BARTEC

Mobile Computing

Installation Instructions

Software SDK and Demo for RFID Snap-on Modules MC 959x non Ex and MC 959x^{ex}-NI

BARTEC

Installation Instructions - Translation

Software SDK and Demo for RFID Snap-on Modules

Type B7-A2Z0-0020 to B7-A2Z0-0023

Type G7-A0Z0-0001 to G7-A0Z0-0004

for Mobile Computer (PDA):

- MC 959x non Ex
- MC 959x^{ex}-NI

Document No. B1-A2Z0-7D0002 / 359520
Status: 15 May 2014

Reservation: Technical data subject to change without notice. Changes, errors and misprints may not be used as a basis for any claim for damages.

BARTEC GmbH
Max-Eyth-Straße 16
97980 Bad Mergentheim
Germany

Phone: +49 7931 597-0
Fax: +49 7931 597-119

Contact:
Service-mobilecomputing@bartec.de
Download:
www.bartec.de/automation-download

- blank -

1. Notes on this Installation Instructions

Read carefully before putting the devices into operation.

The Installation Instructions is a constituent part of the product.

It contains important notes which are necessary for the perfect functioning of the device in operation.

The Installation Instructions is written for all people who program, commission, handle and service the product.

The illustrations in this Manual serve to make the information and descriptions more clear. They are not necessarily true to scale and may deviate slightly from the actual construction of the device.

Safety instructions and warnings are specially highlighted in this manual and marked by symbols.

ATTENTION
ATTENTION identifies a potentially damaging situation which, if not avoided, could damage the equipment or something in its environment.

Important instructions and information on effective, economical and environmentally compatible handling.

1.1 Languages

The original Installation Instructions is written in German. All other available languages are translations of the original user manual.

The Installation Instructions is available in German, English and French. If you require any other languages, please ask BARTEC or request them when placing the order.

1.2 Changes to the document

BARTEC reserves the right to alter the contents of this document without notice. No guarantee is given for the correctness of the information. In case of doubt, the German safety instructions shall apply because it is not possible to rule out errors in translation or in printing. In the event of a legal dispute, the “General Terms and Conditions” of the BARTEC group shall apply in addition.

The respective up-to-date versions of data sheets, manuals, certificates, EC Declaration of Conformity may be downloaded at www.bartec-group.com under products and solutions in the area “Automatic Technology” or ordered directly from BARTEC GmbH.

1.3 Information on the document

The figures used in this Installation Instructions are based on the software version 1.7.
The currently available version may differ from version 1.7 although this has no influence on the descriptions in this document.

1.4 Co-applicable documents – Set of documents

BARTEC

- User Manual (Document No. B1-A290-7D0002) for the Mobile Computer series MC 959x^{ex}-NI – The use of the explosion-protected version of the Mobile Computer series MC 959x^{ex}-NI is described in this User Manual.
- Technical datasheet (Document No. 03-0330-0619) for the explosion-protected version of the Mobile Computer series MC 959x^{ex}-NI – This technical datasheet contains the most important explosion-relevant technical data as well as general technical data.
- User Manual (Document No. B1-A2Z0-7D0001) for the RFID Snap-on Modules – The use of the RFID Snap-on Modules in the MC959x series is described in this User Manual.
- Technical datasheet (Document No. 03-0330-0749) for the explosion-protected version of the RFID Snap-on Modules – This technical datasheet contains the most important explosion-relevant technical data as well as general technical data.

Tectus

Description of the data protocol of the LF and HF Reader.

- LF Protocol description
  [TLB-30-Commands].pdf - Scotty Reader User Manual Version 1.4
- HF Protocol description
  Datenprotokoll.txt

Feig Electronics

Description of the data protocol of the UHF Reader.

- ID FEISC - Manual (Document No. H9391-41d-ID-B.doc) Software Support for OBID i-scan® and OBID® classic-pro
- ID FEUSB – Manual (Document No. H00501-16d-ID-B.doc) Software Support for USB Universal Serial Bus

2. Software description

A Software Development Kit (SDK) is available for software development. The package contains all requisite files in order to implement the RFID Reader in an application.

A demo in Open Source is also contained which can be used for demonstration purposes. The demo also serves as a master for application development.

The SDK contains additional descriptions from the company Tectus and the company Feig on the respective data protocols and commands for the different available versions.

ATTENTION

The RFID demo software will only function after correct installation.

