

Manual

FEIG PC/SC Driver for USB

Version 03.10.00

Operating System	Target		Notes
	32-Bit	64-Bit	
Windows 10	X	X	
Windows Server 2016	X	X	
Windows Server 2019	X	X	

Note

© Copyright by

FEIG ELECTRONIC GmbH

Lange Strasse 4

D-35781 Weilburg

Tel.: +49 6471 3109-0

<http://www.feig.de>

With the edition of this document, all previous editions become void. Indications made in this manual may be changed without previous notice.

Copying of this document, and giving it to others and the use or communication of the contents thereof are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.

Composition of the information in this document has been done to the best of our knowledge.

FEIG ELECTRONIC GmbH does not guarantee the correctness and completeness of the details given in this manual and may not be held liable for damages ensuing from incorrect or incomplete information. Since, despite all our efforts, errors may not be completely avoided, we are always grateful for your useful tips.

The instructions given in this manual are based on advantageous boundary conditions.

FEIG ELECTRONIC GmbH does not give any guarantee promise for perfect function in cross environments and does not give any guarantee for the functionality of the complete system which incorporates the subject of this document.

FEIG ELECTRONIC GmbH calls explicit attention that devices which are subject of this document are not designed with components and testing methods for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to human health. To avoid damage, injury or death the user or application designer must take reasonably prudent steps to protect against system failures.

FEIG ELECTRONIC GmbH assumes no responsibility for the use of any information contained in this document and makes no representation that they are free of patent infringement. FEIG ELECTRONIC GmbH does not convey any license under its patent rights nor the rights of others.

Contents

Licensing Agreement Concerning Use of FEIG PC/SC Driver Software	5
Document Revision History	6
Driver Revision History	7
1. Introduction	9
1.1. System Requirements	10
1.2. Supported Reader Types	10
1.3. Supported Transponder Types	10
1.4. Hints for Smart Card Slots (SAM modules)	11
2. Installation of the FEIG PC/SC Driver	12
2.1. Start Setup	12
2.2. Plug in FEIG USB-Reader	14
2.2.1. Installation of device driver for Windows 10	14
2.3. Installing FEIG Native USB Driver	15
2.3.1. Installation of FEIG Native USB Driver for Windows 10	15
2.4. Checking the correct installation	15
2.5. Updating the FEIG PC/SC Driver	18
2.6. Removing the FEIG PC/SC Driver	18
3. Using the Driver	19
3.1. Switching between PC/SC Mode and FEIG Native Mode	19
3.2. Using of PC/SC Mode	19
3.3. Using the Native Mode	19
4. Notes for Programmers	20
4.1. PC/SC Storage Card Support	20

4.1.1. MIFARE Emulation Activation	21
4.1.2. MIFARE Plus Security Level Switch	22
4.1.3. Get UID	23
4.1.4. Load Keys Command	23
4.1.5. Authenticate Command	23
4.1.6. General Authenticate Command	24
4.1.7. Read Binary Command	25
4.1.8. Update Binary Command	25
4.1.9. MIFARE Classic Increment / Decrement Value	25
4.2. PC/SC IO Control	26
4.2.1. Get Feature Request	26
4.2.2. Display Output	26
4.3. Reader Information Commands (BSI TR-03119)	27
4.3.1. Get Manufacturer Name Command	27
4.3.2. Get Product Name Command	27
4.3.3. Get Firmware Version Command	27
4.3.4. Get Driver Version Command	28
5. Troubleshooting	29

Licensing Agreement Concerning Use of FEIG PC/SC Driver Software

(Issue January 2012)

This is an agreement between you and FEIG ELECTRONIC GmbH (hereafter "FEIG") for use of provided FEIG PC/SC Driver Software shipped with *setup_usb.exe*, hereafter called licensed material. By installing and using the licensed material you agree to all terms and conditions of this agreement without exception and without limitation. If you are not or not completely in agreement with the terms and conditions, you may not install the licensing material or use it in any way.

§1 Subject and Scope of the Agreement

1. You receive the software components of the licensed material in binary executable format.
2. FEIG grants you the non exclusive right to install the licensed material provided and to use it under the following conditions.
3. You may install all components of the licensed material on a hard disk or an other storage medium. You may create backup copies of the licensing material.
4. FEIG grants you the right to use and to distribute the licensed material without payment of licensing fees so long as this licensed material is used only to control or operate devices (hardware) which are developed and/or distributed by FEIG.

§2 Protection of the licensing material

1. The licensed material is the intellectual property of FEIG and its suppliers. It is protected in accordance with copyright, international agreements and relevant national statutes where it is used. The structure, organization and code of the software are a valuable business secret and confidential information of FEIG and its suppliers.
2. You agree not to change, modify, adapt, translate, reverse engineer, decompile, disassemble or otherwise attempt to discover the source code of the licensed material.

§3 Warranty and liability limitations

1. You agree with FEIG that it is not possible to develop electronic data processing programs such that they are without defect for all application conditions. FEIG calls explicit attention to the fact that the installation of a new program may affect already existing software, including software which does not run simultaneous with the new software. In no event will FEIG be liable to you for any consequential, incidental or special damages, including any lost profits or lost savings. If you want to be sure that no already installed program will be affected, you may not install the licensed material.
2. FEIG calls explicit attention to the fact that the use of the licensed material may result irreversible settings and adjustments to devices which may in turn destroy or otherwise make them unusable. FEIG assumes no liability for such actions whether knowingly or unknowingly.
3. FEIG provides the software "as is" and without any warranty. FEIG cannot guarantee the performance or the results you obtain from using the licensed material. FEIG assumes no liability or guarantee that the protection rights of third parties are not violated, nor that the software is suitable for a particular purpose.
4. FEIG call explicit attention the licensed material is not designed with components and testing for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human.
To avoid damage, injury, or death, the user or application designer must take reasonably prudent steps to protect against system failures.

§4 final clause

1. This Agreement contains the complete licensing terms and conditions and supersedes any prior agreements and terms. Changes and additions must be made in writing.
2. If any provision in this agreement is declared to be void, or if for any reason is declared to be invalid or of no effect, the remaining provisions shall be in no manner affected thereby but shall remain in full force and effect. Both parties agree to replace the invalid provision with one which comes closest to its original intention.
3. This agreement is subject to the laws of the Federal Republic of Germany. Place of jurisdiction is Frankfurt a. M.

