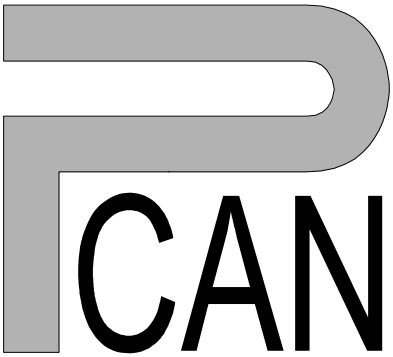

BUS CONVERTER (TJA1054)

User Manual

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1. Edition, November 2000

2 Overview

- Adapter from High-speed CAN (PCA82C251) to Low-speed CAN (TJA 1054)
- Transfer rates up to 125 KBaud.
- CAN transceivers Philips PCA82C251 and TJA1054.
- Terminating resistors for Low-speed CAN switchable (560Ω / 5.66KΩ).
- Power LED
- Error LED (Low-speed CAN)
- Connection with 9-pin Sub-D. Pin assignment according to CiA recommendation DS102. PCAN-Dongle und PCAN-ISA may be set to needed supply by soldering jumpers.

Note:
The Low-speed transceiver always works in normal operating mode. The operation in Sleep or in Standby mode is not possible.

3 Application Note

The Bus-Converter (TJA1054) can be used to connect a high-speed CAN devices (based on transceivers PCA82C250, PCA82C251, and TJA1050 by Philips) like PCAN-Dongle or PCAN-ISA to a Low-speed CAN bus system (PCA82C252, TJA1053, TJA1054).

The 5-Volt supply of the Bus Converter is established over pin 1 (or pin 9) of the Sub-D female connector.

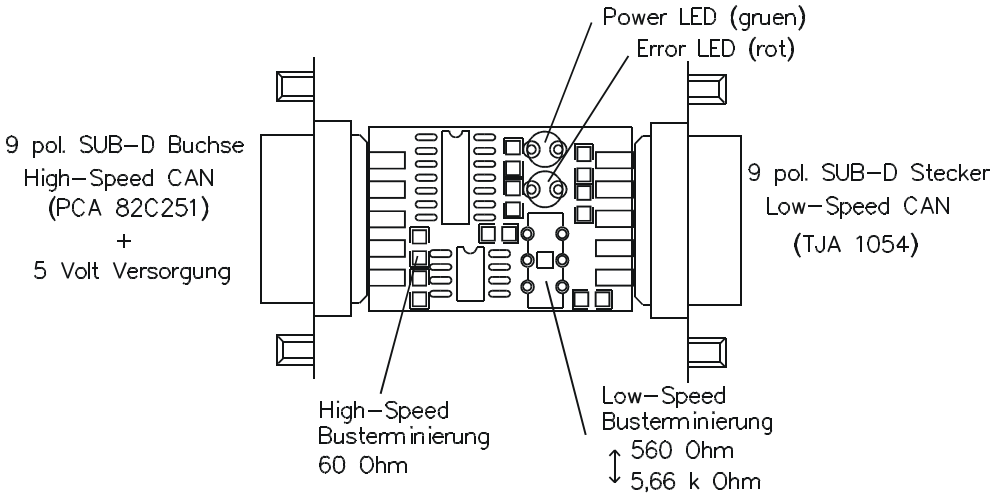
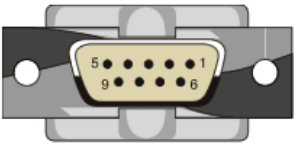


Figure 3-1: Overview of the most important parts for the user

Note: *The Bus Converter may only be operated with 5 Volts. A wrong supply voltage can destroy the Bus Converter, the connected CAN interface or the PC. Connect the Bus Converter only when the PC is turned off.*

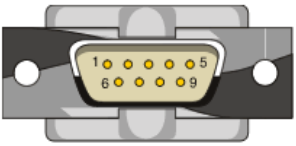
3.1 Pin Assignment of the Sub-D Connectors

Pin assignment 9-pole connector female:
Connection side 82C251 (or 82C250)



Pin	Configuration
1	5 V Power supply
2	CAN-L
3	GND
4	Not connected
5	Not connected
6	GND
7	CAN-H
8	Not connected
9	Not connected

Pin assignment 9-pole connector male:
Connection side TJA 1054



Pin	Configuration
1	Not connected
2	CAN-L
3	GND
4	Not connected
5	Not connected
6	GND
7	CAN-H
8	Not connected
9	Not connected

The Bus Converter already is terminated internally with 60Ω, it therefore can be directly connected to a CAN interface (PCAN-Dongle or PCAN-ISA for example).

3.2 Bus Termination Low-speed CAN

In a Low-speed CAN bus system (TJA1054) every node must have terminating resistors. For optimum system conditions the whole CAN should be terminated with 100Ω (parallel connection of all terminating resistors).

A single node should be terminated with at least 500Ω and at most 6kΩ.

To simplify the adaptation of the CAN Converter to existing CANs you can switch between different terminating resistors (between 560Ω and 5.66kΩ) with a slide switch.

For smaller CAN networks or for testing a single component the slide switch should be set to 560Ω.
For monitoring an existing network (with already optimal termination) the slide switch should be set to 5.66kΩ so that the termination won't influence the system.

3.3 Error LED

The Error LED shows the state of the error output of the Low-Speed CAN transceiver (TJA 1054).
It is active for the following error conditions:

- Interrupt on CAN_H
- Interrupt on CAN_L
- Short circuit between CAN_H and GND
- Short circuit between CAN_H and VCC
- Short circuit between CAN_L and GND
- Short circuit between CAN_L and VCC
- Short circuit between CAN_H and CAN_L

Please see the data sheet of the TJA1054 (Philips) for further details.