▶ It is only possible to use the RFID Snap-on Module on the Mobile Computer outside of a docking station.

The demo software automatically recognises a snapped-on RFID Snap-on Module.

This Installation Instructions describes the SDK and the use of the Demo.

Features of Demo

– Support of all popular RFID standards
– Simple implementation to test/demonstrate read/write process
– Simulation of keypad entry (reading in of transponder data in Word, Excel or other applications)
– Storage of transponder data in a database
– Programming in Open Source to show the function

2.1 Supported RFID standards

The SDK software supports the following RFID standards in the specified frequency ranges.

<table>
<tr><th colspan="2">LF Reader</th><th>HF Reader</th><th>UHF EU and US Reader</th></tr>
<tr><td colspan="2">Type B7-A2Z0-0020
Type G7-A0Z0-0001</td><td>Type B7-A2Z0-0021
Type G7-A0Z0-0002</td><td>Type B7-A2Z0-0022 (US)
Type B7-A2Z0-0023 (EU)
Type G7-A0Z0-0003 (EU)
Type G7-A0Z0-0004 (US)</td></tr>
<tr><td colspan="4">Frequency range</td></tr>
<tr><td colspan="2">125 / 134 KHz</td><td>13.56 MHz</td><td>EU: 865.6 to 867.5 MHz
US: 902 to 928 MHz</td></tr>
<tr><td colspan="4">Supported standards</td></tr>
<tr><td>HITAG S256</td><td>ISO 117845</td><td rowspan="4">ISO 14443
(e.g. Mifare Ultralight)</td><td rowspan="8">EPC Gen 2</td></tr>
<tr><td>HITAG S 2 kb</td><td>ISO Animal</td></tr>
<tr><td>HITAG 1</td><td>ISO 11784/5</td></tr>
<tr><td>HITAG 2</td><td>EM 4450/4550</td></tr>
<tr><td rowspan="2">Q5</td><td rowspan="2">EM4xxx
(UNIQUE)</td><td rowspan="4">ISO 15693</td></tr>
<tr><td>ATA5567</td><td>HDX -RO</td></tr>
<tr><td>EM4305</td><td>HDX (Multipage)</td></tr>
<tr><td>BDE</td><td>FDX-B</td></tr>
</table>

2.2 Definition of the terms

RFID	Radio Frequenzy Identification
LF	Low Frequency
HF	High Frequency
UHF	Ultra High Frequency
UHF (EU)	UHF frequency range for Europe
UHF (US)	UHF frequency range for North America
SDK	Software Development Kit
WM	Windows Mobile
ISO …	International series of standards for wireless chip cards
EPC Gen 2	Second generation of the EPC standard
C#	Programming language C-Sharp
Tag/Transponder	RFID Tag/Transponder for product labelling on which data are stored.
RW	Read/Write transponder
RO	Read/Only transponder

3. System Requirements

3.1 Requirements

Requisite components:
Mobile Computer of the MC 959x series and an RFID Snap-on Module

Mobile Computer

Device	WWAN	Type	Manufacturer
MC 9590ex-NI	none	B7-A29*-****/********	BARTEC GmbH
MC 9596ex-NI	HSDPA	B7-A29*-****/********	BARTEC GmbH
MC 9598ex-NI	CDMA	B7-A29*-****/********	BARTEC GmbH
MC 9590	none	MC9590-K**********	Motorola Solutions
MC 9596	HSDPA	MC9596- K**********	Motorola Solutions
MC 9598	CDMA	MC9598- K**********	Motorola Solutions

The Mobile Computers are described as MC 959x series in this Installation Instructions.

RFID Snap-on Modules

Type number	Version	Type	Frequency range
B7-A2Z0-0020	Ex	RFID LF Reader	125 kHz / 134 kHz
B7-A2Z0-0021	Ex	RFID HF Reader	13.56 MHz
B7-A2Z0-0022	Ex	RFID UHF (US) Reader	902 to 928 MHz
B7-A2Z0-0023	Ex	RFID UHF (EU) Reader	865.6 to 867.5 MHz
G7-A0Z0-0001	non Ex	RFID LF Reader	125 kHz / 134 kHz
G7-A0Z0-0002	non Ex	RFID HF Reader	13.56 MHz
G7-A0Z0-0003	non Ex	RFID UHF (EU) Reader	865.6 to 867.5 MHz
G7-A0Z0-0004	non Ex	RFID UHF (US) Reader	902 to 928 MHz

3.1.1 Operating system on Mobile Computer

Windows Mobile WM6.5

3.1.2 Operating system on PC

All popular operating systems on which an application development for C# runs and which supports data communication with Mobile Computers based on Windows Mobile.