Document Revision History

Revision	Date	Description
0		<ul style="list-style-type: none"> First published edition
1		<ul style="list-style-type: none"> Adding of "Get UID Command"
2		<ul style="list-style-type: none"> Vista Support
3		Described Driver Version: 02.00 <ul style="list-style-type: none"> Adding of ID CPR40.xx-USB support Adding of support of SR176, SRIxx Transponder
4		Described Driver Version: 02.04 <ul style="list-style-type: none"> Adding of ID CPR40.xx-SUSB support
5		Described Driver Version: 02.07 <ul style="list-style-type: none"> Driver signed with FEIG ELECTRONIC GmbH manufacturer information
6		Described Driver Version: 02.08 <ul style="list-style-type: none"> Driver signed with FEIG ELECTRONIC GmbH manufacturer information
7		Described Driver Version: 02.11 <ul style="list-style-type: none"> Description installation for Windows 7
8		Described Driver Version: 02.12 <ul style="list-style-type: none"> Description installation for Windows 7 with WHQL certified driver
9	2016-12-21	Described Driver Version: 03.02.00 and 03.02.01 <ul style="list-style-type: none"> Functional revision of chapter: 4. Notes for Programmers Support for ID CPR74
10	2017-04-21	Described Driver Version: 03.02.04 <ul style="list-style-type: none"> New chapter 4.1.6. General Authenticate Command New chapter 4.1.8. MIFARE Classic Increment / Decrement Value
11	2020-01-13	Described Driver Version: 03.10.00 <ul style="list-style-type: none"> Update version number and product name Update screenshots of install process

Driver Revision History

Version	Description
01.00.00	<ul style="list-style-type: none"> • First released version • Supported reader: <ul style="list-style-type: none"> - ID CPR.04.P/AB-USB
02.00.00	<ul style="list-style-type: none"> • Adding of support of SR176, SRIxx Transponder • Supported reader: <ul style="list-style-type: none"> - ID CPR.04.P/AB-USB - (up from Firmware 02.03.02) - ID CPR40.30-USB - (up from Firmware 01.00.00)
02.00.01	<ul style="list-style-type: none"> • Bug fix for longer transmitted APDUs • Supported reader: <ul style="list-style-type: none"> - ID CPR.04.P/AB-USB - (up from Firmware V02.03.03) - ID CPR40.30-USB - (up from Firmware 01.00.00)
02.04.00	<ul style="list-style-type: none"> • Adding of support for 2 SAM card slots. • Supported reader: <ul style="list-style-type: none"> - ID CPR.04.P/AB-USB - (up from Firmware V02.03.03) - ID CPR40.xx-USB - (up from Firmware 01.05.00) - ID CPR40.xx-SUSB - (up from Firmware 01.05.00)
02.07.00	<ul style="list-style-type: none"> • Improvement for longer transmitted APDUs
02.08.00	<ul style="list-style-type: none"> • Improvements for the bundled separate serial PC/SC driver
02.11.00	<ul style="list-style-type: none"> • Support for Windows 7 operating system (32 Bit and 64 Bit platform)
02.12.00	<ul style="list-style-type: none"> • WHQL certification for PC/SC USB driver • Functional changes: <ul style="list-style-type: none"> - APDU exchange for ISO14443 type B uses CID=0 if supported by - Support for NXP MIFARE Plus 2k (SL1) added - ISO 15693 support added - ID CPR30.xx added - ID CPR52.xx added - Handling of RF-Resets improved. - Default ISO 14443 bit rate set to 106 Kbit/s in CFG3 (registry entry) - Slot name changed in "FEIG ELECTRONIC GmbH ..." - Reader Information Command according BSI TR-31019 added
03.02.00	<ul style="list-style-type: none"> • WHQL certification for PC/SC USB driver • Functional changes: <ul style="list-style-type: none"> - OBID myAXXESS standard added - OBID myAXXESS onTop-S added
03.02.01	<ul style="list-style-type: none"> • Support for Windows 8 operating system (32 Bit and 64 Bit platform) • Support for Windows 2000 removed • MIFARE Plus SL1 command to switch to SL2 or SL3. • Functional changes: <ul style="list-style-type: none"> - changed SAK evaluation in MIFARE Emulation Action.
03.02.03	<ul style="list-style-type: none"> • For MIFARE Ultralight: address range is increase to 0..255 • Support for ID CPR74
03.02.04	<ul style="list-style-type: none"> • Support for MIFARE Classic Value commands Increment / Decrement

Version	Description
03.10.00	<ul style="list-style-type: none"><li data-bbox="300 248 1302 277">• New supported platforms: Windows 10, Windows Server 2016 and Windows Server 2019

1. Introduction

This manual will give you a guideline for installation and possibilities of the FEIG PC/SC Driver. The chapter 4 will provide information for special APDUs applicable with this driver.

The Driver package consists of the following components:

PC/SC USB Driver

The PC/SC Mode is designed for your PC/SC Application. It offers a multi slot concept with the following slots:

- FEIG RFID Reader
- FEIG RFID Reader Slot0: CL (Contactless)

In case of FEIG RFID Reader with additional slots for SAM modules¹

- FEIG RFID Reader Slot1: SC1 (Smart Card Slot 1)
- FEIG RFID Reader Slot2: SC2 (Smart Card Slot 2)
- FEIG RFID Reader Slot3: SC3 (Smart Card Slot 3)
- FEIG RFID Reader Slot4: SC4 (Smart Card Slot 4)

FEIG USB Native Driver

For usage of the reader with native FEIG commands. The FEIG Native Mode can be used for service and testing purposes and firmware updates as well as for non PC/SC applications to get access to all features of the FEIG CPR-Reader.

Human Interface Device Driver (HID)

For use only with ID CPR40.xx-USB in scan-mode for keyboard emulation.

FEIG Driver Switch Application

For switching between PC/SC USB Driver and FEIG USB Driver

¹ see [1.2. Supported Reader Types](#)

1.1. System Requirements

The FEIG PC/SC Driver can be installed on the following operating systems:

Operating System: **Windows 32Bit Systems**

(Windows 10, Windows Server 2016, Windows Server 2019)

Windows 64Bit Systems

(Windows 10, Windows Server 2016, Windows Server 2019)

preferred USB Slot: USB 2.0

This driver must not be installed if there is already an FEIG CPR Standard USB driver installed on the system !! Thus, before installing this driver make sure that an FEIG CPR Standard USB-driver is uninstalled properly.

