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# RFID Desktop Reader NEO 2

Hans-Petter Halvorsen

# Desktop Reader NEO 2



# Desktop Reader NEO 2

High Frequency (HF) 13.56MHz RFID Reader from iDTRONIC



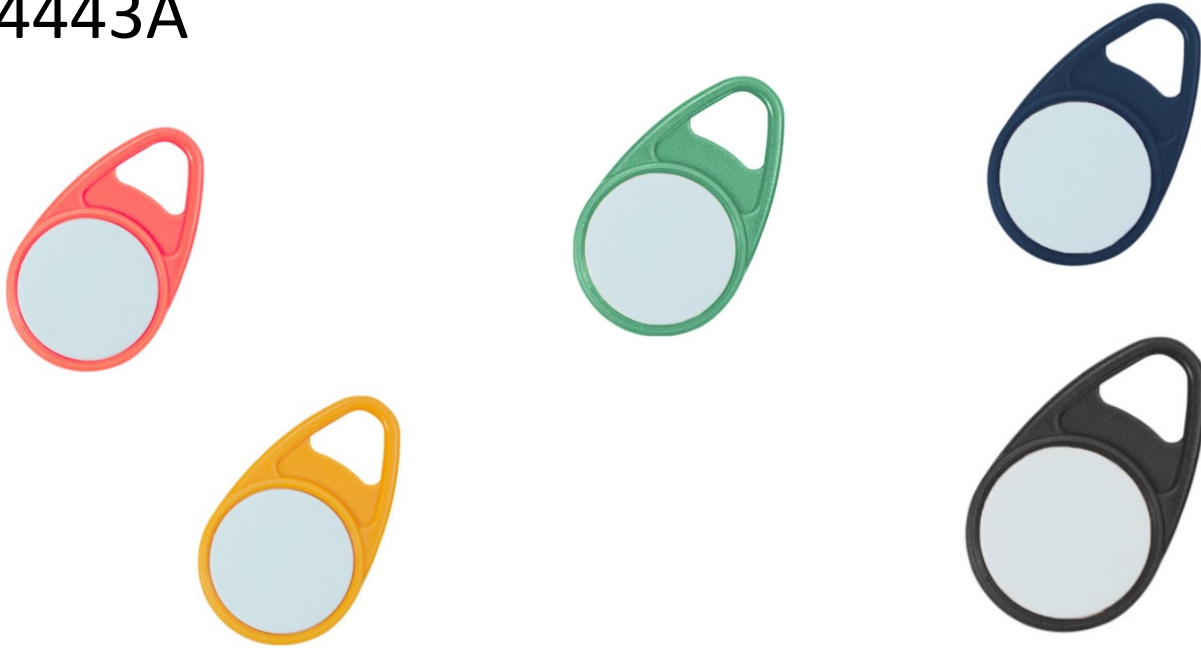
The RFID Reader supports most HF (13.56MHz) on the market, like MIFARE Classic, etc.

