CAN-PCIe/400

PCI Express CAN Interface

Hardware Manual

to Product C.2043.04, C.2043.06

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Document History

The changes in the document listed below affect changes in the hardware as well as changes in the description of the facts, only.

Revision	Chapter	Changes versus previous version	Date
1.0	-	First English version.	2012-03-20

Technical details are subject to change without further notice.

Safety Instructions

- When working with CAN-PCIe/400 follow the instructions below and read the manual carefully to protect yourself from injury and the CAN-PCIe/400 from damage.
- The device is a built-in component. It is essential to ensure that the device is mounted in a way that cannot lead to endangering or injury of persons or damage to objects.
- The device has to be securely installed in the control cabinet before commissioning.
- Protect the CAN-PCIe/400 from dust, moisture and steam.
- Protect the CAN-PCIe/400 from shocks and vibrations.
- The CAN-PCIe/400 may become warm during normal use. Always allow adequate ventilation around the CAN-PCIe/400 and use care when handling.
- Do not operate the CAN-PCIe/400 adjacent to heat sources and do not expose it to unnecessary thermal radiation. Ensure an ambient temperature as specified in the technical data.
- Do not use damaged or defective cables to connect the CAN-PCIe/400 and follow the CAN wiring hints in chapter: "Correctly Wiring Electrically Isolated CAN Networks".
- In case of damages to the device, which might affect safety, appropriate and immediate measures must be taken, that exclude an endangerment of persons and objects.
- Current circuits which are connected to the device have to be sufficiently protected against hazardous voltage (SELV according to EN 60950-1).
- The CAN-PCIe/400 may only be driven by power supply current circuits, that are contact protected. A power supply, that provides a safety extra-low voltage (SELV or PELV) according to EN 60950-1, complies with this conditions.

Attention !
Electrostatic discharges may cause damage to electronic components.
To avoid this, please perform the steps described on page 8 *before* you touch the CAN-PCIe/400, in order to discharge the static electricity from your body.

Qualified Personal
This documentation is directed exclusively towards personal qualified in control and automation engineering. The installation and commissioning of the product may only be carried out by qualified personal, which is authorized to put devices, systems and electric circuits into operation according to the applicable national standards of safety engineering.

Conformity
The CAN-PCIe/400-2 meets the demands of the EU regulations and EMC standards printed in the conformity declaration at the end of this manual.

Intended Use
The intended use of the CAN-PCIe/400 is the operation as a PCI Express CAN interface for PCs.
The guarantee given by esd does not cover damages which result from improper use, usage not in accordance with regulations or disregard of safety instructions and warnings.

- The CAN-PCIe/400 is intended for installation in a PCI Express slot of an industrial or home computer only.
- The operation of the CAN-PCIe/400 in hazardous areas, or areas exposed to potentially explosive materials is not permitted.
- The operation of the CAN-PCIe/400 for medical purposes is prohibited.

Service Note
The CAN-PCIe/400 does not contain any parts that require maintenance by the user. The CAN-PCIe/400 does not require any manual configuration of the hardware.

Disposal
Devices which have become defective in the long run have to be disposed in an appropriate way or have to be returned to the manufacturer for proper disposal. Please, make a contribution to environmental protection.

Table of contents

1. Overview

1.1 Description of the Module

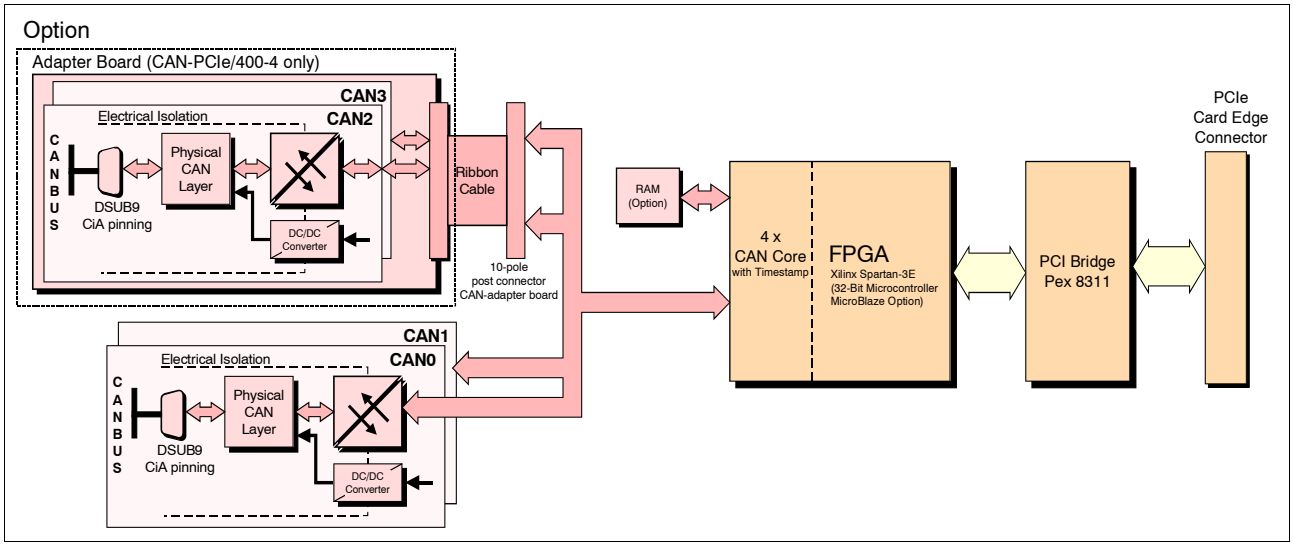


Figure 1: Block circuit diagram of CAN-PCIe/400

The CAN-PCIe/400 is a PC board designed for the PCI Express bus that features two (CAN-PCIe/400-2) or optionally four (CAN-PCIe/400-4) electrically isolated CAN High-Speed interfaces according to ISO 11898-2. CAN-PCIe/400-4 comes with two additional CAN interfaces via a separate slot bracket.

The independent CAN nets acc. to ISO 11898-1 are driven by the esdACC (esd Advanced CAN Core) implemented in the Xilinx Spartan 3e FPGA.

