

OEM-DESFire Series

13.56 MHz OEM RFID Module

Demo Software Manual

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1 Operation Examples

1.1 USB Driver Installation

If the device is connected to a PC for the first time, it can take some time for automatic installation VCP driver. If this is the case, pls. wait until this is fully done.

In rare cases it is possible, that automatic installation fails. Then perform a manual installation.

You can download the latest drivers here: <https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers>

The NEO2 family used a different USB IC: https://www.wch-ic.com/downloads/CH341SER_EXE.html

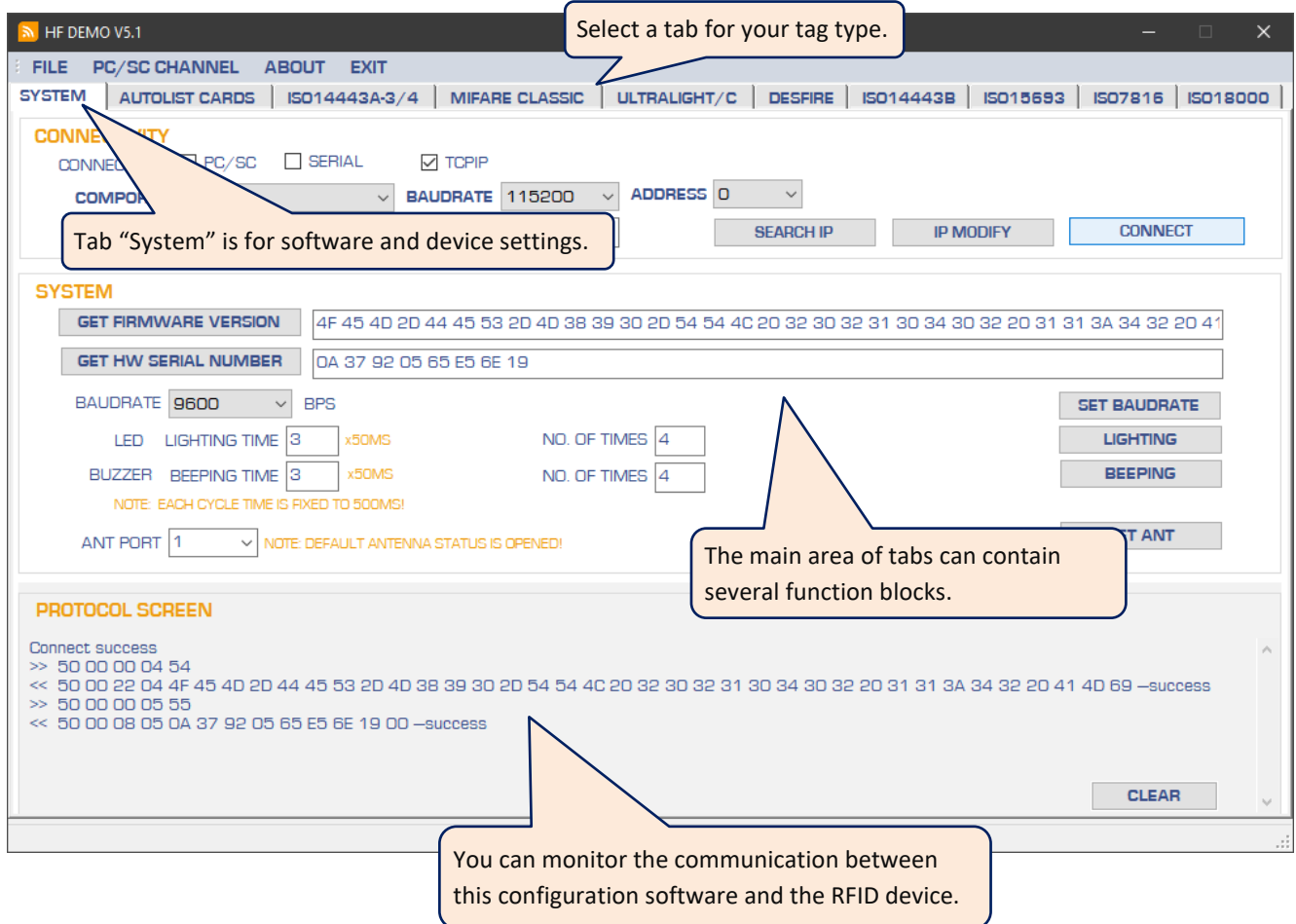
1.2 Driver Installation PC/SC

Support for PC/SC is part of Windows OS. The automatic installation of the device driver takes much longer than for the serial interface (VCP). If you plug in the device for the first time, please wait until all processes finish.

