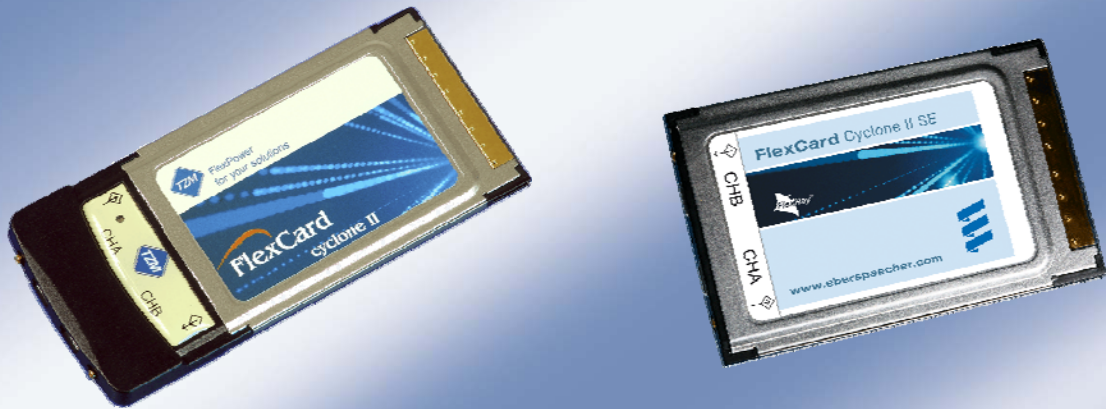# FlexCard Cyclone II
FlexCard Cyclone II SE

Instructions for Use

by Eberspächer Electronics

FlexCard Cyclone II (3-0009-0S01)

FlexCard Cyclone II SE (3-0009-0T01)

Eberspächer

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Any semiconductor devices have an inherent chance of failure. You have to protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions. The safety and handling instructions in this document have to be followed strictly.

EC CONFORMITY

The *FlexCard Cyclone II* and *FlexCard Cyclone II SE* comply with the essential requirements of the EC Directive 89/336/EEC (EMC Directive) including current amendments and carry the CE marking accordingly. The following standards have been used to assess the product:
FlexCard Cyclone II:
- DIN EN 61000-6-2 – Immunity for industrial environments
- DIN EN 61000-6-4 – Emission standard for industrial environments
FlexCard Cyclone II SE:
- EN 55022:1998 +A1:2001 +A2:2003 – Emission for information technology devices
- EN 55024:1998 + A1:2000 +A2:2003+ Corrigendum 04:2003 + Corrigendum 07:2003
  – Immunity for information technology devices

REVISION HISTORY

Version	Date	Description
D2V0-F	06-Mar-2006	First release
D2V1-F	03-Nov-2006	Chap. 1.6: Restriction changed, now 2 *FlexCards* can be used in one PC at the same time. Chap. 2.1: BOSCH CC-FPGA-version changed from beta release 1 to release 1
D2V2-F	26-April-2007	*FlexCard* Cyclone II SE support
D2V3-F	15-May-2007	Installation process changed.
D2V4-F	29-Aug-2007	LED description updated. Firmware update description extended.
D2V5-F	11-July-2008	Firmware update description changed. License update description added. Interface description for CAN bus added. New accessory parts added.
D2V6-F	29-Oct-2008	Linux system requierements added. Uninstallation chapter added.
D2V7-F	27-Feb-2009	Adapted ordering numbers and versions. Changed trouble shooting chapter and added CAN CC specification. Updates for driver version S5V1-F

RELATED HARDWARE / SOFTWARE VERSIONS

Product	Reference No.	Version	Remarks
FlexCard Cyclone II	3-0009-0S01	H1V1-F	*FlexCard Cyclone II* with trigger in- and output
FlexCard Cyclone II SE	3-0009-0T01	H1V1-F	*FlexCard Cyclone II SE* with trigger in- and output
fcBase API (Windows)	3-0009-0K03	S5V1-F	API to build your own application
FlexAlyzerV2	3-0038-0B01	S1V0-F	*FlexCard* monitoring tool. Supports FlexRay/CAN monitoring and sending data, triggers, filters and data logging.

CONTENTS

1 GENERAL

1.1 INTENDED USE

The *FlexCard Cyclone II (SE)* is a CardBus card for use in a CardBus-compatible PC-Card slot of a notebook or a desktop PC. It is a measuring instrument for the analysis of the time-triggered FlexRay protocol which can also be used to send data to other FlexRay bus members.

Only the herein described accessory parts are allowed to be used together with the *FlexCard Cyclone II (SE)*.

The *FlexCard Cyclone II (SE)* is designed, intended and authorized exclusively for

   a) EU: laboratory applications

   b) US: industrial test equipment

Any other use without the prior written consent of *Eberspächer Electronics* is prohibited.

The *FlexCard Cyclone II (SE)* is NOT designed, intended, or authorized for

   ➢ use as part of medical systems,
   ➢ life support applications,
   ➢ aviation, space, nuclear, or military applications,
   ➢ use in areas where combustible or explosive gas mixtures are likely to occur,
   ➢ other applications in which a mistake or malfunction may result in death, personal injury or severe physical damage.

The product described in this document is an industrial device, i.e. is designed, intended, or authorized for professional use. It is not designed, intended, or authorized for home applications or consumers.

1.2 USED PICTOGRAMS

The meaning of used pictograms is shortly described below.

Follow the specific instructions in the document where these pictograms are placed.

e.g.	**⚠CAUTION**
	Used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

	NOTICE
	Used to indicate a situation which may result in an operating failure. Damage of the product may occur, but there is no hazard of injury if not avoided.
	Used to indicate an electrostatic discharge sensitive product. The product is subject to damage by ESD, if no precautions are taken.

	Information
	Used to indicate information provided only for purposes of clarification, illustration, and general information.

	Reference
	References another document.

	Product marking which shows the compliance of the product with the European Waste Electrical and Electronic Equipment Directive 2002/96/EC.

1.3 SAFETY AND HANDLING INSTRUCTIONS

Please read the instructions for use carefully. To protect the device or the application against damage or to avoid personal injury the *FlexCard Cyclone II (SE)* has to be handled as described herein.

Changes or modifications of the *FlexCard Cyclone II (SE)* are not allowed for safety and warranty reasons!

Eberspächer Electronics is not liable for any damages arising from non-observance of the product information.

Follow the

  a) specific safety and handling instructions placed at dedicated document positions

  b) general safety and handling instructions below:

	⚠ **CAUTION**
⚠	To prevent damage to the *FlexCard Cyclone II (SE)*, or to prevent consequential damages, or to prevent personal injury: ➢ Do not open the *FlexCard Cyclone II (SE).* ➢ Do not connect any other signals to the interfaces as described in the chapter "Interfaces". ➢ Ensure that all signals are within the specified range. ➢ Use only adapter cables from *Eberspächer Electronics* for connecting the *FlexCard Cyclone II (SE)* to a FlexRay system. **GREY adapter cables: use only together with *FlexCard Cyclone*** **BLACK adapter cables: use only together with *FlexCard Cyclone II (SE)*** ➢ High temperatures can damage the *FlexCard Cyclone II (SE)*. Keep the *FlexCard Cyclone II (SE)* away from heaters, stoves, fireplaces, and other sources of heat. ➢ Do not expose the *FlexCard Cyclone II (SE)* to rain or use it near water. ➢ Do not use the *FlexCard Cyclone II (SE)* in areas of explosion hazard.

