



HF Reader V4.1

SYSTEM MODE SELECT HELP EXIT

SYSTEM ISO14443A ULTRALIGHT CPU ISO14443B ISO15693

CONNECTIVITY

CONNECTION ☒ COMPORT ☐ TCP/IP

COMPORT COM5 BAUDRATE 9600

DEVICE ADDR 00

IP

PORT 8000

SEARCH BAUD SEARCH IP IP MODIFY DISCONNECT

SETTING

DEVICE ADDRESS

ADDRESS 00 SET

DEVICE BAUDRATE

BAUDRATE 115200 SET

DEVICE S/N

S/N 00 00 00 00 00 00 01 SET

INFORMATION

SW VERSION: HFDEMO-V4.0

HW VERSION: HFR831-USB 20190724

DEVICES/N: 32 30 31 39 30 33 30 38

BUZZER & LED

BUZZER 0A (TIMES) 18 (DURATION) EXECUTE

LED 0A (TIMES) 18 (DURATION) EXECUTE

RELAY ON EXECUTE

MESSAGE

>> AA 00 01 86 87 BB
<< AA 02 15 00 48 48 20 52 38 33 31 20 55 53 42 20 32 30 31 39 30 37
32 34 1E BB -success
23.08.2024 11:19:52

.....

>> AA 00 01 83 82 BB
<< AA 02 0A 00 02 32 30 31 39 30 33 30 38 0B BB -success
23.08.2024 11:19:52

.....

Connect success

CLEAR

Demo-Software for HF Series of RFID Devices

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Issue 1.2
– 26. September 2024 –

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Printed in Germany

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1 Introduction

1.1 General Information

This testing demo is usable for any kinds of readers with TTL, RS232, RS485 or Ethernet interface that “speak” the HF series communication protocol.

This DEMO is just for testing used, other specific app or request on function button, please refer to API documents, demo code and other second development files for your own program or contact our sales for customization.

1.2 USB Driver Installation

If the device is connected to a PC for the first time, it can take some time for automatic installation of the Silicon Labs 210x Series 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>

1.3 Installation

Start the installation with double-click on file “Setup.exe”. Please confirm all steps of the installation. In the end you will find this icon on your desktop.



We recommend to install the font “EurostileT_Bold.ttf” otherwise the software may appear ugly.

2 Operation procedure

2.1 Connection with Serial Interfaces

The screenshot shows the HF Reader V4.1 software interface. The top menu bar includes SYSTEM, MODE SELECT, HELP, and EXIT. Below the menu, there are tabs for SYSTEM, ISO14443A, ULTRALIGHT, CPU, ISO14443B, and ISO15693. The main area is divided into two panels: CONNECTIVITY and SETTING.

CONNECTIVITY

- CONNECTION:** ☒ COMPORT, ☐ TCP IP
- COMPORT:** COM5 (dropdown), BAUDRATE: 9600 (dropdown)
- DEVICE ADDR:** 00 (dropdown), **SEARCH BAUD** (button)
- IP:** (dropdown), **SEARCH IP** (button)
- PORT:** 8000 (text input), **IP MODIFY** (button)
- CONNECT** (button)

SETTING

- DEVICE ADDRESS:** ADDRESS: 00 (dropdown), **SET** (button)
- DEVICE BAUDRATE:** BAUDRATE: 115200 (dropdown), **SET** (button)
- DEVICE S/N:** S/N: 00 00 00 00 00 00 01 (text input), **SET** (button)

2.2 Connection with Ethernet Interface (TCP IP)

Then please click “Connect” to build up communication port, and feedback displaying according device information and Message box, as below:

The screenshot shows the HF Reader V4.1 software interface with the TCP/IP connection settings. The top menu bar and tabs are the same as in the previous screenshot.