If you place an RFID tag to a PC/SC device for the first time, further drivers need to be installed.

Please be patient until this is finished.

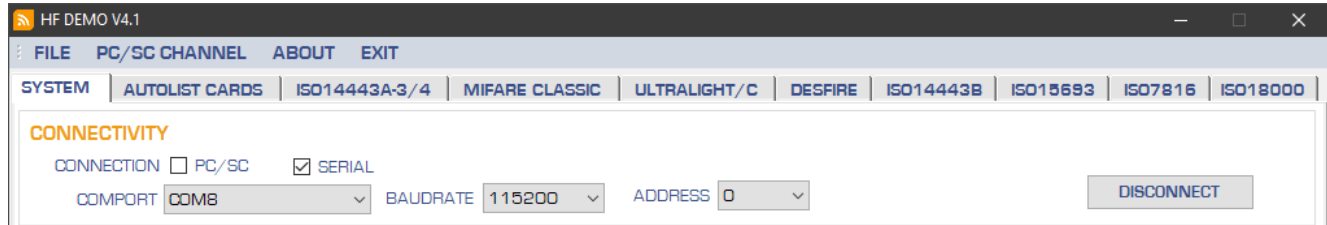
1.3 Software Screen Overview



2 Connect with Device

2.1 Establishing Connection (VCP)

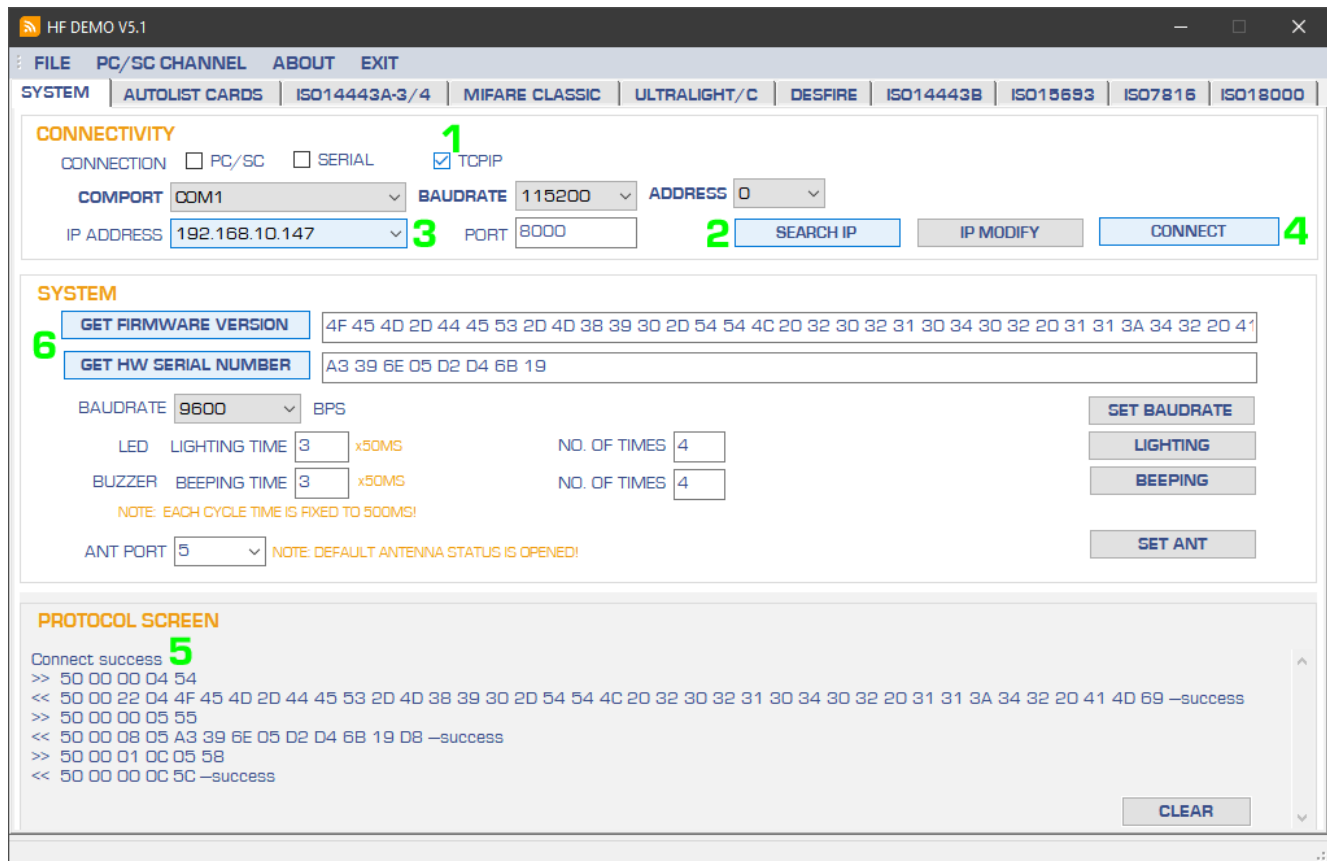
Plug in the RFID device first, then start the demo software.



