User Manual

CANDTU-200UR

CAN Bus Message Records and Wireless Data Transmission Equipment

UM01010101 V1.06 Date: 2019/11/01 **Product User Manual**

Category	Contents
Keywords	CAN-Bus message recording, storage
Abstract	Product User Guide

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Revision History

Version	Date	Description
V0.90	February 1, 2016	Created
V1.04	January 2, 2019	Changed the hardware interface to dual DB9
V1.05	March 15, 2019	Updated the document header and footer and "Sales and Service Network" content, and added the "Disclaimer" content
V1.06	November 1, 2019	Corrected the document description

Contents

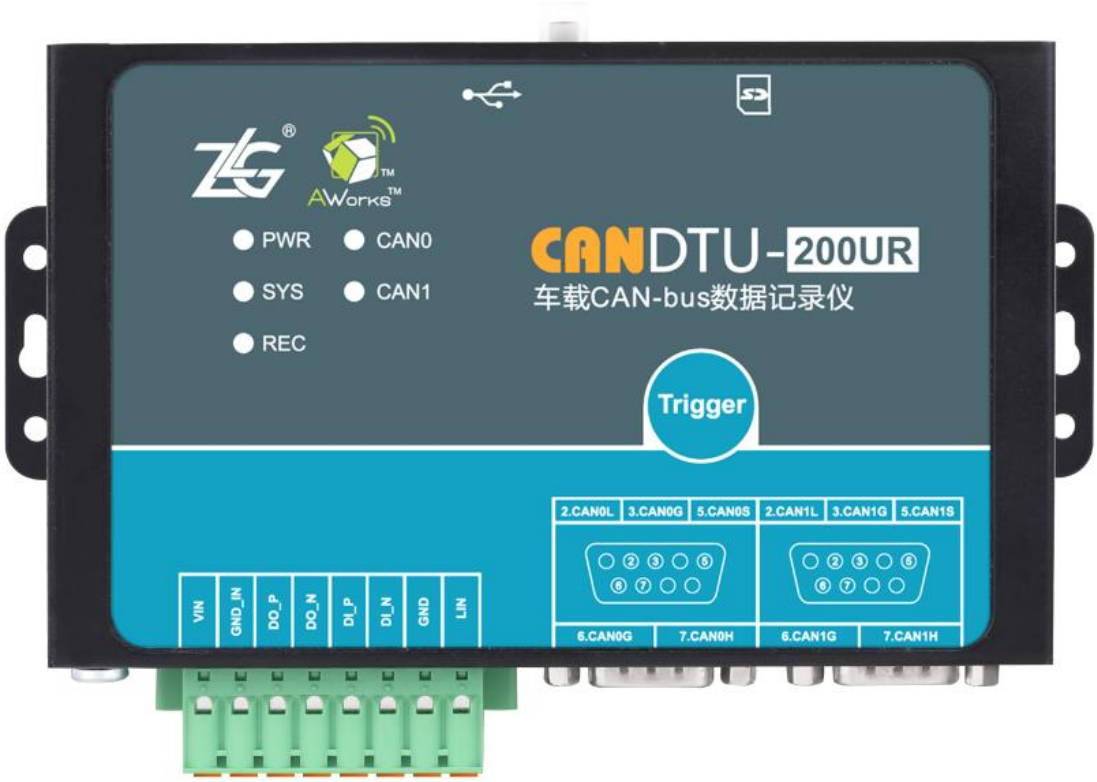
1. Product Introduction

Product Overview

In the CAN bus troubleshooting, the biggest difficulty is occasional faults. This makes engineers or even CAN experts unable to accurately identify the fault cause. For example, the pitch system of the wind turbine had a CAN data transmission interruption in 72 hours; the dashboard of a new energy vehicle appeared "blank" once during a 10,000 km drive, but this could not reoccur; the high-speed train experienced an emergency deceleration due to abnormal CAN communication during a 2,000 km journey. These occasional CANFD communication exceptions have frightened engineers like time bombs. If one CAN bus data recorder is installed on an occasion prone to faults, it is equivalent to a "black box" to record CAN data, which helps analyze the fault cause.

Guangzhou ZLG Electronics Co., Ltd., as a leading manufacturer of the domestic CAN bus, has developed CANDTU series products for troubleshooting CAN buses, which can record CAN messages offline and perform GPRS and 3G transmission. It can easily complete the message recording and on-site monitoring of applications such as vehicles, ships, elevators, wind turbines, and construction machinery.

CANDTU-200UR series products are storage-type 2-channel CAN bus data recorders. The products can run independently from the PC and store CAN message data for a long time, which facilitates analysis and troubleshooting. The recorder can transfer the recorded data to a PC via an SD memory card. After format conversion of the raw data, users can analyze and evaluate the recorded data offline by using CANoe and CANScope.



Features

CAN channel	Number of channels: two user-configurable CAN channels
	Interface type: high-speed CAN (optional fault-tolerant CAN, single-wire CAN)
	Baud rate: arbitrarily programmable between 5 Kbps and 1 Mbps
	Maximum received data flow: greater than 7,000 frames/s
	Surge protection: 1 kV (Class A)
	Electromagnetic isolation: 3.5 kV
LIN channel	One independent LIN channel
PC interface	Hi-speed USB2.0
Message recording and storage	Storage capacity: SD memory card of a maximum of 256 GB
	Storage mode: all storage, scheduled storage
	Full mode: rolling record, full stop
	Trigger mode: conditional trigger, external trigger
	Find and location: manual time stamping
	Data export: ASC or CAN data for CANoe, CANScope analysis
Digital input and output	Two digital inputs
	Two digital outputs
Real-time clock	Built-in rechargeable lithium battery
Software resources	Supports the general configuration function library, which helps users develop application programs with VC, VB, Delphi and C++ Builder

	Supports the configuration tool CANDTU
Power supply voltage	6.8-48 V DC
Power consumption	1.83 W
Temperature range	Operating temperature: -40°C to +85°C (without an SD card)
	Storage temperature: -40°C to +85°C (without an SD card)
External dimension	155.5 mm x 85.3 mm x 27 mm

Typical Applications

High-speed train operation fault detection and troubleshooting

Subway train running fault detection and troubleshooting

Train control system operation fault detection and troubleshooting

Wind turbine CAN communication fault detection

Multi-channel CAN communication records and fault analysis for traditional vehicles and new energy vehicles

Ship CANFD communication fault detection and troubleshooting

Coal mine CAN communication fault analysis

Elevator operation fault detection and troubleshooting

Construction machinery operation fault detection and troubleshooting

Aerospace vehicles and ancillary equipment operation detection and troubleshooting

2. Product Specifications

Electrical Specifications

Table 2.1 Electrical specifications

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	MAXIMUM	
Operating voltage	DC	6.8		48	V
Power consumption				1.3	W

Operating Temperature

Table 2.2 Operating temperature

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	Maximum	
Operating temperature	SD card not included	-40	-	85	°C
Storage Temperature	SD card not included	-40	-	85	°C

Note: The operating temperature of the device depends on the SD card. The specifications are as follows:

SD card specifications: -25°C to +85°C (operating temperature), -40°C to +85°C (storage temperature).

Protection Level

Table 2.3 Protection level-electrostatic discharge immunity test (IEC61000-4-2)

Interface	Conditions	Test level	Test voltage (kV)	Test Result	Remarks
Power supply		Level 4	8	Class A	Contact discharge
CAN bus		Level 4	8	Class A	Contact discharge
LIN bus terminal		Level 4	8	Class A	Contact discharge
Digital switch input and output		Level 4	15	Class A	Air discharge
USB		Level 4	8	Class A	Contact discharge
Buttons, Indicators		Level 4	15	Class A	Air discharge

Table 2.4 Protection level-electrical fast transient pulse group immunity test (IEC61000-4-4)

Interface	Conditions	Test level	Test voltage (kV)	Test Result	Remarks
Power supply		Level 3	2	Class A	Capacitive coupling
CAN bus		Level 3	1	Class B	Capacitive coupling

Table 2.5 Protection level-surge (impact) test (IEC61000-4-5)

Interface	Conditions	Test level	Test voltage (kV)	Test Result	Remarks
Power supply		Level 3	1	Class A	Line-line
		Level 3	2	Class A	Line-ground
CAN bus		Level 3	1	Class B	Line-line
		Level 3	1	Class B	Line-ground

Note: For details, see the attachment *Electromagnetic Compatibility Test Report.pdf*.

Shock and Vibration Level

For details, see the following attachments:

1. CANDTU Series Message Recorder Impact Test Report.pdf
2. CANDTU Series Message Recorder Vibration Test Report.pdf

Mechanical Dimensions

Figure 2.1 shows the mechanical dimensions (unit: mm).

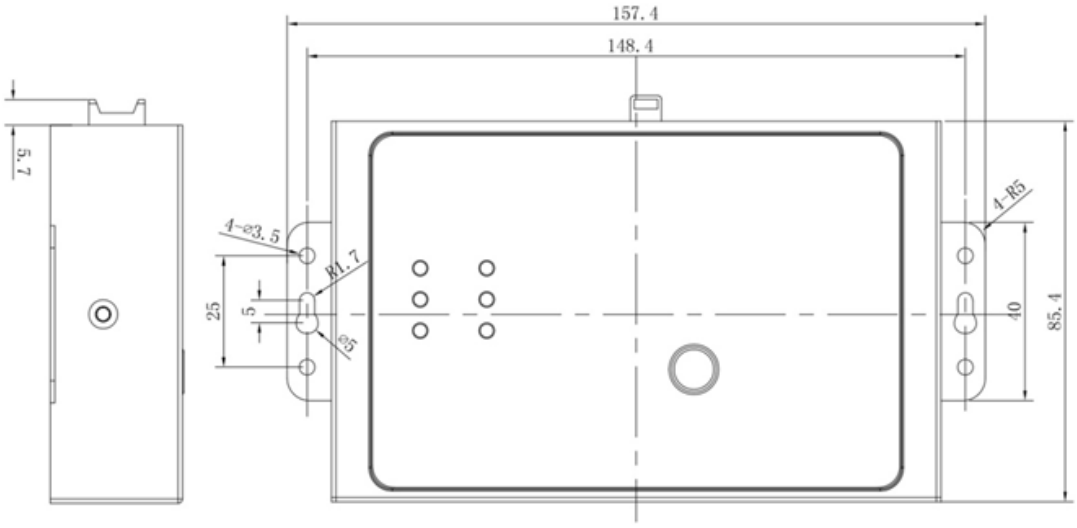


Figure 2.1 Mechanical dimensions

Note: For more detailed mechanical dimension drawings, contact our sales or technical support personnel.

