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RFID Desktop Reader NEO 2

Hans-Petter Halvorsen

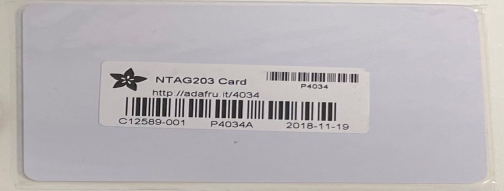
Contents

- Hardware Overview
- Testing of Device
- Visual Studio/C# Example
- Configuration
 - The hardware is normally ready to use from the factory in so-called HID Mode (which is recommended!!)
 - So, you normally don't need to do any configurations!



Hardware Overview

Desktop Reader NEO 2



Desktop Reader NEO 2

High Frequency (HF) 13.56MHz RFID Reader from iDTRONIC



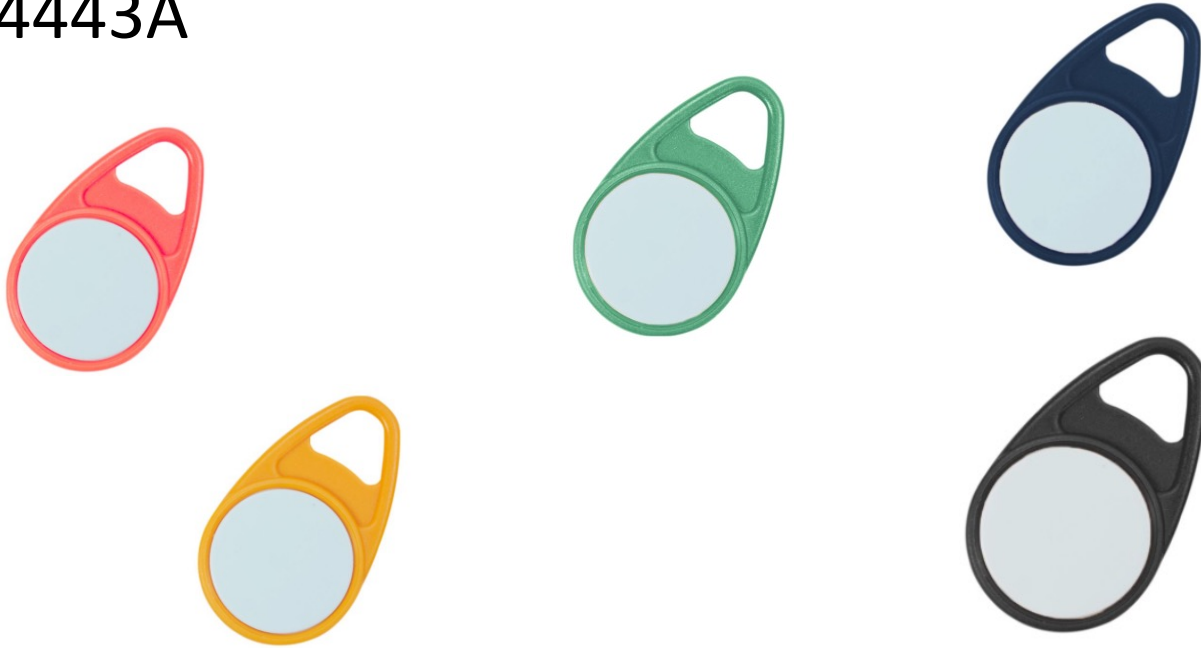
The RFID Reader supports most HF (13.56MHz) on the market, like MIFARE Classic, etc.

The RFID Reader can be used out of the box – Just open, e.g., a. empty MS Word document or similar. Then put a RFID Tag on top of the RFID Reader and the UID will be written to your screen

<https://en.idtronic-rfid.com/rfid-readers/rfid-hf-readers/desktop-reader-neo-2/>

