

OEM-DESFire Series 13.56 MHz HF RFID Module NEO2

Demo Software Manual

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1 Operation Examples

For installation, please execute the "COMM_Setup.msi" file.

1.1 USB Driver Installation

For the NEO2 family, use the driver for the CH340 chip. The driver is no longer installed automatically by the Windows OS. Use the files in the folder "USB_Drivers" of the NEO2 SDK to install the driver.

For other devices:

If automatic installation fails, perform a manual installation:

Use the files in the folder "USB_Drivers" of the Embedded DES SDK to install the driver.

1.2 Driver Installation PC/SC

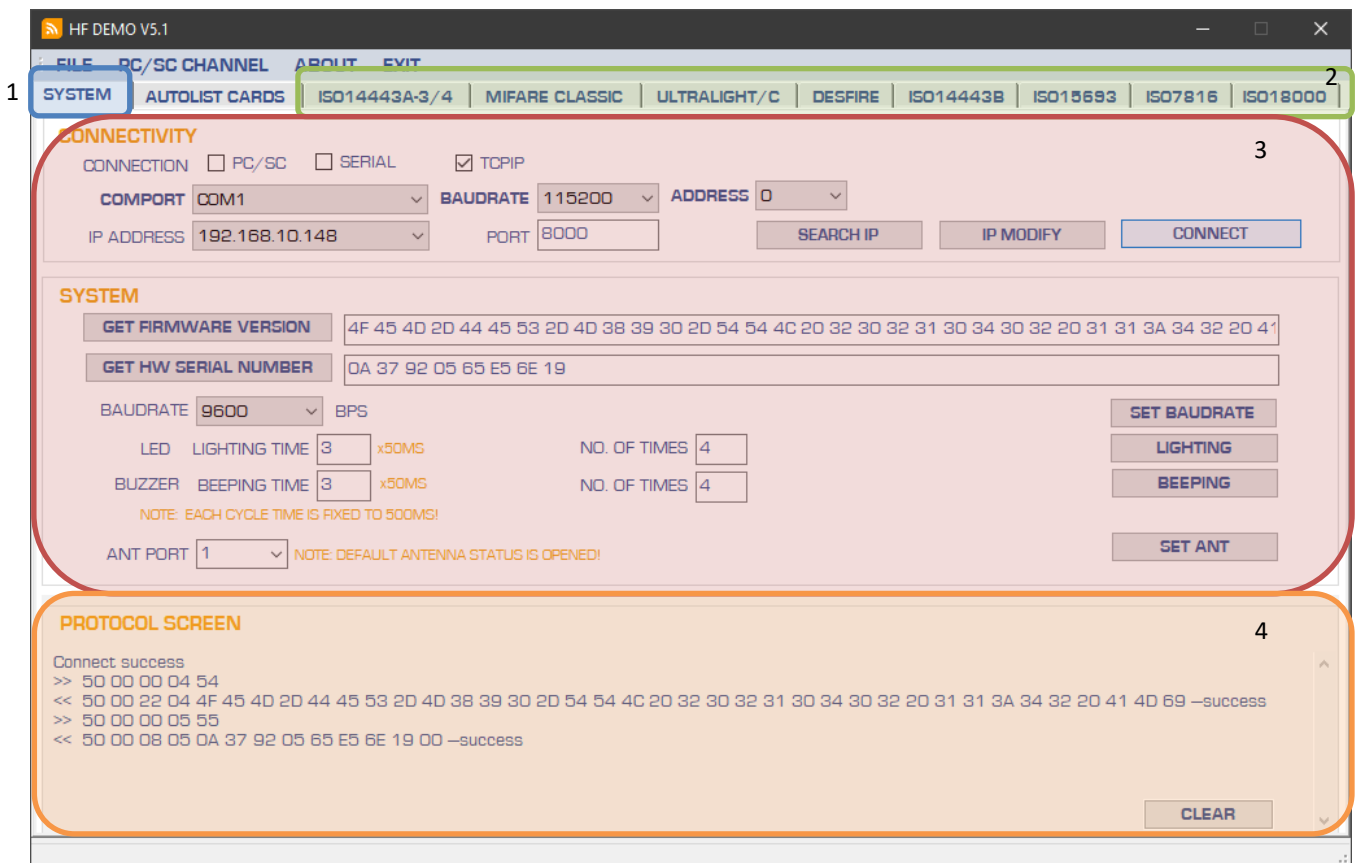
Support for PC/SC is part of Windows OS. The automatic installation of the device driver takes much longer than for the serial interface (VCP). If you plug in the device for the first time, please wait until all processes finish.