3. Hardware Interfaces

This section introduces the hardware interfaces of CANDTU series devices.

Panel Layout

Figure 3.1 shows the device panel layout.

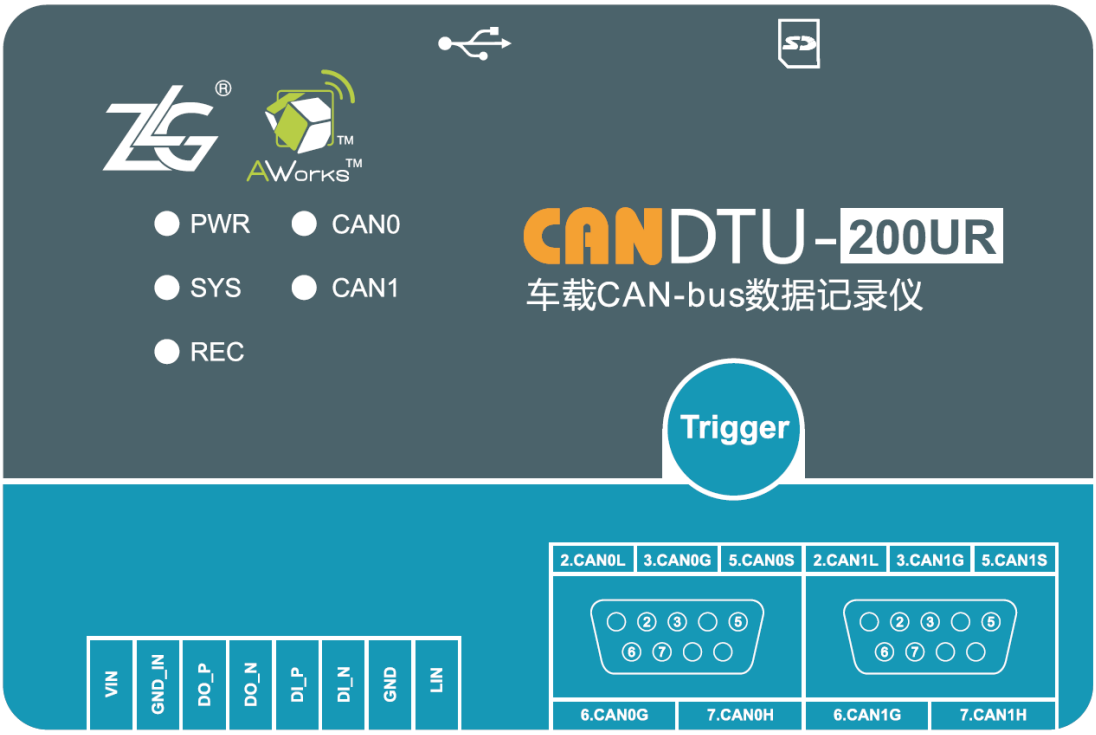


Figure 3.1 Panel layout

Indicators

Table 3.1 LED status indicators

Identification	Function	Status	Description
PWR	Power indicator (Red)	The indicator is on	The device is powered on properly
		The indicator is off	The device is powered off, or the power supply is abnormal
SYS	System running status indicator (red and green indicators)	Flashing red light	System Error
			Enter Bootloader; upgrade firmware
			Download configuration via USB
			SD card not inserted or incorrect card
			Empty the SD card

		Green flashing light	The system is running properly
REC	SD card recording status indicator (red and green indicators)	Continuous red light	In loop recording, the SD card is full In acyclic recording, the SD card is full
		Flashing red light	In loop recording, the SD card has data records
		Continuous green light	When the SD card is not full, enable SD card recording
		Green flashing light	When the SD card is not full, the SD card has data records
		The indicator is off	Not recording mode, or pause recording
CAN0	CAN0 channel transceiver status indicator (red and green indicators)	The indicator is off	The CAN0 channel is not active
		Green flashing light	The CAN0 channel receives data properly
		Continuous red light	The CAN0 channel receives an error frame
CAN1	CAN1 channel transceiver status indicator (red and green indicators)	The indicator is off	The CAN1 channel is not active
		Green flashing light	The CAN1 channel receives data properly
		Continuous red light	The CAN1 channel received an error frame

Buttons

The device provides a trigger button. The shell is identified as "Trigger". Its function is to mark the CAN message data, so that the user can locate the data recorded in the SD card. In addition, this button can be used for firmware upgrade.

Table 3.2 Button operations

Operation	Function	Conditions	Manipulation	Symptom
Stop recording	Stop storing CAN message data	Normal recording, or resumed recording	Press and hold the button for more than 3 seconds to stop recording. Then the SD card can be safely ejected.	REC, CAN0, CAN1 indicators off; The buzzer beeps
Recover records	Recover storage CAN message data	Recording has stopped, and the card exists	Short-press the button to resume recording	REC, CAN0, and CAN1 indicators Return to the state before the stop; The buzzer beeps twice
			Once the configuration is downloaded, the recording can be resumed	
		Recording has stopped	Reinsert the card to resume recording	

		but the card does not exist		
User tag	Mark CAN message data	Normal record	Short-press the button for 200 milliseconds, not more than 2 seconds, to mark the data.	The REC indicator flashes once; The buzzer beeps briefly.
User upgrade	Upgrade device firmware	Enter the upgrade status	Insert the SD card, press and hold the button, and power on the device; Release the button after three short buzzer beeps	The buzzer makes three short beeps
		When upgrading		The SYS red indicator flashes
		Updated		Start working properly

DB9 Interface and Flange Terminal Interfaces

Power Interface

The rated voltage of the power input of the device is 7.5-48 V DC . The physical form of the interface is a flange terminal. Table 3.3, Table 3.4, and Table 3.5 list the interface schematic diagram, signal definition, and interface specifications.

Table 3.3 Power interface

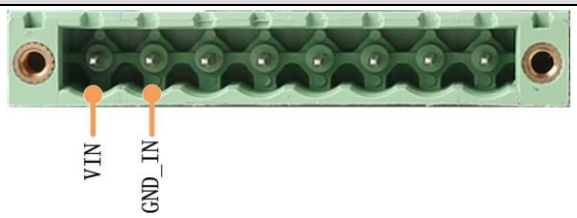
Type	Schematic Diagram
Flange terminal	

Table 3.4 Flange terminal signal definition

Function interface	Signal definition	Signal description
Power supply	VIN	positive electrode of power
	GND_IN	negative electrode of power

Table 3.5 Power interface specifications

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	Maximum	
Working voltage	DC	7.5		48	V

Power consumption				2.568	W

Switch Output Interface

The device provides one channel digital output. The physical form of the interface is a flange terminal. Table 3.6, Table 3.7, and Table 3.8 list the interface schematic diagram, signal definition, and interface specifications.

Table 3.6 DO interface

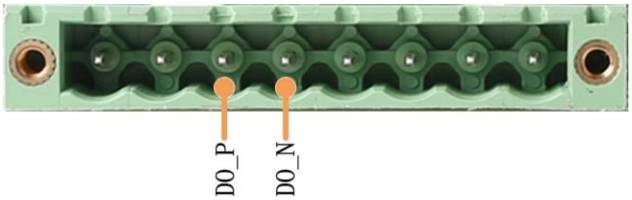
Type	Schematic Diagram
Flange terminal	

Table 3.7 Flange terminal signal definition

Function interface	Signal definition	Signal description
DO	DO_P	Positive pole of the digital output channel
	DO_N	Negative pole of the digital output channel

Table 3.8 DO interface specifications

parameter	Conditions	Minimum	Typical value	Maximum	Unit
Contact load	DC 3A, resistive			30	V
Contact load	AC 3A, resistive			250	V
Contact Resistance	DC 1A, 24V		0.1		Ω
Isolation voltage	Valid value		4000		V

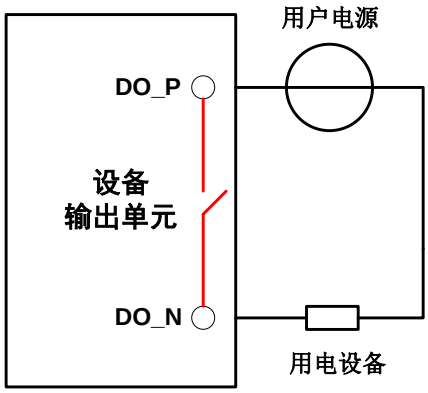


Figure 3.2 DO network connection

The switch output interface is a relay output type, and the interior is a relay contact. The output control circuit is not limited by voltage and polarity, and can be 24 V DC or 220 V AC. Since it is a dry contact output, users need an external power supply to supply power to alarm devices (such as buzzers). Figure 3.2 shows the connection.

The switch output interface is used to output the alarm signal. Through the configuration tool, configurable trigger events include record full, CAN bus error, and SD card status abnormality. In addition, the relay can be configured to be normally open or normally closed based on user needs.

Switching Value Input Interface

The device provides one channel digital input. The physical form of the interface is a flange terminal. Table 3.9, Table 3.10, and Table 3.11 list the interface diagrams, signal definitions,

and interface specifications.

Table 3.9 DI interface

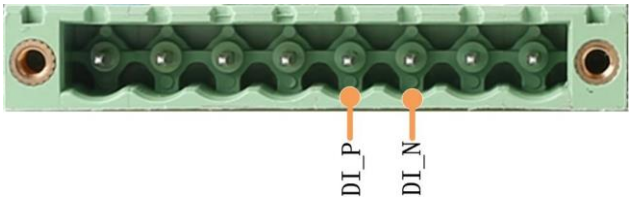
Type	Schematic Diagram
Flange terminal	

Table 3.10 Flange terminal signal definition

Function interface	Signal definition	Signal description
DI	DI_P	Positive pole of the digital input channel
	DI_N	Negative pole of the digital input channel

Table 3.11 DI interface specifications

parameter	Conditions	Minimum	Typical value	Maximum	Unit
Logic 0 signal	DC	0		3	V
Logic 1 signal	DC	5		24	V
Isolation voltage	Valid value		3750		V

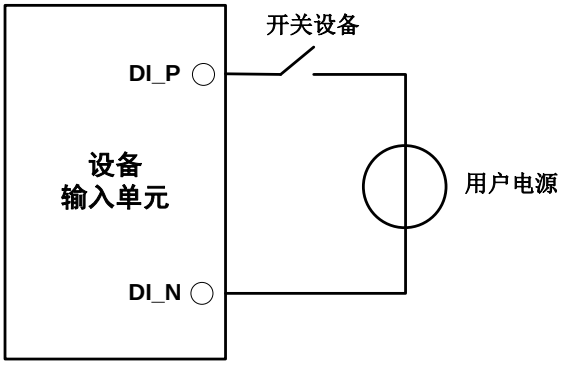


Figure 3.3 DI network connection

By using the configuration tool, the switch input interface can be configured as scheduled record mode and analog key-pressing mode.

