



Korlan USB2CAN User Guide

High quality isolated USB to CAN interface

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Changes history

Date	Change list
2019-04-02	Initial release
2020-04-20	Updated LED indication statuses on page 6
2020-04-28	Added firmware upgrade instructions on page 18

1. Introduction

With Korlan USB2CAN you can monitor a CAN network, write a CAN program and communicate with industrial, medical, automotive or other CAN based device. It comes in two different versions: DB9 or OBD2.

The Korlan CANBUS USB adapter connects a CAN bus to the USB port of any device running Linux or Windows operating system, which also supplies the power to the adapter (no power supply needed). In the downloads section now you can find all the related drivers and software applications and even Windows 7 64-bit kernel driver, which was added recently.

1.1 Usage warning

Your use of this device must be done with caution and a full understanding of the risks!

This warning is presented to inform you that the operation of this device may be dangerous. Your actions can influence the behaviour or a can-based distributed embedded system and depending on the application, the consequences of your improper actions could cause serious operation malfunction, loss of information, damage to equipment and physical injury to yourself or others.

1.2 Technical specification

Connectors	
Computer	USB 2.0 Full speed, Type A connector
CAN	D-SUB, 9 pins. CAN-CIA standard interface pin assignment or OBD2, 16 pins. Standard interface pin assignment.
CAN	
Specification	ISO 11898-2 High-speed CAN
	2.0A (standard format) and 2.0B (extended format)
Bit rates	50, 50, 100, 125, 250, 500, 800, 1000 Kbit/s or user definable
Controller	ARM 32bit Cortex-M0 (STM32F072)
Transceiver	TI ISO1050
Galvanic isolation	Up to 2.5kV, separate for each CAN channel
Termination	None
Measures	
Size	110 x 36.7 x 16.2 mm (L x W x H), no cable
Weight	DB9 version: 100g with cable, OBD2 version: 140g with cable
Environment	
Operating temperature	From -35°C to +55°C
Relative humidity	15-90%, not condensing
Usage	Indoor only
Other	
Available drivers	Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 10, Linux
3rd party ptotocol support	Driver for VSCP protocol
	Open source CANAL API DLL for Windows
	Linux SocketCAN compatible

2. USB2CAN converter

2.1 CAN connector pinout

Figure 2-1. DB9 connector



Pin	Signal	Description
1	-	No connection
2	CANL	CANL bus line (dominant low)
3	CAN GND	CAN Ground
4	-	No connection
5	CAN_SHLD	Connected to CAN GND via 100 Ω /0.1uF
6	CAN GND	CAN Ground
7	CANH	CANH bus line (dominant high)
8	-	No connection
9	-	No connection

Figure 2-2. ODB2 connector



Pin number	Description
4	GND
5	GND
6	CAN Bus High
14	CAN Bus LOW

Note: All other pins on OBD2 are not used and not connected.

2.2 LED indication

Korlan USB2CAN has three LEDs (INFO, STAT, PWR) for device status indication. Device status Indication modes are listed in the table below.



2.3 CAN bus termination

A High-speed CAN bus (ISO 11898-2) must be terminated on both ends with 120 Ohms. Standard termination example.



The 120- Ω characteristic impedance twisted-pair cable must be terminated with an impedance of the same value to minimized reflected waves that occur from miss-matched impedances. Bad terminal may cause signal reflections and the transceivers of the connected CAN nodes (CAN- interface, control device) may not work.

The USB2CAN does not have an internal termination. Device must be used on a terminated CAN bus.

2.4 Testing modes

There are three testing modes supported by Korlan USB2CAN:

- Loopback
- Silent
- Silent loopback

1 Loopback mode

is used to test if the device is operational when only one device is available. If Korlan USB2CAN is in loopback mode, everything what is sent through the CAN interface is send back to device. It is like the CAN interface TX pins are connected to its RX pins.



means the interface only listens to the CAN bus. This means the unit does not even provide an ACK frame when a message is placed on the CAN bus correctly.



is self test mode which can be used in a working CAN system without interfering with it.

3. Work on Linux

3.1 Driver and configuration

The Korlan USB2CAN converter is supported by mainline Linux since version 3.9. It works with Linux distributions like Ubuntu and Debian with no additional driver installation. For older version driver must be built manually.

Recommended Linux distributions:

- Ubuntu 14.04 or newer
- · Debian 8 (Jessie) or newer

If the driver is correctly loaded, CAN interface should be seen when issuing the command sudo ip link.

Set can0 interface speed to 125 Kbps:

sudo ip link set can0 up type can bitrate 125000 sample-point 0.875

Set to can0 to "steady" state (steady green led):

sudo ip link set can0 up

To bring down interface (steady red led):

sudo ip link set can0 down

To get more information about configuration options type:

sudo ip link set can0 type can help

3.2 Tools- can-utils (send/receive CAN packets)

The programs allow to get CAN communications instantly using two commands "cansend" and "candump".