The factory default setting for DESFire devices is 115200 Baud.

Establish the connection with [Connect]. Please pay attention to the status message on the Protocol Screen at the bottom of this software.

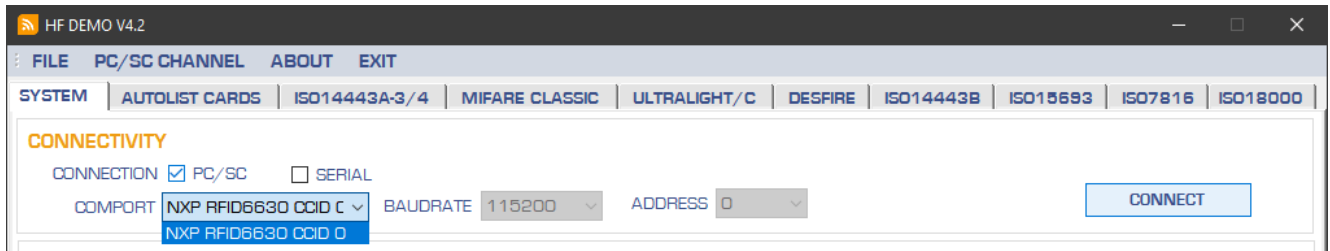
2.2 Establishing Connection (Ethernet)



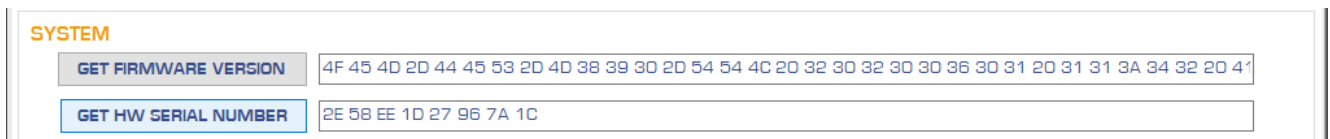
Step 6 is to check the function of the connection.

2.3 Establishing Connection (PC/SC)

Checkmark "PC/SC" and select your device from the pull down menu "COMPORT".

**Note**

PC/SC devices can have a static mode (connection is always possible) or dynamic mode (connection is only possible with a suitable tag in read range). The static mode is not supported by all firmware versions.

2.4 Reading Firmware Version and Hardware Serial Number

You can do this after every click on [CONNECT] to check if the connection is really working.

3 Software Functions in Detail

3.1 Tab “System”

3.1.1 Changing The Baudrate

If you have a NEO2 then DO NOT change the Baudrate using this function!

BAUDRATE	9600	BPS	SET BAUDRATE
----------	------	-----	--------------

3.1.2 IO Commands

Some devices have hardware to react to LED and Buzzer commands.

