



Mobile Computing

Installation Instructions

Software SDK and Demo RFID option MC 92NO^{Ex} series

Installation Instructions - Translation

Software SDK and Demo RFID Option for MC 92N0^{ex}

MC 92N0 ^{ex} -IS	Type 17-A1A2-R***/*
MC 92N0 ^{ex} -IS	Type 17-A1A3-R***/*
MC 92N0 ^{ex} -NI	Type B7-A2A4-R***/*

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1. Notes on these Installation Instructions

Read carefully before putting the devices into operation.



The Installation Instructions form a constituent part of the product.

They contain important notes which are necessary for the perfect functioning of the device in operation.

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

The Installation Instructions are 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 these Installation Instructions are based on the software version 1.2.1. The currently available version may differ from version 1.2.1 although this has no influence on the descriptions in this document.

1.4 Co-applicable documents – Set of documents

BARTEC

- User Manual (Document No. 11-A1A2-7D0002) for the Mobile Computer series MC 92N0^{ex}-NI – The use of the explosion-protected version of the Mobile Computer series MC 92N0^{ex}-NI is described in this User Manual.
- Technical datasheet (Document No. 03-0330-****) for the explosion-protected version of the Mobile Computer series MC 92N0^{ex}-NI – This technical datasheet contains the most important explosion-relevant technical data as well as general technical data.
- Firmwareloader - REV 2_Additional description_Part 4_Firmwareloader.pdf
A description of how the firmware loader functions. It is only required when the RFID LF option is used.

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

Feig Electronics

Description of the data protocol of the UHF Reader.

- ID FEISC-LIB - Manual (Document No. H9391-43d-ID-B.pdf and H9391-43e-ID-B.pdf)
Software Support for OBID i-scan® and OBID® classic-pro
- ID FECOM-LIB – Manual (Document No. H80592-28d-ID-B.pdf and H80592-28e-ID-B.pdf)
Software Support for serial interface
- ID FEUSB-LIB - Manual (Document No. H00501-17d-ID-B.pdf and H00501-17e-ID-B.pdf)
Software-Support for USB (Universal Serial Bus)
- Tutorial Manual
The art of Programming for OBID i-scan® and OBID® classic-pro

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 option on the Mobile Computer outside of a docking station.



The demo software automatically recognises a RFID Reader.
These Installation Instructions describe 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.

LF Reader		HF Reader	UHF EU and US Reader
Frequency range			
125 / 134 KHz		13.56 MHz	EU: 865.6 to 867.5 MHz US: 902 to 928 MHz
Supported standards			
Firmware Version Btrw-rw.V.1.40.frm		ISO 14443 (e. g. Mifare Ultralight)	EPC Gen 2
HITAG S256	HITAG S 2 kb		
HITAG 1	HITAG 2		
Q5	ATA5567		
EM4305			
Firmware Version Btrw-hdx.V.1.40.frm		ISO 15693	
HDX -RO	HDX (Multipage)		
FDX-B	EM4xxx (UNIQUE)		
BDE	ISO 117845		
ISO Animal			
Firmware Version Btrw-ti.V.1.40.frm			
EM 4450/4550	EM4xxx (UNIQUE)		
FDX-B	BDE		
ISO 117845	ISO Animal		

2.2 Definition of the terms

RFID	Radio Frequency 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

A Mobile Computer from the MC 92N0^{ex} series with an RFID module is required:

Mobile Computer

Device	Type	Manufacturer
MC 92N0 ^{ex} -NI	B7-A2A4-R*** /*****	BARTEC
MC 92N0 ^{ex} -IS	17-A1A2-R*** /*****	BARTEC
MC 92N0 ^{ex} -IS	17-A1A3-R*** /*****	BARTEC



The Mobile Computers are described as MC 92N0^{ex} series in these Installation Instructions.

3.1.1 RFID Version/Option

One of the RFID options listed in the following is required.

