ES580
CAN and LIN Bus PCMCIA Card

User's Guide

Copyright

Contents

1   General Information

This introductory chapter provides you with information on basic safety instructions, returning the product and recycling, how to use this manual, and provides you with an overview of the system requirements for operating the ES580 CAN and LIN Bus PCMCIA Card, the delivery scope and other details.

1.1   Basic Safety Instructions

Please adhere to the following safety instructions to avoid injury to yourself and others as well as damage to the device.

1.1.1   Product Liability Disclaimer (ETAS Disclaimer)

> **WARNING!**
>
> *The use and application of this product can be dangerous. It is critical that you carefully read and follow the instructions and warnings below and in the associated user manuals.*

This ETAS product enables a user to influence or control the vehicle's electronic systems. THE PRODUCT IS SPECIFICALLY DESIGNED FOR THE EXCLUSIVE USE BY PERSONNEL WHO HAVE SPECIAL EXPERIENCE AND TRAINING.

Improper use or unskilled application of this ETAS product may alter the vehicle performance in a manner that results in death, serious personal injury or property damage.

- **DO NOT USE THIS ETAS PRODUCT IF YOU DO NOT HAVE THE PROPER EXPERIENCE AND TRAINING.**

- **IT IS RECOMMENDED THAT IN-VEHICLE USE OF THE ETAS PRODUCT BE CONDUCTED ON ENCLOSED TEST TRACKS.**

- **USE OF THIS ETAS PRODUCT ON A PUBLIC ROAD SHOULD NOT OCCUR UNLESS THE SPECIFIC CALIBRATION AND SETTINGS HAVE BEEN PREVIOUSLY TESTED AND VERIFIED AS SAFE.**

- **WHEN USING THIS ETAS PRODUCT WITH VEHICLE SYSTEMS THAT INFLUENCE VEHICLE BEHAVIOR AND CAN AFFECT THE SAFE OPERATION OF THE VEHICLE, YOU MUST INSURE THAT THE VEHICLE CAN BE TRANSITIONED TO A SAFE CONDITION IF A MALFUNCTION OR HAZARDOUS INCIDENT SHOULD OCCUR.**

- **ALL LEGAL REQUIREMENTS, INCLUDING REGULATIONS AND STATUTES REGARDING MOTOR VEHICLES, MUST BE STRICTLY FOLLOWED WHEN USING THIS PRODUCT.**

IF YOU FAIL TO FOLLOW THESE INSTRUCTIONS, THERE IS A RISK OF DEATH, SERIOUS INJURY OR PROPERTY DAMAGE.

Any data acquired through the use of this ETAS product must be verified for reliability, quality and accuracy prior to use or distribution. This applies both to calibration data and to measurements that are used as a basis for calibration work.

THE ETAS GROUP OF COMPANIES AND THEIR REPRESENTATIVES, AGENTS AND AFFLICATED COMPANIES DENY ANY LIABILITY FOR THE FUNCTIONAL IMPAIRMENT OF ETAS PRODUCTS IN TERMS OF FITNESS, PERFORMANCE AND SAFETY IF NON-ETAS SOFTWARE OR MODEL COMPONENTS ARE USED WITH ETAS PRODUCTS OR DEPLOYED TO ACCESS ETAS PRODUCTS. ETAS PROVIDES NO WARRANTY OF MECHANTABILITY OR FITNESS OF THE ETAS PRODUCTS IF NON-ETAS SOFTWARE OR MODEL COMPONENTS ARE USED WITH ETAS PRODUCTS OR DEPLOYED TO ACCESS ETAS PRODUCTS.

THE ETAS GROUP OF COMPANIES AND THEIR REPRESENTATIVES, AGENTS AND AFFILIATED COMPANIES SHALL NOT BE LIABLE FOR ANY DAMAGE OR INJURY CAUSED BY IMPROPER USE OF THIS PRODUCT. ETAS PROVIDES TRAINING REGARDING THE PROPER USE OF THIS PRODUCT.

Also, if a product issue develops, ETAS will prepare a Known Issue Report (KIR) and post it on the internet. The report includes information regarding the technical impact and status of the solution. Therefore you must check the KIR applicable to this ETAS product version and follow the relevant instructions prior to operation of the product.

The Known Issue Report (KIR) can be found here:

http://www.etasgroup.com/kir

If you cannot agree with these limitations, you may return this product free of charge within a (1) month after receipt. You will immediately be refunded the full purchase price.

1.1.2 Correct Use

ETAS GmbH cannot be made liable for damage which is caused by incorrect use and not adhering to the safety instructions.

1.1.3 Labeling of Safety Instructions

The safety instructions contained in this manual are shown with the standard danger symbol shown below:

The following safety instructions are used. They provide extremely important information. Please read this information carefully.

WARNING!

indicates a possible medium-risk danger which could lead to serious or even fatal injuries if not avoided.

CAUTION!

indicates a low-risk danger which could result in minor or less serious injury or damage if not avoided.

1.2 Taking the Product Back and Recycling

The European Union has passed a directive called Waste Electrical and Electronic Equipment, or WEEE for short, to ensure that systems are setup throughout the EU for the collection, treating and recycling of electronic waste.

This ensures that the devices are recycled in a resource-saving way representing no danger to health or the environment.

Fig. 1-1 WEEE-Symbol

The WEEE symbol (see Fig. 1-1 on page 10) on the product or its packaging shows that the product must not be disposed of as residual garbage.

The user is obliged to collect the old devices separately and return them to the WEEE take-back system for recycling.

The WEEE directive concerns all ETAS devices but not external cables or batteries.

For more information on the ETAS GmbH Recycling Program, contact the ETAS sales and service locations (see chapter 10 on page 75).

1.3 About This Manual

This manual describes the startup and technical data of the ES580 CAN and LIN Bus PCMCIA Card.

1.3.1 Structure

This manual consists of nine chapters and one index.

- **Chapter 1: "Introduction"**

  This introductory chapter provides you with information on basic safety instructions, returning the product and recycling, how to use this manual, and provides you with an overview of the system requirements for operating the ES580 CAN and LIN Bus PCMCIA Card, the delivery scope and other details.

- **Chapter 2: "Hardware Description"**

  The "Hardware Description" chapter describes the features, areas of application, the serial numbers and the block diagram of the ES580 CAN and LIN Bus PCMCIA Card, the CAN or LIN transceiver cables and their test set-up as well as the PCMCIA Protector.

- **Chapter 3: "Installing the ES580 Drivers"**

  The "Installing the ES580 Drivers" chapter describes general preparatory steps for installation and how to install the ES580 drivers under Windows 2000 and Windows XP.

- **Chapter 4: "CAN Hardware Configuration Tool"**

  The "CAN Hardware Configuration Tool" chapter contains descriptions of how to launch the tool and of its components.

- **Chapter 5: "Verifying Hardware Operation"**

  The "Verifying Hardware Operation" chapter contains a description of how to check the drivers and hardware are working correctly.

- **Chapter 6: "Troubleshooting"**

  The "Troubleshooting" chapter contains suggestions on how to rectify any faults the ES580 may have.

- **Chapter 7: "Technical Data"**

  The "Technical Data" chapter contains a summary of the pin assignments and all technical data of the ES580 CAN and LIN Bus PCMCIA Card.

- **Chapter 8: "Cables and Accessories"**

  The "Cables and Accessories" chapter contains an overview of the available cables and accessories.

- **Chapter 9: "Ordering Information"**

  The "Ordering Information" chapter contains the ordering information on the available cables and accessories.

The final chapter, "ETAS Contacts", gives you information on ETAS' international sales and service locations.

1.3.2   Using this Manual

Representation of Information

All activities to be executed by the user are presented in what is referred to as a "Use-Case" format. I.e. the aim is defined in brief as a title and the relevant steps necessary to achieve this aim are then listed. The information is displayed as follows:

Target definition:

Any introductory information...

- Step 1

  Possibly an explanation of step 1...

- Step 2

  Possibly an explanation of step 2...

- Step 3

  Possibly an explanation of step 3...

Any concluding remarks...

Typographic Conventions

The following typographic conventions are used:

Click **OK**.	Buttons are shown in boldface.
Press <ENTER>.	Keyboard commands are shown in angled brackets in block capitals.

The "Open File" dialog box appears.	Names of program windows, dialog boxes, fields etc. are shown in quotation marks.
Bold	Device labels
Italics	Crucial text

Important notes for the user are shown as follows:

> **Note**
>
> *Important note for the user.*

1.4 System Requirements

This chapter tells you what hardware and software is needed to operate your ES580.

> **Note**
>
> *Carefully check the software version numbers and cable names. Wrong software versions and cables can keep your ES580 from functioning properly or damage the ES580 and devices connected to it.*

1.4.1 PC Hardware Requirements

The CPU as well as the main memory requests must satisfy the minimum requirements of the used operating system.

- IBM-compatible PC
- Pentium II or higher
- 128 MByte RAM or larger
- One PCMCIA slot (type II or type III)

Device Management Requirements

The CAN and LIN Bus PCMCIA Card communicates with your computer using an 8 kByte memory range and an interrupt. The memory range must be available exclusively to the ES580. Some PCMCIA drivers are an exception as they recommend exclusive IRQ use for ES580.