LED	LIGHTING TIME	3	x50MS	NO. OF TIMES	4	LIGHTING
BUZZER	BEEPING TIME	3	x50MS	NO. OF TIMES	4	BEEPING
NOTE: EACH CYCLE TIME IS FIXED TO 500MS!						

3.1.3 Address Configuration

This function is only available in the version for RS485 devices. The standard demo software does not provide this function.

ADDRESS	0	NOTE: THIS OPTION FOR SET RS485 DEVICES ADDRESS!	SET ADDRESS
---------	---	--	-------------

3.1.4 Antenna Selection

This will only work with devices that operate several antennas.

ANT PORT	1	NOTE: DEFAULT ANTENNA STATUS IS OPENED!	SET ANT
----------	---	---	---------

After a cold boot, the antenna #1 will be selected with multi-antenna devices.

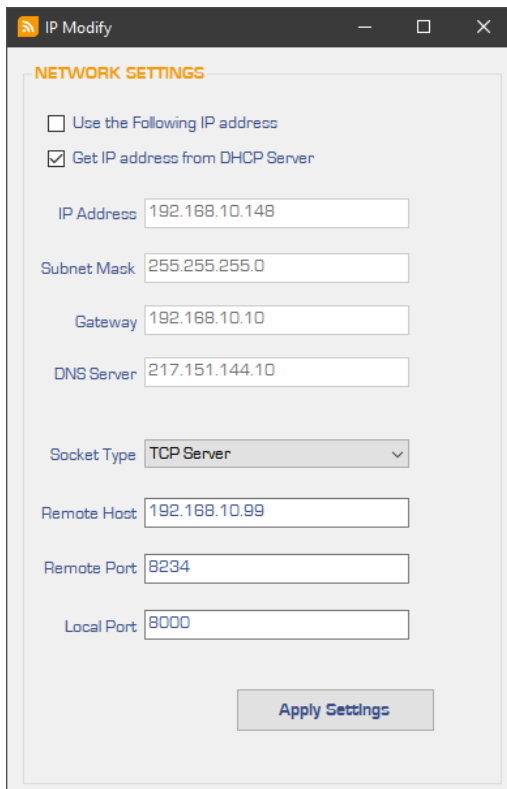
3.1.5 Service Function (not intended for end-customers)

ADDRESS	0x00000010		READ FLASH
ADDRESS	0x00000008		WRITE FLASH
NOTE: ADDRESS AS 32BIT, MSB FIRST!			GET ANT

3.1.6 Configure Ethernet Interface

The screenshot shows the 'HF DEMO V5.1' application window. The 'SYSTEM' menu is open, and the 'CONNECTIVITY' section is selected. Under 'CONNECTION', the 'TCP/IP' checkbox is checked. The 'COMPORT' is set to 'COM1', 'BAUDRATE' is '115200', and 'ADDRESS' is '0'. The 'IP ADDRESS' is '192.168.10.148' and 'PORT' is '8000'. Buttons for 'SEARCH IP', 'IP MODIFY', and 'DISCONNECT' are visible.

After the connection is established, click on [IP MODIFY]. This will open a dialog box to configure the Ethernet interface.

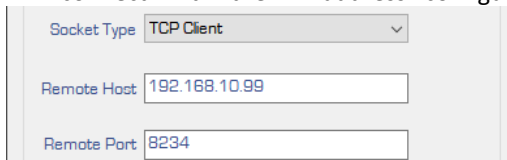


The screenshot shows a window titled "IP Modify" with a "NETWORK SETTINGS" section. It contains several input fields and checkboxes. The "Get IP address from DHCP Server" checkbox is checked. The "IP Address" field is set to "192.168.10.148", "Subnet Mask" to "255.255.255.0", "Gateway" to "192.168.10.10", and "DNS Server" to "217.151.144.10". The "Socket Type" dropdown is set to "TCP Server". The "Remote Host" field is "192.168.10.99", "Remote Port" is "8234", and "Local Port" is "8000". An "Apply Settings" button is at the bottom.

