

# **USB-CAN Bus Interface Adapter & CANalyst-II Analyzer Manual**

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# Chapter 1: Product features

## 1.1 Product Overview

USB-CAN-2 (A / C) bus adapter is an intelligent CAN-bus adapter with USB2.0 interface and 2 CAN interface.

CANalyst-II analyzer is a CAN-bus adapter with USB2.0 interface and 2 CAN interfaces and have CAN-bus protocol analysis function that support SAE J1939, DeviceNet, CANopen, iCAN and customized advanced protocol analysis function, also It is compatible with ZLG CANPro software and Can carry out bidirectional transmission.

USB-CAN bus adapter/CANalyst-II analyzer can be regarded as a standard CAN node, It is a powerful tool for CAN-bus product development, CAN-bus equipment test and data analysis. Using this interface adapter will enable PC to connect to standard CAN-bus network via USB interface, forming the CAN-bus network control nodes for the data processing, data communication and data collection applied in the CAN-bus networks such as bus laboratory, industrial control, intelligent residential zone, auto electronics network, and etc. Meanwhile, small size, easy installation features of USB-CAN Interface Adapter / CANalyst-II analyzer makes it the best choice for the users who are using portable operation systems.

There are three independent types of CAN-bus adapter:

USB-CAN-2A: CAN-bus is not isolated, powered directly by the USB.

USB-CAN-2C: CAN-bus circuit adopt Independent isolated DC - DC power supply module and high-speed magnetic lotus root isolation module for electrical isolation, making the interface adapter having strong anti-interference ability, greatly improved the reliability of the system used in harsh environments. USB is isolated from CAN1 and CAN2, but CAN1 is not isolated from CAN2.

CANalyst-II Analyzer: USB, CAN1, CAN2 are completely isolated.

We can provide USB-CAN-Tool software to help you operating the USB-CAN adapter for CAN-bus configuration, sending and receiving directly. We also provide a uniform application programmable interface and the complete demonstration code including VC, VB, LabVIEW, Delphi and C++ Builder, which make it convenient for user to develop programs.

You do not need to understand the complicated USB interface communication protocol when you do your secondary software development with the USB-CAN bus interface adapter and CANalyst-II analyzer.

## 1.2 Parameters

- support protocol conversion between USB and CAN-bus;
- USB-CAN-2(A/C) is dual-channel intelligent CAN interface module;
- CANalyst-II Analyzer is dual-channel intelligent CAN interface module;

- PC interface supports USB2.0 protocol and is Compatible with USB1.1;
- Support CAN2.0A and CAN2.0B protocols, support standard frame and extension frame;
- Support bi-directional transmission, CAN transmission and CAN receive;
- Support data frame and remote frame;
- CAN controller Baud rates from 10Kbps to 1Mbps, Can be configured by software;
- USB-CAN-2A products: CAN-bus interface is not isolated;
- USB-CAN-2C products: CAN-bus circuit adopt high-speed magnetic lotus root isolation and Independent isolated DC - DC power supply module, USB is isolated from CAN1 and CAN2, CAN1 is not isolated from CAN2.
- CANalyst-II Analyzer: CAN-bus circuit adopts high-speed magnetic lotus root isolation and Independent isolated DC - DC power supply module, USB, CAN1, CAN2 are completely isolated;
- Max data flow: more than 8000 fps (standard frame) for receiving and 8000 fps (standard frame) for transmitting and can be run at the same time.
- Buffer size: 1000 frames length buffer for transmission (with auto repeat transmission when failed) per channel, 2000 frames length buffer for receiving per channel;
- Adopt USB bus power supply, no need for an external power supply;
- USB-CAN-2A products: no electrical isolation;
- USB-CAN-2C products: adopt electrical isolation, the isolation voltage is: 2500V;
- CANalyst-II Analyzer, adopt electrical isolation, the isolation voltage is: 2500V;
- Operating temperature: -20 ~ 85 °C;
- Physical size: (length) 70mm \* (width) 45mm \* (height) 24mm;
- Product compatibility: Function library is similar to the library of Guangzhou ZLG USB-CAN interface adapter.