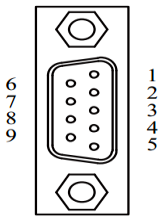
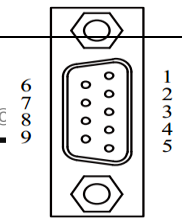
The scheduled record mode is used to regularly collect the switching status of external equipment, such as valve closing and opening, motor start and stop, and contact connection and disconnection. Figure 3.3 shows the connection diagram.

Simulate button mode can be used to simulate on-board buttons, including message marking, pause recording, resume recording, and user upgrades.

CAN-Bus Interface

The device provides two isolated CAN-Bus interfaces. The physical form of the interface is a DB9 terminal. Table 3.12, Table 3.13 and Table 3.14 list the interface diagram, signal definition, and interface specifications.

Table 3.12 CAN interface

Type	Schematic Diagram	Pin description
DB9, pin		2：CAN0_L
		3：CAN0_GND
		5：CAN0_SHIELD
		6：CAN0_GND
		7：CAN0_H
		2：CAN1_L

		3：CAN1_GND
		5：CAN1_SHIELD
		6：CAN1_GND
		7：CAN1_H

Table 3.13 Flange terminal signal definition

Function interface	Signal definition	Signal description
CAN	CAN_L	CAN data transceiving differential inverted signal
	CAN_GND	CAN isolated ground
	CAN_H	CAN data sending and receiving differential positive phase signal
	CAN_SHIELD	CAN shield ground

Table 3.14 CAN-Bus interface specifications

Parameter		Minimum	Typical Value	Maximum	Unit
Communication baud rate		5k		1M	bps
Number of nodes				110	pcs
Dominant level (logic 0)	CANH	2.75	3.5	4.5	V
	CANL	0.5	1.5	2	
Recessive level (logic 1)	CANH	2	2.5	3	
	CANL	2	2.5	3	
Differential level	Dominant (logic 0)	1.2	2	3.1	
	Recessive (logic 1)	-0.5	0	0.05	
Maximum withstand voltage of the bus pin		-18		18	
Instantaneous voltage of the bus		-100		+100	
Isolation voltage (DC)		3500			V

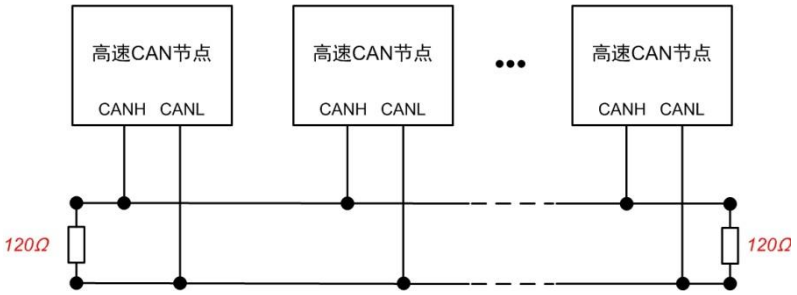


Figure 3.4 Typical high-speed CAN network connection

The CAN bus adopts balanced transmission. ISO11898-2 stipulates: In the

high-speed CAN, a 120 ohm terminal resistor needs to be connected to the network terminal node to eliminate signal reflection on the bus and avoid signal distortion. Figure 3.4 shows the high-speed CAN network topology.

The device has a built-in 120 ohm terminal resistance, which can be configured to turn on or off by using the configuration tool CANDTU. For operation details, see 2616320.

Note: The bus communication distance and communication rate are related to the field application and can be designed according to the actual application and related standards. The CAN-Bus cable can use ordinary twisted pair, shielded twisted pair or standard bus communication cable. In long-distance communication, the terminal resistance value needs to be selected according to the communication distance, cable impedance and number of nodes.

LIN-Bus Interface

The device provides one independent LIN-Bus interface. The physical form of the interface is a flange terminal. Table 3.15, Table 3.16, Table 3.1 list the interface diagrams, signal definitions.

Table 3.15 LIN interface

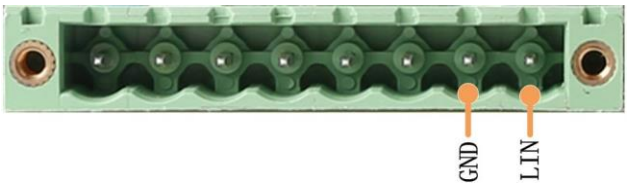
Type	Schematic Diagram
OPEN terminal	

Table 3.16 OPEN, 5557 signal definition

Function Interface	Signal Definition	Signal Description
LIN	LIN	LIN bus signal
	GND	Digital ground

Table 3.17 LIN-Bus interface specifications

parameter		Minimum	Typical Value	Maximum	Unit
LIN line	Communication baud rate			20k	bps
	DC voltage	-36		36	V
	Dominant output level (logic 0)			0.75	V
	Receiver dominant level (logic 0)			2	V
	Receiver stealth level (Logic 1)	3			V

USB Interface

The device provides one USB interface. The device communicates with the PC over

the USB cable. The interface conforms to the high-speed USB2.0 protocol specification and can communicate with PCs compliant with USB1.1 and USB2.0 standards. The physical form of the interface is a Type-B USB port.

SD Card Interface

The device provides one SD card interface, which can support SD memory cards of a maximum of 256 GB for storing CAN bus message data. The interface adopts a self-locking card slot, and the SD card can be locked after the card is inserted according to the direction of the casing logo to prevent accidental falling off during use. When pulling out the card, just push it inwards to eject the SD card.

Note: Do not forcibly pull out the card when the device is in use. Otherwise, data loss or memory card damage may occur! If necessary, after pausing the recording by pressing the button (or configuration tool), gently push in and eject the SD card.. See 0 to pause the recording operation.

4. Configuration Tool Installation and Introduction

Software Installation

1) Double-click the software installation package to install the software. The dialog box shown in Figure 4.1 appears.

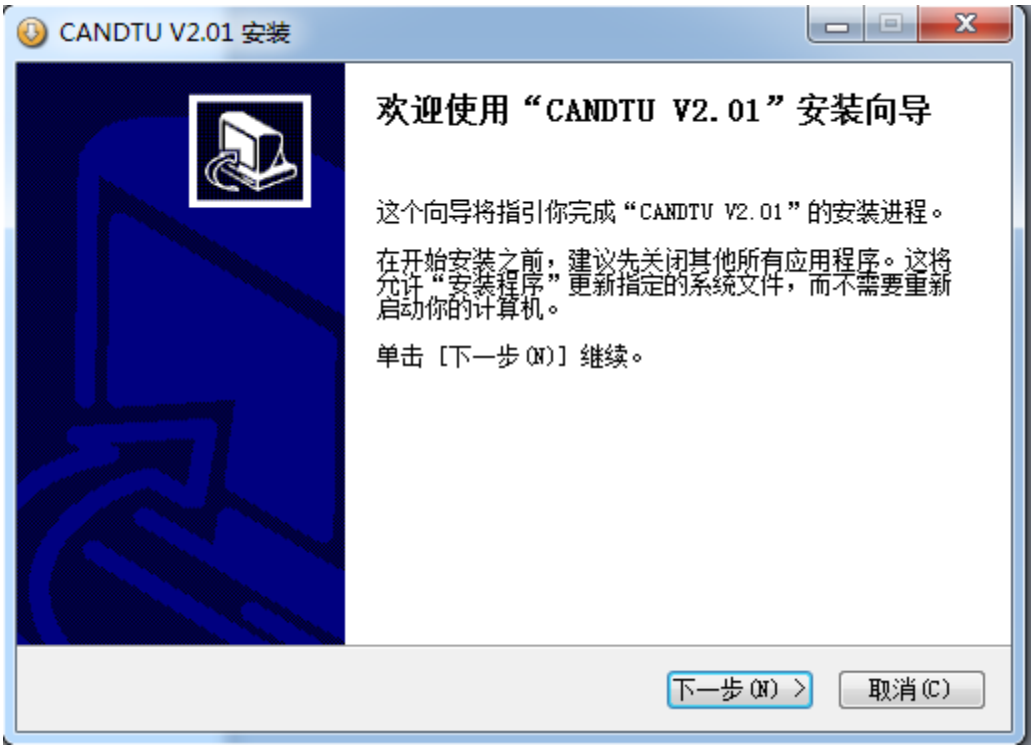


Figure 4.1 Installation wizard

2) Click "Next". The Choose Install Location dialog box appears.

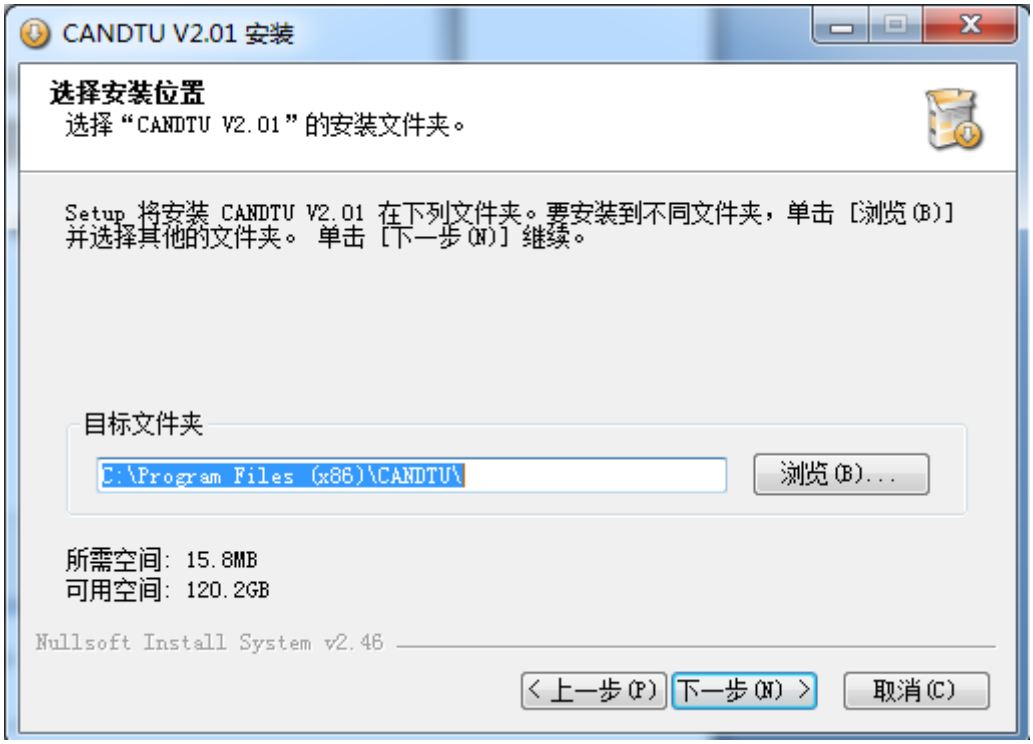


Figure 4.2 Select an installation path

3) Click "Next". The dialog box shown in Figure 4.3 appears.