Power Managers

Almost all notebook computers and many desktop PCs have power managers. Power managers disable the CPU for a certain amount of time. This impairs time management accuracy in your application. If you have stringent require-

ments for your application time management (time-driven transmission of messages, time-driven evaluations), you must deactivate these power managers. Options for power management may be included in:

- the BIOS setup
- the Windows Control Panel (e.g. Power object).

<blockquote>**Note**

This document does not look at the deactivation of power managers in any further detail.
</blockquote>

1.4.2   Software

Operating System

The Operating Systems Windows 2000 or Windows XP can be used.

INCA

The following software is required to operate the interfaces of the ES580 with CAN or LIN transceiver cables:

Interface function	Required Software
CAN	INCA V4.0.4 (or higher)
LIN	INCA V6.0 (or higher)

<blockquote>**Note**

The ETAS PCMCIA CAN Interface Cards CAN-Link, CAN-Link II and also the ES580 card are recognized as "ES580 (CAN-Link)" in the INCA Hardware Configuration Editor (HWC).
</blockquote>

Drivers

The ETAS PCMCIA CAN Interface Card CAN-Link II can be used with ES580 drivers. The ES580 requires drivers version 5.1 (or higher).

1.5 Delivery Scope

Make sure your device was delivered with all its component parts before you start using it. The following belong to the delivery scope of ES580:

- The ES580 CAN and LIN Bus PCMCIA Card
- A CD-ROM containing
  - ES580 drivers
  - Utilities
  - Documentation (PDF format)
  - Adobe Acrobat Reader
- User's Guide in English (printed version)
- User's Guide in German (printed version) and
- ETAS Customer Letter

1.6 Additional Information

Take a look at the relevant software documentation for details of how to configure the ES580 under INCA.

2   Hardware Description

The complexity of systems and subsystems in automotive electronics and the requirements made of communication interfaces between electronic ECUs and other electronic components in the vehicle are constantly on the increase. Serial communication buses play a major role in data exchange, particularly the bus types CAN (Controller Area Network) and LIN (Local Interconnect Network).

CAN applications are divided into the two categories Low-Speed CAN (max. 125 kbit/s) and High-Speed CAN (125 kbit/s to 1 Mbit/s). Data transfer rates of 10 kbit/s to 1 Mbit/s can be attained. The LIN bus is absolutely perfect for interference-insensitive local data transport due to its low requirements and one-wire technology. Data transfer rates of 20 kbit/s can be attained. The CAN bus is an important standard in the networking of on-board components. The LIN bus is used to network intelligent sensors and actuators in vehicles inexpensively if the bandwidth and versatility of CAN are not actually needed for this application. Modern vehicles contain both CAN and LIN networks although CAN is the basis to which the subordinate LIN networks are connected via gateways.

2.1   ES580 CAN and LIN Bus PCMCIA Card

The ES580 PCMCIA CAN/LIN Bus Interface Card integrates CAN and LIN interfaces into laptops/PCs which have a PCMCIA slot (type II or type III).

Fig. 2-1   ES580

2.1.1 Features

The ES580 is part of the family of compact ETAS calibration devices and is involved in the process of continuous firmware and software upgrades.

General Features

General features of the ES580:

- Standard PCMCIA card (type II)
- Two independent interfaces per card
- Two independent CAN channels
- Two independent LIN channels
- Processes high bus loads
- No external supply voltage necessary
- Part of the ETAS tool suite – supported by INCA
- Runs under Windows 2000, Windows XP (Plug & Play installation)
- Operation of several cards simultaneously (Windows 2000, XP)

CAN Functions

Important CAN functions of the ES580:

- Flexible ES580 CAN cable concept which can easily be adapted to different CAN buses
  - CAN transceiver integrated into the ES580 CAN cables
  - Optional high-speed or low-speed connection to the CAN network
  - Optional galvanically isolated connection to the CAN network
- SUB-D connector in accordance with "CAN in Automation" (CiA)
- Monitoring without CAN bus influence
- Temporary storage of messages on the card
- Time synchronization
- Large throughput (35000 messages per second)
- Exact time stamp (1 µs timing resolution)
- Pre-processing of messages on the card to reduce the PC load
- Exact measuring of bus loads

LIN Functions

Important LIN functions of the ES580:

- LIN cable with integrated transceiver as a component of the flexible ES580 cable concept
- Baud rate of up to 20 kbit/s

For more technical data on the ES580 consult chapter 7 on page 65.

2.1.2 Applications

The ES580 can be used for the following tasks:

- Connection of external devices to INCA PC using the CAN interface
- ECU calibration with CAN bus and/or diagnostic interface
- ECU diagnostics
- Flash programming of ECUs
- Measuring of external measure variables with Ipetronik modules
- Recording and acquisition of communication data in one or more CAN networks

2.1.3 Configuration

The ES580 is configured entirely in INCA.

2.1.4 Serial Number

The serial number is on the back of the PCMCIA card. This number is essential for addressing the ES580 uniquely.

2.1.5 ES580 Block Diagram

The block diagram of the ES580 CAN and LIN Bus PCMCIA Card is shown in Fig. 2-2.
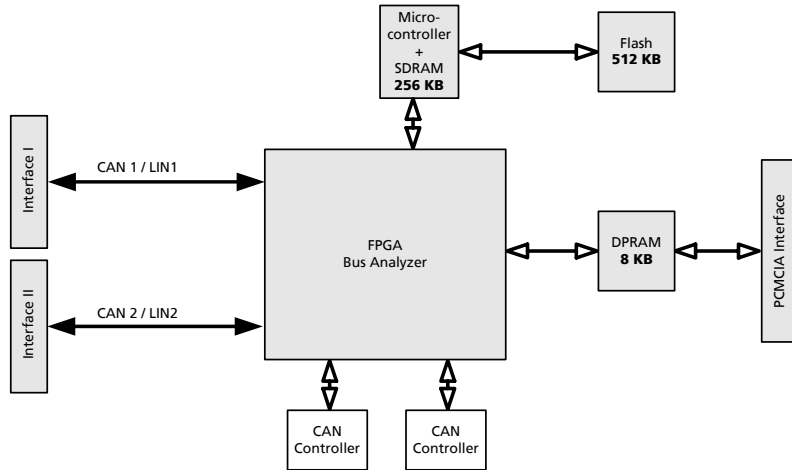
Fig. 2-2   ES580 Block Diagram

In addition to the PCMCIA interface, the ES580 provides two independent interfaces. The interfaces of the ES580 can be used flexibly in the following operating modes by connecting special transceiver cables which have either integrated CAN or LIN transceivers:

- as two CAN channels or
- as one CAN and one LIN channel or
- as two LIN channels.

The two independent I/0 interfaces are shown in Fig. 2-2 on page 20. The interfaces of the ES580 establish a simple and direct connection between the PC and CAN/LIN network. Data is exchanged with the PC via the PCMCIA interface. For example, you can measure and calibrate with the first interface while you monitor CAN messages with the second one.

The ES580 is equipped with a powerful 32-bit 64 MHz microcontroller made by ATMEL with an ARM7 core and two SJA1000 CAN controllers made by Philips. This means that CAN messages can be processed both with an 11- and with a 29-bit identifier. Remote frames can be received and analyzed without any restrictions. The ES580 can generate and detect error frames on the CAN bus.

2.2 ES580 CAN Cables

2.2.1 Overview and Concept

ES580 is a system solution which enables you to work with high-speed and low-speed CAN applications by simply swapping the cables.

The flexible cable concept for integrating the relevant CAN transceivers into the cables allows easy adaptation to different CAN buses.

The user can choose from a large range of ETAS CAN cables with integrated bus drivers:

- cables for high-speed or low-speed connections to the CAN network
- cables for galvanically isolated connections to the CAN network

Note

CAN resistors are NOT integrated in the transceivers!
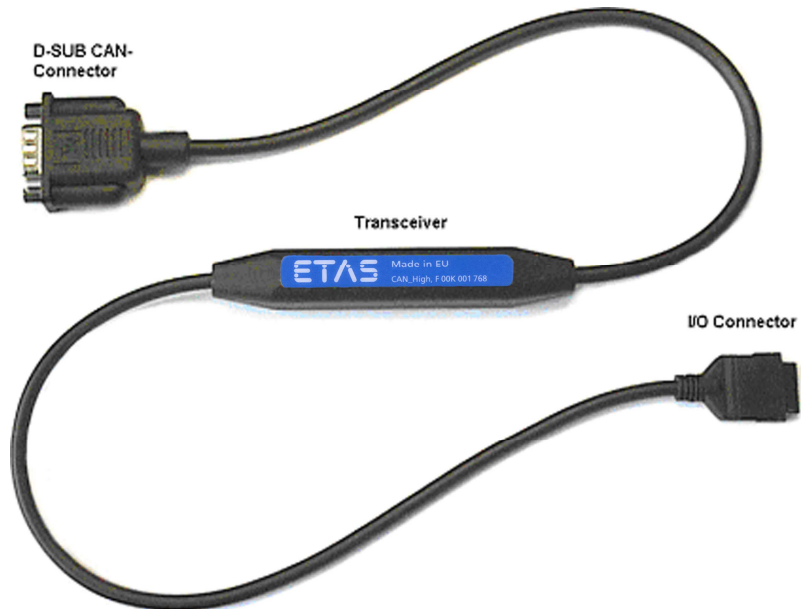
Fig. 2-3   ES580 CAN Cable with Transceiver, I/O Connector and D-Sub CAN Connector

CAN Cable	Transceiver	Description
High Speed	PCA82C251	High Speed 251-type transceiver with standard D-Sub 9 connector
High Speed opto-coupled	PCA82C251	High Speed opto-coupled 251-type transceiver with standard D-Sub 9 connector
Low Speed	TJA1054	Low Speed 1054-type transceiver with standard D-Sub 9 connector

2.2.2 ES580 CAN High Speed Cables

ES580 CAN High Speed Cables are fully compatible with the ISO 11898-2 standard. They are suitable for baud rates up to 1 MBaud.

