CANbridge

CAN-to-CAN Gateway

IXXAT

The experts for industrial and automotive communication

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Contents

1   Introduction

1.1   Overview

Congratulations on your purchase of the IXXAT CANbridge, a high quality electronic component developed and manufactured according to the latest technological standards.

The CANbridge is a universal, intelligent CAN topology component based on the store-modify-forward principle.

The component allows a configurable coupling of two, also different, CAN networks. It is configured via a configuration file and the download program included in the delivery.

This manual is intended to familiarize you with your CANbridge. Please read this manual before beginning with the installation.

1.2   Features

- Supply voltage 9-36 V DC (automotive version 7-16 V DC)
- CAN bus interface according to ISO 11898-2, as an option galvanically isolated
- Optional CAN low speed bus interface according to ISO 11898-3 ("fault-tolerant") for automotive version
- Serial interface (RS232) for configuration of the CANbridge (as an option RS485)
- Fujitsu 16-bit microcontroller
- Two housing designs available: robust aluminum housing or plastic housing for DIN rail assembly

1.3   Versions

The CANbridge is available in the following versions:

	Industrial DIN rail	Industrial aluminum	Automotive
Housing	Plastic	Aluminum	Aluminum
Supply voltage	9 V - 36 V DC	9 V - 36 V DC	7 V - 16 V DC
Bus interface	2 x high speed (ISO 11898-2)	2 x high speed (ISO 11898-2)	1 x high speed, 1 x high speed or low speed
Galvanically isolated	Optional	Optional	Not available

1.4 Block diagram

Full RS232 transceiver optional RS485

internal RS232 Adapter

RS232 Lines

RxD   TxD

Microcontroller MB90F543

D 0..15

A 0..17

Optional Data Memory

CAN 1   CAN 2

CAN Bus Interface High Speed

CAN Bus Interface High or Low Speed

Industrial Range (9V-36V)

or

Automotive Range (7V-16V)

Power Supply

CAN High   CAN High
CAN Low   CAN Low

CAN Bus 1   **CAN Bus 2**
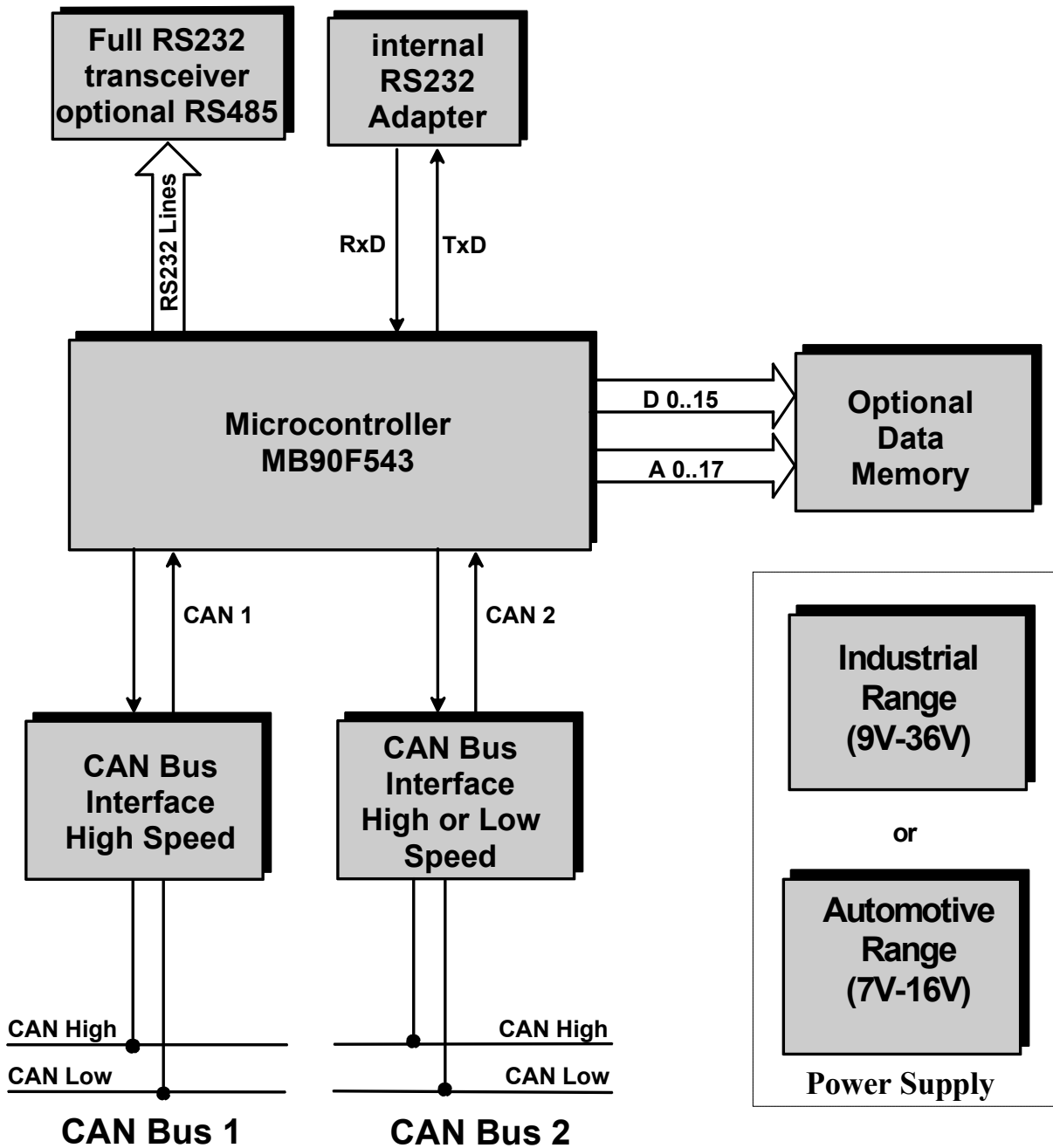
Fig. 1-1: Block circuit diagram CANbridge

2 Aluminum Version

2.1 Pin Allocation

Fig. 2-1: Pin allocation aluminum version

2.1.1 Voltage supply (X1)

The device is supplied with direct voltage of 9 V - 36 V. With the automotive version the supply voltage is 7 V - 16 V. A pre-fabricated cable for power supply is included in the scope of delivery. The connection allocation is shown in Table 2-1.