	NOTICE
❗	The *FlexCard Cyclone II (SE)* may not work correctly or communication problems may occur if: ➢ The *FlexCard Cyclone II (SE)* is used in existing passive networks, i.e. when changing the topology structure. ➢ The bus termination of the *FlexCard Cyclone II (SE)* is not adapted to the connected bus topology. ➢ the notebook is used in ambient temperatures higher than 25°C. ➢ The *FlexCard Cyclone II (SE)* is configured wrong.

	NOTICE
❗	By sending messages over the *FlexCard Cyclone II (SE)* to an automotive bus system it is possible to trigger actions resulting in malfunction and/or damage. The *FlexCard Cyclone II (SE*) must be used by expert technicians familiar with the corresponding systems.

	NOTICE
	ESD (Electro Static Discharge) sensitive product *Eberspächer Electronics* products lacking protective enclosures are subject to damage by ESD. Take proper ESD precautions to avoid performance degradation or loss of functionality! Unpack, handle or operate these products only in environments where sufficient precautionary measures have been taken in respect to ESD hazards. A guideline is available in chapter 9.1. Only appropriately trained personnel (such as electricians, technicians and engineers) may handle and/or operate these products.

1.4 USER GROUP

This document is written for expert technicians who are familiar with electronic components and systems.

Each person involved with assembly, line-up, operation, maintenance, or disposal of the *FlexCard Cyclone II (SE)* has to

> ➢ be a qualified technician, or electrician, or engineer
> ➢ strictly adhere to this manual
> ➢ receive a briefing by an authorized person

2 PRODUCT DESCRIPTION

2.1 *FLEXCARD CYCLONE II (SE)* AT A GLANCE

The *FlexCard Cyclone II (SE)* is a flexible and multi-use monitoring and analyzing instrument for configuration, maintenance, testing and monitoring of the time-triggered FlexRay serial bus system.

The *FlexCard Cyclone II (SE)* is able to monitor and analyze CAN bus systems, too. After aquiring a license there are 2 CAN HS bus channels available.

It is a 32 bit CardBus-Card for a CardBus-compatible PC-Card slot of a notebook or desktop PC which processes and transfers data between the bus system and the host PC or notebook.

FlexCard Cyclone II (SE) supports two FlexRay bus channels and provides a status LED, various filters and adjustable trigger functionalities.

FEATURES
➢ 32 bit CardBus card
➢ Quick access times and high data throughput
➢ 2 FlexRay channels
➢ 2 CAN High Speed channels (license required)
➢ Plug & Play

A buffer of 1MB is provided which can temporarily store incoming data to prevent data loss during temporary blocking of the bus connection on the PC side and make flexible data collection cycles possible. Transmit data will be written directly into the Communication Controller in order to ensure a maximum of performance.

Furthermore, the physical layers for the two channels are already integrated in the card. This offers the significant advantage that the relatively high number of conductors to the physical layer (bus driver and bus guardian) does not have to be led outwards and therefore the interference liability is drastically reduced.

FlexCard Cyclone II:
The physical layers are mounted in the Extension Pack, a physical extension of the card. The update-ability to new physical layer chips is not restricted as they are situated on a separate board within the *FlexCard* housing.

FlexCard Cyclone II SE:
The Physical Layers are mounted directly in the *FlexCard Cyclone II SE*.

	Reference
📖	Further information about how to program applications for the *FlexCard Cyclone II (SE)* can be found in the *FlexCard* API Documentation.

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	Information
	The currently supported FlexRay Communication Controller type on the *FlexCard Cyclone II (SE)* is:
	➤ BOSCH E-Ray FlexRay IP-Module, Release 1.0
	(Referring to the FlexRay protocol specification v2.1a)
	The currently supported CAN Communication Controller type on the *FlexCard Cyclone II (SE)* is:
	➤ BOSCH D_CAN CAN IP-Module Release 1.0
	(Referring to the CAN protocol specification v2.0 part A, B)
	Other versions are not supported up to now. Please contact *Eberspächer Electronics* if other versions need to be supported.
	The firmwares can be exchanged using the update tool FlexUpdate.exe.

Applications

> ➤ Usage with *FlexAlyzerV2* (See chapter 2.2 "Scope of Supply")

> ➤ Usage with customer specific software

> ➤ Usage with tools of *Vector Informatik*

> ➤ Further commercial applications will support *FlexCard Cyclone II (SE)* soon

Additional features compared to the successful and multi-use forerunner *FlexCard Cyclone*

> ➤ Sending and reception of FlexRay symbols and wake-up patterns

> ➤ Synchronisation of the network is immediately displayed

> ➤ The user will be directly informed of the error status (e.g. bus/syntax errors)

> ➤ Reception of "Nullframes" configurable

> ➤ Additional increase of the data throughput

> ➤ Sending confirmation of the frames possible including the payload data which is transferred

> ➤ Exact timestamp for each message

> ➤ Configurable trigger output

> ➤ Full asynchronous mode for data reception without any knowledge of cluster configuration

2.2   SCOPE OF SUPPLY

The *FlexCard Cyclone II (SE)* is delivered with

Product	Reference No.	Version	Remarks
FlexCard Cyclone II	3-0009-0S01	H1V1-F	*FlexCard Cyclone II* with trigger in- and output
FlexCard Cyclone II SE	3-0009-0T01	H1V1-F	*FlexCard Cyclone II (SE)* with trigger in- and output
FC Cable CycloneII Set	3-0034-0C01	H4V0-F	Mini-USB cable to SubD9 jack. Connects FlexRay and CAN lines.
FlexCard SYS	3-0009-0E02	S5V1-F	Required low level driver for the *FlexCard*.
FlexCard DLL	3-0009-0K01	S5V1-F	Required high level driver for the *FlexCard*.
FlexAlyzerV2	3-0038-0B01	S1V0-F	*FlexCard* monitoring tool. Supports FlexRay/CAN monitoring and sending data, triggers, filters and data logging.
Instructions for Use	3-0009-0T01-D01	D1V0-F	This document.
API Documentation	3-0009-0S01-D03	D1V11-F	API programming manual as PDF file.
Getting Started Manual	3-0009-0S01-D02	D1V4-F	Example how to build a small FlexRay/CAN-communication.
Demo	-	S1V4-F	Demo explaining the programming of the *FlexCard.*
DemoPMC	-	S1V4-F	Demo explaining the programming of the *FlexCard* with multiple FlexRay CCs.
DemoCAN	-	S1V2-F	Console application explaining the communication over CAN.
CanBaudRateCalculator	-	S1V2-F	Helps with the calculation of CAN bus parameters.
FlexUpdate	-	S1V3-F	Tool for updating firmware and licenses.
Tracer Control	-	S1V1-F	Activates debug information.

A list of available accessory parts can be found in chapter 8.2.

2.3   UPDATES

Information
Updates regarding the Windows driver and firmware are possible via web-downloads from *Eberspächer Electronics* homepage. The firmware on the *FlexCard Cyclone II (SE)* can be updated with an appropriate software tool, see chapter 4.2.

3 TECHNICAL DATA

3.1 ELECTRICAL CHARACTERISTICS

The necessary power is directly provided by the CardBus interface.

This interface has to supply 3.3V @ 700mA for the *FlexCard Cyclone II (SE)* which is the specified minimum value in the corresponding interface specification of CardBus interfaces.