Command to install tool:

sudo apt-get install can-utils

Send byte of information (0102030405060708) to can device with id = "01010101":

cansend can0 01010101#0102030405060708

Receive everything on can0 interface:

candump can0

3.3 Tools- dfu-util (USB2CAN Firmware upgrade)

For dfu-util tool is recommended for USB2CAN firmware upgrade. The tool is used to upload firmware from PC to device over USB. The tool is available for download on 8devices WEB page.

3.4 Test code example

Code example is available to download from a WEB (USB2CAN_TEST.py)

Two CAN bus interfaces need to be connected on same computer together (Ex.: connect two USB2CAN usb ports to a computer and connect can ports together). The code sends random from one interface to another and checks if the received data is valid.

To use the code go to terminal and launch command:

python USB2CAN_TEST [can interface 1] [can interface 2] [number of packets] [baudrate]

Example to send 100 random data packets from interface can0 to can1 at a 125 Kbps baudrate:

python USB2CAN_TEST.py can0 can1 100 125000

Testing was done using Ubuntu Linux distribution. Other distributions may require additional configuration.

3.5 Firmware upgrade

Instal dfu-util (>= 0.9)

sudo apt-get install dfu-util

Switch to internal bootloader using the set_dfu utility provided with the firmware:

sudo ./set_dfu

Flash new firmware as root:

sudo dfu-util -a 0 -s 0x8008000 -D USB2CAN-v2.0.bin

4. Work on Windows

4.1 Plug and play Windows 7, 8 and 10 driver

Starting from firmware version 2.3 Korlan USB2CAN adapter is a plug and play device. You do not require any drivers or test program found on our website. These are required for all previous software versions. If you are running firmware version 2.2 or earlier with your Korlan USB2CAN devices, please check firmware upgrade instructions on section 5 (Firmware upgrade) page 18.

4.2 Windows XP driver installation

Download drivers files from 8devices WEB page:

- · 32-bit USB2CAN Windows 32-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1
- · 64-bit USB2CAN Windows 64-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1

Plug Korlan USB2CAN device to computer USB connection. Info LED should be on, Error LED should be off.

Use Hardware wizard, which will start after You plug device to PC. It can be started manually by pressing: Start – Control Panel – Add Hardware.

- When Hardware wizard starts, choose "No, not this time" and press next:
- 2 Then choose "Install from a list or specific location":
- 3 Choose "Search for the best driver in these locations", browse for drivers location and press next:











If the driver installation was successful, Korlan USB2CAN Info LED should be off, Error LED should be on. Run USB2CAN test application (can be downloaded from 8devices WEB page). Test application should find all USB to CAN devices connectd to PC and their serial numbers. Insert the device's serial number you would like to use and press **"Open"**.

Open parameters	Message	
Flags	Msg ID Flags	
🔲 Enable status messa	ages Vended	
Disable auto retrans	mission Ox1FFFFFFF RTR Clear data	
Silent		
Loopback	Data	
	0x00 0x01 0x02 0x03 0x04 0x05 0x06 0x07 🔽	Inc
ED000100 ; 125		
A 00	pen 100 Send hurst Send msg Clear list Send:	0
Sind y	pen 100 Send burst Send msg Clear list Send: Received:	ŏ
SB2CAN serial(1): ED000200		
ISB2CAN serial(0): ED000100 ISB2CAN serial(1): ED000200 ISB2CAN serial(2): 73796105		
- Versions	Status	
- Versions	Statictics Received frames: 0	
-Versions	Statictics Received frames: 0 Overruns: 0 Pereived data: 0 Bus warnings: 0 C bus off RX err: 0	
- Versions	Stabictics Received frames: 0 Overruns: 0 CAN bus off Rverr: 0 Bus warnings: 0 C bus off Rverr: 0	- 1

4.3 Windows 7 driver installation

Download drivers files from 8devices WEB page:

- 32-bit USB2CAN Windows 32-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1
- 64-bit USB2CAN Windows 64-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1

Plug USB2CAN device to computer USB connection. Info LED should be on, Error LED should be off. Use Hardware wizard, which will start after You plug device to PC.