The CANbridge is protected against polarity reversal, under-voltage and over-voltage. In the event of polarity reversal or under-voltage, it is switched off, with over-voltage an internal fuse is triggered.

Pin no. X1	Signal	Lead color
1	PWR (+)	white
2	GND (-)	brown
3	Shield	Shield
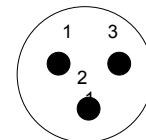
Table 2-1: Pin allocation Power

2.1.2 Serial interface RS232 (X2)

The serial interface is used for configuration of the CANbridge. The signals of the serial interface are connected to the 9-pin Sub-D connector X2 (see Table 2-2).

Pin no. X2	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
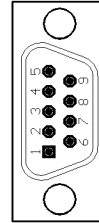
Table 2-2: Pin allocation RS232

2.1.3 CAN 1 (X3)

CAN 1 is available on connector X3 with a bus interface according to ISO 11898-2. The signals of the bus interface are connected to the 9-pin Sub-D connector X3 (see Table 2-3).

Pin no. X3	Signal
1	-
2	CAN Low
3	GND
4	-
5	-
6	-
7	CAN High
8	-
9	-
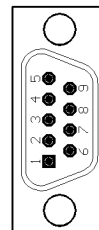
Table 2-3: Pin allocation CAN1

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2.1.4 CAN 2 (X4)

The second CAN interface according to ISO 11898-2 (CAN High Speed) or according to ISO 11898-3 (CAN low speed "fault-tolerant") is available at connector X4 (see Table 2-4).

Pin no. X4	Signal
1	-
2	CAN Low
3	GND
4	-
5	-
6	-
7	CAN High
8	-
9	-
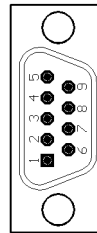
Table 2-4: Pin allocation CAN2

2.2   Ground connections

In the galvanically isolated version, the GND of CAN1 (X3) and CAN2 (X4) is isolated in each case from the rest of the circuit, the GND of the serial interface (X2) is connected to the GND of the power supply (X1).

In the version without galvanic isolation, all GND connections (X1, X2, X3, X4) are connected with each other.

The shield connections of CAN1 (X3), CAN2 (X4), serial interface (X2) and power supply (X1) are connected with each other both in the version with and in the version without galvanic isolation.

3 Industrial DIN-Rail Version

3.1 Pin allocation

The pin allocation for the Industrial DIN-Rail version is shown in Fig. 3-1. X1, X2 and X3 are plug components with screw connection.
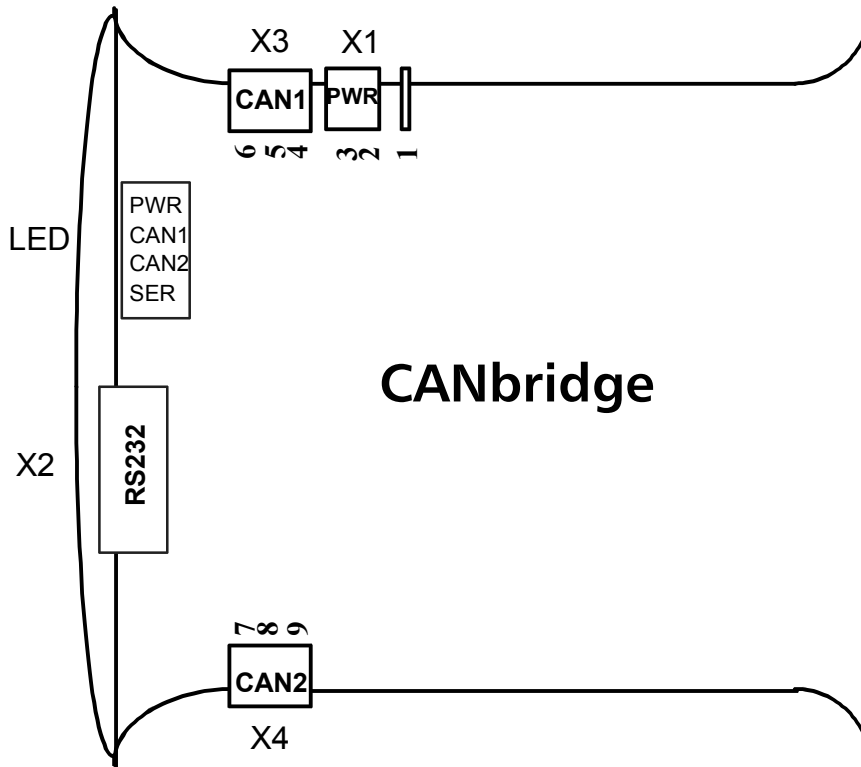
Fig. 3-1: Pin allocation Industrial DIN-Rail version

3.1.1 Voltage supply (X1)

The device is supplied with DC voltage of 9V – 36V. The pin allocation is shown in Table 3-1. The CANbridge is protected against polarity reversal, under-voltage and over-voltage.