Supply voltage	+ 3.3VDC		
HW Sync input voltage	min: 2V@0.5mA	typ: 3.3V@0.5mA	max: 20V@5mA
Trigger output voltage	-	typ: 5V	max: 5.5V
Trigger output current	-	-	max: 10mA
Quiescent supply current	typ: 100 mA		
Supply current in operating mode	typ: 400 mA		

Table 1: Voltage and current ranges of the *FlexCard Cyclone II (SE)*

3.2 PHYSICAL CHARACTERISTICS

The CPU of the *FlexCard Cyclone II (SE)*	Altera Cyclone II BOSCH E-Ray CC-FPGA-Version release V1.0 (Implementation according to FlexRay protocol specification version 2.1a) BOSCH D_CAN CC-FPGA-version 1.0 (implementation according to Bosch CAN protocol specification version 2.0 A, B)	
Data and Communication Interfaces	2 NXP FlexRay physical layer TJA1080 2 Texas Instruments CAN HS physical layer SN65HVD230D	
FlexRay Channels	Up to 10 MBit/s	
CAN Channels	Up to 1 MBit/s	
Dimensions approx. L x W x H	*FlexCard Cyclone II*	117 x 54 x 7 mm^3 (Extended PC-Card enclosure; Type II)
	FlexCard Cyclone II SE	86 x 54 x 5mm³

Table 2: Physical characteristics of the *FlexCard Cyclone II (SE)*

3.3 ENVIRONMENTAL CONDITIONS

Temperature	**Operating:**	0 to +60°C
	Storage:	-40 to +70°C
Relative Humidity	10% to 90% rH, non-condensing	

Table 3: Environmental conditions for the *FlexCard Cyclone II (SE)*
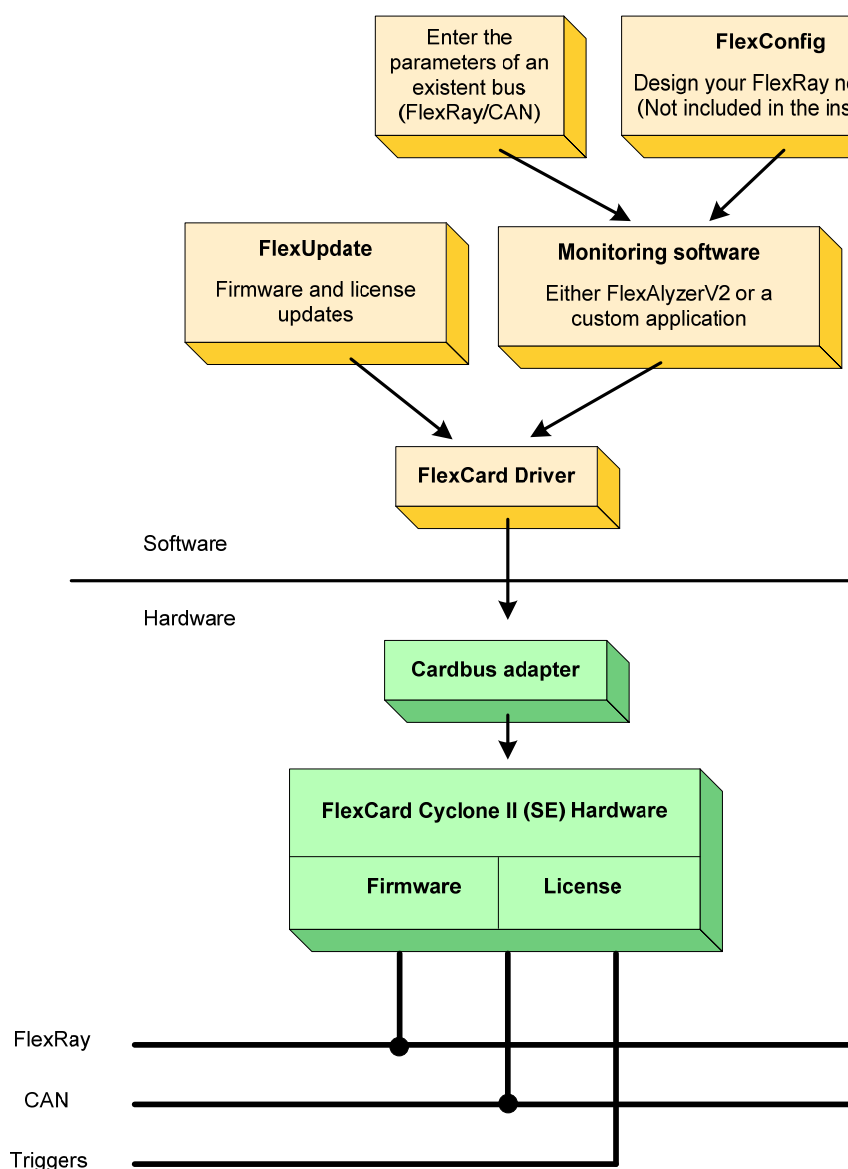
3.4 BLOCK DIAGRAM

Figure 1: The *FlexCard Cyclone II (SE)* in a functional environment

Reference
Further information about the usage of the included FlexRay/CAN monitoring tool *FlexAlyzerV2* can be found in *FlexAlyzerV2* Instructions for Use.

3.5 INTERFACES AND CONNECTORS

Read and follow these instructions when connecting and using the *FlexCard Cyclone II (SE)*:

NOTICE
➢ Ensure that all signal lines connected to the *FlexCard Cyclone II (SE)* are in the allowed range.
➢ Be sure to connect all cables as described in this manual.
➢ It is recommended to only use cables from *Eberspächer Electronics.* See Chapter 8.2 "Accessory Parts".
➢ Ensure to grasp the plug and not the cable when disconnecting the *FlexCard Cyclone II (SE).*

3.5.1 CARDBUS

The *FlexCard Cyclone II (SE)* is designed according to PCI local bus specification, Rev. 3.0, and PC Card Standard Release 7.0.

3.5.2 FLEXRAY

The physical layer for the FlexRay bus is realized with integrated FlexRay physical layer TJA1080 from NXP.

Maximum voltage input on FlexRay BP/BM: 60V

Minimum voltage input on FlexRay BP/BM: -60V

Information
Due to the development progress of FlexRay there are different development steps of the physical layer chips used in the *FlexCard Cyclone II (SE)*. These chips are not compatible under all circumstances which may cause communication problems in some FlexRay networks. If there may be any problem with the bus-communication caused by the physical layer please contact *Eberspächer Electronics*.

3.5.3 CAN

The physical layer for the CAN bus is realized with integrated CAN HS physical layer SN65HVD230D from Texas Instruments.

Maximum voltage input on CAN high/low: 16V

Minimum voltage input on CAN high/low: -4V

3.5.4 CONNECTOR PIN ASSIGNMENT

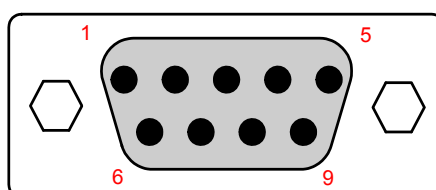| ⚠ CAUTION |
|---|
| The lines for both current physical layers are led out through "USB On-The-Go Mini-B" receptacles at the back end of the *FlexCard Cyclone II (SE)*. **Do not plug any USB device into these connectors!** The standard *FlexCard* adapter cable from *Eberspächer Electronics* included in delivery transfers these lines to a SUBD9 female connector. |

Figure 2: SUBD9 female connector (user contact side) of the *FlexCard* cable

SUBD 9 Pin number	CHA	CHB
1	Bus_low (CAN1)	Bus_low (CAN2)
2	BM_A (FlexRay)	BM_B (FlexRay)
3	Ground	Ground–
4	–	–
5	–	–
6	–	–
7	BP_A (FlexRay)	BP_B (FlexRay)
8	Bus_high (CAN1)	Bus_high (CAN2)
9	–	–

Table 4: FlexRay interface pin assignment

⚠ CAUTION
Use only the standard *FlexCard* adapter cables from *Eberspächer Electronics* included in delivery for connecting the *FlexCard Cyclone II (SE)* to a FlexRay system: **GREY adapter cables: Use only together with *FlexCard Cyclone* BLACK adapter cables: Use only together with *FlexCard Cyclone II (SE)***

Information
Eberspächer Electronics offers different cables with FlexRay or CAN lines. See chapter 8.2 Accessory parts. The purchased cables include a pin assignment documentation.