## 1.3 Typical applications

- Transmit or receive messages in CAN-bus network via PC or laptop's USB;
- data collection, data analysis in the fast CAN network;

- CAN-bus-USB gateway;
- USB interface to CAN network interface;
- Extend CAN-bus line length;
- Industrial site CAN network data monitoring.

## 1.4 Packing Checklist

N O.	Name	Amount	Comment
1	Adapter host	1	
2	CD-ROM	1	Includes: manual, USB driver, secondary development library files, the secondary development sample program source code, USB-CAN TOOL software, baud rate detection tools, etc.
3	USB data cable	1	gift
4	8Pin Terminal Blocks	1	gift
5	3-inch Phillips screwdriver	1	gift

## 1.5 Technical support and services

Return goods unconditionally within 7 days from the date of receipt, 1 year free maintenance, lifelong maintenance and upgrade services.

Technical support and purchasing information please refer to:

Email: [zhcxgd@163.com](mailto:zhcxgd@163.com)

## 1.6 Product Selection Table

Model	Channels	isolation	Isolation voltage	Transparent transmission relay function	High-level protocol analysis function
USB-CAN-2A	2	no		no	no
USB-CAN-2C(Extreme Edition)	2	yes	2500V	yes	no
CANalyst-II Analyzer(Extreme Edition)	2	yes	2500V	yes	yes

Instructions:

1, All-models support: USB\_CAN\_Tool with the original code from our company, Zhou Ligong'ZLG CANTest and the latest version of Ji Yang electric CANTools.

2, CANalyst-II analyzer: Support the latest version of ZLG CANPro protocol analysis platform software and High-level protocol analysis function.

3, Extreme Edition dual channel equipment: support CAN relay function and transparent transmission function.

Note: for instructions on CAN relay function and transparent transmission function please refer to 《Relay, transparent transmission function and use of relay software instructions》.

# Chapter 2: Appearance and interface

## 2.1 Appearance of the product

There are two sets of external interfaces on USB-CAN/ CANalyst-II analyzer intelligent CAN interface adapter: A standard USB interface, an 8-pin binding post terminals (CANalyst-II analyzer for 6 pin), CAN-bus interface is available.

Power indicator light of our products is red except CANalyst-II analyzer for highlighted in red.

When LED- CAN1 Channel1 indicator light is red (CANalyst-II analyzer for blue) indicate the transmitting or receiving state of the channel1. When the USB-CAN adapter insert into a USB interface, the power is turned on, the LED- CAN1 indicator light flashes twice for system self-test.

When LED- CAN2 Channel2 indicator light is red (CANalyst-II analyzer for highlighted in red) indicate the transmitting or receiving state of the channel 2. When the USB-CAN adapter insert into a USB interface, the power is turned on, the LED- CAN2 indicator light flashes twice for system self-test.



Figure 1: USB-CAN products uniform appearance



Figure 2: CANalyst-II analyzer uniform appearance

## 2.2 Signal Definition

Series of USB-CAN products	
Name	Description
R+	Terminal resistance R+, R + and R - shorted, the internal 120 ohm resistor will be access to the bus
R-	Terminal resistance R-
CANH	CAN_H signal cable
CANL	CAN_L signal cable
PWR	Power indicator light
CAN1	CAN1 channel signal
CAN2	CAN2 channel signal
CANalyst-II analyzer products	
Name	Description
R1	Terminal resistance R1, Down to the ON state, the internal 120 ohm resistor will be access to the bus.
R2	Terminal resistance R2, in parallel with R1, same effect as R1



Series of USB-CAN products	
Name	Description
H	CAN_H signal cable
S	Shielded wire interface, unconnected with the CAN transceiver directly, connected with resistors and capacitors.
L	CAN_L signal cable
PWR	Power indicator light
SYS	System status indication, under normal circumstances are often off state
CAN1	CAN1 channel signal
CAN2	CAN2 channel signal

**Method of operation:**

**CAN Transmit:** When a user application calls the Transmit Function, a message will be push to the channel T-Buffer (it's a FIFO buffer) in USB-CAN adapter immediately, then the CAN Controller transmit it to the CAN-Bus.

