CAN@net

TCP/IP Gateway for CAN and RS232

IXXAT

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1 Introduction

1.1 Overview

The CAN@net allows simple, flexible access to CAN-systems via Ethernet or Modem/GSM. By supporting the TCP/IP protocol, CAN@net can be accessed worldwide via the Internet.

With the IXXAT CAN@net, you have purchased a high-quality electronic component that has been developed and manufactured according to the latest technological standards.

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

1.2 Performance features

- Microcontroller NetSilicion NETArm 15 with 18.432 MHz
  (via internal PLL to 33 MHz)

- 8 MByte DRAM

- 1 MByte Flash

- One CAN-Controller PHILIPS SJA 1000 clocked with 16 MHz

- CAN bus connection according to ISO/IS 11898-2, galvanic isolated

- 10/100 Mbit Ethernet, Lucent LU3X31 clocked with 25 MHz

- One serial interface with Tx/Rx- and control lines

- One serial interface with Tx/Rx-lines

- Voltage range +9V to +36V DC

- Top hat rail capable housing

1.3　Block diagram
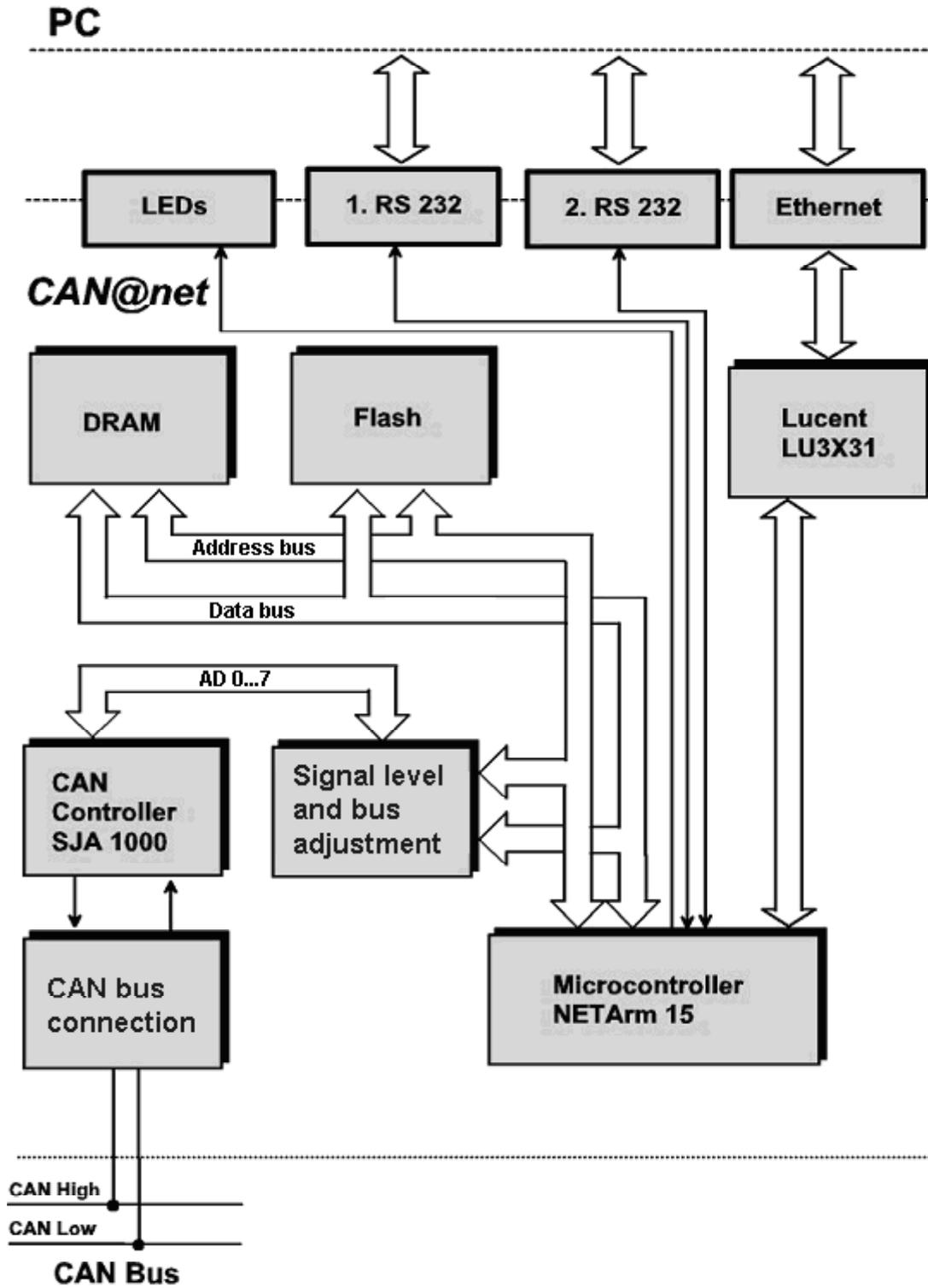
Fig. 1.3-1: Block diagram CAN@net

2 Installation of the device

2.1 Connections of the CAN@net

The following diagram shows the connections of the CAN@net. The pin allocations are described in detail in section 5.

The CAN@net also has four LEDs. For the three communication connections Ethernet, CAN and RS232, one Duo-LED each is available with which the communication status of the interface can be read off. When connected to the voltage supply, the Power LED is illuminated.
