



EtherCAN/2

Ethernet-CAN-Gateway



Hardware Manual

to Product C.2051.02

NOTE

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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
1.2	all	First version of English manual.	2009-11-09
1.3	2.2	LED description updated	2010-05-19
	4	Updated description for IP- and DHCP configuration	
	4.2	Updated images	
		Added description for UPnP	
4.2.3	Added description for ELLSI clients		

Technical details are subject to change without further notice.

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Safety Instructions and Conformity

- When working with EtherCAN/2 follow the instructions below and read the manual carefully to protect yourself and the EtherCAN/2 from damage.
The esd guarantee does not cover damages which result from improper use or disregard of safety instructions and warnings.
- Do not open the housing of the device. It does not contain any serviceable parts and does not require any manual configuration of the hardware.
Dismantling the housing by personnel which is not authorized by esd causes the loss of all warranty claims.
- In order to prevent overvoltage damage due to thunder storm, unplug the device from Ethernet and CAN beforehand.
- Never let liquids get inside the device. Otherwise, electric shocks or short circuits may result.
- Protect the device from dust, moisture and steam. Remove all cables before cleaning. Clean the device with a slightly moist, lint-free cloth. Cleaning agents or solvents are not suitable.
- Protect the device from shocks and vibrations.
- The device may become warm during normal use. Always allow adequate ventilation around the device and use care when handling.
- Do not operate the device adjacent to heat sources and do not expose it to unnecessary thermal radiation. Ensure an ambient temperature of 0°...70 °C.
- Do not use damaged or defective cables to connect the device and follow the CAN wiring hints at the end of the manual.
- The device is intended for indoor use only.
- The operation of the device in hazardous areas, or areas exposed to potentially explosive materials is not permitted.
- The operation of the device for medical purposes is prohibited.
- The EtherCAN/2 is an industrial product and meets the demands of the EU regulations and EMC standards printed in the conformity declaration at the end of this manual.

Warning: In a residential, commercial or light industrial environment the EtherCAN/2 may cause radio interferences in which case the user may be required to take adequate measures.

Table of Contents

1	Overview.....	7
1.1	Safety Instructions.....	7
1.2	Service Note.....	7
2	Hardware Installation.....	8
2.1	Connections.....	8
2.2	LEDs.....	9
2.2.1	LED Assignment.....	9
3	Starting Up.....	11
4	Configuration.....	12
4.1	Configuration of the IP Address.....	12
4.1.1	Configuration via DHCP.....	12
4.1.1.1	Using a Hostname Instead of the IP Address.....	13
4.1.2	Determining IP Address via UPnP.....	13
4.1.3	Configuration via esdcp.....	15
4.2	Web Based Configuration.....	17
4.2.1	Overview.....	17
4.2.2	Configuration.....	18
4.2.2.1	Security.....	18
4.2.2.2	Network Settings.....	19
4.2.2.3	Remote Logging.....	23
4.2.2.4	Firmware Update.....	24
4.2.2.5	Reboot.....	26
4.2.3	Status.....	27
4.2.3.1	CAN Statistics.....	27
4.2.3.2	Ethernet.....	28
4.2.3.3	Connected clients.....	29
4.2.3.4	Alarms and Events.....	30
5	Technical Data.....	31
5.1	General Technical Data.....	31
5.2	Microprocessor and Memory.....	31
5.3	CAN Interface.....	32
5.4	Ethernet Interface.....	32
5.5	DIAG, Serial Interface via USB Interface.....	32
5.6	Software.....	33
5.7	Order Information.....	34
6	Interfaces and Connector Assignments.....	35
6.1	24 V-Power Supply Voltage.....	35
6.1.1	Connector Assignment.....	35
6.2	CAN.....	36
6.2.1	Connector Assignment.....	37
6.3	24 V and CAN via InRailBus.....	38
6.4	DIAG.....	38
6.4.1	Assignment.....	38
7	Correctly Wiring Electrically Isolated CAN Networks.....	39
8	CAN-Bus Troubleshooting Guide.....	43
8.1	Termination.....	43
8.2	CAN_H/CAN_L-Voltage.....	44
8.3	Ground.....	44
8.4	CAN Transceiver Resistance Test.....	45

9	Appendix InRailBus (Option).....	46
9.1	Order Information InRailBus Accessories.....	46
9.2	Connector Assignment 24V and CAN via InRailBus (Option).....	47
9.3	Using InRailBus (Option).....	48
9.3.1	Installation of the Module Using InRailBus Connector.....	48
9.3.2	Connecting Power Supply and CAN Signals to CBX-InRailBus.....	49
9.3.3	Connection of the Power Supply Voltage.....	50
9.3.4	Connection of CAN.....	50
9.4	Remove the CAN-CBX Module from InRailBus.....	51

1 Overview

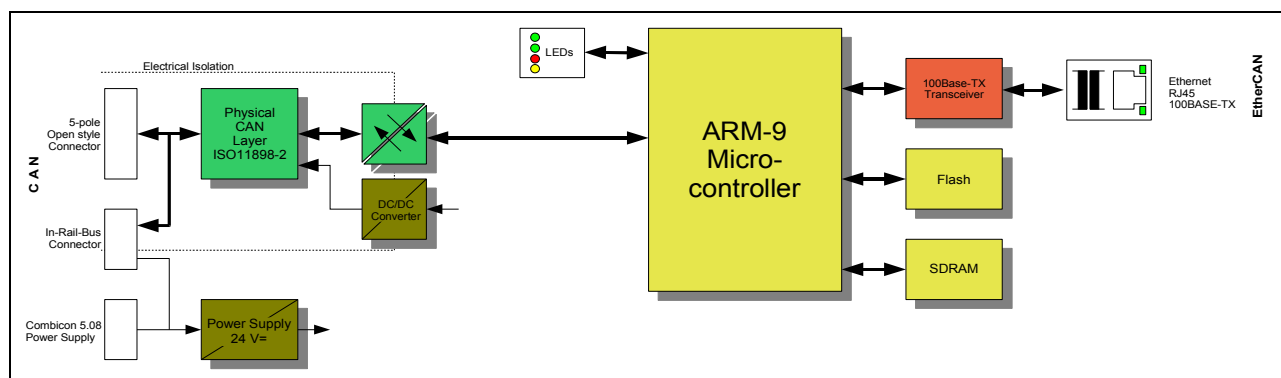


Fig. 1: Block circuit diagram

The EtherCAN/2 is an Ethernet-CAN-Gateway equipped with an ARM9 processor, which controls the data transfer between CAN and Ethernet.

The Ethernet interface is suitable for 10 Mbit/s and 100 Mbit/s networks and can be connected via an RJ45-socket.

The CAN interface can be connected via a 5-pin Combicon connector.

The interface is in accordance with ISO 11898-2, is electrically isolated and can be used for transmission rates from 50 kbit/s up to 1 Mbit/s.

The connectors for the Ethernet-, CAN- and serial interface and the status LEDs are located in the front panel of the top hat rail module and are easily accessible.

The 4-pin Combicon connector for the power supply is located in the case top side, easily accessible.

1.1 Safety Instructions

When working with EtherCAN/2 follow the instructions and information about safety and conformity (see page 4) and read the manual carefully to protect yourself and the EtherCAN/2 from damage.

The intended use is the operation of the EtherCAN/2 as Ethernet-CAN-Gateway.

The esd guarantee does not cover damages which result from improper use or disregard of safety instructions and warnings.

1.2 Service Note

The EtherCAN/2 does not contain any parts that require maintenance by the user.

2 Hardware Installation

2.1 Connections

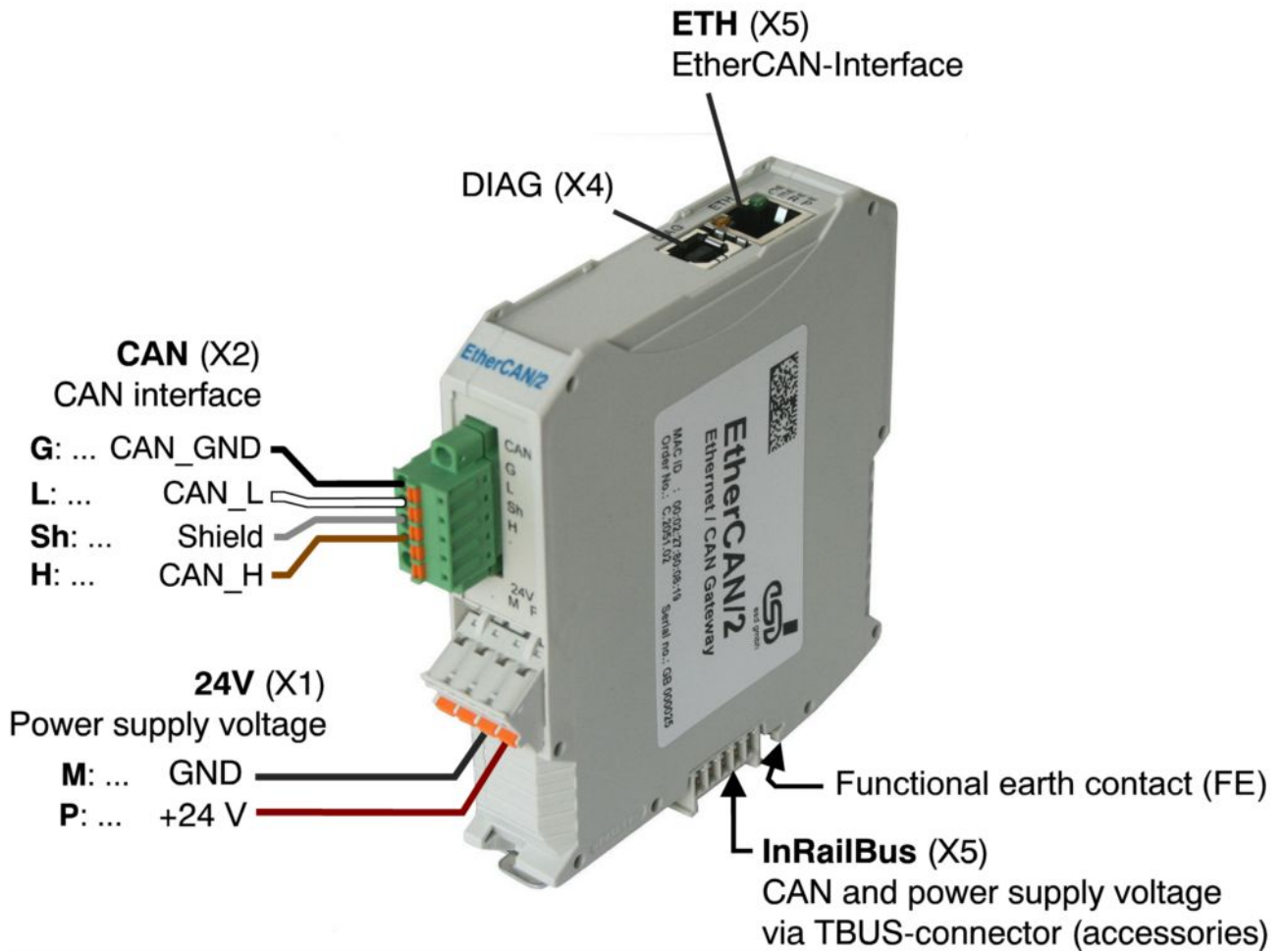


Fig. 2: Connections in operable state

Please refer as well to page 35 for signal assignment of the connectors.