In the event of polarity reversal or under-voltage, it is switched off, with over-voltage an internal fuse is triggered.

Pin	Signal
1	PE
2	PWR (+)
3	GND (-)

Table 3-1: Pin allocation Power

3.1.2 Serial interface RS232 (X2)

The signals of the serial interface are connected to the 9-pin Sub-D connector X2 (see Table 3-2).

Pin no. X2	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
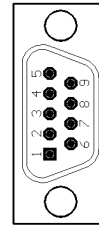
Table 3-2: Pin allocation RS232

3.1.3 CAN 1 (X3)

CAN 1 is available on X3 with a bus interface according to ISO 11898-2 (see Table 3-3).

Pin	Signal
4	CAN High
5	CAN Low
6	GND

Table 3-3: Pin allocation CAN1

3.1.4 CAN 2 (X4)

CAN 2 is available on CAN 4 with a bus interface according to ISO 11898-2 (see Table 3-4).

Pin	Signal
7	CAN High
8	CAN Low
9	GND

Table 3-4: Pin allocation CAN2

3.2 Ground connections

In the galvanically isolated version, the GND of CAN1 (X3) and CAN2 (X4) is isolated in each case from the rest of the circuit, the GND of the serial interface (X2) is connected to the GND of the power supply (X1).

In the version without galvanic isolation, all GND connections (X1, X2, X3, X4) are connected with each other.

The shield connection of the serial interface (X2) and the PE connection (X1 – terminal 1) are connected with each other both in the version with and in the version without galvanic isolation.

4 Displays

The CANbridge has four 2-color LEDs (see Fig. 2-1 or Fig. 3-1). The LEDs behave in the following way depending on the operating mode of the CANbridge.

4.1 Normal mode (Gateway mode)

4.1.1 PWR - LED

The Power-LED (PWR) is lit when the CANbridge is connected to the supply voltage and the microcontroller is installed. With a Watchdog reset the PWR-LED is lit red.

4.1.2 CAN1/CAN2 LED

The CAN-LEDs are lit green with every message received or transmitted without errors. When the CAN error warning level is reached, the corresponding LED is lit red when receiving and transmitting. In 'CAN BUS OFF' status, communication is no longer possible. The corresponding LED is permanently lit red.

4.1.3 COM LED

The COM-LED is lit green briefly with every message received or transmitted without errors. With an erroneous message it is lit red.

4.2 Automatic baudrate detection

During automatic baud rate detection the PWR- and CAN- LEDs have the following meaning:

4.2.1 PWR LED

The Power-LED (PWR) flashes red during automatic baud rate detection with a frequency of approx. 1Hz. If the automatic baud rate detection is terminated without success, the Power-LED is permanently lit red.

4.2.2 CAN1/CAN2 LED

As long as no baudrate has been detected and allocated for the CAN-channels, the LEDs flash red. If the baudrate is detected on one segment, the LED allocated to this bus segment flashes green for each message received. If the baudrate of the second segment is also detected, the PWR LED is permanently lit green and the CANbridge switches to normal mode.

5 Functional description

5.1 Introduction

The CANbridge allows the coupling of two CAN networks also with different bit rates or frame formats (standard and extended). The CAN messages are received in full by the CANbridge and then transmitted in the other CAN network, taking filters and implementation rules (store-(modify)-forward principle). With the aid of the implementation rules the CAN messages can be filtered or forwarded under a different identifier. With these mechanisms the busload can be reduced in the associated network by only transmitting those messages that are of interest there.

The baudrates of the CAN segments are freely configurable. In addition the CANbridge offers automatic baud rate detection.

For configuration of the CANbridge, an ASCII-file is created and the configuration data are loaded onto the CANbridge via the serial interface with the aid of a download tool. The setting possibilities are described in Table 5-1.

Function	Setting possibilities	Key word
Baudrate for CAN1 and CAN2	1. Automatic baud rate detection 2. Setting of a CIA-baudrate 3. Setting of the bus timing register BTR0 / BTR1	BaudRate (under [CANBus1] or [CANBus2])
Frame format for CAN1 and CAN2	1. Standard frame format (11-bit identifiers) 2. Extended frame format (29-bit identifiers)	FrameFormat (under [CANBus1] or [CANBus2])
Activate gateway table for CAN1 and CAN2	1. Use gateway table 2. Do not use table, then all messages are transmitted to the other segment unchanged	UseGatewayTable (under [CANBus1] or [CANBus2])
Repeater functionality	1. Switch on repeater functionality: All messages are transmitted unchanged to the other segment independently of frame format. 2. Switch off repeater functionality: the settings under frame format and gateway table are taken into account.	RepeaterFunctionality (under [General])
Restart after Bus Off	1. Allow restart after Bus Off 2. Do not allow restart after Bus Off	CANBusOffRecovery (under [General])

Table 5-1: Possible settings of the CANbridge

5.2 Data Structure of the Configuration Files

A template of the ASCII configuration file can be generated with the download tool (see Section 6). The required configuration can be easily created with the template and a text editor. The data structure is based on the Windows INI-Format.

Important information:

The last configuration line in the configuration file must be terminated with RETURN, otherwise the instruction will not be executed.