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

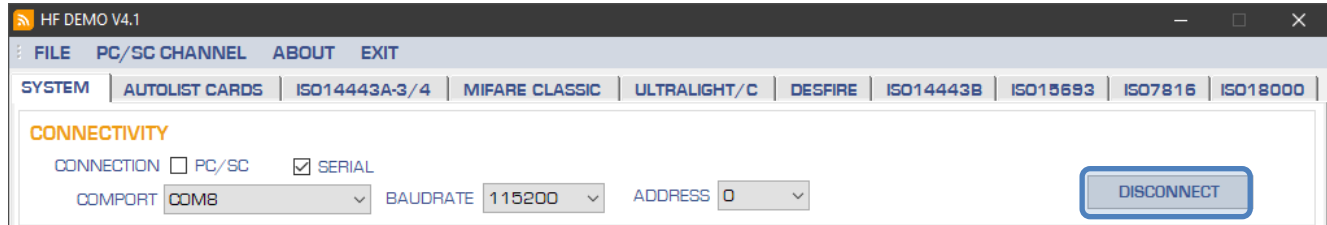
1. The tab "System" is for software and device settings.
2. In the following tabs you can select the tag type you are using.
3. The main area of each tab contains several function blocks.
4. In each tab you can monitor the communication between this software and the RFID device.



2 Connect with Device

2.1 Establishing Connection (VCP)

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

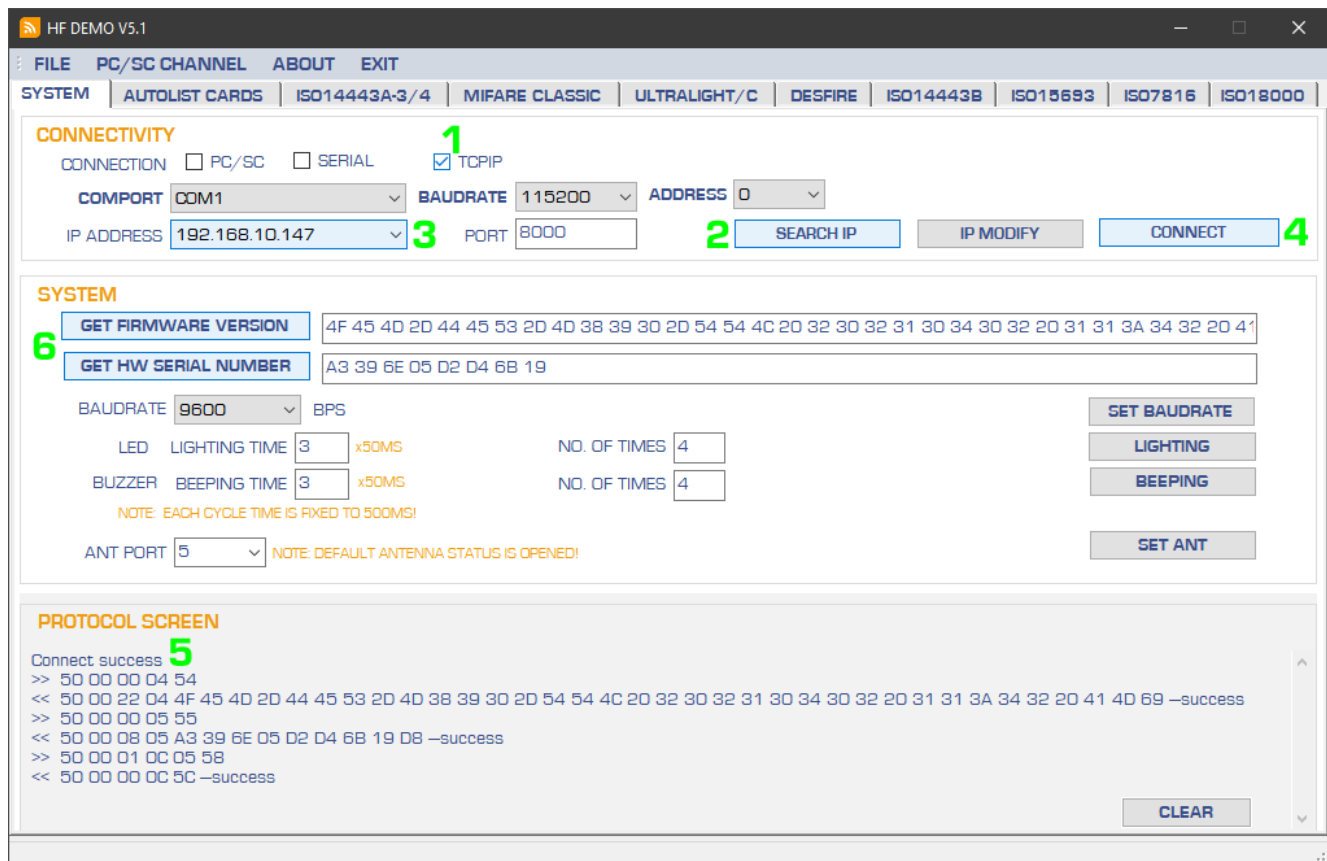


The factory default setting for DESFire devices is 115200 Baud. NEO2 devices with firmware from before 2022-09-13 use 9600 Baud.