2.2 LEDs

2.2.1 LED Assignment

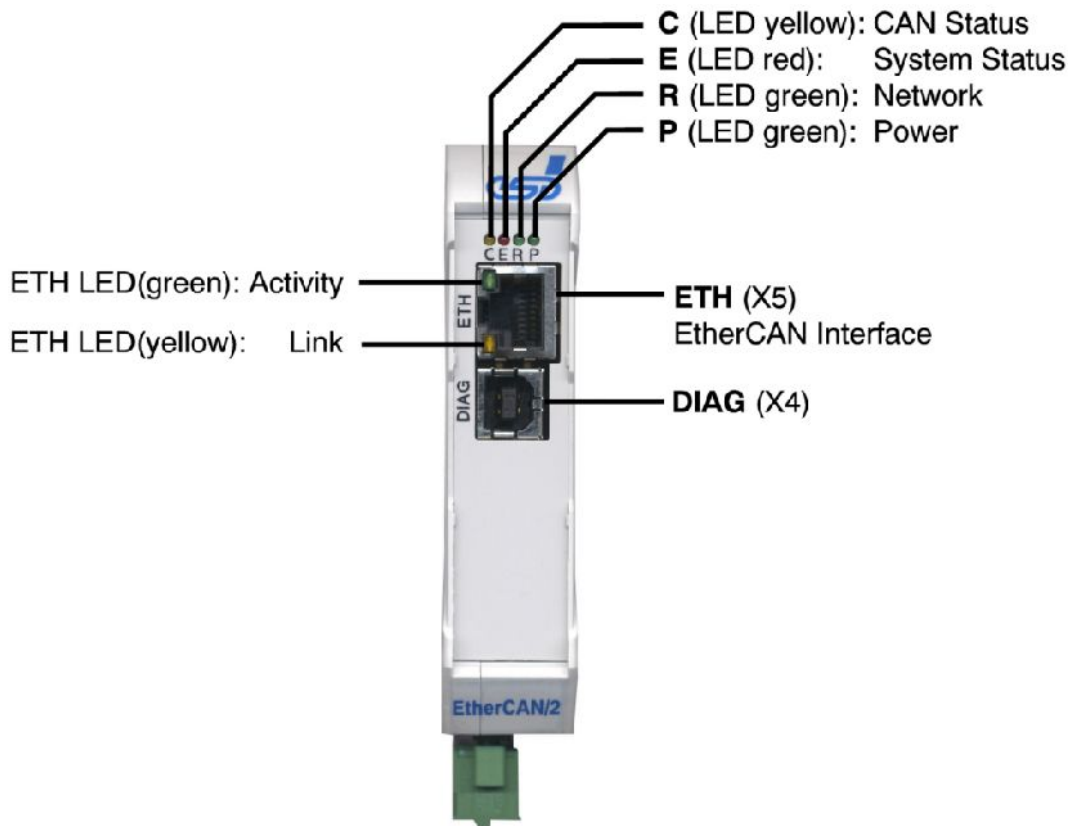


Fig. 3: Position of the LEDs in the front panel

LEDs of the EtherCAN-RJ-45 socket

LED	Colour	Indication	Description
Activity	green	off	no Ethernet activity
		blinking	Ethernet activity (reception of Ethernet data)
Link	yellow	off	no Ethernet connection
		on	Link Status Ethernet (link to server or hub)

Table 1: Display function of ETH LEDs (RJ45-socket)


LEDs C, E, R, P

LED	Colour	Function	Indication	Description	LED-name in schematic diagram
C	yellow	CAN-Status	off	Bus-OK	LED1A
			on	Bus-OFF	
			blinking short on (long off)	Bus-Warn	
			blinking long on (short off)	Bus-Passive	
E	red	System-Status	off	no error detected	LED1B
			on	system start failed	
			blinking short on (long off)	web-server failure	
			blinking long on (short off)	net configuration failure (system has set IP address automatically)	
R	green	Network	off	no EtherCAN clients	LED1C
			blinking short on (long off)	net configuration active	
			blinking long on (short off)	EtherCAN clients connected	
P	green	Power	off	no power supply voltage or hardware error	LED1D
			on	power supply voltage supplied and hardware initialised correctly.	

Table 2: Display function of LEDs

3 Starting Up

To start up the EtherCAN/2 follow the instructions below.

Step		see chapter	see page
	Read the safety instructions at the beginning of this document carefully before you start with the hardware installation!	-	4
1.	Mount and wire the EtherCAN/2 module (power supply voltage, CAN, Ethernet).	2.1	8
2.	Please remember that the CAN bus has to be terminated at both ends. esd offers T-connectors and terminators. Additionally, the CAN-GND-signal has to be grounded at <i>exactly one</i> point in the CAN network. Therefore the CAN termination connectors offered by esd have got a grounding contact. A CAN device with a CAN interface which is not electrically isolated corresponds to the grounding of the CAN-GND.	-	-
3.	Switch on the 24 V-power supply voltage of the EtherCAN/2.	-	-
4.	Assignment of a valid IP address for EtherCAN/2. 4a) If the current IP address is known, proceed to step 6. with the assignment of a fixed IP address and the further configuration. 4b) If the current IP address is not known, use esdcp to detect it and to assign a fixed IP address. For that purpose at first the host-driver software has to be installed as described under step 5.	4.1	12
5.	Insert the CAN-driver CD in the appropriate drive of your PC. Install the EtherCAN/2 host-driver software from the CAN-driver CD on your PC, as described in the manual 'CAN-API Part 2 Installation Guide' in chapter: 'Installation and Configuration of the EtherCAN Module' for the EtherCAN module. The installation will be guided by an installation program (<i>Install Shield Wizard</i>). The window of the installation program depends on the Windows operating system installed on your PC.	-	-
6.	Configure the EtherCAN/2 via web browser. Note: Please note that changes of the configuration generally will not be effective until a reboot.	4.2 4.2.2.5	17 26
7.	Install the host-driver software now as described under step 5., if not already done. Configure the host-driver on the Windows PC as described in the manual 'CAN-API Part 2 Installation Guide' in chapter: 'Installation and Configuration of the EtherCAN-Module' for the EtherCAN module.	-	-

4 Configuration

The following chapter describes the configuration of the EtherCAN/2 module in two steps:

1. Assignment of a valid IP address. (If not already known/reachable)
2. Configuration of the other parameters by means of a web browser. (see page 20).

The RJ45-socket has to be connected with the configuring host PC, like in later operation, via a Twisted-Pair cable with a switch or hub or via a Cross Twisted-Pair cable. The yellow (Link) LED has to turn on to indicate a correct connection.

4.1 Configuration of the IP Address

First a valid IP address has to be assigned to the EtherCAN/2. An IP address is an unique address for a device, that communicates in a TCP/IP network.

For the configuration it is therefore necessary to configure an unique IP address, which is not already assigned to another device in the network.

First configuration of the IP address:

In delivery status after switching-on the EtherCAN/2 attempts to get assigned an IP address by a DHCP-server (maximum approx. 2 min.).

In case that the DHCP-server does not assign an IP address to the EtherCAN/2, the EtherCAN/2 generates an Auto-IP address by itself in the range 169.254.X.X .

To change the assigned IP address it is recommended to use the tool esdcp (see page 15).

To enable esdcp to find the device, the PC on which esdcp runs has to be at least in the same subnet.

If esdcp finds the device, IP address and netmask have to be set like for the later use.

Then (after a Reboot of the EtherCAN/2) the EtherCAN/2 can be configured by means of a web browser (see page 17 et seq.).

4.1.1 Configuration via DHCP

For a configuration via DHCP the DHCP-server has to be in the **same subnet** as the EtherCAN/2. Before usage the DHCP-server possibly has to be configured especially. Please contact your system administrator for this purpose.

The server assigns to the module a valid IP address, a net mask, a gateway address and the IP address of a name server. After a successful assignment the EtherCAN/2 operates with these values without reboot.

The IP address **<IP Address>** which is assigned to the device has to be detected by means of the logging mechanisms of the DHCP-server.

Further configuration of the network parameters can now be done by means of any web browser, that is in the same subnet, with the URL **http://<IP Address>**, as described in chapter: "4.2 Web based Configuration".

Attention!

Without further configuration a DHCP-server might possibly assign another IP address to a device at every reboot and this only for a specific period. For the driver software on the host-PC it is necessary, that this IP address is invariable and unchanged for the complete period of operation. If at every reboot the same IP address shall be assigned to the EtherCAN/2 module via DHCP, the system administrator has to ensure this.

4.1.1.1 Using a Hostname Instead of the IP Address

The DHCP Client of the EtherCAN/2 automatically transmits the hostname configured under *Network Settings* to the DHCP-Server.

This is subject to some restrictions:

- In addition to the DHCP-server a DNS-server has to be available and both servers must co-operate accordingly.
- To enable this is task of your system administrator, if necessary - further support by esd concerning this matter is not possible.
- The choice of the hostname might be restricted depending on the system and the DHCP-/DNS-server used: E.g. usually underscores are not allowed. In a test with a DNS-server a limitation of the length to 15 characters has been found. In another test the hostname has only been solved correctly, if it contained the domain-suffix. (Independent of the domain name configured!)
- Each time the EtherCAN/2 receives a new IP address from the DHCP-server, all network connections of the EtherCAN/2 are terminated.

Thus esd recommends to use a **fixed** IP address instead!

Standard Hostname

If the hostname is not configured in the web-based configuration, a standard name is generated containing the serial number.

For example for the serial number "AA001234" the hostname is: **Eth2-001234**.

(The same applies for entering "default" for the hostname in the esdcp software.)

4.1.2 Determining IP Address via UPnP

In the state of delivery the EtherCAN/2 furthermore operates as an UPnP-device. The IP address of the EtherCAN/2 can not be changed by this, but generally you can easily get to the web based configuration.

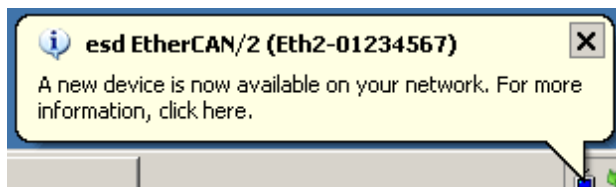
Precondition for this is that UPnP is supported by the operating system used. Furthermore the IP address used by the EtherCAN/2 must be accessible by this computer. (Firewall-settings concerning UPnP¹ might possibly have to be made.)

¹ Standards for UPnP are already defined for the Windows-Firewall (Proceeding after Table 3 automatically enables these). Otherwise: Incoming connections on UDP Port 1900 and TCP Port 2869 have to be permitted.

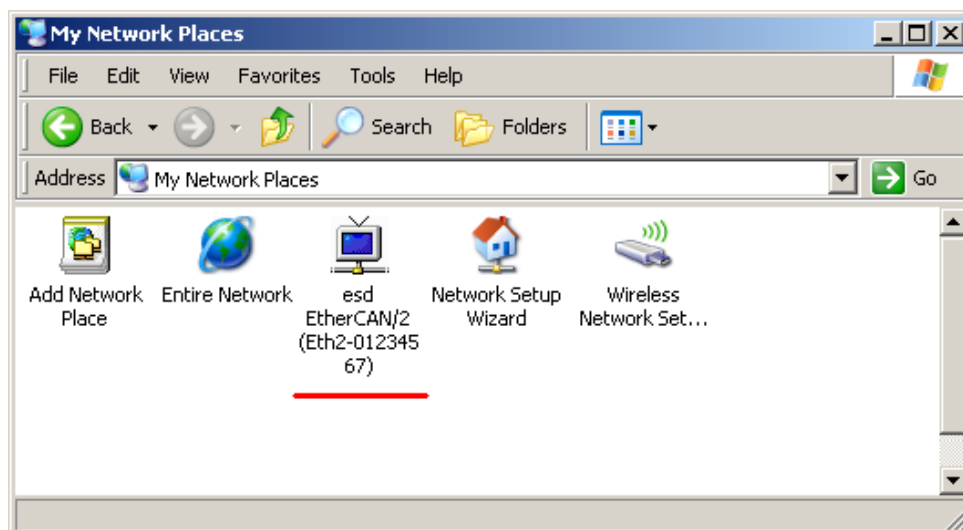
Configuration

Example: Windows XP

Provided that UPnP is enabled, a note is shown when the EtherCAN/2 is identified:



Furthermore the symbol of the EtherCAN/2 is shown in the window *My Network Places*:



A double click on the EtherCAN/2 icon automatically opens the configuration page in the standard web-browser.

Enable UPnP under Windows XP

1. Click **Start** and then click **Control Panel**
2. In Control Panel, double-click **Add or Remove Programs**.
3. Click **Add/Remove Windows Components**.
4. In the **Components** list, click **Networking Services**, and then click **Details**.
5. Select the **Universal Plug and Play** check box, and then click **OK**.
6. Click **Next**, and then click **Finish**.