Version	Available for	Frequency range
Internal RFID LF Reader	Div 2 / Zone 2/22 UL Division 1	125 kHz / 134 kHz
Extended RFID LF Reader	Div 2 / Zone 2/22 UL Division 1 ATEX / IECEx Zone 1	125 kHz / 134 kHz
Extended RFID HF Reader	Div 2 / Zone 2/22 UL Division 1 ATEX / IECEx Zone 1	13.56 MHz
Extended RFID UHF (US) Reader	Div 2 / Zone 2/22 UL Division 1 ATEX / IECEx Zone 1	902 to 928 MHz
Extended RFID UHF (EU) Reader	Div 2 / Zone 2/22 UL Division 1 ATEX / IECEx Zone 1	865.6 to 867.5 MHz
Integrated RFID UHF (US) Reader + mounted antenna	Div 2 / Zone 2/22 UL Division 1 ATEX / IECEx Zone 1	902 to 928 MHz
Extended RFID UHF (EU) Reader + mounted antenna	Div 2 / Zone 2/22 UL Division 1 ATEX / IECEx Zone 1	865.6 to 867.5 MHz

3.1.2 Operating system on Mobile Computer

Windows Mobile WM6.5.3 or Windows CE7.0

3.1.3 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.

3.1.4 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 6.5.3 or Windows CE7. 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:

- **MC92N0 SDK – Protocol Commands**
- *Contains additional descriptions relating to the data protocols and commands for LF, HF and UHF.*
- **MC92N0 CE - RFID Demo for the Vx.x.cab CE operating system**
Demo application installation file (.cab).
Demo Source Files
- *SQL files which are required for the demo function*
- **MC92N0 WEH6.5 - RFID demo for the Vx.x.cab WEH operating system**
Demo application installation file (.cab).
Demo Source files
SQL files which are required for the demo function
Additional example application

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 92N0^{ex}-NI
- RFID SDK

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 option on the Mobile Computer outside of a docking station.

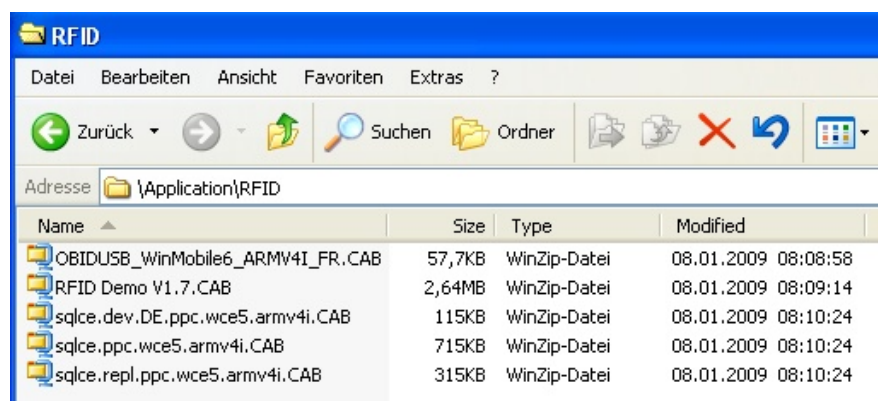


The demo software automatically recognises the RFID Reader.
These Installation Instructions describe the SDK and the use of the Demo.

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.



Difference in installation between WEH6.5.3 and CE7.0



Each of the two operating systems has its own RFID Demo.cab file.

WEH6.5.3 RFID Demo V1.2.1_Mobile.CAB

CE7.0 RFID Demo V1.2.1_CE.CAB



Firmware loader

The firmware loader is only required when the RFID LF option is used. The firmware can be changed with the loader. The firmware loader comes with its own description.

