

# CANDTU-200R-mini

## CAN black box recorder

UM01010101 V1.03 Date: 2020/11/10

Product User Manual

Category	Contents
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Abstract	Product User Guide

### Revision History

Version	Date	Description
V0.90	September 22, 2016	Created
V1.00	August 21, 2017	Updated the product manual template and used the latest version of the host computer screenshot
V1.01	January 21, 2018	Changed the interface to dual DB9
V1.02	March 15, 2019.	Updated the document header and footer and "Sales and Service Network" content, and added the "Disclaimer" content
V1.03	November 10,2020	Modified incorrect description

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## 1. Functions

### 1.1 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.

CANDTU-200R-mini is a storage-type dual-channel CAN bus data recorder. It can run independently from the PC and store CAN message data for a long time, which facilitates analysis and troubleshooting. The protection level of the recorder reaches IP55. When the CANDTU-200R-mini is installed in a harsh environment for a long time, it will enter the low power consumption mode when the specified ID message is monitored. When the CAN bus communicates, it will wake up automatically and start recording again. The recorder can transfer the recorded data to a PC via an EMMC memory card. After format conversion of the raw data, users can analyze and evaluate the recorded data offline by using CANoe and CANScope.

CANDTU-200R-mini complies with USB2.0 high-speed specification protocol for reading the recorded data.

### 1.2 Features

Table 1.1 Product features

Parameter Name	Detailed parameters
CAN channel	Number of channels: one user-configurable CAN channel
	Interface type: two high-speed CANs (ISO11898-1)
	Baud rate: arbitrarily programmable between 40 Kbps and 1 Mbps
	Maximum receive data flow: 5,000 frames/s
	Surge protection: 1 kV (Class B)
PC interface	Hi-speed USB2.0
Message recording and storage	Storage capacity: EMMC memory card of a maximum of 16 GB
	Storage mode: long time recording, condition recording, scheduled recording, pre-trigger recording
	Full mode: cyclic recording, full stop
	Data export: .frame, .csv, .txt, .asc, or .can data for analysis
Real-time clock	Built-in rechargeable RTC battery
Software resources	Supporting configuration tool ConfigTool
Power supply voltage	DC 9 ~ 48V
Power consumption	Power consumption: 0.8 W during recording; 0.3 W in low power mode
Range of temperature	Operating temperature: -25 °C to +85 °C
	Storage temperature: -40 °C to +85 °C
External dimension	Figure 2.1 shows the structure and dimensions

### 1.3 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 exception detection.
- Multi-channel CAN communication records and fault analysis for traditional vehicles and new energy vehicles
- Ship CANFD communication fault detection and troubleshooting
- Elevator operation fault detection and troubleshooting
- Construction machinery operation fault detection and troubleshooting
- Operation detection and troubleshooting of aerospace vehicles and ancillary equipment

## 2. Product Specifications

### 2.1 Electrical Specifications

Table 2.1 Electrical specifications

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	Maximum	
Operating voltage	DC	9	12	48	V
Power consumption	Normal recording mode	0.7	0.8	1.0	W
	Low-power mode	--	0.3	--	W

### 2.2 Operating Temperature

Table 2.2 Operating temperature

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	Maximum	
Operating temperature	EMMC and lithium battery are not contained	-40	-	85	℃
Storage Temperature	EMMC and lithium battery are not contained	-40	-	85	℃

Note: Under extreme ambient temperature conditions, because the crystal oscillator frequency is affected by temperature, an error message will appear on the CAN bus and a record will be generated, which is related to the baud rate. Do not use high baud rate communications in extreme temperature environments.

The operating temperature of the device depends on the lithium battery and EMMC. The specifications are as follows:

Lithium battery specifications: -30 ℃ to +85 ℃ (operating temperature), -40 ℃ to +85 ℃ (storage temperature).

EMMC specifications: -25 ℃ to +85 ℃ (operating temperature), -40 ℃ to +85 ℃ (storage temperature).

### 2.3 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	See the note	Level 3	6	Class A	Contact discharge
CAN bus	See the note	Level 3	6	Class A	Contact discharge
Digital switch input	See the note	Level 3	6	Class A	Contact discharge
USB	See the note	Level 2	4	Class B	Contact 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	See the note	Level 3	2	Class A	Capacitive coupling
CAN bus	See the note	Level 3	2	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	See the note	Level 3	1	Class A	Line-line
	See the note	Level 3	2	Class A	Line-ground
CAN bus	See the note	Level 3	1	Class B	Line-ground

Note: For details, see the attachment *Electromagnetic Compatibility Test Report.pdf*. Unless otherwise specified, this test is carried out under the condition of 12 V power supply and normal data recording.

## 2.4 IP Protection Level

IP protection level: IP55.

