



WAVESHARE USB-CAN-B USB to CAN Adapter User Manual

[Home](#) » [WAVESHARE](#) » WAVESHARE USB-CAN-B USB to CAN Adapter User Manual 

Contents

- 1 WAVESHARE USB-CAN-B USB to CAN Adapter
- 2 PRODUCT FEATURES
 - 2.1 PRODUCT OVERVIEW
 - 2.2 PARAMETERS
 - 2.3 TYPICAL APPLICATIONS
- 3 APPEARANCE AND INTERFACE
 - 3.1 APPEARANCE OF THE PRODUCT
 - 3.2 SIGNAL DEFINITION
 - 3.3 FACTORY CONFIGURATION
- 4 DRIVER INSTALLATION AND USB-CAN-B TOOL
 - 4.1 DRIVER INSTALLATION
 - 4.2 USB-CAN-B TOOL SOFTWARE
 - 4.3 SOFTWARE OPERATION AND FEATURES
 - 4.4 SELF-TEST
 - 4.5 SIMULTANEOUS USE OF MULTIPLE USB-CAN-B
- 5 Documents / Resources
 - 5.1 References
- 6 Related Posts



WAVESHARE USB-CAN-B USB to CAN Adapter



PRODUCT FEATURES

PRODUCT OVERVIEW

USB-CAN-B-2 (A / C) bus adapter is an intelligent CAN-bus adapter with USB2.0 interface and 2 CAN interface. USB-CAN-B 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-B bus adapter/USB-CAN-B 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-B Interface Adapter / USB-CAN-B 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-B-2A: CAN-bus is not isolated, powered directly by the USB.

USB-CAN-B-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.

USB-CAN-B: USB, CAN1, CAN2 are completely isolated.

We can provide USB-CAN-B-Tool software to help you operating the USB-CAN-B 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-B bus interface adapter and USB-CAN-B.

PARAMETERS

- Support protocol conversion between USB and CAN-bus;
- USB-CAN-B-2(A/C) is dual-channel intelligent CAN interface module;
- USB-CAN-B 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-B-2A products: CAN-bus interface is not isolated;
- USB-CAN-B-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.
- USB-CAN-B: 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-B-2A products: no electrical isolation;
- USB-CAN-B-2C products: adopt electrical isolation, the isolation voltage is: 2500V;
- USB-CAN-B, 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-B interface adapter.

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.

APPEARANCE AND INTERFACE

APPEARANCE OF THE PRODUCT

There are two sets of external interfaces on USB-CAN-B/ USB-CAN-B intelligent CAN interface adapter: A standard USB interface, an 8-pin binding post terminals (USB-CAN-B for 6 pin), CAN-bus interface is available. Power indicator light of our products is red except USB-CAN-B for highlighted in red.

When LED- CAN1 Channel1 indicator light is red (USB-CAN-B for blue) indicate the transmitting or receiving state of the channel1. When the USB-CAN-B 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(USB-CAN-B for highlighted in red) indicate the transmitting or receiving state of the channel 2. When the USB-CAN-B adapter insert into a USB interface, the power is turned on, the LED- CAN2 indicator light flashes twice for system self-test.



SIGNAL DEFINITION

Series of USB-CAN-B 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
USB-CAN-B 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
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-B 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-B adapter immediately, when a user application call the Receive-Function, the message will be return.

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 USB-CAN-B) 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.

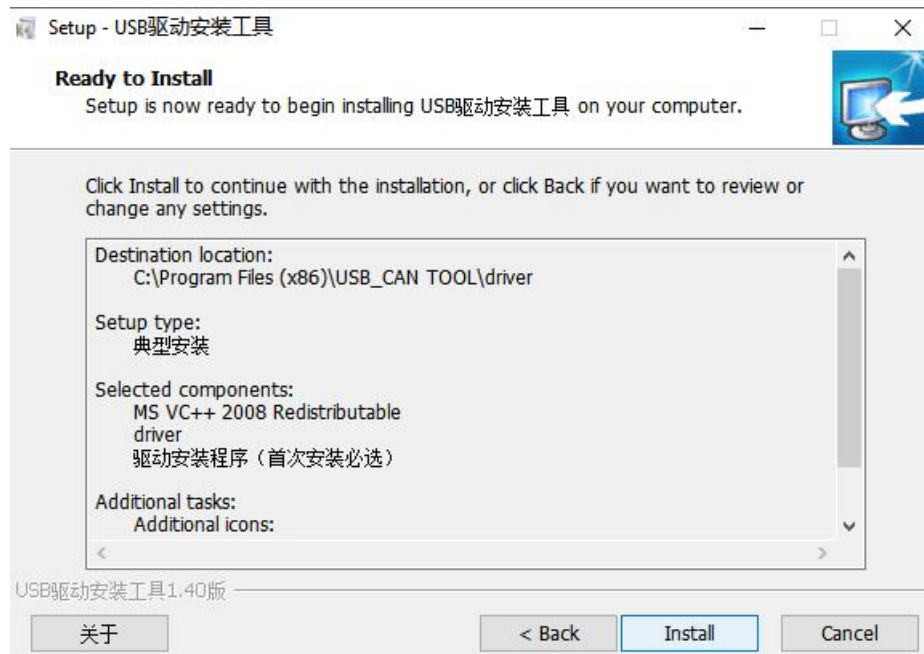
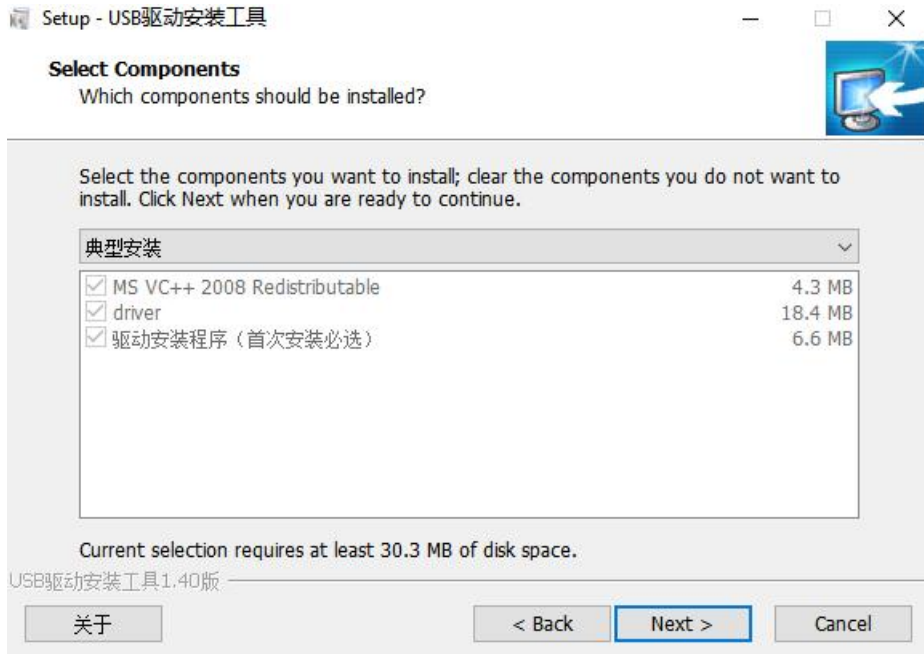
The above description is effective for each CAN channel.