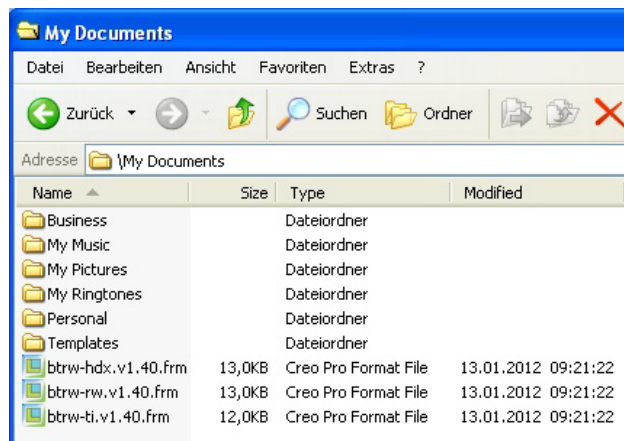


- Firmware files for LF
- As standard, the “btrw-hdx.v1.40.frm” file is installed with the demonstration. If other standards are required, another firmware file must be installed for LF.

The following are available:

- btrw-hdx.v1.40.frm
- btrw-rw.v1.40.frm
- btrw-ti.v1.40.frm

The firmware files must be copied into the “My Documents” folder so that the firmware can be changed by means of the firmware loader.



Firmware files for HF and UHF

The firmware files for HF and UHF are integrated in the demo and do not need to be installed separately.

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.

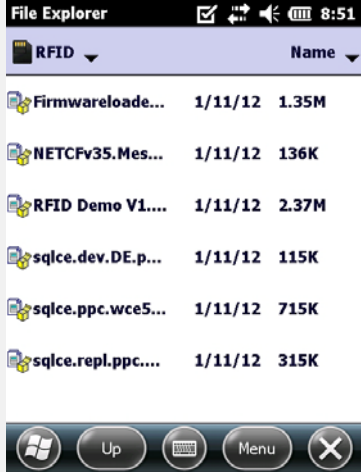
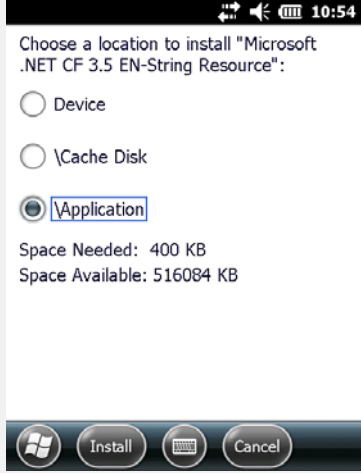

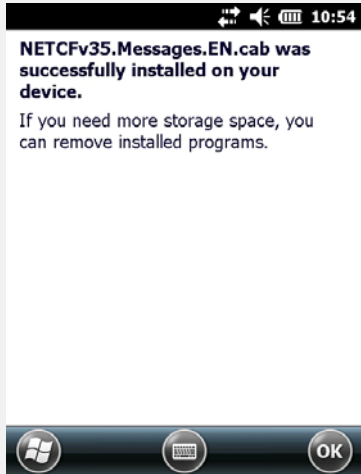
For WEH6.5.3

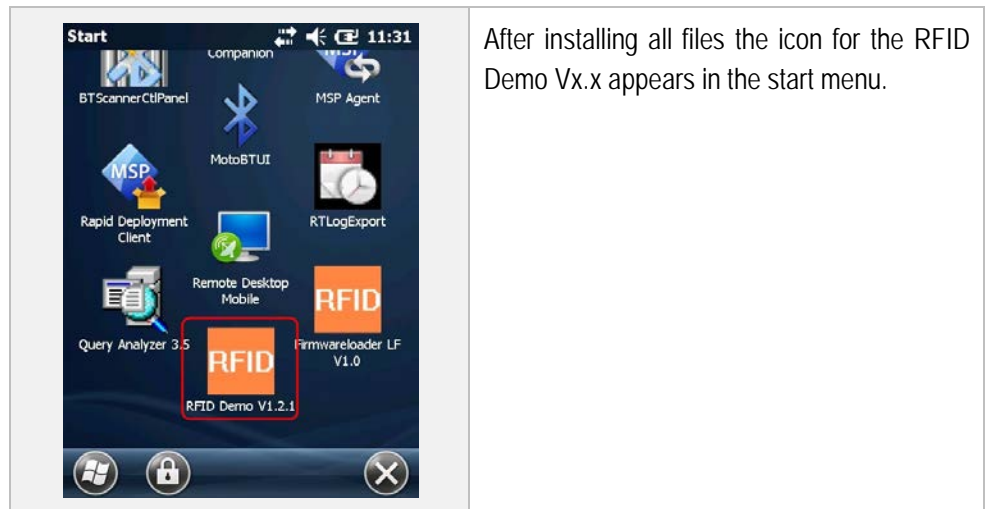
1. NETCFv35.Messages.EN.wm.cab
2. sqlce.dev.DE.ppc.wce5.armv4i.CAB
3. sqlce.ppc.wce5.armv4i.CAB
4. sqlce.repl.ppc.wce5.armv4i.CAB
5. RFID Demo V1.2.1_Mobile.CAB
6. Firmwareloader LF V1.0.CAB