Explanation: The first digit 5 indicates the level of protection against dust: it is impossible to completely prevent dust, but the amount of dust will not cause harm to the equipment; the second digit 5 indicates the level of protection against water jets: Water jets: Water jets aimed at the cabinet from every direction should not cause damage.

Note: For details, see the attached *IP Protection Level and Vibration Test Report.pdf*. Unless otherwise specified, this test is carried out under the condition of 12 V power supply and normal data recording.

## 2.5 Mechanical Dimensions

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

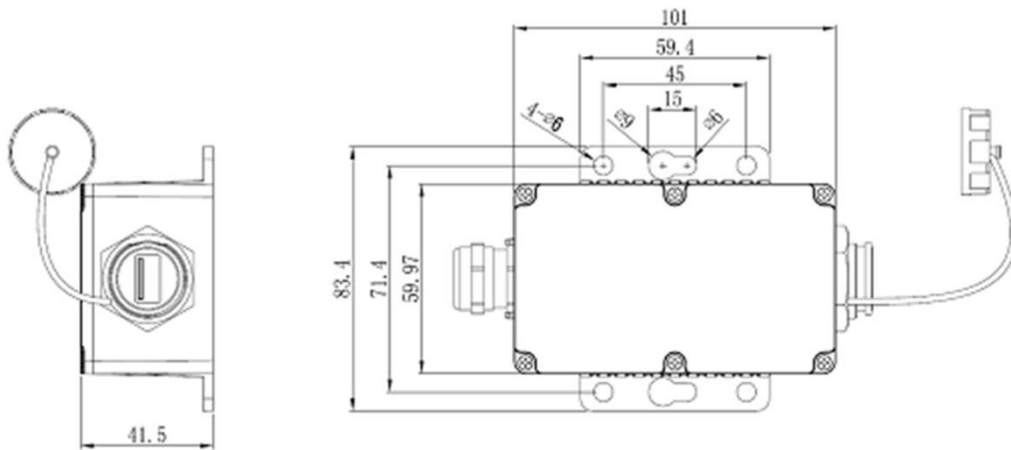


Figure 2.1 Mechanical dimensions

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



## 3. Hardware Interfaces

This section describes the hardware interface information of CANDTU-200R-mini series devices.

### 3.1 Panel Layout

Figure 3.1 shows the device panel layout.

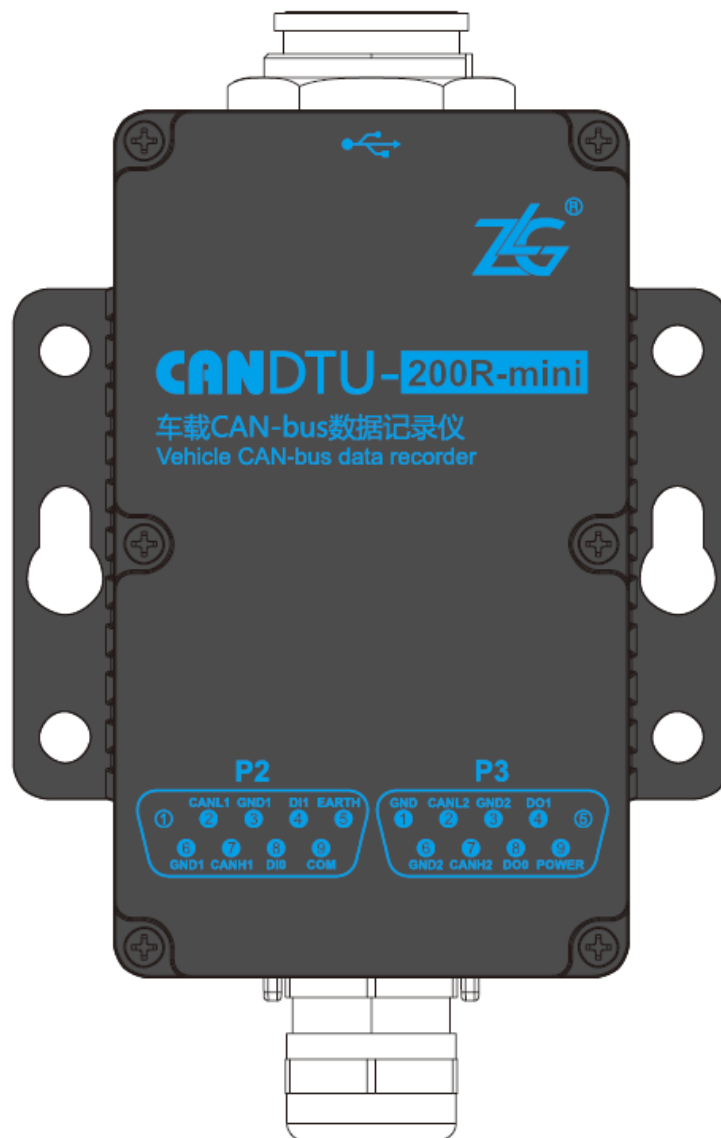


Figure 3.1 Panel layout

## 3.2 Interface Description

### 3.2.1 Power Interface

The rated input voltage is 9-48 V DC. The shell is identified as "POWER". The physical form of the interface is a DB9 terminal. Table 3.1, Table 3.2 and Table 3.3 list the interface diagram,

signal definition, and interface specifications.