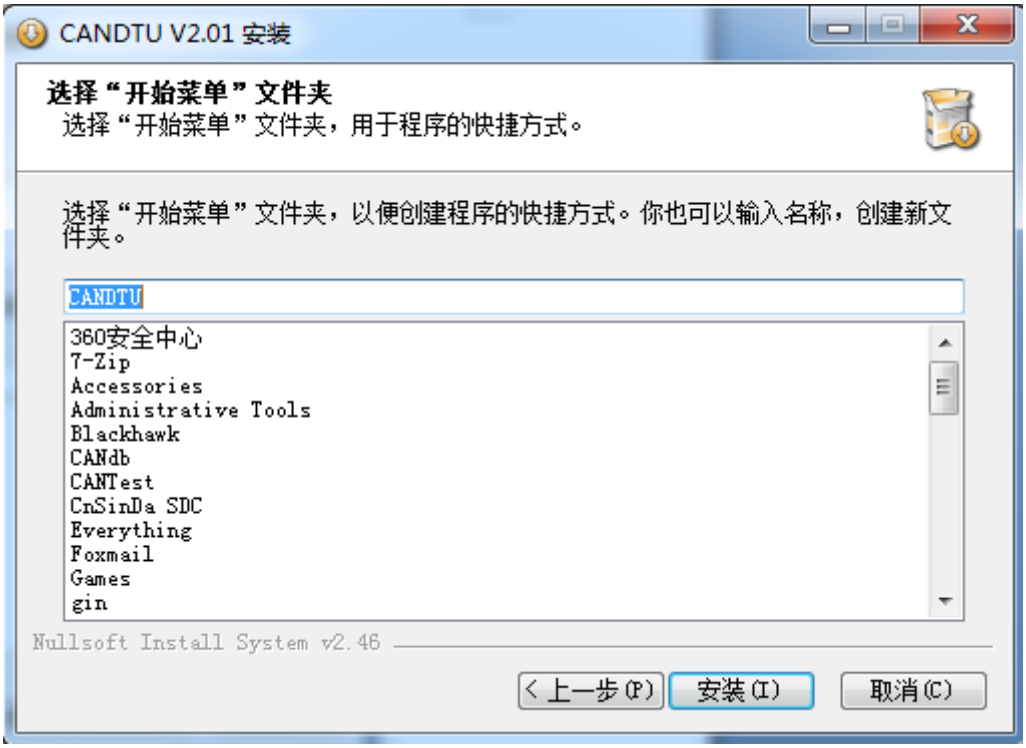


Figure 4.3 Selecting the Start Menu Folder

4) Click "Install". The Install Driver dialog box appears.

Figure 4.4 Installing the driver

5) Click "Install". The dialog box shown in Figure 4.5 appears.

Figure 4.5 Installation complete

6) Click "Finish". The configuration software and driver are installed.

Function Description

After the program is installed, there will be shortcuts to the configuration tool on the desktop and start menu. Double-click the desktop icon to launch the program. The CAN configuration page appears by default, as shown in Figure 4.6. The configuration tool interface is divided into four parts:

Menu bar

Provide all operation commands of the configuration tool, including common operation commands in the shortcut toolbar, restore factory settings, etc.;

Shortcut Toolbar

Provide common operation buttons of the configuration tool to complete the quick operation of commands;

Side Navigation Bar

Provide multiple categories of information tabs to quickly switch tabs;

Information Settings Bar

Operate the specific configuration information based on the options in the left navigation bar.

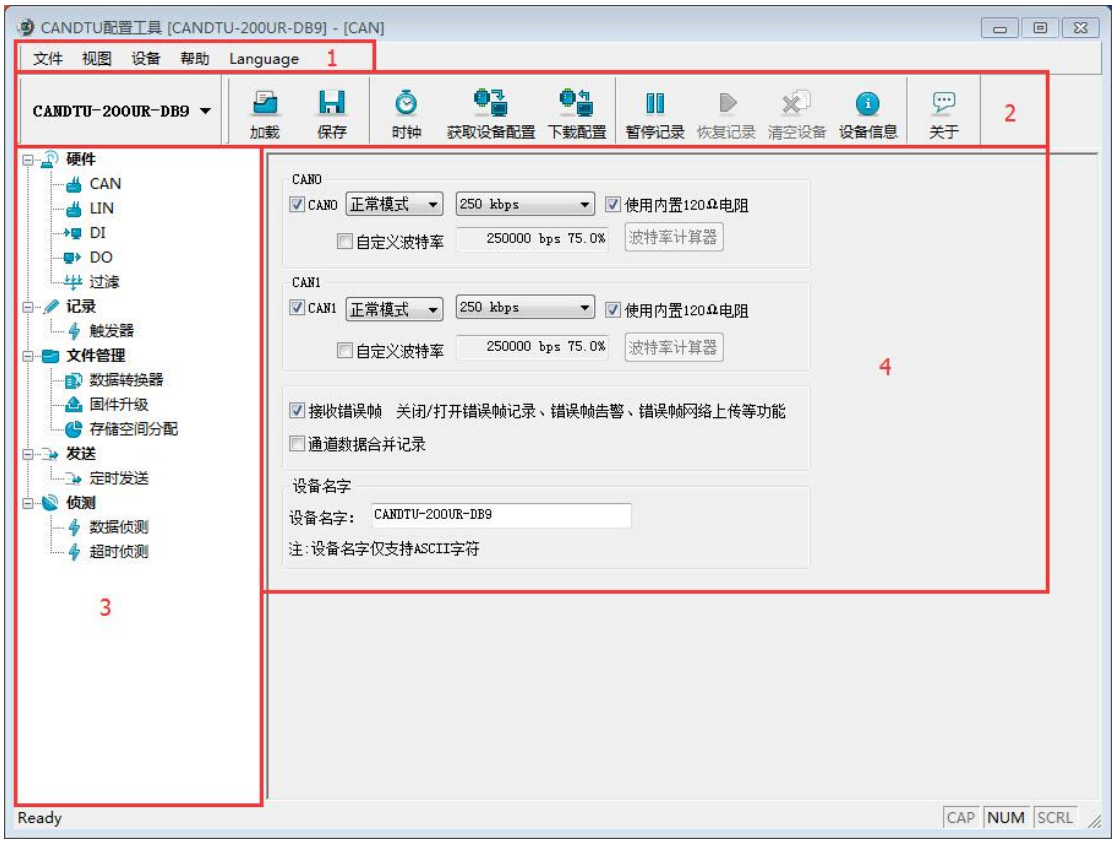


Figure 4.6 CAN configuration page

The following describes the function and meaning of each configuration parameter of the configuration tool.

Device Selection

When using the configuration software, select the corresponding device model, as shown in Figure 4.7.

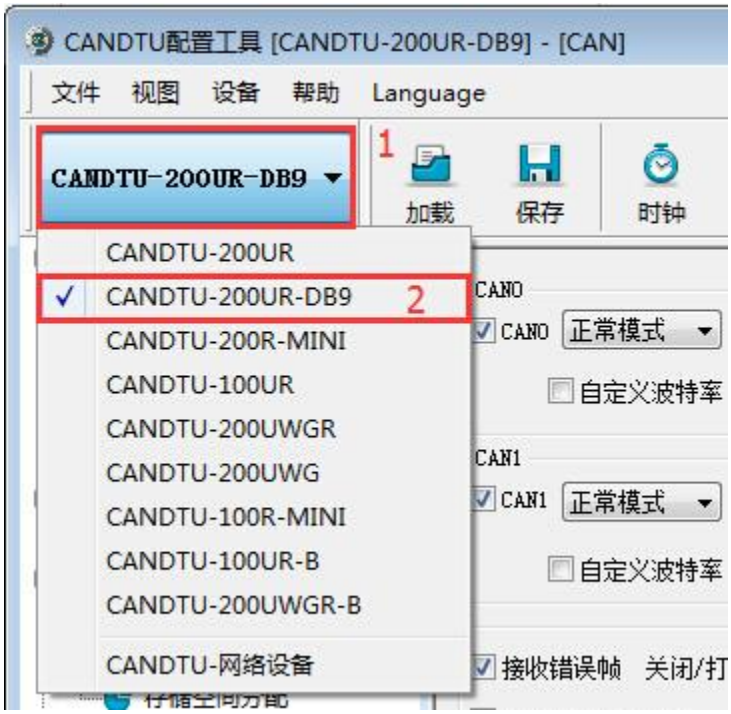


Figure 4.7 Device selection

When the software retrieves that the device of the selected model is connected to the computer properly, the shortcut toolbar will change from dark to bright, as shown in Figure 4.8.

Figure 4.8 Device valid

CAN Configuration

Figure 4.9 shows the CAN configuration tab. Configure CAN-Bus related parameters on this tab page.

