

PCAN-Dongle

QuickStart Instructions

Using PEAK CANview for Windows Software

Preliminary Version

Edition: November 2000

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PCAN-Dongle QuickStart Instructions

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1 Introduction

The PCAN-Dongle attaches to the the parallel port of an IBM-compatible desktop or laptop PC, enabling connectivity of the PC into a CAN network without opening the computer to install a CAN networking insert card. The Dongle houses a Philips SJA1000 CAN controller and a Philips 82C250 CAN transceiver. Its transmission baudrate can be configured for up to 1 MBit/s. The PCAN-Dongle supports all Interrupt and Port address configurations used by the parallel Interface, including ECP and EPP. The included PCANView software for Windows enables viewing of CAN transmission status and configuration data and allows hardware reset of the SJA1000 with software commands.

The PCAN-Dongle is available in four variants:

PCAN Dongle	Message Identifiers	Power Connector
PK-001	11-bit	DIN
PK-002	11-bit	PS/2
PK-003	29-bit	DIN
PK-004	29-bit	PS/2

Table 1: *PCAN-Dongle Variations*

1.1 Technical Highlights

- Space-saving parallel port Dongle adapter case housing a Philips CAN-Controller SJA1000 with a 16 MHz clock and a Philips 82C250 CAN transceiver
- DB25 (male) plug enabling easy connection to parallel port of a host-PC
- DB9 (male) plug for easy connection to a CAN network
- Baudrate configurations up to 1 MBits
- Supports all Interrupt and Port address configurations of parallel interfaces

- Allows hardware reset of the SJA1000 from software commands
- Power supplied via the keyboard port with either a PS/2 or DIN connection, or through a PS/2 mouse connection with a pass through for the keyboard connection

1.2 View of the PCAN-Dongle



Figure 1: View of the PCAN-Dongle with DB-9 CAN Connector and 120 Ohm Termination Resistor

1.3 System Requirements

Use of the PEAK PCAN-Dongle requires:

- an IBM-compatible PC (desktop or laptop) with an available parallel port and Windows95/98/NT/2000/Me to operate the included PCANView for Windows software
- CAN cable with 120 Ohm termination resistor

1.4 Overview of this Manual

This manual provides:

- 1) Step-by-step instructions to setup the PCAN-Dongle with your computer
- 2) Description of, and installation hints for, the PCANView for Windows software
- 3) An example showing connectivity of a PC to a CAN network using the PCAN-Dongle and a PHYTEC phyCORE-591 Rapid Development Kit

For more information and example updates, please refer to the following sources:



<http://www.phytec.com> - or - <http://www.phytec.de>
support@phytec.com - or - support@phytec.de

<http://www.peak-system.com>

2 Getting Started

The PCAN-Dongle can be used with any CAN network and is for general use. This example covers the PHYTEC phyCORE-591 Rapid Development Kit but can be modified for use with any CAN capable Single Board Computer.

What you will learn with this Getting Started example:

- How to configure the PCAN-Dongle for connection to a CAN network
- How to prepare a twisted wire pair as a CAN network
- How to connect the PCAN-Dongle to a host-PC or laptop
- How to integrate the PCAN-Dongle and a PHYTEC phyCORE-591 Single Board Computer in a Rapid Development Kit into a two-node CAN network
- How to use the PCANView software to monitor CAN transmit and receive activity over a two node CAN network (PCAN-Dongle and phyCORE-591 Rapid Development Kit)

This examples requires:

- A Host-PC (desktop or laptop)
- The PCAN-Dongle with PCANView software for Windows
- A twisted pair wire, two 120Ohm resistors and two (female) DB9 sockets
- A PHYTEC phyCORE-591 Rapid Development Kit

2.1 Standard Base Addresses and IRQ Configuration

The PCAN-Dongle requires setting of the Interrupts and the Port address of the parallel interface for start-up. These settings are pre-configured upon delivery.

The following table shows the standard Base address and Interrupt (IRQ) that are assigned to each parallel port on all variations of the PCAN-Dongle. If these values are not known, they can be located by clicking on the Start button, go to “Settings”, then “Control Panel”. Double click on the System Icon. Click on the Device Manager tab on the top of the window. Double click on the Ports (COM&LPT) Icon. Double click on the Printer Port (LPT1) Icon. Click on the Resources tab on the top of the window. In the Combi-box, you will see the settings for the IRQ (Interrupt Request) and Base Address (Input/Output Range).

