of the CAN (FD) messages, Can minimize the network burden of the self-network, Filter mode for whitelist filtering, Each channel provides 16 standard and 16 extended frame filter terms, The filter term is similar to an ID range, Each filter term represents the ID within the range of a certain received ID, The filter format is a mask filter (set up a filter ID and a mask ID, bit mask 1 corresponding to the filter ID fixed, It is received only if the bits satisfying the mask 1 are the same as the fixed bits). When there are multiple filtering items, the received message can pass through any one filter item, otherwise it will be filtered out in the hardware layer.

In the matching software click filter into the filter configuration bar, above the first configure a filter template, click add, add the filter into the configuration, can add up to 16 standard frame filter and 16 extended frame filter, at the same time if not careful to the wrong configuration, can click to delete or empty to delete the filter has been configured.

illustrate:

There are two standard frame filter items:

1: Filter ID is 1, mask ID is 7FF;

2: Filter ID is 2, mask ID is 7FF;

There are two extended frame filter items

1: Filter ID is 1, mask ID is 1FFFFFFF;

2: Filter ID is 2, mask ID is 1FFFFFFF;

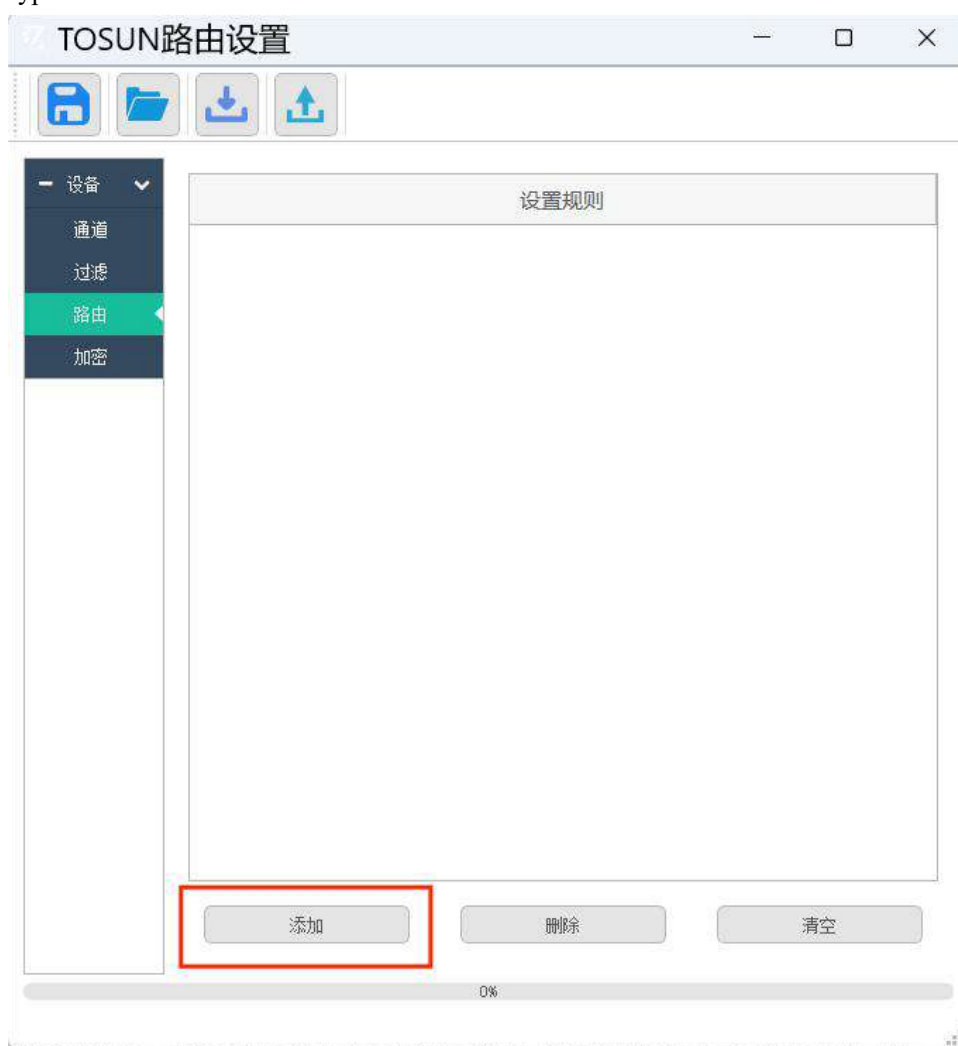
At this time, only the standard frame with ID 1, the standard frame with ID 2, extended frame with ID 1, and extended frame with ID 2 can be passed.



