CANDTU-200UWGR

CAN Bus Message Records and Wireless Data Transmission Equipment

UM01010101   V1.03   Date: 2019/03/15   **Product User Manual**

Category	Contents
Keywords	CAN-Bus message recording and storage
Description	Product User Guide

Revision History

Version	Date	Description
V0.90	September 18, 2017	Created
V1.01	October 10, 2017	Added the network data frame format
V1.02	February 8, 2018	Modified the firmware upgrade operation, and added the description of the online upgrade function
V1.03	March 15, 2019.	Updated the document header and footer and "Sales and Service Network" content, and added the "Disclaimer" content

Contents

1. Product Introduction

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.

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 4G 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-200UWGR 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.

CANDTU-200UWGR also supports 4G communication, which can upload the data on the CAN bus to the specified server. Support GPS/Beidou positioning and record the device localization real time.

The CANDTU-200UWGR is also a CAN-Bus bus communication device that complies with USB2.0 high-speed specification protocol and integrates two CAN interfaces. The PC can be connected to the CAN-Bus network through the USB bus of the device to realize the data mutual transmission between the PC and the CAN-Bus network.

1.2 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 5Kbps and 1Mbps
	Maximum received data flow: greater than 7,000 frames/s
	Surge protection: 2 kV (Class B)
	Electromagnetic isolation: 3.5 kV
LIN channel	One independent LIN channel
PC interface	Hi-speed USB2.0
Wireless 4G transmission	Support Unicom, Telecom, Mobile 4G
GPS/Beidou Positioning	The GPS/Beidou function can be enabled using the configuration software, and the positioning information can be sent to the host computer wirelessly
	Positioning accuracy: 2.5 m
Recording, storage	Storage capacity: SD memory card of a maximum of 256 GB
	Storage mode: all storage, timing storage
	Full mode: rolling record, full stop
	Trigger mode: conditional trigger, external trigger
	Find and location: Manual time stamping
	Data export: ASC or CCP data for CANoe, CANScope analysis
Digital output	One digital output
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	DC 7.5~48V
Power consumption	2.568W
Range of temperature	Operating temperature: -40℃ to +85℃ (without an SD card)
	Storage temperature: -40℃ to +85℃ (without an SD card)
External dimension	155.5mm×85.3mm×27mm

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 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
- Operation detection and troubleshooting of aerospace vehicles and ancillary equipment

2. Product Specifications

2.1   Electrical Parameters

Table 2.1 Electrical parameters

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical Value	Maximum	
Operating voltage	DC	7.5		48	V
Power consumption				2.568	W

2.2   Operating Temperature

Table 2.2 Operating temperature

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

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).

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		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	8	Class A	Contact discharge
USB		Level 4	8	Class A	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		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.

2.4 Mechanical Dimensions

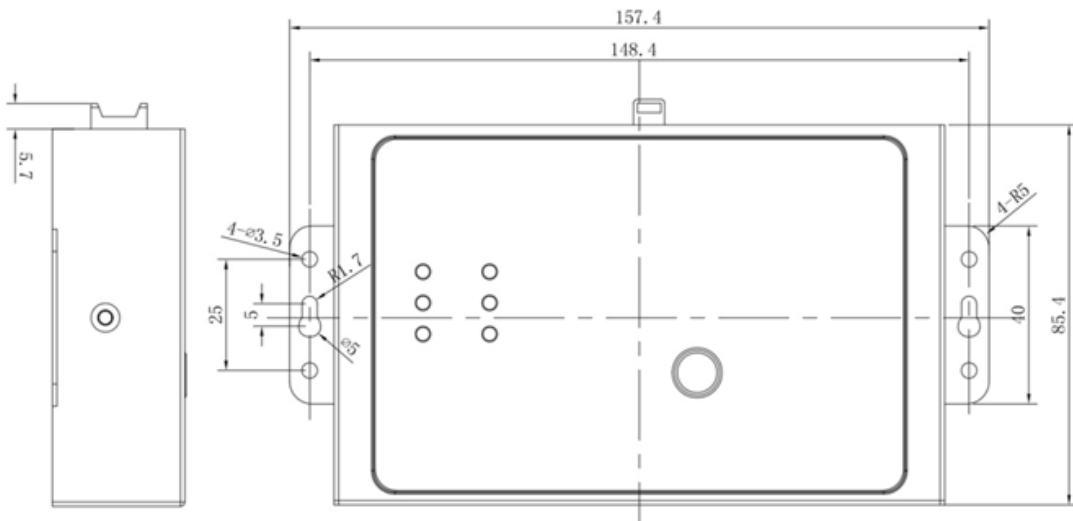Figure 2.1 shows the mechanical dimensions (unit: mm).

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.

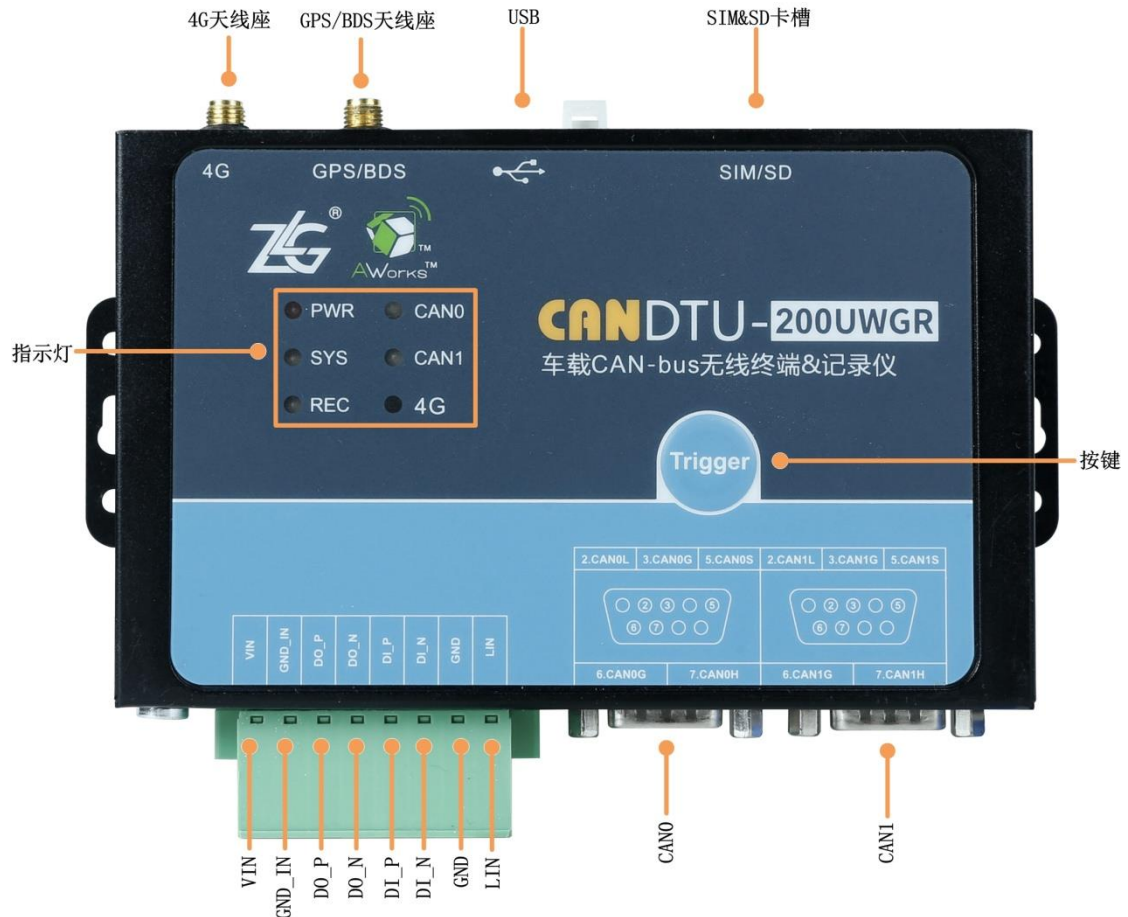### 3.1 Interface Layout

Figure 3.1 shows the device panel layout.

Figure 3.1 Panel layout

3.2 Indicators

错误!未找到引用源。 describes the indicator status.

Table 3.1 Indicator status

Indicator	STATUS	State description
Power supply	Always red	The power supply is normal
CAN0/1	Green normally on	Channel enabled
	Green flashing	Channel data receive and send
	Flash in red	Channel data error
	Turn off	Channel closed

SYS	Green flashing	The system is normal
	Flash in red	System error
REC	Green normally on	The SD card is normal
	Green flashing	The SD card has data written
	Flash in red	The SD card has data written, and the channel storage space is insufficient
	Turn off	The SD card is not detected
4G	Flash quickly (100 ms on/800 ms off)	Search the network
	Slow flash (100 ms on/3000 ms off)	Registered Successfully
	Fast flash (100 ms on/300 ms off)	Data transmission
	Closed	No SIM card or registration failed

3.3　DB9 Interface, Flange Terminal Interface

3.3.1　Power INTERFACE

The rated voltage of the power input of the device is 7.5-48 V DC . Table 3.2, Table 3.3, and Table 3.4 list the interface schematic diagram, signal definition, and interface specifications.

Table 3.2 Power interface

Type	Schematic Diagram
Flange terminal	

Table 3.3 Flange terminal signal definition

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

Table 3.4 Power interface specifications

Parameter Name	Conditions	Rating			Unit
		Minimum	Typical value	Maximum	
Working voltage	DC	7.5		48	V
Power consumption				2.568	W

3.3.2　Switch Output Interface

The device provides one channel digital output. The physical form of the interface is a flange terminal. Table 3.5, Table 3.6, and Table 3.7 list the interface diagrams, signal definitions, and interface specifications.
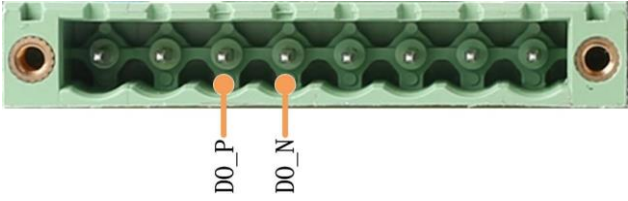
Table 3.5 DO interface

Type	Schematic Diagram
Flange terminal	

Table 3.6 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 3.7 DO interface specifications

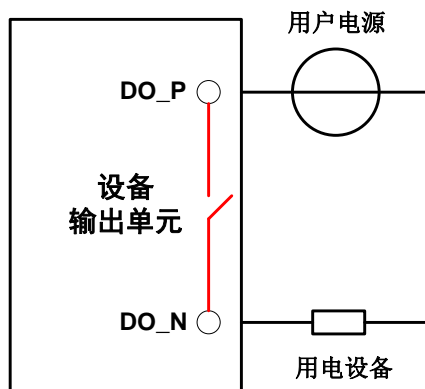| parameter	Conditions	Minimum	Typical value	Maximum	Unit
Contact load	DC 3A, resistive			30	V
Contact load	AC 3A, resistive			250	V
Contact Resistance	DC 1A, 24V		0.1		Ω
Isolation voltage	Valid value		4000		V

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.

3.3.3 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.
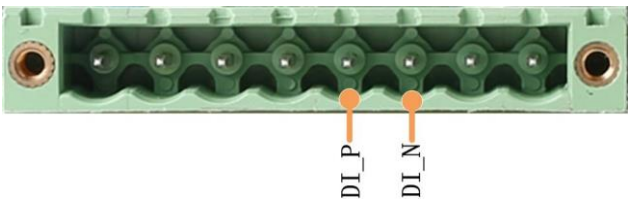
Table 3.8 DI interface

Type	Schematic Diagram
Flange terminal	DI_P DI_N

Table 3.9 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 3.10 DI interface specifications

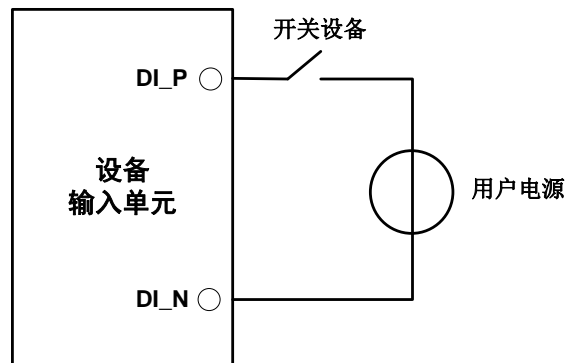| parameter	Conditions	Minimum	Typical value	Maximum	Unit
Logic 0 signal	DC	0		3	V
Logic 1 signal	DC	5		24	V
Isolation voltage	Valid value		3750		V

Figure 3.3 DI network connection

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

1) The timing recording 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.