**CAN Receive:** The CAN Controller receives a CAN frame from CAN-Bus, and push it to the channel R-Buffer (also a FIFO buffer) in USB-CAN adapter immediately, when a user application call the Receive-Function, the message will be return.

**2.3 Factory configuration**

- 1) CAN-bus Baud rate: 1Mbps;
- 2) Acceptance mask register: 0xFFFFFFFF, means to accept all CAN frame;
- 3) Termination resistor is selectable: connect the R+ and R- (dial down the corresponding switch for CANalyst-II analyzer) to get 120 euro internal resistor.

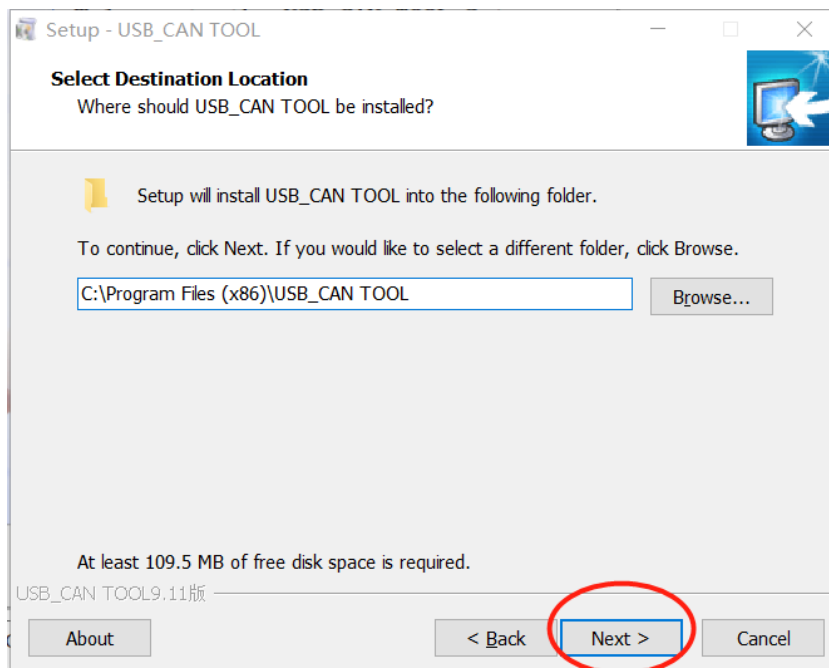
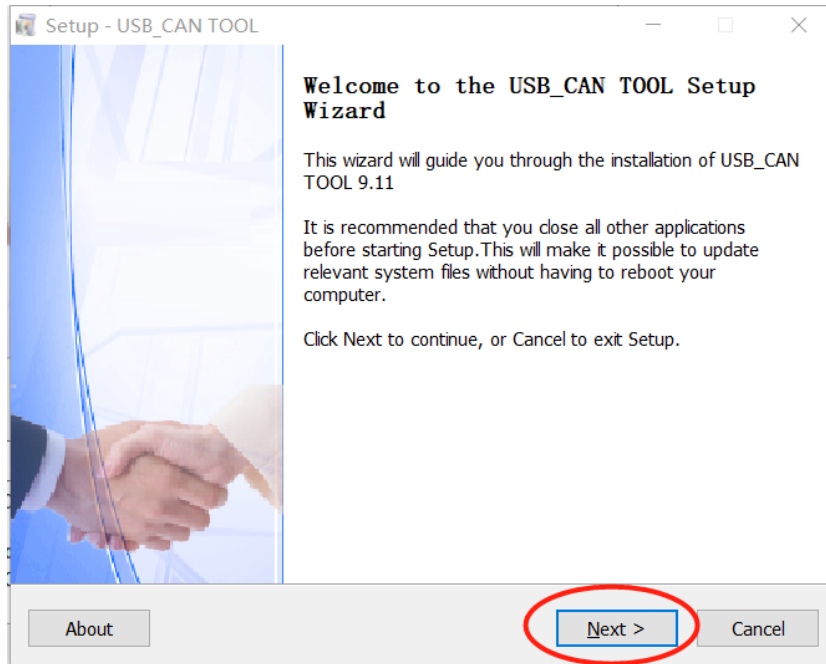
Note: ensure that there are two 120 ohm termination resistors on the CAN-bus; otherwise it will lead to the CAN-bus work abnormality.