DRIVER INSTALLATION AND USB-CAN-B TOOL

DRIVER INSTALLATION

WIN7 & WIN8& WIN10 & WIN11 SYSTEM

Connect USB-CAN-B intelligent interface module to the PC with USB cable correctly. The Windows will then auto run an installation wizard called “new hardware is found” after the hardware is detected. Select “Install the software automatically (Recommended)”. Click “Next” to continue;





Welcome to the Device Driver Installation Wizard!

This wizard helps you install the software drivers that some computers devices need in order to work.

To continue, click Next.

< Back

Next >

Cancel



Completing the Device Driver Installation Wizard

The drivers were successfully installed on this computer.

You can now connect your device to this computer. If your device came with instructions, please read them first.

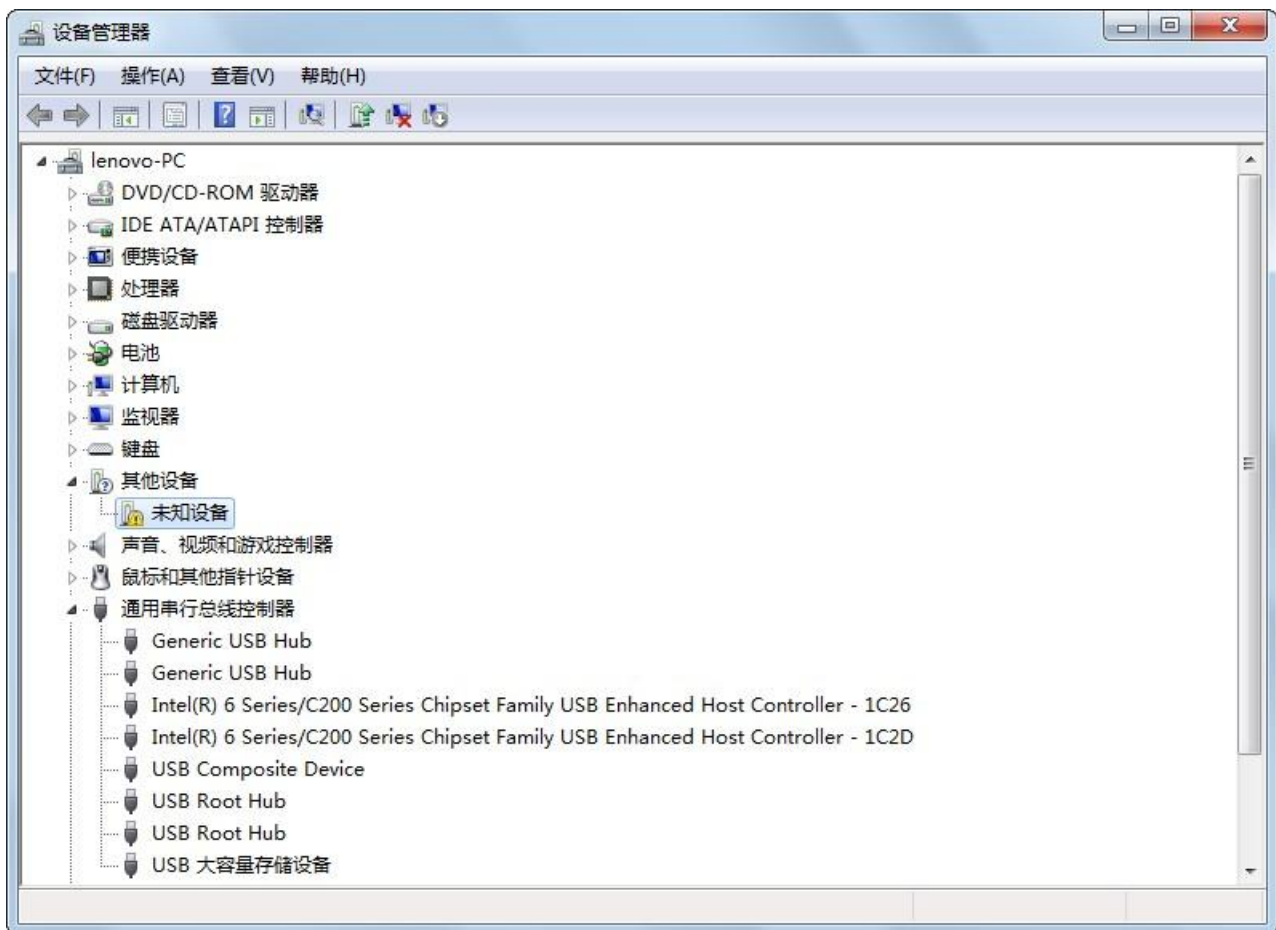
Driver Name	Status
✓ Microchip Technology, I...	Ready to use

