

SHENZHEN CHAINWAY INFORMATION TECHNOLOGY CO., LTD

Fixed UHF Reader

UR4 User Manual



Statement

2013 by ShenZhenChainway Information Technology Co., Ltd. All rights reserved.

No part of this publication may be reproduced or used in any form, or by any electrical or mechanical means, without permission written from Chainway. This includes electronic or mechanical means, such as photocopying, recording, or information storage and retrieval systems. The material in this manual is subject to change without notice. The software is provided strictly on an “as is” basis. All software, including firmware, furnished to the user is on a licensed basis. Chainway grants to the user a non-transferable and non-exclusive license to use each software or firmware program delivered hereunder (licensed program). Except as noted below, such license may not be assigned, sublicensed, or otherwise transferred by the user without prior written consent of Chainway. No right to copy a licensed program in whole or in part is granted, except as permitted under copyright law. The user shall not modify, merge, or incorporate any form or portion of a licensed program with other program material, create a derivative work from a licensed program, or use a licensed program in a network without written permission from Chainway. Chainway reserves the right to make changes to any software or product to improve reliability, function, or design. Chainway does not assume any product liability arising out of, or in connection with, the application or use of any product, circuit, or application described herein.

No license is granted, either expressly or by implication, estoppel, or otherwise under any Chainway intellectual property rights. An implied license only exists for equipment, circuits, and subsystems contained in Chainway products.

Statement	1
Chapter 1 Product Intro.....	3
1.1 Intro.....	3
1.2 Brief.....	4
1.3 Device List.....	5
1.4 Device installation	6
1.5 GPIO	6
Chapter 2 Installation instructions	7
2.1 Appearance	7
2.2 Parameter Setup	8
Chapter 3 Read and Write EPC	15
3.1 Read EPC	15
3.2 Read & Write Tags	16
3.3 Lock UHF Tag	20
3.4 UDP-ReceiveEPC	21
3.5 Others	22

Chapter 1 Product Intro

1.1 Intro

Chainway UR4 is a high-performance four-channel fixed UHF reader. The core chip adopts Impinj R2000 module with high integration and excellent performance. With Stable and reliable capacity, excellent anti-electromagnetic interference capability and heat dissipation performance, it meets the requirements for installation and application of various indoor and outdoor environments and can be applied in multiple industries with strict RFID application standard such as warehouse management, archives and library management, bank, clothing and footwear retail, jewelry monitoring, watch industry, laundry, production line management, medical instrument cabinet and vending machines.

1.2 Brief

UR4 has adopted DC 12V/5A power supply, it can be equipped with multiple types of antennas with different output power such as 6dBi, 9dBi. Also UR4 has adopted reverse SMA female port, RS232 and RJ45 interfaces, Windows SDK and demo are provided.

1.3 Device List

1. UR4 fixed reader, 12V/5A power adaptor.
2. UHF antennas: 6dBi, 9dBi, etc.
3. Feeder line that has adopted with reverse SMA port, the port on other side needs to be equipped with antenna.
4. RJ45 Ethernet cable.
5. Serial port cable.
6. Demo software, it includes 4 necessary files and UHFAPP.exe is execute program as pic. 1.