Port	Address	Interrupt
LPT1	3BC	IRQ5
LPT2	378	IRQ7
LPT3	278	IRQ15

Table 2: List of Interrupts and Base addresses for the Parallel Interface

2.2 Building and Connecting to a CAN Network

According to the CiA (CAN in Automation) DS 102-1 recommendation, a CAN-Network should utilize DB-9 plugs and sockets for connection to devices. A DB9 plug is available on the PCAN-Dongle, opposite the DB25 plug, for easy connectivity of the Dongle into a CAN network.

The CAN signals are located on pins 2 (CAN-L) and 7 (CAN-H) of the DB9 plug on the PCAN-Dongle. The physical connection to the DB-9 plug is depicted in *Figure 2* below. An overview of CAN signals provided is in *Table 3*.

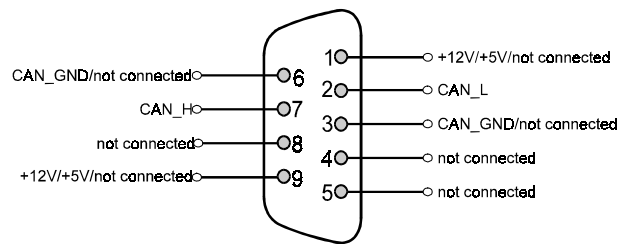


Figure 2: Connection configuration for the DB-9 plug

Pin-out of the DB-9 plug according to CiA DS 102-1 recommendations:

Pin	Connection
1	User-defined +12V / +5V / not connected.
2	CAN-L
3	User-defined CAN-GND / not connected.
4	not connected.
5	not connected.
6	User-defined CAN-GND / not connected.
7	CAN-H
8	not connected.
9	User-defined +12V / +5V / not connected.

Table 3: Pin-out for the DB-9 plug.

One of the primary features of CAN is easy connectivity between nodes on the network. To connect two CAN nodes together, you will need the following:

- Two (female) DB-9 sockets
- Two 120 Ohm resistors (to terminate the network)
- Sufficient length of twisted pair wire to connect your nodes together (any dual wire will work, but CAN networks are best suited to a twisted pair)

Prepare the twisted pair wire as follows:

- Bare the wires on one end of the twisted pair
- Insert the end of one wire, along with one end of the 120 Ohm resistor, into the receptacle for pin 2 on the DB9 (female) socket
- Solder the wire and resistor into place
- Insert the other wire, along with the other end of the 120 Ohm resistor, into the receptacle for pin 7 on the (female) DB9 socket and solder the wire and resistor into place
- Repeat this with the other end of the twisted pair, ensuring that the wires in pins 2 and 7 at one end are also soldered into the respective receptacles for pins 2 and 7 at the other end of the twisted pair

Once the twisted pair is prepared:

- Connect the PCAN-Dongle, using its DB25 plug, to the parallel printer port of a host-PC (desktop or laptop) as well as inserting either the PS/2 or DIN plug into the keyboard plug on the host PC
- Connect the PCAN-Dongle, using its DB9 plug, to the (female) DB9 sockets one end of the twisted pair wire
- Use the (female) DB9 socket at the other end of the twisted pair to connect the wire to the male DB9 plug on the PHYTEC phyCORE Development Board LD on which a phyCORE-591 PHYTEC Single Board Computer is mounted.



Figure 3: Three-Node CAN Network with PCAN-Dongle and two phyCORE-591 RDK

The following PHYTEC Single Board Computers can serve as the second node in the two-node CAN network:

- phyCORE-591 module
- phyCORE-XAC3 module
- CANmodul-592
- microMODUL-8051/CAN
- miniMODUL-167/CAN
- miniMODUL-515/CAN
- nanoMODUL-164/CAN

For a description of how to mount these Single Board Computer modules and configure CAN signal transmission on applicable PHYTEC Development Boards, please refer to the respective hardware manuals.