Information
To be as flexible as possible, there is no termination for the FlexRay bus on the *FlexCard Cyclone II (SE)*. If a termination is necessary, this should be done externally.

3.5.5 TRIGGER INPUT

The *FlexCard Cyclone II (SE)* has the ability to receive trigger events on the trigger input connector and forward it to the PC. This feature allows e.g. a synchronization of different bus analyzing hardware.

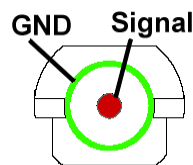The connector is a MMCX-male-connector for coax-cables.

Figure 3: Trigger input connector

The electrical characteristic of this input is described in chapter 3.1.

This input is edge-triggered. The edge to be used can be chosen via software.

To connect the trigger input to the Sync box of *Vector Informatik* the HW Sync cable can be ordered from *Eberspächer Electronics*, see chapter 8.2 Accessory parts.

3.5.6 TRIGGER OUTPUT

Beside the passive trigger input, the *FlexCard Cyclone II (SE)* also has the ability to output a trigger signal via a separate connector at the backend of the *FlexCard Cyclone II (SE)*. There are several signals which can be configured via software to be output via this interface. With the trigger output signal e.g. an oscilloscope can be triggered at each start of a FlexRay cycle.

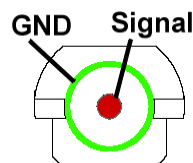The connector is a MMCX-male-connector for coax-cables.

Figure 4: Trigger output connector

The electrical characteristic of this output is described in chapter 3.1.

	Information
ℹ	To connect the trigger output to a BNC-connector, the trigger line cable can be ordered at *Eberspächer Electronics*, see chapter 8.2 Accessory parts.

	Reference
📖	Detailed information about how the trigger events are used with the *FlexCard Cyclone II (SE)* can be found in the *FlexCard* API Documentation.

3.5.7   LEDs

3.5.7.1 *FLEXCARD CYCLONE II*

The *FlexCard Cyclone II* has 3 optical interfaces:

> ➢ TZM-Logo on the extention   ➔   shows that the *FlexCard* is powered on
>
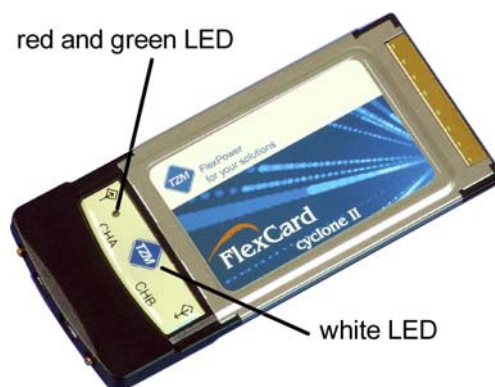> ➢ Green and red LED   ➔   see table in chapter 3.5.7.2

Figure 5: LED position

3.5.7.2   *FLEXCARD CYCLONE II SE*

The *FlexCard Cyclone II SE* also has 3 optical interfaces:

> ➢ Blue LED   ➔   shows that the *FlexCard* is powered on
>
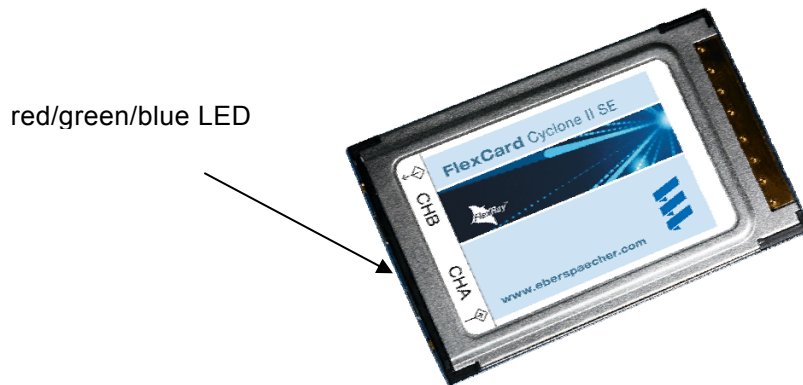> ➢ Green and red LED   ➔   see table below

red/green/blue LED

Figure 6: LED position

The red/green LED indicator signals the different channel states.

Signaling	Connected bus	Description
Permanent red lighting of all LEDs	FlexRay or CAN	Signals a buffer overflow on the internal RAM.
Red flashing	FlexRay	Signals an error in the FlexRay communication controller (e.g. clock correction errors).
Red and green lighting at the same time	FlexRay	FlexRay communication controller is not synchronized, but connected to an actively working network. Bus traffic is detected. This LED combination is active when monitoring in asynchronous mode. The intensity of the LEDs is dependent on the traffic on the bus.
	CAN	Bus traffic is detected. The intensity of the LEDs is dependent on the traffic on the bus.
Green lighting	FlexRay	FlexRay communication controller is synchronized. The intensity of the LED is dependent on the traffic on the bus.
Green flashing	FlexRay	Signals the FlexRay communication controller is in a startup path (that means that the FlexRay communication controller is ready for synchronization). This can be seen when monitoring in normal mode and the FlexRay configuration is incorrect or no cable connected.

Table 5: Description of indicating LEDs

4 GETTING STARTED

4.1 LICENSES

The usage of the CAN communication controller requires a license. Also the operation of the *FlexCard Cyclone II (SE)* on Linux and Xenomai requires a license. Please contact *Eberspächer Electronics* if you want to obtain a license file and refer to chapter 4.4 on how to update the *FlexCard*.

4.2 SOFTWARE INSTALLATION AND UPDATE

4.2.1 PRECONDITIONS

Information
On all operating systems administrator access rights are required to install the device driver.

The minimum system requirements for installing and running the *FlexCard Cyclone II (SE)* hardware and software are:

Microsoft Windows 2000 with Service Pack 3 or higher
- -Computer/processor: 1 GHz or faster AMD/Pentium-compatible processor
- -Memory: 256 MB of RAM
- -Display: VGA or higher-resolution monitor
- -Peripheral keyboard and mouse or compatible pointing device
- -PC-Card Type II Slot, CardBus-compatible

Microsoft Windows XP
- -Computer/processor 1 GHz or faster AMD/Pentium -compatible processor
- -Memory: 256 MB of RAM
- -Display: VGA or higher-resolution monitor
- -Peripheral keyboard and mouse or compatible pointing device
- -PC-Card Type II Slot, CardBus-compatible

Microsoft Windows Vista
- -Computer/Processor 1.5 GHz or faster AMD/Pentium -compatible processor
- -Memory: 1 GB of RAM
- -Display: VGA or higher-resolution monitor
- -Peripheral keyboard and mouse or compatible pointing device
- -PC-Card Type II Slot, CardBus-compatible

Linux (with/without Xenomai)
- -Computer/Processor 1 GHz or faster AMD/Pentium -compatible processor
- -Memory: 256 MB of RAM
- -Display: VGA or higher-resolution monitor

-Peripheral Keyboard and Mouse or compatible pointing device
-PC-Card Type II Slot, CardBus-compatible
-Supported Linux kernel version: 2.6.16 to 2.6.26
-Optional supported Xenomai version: 2.3.3 to 2.4.5

For the PC-Card slot adapter, we recommend to use the following CardBus controller:

➢ Texas Instrument PCI-1410 CardBus-Controller

➢ Texas Instrument PCI-1420 CardBus-Controller

The following table shows a list of tested CardBus controllers. All other components are not tested and the *Eberspächer Electronics* is not able to guarantee the compatibility with the *FlexCard*. Devices which are not listed in this table might not work correctly.