MIFARE Classic 1K (ISO 14443A) Tags

ISO 14443A





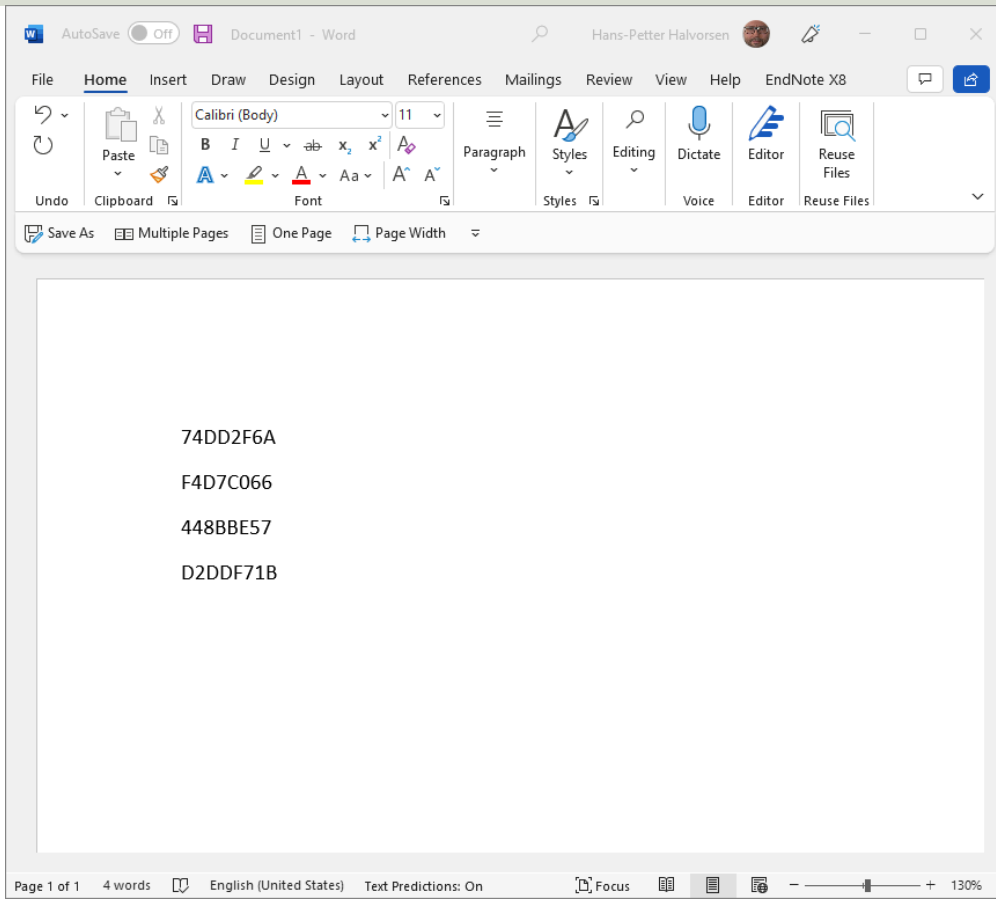
Test of Device

HID Mode - Human Interface Device

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Testing



- Plug in the RFID Reader into your PC
- Open MS Word, Notepad, etc.
- Put a RFID Tag on top of the Reader
- Observe that the unique Tag UID is written into MS Word