3.1.3 Synchronisation software

“Active Sync” or “Windows Mobile Device Center”

Both versions are from Microsoft and can be downloaded free of charge from www.microsoft.com.

3.2 Connection to PC

The requisite synchronisation software is available as a download free of charge from Microsoft. The synchronisation software is required to connect a mobile terminal device on which a Microsoft operating system such as Windows Mobile 6.5 runs with a PC in order to synchronise data, install programs or exchange data.

3.2.1 Active Sync

The installation of ActiveSync (Version 4.5 or higher) on the host computer is recommended for the communication with different computers installed under Windows XP or earlier operating systems.

ActiveSync synchronises the information from the Mobile Computer with the host computer. Any changes made on the Mobile Computer or a host computer exist on both devices following synchronisation.

ActiveSync is available for download as freeware at www.microsoft.com.

Supporting operating systems: Windows XP or earlier operating systems.

Further information on ActiveSync may be found on the Microsoft website.

3.2.2 Windows Mobile Device Center

The installation of the Windows Mobile Device Center on the host computer is recommended for the communication with different host computers installed under Windows Vista, Windows 7 or Windows 8.

The Windows Mobile Device Center synchronises the data from the Mobile Computer with the host computer. Any changes made on the Mobile Computer or a host computer exist on both devices following synchronisation.

The Windows Mobile Device Center is available for download as freeware at www.microsoft.com.

Supporting operating systems: Windows Vista, Windows 7 or Windows 8

Further information on the Windows Mobile Device Center can be found on the Microsoft website.

4. SDK – Software Development Kit

4.1 SDK

4.1.1 Programming language

The programming language used is C# (C-Sharp).

All available files/sources of the SDK are in C#.

4.1.2 Development environment

The Demo is programmed with Visual Studio 2008.

4.1.3 LF protocol

Based on command basis LL (Low Level).

4.1.4 HF protocol

Based on command basis LL (Low Level).

4.1.5 SDK structure

The SDK comprises the following parts:

- *Cab Files for failure message*
- *Driver USB for PDA*
  USB driver for the Mobile Computer. Is required so that the USB interface of MC 959x can recognise the RFID Snap-on Module.
- *RFID-Demo V1.7 Sourcen*
  Comprises all requisite sources for application developments.
- *Sourcen-Protocol-Commands*
  Additional description for the protocols and commands.
  Comprises additional descriptions on the data protocols and commands.
- *Setup - RFID-Demo V1.7 UHF LF HF*
  Installation file for the Demo application.
- *SQL CE 3.5 Windows Mobile 6.0*
  All requisite SQL files so that the Demo application functions correctly.

4.1.6 SDK Download

The SDK can be downloaded free of charge from the BARTEC download page.

http://www.bartec.de/automation-download/

to be found under category::

- Mobile Computer
- MC 959x^{ex}-NI
- RFID

5. Demo Application

5.1 Installation of the Demo

ATTENTION

The RFID demo software will only function after correct installation.

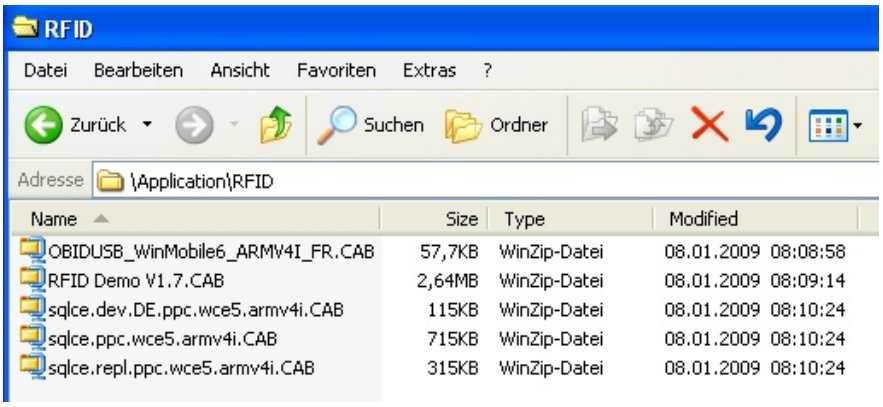
- ▶ It is only possible to use the RFID Snap-on Module on the Mobile Computer outside of a docking station.