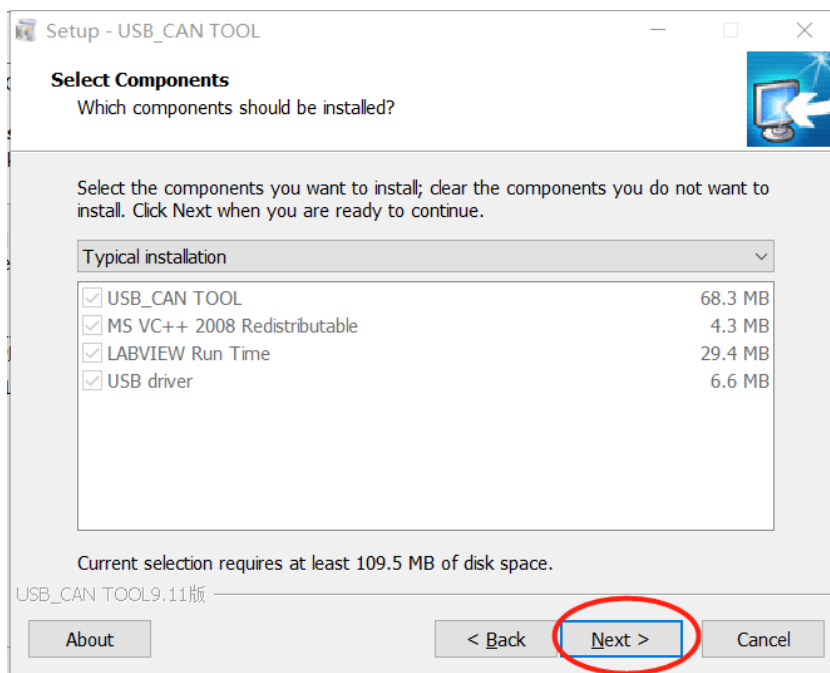
The above description is effective for each CAN channel.