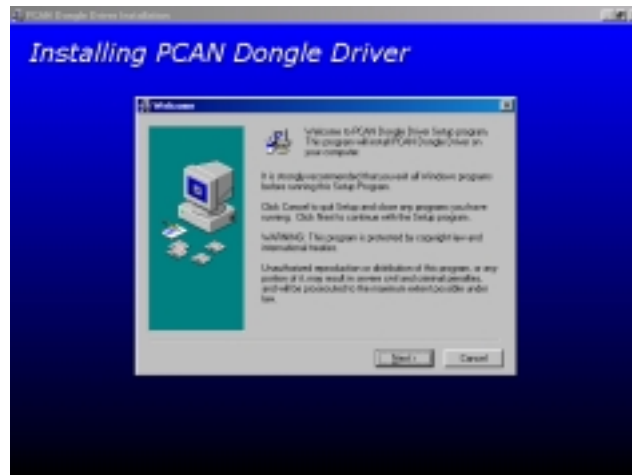
2.3 Installing and Using the PCANView for Windows Software Program

The PCANView program is included on the floppy disc you received with the PCAN Dongle. It is a CAN-Bus Viewer that runs under Windows. It supports the PCAN Dongle available from PHYTEC and allows monitoring of manual transmission and receipt of CAN messages. With PCANView, existing CAN networks can be quickly examined.

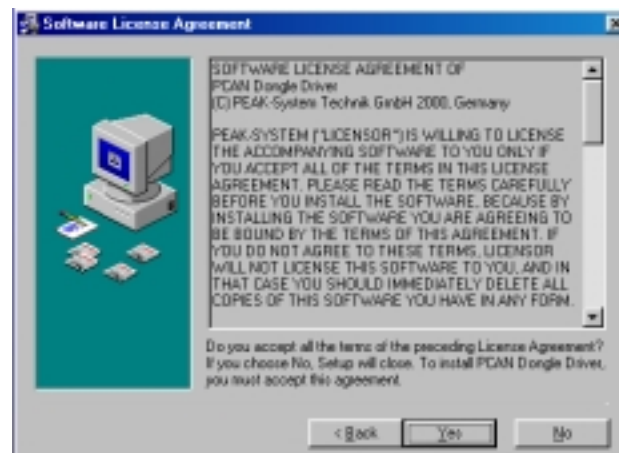
PCAN-Dongle QuickStart Instructions

To install PCANView:

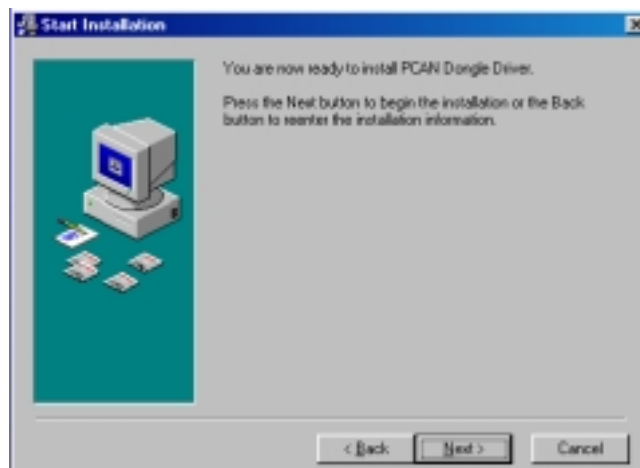
- Create a folder on the root of your host-PC hard-drive and name it Dongle.
- Copy the .exe format file Pcan_dng.exe to this folder.
- Double click on the application. This will start an installation program as seen below.



- On the next screen, accept the license agreement as seen below.

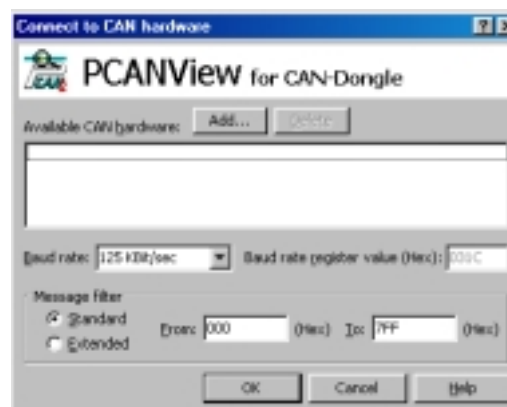


- On the next screen, you will begin the installation.



- When the installation is complete, you will be prompted to restart your computer. Click on Finish to do this.