CONNECTIVITY

- CONNECTION:** ☐ COMPORT, ☒ TCP IP
- COMPORT:** COM1 (dropdown), BAUDRATE: 9600 (dropdown)
- DEVICE ADDR:** 00 (dropdown), **SEARCH BAUD** (button)
- IP:** 192.168.10.226 (dropdown), **SEARCH IP** (button)
- PORT:** 8000 (text input), **IP MODIFY** (button)
- CONNECT** (button)

SETTING

- DEVICE ADDRESS:** ADDRESS: 00 (dropdown), **SET** (button)
- DEVICE BAUDRATE:** BAUDRATE: 115200 (dropdown), **SET** (button)
- DEVICE S/N:** S/N: 00 00 00 00 00 00 01 (text input), **SET** (button)

2.3 Information to see after Connection is established

The screenshot shows the HF Reader V4.1 software interface after a successful connection. The top menu bar and tabs are the same. The main area is divided into two panels: INFORMATION and MESSAGE.

INFORMATION

- SW VERSION:** HF DEMO-V4.0
- HW VERSION:** HFR831-USB 20190724
- DEVICE S/N:** 32 30 31 39 30 33 30 38

MESSAGE

```
>> AA 00 01 86 87 BB
<< AA 02 15 00 48 46 2D 52 38 33 31 2D 55 53 42 20 32 30 31 39 30 37
32 34 1E BB --success
23.08.2024 11:19:52
-----
>> AA 00 01 83 82 BB
<< AA 02 0A 00 02 32 30 31 39 30 33 30 38 0B BB --success
23.08.2024 11:19:52
-----
Connect success
```

INFORMATION

SW VERSION: HF-DEMO-V4.0

HW VERSION: HF-R831-USB 20190724

DEVICE S/N: 32 30 31 39 30 33 30 38

MESSAGE

>> AA 00 01 86 87 BB
<< AA 02 15 00 48 46 20 52 38 33 31 20 55 53 42 20 32 30 31 39 30 37 32 34 1E BB —success
23.08.2024 11:19:52

>> AA 00 01 83 82 BB
<< AA 02 0A 00 02 32 30 31 39 30 33 30 38 0B BB —success
23.08.2024 11:19:52

Connect success

2.4 Simple Function Test with Relay and LED (if supported by hardware)

3 RFID Demo Operation

3.1 ISO14443 Type A operation

ISO14443A Search card

Please enter to “ISO14443A Type A” operation interface, and click “Search” to look for cards in the reading field, then get back UID of the card if succeed, shown as:

HF Reader V4.1

SYSTEM MODE SELECT HELP EXIT

SYSTEM ISO14443A ULTRALIGHT CPU ISO14443B ISO15693

SEARCH / HALT

SEARCH CARD

☒ IDEL ☐ ALL **SEARCH**

HALT **HALT**

READ/WRITE

READ

☒ IDEL ☒ KEY BLOCKS 01 KEY FF FF FF FF FF FF

☐ ALL ☐ KEYB ADDR 10 ☐ AUTO **READ**

WRITE

☒ IDEL ☒ KEY BLOCKS 01 KEY FF FF FF FF FF FF

☐ ALL ☐ KEYB ADDR 10 ☐ AUTO **WRITE**

FF FF FF FF FF FF FF FF FF FF FF FF AA BB

E-WALLET

INITIALIZE

☒ IDEL ☒ KEY SECTOR 01 KEY FF FF FF FF FF FF

☐ ALL ☐ KEYB VALUE 64 00 00 00 **INITIALIZE**

INCREMENT

☒ IDEL ☒ KEY SECTOR 01 KEY FF FF FF FF FF FF

☐ ALL ☐ KEYB VALUE 01 00 00 00 **INCREASE**

DECREMENT

☒ IDEL ☒ KEY SECTOR 01 KEY FF FF FF FF FF FF

☐ ALL ☐ KEYB VALUE 01 00 00 00 **DECREASE**

MESSAGE

>> AA 00 03 25 26 00 00 BB
 << AA 02 06 00 00 74 3F 6E 1D 3C BB —success
 23.08.2024 11:37:54

>> AA 00 0A 20 00 01 10 FF FF FF FF FF FF 3B BB
 << AA 02 15 00 74 3F 6E 1D 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2F BB —success
 23.08.2024 11:37:58

CLEAR

Card Halting operation

This process is to halt card:

Read data of card blocks

To operate card blocks information reading, card supporting types can be MIFARE 1K, MIFARE 4K, and the working mode optional with Idle mode and All mode.