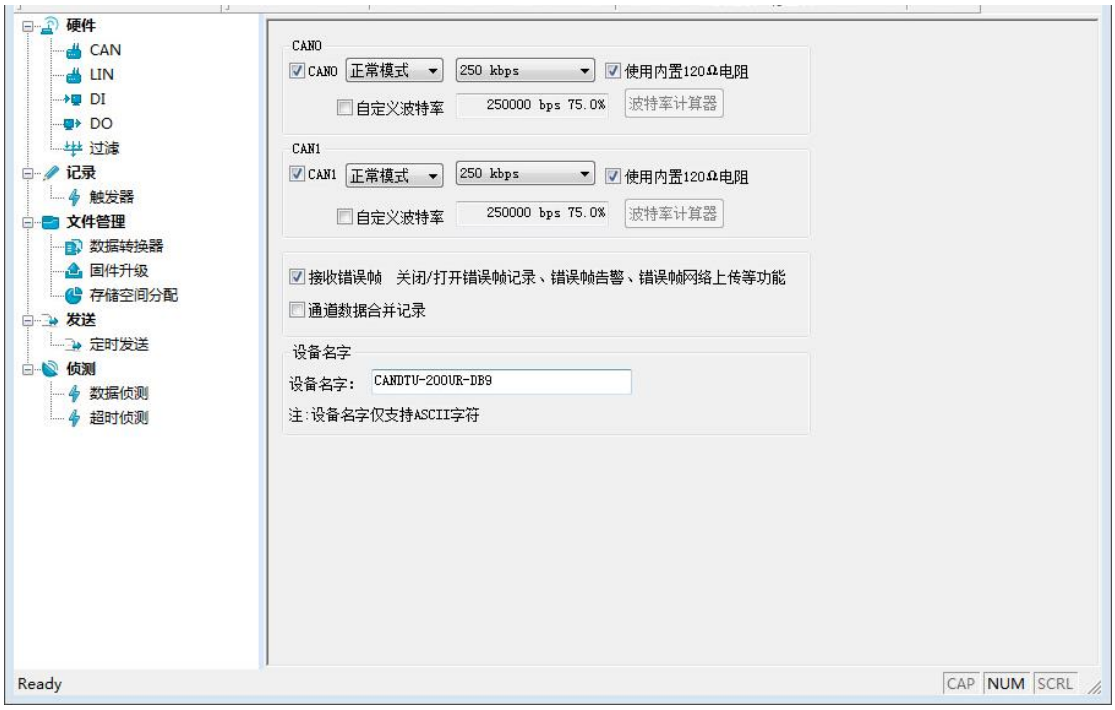


Figure 4.9 CAN Configuration tab

The CAN Configuration tab contains the following parameters:

Channel selection

- Selected: Enable the corresponding CAN channel.
- Deselected: Disable the corresponding CAN channel.

Communication mode

- Normal mode:
- Listen only mode:

Communication baud rate

Provides commonly used CAN communication baud rates.

Use a built-in 120-ohm resistor (connected by default)

- Selected: Connect the built-in 120-ohm resistor termination resistor corresponding to the CAN channel.
- Deselected: Disconnect the built-in 120-ohm resistor termination resistor of the corresponding CAN channel.

Custom baud rate

If the provided common CAN communication baud rate cannot meet the requirements, select the customized baud rate check box, click the baud rate calculator to calculate the customized baud rate information. The text box displays the current baud rate and sample point information.

Baud rate calculator

As shown in Figure 4.10, select the appropriate synchronous jump width value, select

or deselect the three sampling check box as required, enter a baud rate, and whether it conforms to the rule of TSEG2>=SJW. Click the Calculate button to calculate the data combination for the baud rate. Select a numerical combination that matches the desired sampling point. Press the OK button or double-click the row to complete the customized baud rate setting.

Figure 4.10 Baud rate calculator

Record error frames

- Selected: Record CAN error frames.
- Deselected: CAN error frames will not be recorded.

Device name

Set a custom device name (not currently used, a reserved function)

LIN Configuration

As shown in the figure, it is a LIN configuration item.

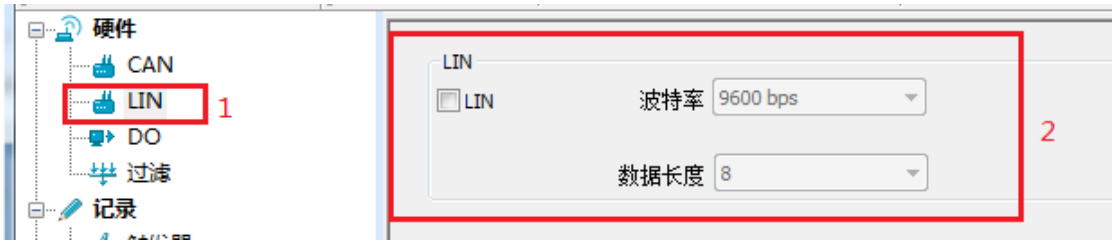


Figure 4.11 LIN Configuration tab

Channel selection

- Selected: Enable the corresponding LIN channel.
- Deselected: Disable the corresponding LIN channel.

Communication baud rate

Provides commonly used LIN communication baud rates.

Data length

The LIN data length can be set.

DI Configuration

Figure 4.12 shows the DI Configuration tab. DI is the function of the CANDTU device to collect the switch state of the external device.

Figure 4.12 DI Configuration tab

Channel selection

- Selected: Enable the corresponding DI channel.
- Deselected: Disable the corresponding DI channel.

Mode selection

- Simulate buttons: simulate on-board buttons, including message marking, pause recording, resume recording, and user upgrades.
- Scheduled record: used to regularly collect the switch status of external devices.

DO Configuration

Figure 4.13 shows the DO configuration tab . The DO function is used to generate an alarm signal when the device is abnormal.

Figure 4.13 DO Configuration tab

Channel selection

- Selected: Enable the corresponding DO channel.
- Deselected: Disable the corresponding DO channel.

Triggering event

- Record full: When the SD card is full, the relay will act.
- Bus error: When the CAN bus is incorrect, the relay will act.
- SD card exception: When the SD card is abnormal, or the SD card does not exist, the relay will act.

Relay actions

- Closed: When an event is triggered, the relay closes.
- Open: When an event is triggered, the relay is opened.

Filtering

Figure 4.14 shows the Filtering Configuration tab. Configure CAN data filtering parameters.

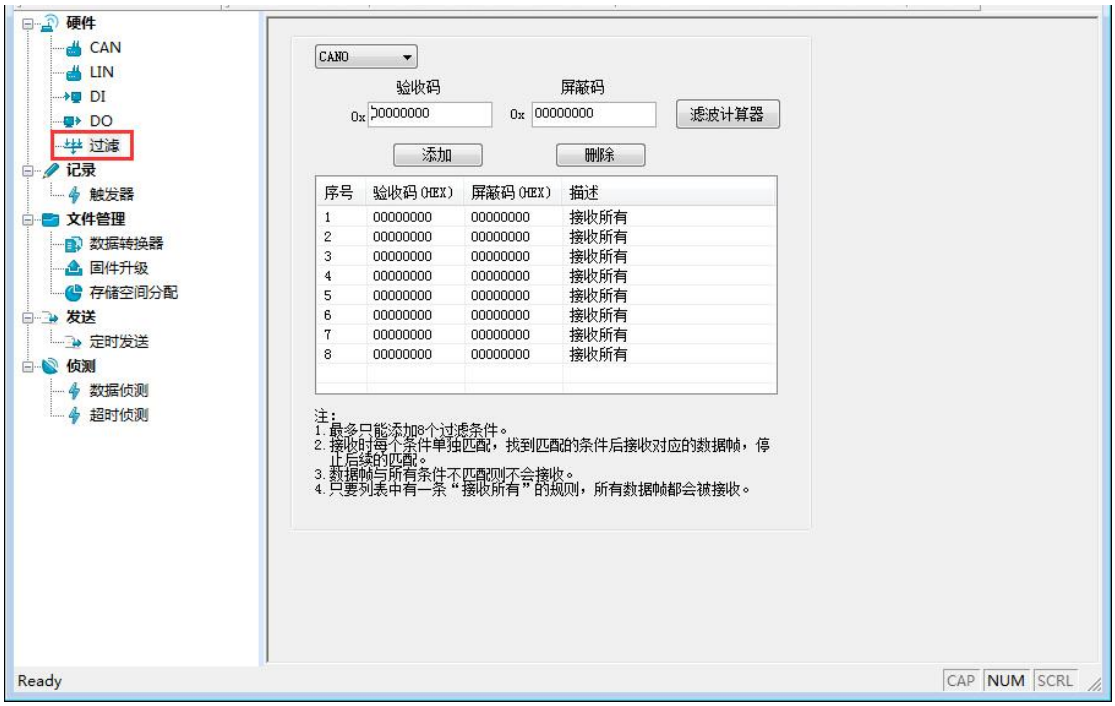


Figure 4.14 Filter Settings tab

The configuration tool supports a maximum of eight sets of filtering rules for each CAN. The filtering rules of each CAN channel are independent of each other and need to be configured separately. The Filter tab contains the following parameters:

Channel selection

Select an CAN channel for which filtering rules need to be set.

Acceptance code and mask code

Each set of filter items contains an acceptance code and a mask code. The acceptance code and mask code are both a 32-bit value. Figure 4.15 shows the specific format.

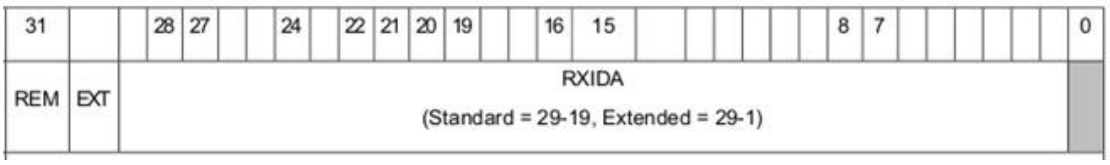


Figure 4.15 Filter table format

- REM: 1 indicates remote frame reception, data frame rejection.
- EXT: 1 indicates extended frame reception, standard frame rejection.
- In a standard frame, only 11 bits (bit[29:19]) are used for the frame ID; in an extended frame, all bits (except bit 0) are used.
- In the acceptance code, a position 1 indicates that a frame whose corresponding bit is 1 is received; a position 0 indicates that a frame whose corresponding bit is 0 is received.
- In the mask code, the corresponding bit determines whether the corresponding bit of the received code is valid. When a certain bit is set to 1, the matching function of the corresponding bit of the acceptance code is enabled. Receive if the bit in the received data frame matches the bit in the acceptance code. If a certain bit is set to 0, this bit does not participate in matching and all are received. There is a one-to-one correspondence between the acceptance code and the mask code.
- Each CAN channel supports the setting of eight groups of acceptance codes and mask codes.

Filter calculator

For user convenience, the configuration tool comes with a filter calculator. The required acceptance code and mask code can be generated by specifying the frame ID or specific bits in the ID based on the user's needs. Figure 4.16 shows the filter calculator.

Figure 4.16 Filter calculator

The filter calculator provides several common filter modes, which helps users quickly set filter rules. If the several modes provided in the filter calculator cannot meet the user's needs, the user can select the "Custom filter settings" checkbox. The appropriate acceptance code and mask code are generated based on the bit definition information of the acceptance code and the mask code.

Triggering

As shown in Figure 4.17, there are several recording modes provided for the recording mode configuration item.

Figure 4.17 Trigger tab

Storage mode

The device supports two storage modes:

- Circular recording: When the SD card is full, the device will delete the old data and record the latest data cyclically.
- Full stop: When the SD card is full, the device will stop recording. Users need to replace the SD card before recording.

Record mode

The device supports five recording modes:

1) Long-time record

As shown in Figure 4.18, select Long Time Recording. After the device is powered on, it will record related information based on the configuration.