Furthermore the service "SSDP-Discovery Service" has to be enabled.
(See **Control Panel** → **Administration Tools** → **Services**)

Reference: Microsoft (<http://support.microsoft.com/kb/821371/>)

Table 3: Enable UPnP under Windows XP

Example: Windows Vista / Windows 7

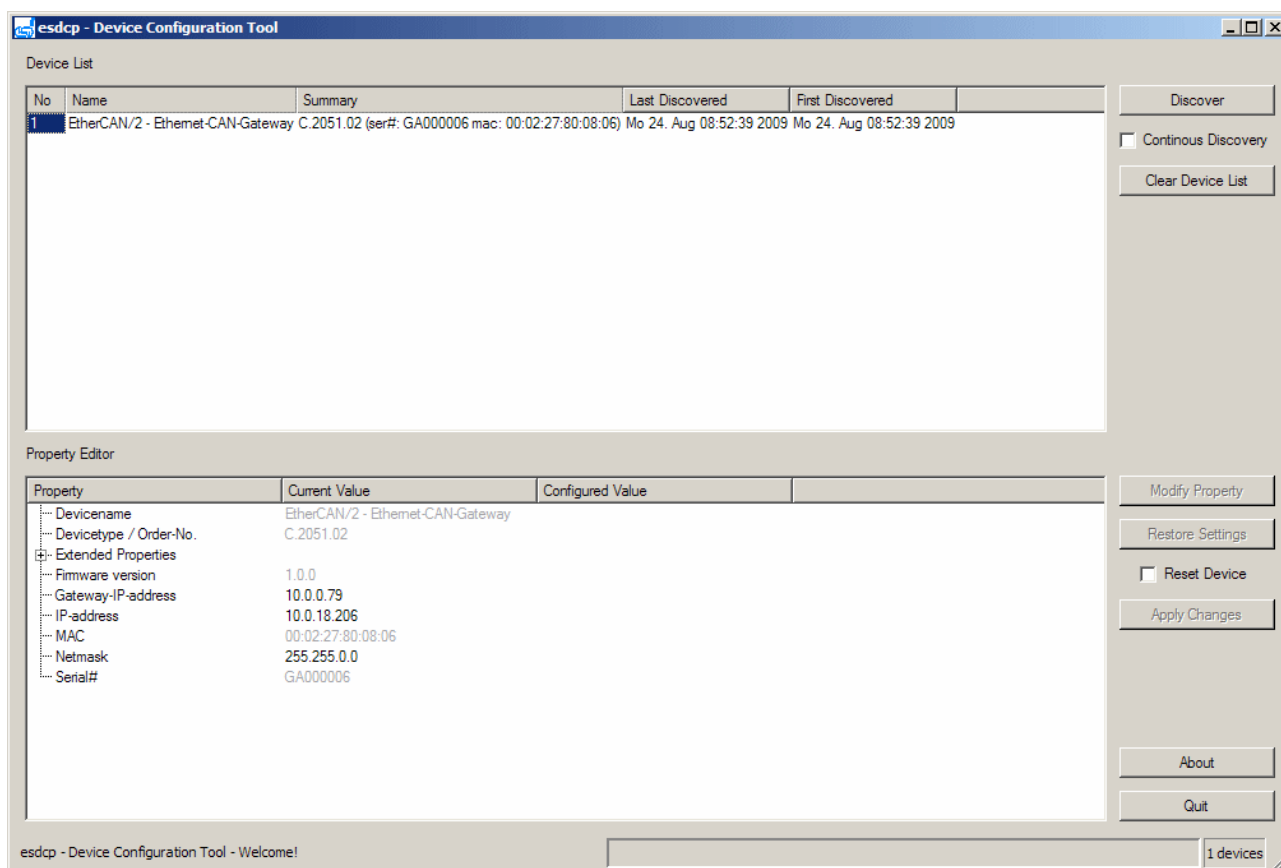
The corresponding settings are generally enabled by default here, and the symbol of the EtherCAN/2 is shown in the window *My Network Places* (without a note as in Windows XP).

A double click to the icon of the device automatically opens the configuration page in the standard web-browser.

Additionally there is the context menu entry: "Open CAN Control Panel", which starts the configuration software. (Also refer to the software manual: '*CAN-API Part 2, Installation Guide*, chapter: "*Installation and Configuration of the EtherCAN Module*")

4.1.3 Configuration via esdcp

esdcp is a tool to find and configure esd devices with Ethernet interface in a LAN. For this a stateless protocol – using UDP - is used.



To be able to detect devices with Ethernet interface the PC has to be in the same subnet.

Click the button **Discover** to search for esd devices. The detected devices will be shown in the *Device List*.

Enable the continuous search for esd devices by clicking the Check-Box *Continuous Discovery*.

Devices which are no longer available will not automatically be deleted from the list.

To delete the entries of the *Device List* click the button **Clear Device List**.

If no DHCP could have been found and the EtherCAN/2 thus has got an IP address in the range of 169.254.x.x, the PC has to be configured accordingly (only once, for the configuration of the EtherCAN/2).

If the tool esdcp has detected the EtherCAN/2, at least IP address and subnet mask can/must be set there. For this double click in the window *Property Editor* the row *IP-address* to change the IP address or the row *Netmask* to change the netmask.

Now you can open the input field of the selected row also by clicking the button **Modify Property**.

Configuration

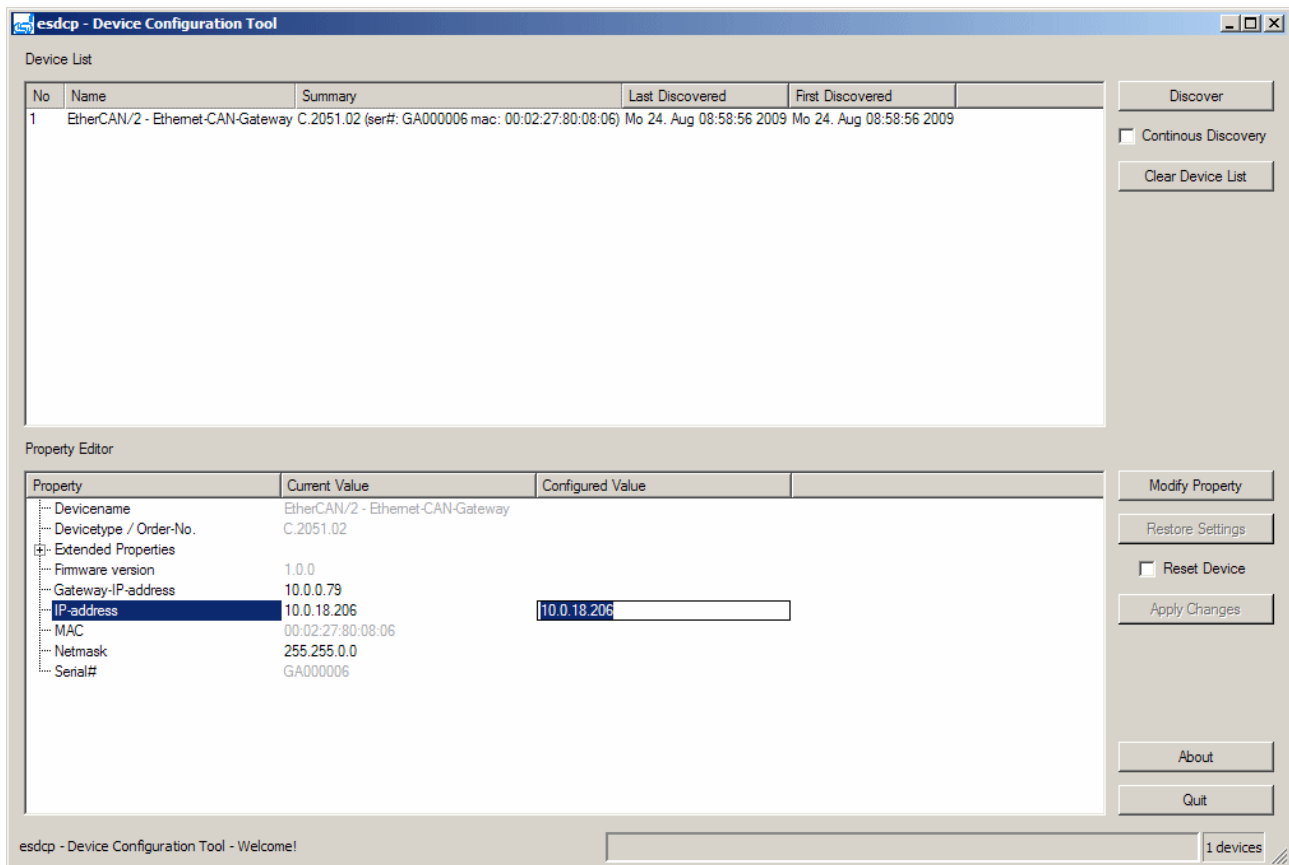


Fig. 5: Modify the IP address via esdcp

Enter the IP address in the input field in the column *Configured Value*.

Enter the *Netmask* in the same manner.

Activate the check-box *Reset Device* for a reboot of the EtherCAN/2 after acknowledgement of the entry, because the changes are not transferred until the device is rebooted.

Confirm the entry of the IP address by clicking the button **Apply Changes**.

After a request of the password the value entered under *Configured Value* will then be accepted as current value and shown under *Current Value*.

The button **Restore Settings** deletes the entered values in the field *Configured Value*. The current values remain unchanged.

The esdcp default password is: esd

The password can be changed via page "Network settings" of the web-browser.

4.2 Web Based Configuration

The EtherCAN/2 offers an integrated HTTP-Server, which allows further configuration with a web-browser.

4.2.1 Overview

A menu is shown on the left side of this program window.

In the menu item *Overview* the module specific details of the EtherCAN/2 are shown. Under *Gateway details* you find firmware revision, hardware revision, order number and serial number. Under *Gateway status* you find details about the CAN interface of the EtherCAN/2.

The screenshot displays the web interface for the EtherCAN/2. The top header shows the title 'EtherCAN/2 - Ethernet-CAN-Gateway' and the user 'esd gmbh, Hannover'. The left sidebar contains a menu with the following items: Overview (selected), Configuration, Security, Network settings, Remote logging, Firmware update, Reboot, Status, CAN, Ethernet, EtherCAN-Clients, Events, Information, and Contact. The main content area is divided into two sections: 'Gateway details' and 'Gateway status'. The 'Gateway details' section contains a table with the following data:

Firmware revision	1.0.4
Hardware revision	1.1
Order number	C.2051.02
Serial number	AA000014

The 'Gateway status' section contains a table with the following data:

CAN-Baudrate	1000 kBit/s
CAN-Status	OK
EtherCAN-Clients	2

Fig. 6: Overview

4.2.2 Configuration

All settings which can be made under menu item *Configuration*, are protected by a combination of user name and password. The default setting at delivery is:

User name:	esd
Password:	esd

4.2.2.1 Security

In the *Security Setup* page you can change the *Webserver Username* and the *Webserver Password* for access protection. These values will be asked for the authentication in the firmware update as described in the following chapter.

User name and password can be adapted. Usage of special characters and space characters is not allowed. Pay attention to case sensitivity.

Clicking the button **Submit** saves the changed data in a non-volatile memory of the EtherCAN/2 module. After a reboot the data will become active.

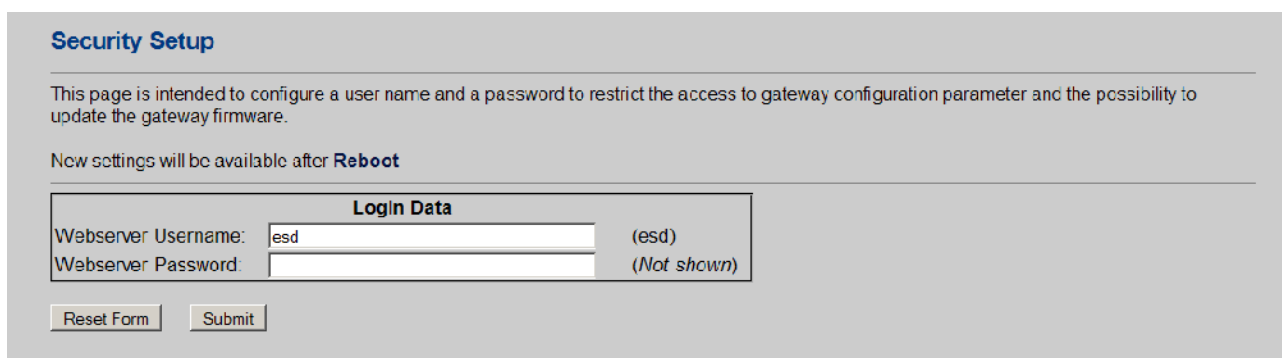


Fig. 7: Enter user name and password

4.2.2.2 Network Settings

The menu item *Network Settings* contains an overview of the configured values for:

- TCP/IP
- SMTP
- Time Server
- SNMP
- esdcp

Network Configuration

The values in braces reflect the current settings. These may differ from the configured values if the device is booted via DHCP or the configuration has been already changed without rebooting the device.