<https://www.halvorsen.blog>



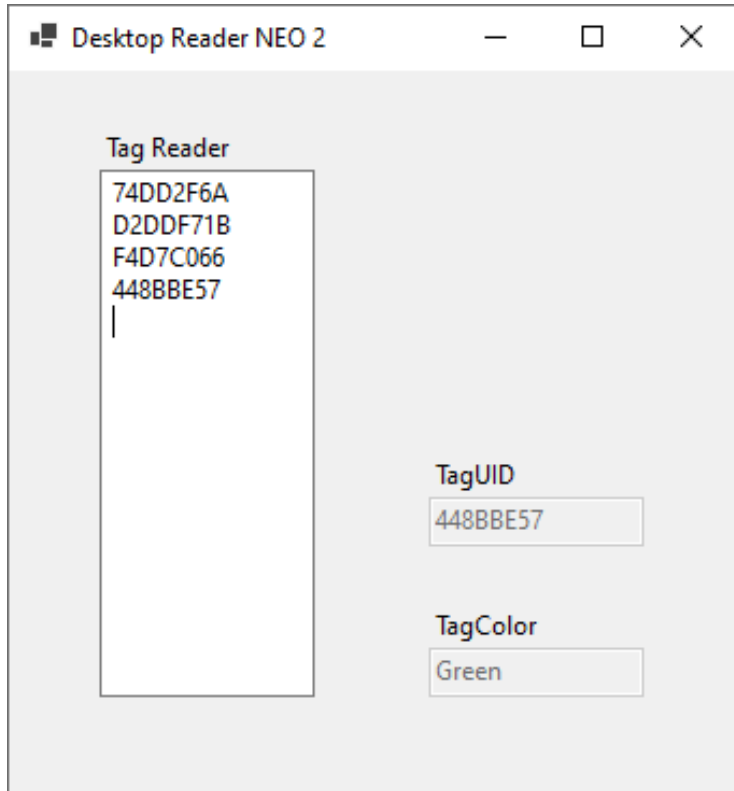
Visual Studio/C# Example

HID Mode

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Desktop Application



```
private void txtRfidReader_TextChanged(object sender, EventArgs e)
{
    string textRead = txtRfidReader.Text;
    string color = "";

    if (textRead.Length > 9)
    {
        string tagUid = textRead.Substring(textRead.Length - 10, 8);

        if (tagUid == "448BBE57")
            color = "Green";
        else if (tagUid == "74DD2F6A")
            color = "Red";
        else if (tagUid == "F4D7C066")
            color = "Blue";
        else if (tagUid == "D2DDF71B")
            color = "Yellow";

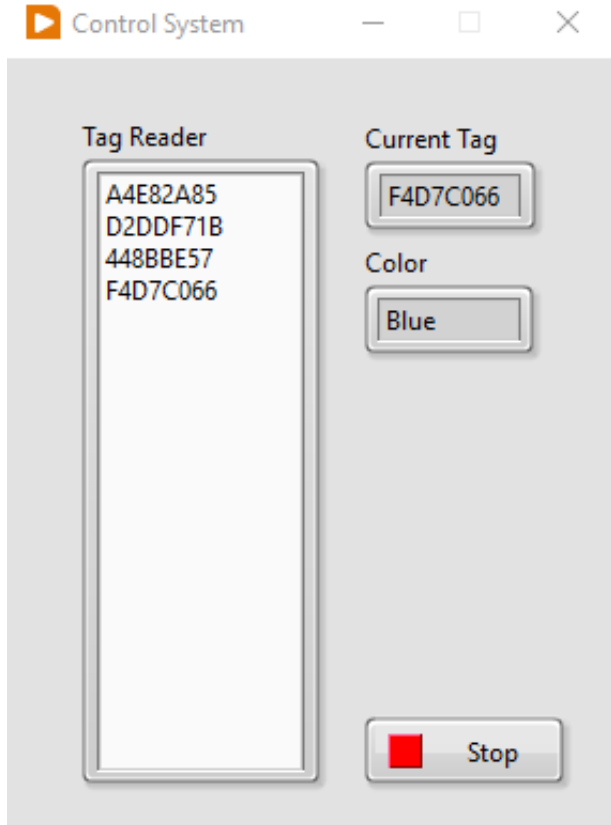
        txtRfidUid.Text = tagUid;
        txtColor.Text = color;
        txtRfidReader.Focus();
    }
}
```



LabVIEW Example

HID Mode

Desktop Application



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Note! For Advanced Users!

Configuration

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Configuration

Note!!