Opto Version of ES580 CAN High Speed Cables

The ES580 CAN High Speed Cable is also available in an opto version, which results in galvanic isolation between the ES580 card and the CAN bus. The galvanic isolation of the transceiver voltage supply is realized by a DC/DC converter.

> **CAUTION!**
>
> *Pin 4 must not be connected for ES580 CAN High Speed Cables.*

Bus Levels for ES580 CAN High Speed Cables
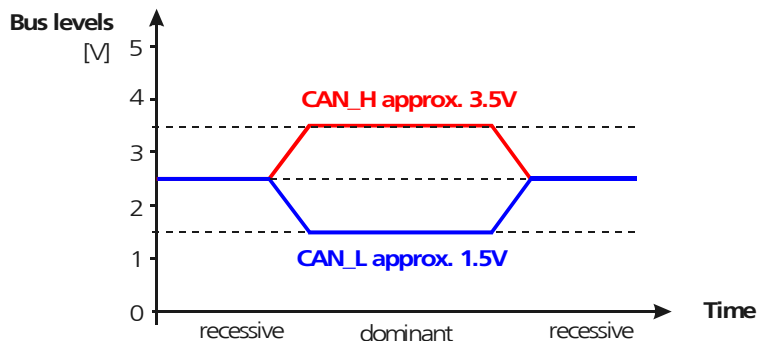
Fig. 2-4   Bus Levels for ES580 CAN High Speed Cables

2.2.3 ES580 CAN Low Speed Cables

ES580 CAN Low Speed Cables are fully compatible with the ISO 11898-3 standard. They are suitable for baud rates up to 125 KBaud.

Bus Levels in Normal Mode
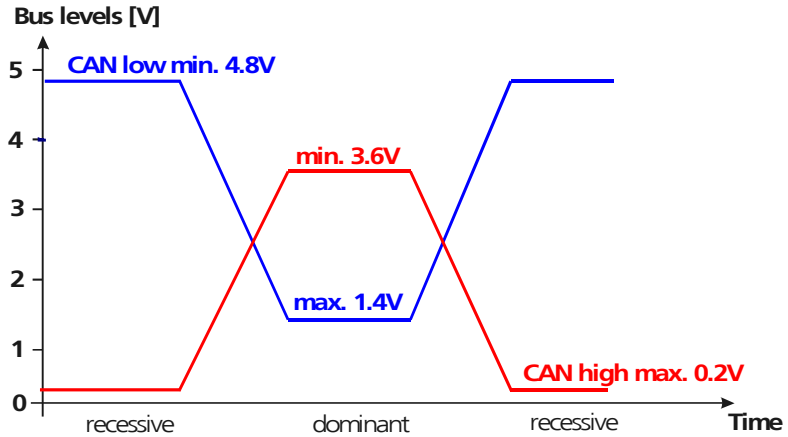
Fig. 2-5   Bus Levels in Normal Mode for ES580 CAN Low Speed Cable

Bus Levels for Standby / Sleep Mode:
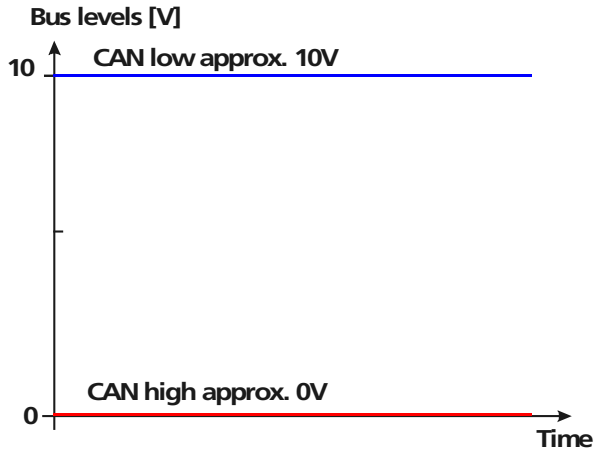
Fig. 2-6   Bus Levels for Standby / Sleep Mode for ES580 CAN Low Speed Cable

2.2.4   Test Setups for ES580 CAN Cables

Test Setup for ES580 CAN High Speed and ES580 CAN High Speed Opto Cables

To test the ES580 CAN High Speed Cables and ES580 CAN High Speed opto Cables use the CAN Loop Back Cable 1 (CAN_CON1).
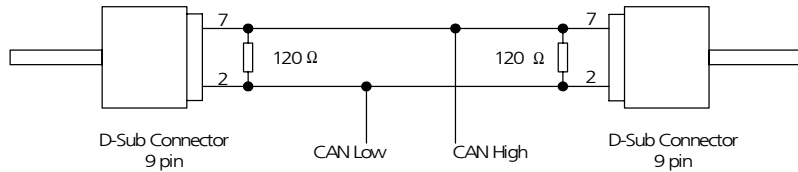
Fig. 2-7   Test Setup for ES580 CAN High Speed Cables (CAN_High, CAN_High_o)

Test Setup for ES580 CAN Low Speed Cable

To test the ES580 CAN Low Speed Cables use the CAN Loop Back Cable 0 (CAN_CON0).
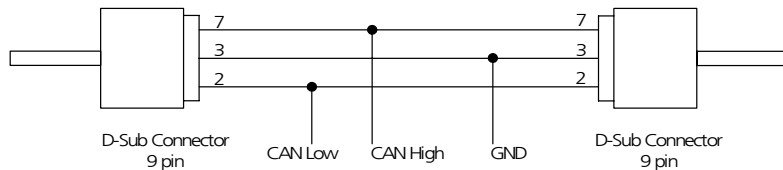
Fig. 2-8   Test Setup for ES580 CAN Low Speed Cable (CAN_Low)

2.3 ES580 LIN Cable

The LIN cable is compatible with LIN Standard and is specified for transmission rates up to 20 kBaud. LIN Bus (Local Interconnect Network) communicates via a Single-Wire Bus and operates with a Master-Slave concept. The LIN Bus specification permits a clock accuracy of the clock generator from Slave nodes of 15%. This is achievable by a simple RC clock generator.

2.3.1 LIN Principle of Communication

- LIN-Master generates the Message-Header. The correspondent LIN-Slave node transfers the Message-Response behind the Message-Header via the bus.
- Message-Header consists of Sync-Break, Sync-Field and ID-Field.
- Message-Response consists of 0 to 7 Data bytes and a Checksum Field.
- The Bytes of a Message are transferred with the UART typical Protocol (1 Startbit, 8 Databits, 1 Stopbit).

2.3.2 Voltage Level on the LIN Bus

Fig. 2-9 on page 25 shows the voltage levels on the LIN Bus. V_Bat is the supply voltage of the LIN Master node. By using filters resp. dynamic voltage fluctuation of the supply voltage (Master node), the recessive level of the LIN bus might vary (V_Sup).
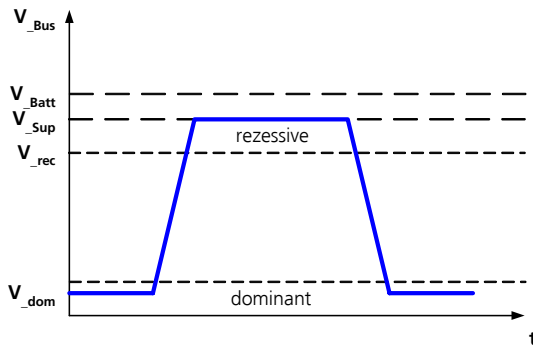
Fig. 2-9   Voltage Level on the LIN Bus

2.3.3 Power Supply

The LIN cable comes with a galvanic isolation to the ES580. A DC/DC converter provides the power supply of the LIN transceiver.
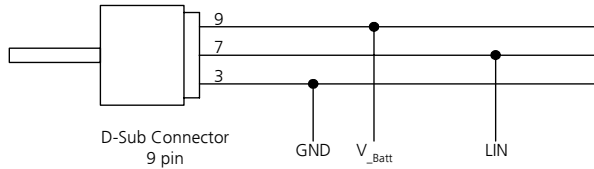
Fig. 2-10   Test Setup for LIN Cable

Since the recessive level depends on the supply voltage of the master node, it is recommended you power the LIN cable externally with the supply voltage of the master. Then you can prevent transient current between the nodes.

To take measurements at a supply voltage below 10 V, you must disable the internal power supply by connecting pins 3 (GND) and 4 at the D-Sub connector.