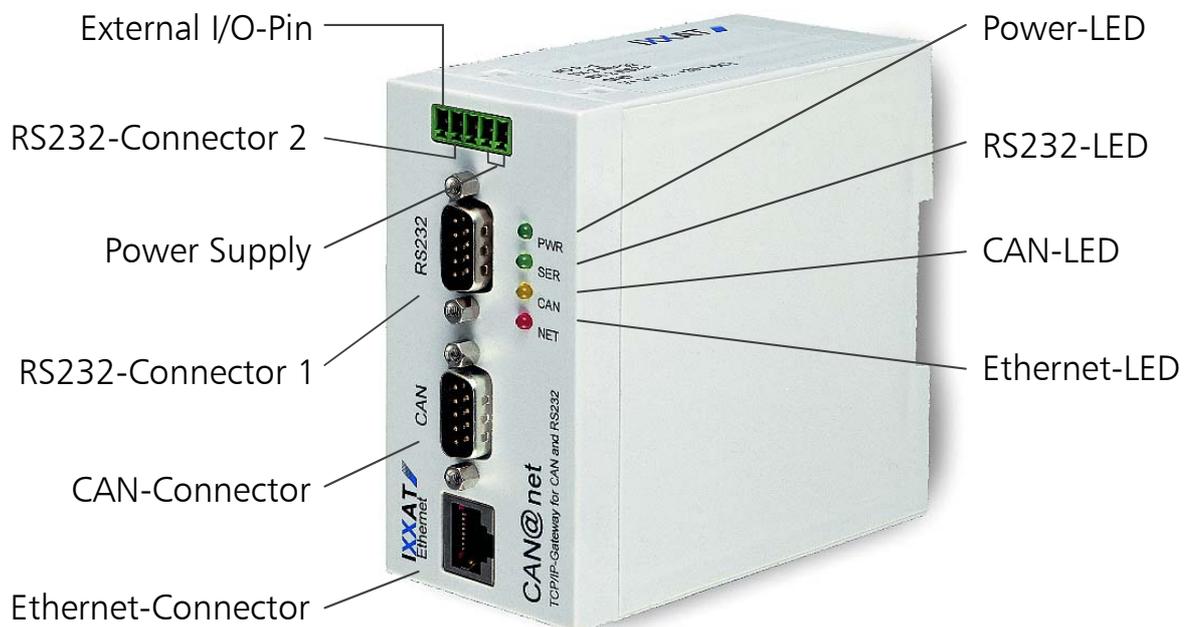
Fig. 2.1-1: Connections and displays of the CAN@net

2.2 Preparation of configuration

Before initial commissioning of the CAN@net, the device must be configured. For configuration you require a standard PC with a terminal program (e.g. Windows-Hyperterminal). First carry out the following steps to prepare the device for configuration:

(1) Connect the first serial interface of the CAN@net with a serial port of your PC with a null modem cable.

(2) Start a terminal-program on your PC with baud rate 19200 baud, 8 bits, no parity, 1 stop bit (or the last configured baud rate of the CAN@net).

(3) Connect the CAN@net to the voltage supply (9V-36V DC on pin 1,2 of the Power plug). Now the CAN@net boots which it also indicates by blinking the green function LEDs (RS232, CAN, Ethernet), one after the other.

(4) After the boot process the CAN@net prompts a dialog via the serial connection to the terminal emulation. Within 10 seconds press any key in order to start the configuration dialog.

(5) Carry out configuration of the device as described in section 3. If you wish to use the CAN@net in a network with DHCP server, you have to enter the MAC ID of the device in the DHCP server. The MAC-ID of the device is fixed to one side of the CAN@net with a sticker.