# Chapter 3: Driver installation and USB-CAN tool

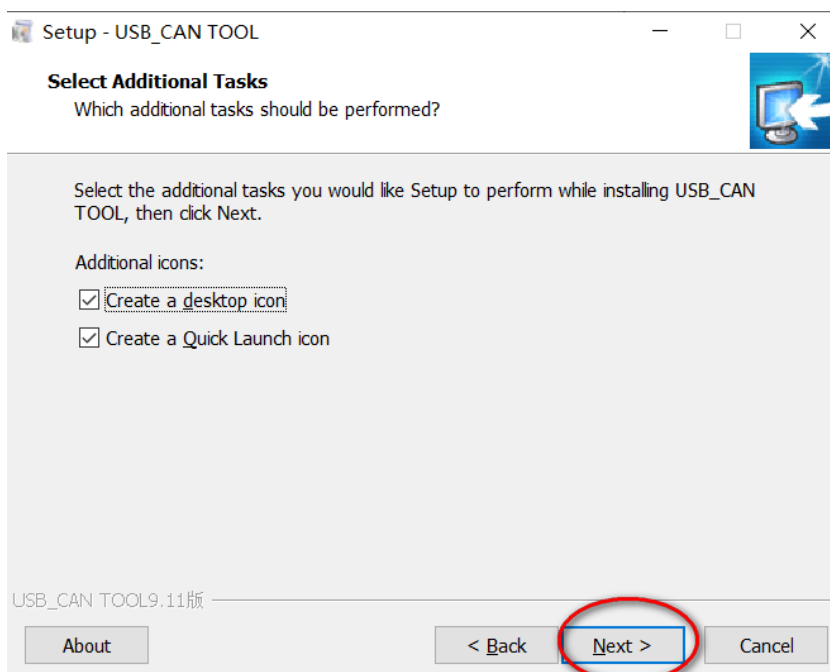
## 3.1 USB-CAN tool software

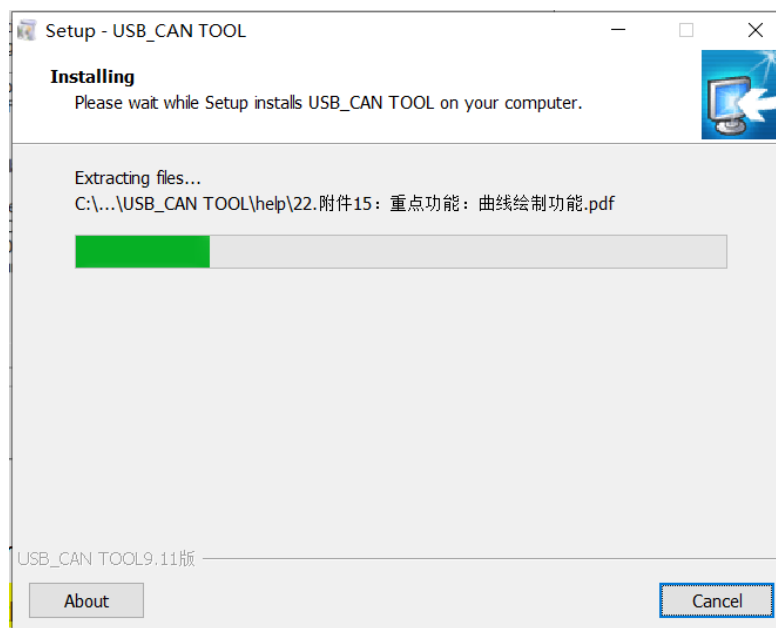
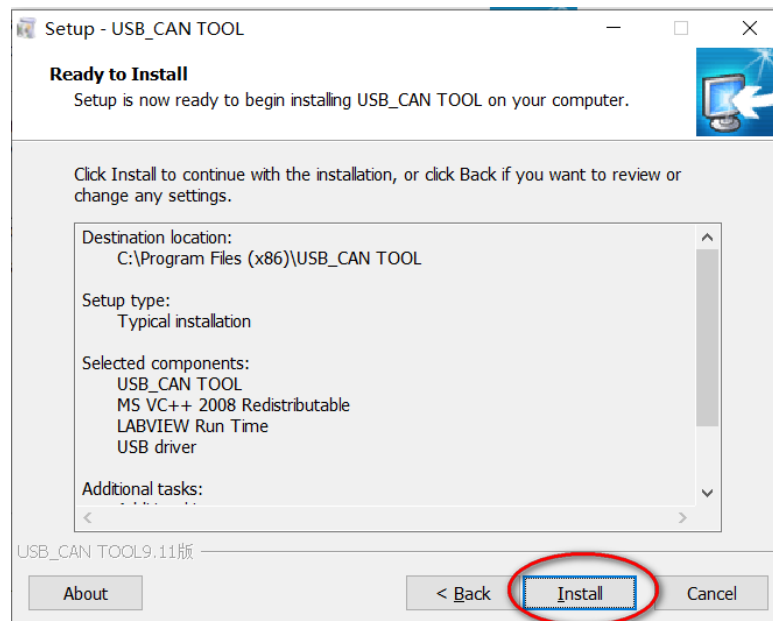
Run and install USB-CAN TOOL Setup.exe directly from “CD-ROM directory\How to use English software\USB\_CAN TOOL\USBCANToolSetup.exe”