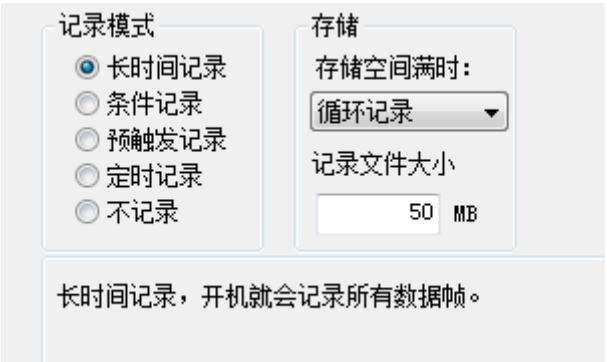


Figure 4.18 Long-time recording

2) Condition record

As shown in Figure 4.19, select the condition record. When the start recording condition occurs, the device starts the recording function (enters the recording state). When the recording stop condition occurs, the device stops recording (enters the recording stop state).

Figure 4.19 Conditional record

3) Pre-trigger recording

As shown in Figure 4.20, pre-trigger recording is selected. When no trigger condition occurs, the device records the number of frames according to the configured pre-trigger, and buffers the corresponding number of latest packets until the trigger condition occurs. Save the pre-cached data and continuously record the packets received in the subsequent period based on the configured time.

Figure 4.20 Pre-trigger recording

4) Scheduled record

As shown in Figure 4.21, select the scheduled record, add several message IDs to the list, and set the recording cycle time. The device only records the messages in the ID list based on the configuration, and only saves the last message received by the ID within the cycle time. If the specified ID message is not received within the period, there are three processing methods:

Not recorded

Record with last received data

Record with custom data

Figure 4.21 Scheduled record

5) Not recorded

As shown in Figure 4.22, if the no recording mode is selected, no data will be recorded during normal operation of the device.

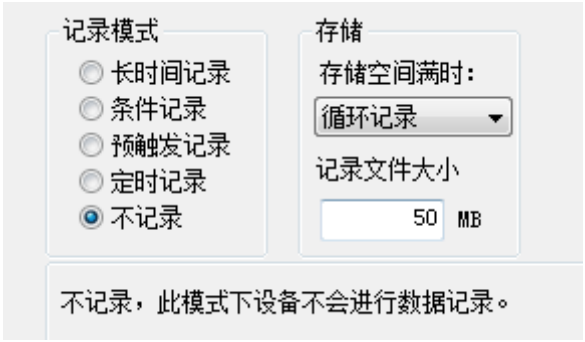


Figure 4.22 No record

Data Converter

The data converter converts the raw data recorded by the device into data in a specific target format, including frame, txt, xls, and etc., so that users can analyze and evaluate the recorded data offline by using CANoe and CANScope.

Note: At present, the device does not support the PC directly connecting the device to read data for conversion. The SD card data can be read for conversion by reading the card. For details about the latest

functions, contact our sales or technical support personnel.

As shown in Figure 4.23 and Figure 4.24, select the original data for data conversion.

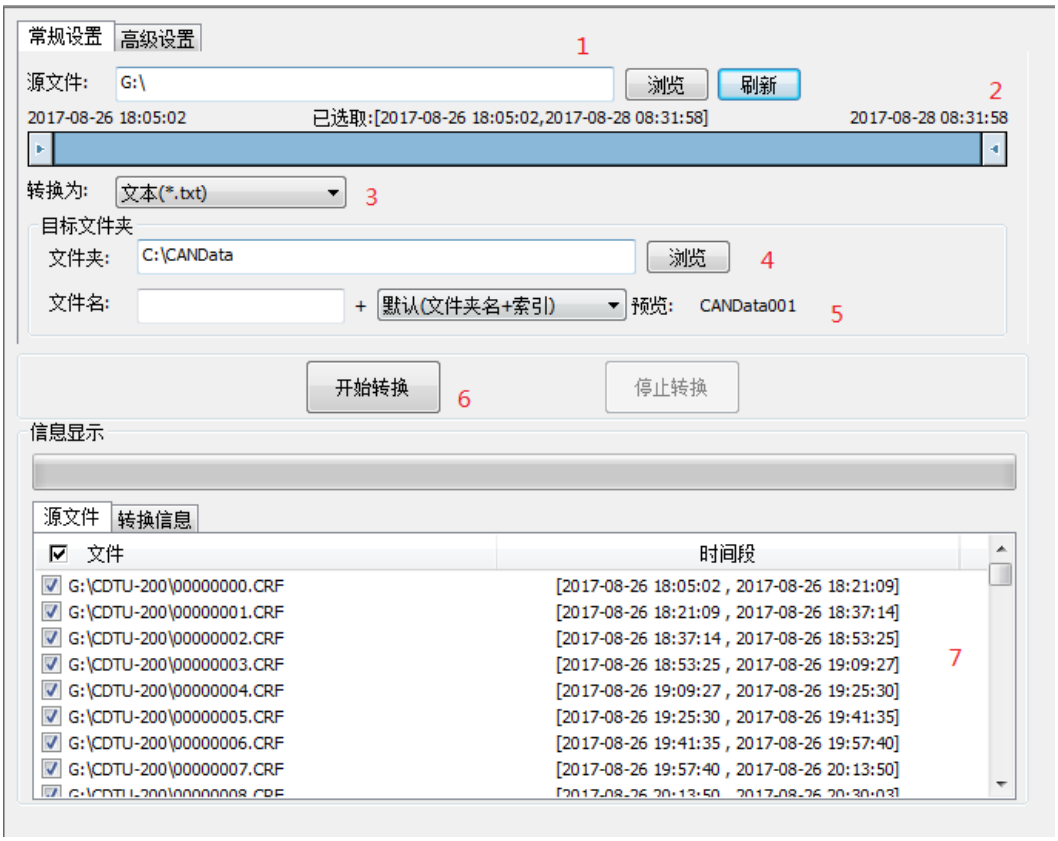


Figure 4.23 Data Converter - General Settings

Select the original data path and click the Refresh button. The information list will list all data files;

By dragging the time bar, select the data of the time range to be converted;

Select the output file format. Currently, the following formats are supported:

- CANScope(*.frame) for parsing in the CANScope software
- CANRec(*.frame) for parsing in the CANRec software
- Timed record (multi-column) (*.csv) can be opened in Excel. The premise for selecting this format is that the source file is recorded by the device working in the timed storage mode.
- Timed record (single column) (*.csv). Similar to multiple columns, it combines data from multiple columns into one column
- 792Text (*.txt), can be opened in Excel or Notepad
- ASCII logging file(*.asc) for opening in the CANoe software
- CANPro(*.can) for opening in the CANPro software
- CSV(*.csv), opened in Excel;

Set the output file storage path

Set output filename rules. A preview of the filename of the current rule is displayed on the right. There are currently the following rules:

- Folder Name + Index: Default. The file name is determined based on the selected target directory. If the directory is Data, the file names are Data1, Data2...
- Index: pure index named filename, such as 1, 2...
- Date and time: Name the file based on the timestamp of the first frame in the file, such as 2015-10-10_09-34-23

Operation button;

- Start conversion
- Stop convertion. The converted data is retained

Information list

- Source file. List all *.CRF files in the selected removable disk
- Conversion information. List reads and writes, error messages, etc.

Figure 4.24 Data Converter - Advanced Settings

Set the size of the output file, which can be set based on the number of frames and the number of bytes;

Time stamp display method

- Relative time
- Absolute time

Table 4.1 lists message error codes

Table 4.1 Error codes

Data area	Error code meanings

DATA0	E1: bus error
	E2: bus warning
	E3: bus negative
	E4: bus off
	E5: bus overload
DATA1	bit7: send buffer error
	bit6: receive buffer error
	bit5: overload error
	bit4: padding error
	bit3: format error
	bit2: CRC error
	bit1: response error
	bit0: bit error

Firmware Upgrade

The device supports online upgrade of device firmware by using the configuration tool. Figure 4.25 shows the Firmware Upgrade tab. Select the device firmware file by clicking "Browse", and click the "Upgrade" button. After the file transfer is complete, the device restarts automatically for firmware upgrade. The upgrade process takes about 3 minutes. After the upgrade is complete, the device starts automatically.

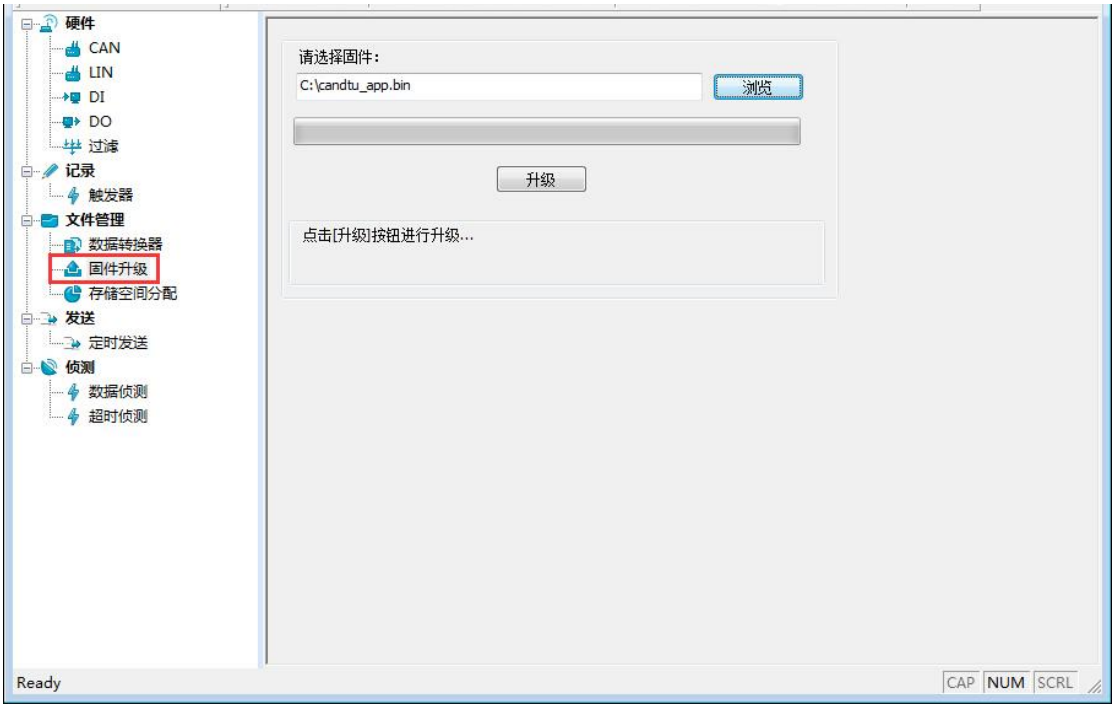


Figure 4.25 Firmware Upgrade tab

Storage Space Allocation

As shown in Figure 4.26, you can freely allocate memory for each active recording channel.