For CE7.0

1. NETCFv35.Messages.EN.wm.cab
2. sqlce.dev.DE.wce5.armv4i.CAB
3. sqlce.wce5.armv4i.CAB
4. sqlce.repl.ppc.wce5.armv4i.CAB
5. RFID Demo V1.2.1_CE.CAB
6. Firmwareloader LF V1.0.CAB

Installation procedure:

	<ul style="list-style-type: none"> ► Move to "File Explorer" on the Mobile Computer. ► For installation select the files in the "File Explorer" one after the other. <p>The installation process by way of example: "1. NETCFv35.Messages.EN.wm.cab"</p> <p>The procedure is identical for all files.</p>
	<p>The menu to set the installation path opens.</p> <ul style="list-style-type: none"> ► Recommended directory "Application". ► Tap "Install" and continue with the installation process.
	<p>The installation progress is shown by a progress bar.</p>
	<p>After successful installation a message appears showing that the installation has been completed.</p> <ul style="list-style-type: none"> ► Tap "OK". <p>The File Explorer opens.</p> <ul style="list-style-type: none"> ► Install the remaining files.

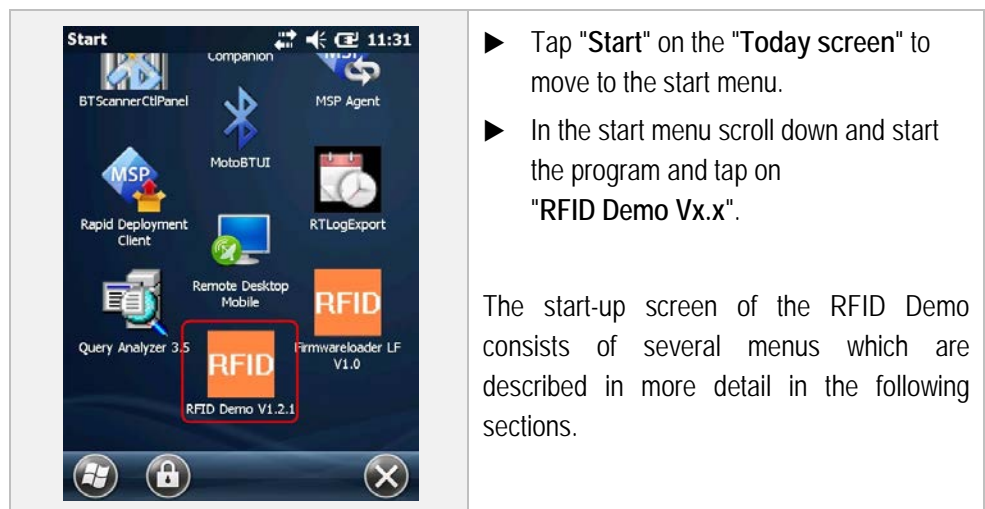


5.2 Function of the Demo



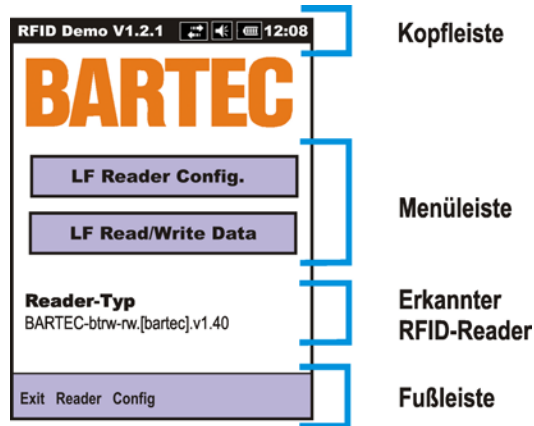
The RFID reader can be used only outside the cradle. The RFID reader uses internally the same COM interface that is necessary for communication with the cradle.