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

3.3.4 CAN-bus Interface

The device provides two isolated CAN-Bus interfaces. The physical form of the interface is a DB9 terminal. Table 3.11, Table 3.12, and Table 3.13 list the interface schematic diagram, signal definition, and interface specification.

Table 3.11 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 3.12 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 3.13 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
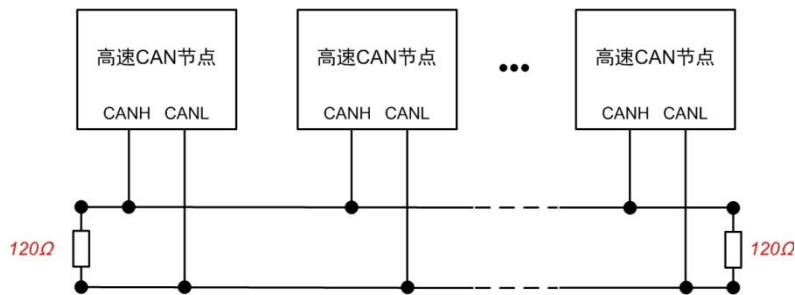
Figure 3. 4 High-speed CAN typical network connection

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 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.

3.3.5   LIN-Bus Interface

The device provides one independent LIN-Bus interface. 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,

See Table 3.14, Table 3.15, and Table 3.16.
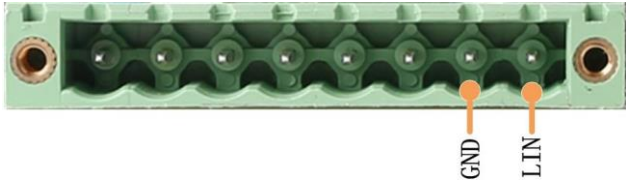
Table 3.14 LIN interface

Type	Schematic Diagram
OPEN terminal	

Table 3.15 OPEN, 5557 signal definition

Function interface	Signal definition	Signal description
LIN	LIN	LIN bus signal
	GND	Digital ground

Table 3.16 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

3.4 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.

3.5 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.. For details about how to pause the recording, see 4.2.22.

3.6 SIM Card Interface

The device provides one SIM card interface, which supports 4G communication

services of China Unicom, China Telecom and China Mobile. Put the SIM card into the SIM card tray and push it into the SIM card slot; when pulling it out, push the yellow dot next to it to take out the SIM tray.

4. Configuration Tool Installation and Introduction

4.1   Software Installation

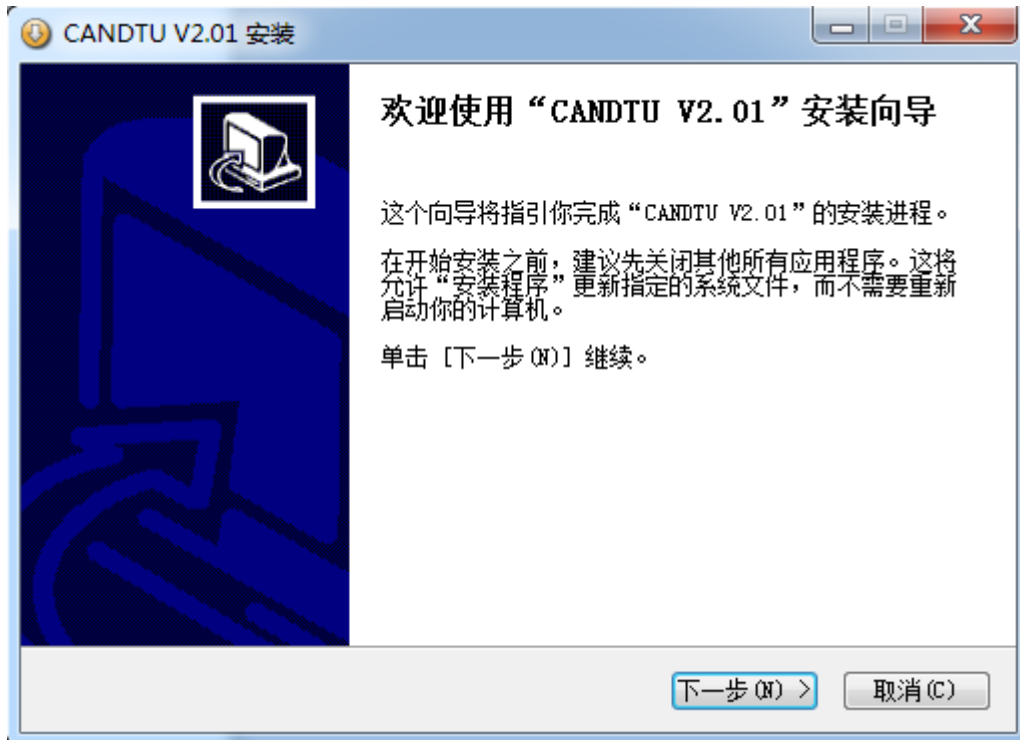1) Double-click the software installation package to install the software. The dialog box shown in Figure 4.1 appears.

Figure 4.1 Installation wizard

2) Click "Next". The Choose Install Location dialog box appears.
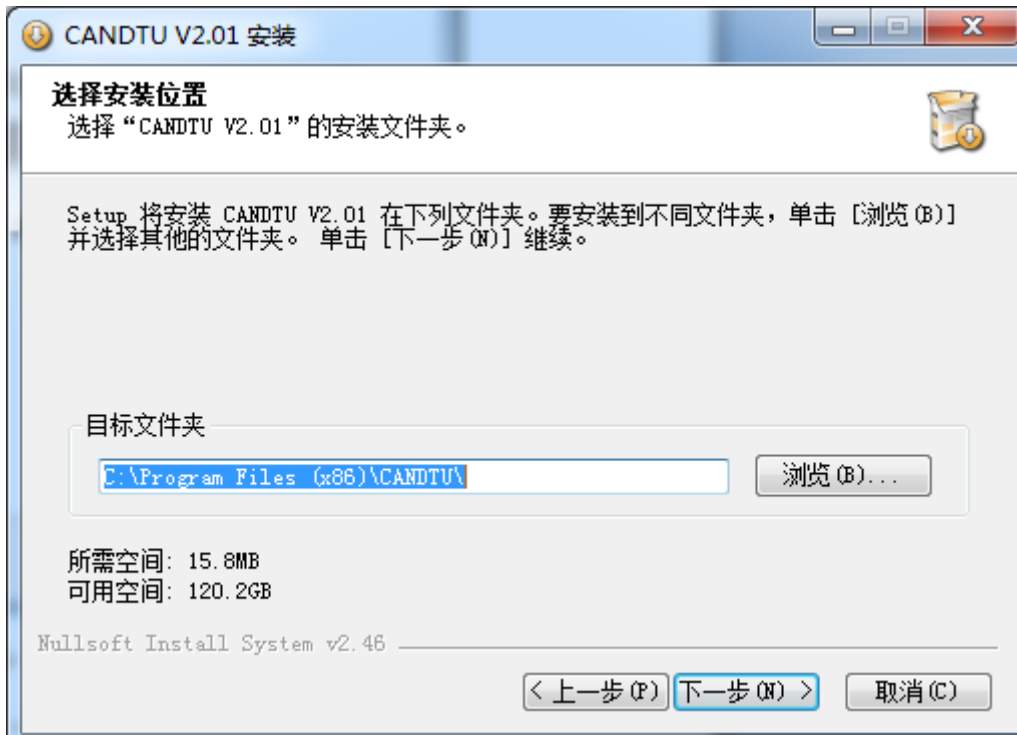
Figure 4.2 Selecting an installation path

3) Click "Next". The dialog box shown in Figure 4.3 appears.
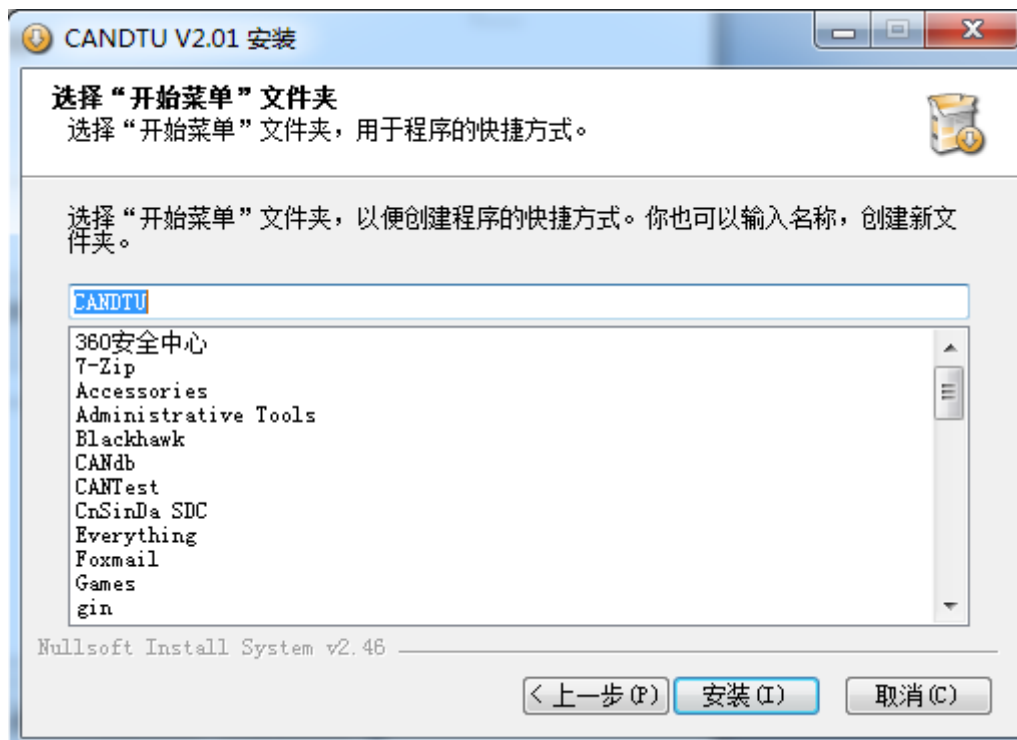
Figure 4.3 Selecting the "Start Menu" folder

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 completed

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

4.2　Functions

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:

1)　Menu bar:

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

2) Shortcut Toolbar

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

3) Side navigation bar

Provide multiple categories of information tabs to quickly switch tabs;

4) Information settings bar

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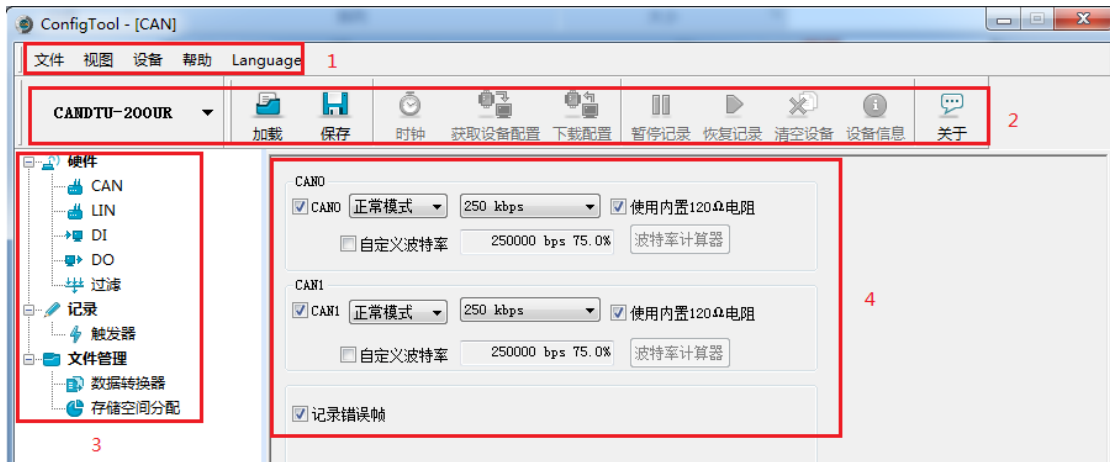