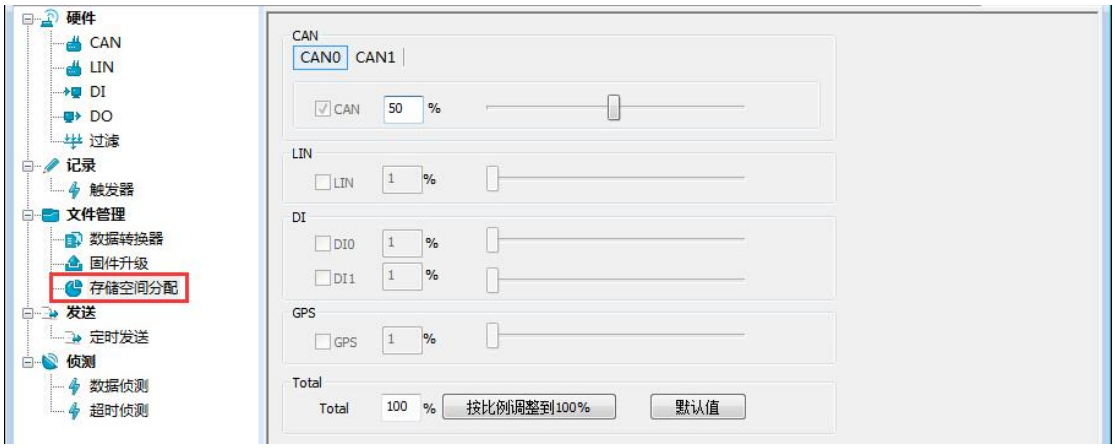


Figure 4.26 Storage space allocation

The storage space of the corresponding channel can be configured on the interface only after the corresponding storage function is enabled.

Scheduled Send

Figure 4.27 shows the Scheduled Send tab. You can configure the scheduled send function, so that device can send setting data to the CAN-Bus bus at regular intervals.

Figure 4.27 Scheduled Send tab

Sending timeout

After the function is enabled, the device will automatically send the data added in the list to the CAN-Bus after startup. When the sending fails, the device will retry sending within the timeout period, until the sending succeeds or times out, and then sends the next frame of data.

Adding data

Figure 4.28 shows the Add Data tab.

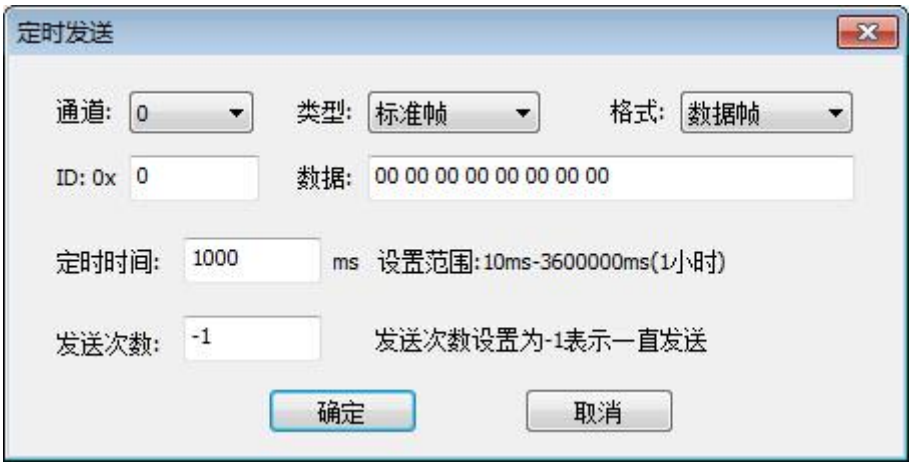


Figure 4.28 Add timed sending data

a) Channel number: Select a channel for data transmission
b) Type: standard frame or extended frame
c) Format: data frame or remote frame
d) Scheduled time: scheduled send interval of the current frame
e) Sending times: sending times of the current frame. After the preset sending times are reached, the current frame will not be sent; -1 means always sending.

Data Detection

The data detection function is to detect whether the specified ID and data appear on the CAN-Bus during the use of the CANDTU device. If there is detected data, the buzzer will sound an alarm, and the indicator of the corresponding channel will flash in red. Figure 4.29 shows the Data Detection tab.

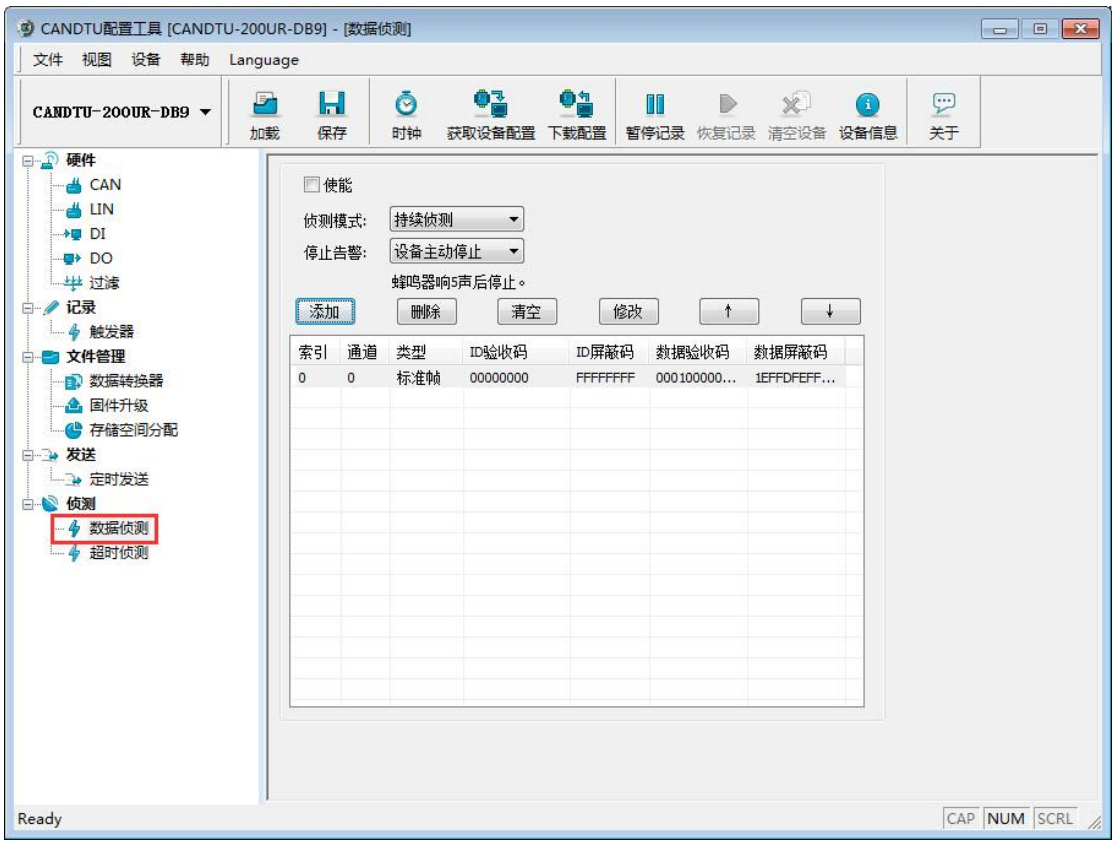


Figure 4.29 Data Detection tab

Detection mode

Single detection: After the specified data is detected, the detection function will stop and no data will be detected;

Continuous detection: After detecting the specified data, the device stops detection and continues the next detection.

Stopping an alarm

DIO trigger stop: In the alarm state, the alarm state is cleared through the device DI input;

Button trigger stop: In the alarm state, press the Trigger button on the device to cancel the alarm state;

The device automatically stops: In the alarm state, the alarm state is automatically cleared after the buzzer sounds 5 times.

Adding data

The detection function can detect specific data bits. In the option of adding data, two small tools, ID editor and data editor, are provided to calculate the acceptance code and mask code. Directly use the ID editor and data editor, without the acceptance code and mask code.

When adding data, select "Type" and "Length", and use the editor on the tab page to edit the data. Figure 4.30 shows the tab.

Figure 4.30 Add Detection Data tab

Figure 4.31 ID editor

In the ID editor (Figure 4.31), if you need to detect the value of the specified bit in the ID, click the corresponding value to change the corresponding bit in the editor to the value to be set. If you do not detect the data value of the specified bit, set the "X" state. Click "OK".

Figure 4.32 Data editor

In the ID editor (Figure 4.32), if you need to detect the value of the specified bit in the data, click the corresponding value to change the corresponding bit in the editor to the value that needs to be set. If you do not detect the data value of the specified bit, set the "X" state. Click "OK".

Timeout Detection

The timeout detection function is to detect whether the specified ID appears on the CAN-Bus during the use of the CANDTU device. If the specified data does not appear in the detection cycle, the buzzer will sound an alarm, and the corresponding channel indicator will flash in red. Figure 4.33 shows the Timeout Detection tab.