New settings will be available after **Reboot**

TCP/IP base configuration

IP-Address:	<input type="text" value="10.0.16.100"/>	(10.0.16.85)
Subnet Mask:	<input type="text" value="255.255.0.0"/>	(255.255.0.0)
Default Gateway:	<input type="text" value="10.0.1.1"/>	(0.0.0.0)
Nameserver:	<input type="text"/>	()
Hostname:	<input type="text"/>	(Eth2-01234567)
Domain:	<input type="text" value="yourdomain"/>	()
Use DHCP for all above:	<input checked="" type="checkbox"/>	
Enable UPnP:	<input checked="" type="checkbox"/>	

Time server configuration

NTP Server:	<input type="text" value="ntp.example.com"/>	(10.0.0.79)
Update Interval [s]:	<input type="text" value="36400"/>	
Timezone:	<input type="text" value="Europe/Berlin"/>	

SNMP configuration

Enable SNMP	<input checked="" type="checkbox"/>
Device Location	<input type="text" value="Office1"/>
Device Description	<input type="text" value="Ethernet-CAN-Gateway"/>
Contact Information	<input type="text" value="you@example.com"/>

esdcp configuration

Password:	<input type="password"/>	(Not shown, empty to leave unchanged)
-----------	--------------------------	---------------------------------------

SMTP configuration

SMTP Server:	<input type="text" value="10.0.1.10"/>	
Auth method:	<input type="radio"/> None <input type="radio"/> Plain <input checked="" type="radio"/> Login <input type="radio"/> cram-md5	
Auth. Username:	<input type="text" value="mailuser"/>	
Auth. Password:	<input type="password" value="....."/>	(Not shown, empty to leave unchanged)
Email Sender:	<input type="text" value="Logging@EtherCAN2"/>	
Email Recipient:	<input type="text" value="you@example.com"/>	
Email Subject:	<input type="text" value="Ethernet-CAN-Gateway Log Event"/>	

Fig. 8: Network configuration

Configuration

- **TCP/IP base configuration**

TCP/IP base configuration		
IP-Address:	<input type="text" value="10.0.16.100"/>	(10.0.16.85)
Subnet Mask:	<input type="text" value="255.255.0.0"/>	(255.255.0.0)
Default Gateway:	<input type="text" value="10.0.1.1"/>	(0.0.0.0)
Nameserver:	<input type="text"/>	()
Hostname:	<input type="text"/>	(Eth2-01234567)
Domain:	<input type="text" value="yourdomain"/>	()
Use DHCP for all above:	<input checked="" type="checkbox"/>	
Enable UPnP:	<input checked="" type="checkbox"/>	

Fig. 9: TCP/IP base configuration

Here the base TCP/IP network parameters can be configured. The current settings of the parameters are shown in brackets.

At the first time starting up at least the subnet mask and the IP address have to be adapted to the conditions of the network.

For the communication with other nets, e.g. to access Internet or time server, a *Default Gateway* has to be assigned.

The addresses of a nameserver and a NTP-time server can be optionally configured under *Time server configuration*. They will be evaluated by the *Remote Logging* support (see page 23).

Enable the check box *Use DHCP* to assign IP address, gateway and subnet mask via DHCP. This may cause problems as described in chapter 'Configuration via DHCP' (see page 12).

To use the parameters above (*IP address, Subnet Mask, Default Gateway and Nameserver*) the check box must be disabled.

When the checkbox *Enable UPnP* is enabled, the EtherCAN/2 also acts as an UPnP device. This is usually only used for an easier discovering when its IP address is unknown, see chapter: "4.1.2 Determining IP Address via UPnP".

A domain name can be entered in the input box *Domain*.

TCP/IP Default Parameters

At the first time starting up of the EtherCAN/2 the check box *Use DHCP* is enabled. Thus the IP address is per default assigned via the DHCP-Server.

- **SMTP configuration**

SMTP configuration	
SMTP Server:	192.168.0.2 (192.168.0.2)
Auth method:	<input type="radio"/> None <input type="radio"/> Plain <input checked="" type="radio"/> Login <input type="radio"/> cram-md5
Auth. Username:	abcde1fg (abcde1fg)
Auth. Password:	(Not shown, empty to leave unchanged)
Email Sender:	Logging@EtherCAN2.yourdomain (Logging@EtherCAN2.yourdomain)
Email Recipient:	you@example.com (you@example.com)
Email Subject:	Ethernet-CAN-Gateway Log Event (Ethernet-CAN-Gateway Log Event)

Fig. 10: SMTP configuration

The data such as SMTP server IP, user name, password etc. can be configured here to forward alarms and events as email to a SMTP server. Otherwise the configuration of these parameters is not necessary.

If the SMTP server requires a login, the method of the login can be selected under *Auth. method*.
Login is selected per default.

- **Time Server**

Time server configuration	
Time Server:	tz.example.com (tz.example.com)
Update Interval [s]:	86400 (86400)
Timezone:	Europe/Berlin

Fig. 11: Time server configuration

The NTP-server can be configured in this field.
For correct date and time indication a time server must be configured.

To be able to use the Remote Logging-Support these parameters have to be configured.
Without an entry in this field, the calculation of times will restart from 1970-01-01 at 00:00 a.m with every reboot (power up) of the EtherCAN/2 module.

- **SNMP**

SNMP configuration	
Enable SNMP	<input checked="" type="checkbox"/>
Device Location	Office1 (Office1)
Device Description	Ethernet-CAN-Gateway (Ethernet-CAN-Gateway)
Contact Information	you@example.com (you@example.com)

Fig. 12: SNMP configuration

The SNMP configuration is disabled per default.
To use SNMP click the Check-Box *Enable SNMP*.

SNMP (Simple Network Management Protocol) is a protocol to control and monitor various network devices, e.g. router, printer etc.
The EtherCAN/2 gateway provides - besides various standard data as e.g. "Uptime" - the data of the CAN Statistics (see page 27).

Configuration

These data can then be evaluated further by means of corresponding tools (SNMP manager). An appropriate ".mib" file for this is available in the installation directory of the host-driver.

The SNMP agent of the EtherCAN/2 gateway supports the versions 1 and 2c of the SNMP protocol. The community string is "public".

- **esdcp**



The screenshot shows a configuration window titled "esdcp configuration". Inside the window, there is a label "Password:" followed by an empty text input field. To the right of the input field, there is a note in parentheses: "(Not shown, empty to leave unchanged)".

Fig. 13: esdcp configuration

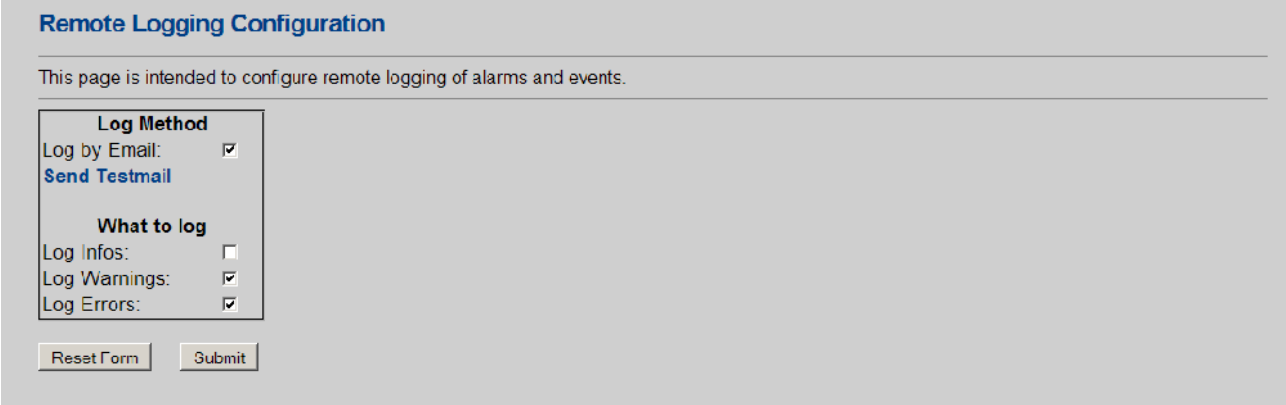
To change the esdcp password type in the new password in this input field.

Click the button **Submit** to save the changed data in a non-volatile memory of the EtherCAN/2 module. After a reboot the data is enabled.

4.2.2.3 Remote Logging

The *Remote Logging* support of the EtherCAN/2 module can be configured and enabled on this page. The module offers the feature to provide alarms and events not only on the local HTTP-server, but to forward them as e-mail to a SMTP-Server.

For the configuration of the SMTP parameters refer to *SMTP configuration* (see page 21).



The screenshot shows a web page titled "Remote Logging Configuration". Below the title, a message states: "This page is intended to configure remote logging of alarms and events." The main content area contains a form with two sections: "Log Method" and "What to log".

Log Method	
Log by Email:	<input checked="" type="checkbox"/>
Send Testmail	

What to log	
Log Infos:	<input type="checkbox"/>
Log Warnings:	<input checked="" type="checkbox"/>
Log Errors:	<input checked="" type="checkbox"/>

At the bottom of the form are two buttons: "Reset Form" and "Submit".

Fig. 14: Configuration of the Remote Logging

The check box *Log by Email* enables/disables the Remote Logging Support.

Use the check boxes *Log Errors*, *Log Warnings* and *Log Infos* to configure which kind of event should be transmitted as e-mail.

Click the button **Submit** to save the changed data in a non-volatile memory of the EtherCAN/2 module. After a reboot the data is enabled.

4.2.2.4 Firmware Update

For an update of the firmware of the EtherCAN/2 click the menu item *Firmware Update* in the program window.

Fig. 15: Firmware update

The upload of the file is done by means of the web browser. Enter the file name, or click the button **Choose...** to select a file.

Acknowledge the entry by clicking the button **Submit**. The firmware update is started now. This can take some time. The progress of the updates will be recorded.

Attention ! During firmware update the power supply of the EtherCAN/2 must not be cut off, because the module could get into an inoperable state.