The demo software automatically recognises a snapped-on RFID Snap-on Module.

5.1.1 Copy of the files required on the Mobile Computer

The files required can be copied with the assistance of synchronisation software (e.g. Active Sync) or with the assistance of an SD card on the Mobile Computer.

We recommend that an RFID folder be created on the Mobile Computer in the directory application and that all files be copied to this directory.



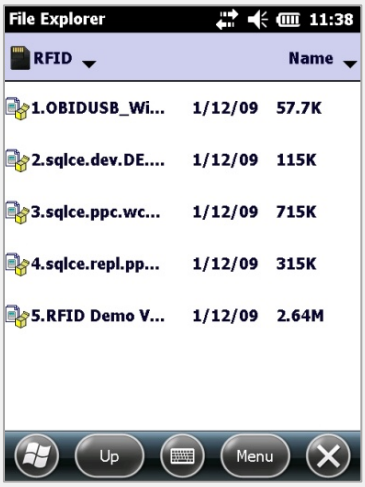
5.1.2 Installation of the files required on the Mobile Computer

It is important to install the files in the correct order.

We recommend that all files be installed in the application directory.

1.OBIDUSB_WinMobile6_ARMV4I_FR.CAB
2.sqlce.dev.DE.ppc.wce5.armv4i.CAB
3.sqlce.ppc.wce5.armv4i.CAB
4.sqlce.repl.ppc.wce5.armv4i.CAB
5.RFID-Demo *V1.7.CAB*

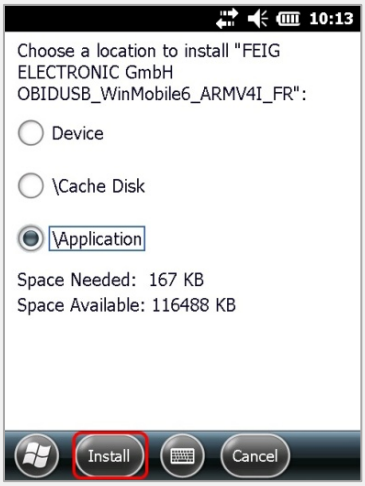
Installation procedure:



- ▶ Move to "File Explorer" on the Mobile Computer.
- ▶ For installation select the files in the "File Explorer" one after the other.

The installation process by way of example:
"1.OBIDUSB_WinMobile6_ARMV4I_FR.CAB"

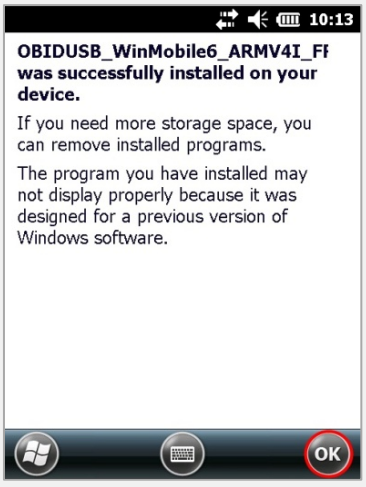
The procedure is identical for all files.



The menu to set the installation path opens.

- ▶ Recommended directory "Application".
- ▶ Tap "Install" and continue with the installation process.

The installation progress is shown by a progress bar.



After successful installation a message appears showing that the installation has been completed.

- ▶ Tap "OK".

The File Explorer opens.

- ▶ Install the remaining files.

After installing all files the icon for the RFID Demo Vx.x appears in the start menu.

5.2 Function of the Demo

The RFID Demo can be started without snapped-on RFID Snap-on Module but will not function. The RFID Demo will only function if the RFID Snap-on Module has been snapped on.

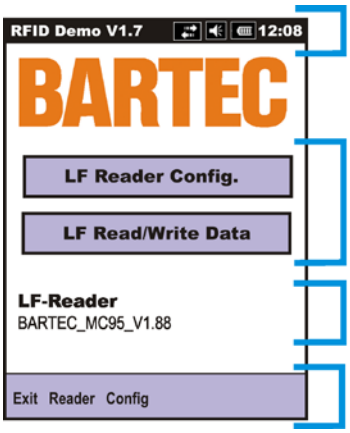
5.2.1 Start-up Demo

- ▶ Tap "Start" on the "Today screen" to move to the start menu.
- ▶ In the start menu scroll down and start the program and tap on "RFID Demo Vx.x".