➢ ENE CB1410 CardBus-Controller

➢ ENE CB1420 CardBus-Controller

➢ O2Micro OZ6933 CardBus-Controller

➢ O2Micro OZ711M3 MemoryCardBus-Controller

If you want to know which CardBus controller your PC has, have a look in the hardware manager of your Windows operating system. Figure 7 shows an example.
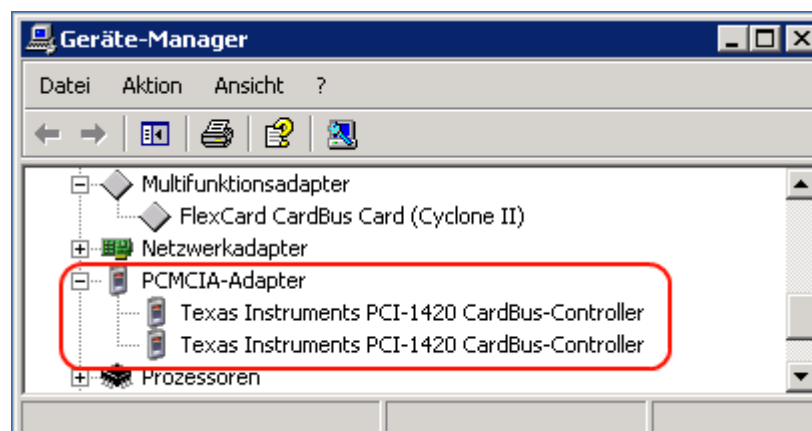

Figure 7: Hardware Manager with FlexCard and CardBus Controller

4.2.2 INSTALLATION ON MICROSOFT WINDOWS OPERATING SYSTEMS

To install the *FlexCard Cyclone II (SE)* device driver and dynamic link library, please follow the steps below. Before you install the *FlexCard Cyclone II (SE)*, uninstall the old version first (Refer to chapter "Uninstallation").

Step 1
Insert the *FlexCard Cyclone II (SE)* hardware in the 32-Bit PCMCIA-Slot. Switch the power on and boot your computer. Windows will show this dialog.
As the device driver will not be installed using the "New Hardware Wizard", click on the *Cancel* button to abort the wizard.

Step 2 (a)
To start the installation, double click the file **FlexCard_Setup_SxVy-F.exe.** The installation wizard will start immediately and guide you through the installation.

Click on the *Next* button.

Note: On a Windows 2000 system, make sure that you have the Windows Installer 2.0 installed.

Step 2 (b)
If you installed a *FlexCard* driver package before, the setup will return this error message. For installing the new driver you have to **remove** the previous package first.
Follow the instructions in chapter "Uninstallation".
**Restart** your computer and go to **Step 1** again.

3-0009-0T01-D01_FlexCard_Cyclone_II_(SE)_Instructions_for_Use_D2V7-F.doc

Step 3
Read the license agreement and if you accept the agreement, click *"I accept the terms…"* and the **Next** button to continue the installation. Otherwise click *Cancel* to abort the installation.
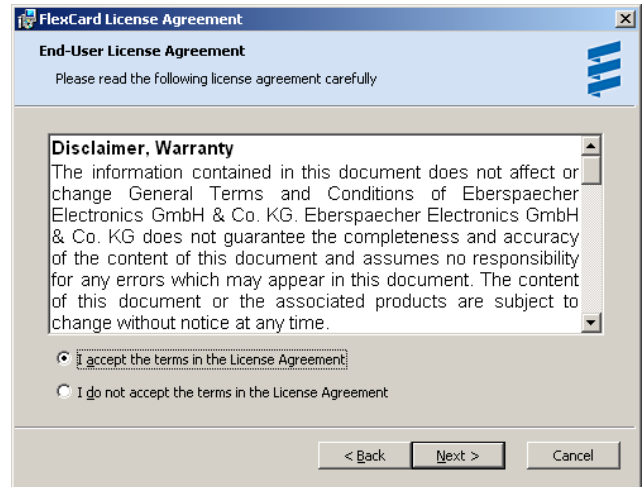
Step 4
Select the installation folder for the *FlexCard* files. There are two setup types:
  - **Normal** setup for using *FlexCard Cyclone II (SE)* with commercial applications.
  - **Developers** setup for developing applications for the *FlexCard Cyclone II (SE)*. This will install the C header files and libraries you need, to access the API in your own applications. Also the *FlexCard* API Documentation is installed.

Choose your setup type by clicking the corresponding icon.
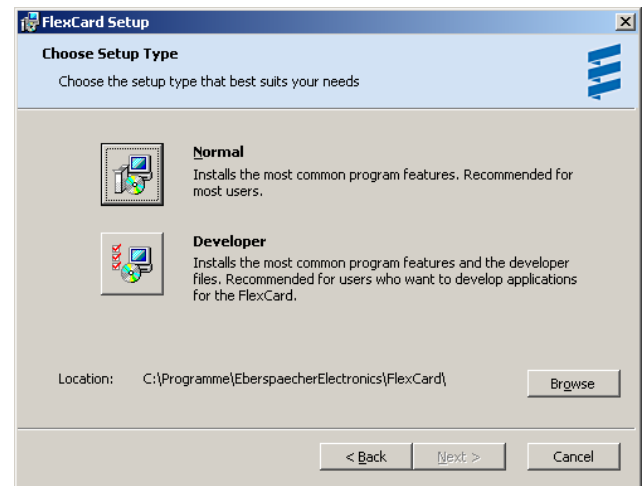
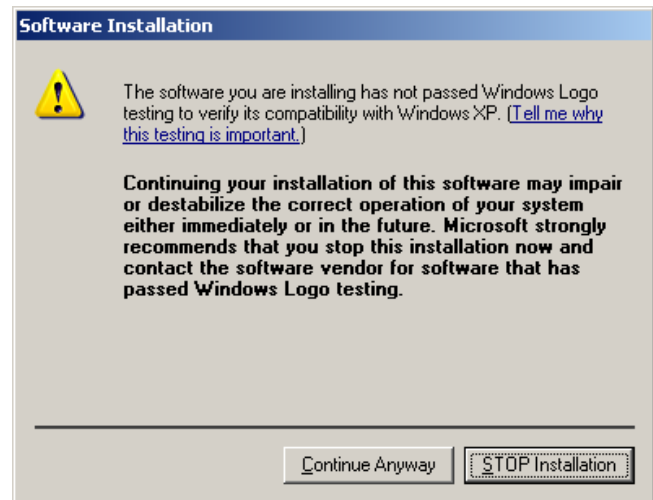**Note**: The device driver and dynamic link library will be installed to the Windows system directory.