Remark:

- Under idle mode, all cards in the IDLE state shall respond synchronously with ATQA
- Under All mode, all the card in the IDLE or HALT state shall respond synchronously with ATQA.

“Blocks” dialog box stands for the blocks number to be read in one time, and the “Addr” is the start address of this reading, the “KEY” default is FF FF FF FF FF.

If the writing block/blocks is/are protected, please get and input the special key, see following:

If successfully, then Message box will return right information about the operation; if failed, then feedback with wrong code, please refer to Wrong code list to know their definition.

Write data into card blocks

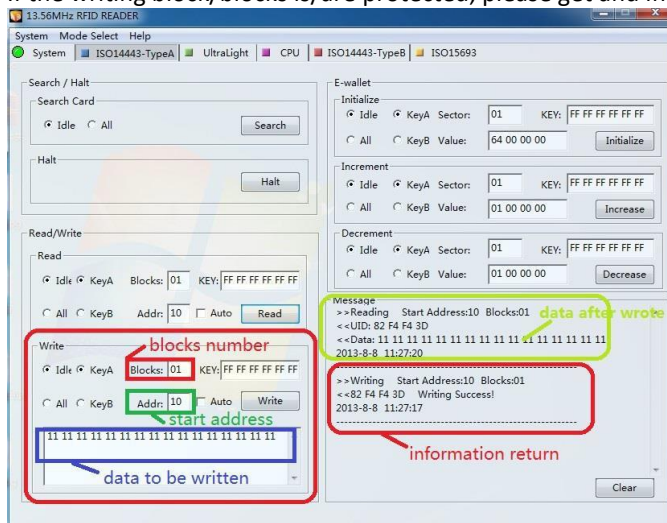
To operate card blocks information writing, card supporting types can be MIFARE 1K, MIFARE 4K, and the working mode optional with Idle mode and All mode.

Remark:

- Under idle mode, all cards in the IDLE state shall respond synchronously with ATQA
- Under All mode, all the card in the IDLE or HALT state shall respond synchronously with ATQA.

“Blocks” dialog box stands for the blocks number to be written in one time, and the “Addr” is the start address of this writing, the “KEY” default is FF FF FF FF FF.

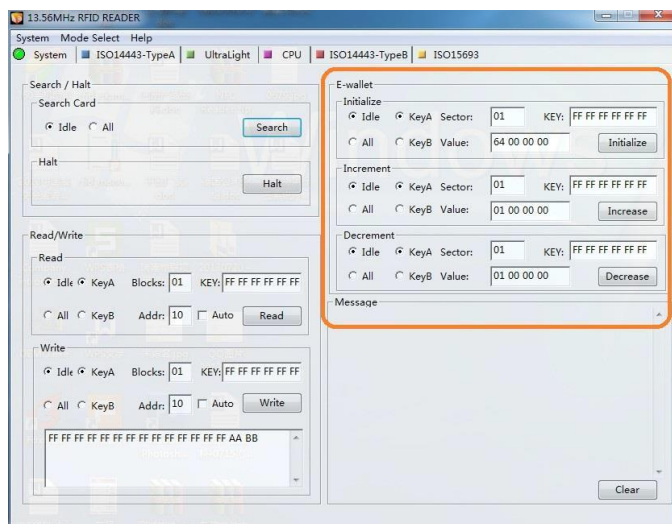
If the writing block/blocks is/are protected, please get and input the special key, see following:



If successfully, then Message box will return right information about the operation; if failed, then feedback with wrong code, please refer to Wrong code list to know their definition.