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

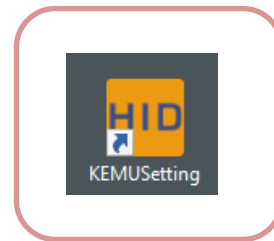
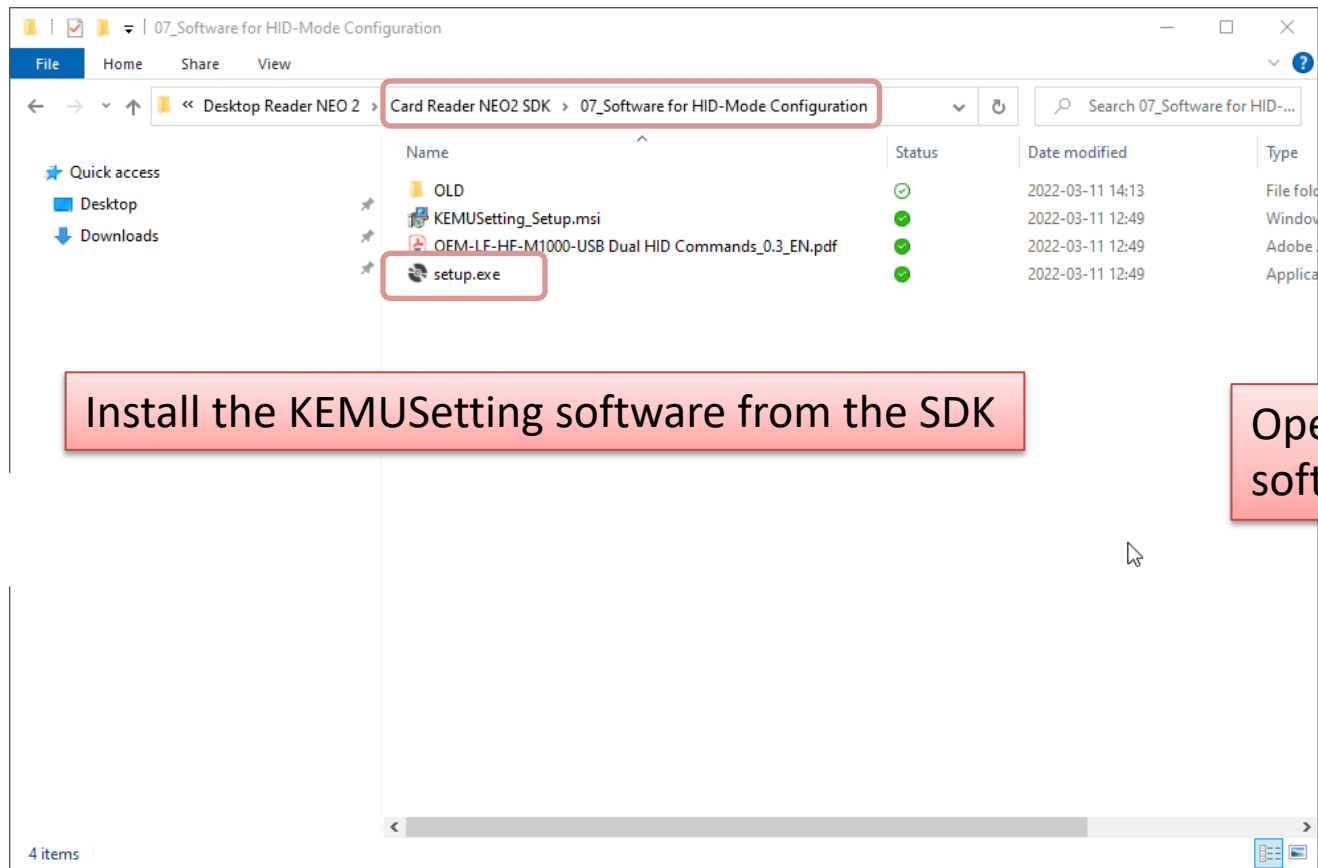


# Operating Modes

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



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. It has a title bar with standard window controls. The main content is divided into several sections:

- Connectivity**: Contains a 'Connection' checkbox (checked), 'ComPort' (COM5), 'Baudrate' (9600), and 'Address' (0). A 'Connect' button is on the right.
- Settings**: Divided into two tabs: 'Settings Single HID Mode' and 'Settings Dual HID Mode'.
  - Set Reader to HID Mode**: A toggle switch is shown in the 'off' position.
  - Working Mode**: A dropdown menu showing '00: HF 14443A LSB'.
  - Memory Position**: A dropdown menu showing '00'.
  - Data Position**: A numeric input field showing '0'.
  - Data Length**: A numeric input field showing '16'.
  - Memory Key(if applicable)**: Includes checkboxes for 'Key A' (checked) and 'Key B' (unchecked), and a 'Key' input field showing 'FF FF FF FF FF FF'.
  - Output Format**: Includes checkboxes for 'HEX' (checked) and 'ASCII' (unchecked).
  - LF + HF Enable**: A section with three dropdown menus:
    - 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'
- Protocol Screen**: A large empty area at the bottom with a 'Clear' button in the bottom right corner.

Red boxes highlight the 'Connect' button, the 'Set Reader to HID Mode' toggle, the 'Set Reader' button, and the 'CR Added' button.