1.2. Supported Reader Types

The following FEIG CPR Readers are supported:

Reader Type	Smart Card Slots provided	Reader-Firmware	USB-Firmware
ID CPR.04.P/AB-USB	0	≥ 02.03.02	≥ 01.05.02
ID CPR40.xx-U	2	≥ 01.05.00	-
ID CPR40.xx-US	2	≥ 01.05.00	-
ID CPR44.xx-US	4	≥ 01.00.00	-
ID CPR30.xx-U	Up to 2	≥ 01.00.00	-
ID CPR52.xx	Up to 4	≥ 01.00.00	-
ID CPR74	Up to 4	≥ 01.00.00	-
OBID myAXXESS onTop-S	1		-

1.3. Supported Transponder Types

The FEIG PC/SC-Driver supports ISO 14443 type A and type B processor cards as well as a couple ISO 14443 and ISO 15693 memory card as described in chapter [4.1. PC/SC Storage Card Support](#). Because of different capabilities of the supported FEIG RFID Readers not each memory card can be processed with each FEIG RFID Reader. For details please look to the manual of the used FEIG RFID Reader.

The Transponder type is automatically assigned by the PC/SC Driver. For this purpose the driver utilize several rules. Some of this rules are described below.

- The Transponder type "MIFARE 4k" will be assigned, if a ISO 14443A Transponder is not ISO 14443-4 conform and the bits 3 and 4 in the SAK are set to 1 (SAK == bxxx11xxx).

- If a ISO 14443A Transponder is not ISO 14443-4 conform and the bits 0 and 3 in the SAK are set to 1 (SAK == bxxx01xx1) the Transponder type MIFARE Mini will be set.
- For all other ISO 14443A Transponder that are not ISO 14443-4 conform and have bit 3 set in the SAK (SAK == bxxxx1xxx) the Transponder type MIFARE 1k will be set.

1.4. Hints for Smart Card Slots (SAM modules)

If an FEIG RFID Reader with additional slots for SAM modules (Smart Card Slots) was detected by the setup, the setup installs additional independent slot driver for each slot.

To use a SAM it has to be installed into the physical SAM slot before any interaction can be made. Dynamic card insertion or card removal detection is not supported by the FEIG PC/SC Driver.

2. Installation of the FEIG PC/SC Driver

The installation of the FEIG PC/SC Driver will be done in four steps and every installation step requires **administrator rights**.

1. Unplug the FEIG USB-Reader. This is a strong requirement.
2. Start the setup software *setup.exe* and follow the instructions of the setup assistant.
3. Plug in the FEIG *CPR* USB-Reader and follow the advices of the hardware-assistant for installation of the PC/SC device driver.
4. Installing the FEIG native device driver.

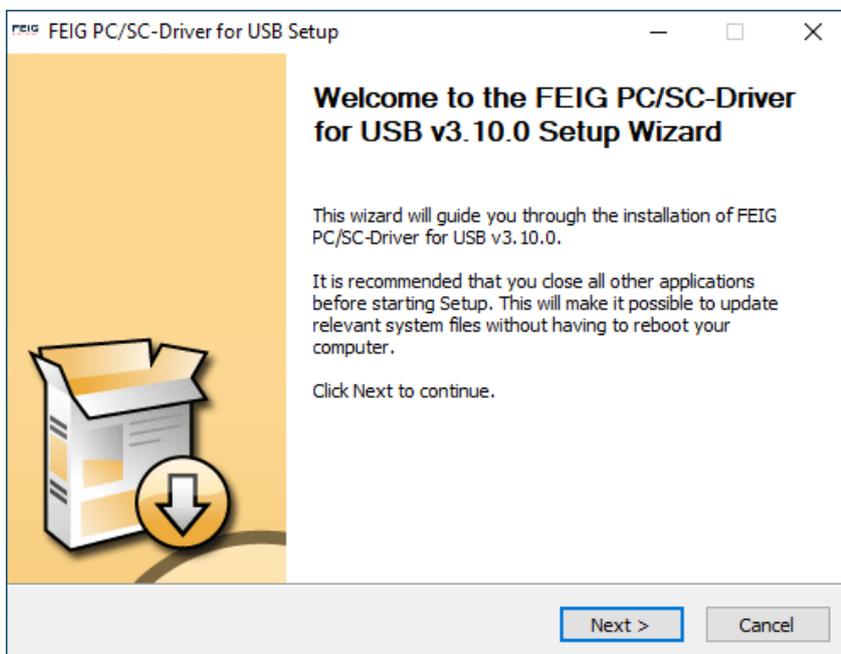
It is important to close all the other programs before beginning the installation of the driver and uninstall older versions of PC/SC Driver first.

2.1. Start Setup

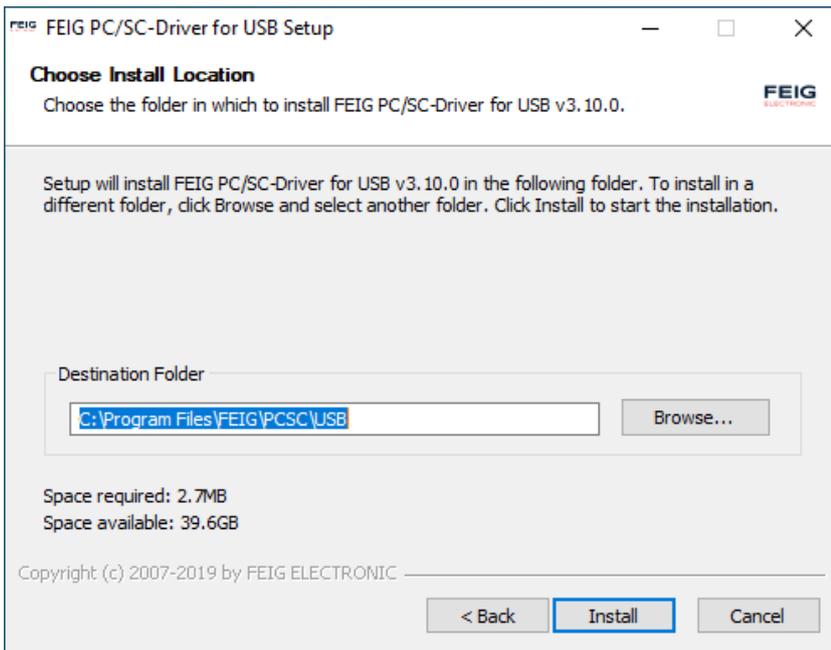
The following steps are necessary for the installation (Windows 7 or higher):

The installation of the FEIG PC/SC Driver is only possible with “Administrator rights” !!