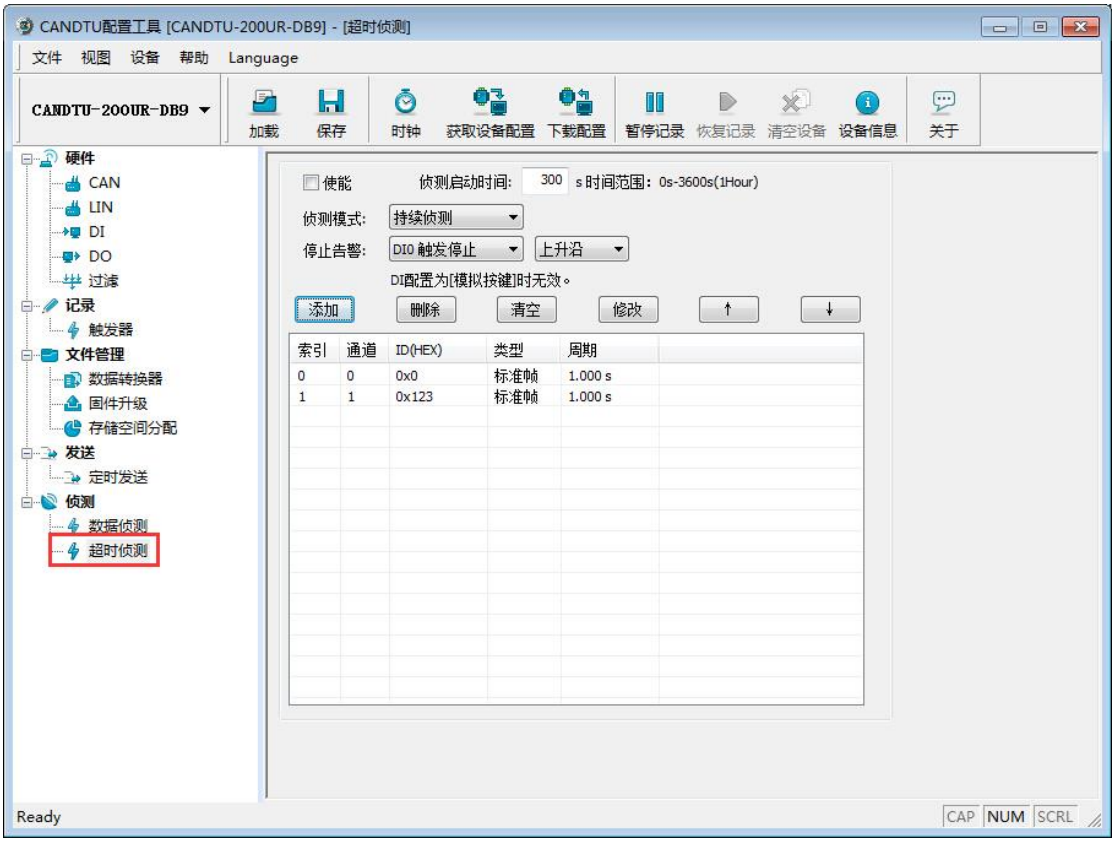


Figure 4.33 Timeout Detection tab

1) Detection startup time: The timeout detection function will be activated only after the preset time has elapsed after the device is started;

2) Detection mode

   Single detection: After the specified data is detected, the detection function will stop and no data will be detected;

   Continuous detection: After detecting the specified data, the device stops detection and continues the next detection.

3) Stop an alarm

   DIO trigger stop: In the alarm state, the alarm state is cleared through the device DI input;

   Button trigger stop: In the alarm state, press the Trigger button on the device to cancel the alarm state;

   The device automatically stops: In the alarm state, the alarm state is automatically cleared after the buzzer sounds 5 times.

4) Adding data

Figure 4.34 Timeout detection data addition

Select the detected channel and frame type, and set the specified ID value and detection period.

Menu Operations

1) File menu

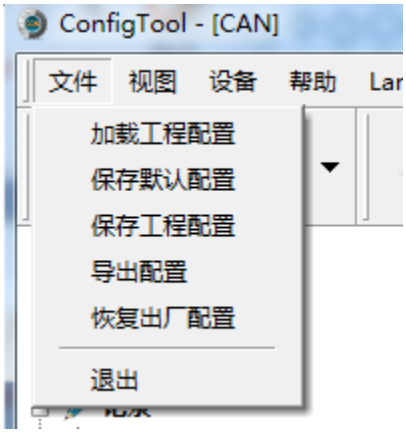


Figure 4.35 File menu

- Load project configuration: Load configuration information from the saved configuration file.
- Save default configuration: Manually save the current configuration in the program installation directory. It is automatically loaded when the program starts and automatically saved when the program stops.
- Save project configuration: Save the current configuration in another copy, so that it can be loaded and used again later.
- Export configuration: Save another copy of the current configuration, so that it can be loaded and used again in the future.
- Restore factory configuration: Restore the current configuration to the default value of the program. If a device is connected to the computer via USB, the device configuration will be restored to the default state.

Note: When restoring the factory configuration, if there is a device connected, restore the device to the default settings at the same time!

2) Device menu

The Device menu provides configuration tools for interacting with the device. The options in this menu can be found in the Shortcut Bar.

Figure 4.36 Device menu

Setting and Obtaining the Device Clock

Click "Set Real-Time Clock" from the device menu (or the corresponding button in the toolbar). The dialog box shown in Figure 4.37 appears.

1) Click "Set Time". The program will set it to the device based on the time combination set in the date and time selection box selected by the calendar on the left.
2) Click "Set device time to current time". The program will set the current system time to the device.
3) Click "Get Device Time". The program will obtain the RTC clock of the device via USB and display it.
4) Select the "Automatically obtain device time" checkbox. The program will periodically obtain the device time and display it.

*If the time setting fails, a failure message will appear. Reconnect the device and try again.

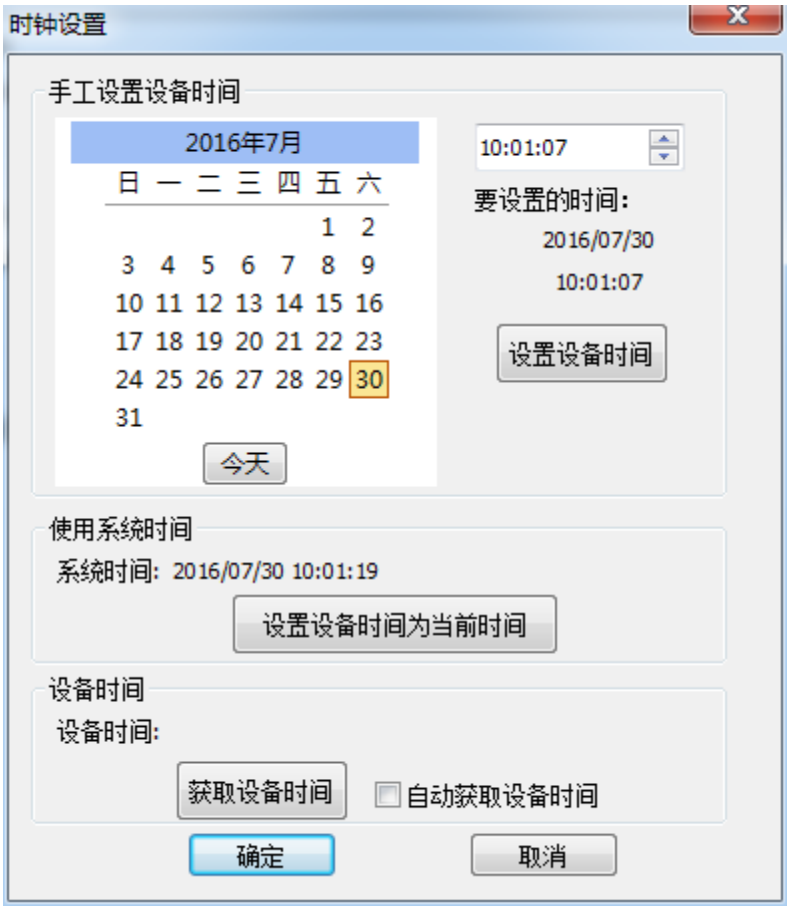


Figure 4.37 Setting the real-time clock

Downloading and Obtaining Device Configurations

Download configurations to the device

After clicking "Download Configuration" from the device menu (or the corresponding button in the toolbar), the program will download the current configuration information on each device page to the device. After the configuration is downloaded successfully, the device will be in the configuration stage for a short time. No other device operations can be performed at this time.

Obtain device configurations

After clicking "Get Device Configuration" (or the corresponding button in the toolbar) from the device menu, the program will obtain the current configuration information of the device and display the information on each configuration page.

Pausing and Resuming Records

When the device is connected to the computer, the program can control whether the current device records data.

Clearing Device Storage

After clicking "Clear Device Storage" from the device menu (or the corresponding button in the toolbar), a dialog box appears, indicating that data is being cleared. When the data is cleared, the dialog will close automatically. This function helps users directly clear the previously recorded data when the device is connected to the computer.

Device Information

Device information is used to display the firmware version, hardware version, serial number, current recording status of the device, SD card status and other device information. Figure 4.38 shows the device information.

Figure 4.38 Device information

5. Quick Instructions

This chapter introduces the basic usage of the device. You will quickly learn about how to use the device and have an intuitive understanding of the device. Before using the device, understand some default parameters and make simple preparations.

Operation Guide

Configuration

Connect the USB. This product uses the CANDTU configuration software to configure the device through the USB interface. Therefore, the USB connection is only required to configure the device. Whether the USB cable is connected at other times has no effect on the product functions.

Install driver. Use the driver in the driver directory of the CANDTU configuration software directory.

To download, click the download configuration button of the CANDTU configuration software. At this time, the SYS indicator of the device will flash in red rapidly at a frequency of 500 ms. At the same time, the buzzer sounds at the same frequency. After the configuration, the device directly enters the recording state.

Note: When you use the device for the first time, synchronize the device clock once by using the CANDTU configuration software.

Records

1) Enter the record. If no fault occurs during power-on, downloading configuration, inserting SD card, clearing data and resuming recording, the device will enter the recording state, and the buzzer beeps 200 ms for two consecutive times.
2) Start recording. When a CAN bus message is received, an error occurs on the bus, or a marked message is generated by pressing the button, the device will record the data, store the message directly to the SD card, and the REC indicator will flash at a frequency of 200 ms.

Upgrade

1. Online upgrade by using the configuration tool;
2. To upgrade the device firmware by using the SD card:

   Firmware file. Save the firmware binary file to the SD card and load the SD card into the device;

   Enter the upgrade status. When the device starts, press and hold the button until the SYS red indicator flashes and you hear the buzzer sound for 3 consecutive times, indicating that the device has entered the upgrade mode. You can release the button at this time.

   The upgrade is complete. If you hear two consecutive buzzer sounds in the recording state, the upgrade is successful. If you hear continuous alarm sounds,

the upgrade fails or the firmware file on the SD card is not found.

Change the Card

Pause recording. The device enters the pause state if you configure the software to pause the recording or hold down the button for more than 3s. The SYS indicator is normal, other indicators stop working, and the CAN interface and SD card enter the stop state.

Pull out the SD card, and remove the SD card in the pause state. The device does not sound an alarm.

Insert the SD card, and reinsert the SD card. The device automatically resumes recording and detects the SD card.

Product Fault Report Form

Customer name:	
Company:	
Tel:	Fax:
Email:	Purchasing date:
Distributor:	
Product name:	S/N:

Symptom: (Describe the fault in detail, and list all error messages in detail)

Product Return Process

1. Provide proof of purchase.
2. Obtain a return authorization from a dealer or branch.
3. Fill in the product fault report form, and state the reasons for the repair and the symptom in detail, so as to minimize the repair time. Carefully package the product and send it to the maintenance department with a fault report form attached.

Disclaimer

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