Example print of a firmware update protocol:

```
Starting firmware update... (Tue Aug 25 07:02:39 CEST 2009)
```

```
Serial No: GA000006  
Hardware version: 1.1  
Installed firmware version: 1.0.0  
Update firmware version: 1.0.1
```

```
Updating kernel image...  
Installed kernel image version: 1.0.0  
Update kernel image version: 1.0.1
```

```
Erasing 128 Kibyte @ 0 -- 0 % complete.  
Erasing 128 Kibyte @ 20000 -- 4 % complete.  
Erasing 128 Kibyte @ 40000 -- 8 % complete.  
Erasing 128 Kibyte @ 60000 -- 12 % complete.  
Erasing 128 Kibyte @ 80000 -- 16 % complete.  
Erasing 128 Kibyte @ a0000 -- 20 % complete.  
Erasing 128 Kibyte @ c0000 -- 25 % complete.  
Erasing 128 Kibyte @ e0000 -- 29 % complete.  
Erasing 128 Kibyte @ 100000 -- 33 % complete.  
Erasing 128 Kibyte @ 120000 -- 37 % complete.  
Erasing 128 Kibyte @ 140000 -- 41 % complete.  
Erasing 128 Kibyte @ 160000 -- 45 % complete.  
Erasing 128 Kibyte @ 180000 -- 50 % complete.  
Erasing 128 Kibyte @ 1a0000 -- 54 % complete.  
Erasing 128 Kibyte @ 1c0000 -- 58 % complete.  
Erasing 128 Kibyte @ 1e0000 -- 62 % complete.  
Erasing 128 Kibyte @ 200000 -- 66 % complete.  
Erasing 128 Kibyte @ 220000 -- 70 % complete.  
Erasing 128 Kibyte @ 240000 -- 75 % complete.  
Erasing 128 Kibyte @ 260000 -- 79 % complete.  
Erasing 128 Kibyte @ 280000 -- 83 % complete.  
Erasing 128 Kibyte @ 2a0000 -- 87 % complete.  
Erasing 128 Kibyte @ 2c0000 -- 91 % complete.  
Erasing 128 Kibyte @ 2e0000 -- 95 % complete.
```

```
Writing data to block 0
Writing data to block 20000
Writing data to block 40000
Writing data to block 60000
Writing data to block 80000
Writing data to block a0000
Writing data to block c0000
Writing data to block e0000
Writing data to block 100000
Writing data to block 120000
Writing data to block 140000
Writing data to block 160000
Writing data to block 180000
Writing data to block 1a0000

Updating Ramdisk image...
Installed Ramdisk image version: 1.0.0
Update Ramdisk image version: 1.0.1

Erasing 128 Kibyte @ 0 -- 0 % complete.
Erasing 128 Kibyte @ 20000 -- 4 % complete.
Erasing 128 Kibyte @ 40000 -- 8 % complete.
Erasing 128 Kibyte @ 60000 -- 12 % complete.
Erasing 128 Kibyte @ 80000 -- 16 % complete.
Erasing 128 Kibyte @ a0000 -- 20 % complete.
Erasing 128 Kibyte @ c0000 -- 25 % complete.
Erasing 128 Kibyte @ e0000 -- 29 % complete.
Erasing 128 Kibyte @ 100000 -- 33 % complete.
Erasing 128 Kibyte @ 120000 -- 37 % complete.
Erasing 128 Kibyte @ 140000 -- 41 % complete.
Erasing 128 Kibyte @ 160000 -- 45 % complete.
Erasing 128 Kibyte @ 180000 -- 50 % complete.
Erasing 128 Kibyte @ 1a0000 -- 54 % complete.
Erasing 128 Kibyte @ 1c0000 -- 58 % complete.
Erasing 128 Kibyte @ 1e0000 -- 62 % complete.
Erasing 128 Kibyte @ 200000 -- 66 % complete.
Erasing 128 Kibyte @ 220000 -- 70 % complete.
Erasing 128 Kibyte @ 240000 -- 75 % complete.
Erasing 128 Kibyte @ 260000 -- 79 % complete.
Erasing 128 Kibyte @ 280000 -- 83 % complete.
Erasing 128 Kibyte @ 2a0000 -- 87 % complete.
Erasing 128 Kibyte @ 2c0000 -- 91 % complete.
Erasing 128 Kibyte @ 2e0000 -- 95 % complete.
Writing data to block 0
Writing data to block 20000
Writing data to block 40000
Writing data to block 60000
Writing data to block 80000
Writing data to block a0000
Writing data to block c0000
Writing data to block e0000
Writing data to block 100000
Writing data to block 120000
Writing data to block 140000
Writing data to block 160000
Writing data to block 180000
Writing data to block 1a0000
Writing data to block 1c0000
Writing data to block 1e0000
Writing data to block 200000

Updating NV-RAM...
Installed NV-RAM image version: 1.0.0
Update NV-RAM image version: 1.0.1

Update successful. System reboots now... (Tue Aug 25 07:03:08 CEST 2009)
```

Fig. 16: Firmware update protocol (example)

Wait until the protocol about the update is completely finished.
The system will reboot automatically.

4.2.2.5 Reboot

Click the menu item *Reboot* in the program window to reboot the system .

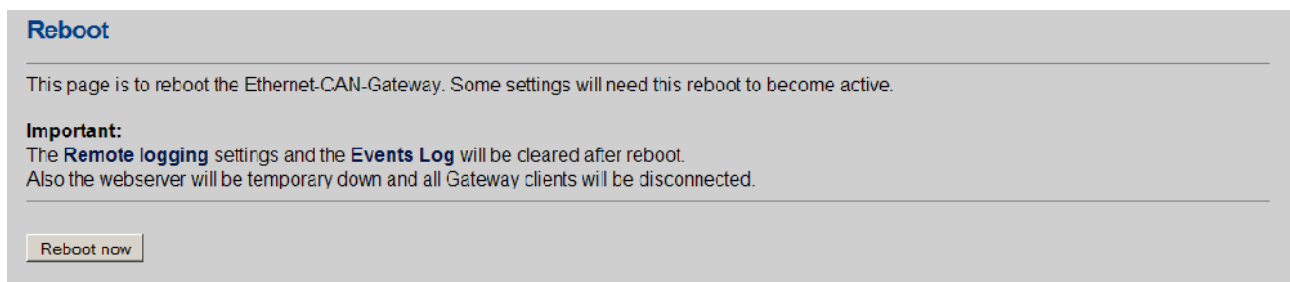


Fig. 17: Reboot

To reboot the system click the button **Reboot now** .

Attention !

The **Remote logging** settings and the **Events Log** will be cleared after reboot. Furthermore the web server will be shut down and all links of the gateway clients will be disconnected.

4.2.3 Status

4.2.3.1 CAN Statistics

To view the status of the CAN bus click the menu item CAN in the program window.

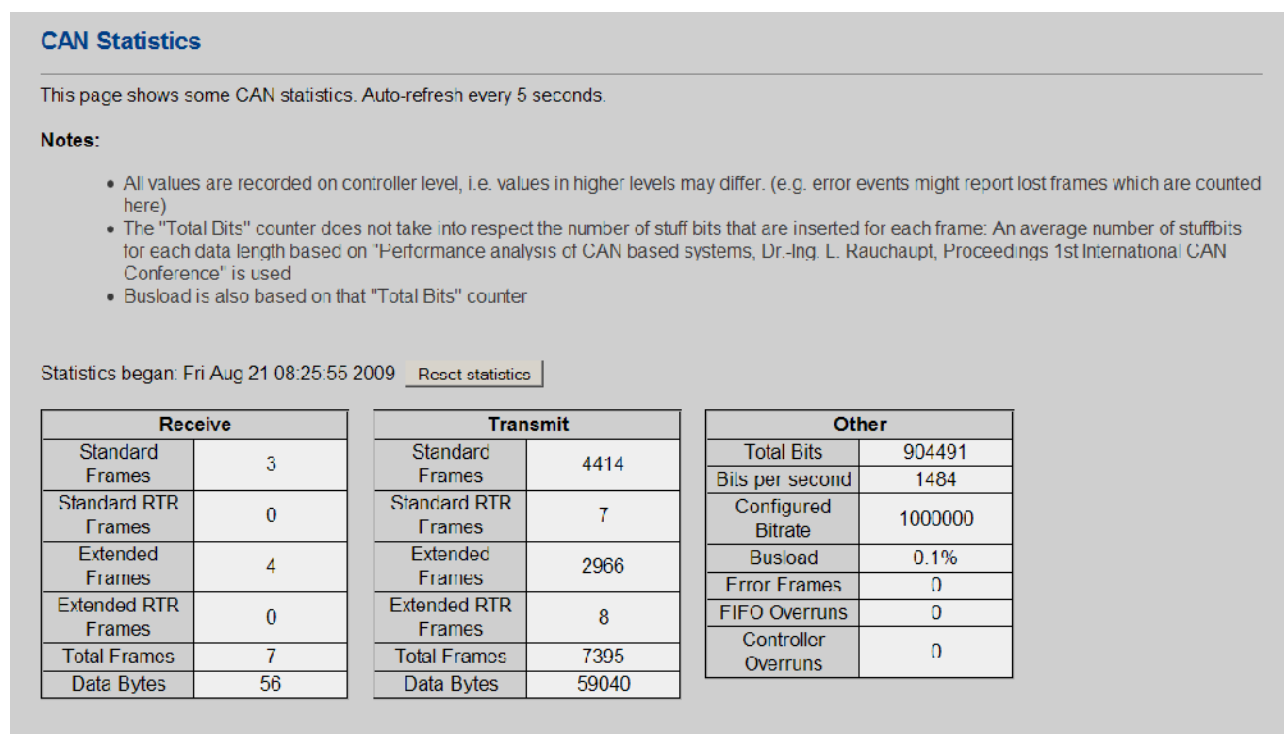


Fig. 18: Status CAN

The values shown are also provided via SNMP (see page 21) and can be evaluated by means of additional tools.

4.2.3.2 Ethernet

The Ethernet status can be displayed by choosing the menu item *Ethernet*.

On the Ethernet page the current transmission speed (10/100 Mbit/s), the communication mode (half/full duplex) and the MAC-ID of the EtherCAN/2 module are displayed among a number of statistical parameters of the Ethernet link.

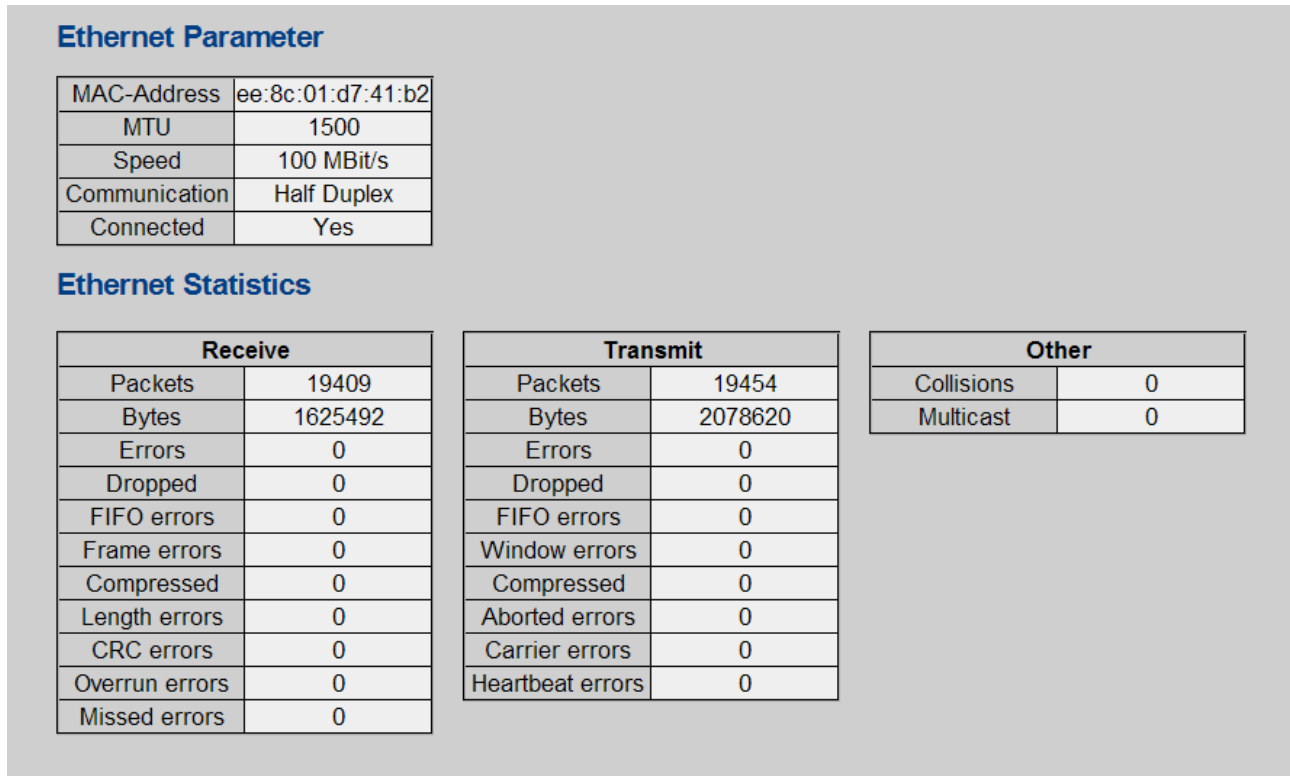


Fig. 19: Ethernet status

4.2.3.3 Connected clients

Click the menu item *Connected clients* for the status of the EtherCAN- and ELLSI clients.