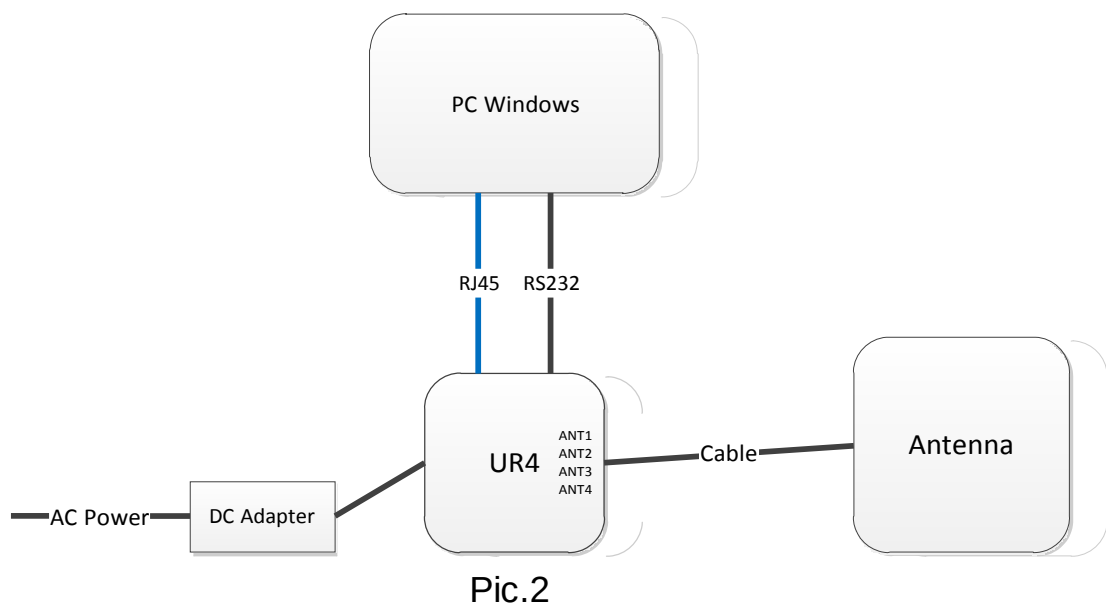
Name	Compressed	Original	Type	Modified
--				
ipConfig.txt	28	28	Text Document	8/2/2018 11:24:19 AM
UHFAPL.dll	55,281	208,896	Application extension	11/8/2018 3:15:05 PM
UHFAPP.exe	56,234	201,216	Application	11/14/2018 5:59:32 PM
WindowsFormsControlLibrary1.dll	3,713	9,216	Application extension	7/20/2018 10:11:22 AM

Pic.1

1.4 Device installation

UR4 can be connected as Pic.2. PC can connect with device by serial port cable (communication velocity is 115200bps). Also it can be connected by Ethernet cable through RJ45 port. (Default IP address of UR4 is 192.168.99.202, Port is 8888).

PC needs to be set with UR4 in same network segment and PC could connect with multiple UR4 devices through switchboard or similar. One UR4 can be connected with 4 antennas at maximum.



1.5 GPIO

1	2	3	4	5	6	7	8
NC	NC	output : Relay pin 1	output : Relay pin 2	input : Optically coupled 1 LED+	input : Optically coupled 1 LED-	input : Optically coupled 2 LED+	input : Optically coupled 2 LED-

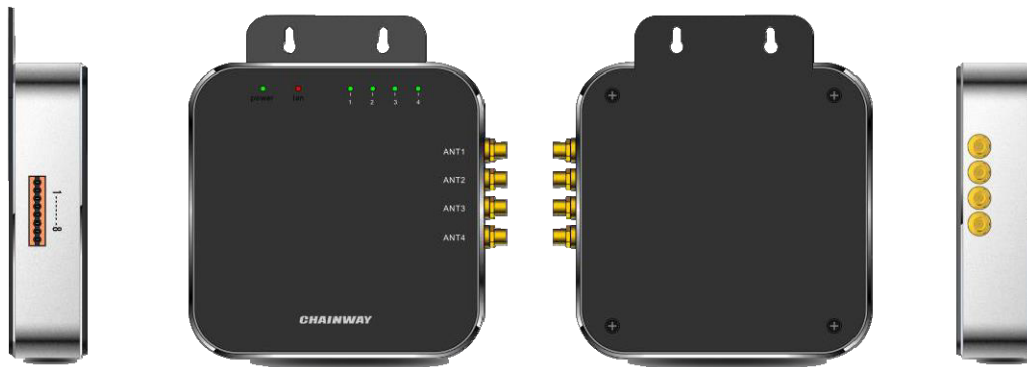
UR4 contains a GPIO interface, which is defined as follows :

- 1、IO1-2 : NC, unable to connect to any electrical level ;