Table 3.1 Power interface

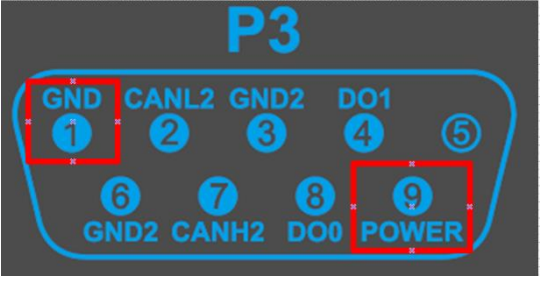
Type	Schematic Diagram
DB9 terminal	

Table 3.2 DB9 signal definition

Function Interface	Signal Definition	Signal Description	Interface Type
			DB9 Interface
Power supply	POWER	positive electrode of power	√
	GND	negative electrode of power	√

Table 3.3 Power interface specifications

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	Maximum	
Operating voltage	DC	9	12	48	V
Power consumption	V <sub>in</sub> =12V	--	0.8	1.0	W
Current	V <sub>in</sub> =12V	40	67	85	mA
Maximum withstand ripple voltage	V <sub>in</sub> =12V	--	--	500	mV

### 3.2.2 CAN-Bus Interface

The device provides dual non-isolated CAN-Bus interfaces. The shell is identified as "CANH", "CANL". The physical form of the interface is a DB9 terminal. Table 3.4 and Table 3.5 list the interface diagram, signal definition, and interface specifications.

Table 3.4 CAN interface

Type	Schematic Diagram
DB9 terminal	

Table 3.5 CAN-Bus interface specifications

Parameter		Minimum	Typical Value	Maximum	Unit
Communication baud rate	--	40k	--	1M	bit/s
Number of nodes	--	--	--	110	pcs
Dominant level (logic 0)	CANH	2.75	3.5	4.5	V
	CANL	0.5	1.5	2.25	
Recessive level (logic 1)	CANH	2	2.5	3	
	CANL	2	2.5	3	
Differential level	Dominant (logic 0)	1.5	--	3	
	Recessive (logic 1)	-0.05	--	0.05	

Continuous maximum withstand voltage of the bus pin	--	-58	--	58	
Instantaneous voltage of the bus	--	-150	--	+100	

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 3.2 shows the high-speed CAN network topology. The device has a built-in 120-ohm terminal resistance, which can be configured to be connected or disconnected by using the configuration tool CANDTU. For the operation method, see 4.2.1.

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.

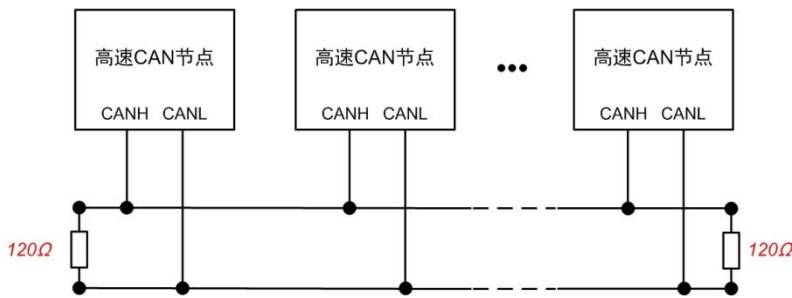


Figure 3.2 Typical high-speed CAN connection

### 3.2.3 Switching Value Input Interface

The device provides two isolated switch inputs for firmware upgrade and user-defined DI input. When the product cannot be upgraded by using the host computer, the upgrade pin can be used for upgrade, as shown in Figure 3.3. The shell identification is "DI1" "COM". The other "DI0" is user-defined. The physical form of the interface is a DB9 terminal. Table 3.6, Table 3.7, and Table 3.8 list the interface diagram, signal definition, and interface specifications.