5. Routing configuration

Routing is packet forwarding rules, and users can define forwarding rules according to needs. Forwarding rules need to specify the type of rules, which channel is forwarded to which channel, the parameters of corresponding rules, GW2112 supports up to 80 rules, and the priority of rules is determined by the order of addition.

Click route on the supporting software into the routing configuration interface, click add to add custom rules, click add, first at the top of the receiving and send channel, then select the rule type, GW2112 now provides four types of rules for users to choose: mapping, split, merge, group forwarding, each rule is different, click configuration window OK, then explain the function of each type of rules.



5.1 Mapping

GW2112 Support the function of mapping forwarding, in the configuration window to select mapping, click enabled, there will be two message template, one for the source message template, one for the target message template, check the blank box on the right, when the CAN port (CAN 0 / CAN 1) received the message with the source message (mapping the data requirements are exactly the same), will hook the source message into the corresponding to the target message, and then forward out.

接收: 通道0 通道1 发送: 通道0 通道1

映射 拆分 合并 群组转发

使能

源

CAN类型: CAN

帧类型: 标准帧

格式: 数据帧

长度: 0

加速: 转换

ID (HEX): 0x FF

Data (HEX): 0x 00 02

目标

CAN类型: CAN

帧类型: 标准帧

格式: 数据帧

长度: 0

加速: 转换

ID (HEX): 0x 77F

Data (HEX): 0x 00 02

OK Cancel

5.2 Split

GW2112 Support the function of splitting and forwarding, Select a split in the configuration window, Click to enable the power, First, you need to configure a source message template, Including ID, CAN type, frame format, frame type, data length, After you configure the source message, There are three buttons below, as in the filter, Add, delete, and empty, Click on Add to add a message, Need for the user to configure the basic properties of this message, The content of this message is determined by two values: the data length and the starting position in the CANFD data, The default byte order is Intel, The content of the message is the data of bytes from the starting position of the CANFD data according to the Intel sequential data length, If the user needs higher accuracy or needs to change the byte order, You can click on the advanced button of the split interface, Go to the advanced split configuration interface, The advanced split configuration interface requires the user to configure the data in the source message first, Divide it into sections of bit streams, Then select the carried information flow directly in the added message.

A message in a split rule can be split into up to 16 packets, and if advanced configuration is enabled, a source message can be set for up to 64 bit streams.



接收: 通道0 通道1 发送: 通道0 通道1

映射 拆分 合并 群组转发

使能

加速 错误状态显示

ID (HEX): 0x

CAN类型:

格式:

帧类型:

数据长度:

ID	格式	帧类型	DLC
----	----	-----	-----

5.3 Consolidation

GW2112 Support for consolidated forwarding function, Select the merge in the configuration window, Click to enable the power, First, you need to configure the source message, Including ID, CAN type, frame format, frame type, data length, You can configure 1 or more source messages, But no more than 16, Add a configuration by clicking Add, Click Delete or empty to delete the configuration, After you configure the source message, configure the target message below, The message content of the target message is formed from the combination of the previously configured source message, The content order is determined by the order when the source message is added, If the user needs higher accuracy or needs to change the byte order, You can click on the advanced button of the merge interface, Go to the advanced merge configuration interface, As with the split, The advanced merge configuration interface requires the user to configure the data in the source message first, Divide it into sections of bit streams, Unlike with a split, The merge also requires assigning the location of the segment bit stream in the merged message.

In a merge rule, up to 16 packets can be merged into one message, and if advanced configuration is enabled, a source message can be set up up to 64 bit streams.

路由设置

接收: 通道0 通道1 发送: 通道0 通道1

映射 拆分 合并 群组转发

使能

加速 错误状态显示

ID(HEX): 0x DC

CAN类型: CAN

格式: 数据帧

帧类型: 标准帧

数据长度: 0

添加 删除 清空

ID	格式	帧类型	DLC
----	----	-----	-----

目标

加速 错误状态显示

ID(HEX): 0x DC

CAN类型: CAN

格式: 数据帧

帧类型: 标准帧

数据长度: 0

OK Cancel

5.4 Group forwarding

GW2112 Support the function of group forwarding, select group forwarding in the configuration window, click to enable, and then the user needs to configure the source start ID, the target start ID and an ID length, to offset the source ID segment into the target ID segment.