5.2.1 Start-up Demo



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.



Header

RFID Demo V1.2.1	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.


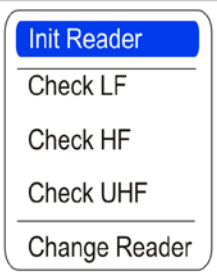
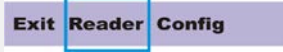
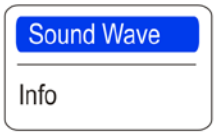

Menu

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-btrw-rw.[bartec].v1.40	LF reader with specification of the Reader version and the installed firmware version. BARTEC-btrw-rw.[bartec].v1.40 BARTEC-btrw-hdx.[bartec].v1.40 BARTEC-btrw-ti.[bartec].v1.40
HF Reader Reader Type:80 / ID C'R.M02	HF reader with specification of the reader version Reader type:80 / ID CPR.M02
UHF Reader Reader Type:50 / ID ISC.MU02	UHF reader with specification of the reader version Reader type: 50 / ID ISC.MU02

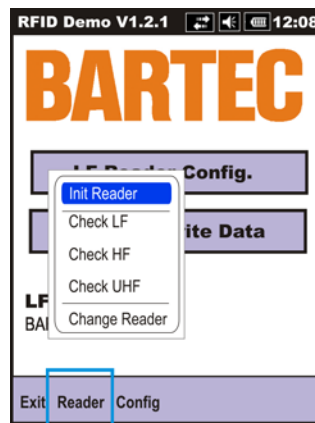
Footer

	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.

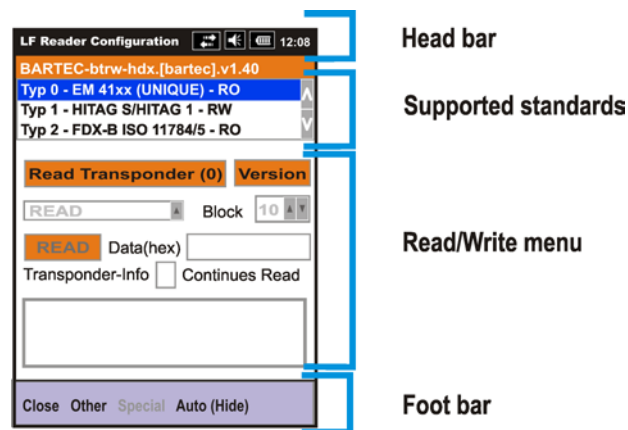
	The RFID Reader type is not known.
	It is known that this is a LF Reader.
	It is known that this is a HF Reader.
	It is known that this is a UHF Reader.
	This function is not available because the RFID reader is permanently mounted.

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.