The start-up screen of the RFID Demo consists of several menus which are described in more detail in the following sections.

5.2.2 Start-up screen

The start-up screen is shown after starting the RFID Demo. The start-up screen consists of several menus.



Head bar

RFID Demo V 1.7	Name of the application and version
	Status display for connections
	Adjustment of volume
	Battery's charge status
12:08	Change of date and time, setting of the alarm function etc.

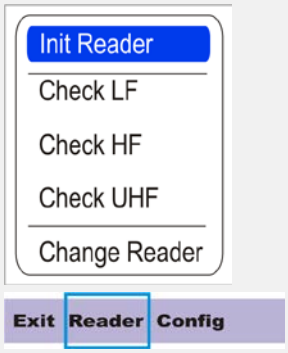
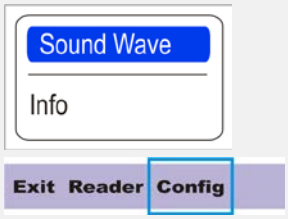
Menu

LF Reader Config.	Configuration and settings for the different RFID standards.
LF Read/Write Data	Reading/writing of transponders to a database

Recognized RFID Reader

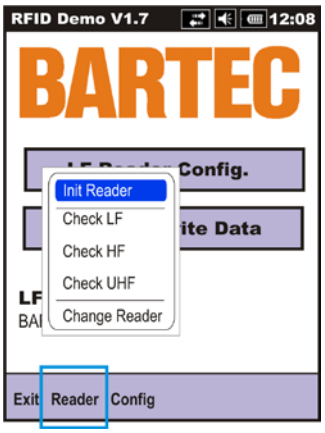
LF-Reader BARTEC_MC95_V1.88	LF Reader stating Reader version
HF-Reader [SNR] 000001 (Tectus MC95-HF v1.0)	HF Reader stating Reader version
UHF-Reader Reader Type:51 / ID ISC.MU95	UHF Reader stating Reader version

Foot bar

	Exit the RFID Demo application
	Menu to recognise/initialise the RFID Reader manually or to change the RFID Reader in operation.
	Menu to request versions info or to turn the sound for the Read/Write process ON or OFF.

5.2.3 Initialisation/recognition of the RFID Snap-on Module

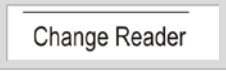
A snapped-on RFID Snap-on Module is automatically recognised when the RFID Demo is started.



It is possible to conduct the initialisation/recognition manually if an automatic recognition has not taken place.

▶ Tap on option "**Reader**".

A search through all types can be started with "**Init Reader**" in the menu. If the RFID Reader type is known, it can also be selected directly.

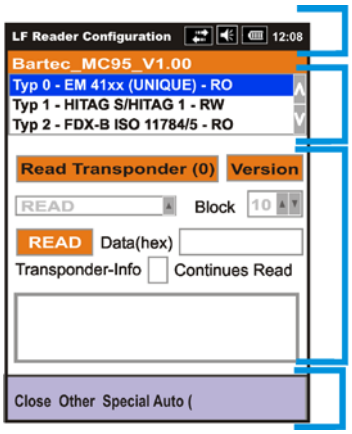
	The RFID Reader type is not known.
	It is known that this is a LF Reader.
	It is known that this is a HF Reader.
	It is known that this is a UHF Reader.
	Permits the replacement during current operation.

5.2.4 Reader Config. / Reader Configuration

Reader Config.	Configuration and settings for the different RFID standards.

The user interface of the "Reader Config." menu distinguishes between the different RFID Readers only in the selection of the supported standards. The other functions are identical.

The menu is used to set the standard of the RFID transponder. A simple Read/Write test can be made in the menu whereby no data are stored on the Mobile Computer.