Client Statistics										
This page shows some infos about connected ethernet clients. Auto-refresh every 5 seconds.										
EtherCAN Clients										
Ethernet								CAN		
IP-Address	Port	Client-Port	Cmd-Frames	Rx-Bytes	Tx-Bytes	Keep-Alive-Frames	Connect-Time	Rx-Frames	Tx-Frames	Tx-Done-Frames
10.0.16.79	22080	1192	2075	226272	291604	18	03/09/10 12:51:17	3	5823	6482
10.0.16.79	22080	1191	2075	31188	291604	18	03/09/10 12:51:15	3	404	6482

ELLSI Clients													
No.	IP-Address	Client-Port	Last Reg.	Last Rx	Last Tx	RX Frames	TX Frames	Heart-beat RX	Heart-beat TX	Register	RX Out of Order	RX Heart-beat Timeouts	CAN Lost Frames
0	10.0.16.79	1205	>2 min	1 sec	1 sec	59	118	0	0	1	0	0	0
1	10.0.16.79	1206	>2 min	0 sec	1 sec	0	0	48	48	1	0	0	0
2	10.0.16.79	1211	>2 min	1 sec	1 sec	56	112	0	0	1	0	0	0
3	10.0.16.79	1224	80 sec	50 sec	45 sec	14	28	0	2	1	0	1	0
4	10.0.16.79	1225	78 sec	2 sec	0 sec	0	0	29	30	1	0	0	0
5	0.0.0.0	0	---	---	---	0	0	0	0	0	0	0	0

Fig. 20: Connected clients

ELLSI Clients

As the total number of connected clients is fixed, the number of table lines is fixed, too. Lines which contain clients that are not connected (or no longer connected) are displayed in a grey font.

For further information about ELLSI see ELLSI software-manual: *ELLSI_Software_Manual.pdf*.

4.2.3.4 Alarms and Events

For this window click the menu item *Events*.

This page shows the alarms and events from the start up of the EtherCAN/2. The events are classified depending on the severity into the categories *Error*, *Warning* and *Info*. The list will be deleted at every reboot. During the runtime of the module the occurring events can be transmitted per e-mail to another PC (see page 23).

For correct date and time indication a time server has to be configured (see page 21). Otherwise the calculation of times will restart from 1970-01-01 at 00:00 a.m. with every reboot (Power Up) of the EtherCAN/2 module.

The screenshot shows a window titled "Alarms and Events". Below the title is a text box: "This page shows the log/alarm events. See **Remote logging** to configure which events should also be emailed." Below this is a table with three columns: "Date", "Time", and "Event". The table contains two rows of data. Below the table is a "Colors:" legend with three entries: "Error" with a red square, "Warning" with a blue square, and "Info" with a white square.

Date	Time	Event
08/21/09	08:25:56	Webserver start
08/21/09	08:25:55	Webserver task started

Colors: Error Warning Info

Fig. 21: Alarms and Events

5 Technical Data

5.1 General Technical Data

Power	nominal voltage: typical: 24 V/DC, (min.: 18 V, max.: 32 V) current consumption: (24 V, 20 °C): typical: 100 mA
Connectors	<p>24V 24 V-power supply voltage (X1, 4-pin COMBICON-connector with spring-cage connection)</p> <p>CAN CAN bus interface (X2, 5-pin Phoenix Contact MC 1,5/5-GF-3,81)</p> <p>ETH Ethernet interface (X5, 8-pin RJ45-socket)</p> <p>InRailBus CAN bus interface and power supply voltage via InRailBus (X6, 5-pin TBUS-connector, accessories)</p> <p>The following interface is for manufacturing purposes: DIAG DIAG interface (X4, USB-connector type B)</p>
Temperature range	0 °C ... 70 °C ambient temperature
Humidity	max. 90 %, non-condensing
Dimensions	width: 22 mm, height: 112 mm, depth: 113 mm
Weight	130 g

Table 4: General technical data

5.2 Microprocessor and Memory

CPU	ARM9-Processor, 200 MHz, AT91SAM9263
Data Flash	1 MB
NAND Flash	256 MB
SDRAM	32 MB

Table 5: Microprocessor and Memory

5.3 CAN Interface

Number of CAN-Interfaces	1 x CAN
CAN controller	integrated in CPU
CAN protocol	according to ISO 11898-1
Physical Interface	High-Speed physical Layer according to ISO 11898-2, Transmission rate programmable up to 1 Mbit/s
Bus termination	Terminating resistor has to be set externally, if required.
Electrical isolation	500 V (effective) between CAN potential and module-system-potential with pollution degree 1, via optocoupler and DC/DC converter
Connector	CAN, 5-pin COMBICON (X2)

Table 6: Data of the CAN interface

5.4 Ethernet Interface

Number of the interfaces	1
Bit rate	100BASE-TX, 100 Mbit/s
Connection	Twisted Pair (compatible to IEEE 802.3), 100BASE-TX,
Electrical isolation	via transformer
Connector	RJ-45-socket with integrated LEDs in the front panel (X5)

Table 7: Data of the Ethernet interface

5.5 DIAG, Serial Interface via USB Interface

Type	USB, for manufacturing purposes only
USB specification	USB 2.0 Full Speed (12 Mbit/s)
Connector	DIAG (X4), USB-connector type-B

Table 8: Data of the DIAG interface

5.6 Software

The complete local firmware is stored in the internal flash and can be updated as required. The EtherCAN/2 module can be configured by means of a web-browser.

For the operation of the Ethernet-CAN-Gateways as virtual CAN adapter specific drivers are currently available for Windows XP, Windows Vista and Linux. These allow the usage of the complete CAN-SDK incl. the monitor-programs CANreal, if available on the host platform.

The installation of the host software is described in the manual 'CAN-API Part 2 Installation Guide'.

Bootloader	U-Boot
License information	<p>This product uses the open source-bootloader "Das U-Boot". The U-Boot-source code is released under the terms of the GNU Public License (GPL).</p> <p>The complete text of the license is contained in the esd-document "3rd Party Licensor Notice" as part of the product documentation. esd provides the complete bootloader-source code on request. esd strives to restore all changes on the bootloader into the official sources.</p> <p>The homepage of the U-Boot project is: http://www.denx.de/wiki/U-Boot.</p>

Operating system	Linux, Kernel 2.6.x
Adaptation	Driver and API-functions are optimized for this system
License information	<p>This product uses the operating system "Linux".</p> <p>The Linux-source code is released under the terms of the GNU Public License (GPL).</p> <p>The complete text of the license is contained in the esd-document "3rd Party Licensor Notice" as part of the product documentation. esd provides the complete operating system source code on request.</p>

5.7 Order Information

Type	Description	Order No.
EtherCAN/2	Ethernet-CAN-Gateway	C.2051.02
EtherCAN/2-S7	Ethernet-CAN-Gateway module inclusive S7-example project with function block to connect a S7-300/400 via Industrial Ethernet/UDP	C.2051.07
CAN-DRV-LCD		
	Object licence for Windows and Linux incl. CD-ROM	C.1101.02
Manuals:		
EtherCAN/2-ME	EtherCAN/2 manual in English (this manual)	C.2051.21
EtherCAN/2-MD	EtherCAN/2 manual in German	C.2051.20
CAN-API-ME	Software manual for the Host-software drivers in English	C.2001.21
CANopen-ME	CANopen manuals	C.2002.21

Table 9: Order information

6 Interfaces and Connector Assignments

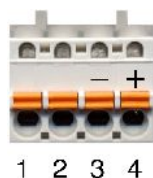
6.1 24 V-Power Supply Voltage

The power supply voltage can be fed via connector X1 or optional via InRailBus (connector assignment see page 38).

6.1.1 Connector Assignment

Device socket: Phoenix Contact MSTBO 2,5/4-G1L-KMGY
 Line connector: Phoenix Contact FKCT 2,5/4-ST, 5.0 mm pitch,
 spring cage connection,
 Phoenix Contact order No.: 19 21 90 0 (included in the scope of delivery)

Pin Position:



Pin Assignment:

Pin	1	2	3	4
Labelling of the EtherCAN/2	.	.	M	P
Signal	Do not connect!	Do not connect!	M24 (GND)	P24 (+24 V)

Please refer to the connecting diagram page 8.



Attention!

It is not permissible to feed through the power supply voltage through the connector X1 and to supply the power supply voltage to another CAN module station!
 A feed through of the +24V power supply voltage can cause damage on the modules.

Signal description:

P24... power supply voltage +24 V ± 10 %
 M24... reference potential

6.2 CAN

The differential CAN Bus signals are electrically isolated from the other signals via dual digital isolator and DC/DC-converter.

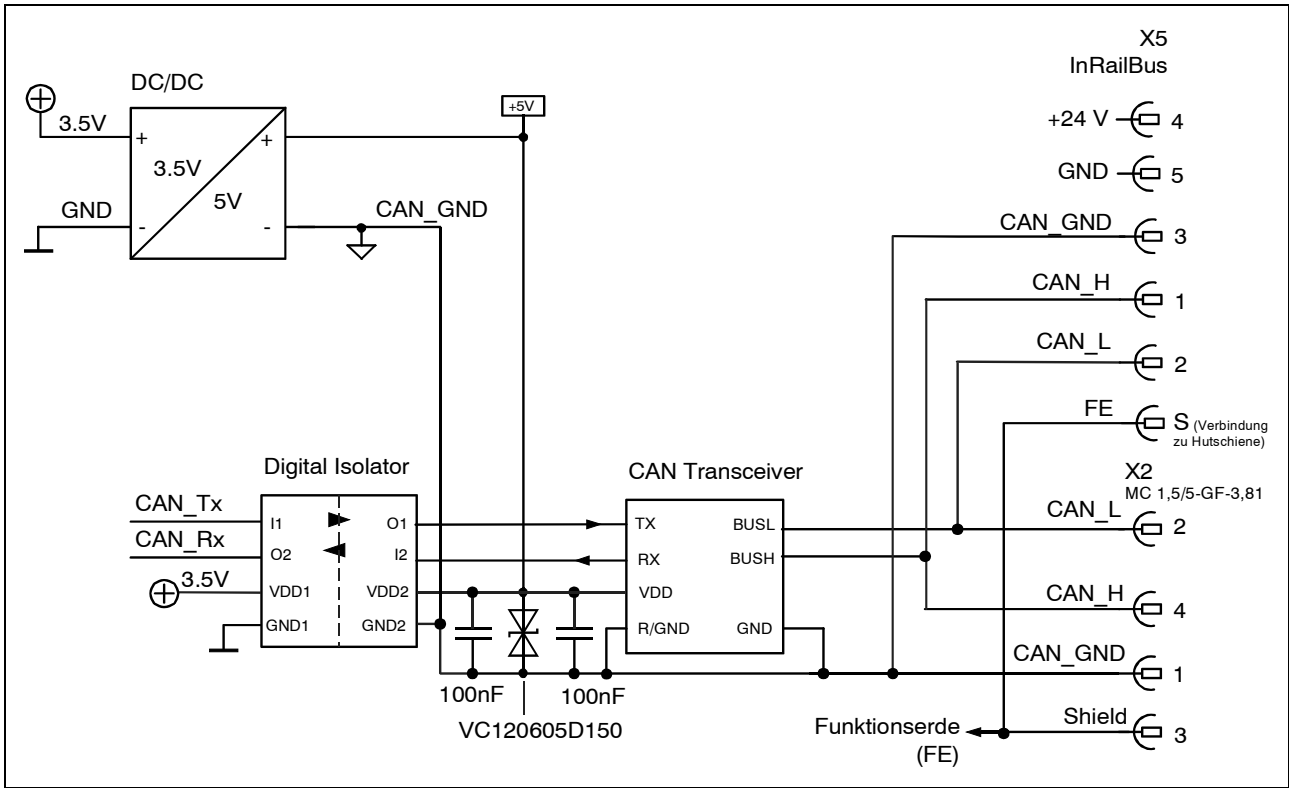


Fig. 22: CAN-Interface

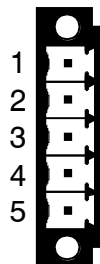
The CAN interface can be connected via CAN connector (X2) or optional via InRailBus, see order information in the appendix (page 47).

6.2.1 Connector Assignment

Device connector : Phoenix Contact MC 1,5/5-GF-3,81
 Line connector: Phoenix Contact FK-MCP 1,5/5-STF-3,81, spring-cage connection
 Phoenix Contact Order No.: 1851261 (included in delivery)

Pin Position:

(device connector view)



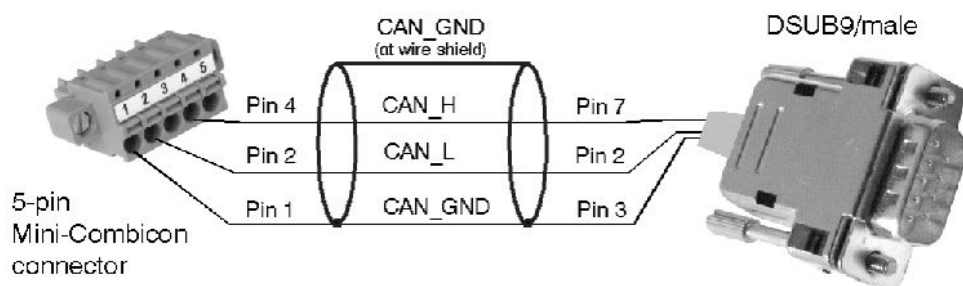
Pin Assignment:

Pin	Signal
1	CAN_GND
2	CAN_L
3	Shield
4	CAN_H
5	-

Signal description:

CAN_L, CAN_H ... CAN signals
 CAN_GND ... reference potential of the local CAN physical layer
 Shield ... pin for line shield connection (using hat rail mounting direct contact to the mounting rail potential)
 - ... not connected

Recommendation of an adapter cable from 5-pin COMBICON (here line connector FK-MCP1,5/5-STF_3,81 with spring-cage-connection) to 9-pin DSUB:



The assignment of the 9-pin DSUB-connector is designed according to CiA DS-102.

