

LT-DS8116 User's Guide V2.3

1. Basic Parameter Setting	1
1.1 Connect Reader	1
1.2 Parameter Setting:	1
2. Work mode Setting	3
2.1 Real time inventory Setting:.....	3
3. The Necessary Knowledge.....	4
3.1 EPCC1G2 tag memory	4
3.2 18000-6B tag	4
3.3 Data display (tag ID, passwords, memory data is display in 16 hexadecimal)	5
4. EPCC1-G2 Test	5
4.1 Query Tag EPC.....	5
4.2 Read Data, Write Data, Block Erase	6
4.3Revise the password	8
4.4 Write EPC.....	9
4.5 Lock Operation	9
4.6 Read Protection	10
4.7 EAS Alarm	11
4.8 Kill Tag (Permanently Kill)	12
4.9 Mask conditions.....	13
5. Buffer operation	14
6. Auto real-time-query mode	15
7. 18000-6B Test.....	16
7.1 Query Tag	16
7.2 Read and Write Data Block / Permanently Write Protect Block of Byte.....	16
8. Config TCPIP	17
8.1 Web config	17
9. FCC Statement.....	22

LT-DS8116 is an industrial-grade, high-performance, 16-channel UHF RFID reading and writing equipment. It is designed with all-metal shell, and has excellent durability and heat dissipation performance. The product integrates a wealth of communication interfaces, including USB, RSS-232, Ethernet, wireless WIFI(optional) and so on.

LT-DS8116 adopts carrier cancellation technology and a new anti-collision algorithm, the application of external watchdog and network heartbeat packet, the lightning protection and surge protection design of circuit, which makes its reading and writing performance excellent, stable and reliable, and has strong anti-interference ability. It can completely meet the needs of various environments.

1. Basic Parameter Setting

1.1 Connect Reader

<1> RS232 connection.

Select connect type



Connect Type

☒ RS232 ☐ TCP/IP

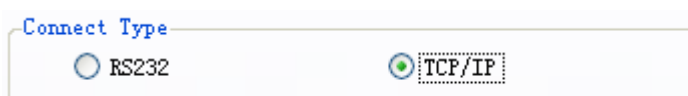
Select Port Port: COM4 (According to the actually Select)

And baud rate Baud rate: 57600bps (default) , click **Connect**

If success , can see 2014-7-25 14:09:35 Connected COM4@57600bps

<2>TCP/IP connection.

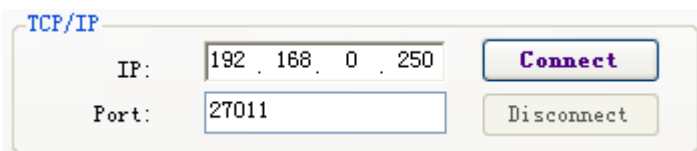
Select connect type



Connect Type

☐ RS232 ☒ TCP/IP

Input reader ip address and port:



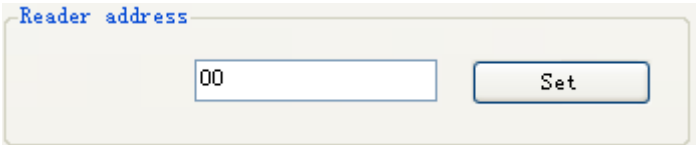
TCP/IP

IP: 192 . 168 . 0 . 250 **Connect**

Port: 27011 **Disconnect**


Click **Connect**


1.2 Parameter Setting:

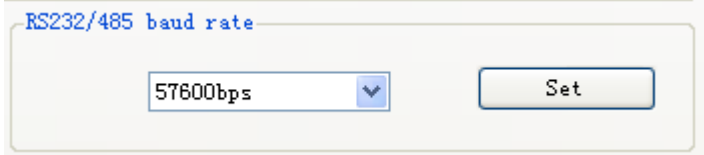
- (1)  the new reader address to set.

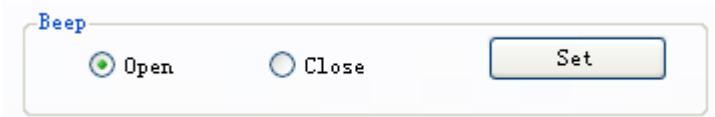
This address can't be 0xFF. If set 0xFF, reader will return error information.

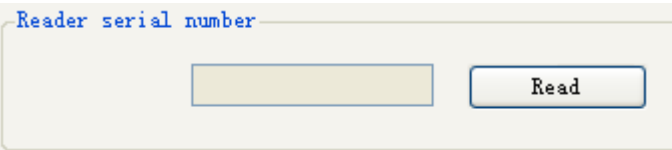

- (2)  set and save power configuration.

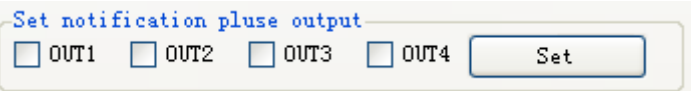
- (3)  select the reader's band, different band, the frequency is different.