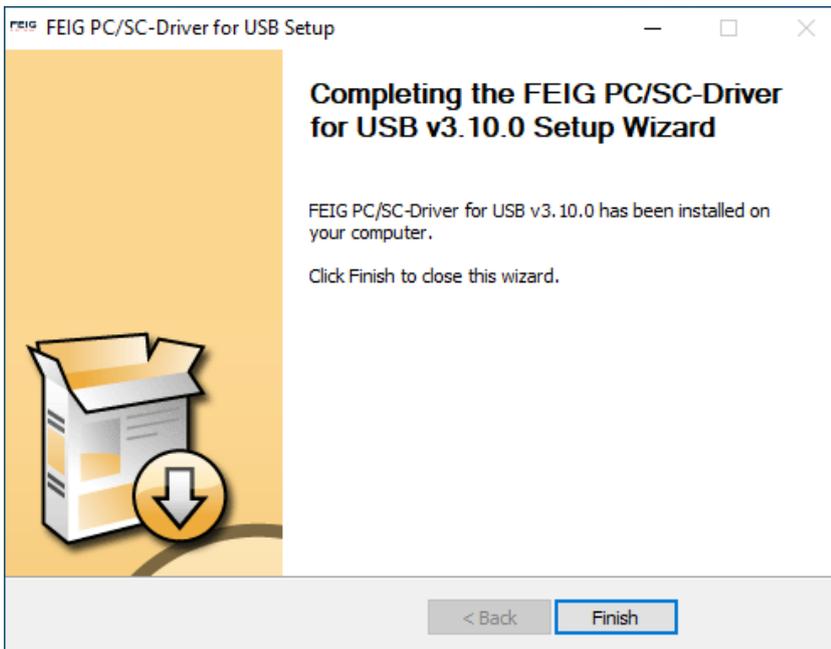
Start the setup software *setup.exe* and follow the instructions of the setup assistant.



Choose a target folder for the driver installation.



The end of the first step of the installation is displayed. The second step is the installation of the hardware device.

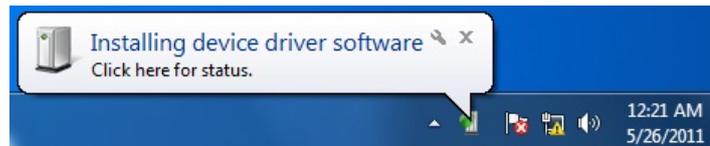


2.2. Plug in FEIG USB-Reader

2.2.1. Installation of device driver for Windows 10

Plug in your USB Reader. Choose a USB hub which can power the device. The installation of the reader drivers will be done automatically in the background of the operating system.

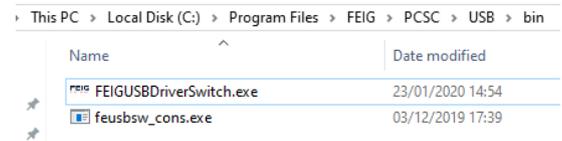
For the device driver installation you need "Administrator rights" !!



2.3. Installing FEIG Native USB Driver

2.3.1. Installation of FEIG Native USB Driver for Windows 10

For the installation of the FEIG Native USB Driver you first have to start the FEIG USB Driver Switch Tool. You can find the tool in the installation path of the driver software. (e.g. "C:\Program Files\FEIG\PCSC\USB\bin")

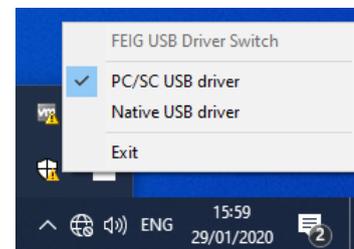


For activation click on the entry "*FEIG USB Driver Switch*" in the menu "*Autostart*".

The activated FEIG USB Driver Switch tool appears as FEIG Icon in the taskbar.



By clicking on the FEIG Icon with the right mouse button the FEIG USB Driver Switch menu will open. In this menu you can switch over between the PC/SC-Mode (PC/SC USB driver) and the FEIG Native Mode (Native USB driver).



Choose the entry "Native USB driver" for switching over the driver in the FEIG Native USB driver Mode.

Now the system is ready to operate in FEIG Native USB driver Mode.

2.4. Checking the correct installation

After successful installation of the complete FEIG PC/SC Driver the device manager shows the following device entries when the reader has been plugged in.

Choose:

Settings ⇒ *Control Panel* ⇒ *System* ⇒ *Hardware* ⇒ *Device Manager*

For PC/SC-Mode:

- > Disk drives
- > Display adapters
- ✓ FEIG USB Devices
 - FEIG RFID Reader (USB)
 - FEIG Switch Driver
- > Firmware
- > Human Interface Devices
- > Processors
- > Security devices
- > Sensors
- ✓ Smart card readers
 - FEIG RFID Reader Slot (USB)
- > Software components
- > Software devices

For ID CPR40.xx-USB additionally:

- > Firmware
- ✓ Human Interface Devices
 - Alps PTP Config Filter
 - Alps PTP Filter
 - I2C HID Device
 - USB Input Device
 - USB Input Device
- > Keyboards
- > Mice and other pointing devices

For ID CPR40.xx-SUSB additionally:

- > Disk drives
- > Display adapters
- ✓ FEIG USB Devices
 - FEIG RFID Reader (USB)
 - FEIG Switch Driver
- > Firmware
- > Human Interface Devices
- > Processors
- > Security devices
- > Sensors
- ✓ Smart card readers
 - FEIG RFID Reader Slot (USB)
 - FEIG RFID Reader Slot (USB)
 - FEIG RFID Reader Slot (USB)
- > Software components
- > Software devices

For FEIG Native Mode:

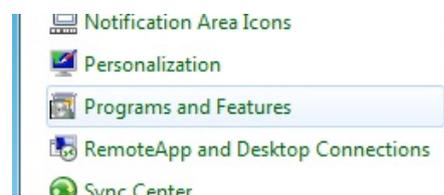
- >  Computer
- >  Disk drives
- >  Display adapters
- ✓  FEIG USB Devices
 -  FEIG RFID Device
 -  FEIG Switch Driver
- >  Firmware
- >  Human Interface Devices
- >  Keyboards