2.4 PCMCIA Protector

The PCMCIA Protector was developed to protect sensitive connections between transceiver cables and the ES580 and to protect the PCMCIA connector of the laptop/PC from mechanical damage.
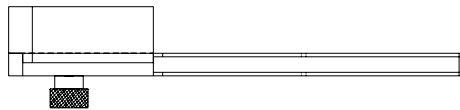
Fig. 2-11   PCMCIA Protector

2.4.1 Features

Important features of the PCMCIA Protector are:

- Use in devices with PCMCIA and Express Card slot possible
- The second PCMCIA/Express Card slot is used for the PCMCIA Protector
- Two external guide rails, adapted to the PCMCIA slot

- Faster and simpler use without have to make changes to the PCMCIA card or the laptop/PC

- No tools are necessary

- No mounting elements are required on the laptop/PC or the ES580

- Adaptation to the position of the PCMCIA slot possible by turning over the base plate of the PCMCIA Protector

2.4.2   Assembling Transceiver Cables

To remove the PCMCIA Protector
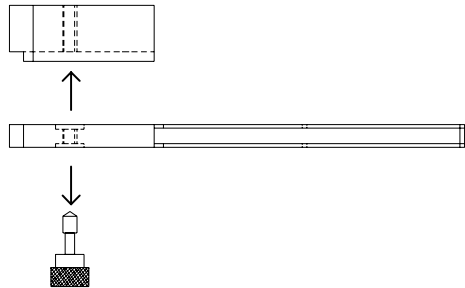
- Loosen and remove the connecting screw of the PCMCIA Protector.

- Remove the cover of the PCMCIA Protector.

To assemble the transceiver cables on the PCMCIA Protector

- Connect the transceiver cables to the ES580.

- Turn the cover of the PCMCIA Protector over
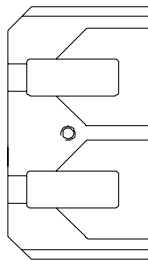
- Insert the plugs of the transceiver cables into the appropriate holes of the PCMCIA Protector cover.
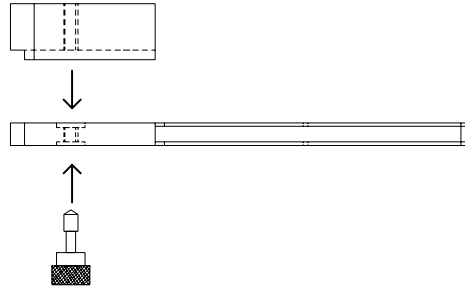
- Place the base plate on the PCMCIA Protector cover.

- Connect the two parts of the PCMCIA Protector with the connecting screw.

  ES580, transceiver cables are a protected mechanical unit.

- Connect this unit with the PCMCIA interface of your laptop/PC.

2.4.3   Adapting the PCMCIA Protector to Correspond to the Position of the PCMCIA Slot

You can adapt the PCMCIA Protector to the mechanical features of the PCMCIA slot of your laptop/PC by removing the base plate of the PCMCIA Protector and then assembling it the other way round.

To adapt the PCMCIA Protector to correspond to the position of the PCMCIA slot
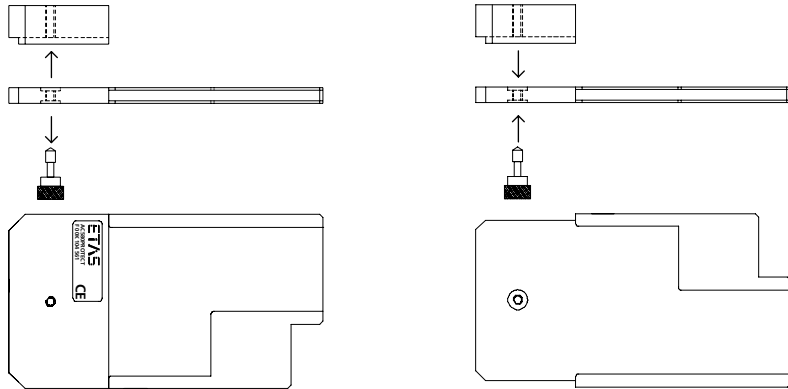
- Loosen and remove the connecting screw of the PCMCIA Protector.
- Remove the cover of the PCMCIA Protector.
- Turn the base plate of the PCMCIA Protector over.
- Connect both parts with the connecting screw.

3 ES580 Driver Installation

3.1 Preparation

3.1.1 Card Insertion and Removal

Insert the ES580 card into a PCMCIA slot (type II or type III) with the PC connector side first. The card side labeled "ES580" is the top and the side labeled with the bar code the bottom.

Push the ES580 card into the slot until it clicks into place.

> **CAUTION!**
>
> **Possibilty of damage the PCMCIA card or the PCMCIA socket.**
> *Make sure that you carefully align the ES580 card in the PCMCIA socket.*
> *Never remove the ES580 card by pulling on the ES580 cables.*

Plug & Play

ES580 can be installed on Plug & Play compatible operating systems (Windows 2000/ XP). You can remove and re-insert your ES580 whenever you like.

Power On / Off

You don't have to switch the power off before inserting or removing the card .

3.1.2 Different CAN Bus Interface Cards on one Computer

If you have different ETAS CAN Bus Interface cards (CAN-Link, CAN-Link II, ES580) on one computer under one operating system, you must note the following:

- Do not install drivers of version 2.x together with drivers of versions 3.x or 4.x!
- The driver with the lower version number should always installaed first.
- The ETAS CAN-Link II can be used with ES580 drivers; for the ES580 you must use a driver version 5.1 (or higher).

3.1.3 CAN Hardware Configuration Tool

The ES580 card can be configured with the CAN Hardware Configuration Tool (refer to chapter 4 on page 51). This tool also provides information about ES580, its channels and other ETAS hardware as well as the virtual CAN bus.

3.1.4   Important Hints

Note

Always make sure that I/O connectors are firmly clicked into place.

Note

Both tabs on the I/O connector must be pressed firmly when removing a ES580 CAN cable.

3.2 Installation under Windows 2000

This chapter provides tips and information for your first installation of the driver as well as for updating drivers already installed for Windows 2000. All files required can be found on the installation CD.

> **Note**
>
> *We strongly recommend that you use Windows 2000 with Service Pack 4 or later.*

3.2.1 First Installation of the Driver

You must carry out this procedure when using ES580 for the first time on any computer.

To install the ES580 driver first time

- Insert ES580 in an available PCMCIA socket.

  Windows 2000 will automatically start the wizard for installing the device driver.

- Follow the instructions displayed by Windows.

- Select **Search for a suitable driver for my device (recommended)**.

Found New Hardware Wizard

Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.

This wizard will complete the installation for this device:

ETAS ES580

A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.

What do you want the wizard to do?

⦿ Search for a suitable driver for my device (recommended)

○ Display a list of the known drivers for this device so that I can choose a specific driver

[< Back] [Next >] [Cancel]

- Activate **Specify a location** to give the Windows installation wizard a search location.

  The driver is located in the directory `CD:\Drivers\Windows_2000_XP` on the installation CD.
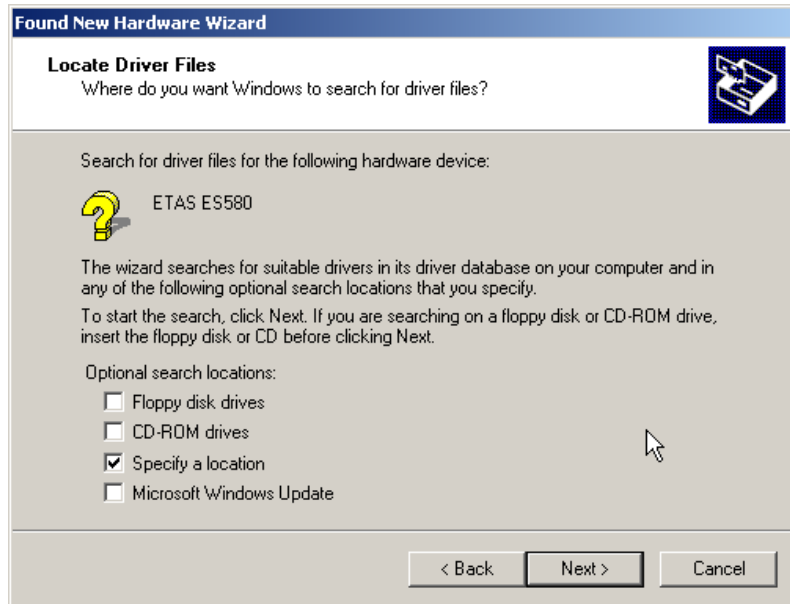
- Follow the instructions of the **Windows Installation Wizard**.
- Reboot your computer.
- Check whether the installation was successful referring to section 3.2.3 on page 38 for more details.

3.2.2 Updating an Existing Installation

A driver must be updated if an older version of the ES580 driver has already been installed on the computer. The latest ES580 driver is included in the ETAS Hardware Service Pack (HSP) available for download on the ETAS homepage (refer to chapter 10 on page 75).

Once the driver has been installed successfully, the CAN Hardware Configuration Tool can be used (refer to chapter 4 on page 51 for details).

To check the ES580 driver version currently used

- Insert the ES580 in an unused PCMCIA socket.

- Select **Start → Settings → Control Panel**.

  The **Control Panel** window opens.
- Select the **CAN-Hardware** program entry.