Controlled by the FPGA the CAN-PCIe/400 supports bus mastering as an initiator, meaning that it is capable of initiating write cycles to the host CPU's RAM independent of the CPU or the system DMA controller. This results in a reduction of overall latency on servicing I/O transactions in particular at higher data rates and reduced host CPU load.
The CAN-PCIe/400 provides high resolution hardware timestamps.
CAN Error injection on request.

CAN layer 2 (CAN-API) software drivers are available for Windows, VxWorks, QNX, RTX and Linux supporting up to 24 CAN nets. Drivers for other operating systems are available on request. The CANopen software package is available for Windows, Linux, VxWorks, and QNX.

1.2 PCB View with Connectors

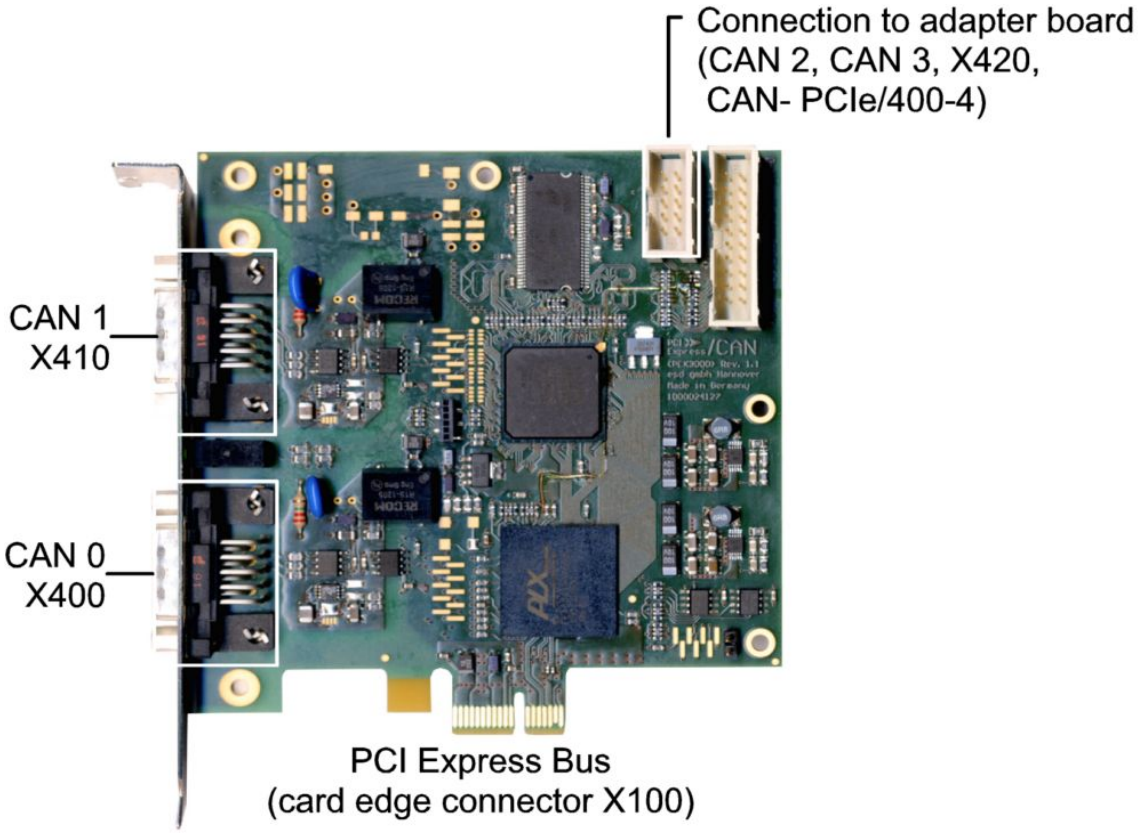


Figure 2: Top layer view of the CAN-PCIe/400-2 with 2x CAN

See also page 15 for signal assignment of the CAN connectors.

2. Hardware Installation

Read the safety instructions at the beginning of this document carefully, before you start with the hardware installation!

Danger!
Electric shock risk. Never carry out work while power supply voltage is switched on!

Attention !
Electrostatic discharges may cause damage to electronic components. To avoid this, please discharge the static electricity from your body by touching the metal case of the PCI Express system *before* you touch the CAN-PCIe/400.

Procedure:

1. Switch off your computer and all connected peripheral devices (monitor, printer, etc.). Switch off the connected CAN devices.
2. Discharge your body as described above.
3. Disconnect the power supply of the PC from the mains.
   If the computer does not have a flexible mains cable, but is directly connected to mains, disconnect the power supply via the safety fuse and make sure that the fuse cannot switch on again unintentionally (i.e. with caution label).

   Danger!
   Never carry out work while power supply voltage is switched on!
4. Open the case.
5. Select an open PCI Express slot and remove the slot cover at the back of the PC.
   The CAN module can be inserted into every PCI Express slot.
   Be careful not to insert the board into an ISA slot, because this can damage the PC and the board!
6. Insert the CAN-PCIe/400 board into the selected PCI Express slot. Carefully push the board down until it snaps into place.
7. Attach the board.
8. If you are installing the CAN-PCIe/400-4 module with 4 CAN interfaces you have to install the adapter board in the PCI Express slot next to the CAN-PCIe/400 board. Connect the two boards with the included ribbon cable (see figure 3 on page 10) via the 10-pin post connectors on the bard and on the adapter.
9. Close the computer case again.
10. Connect the CAN wire.
    Please note that the CAN bus has to be terminated at both ends!
    Use the special T- connectors and terminator connectors offered by esd. Additionally the CAN_GND signal has to be connected to earth at exactly one point. For easier wiring the termination connectors are equipped with an earth connector (4.8 mm fast-on, male).
    A CAN participant without an electrically isolated interface acts as an earth connection.

The first CAN interface (CAN 0) has to be connected via the lower DSUB connector (X400) and the second CAN interface (CAN 1) has to be connected via the upper DSUB connector (X410).

If you are installing a CAN-PCIe/400-4 with four CAN interfaces, you have to connect the third CAN interface via the lower DSUB connector of the adapter board and the fourth CAN interface via the upper DSUB connector of the adapter board. You will find a figure showing the connectors on page 10.

11. Connect the computer to mains again (mains connector or fuse).
12. Switch on the computer and the peripheral devices.
13. End of hardware installation.