2.5. Updating the FEIG PC/SC Driver

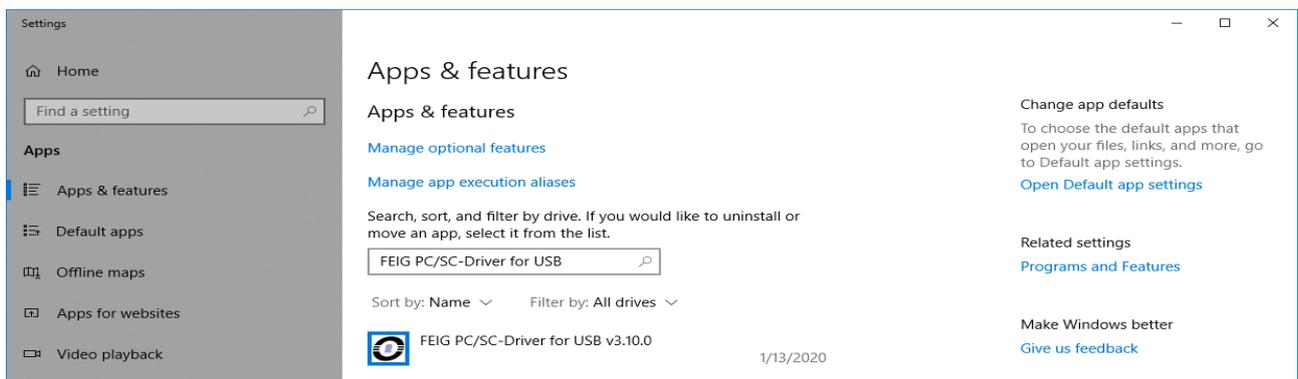
1. If an older version of FEIG PC/SC Driver is installed on your system you have to de-install this older version manually and before the installation of the new driver.
2. Start the setup of the new FEIG PC/SC Driver version and follow the instructions of the assistant.
3. Reboot your system as suggested by the assistant.
4. After your system is rebooted start the setup of the new FEIG PC/SC Driver version once again to install the new version.

2.6. Removing the FEIG PC/SC Driver

Choose: *Settings* ⇒ *Control Panel* ⇒ *Add or Remove Programs*

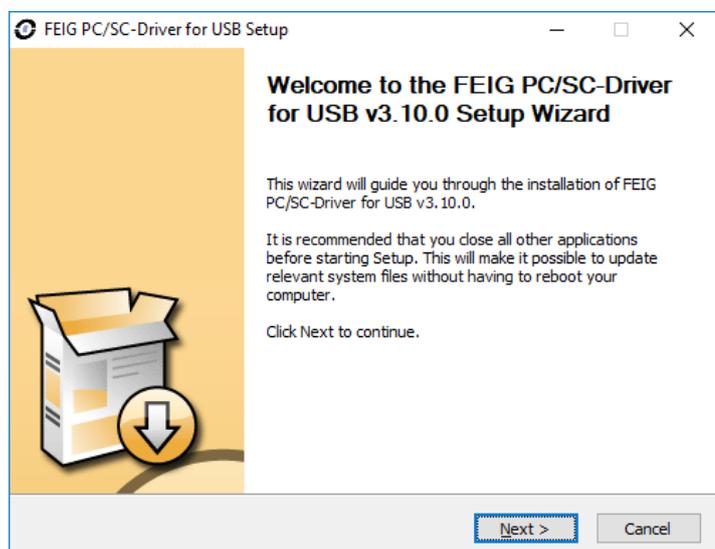


For removing the FEIG PC/SC Driver open the and choose the entry “FEIG PC/SC-Driver for USB vX.XX.XX”. Then press the button “*Remove*”.



The assistant for the uninstall routine will start.

Follow the instructions of the assistant.



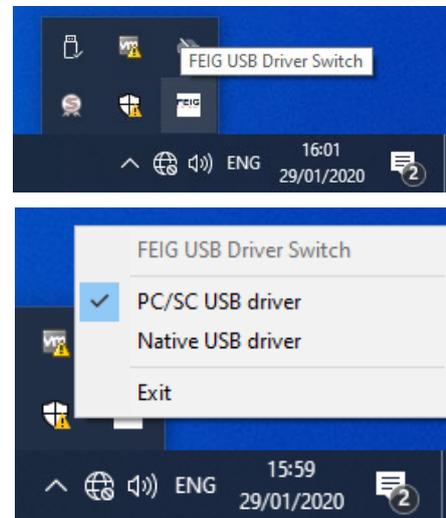
3. Using the Driver

3.1. Switching between PC/SC Mode and FEIG Native Mode

The FEIG USB Driver Switch appears as FEIG Icon in the taskbar.

By clicking on the FEIG Icon with the right mouse button the FEIG Driver Switch menu will open. In this menu you can switch between the PC/SC-Mode and the Native Mode.

Choose the entry "Native USB driver" for selecting the driver for the FEIG Native USB Mode.



3.2. Using of PC/SC Mode

After the driver is installed on your PC System it starts running in PC/SC Mode. To communicate with the connected FEIG ID CPR-Reader make sure that the Smart Card Service of your Windows operating system is enabled (for details see 6. Troubleshooting).

Just as the PC/SC Mode is running and the Reader is connect to your PC the Reader is polled permanently by the PC/SC Driver.

The LEDs of the Reader indicates some processing status of the system. For more details please see the Reader documentation.

3.3. Using the Native Mode

In Native Mode the driver can be used with non PC/SC Applications like a standard USBIO Driver. The Native Mode can be used for processing a firmware update or other special device testing e.g. in connection with FEIG CPRStart Software.

The functionality of the Reader in this mode is documented in the FEIG ID CPR-Family Manual.

4. Notes for Programmers

The Application Programming Interface (API) is defined in detail with the PC/SC specification. In the following chapters, some additional information is provided.

4.1. PC/SC Storage Card Support

This chapter describes the implementation of PC/SC Storage Card commands in relation to the supported Transponder Types.

The following table gives a short overview about the supported Storage Card commands.

Identifier	SAK	Transponder Type	Address Range	File Start Address	Block Size [byte]	max. File Size [byte]	PCS/SC Command			
							Get UID	Authenticate	Read Binary	Update Binary
00 01 0036	bxx0x 1xxx	MIFARE Standard 1K MIFARE plus 2k SL1	0...63	0, 4, ... 60	16	64	•	•	•	•
00 02 0037	bxx01 1xxx	MIFARE Standard 4K	0...127	0, 4, ...124	16	64	•	•	•	•
		MIFARE plus 4k SL1	128...255	128, 144, ...240	16	256	•		•	•
00 03	b0000 0000	MIFARE Ultralight	0...255	0	4	64	•		•	•
00 04	b0000 0000	SLE55Rxx	0...255	0	8	2048	•		•	•
00 06	-	SR176	0...15	0	2	32	•		•	•
	-	SRI512 / SRIX512	0...15, 255	0, 255	4	32	•		•	•
00 07	-	SRI4K / SRIX4K	0...127, 255	0, 255	4	512	•		•	•

4.1.1. MIFARE Emulation Activation

Some ISO 14443 part 4 cards may support a MIFARE classic emulation on ISO 14443 part 3 level. To switch from the ISO 14443A part 4 (T=CL) of a dual interface card to ISO 14443A part 3 (on-card MIFARE emulation) the following APDU has to be executed.