< Back

Finish

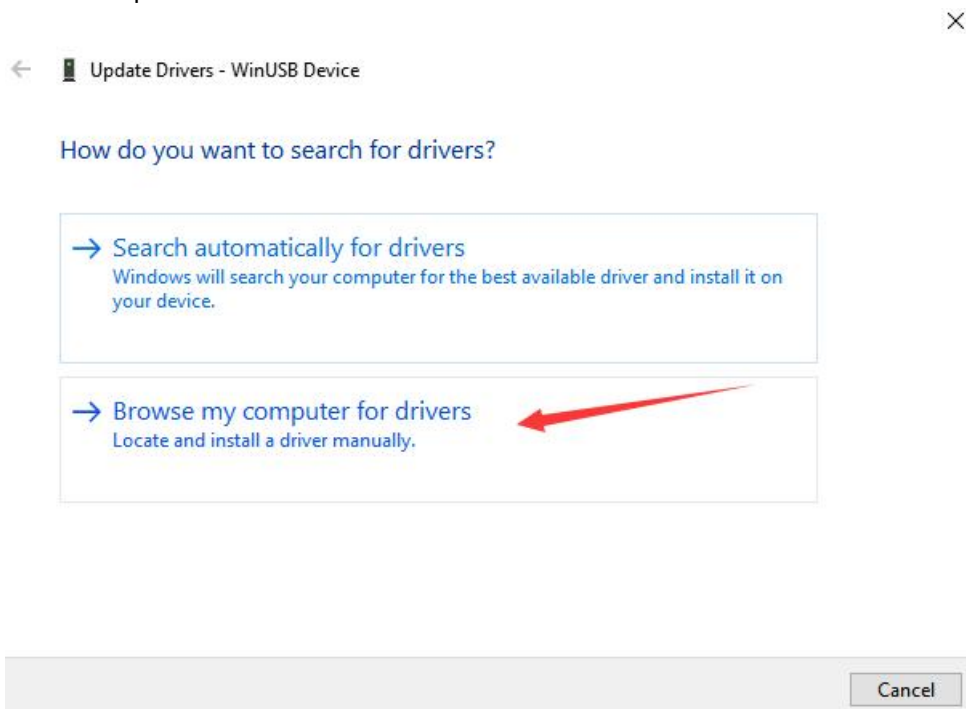
Cancel

If the windows 7 do not run the wizard, Right click "My Computer" and select "Device Manager" and find the "other devices" in other devices list:



Right-click “unknown device”, select “update driver software”, manually add the driver of the device. Select the driver for installation from directory as showed in diagram below. Then it will prompt a message said whether to confirm the installation, click confirm to go.

Select “Browse the computer to find the driver software” and click next.



Select directory and install (driver located in the directory of directory [hardware drivers]). Select directory and install Usb_Drivers(Manual installation) in the directory of [hardware drivers]. Use the “Browse for Folder” window selects where the driver is:

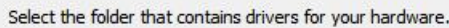


Search for drivers in this location:

Browse...

☒

This list will show available drivers compatible with the device, and all drivers in the



“USB-CAN-B”.



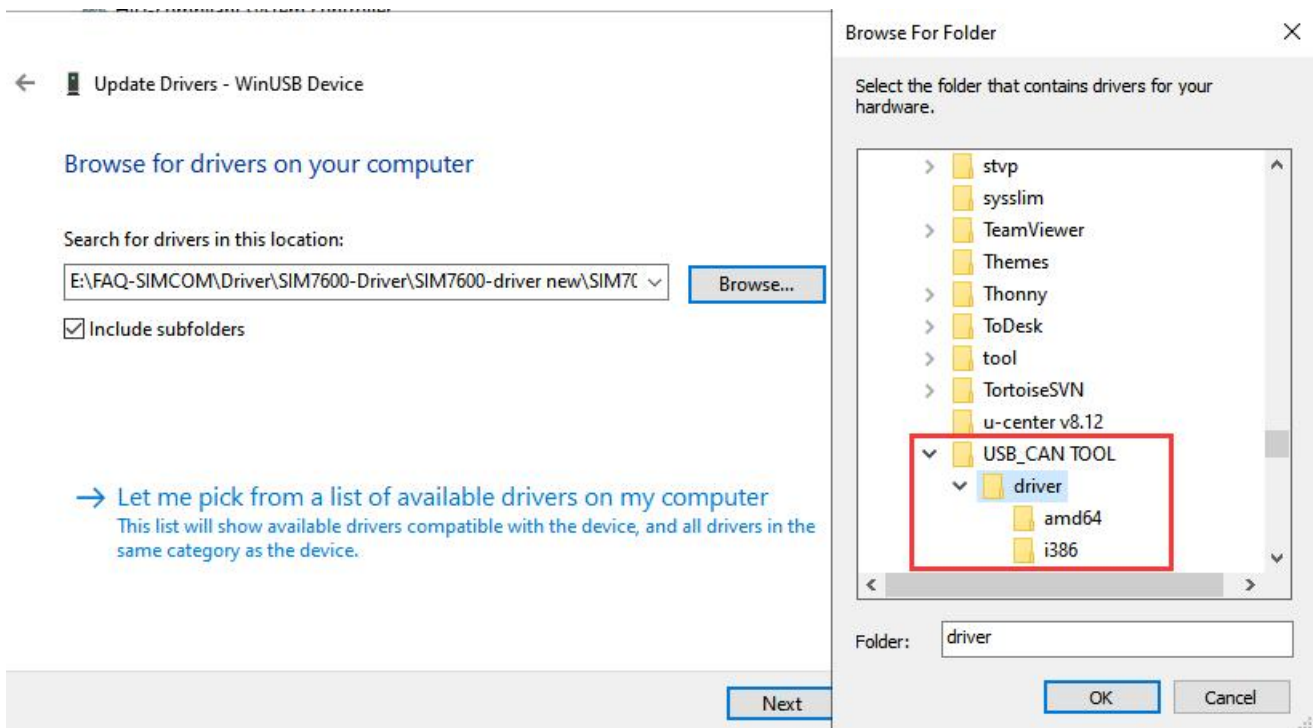
Search for drivers in this location:

Browse...