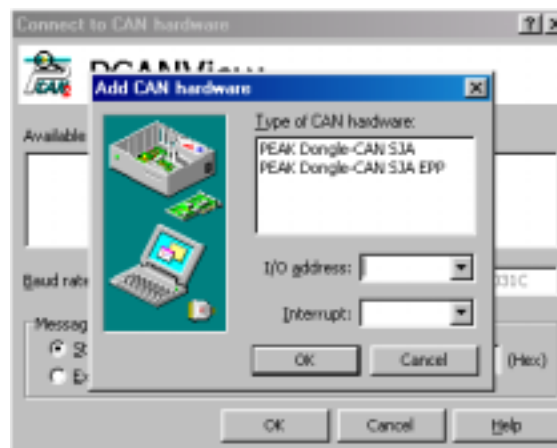
After your computer restarts, click on the Start button on the Windows main screen, and go to Programs|PCAN Dongle. Click on the program PCANView Dongle. This will start the PCANView Dongle program. This first screen you will see is below.



From this screen you will configure the Dongle. The main configuration variables are:

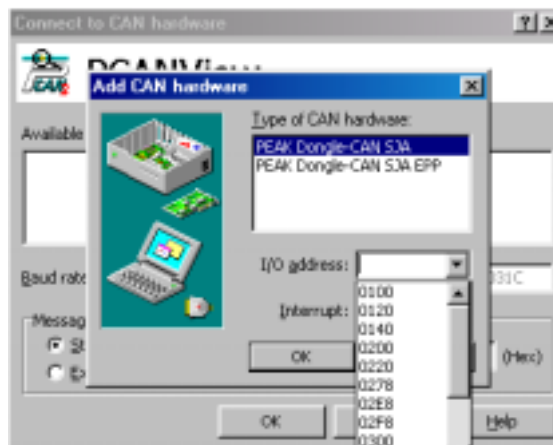
Hardware: PCANView is designed to be used the PCAN Dongle

- Base Address (hex): Enter the Base Address for your LPT port
- Interrupt Number: Enter the IRQ for your LPT port
- Baud Rate: Choose the appropriate baud rate for your CAN network.
- Baud Rate Register Value (hex): This value will change with your choice of baud rate
- Click on the Add button to choose your hardware. The screen below will appear.



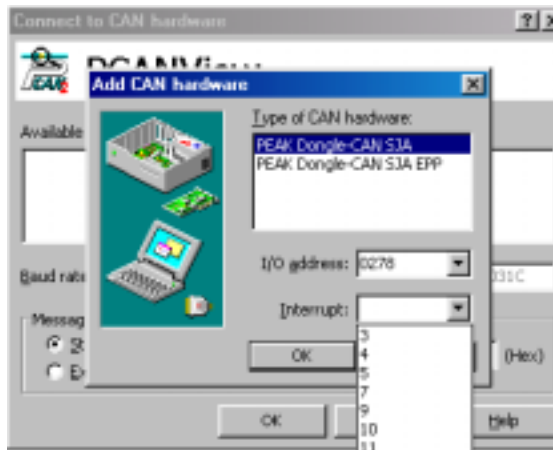
- Choose the host-PC configuration you have. Depending on the properties of your LPT port, you need to choose either Standard (PEAK Dongle-CAN SJA) or EPP (PEAK Dongle-CAN SJA EPP).

From this screen, you will also choose your I/O address and Interrupt. This information can be found in Section 2. From the I/O address pull down, choose the I/O address that matches your LPT port. This can be seen in the picture below.



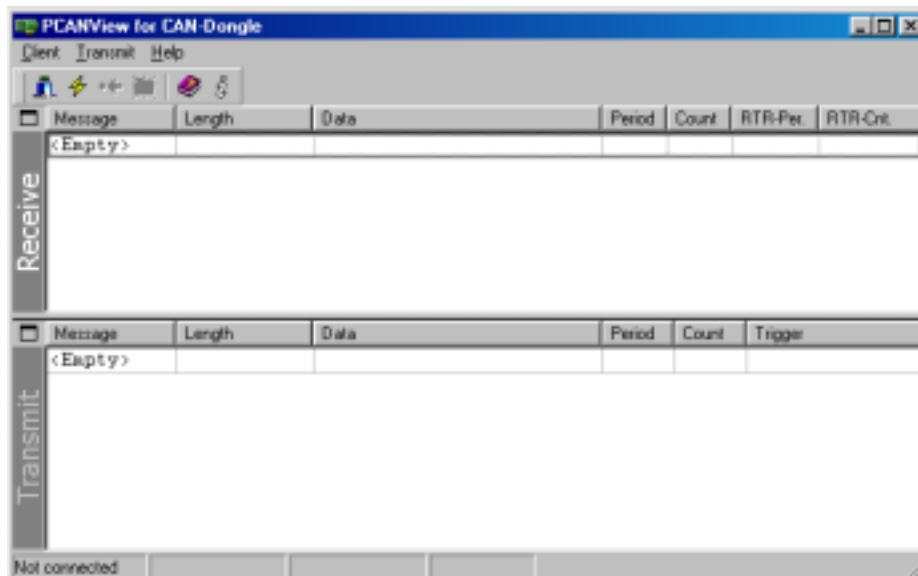
- Highlight the correct I/O address.

