Ixxat SimplyCAN USB-to-CAN Adapter User Manual

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Important User Information

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The data, examples and illustrations found in this document are included for illustrative purposes and are only intended to help improve understanding of the functionality and handling of the product. In view of the wide range of possible applications of the product, and because of the many variables and requirements associated with any particular implementation, HMS Networks cannot assume responsibility or liability for actual use based on the data, examples or illustrations included in this document nor for any damages incurred during installation of the product. Those responsible for the use of the product must acquire sufficient knowledge in order to ensure that the product is used correctly in their specific application and that the application meets all performance and safety requirements including any applicable laws, regulations, codes and standards. Further, HMS Networks will under no circumstances assume liability or responsibility for any problems that may arise as a result from the use of undocumented features or functional side effects found outside the documented scope of the product. The effects caused by any direct or indirect use of such aspects of the product are undefined and may include e.g. compatibility issues and stability issues.

User Guide

Please read the manual carefully. Make sure you fully understand the manual before using the product.

Target Audience
This manual addresses trained personnel who are familiar with CAN and the applicable standards. The contents of the manual must be made available to any person authorized to use or operate the product.

Document History

Version	Date	Description
1.0	March 2019	First release
1.1	January 2020	Adjusted max. bus load, removed Windows 7 installation
1.2	October 2020	Corrections tested OS, minor corrections, added FCC

Trademark Information
Ixxat® is a registered trademark of HMS Industrial Networks AB. All other trademarks mentioned in this document are the property of their respective holders.

Conventions
Instructions and results are structured as follows:

- instruction 1
- instruction 2
  - → result 1
  - → result 2

Lists are structured as follows:

• item 1
• item 2

Bold typeface indicates interactive parts such as connectors and switches on the hardware, or menus and buttons in a graphical user interface.
This font is used to indicate program code and other kinds of data input/output such as configuration scripts.

This is a cross-reference within this document: Conventions, p. 4 This is an external link (URL): **www.hms-networks.com**

Safety Instructions

Information on EMC
Risk of interference to radio and television if used in office or home environment! The product is a class B device.
Use exclusively included accessories or HMS accessories that are intended for use with the device. Use exclusively shielded cables. Make sure that the shield of the interface is connected with the device plug and the plug on the other side.

General Safety Instructions

- Protect product from moisture and humidity.
- Protect product from too high or too low temperature (see Technical Data, p. 11).

- Protect product from fire.
- Do not paint the product.
- Do not modify or disassemble the product. Service must be carried out by HMS Industrial Networks.
- Store products in dry and dust-free place.

Intended Use
The device is used to connect computer systems to CAN networks to exchange data for example to configure a device via CAN or to read device diagnosis data. The simplyCAN is intended for the connection to a computer via the USB interface.

Scope of Delivery

Included in the scope of delivery:

- simplyCAN device
  The following is available via download from **www.simplycan.info**:
- simplyCAN bus monitor
- installation file setup.bat
- programming API
- programming examples
- user manual
  A CAN bus termination can be ordered separately.

Product Description

The simplyCAN is an active USB adapter which enables the user to connect a computer with a CAN network to monitor the network traffic and to interact with other network devices. The simplyCAN is a plug and play device due to the easy installation and the easy-to-use CAN programming interface.

Features

• USB 1.1 Full-Speed (12 MBit/s)
• 1 x CAN high-speed channel according to ISO 11898-2
• D-Sub 9 fieldbus connection, pin allocation according to CiA 303-1
• USB cable with plug type A

Windows: the simplyCAN is tested Windows 10 (64 bit).
Linux: the simplyCAN is tested using Ubuntu 16.04 (32 bit) on Linux kernel version 4.15 as well as Ubuntu 20.04 (64 bit) on Linux kernel version 5.4, and Rasberry OS 10 (buster) kernel version 5.4 (32 bit).

The performance is limited to 50-60 % for Rx and Tx directions each. For a busload higher than 50-60 % data loss is possible.

Installation

Insufficient power supply!
Connect the device directly to the computer or to self-powered hubs to ensure sufficient power supply. Extension cables may cause connection issues.

On Windows 10 and Linux the USB interface is automatically installed when plugged in, without a driver installation.
Download the simplyCAN package for the operating system in use from www.simplycan.info and unpack the files.

The COM interface for the simplyCAN is showed as USB Serial Device (COMx) in the device manager when plugged in. To show the simplyCAN as Ixxat simplyCAN (COMx) in the device manager, execute the file setup.bat.