# 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>



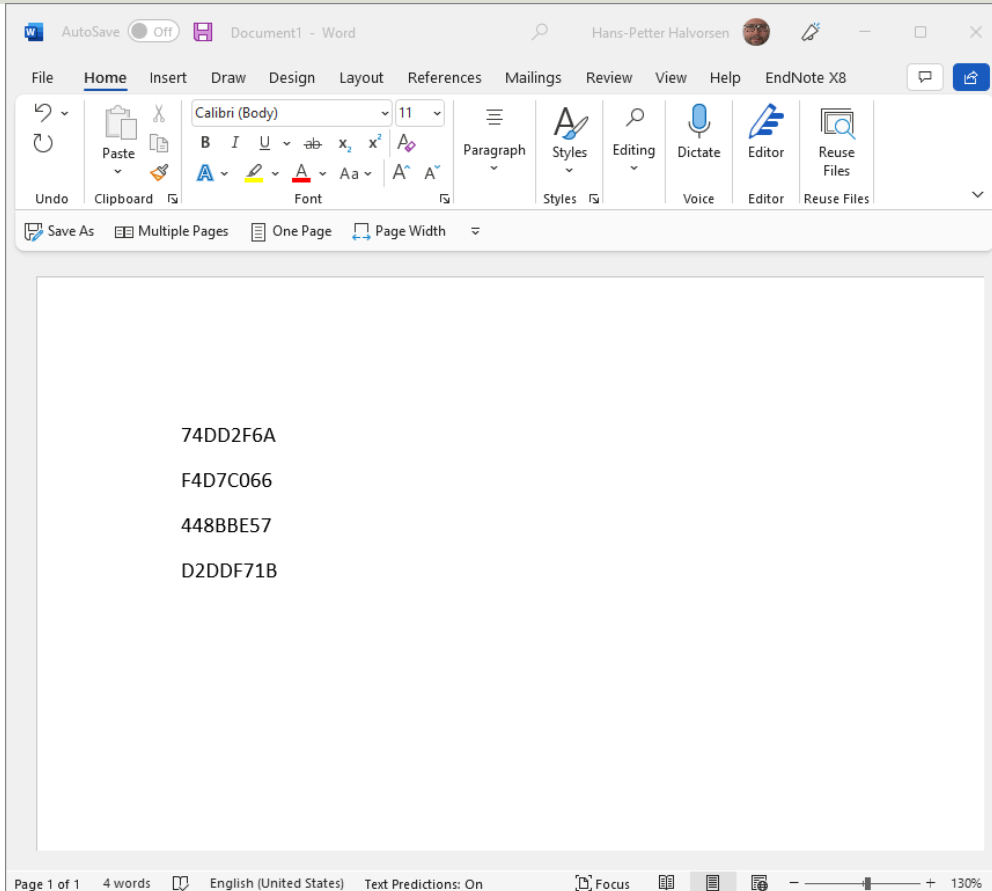
# HID Mode

**HID** - 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

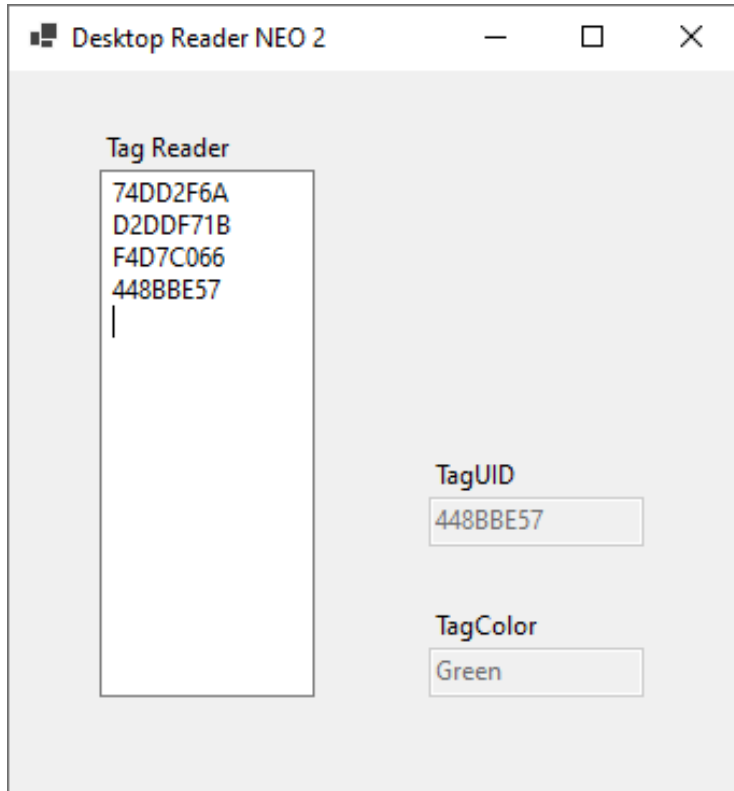


# Visual Studio/C# Example HID Mode

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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();
    }
}
```



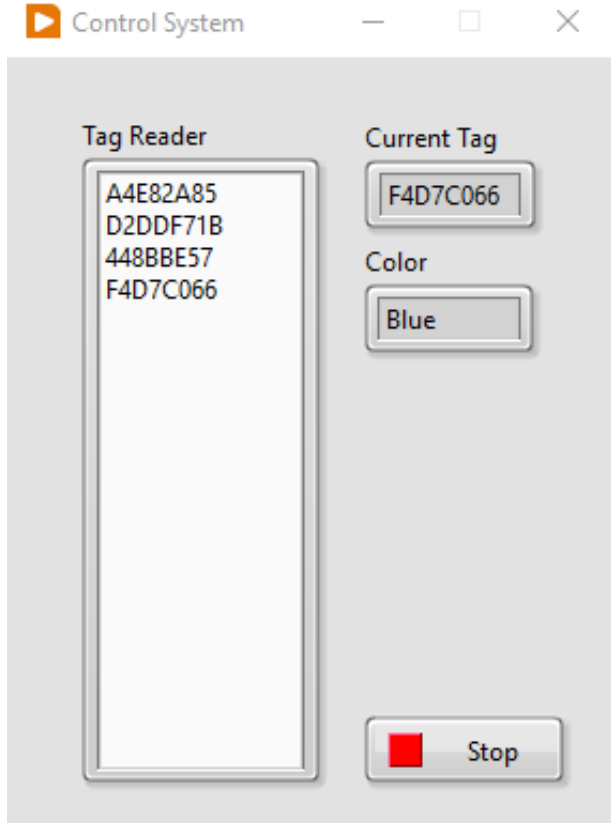
# LabVIEW Example

## HID Mode

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# Desktop Application







# VCP Mode

**VCP** – Virtual COM Port

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# HID/VCP Mode Configuration

» Card Reader NEO2 SDK » 07\_Software for HID-Mode Configuration

Name	Status	Date modified
OLD	✓	2022-03-11 14:13
KEMUSetting_Setup.msi	✓	2022-03-11 12:49
OEM-LE-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 Format00 = 00: HF 14443A LSB

LF Data Format10: LF Read UID LSB of read-only tag type

LF Page Address00

Set Reader

CR Added

Protocol Screen

Clear

# 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

# 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	
9000 Baud with the NEO2!.txt	✓	2022-03-11 12:49	Text Document	