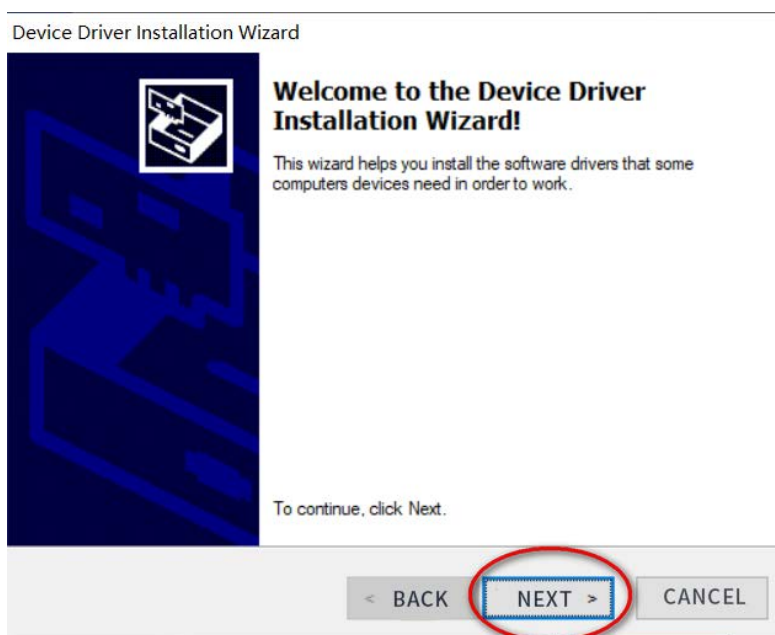
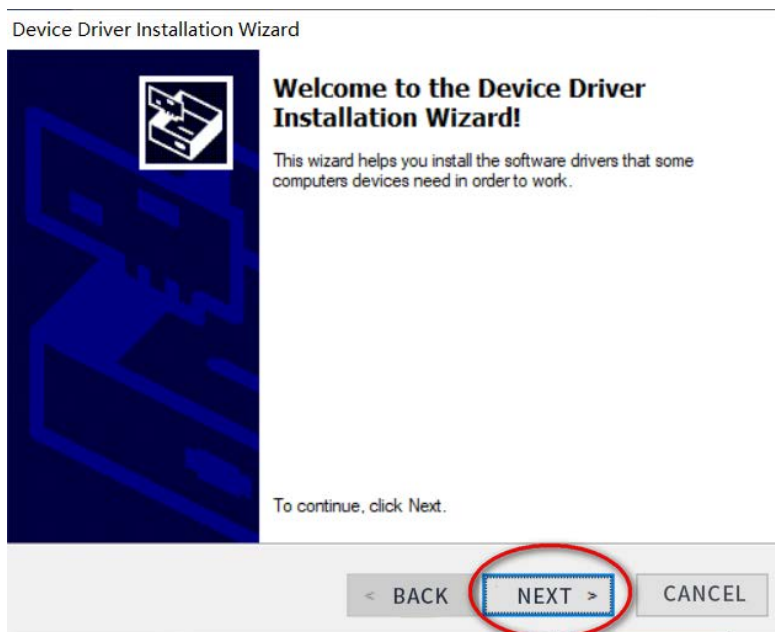




First time to install the USB-CAN please make sure to check “run Engine” .this installation package is needed for the application developed from the LABVIEW environment.