- 2、IO3-4 : Controllable by software, maximum switching voltage of electric relay is 220Vdc, 250Vac ;
- 3、IO5 : Optically coupled 1 input LED+, voltage range between IO5 and IO6 is 3-5.5V, maximum current is 50mA ;
- 4、IO6 : Optically coupled 1 input LED-, voltage range between IO5 and IO6 is 3-5.5V, maximum current is 50mA ;
- 5、IO7 : Optically coupled 2 input LED+, voltage range between IO7 and IO8 is 3-5.5V, maximum current is 50mA ;
- 6、IO8 : Optically coupled 2 input LED-, voltage range between IO7 and IO8 is 3-5.5V, maximum current is 50mA ;

Chapter 2 Installation instructions

2.1 Appearance



2.2 Parameter Setup

Double click UHFAPP.exe to enter software, and connect with device through serial port line. Select **Mode** to “SerialPort”, select COM to according serial port on PC. Click “Open” to connect with device, initiation page is as follows:



If RJ45 has been used as connection, communication **Mode** needs to be selected as “network” and input IP address and port number (default IP address is 192.168.99.202, Port is 8888.) Then click “Open” to connect PC and device. After PC and device have been connected, the status page is as follows:



UHF(1.2.4) - [ConfigForm]

ReadEPC ReadWriteTag Configuration Kill-Lock UHF Info Temperature UDP-ReceiveEPC

Mode: network IP: 192 . 168 . 1 . 201 Port: 8888 Close 语言: English

Power

Output Power: 30 dBm

Get Set Save

Region

Region: USA

Get Set Save

RFLink

RFLink: PR_ASK/Miller4.250KHz

get Set cbSave

ON OFF

Local IP

IP: 192 . 168 . 1 . 201

Port: 8888

Gas2

Target: 000(m0) startQ: 4

Action: 000 minQ: 0

Truncate: 0(Disable) maxQ: 15

Q: 1(Dynamic) DR: 1(DR=64/3)

Miller: 10(M=4) Session: 01(S1)

TRext: 1(Use pilot) Target: 0(A)

sel: 01(ALL) linkFrequency: 011(250KHz)

Set Get

FastID

Enable Disable

Get Set

Tagform

Enable Disable

Get Set

TemperatureProtect

value: 75 50-75

get set

EPC And Tid

Enable Disable

Get Set Save

Reset

Power

Open Close

ANT

☒ ANT1
 ☐ ANT2
 ☐ ANT3
 ☐ ANT4
 ☐ ANT5
 ☐ ANT6
 ☐ ANT7
 ☐ ANT8
 ☐ ANT9
 ☐ ANT10
 ☐ ANT11
 ☐ ANT12
 ☐ ANT13
 ☐ ANT14
 ☐ ANT15
 ☐ ANT16

get set Save

ANT: ANT1 workTime: 200 10-65535ms

get set Save

After device has connected with PC, the parameters on interface will be empty. Click “Get” on each option to collect device parameters.

Click “Set” on the page, user can adjust necessary parameters, some parameters are default values.

Output power can be set in range of 5 dBm to 30 dBm as following picture, after select value, click “Set” button. If “Save” has been selected, current parameters will be saved after power off device.

The screenshot shows a software interface for configuring a device. The 'Power' section is active, with a dropdown menu for 'Output Power' open. The menu lists values from 5 to 30 dBm in increments of 1. The value '30' is currently selected and highlighted in blue. To the right of the dropdown is a 'Save' button. Below the 'Power' section, there are other configuration sections: 'Region' with a 'Save' button, 'RFLink' with a 'Save' button, and 'CW' with a 'Save' button. The 'RFLink' section also has a 'cbSave' button.

Set regions:

The screenshot shows the 'Region' configuration section of the software interface. A dropdown menu for 'Region' is open, displaying a list of available regions: China1, China2, Europe, USA, Korea, and Japan. The 'USA' option is selected and highlighted in blue. To the right of the dropdown is a 'Save' button. Below the 'Region' section, there is an 'RFLink' section.