COMM_Setup.msi	✓	2022-03-11 12:49	Text Document	
EurostileT_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 2D 32 3D 32 31 30 34 3D 32 2D 31 31 3A 34 32 2D 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!

GET BAUDRATE

LIGHTING

BEEPING

READ FLASH

WRITE FLASH

GET ANT

SET ANT

PROTOCOL SCREEN

>> 50 00 00 04 54

<< 00 00 22 04 4F 45 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 2D 32 3D 32 31 30 34 3D 32 2D 31 31 3A 34 32 2D 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

FILEPC/SC CHANNELABOUTEXIT

SYSTEMAUTOLIST CARDSISO14443A-3/4MIFARE CLASSICULTRALIGHT/CDESFIREISO14443BMIFARE DESFIREISO15693ISO7816ISO18000

CONNECTIVITY

CONNECTION☐ PC/SC☒ SERIAL  
COMPORTCOM5BAUDRATE9600ADDRESS0DISCONNECT

SYSTEM

GET FIRMWARE VERSION5 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 NUMBER07 D8 D2 1D 4C 16 67 1C

BAUDRATE9600BPS  
LEDLIGHTING TIME3x50MSNO. OF TIMES4  
BUZZERBEEPING TIME3x50MSNO. OF TIMES4  
NOTE: EACH CYCLE TIME IS FIXED TO 500MS!  
ADDRESS0x00000010  
ADDRESS0x00000008  
NOTE: ADDRESS AS 32BIT, MSB FIRST!  