  The **CAN Hardware Config** window opens.
- Select **ES580**.

  Details on the ES580 driver version are displayed.

To update an existing ES580 driver installation

- Insert the ES580 in an unused PCMCIA socket.
- Select **Start → Settings → Control Panel**.

  The **Control Panel** window opens.
- Select the **System** entry.

  The **System Properties** window opens.
- Select the **Hardware** tab.
- Click the **Device Manager** tab.

  The **Device Manager** window opens.
- Select **CAN Hardware → ETAS ES580 → Properties**.
- Click the **Driver** tab.
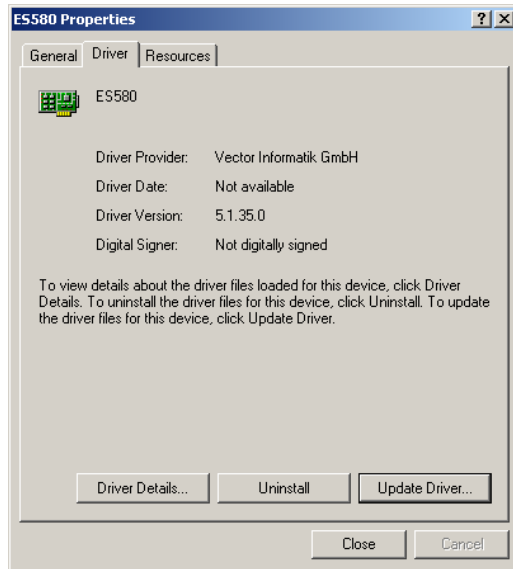
- Click the **Update Driver …** button.

  Windows 2000 will start the wizard for updating the device driver. Follow the instructions displayed by Windows.

- Select **Display a list of the known drivers for this device so that I can choose a specific driver**.

- Then mark the **ES580** entry.

- Click the **Have Disk …** button.

- Specify the location of the device driver.

- The driver is located

  – on the installation CD in the directory:
    `CD:\Drivers\Windows_2000_XP`

  or

  – in the HSP ES580 Service Pack.

- Select **Firma ETAS** and **ES580** and click the **Next** button.

- Follow the Windows Wizard instructions.

ES580 Driver Installation   **37**

- Reboot the computer.

3.2.3   Checking the Driver Installation

To verify the ES580 driver installation

- Insert the ES580 in an unused PCMCIA socket.
- Select **Start → Settings → Control Panel**.
  The **Control Panel** window opens.
- Select the **System** entry.
- The **System Properties** window opens.
- Select the **Hardware** tab.
- Click the **Device Manager** tab.
  The **Device Manager** window opens.
- Select **CAN Hardware.**

- Check whether the **ES580** device has been entered as a subgroup of the entry **CAN Hardware**.

- Double-click on the **ES580** entry.
- Click the **General** tab.

  Once the driver has been installed successfully the device status **This device is working properly** is displayed.

More detailed comments and tips about devices causing conflicts can be found in chapter 6 on page 59.

You can now carry out a function test for the hardware as described in chapter 5 on page 55.

3.3 Installation under Windows XP

This chapter provides tips and information for your first installation of the driver as well as for updating drivers already installed for Windows XP. All files required can be found on the installation CD.

> **Note**
>
> *Depending on the chosen view, the Windows XP Device Manager can be started as follows:*

To start the Device Manager in the Category View

- Select **Start → Settings → Control Panel → Performance and Maintenance → System → Hardware → Device Manager** to start the Windows Device Manager.

To start the Device Manager in the Classic View

- Select **Start → Settings → Control Panel → System → Hardware → Device Manager** to start the Windows Device Manager.

3.3.1 First Installation of the Driver

You must carry out this procedure when using ES580 for the first time on any computer.

To install the ES580 driver first time

- Insert ES580 in an available PCMCIA socket.

  Windows XP will automatically start the wizard for installing the device driver.

- Select **Install from a list or specific location (Advanced)**.
- Follow the Windows installation wizard instructions.
- Activate **Include this location in the search** to give the Windows installation wizard a search location.

  The driver is located in the directory `CD:\Drivers\Windows_2000_XP` on the installation CD.

Found New Hardware Wizard

Please choose your search and installation options.

○ Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☑ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

C:\ETAS\HSP3.2\ServicePacks\ES580 (CAN-LINK) ▼   [Browse]

○ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

[< Back] [Next >] [Cancel]

The assistant for installing the device driver will finish its work with a special confirmation message.

- Reboot the computer.
- Check whether the installation was successful referring to section 3.3.3 on page 47 for more details.

3.3.2 Updating an Existing Installation

A driver must be updated if an older version of the ES580 driver has already been installed on the computer. The latest ES580 driver is included in the ETAS Hardware Service Pack (HSP) available for download on the ETAS homepage (refer to chapter 10 on page 75).

Once the driver has been installed successfully, the CAN Hardware Configuration Tool can be used (refer to chapter 4 on page 51 for details).

To check the ES580 driver version currently used

- Insert the ES580 in an unused PCMCIA socket.
- Select **Start** → **Settings** → **Control Panel**.
  The **Control Panel** window opens.
- Select the **CAN-Hardware** program entry.
  The **CAN Hardware Config** window opens.
- Select **ES580**.
  Details on the ES580 driver version are displayed.

To update an existing ES580 driver installation

- Insert the ES580 in an unused PCMCIA socket.
- Select **Start → Settings → Control Panel → System → Hardware → Device Manager** to start the Windows Device Manager.
- Select **CAN Hardware → ES580 → Properties**.
- The ES580 Properties window opens.
- Click the **Driver** tab.
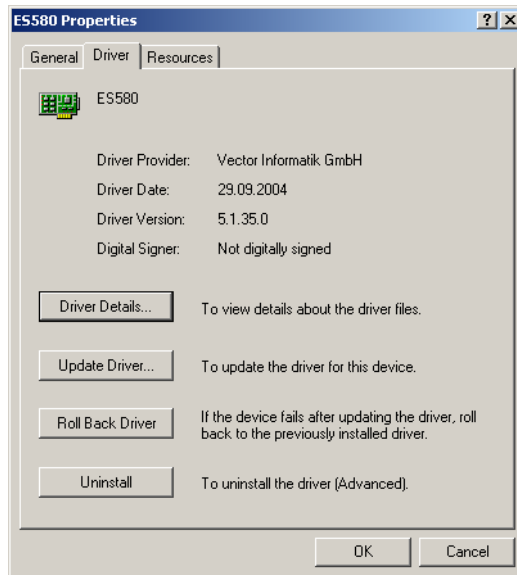
- Select **Update Driver …**.

  Windows XP will start the wizard for updating the device driver.

- Select **Install from a list or specific location (Advanced)** and follow the wizard instructions.

- Specify the location of the device driver.

  The driver is located

  – on the installation CD in the directory:
    `CD:\Drivers\Windows_2000_XP`

or

  – in the HSP ES580 Service Pack.
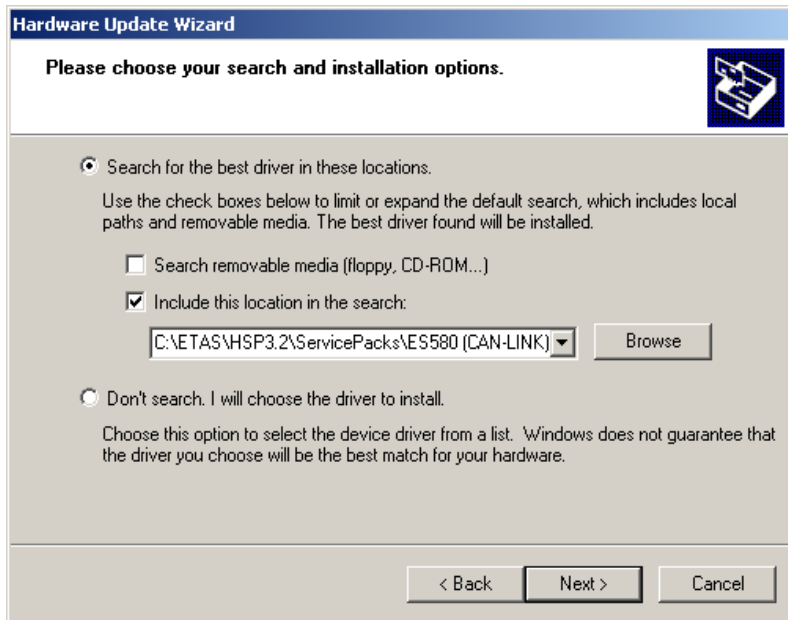
The assistant for the hardware update will finish its work with a special confirmation message.

• Reboot the computer.

3.3.3 Checking the Driver Installation

To verify the ES580 driver installation

• Insert the ES580 in an unused PCMCIA socket.
• Start the **Device Manager**.

The **Device Manager** window opens.