- Plug the USB connector in the USB port of computer.
  → Hardware is automatically found and installed.
  → USB LED is green flashing.
- If necessary install a bus termination (see CAN Bus Termination, p. 10).
- Connect the CAN fieldbus connector to the CAN fieldbus.
- Start the simplyCAN bus monitor (see Operation, p. 8).

Connectors
The shield of the USB cable is connected to ground using a 100 nF capacitor. The shield of the CAN connector is connected to CAN ground via a 1 MΩ resistor and a 10 nF capacitor. USB_shield is connected to CAN_shield via a 4.7 nF capacitor.

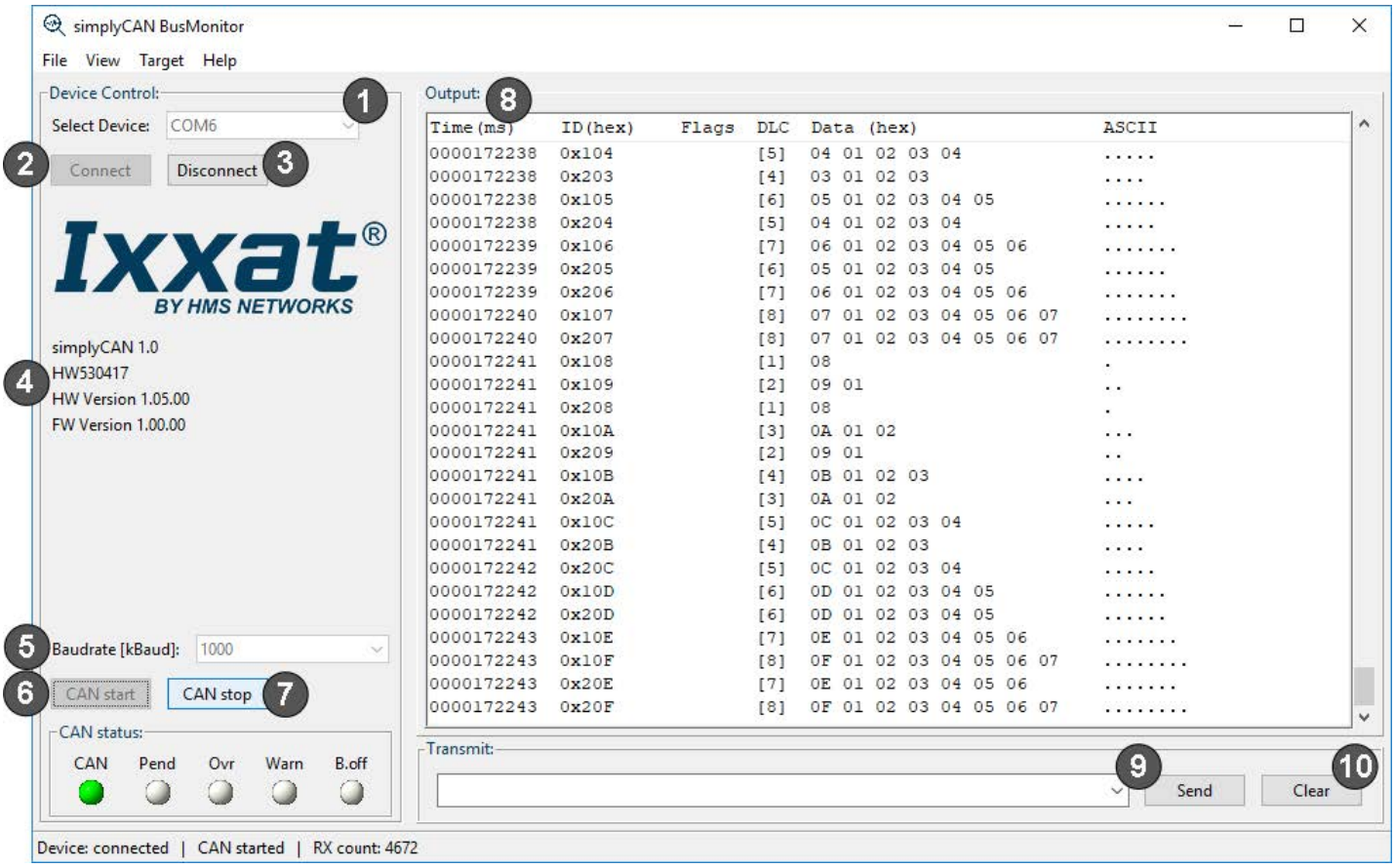
For best noise immunity connect the shields of the CAN cables directly to the device ground.