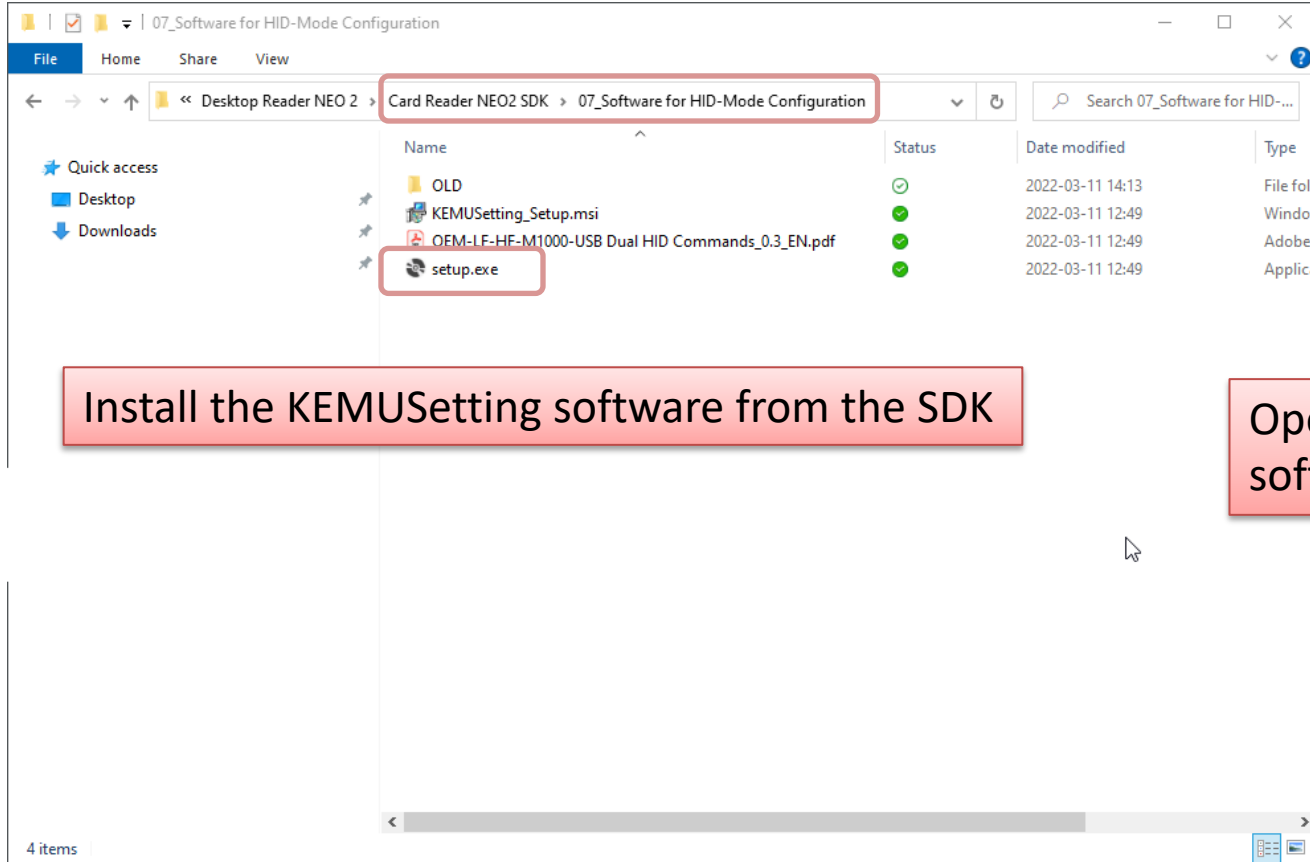
- The hardware is normally ready to use from the factory in so-called HID Mode (which is recommended)
- So, you normally don't need to do any configurations
- So, you can go directly to to the Examples

Operating Modes

You can switch between 2 different Modes

- **HID** - Human Interface Device
 - The HID mode is a **Keyboard Emulation Mode**
 - It automatically reads the UID for the RFID you put on the Reader in the active Textbox (e.g., in an Application) or Document (e.g., Word)
 - No Code is necessary to read the RFID Tag UID
- **VCP** – Virtual COM Port
 - It is designed for IoT applications
 - The VCP mode has a complete read and write access
 - You need to use a Serial Port Software or Develop Serial Port Communication using a Programming Language like C#, LabVIEW, Python, etc.

KEMUSetting Software



07_Software for HID-Mode Configuration

File Home Share View

« Desktop Reader NEO 2 » Card Reader NEO2 SDK » 07_Software for HID-Mode Configuration

Search 07_Software for HID-...

| Name | Status | Date modified | Type |
|--|--------|------------------|---------------------------|
| OLD | ✓ | 2022-03-11 14:13 | File folder |
| KEMUSetting_Setup.msi | ✓ | 2022-03-11 12:49 | Windows Installer Package |
| OEM-LF-HF-M1000-USB Dual HID Commands_0.3_EN.pdf | ✓ | 2022-03-11 12:49 | Adobe PDF Document |
| setup.exe | ✓ | 2022-03-11 12:49 | Application Extension |

4 items



Install the KEMUSetting software from the SDK

Open the KEMUSetting software from your Desktop

Set Operating Mode

- You can switch between the 2 modes with the “KEMU Setting” Software.
- Please select the tab “**Settings Dual HID Mode**”.
- Important: In the software there is a slide switch, with which you can switch between the working modes, but it doesn't update in real time, so it doesn't show you the working mode which the reader is operating at the time!
- To store the current setting into the RFID device, click on “**Set Reader**”.