Figure 4.6 Main page

4.2.1 Device Selection

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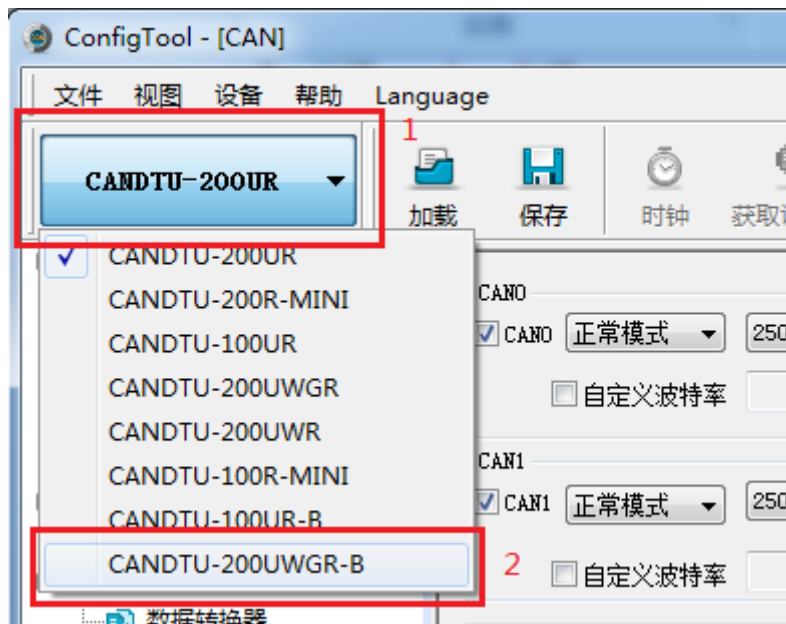
Figure 4.7 Selecting a device

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

4.2.2　Device Name Configuration

To easily distinguish devices when using network transmission, CANDTU supports device name customization. Users can distinguish CANDTU devices by device name.
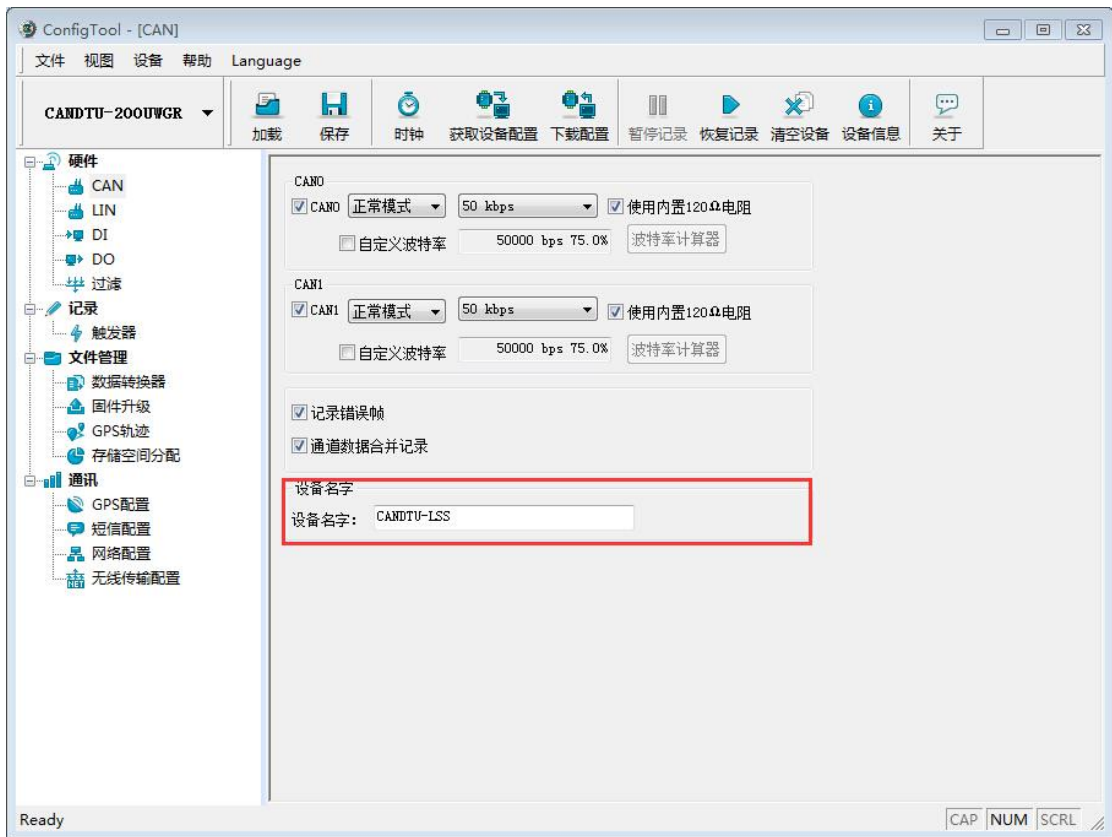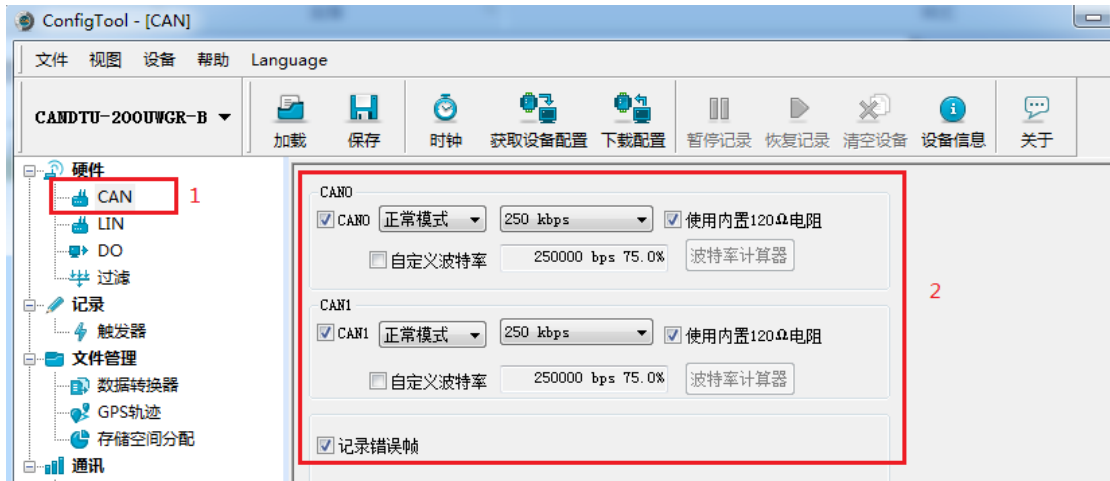

4.2.3　CAN Configuration

Figure 4.9 shows CAN configuration items.

Figure 4.9 CAN Configuration tab

The CAN Configuration tab contains the following parameters:

1) Channel enable

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

2) Communication mode

- Normal mode
- Listen only mode

3) Communication baud rate

The drop-down menu provides common baud rates for CAN communication.

4) 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.

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 4.10, 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.
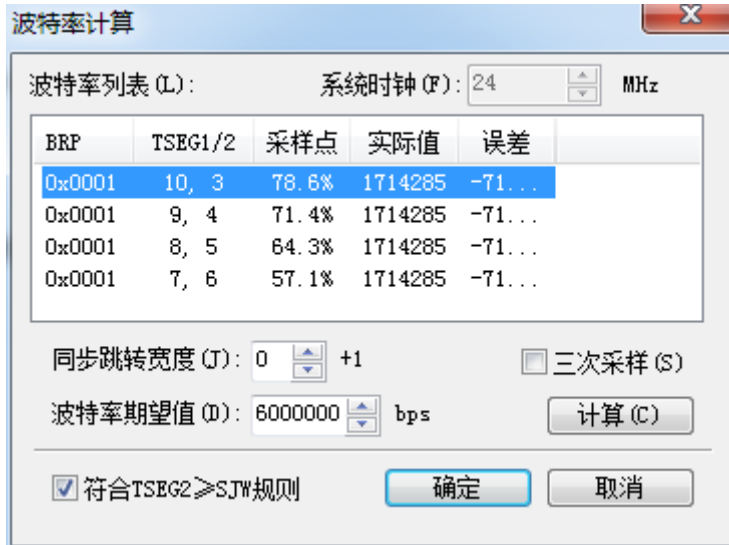
Figure 4.10 Baud rate calculator

7) Record error frames

- Selected: Record CAN error frames.

- Deselected: CAN error frames are not recorded.

4.2.4　LIN Configuration

The following figure shows the CAN configuration items.

Figure 4.11LIN Configuration tab

1) Channel selection

- Selected: Enable the corresponding LIN channel.

- Deselected: Disable the corresponding LIN channel.

2) Communication baud rate

Provides commonly used LIN communication baud rates.

3) Data length

The LIN data length can be set.

4.2.5 DO Configuration

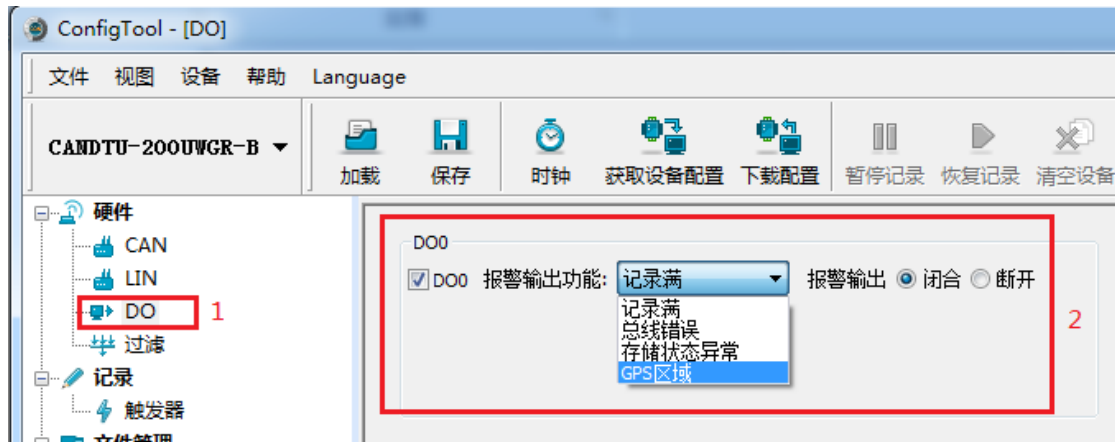Figure 4.12 and Figure 4.13 show the DO interface configuration items.
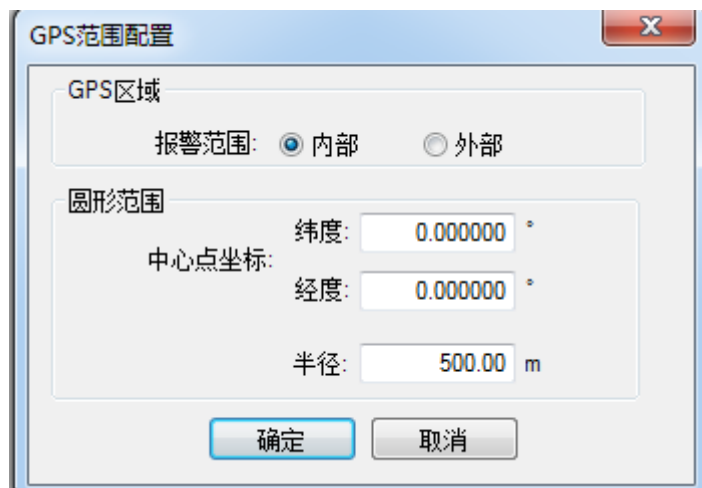

Figure 4.12 DO Configuration tab

Figure 4.13 GPS area setting

1) Channel enable

   ● Selected: Enable the corresponding DO channel.

   ● Deselected: Disable the corresponding DO channel.

2) Triggering event

   ● Record full. Trigger output when the SD card is full;

   ● Bus error. Trigger output when the CAN bus is faulty;

   ● Trigger output when the SD card is abnormal or does not exist;

   ● In GPS area, trigger output when the device is outside or inside the specified GPS area.

3) Relay actions

   ● Closed: When an event is triggered, the relay closes.