    Continue with the software installation as described in the manual ‘CAN-API, Installation Guide’.

2.1 CAN-PCIe/400-4 Version with 4 CAN Interfaces

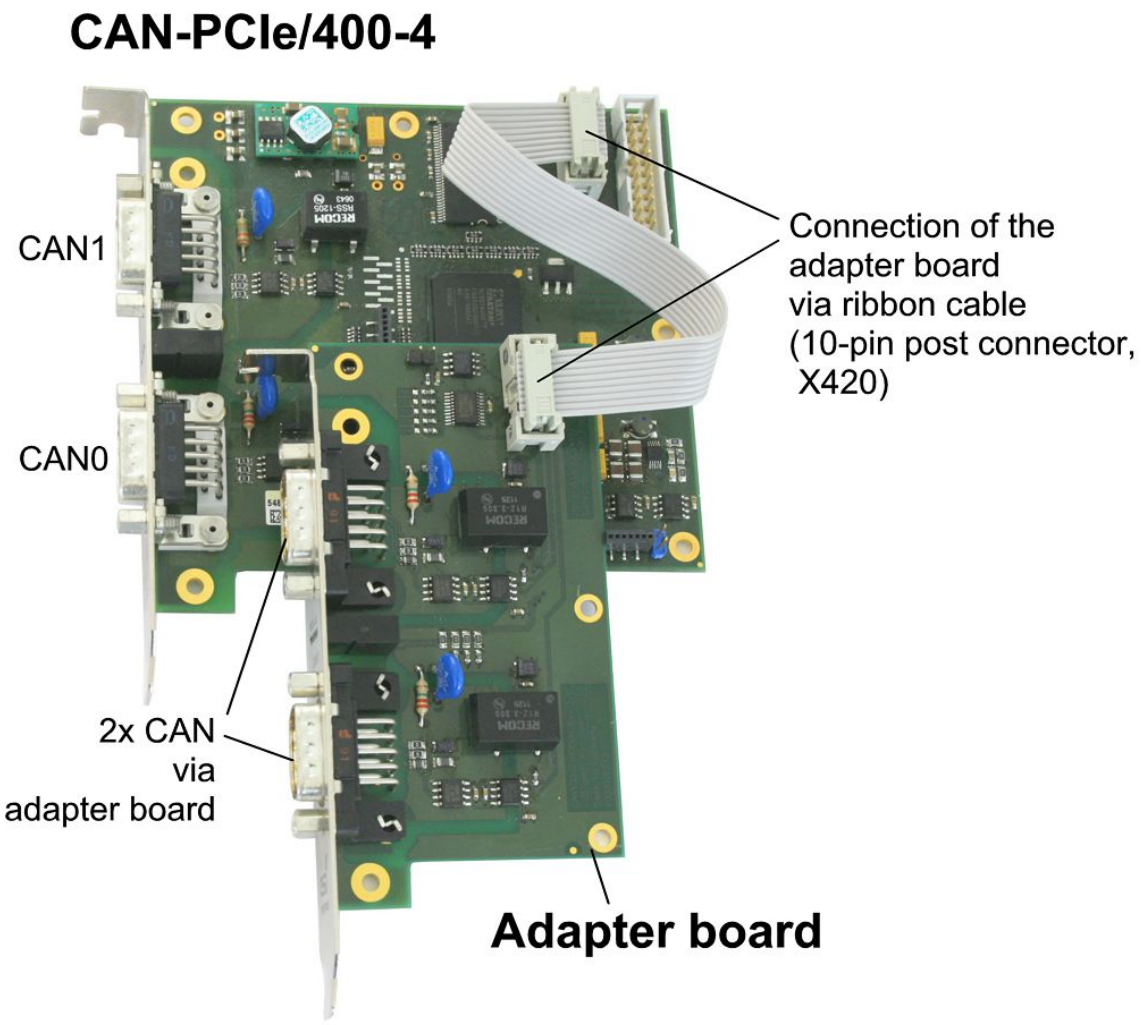


Figure 3: View of CAN-PCIe/400-4 with ribbon cable

In the CAN-PCIe/400-4 version, the board comes with four CAN interfaces.
This module type uses two additional CAN transcievers. The physical layer of the additional CAN interfaces is placed on a separate adapter board. The adapter board has to be mounted close to the CAN-PCIe/400. Furthermore, it has to be connected via the ribbon cable that is contained in the scope of delivery.
The two additional physical interfaces are designed identical to the physical interfaces of CAN0 and CAN1.

3. Front Panel View with LED-Display

The CAN-PCIe/400-2 is equipped with four green LEDs in the front panel.

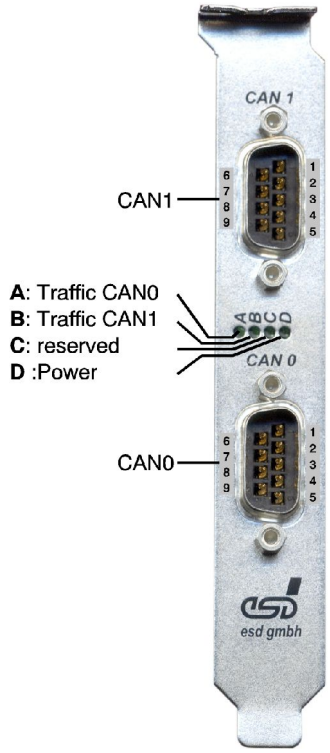


Figure 4: Front panel view (CAN-PCIe/400-2)

Label	Name	Indicator State	Description	LED name in schematic diagram
A	Traffic CAN0	off	no CAN bus connection and/or no CAN traffic on CAN0	D300A
		on	connected to CAN bus 0 and CAN traffic on CAN0	
B	Traffic CAN1	off	no CAN bus connection and/or no CAN traffic on CAN1	D300B
		on	connected to CAN bus 1 and CAN traffic on CAN1	
C	reserved	-	-	D300C
D	Power	off	power supply voltage off	D300D
		on	power supply voltage on	

Table 1: LEDs

3.1 Additional LEDs on CAN-PCIe/400-4 Adapter Board

The CAN-PCIe/400-4 is equipped with four LEDs as described in table 1 and with four additional green LEDs in the front panel of the adapter board.