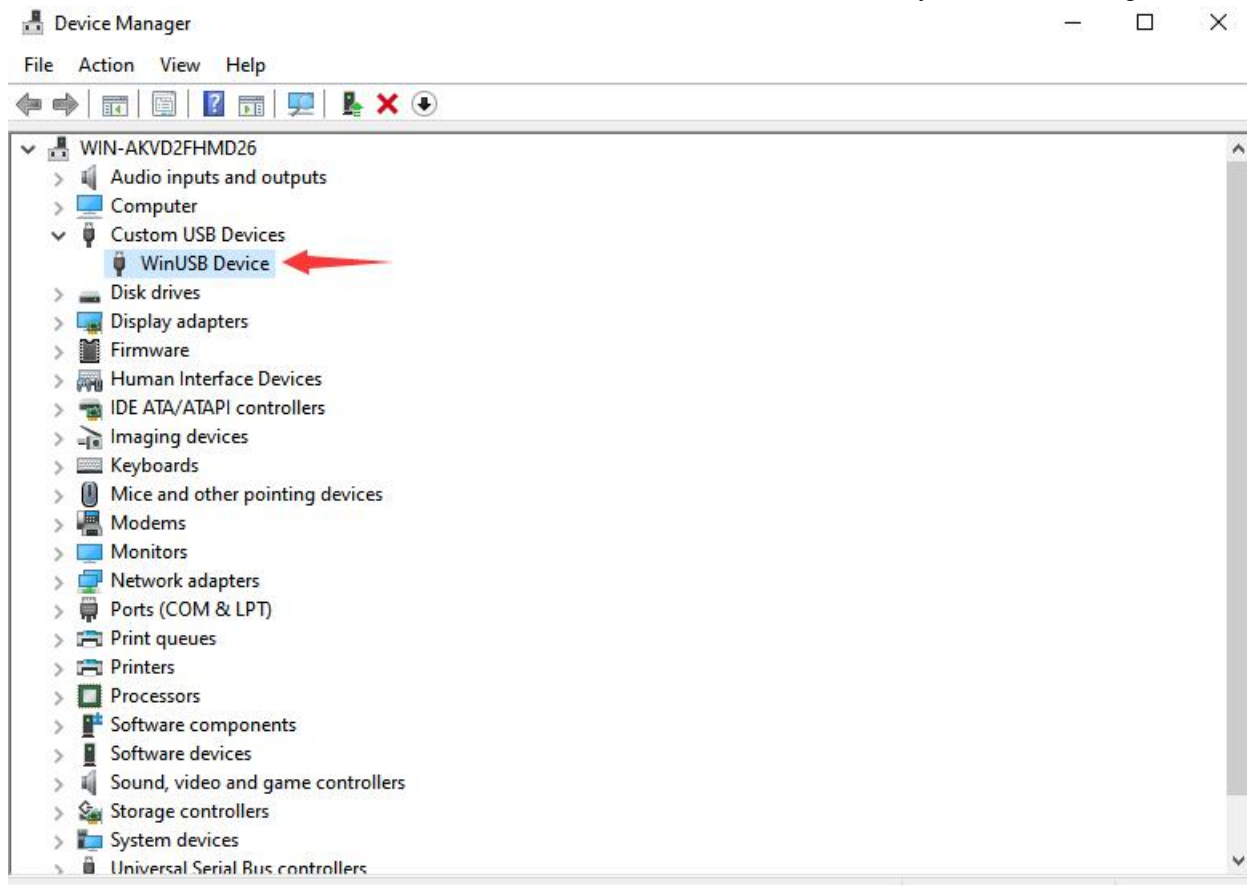
☒

This list will show available drivers compatible with the device, and all drivers in the same category as the device.

If installed “USB_CAN TOOL Setup. exe”, the corresponding USB drive will generate in the software installation directory, so can also install the driver from the file of corresponding USB drive.



After installation, “USB-CAN-B or USB_CAN Device” will be added to the directory of device manager.



After installation, “WinUSB Device” will be added to the directory of device manager.

If installed “USB_CAN TOOL Setup. Exe”, the corresponding USB drive will generate in the software installation directory, so can also install the driver from the file of corresponding USB drive.

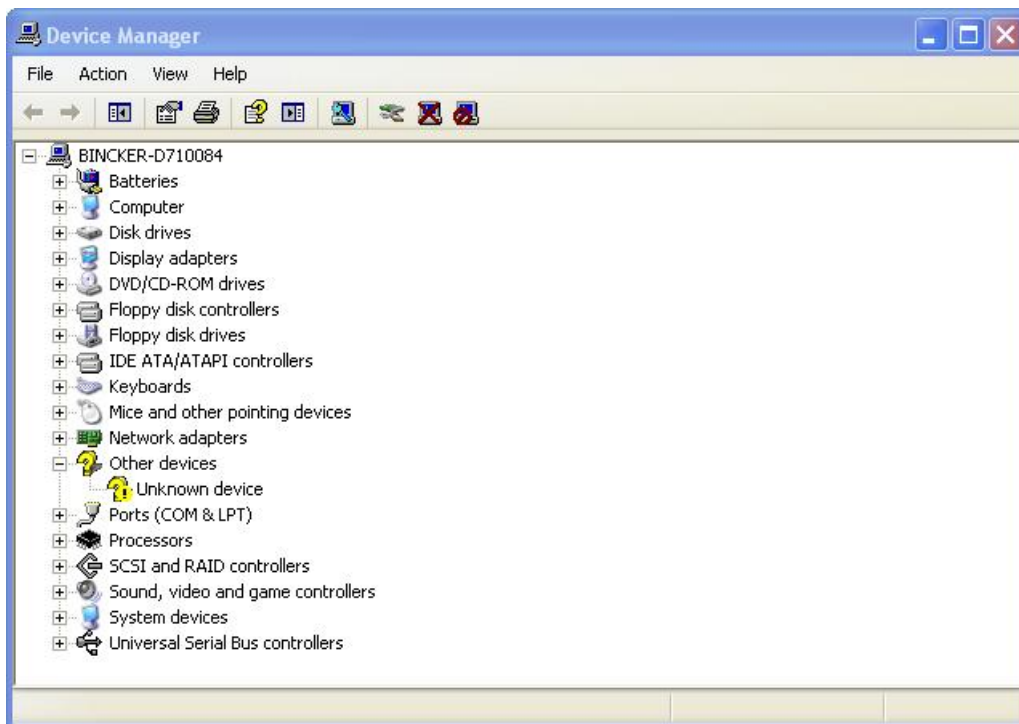
WINDOWS XP

Connect USB-CAN-B intelligent interface module to the PC with USB cable correctly.