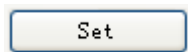
- (4)  Set reader working Min Frequency and Max Frequency. In different places, the radio requires the rule to be different. Users can follow the local situation and choose to read more sensitive frequency range of the card. In single frequency point operation, only need to set two frequencies to the same value. In frequency hopping operation, only need to set two frequencies to the different value.

- (5)  demo software start run, default use the baud rate 57600 to open COM port, reader power on, reader baud rate default is 57600. After change the baud rate, reader use the new baud rate until power off. Close port and open port, the baud rate no change. The demo software will use the new baud rate, until close the demo software.

- (6)  , Set beep open or close

- (7)  , click  can get reader's serial number.


- (8)  , select output port , click

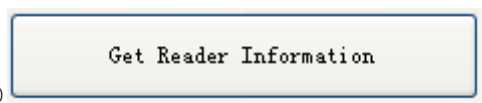


, Can install require notification output port.

- (9)  , this function is used to get or set EPC/TID length on buffer tag.
- The control panel for 'Buffer EPC/TID length' includes two radio buttons: '128bit' (selected) and '496bit'. It also features 'Set' and 'Get' buttons.

- (10)  , this function is used to get reader's serial number.
- The control panel for 'Reader serial number' includes a text input field and a 'Get' button.

- (11)  , this function is used to restore default setting of reader.

- (12)  , this function is used to get reader's information.

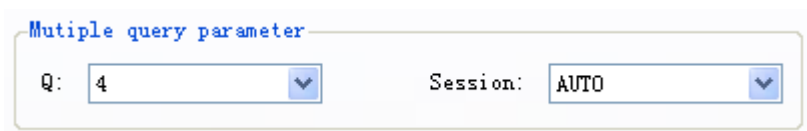
2. Work mode Setting

2.1 Real time inventory Setting:

- (1)  select read tag type on real-time-query mode.
- The 'Protocol' control panel has two radio buttons: 'EPCC1-G2' (selected) and '18000-6B'.

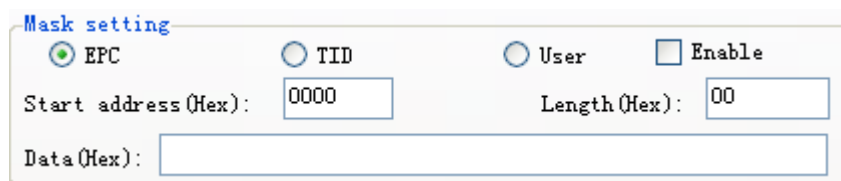
-  select read pulse time on real-time-query mode.
- The 'Pulse interval' control panel includes a 'Pulse Time' dropdown menu currently set to '10ms'.

-  Select tag filter time, if select 0 is not filter.
- The 'Tag Filter' control panel includes a 'Filter time' dropdown menu currently set to '0*1s'.

-  Select Q and
- The 'Multiple query parameter' control panel includes a 'Q' dropdown menu set to '4' and a 'Session' dropdown menu set to 'AUTO'.

Session on real-time-query mode.

When Session is AUTO, only effective with EPC query.



Mask setting

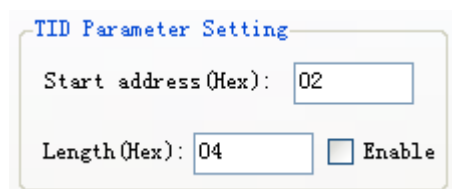
☒ EPC ☐ TID ☐ User ☐ Enable

Start address(Hex): Length(Hex):

Data(Hex):

set mask

conditions on real-time-query mode, if you want it effective, you should check ☐ Enable .



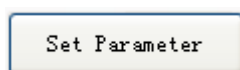
TID Parameter Setting

Start address(Hex):

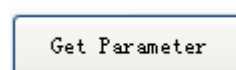
Length(Hex): ☐ Enable

Set query TID parameter on real-time-query mode,

if you want it effective, you should check ☐ Enable .

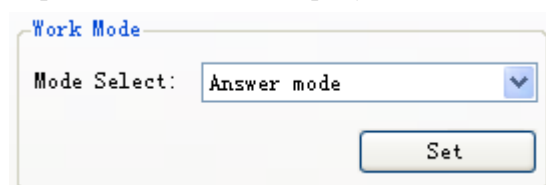


set parameter with you select condition,



get

reader parameter on real-time-query mode.

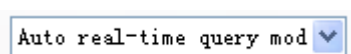


Work Mode

Mode Select: ▼

(2)

Set reader work mode, if it set to



, we can get data by page "AUTO Real time".

3. The Necessary Knowledge

3.1 EPCC1G2 tag memory

Tag memory divided into four storage areas, each storage area can be made up of one or more memory words. The four storage areas:

EPC areas (EPC): Store the area of EPC number, this module stipulates it can store 15 word EPC number. Can read and can write.

TID areas (TID): Store ID number established by the tag production firm. There are 4 words and 8 words two kinds of ID numbers at present. Can read and not can write.

User areas (User): This area of different manufacturers is different. There is no user area in G2 tag of Inpinj Company. There are 28 words in Philips Company. Can read and can write.