Set continuous wave:



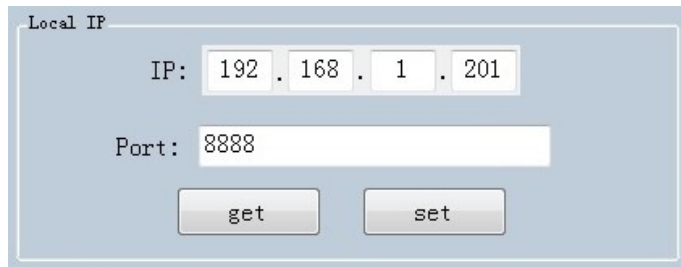
There are two work modes can be selected, “command mode” and “auto mode”.

Under “command mode”, user could collect tag data in “Read EPC” page, click “Start” to send command to device on PC, click “Stop” to stop collecting tag data.

Under “auto mode”, user could collect tag data in “UDP-ReceiveEPC” page, click “Start” to receive data, click “Stop” to stop receiving data. After selecting “auto mode”, the device needs to be restarted.



Set IP address and make sure PC and device have used in same segment. For example, if IP address of PC is 192.168.1.109, mask is 255.255.255.0, the device IP address can be set to 192.168.1.201, port number doesn't need to be changed.



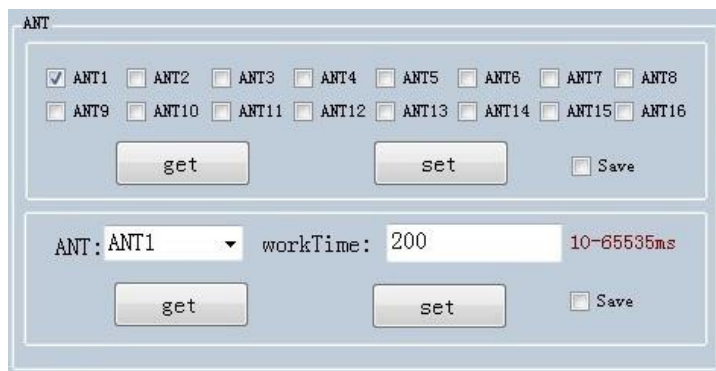
Local IP

IP: 192 . 168 . 1 . 201

Port: 8888

get set

Set antenna connection, there are 4 I/O ports on device and have been marked as ANT1, ANT2, ANT3, ANT4. User needs to select antenna which has been connected and click "set".



ANT

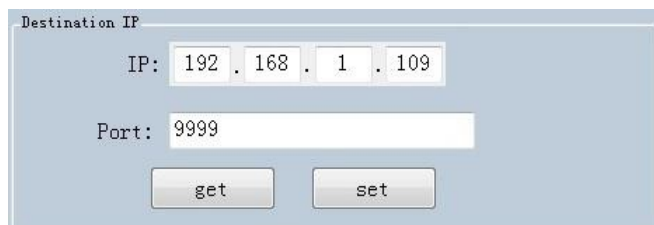
☒ ANT1 ☐ ANT2 ☐ ANT3 ☐ ANT4 ☐ ANT5 ☐ ANT6 ☐ ANT7 ☐ ANT8
☐ ANT9 ☐ ANT10 ☐ ANT11 ☐ ANT12 ☐ ANT13 ☐ ANT14 ☐ ANT15 ☐ ANT16

get set ☐ Save

ANT: ANT1 ▼ workTime: 200 10~65535ms

get set ☐ Save

Set destination IP address and port number, destination IP address is the IP address which used for reading tag data under "auto mode".



Destination IP

IP: 192 . 168 . 1 . 109

Port: 9999

get set

Set FastID:



FastID

☐ Enable ☒ Disable

Get Set

Set TagFocus:

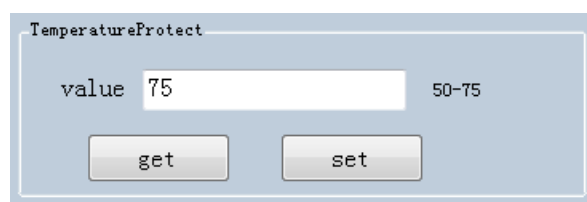


Tagfocus

☐ Enable ☒ Disable

Get Set

Set protective temp. It means to setup highest operating temperature of UHF module:



TemperatureProtect

value 50-75

get set

Set EPC and TID:



EPC And Tid

☐ Enable ☒ Disable

Get Set ☐ Save

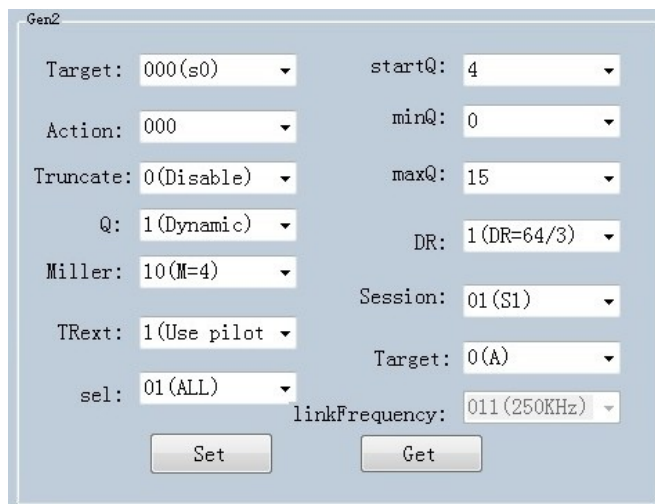
Reset, click “Reset” button to restore device to default value. After reset, user needs to click “Close” and “Open” to reconnect the device.



Set Buzzer, click “Open” to switch on buzzer function, device will play notification sound when reading tags.



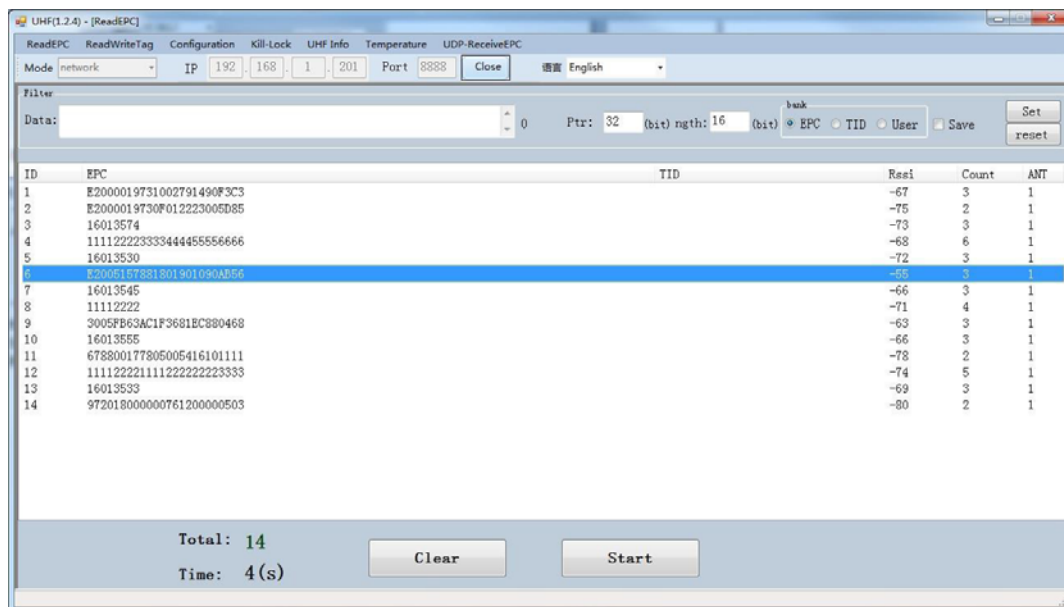
Set Gen2, this parameter needs to be adjusted by actual requirements.