It can be started manually by pressing **"Start"** button and then run Device manager by writing **"Device manager"** in search field

Getting Started		Control Panel (3)
Remote Desktop Connection	IEUser	幅 View devices and printers 圖 Update device drivers
Sticky Notes	Documents Pictures	
Snipping Tool	Music	
Calculator	Computer	
Command Prompt	Control Panel	
XPS Viewer	Devices and Printers Default Programs	
Task Scheduler	Help and Support	
All Programs		₽ See more results
Search programs and files	🕐 Shut down 🕨	device manager × Shut down +
වී 📋 🙆		🔕 🤌 拱 🔍

1

Choose sub2can device:

Device Manager

File Action View Help

Tite Action View Help

Tite

2 Press "Update Driver":





6

Will pop-up Windows Security message. Press "Install":





Finish installation:

If the driver installation was successful, Korlan USB2CAN Info LED shoud be off, Error LED should be on. Run USB2CAN test application (can be downloaded from 8devices WEB page). Test application should find all USB to CAN devices connectd to PC and their serial numbers. Insert the device's serial number you would like to use and press **"Open"**:

Open parameters	Message
-	Msg ID Flags
Enable status message	0x1FFFFFFF Charles Clear data
Silent	ssion
,	
Loopback	
	0x00 0x01 0x02 0x03 0x04 0x05 0x06 0x07 ✓ Inc
ED000100 ; 125	
DDe Ope	n 100 Send burst Send msg Clear list Send: 0
Sind	Send burst Send msg Clear list Received: 0
SB2CAN serial(1): ED000200	
ISB2CAN serial(0): ED000100 ISB2CAN serial(1): ED000200 ISB2CAN serial(2): 73796105	
SB2CAN serial(1): ED000200	⊂ Statictics ⊂ Status
SR2CAN serial(1): ED000200 SR2CAN serial(2): 73796105	Overruns: 0 CAN bus Tx err: 0
SR2CAN serial(1): ED000200 SR2CAN serial(2): 73796105	Received frames: Overruns: 0 CAN bus Tx err: 0 Bus warnings: 0 C bus off Rx err: 0
SR2CAN serial(2): E0000200 SR2CAN serial(2): 73796105 Versions Hardware: -	Received frames: 0 Overruns: 0 CAN bus Tx err: 0

4.4 Windows 8 driver installation

Download drivers files from 8devices WEB page:

- 32-bit USB2CAN Windows 32-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1
- 64-bit USB2CAN Windows 64-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1

Plug USB2CAN device to computer USB connection. Info LED should be on, Error LED should be off.

Run device manager.



1

Then mark USB2CAN device and chose "Update driver software" from top menu:

2	Device Manager – 🗆	^
File Act	ion View Help	
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4 🚔 IE1		
	Audio inputs and outputs	
	Batteries	
	Computer	
	Disk drives	
	Display adapters	
	DVD/CD-ROM drives	
	Human Interface Devices	
	IDE ATA/ATAPI controllers	
	Keyboards	
	Mice and other pointing devices	
	Monitors	
	Network adapters	
- jb	Other devices	
	USB2CAN converter	
	Print queues	
- Þ 🔲	Processors	
⊳ ⊠ 8	Sensors	
Þ. 🛄	Software devices	
	Sound, video and game controllers	
	Storage controllers	
	System devices	
1.12	Universal Serial Bus controllers	

2 Choose "Browse my computer for driver software":



3 Browse for drivers and click next:



Will pup-up Windows Security message. Choose "Install":

•-	Windows Security
N	d you like to install this device software? ame: edevices ublisher: 8devices
✓ AI	ways trust software from "8devices". Install Don't Install
	u should only install driver software from publishers you trust. <u>How can</u> ecide which device software is safe to install?

And press "Close":



If the driver installation was successful, USB2CAN Info LED should be off, Error LED should be on. Run USB2CAN test application (can be downloaded from 8devices WEB page). Test application should find all USB to CAN devices connectd to PC and their serial numbers. Insert the device's serial number you would like to use and press **"Open"**:

Open parameters		Message					
Flags		Msg ID -	Flag				
Enable status n		0x1FFF	FFFF E	Extended	Clear data		
Disable auto re	transmission	Jonanni -	[[] [RTR			
Silent							
Loopback		Data					
		0×00	0x01 0x02 0x0	03 0x04 0x0	05 0×06	0x07 🔽 Inc	
ED000100 ; 125							
	Open		-		1	Send: C	
Sin _	open	100	Send burst	Send msg	Clear list	Received: 0	
							-
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USB2CAN serial(1): ED00 USB2CAN serial(2): 7379	C200 5105	dframes: 0	Overruns: 0		AN bus	Tx err: 0	
-Versions	StabicticsReceive	d frames: 0	Overruns: 0 Bus warnings: 0		AN bus	Txerr: 0 Rxerr: 0	
Versions Hardware: - Firmware: -	Stabictics - Receive	ved data: 0			AN bus bus off bus passive	-	
Hardware: -	Stabictics - Receive		Bus warnings: 0		AN bus bus off bus passive	-	1

4.5 Windows 10 driver installation

Download drivers files from 8devices WEB page:

- 32-bit USB2CAN Windows 32-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1
- 64-bit USB2CAN Windows 64-bit (XP, Vista, Win7, Win8, Win10) USB driver v1.0.2.1

Plug USB2CAN device to computer USB connection. Info LED should be on, Error LED should be off. Use Hardware wizard, which will start after You plug device to PC.