(6) Restart the CAN@net by disconnecting the voltage supply and reconnecting. The set parameters from the configuration are adopted. With the "Ping" program, you can test whether the CAN@net can be accessed under the configured IP address.

2.3   Commissioning a configured device

The configured CAN@net is commissioned with the following steps:

(1) Connect the CAN@net to the voltage supply (9 V- 36 V DC on pin 1,2 of the Power-plug). First the communication LEDs are alternate blinking green, in this case the firmware is copied from flash to DRAM. Afterwards the CAN and the Ethernet LEDs are flashing green and red. The Serial LED is flashing green, the gateway is now in the configuration mode.

(2) Establish the Ethernet connection and the connection to the CAN network. If the connection to the Ethernet has been carried out correctly, the Ethernet LED flashes when receiving/transmitting Ethernet packages. The CAN LED flashes green if messages are received/transmitted via CAN messages.

(3) The CAN@net is ready for operation and can be initialized via the connected network. If the CAN@net is to be initialized via the Ixxat driver software VCI, the VCI software package must be installed on your computer. For this, see the VCI Installation Manual.

3 Configuration

In order to operate the CAN@net in your network, you must adjust the network parameters of the device. These parameters are altered via a terminal program. If you have started the configuration, the terminal program will lead you through simple setting dialogs. Fig. 3-1 shows the sequence of the setting dialogs.
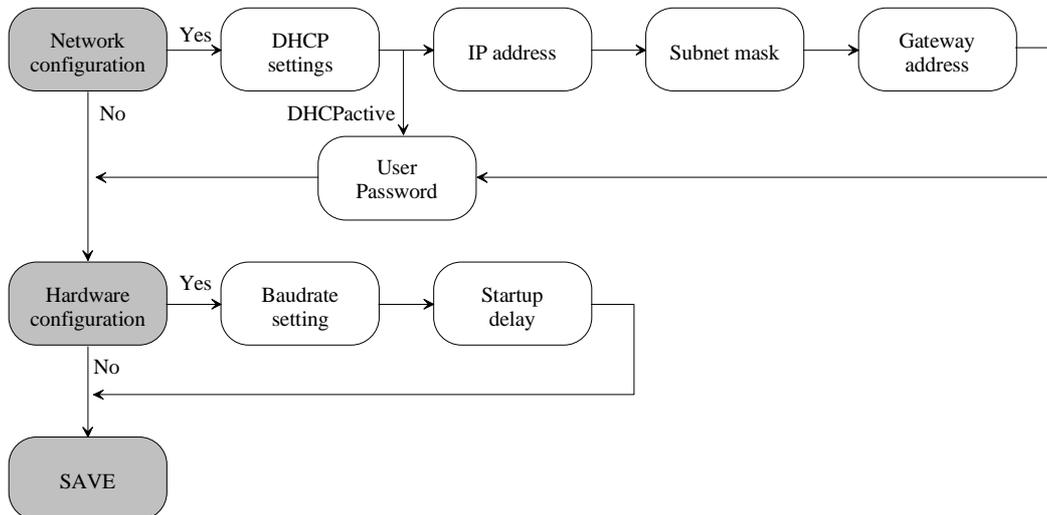

Fig. 3-1 Sequence of the setting dialogs

When you have altered the parameters, the CAN@net must be restarted in order to accept the new parameters.

During the configuration the CAN and the Ethernet LEDs are blinking green and red. The CAN LED is a few moments longer blinking than the Ethernet LED. After the CAN LED stopped blinking, the configuration is done.

3.1　Overview of the parameters

	Type	Pre-setting	Comment
Network parameter	DHCP	Inactive	
	IP-address	192.168.10.22	
	Subnet Mask	255.255.255.0	
	Gateway address	192.168.10.254	
	Root password	Ixxat	Protected by password
Hardware parameter	Baud rate for RS232	19200	
	Delay time (in seconds) in the configuration dialog	10	
Access to manu-facturer specific parameters			Protected by password
Firmware update			

3.2　Starting the configuration

To start the configuration, a terminal program must be connected with the CAN@net via the first serial interface with Power on (pre-setting: 19200 Baud, 8 bits, no parity, 1 stop bit). A key must be pressed after the greeting text within the start-up delay time (pre-setting 10s).

The configuration dialog is started by asking the user whether he wishes to modify the configuration:

Press A to Accept the settings, or M to Modify [M]?

With 'A'+<RETURN>, the dialog is exited and the CAN@net continues with the initialization.