Chapter 3 Read and Write EPC

3.1 Read EPC

Click “ReadEPC” in menu to enter EPC page, click “Start” to read tags, click “Stop” to stop reading. The EPC, RSSI, Count number and ANT number (antenna channel) will be recorded in window as following pic:



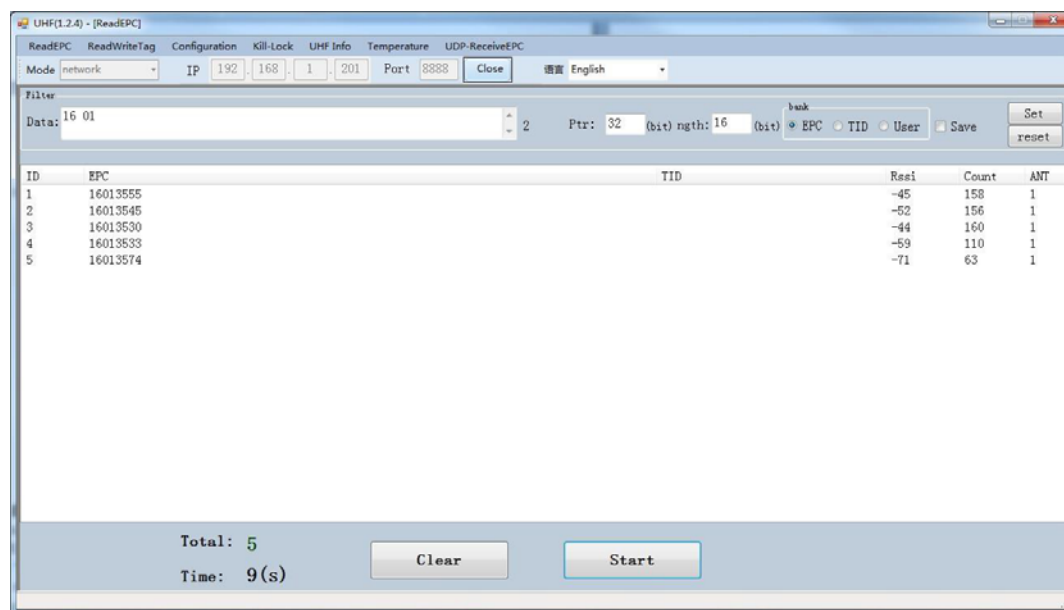
The screenshot shows the 'UHF(1.2.4) - [ReadEPC]' window. At the top, there are tabs for 'ReadEPC', 'ReadWriteTag', 'Configuration', 'Kill-Lock', 'UHF Info', 'Temperature', and 'UDP-ReceiveEPC'. Below the tabs, there are input fields for 'Mode' (set to 'network'), 'IP' (192.168.1.201), and 'Port' (8888). A 'Close' button is next to the port field. Below this is a 'Filter' section with a 'Data:' input field (containing '0'), 'Ptr:' (32), 'length:' (16), and a 'bank' dropdown (set to 'EPC'). There are also 'Set', 'reset', and 'Save' buttons. The main area is a table with the following data:

ID	EPC	TID	Rssi	Count	ANT
1	E2000019731002791490F3C3		-67	3	1
2	E2000019730F01222300ED85		-75	2	1
3	16013574		-73	3	1
4	111122223333444455556666		-68	6	1
5	16013530		-72	3	1
6	E2000157321801901090A56		-55	3	1
7	16013545		-66	3	1
8	11112222		-71	4	1
9	3005FB63AC1F3681EC880468		-63	3	1
10	16013555		-66	3	1
11	678800177805005416101111		-78	2	1
12	11112222111122222223333		-74	5	1
13	16013539		-69	3	1
14	972018000000761200000503		-80	2	1

At the bottom, there is a 'Total: 14' and 'Time: 4(s)' display, along with 'Clear' and 'Start' buttons.

