TOSUN-TC3014
User Manual

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Product Features & Interface Overview

Product Name	Channel
TC3014	CAN FD * 4

Copyright Information

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1. Introduction

The TC3014 is a multi-channel CAN/CAN FD communication tool based on SocketCAN.

It features four independent and isolated CAN/CAN FD interfaces, enabling CAN communication as easily and efficiently as network programming.

The device supports CAN FD bus speeds up to 5Mbps (optionally up to 8Mbps), connects to the host via a Mini PCIe interface, and provides a fully compatible Linux driver, ensuring excellent system integration and stability.

Equipped with a China-made main control chip, TC3014 supports full localization configurations and enables real-time monitoring of multiple bus networks simultaneously.

Its compact design allows for easy integration into in-vehicle industrial PCs, single-board computers, portable industrial hosts, and rugged notebooks, offering flexible installation and deployment.

1.1. Technical Specifications

➢ **Device Specifications**

Parameter	Description
PC Interface	Mini PCIe interface (USB channel)
Driver	Linux driver support
Buffer	Hardware buffer
Connector	Standard D-Sub, 9-pin
CAN	Supports CAN 2.0 A/B protocols (ISO 11898-1 compliant); baud rate 125Kbps ~ 1Mbps
CAN FD	Supports both ISO and non-ISO CAN FD standards; baud rate 125Kbps ~ 5Mbps (8Mbps optional)
Power Supply	Powered via Mini PCIe
Power Consumption	2W

Sample Point Range	Adjustable from 70% ~ 90%
Dimensions	30 * 50.95mm
Weight	(Unpackaged)
Operating Humidity	10% ~ 90%
Operating Environment	Avoid corrosive gases

➢ **CAN/CAN FD Specifications**

Parameter	Description
Supported Protocols	CAN 2.0 A/B (ISO 11898-1), CAN FD (ISO and non-ISO)
CAN Baud Rate	125Kbps ~ 1Mbps
CAN Frame Data Length	Up to 8 bytes
CAN FD Baud Rate	125Kbps ~ 5Mbps (8Mbps optional)
CAN FD Frame Data Length	Up to 64 bytes; supports BRS frames
Channel Count	4 independent and isolated CAN/CAN FD channels
Buffer	Hardware buffer

1.2. Electrical Specifications

➢ **Power Characteristics**

Parameter	Condition	Min	Typ.	Max	Unit
Operating Voltage	Mini PCIe power supply	--	5.1	--	V
Power Consumption	Mini PCIe power supply	--	2.0	--	W

➢ **CAN Interface Characteristics**

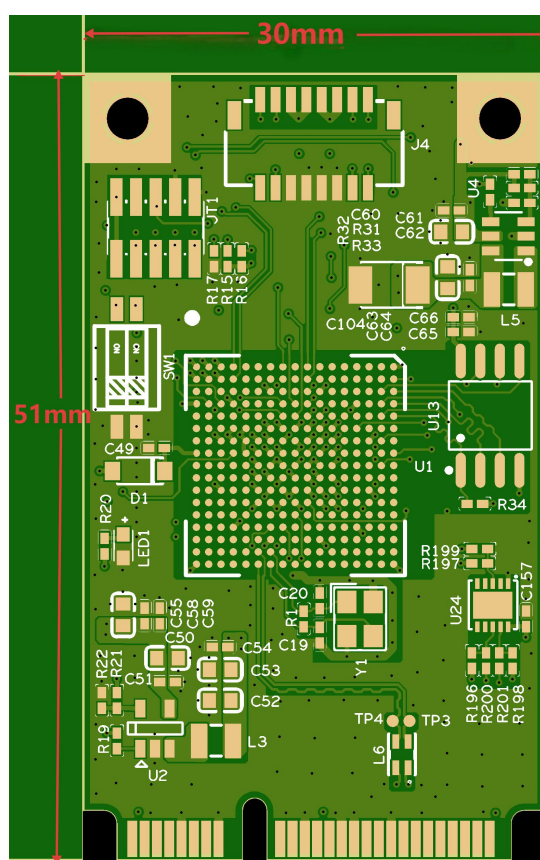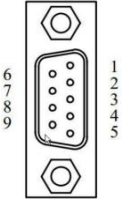| Parameter	Condition	Min	Typ.	Max	Unit
Bus Pin Tolerance Voltage	CAN_H, CAN_L to GND	-58	--	58	V
Isolation Voltage	Isolation resistance test	2500	--	--	VDC