You will also choose the correct Interrupt (IRQ) address for your LPT port from this screen. This can be seen in the picture below.



- Highlight the correct Interrupt address. When done with all of your choices, click on OK.

- If your PCAN Dongle is correctly attached to your host-PC, and all of the variables are correct, you will see the following screen.



If this screen does not appear, you need to re-configure your choices above. Check the settings for I/O Address and Interrupt. Verify that the PCAN Dongle is securely plugged into the LPT port and the power connection is securely plugged into the keyboard connection.

This screen is divided into two sections: Receive and Transmit

- Receive: monitors CAN signals that are received from a node
- Transmit: monitors CAN signals sent from the host-PC to the CAN network

The Receive Window

The Receive Window has the following information available:

- Message: Identifier of the CAN message, hexadecimal format, ranging from 0 to 7FFh for 11 bit identifiers (CAN specification 1.0) and from 0 to 1FFFFFFFh for 29 bit identifiers (CAN specification 2.0b)
- Length: Data length code of the message (ranges from 0 to 8)

- **Data:** Values of the messages' data bytes (up to 8) or the text Remote request, if a remote frame has been received
- **Period:** Period of time between the reception of the last two messages with this identifier
- **Count:** Number of messages received with this identifier (no remote frames) since last user reset
- **RTR-Per.:** Period of time between the reception for the last two remote frames
- **RTR-Cnt.:** Number of remote frames with this identifier

Transmit Window

The Transmit Window has the following information available:

- **Message:** Identifier of the CAN message, hexadecimal format, ranging from 0 to 7FFh for 11 bit identifiers (CAN specification 1.0) and from 0 to 1FFFFFFFh for 29 bit identifiers (CAN specification 2.0B)
- **Length:** Data length code of the message (ranges from 0 to 8)
- **Data:** Values of the messages' data bytes (up to 8) or the text Remote request, if a remote frame shall be sent
- **Period:** Period of time between the last two message send events. If, at creation of the message, the period was set to 0, the text Wait is shown. In this case the message has to be sent manually or is sent automatically after a matching remote frame has been received.
- **Count:** Number of messages sent with this identifier (no remote frames) since last user reset
- **Trigger:** Reason for the last sending of the message.
- **Manual:** Manual sending by the user pressing the space bar.
- **Time:** Period of time has passed for periodical sending
- **RTR:** Remote frame has been received

In order to edit the transmit list, the following menu commands are available:

- Transmit | New...: Create a new transmit message. The editing window for the message is shown. Note: It can contain only 3 messages in the transmit list
- Transmit | Delete: Delete the currently selected message from the send list.
- Transmit | Edit...: Edit the currently selected message.
- Transmit | Clear all: Delete the whole send list.
- Program | Reset: Reset the message counters and reset the connected CAN hardware. Deletes the receive list.

3 Examples

The following two examples will show the receive and send capabilities of the PCAN-Dongle.

3.1 Receive Example Using the PCAN-Dongle and a PHYTEC phyCORE-591

This example will allow you to receive a message on a simple two node CAN network. While this example is based on using a PHYTEC phyCORE-591 board, you can use any CAN-capable board, as long as a transmit program is able to be implemented.