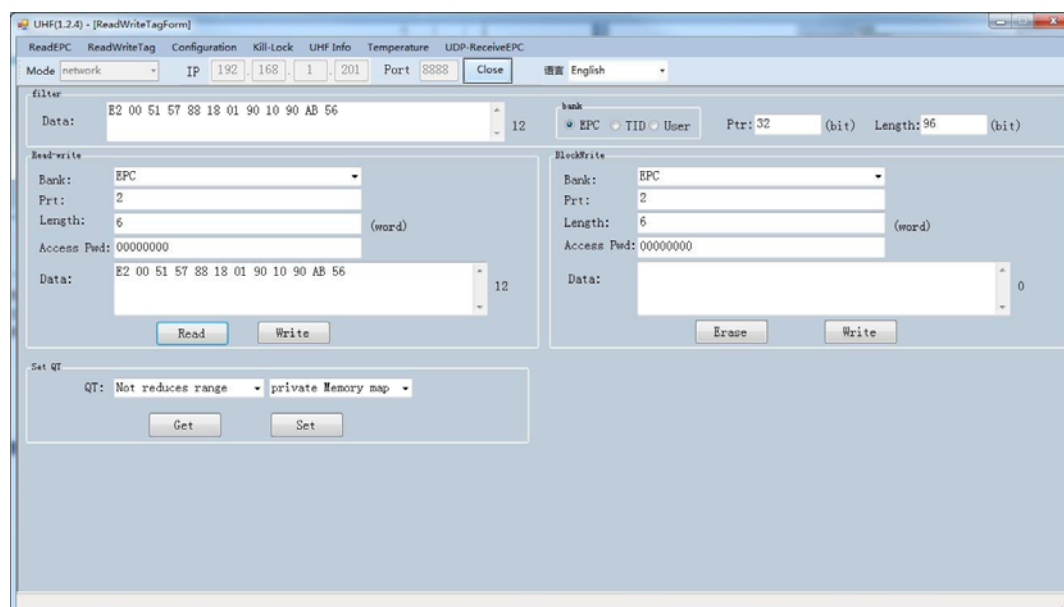
User could enter data in “Filter” to filter EPC of special tags, the maximum filter DL is 96 bits. User needs to setup data, initial address, data length and click “Set”. After filtered data has been set, the device will read and search for the tag which has been filtered.

For example: enter 16 01 in “Data”, initial address data length is 32(bit), length is 16(bit), select EPC in “bank”, click “Set” and click “Start” to start scanning tags which the address start at 16 01:



3.2 Read & Write Tags

Click “ReadWriteTag” to enter its page, TID area can be read only, RESERVED, EPC and USER areas can be read and written.



filter

Data:

E2 00 51 57 88 18 01 90 10 90 AB 56

12

Read-write

Bank:

EPC

Prt:

RESERVED

Length:

EPC

TID

USER

(word)

Access Pwd:

00000000

Data:

0

Read

Write

Click one option in “Read-write” window to enter tag reading mode, EPC will be automatically copied into “Data” block in filter, default option is EPC reading, click “Read” to read 12 bytes of EPC area.

filter

Data:

E2 00 51 57 88 18 01 90 10 90 AB 56

12

Read-write

Bank:

EPC

Prt:

2

Length:

6

(word)

Access Pwd:

00000000

Data:

E2 00 51 57 88 18 01 90 10 90 AB 56

12

Read

Write

For “RESERVED” area, user could read 4 words at maximum, previous 2 words are password of KILL function, last 2 words are access passwords:

filter

Data: E2 00 51 57 88 18 01 90 10 90 AB 56 12

Read-write

Bank: RESERVED

Prt: 0

Length: 4 (word)

Access Pwd: 00000000

Data: 20 18 20 18 20 18 20 18 8

Read Write

Read TID area:

filter

Data: E2 00 51 57 88 18 01 90 10 90 AB 56 12

Read-write

Bank: TID

Prt: 0

Length: 6 (word)

Access Pwd: 00000000

Data: E2 00 34 12 01 3C FA 00 09 AC AB 56 12

Read Write

Read USER area:

The screenshot shows a software interface with two main sections: 'filter' and 'Read-write'.

filter section:

- Label: filter
- Data: E2 00 51 57 88 18 01 90 10 90 AB 56
- Value: 12

Read-write section:

- Bank: USER (dropdown menu)
- Prt: 0
- Length: 4 (word)
- Access Pwd: 00000000
- Data: 12 34 12 34 12 34 12 34
- Value: 8

At the bottom of the 'Read-write' section are two buttons: 'Read' and 'Write'.

Data could be written in EPC, RESERVED and USER areas, select according areas and input initial address, length, input data into “Data” window and click “Write” to write data into according areas.