Table 3.6 DI interface

Type	Schematic Diagram
------	-------------------

DB9 terminal	
--------------	--

Table 3.7 DB9 signal definition

Function Interface	Signal Definition	Signal Description	Interface Type
			DB9 Interface
DI0	DI1	Digital input channel 0 positive	√
	COM	Digital input channel 0 negative	√
DI1	DI1	Digital input channel 0 positive	√
	COM	Digital input channel 0 negative	√

Table 3.8 DI interface specifications

Parameter	Conditions	Minimum	Typical Value	Maximum	Unit
Logic 0 signal	DC	0		3	V
Logic 1 signal	DC	5	12	24	V
Isolation voltage	Valid value		3750		V

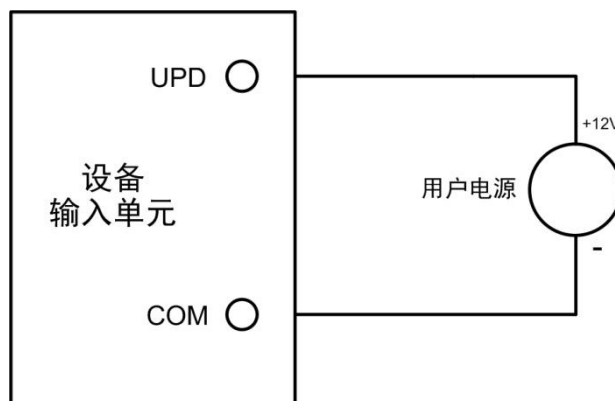


Figure 3.3 DI network connection

### 3.3 Switch Output Interface

The device provides two digital outputs. The shell is marked as "DO0(1)". The physical form of the interface is a DB9 terminal. Table 3.9 and Table 3.10 list the interface schematic diagram, signal definition, and interface specifications.

Table 3.9 DO interface

Type	Schematic Diagram
DB9 terminal	

Table 3.10 OPEN and DB9 signal definition

Function Interface	Signal Definition	Signal Description	Interface Type	
			OPEN Interface	DB9 Interface
DO	DO0	Digital output channel 0 positive	/	√
	DO1	Digital output channel 1 positive	/	√

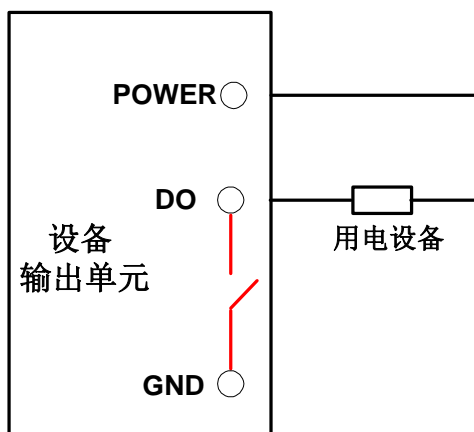


Figure 3.4 DO network connection

The switch output interface is an open-drain output type, with an open-drain contact inside. Since it is a wet contact output, the user needs an external power supply to supply power to the alarm device (such as a buzzer). Figure 3.4 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 open-drain can be configured to be normally open or normally closed based on user needs.

### 3.4 USB Interface

The device provides one USB interface. The device can communicate with the PC by using the delivered USB cable (A port-A port) (**this product is only used as DEVICE**). The interface conforms to the high-speed USB2.0 protocol specification and can communicate with PCs compliant with USB1.1 and USB2.0 standards. See Figure 3.5. When the USB interface is not

applicable, tighten it to ensure the IP protection performance (Note: The USB interface is not waterproof through the locking cover. The inside of the interface is in the form of glue. Even if the interface is partially water stained, it does not mean that water has entered the product. Just wipe it dry).



Figure 3.5 USB interface

### 3.5 EMMC Card

The device provides one EMMC card, which can support a maximum of 16 GB EMMC memory card for storing CAN bus message data. The interface is the onboard type and is directly soldered on the motherboard. Data is read via the USB interface.

## 4. Configuration Tool Installation and Introduction

### 4.1 Software Installation

- 1) Double-click the software installation package to install the software. The dialog box shown in Figure 4.1 is displayed (Note: The software version number on the official website or the one provided by the sales staff shall prevail. Here, V1.808 is used as an example).



Figure 4.1 Installation wizard

- 2) Click "Next". The Select Installation Location dialog box is displayed, as shown in Figure 4.2.

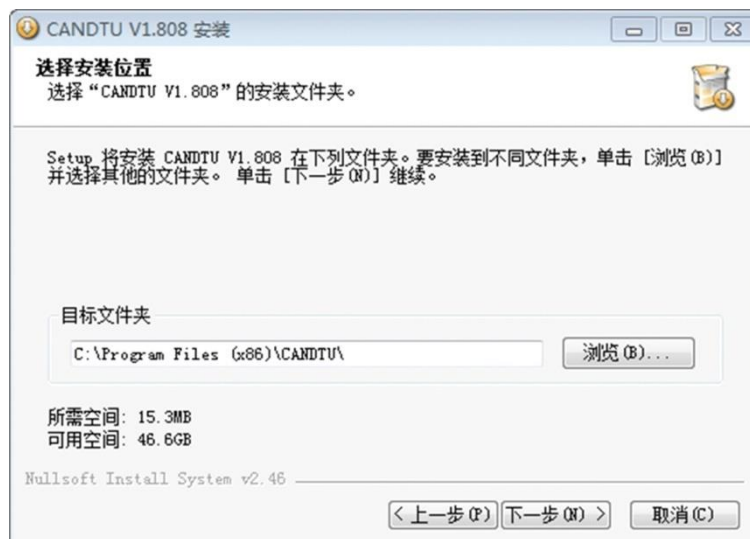


Figure 4.2 Select an installation path

- 3) Click "Next". The dialog box shown in Figure 43 is displayed.