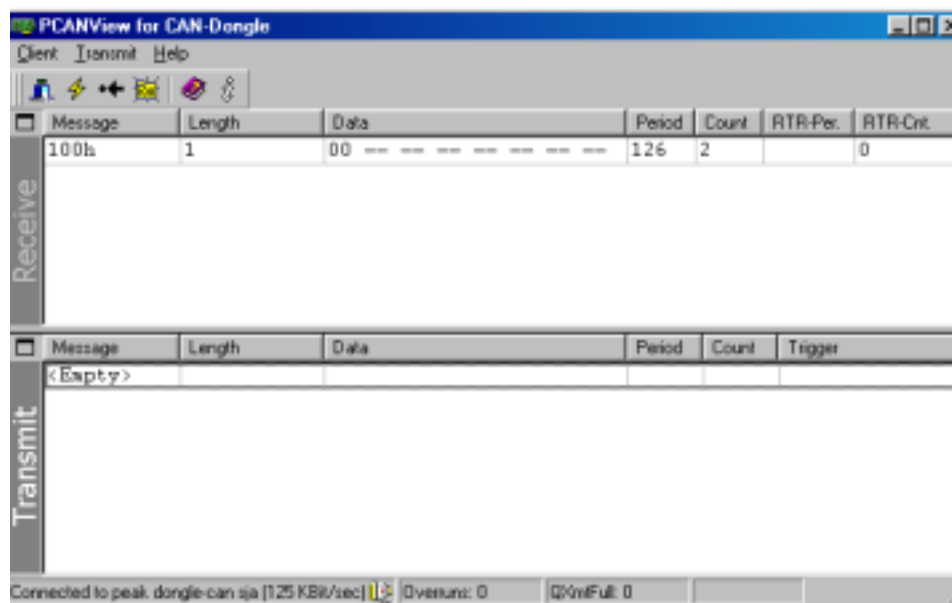
For this example, you will need the following:

- PCAN-Dongle
- phyCORE-591 Rapid Development Kit (RDK) with DB-9 serial cable and power supply
- Physical CAN connectivity (two DB-9 female connectors, two 120Ohm resistors, twisted pair wire)
- Pre-made Intel hex file (located on the PHYTEC Spectrum CD)
- Host PC running Windows 95 or higher

For all hardware settings, consult the phyCORE-591 and Development board hardware manuals. For instructions on how to program the Flash device on the phyCORE-591, consult the Quick Start manual. Both manuals can be found on the PHYTEC Spectrum CD.

- Prepare the phyCORE-591 Rapid Development Kit as described in the QuickStart manual, Section 2.3.
- Install the PCAN-Dongle on the parallel port of your host PC. Ensure that either the PS/2 or DIN plug is inserted into the keyboard port of the host PC.
- PCANView for Windows should already be installed on your host PC. If not, refer to section 2.2 of this manual for directions on how to install PCANView.

- Connect the CAN network cable you have made to the male DB-9 connector of the PCAN-Dongle and the male DB-9 connector of the phyCORE-591 RDK.
- Download the pre-made Intel hex file **Can.hex** located on the PHYTEC Spectrum CD-ROM in the folder `X:\PHYbasic\pc591\Demos\Keil\Can` where X is the drive designation of your CD-ROM drive. For directions on how to use FlashTools98, consult the phyCORE-591 QuickStart instruction Section 2.4.
- Start the PCANView program. This was described in section 2.3 of this QuickStart manual.
- Press the Reset button (S4) on the phyCORE Development board.
- Beside the wire wrap field you will see two buttons, S1 and S2. Press the S1 button. You will notice that LED D1 will light as long as you hold the S1 button down.
- In the PCANView program, you will also note that in the Receive area, there will be a message as seen below. This indicates that a CAN message was sent from the phyCORE-591 RDK in the CAN bus was received by the PCAN-Dongle. This verifies that the CAN network was properly constructed and that transmitted signals can be viewed with the PCANView program.