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

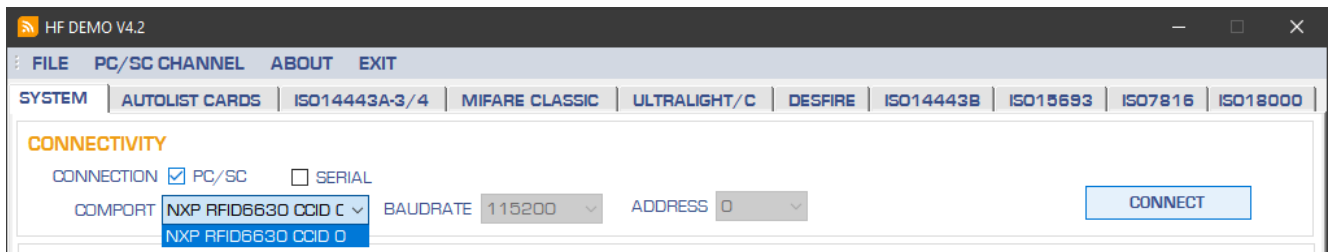
2.2 Establishing Connection (Ethernet)

1. Select TCP/IP as connection.
2. Click on [SEARCH IP] to search for available devices.
3. Use the dropdown menu to select the correct IP address.
4. Click on [CONNECT] to establish a connection.
5. In the protocol screen at the bottom of the window you can check the communication between the software and the device.
6. Use functions [GET FIRMWARE VERSION] and [GET HW SERIAL NUMBER] to check the connection with the device.



2.3 Establishing Connection (PC/SC)

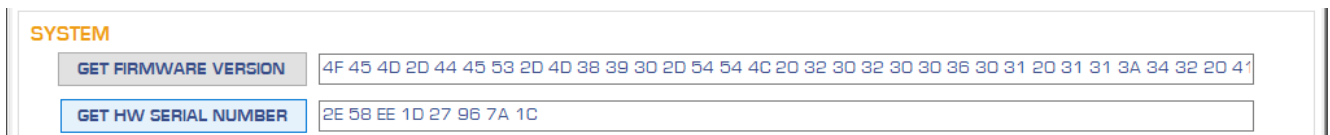
Checkmark “PC/SC” and select your device from the pull down menu “COMPORT”.



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.

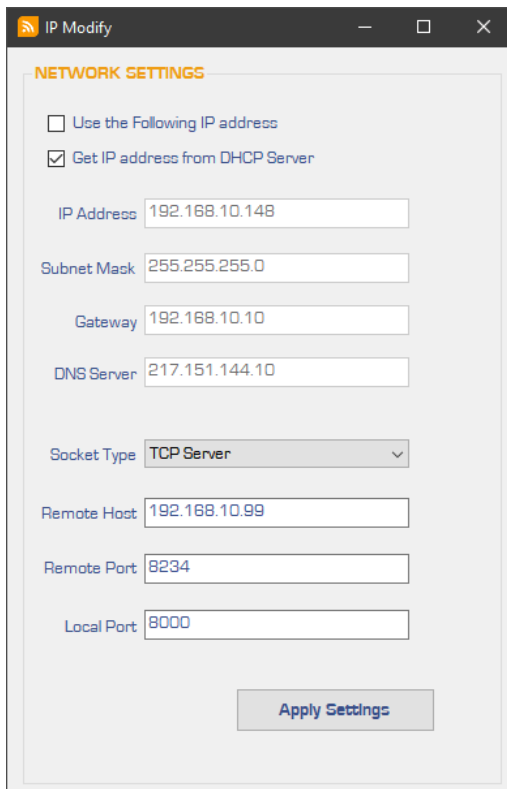
ANT PORT	1	NOTE: DEFAULT ANTENNA STATUS IS OPENED!	SET ANT
----------	---	---	---------

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

3.1.5 Configure Ethernet Interface

The screenshot shows the 'HF DEMO V5.1' application window. The 'SYSTEM' tab is selected, and the 'CONNECTIVITY' section is active. 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 the 'PORT' is '8000'. There are buttons for 'SEARCH IP', 'IP MODIFY', and 'DISCONNECT'.

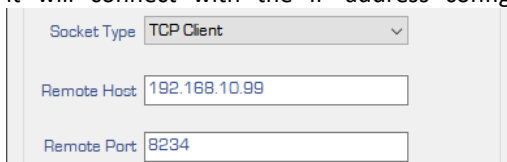
After the connection is established, click on [IP MODIFY]. This will open a dialog box to configure the Ethernet interface.