E-Wallet operation

Here in this demo, we just provide a simple operation interface, to demonstrate the using procedure of E-wallet, which including initialize, increment, decrement, detail operating sectors and value command, please refer to use manual of the card.



3.2 Mifare Ultralight operation

Search MIFARE Ultralight

This procedure is need before reading or writing any specific page, just click the “Search”, then you will get the CardID displaying in Message box, shown as below:

The screenshot shows the HF Reader V4.1 software interface. At the top, there is a menu bar with 'SYSTEM', 'MODE SELECT', 'HELP', and 'EXIT'. Below the menu bar, there are tabs for 'SYSTEM', 'ISO14443A', 'ULTRALIGHT', 'CPU', 'ISO14443B', and 'ISO15693'. The 'ULTRALIGHT' tab is selected.

The main interface is divided into three sections:

- SEARCH / HALT:** This section contains two radio buttons: 'IDEL' (checked) and 'ALL'. To the right of these buttons is a 'SEARCH' button. Below the buttons is a 'CARD ID' label followed by a text box containing '04 BD 93 8A 53 4F 80'. To the right of this text box is a 'HALT' button.
- READ / WRITE:** This section contains a 'PAGE ADDR' label followed by a drop-down menu showing '00'. To the right of the drop-down menu is a text box containing '04 BD 93 A2'. To the right of this text box is a 'READ' button. Below the text box is another empty text box. To the right of this empty text box is a 'WRITE' button.
- MESSAGE:** This section contains a scrollable area with the following text:


```
>> AA 00 03 25 26 00 00 BB
<< AA 02 09 00 00 04 BD 93 8A 53 4F 80 37 BB —success
23.08.2024 11:39:09
-----
>> AA 00 04 20 00 01 00 25 BB
<< AA 02 05 00 04 BD 93 A2 8F BB —success
23.08.2024 11:39:14
-----
```

 At the bottom right of the scrollable area is a 'CLEAR' button.

Read data from page

Please choose the page number in the drop-down list box, then click “Read”, then get the information of the selected memory page.

Write data to page

To write information to the page, select the page number to be written under drop-down list box, input data need to be written into (4 bytes), then click “Write”.

To check out if the writing success, you could see the information return in the Message box, also you could operate to read the page just wrote , shown as below:

3.3 CPU card operation

This interface is used for contactless CPU cards compliant with ISO 14443A standard, here we provide three function buttons, including RATS (Request for Answer to Select), RST ANT (Reset Antenna) and Send APDU. These three functions are fit for all common types of contactless CPU cards.

The screenshot displays the 'HF Reader V4.1' software window. At the top, there is a menu bar with 'SYSTEM', 'MODE SELECT', 'HELP', and 'EXIT'. Below the menu bar is a tabbed interface with tabs for 'SYSTEM', 'ISO14443A', 'ULTRALIGHT', 'CPU', 'ISO14443B', and 'ISO15693'. The 'CPU' tab is currently selected. The main interface is divided into two main sections. The left section contains two sub-sections: 'CPU CARD OPERATIONS' and 'COS COMMAND'. Under 'CPU CARD OPERATIONS', there is a 'REQUEST' label and two buttons: 'RATS' and 'RST ANT'. Under 'COS COMMAND', there is a 'SEND DATA' label, a text input field containing '00 84 00 00 08', and an 'APDU' button. The right section is a large area labeled 'MESSAGE' with a vertical scrollbar. At the bottom right of the 'MESSAGE' area is a 'CLEAR' button.

3.4 ISO14443 Type B

Detail operation, there is other demo to do it.

The screenshot displays the 'HF Reader V4.1' application window. The top menu bar includes 'SYSTEM', 'MODE SELECT', 'HELP', and 'EXIT'. Below this is a tabbed interface with tabs for 'SYSTEM', 'ISO14443A', 'ULTRALIGHT', 'CPU', 'ISO14443B' (which is selected), and 'ISO15693'. The main content area is divided into three sections on the left and a large message area on the right.