➢ **Mechanical Dimensions**

Unit: mm

Figure 1-1 Mechanical Dimensions

1.3. Pin Definition

➢ **CAN FD DB9 Interface (Male)**

DB9 Pin	Channel	Pin	Definition	Channel	Pin	Definition

		PIN2	CANFD1_Low		PIN2	CANFD2_Low
		PIN1	CANFD1_GND		PIN1	CANFD2_GND
	CAN FD 1/3	PIN4	CANFD3_Low	CAN FD 2/4	PIN4	CANFD4_Low
		PIN5	CANFD_Shield		PIN5	CANFD_Shield
		PIN7	CANFD1_High		PIN7	CANFD2_High
		PIN8	CANFD3_High		PIN8	CANFD4_High
		PIN9	CANFD3_GND		PIN9	CANFD4_GND

1.4. System Requirements

➢ **PC Requirements**

■ Operating System: Linux (official driver provided; compatible with mainstream distributions and Loongson Kylin OS)

➢ **Build & Runtime Dependencies**

■ Kernel header package for the corresponding version

■ GCC compiler

■ Makefile build environment

■ Shell (supported sh scripts)

1.5. Packing List

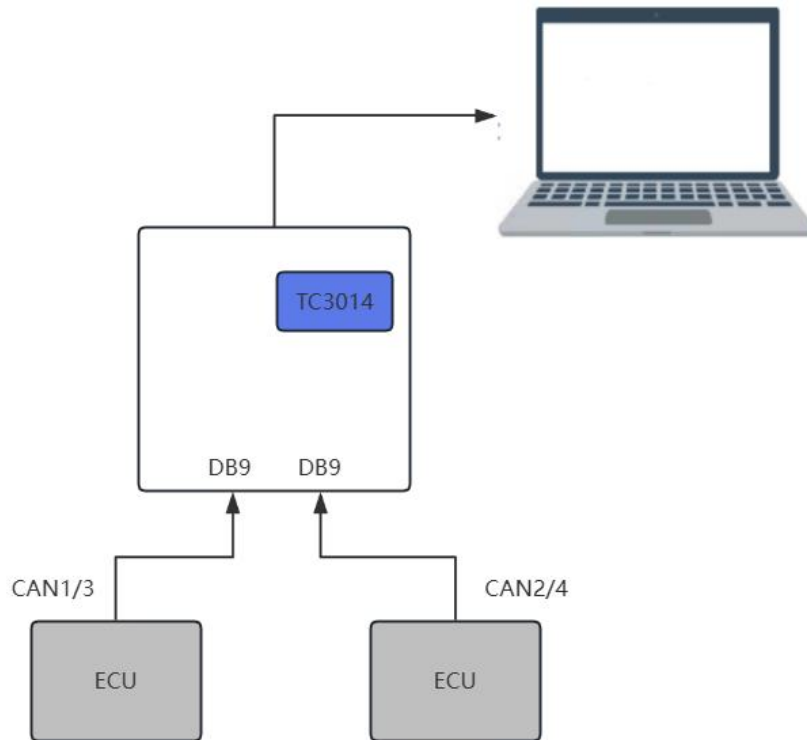| Item	Qty.	Illustration	Standard/Optional
TC3014 Main Device	**1**		**Standard**
DB9 Cable Harness	**2**		**Standard**

2. Application Example in Linux

Figure 2-1 Example in Linux

2.1. Driver Installation

The TC3014 provides a Linux driver with excellent system compatibility.

2.1.1. Environment Dependencies

1. Install the kernel header package for your system version (with CAN device support).

2. Install the GCC compiler.

3. Ensure Makefile support is available.

4. Enable shell script (.sh) execution environment.

2.1.2. Driver Installation Steps

1. Copy the user directory to the Linux environment and enter the directory.

Figure 2-2 User Directory

2. Enter the socket_drv folder and run make to compile the driver. The generated file is tosun_socket_can.ko.

Figure 2-3 Example Figure1

3. Run make install to load can_dev and hid dependencies, then install the driver.

Figure 2-4 Example Figure2

4. The driver does not produce console output during loading. After connecting the device, run dmesg to view log entries containing "tosun", and run ip link show to verify the CAN interface.

Figure 2-5 Example Figure3

```
root@kylin:/home/kylin/user/app# ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: can0: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
3: can1: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
4: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP mode DEFAULT group default qlen 1000
    link/ether a4:11:63:22:1b:53 brd ff:ff:ff:ff:ff:ff
5: eth1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN mode DEFAULT group default qlen 1000
    link/ether a4:11:63:22:1b:52 brd ff:ff:ff:ff:ff:ff
30: can2: <NOARP,UP,LOWER_UP,ECHO> mtu 16 qdisc pfifo_fast state UP mode DEFAULT group default qlen 10
    link/can
31: can3: <NOARP,UP,LOWER_UP,ECHO> mtu 16 qdisc pfifo_fast state UP mode DEFAULT group default qlen 10
    link/can
32: can4: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
33: can5: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
root@kylin:/home/kylin/user/app#
```

Figure 2-6 Example Figure4

5. To uninstall the driver, run make uninstall.

2.2. Usage Example

TC3014 functions as a standard SocketCAN device, fully compatible with the Linux SocketCAN subsystem API.