The assignment of the 5-pin Mini- COMBICON is designed according to CiA DR-303 Part 1

6.3 24 V and CAN via InRailBus

Power supply voltage and CAN can optionally be fed via InRailBus. Use the mounting-rail bus connector of the CBX-InRailBus for the connection via the InRailBus, see order information in the appendix (page 46). Take notice of the instructions for connecting power supply and CAN signals via InRailBus in the appendix!

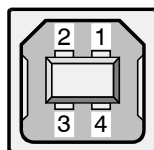
6.4 DIAG

The serial diagnosis interface DIAG does not fulfil a function and is only used for manufacturing purposes.

6.4.1 Assignment

Note: The module may only be operated with USB nets with USB interfaces with versions 1.1 or 2.0! Operability can only be guaranteed for these USB interfaces.

Pin Position:



Pin Assignment:

Pin	Signal
1	V _{BUS}
2	D-
3	D+
4	GND
Shell	Shield

USB socket (type B)

7 Correctly Wiring Electrically Isolated CAN Networks

Generally all instructions applying for wiring regarding an electromagnetic compatible installation, wiring, cross sections of wires, material to be used, minimum distances, lightning protection, etc. have to be followed.

The following **general rules** for the CAN wiring must be followed:

1	A suitable type of wire (wave impedance approx. $120\ \Omega \pm 10\%$) with an adequate wire cross section has to be used and the voltage loss in the wire has to be considered!
2	A CAN data wire requires two twisted wires and a wire to conduct the reference potential (CAN_GND)! For this the shield of the wire should be used!
3	The reference potential CAN_GND has to be connected to the earth potential (PE) at one point. Exactly one connection to earth has to be established!
4	A CAN net must not branch (exception: short stub lines) and has to be terminated by the wave impedance of the wire (generally $120\ \Omega \pm 10\%$) at both ends (between the signals CAN_L and CAN_H)!
5	Stub lines have to kept as short as possible ($l < 0.3\ \text{m}$)!
6	The bit rate has to be adapted to the wire length.
7	CAN wires should not be laid directly next to disturbing sources. If this cannot be avoided, double shielded wires are preferable.
8	When using double shielded wires the external shield has to be connected to the earth potential (PE) at one point. There must be not more than one connection to earth.

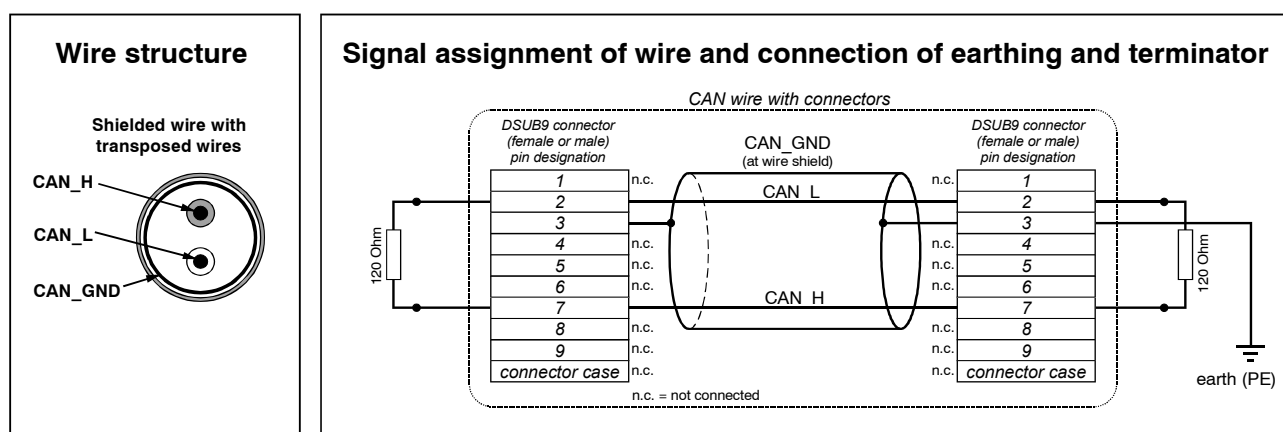


Figure.: Structure and connection of Wire

Cabling

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

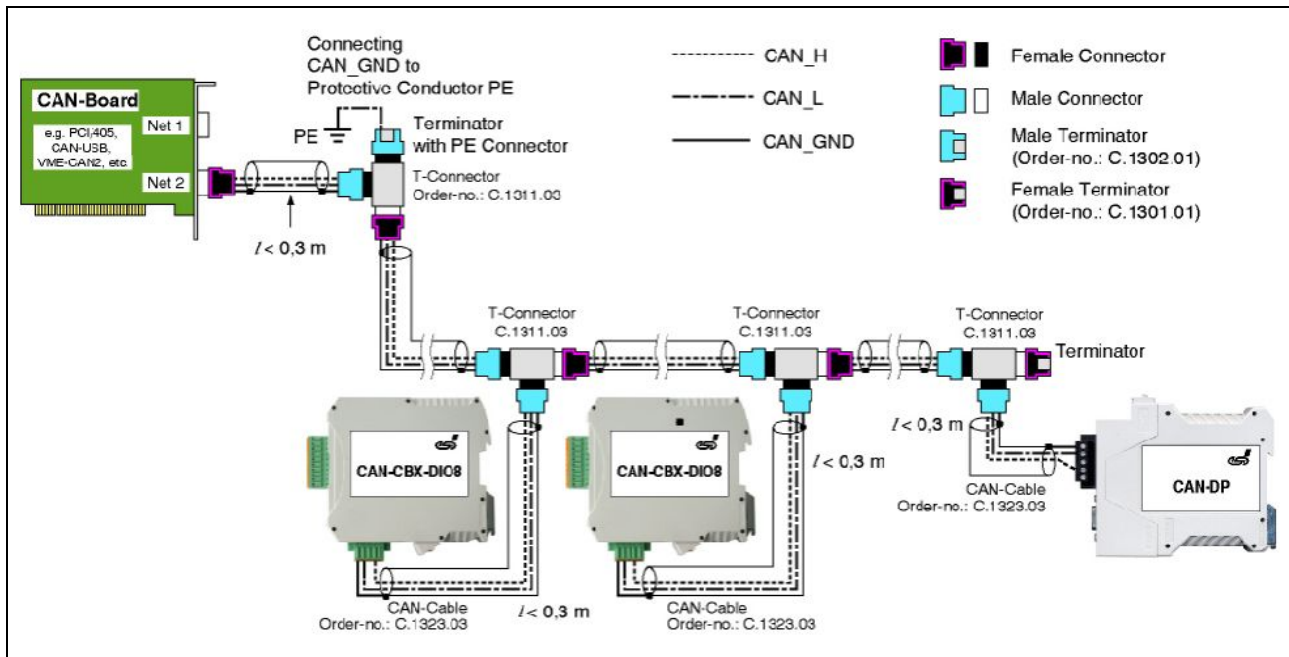


Figure: Example for correct wiring (when using single shielded wires)

Terminal Resistance

- use **external** terminator, because this can later be found again more easily!
- 9-pin DSUB-terminator with male and female contacts and earth terminal are available as accessories

Earthing

- CAN_GND has to be conducted in the CAN wire, because the individual esd modules are electrically isolated from each other!
- CAN_GND has to be connected to the earth potential (PE) at **exactly one** point in the net!
- each CAN user without electrically isolated interface works as an earthing, therefore: do not connect more than one user without potential separation!
- Earthing can e.g. be made at a connector

Wire Length


- Optical couplers are delaying the CAN signals. By using fast digital isolators and testing each board at 1 Mbit/s, esd modules typically reach a wire length of 37 m at 1 Mbit/s within a closed net without impedance disturbances like e.g. longer stub.

Bit rate [kbit/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: Reachable wire lengths depending on the bit rate when using esd-CAN interfaces

Examples for CAN Wires

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


Note:
Completely configured CAN wires can be ordered from **esd**.

8 CAN-Bus Troubleshooting Guide

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

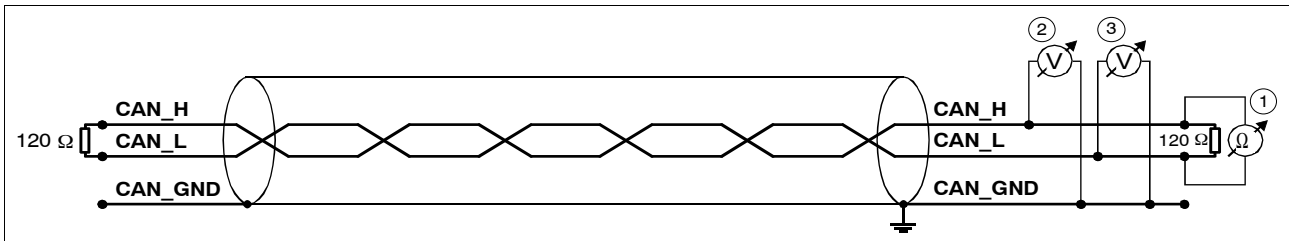


Fig. : Simplified diagram of a CAN network

8.1 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 middle and ends of the network (1)(see figure above).

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.

8.2 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 chapter: "8.4 CAN Transceiver-Resistance Test").

8.3 Ground

The shield of the CAN network has to be grounded at only one location. This test will indicate if the shielding is grounded in several places. To test it, please

1. Disconnect the shield wire (Shield) from the ground.
2. Measure the DC resistance between Shield and ground (see picture on the right hand).
3. Connect Shield wire to ground.

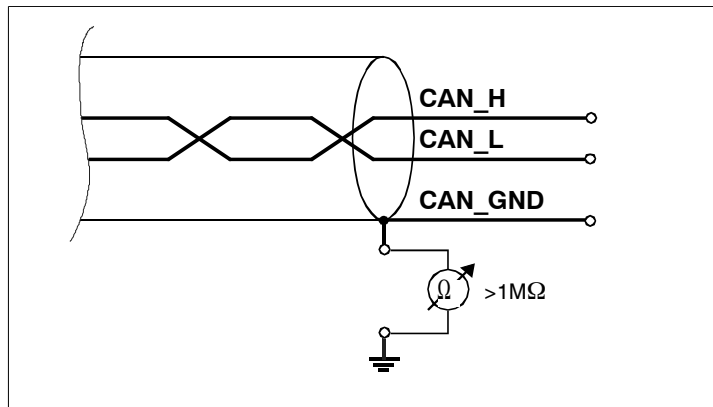


Fig.: Simplified schematic diagram of ground test measurement

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

8.4 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 ④ and disconnect it from the network. (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).

Normally the resistance should be between 1 M Ω and 4 M Ω or higher. If it is lower than this range, the CAN transceiver is probably faulty.

