CANdapter
Manual

Ewert Energy Systems
120 Easy Street
Carol Stream, IL 60188

Phone: 630-445-1125
Fax: 866-657-5667
info@ewertenergy.com

1.0 Introduction

CANdapter is a low cost CANBUS to USB converter. The CANdapter has drivers supported by both Windows and Linux. The Windows driver can access the CANdapter directly through an API (D2XX) or through a virtual serial port (RS232). The Linux driver only includes the virtual serial port (RS232). For more information about the drivers, see the driver installation manual at www.candapter.com. CANdapter supports both extended (29 bit) and standard (11 bit) identifiers. CANdapter does not require an external power supply because the power is supplied via the USB port.

1.1 Installation

Below is the pinout diagram for the CANdapter to OBD2 connection. The CAN-High and CAN-Low wires should be twisted pair. Please check www.candapter.com for the most recent drivers and the driver installation manual.

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1.2 Testing the CANdapter
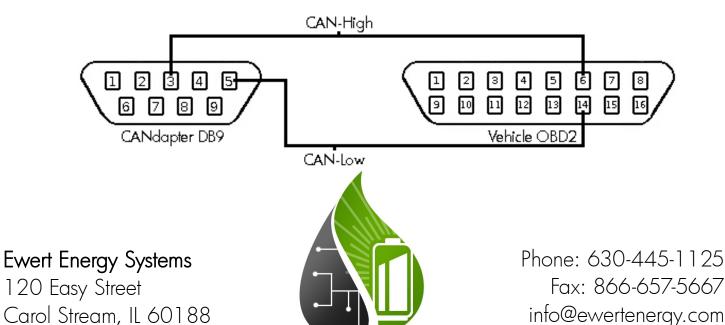
Plug the CANdapter into a USB port. The red and green LED lights should flash 3 times. This means that the CANdapter is receiving power. Using the provided diagnostic utility (which can be found in the utilities section of www.candapter.com) you can find a list of all of the CANdapters connected to your computer and retrieve their serial number information. To test the functionality of the CANdapter, use the supplied console program (in the utilities section of www.candapter.com). This program provides an interface with which you can issue commands directly to the CANdapter. See the command section below (section 2.0) for list of CANdapter commands. In order to transmit a message on the CANBUS, there must be at least 2 nodes (CANdapter is one node; one additional node is required). Otherwise transmission errors will occur.

Please note that whenever the green LED flashes, a CANBUS message was either successfully sent or received. The red LED indicates either that a CANBUS error frame was received (flashing red LED) or that the chip is in error passive state, meaning that too many transmit /receive CANBUS errors have occurred (solid red LED).

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1.3 Limitations

The CANdapter uses a USB FIFO to communicate with the computer. This limits the speed of the device due to the large amounts of data passing through a small channel. Therefore it is designed to be used most effectively for lower speed automotive (500 Kbps) CANBUS baudrates, though it is rated for up to 1 Mbps. The device must be actively polled to prevent the FIFO from filling up. If the device is not actively polled, the FIFO will fill up, preventing the transmission of messages. Make sure that you poll the CANdapter while transmitting messages.

1.4 Designing a device driver for the CANdapter

The easiest way to interact with the CANdapter is over the virtual serial port that it creates. The serial port number can be discovered using the diagnostic utility provided at www.candapter.com or using the operating system device manager.

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1.4 Designing cont'd

The basic strategy for communicating with the CANdapter has 4 steps.

1) <u>Opening the serial communication port:</u> This can be accomplished with any number of libraries and utilities and will be specific to the programming language you are using. Once you have the serial communication port open, you can begin sending commands to the CANdapter.

2) <u>Initializing the CANdapter:</u> Before the CANdapter can communicate with the CANBUS, it must first be initialized. Specifically the baudrate needs to be set, along with other options such as timestamps, filters, and masks (see commands list in section 2.0). These must be set before the CANBUS channel is opened. Once you are finished sending the initialization commands to the CANdapter, send the O command to open the CANBUS port. At this point you can no longer change the initial configuration. The CANBUS should now be open and active.

3) <u>Issuing commands to the CANdapter:</u> At this point the CANdapter is live and ready to receive and respond to commands. Please see the command section (section 2.0) for a list of commands.

4) <u>Closing the CANBUS:</u> When you are finished, close the CANBUS channel by issuing the C command.