Step 5
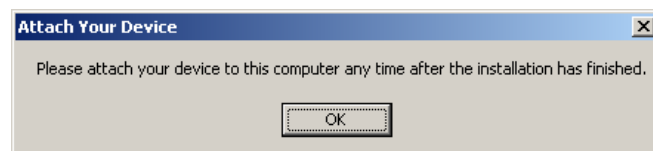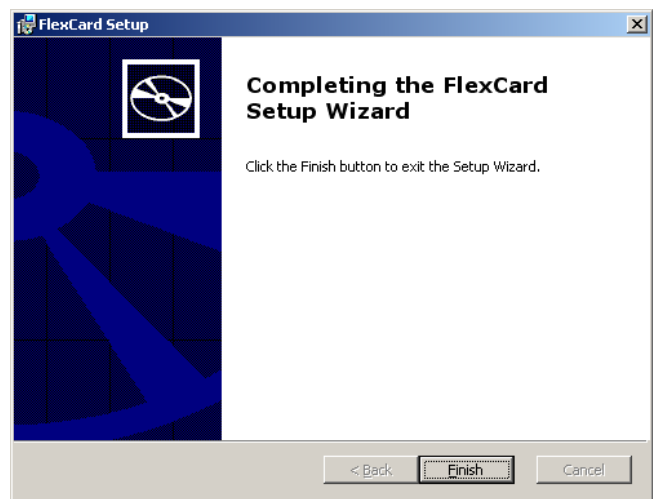Click **Install** to start the installation.
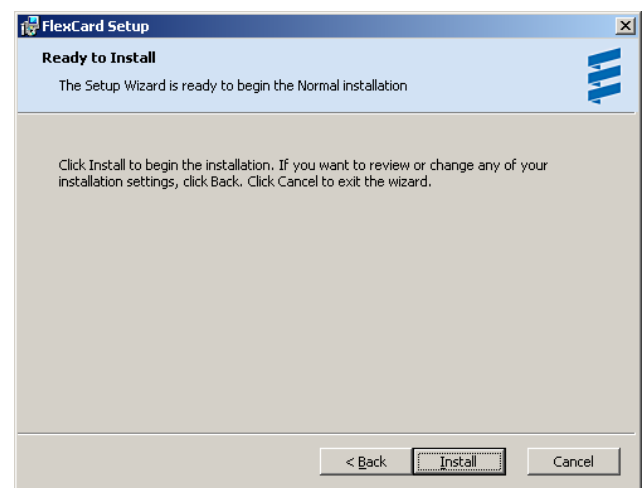
Step 6
The following warning dialog may appear, as the *FlexCard* device driver is not certificated by the Microsoft Hardware Quality Labs. Click on *Continue anyway* to proceed with the installation.
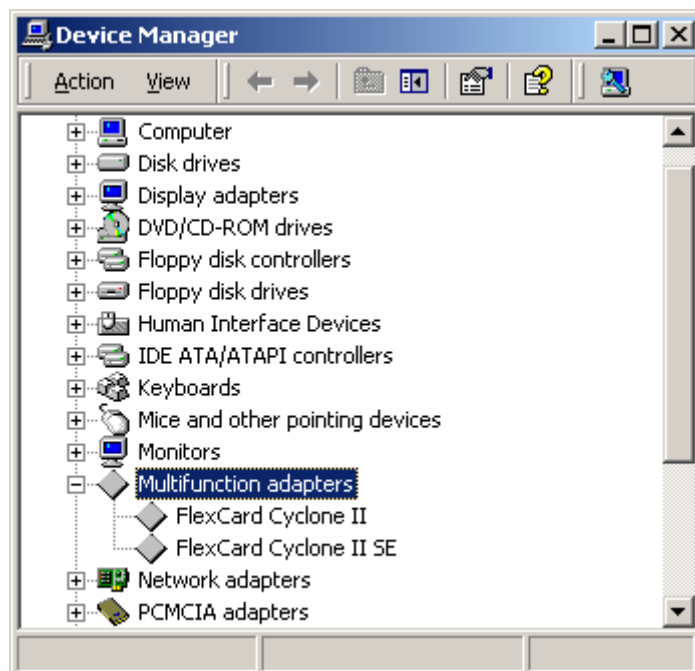
Step 7
A dialog box appears. Click on *Ok*.

Step 8
Click *Finish* to complete the installation.

Step 9
After the installation of the device driver you will find the *FlexCard Cyclone II (SE)* entry in the *Device Manager* in the folder *Multifunction adapters*.

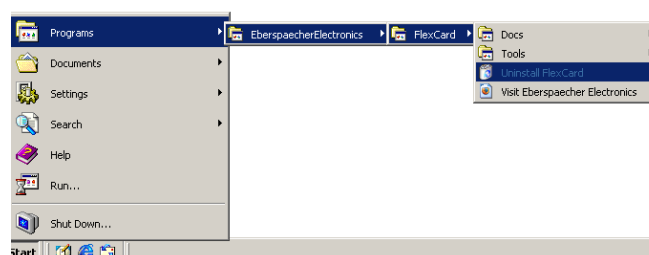### 4.2.3 UNINSTALLATION ON MICROSOFT WINDOWS OPERATING SYSTEMS

Uninstall alternative 1
You can remove the installed *FlexCard* driver package by calling the shortcut in Windows start menu:
Start->Programs->EberspaecherElectronics->FlexCard-> Uninstall FlexCard.
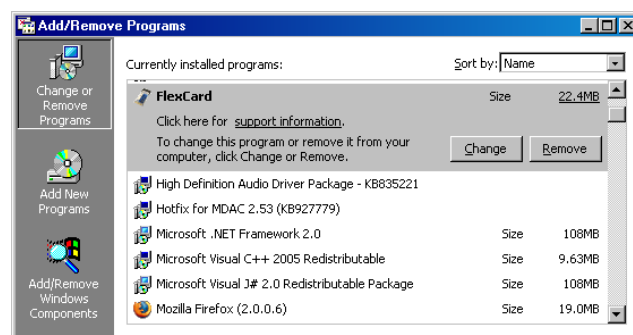Or:
Start->Programs->TZM->FlexCard-> Uninstall FlexCard.

Uninstall alternative 2
Another possibility to uninstall the previous *FlexCard* driver package is provided in the Windows Control Panel:
Start->Settings->Control Panel-> Add/Remove Programs
Click ***Remove*** to uninstall the package.

4.2.4 INSTALLATION ON LINUX OPERATING SYSTEMS

To install the *FlexCard* Linux or Xenomai driver software, please refer to the Read_Me.txt file, which can be found in the delivered FlexCard.zip file. Before you install the *FlexCard Cyclone II (SE)*, uninstall the old version first.

4.2.5 UNINSTALLATION ON LINUX OPERATING SYSTEMS

To uninstall the *FlexCard* Linux driver, open a terminal and type in the following with super user rights:

flexcard_stop

dpkg -r libfcBase

## 4.3 FIRMWARE UPDATE

In order to update the firmware of a *FlexCard Cyclone II (SE)*, it is necessary to follow these steps strictly.

Step 1
Start the update software *FlexUpdate* included in the *FlexCard Cyclone II (SE)* install package.
In this window, you can check the current hardware and software version of installed *FlexCard* components.
Select the *FlexCard Cyclone II (SE)* whose firmware you want to update from the Hardware List.
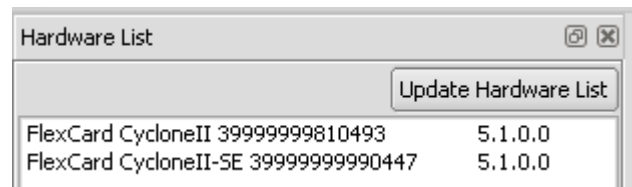
Information		
The upper right shows details about the selected hardware. The column "Possible" lists the number of CCs in the firmware. The column "Useable" displays the CCs that are available in the firmware and licensed.		