Label	Name	Indicator State	Description
A	Traffic CAN2	off	no CAN bus connection and/or no CAN traffic on CAN2
		on	connected to CAN bus 2 and CAN traffic on CAN2
B	Traffic CAN3	off	no CAN bus connection and/or no CAN traffic on CAN3
		on	connected to CAN bus 3 and CAN traffic on CAN3
C	reserved	-	-
D	Power	off	power supply voltage off
		on	power supply voltage on

Table 2: Additional LEDs on adapter board

4. Technical Data

4.1 General Technical Data

Ambient temperature	0...50°C
Humidity	90 %, non-condensing
Supply voltage	3.3 V ±5% / (depending on FPGA-image, 2x CAN: up to I = 1 A) 12 V ±5% / $I_{typically}$ = 100 mA
Plug- and socket connectors	CAN0 - CAN interface 0 (9-pin DSUB/male, X400) CAN1 - CAN interface 1 (9-pin DSUB/male, X410) PCIe - (card edge connector, X100) X420 - connection to adapter board via ribbon cable (10-pin post connector) Only for test- and programming purposes: X430 - future use X700 - future use Additional connectors equipped on CAN-PCIe/400-4 adapter board: CAN0 - CAN interface 0 (9-pin DSUB/male) CAN1 - CAN interface 1 (9-pin DSUB/male) X420 - connection to CAN-PCIe/400 board via ribbon cable (10-pin post connector)
LEDs	CAN traffic, Power
Dimensions	105 mm x 111 mm (board only) CAN-PCIe/400-4 only: adapter board: 107 mm x 55 mm (board only)
Weight	CAN-PCIe/400-2: 100 g CAN-PCIe/400-4: 165 g

Table 3: General technical data of the module

4.2 PCI Express Interface

PCIe endpoint	PLX PEX8311
PCIe port	according to PCI Express Specification R1.0a
Link width	33/66 MHz / 3.3 V signalling level (5.0 V tolerant)
Memory	BlockRAM:72 KB, DDR-SDRAM:64 MB
Connector	PCI-card edge connector

Table 4: PCI bus data

4.3 CAN Interface

Number of CAN interfaces	CAN-PCIe/400-2: 2 CAN high-speed interfaces (CAN0, CAN1) CAN-PCIe/400-4: 4 CAN high-speed interfaces (CAN0 - CAN3)
CAN controller	esdACC in FPGA Spartan® 3e, according to ISO11898-1 (CAN 2.0A/2.0B)
CAN protocol	according to ISO11898-1
Physical Layer	physical layer according to ISO 11898-2, bit rate up to 1 Mbit/s
Bus termination	terminating resistor has to be set externally, if required
Electrical isolation	via digital isolator and DC/DC-converters
Connector	CAN-PCIe/400-2 (2x CAN): 2x DSUB9 (male) CAN-PCIe/400-4 (4x CAN): 4x DSUB9 (male)

Table 5: Data of the CAN interface

4.4 Software Support

CAN layer 2 (CAN-API) software drivers are available for Windows, VxWorks, QNX, RTX and Linux supporting up to 24 CAN nets. Drivers for other operating systems are available on request. The CANopen software package is available for Windows, Linux, VxWorks, and QNX.
For detailed information about the driver availability for your operating system, please contact our sales team: sales@esd.eu

The CAN layer 2 (CAN-API) software installation and the software drivers are described in the manual:

“CAN-API Part 1: Function Description” and
“CAN-API Part 2: Installation Guide”
esd-order No.: C.2001.21

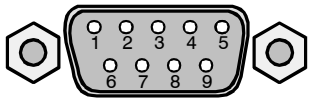
5. Connector Assignments

5.1 CAN

The signal assignments of CAN 0 and CAN 1 and both additional CAN interfaces (CAN-PCIe/400-4 only) are identical.

Device connector: 9-pin DSUB connector, male

Pin Position:



Pin Assignment:

Signal	Pin		Signal
(CANx_GND)	6	1	reserved
CANx_H	7	2	CANx_L
reserved	8	3	CANx_GND
reserved	9	4	reserved
		5	Shield

Signal Description:

CANx_L, CANx_H ... CAN signal lines of CAN net x (CAN-PCIe/400-2: x ... 0,1, CAN-PCIe/400-4: x ... 0 - 3)
CANx_GND ... reference potential of the local CAN physical layer x
(CANx_GND)... optional reference potential of the local CAN physical layer
Shield ... shielding (connected with the case of the 9-pin DSUB connector)
reserved ... reserved for future applications, do not connect!

6. Correctly Wiring Electrically Isolated CAN Networks

For the CAN wiring all applicable rules and regulations (EC, DIN), e.g. regarding electromagnetic compatibility, security distances, cable cross-section or material, have to be met.

6.1 Light Industrial Environment (*Single* Twisted Pair Cable)

6.1.1 General Rules

Note:
esd grants the EC Conformity of the product, if the CAN wiring is carried out with at least single shielded **single** twisted pair cables that match the requirements of ISO 118982-2. Single shielded *double* twisted pair cable wiring as described in chapter 6.2. ensures the EC Conformity as well.

The following **general rules** for CAN wiring with single shielded *single* twisted pair cable must be followed:

1	A cable type with a wave impedance of about 120 Ω ±10% with an adequate wire cross-section (0.22 mm²) has to be used. The voltage drop over the wire has to be considered!
2	For light industrial environment use at least a two-wire CAN cable. Connect • the two twisted wires to the data signals (CAN_H, CAN_L) and • the cable shield to the reference potential (CAN_GND)!
3	The reference potential CAN_GND has to be connected to the functional earth (FE) at exactly **one** point.
4	A CAN net must not branch (exception: short cable stubs) and has to be terminated with the characteristic impedance of the line (generally 120 Ω ±10%) at both ends (between the signals CAN_L and CAN_H and **not** at GND)!
5	Keep cable stubs as short as possible (l < 0.3 m)!
6	Select a working combination of bit rate and cable length.
7	Keep away cables from disturbing sources. If this cannot be avoided, double shielded wires are recommended.