● Open: When an event is triggered, the relay is opened.
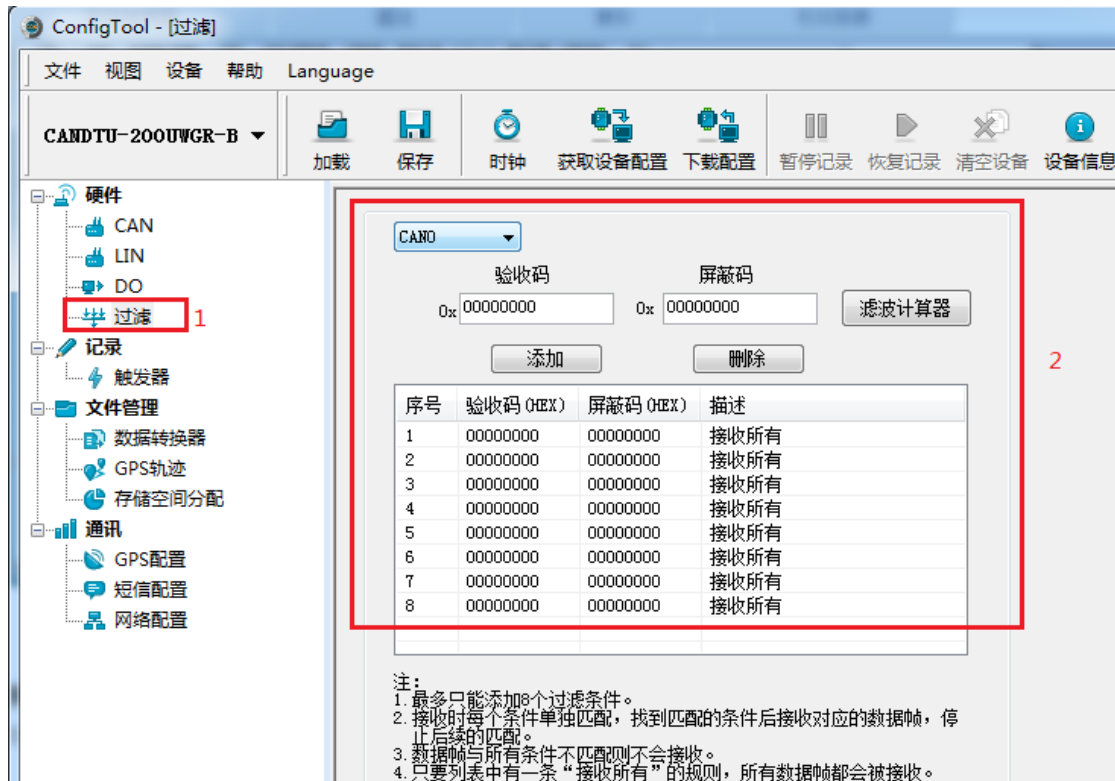
4.2.6 Filtering

Figure 4.14 Filter Settings tab

Figure 4.14 shows CAN hardware filter configuration items. Each CAN channel has a maximum of eight sets of filtering rules. The filtering rules of each CAN channel are independent of each other and need to be configured separately.

1) Channel selection

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

2) 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.

3) 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.
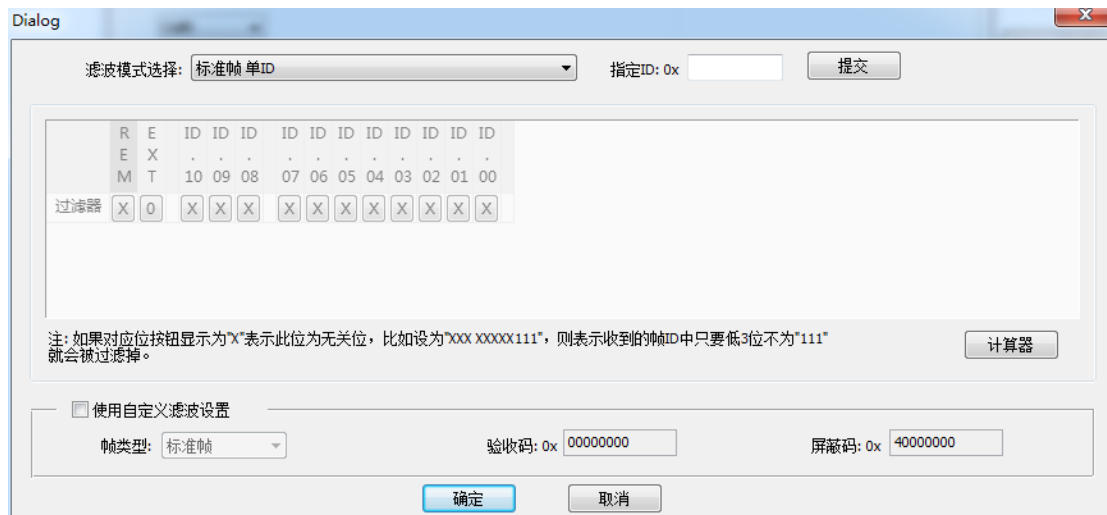

Figure 4.16 Filtering calculator

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.

4.2.7 Triggering

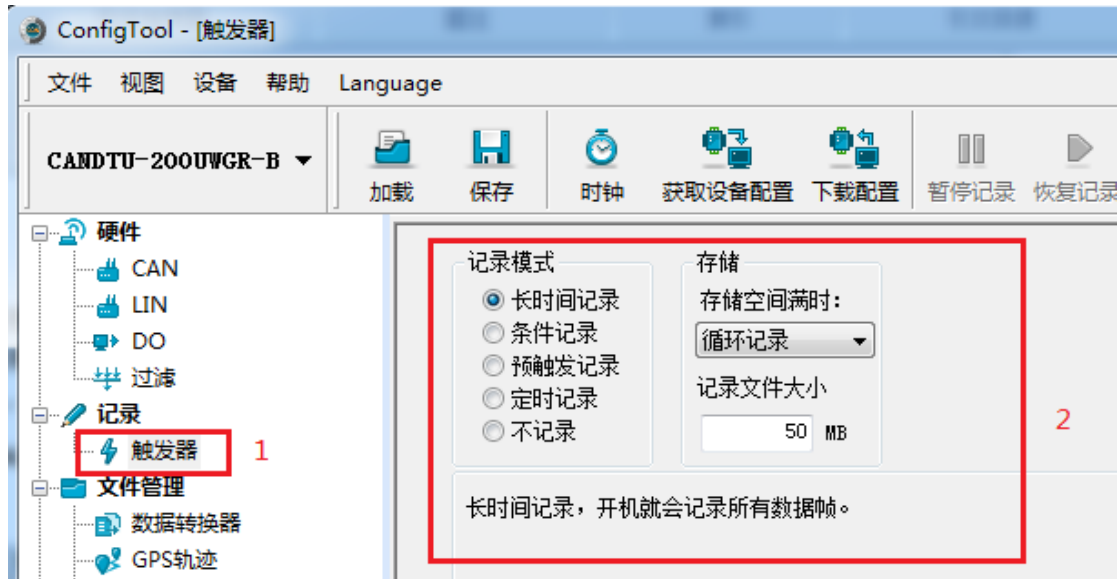Figure 4.17 shows the configuration items in recording mode.

Figure 4.17 Trigger tab

4.2.7.1 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.

4.2.7.2 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.
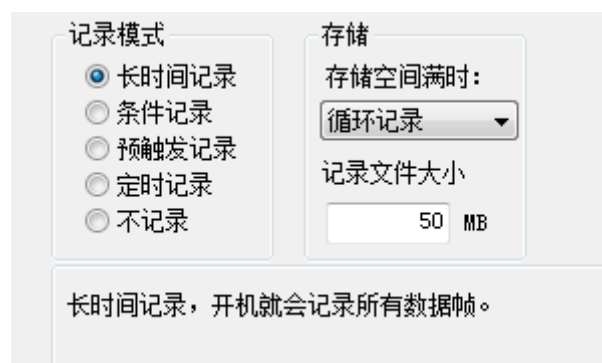

Figure 4.18 Long record

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
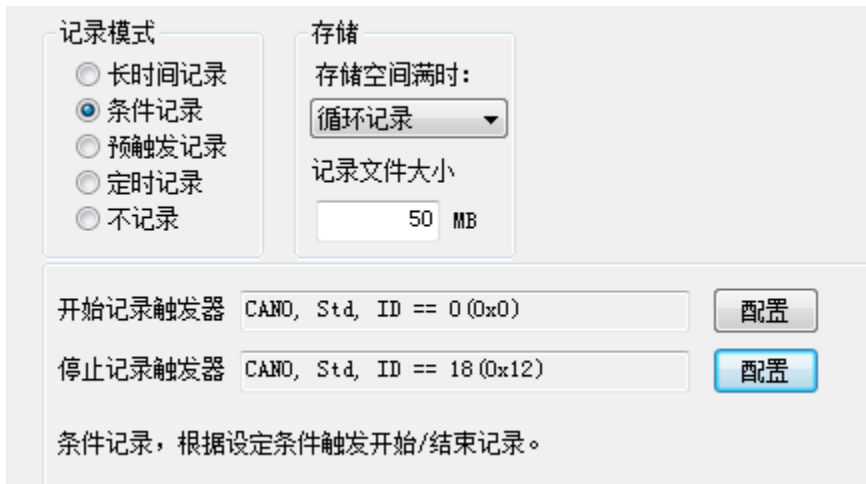
recording stop state).

Figure 4.19 Condition 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.
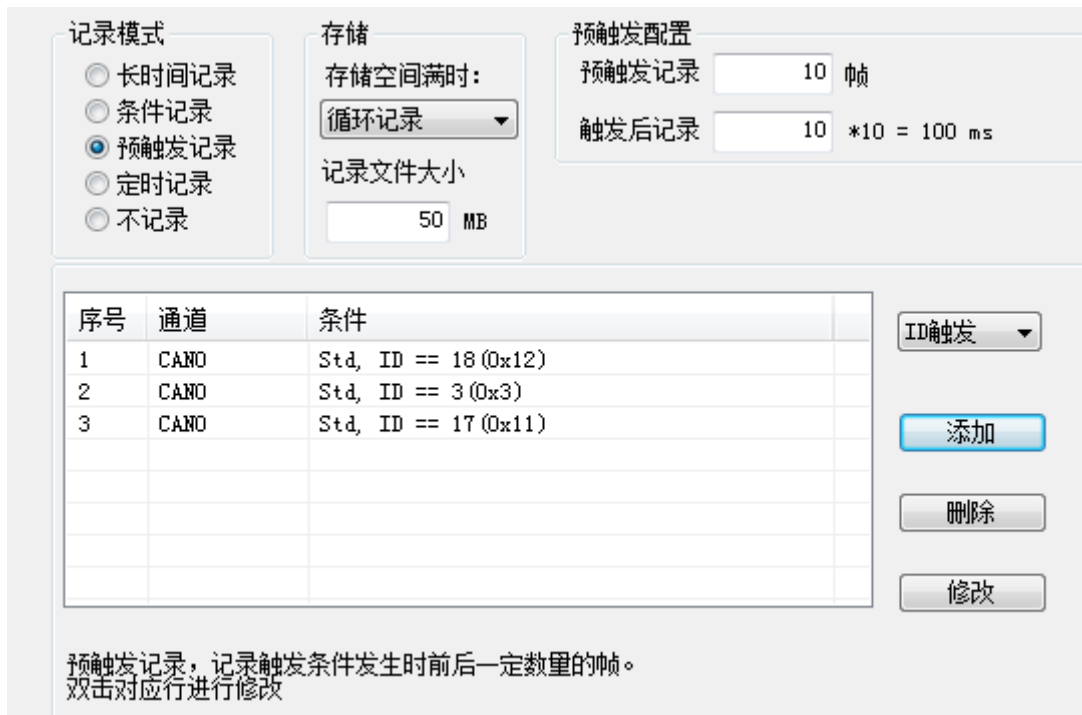

Figure 4 .20 Pre-trigger record

4) Timing record

As shown in Figure 4.21, select the timing 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 Timing 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.
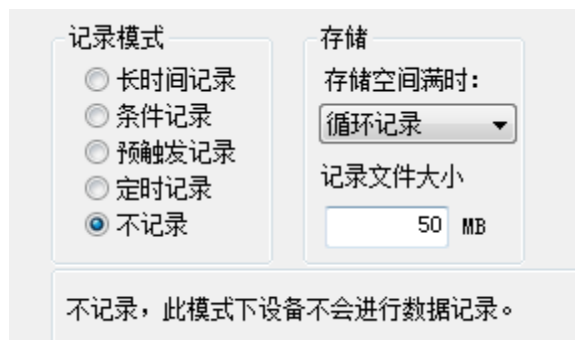

Figure 4.22 No recording

4.2.8   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.