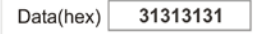




Supported standards

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

	<p>The function to select the block is not provided in all standards.</p> <p>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.</p>
	<p>"READ" = reads out the transponder ID and the data</p> <ul style="list-style-type: none"> ▶ Start the "Read Transponder" function if a transponder is in the Read/Write area of the antenna.
	<p>The ID number and the data from the read transponder are shown in the "Transponder Info" dialog box.</p> <p>Example: TAG No.: 723C231D Tag Data: 31313131</p>
	<p>The data of the selected transponder (block) is similarly shown in the "Data (hex)" dialog box.</p> <p>Example: Data(hex): 31313131</p>
	<ul style="list-style-type: none"> ▶ Save data on transponder.
 	<ul style="list-style-type: none"> ▶ 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.
	<ul style="list-style-type: none"> ▶ 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.

Footer

	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

Read/Write menu

Footbar

Supported standards



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

Read/Write menu

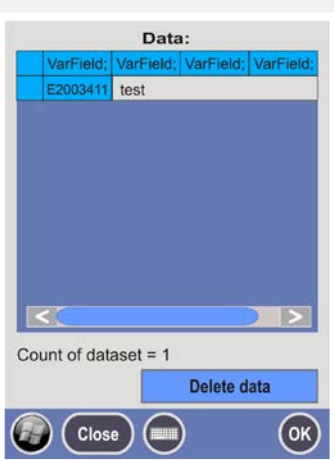
By way of example of a HITAG S/HITAG 1 RW RFID Transponder.

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

Footer

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

5.2.5 Database

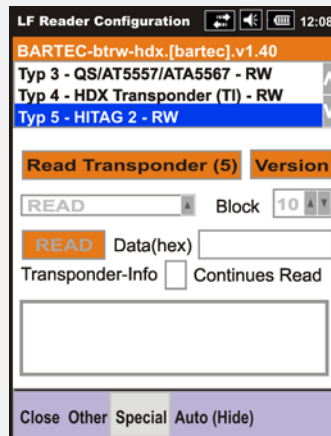
	User interface of the database Every line represents a dataset. In the case of standards such as HITAG S different memory areas (blocks) may be selected.
Count of dataset = 1	Number of datasets in the database
Delete data	Delete all datasets in the database
Close	Exit database to return to "Read/Write Data" menu.

6. Further Options

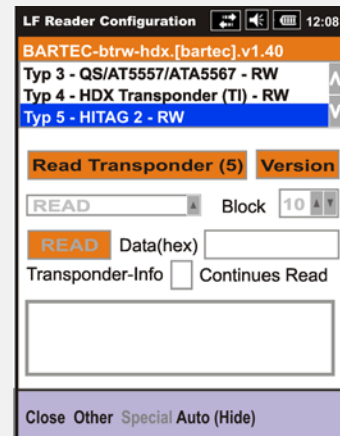
6.1.1 Change password for EM4450/4550 and HITAG 2

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

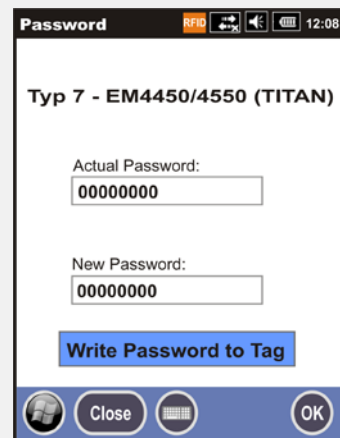
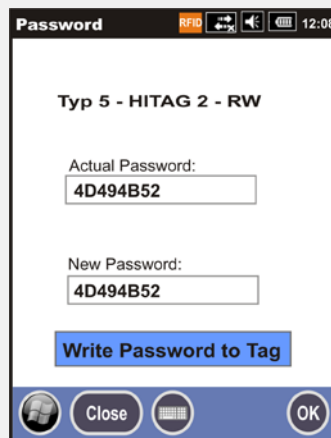
HITAG 2



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 MC 92N0^{ex} series are available in the category for the Mobile Computers.

- SDK RFID option for MC 92N0^{ex} series
- Documentation
- Original Motorola Software

<http://www.Microsoft.com>

Microsoft website for download:

- Active Sync
- Windows Mobile Device Center

BARTEC protects
people and
the environment
by the safety

of components,
systems
and plants.