1.5 Checking CANdapter version

The easiest way to check the CANdapter version is to use the diagnostic utility provided on www.candapter.com. However, if you want to check the CANdapter version using your own program, issue the **V** command. This will return a message in the format "VAABBCC". AA is the major release number. BB is the minor release number. CC is the patch version number. Together these make up the code revision number. When contacting technical support, you will need to know your CANdapter version number.

Sample return: V010203

Major release number: 01
Minor release number: 02
Patch version number: 03

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2.0 CANdapter Commands

Note: All commands to the CANdapter must end with
[CR] (ASCII=0x06). Commands are not case sensitive.

Sn[CR]
Setup with standard CAN bit-rates where n is 0-8.
This command is only active if the CAN channel is closed.

S0	Setup 10Kbit
S1	Setup 20Kbit
S2	Setup 50Kbit
S3	Setup 100Kbit
S4	Setup 125Kbit
S5	Setup 250Kbit
S6	Setup 500Kbit
S0x07	Setup 800Kbit
S8	Setup 1Mbit

Example: **S6[CR]**
Setup CAN to 500Kbit.

Returns: **[ACK]** (ASCII 0x06) for OK or **[BELL]** (ASCII 0x07) for ERROR.

O[CR]
Open the CAN channel.
Note: The **S** command must be issued before the CANBUS port can be opened and the **O** command can be sent

Example: **O[CR]**
Open the channel

Returns: **[ACK]** (ASCII 0x06) for OK or **[BELL]** (ASCII 0x07) for ERROR.

C[CR]

Close the CAN channel.
This command is only active if the CAN channel is open.

Example: **C[CR]**
            Close the channel

Returns: **[ACK]** (ASCII 0x06) for OK or **[BELL]** (ASCII 0x07) for ERROR.

Tiiildd…[CR]

Transmit a standard (11bit) CAN frame.
This command is only active if the CAN channel is open.

iii   Identifier in hex (000-7FF)
l   Data length (0-8)
dd   Byte value in hex (00-FF). Numbers of dd pairs must match the
        data length, otherwise an error will occur.

Example: **T3CF411223344[CR]**
            Sends an 11bit CAN frame with ID=0x3CF, 4 bytes
            with the values 0x11, 0x22, 0x33, and 0x44.

Returns: **[ACK]** (ASCII 0x06) for OK or **[BELL]** (ASCII 0x07) for ERROR.

Xiiiiiiiildd…[CR]

Transmit an extended (29bit) CAN frame.
This command is only active if the CAN channel is open.

iiiiiiii   Identifier in hex (00000000-1FFFFFFF)
l   Data length (0-8)
dd   Byte value in hex (00-FF). Numbers of dd pairs must match the
       data length, otherwise an error will occur.

Example 1: **X000003CF411223344[CR]**
          Sends a 29bit CAN frame with ID=0x3CF, 4 bytes
          with the values 0x11, 0x22, 0x33, and 0x44.

Returns: **[ACK]** (ASCII 0x06) for OK or **[BELL]** (ASCII 0x07) for ERROR.

V[CR]

Get version number of the CANdapter software
This command is active always.

Example: **V[CR]**
           Get Version numbers

Returns: **Vaabbcc[CR]** (e.g. V010500)
          aa   major release number (e.g.: 01)
          bb   minor release number (e.g.: 05)
          cc   patch version number (e.g.: 00)

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A[CR]

Sets time stamp ON/OFF for received frames only.
This command is only active if the CAN channel is closed.
It is set to OFF by default. Setting it to ON will add 4 bytes sent out from CANdapter. The timestamp feature measures every 1 millisecond. The counter will reset every 60,000 milliseconds (exactly 1 minute).

With the timestamp feature OFF, a sample received message might look like this: **T3CF101[CR]**
With the timestamp feature ON, a sample received message might look like this: **T3CF1014521[CR]**
In this example, 4521 represents the running millisecond counter

Please note that having timestamps enabled will decrease the amount of throughput for the CANdapter due to the increase in message length. Also note that the message length indicator in messages does not reflect the additional bytes of the timestamp (your program must read beyond what the CANBUS message length indicates).

Example 1: **A0[CR]**
             Turn OFF the Time Stamp feature (default).

Example 2: **A1[CR]**
             Turn ON the Time Stamp feature.

Returns: **[ACK]** (ASCII 0x06) for OK or **[BELL]** (ASCII 0x07) for ERROR.

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