Pin Allocation D-Sub 9

Signal	Pin No.
CAN high	7
CAN low	2
CAN GND	3, 6

Operation

simply CAN Bus Monitor



- Start the simplyCAN bus monitor.
  → If one simplyCAN is connected to the computer, the device is automatically selected and connected (1).
- If several simplyCAN are connected to the computer, select the desired device (1) and click button Connect (2).
  → Information about the device are displayed (4).
  The simplyCAN bus monitor can be opened several times to connect several simplyCAN devices simultaneously.
- To change the device, click button Disconnect (3), select the device in drop-down list Select device (1) and click button Connect (2).
- Select the desired CiA baudrate (5).
- To start the communication, click button CAN start (6).
  → CAN messages are shown in the window Output (8).
  → In transmitted messages the time stamp is 0 and the flag S is displayed.
- To send a message, enter the message in the Transmit line (9) (see Transmit Messages, p. 9 for more information).
- Click button Send (9).
  → If the entered message is valid, the message is transmitted.
  → If the entered message is invalid, the error message Syntax error and a description of the message format is shown.
- Stop the communication with button CAN stop (7).
- Clear the output window with button Clear (10).
- For a busload higher than 50-60 % data loss is possible. Data loss is signalled by the Ovr LED in the simplyCAN bus monitor.

Transmit Messages
Syntax: <id> [R] [E] [<data>…]

• id: identifier (decimal or hexadecimal)
• R: remote transmit request for message
• E: message in Extended frame format (29 bit)
• data: data bytes of the message (decimal or hexadecimal), in RTR messages the first data byte contains the DLC

Examples

Examples

Message in simplyCAN bus monitor	Description
0x100 0x11 0x22 0x3 0x44	11 bit message with ID 100 (hex) and 4 data bytes
0x1FE1200 E 1 2 3 4 5 6 7 8	29 bit message with ID 1FE1200 (hex) and 8 data bytes
123 R 8	11 bit remote frame with ID 123 and DLC=8
0x1FE1200 R 8	29 bit remote frame with ID 1FE1200 (hex) and DLC=8

USB LED

The USB LED reflects the status of the USB communication.

LED state	Description	Comments
Off	Power off	No power or device defect
Green flashing	No active connection	Device ready to use, simplyCAN bus monitor or API must be started to use the device
Green	Active connection	Device in use

CAN LED

The CAN LED reflects the status of CAN communication.

LED state	Description	Comments
Off	No communication	No communication, device not connected to CAN
Green flashing	Communication OK	LED is triggered with each message.
Red flashing	Communication with errors	Controller is in state *error warning* or in state *error passive*, communication is possible.
Red	Bus off	Controller is in state *bus off*, no communication possible.

Additional Components

CAN Bus Termination

There is no bus termination resistor for the CAN bus integrated in the device. HMS Industrial Networks offers a bus termination resistor

as a feed through connector.

For ordering information see **www.ixxat.com**.

Technical Data

USB interface	USB 1.1, Full-Speed (12 MBit/s)
CAN bitrates	10 kbit/s to 1 Mbit/s, only CiA recommended bit rates are supported: 10, 20, 50, 125, 250, 500, 800, 1000
CAN transceiver	TI SN65HVD251
CAN bus termination	None
Dimensions	80 x 50 x 22 mm
Weight	Approx. 100 g
Power supply	Via USB, 5 V DC/100 mA
Galvanic isolation	800 V DC/500 V AC for 1 min
Operating temperature	-20 to +70 °C
Storage temperature	-40 to +85 °C
Relative humidity	10 % to 95 %, non condensing
Housing material	ABS plastic
Protection class	IP40

Troubleshooting

USB LED is off after connecting.

No power or defect device

- Make sure that the device is correctly connected to the USB port.
- Connect the device directly to the computer or to self-powered hubs.

Extension cable is used and device is not working.

Extension cables may cause connection issues.

- Remove the extension cable.
- Connect the device directly or via an active USB hub to the computer.

Cleaning

- Disconnect the device from power supply.
- Remove dirt with a soft, chemical untreated, dry cloth.