After the successful execution, the APDUs from chapter [4.1. PC/SC Storage Card Support](#) can be used to access the MIFARE application on the transponder.

Command	Class	INS	P1	P2	Lc	Data In	Le
Get Data	0xFF	0xCA	0x00	0x00	-	-	0x04
Content							

Data Out

UID0 UID1 UID2 UID3	SW1 SW2
----------------------------	---------

NOTE:

- **Firmware Version >= 1.09.00 is necessary for the ID CPR40.xx family**
- **Firmware Version >= 1.01.00 is necessary for the ID CPR44.xx family**
- **The command will only be executed on transponder with bit 3 is set in SAK.**

4.1.2. MIFARE Plus Security Level Switch

To switch a MIFARE Plus from Security Level 1 (SL1) to SL2 or SL3, two steps are necessary.

1st Step: switch from ISO 14443-3 to ISO 14443-4 Mode

Command	Class	INS	P1	P2	Lc	Data In	Le
Vendor Cmd	0xFF	0x70	0x0A	0xB1	Custom Command Length	Custom Command Data	-
Content					03	25 00 01	

Custom Command Length:

0x03: Length of the Command Data

Custom Command Data:

0x25: Command byte (based on the ISO Host Command "Select")

0x00: mode

0x01: Transponder driver

Data Out

SW1 SW2

SW1 SW2:

0x90 0x00: Ok, command completed

0x6F 0x00: Communication error

2nd Step: switch from SL1 to SL2 or SL3

After switching a MIFARE Plus Transponder, which is in Security Level 1, to ISO/IEC 14443-4 Mode, it is possible to switch the Security Level to SL2 or SL3 by using PC/SC SCardTransmit function. For additional information refer to the MIFARE Plus data sheet.

4.1.3. Get UID

Command	Class	INS	P1	P2	Lc	Data In	Le
Get Data	0xFF	0xCA	0x00	0x00	-	-	XX
Content							

Le:

0x00: Returns the full length of the UID. The usage of this Le value is recommended.

4.1.4. Load Keys Command

Command	Class	INS	P1	P2	Lc	Data In	Le
Load Keys	0xFF	0x82	Key Structure	Key Number	Key Length	Key	-
Content			001x xxxx	0...31	0x06		

Key Number (0...31):

Even number (0, 2, 4,...30): MIFARE Key A

Odd number: (1, 3, 5..31): MIFARE Key B

4.1.5. Authenticate Command

Command	Class	INS	P1	P2	P3	Data In	Le
Authenticate	0xFF	0x88	Address MSB	Address LSB	Key Type	Key No	-
Content			0x00		0x60 0x61	0...15	

Key Type:

0x60: MIFARE Key A

0x61: MIFARE Key B

Note from the PC/SC specification Part 3 rev. 2.1.9 amd1 from 2011-06-03:

This command is obsolete and should not be used any more !

4.1.6. General Authenticate Command

Command	Class	INS	P1	P2	Lc	Data In	Le
Authenticate	0xFF	0x86	0x00	0x00	5	See table	-
Content							

Table for Data In

Byte	1	2	3	4	5
Fieldname	Version	Address MSB	Address LSB	Key Type	Key No
Content	0x01	0x00		0x60 0x61	0..15

Key Type:

0x60: MIFARE Key A

0x61: MIFARE Key B

Example:

When Key of type Key B with Key number 5 should be used for Authenticate, then Key type must be set to 0x61 and Key number must be set to 2.

4.1.7. Read Binary Command

Command	Class	INS	P1	P2	Lc	Data In	Le
Read Binary	0xFF	0xB0	Address MSB	Address LSB	-	-	xx
Content			0x00	0...255			max 128

Le:

The Le parameter must match to the Block Size of the Transponder.

NOTICE:

Le is limited to 128 byte (0x80) because of Reader's internal buffer size

4.1.8. Update Binary Command

Command	Class	INS	P1	P2	Lc	Data In	Le
Update Binary	0xFF	0xD6	Address MSB	Address LSB	XX	Data	-
Content			0x00	0...255	max. 128		

Lc:

The Lc parameter must match the Block Size of the Transponder.

4.1.9. MIFARE Classic Increment / Decrement Value

The implementation of this command is according the PC/SC specification Part 3 rev. 2.1.9 amd1 from 2011-06-03.

Note1: the number of destinations is limited to 4 per choice.

Note2: the number of choices is limited to 4 per command.

Command	Class	INS	P1	P2	Lc	Data In	Le
Authenticate	0xFF	0xC2	0x00	0x03	XX	BER-TLV	-
Content					<= 80		

Lc:

The Lc parameter contains the length in short format of the BER-TLV data.

4.2. PC/SC IO Control

The chapter is applicable only for OBID myAXXESS onTop-S.

4.2.1. Get Feature Request

The Reader OBID myAXXESS onTop-S supports the Request of Features capability as specified in Part 10 of PS/SC specification. When the feature FEATURE_MCT_UNIVERSAL (0x09) is part of the returned feature list, then the Display can be controlled.

4.2.2. Display Output

For displaying test messages, the feature FEATURE_MCT_UNIVERSAL is to be used with SCardControl. The following two steps are required:

1st Step: Connection to the Reader with SCardConnect in share mode = SCARD_SHARE_DIRECT and 0 (zero) for the preferred protocol.

2nd Step: The Display control command is specified by CT-BCS 1.1 and packed as an APDU in a PC/SC command for MCT_UNIVERSAL, sent by SCardControl with control code previously requested for FEATURE_MCT_UNIVERSAL.