接收: 通道0 通道1 发送: 通道0 通道1

映射 拆分 合并 **群组转发**

使能

源起始ID (HEX) 4DF

目标起始ID (HEX) FFFF

ID长度 (HEX) 10

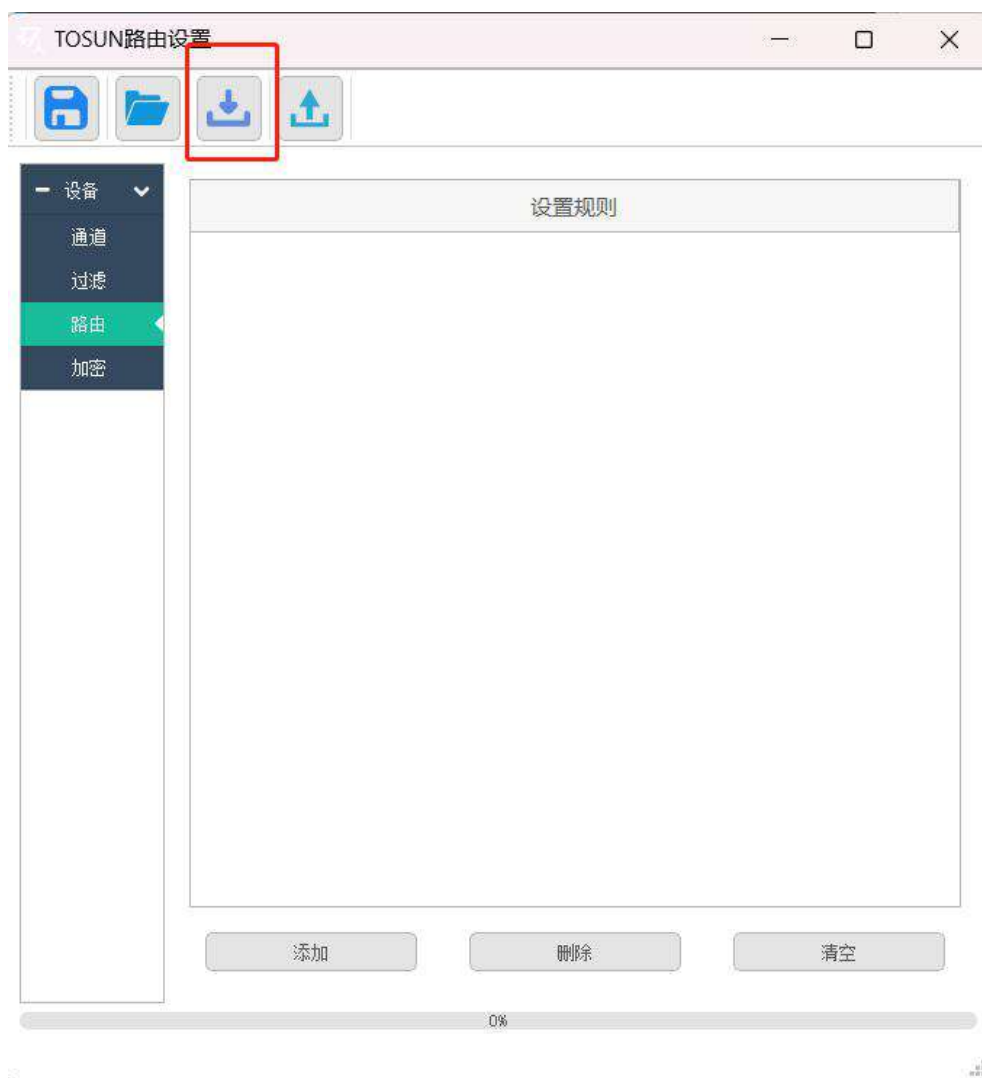
OK Cancel

6.Download & Read

After configuring the GW2112, users can click the purple download button in the upper left corner to download the configuration to the device. Please wait patiently for the progress bar to end during the download process.

Users can also obtain the configuration stored in the connected device by clicking the blue acquisition button in the upper left corner. GW2112 In order to ensure the security of the device information, the user must input the configuration key downloaded from the last download configuration to obtain the configuration data.

GW2112 At the same time, you can also export the profile locally by clicking the JS button in the upper left corner, or import other profiles to facilitate users to save the past profile.



7. Inspection and maintenance

GW2112 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
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 device	If the cleaning and protection equipment is required
	Check for corrosive or flammable gases in the equipment area	No easily corrosive or flammable gases	Check by smelling or using 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 compression connector 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

8. Appendix

8.1 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.

8.2 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.

8.3 Precautions

- ① Connecting the circuit to avoid a short circuit.
- ② Before using the equipment, please carefully consult the pin information in the product use manual.
- ③ During the operation of the equipment, be careful to properly connect the power cord and avoid plugging and unplugging.
- ④ pay attention to! Damage caused by electrostatic discharge (ESD).

9.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!



汽车电子工具链，国产领导品牌

同星智能成立于2017年，一直专注于研发国产自主可控的汽车电子基础工具链产品，也是该领域国产领导品牌。

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。



扫码关注
获取软件下载链接

软件

- UDS诊断
- ECU刷写
- 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