Head bar

Supported standards

Read/Write menu

Foot bar

Supported standards

Typ 0 - EM 41xx (UNIQUE) - RO Typ 1 - HITAG S/HITAG 1 - RW Typ 2 - FDX-B ISO 11784/5 - RO	Selection menu for the supported LF Standards
ISO 15693 -RW ISO 14443 (Mifare) - RW	Selection menu for the supported HF Standards
EPC Gen 2	Selection menu for the supported UHF Standards

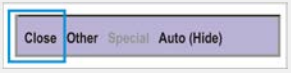
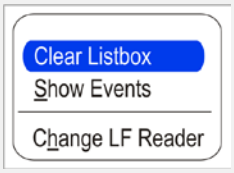
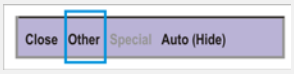
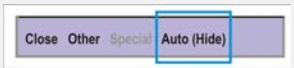
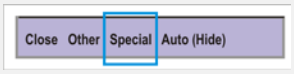
Read/Write menu

By way of example of HITAG S/HITAG 1 RW RFID Transponder

Read Transponder (0)	"Read Transponder" = reading out of the transponder ID ▶ Start the "Read Transponder" function if a transponder is in the Read/Write area of the aerial.
TAG-Nr. 723C231D	The ID number of the read transponder is shown in the "Transponder Info" dialog box. Example: TAG No.: 723C231D

	The function to select the block is not provided in all standards. The HITAG S/Hitag1 RW Transponder used in the example is a Read-Write transponder. In these transponders, the memory area is divided in different memory blocks. These can be read out by selecting the block number.
	"READ" = reads out the transponder ID and the data ▶ Start the "Read Transponder" function if a transponder is in the Read/Write area of the antenna.
	The ID number and the data from the read transponder are shown in the "Transponder Info" dialog box. Example: TAG No.: 723C231D Tag Data: 31313131
	The data of the selected transponder (block) is similarly shown in the "Data (hex)" dialog box. Example: Data(hex): 31313131
	▶ Save data on transponder.
 	▶ In order to save data on a R/W Transponder, an entry must first be made in the "Data(hex)" dialog box. A maximum of 8 hex characters is possible in the Demo. ▶ In the drop-down menu, the user can move between the "READ" and "WRITE" function. The selection "READ" then changes to "WRITE". ▶ Select "WRITE" to write the data in the dialog box "Data(hex)" to the transponder.
	▶ If the check box is activated, the Read function is moved to the "Continues Read" function. ▶ To complete the process, remove tick from the check box.

Foot bar

	Close – Back to start-up screen
 	Other – Opens the Drop Down menu Clear Listbox – All data in the "Transponder Info" dialog box are deleted. Show Events – Shows detailed information in the "Transponder Info" dialog box. Change LF Reader – Permits the exchange of the used RFID Reader.
 	Auto (Hide Form) – The RFID Demo continues to run in the background. Using this function, the Demo can be used, for example, to read data in Excel, Word or another application.
	Is only available in certain standards where further settings can be made. e.g. password at EM4450/4550 or HITAG 2 Standard.

Reader Config. / Reader Configuration

	Reading/Writing of data from a transponder to a database on a Mobile Computer.

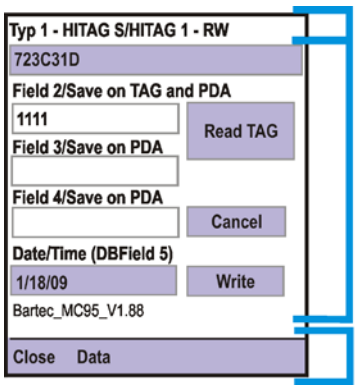
The user interface of the "Read/Write Data" menu does not distinguish between the different RFID Readers.

The data in this menu are stored in a database on the Mobile Computer.

Read-Only Transponder –
Data are stored only in the database on the Mobile Computer.

Read-Write Transponder –
The data are stored on the transponder and similarly in the database on the Mobile Computer.

The size of the storable data in this Demo software is restricted to 8 hex characters per field. The size of the available memory will also depend on the transponder used.

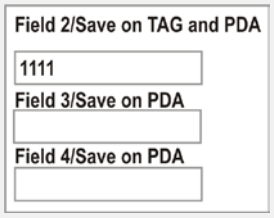
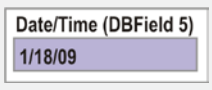


Supported standards

Which standard was set in the "**Reader Config.**" menu is shown in the dialog box.

Read/Write menu

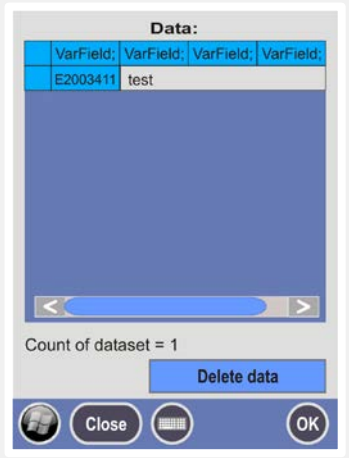
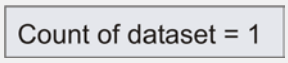
By way of example of a HITAG S/HITAG 1 RW RFID Transponder.