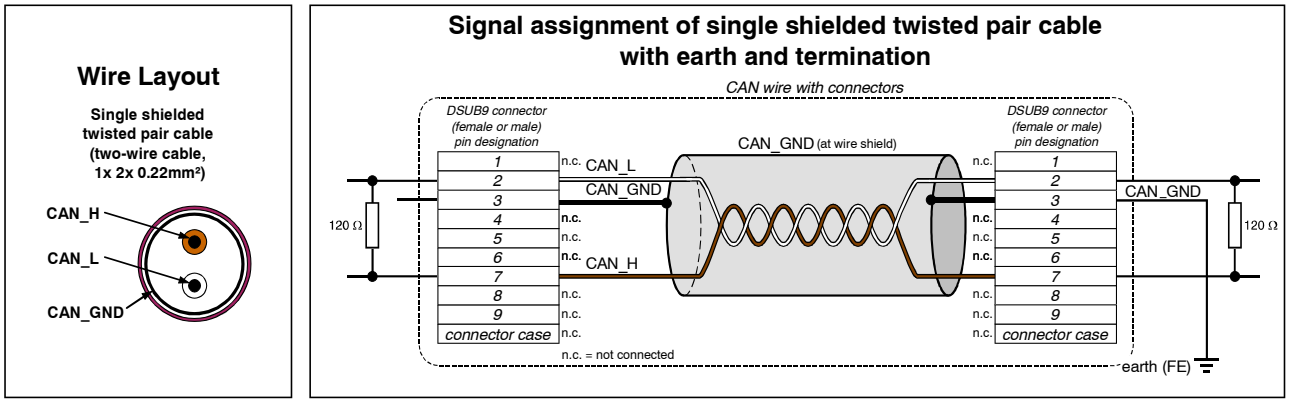


Figure. 5: CAN wiring for light industrial environment

6.1.2 Cabling

- for devices which have only one CAN connector per net use T-connector and stub (shorter than 0.3 m) (available as accessory)

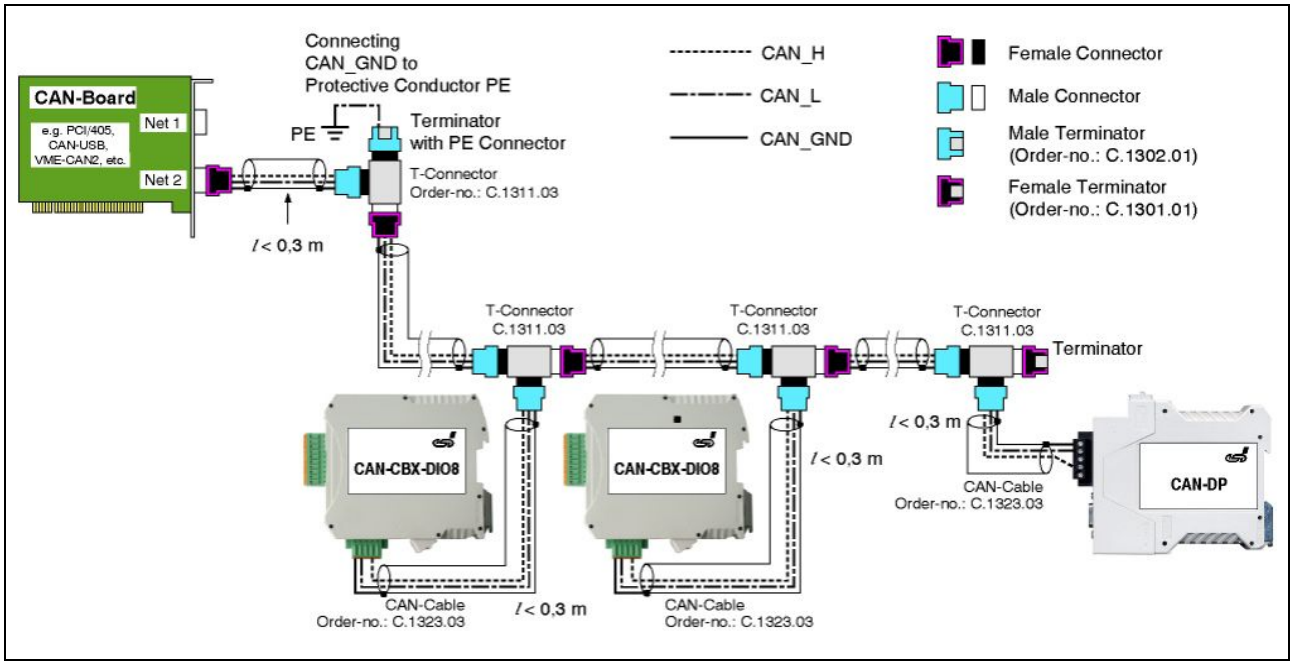


Figure. 6: Example for proper wiring with single shielded single twisted pair wires

6.1.3 Termination

- Use external termination plugs, because they can be rediscovered more easily than internal terminations within the CAN devices!
- 9-pin DSUB-termination connectors with male and female contacts and earth terminal are available as accessories

6.2 Heavy Industrial Environment (*Double* Twisted Pair Cable)

6.2.1 General Rules

The following **general rules** for the CAN wiring with single shielded *double* twisted pair cable must be followed:

1	A cable type with a wave impedance of about 120 Ω ±10% with an adequate wire cross-section (0.22 mm²) has to be used. The voltage drop over the wire has to be considered!
2	For heavy industrial environment use a four-wire CAN cable. Connect • two twisted wires to the data signals (CAN_H, CAN_L) and • the other two twisted wires to the reference potential (CAN_GND) and • the cable shield to functional earth (FE) at least at one point!
3	The reference potential CAN_GND has to be connected to the functional earth (FE) at exactly **one** point.
4	A CAN bus line must not branch (exception: short cable stubs) and has to be terminated with the characteristic impedance of the line (generally 120 Ω ±10%) at both ends (between the signals CAN_L and CAN_H and **not** at GND)!
5	Keep cable stubs as short as possible (l < 0.3 m)!
6	Select a working combination of bit rate and cable length.
7	Keep away CAN cables from disturbing sources. If this can not be avoided, double shielded cables are recommended.