It can be started manually by pressing **"Start"** button and then run Device manager by writing **"Device manager"** in search field.



1 Choose USB2CAN device:



2 Press "Update Driver":

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File A	tion View Help		
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✓ ≟ W	inDev1811Eval		
> 4	Audio inputs and outputs		
> 🗧			
>	Computer		
> <u> </u>	Disk drives		
> 🖣	Display adapters		
> 🗳	DVD/CD-ROM drives		
	Human Interface Devices		
> 7	IDE ATA/ATAPI controllers		
> 💷	Jungo Connectivity		
>			
> U	Mice and other pointing devices		
>	Monitors		
> 🛄	Network adapters		
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	USB2C/ Update driver		
	Processors Disable device		
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	Universal School per componentes		
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3

Choose "Browse my computer for driver software:



Device Manage		-	\times
e Action Vie	w Help		
🔿 📰 📴	🛙 📷 🖳 💺 🗙 💿		
🐣 WinDe		×	
> 🖬 Auc	_		
> Bat 🗧	Update Drivers - USB2CAN converter		
> 💻 Cor			
> 🔜 Disl	Browse for drivers on your computer		
	bronse for anners on your comparer		
> A Hu			
> TOE	Search for drivers in this location:		
> 💭 Jun	C:\Users\User\Desktop\usb2can_win32_v1.0.2.1		
> 🧰 Key	✓ Include subfolders		
> 🕕 Mic	∠] include subfolders		
> 🛄 Mo			
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V V Oth			
> 📼 Prin			
> Pro	ightarrow Let me pick from a list of available drivers on my computer		
> Sof	This list will show available drivers compatible with the device, and all drivers in the		
Sol	same category as the device.		
> Sto			
> 🛅 Sys			
> 🏺 Uni			
	Next	Cancel	

Browse for driver's location on Your computer:



Finish installation:



If the driver installation was successful, USB2CAN Info LED should be off, Error LED should be on. Run USB2CAN test application (can be downloaded from 8devices WEB page). Test application should find all USB to CAN devices connectd to PC and their serial numbers. Insert the device's serial number you would like to use and press **"Open"**:

Flags Flags Flags Flags Disable auto retransmission Silent RTR Clear data Dopback Data 0x00 0x01 0x02 0x03 0x04 0x05 0x06 0x07 Inc ED000100 ; 125 Data 0x00 Send burst Send msg Clear list Send: 0 BBCCAN serial(0): ED000100 Send burst Send msg Clear list Send: 0 BBCCAN serial(0): ED000100 BBCCAN serial(2): 73796105 Status Status Versions Statictics Overruns: 0 CAN bus Tx err: 0 Hardware: - Bus warnings: 0 Overrus: 0 CAN bus Tx err: 0)pen parameters	Message				
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	B2CAN serial(1): ED000200 B2CAN serial(2): 73796105			-	CAN bus	Tx err: 0
Canal: - Received data: 0 Bus off: 0 C bus passive Canal: - Transmited frames: 0 C bus warning	82CAN serial(1): ED000200 B2CAN serial(2): 73796105 Versions Hardware: -			-	CAN bus	
Hardware: - Received frames: 0 Overruns: 0 CAN bus Tx err: 0 Bus warnings: 0 C bus off Rx err: 0	B2CAN serial(1): ED000200					

4.6 USB2CAN test application bus speed configuration

For a proper operation a correct serial number and bus speed must be entered. Serial number is located on USB2CAN label.

Standard CAN bus speed configuration

Input format is: "serial number;can bus speed", speed options 20, 50, 100, 125, 250, 500, 800,1000 Example: 664E01CF;125

Customized CAN bus speed configuration

For a customized speed, the bus speed setting must be set to "0" with additional configuration parameters. The additional parameters are written directly to internal microcontroller timing register.

Input format is: "serial number;0;tseg1;tseg2;sjw;brp" Example: 664E01CF;0;12;34;22;11

More details how to configure customized speed can be found at http://www.bittiming.can-wiki.info

Note: on the WEB page drop down menu select "ST Microelectronics bxCAN" and "Clock Rate" = 32MHz

5. Firmware upgrade

Firmware upgrade to version 2.3 is simple and straightforward on Windows operating system. Follow the instructions below.



Connect your Korlan USB2CAN adapter to USB port of your computer.

2

3

Download Korlan USB2CAN Firmware Upgrade Tool v2.3 from our website: https://www.8devices.com/media/products/usb2can_korlan/downloads/USB2CAN_v23.exe

Run the USB2CAN_v23.exe file to start the firmware upgrade.





Follow instructions and wait until firmware upgrade is finished before disconnecting Korlan USB2CAN device.