With 'M'+<RETURN>, the other dialogs can be accessed.

With all dialogs, if the <RETURN> key alone is pressed, the suggested values in the square brackets [ ] are accepted.

3.3   Settings of the network parameters

The settings for IP are made with the network configuration. If the network parameters should not be changed, you can skip to the next configuration:

Change the network configuration?[N]

The network configuration can be skipped with <ENTER> or 'N'+<ENTER>. These further network configuration dialogs are branched into by pressing 'Y'+<ENTER>.

For the function of the Internet protocol, the device must have the own IP address, subnet mask and the address of the gateway. These settings are made with the following dialogs.

3.3.1 DHCP setting

The DHCP client can be set up on the CAN@net via the DHCP setting. The DHCP client obtains the IP address automatically via a DHCP server, so that no further network settings are necessary. The condition for this is that the network in which the CAN@net is used has a DHCP server service.

Should this device use DHCP to obtain
its IP settings automatically?[N]

By entering Y+<ENTER>, the DHCP-client of the CAN@net is activated and will obtain the configuration from a DHCP-server after a reset. No further network configurations are required.

By entering N+<ENTER>, the DHCP-client is deactivated. IP address and subnet mask must be entered manually.

3.3.2 Configuration of the IP address

The IP address of the CAN@net is configured with the following configuration dialog:

IP address[192.168.10.22]?

Entry is made in the IP address notation: 4Byte in decimal representation separated by dots in each case (see displayed IP-address). Entry must be completed with <ENTER>. <ENTER> without any further entry accepts the IP address given in brackets.

3.3.3 Configuration of the subnet mask

The subnet mask states which part of the IP address describes the network. All bits set to 1 in this mask mark the network part of the address.

Subnet mask[255.255.255.0]?

To change the subnet-mask, the mask is entered in the IP- address notation. If the mask is to be retained, acknowledgement is made with <ENTER> without any further entry.

3.3.4 Configuration of the gateway address

If the network consists of several subnets connected via gateways, the IP address of the default gateway or of the default router must be entered.

Gateway address[192.168.10.254]?

To change the gateway address, the address is entered in the IP-address notation. To retain the displayed address, the value in brackets is acknowledged with <ENTER> without any further entry.

3.4 Configuration of the root password

For access to the gateway the root password is necessary. The password can consists of a maximum of 19 characters. This could be letters, numbers or special signs.

Do you want to change the root password?[N]

By entering <ENTER> or N+<ENTER> the configuration of the password can be skipped.
With Y+<ENTER> the configuration is started.

Enter root password for access:

Please enter the already root password. After entering the password press <ENTER>.

Success, access granted…!

The entered password was ok, the configuration of the password can go on.

Access denied!!

The entered password wasn't ok, so the configuration of the password is terminated.

Enter the new root password with maximum 19 digits.

Now the new root password should be entered. After writing the password press <ENTER>.

Please enter the new root password once again.

For verification pupose the new password have to be entered again.

Success, password will be changed…!

If both entered passwords are the same, the new password will be saved. The saving to the flash memory will take place after completion of the configuration. So if the gateway is now disconnected from the power, the former password is still active.

Without the correct password the gateway can't be accessed. If the password is lossed, the gateway have to be returned to the manufacturer to restore it.

3.5 Hardware Configuration

In the hardware configuration, settings for the serial interface and the delay time to start the configuration dialog can be made.

Change the HARDWARE configuration?[N]

The hardware configuration can be branched into via 'Y'+<ENTER>. With <ENTER> or 'N'+<ENTER>, this configuration dialog is skipped.

3.5.1 Setting the baud rate for the serial interface

The setting of the baud rate only applies to the first serial interface (COM1), which is used for the configuration.

Set the baud rate of Serial channel[19200]?

The baud rate is entered in bits / second. A maximum of 57600 bits/s is supported. When changing the baud rate, ensure that the new baud rate is supported by your terminal program. The new baud rate is completed with <ENTER>. The baud rate currently set is retained of the value in brackets is acknowledged with <ENTER> without any further entry.

3.5.2 Setting the delay time of the configuration dialog

The delay time of the configuration dialog shows how long the CAN@net waits for a key to be pressed by a terminal before the standard software starts.

How long (in seconds) should the CPU wait
before starting the application[10]?

The delay time is given in seconds and is accepted with <ENTER>. If the currently set delay time is to be retained, the value in brackets is acknowledged with <ENTER> without any further entry.