- Official Documentation: For complete SocketCAN APIs, concepts, and usage, refer to the official Linux kernel documentation: Linux source tree ➜ /Documentation/networking/can.rst

(Online version: https://www.kernel.org/doc/html/latest/networking/can.html)

- Practical Tutorial: For beginners, third-party resources such as SocketCAN – Wikipedia provide a quick overview of key concepts.

The examples in this document assume a basic understanding of SocketCAN.

> ⓘ Please refer to *TOSUN-SOCKET_CAN User Guide_V1.0.0* for details.

3. Reference Document

TOSUN-SOCKET_CAN User Guide_V1.0.0

4. Inspection and Maintenance

The TC3014 primarily contains semiconductor components, which typically have a long service life. However, adverse environmental conditions may accelerate aging and degrade performance. To ensure proper operation, regular inspections are recommended to maintain the required environmental conditions.

It is recommended to inspect the device at least once every 6 to 12 months. In harsher environments, inspections should be performed more frequently. Refer to the table below for inspection criteria and recommended actions. If issues persist, please contact Shanghai TOSUN Technology Ltd.

➢ **Power Environment Inspection**

Item	Check Content	Standard/ Range	Action/Measure
Power Supply	Check voltage fluctuation at power input	USB port:+5V DC Power port: +12V DC	Use a power meter or voltmeter at the input; ensure voltage fluctuation is within range
Ambient Conditions	Check ambient temperature (including internal temperature within enclosures)	-40℃ ~ +80℃	Use a thermometer to ensure temperature is within specified range
	Check the ambient humidity (including internal humidity within enclosures)	10% ~ 90% RH	Use a hygrometer to ensure humidity is within specified range

➢ **Contamination & Protection Check**

Item	Check Content	Standard/Range	Action/Measure
Contamination	Check for accumulation of dust, powder, salt, and metal debris	None	Clean the device and prevent future contamination
	Check for exposure to water, oil, or chemicals	None	Clean and shield if necessary
Hazardous Gases	Check for corrosive or flammable gases	None	Use sensors or odor detection to verify

➢ **Mechanical Stress & EMI Check**

Item	Check Content	Standard/Range	Action/Measure
Mechanical Stress	Check vibration and shock levels	Within specified limits	Install padding or vibration isolation measures if necessary
Electromagnetic Environment	Check for noise sources near the device	No significant noise sources	Isolate or shield the device from noise sources

➢ **Installation & Wiring Check**

Item	Check Content	Standard/Range	Action/Measure
Wiring	Check crimped connectors in external wiring	Adequate clearance between connectors	Visually inspect and adjust as needed
	Check for damage to external wiring	No damage	Visually inspect and replace damaged cables if necessary

Software

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

UDS diagnostics/ECU flashing/CCP/XCP calibration

Embedded code generation/Application builder

Encrypted release/Logging and bus replay

Graphical programming/Residual bus simulation

C and Python scripting

Bus monitoring/Transmiting/Automated testing
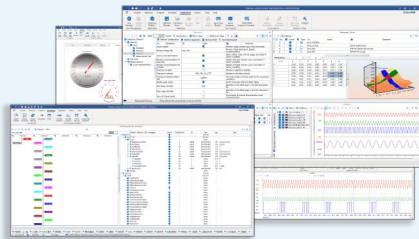
TSMASTER

Hardware

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

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

Multi channel FlexRay/CAN FD to USB/PCIe device

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

Automotive Ethernet media conversion device (T1 to Tx)

Multi-channel CAN FD/Ethernet/LIN datalogger

TTS test systems

-CAN FD/CAN/FlexRay/LIN communication boards

-Relay and fault injection boards

-Resistors for sensor simulation

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

CAN **CAN** FD *lin* **FlexRay** **OPEN ALLIANCE**

Solutions

- Bus Conformance
- Network Automation Testing System
- Charging Testing System
- EMB Calibration Testing Equipment
- Information Security Solutions
- Steer-by-Wire Chassis Testing Solutions

- EOL Testing Equipment
- Motor Performance
- Durability Testing Solutions
- FCT

About TOSUN

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

International Organization

ASAM **CiA**

Quality Assurance

ISO9001:2015

CE Certification

CE

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