The setting possibilities of the configuration file are listed in the following:

Functional description

```
[General]
TemplateVersion = 01.01.00      ;!Don't change this!
RepeaterFunctionality = no or yes
AutoBaudAttemptTimeout = no or value in seconds;(max.600s)
CANBusOffRecovery = no or value in seconds (1…60)


[User]
ConfigAlias = up to 31 characters ;(e.g."CAN-Bridge Auto")


[CANBus1]
BaudRate = Auto or CIA-baudrates or BTR0/BTR1
;(e.g. BaudRate=Auto, BaudRate=1000, BaudRate=0x01/0x0C)
FrameFormat = std or ext
UseGatewayTable = yes or no


[CANBus2]
BaudRate = Auto or CIA-baudrates or BTR0/BTR1
;(e.g. BaudRate=Auto / BaudRate=1000 / BaudRate=0x01/0x0C
FrameFormat = std or ext
UseGatewayTable = yes or no


[CAN1GatewayTable]
0x000 = 0x000           ;normal id retransmission with the
0x001 = 0x001           ;same identifier on both sides
…
0x100 = 0x200           ;modify the id
0x101 = 0x10052ff       ;modify the id
…
0x7fa =                 ;not forward
0x7fb = no              ;not forward


[CAN2GatewayTable]
0x004 = 0x004           ;normal id retransmission with the
0x006 = 0x006           ;same identifier on both sides
…
0x110 = 0x210           ;modify the id
0x111 = 0x110c200       ;modify the id
…
0x7fa =                 ;not forward
0x7fb = no              ;not forward
```

5.2.1 General settings [General]

There are three parameters in the ASCII-file under the key word [General]:

5.2.1.1   Version number (TemplateVersion)

The version number of the ASCII-file structure. It is used for a compatibility check and for this reason must not be changed.

5.2.1.2   RepeaterFunctionality

This parameter is used to activate the repeater functionality. In this mode all messages are transferred unchanged to the other segment irrespective of frame format and the gateway tables.

Note: If the repeater functionality, the entries under FrameFormat and UseGatewayTable and the gateway tables are ignored.

5.2.1.3   AutoBaudAttemptTimeout

A timeout time can be set for the automatic baud rate detection. The timeout time starts with detection of a baudrate on one of the two segments. When this time expires the detected baudrate is also set on the second segment provided if no baudrate has already been detected there and a transmit attempt is then made. If an error occurs during transmission, the CANbridge switches off (see Fig. 5-1).

This parameter is only relevant if the automatic baudrate detection has been selected for at least one CAN segment.

No time limit is set in the standard configuration, the CANbridge then remains in "Automatic baudrate detection" mode until a baudrate has been detected on both sides.

Note: the baudrate can only be detected if there is bus traffic and at least two nodes per segment are active.

5.2.1.4   Behavior on Bus Off (CANBusOffRecovery)

The parameter CANBusOffRecovery defines how the CANbridge is to behave when a CAN segment goes into Bus Off state. With CANBusOffRecovery = no, the relevant CAN segment remains in Bus Off state until the device is switched off. If a time between 1 and 60 seconds is specified, CANbridge is restarted after this time expires. With a restart, the CAN message buffers of both CAN segments are cleared.

5.2.2 User settings [User]

The user can set a character chain of up to 31 characters for the designation of his or her individual configuration. The identification key is stored in the device and can be read out with the download tool.

5.2.3 CAN-Bus settings [CAN1/CAN2]

5.2.3.1 [BaudRate]

There are three possibilities for setting the baudrate.

1. **Automatic baudrate detection (BaudRate=Auto):**

    Note: The baudrate can only be detected if there is bus traffic and at least two nodes per segment are active.

    Table 4-1 shows the possible baudrates with automatic baudrate detection:

Baudrate (CiA)	BTR0 (Hex)	BTR1 (Hex)
1 Mbit/s	0x00	0x14
800 kbit/s	0x00	0x16
500 kbit/s	0x00	0x1C
250 kbit/s	0x01	0x1C
125 kbit/s	0x03	0x1C
100 kbit/s	0x04	0x1C
50 kbit/s	0x09	0x1C
20 kbit/s	0x18	0x1C

    Table 5-1: Baudrates with automatic baudrate detection

2. **Setting a CiA-baudrate:**

    20 kbit/s, 50 kbit/s, 100 kbit/s, 125 kbit/s, 250 kbit/s, 800 kbit/s and 1000 kbit/s can be set (e.g. baudrate=1000).

3. **Setting via Bit Timing Register**

    The baudrate can be set via the Bit Timing Registers BTR0 and BTR1 of the controller. Baudrates can thus also be selected that are not defined by CiA (e.g. BaudRate = 0x04/0x14 for 200 kbit/s).

    The values for the Bit Timing Registers BTR0 and BTR1 are determined according to the specifications for the Philips CAN controller SJA1000 with 16MHz clock frequency (see data sheet SJA1000).

5.2.3.2 FrameFormat

The frame format states in which format the messages are received. Standard frames (11 bit identifiers) or extended frames (29 bit identifiers) can be selected. The frame format must always be defined, but with repeater functionality (RepeaterFunctionality = yes) both formats are received and transmitted irrespective of the setting of the frame format.

5.2.3.3 UseGatewayTable

The parameter UseGatewayTable specifies whether the gateway tables under [CAN1GatewayTable] or [CAN2GatewayTable] are used. With the setting UseGatewayTable = no, all messages are transmitted unchanged to the other segment. The entries in the tables are ignored.

Note: with different frame formats, the gateway tables must be used for translation into the other format.

5.2.4 Gateway Tables [CAN1/CAN2]

A separate gateway table is available for each CAN bus segment ([CAN1GatewayTable], [CAN2GatewayTable]). This configures which identifier the received message receives when transmitting to the other segment or whether the message is filtered out.

The gateway tables are to be created as follows:

The messages to be received are given to the left of the equals sign and the identifiers to be used when transmitting to the other segment are given to the right of the equals sign. The data of the messages remain unchanged.