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 is displayed.



Figure 4.5 Installation complete

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

## 4.2 Function Description

### 4.2.1 CAN Configuration



Figure 4.6 CAN Configuration Tab

The CAN Configuration tab contains the following parameters:

1. Channel selection
  - Selected: Enable the corresponding CAN channel
  - Unselected: Disable the corresponding CAN channel
2. Communication mode
  - Normal mode
  - Listen only mode
3. Communication baud rate
  - Provide the common CAN communication baud rate
4. Use a built-in 120-ohm resistor
  - Selected: Connect the terminal resistor of the built-in 120-ohm resistor of the corresponding CAN channel
  - Unchecked: Disconnect the terminal resistor of the built-in 120-ohm resistor of the corresponding CAN channel
5. 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.

#### 6. Baud rate calculator

As shown in Figure 4.7, 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  $TSEG2 \geq SJW$ . Click the Calculate button to calculate the data combination for the baud rate. Select from the list the numerical combination that matches the desired sampling point. Press the OK button or double-click the row to complete the custom baud rate setting.



Figure 4.7 Baud rate calculator

7. Record error frames
  - Selected: Record CAN error frames
  - Deselected: Do not record CAN error frames
8. Enable low power mode
  - Selected: Enter low power mode based on the specified ID
  - Deselected: Do not enable low power mode

### 4.2.2 Filtration



Figure 4.8 Filter Settings tab

The configuration tool supports a maximum of 128 sets of filtering rules. It supports filtering configuration based on the ID. The Filter tab contains the following parameters:

- Start and end frame IDs
- Mode selection: standard frame single ID, standard frame group ID, extended frame single ID, extended frame group ID

### 4.2.3 Trigger



Figure 4.9 Triggers tab

1. The EMMC memory full processing mode supports two modes: "Circular Recording" and "Full Stopping", as shown in Figure 4.10.



Figure 4.10 Recording mode

- Circular recording: In this mode, when the EMMC record is full, the device deletes the old data and records the latest data cyclically.

- Full stop: In this mode, when the EMMC record is full, the device stops recording.

2. The configuration tool supports five recording modes

- Long-time record

In this mode, the configuration information is recorded after the device is powered on. Figure 4.11 shows the configuration interface.



Figure 4.11 Long time recording

- Condition record

In this mode, conditional recording is divided into the start recording trigger and stop recording trigger. Two conditions can be configured separately. Start recording data when the conditions set by the trigger to start recording are met. Recording will stop when the conditions set

by the trigger to stop recording are met. Figure 4.12 shows the configuration interface.



Figure 4.12 Condition record

The trigger conditions can be configured for both the start recording trigger and the stop recording trigger. Figure 4.13 shows the condition recording ID configuration dialog box.



Figure 4.13 Conditional record ID configuration options

### 3. Pre-trigger recording

In this mode, the device will cache a certain amount of data frames. When the conditions set by the pre-trigger are met, the cached data will be written to the EMMC and the frames within a period of time after the triggering will be recorded. The amount of data recorded before and after the trigger is set by the pre-trigger record item and the post-trigger record item. Figure 4.14 shows the configuration interface.

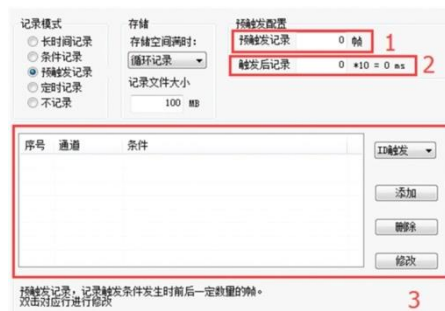


Figure 4.14 Pre-trigger record

Each functional area is described below, and the numbers correspond to the numbers in the figure:

- 1) Pre-trigger record: Set the number of frames recorded before triggering.
- 2) Post-trigger record: Set the recording time after trigger.
- 3) Add trigger conditions.