The Windows will then auto run an installation wizard called “new hardware is found” after the hardware is detected. Select “Install the software automatically (Recommended)”. Click “Next” to continue;



If the windows XP do not run the wizard, Right click “My Computer” and select “Device Manager” and find the “other devices” in other devices list:



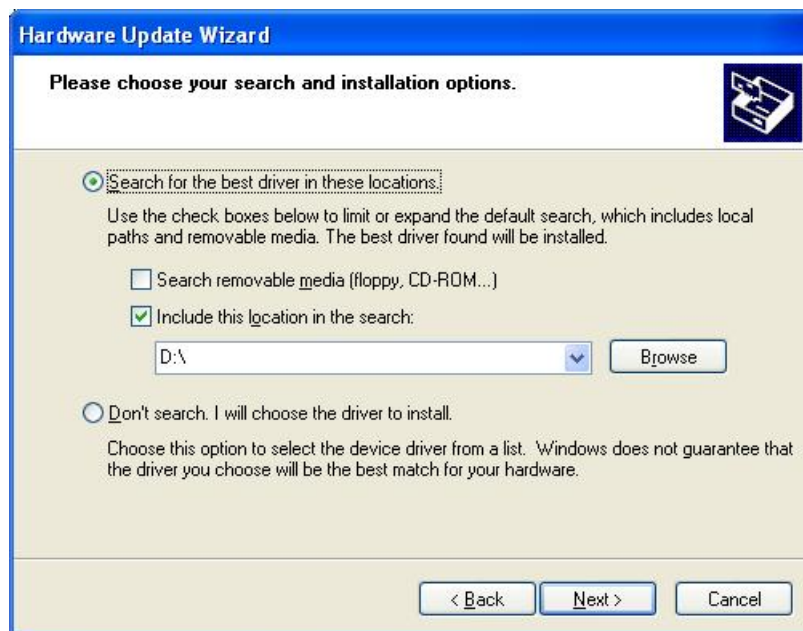
Right click “Unknown device”, and select “Update Driver” from the menu:



Select “Install from a list or specific location (Advanced)” .Click “Next” to continue:



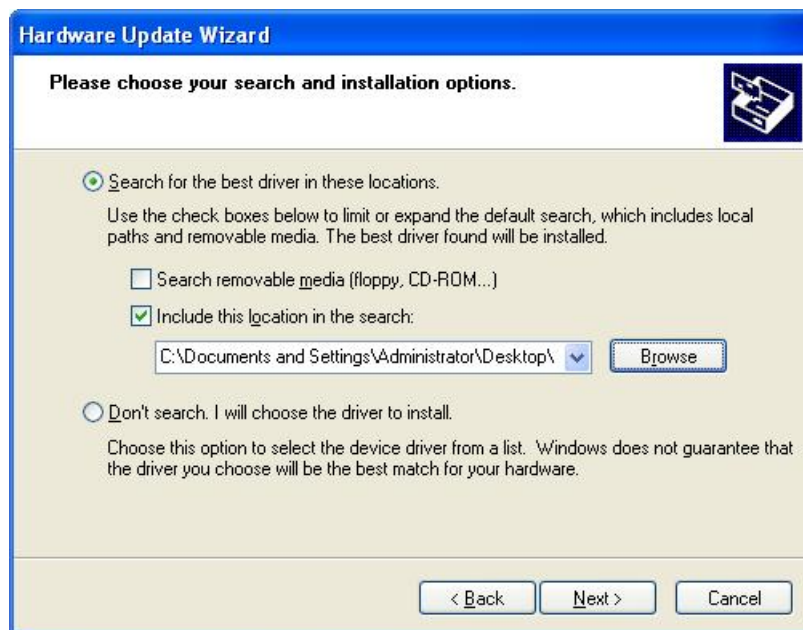
Next, select “Search for the best driver in these locations”, and check “Include this location in the search:”(do not select “Search removable media otherwise it is possible to come with an exclamation point or tips after successfully installed the driver and reboot the corresponding device in Device Manager which causing the device unusable.). Then click “Browse” button to browse the driver folder:



Select directory and install (driver located in the directory of directory [hardware drivers]).
 Select directory and install “USB-CAN-B” (Depending on the model) in the directory of [hardware drivers]. Use the “Browse for Folder” window selects where the driver is:



Click "OK" to finish selection:



Click "Next" to search and install driver:





In some cases, the system will prompt a message that the WinUSBCoInstaller2.dll cannot be found. Then, click "Browse", and select the WinUSBCoInstaller2.dll file from the i386 (for 32 bit system) or AMD64 (for 64 bit systems) folder in the directory of drive program directory "USB-CAN-B".





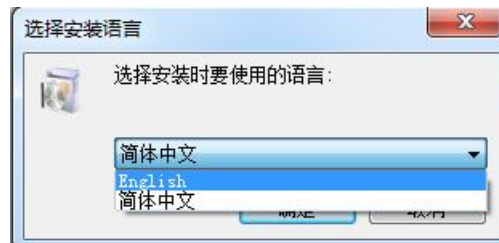
When the system suggest to restart, or an exclamation point on a model in the device manager appear, please restart the system.

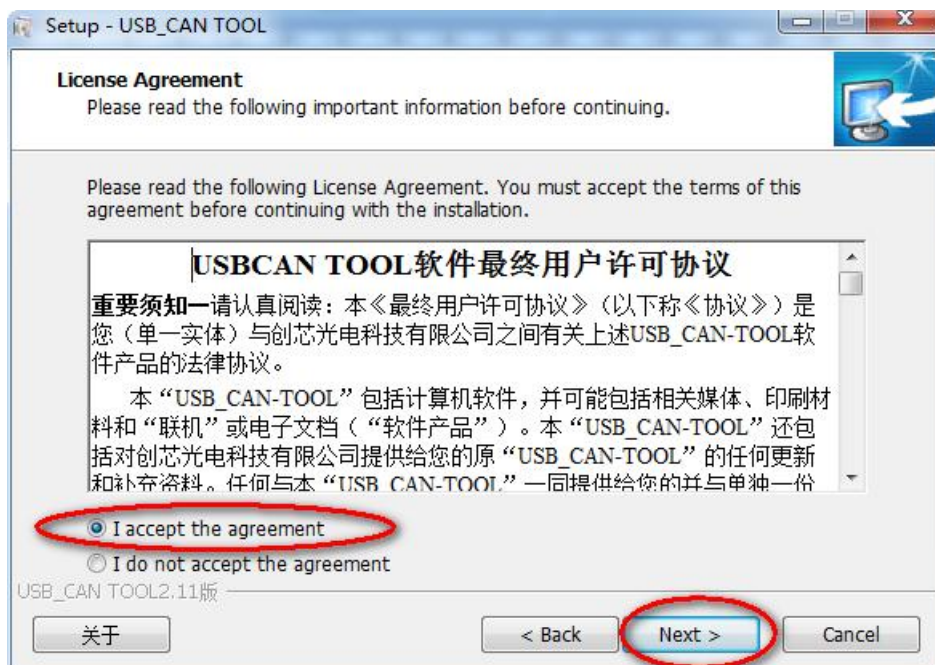
After installation, “USB-CAN-B or USB_CAN Device” will be added to the directory of device manager.