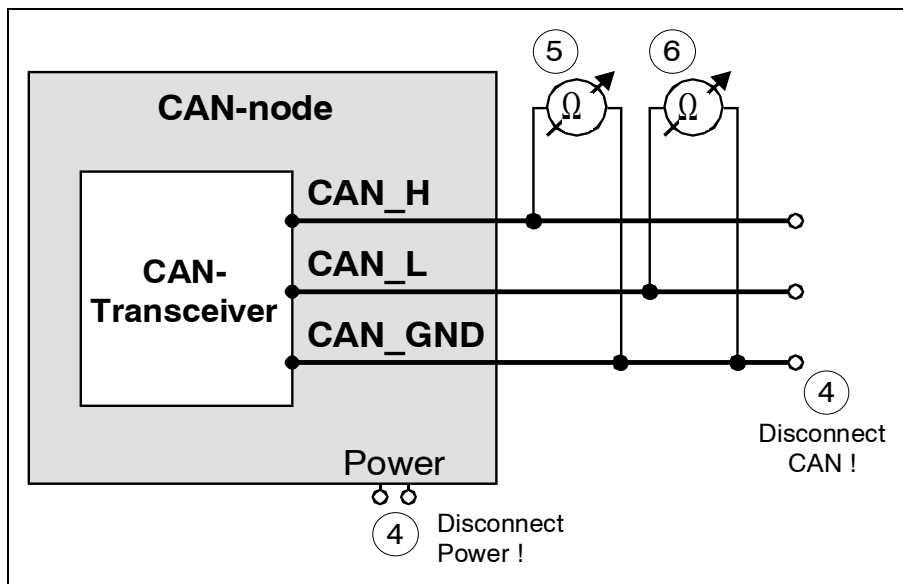


Fig.: Simplified diagram of a CAN node

9 Appendix InRailBus (Option)

9.1 Order Information InRailBus Accessories




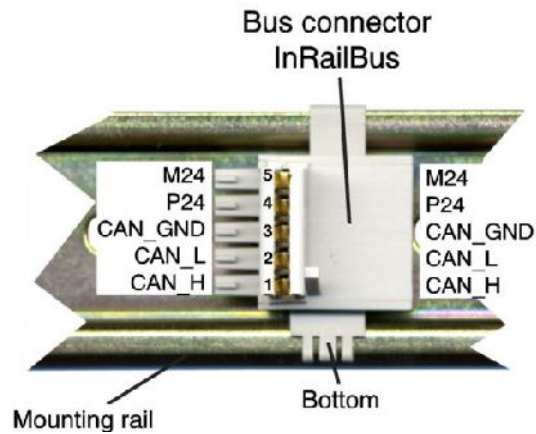
Type	Properties	Order No.
Accessories		
 CAN-CBX-TBUS	Mounting-rail bus connector of the CBX-InRailBus for CAN-CBX modules (order separately)	C.3000.01
 CAN-CBX-TBUS-Connector	Terminal plug of the CBX-InRailBus for the connection of the +24V power supply voltage and the CAN interface Female type	C.3000.02
 CAN-CBX-TBUS-Connection adapter	Terminal plug of the CBX-InRailBus for the connection of the +24V power supply voltage and the CAN-Interface Male type	C.3000.03

Table 10: Order Information

9.2 Connector Assignment 24V and CAN via InRailBus (Option)

Connector type: Mounting-rail bus connector of the CBX-InRailBus
Phoenix Contact ME 22,5 TBUS 1,5/5-ST-3,81 KMGY

Connector View:



Pin Assignment:

Pin	Signal
5	M24 (GND)
4	P24 (+24 V)
3	CAN_GND
2	CAN_L
1	CAN_H
S	FE (PE_GND)

Signal Description:

CAN_L,
CAN_H ... CAN signals
CAN_GND ... reference potential of the local CAN-Physical layers
P24... power supply voltage +24 V
M24... reference potential
FE... functional earth contact (EMC) (connected to mounting rail potential)

9.3 Using InRailBus (Option)



Note:

This chapter describes the installation of the module using InRailBus for CAN-CBX-modules. For the EtherCAN/2 module the following points apply accordingly .

9.3.1 Installation of the Module Using InRailBus Connector

If the CAN bus signals and the power supply voltage shall be fed via the InRailBus, please proceed as follows:

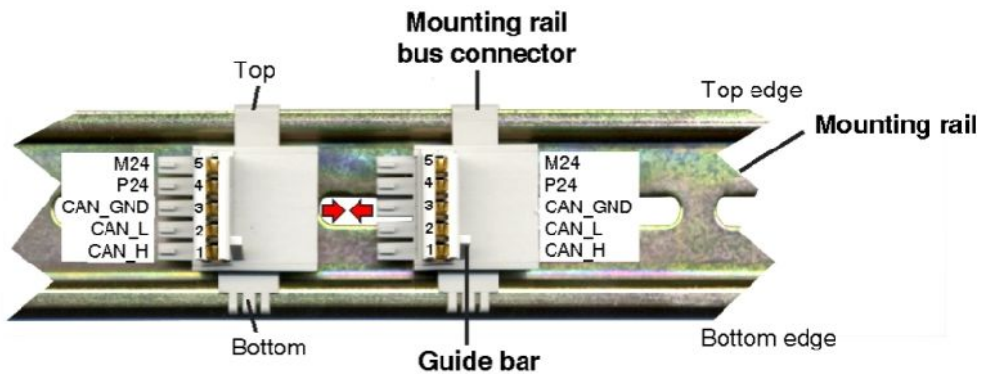


Figure. 23: Mounting rail with bus connector

1. Position the InRailBus connector on the mounting rail and snap it onto the mounting rail using slight pressure. Plug the bus connectors together to contact the communication and power signals (in parallel with one). The bus connectors can be plugged together before or after mounting the CAN-CBX modules.
2. Place the CAN-CBX module with the DIN rail guideway on the top edge of the mounting rail.



Figure. 24: Mounting CAN-CBX modules

3. Swivel the CAN-CBX module onto the mounting rail in pressing the module downwards according to the arrow as shown in figure 23. The housing is mechanically guided by the DIN rail bus connector.
4. When mounting the CAN-CBX module the metal foot catch snaps on the bottom edge of the mounting rail. Now the module is mounted on the mounting rail and connected to the InRailBus via the bus connector. Connect the bus connectors and the InRailBus, if not already done.



Figure. 25: Mounted CAN-CBX module

9.3.2 Connecting Power Supply and CAN Signals to CBX-InRailBus

To connect the power supply and the CAN-signals via the InRailBus, a terminal plug is needed. The terminal plug is not included in delivery and must be ordered separately (order no.: C.3000.02, see order information for InRailBus Accessories, page 46).

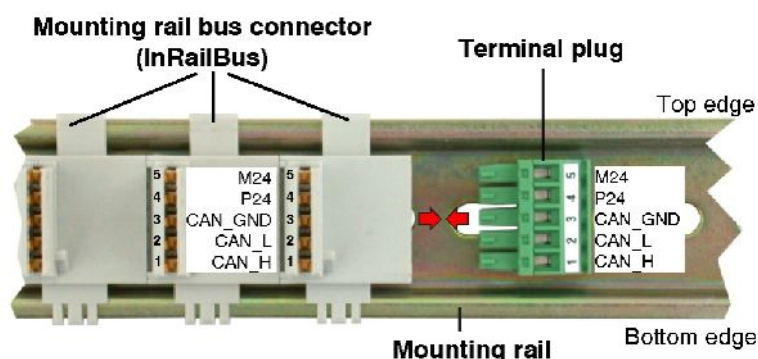


Figure. 26: Mounting rail with InRailBus and terminal plug

Plug the terminal plug into the socket on the right of the mounting-rail bus connector of the InRailBus, as described in Figure 26. Then connect the CAN interface and the power supply voltage via the terminal plug.

9.3.3 Connection of the Power Supply Voltage



Attention!

It is **not permissible** to feed through the power supply voltage through the CBX station and to supply it to another CBX station via 24V connector! A feed through of the +24 V power supply voltage can cause damage on the CBX modules.

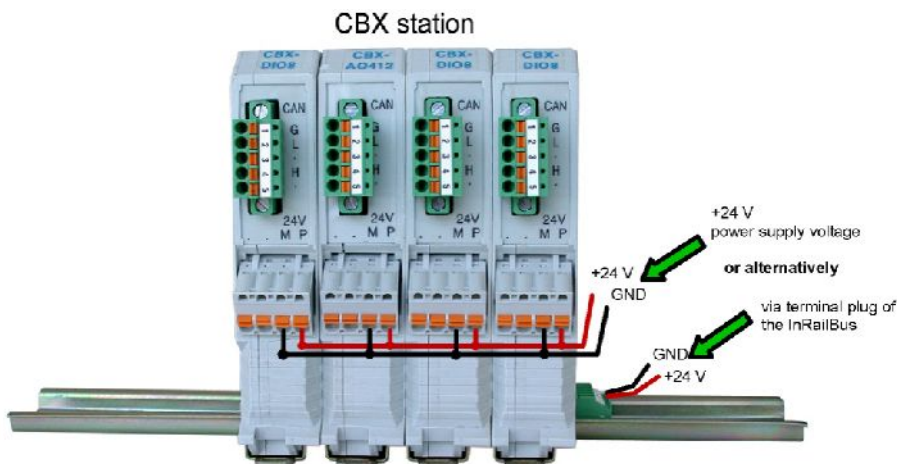


Figure. 27: Connecting the power supply voltage to the CAN-CBX station

9.3.4 Connection of CAN

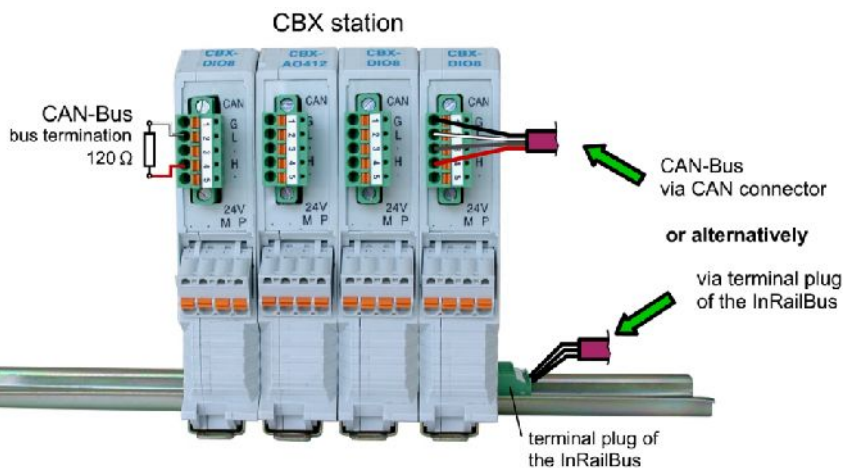


Figure. 28: Connecting the CAN signals to the CAN-CBX station

Generally the CAN signals can be fed via the CAN connector of the first CAN-CBX module of the CBX station. The signals are then connected through the CAN-CBX station via the InRailBus. To lead through the CAN signals the CAN bus connector of the last CAN-CBX module of the CAN-CBX station has to be used. The CAN connectors of the CAN-CBX modules which are not at the ends of the CAN-CBX station must not be connected to the CAN bus, because this would cause incorrect branching.

A bus termination must be connected to the CAN connector of the CAN-CBX module at the end of the CBX-InRailBus (see Fig. 25), if the CAN bus ends there.

9.4 Remove the CAN-CBX Module from InRailBus

If the CAN-CBX module is connected to the InRailBus please proceed as follows:

Release the module from the mounting rail in moving the foot catch (see Fig. 24) downwards (e.g. with a screwdriver). Now the module is detached from the bottom edge of the mounting rail and can be removed.

**Note:**

It is possible to remove individual devices from the whole without interrupting the InRailBus connection, because the contact chain will not be interrupted.

CE-KONFORMITÄTSERKLÄRUNG CE DECLARATION OF CONFORMITY



Adresse
Address

esd electronic system design gmbh
Vahrenwalder Str. 207
30165 Hannover
Germany

esd erklärt, dass die Produkte
esd declares, that the products

EtherCAN/2

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

C.2051.02

die Anforderungen der Normen
für industrielle Produkte (Klasse A)
*fulfills the requirements of the standards
for industrial products (class A)*

**EN 61000-6-4 (01/2007),
EN 61000-6-2 (08/2005)**

gemäß folgendem Prüfbericht erfüllt.
according to test certificate.

H-K00-0366-09

Das Produkt entspricht damit den EG-Richtlinien
Therefore the product corresponds to the EU-Directives

2004/108/EG (2004-Dez-15)

Diese Erklärung gilt für alle Exemplare, die das CE-Zeichen tragen und verliert ihre Gültigkeit,
wenn Veränderungen am Produkt vorgenommen werden.

*This declaration is valid for all units with the CE label on it and it loses its validity if a modification
is done on the product.*

Name / Name
Funktion / Title
Datum / Date

Dr. Ing. Werner Schulze
Geschäftsführer / *Managing Director*
Hannover, den 2009-Jul-23

Rechtsgültige Unterschrift / *authorized Signature*