- ID trigger: Set the conditions for ID trigger, as shown in Figure 4.15. When the preset pre-trigger ID conditions are met, the device can record data

- Error frame trigger: Select Error Frame Trigger, specify the channel to trigger recording, and click Add



Figure 4.15 Pre-trigger ID configuration

Note: In pre-trigger mode, pre-trigger records and post-trigger records should not be set too small, such as 0 or 1. Recommended: pre-trigger records > 20; post-trigger records > 100

#### 4. Scheduled record

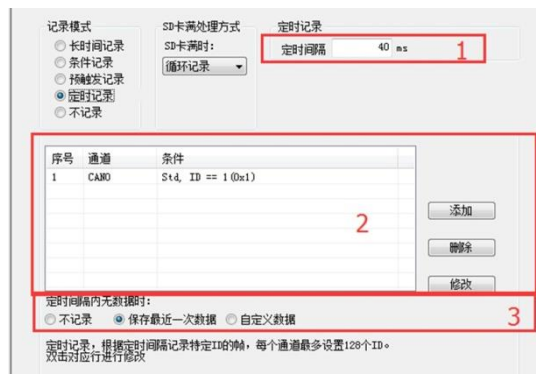


Figure 4.16 Scheduled record

In this mode, the device records the configured ID, and the timing interval unit is 10 ms. The configured ID is recorded at the specified time interval. There are three processing methods according to the user's configuration in the case of timed recording when the timed interval expires and no data is received. Figure 4.16 shows the configuration interface. Each functional area is described below. The numbers correspond to the numbers in the figure.

- 1) Timing interval: During the preset time interval, record the frames of a specific ID. Using 40ms as an example, it means that data is recorded every 40 ms.
- 2) Add frame recording conditions: Click the "Add" button. The scheduled record ID configuration dialog box appears, as shown in Figure 4.17.



Figure 4.17 Scheduled record ID configuration

- 3) When there is no data in the timing interval
  - Not recorded
  - Record with last received data
  - Record with custom data
5. Not recorded

In this mode, data will not be recorded during normal device operation .

### 4.2.4 Menu Operations

1. File menu

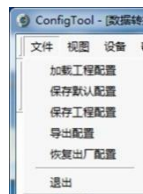


Figure 4.18 File menu

- 1) Load project configuration: Load configuration information from the saved configuration file.
- 2) 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.
- 3) Save project configuration: Save the current configuration in another copy, so that it can be loaded and used again later.
- 4) Export configuration: Save another copy of the current configuration, so that it can be loaded and used again in the future.

- 5) 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.

### 2. Device menu

The device menu provides configuration tools for interacting with the device. The options in this menu are available in the Shortcut Toolbar, as shown in Figure 4.19.

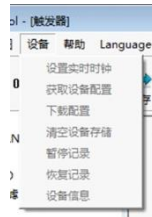


Figure 4.19 Device menu

### 4.2.5 Setting and Obtaining the Device Clock

1. Click "Set Real-Time Clock" in the device menu (or the corresponding button in the toolbar). The dialog shown in Figure 4.20 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.
2. If the time setting fails, a failure message appears. Reconnect the device and try again.





Figure 4.20 Setting real-time clock

#### 4.2.6 Downloading and Obtaining Device Configurations

1. 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.

2. 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.

#### 4.2.7 Clearing Device Storage

The emptying is the same as the emptying of an ordinary USB flash drive. You only need to format the device after connecting the USB interface and seeing the mass storage device on the computer.

#### 4.2.8 Device Information

Device information displays the device's firmware version, hardware version, serial number, current record status, and EMMC status.

#### 4.2.9 Data Converter

The data converter converts the raw data recorded by the device into data in a specific target format (shown in 3), so that users can analyze and evaluate the recorded data offline by using CANoe and CANScope. Figure 4.21 shows the operation interface.

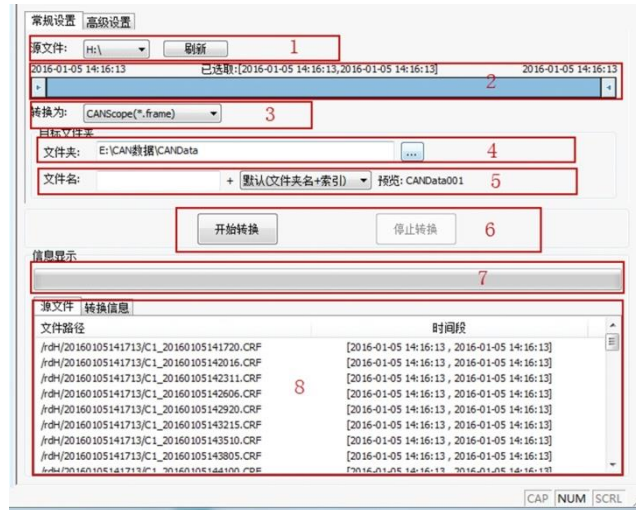


Figure 4.21 Data Converter - General Settings

Each functional area is described below, and the numbers correspond to the numbers in the figure:

1. Displays removable disk information. Click Refresh to update the mobile disk information;
2. The time range of the source file data is displayed. Drag to select a time range;
3. Select a target format. Currently, the following formats are available:
  - CANScope(\*.frame): used for parsing in the CANScope software
  - CANRec(\*.frame): used for parsing in the CANRec software
  - Scheduled record (multi-column) (\*.csv): It can be opened in Excel. The premise for selecting this format must be that the source file is recorded by the device working in scheduled storage mode.
    - Scheduled record (single column) (\*.csv): similar to multiple columns, integrates data from multiple columns into one column
    - MS Excel (\*.txt): can be opened in Excel or Notepad
    - ASCII logging file (\*.asc): used to open in the CANoe software
4. Select a directory for storing the target file;
5. Sets the file name rules for the target file. A preview of the file name of the current rule is displayed below. Currently, the following rules are available;
  - 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
6. Operation button;
  - Start conversion

- Stop conversion. The converted data is retained
7. Progress Bar: shows the conversion progress
  8. Information list
    - Source files: List all \*.CRF files in the selected removable disk
    - Conversion information: lists read and write conditions, error messages, etc.



Figure 4.22 Data Converter - Advanced Settings

9. Set the size of a single object file based on the number of frames and bytes;
10. Time stamp display method
  - Relative time
  - Absolute time

## 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.

### 5.1 Reading Data

- 1) Connect the USB cable to the PC.
- 2) The computer prompts for a mass storage device (14.5 GB), which contains data storage information.
- 3) Run the installed CANDTU configuration tool. For the installation method, see section 4.1.
- 4) Select the "Data Converter" interface, select a removable disk for the source file (if it does not appear, click the refresh button until it appears), select the required conversion time period (to improve the conversion speed, you are advised to select a shorter time period during debugging). Select the .txt conversion format, select a save path, and select all source files, as shown in Figure 5.1.

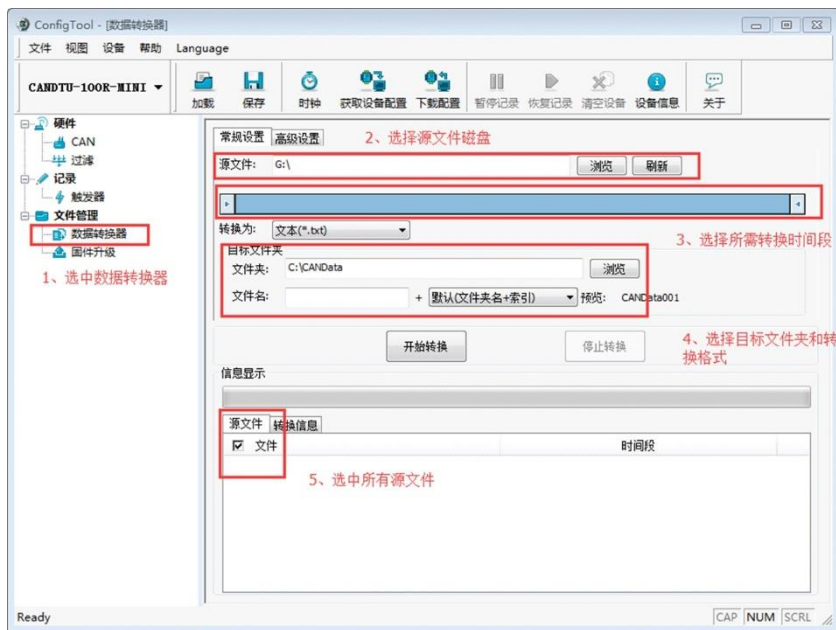


Figure 5.1 General settings on the data conversion interface

- 5) Click the Advanced Settings button. Select "1000000" as the maximum size of the generated file, and "Relative Time" as the timestamp, as shown in Figure 5.2.



Figure 5.2 Advanced settings on the Data Conversion Interface

- 6) After the settings, click the Start Conversion button to convert the data. A message appears when the conversion is complete, as shown in Figure 5.3

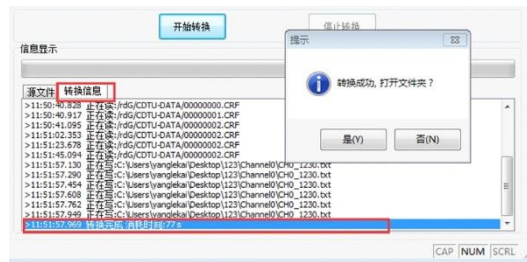


Figure 5.3 Start Conversion interface

- 7) After you open the folder, the corresponding .txt file is displayed. If you open the file directly, the corresponding data appears. (You are advised to open the .txt file in Excel, which is faster and displays the row information)
- 8) Disconnect the USB connection, and power on the device again. The device directly enters the recording state.

## 5.2 Records

- 1) Ensure that the USB is not connected to the PC.
- 2) Enter the record status. The device enters the record state when events such as power-on, configuration download, data clearing, and record resumption occur without errors.
- 3) Start recording. When a CAN bus message is received and an error occurs on the bus, the device records the data and stores the message on the EMMC card.