The CT-BCS OUTPUT-Command is built with the following byte order:

No of Bytes	1	1	2	1	1	1	1	1
Field	SAD	DAD	Length	CLA	INS	P1	P2	Lc
Value	0x02	0x01	LSB, MSB	0x20	0x17	0x40	0x00	ReqLen
Reference	1, 2	1, 2	2	1	1	1	1	1

No of Bytes	1	1	N	1	1	1
Field	Tag	Length	Value	Tag	Length	Value
Value	0x50	N	N chars	0x80	1	Time in s
Reference	2	2	2	2	2	2

Example: APDU for display of the message "Value 0.01" for 15 seconds:

```
02 01 14 00 20 17 40 00 0F 50 0A 56 61 6C 75 65 20 30 2E 30 31 80 01 0f
```

References:

1. PC/SC specification Part 10 IFDs with Secure PIN Entry Capabilities
2. CT-BCS V1.1

4.3. Reader Information Commands (BSI TR-03119)

The commands described in this chapter are implemented according "Technische Richtlinie BSI TR-03119, Version 1.2, Chapter A.1.2.

4.3.1. Get Manufacturer Name Command

Command	Class	INS	P1	P2	P3	Data In	Le
Content	0xFF	0x9A	0x01	0x01	0x00		

e.g. ID CPR40.30-U manufacturer name → FEIG ELECTRONIC GmbH:

APDU							SW		Data OUT	
Cl	Ins	P1	P2	P3/Lc	Le	Data IN (Hex)	Value (Hex)	Verbose SW Lookup	(Hex)	(ASCII)
FF	9A	01	01	00			90 00	90 00 --> 0x...	46 45 49 47 20 45 4C 45 43 54 52 4F 4E 49 43 20 47 6D 62 48	FEIG ELECTRONIC GmbH

4.3.2. Get Product Name Command

Command	Class	INS	P1	P2	P3	Data In	Le
Content	0xFF	0x9A	0x01	0x03	0x00		

e.g. ID CPR40.30-U connected:

APDU							SW		Data OUT	
Cl	Ins	P1	P2	P3/Lc	Le	Data IN (Hex)	Value (Hex)	Verbose SW Lookup	(Hex)	(ASCII)
FF	9A	01	03	00			90 00	90 00 --> 0x...	49 44 20 43 50 52 34 30 2E 78 78 2D 55	ID CPR40.xx-U

4.3.3. Get Firmware Version Command

Command	Class	INS	P1	P2	P3	Data In	Le
Content	0xFF	0x9A	0x01	0x06	0x00		

e.g. ID CPR40.30-U with firmware version v02.00.00:

APDU							SW		Data OUT	
Cl	Ins	P1	P2	P3/Lc	Le	Data IN (Hex)	Value (Hex)	Verbose SW Lookup	(Hex)	(ASCII)
FF	9A	01	06	00			90 00	90 00 --> 0x...	32 2E 30 2E 30	2.0.0

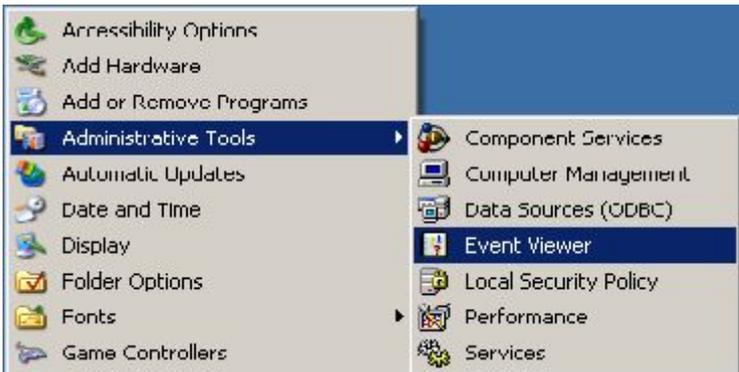
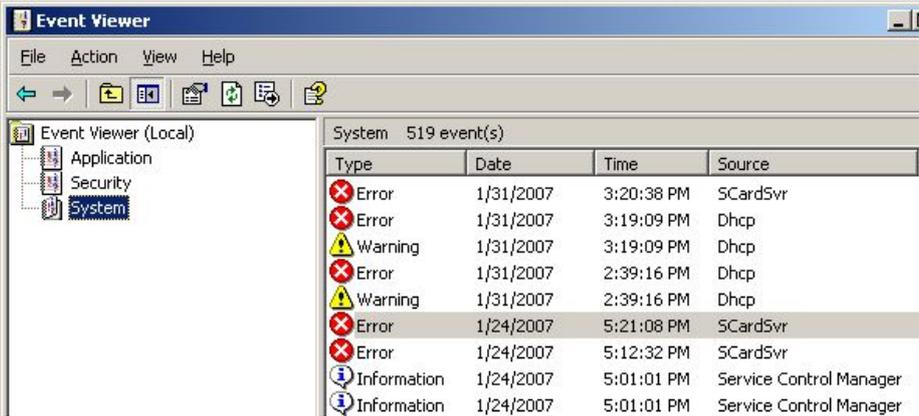
4.3.4. Get Driver Version Command