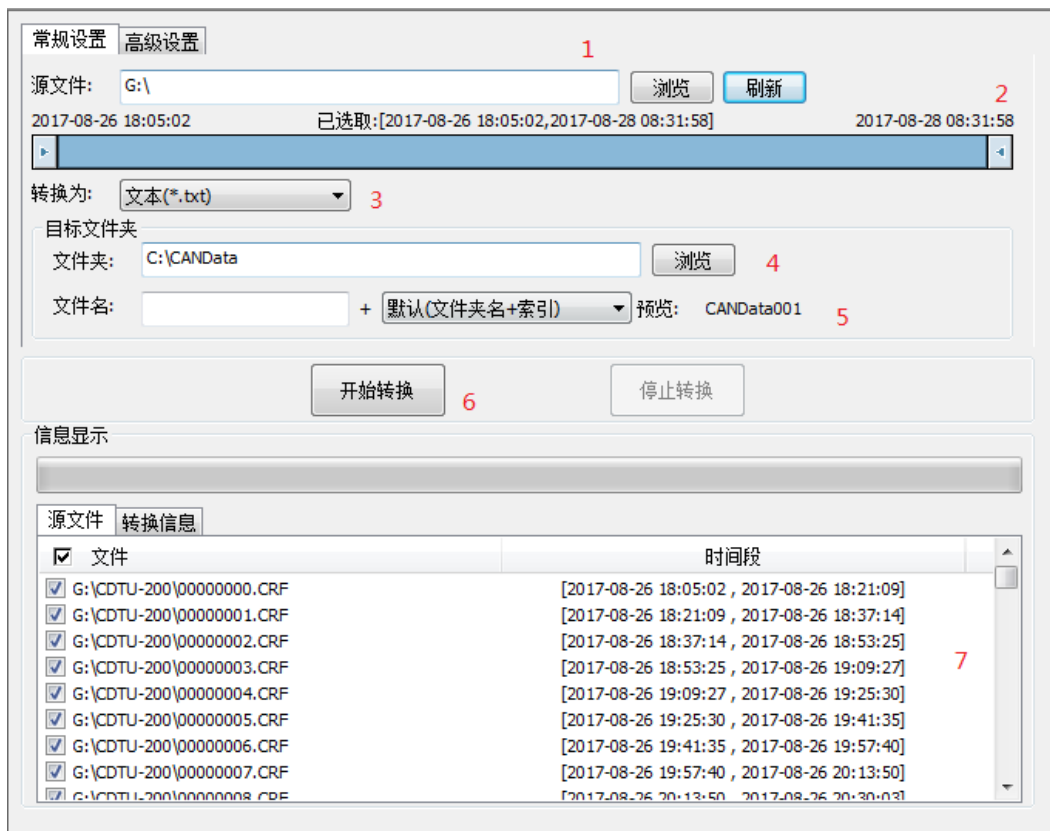As shown in Figure 4.23 and Figure 4.24, select the original data for data conversion.

Figure 4.23 Data converter - general settings

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

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

3) 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.

- Timing record (single column) (*.csv), similar to multiple columns, data of multiple

columns integrated 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), open with Excel software;

4) Set the output file storage path

5) 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

6) Operation button;

- Start conversion

- Stop conversion. The converted data is retained

7) 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

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

9) Time stamp display method

- Relative time

- Absolute time

10) 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

4.2.9　GPS Track

As shown in Figure 4.25, draw items for the GPS track. Click Browse. As shown in Figure 4.26, select the folder where the track file (*.GPX) recorded by the device is located. Click OK. On the multi-file merge selection interface, as shown in Figure 4.27, select a file, and click OK to complete the drawing, as shown in Figure 4.28.
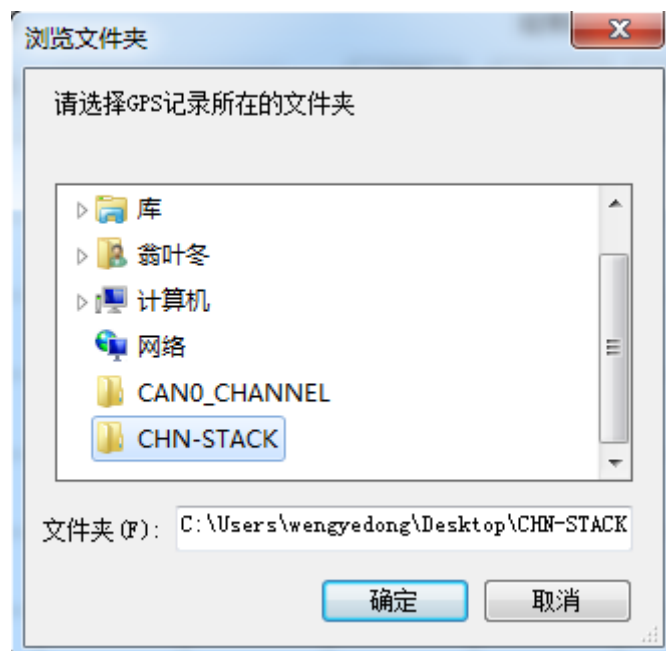
Figure 4.25 GPS track
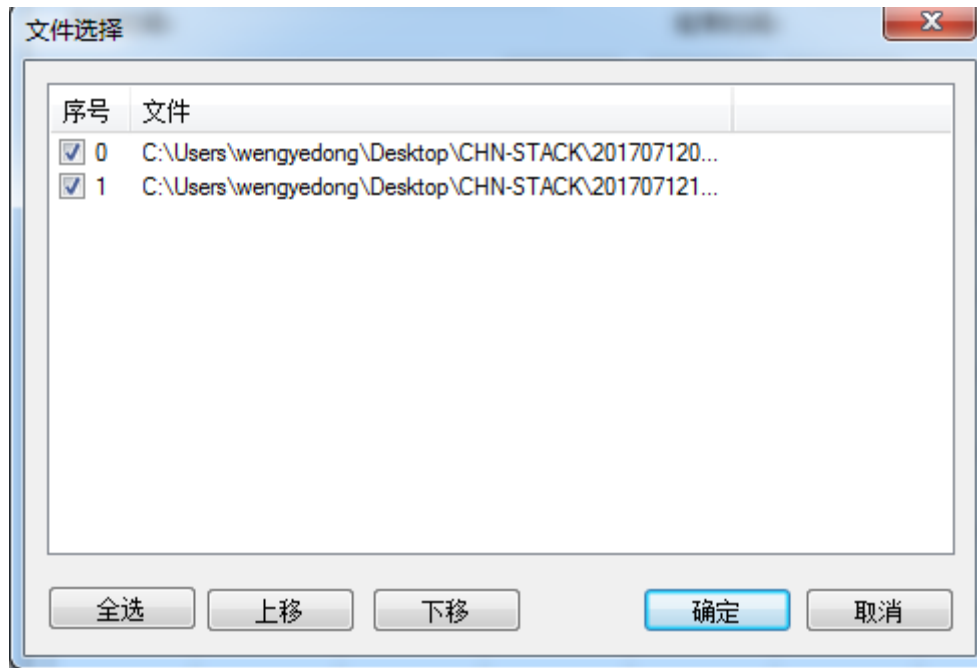

Figure 4.26 Selecting a track file

Figure 4.27 Merging trajectory files

Figure 4.28 Drawing a track

4.2.10 Storage Space Allocation

Figure 4.29 shows the storage space allocation item. Users can freely allocate memory space for each valid recording channel.
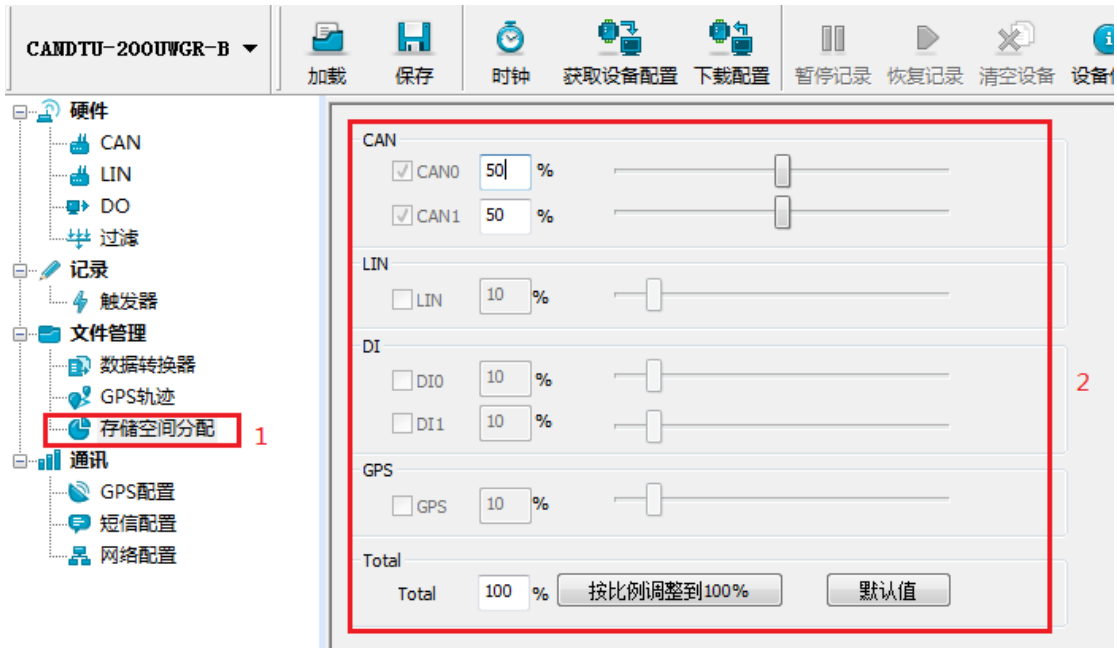
Figure 4.29 Storage allocation

4.2.11 GPS configuration

Figure 4.30 shows the GPS configuration item.

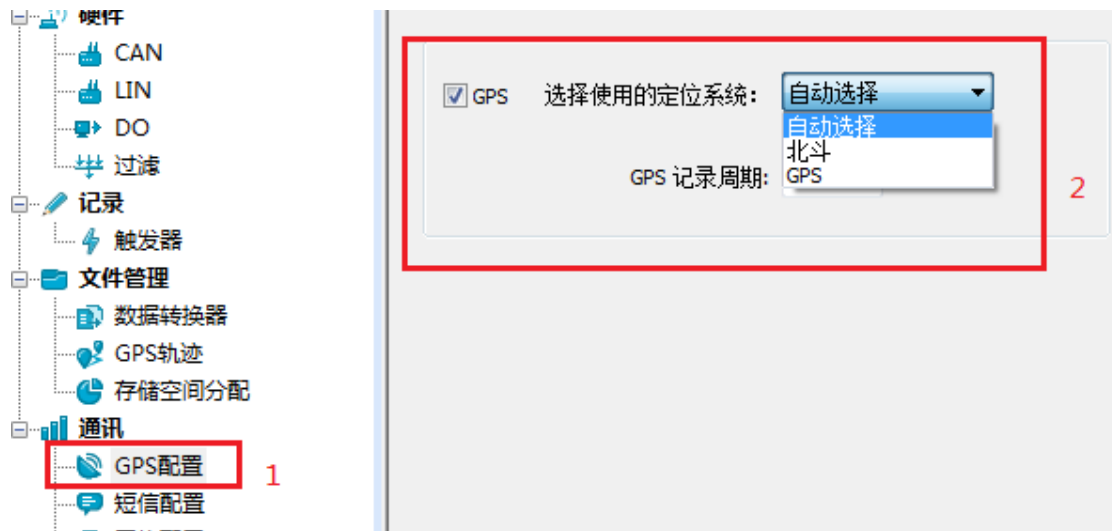Figure 4.30 GPS configuration

1) Channel enable

- If selected, enable GPS channel track recording;

- If not selected, disable GPS channel track recording.

2) System selection

- Automatically selected. The device automatically selects an available GPS positioning system;

- Beidou. Only use the Beidou system to provide positioning data;

- GPS. Only use the positioning data provided by the GPS system.

3) Period setting

Set the GPS track data recording period, in seconds.

4.2.12 SMS Configuration

Figure 4.31 shows the SMS configuration item. Six target numbers can be set, and SMS alarm conditions can be selected.

Figure 4.31 SMS configuration

1) Number settings

Set the target number for SMS notification.

2) Function enable

- If selected, enable the SMS alarm function;

- If not selected, the SMS alarm function is disabled.

3) Function selection

- The record is full. An alarm is generated when the channel space is full;

- Bus error, CAN bus error. An alarm is generated;

- If the storage status is abnormal or the SD card is abnormal, an alarm is generated;

- GPS area. When the device location meets the preset GPS area, an alarm is generated;

4.2.13 Network Configurations

Figure 4.32 shows the network configuration items. You can set three remote addresses or domain names.

Figure 4.32 Network configuration

1) Function enable

- If this option is selected, the network function is enabled, and the data is sent and received remotely;

- If this option is not selected, the network function is disabled, and the data is sent and received remotely;

2) Protocol type

TCP client. Set the device as a TCP client (currently only this configuration is supported).

3) Local port

Set the local TCP client port number.

4) Remote address

Set the remote server address to an IP address or domain name.

5) Remote port

Set the communication port number of the remote server.