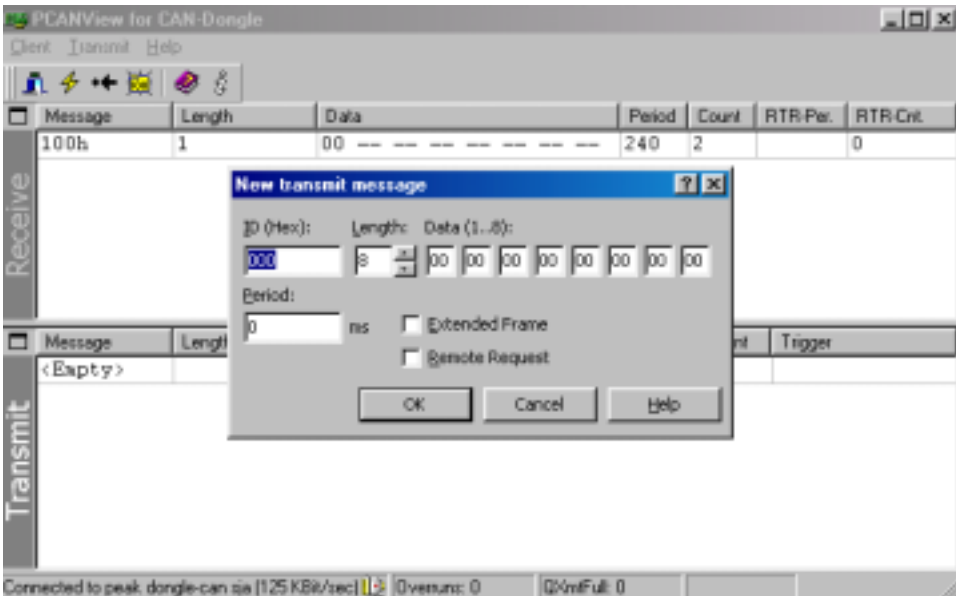
3.2 Send Example Using the PCAN-Dongle and a PHYTEC phyCORE-591

To use the Send function, the following functions are available:

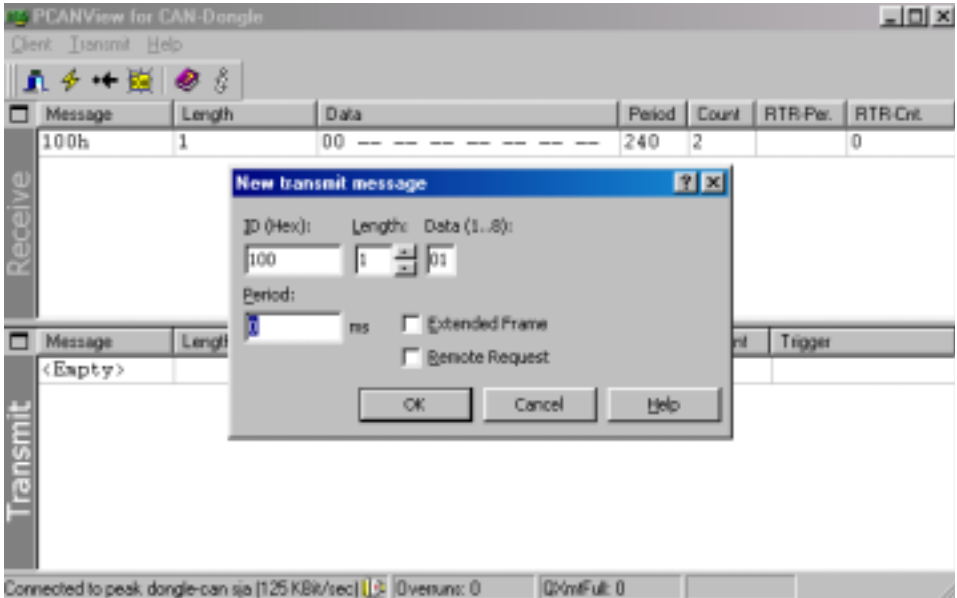
- **ID:** This is the CAN identifier (hexadecimal format) of the message to be created.
- **Length:** At this place the Data Length Code can be specified. If the message is a Data Frame, the number of data bytes is defined here (0 to 8). If the message is a Remote Frame, the number of data bytes for the requested message is defined here.
- **Data:** The data bytes of the message in hexadecimal form.
- **Period:** The duration of an interval (in milliseconds) for periodic message sending. If the message is to be sent manually or only as an answer to received Remote Frames, a '0' has to be entered.
- **Extended Frame:**
This option has to be activated if an Extended Frame shall be created. Extended Frames are CAN messages with 29 bit CAN identifier according to CAN specification 2.0b.
- **Remote request:**
This option has to be activated if a Remote Frame shall be created. In this case the entry fields for the data bytes will be hidden.

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To begin sending messages, click on the Transmit tab at the top of the main screen, and click on new. The following screen will open up.



For this example, you can use the following settings for the send example.



After entering the settings above, click OK. You will see “Wait” in the Period column. This is because it is set up for manual transmission. Press the space bar. This will transmit the message and this turns the LED D1 on the Development Board on. To turn it off, click on the Transmit tab, use the same settings, but change the Data from 01 to 00. Click on OK, and press the space bar. The LED will go off.

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