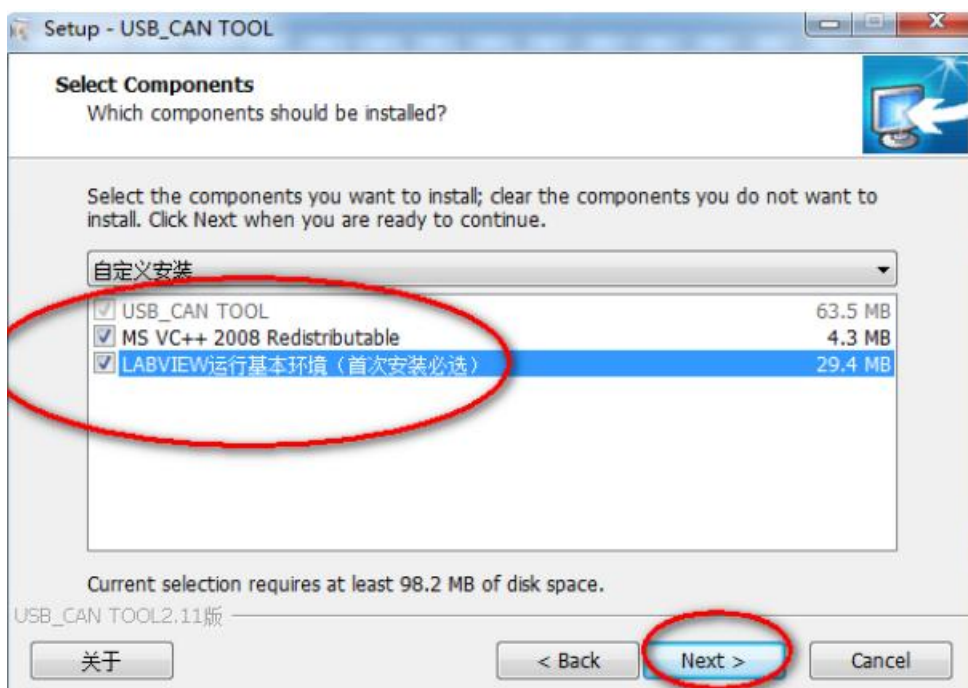
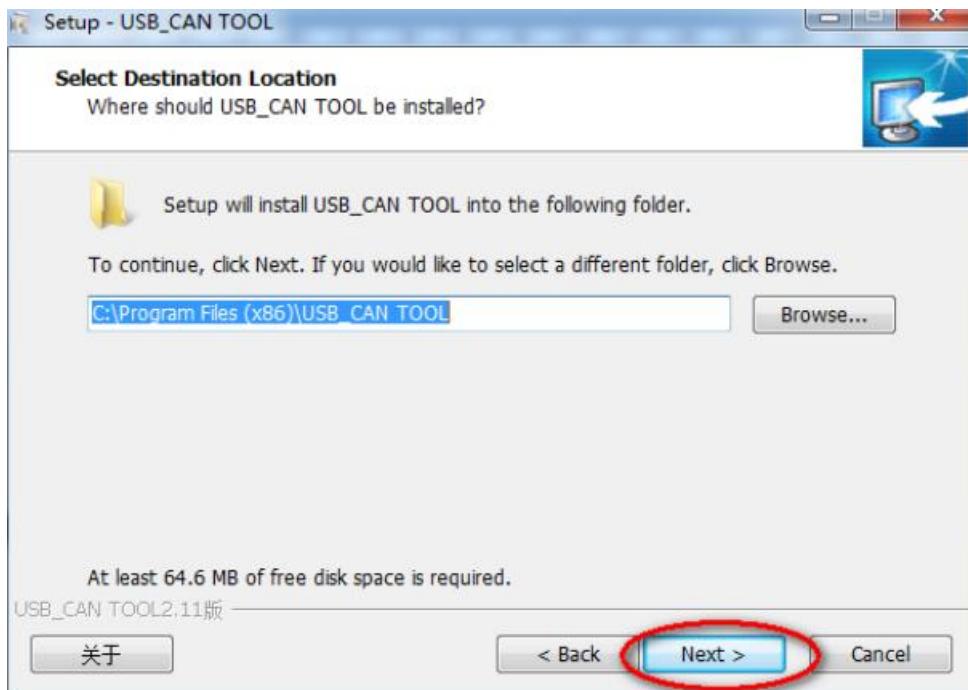
If installed “USB_CAN TOOL Setup. Exe”, the corresponding USB drive will generate in the software installation directory, so can also install the driver from the file of corresponding USB drive.