ISO14443-TYPE-B COMMAND

REQUEST

PUPID

OPERATE COMMANDS

TRANSMIT DATA

DATA

MESSAGE

3.5 ISO15693 Operation

Inventory

To search the card or cards in the reading field:

HF Reader V4.1

SYSTEM MODE SELECT HELP EXIT

SYSTEM ISO14443A ULTRALIGHT CPU ISO14443B **ISO15693**

ISO15693 COMMAND

SEARCH CARD ☐ AUTO **INVENTORY**

READ/WRITE

READ

FLAG: 02 ADDR: 01 BLOCKS: 05 **READ BLOCK**

UID: 1B 87 9B F1 50 01 04 E0

WRITE

FLAG: 02 ADDR: 05 BLOCKS: 01 **WRITE BLOCK**

UID: 1B 87 9B F1 50 DATA: 11 11 11 11

LOCK

FLAG: 02 BLOCKS: 05 **LOCK BLOCK**

WRITE&LOCK(AFI/DSFID)

AFI

FLAG: 02 AFI: 06 **WRITE AFI**

UID: 1B 87 9B F1 50 01 04 E0 **LOCK AFI**

DSFID

FLAG: 02 DSFID: 08 **WRITE DSFID**

UID: 1B 87 9B F1 50 01 04 E0 **LOCK DSFID**

15693 GENERAL COMMANDS

FLAG: 02 UID: 1B 87 9B F1 50 01 04 E0 **STAY QUIET**

SELECT

RSTToReady

SYSTEM INFO&SECURE INFO

SYSTEM INFO

FLAG: 02 UID: 1B 87 9B F1 50 01 04 E0 **GET SYSINFO**

SECURE INFO

FLAG: 02 ADDR: 00 BLOCKS: 05 **GET SECINFO**

UID: 1B 87 9B F1 50 01 04 E0

TRANSMIT COMMAND

LENGTH: 02 DATA: 02 2B **DATA TRANS**

MESSAGE

```
>> AA 00 04 10 06 00 00 12 BB
<< AA 02 0C 00 01 00 00 1B 87 9B F1 50 01 04 E0 4C BB —success
23.08.2024 12:01:30

>> AA 00 04 11 02 01 05 13 BB
<< AA 02 16 00 00 30 30 30 37 38 31 00 00 00 00 00 00 00 00 AD
67 44 45 34 E5 BB —success
23.08.2024 12:01:31

>> AA 00 02 1B 02 1B BB
<< AA 02 10 00 00 0F 1B 87 9B F1 50 01 04 E0 00 00 1B 03 01 47 BB
—success
23.08.2024 12:01:33

>> AA 00 04 1C 02 00 05 1F BB
<< AA 02 08 00 00 00 00 00 00 00 00 0A BB —success
23.08.2024 12:01:34

CLEAR
```

Read block

To read data of the block.

Please refer to user manual of different chip cards, to get the Flag value, then input the right one, and chose the start address and blocks number to be read.

Following is the example for the I CODE SLI chip cards, the Flag value is 02, as following:

Write block

To write data of the block

Please refer to user manual of different chip cards, to get the Flag value, then input the right one, and chose the start address and blocks number to be written.

Following is the example for the I CODE SLI chip cards, the Flag value is 02.

Lock block

Here needed to input the right Flag of the using card and choose the blocks number to be locked. Attention: if the block locked, rewriting for these blocks will be not available any more.

Write & Lock (AFI/DSFID)

Please refer to the ISO15693 standard.

ISO15693 General Commands

Stay_Quiet	This will bring the RFID card into sleep mode.
Select	To select a single card in the reading field.
RST to Ready	To wake-up a single card from sleep mode.

System info & Secure info

This is to get the system & secure information of the card, here this testing demo is available with three buttons of "GetSysInfo", "GetSecurInfo" and "Data Transmit".

For further functions, please refer to the API document for reference for developing you own software.