Depending on frame format, the gateway tables are interpreted differently. If both CAN segments are set to the standard frame format, 11 bit identifiers must be given to the left and right of the equals sign. All 2048 identifiers can be listed in the table. If standard frame is translated into extended frame, 2048 entries are also possible. 11 bit identifiers are on the left, 29 bit identifiers on the right. If both CAN segments are set to extended frame format, max. 128 entries are possible and 29 bit identifiers are on both sides of the equals sign. With translations of extended frame messages to standard frame messages, a maximum of 128 entries is also possible. 29 bit identifiers are on the left, 11 bit identifiers on the right.

Note: the data are interpreted differently depending on the setting in the frame format box.

The following example applies when standard frames were set for CAN 1 and extended frames for CAN2. In this case all values on the left side are interpreted as standard identifiers, all values on the right as extended identifiers.

```
[CAN1GatewayTable]
0x0=0x0             ; These messages are forwarded to the
0x1=0x1             ; other segment (CAN2) with the
0x2=0x2             ; same identifiers
…
0x100=0x200         ; These messages are forwarded to CAN2
0x101=0x1005abc     ; with the identifiers given
0x102=0x202         ; on the right side
```

```
…
0x7fa=                  ; The identifiers that are not listed
0x7fb=no                ; or that do not have a
0x7fc=                  ; numerical value on the right side
0x7fd=                  ; are not forwarded to CAN2
```

5.3   Sample configurations

5.3.1 Standard configuration

With the standard configuration of the CANbridge, automatic baud rate detection and repeater functionality (RepeaterFunctionality=yes) are activated. Both frame formats (std and ext) are processed simultaneously.

```
[General]
TemplateVersion = 01.01.00      ;!Don't change this!
RepeaterFunctionality = yes
AutoBaudAttemptTimeout = no
CANBusOffRecovery = no


[USER]
ConfigAlias = "CAN-Bridge AutoBaud Repeater"


[CANBus1]
BaudRate = Auto
FrameFormat = std       ;FrameFormat is ignored
UseGatewayTable = no    ;UseGatewayTable is ignored


[CANBus2]
BaudRate = Auto
FrameFormat = ext       ;Frameformat is ignored
UseGatewayTable = no    ;UseGatewayTable is ignored


[CAN1GatewayTable]      ;Gatewaytable is ignored


[CAN2GatewayTable]      ;Gatewaytable is ignored
```

5.3.2 Bridge with different Frames and Filters

With the following configuration, CAN1 has standard frame format, the baudrate is 800 kbit/s and the gateway Table is used. CAN2 works with extended frame format, the baudrate is defined by the Bit Timing Registers BTR0 and BTR1, the gateway table is also used. If a CAN bus goes into Bus Off state, the CANbridge is restarted after 10 seconds.

```
[General]
TemplateVersion = 01.01.00      ;!Don't change this!
RepeaterFunctionality = no
AutoBaudAttemptTimeout = no
CANBusOffRecovery = 10


[USER]
ConfigAlias = "CAN-Bridge std/ext/Filter"


[CANBus1]
BaudRate = 800
FrameFormat = std
UseGatewayTable = yes


[CANBus2]
BaudRate = 0x01/0x0c
FrameFormat = ext
UseGatewayTable = yes


[CAN1GatewayTable]
0x000 = 0x000          ;normal id retransmission with the
0x001 = 0x001          ;same identifier on both sides
…
0x100 = 0x1234567      ;modify the id and
0x101 = 0x1005201      ;translate to Extended Frame
…
[CAN2GatewayTable]
0x004 = 0x004          ;normal id retransmission with the
0x006 = 0x006          ;same identifier on both sides
…
0x1234567 = 0x210      ;modify the id and
0x2345678 = 0x211      ;translate to Standard Frame
```
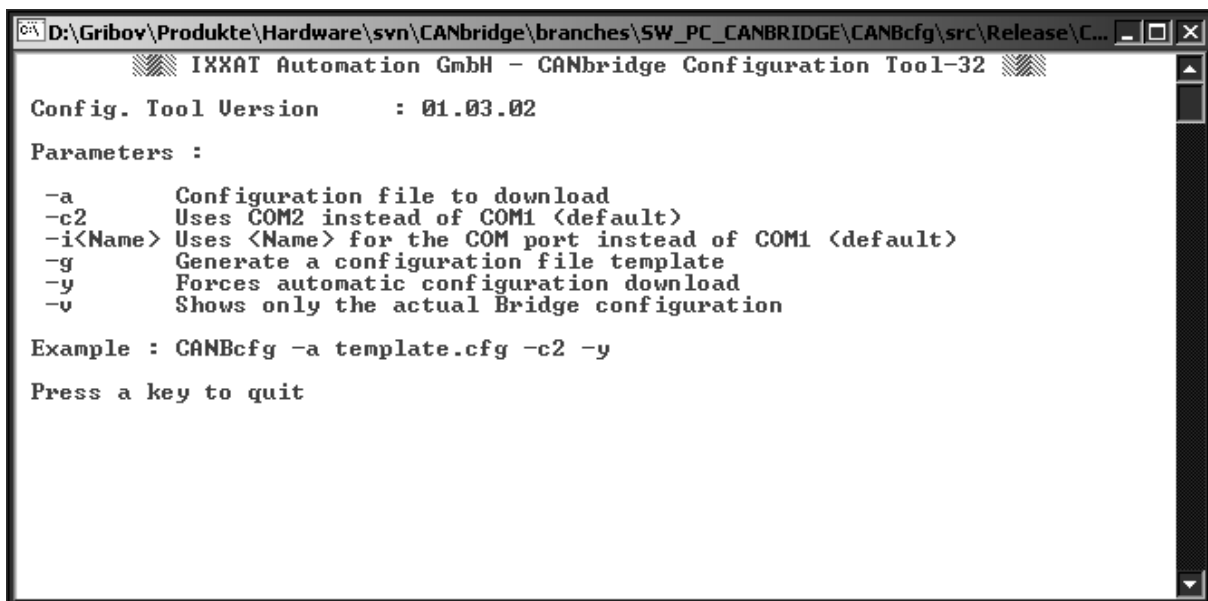
6 Download Tool

The Windows console program CANBcfg.exe is available for the configuration of the CANbridge.