Field	Value
Use the Following IP address	<input type="checkbox"/>
Get IP address from DHCP Server	<input checked="" type="checkbox"/>
IP Address	192.168.10.148
Subnet Mask	255.255.255.0
Gateway	192.168.10.10
DNS Server	217.151.144.10
Socket Type	TCP Server
Remote Host	192.168.10.99
Remote Port	8234
Local Port	8000

The standard setting of the socket type is TCP Server. This means that a control software connects with the RFID device. The connection is made with the Local Port.

If the reader automatically reads data from a tag, you can configure the RFID device as TCP Client. After reading the data, it will connect with the IP address configured in remote host and use the remote port so deliver the data.

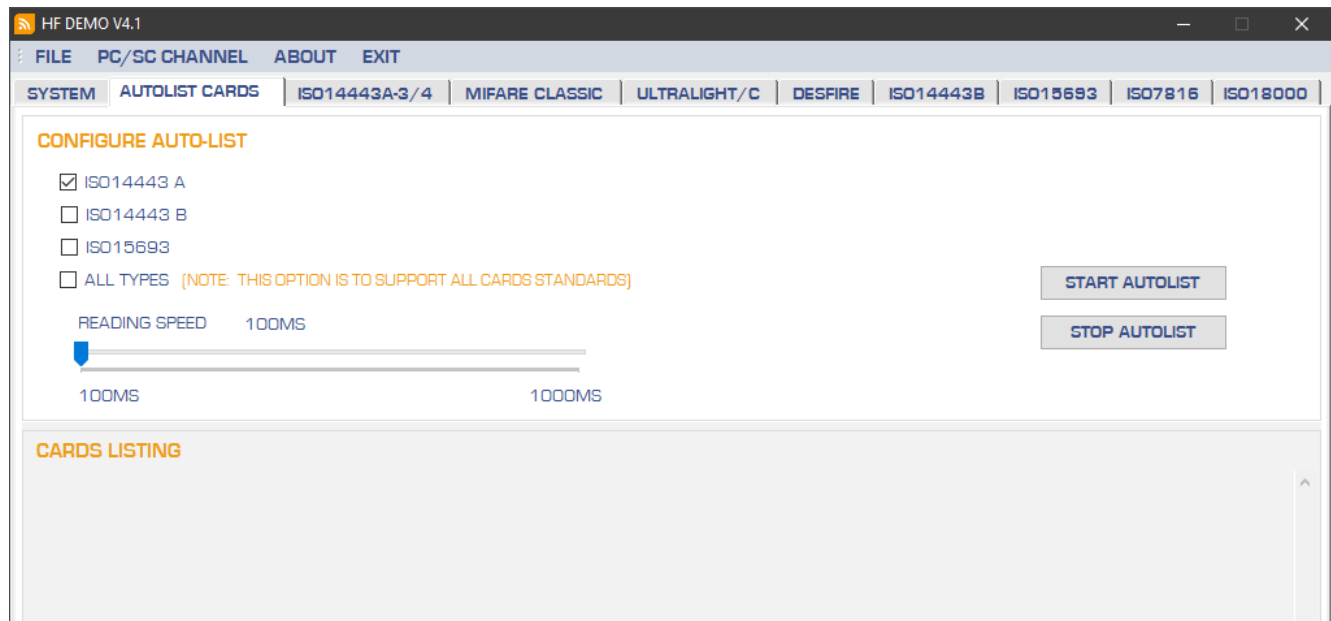


This screenshot shows a portion of the "IP Modify" dialog box, specifically the "Socket Type" dropdown set to "TCP Client". The "Remote Host" field is "192.168.10.99" and the "Remote Port" field is "8234".

Field	Value
Socket Type	TCP Client
Remote Host	192.168.10.99
Remote Port	8234

You can also configure the Ethernet interface via the web interface or with the software "S2E ConfigTool_V1.4.exe".