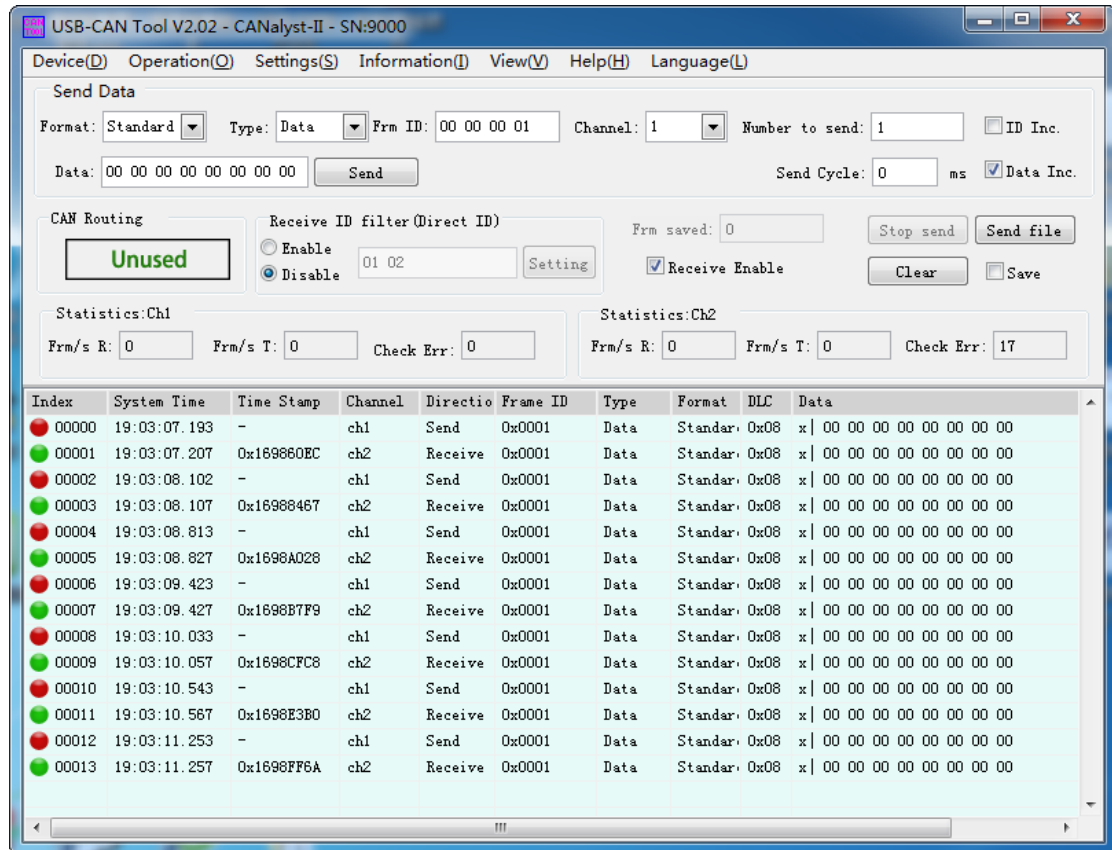


If you need termination resistor, connect R+ with R-.

**Note:** must ensure that there are two 120 ohm termination resistors connected to the bus, otherwise it will cause CAN-bus work abnormality.

Connect the USB interface of the device with PC via USB.

Run “USB-CAN Tool.exe” as shown in the following figure:



### 3.2 Software operation and Features

- Select Device

If use USB-CAN-2(A/C) or CANalyst-II Analyzer product, select menu "Select Device"-> "USB-CAN2.0"(the default option).

- Start/Stop Device

Select menu "Device Operation"-> "Start", to open specified channel, USB-CAN Tool forced to start all channels.

Select menu "Device Operation"-> "Stop", to close all running channels.

- Registers

Select menu "Device Operation"-> "Registers", to view the registers' information (compatible the ZLG mode).

- current configuration

Select menu "Information"-> "ParamNow", to view the current configuration.

- Device Information

Select menu "Information"-> "Device Information", to view the device information such as product model, serial number, version number, etc.

- Select Channel

USB-CAN-2(A/C) product have two channels, the index number is respectively 0, 1 (Ch1, Ch2).

Set CAN parameters to ensure that the setting is correct for each channel.

- CAN Baud Rate

Select menu "Settings" -> "CAN Settings", to modify the value into your needs

If connected with external devices, please must make sure baud rate is same to the external devices then click "Set", there is a message when success.

**Note: We recommend that you first set baud rate, then connect it to CAN-bus.**

- Work mode

USB CAN products support 3 kind of work-mode: normal, listen, self-Test (loopback).

Normal: The CAN module will appear on the CAN-bus, and it can send and receive CAN messages.

Listen: The module will appear on the CAN-bus, but in a passive state. It can receive CAN messages, but cannot transmit CAN messages or answer. This mode can be used as a bus monitor because it does not affect CAN-bus communications but can observe the CAN-bus states.

Self-Test (loopback): For adapter self-test, CAN module receives its own messages. In this mode, the send part of the CAN module is connected internally with the reception one. This mode will provide a "false" response, so that don't need another node to provide the acknowledge bit. And the CAN messages will not sent to CAN-bus.

- Filter

Users can set the filter-mode, ACR and AMR to filter the received CAN messages.