Step 2
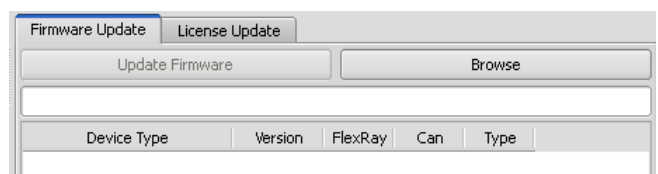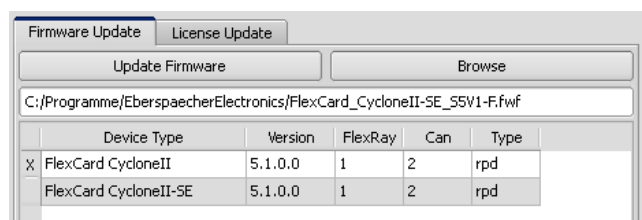Open the "Firmware Update" tab and click "Browse" button to select a firmware container file (*__.fwf__*).
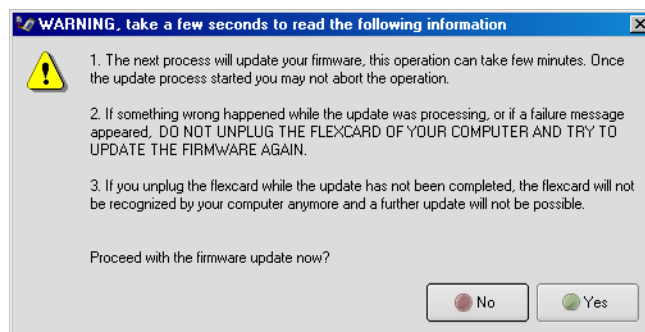
Step 3
The firmware files contained in the firmware container are displayed.

Select the firmware you like to write to the *FlexCard* and click the "**Update Firmware**" button.

Step 4
Read attentively the warning messages before starting the update process. The process is composed of three phases: **Reset**, **Write** and **Check**.


	NOTICE
	Once started, the update process must not be interrupted! **If it happens, neither unplug the *FlexCard Cyclone II (SE)* nor restart the computer!** Otherwise the *FlexCard Cyclone II (SE)* is not functional any more and has to be shipped to *Eberspächer Electronics* for reprogramming. Try to update the firmware again until the whole update has been successfully completed.

Step 5
Once the message "**Firmware update successfully completed.**" appears, close the Firmware-update software and shutdown. **A restart is not sufficient!**
After a firmware update stand-by is prevented by the *FlexCard* until the next start of the computer.

If any problems occur when updating the *FlexCard* firmware, please try again without reinserting the *FlexCard*!
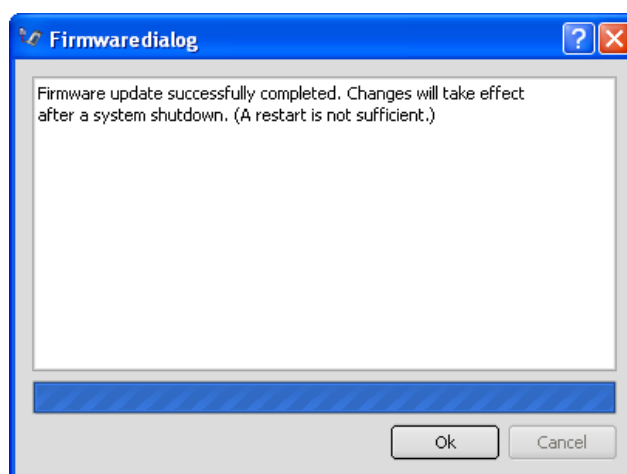

4.4 LICENSE UPDATE

To update the *FlexCard Cyclone II (SE)* with a new license file you need to follow these steps:

Step 1

Insert the *FlexCard Cyclone II (SE)* hardware in the PCI-Slot and start the update software *FlexUpdate* included in the *FlexCard Cyclone II (SE)* install package.
In this window, you can check the current hardware and software version of *FlexCard Cyclone II (SE)* components installed.
Select the *FlexCard Cyclone II (SE)* you want to update from the Hardware List.
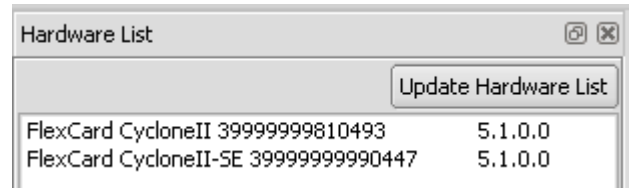
Information		
ℹ️	The upper right shows details about the selected hardware and its currently available features. The column "Possible" lists the number of CCs in the firmware. The column "Useable" displays the CCs that are available for the application.	

Step 2

Open the "License Update" tab. On the left side the currently licensed features are displayed.

Click the "Load from file" button to select a license file (*.**lic**).
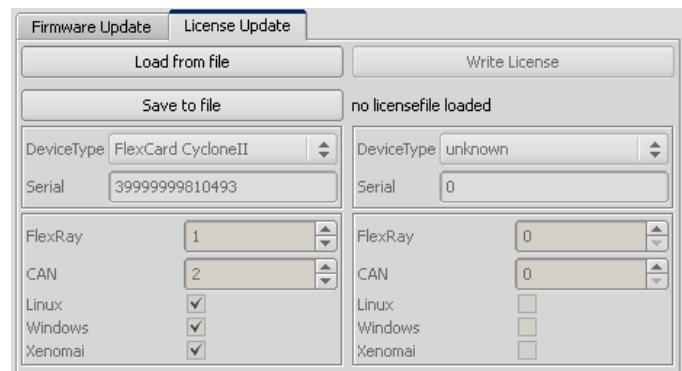
Step 3

Once you choose the file, the text on the right side will inform you about the state of the file. The number of licensed FlexRay and CAN CCs and the licenses for the Linux, Windows and Xenomai *FlexCard* driver are displayed.

If the text "license file ok" appears, you can use "Write License" to apply the license to the hardware.
If not, you need to choose another license file.
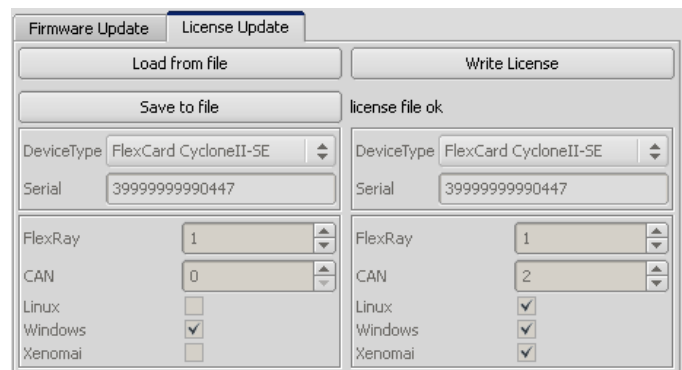
Step 4
After the license was written, the current licenses on the *FlexCard* are displayed on the left side.

Firmware Update	License Update		
Load from file		Write License	
Save to file		license file ok	
DeviceType	FlexCard PMCII	DeviceType	FlexCard PMCII
Serial	30000001610006	Serial	30000001610006
FlexRay	1	FlexRay	1
CAN	2	CAN	2
Linux	☐	Linux	☐
Windows	☑	Windows	☑
Xenomai	☐	Xenomai	☐

5   CONFIGURATION AND OPERATION

All operation modes as well as further information about the programming of a *FlexCard Cyclone II (SE)* application are described in the *FlexCard* API Documentation.

6   SHIPPING, MAINTENANCE AND DISPOSAL

Keep the package in which the *FlexCard Cyclone II (SE)* was shipped.

Store and transport the *FlexCard* in a cool, dry, dark environment. Don't store or transport it near sources of magnetic fields.

Void warranty if tried to manipulate/repair the *FlexCard Cyclone II (SE)*. Please contact *Eberspächer Electronics* for maintenance.

	Dispose off properly per regulations of the country where end-of-life occurs.