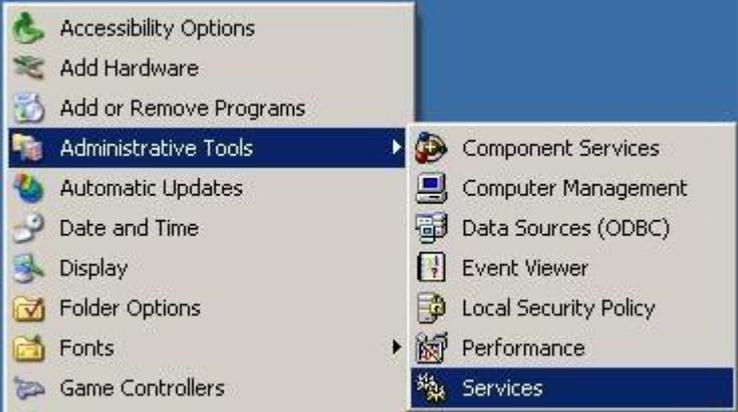
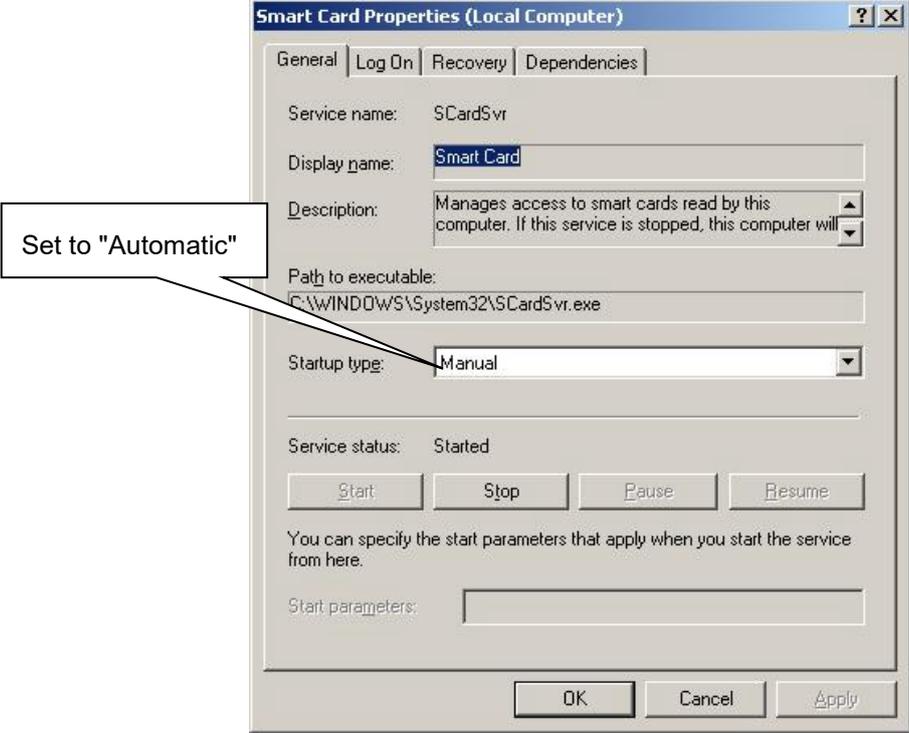
Command	Class	INS	P1	P2	P3	Data In	Le
Content	0xFF	0x9A	0x01	0x07	0x00		

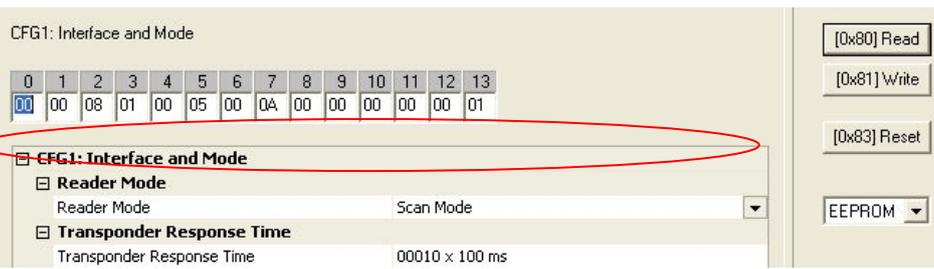
PC/SC USB Driver Version v02.12.00:

APDU							SW		Data OUT	
Cl	Ins	P1	P2	P3/Lc	Le	Data IN (Hex)	Value (Hex)	Verbose SW Lookup	(Hex)	(ASCII)
FF	9A	01	07	00			90 00	90 00 --> 0x...	32 2E 31 32 2E 30	2 . 1 2 . 0

5. Troubleshooting

Error	What to do
<p>Reader doesn't work correctly in the operating system</p>	<p>Check the entries in the device manager after you've plugged in the Reader device (find correct device manager entries: End of Chapter 2.5, page 15)</p> <p>Please contact the FEIG Support:</p> <p>Phone: +49 (6471) 3109-0 Email: IDENTIFICATION-support@feig.de</p> <p>The FEIG® Support Team need further details, which you can find in the <i>List of Events</i> of your operating system.</p> <p><i>Settings</i> ⇒ <i>Control Panel</i> ⇒ <i>Administrative Tools</i> ⇒ <i>Event Viewer</i></p>  <p><i>List of Events:</i></p> 

Error	What to do															
<p>Application gets no data from the PC/SC interface</p>	<p>Check whether the <i>Smart Card Service</i> has been activated in your system environment:</p> <p><i>Settings</i> ⇒ <i>Control Panel</i> ⇒ <i>Administrative Tools</i> ⇒ <i>Services</i></p>  <p>The service which must be running is called „Smart Card“</p> <table border="1" data-bbox="518 913 1453 990"> <tr> <td>Shell Hardware Detection</td> <td>Provides notifications for AutoPlay hardware events.</td> <td>Started</td> <td>Automatic</td> <td>Local System</td> </tr> <tr> <td>Smart Card</td> <td>Manages access to smart cards read by this computer....</td> <td>Started</td> <td>Manual</td> <td>Local Service</td> </tr> <tr> <td>SSDP Discovery Service</td> <td>Enables discovery of UPnP devices on your home netw...</td> <td>Started</td> <td>Manual</td> <td>Local Service</td> </tr> </table> <p>If this service is not marked as „Started“, then click on the „Smart Card“ entry and the following window will appear.</p>  <p>Here you have the possibility to start the service by pressing the „Start“ button.</p>	Shell Hardware Detection	Provides notifications for AutoPlay hardware events.	Started	Automatic	Local System	Smart Card	Manages access to smart cards read by this computer....	Started	Manual	Local Service	SSDP Discovery Service	Enables discovery of UPnP devices on your home netw...	Started	Manual	Local Service
Shell Hardware Detection	Provides notifications for AutoPlay hardware events.	Started	Automatic	Local System												
Smart Card	Manages access to smart cards read by this computer....	Started	Manual	Local Service												
SSDP Discovery Service	Enables discovery of UPnP devices on your home netw...	Started	Manual	Local Service												

Error	What to do
<p>Only for CPR40.30-U</p> <p>Reader doesn't work correctly in PC/SC Mode and application gets no data from the PC/SC interface of the operating system.</p>	<p>Check the entries in the device manager after you've plugged in the Reader device (find correct device manager entries: End of Chapter 2.5, page 15)</p> <p>Check also with the CPRStart Software if the Reader is configured in Reader Mode: "ISOHost Mode". For this, select previously the "FEIG USB Driver", open then the CPRStart Software, detect the Reader and make then the described modification in the configuration.</p> <p>Check the configuration page "CFG1: Interface and Mode":</p>  <p>Press the "[0x80] Read" – Button to read out the EEPROM settings of the reader.</p> <p>If the Reader has the following settings:</p>  <p>you must switch the Reader to "ISOHost Mode" and store the changes in the EEPROM of the Reader by pressing the "[0x81] Write" – button.</p> <p>Now it should be possible to run the reader in PC/SC Mode when switching back to the "PC/SC USB driver".</p>