	Display of the Transponder ID
	▶ Start the "**Read Transponder**" function if a transponder is in the Read/Write area of the aerial. 3 fields which may be used for data entry. The data entry is restricted to 8 hex characters per field. **Field 2:** Data are saved on the transponder (only RW) and the Mobile Computer. **Field 3:** Data are saved only on the Mobile Computer. **Field 4:** Data are saved only on the Mobile Computer.
	Display of date and time. The data are stored in a database in the "**DBField 5**" field.

Foot bar

	Close – Back to the start-up screen
	Data – Opens the database on the Mobile Computer

5.2.5 Database

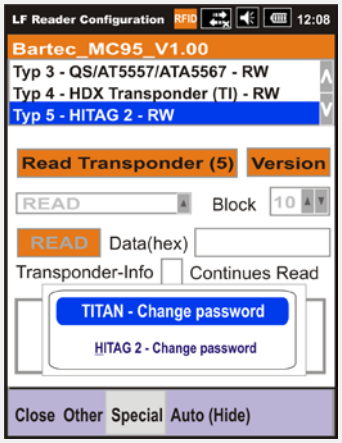
	User interface of the database Every line represents a dataset. In the case of standards such as HITAG S different memory areas (blocks) may be selected.
	Number of datasets in the database
	Delete all datasets in the database
	Exit database to return to "Read/Write Data" menu.

6. Further Options

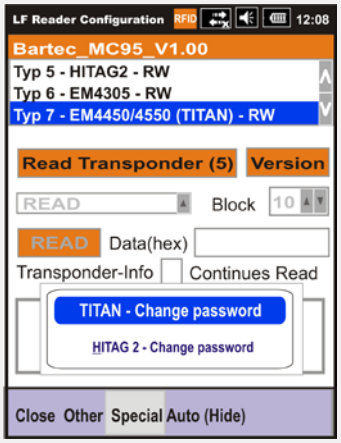
6.1.1 Change password for EM4450/4550 and HITAG 2

After selecting EM4450/4550 or HITAG 2, the password can be changed via the "Special" option in the "Reader Config." menu – Change password.

HITAG 2



EM4450/4550



Depending on the selected transponder type the following menu will appear:

Changing the password:

- Enter the current password in the "Actual Password" dialog box.
- Enter the new password in the "New Password" dialog box.
- Confirm change with "Write Password to Tag".

The standard passwords are as follows:

HITAG 2: 4D494B52

EM4450: 00000000.

A transponder which has no standard password, after reading in the transponder the standard password must be entered in the "Actual Password" dialog box and tap on "Write Password to Tag" to close the procedure.

Tap "Close" for "OK" to exit the menu.

7. Additional Information

7.1 Links

http://www.bartec-group.com

BARTEC website

To download technical datasheets and certificates.

http://www.bartec.de/automation-download/index.htm

BARTEC Download page

Product-specific downloads for the MC959x^{ex}-NI are available in the category for the Mobile Computers.

- SDK RFID Snap-on Module for MC 959x series
- Documentation
- Original Motorola Software

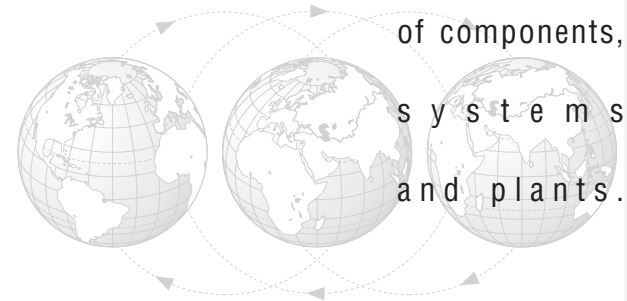
http://www.Microsoft.com

Microsoft website for download:

- Active Sync
- Windows Mobile Device Center

BARTEC

BARTEC protects people and the environment by the safety of components, systems and plants.



BARTEC GmbH
Germany

Max-Eyth-Straße 16
97980 Bad Mergentheim

Phone: +49 7931 597-0
Fax: +49 7931 597-119

info@bartec.de
www.bartec-group.com

EN_B1-A220-7D0002-05/2014-Automation Technology-359520