7 TROUBLESHOOTING

This chapter contains some frequently asked questions about the *FlexCard Cyclone II (SE).*

1	Effect	The *FlexCard Cyclone II (SE)* is not recognized. On Windows, the *FlexCard Cyclone II (SE)* is not displayed under "Multifunction adapters" in the device manager or it is displayed with a warning symbol in the device manager.
	Cause	*FlexCard Cyclone II (SE)* is not correctly plugged in. The drivers (respective the INF-file), required by the system to recognize the *FlexCard Cyclone II (SE),* are not installed properly.
	Solution	Check if the *FlexCard Cyclone II (SE)* is inserted correctly. Reinstall the driver for the *FlexCard Cyclone II (SE)* or update the firmware. Check whether the DLL, SYS and firmware are compatible. The major version numbers must be identical. Use the *FlexCard API* function "fcbCheckVersion" to test whether DLL, SYS and firmware match. See "*FlexCard* API Documentation".

2	Effect	No FlexRay frames are received. The *FlexCard Cyclone II (SE)* could not synchronize with the FlexRay bus (Green LED is blinking).
	Cause	Wrong configuration of the communication controller → the hardware could not synchronize on the FlexRay bus. Wrong firmware of the *FlexCard Cyclone II (SE)* (wrong bus systems chosen). Buses are not correctly terminated. The cable of FlexRay channel A is inserted in plug B and/or vice versa. The *FlexTiny II* module is missing or the mounted *FlexTiny II* does not fit to the firmware of the *FlexCard Cyclone II (SE).*
	Solution	Check all parameters in the configuration; be sure to use the same configuration as the other FlexRay nodes. Ensure that you chose the correct firmware which fits to your needs (regarding FlexRay connections). Terminate your bus systems correctly. Insert the cables to the correct connectors of the *FlexCard*. Mount the correct *FlexTiny II* module and/or change the firmware. For example if the firmware supports 2 FlexRay channels and 4 CAN channels, install *2 FlexTiny II FR iso* on the first two slots and 2 *FlexTiny II CAN-HS iso* on the last two slots.

3	Effect	No FlexRay frames are received. The *FlexCard Cyclone II (SE)* is synchronized with the FlexRay bus (Green LED is on).
	Cause	Maybe a filter is activated.
	Solution	Deactivate the message filter and channel filter in the software.

4	Effect	No CAN frames are received.
	Cause	Wrong configuration of the communication controller
		Wrong firmware of the *FlexCard Cyclone II (SE)* (wrong bus systems chosen).
		Bus is not correctly terminated.
		The *FlexTiny II* module is missing or the mounted *FlexTiny II* does not fit to the firmware of the *FlexCard Cyclone II (SE).*
		Maybe a filter is activated.
	Solution	Check the CAN bus parameters on the *FlexCard Cyclone II (SE).*
		Ensure that you chose the correct firmware which fits to your needs (regarding CAN connections).
		Terminate your bus systems correctly.
		Deactivate the message filter and channel filter in the software.

5	Effect	The *FlexCard API* returns with the error "The CC index is not valid".
	Cause	Maybe the license is missing.
	Solution	Please contact *Eberspächer Electronics* to obtain a license for the bus interfaces.

6	Effect	The *FlexCard API* returns with the error "Invalid hardware license".
	Cause	The license for using the *FlexCard Cyclone II (SE)* on this operating system is missing.
	Solution	Please contact *Eberspächer Electronics* to obtain a license.

7	Effect	All LEDs of the *FlexCard Cyclone II (SE)* glow red, no messages can be received.
	Cause	The buffer on the *FlexCard* is full. The data on the *FlexCard* is collected too slowly by the software.
	Solution	Use a faster PC or filter messages to reduce the workload.

8   ORDERING INFORMATION

8.1   *FLEXCARD CYCLONE II (SE)*

Product	Description	Ordering number
FlexCard Cyclone II	The FlexCard Cyclone II is equipped with FlexRay physical layer chips TJA1080 (with different development steps) from NXP and the CAN chips TI SN65HVD230D. The physical layers are mounted in the Extension Pack, a physical extension of the card.	3-0009-0S01
FlexCard Cyclone II SE	The FlexCard Cyclone II SE is a compact CardBus Card equipped with the FlexRay physical layer chips TJA1080 (with different development steps) from NXP and the CAN chips TI SN65HVD230D.	3-0009-0T01

8.2   ACCESSORY PARTS

Product	Description	Ordering number
FlexCard FlexRay cable, 1m length, black	FlexRay adapter cable between FlexCard and Sub-D-connector	3-0009-0L03
FlexCard Daisy Chain FlexRay Cable, 1m	FlexRay Daisy Chain adapter cable between FlexCard and Sub-D-connectors	3-0034-0E01
FlexCard Daisy Chain FlexRay / CAN Cable, 1m	FlexRay Daisy Chain adapter cable between FlexCard and Sub-D-connectors with separate CAN connector.	3-0034-0F01
FlexCard CAN cable, 1m length, black	CAN adapter cable between FlexCard and Sub-D-connector	3-0034-0D01
FC Trigger cable BNC, 1m	Trigger cable between the FlexCard and a standard BNC connector.	3-0009-0L04
HW Sync cable, 1m	Trigger cable between the FlexCard and e.g. Sync Box from Vector Informatik.	3-0009-0L02
FlexConfig	Configuration software for FlexRay networks. Generates the CHI configuration files used by the FlexCard, FlexXCon and FlexEntry.	3-0016-0A01
Customer specific parts		Please contact *Eberspächer Electronics*

8.3 RELATED DOCUMENTS

Document	Description	Ordering number
[1] API Documentation	Describes how to write own applications for the *FlexCard* family.	3-0009-0S01-D03
[2] *FlexCard Cyclone II (SE)* Getting Started	Describes how to use the demo applications contained in the Windows *FlexCard* Installer.	3-0009-0S01-D02
[3] *FlexAlyzerV2* Instructions for Use	Explains how to use the monitoring software that is contained in the Windows *FlexCard* Installer.	3-0038-0B01-D01
[4] *FlexConfig* User Manual	Manual for the configuration software for FlexRay networks. *FlexConfig* generates the CHI configuration files used by the *FlexCard*, *FlexXCon* and *FlexEntry*.	3-0016-0C01-D06

9 APPENDIX

9.1 APPENDIX A: GUIDELINE FOR HANDLING ESD SENSITIVE PRODUCTS

- Any tester, equipment, or tool used at any production step or for any manipulation of semi-conductor devices must have its shield connected to ground.

- The product itself and the carrier system of the product respectively must be placed on a conductive table top or covered by an antistatic surface (superficial resistivity equal to or higher than 0.5 MΩ/cm^2), grounded through a ground cable (conductive cable from protected equipment to ground isolated through a 1 MΩ resistor placed in series).

- All manipulation of finished goods has to be made at such a grounded worktable.

- The worktable must be free of all non-antistatic objects.

- An antistatic floor covering grounded through a conductive ground cable (with serial resistor between 0.9 and 1.5 MΩ) should be used.

- It is recommended that you wear an antistatic wrist or ankle strap, connected to the antistatic floor covering or to the grounded equipment.

- If no antistatic wrist or ankle strap is worn, touch the surface of the grounded worktable before each manipulation of the ESD sensitive product.

- It is recommended that antistatic gloves or finger coats be worn.

- It is recommended that nylon clothing be avoided while performing any manipulation of parts.

9.2 APPENDIX B:

9.2.1 ACRONYMS AND ABBREVIATIONS

Item	Definition
BD	Bus driver
BP	Bus plus
BM	Bus minus
CAN	Controller Area Network
CC	Communication Controller
ECU	Electronic Control Unit
EMC	Electromagnetic Compatibility
ESD	Electro Static Discharge
FR	FlexRay
NC	Not Connected
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PL	Physical Layer

9.2.2 LIST OF TABLES

9.2.3 LIST OF FIGURES

www.eberspaecher.com