4.2.14 Network Transmission Filtering

The CANDTU supports network transmission filtering. By configuring the software, transmit only the CAN ID messages in the filter, which reduces unnecessary network traffic.
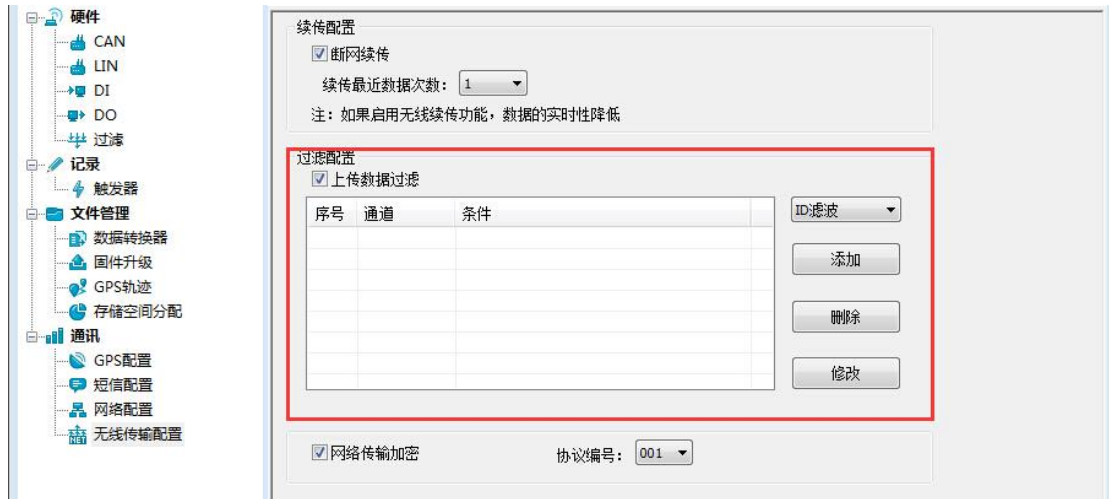
Figure 4.33 Network transmission filter

4.2.15 Continuous Transmission After Disconnection

The CANDTU device supports continuous transmission after disconnection, which minimizes the risks of data loss caused by network quality.
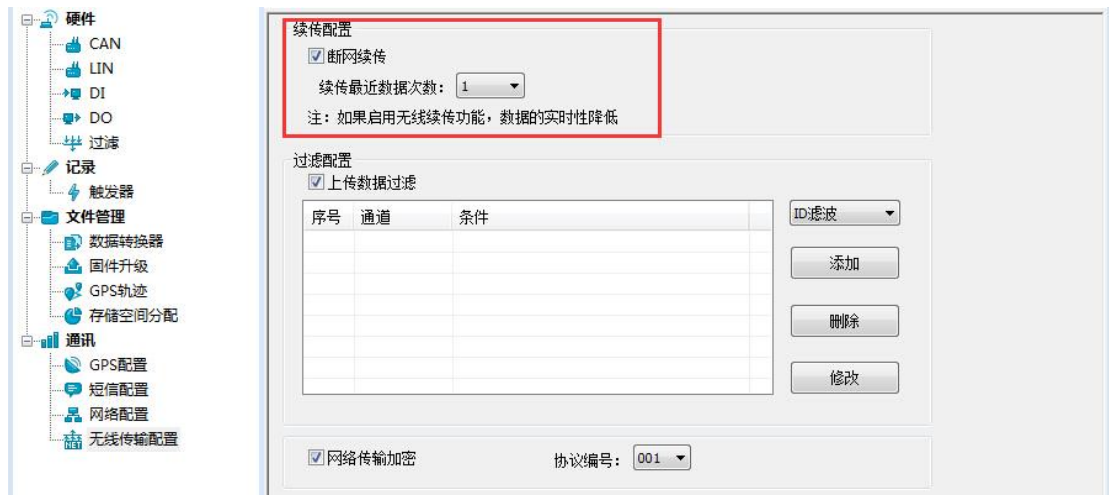

Figure 4.34 Continuous transmission after network disconnection

4.2.16 Network Transmission Encryption (To Be Customized)

The CANDTU supports network transmission encryption, and includes the encryption algorithm library provided by the customer in the device firmware in advance. After encryption by using the configuration tool, the data transmitted over the network needs to be decrypted before it can be used.
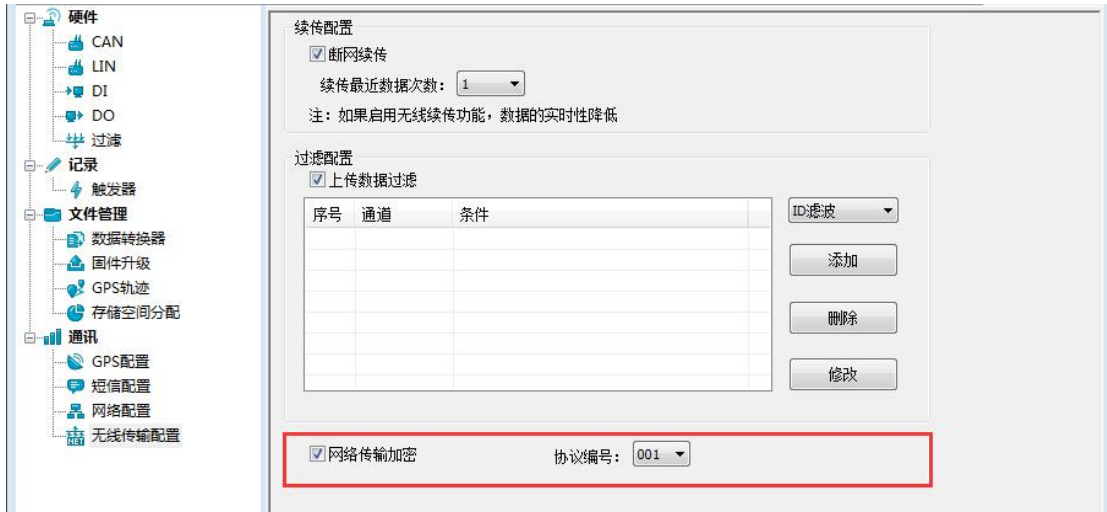
Figure 4.35 Network transmission encryption

4.2.17 Network Frame Format

错误!未找到引用源。 shows the network message communication protocol format. Special attention: All network packet data are sent and received in big-endian mode.
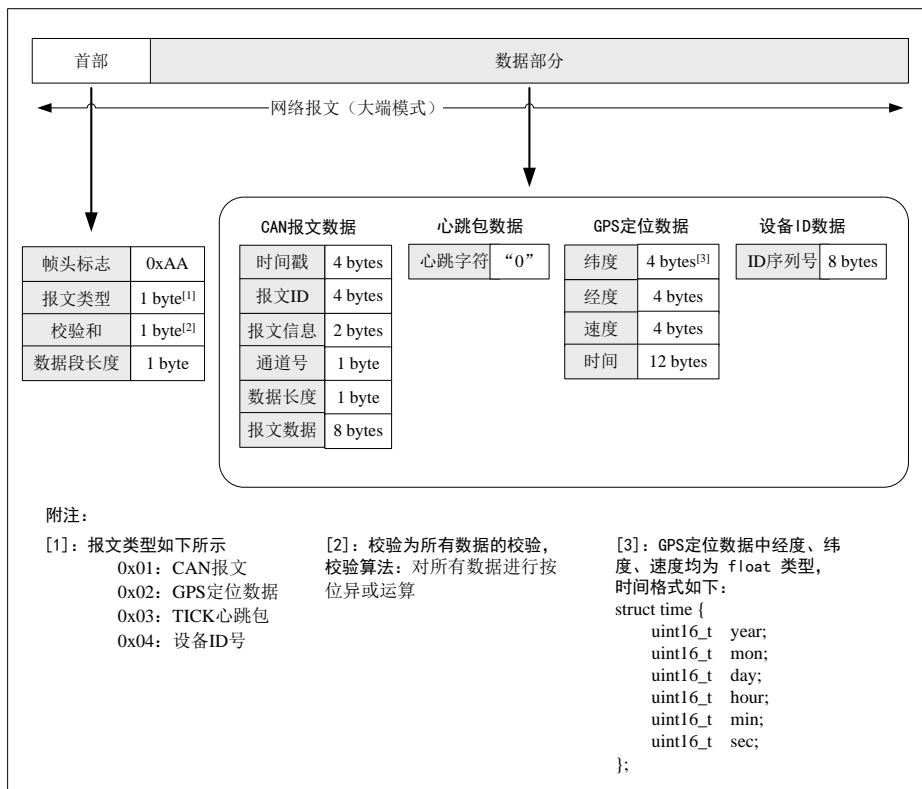

Figure 4.36 Network frame protocol format

4.2.18 Network Server Settings

1) Start the cantest host computer software, and select the "CANDTU" item, as shown in 错误!未找到引用源。.

Figure 4.37 Device selection

2) Configure the server, as shown in 错误!未找到引用源。.

- Set "Device Index Number" and "Channel Number"

- Select "Server" as the work mode.

- Set the local port to be the same as "Remote Port" under "Network Configuration" of the CANDTU configuration software

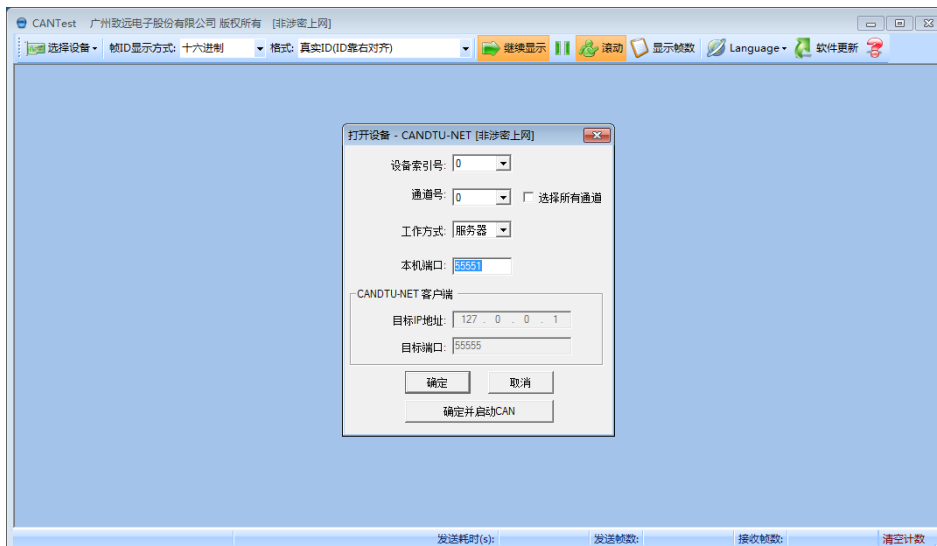- Click "OK and start CAN" to start the web server

Figure 4.38 Configuration interface

3) Wait until the device is connected. You can also open "Device Information" under

"Device Operation" to view the information of the currently connected device, as shown in Figure 4.39.

Figure 4.39 Device information selection
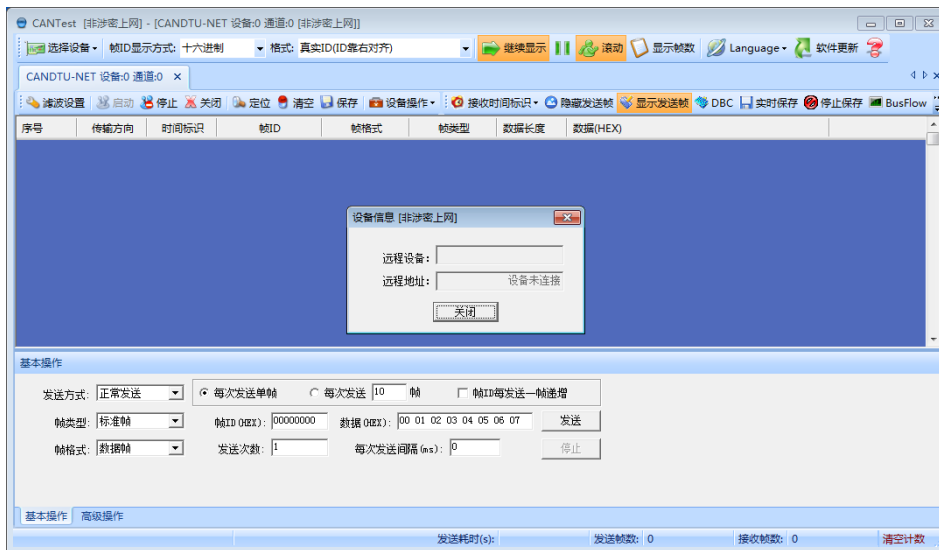
Figure 4.40 shows no device connected.