Set Operating Mode

The screenshot shows the HID Setting application window. The 'Connectivity' section is active, with 'COM5' selected for the ComPort and '9600' for the Baudrate. The 'Connect' button is highlighted with a red box. Below this, the 'Settings Dual HID Mode' tab is selected. The 'Set Reader to HID Mode' toggle switch is turned on and highlighted with a red box. The 'Working Mode' is set to '00: HF 14443A LSB'. The 'Memory Position' is '00', 'Data Position' is '0', and 'Data Length' is '16'. The 'Memory Key' is 'FF FF FF FF FF' with 'Key A' checked. The 'Output Format' is 'HEX'. The 'LF + HF Enable' section shows 'HF Data Format' as '00 = 00: HF 14443A LSB', 'LF Data Format' as '10: LF Read UID LSB of read-only tag type', and 'LF Page Address' as '00'. The 'Set Reader' button is highlighted with a red box. The 'Protocol Screen' at the bottom is empty, with a 'Clear' button at the bottom right.

HID Setting

Connectivity

Connection: COM

ComPort: COM5 Baudrate: 9600 Address: 0 **Connect**

Settings Single HID Mode **Settings Dual HID Mode**

Set Reader to HID Mode

Working Mode: 00: HF 14443A LSB

Memory Position: 00 Data Position: 0 Data Length: 16

Memory Key(if applicable): Key A Key B Key: FF FF FF FF FF

Output Format: HEX ASCII

LF + HF Enable

HF Data Format: 00 = 00: HF 14443A LSB

LF Data Format: 10: LF Read UID LSB of read-only tag type **Set Reader**

LF Page Address: 00 **CR Added**

Protocol Screen

Clear

Desktop Reader NEO 2

- <https://en.idtronic-rfid.com/rfid-readers/rfid-hf-readers/desktop-reader-neo-2/>
- <https://www.elfadistelec.no/en/desktop-rfid-reader-13-56mhz-usb-200ma-idtronic-dt-neo2-hf/p/30241934?q=RFID&pos=19&origPos=19&origPageSize=50&track=true>



Note! For Advanced Users!

VCP Mode

VCP – Virtual COM Port

HID/VCP Mode Configuration

> Card Reader NEO2 SDK > 07_Software for HID-Mode Configuration

Search 07_Softw

| Name | Status | Date modified |
|--|--------|------------------|
| OLD | ✓ | 2022-03-11 14:13 |
| KEMUSetting_Setup.msi | ✓ | 2022-03-11 12:49 |
| OEM-LF-HF-M1000-USB Dual HID Commands_0.3_EN.pdf | ✓ | 2022-03-11 12:49 |
| setup.exe | ✓ | 2022-03-11 12:49 |

Install the “KEMUSetting” Tool which is located in the Card Reader NEO2 SDK

HID Setting

Connectivity

Connection: COM

ComPort: COM5 Baudrate: 9600 Address: 0 Connect

Settings Single HID Mode Settings Dual HID Mode

Set Reader to HID Mode

Working Mode 00: HF 14443A LSB

Memory Position 00 Data Position 0 Data Length 16

Memory Key (if applicable) Key A Key B Key FF FF FF FF FF FF

Output Format HEX ASCII

LF + HF Enable

HF Data Format 00 = 00: HF 14443A LSB

LF Data Format 10: LF Read UID LSB of read-only tag type

LF Page Address 00

Set Reader

CR Added

Protocol Screen

Clear

Connectivity

Connection: COM

ComPort: COM5

Baudrate: 9600

Address: 0

Connect

Settings Single HID Mode

Settings Dual HID Mode

Set Reader to HID Mode



Working Mode: 00: HF 14443A LSB

Memory Position: 00 Data Position: 0 Data Length: 16

Memory Key(if applicable): Key A Key B Key: FF FF FF FF FF FFOutput Format: HEX ASCII