Support/Return Hardware

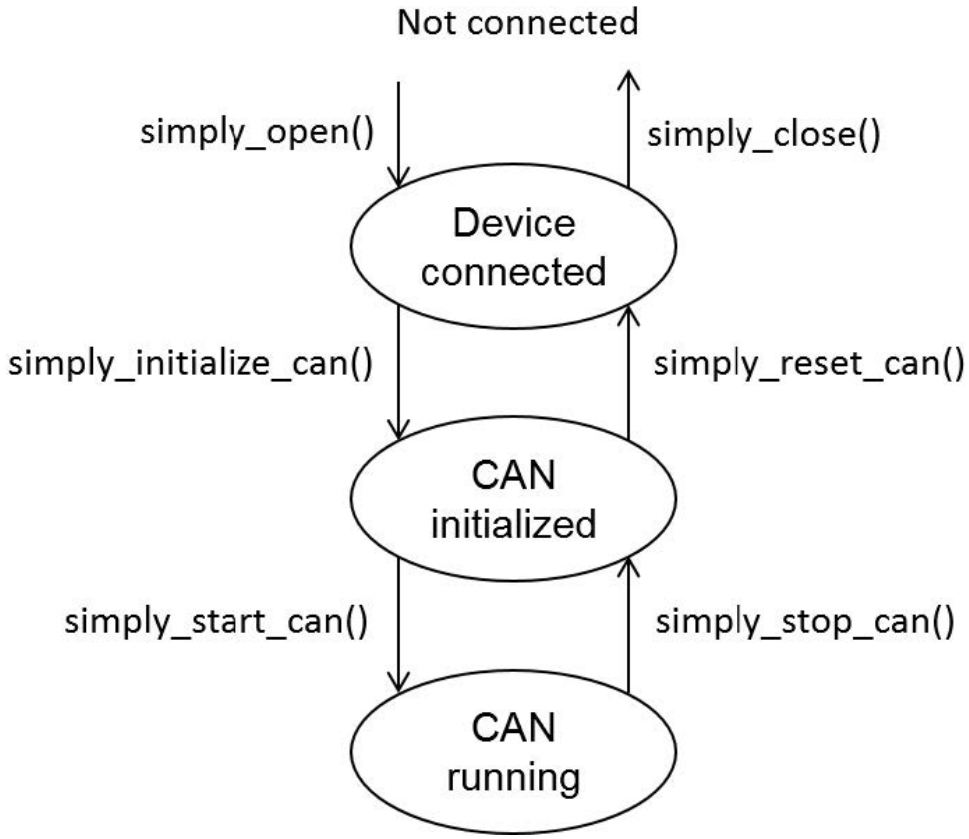
Support

- For problems or support with the product request support at **www.ixxat.com/support**.
- If required use support phone contacts on **www.ixxat.com**.

Return Hardware

- Fill in the form for warranty claims and repair on **www.ixxat.com/support/product-returns**.
- Print out the Product Return Number (PRN resp. RMA).
- Pack product in a physically- and ESD-safe way, use original packaging if possible.
- Enclose PRN number.
- Observe further notes on **www.ixxat.com**.
- Return hardware.

State Diagram



Function Calls and the Corresponding Valid States

Function Calls and the Corresponding Valid States

Function	Valid states
simply_open()	Not connected
simply_close()	Device connected, CAN initialized
simply_initialize_can()	Device connected, CAN initialized
simply_reset_can()	Device connected, CAN initialized, CAN running
simply_start_can()	CAN initialized
simply_stop_can()	Device connected, CAN initialized, CAN running
simply_receive()	CAN initialized, CAN running
simply_send()	CAN running
simply_get_last_error()	All states
simply_can_status()	Device connected, CAN initialized, CAN running
simply_identify()	Device connected, CAN initialized, CAN running
simply_set_filter()	CAN initialized

Regulatory Compliance

The product is in compliance with the Electromagnetic Compatibility Directive. More information and the Declaration of Conformity is found at www.ixxat.com.

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

• This device may not cause harmful interference.
• This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by HMS Industrial Networks could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment

off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Disposal and recycling

You must dispose of this product properly according to local laws and regulations. Because this product contains electronic components, it must be disposed of separately from household waste. When this product reaches its end of life, contact local authorities to learn about disposal and recycling options, or simply drop it off at your local HMS office or return it to HMS.
For more information, see **www.hms-networks.com**.

Documents / Resources

Ixxat SimplyCAN USB-to-CAN Adapter [pdf] User Manual
SimplyCAN, USB-to-CAN Adapter

References

- **HMS Networks | Industrial IoT and industrial ICT**
- **Ixxat | Data communication for Embedded, Safety and Energy**
- **Technical Support | Product Support | Ixxat**
- **Product Returns | Return Material Authorization | Ixxat**
- **simplyCAN**