USB-CAN-B TOOL SOFTWARE

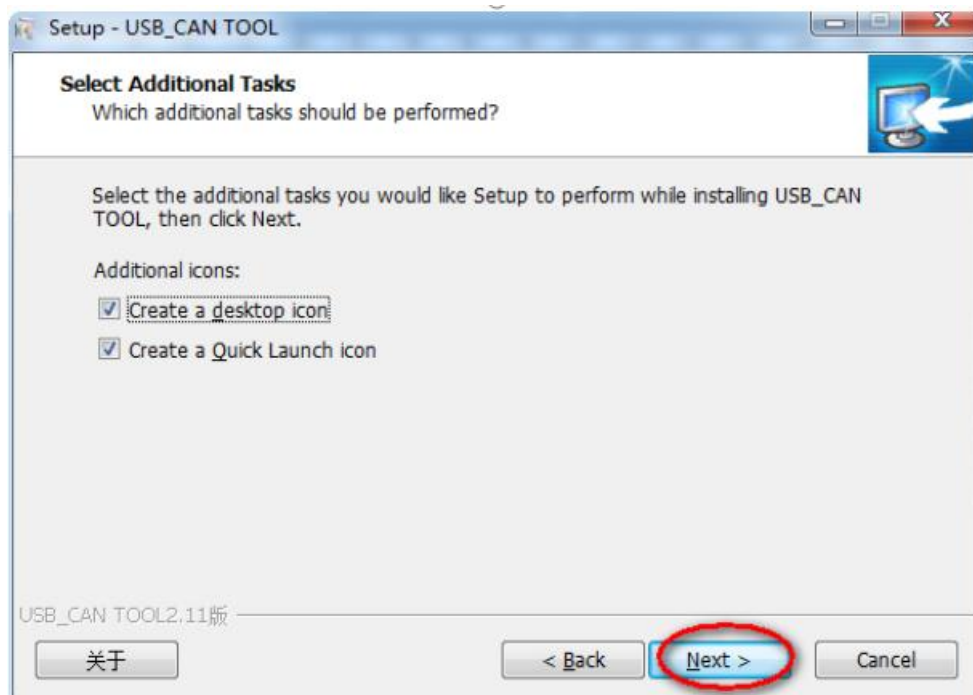
Run and install USB-CAN-B TOOL Setup.exe

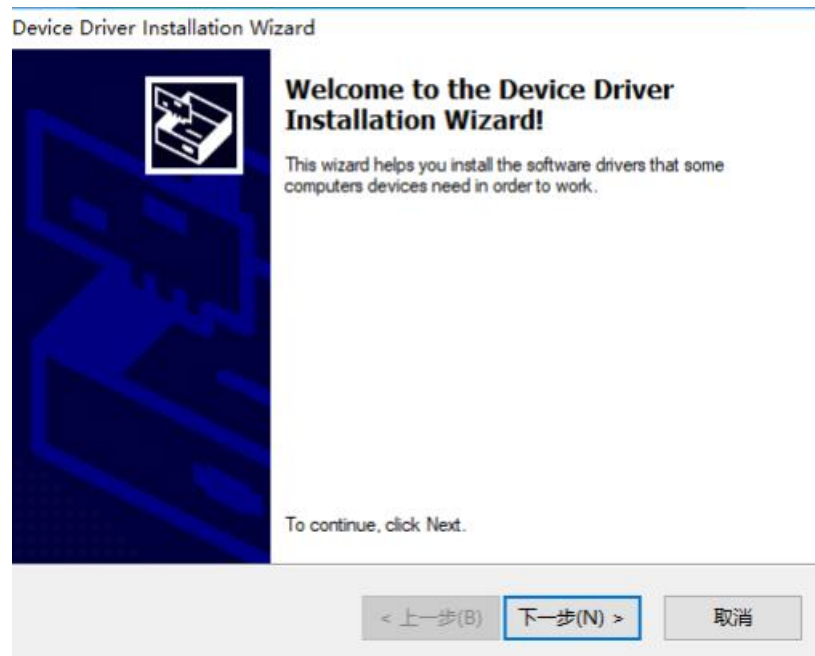
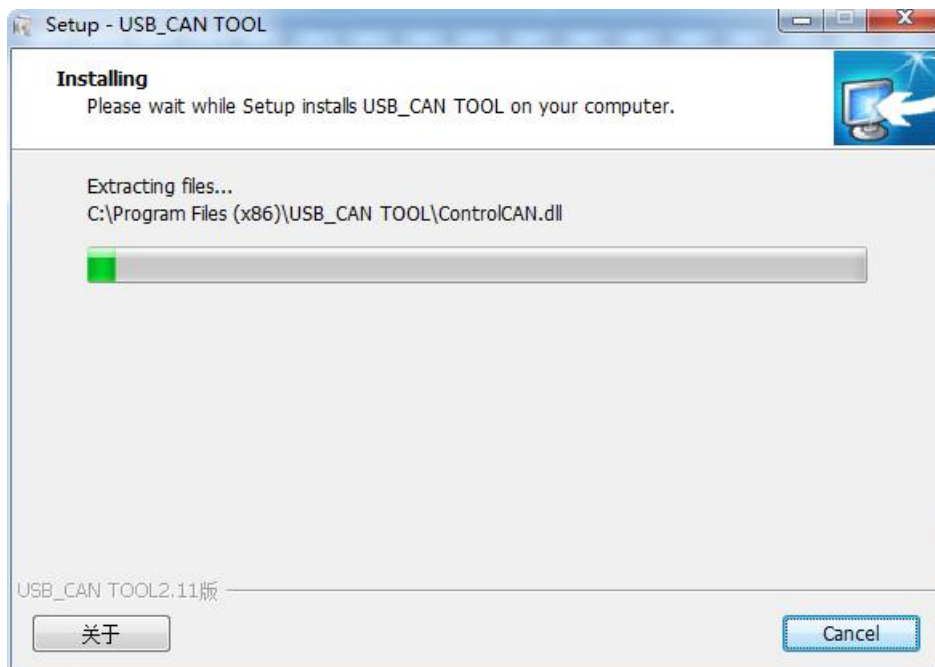