LF + HF Enable

HF Data Format: 00 = 00: HF 14443A LSB

LF Data Format: 10: LF Read UID LSB of read-only tag type

LF Page Address: 00

Set Reader

CR Added

Protocol Screen

Clear

HF DEMO Software

> Card Reader NEO2 SDK > 06_Demo Software_HF-DESFire

| Name | Status | Date modified | Type | Size |
|---|--------|------------------|---------------|------|
| Archiv | ✓ | 2022-03-11 14:13 | File folder | |
| !_IMPORTANT_WICHTIG_!.txt | ✓ | 2022-03-11 12:49 | Text Document | |
| 9600 Baud with the NEO2!.txt | ✓ | 2022-03-11 12:49 | Text Document | |
| COMM_Setup.msi | ✓ | 2022-03-11 12:49 | Text Document | |
| Eurostile_Bold.ttf | ✓ | 2022-03-11 12:49 | Text Document | |
| OEM-DES Devices Test Software Manual_0.5_EN.pdf | ✓ | 2022-03-11 12:49 | Text Document | |

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

CONNECTIVITY

CONNECTION PC/SC SERIAL

COMPORT COM5 BAUDRATE 9600 ADDRESS 0 DISCONNECT

SYSTEM

GET FIRMWARE VERSION 5 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 20 32 30 32 31 30 34 30 32 20 31 31 3A 34 32 20 41 4D

GET HW SERIAL NUMBER 07 D8 D2 1D 4C 16 67 1C

BAUDRATE 9600 BPS

LED LIGHTING TIME 3 x50MS NO. OF TIMES 4

BUZZER BEEPING TIME 3 x50MS NO. OF TIMES 4

NOTE: EACH CYCLE TIME IS FIXED TO 500MS!

ADDRESS 0x00000010

ADDRESS 0x00000008

NOTE: ADDRESS AS 32BIT, MSB FIRST!

ANT1 ON ANT2 ON NOTE: DEFAULT ANTENNA STATUS IS OPENED!

SET BAUDRATE LIGHTING BEEPING READ FLASH WRITE FLASH GET ANT SET ANT

PROTOCOL SCREEN

>> 50 00 00 04 54 << 50 00 22 04 4F 45 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 20 32 30 32 31 30 34 30 32 20 31 31 3A 34 32 20 41 4D 69 --success

CLEAR

Install the “HF Demo” Tool which is located in the Card Reader NEO2 SDK

Connect and Get Firmware

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

CONNECTIVITY

CONNECTION PC/SC SERIAL

COMPORT COM5 BAUDRATE 9600 ADDRESS 0 DISCONNECT

SYSTEM

GET FIRMWARE VERSION 5 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 20 32 30 32 31 30 34 30 32 20 31 31 3A 34 32 20 41 4D

GET HW SERIAL NUMBER 07 D8 D2 1D 4C 16 67 1C

BAUDRATE 9600 BPS

LED LIGHTING TIME 3 x50MS NO. OF TIMES 4

BUZZER BEEPING TIME 3 x50MS NO. OF TIMES 4

NOTE: EACH CYCLE TIME IS FIXED TO 500MS!

ADDRESS 0x00000010

ADDRESS 0x00000008

NOTE: ADDRESS AS 32BIT, MSB FIRST!

ANT1 ON ANT2 ON NOTE: DEFAULT ANTENNA STATUS IS OPENED!

SET BAUDRATE

LIGHTING

BEEPING

READ FLASH

WRITE FLASH

GET ANT

SET ANT

PROTOCOL SCREEN

```
>> 50 00 00 04 54
<< 50 00 22 04 4F 45 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 20 32 30 32 31 30 34 30 32 20 31 31 3A 34 32 20 41 4D 69 --success
```