• Select **CAN Hardware.**
• Check whether the **ES580** device has been entered as a subgroup of the entry **CAN Hardware**.
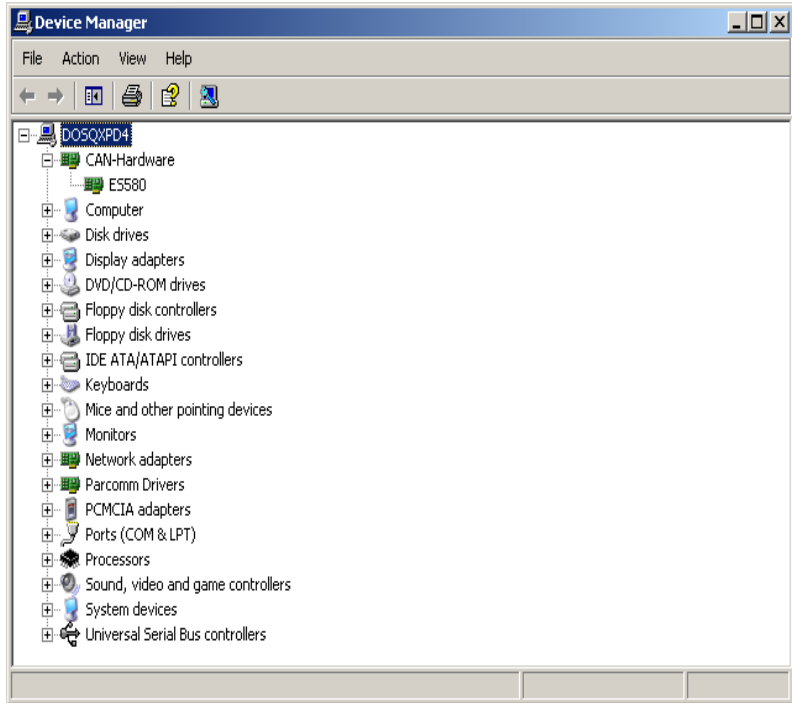
- Double-click on the **ES580** entry.
- Click the **General** tab.

  Once the driver has been installed successfully, the device status **This device is working properly** is displayed.
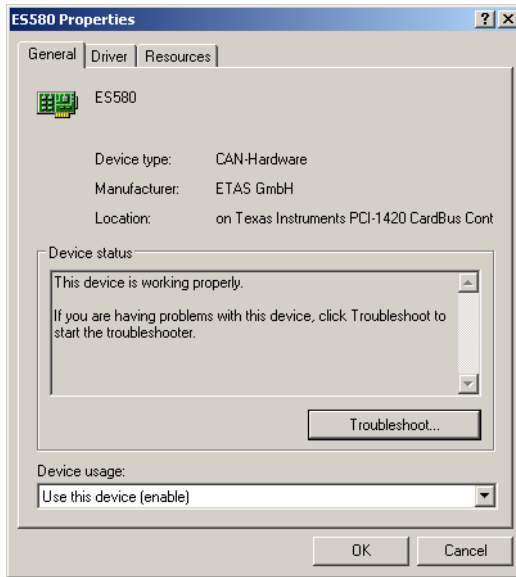
More detailed comments and tips about devices causing conflicts can be found in chapter 6 on page 59.

You can now carry out a function test for the hardware as described in chapter 5 on page 55.

4   CAN Hardware Configuration Tool

4.1   Starting the CAN Hardware Configuration Tool

4.1.1   Starting under Windows 2000

To start the CAN Hardware Configuration Tool

- After installing the driver successfully, select **Start → Settings → Control Panel**.
- Click the **CAN Hardware** icon.

  The CAN Hardware Configuration Tool will be started.

4.1.2   Starting under Windows XP

> **Note**
>
> *Depending on the chosen view in Windows XP, the CAN Hardware Configuration Tool can be started as follows:*

To start the CAN Hardware Configuration Tool in the Category View

- After installing the driver successfully, select **Start → Settings → Control Panel**.
- Click the **CAN Hardware** icon.

  The CAN Hardware Configuration Tool will be started.

To start the CAN Hardware Configuration Tool in the Classic View

- After installing the driver successfully, select **Start → Settings → Control Panel**.
- Select the issue **Other Control Panel Options**.
- Click the **CAN Hardware** icon.

  The CAN Hardware Configuration Tool will be started.

4.2   Components of the CAN Hardware Configuration Tool

Hardware

The Hardware section shows all installed PCMCIA CAN bus interface cards and the application assignment in a tree like view. The tree view shows the adapters on the lowest level. Above you will find the CAN channels of the particular hardware. The application assignments are then visible.

Application

The Application section shows all available applications with configured channels. You can click on an application to see all its channels.

*General information*

The General information section contains overall settings of ETAS devices and applications.

License

The License section contains information about all currently available licenses. You can check for which tools and applications your hardware is licensed.

Note

You can find a detailed description of the CAN Hardware components in the Online Help under Help → Contents.
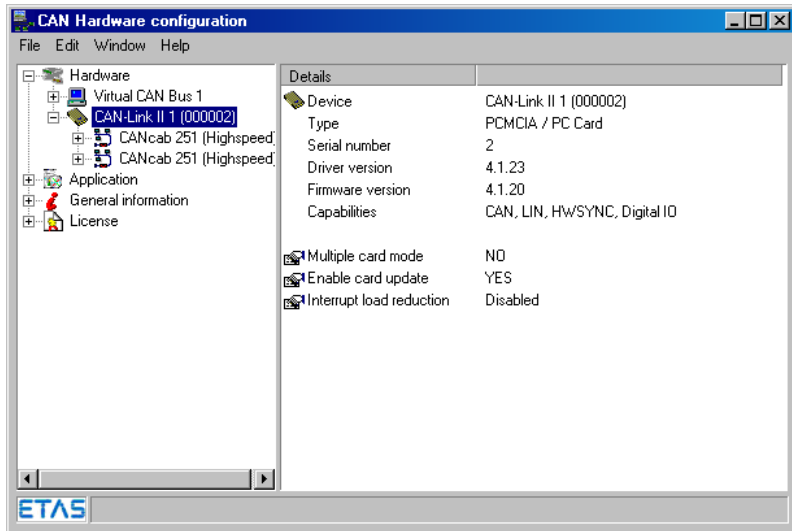
5   Checking the Operation of the Hardware

This chapter explains how to check the correct operation of the driver and hardware. This test is identical for Windows 98, Windows NT 4.0, Windows 2000 and Windows XP and is application-independent. Verification of hardware operation may also be performed through the application.

With this test you can check whether:

- the ES580 driver has been installed and is running correctly
- the ES580 card functions correctly on both channels
- the ES580 CAN Cables are functioning as they should

Testing the Hardware and the Driver

This test requires:

- an installed ES580 card
- two high speed CAN cables (e.g. CAN_High cable) with identical transceivers and
- one CAN Loop Back Cable 1 (CAN_CON1).

To test the hardware and the ES580 drivers

- Connect the ES580 CAN Cables to the ES580 slots labeled 1 and 2.
- Use the CAN_CON1 Cable to connect the CAN cables to each other.
- Start `LOOP3.EXE`.

  The program is located on the installation CD in the directory: CD:\Utilities.

  Normally the default settings displayed after program start can be used.
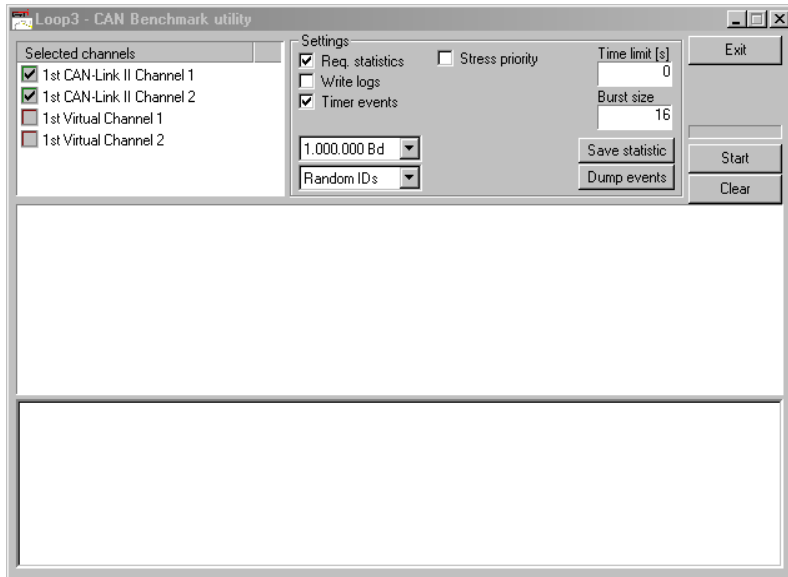
- Start the test by clicking the **Start** button.
- After some seconds stop the test by clicking the same button now indicating "Stop".
- After a successful test an OK message appears as shown below:

Loop3 - CAN Benchmark utility

Selected channels
☑ 1st CAN-Link II Channel 1
☑ 1st CAN-Link II Channel 2
☐ 1st Virtual Channel 1
☐ 1st Virtual Channel 2

Settings
☑ Req. statistics   ☐ Stress priority
☐ Write logs
☑ Timer events

Time limit [s]
0

Burst size
16

1.000.000 Bd
Random IDs

Exit
Save statistic
Dump events
Start
Clear

FwVersion=04020028, HwVersion=00000000, SerialNumber=499
FwVersion=04020028, HwVersion=00000000, SerialNumber=499

Setting timer rate to 1
Started at Tue Nov 11 09:27:52 2003

Time synchronization disabled.
Test finished with result:
                xxxxxxxxxxxxxxxxxxx
                          O K
                xxxxxxxxxxxxxxxxxxx

0:00:05.404 ClkDiff=-1.222ms Tim=3682 Stats=24/24 Msg=35634/74953 I/O=9645/20297msg/s
00 Delay[ns]: AvRcv=292798 Av=1173, Min=0, Max=10000, Global [Av=1070, Min=0, Max=10000, Last=0]
01 Delay[ns]: AvRcv=314796 Av=1150, Min=0, Max=10000, Global [Av=1261, Min=0, Max=10000, Last=0]
Total global delays[ns]: Average=1165, Min=0, Max=10000, Average ClkDiff=-1848.15us, BusLoad=97.25%

- Press <EXIT> to exit the program.