## 5.3 Upgrade

This product upgrades the device firmware by multiplexing the USB interface. There are two upgrade solutions:

1. The firmware is upgraded by using the host computer. The operation procedure is as follows:
  - 1) Connect the USB to the PC.
  - 2) Select the upgrade button of the host computer software, as shown in Figure 5.4. Send the firmware on the PC to the product.



Figure 5.4 Firmware upgrade

- 3) The upgrade is complete.
2. Upgrade the firmware directly by using the USB flash drive. In this mode, the operation sequence is critical. Perform the following steps:
  - 1) Make sure the product is not connected to the power port and USB port.
  - 2) Connect the 12 V power supply to the COM and DI1 ports (COM is connected to the negative terminal, while DI1 is connected to 12V).
  - 3) Power on the product (without connecting to the USB port).
  - 4) Connect to the USB port. A drive letter appears on the computer, as shown in Figure 55. If no drive letter appears, repeat steps 1)-3).



Figure 5.5 Upgrade the disk

- 5) Click to enter this drive letter and delete the old firmware "CANDTU-200R-mini-V0\_11.bin" (be sure to delete the old firmware before proceeding to 6). The old firmware cannot be directly overwritten.)
- 6) Copy the new firmware to the disk as shown in Figure 5.5, and power on the device again.

### 6. Appendix

Figure 6.1 and Table 6.1 show the electrical interface installation specification and device interface definition.

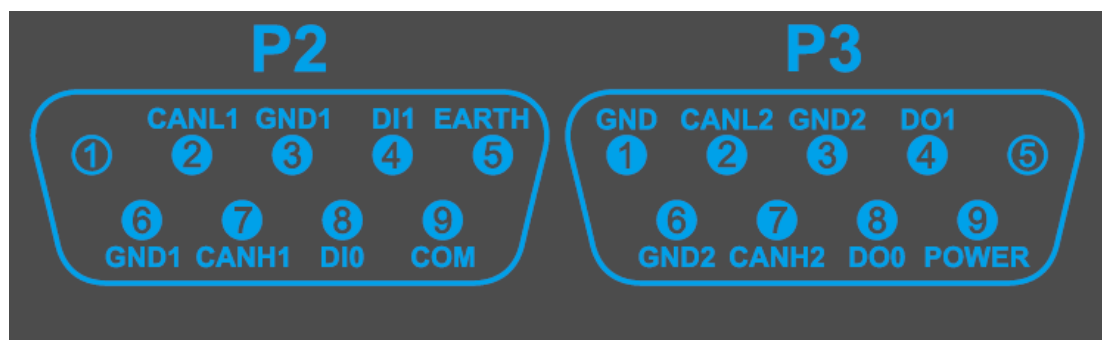


Figure 6.1 DB9 interface

Table 6.1 Terminal definition

DB9 name	Interface wire sequence	Signal definition	Signal description	Signal direction	Remarks
P2	1	NC	Not connected	--	--
	2	CANL1	CAN1 data transceiver differential inversion signal	--	--
	3	GND1	CAN1 ground	--	--
	4	DI1	Optocoupler isolated input 1	--	--
	5	EARTH	Ground	--	--
	6	GND1	CAN1 ground	--	--
	7	CANH1	CAN1 data transceiver differential positive phase signal	--	--
	8	DI0	Optocoupler isolation input 0	--	--
	9	COM	Optocoupler isolation input public terminal	--	--
P3	1	GND	negative electrode of power	--	--
	2	CANL2	CAN2 data transceiver differential inversion signal	--	--
	3	GND2	CAN2 ground	--	--
	4	DO1	Open-drain output 1	--	--
	5	NC	Dangling	--	--
	6	GND2	CAN2 ground		
	7	CANH2	CAN2 data transceiver		

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			differential positive phase signal		
	8	DO0	Open-drain output 0		
	9	POWER	positive electrode of power		





## 8. 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 maintenance department with a fault report form attached.

### 9. Product Packing List

Table 9.1 CANDTU-200R-mini Packing List V1.00

No.	Name	Quantity	Unit	Remarks
1	CANDTU-200R-mini device	1	Piece	
2	USB communication cable	1	Piece	
3	Product CD-ROM	1	Piece	
4	After-sales Service Guide	1	Current	
5	Certificate of Conformity	1	Piece	

### 10. Disclaimer

Based on the principle of providing better service for users, Guangzhou ZLG Electronics Co., Ltd. ("ZLG Electronics") will try to present detailed and accurate product information in this manual. However, due to the effectiveness of this manual within a particular period of time, ZLG Electronics does not guarantee the applicability of this document at any time. ZLG Electronics shall reserve the right to update this manual without prior notice. To get the latest version, please visit the official website of ZLG Electronics regularly or contact ZLG Electronics. Thank you!

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