CLEAR

Read Tag Information

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

MIFARE CLASSIC 1K&4K

CARD UID

BLOCK ADDR KEY TYPE KEY

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

PROTOCOL SCREEN

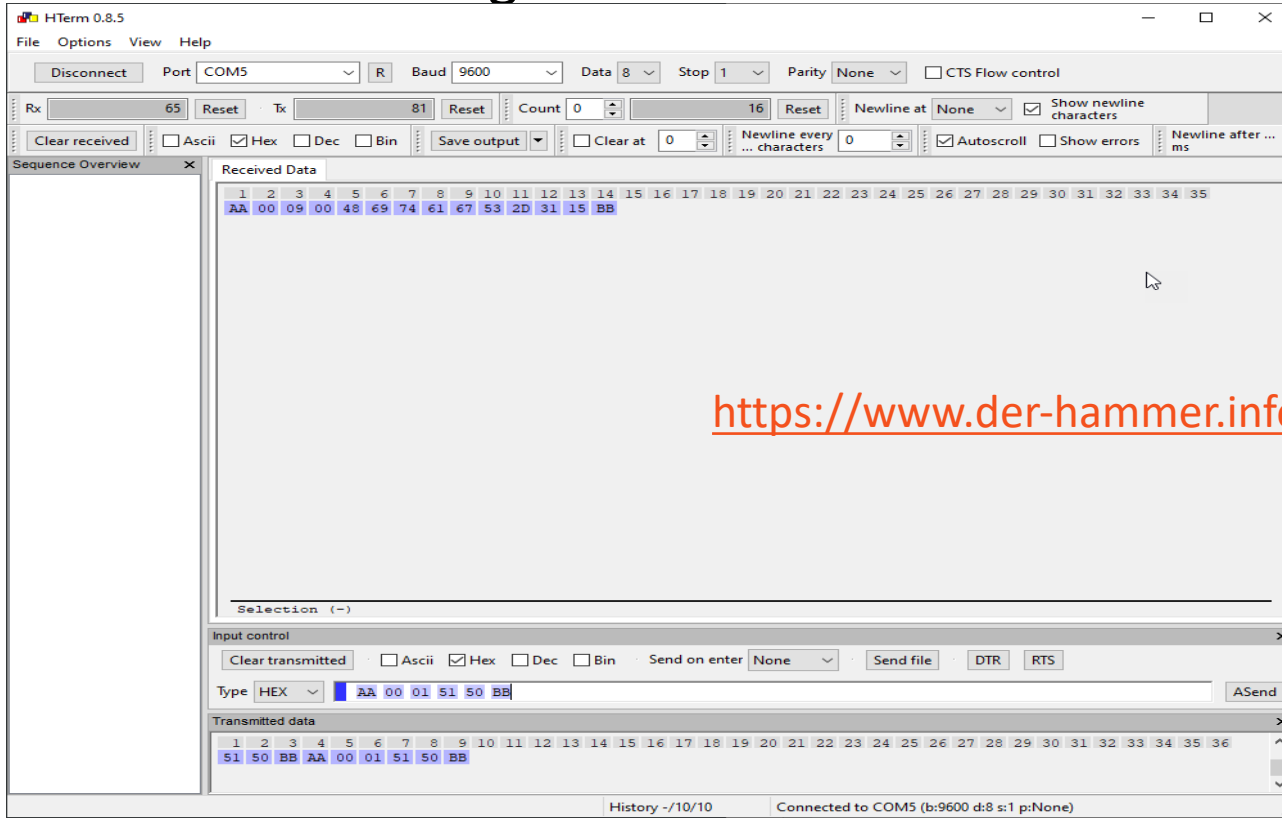
```
>> 50 00 01 17 05 43
<< F0 00 01 17 01 E7 --failure
>> 50 00 02 22 10 26 46
<< 50 00 08 22 04 00 08 04 D2 DD F7 1B 91 --success
>> 50 00 02 22 10 26 46
<< 50 00 08 22 04 00 08 04 F4 D7 CD 66 F7 --success
>> 50 00 02 22 10 26 46
<< 50 00 08 22 04 00 08 04 F4 D7 CD 66 F7 --success
```

Virtual COM Port Settings

- Baudrate: 9600
- Data bits: 8
- Parity: No parity
- Start bit: 1
- Stop bit: 1

HTerm

Serial Terminal Program for communication with RFID Reader



<https://www.der-hammer.info/pages/terminal.html>

Get Firmware Version

The screenshot shows the HTerm 0.8.5 interface. The top menu bar includes File, Options, View, and Help. Below it are configuration options for Port (COM5), Baud (9600), Data (8), Stop (1), Parity (None), and CTS Flow control. The main window is divided into three sections: Received Data, Input control, and Transmitted data.