Reasons why the test was not successful and information on how to remedy the problem can be found in chapter 6 on page 59.

6 Troubleshooting

The "Troubleshooting" chapter contains suggestions on how to rectify any faults the ES580 may have.

6.1 Verifying the Correct Installation of the Device Drivers for the PCMCIA Socket

Starting in Windows 2000

- Select **Star**t → **Settings** → **Control Panel** → **System** → **Hardware** → **Device Manager**.

  The Windows Device Manager opens.

- Double-click the **PCMCIA adapter** icon in the Device Manager (referred to below as PCMCIA adapter).

Starting in Windows XP

- Select **Start** → **Control Panel** → **Performance and Maintenance** → **System** → **Hardware** → **Device Manager** in Windows XP Category View

  or

- select **Start** → **Control Panel** → **System** → **Hardware** → **Device Manager** in Windows XP Classic View.

  The Windows Device Manager is started.

- Double-click the **PCMCIA adapter** icon in the Device Manager (referred to below as PCMCIA adapter).

Verification steps

- Check whether the PCMCIA socket device is listed as a subgroup of the Computer device.

- If the device is not listed, start the hardware assistant for installing this device.

- Start the hardware assistant from the control panel (**Start → Settings → Control panel → System/Hardware**).

  You can find a device for the configuration of your PCMCIA chip as a subgroup of `PCMCIA socket`.
  (Possible name of the device: `PCIC-` or compatible `PCMCIA Controller`; **not** ES580).

- Verify that this device is ready for operation.

  A device is ready for operation if it is not marked with a red check mark or an exclamation mark on a yellow background.

6.2 Verifying the Correct Installation of the ES580 Device Drivers

The ES580 must be plugged into a PCMCIA socket to execute these verification steps:

Starting in Windows 2000

- Select **Star**t → **Settings → Control Panel → System → Hardware → Device Manager**.

  The Windows Device Manager opens.

- Double-click the **PCMCIA adapter** icon in the Device Manager (referred to below as PCMCIA adapter).

Starting in Windows XP

- Select **Start → Control Panel → Performance and Maintenance → System → Hardware → Device Manager** in Windows XP Category View

or

- select **Start → Control Panel → System → Hardware → Device Manager** in Windows XP Classic View.

  The Windows Device Manager is started.

To check whether the installation is correct

- Check whether the ES580 device is registered as a subgroup of the PCMCIA adapter, alternatively as a subgroup of the CAN Hardware (Windows 2000/XP).

  If this device is not registered, either the device driver has not been installed correctly or has not been installed at all.

- Open the **Other components** item (marked by a yellow **?**) in the Device Manager.

  If you find the entry ETAS GmbH-ES580 PCM-CIA-Interface, the driver has not been installed correctly.

- Correct the driver installation as described in section 6.3 on page 62.

If you do not find the entries mentioned above, the device driver for the ES580 has not yet been installed. Make sure that the device driver for the PCMCIA adapter is installed properly (see the previous paragraph), then repeat the driver installation as described in the corresponding section (see 3.2.1 on page 33 and 3.3.1 on page 41).

To check the availability of an interrupt

- Verify that the Device ES580 is listed in the Device Manager *without* an exclamation mark.

- If it is listed with an exclamation mark, check the ES580 resource settings.

- If the ES580 is not assigned any resources, it is most likely that no interrupt is available.

- In this case deactivate all unnecessary devices (e.g. sound card) or manually change the interrupt assignments of other devices.

  Some devices allow sharing of an interrupt with other devices.

To check the ES580 device check mark

- Check whether the ES580 device is listed in the Device Manager *without* a check mark.

- If the device ES580 is listed with a check mark, please activate it in the Device Manager.

6.3 Correcting an Unsuccessful Installation of the ES580 Device Driver

The driver has not been installed correctly if you find the entry ES580 PCMCIA-Interface in the Device Manager under the **Other components** entry (marked by a yellow **?**).

In this case you have to update the driver.

To update the driver

- Open the Device Manager.
- Double-click the line **Other components** to open it.
- Highlight the entry **ES580 PCMCIA Interface** and click **Properties**.
- Select the Driver tab and click **Driver update …**.
- Follow the Windows instructions using the corresponding driver provided on the installation CD.

7 Technical Data

7.1 ES580 CAN and LIN Bus PCMCIA Card

7.1.1 Minimum System Requirements

Hardware requirement	IBM-compatible PC; PC card slot type II or type III
PC interface	PCMCIA type II - 16 bit
Software requirement	Windows 2000/ Windows XP
Configuration	Plug & Play (does not apply to Windows NT)

7.1.2 CAN Interface

CAN channels	2 (V2.0B extended format)
CAN transceiver	Integrated in the CAN Cables
CAN controller	Phillips SJA 1000
Number of CAN controllers	2
Microcontroller	ATMEL AT91 (ARM7 TDMI at 64 MHz)
Baud rate	1 Mbit/s max.
Identifier length	11/ 29
Time resolution	1 µs
Error frame detection	Yes
Error frame generation	Yes
Remote frame detection	Yes
Remote frame generation	Yes

7.1.3 LIN Interface

LIN channels	2
LIN transceiver	Integrated in the LIN Cables
Baud rate	20 kbit/s

7.1.4 Current Consumption

Current consumption	150 mA

7.1.5 Mechanical Data

Dimensions (H x W x D)	Approx. 85 mm x 54 mm x 5 mm
Weight	Approx. 34 g

7.1.6 Environmental Conditions

Operation temperature	0 °C ... +55 °C
Storage temperature	-40 °C ... +125 °C
Relative humidity	15 % ... 95 %, non-condensing

7.2 ES580 CAN Cables

7.2.1 General Technical Data

Transceiver case dimensions	100 x 16 x 16 mm (4.0 x 0.6 x 0.6 in.)
Case	Plastic ABS
Weight	Approx. 100 g (3.5 oz)
Cable length	Approx. 30 cm (1 ft.) on both ends
Connection PC-side	15-pin plug to the ES580
Connection bus-side	9-pin D-Sub plug (DIN 41652)

7.2.2 ES580 CAN High Speed Cable (CAN_High)

Power supply	By ETAS ES580
Current consumption (typically)	Approx. 30 mA
Transceiver	Philips 82C251
Maximum baud rate	1 Mbit/s

7.2.3 ES580 CAN High Speed opto Cable (CAN_High_o)

Power supply	By ETAS ES580
Current consumption (typically)	Approx. 30 mA
Transceiver	Philips 82C251
Maximum baud rate	1 Mbit/s
Opto coupler	HP 7101 or compatible (typical delay time approx. 30 ns)
Isolation voltage	50 V (low voltage directive)

7.2.4 ES580 CAN Low Speed Cable (CAN_Low)

Power supply	By ETAS ES580
Current consumption (typically)	Approx. 20 mA
Transceiver	Philips TJA1054
Maximum baud rate	125 kbit/s
Minimum baud rate	40 kbit/s

7.3 ES580 LIN Cable

Power supply	By ETAS ES580 or extern (6 V … 18 V DC)
Current consumption (typically)	Approx. 20 mA
Transceiver	Infineon TLE7259
Maximum baud rate	20 kbit/s
Opto coupler	HCPL-0720
Bus termination	Master mode: 1 kOhm
	Slave mode: 30 kOhm

7.4   Standards

This product conforms to the following standards:

- EN 55022
- EN 61000-4-2
- EN 61000-4-3
- EN 61000-4-4
- EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-8

8 Cables and Accessories

8.1 ES580 CAN Cables

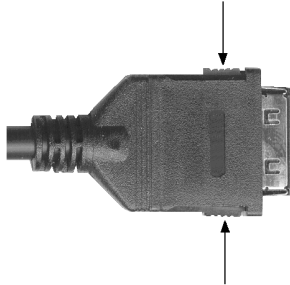### 8.1.1 ES580 CAN Cable I/O-Connector

Fig. 8-1   I/0 Connector on a ES580 CAN Cable (the Tabs are Marked with Arrows)

Note

Push firmly to insert the connector into ES580. To remove the connector, push both tabs (see Fig. 8-1 on page 67) as deep as possible and pull out the connector.

8.1.2 ES580 CAN Cable D-Sub Connector

Fig. 8-2   ES580 CAN Cable D-Sub Connector

The CAN bus is connected to the ES580 CAN Cable by the 9-pin D-Sub connector (see Fig. 8-2).