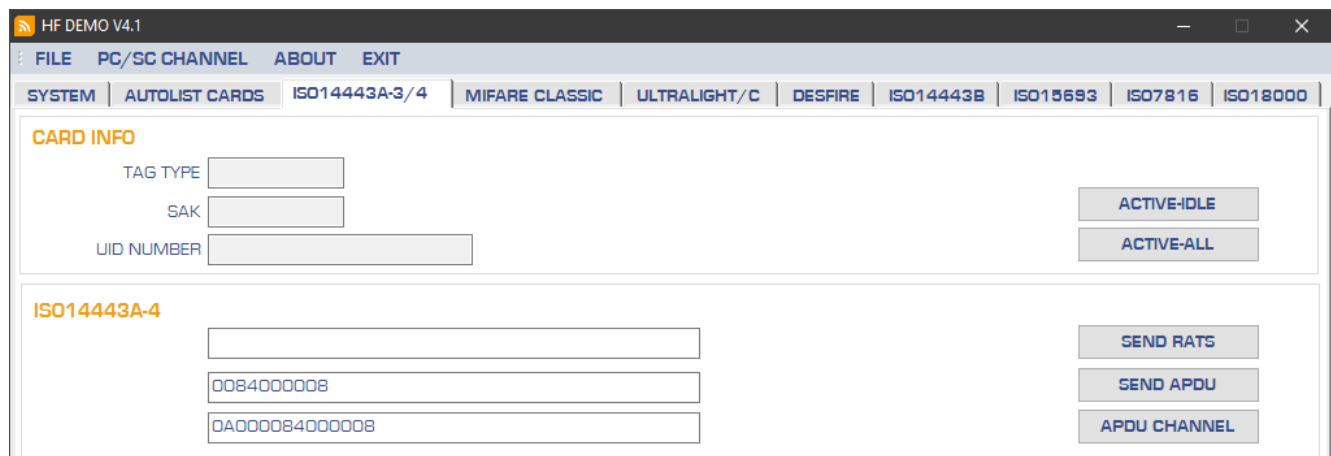
3.2 Tab “AUTOLIST CARDS”



This tab is to send continuous commands to detect tags. Use this tab to detect the tag type.

This is not a configuration tab for the explicit auto-list cards configuration command 0x23.

3.3 Tab “ISO1443A-3/4”



Active-IDLE= Send REQ, Anticollision, select, this will only work with cards that are NOT halted.

Active-ALL = Send WUPA , Anticollision, select, this will work with all cards.

3.4 Tab “MIFARE Classic”

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 **MIFARE CLASSIC** ULTRALIGHT/C DESFIRE ISO14443B ISO15693 ISO7816 ISO18000

CARD INFO

TAG TYPE SAK

UID NUMBER

MEMORY SIZE

BLOCK SIZE

NUMBER OF BLOCKS

NUMBER OF SECTORS

APDU

ACTIVE-IDLE

ACTIVE-ALL

APDU CHANNEL

MIFARE CLASSIC 1K&4K

CARD UID

BLOCK ADDR KEY TYPE KEY

AUTHENTICATE

READ BLOCK

WRITE BLOCK

READ ALL BLOCKS

E-WALLET

NOTE: EXCEPT FOR FUNCTION OF "READ ALL BLOCKS", ALL COMMANDS MUST DO AUTHENTICATE FIRSTLY!

If you have detected a Mifare Classic card with [ACTIVE-IDLE] or [ACTIVE-ALL], you can click on [READ ALL BLOCKS] to read out all accessible memory blocks or on [E-WALLET] to check the payment functions for Mifare Classic.

READ ALL BLOCKS

UID

DEFAULT KEY

KEY TYPE

READ ALL BLOCKS

MEMORY INFO

DATA OUTPUT IS IN HEXADECIMAL NUMBERS

Sector:00
1C 53 73 06 FA 88 04 00 48 85 14 90 49 20 50 10
11 11 11 11 11 11 11 11 11 11 11 11 11 11 11
22 22 22 22 22 22 22 22 22 22 22 22 22 22
00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF

Sector:01
44 44 44 44 44 44 44 44 44 44 44 44 44 44
55 55 55 55 55 55 55 55 55 55 55 55 55 55
66 66 66 66 66 66 66 66 66 66 66 66 66 66
00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF

Sector:02
88 88 88 88 88 88 88 88 88 88 88 88 88 88
99 99 99 99 99 99 99 99 99 99 99 99 99 99
AA AA AA AA AA AA AA AA AA AA AA AA AA AA
00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF

Sector:03
CC CC CC CC CC CC CC CC CC CC CC CC CC CC
DD DD DD DD DD DD DD DD DD DD DD DD DD DD
EE EE EE EE EE EE EE EE EE EE EE EE EE EE
00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF

PROTOCOL SCREEN

<< 50 01 00 27 FF
FF
00 FF 07 80 69 FF
FF
00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF
FF
FF
FF
76 —success

CLEAR

E-WALLET

INITIALIZE VALUE

INCREASE VALUE

DECREASE VALUE

BACKUP TO

BALANCE

READ VALUE

PROTOCOL SCREEN

CLEAR

3.5 Tab “Ultralight/C”

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC **ULTRALIGHT/C** DESFIRE ISO14443B ISO15693 ISO7816 ISO18000

CARD INFO

TAG TYPE SAK

UID NUMBER

MEMORY SIZE

PAGE SIZE

NUMBER OF PAGES

APDU

ACTIVE-IDLE

ACTIVE-ALL

APDU CHANNEL

MIFARE ULTRALIGHT/C

KEY

New KEY

PAGE ADDR

AUTHENTICATE

CHANGE KEY

READ PAGE

WRITE PAGE

NOTE: FOR ULTRALIGHT C AND COMPATIBLE CARDS, YOU HAVE TO AUTHENTICATE FIRSTLY!

If you need to access further Ultralight functions, refer to the tag’s manual and use the APDU channel to send manufacturer-specific commands directly to the RFID tag.

3.6 Tab “DESFire”

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC ULTRALIGHT/C **DESFIRE** ISO14443B ISO15693 ISO7816 ISO18000

CARD/SYS COMMANDS

TAG TYPE SAK

UID NUMBER

ATS

VERSION

ACTIVE-IDLE

ACTIVE-ALL

RATS

GET VERSION

KEY COMMANDS

KEY VERSION

KEY NUMBER KEY

KEY SETTING

NEW KEY SETTING

GET KEY VERSION

AUTHENTICATE

GET KEY SETTING

CHANGE KEY SETTING

KEY NUMBER KEY SETTING

ORIGINAL KEY

NEW KEY

CHANGE KEY

CARD LEVEL

NOTE: PLEASE CLICK RIGHT SIDE BUTTON FOR FURTHER DETAIL OPERATION!

PICC LEVEL

APPLICATION LEVEL

The memory of a DESFire RFID tag is organized as a computer memory. You can have folders, which are called “Applications”. Access the Application management by click on the button [PICC LEVEL].

PICC LEVEL

APPLICATION ID

APPLICATION ID

NOTE: THE TWO FUNCTIONS ABOVE DO NOT NEED A KEY AUTHENTICATE!

APPLICATION ID KEY SETTING KEY NUMBER

APPLICATION ID

GET APP

SELECT APP

CREATE APP

DELETE APP

FORMAT PICC

After you have selected or created an Application, you can open the file management by click on the button [APPLICATION LEVEL] in the main screen.

APPLICATION LEVEL

FILE IDS

FILE ID

GET FILE ID

DELETE FILE

FILE SETTING

FILE ID

FILE TYPE COMMUNICATE WAY ACCESS RIGHT FILE SIZE

FILE ID COMMUNICATE WAY ACCESS RIGHT

GET FILE SETTING

CHANGE FILE SETTING

STANDARD DATAFILE & BACKUP FILE

FILE ID COMMUNICATE WAY ACCESS RIGHT FILE SIZE

NOTE: STDFILE MEANS TO STANDARD DATA FILE

FILE ID COMMUNICATE WAY ADDRESS LENGTH

DATA

DATA ☐ BACKUP FILE

CREATE STDFILE

CREATE BACKUP FILE

READ DATA

WRITE DATA

VALUE FILE & RECORD FILE

NOTE: PLEASE CLICK RIGHT SIDE BUTTON FOR FURTHER DETAIL OPERATION

VALUE FILE

RECORD FILE

3.7 Tab “ISO 14443B”

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC ULTRALIGHT/C DESFIRE ISO14443B ISO15693 ISO7816 ISO18000

CARD INFO

TAG TYPE

UID NUMBER

ACTIVE-TYPEB

ISO14443B-4

APDU

APDU CHANNEL

SR SERIES CARDS

UID NUMBER

BLOCK ADDRESS

ACTIVE SR

READ BLOCK

WRITE BLOCK

3.8 Tab “ISO15693”

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC ULTRALIGHT/C DESFIRE ISO14443B **ISO15693** ISO7816 ISO18000

ISO15693

UID NUMBER ☒ USE 16 TIMES SLOT

NOTE: CHECKMARK "USE 16 TIMES SLOT" WHEN READING MULTIPLE CARDS!