The screenshot shows a window titled "IP Modify" with a "NETWORK SETTINGS" section. It contains two radio buttons: "Use the Following IP address" (unchecked) and "Get IP address from DHCP Server" (checked). Below these are text input fields for "IP Address" (192.168.10.148), "Subnet Mask" (255.255.255.0), "Gateway" (192.168.10.10), and "DNS Server" (217.151.144.10). There is a "Socket Type" dropdown menu set to "TCP Server". Below that are fields for "Remote Host" (192.168.10.99), "Remote Port" (8234), and "Local Port" (8000). An "Apply Settings" button is at the bottom right.

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 to deliver the data.



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

DESIRE

ISO14443B

ISO15693

ISO7816

ISO18000

CARD INFO

TAG TYPE

SAK

UID NUMBER

MEMORY SIZE

BLOCK SIZE

NUMBER OF BLOCKS

NUMBER OF SECTORS

APDU

0A000084000008

ACTIVE-IDLE

ACTIVE-ALL

APDU CHANNEL

MIFARE CLASSIC 1K&4K

CARD UID

BLOCK ADDR

5

KEY TYPE

KEYA

KEY

FFFFFFFFFFFF

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

AUTHENTICATE

READ BLOCK

WRITE BLOCK

READ ALL BLOCKS

E-WALLET

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	1C5373D5
DEFAULT KEY	FFFFFFFFFFFF
KEY TYPE	<div>KYA ▾</div>

[READ ALL BLOCKS](#)

MEMORY INFO

DATA OUTPUT IS IN HEXADEcimal NUMBERS

```

Sector:00
1C 53 73 C6 FA 88 04 00 48 85 14 90 49 20 50 1D
11 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 22 22
00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF

Sector:01
44 44 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 55 55
66 66 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 FF


Sector:02
88 88 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 99 99
AA AA 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 FF

Sector:03
CC CC 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 DD DD
EE EE 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 FF
    
```

PROTOCOL SCREEN

```
<< 50 01 00 27 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
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 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 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 FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF 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

64000000

INCREASE VALUE

01000000

DECREASE VALUE

01000000

BACKUP TO

6

BALANCE

INITIALIZE

INCREASE

DECREASE

BACKUP

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 clicking 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 clicking 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

Use the APDU channel to send manufacturer-specific commands directly to the RFID tag.

3.8 Tab "ISO15693"

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"

3.10 Tab "ISO18000"

3.10.1 Overview

HF DEMO V5.1

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

EPC/UII NUMBER PC

RN16/HANDLE

INVENTORY

ACK

REGEN

KILL & LOCK

OPTIONS NO COVER CODING PASSWORD 00 00 00 00 RECOMM BITS 00

PMASK 0001 PACTION 0001

KILL

LOCK

ACCESS & READ & WRITE

OPTIONS NO COVER CODING PASSWORD 00 00 00 00

ACCESS

MEMORY BANK USER START ADDR 00 00 LENGHT OF WOERD 0001

READ DATA

READ

DATA TO WRITE 11223344

WRITE

HANDLE 00 00

BLOCK ERASE

BLOCK WRITE

POINTER LENGTH

SET HANDLE

BLOCK PERMA LOCK

PROTOCOL SCREEN

CLEAR

3.10.2 Write 1 Block of Data in Block 0x0004

1. Enter the **start address**. This value is in hexadecimal with the least-significant Byte first (leftmost).
2. Enter 1 block = 2 Bytes of **data to write**.
3. Click on [**WRITE**].
4. Monitor the **result** at the bottom of the window.

Important Note

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

HF DEMO V5.1

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 INVENTORY

EPC/UII NUMBER PC ACK

RN16/HANDLE REGEN

KILL & LOCK

OPTIONS NO COVER CODING PASSWORD 00 00 00 00 RECOMM BITS 00 KILL

PMASK 0001 PACTION 0001 LOCK

ACCESS & READ & WRITE

OPTIONS NO COVER CODING PASSWORD 00 00 00 00 ACCESS

MEMORY BANK USER START ADDR 04 00 1 LENGHT OF WOERD 0001

READ DATA

DATA TO WRITE 4444 2

HANDLE 00 00

POINTER LENGTH

BLOCK ERASE BLOCK WRITE

SET HANDLE BLOCK PERMA LOCK

PROTOCOL SCREEN 4

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

<< 50 00 00 B5 E5 -success

CLEAR

3.10.3 Read All Blocks, New Data at Block 0x0004

1. Enter the **start address**. This value is in hexadecimal with the least-significant Byte first (leftmost).
2. Enter the **number of blocks** to read. 00 = read all blocks.
3. Click on [**READ**].

[illegible]