8.1.3 Pin Assignments ES580 CAN Cables (D-Sub Terminal)

Pin D-Sub	High Speed Cable	High Speed Opto Cable	Low Speed Cable
1	-	-	-
2	CAN Low	CAN Low	CAN Low
3	GND	V_{GND}	GND
4	Reserved	Not connected	Reserved
5	Shield	Shield	Shield
6	-	-	-
7	CAN High	CAN High	CAN High
8	-	-	-
9	Not connected	Not connected	Not connected

Shield: shield

GND: Ground

Reserved: reserved lines, may not be connected to any cable

V_{GND}: galvanically isolated ground

8.1.4 CAN Termination Plug CBCX131.1-0 (120 Ohm, SUB-D)

Cable SubD - SubD (9fc-9mc, 0 m), 120 Ohm Resistor
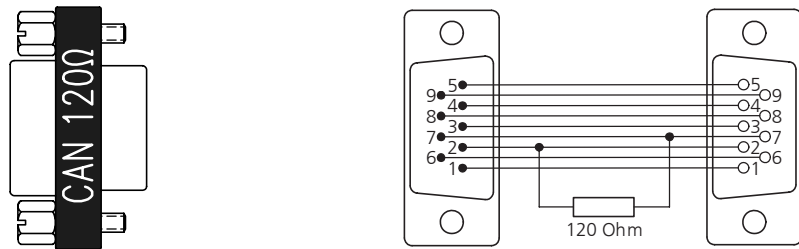
Fig. 8-3   CAN Termination Plug CBCX131.1-0 (120 Ohm, SUB-D)

8.2 CAN Loop Back Cables

Cable length	Approx. 30 cm (1 ft.)
Connection A	9-pin D-Sub socket connector to the first CAN Cable
Connection B	9-pin D-Sub socket connector to the second CAN Cable

8.2.1 CAN_CON0

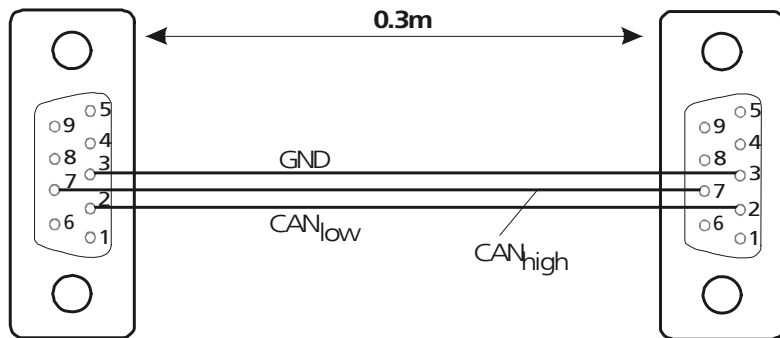CAN_CON0 is a CAN Loop Back Cable without terminating resistors.

Fig. 8-4 Cable CAN_CON0

8.2.2 CAN_CON1

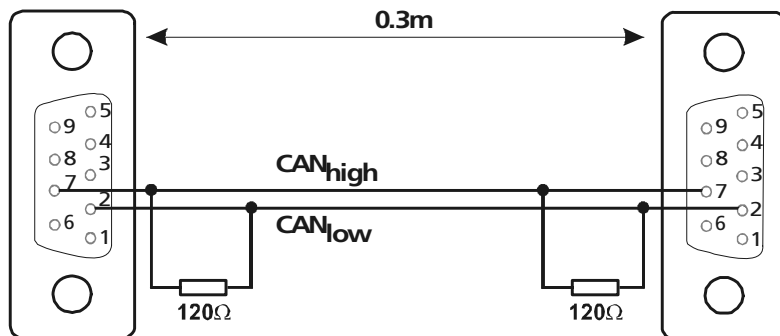CAN_CON1 is a CAN Loop Back Cable with two parallel 120 Ohm terminating resistors between pin 2 and 7.

Fig. 8-5 Cable CAN_CON1

8.3   ES580 LIN Cables

8.3.1   ES580 LIN Cable I/O-Connector
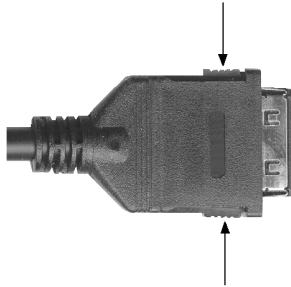
Fig. 8-6   I/0 Connector on a ES580 LIN Cable (the Tabs are Marked with Arrows)

Note

Push firmly to insert the connector into ES580. To remove the connector, push both tabs (see Fig. 8-1 on page 67) as deep as possible and pull out the connector.

8.3.2   ES580 LIN Cable D-Sub Connector

Fig. 8-7   ES580 LIN Cable D-Sub Connector

The LIN bus is connected to the ES580 LIN Cable by the 9-pin D-Sub connector (see Fig. 8-2).

Assignments for ES580 LIN Cable (D-Sub Terminal)

Pin D-Sub	High Speed
1	-
2	N.C:
3	VGND
4	Pdis
5	Shield
6	-
7	LIN
8	-
9	VB+ optional 11 ...18 V

Shield: shield

GND: Ground

Reserved: reserved lines, may not be connected to any cable

V_{GND}: galvanically isolated ground

Pdis: If this pin of the LINcab is connected to GND (pin 3), the internal voltage supply is switched off.
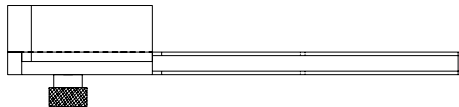
8.4 PCMCIA Protector

Fig. 8-8   PCMCIA Protector

9   Ordering Information

9.1   ES580 CAN and LIN Bus PCMCIA Card

Order Name	Short Name	Order Number
ES580 CAN and LIN Bus PCMCIA Card, CD-ROM with Drivers, User's Guides (German and English) ETAS Customer Letter	ES580	F-00K-103-468

Note

Cables are not included in the ES580 delivery.

9.2   Accessories

9.2.1   ES580 Cables

Order Name	Short Name	Order Number
CAN High Speed Cable, Transceiver type 251, PCMCIA - SubD (15mc - 9mc), 0m7	CAN_High	F-00K-001-768
CAN High Speed Cable, Optoisolated, Transceiver type 251, PCMCIA - SubD (15mc - 9mc), 0m7	CAN_High_o	F-00K-103-130
CAN Low Speed Cable, Transceiver type TJA1054, PCMCIA - SubD (15mc - 9mc), 0m7	CAN_Low	F-00K-001-770
CAN loop back cable without terminating resistors, SubD - SubD (9fc - 9fc), 0m3	CAN_CON0	F-00K-001-764
CAN loop back cable with two 120 Ohm terminating resistors, SubD - SubD (9fc - 9fc), 0m3	CAN_CON1	F-00K-001-765

9.2.2 CAN Termination Plug

Order Name	Short Name	Order Number
CAN Cable SubD - SubD (9fc-9mc, 0 m), 120 Ohm Resistor	CBCX131-0	F-00K-103-786

9.3 LIN Cable

Order Name	Short Name	Order Number
LIN Interface Cable, Magnetoisolated, Transceiver type 7259, PCMCIA - SubD (15mc - 9mc), 0m7	LIN_m	F-00K-105-525

9.4 PCMCIA Protector V2

Order Name	Short Name	Order Number
PCMCIA Protector V2	AC580PROTECT	F-00K-104-561

10 ETAS Contact Addresses

ETAS HQ

ETAS GmbH

Borsigstraße 14	Phone:	+49 711 89661-0
70469 Stuttgart	Fax:	+49 711 89661-105
Germany	E-mail:	sales@etas.de
	WWW:	www.etasgroup.com

North America

ETAS Inc.

3021 Miller Road	Phone:	+1 888 ETAS INC
Ann Arbor, MI 48103	Fax:	+1 734 997-9449
USA	E-mail:	sales@etas.us
	WWW:	www.etasgroup.com

Japan

ETAS K.K.

Queen's Tower C-17F	Phone:	+81 45 222-0900
2-3-5, Minatomirai, Nishi-ku	Fax:	+81 45 222-0956
Yokohama 220-6217	E-mail:	sales@etas.co.jp
Japan	WWW:	www.etasgroup.com

Great Britain

ETAS Ltd.

Studio 3, Waterside Court	Phone:	+44 1283 54 65 12
Third Avenue, Centrum 100	Fax:	+44 1283 54 87 67
Burton-upon-Trent	E-mail:	sales@etas-uk.net
Staffordshire DE14 2WQ	WWW:	www.etasgroup.com
Great Britain		

France

ETAS S.A.S.

1, place des Etats-Unis	Phone:	+33 1 56 70 00 50
SILIC 307	Fax:	+33 1 56 70 00 51
94588 Rungis Cedex	E-mail:	sales@etas.fr
France	WWW:	www.etasgroup.com

Korea

ETAS Korea Co. Ltd.

4F, 705 Bldg. 70-5	Phone:	+82 2 57 47-016
Yangjae-dong, Seocho-gu	Fax:	+82 2 57 47-120
Seoul 137-889	E-mail:	sales@etas.co.kr
Korea		

China

ETAS (Shanghai) Co., Ltd.

2404 Bank of China Tower	Phone:	+86 21 5037 2220
200 Yincheng Road Central	Fax:	+86 21 5037 2221
Shanghai 200120, P.R. China	E-mail:	sales.cn@etasgroup.com
	WWW:	www.etasgroup.com

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