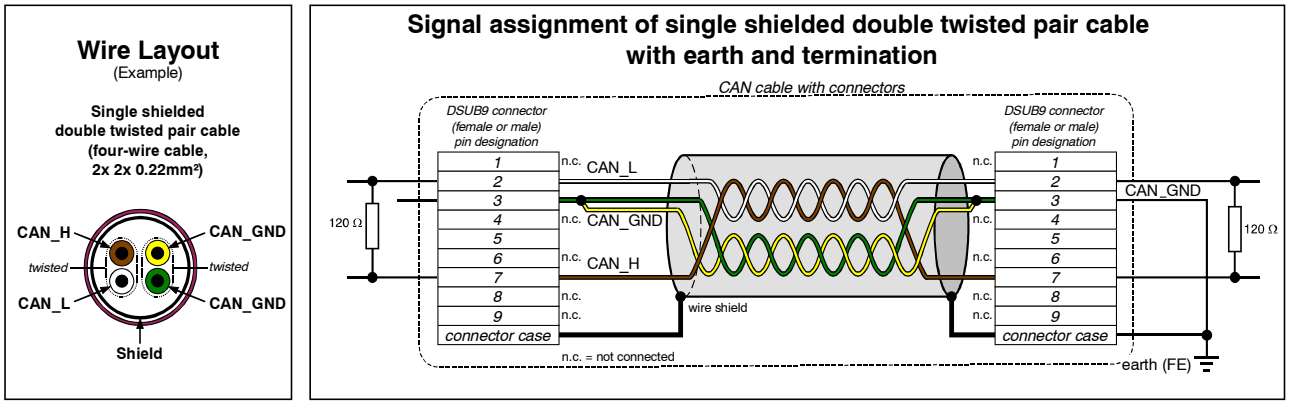


Figure. 7: CAN wiring for heavy industrial environment

6.2.2 Device Cabling

- To connect CAN devices which are equipped with one CAN connector per net, use T-connectors and cable stubs (shorter than 0.3 m).

Attention:
If single shielded *double* twisted pair cables are used, realize the T-connections by means of connectors that support connection of two CAN cables at one connector where the cable's shield is looped through e.g. DSUB9 connector from ERNI (ERBIC CAN BUS MAX, order no.:154039).

The usage of esd's T-connector type C.1311.03 is not recommended for single shielded *double* twisted pair cables because the shield potential of the conductive DSUB housing is not looped through this T-connector type.

Furthermore, mixed use of single twisted and double twisted cables should be avoided!

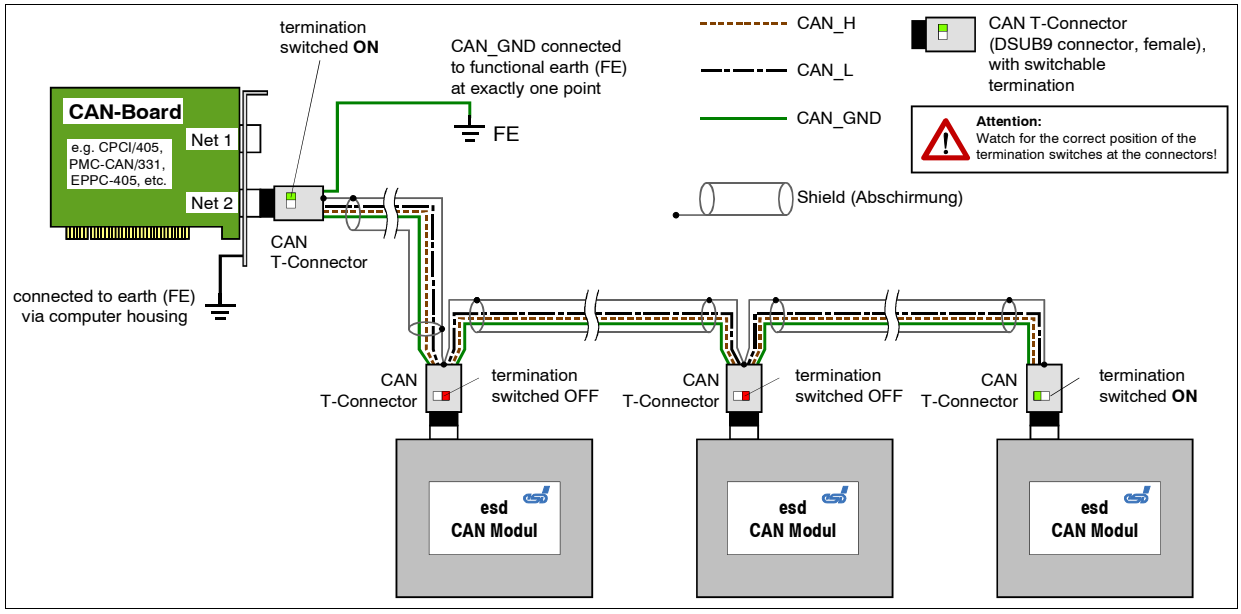


Figure. 8: Example for proper wiring with single shielded double twisted pair cables

6.2.3 Termination

- Use external termination plugs, because they can later be rediscovered more easily than internal terminations within the CAN devices!

- A 9-pin DSUB-connector with integrated switchable termination resistor can be ordered e.g. from ERNI (ERBIC CAN BUS MAX, female contacts, order no.:154039).

6.3 Electrical Grounding

- CAN_GND has to be connected between the CAN devices, because esd CAN devices are electrically isolated from each other!
- CAN_GND has to be connected to the earth potential (FE) at **exactly one** point of the network!
- Each CAN interface without electrically isolated interface acts as an earthing point. For this reason do not connect more than one CAN device without electrically isolated CAN interface!
- Earthing can e.g. be made at a connector/T-connector.

6.4 Bus Length

- Optical couplers are delaying the CAN signals. esd modules typically reach a wire length of 37 m at 1 Mbit/s within a closed net without impedance disturbances like e.g. cable stubs >> 0.3 m.

Bit rate [Kbits/s]	Typical values of reachable wire length **with esd interface** l_{max} [m]	**CiA recommendations** (07/95) for reachable wire lengths l_{min} [m]
1000	37	25
800	59	50
666.6	80	-
500	130	100
333.3	180	-
250	270	250
166	420	-
125	570	500
100	710	650
66.6	1000	-
50	1400	1000
33.3	2000	-
20	3600	2500
12.5	5400	-
10	7300	5000

Table 6: Recommended cable lengths at typical bit rates (with esd-CAN interfaces)

Note:
Please note the recommendations according to ISO 11898 for the selection of the cross section of the wire depending of the wire length.