3.6   Saving the changed data

After ending the hardware configuration dialog, all parameters are saved independent of changes in the Flash. During the saving process, the following message appears:

Saving the changes in NV memory...Done.

4 Software Update

This section describes updates of software via the serial interface. To do an update, the flashloader utility from IXXAT is required.

4.1 Update via the serial interface

The IXXAT flashloader utility provides two batch jobs to ease the task. One (fload1.bat) is prepared to do a firmware download via the PC COM1 and the other (fload2.bat) is prepared to do it via the PC COM2.

1. Connect the CAN@net serial port via a null modem - cable (the one which was part of the delivery) with the PC COM of your choice.
2. Run the batch job which corresponds to the COM port you are using.
3. Do a power cycle with the CAN@net. This starts the Bootmanager which sees the waiting batch job on the serial connection and starts the flash download.
4. The batch job prompts its progress and issues a success or failure message when finished.

Caution: The batch job is prepared to work with the default baudrate of 19200 Baud. When you changed the settings of the baudrate for the CAN@net, these changes must be done to the batch jobs as well.

5 Pin assignment

5.1 Voltage supply

The five-pin socket on the head of the CAN@net is for voltage supply. In addition, a second serial interface and an I/O-pin are connected.

Pin no.	Signal name
1	VCC external
2	GND external
3	RX2 RS232
4	TX2 RS232
5	IOP external

Assignment current supply connection

5.2 CAN

The CAN connection on the CAN@net is designed as a Sub-D9 plug according to CiA Standard DS 102 (n.c. = not connected).

Pin no.	Signal name
1	n.c.
2	CAN Low
3	n.c. (CAN GND)
4	n.c.
5	n.c.
6	n.c.
7	CAN High
8	n.c.
9	n.c.

Assignment CAN connection

5.3   RS232

The first serial interface is connected to the second Sub-D-9 plug of the CAN@net. Assignment corresponds to the PC-standard.

Pin no.	Signal name
1	DCD
2	RxD
3	TxD
4	DTR.
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Assignment of first RS232 connection

5.4   Ethernet

Connection to the Ethernet is established via an RJ45-socket. For this a twisted-pair cable is required.

The allocation corresponds to the Ethernet standard.

Pin no.	Signal name
1	Tx +
2	Tx -
3	Rx +
4	n.c.
5	n.c.
6	Rx -
7	n.c.
8	n.c.

Allocation Ethernet connection RJ45 socket

6 Displays

6.1 Power LED

Marked on the CAN@net as PWR.

The Power LED indicates whether power is switched on or not.

6.2 Serial LED

Marked on the CAN@net as SER.

After power on or a reset of the gateway the Serial LED flashes green, alternating with the Ethernet and the CAN LED.

The Serial LED displays communication on both RS232 interfaces. The LED flashes green on data transmition or receiption.

6.3 CAN LED

Marked on the CAN@net as CAN.

After power on or a reset of the gateway the LED flashes green, alternating with the Serial and the Ethernet LED.

While the configuration of the gateway takes place the LED is flashing red and green.

The CAN LED signals communication on the CAN bus. When CAN telegrams are received, the LED flashes green. If the CAN-controller reaches the error warning limit, received data are signaled by red flashing. The CAN- LED is illuminated red when CAN-communication is no longer possible (CAN controller in bus off).

6.4 Ethernet LED

Marked on the CAN@net as NET.

After power on or a reset of the gateway the LED flashes green, alternating with the Serial and the CAN LED.

While the configuration of the gateway takes place the LED is flashing red and green.

The Ethernet LED displays received packages with green flashing. An invalid port connection, e.g. no ethernet cable connected to the gateway, is displayed with red illumination

Appendix

Technical specifications

- Dimensions: approx. 102 x 50 x 120 mm
- Weight: approx. 330 g
- Working temperature range: 0 – 70 ° C
- Voltage supply: 9 V – 36 V DC ±5%
- Power consumption active: typically 200 mA
                                     max. 600 mA

EMC requirements

The CAN@net fulfills the EMC requirements according to

- DIN EN 55022 (VDE 0878 part 22)
- DIN EN 61000-3-2 (VDE 0838 part 2)
- DIN EN 61000-3-3 (VDE 0838 part 3)
- DIN EN 61000-6-2 (VDE 0839 part 6-2).

Factory settings

	Type	**Pre-setting**
Network parameters	DHCP	Inactive
	IP-address	192.168.10.22
	Subnet Mask	255.255.255.0
	Gateway address	192.168.10.254
	Root password	Ixxat
Hardware parameters	Baud rate for RS232	19200
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