3.4 Note Low-power Mode

The connection to the PCAN Bus Converter from a CAN hardware (PCAN-Dongle, PCAN-ISA) is only via CAN bus and therefore it is not possible to set the TJA1054 into low-power mode.

If the PCAN-Bus Converter will be connected to a motor vehicle, which uses the low-power mode, the following should be considered:

When the motor vehicle electronics switch to low-power mode then all transceivers terminate CAN_L to the battery. However, the Bus Converter still terminates CAN_L to VCC. On the CAN_L wire the voltage adjusts to a level above or below the recognition threshold for short circuits on CAN_L (7.3 V) depending on the network size and termination.

If the voltage on CAN_L stays below 7.3 V, a shunt current leads to an increased current consumption of the motor vehicle.

If the voltag on CAN_L is however above 7.3 V, the Bus Converter detects a short circuit on CAN_L and switches to one-wire operation (CAN_H). The communication is ensured but an error is continuously indicated by the red LED.

4 Getting Started

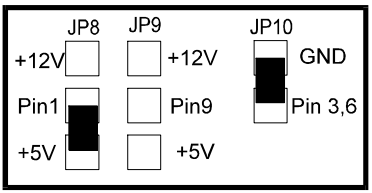
4.1 Connecting the Bus Converter to the PCAN-ISA

With soldering jumpers the PCAN-ISA card can be configured so that 5 V or 12 V can be connected to pin 1 and/or pin 9 of the 9-pin Sub-D connector. To supply the PCAN-Bus Converter from the PCAN-ISA card, Pin 1 must be connected to 5 Volts and GND must be connected via JP10.

Note: *The Bus Converter may only be operated with 5 Volts. A wrong supply voltage can destroy the Bus Converter, the connected CAN interface or the PC.*

ATTENTION! *The voltage supply is not fused and comes directly from the PC's power supply. Do* ***not*** *connect the Bus Converter while the PC is turned on.*

Jumper settings on PCAN-ISA:

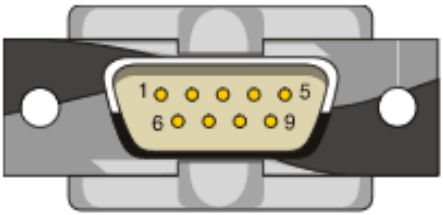


To supply the PCAN Bus Converter from a PCAN-ISA card the soldering jumpers JP8 and JP10 must be set according to the figure above. After configuring make sure, that the necessary supply voltage is available at the Sub-D connector of the card.

Pin assignment of the Sub-D connector according to CiA/DS 102-1

The Sub-D connector of PCAN-ISA is in accordance with the CiA recommendation DS 102-1. Reserved pins are not internally connected.

Pin assignment 9-pole connector male:



Pin	Configuration
1	+12 V / +5 V / Not connected
2	CAN-L
3	CAN-GND / Not connected
4	Not connected
5	Not connected
6	CAN-GND / Not connected
7	CAN-H
8	Not connected
9	+12 V / +5 V / Not connected

Figure 4-1: Pin assignment, 9-pin Sub-D connector PCAN-ISA

4.2 Connecting the Bus Converter to the PCAN-Dongle

With soldering jumpers the PCAN-Dongle can be configured so that 5 V can be connected to pin 1 and/or pin 9 of the 9-pin Sub-D connector. For operating the Bus Converter the 5-Volt supply must be connected to pin 1.

Note: *The Bus Converter may only be operated with 5 Volts. A wrong supply voltage can destroy the Bus Converter, the connected CAN interface or the PC.*

ATTENTION! *The voltage supply is not fused and comes directly from the PC's power supply.*

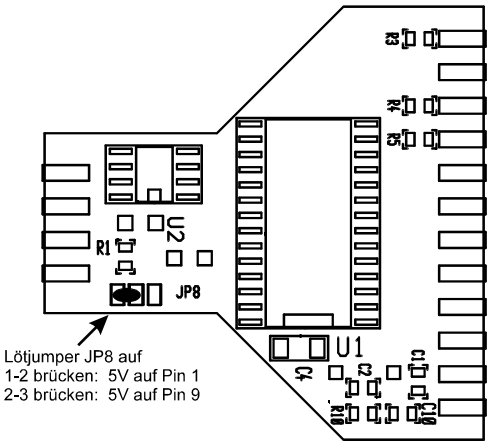


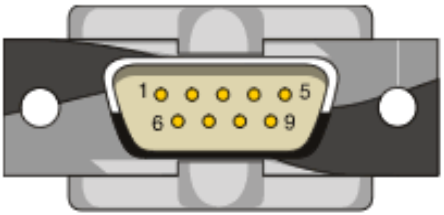
Figure 4-2: Soldering jumper on the PCAN-Dongle PCB

To supply the PCAN Bus Converter from a PCAN-Dongle the soldering jumper JP8 must be set according to the figure above. After configuring make sure, that the necessary supply voltage is available at the Sub-D connector of the PCAN-Dongle.

Pin assignment of the Sub-D connector according to CiA/DS 102-1

The Sub-D connector of the PCAN-Dongle is in accordance to the CiA recommendation DS 102-1. Reserved pins are not internally connected.

Pin assignment 9-pole connector male:



Pin	Configuration
1	+12 V / +5 V / Not connected
2	CAN-L
3	CAN-GND / Not connected
4	Not connected
5	Not connected
6	CAN-GND / Not connected
7	CAN-H
8	Not connected
9	+12 V / +5 V / Not connected

Figure 4-3: Pin assignment, 9-pin Sub-D connector PCAN-Dongle

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