6.5 Examples for CAN Cables

6.5.1 Cable for Light Industrial Environment Applications (Two-Wire)

Manufacturer	Cable Type
U.I. LAPP GmbH Schulze-Delitzsch-Straße 25 70565 Stuttgart Germany www.lappkabel.com	e.g. UNITRONIC ®-BUS CAN UL/CSA (1x 2x 0.22) (UL/CSA approved) Part No.: 2170260 UNITRONIC ®-BUS-FD P CAN UL/CSA (1x 2x 0.25) (UL/CSA approved) Part No.: 2170272
ConCab GmbH Äußerer Eichwald 74535 Mainhardt Germany www.concab.de	e. g. BUS-PVC-C (1x 2x 0,22 mm²) Order No.: 93 022 016 (UL appr.) BUS-Schleppflex-PUR-C (1x 2x 0,25 mm²) Order No.: 94 025 016 (UL appr.)

6.5.2 Cable for Heavy Industrial Environment Applications (Four-Wire)

Manufacturer	Cable Type
U.I. LAPP GmbH Schulze-Delitzsch-Straße 25 70565 Stuttgart Germany www.lappkabel.com	e.g. UNITRONIC ®-BUS CAN UL/CSA (2x 2x 0.22) (UL/CSA approved) Part No.: 2170261 UNITRONIC ®-BUS-FD P CAN UL/CSA (2x 2x 0.25) (UL/CSA approved) Part No.: 2170273
ConCab GmbH Äußerer Eichwald 74535 Mainhardt Germany www.concab.de	e. g. BUS-PVC-C (2x 2x 0,22 mm²) Order No.: 93 022 026 (UL appr.) BUS-Schleppflex-PUR-C (2x 2x 0,25 mm²) Order No.: 94 025 026 (UL appr.)

Note:
Configured CAN cables can be ordered from **esd**.

7. CAN Troubleshooting Guide

The CAN Troubleshooting Guide is a guide to find and eliminate the most frequent hardware-error causes in the wiring of CAN-networks.

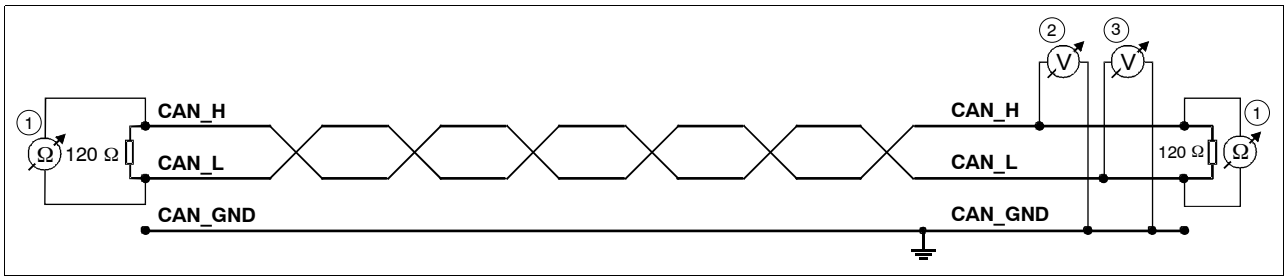


Figure. 9: Simplified diagram of a CAN network

7.1 Termination

The termination is used to match impedance of a node to the impedance of the transmission line being used. When impedance is mismatched, the transmitted signal is not completely absorbed by the load and a portion is reflected back into the transmission line. If the source, transmission line and load impedance are equal these reflections are eliminated. This test measures the series resistance of the CAN data pair conductors and the attached terminating resistors.

To test it, please

1. Turn off all power supplies of the attached CAN nodes.
2. Measure the DC resistance between CAN_H and CAN_L at the ends of the network ① (see figure above) and at the centre of the network (if the network cable consists of more than one line section).

The measured value should be between 50 Ω and 70 Ω. The measured value should be nearly the same at each point of the network.

If the value is below 50 Ω, please make sure that:
- there is no short circuit between CAN_H and CAN_L wiring
- there are not more than two terminating resistors
- the nodes do not have faulty transceivers.

If the value is higher than 70 Ω, please make sure that:
- there are no open circuits in CAN_H or CAN_L wiring
- your bus system has two terminating resistors (one at each end) and that they are 120 Ω each.

7.2 Electrical Grounding

The CAN_GND of the CAN network has to be connected to the functional earth potential (FE) at only **one** point. This test will indicate if the CAN_GND is grounded in several places.
To test it, please

1. Disconnect the CAN_GND from the earth potential (FE).
2. Measure the DC resistance between CAN_GND and earth potential (see figure on the right).
3. Connect CAN_GND to earth potential.

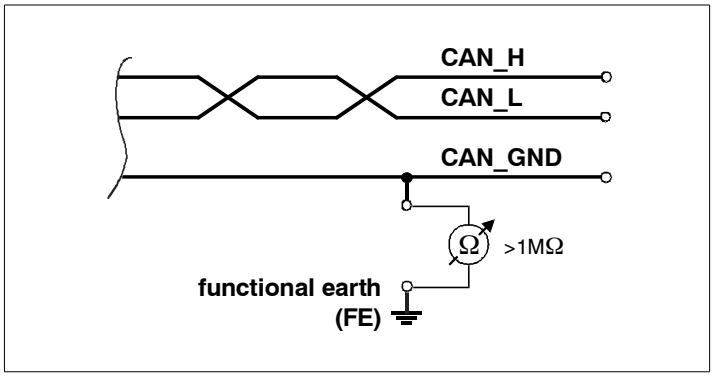


Figure. 10: Simplified schematic diagram of ground test measurement

The resistance should be higher than 1 MΩ. If it is lower, please search for additional grounding of the CAN_GND wires.

7.3 Short Circuit in CAN Wiring

A CAN bus might possibly still be able to transmit data if there is a short circuit between CAN_GND and CAN_L, but the error rate will increase strongly. Make sure that there is no short circuit between CAN_GND and CAN_L!

7.4 CAN_H/CAN_L-Voltage

Each node contains a CAN transceiver that outputs differential signals. When the network communication is idle the CAN_H and CAN_L voltages are approximately 2.5 volts. Faulty transceivers can cause the idle voltages to vary and disrupt network communication.