Figure 4.40 Device Information

4) Figure 4.41 shows the device connection. The data display area displays the data sent and received
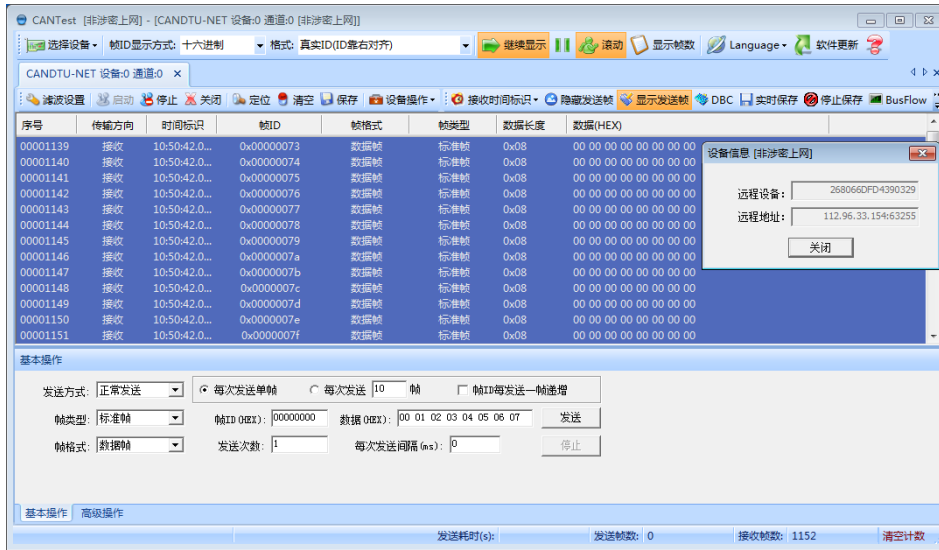
Figure 4.41 Data sending and receiving

5)   As shown in Figure 4.42, click "Parameter Device" under "Device Operation" to view the GPS uploaded location information, as shown in Figure 4.43.
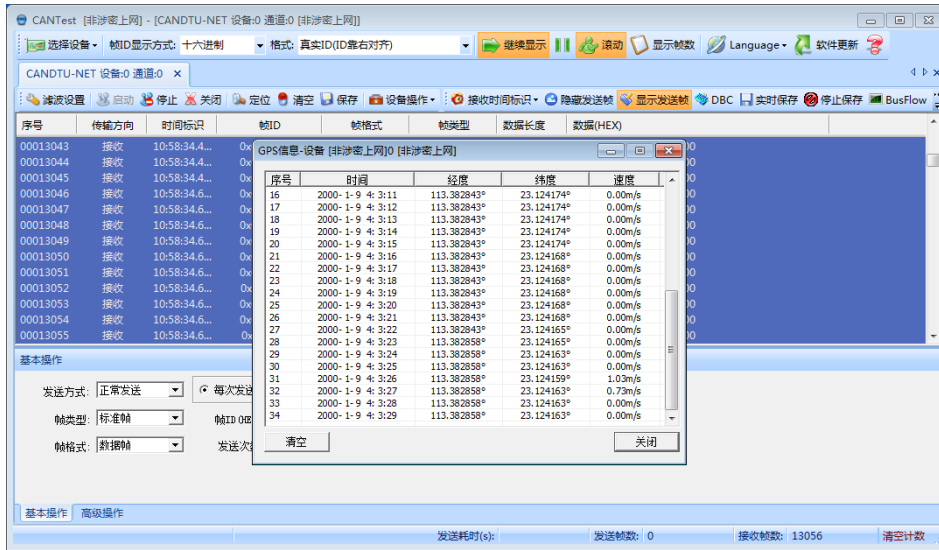

Figure 4.42 Parameter setting

Figure 4.43 GPS positioning data

4.2.19 Menu Operation

1) File menu
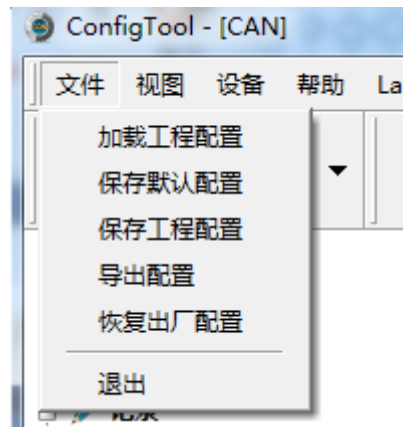
Figure 4.44 File menu

- 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.

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 4.45 Device menu

4.2.20 Setting and Getting the Device Clock

Click "Set Real Time Clock" in the device menu (or the corresponding button in the toolbar). The dialog box shown in Figure 4.46 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   appears. Reconnect the device and try again.

Figure 4.46 Setting the real-time clock

4.2.21 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.

4.2.22 Pausing and Resuming records

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

4.2.23 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.

4.2.24 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 4.47 shows the device information.

Figure 4.47 Device Information

5. USBCAN Function

The CANDTU-200UWGR is a CAN-Bus bus communication device that complies with USB2.0 high-speed specification protocol and integrates two CAN interfaces. The PC can be connected to the CAN-Bus network by using the USB bus of the device to realize the mutual data transmission   between the PC and the CAN-Bus network.

5.1   CANTest Test Software Installation

Find the CANTest software in the CD-ROM (use this version or later). Double-click the "CANTest_Setup_V2.63.exe" software to install it. The dialog box shown in Figure 5.1 appears.

Figure 5.1 CANTest installation dialog

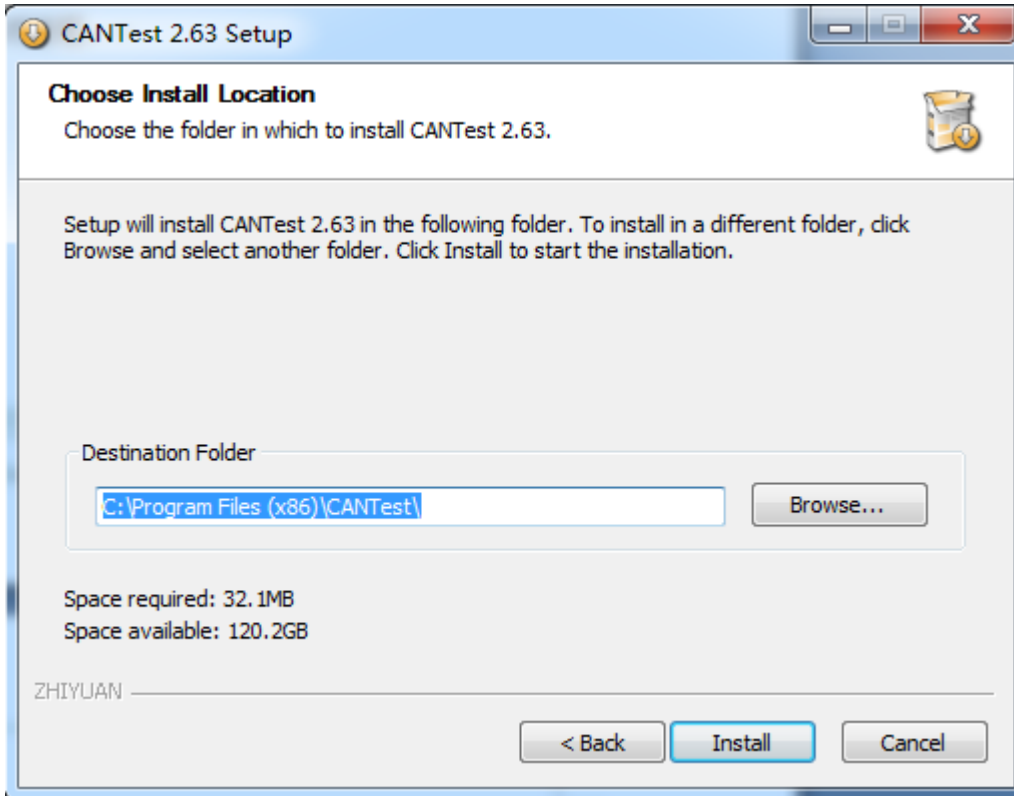Click "Next". As shown in Figure 5.2, the installation path selection dialog box appears.

Figure 5.2 Selecting an installation path

Click "Install". The license agreement dialog box appears, as shown in Figure 5.3.
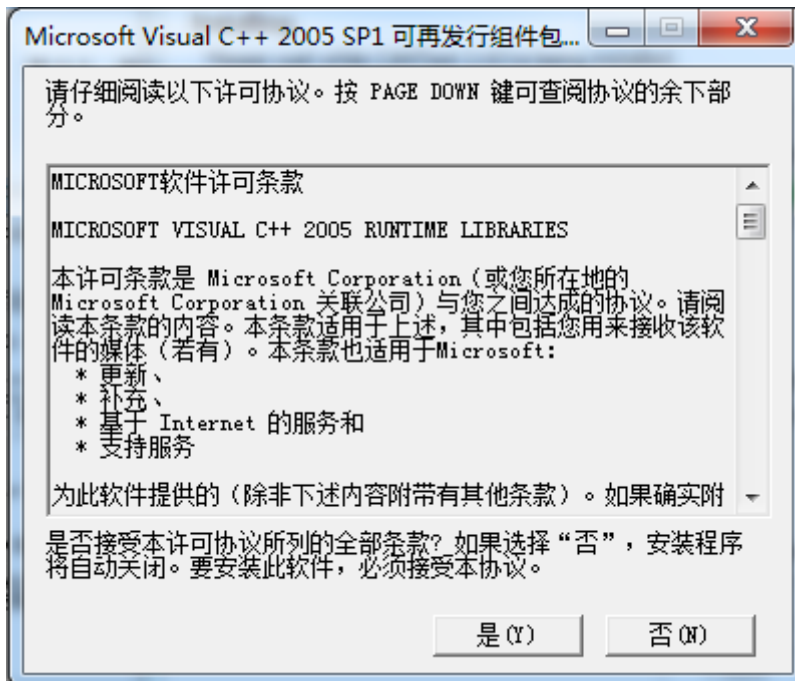

Figure 5.3 License Agreement dialog box

Click "Yes" to complete the software installation. Figure 5.4 Installation complete
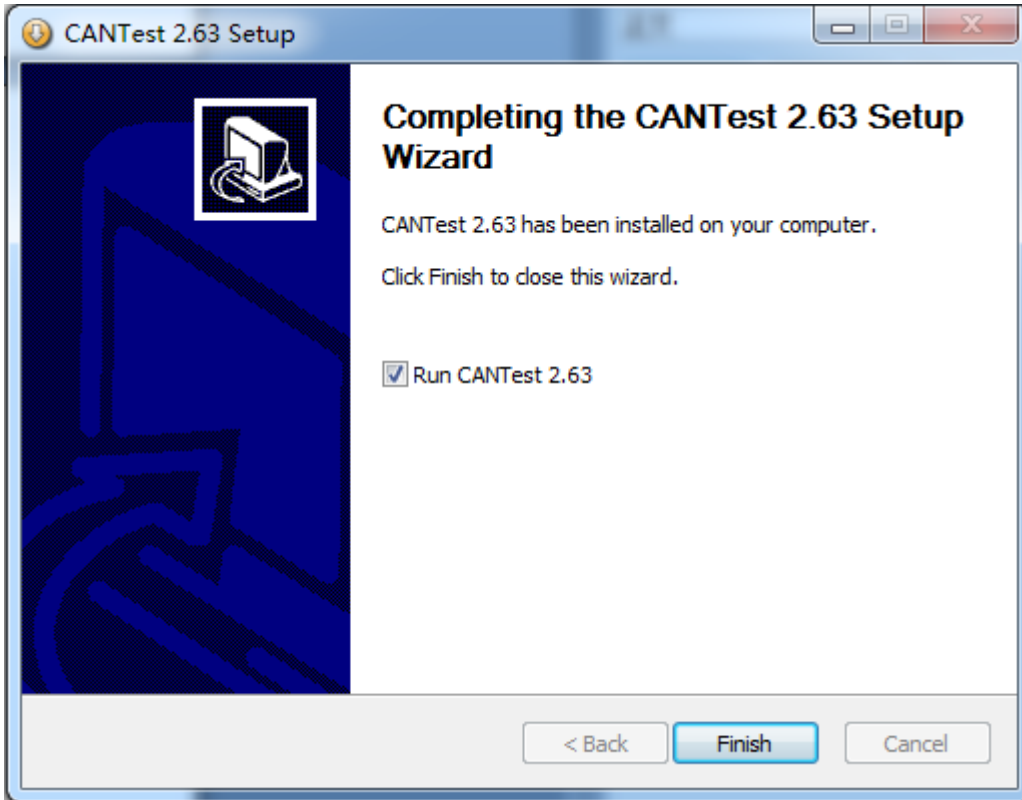
Figure 5.4 Installation complete

5.2 Quick Use of the USBCAN Function

Connect the CANDTU-200UWGR to the PC with a USB cable, connect the two CANs of the CANDTU-200UWGR to each other, and connect the power cable to the CANDTU-200UWGR. Run the CANtest software installed in the previous section on the PC (as shown in Figure 5.5).