The program is operated via call parameters. The following execution possibilities are available:

- In Windows you can switch to the path in which the CANBcfg.exe program is found via "Start – Run – Browse". Select it by clicking and insert the required parameters.

- You can open a DOS box under "Start – Programs – MS-DOS-Prompt", change to the directory in which the CANBcfg.exe program is found and then execute it with the corresponding parameters.

- You can create a Batch-file or a link.

```
D:\Gribov\Produkte\Hardware\svn\CANbridge\branches\SW_PC_CANBRIDGE\CANBcfg\src\Release\C...

          ▒▒▒ IXXAT Automation GmbH – CANbridge Configuration Tool-32 ▒▒▒

Config. Tool Version    : 01.03.02

Parameters :

 -a        Configuration file to download
 -c2       Uses COM2 instead of COM1 (default)
 -i<Name>  Uses <Name> for the COM port instead of COM1 (default)
 -g        Generate a configuration file template
 -y        Forces automatic configuration download
 -v        Shows only the actual Bridge configuration

Example : CANBcfg -a template.cfg -c2 -y

Press a key to quit
```
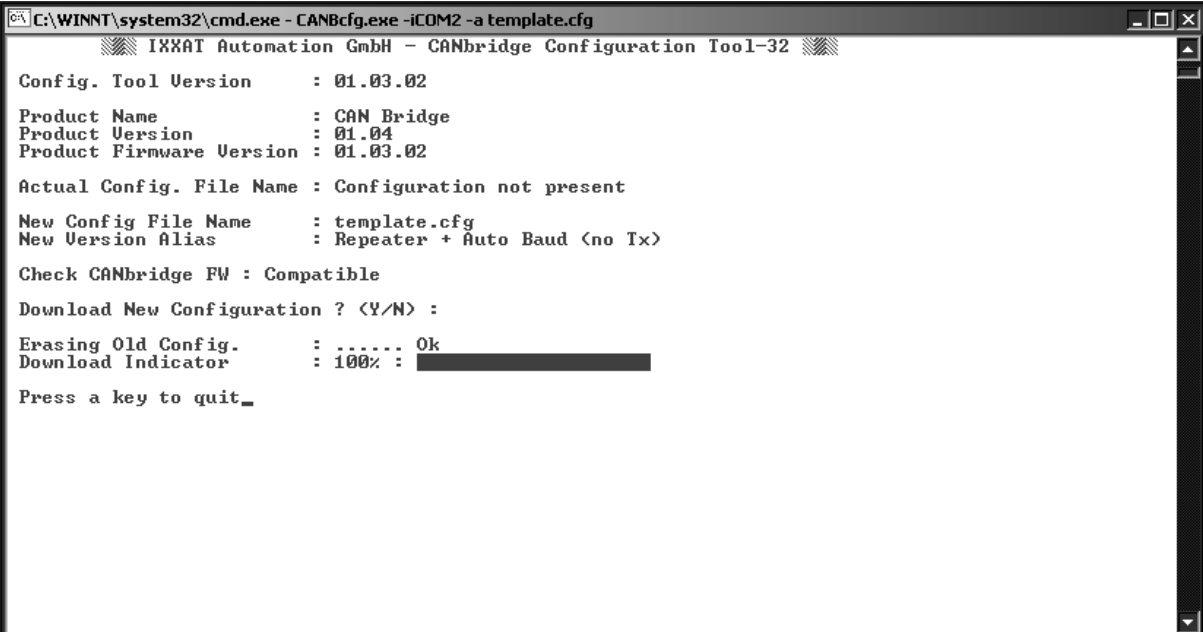
6.1 Generating a configuration file

To generate a new configuration file, the following steps are necessary:

- Call of the CANBcfg.exe program with the parameter –g (`CANBcfg -g`). This generates the file template.cfg.

- The required configuration can now be created by editing the Template file with a Text editor (see Section 5).

- The configuration should be saved under a different name to prevent it being overwritten when generating a new Template file.