First time to install the USB-CAN-B please make sure to check “run Engine” .this installation package is needed for the application developed from the LABVIEW environment.
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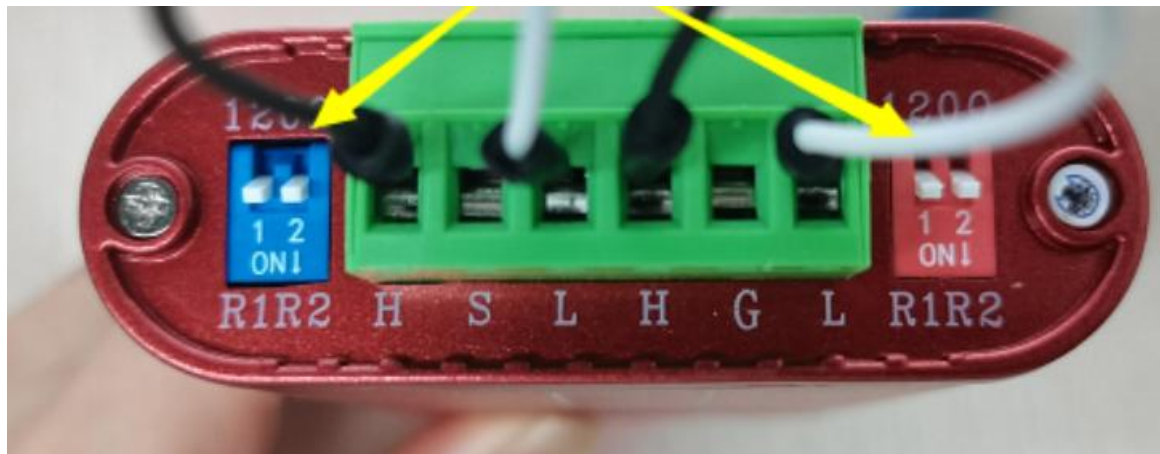




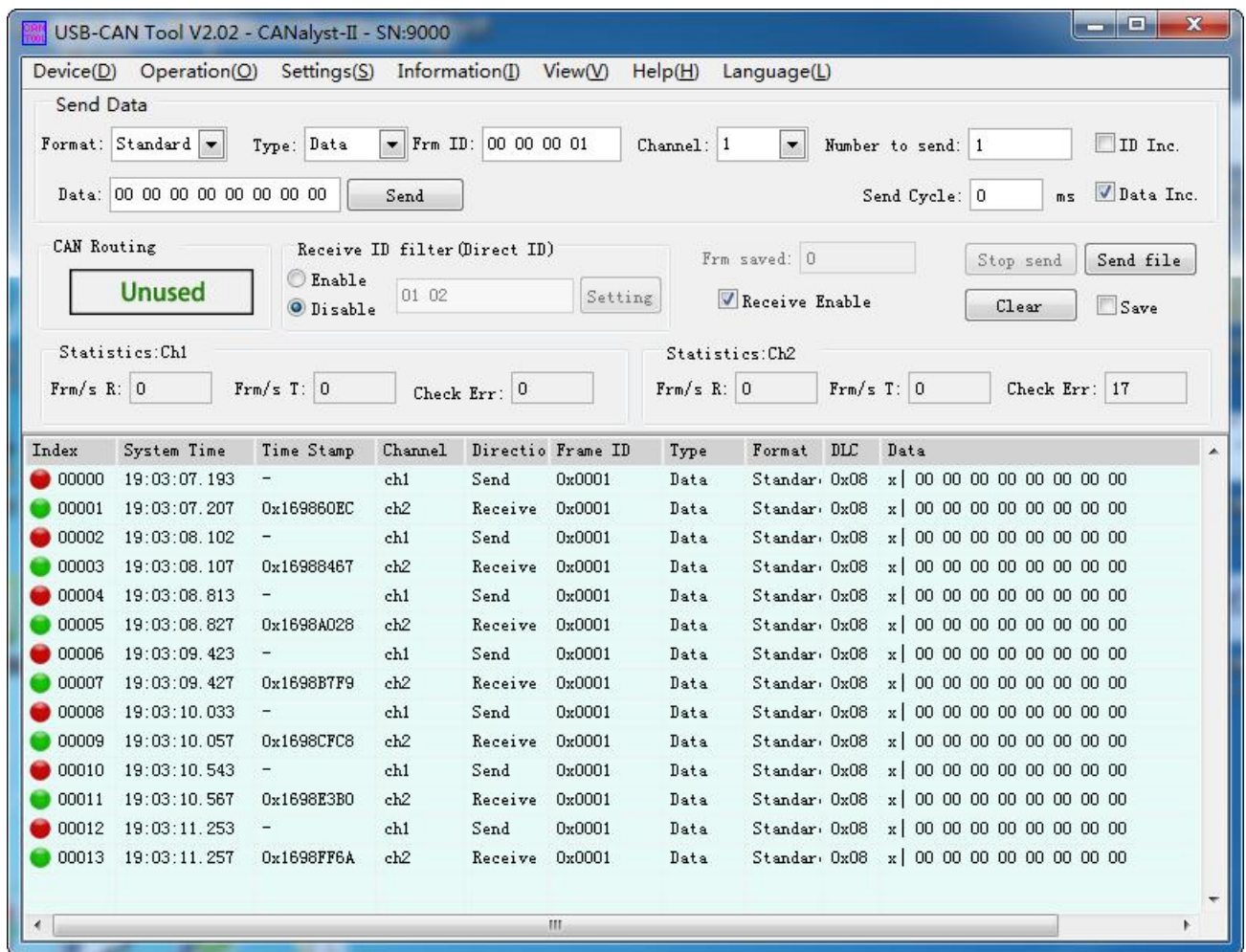
If you need termination resistor, connect R+ with R-.

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.

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



Run "USB-CAN-B Tool.exe" as shown in the following figure:



SOFTWARE OPERATION AND FEATURES

Select Device

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

Start/Stop Device

Select menu "Device Operation"-> "Start", to open specified channel, USB-CAN-B 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-B-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-B 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-B 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-B 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.

SELF-TEST

Each channel supports self-test mode. Do Self-test in the following steps:

1. Plug the USB-CAN-B adapter into the PC’s USB, and then run the “USB-CAN-B Tool”.
2. Select menu “Select Device” “USB-CAN-B 2.0”, then select menu “Device Operation” “Start” to open the USB-CAN-B 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), USB-CAN-B 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 testdocumentation“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-B adapter restart, may need to restart the USB-CAN-B 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.


SIMULTANEOUS USE OF MULTIPLE USB-CAN-B

USB-CAN-B Tool supports the same computer to connect up to four USB-CAN-B 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”.

www.waveshare.com
www.waveshare.com/wiki

Documents / Resources

	<p>WAVESHARE USB-CAN-B USB to CAN Adapter [pdf] User Manual USB-CAN-B USB to CAN Adapter, USB-CAN-B, USB to CAN Adapter, CAN Adapter, Adapter</p>
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References

-  [Waveshare Electronics](#)
-  [Waveshare Wiki](#)