APDU

FLAG BLOCK ADDR

NOTE: DEFAULT FLAG=0x22, YOU NEED UID FOR ALL OPERATIONS!
FOR SINGLE CARD OPERATION, THERE IS NO NEED TO DO INVENTORY FIRSTLY!

AFI ATTENTION: BE CAREFUL WHEN DO LOCK AFI, THIS IS ONE TIME OPERATION!

DSFID ATTENTION: BE CAREFUL WHEN DO LOCK DSFID, THIS IS ONE TIME OPERATION!

UID-CLASS

INVENTORY
SELECT CARD
STAY QUIET
APDU CHANNEL
READ BLOCK
WRITE BLOCK
LOCK BLOCK
WRITE AFI
LOCK AFI
WRITE DSFID
LOCK DSFID
GET CARD INFO
GET ICLASS

Note: You can only select the flag values 0x02 and 0x22. Some tags need other flags set for write operations (e.g. Tag-it).

3.9 Tab “ISO7816”

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC ULTRALIGHT/C DESFIRE ISO14443B ISO15693 **ISO7816** ISO18000

ISO7816 PSAM

SAM SLOT

BAUDRATE NOTE: DEFAULT BAUDRATE IS 9600BPS!

ATS

APDU

NOTE: 1. DEFAULT BAUDRATE IS 9600 BPS
2. IF THE BAUDRATE OF PSAM CARD IS NOT 9600, PLS SET IT TO CORRECT VALUE.

DETECT
SET
POWER ON
SEND APDU

3.10 Tab “ISO18000”

3.10.1 Overview

HF DEMO V4.0

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM | AUTOLIST CARDS | ISO14443A-3/4 | MIFARE CLASSIC | ULTRALIGHT/C | DESFIRE | ISO14443B | ISO15693 | ISO7816 | ISO18000

ISO18000-3

EPC/Ull NUMBER

EPC/Ull NUMBER PC

RN16/HANDLE

MEMORY BANK START ADDR NUMBER OF BLOCKS

READ DATA

DATA TO WRITE

PASSWORD OPTIONS

PMASK PACTION

RECOMM BITS

HANDLE

POINTER LENGTH

INVENTORY

ACK

REGEN

READ

WRITE

ACCESS

LOCK

KILL

SET HANDLE

BLOCK WRITE

BLOCK ERASE

BLOCK PERMA LOCK

PROTOCOL SCREEN

CLEAR

3.10.2 Write 1 Block of Data in Block 0x0004

HF DEMO V4.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC ULTRALIGHT/C DESFIRE ISO14443B ISO15693 ISO7816 ISO18000

ISO18000-3

EPC/UII NUMBER 000000000000480138F2512D

EPC/UII NUMBER

RN16/HANDLE

MEMORY BANK USER START ADDR 0400 NUMBER OF BLOCKS 0x00 00

READ DATA 00 00 11 11 22 22 33 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 C

DATA TO WRITE 4444

PASSWORD 00

OPTIONS NO COVER CODING

PACTION 00 00

RECOMM BITS 00

HANDLE 00 00

POINTER LENGTH

INVENTORY

ACK

REGEN

READ

WRITE

ACCE

KILL

SET HANDLE

BLOCK WRITE

BLOCK ERASE

BLOCK PERMA LOCK

PROTOCOL SCREEN

>> 50 00 07 B5 00 03 04 00 00 44 44 E5

<< 50 00 00 B5 E5 —success

CLEAR

Important Note

The I-Code ILT-M supports to write only 1 block at once using this command.

3.10.3 Read All Blocks, New Data at Block 0x0004

[illegible]