6.2 Downloading a configuration

To save the configuration you have to connect the serial interface of the CAN-bridge and the serial interface of the PC with a null modem cable.
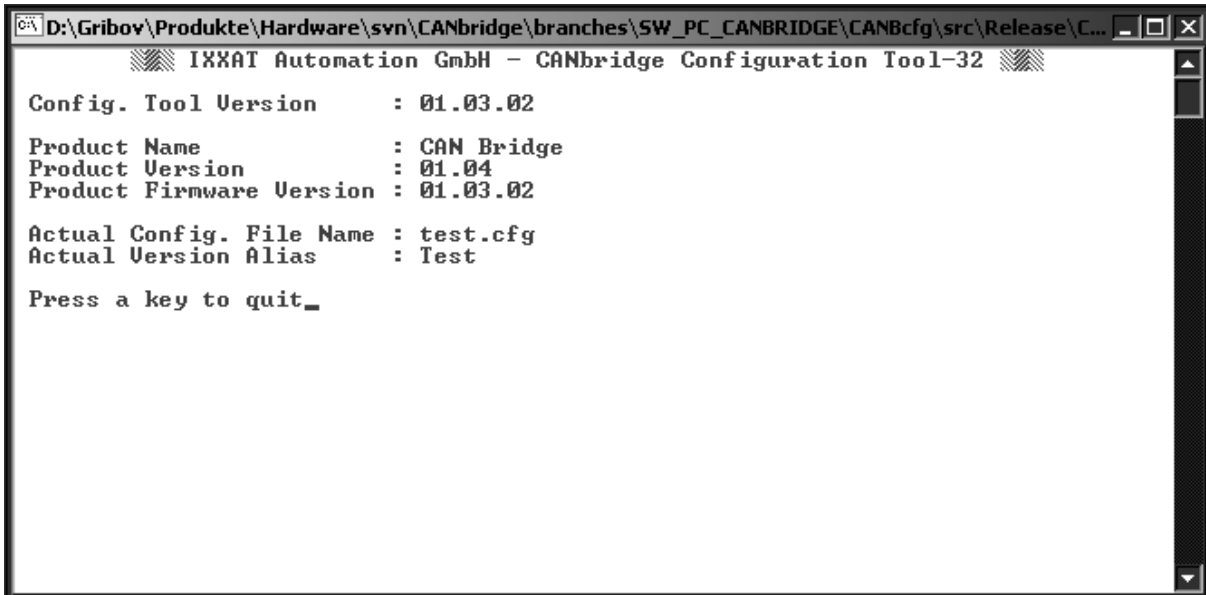
To download, the CANBcfg.exe program is called with the parameter –a <Filename> <Interface> (e.g. `CANBcfg -a myconfig.cfg -c2` if using COM2 serial port). After program start, you are asked again whether you really want to carry out the download. The download is started via the specified serial interface by pressing the 'y' key. However, you can also automate this process by adding the parameter -y when executing the program (e.g. `CANBcfg -a myconfig.cfg -y`). In this case the configuration is loaded into the CANbridge without asking again.

```
C:\WINNT\system32\cmd.exe - CANBcfg.exe -iCOM2 -a template.cfg            _ □ ×
        ▧ IXXAT Automation GmbH - CANbridge Configuration Tool-32 ▧
Config. Tool Version     : 01.03.02

Product Name             : CAN Bridge
Product Version          : 01.04
Product Firmware Version : 01.03.02

Actual Config. File Name : Configuration not present

New Config File Name     : template.cfg
New Version Alias        : Repeater + Auto Baud (no Tx)

Check CANbridge FW : Compatible

Download New Configuration ? (Y/N) :

Erasing Old Config.      : ....... Ok
Download Indicator       : 100% : ██████████████

Press a key to quit_
```

6.3   Display of the current configuration

The current configuration can be read out with parameter –v (e.g. `CANBcfg –v –iCOM7` if using COM7 serial port). The file name of the configuration file and the character chain entered when creating the configuration in the ASCII-file are displayed (see Section 5.2.2).

```
D:\Gribov\Produkte\Hardware\svn\CANbridge\branches\SW_PC_CANBRIDGE\CANBcfg\src\Release\C...

           ▨ IXXAT Automation GmbH - CANbridge Configuration Tool-32 ▨

Config. Tool Version     : 01.03.02

Product Name             : CAN Bridge
Product Version          : 01.04
Product Firmware Version : 01.03.02

Actual Config. File Name : test.cfg
Actual Version Alias     : Test

Press a key to quit_
```

7 Notes on EMC

7.1 Aluminum Version

The CAN-bus connected to the CANbridge must have a shielded lead. The shield braiding is to be laid flat on the connector housing.

The shield connections of CAN1 (X3), CAN2 (X4), serial interface (X2) and power supply (X1) are connected with one another in the device

7.2 Industrial DIN-Rail Version – Shield concept

The highest interference immunity is achieved when the shield of the two CAN buses is grounded on the assembly plate and the ground terminal (Pin 1 / PE, FASTON 6,3 x 0,8 mm) of the CANbridge is connected to the next available grounding (see Fig. 7-1). Via parallel connection of a resistor (1 MΩ) and a capacitor, the grounding connection is connected internally to the GND of CAN1, CAN2 and of the supply voltage.
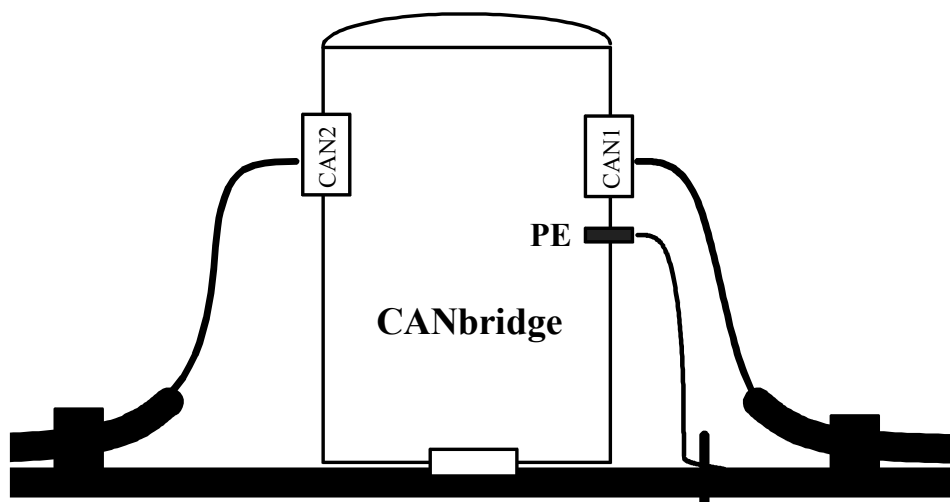
Fig. 7-1: Shield concept CANbridge Industrial DIN-Rail

8 Appendix

8.1 Support

For more information on our products, FAQ lists and installation tips, please refer to the support area on our homepage (http://www.ixxat.de). There you will also find information on current product versions and available updates.