Received Data: A table showing 35 columns of data. The first two rows are highlighted in blue:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 50 | 00 | 22 | 04 | 4F | 45 | 4D | 2D | 44 | 45 | 53 | 2D | 4D | 38 | 39 | 30 | 2D | 54 | 54 | 4C | 20 | 32 | 30 | 32 | 31 | 30 | 34 | 30 | 32 | 20 | 31 | 31 | 3A | 34 | 32 | |
| 20 | 41 | 4D | 69 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Input control: The 'Type' is set to HEX. The input field contains the hex string `50 00 00 04 54`. The 'Send on enter' dropdown is set to None. Buttons for 'Send file', 'DIR', and 'RTS' are visible.

Transmitted data: A table showing 36 columns of data. The first row is highlighted in blue:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 26 | 46 | 50 | 00 | 00 | 04 | 54 | 50 | 00 | 00 | 04 | 54 | | | | | | | | | | | | | | | | | | | | | | | | |

The status bar at the bottom shows 'History -/10/10' and 'Connected to COM5 (b:9600 d:8 s:1 p:None)'.

Response from the RFID Reader

Enter **“50 00 00 04 54”** and hit Enter

Example Tags

ISO 14443A/MIFARE Classic 1K



UID = 448BBE57



UID = 74DD2F6A



UID = F4D7C066



UID = D2DDF71B

Get UID

50 00 02 22 10 26 46

The screenshot shows the HTerm 0.8.5 terminal interface. The 'Received Data' window displays a sequence of hexadecimal values: 50 00 08 22 04 00 08 04 F4 D7 C0 66 F7. A red box highlights the values F4 D7 C0 66. Below this, the text 'UID = F4D7C066' is displayed in red. The 'Input control' window shows the text '50 00 02 22 10 26 46' entered in the input field, with a red arrow pointing to it from the text 'Enter "50 00 02 22 10 26 46" and hit Enter'. The 'Transmitted data' window shows the values 26 46. The status bar at the bottom indicates 'Connected to COM5 (b:9600 d:8 s:1 p:None)'.

Received Data

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | |
| 50 | 00 | 08 | 22 | 04 | 00 | 08 | 04 | F4 | D7 | C0 | 66 | F7 | | | | | | | | | | | | | | | | | | | | | | | |

UID = F4D7C066

Input control

Type: HEX 50 00 02 22 10 26 46

Transmitted data

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | |
| 26 | 46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

History -/10/10 Connected to COM5 (b:9600 d:8 s:1 p:None)

Put a RFID Tag on the Reader

Enter "50 00 02 22 10 26 46"
and hit Enter

Disconnect Port COM5 R Baud 9600 Data 8 Stop 1 Parity None

Here I read 4 different Tags

Rx 637 Reset Tx 227 Reset Count 0 50 Reset Newline at None Show newline characters Clear received Ascii Hex Dec Bin Save output Clear at 0 Newline every 13 characters Autoscroll Show errors Newline after ms

Sequence Overview

Received Data

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 50 | 00 | 08 | 22 | 04 | 00 | 08 | 04 | 44 | 8B | BE | 57 | 54 | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 00 | 08 | 22 | 04 | 00 | 08 | 04 | F4 | D7 | C0 | 66 | F7 | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 00 | 08 | 22 | 04 | 00 | 08 | 04 | D2 | DD | F7 | 1B | 91 | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 00 | 08 | 22 | 04 | 00 | 08 | 04 | 74 | DD | 2F | 6A | 9E | | | | | | | | | | | | | | | | | | | | | | |

UID = 448BBE57
 UID = F4D7C066
 UID = D2DDF71B
 UID = 74DD2F6A

Input control

Clear transmitted Ascii Hex Dec Bin Send on enter None Send file DTR RTS Type HEX 50 00 02 22 10 26 46 ASend

Transmitted data

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 22 | 10 | 26 | 46 | 50 | 00 | 02 | 22 | 10 | 26 | 46 | | | | | | | | | | | | | | | | | | | | | | | | | |

Resources

- <https://en.wikipedia.org/wiki/Barcode>
- https://en.wikipedia.org/wiki/Radio-frequency_identification
- <https://www.atlasrfidstore.com/rfid-beginners-guide/>
- <https://no.rs-online.com/web/p/rf-modules/1262181/>
- <https://eccel.co.uk/product/oem-micode-usb/>

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