Figure 5.5 CANTest software

After starting CANtest, select a device type. We choose "CANDTU". The parameter setting interface of the device is displayed (as shown in Figure 5.6). The baud rates of CAN0 and CAN1 must be consistent with the two CAN baud rates of the CANDTU-200UWGR.
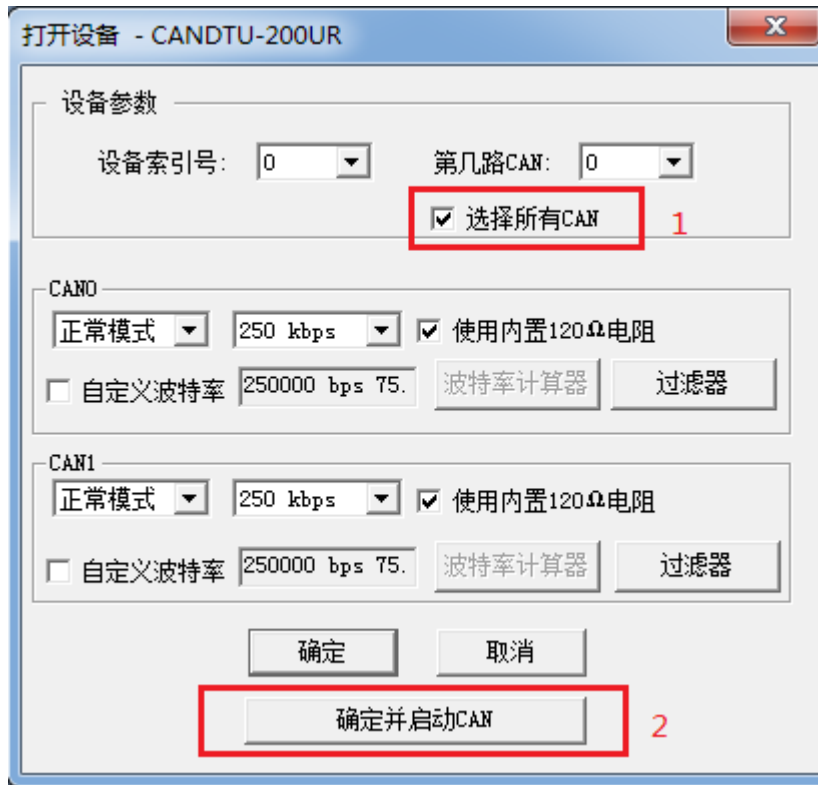
Figure 5.6 Setting the CAN baud rate

Click the "OK and start CAN" button or click "OK". Click "Start" on the data operation interface (as shown in Figure 5.7). If the device is connected properly, no message appears; if the connection is abnormal, an error message appears.

Figure 5.7 Start CANDTU-200UWGR

On the tab page of any CANtest software, click the "Send" button. You can then receive the data you just sent on the tab page of another CANtest software, as shown in the following figure.

Figure 5.8 Communication between dual CANs of the CANDTU-20UR

6. Quick Instructions

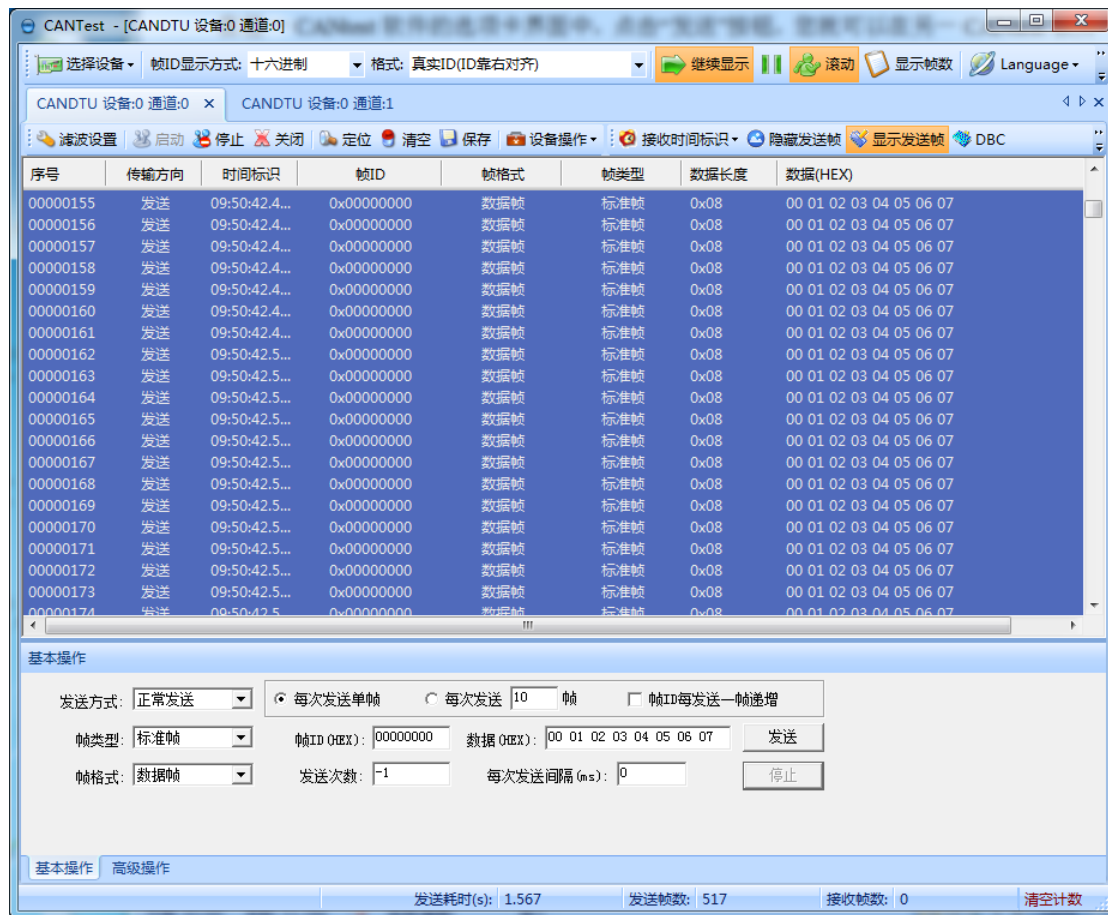This chapter introduces the basic usage of the device. You will quickly learn about how to use the device and have an intuitive understanding of the device. Before using the device, understand some default parameters and make simple preparations.

6.1   Operational Guidelines

6.1.1   Configuration

1) 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.

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

3) Perform download. Click the download configuration button in the CANDTU configuration software. After the download is complete, 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.

6.1.2   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 and store the message directly to the SD card.

6.1.3   Upgrade

1. SD card upgrade

1) Save the firmware file to the SD card. The firmware file name must be: candtu_app.bin. The storage path must be in the root directory of the SD card, as shown in Figure 6.1.
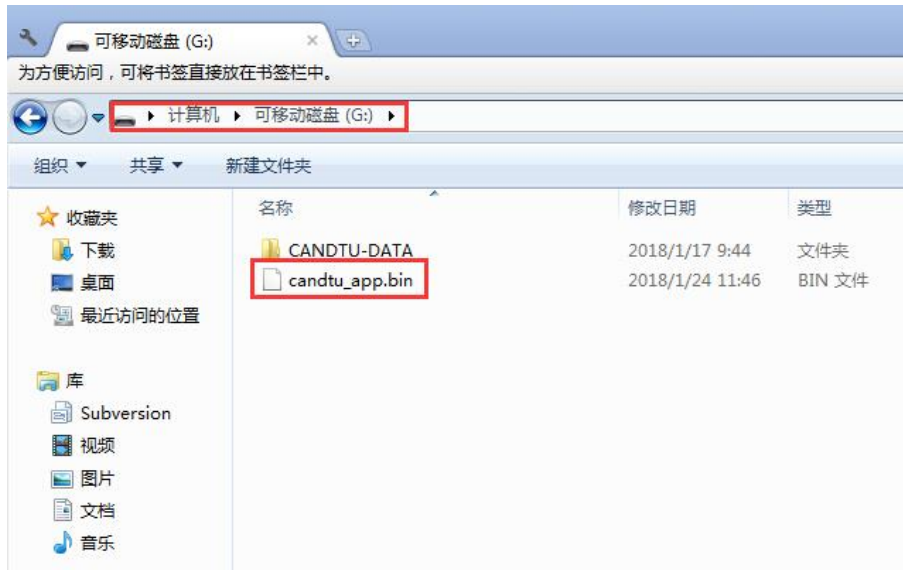
Figure 6.1 Firmware save path

2) Insert the SD card into the device, press and hold the Trigger button on the device, and power on the device. At this time, you will hear the buzzer sound for three consecutive times, indicating that the device has entered the upgrade mode. Release the Trigger button.

3) Wait until the upgrade is complete. If you hear the buzzer sound for two consecutive times in the recording state, the upgrade is successful, and the device automatically restarts and enters the working state. If you hear continuous beeps, the upgrade fails.

2. Online upgrade

1) Run the configuration tool, and select the corresponding device model, as shown in Figure 6.2. If the device is connected successfully, the "Device Information" option in the configuration tool changes from gray to blue, and you can view the current device information by clicking "Device Information". Otherwise, the connection fails.

Figure 6.2 Connected a device

2) Select "Firmware Upgrade" in the option bar on the left side of the configuration tool. Select "Browse" on the main interface of the configuration tool to find and start the firmware to be upgraded, as shown in Figure 6.3.
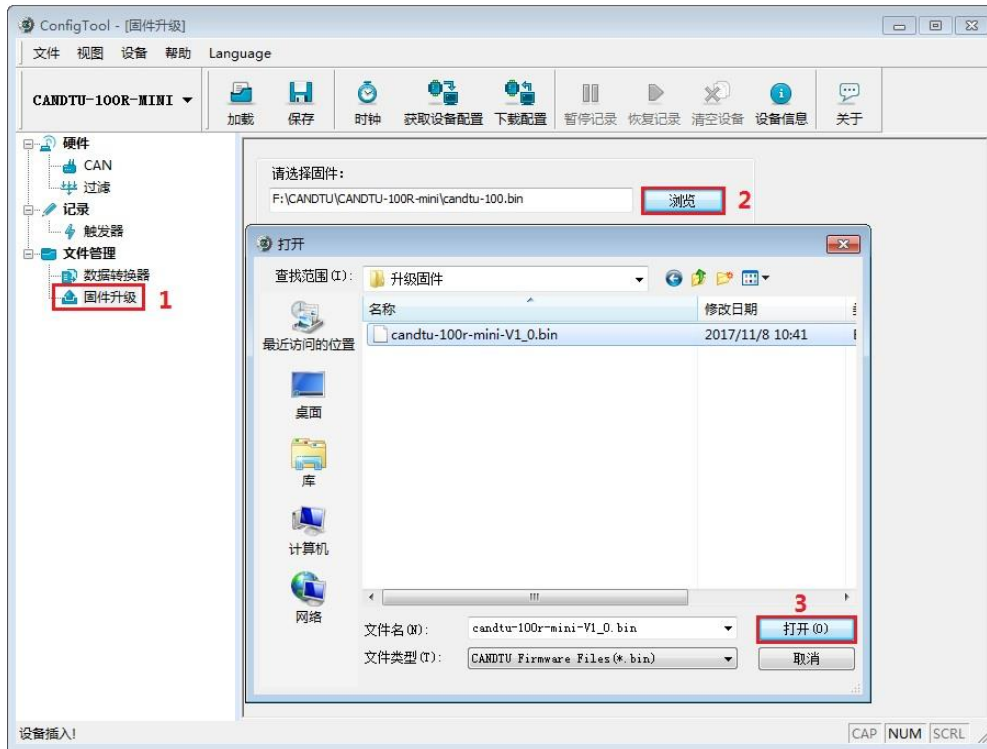
Figure 6.3 Selecting firmware

3) Click the "Upgrade" button and wait until the upgrade is complete.

Figure 6.4 Starting upgrade

After the upgrade is successful, the "Firmware verification is successful, waiting for the device to restart automatically to complete the update..." message is displayed. After the device restarts, the "Device Information" option in the configuration tool returns to the blue state, and the device information can be viewed. Check whether the device has been successfully upgraded to the specified version through "Firmware Version" in the device information, as shown in Figure 6.5.

Figure 6.5 Viewing the firmware version

6.1.4 Changing the Card

1) Pause recording. Pause recording by using the configuration software (or disconnect the power failure detection signal first). The device enters a suspended state, the SD card saves data, and the device stops.

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

3) 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)

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Product return procedure

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.

Disclaimer

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Electronics Co., Ltd.