If you have any further questions after studying the information on our homepage and the manuals, please contact our support department. In the support area on our homepage you will find the relevant forms for your support request. In order to facilitate our support work and enable a fast response, please provide precise information on the individual points and describe your question or problem in detail.

If you would prefer to contact our support department by phone, please also send a support request via our homepage first, so that our support department has the relevant information available.

8.2 Returning hardware

If it is necessary to return hardware to us, please download the relevant RMA form from our homepage and follow the instructions on this form. In the case of repairs, please also describe the problem or fault in detail on the RMA form. This will enable us to carry out the repair quickly.

8.3 Note on disposal of used devices

This product is subject to the ElektroG (electrical and electronic equipment act) and is to be disposed of in accordance with this act. The products of IXXAT that are subject to the ElektroG are devices for exclusive commercial use and are marked with the symbol of the crossed out garbage can.

Based on the B2B regulation, disposal is governed separately in the Terms of Sale of IXXAT in accordance with § 10 para. 2 clause 3 of the Electrical and Electronic Equipment Act (ElektroG) in the version of 16.03.2005.

When products supplied by IXXAT are no longer used, the customer is obliged to dispose these products at his/her own expense. It is to be noted that, unlike privately used devices (B2C), they may not be disposed of at the collection centers of public disposal contractors (e.g. municipal recycling centers). The statutory regulations for disposal are to be complied with.

If products delivered were passed on to third parties, the customer is obliged to take back the delivered products at his/her expense when no longer used and to correctly dispose of them in accordance with the statutory regulations or to impose these obligations on the third parties.

The Terms of Sale and their supplements as well as further information on the disposal of used devices can be downloaded from www.ixxat.com.

8.4 Technical Data

Voltage supply:	9 V – 36 V DC, automotive 7 V – 16 V DC
Power consumption:	approx. 1.5 W
Dimensions:	approx. 120 X 90 X 30 mm
Weight Alu Version:	approx. 250 g
Weight DIN-Rail:	approx. 100 g
Temperature range:	Operation: -20..+70 °C, storage: -40..+85°C
Relative humidity:	10 - 95%, non-condensing
Protection type DIN Rail:	IP20
Protection type Alu Version:	IP40
Microcontroller:	Fuijtsu MB90F543, 16MHz
RAM / Flash:	6 kByte / 128 kByte
CAN-Controller:	2x Philips SJA1000
CAN Transceiver (High Speed):	Texas Instruments SN65HVD251
CAN Transceiver (Low Speed):	Philips TJA1054 (only automotive version)
Max. number of CAN-bus nodes:	120 (High Speed),
	32 (Low Speed)
CAN bus termination resistor:	none (High Speed),
	$RTH=RTL=4,7k\Omega$ (Low Speed)
CAN baudrates:	20 kBit – 1 MBit (High Speed),
	20 kBit - 125 kBit (Low Speed)
Galvanic isolation:	as an option CAN-bus to internal logics 250 V AC for 1 min
Delay galv. isolation:	typ. 50 ns
CAN pass through delay:	approx. 70 us with Standard Frame Format
	approx. 150 us with Extended Frame Format
CAN Message Buffer	100 messages per CAN segment
RS232 parameters	38400 Bit/s, 8 databits, no parity, 1 stopbit

8.5 Accessories

Null modem cable

To configure the CANbridge there is a null modem cable available.
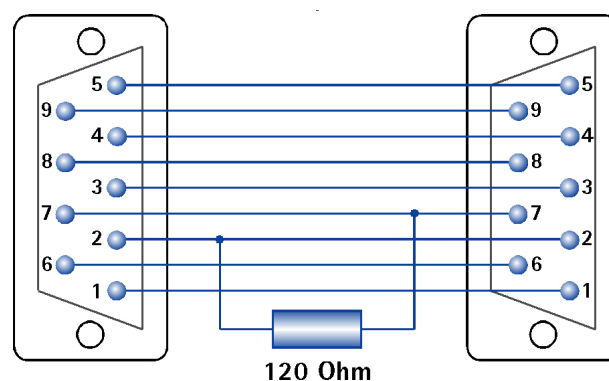Ordering Number 2.09.0000.00524

Sub-D9	Pin	Pin	Sub-D9
DCD	1	7,8	RTS/CTS
RX	2	3	TX
TX	3	2	RX
DTR	4	6	DSR
GND	5	5	GND
DSR	6	4	DTR
RTS	7	1	DCD
CTS	8	1	DCD
RI	9	-	RI

Table A-1: cable links of the null modem cable

CAN bus termination resistor

For CAN-Bus termination there is a Sub-D9 feed through connector with internal 120 Ohm resistor available.

Ordering number: 1.04.0075.03000

Picture A-1: Pin assignment of the CAN bus termination connector

8.6   FCC Compliance

Declaration of conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation

Class A digital device – instructions:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

8.7   EC Declaration of Conformity

IXXAT Automation hereby declares that the product: CANbridge

model:	CANbridge industrial ALU, CANbridge automotive
with the article numbers:	1.01.0120.11010
	1.01.0120.11020
	1.01.0120.13010
	1.01.0120.13020
	1.01.0120.22010
model:	CANbridge industrial DIN Rail
with the article numbers:	1.01.0121.11020
	1.01.0121.22020

do comply with the EC directives 2004/108/EC.

Applied harmonized standards in particular:

EN 55022:2006 + A1:2007
EN 61000-6-2:2005

23.08.2011, Dipl.-Ing. Christian Schlegel , Managing Director

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