ANT1ONANT2ONNOTE: 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

FILEPC/SC CHANNELABOUTEXIT

SYSTEMAUTOLIST CARDSISO14443A-3/4MIFARE CLASSICULTRALIGHT/CDESFIREISO14443BISO15693ISO7816ISO18000

CARD INFO

TAG TYPE

O400

SAK

08

UID NUMBER

F4D7C066

MEMORY SIZE

1 k

BLOCK SIZE

16 Bytes

NUMBER OF BLOCKS

64 Blocks

NUMBER OF SECTORS

16 Sectors

APDU

0A00000840000008

ACTIVE-IDLE

ACTIVE-ALL

APDU CHANNEL

MIFARE CLASSIC 1K&4K

CARD UID

F4D7C066

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

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 C0 66 F7 —success  
>> 50 00 02 22 10 26 46  
<< 50 00 08 22 04 00 08 04 F4 D7 C0 66 F7 —success

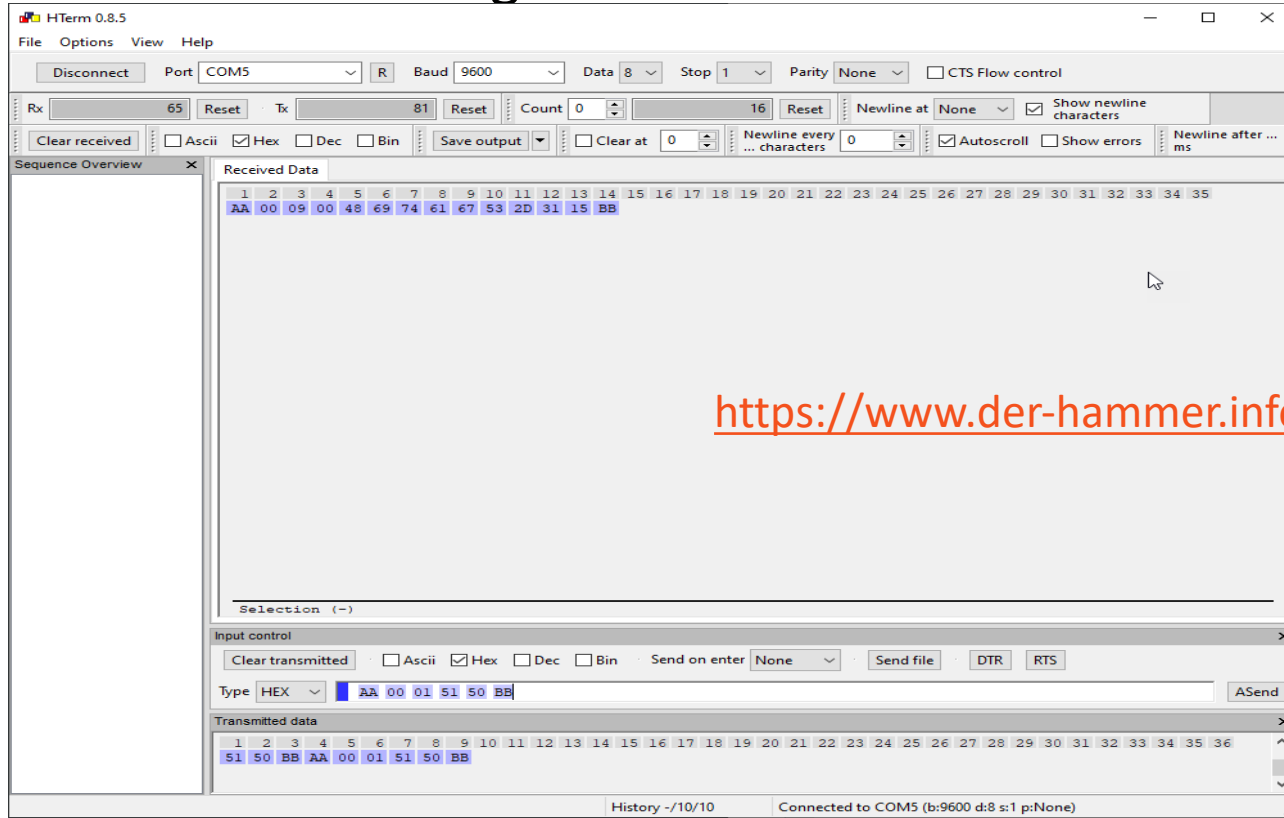
CLEAR

# Virtual COM Port Settings

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

# HTerm

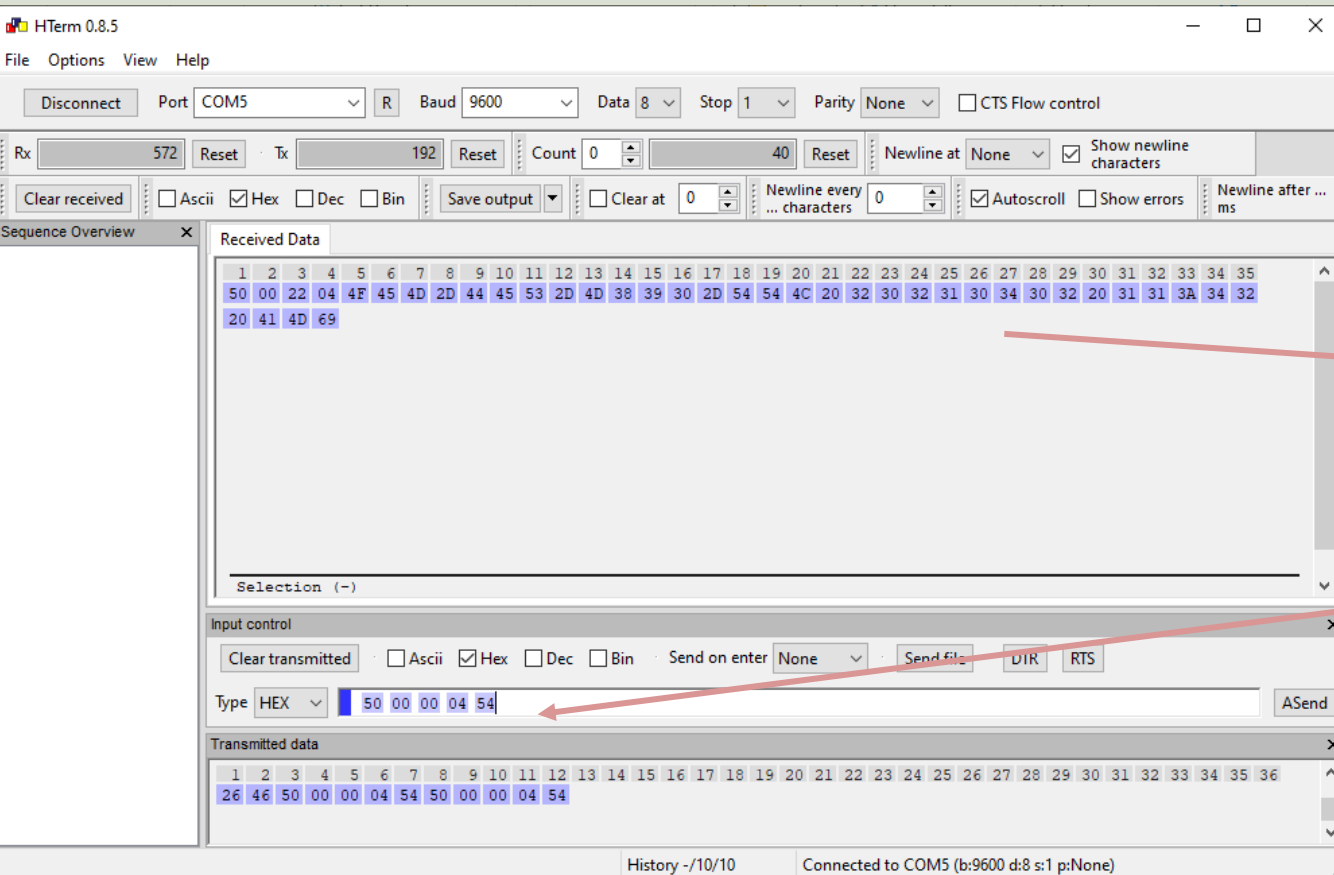
## Serial Terminal Program for communication with RFID Reader



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



# Get Firmware Version



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 window. The 'Received Data' pane displays a sequence of hexadecimal bytes: 50 00 08 22 04 00 08 04 F4 D7 C0 66 F7. A red box highlights the bytes F4 D7 C0 66. The 'Input control' pane shows the 'Type' set to 'HEX' and the input field containing the command 50 00 02 22 10 26 46. A red arrow points from the text 'Enter "50 00 02 22 10 26 46" and hit Enter' to this input field. The 'Transmitted data' pane shows the first two bytes of the command: 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

HTerm 0.8.5

File Options View Help

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

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 ... characters 13 ☒ Autoscroll ☐ Show errors Newline after ... ms

Sequence Overview X

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

Selection (-)

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																									

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

Here I read 4 different Tags

# Resources

- <https://en.wikipedia.org/wiki/Barcode>
- [https://en.wikipedia.org/wiki/Radio-frequency identification](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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