Note: please refer to 《9.annex 2:CAN description parameter setting》 for further information.

- Transmit messages

When transmit messages, need to select extend frame/standard frame, a remote frame/data frame, frame ID, data length, data and other information.

Please enter 16 hexadecimal format values In the CAN test software ID edit box and data edit box, and each value need space. When sending ID up from the top 4 values, data up to the first 8 values.

Note: The “System time” in data list is system time in computer, and compare with the actual eventuate-time there may be up to 50ms difference.

**Attention: The USB-CAN products will not receive acknowledge message when it isn't connect to the CAN-bus or parameters settings error , then it will resend the messages automatic until the message is received by other node in CAN-bus or the USB-CAN product restart. There is 1000 frames length send buffer, it will return 0 when call the “VCI\_transmit” function failure.**

- ID Format

There are two kind of format for ID format: SJA1000 mode (Align Left) and Real ID (Align Right).

SJA1000 mode: SJA1000 internal registers format, the highest bit of the ID and ID byte Bit31 alignment. For example, standard frame ID = 2, make 0x00 00 00 02 shift left 21 bit, and the SJA1000 mode ID is 0x 00 40 00 00; if the frame is extended one, make 0x00 00 00 02 shift left 3 bit, then the SJA1000 mode ID is 0x00 00 00 10(temporary invalid).

Real ID: The lowest bit (Bit0) of ID is aligned with the ID byte Bit0. For example, if ID = 2, then file 00 00 00 02 in the ID edit box directly. This format is simple and intuitive.

Each time the data will be displayed in the list box on the interface.

- Enable/Disable Receive

Check “CAN receive enable” to open the receive thread. The latest messages will be shown in list control in time. If uncheck “CAN receive enable”, when there are messages on CAN-bus, the receive buffer on the USB-CAN adapter may overflow.

When in the high-speed receiving, it is best not operating the CAN settings, query etc.

Open the CAN bus receiver function, when check receiving box in the main interface, receiving function is opened at the same time.

If the data received from the other CAN node will be displayed on the interface.

- High-speed mode, show list data, information save



These three items are located in “Display” menu.

When the “High-speed mode” is checked, “show list data” and “information saves” become invalid.

When the “show list data” is checked, the latest messages will be shown in list control make CAN message monitoring more in time.

When the “information save” is checked, the messages will be save to the specified text-format excel-file for a long time.

**We recommend that you check the "high-speed mode" in order to save memory and CPU consumption when using the high-speed transceiver.**

### 3.3 Self-Test

Each channel supports self-test mode.

Do Self-test in the following steps:

- 1) Plug the USB-CAN adapter into the PC's USB, and then run the “USB-CAN Tool”.
- 2) Select menu “Select Device”→ “USB-CAN 2.0”, then select menu “Device Operation”→ “Start” to open the USB-CAN adapter, and set the “work mode” to “self-test” in next popup dialog.
- 3) In the main UI Send area, set “Frames=1”, “Send Interval=1000”, check “CAN receive enable”, then, click “send” button to send message. It will receive the same message in same channel.

If there is no problem in the receiving function test shows that the USB - CAN adapter no fault in the work.

USB - CAN - 2 (A/C), CANalyst-II has dual channel CAN interfaces, you also can interconnect channel1 and cchannel2 to test. This test is more comprehensive, and can direct response CAN transceiver failure, please refer to the 《USB - CAN bus adapter test documentation》 for more detail.

Tips:

If the above operation is not success, please check the correct steps carefully. If it still does not work, please contact us.

If it can't receive messages after the USB-CAN adapter restart, may need to restart

the USB-CAN Tool.

When using the adapter for external CAN equipment debugging, please put the USB - CAN CANH, CANL corresponding connected with CANH, CANL of external CAN devices, other line do not need to connect.

### **3.4 Simultaneous use of multiple USB-CAN**

USB-CAN Tool supports the same computer to connect up to four USB-CAN modules at the same time. Please refer to 《multiple cards operation at the same time instruction handbook》 for More details.

**Note: more detailed information about USB - CAN tool, please refer to 《the USB - CAN tool instructions》 .**