To test for faulty transceivers, please

1. Turn on all supplies.
2. Stop all network communication.
3. Measure the DC voltage between CAN_H and GND ② (see figure above).
4. Measure the DC voltage between CAN_L and GND ③ (see figure above).

Normally the voltage should be between 2.0 V and 4.0 V.

If it is lower than 2.0 V or higher than 4.0 V, it is possible that one or more nodes have faulty transceivers. For a voltage lower than 2.0 V please check CAN_H and CAN_L conductors for continuity. For a voltage higher than 4.0 V, please check for excessive voltage.

To find the node with a faulty transceiver please test the CAN transceiver resistance (see below).

7.5 CAN Transceiver Resistance Test

CAN transceivers have one circuit that controls CAN_H and another circuit that controls CAN_L. Experience has shown that electrical damage to one or both of the circuits may increase the leakage current in these circuits.

To measure the current leakage through the CAN circuits, please use an resistance measuring device and:

1. Switch off the node and disconnect it from the network ④
   (see figure below).

2. Measure the DC resistance between CAN_H and CAN_GND ⑤
   (see figure below).

3. Measure the DC resistance between CAN_L and CAN_GND ⑥
   (see figure below).

The measured resistance has to be about 500 kΩ for each signal. If it is much lower, the CAN transceiver it is probably faulty.
Another sign for a faulty transceiver is a very high deviation between the two measured input resistance (>> 200%).

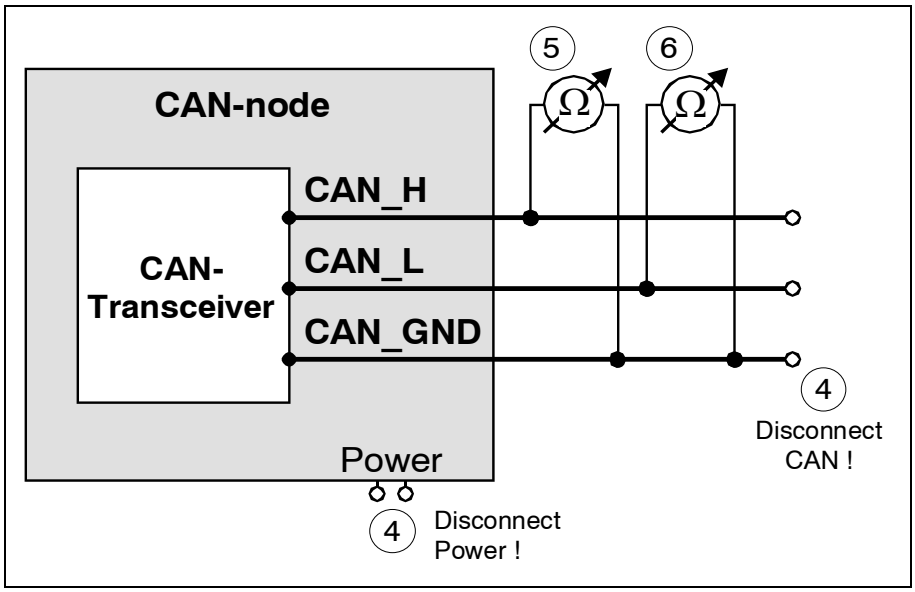


Figure. 11: Measuring the internal resistance of CAN transceivers

8. Declaration of Conformity

EG-KONFORMITÄTSERKLÄRUNG
EC DECLARATION OF CONFORMITY

Adresse / *Address*
esd electronic system design gmbh
Vahrenwalder Str. 207
30165 Hannover
Germany

esd erklärt, dass das Produkt
esd declares, that the product
CAN-PCIe/400-2

Typ, Modell, Artikel-Nr.
Type, Model, Article No.
C.2043.04

die Anforderungen der Normen
fulfills the requirements of the standards
EN 61000-6-2: 2005,
EN 61000-6-3: 2007

gemäß folgendem Prüfbericht erfüllt.
according to test certificate.
H-K00-0426-11

Das Produkt entspricht damit der EG-Richtlinie „EMV"
Therefore the product corresponds to the EC-Directive 'EMC'
2004/108/EG

Das Produkt entspricht der EG-Richtlinie „RoHS"
The product corresponds to the EC-Directive 'RoHS'
2011/65/EU

Diese Erklärung verliert ihre Gültigkeit, wenn das Produkt nicht den Herstellerunterlagen entsprechend eingesetzt und betrieben wird, oder das Produkt abweichend modifiziert wird.
This declaration loses its validity if the product is not used or run according to the manufacturer's documentation or if non-compliant modifications are made.

Name / *Name* T. Ramm
Funktion / *Title* CE-Koordinator / *CE Coordinator*
Datum / *Date* Hannover, 2012-03-19

Rechtsgültige Unterschrift / *authorized signature*

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9. Order Information

Type	Properties	Order No.
CAN-PCIe/400-2	2x CAN, ISO11898	C.2043.04
CAN-PCIe/400-4	4x CAN, ISO 11898	C.2043.06
Software		
CAN-layer 2 object licences including CD-ROM: CAN-DRV-LCD Windows/Linux CAN-DRV-LCD QNX CAN-DRV-LCD VxWorks CAN-DRV-LCD RTX		 C.1101.02 C.1101.32 C.1101.55 C.1101.35
CANopen object licences including CD-ROM: CANopen-DRV-LCD Windows/Linux CANopen-DRV-LCD QNX CANopen-DRV-LCD VxWorks CANopen-DRV-LCD RTX		 C.1101.06 C.1101.17 C.1101.18 C.1101.16
For detailed information about the driver availability for your operating system, please contact our sales team.		

Table 7: Order information

PDF Manuals
Manuals are available in English and usually in German as well. For availability of English manuals see table below.
Please download the manuals as PDF documents from our esd website www.esd.eu for free.

Manuals		Order No.
CAN-PCIe/400-ME	Hardware manual in English	C.2043.21
CAN-API-ME	API manual 1/2: Functions (English) API manual 2/2: Installation (English)	C.2001.21
CANopen-ME	CANopen manuals in English	C.2002.21

Table 8: Available manuals

Printed Manuals
If you need a printout of the manual additionally, please contact our sales team: sales@esd.eu for a quotation. Printed manuals may be ordered for a fee.