3.3 Lock UHF Tag

Click “Kill-Lock” in main menu to enter Tag locking function. For this function, user could execute “Lock”, “Kill”, “Open”, “Permanent Open” and “Permanent Lock”, to execute “Lock” function, password is needed. If user wants to kill UHF tag, need to enter password and tag will be wasted permanently.

The screenshot displays the UHF(1.2.4) - [Kill_LockForm] software interface. The top menu bar includes ReadEPC, ReadWriteTag, Configuration, Kill-Lock, UHF Info, Temperature, and UDP-ReceiveEPC. The main window is divided into several sections:

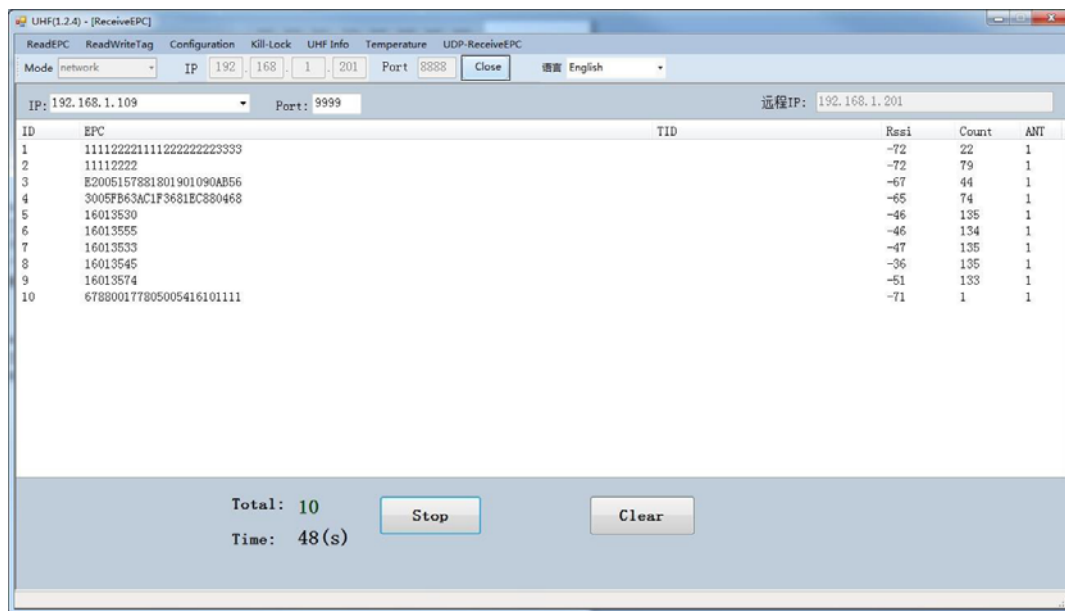
- filter:** Data: E2 00 51 57 88 18 01 90 10 90 AB 56, 12
- lock:** Access Pwd: 20 18 20 18 (Can't use the default password). Radio buttons: Open (selected), Lock, Permanent Open, Permanent Lock. Below: Kill-pwd, Access-pwd, EPC, TID, USER (selected). LockData: 00 08 00. Confirm button.
- Kill:** Access Pwd: 20 18 20 18 (Can't use the default password). Kill button.
- Block/Unblock:** Bank: USER, Ptr: 0, Access-pwd: 00000000, ReadLock: Read. Checkboxes for block-1 through block-16. Maskbuf. Confirm button.

The bottom section is a zoomed-in view of the 'lock' and 'kill' sections, showing the 'Access Pwd' field with the warning 'Can't use the default password' and the 'Confirm' and 'kill' buttons.

3.4 UDP-ReceiveEPC

After auto mode has been selected, restart device and select UDP-ReceiveEPC, click “Open” to connect device and select IP address of PC in address column, click “Stop” to stop receiving UHF tag data.

If user needs to escape auto work mode, “command mode” needs to be selected in work mode.



3.5 Others

Click “UHF information” in main menu to read hardware version and firmware version, click “Temperature” to read current temperature value of UHF module.

FCC Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.