Password areas (Password): The first two words is kill password, the last two words is access password. Can read and can write.

Can write protect in four storage areas. It means this area is never writeable or not writeable under the non-safe state; only password area can set unreadable.

3.2 18000-6B tag

6B tag has a memory space, the minimum 8 bytes (byte 0- 7) is UID of the tag, and can't

be rewritten. Following byte all can be rewritten, can be locked too, but once locking, can't rewrite again, can't unblock either.

3.3 Data display (tag ID, passwords, memory data is display in 16 hexadecimal)

Write Data (Hex): 1122334455667788

Display in Hex, then 11 is first byte, 22 is second byte, and 1122 is first word.

1122334455667788

Total 8 bytes, in other words, total 4 words.

4. EPCC1-G2 Test

4.1 Query Tag EPC

(1) Select EPC or TID to read,



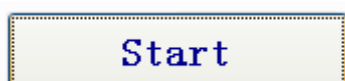
like

Select other condition

Q: 4 Session: AUTO Max-ScanTime: 20*100ms Target: A

☒ Read 2 times no tag. then A/B conversion ☒ Return Speed

Note: about Q, S choice, a single tag or less number must be S0, a lot of tag queries using S1 or S2, S3. 2^Q equal tag number is better. If it is a single query effect must use S0 if Session select AUTO, only effective by query EPC. For this demo, session is AUTO, reader will read tag by preset antenna. Other session, you can select ant by you specified. Also if you write demo by yourself, you can specified antenna with Session-AUTO too.



(2) Click

No.	EPC	Times	RSSI
1	E20028505003020912309C84	4	74
2	E20028505003012014108542	4	70
3	E20028505003011922802C67	4	75
4	E20028505003016912309BE4	4	69
5	E200285050030107212037D9	4	68
6	E20028505003013911909FCD	4	66
7	E20028505003024112309D04	4	59
8	E20028505003013811909FBC	4	54
9	E20028505003017012309BE8	4	79
10	E20028505003006014208453	4	65
11	E20028505003004914108426	4	65
12	E20028505003007214108482	4	66
13	E20028505003007314108486	4	72
14	E20028505003019512309C4C	4	75
15	E200285050030033141083B6	4	72
16	E200285050030080141084A2	4	69

Tag Number: 00000000

Speed: 149 cmd time(ms): 1203

Total tag number: 355 Total-cmd-time(ms): 1516



(3) if select Mix query

,we

can select read memory, for example:

Mix

Mem: Addr:

Password: Len:

Start

,click ,can see:

No.	EPC	Data	Times	RSSI
1	E20028505003017012308E8	0133F1000DF58BE7	1	63
2	E200285050030035141083EE	0140F1000DF583ED	1	56
3	E20028505003011411909F5C	013CF1000DF58F5B	1	74
4	7D597D5965B604E00000000	0131F1000DF52CA2	1	80
5	E20028505003019512309C4C	012EF1000DF59C4B	1	67
6	E20028505003010011909F24	0130F1000DF59F23	1	74
7	E2002850500301631190A020	0149F1000DF5A01F	1	73
8	E200285050030112218033FB	013AF1000DF533FA	1	67
9	E200285050030187216034D5	0135F1000DF534D4	1	72
10	E200285050030096141084E2	012EF1000DF584E1	1	63
11	E200285050030019142083AF	0133F1000DF583AE	1	65
12	E20028505003017212308BF0	013AF1000DF58BEF	1	62
13	2959295911540A4E00000000	0134F1000DF52CC5	1	70
14	E200285050030160216034B9	0133F1000DF534B8	1	73
15	E20028505003019312309C44	0131F1000DF59C43	1	67
16	E200285050030033141083B6	013BF1000DF583B5	1	58

Tag Number: 000054

Speed: 135 cmd time(ms): 859

Total tag number: 110 Total-cmd-time(ms): 719

4.2 Read Data, Write Data, Block Erase

Read Data / Write Data / Block Erase

Start address: (Hex): Read/Write data (Hex):

Length (Dec): ☐ Auto Compute and add PC

Password: (Hex): ☐ Password ☒ EPC ☐ TID ☐ User

Read Write Ext Read Block Block Ext Write

E211210100120000000001BA

E211210100120000000001BA

E220000000000000000001368

F700000000000000000000AFB

E201205100000000000000176

C200000000000000000000013

E870000000000000000000153

E2012051000000000000001AC

E1030000000000000000014D6

<1> Select one tag then click

Select

, check

☒ Selected tag: E211210100120000000001BA

☐ Password ☐ EPC ☐ TID ☒ User

Select memory to be operation

(1) Read data operation

Start address: (Hex):

Length (Dec):

Password: (Hex):

<1> Input data like

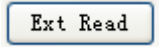
Start address: 0x00 stand in start to read data from first word in the designated storage area, 0x01 stand in start to read data from second word in the designated storage area, and so on.

Read the length: Number of the word to be read. It read 120 words at most. Can not set 0 or 120, otherwise, return the parameter error information.

Access password: From left to right it is the former high-word, low word in the access password. If operation don't need access password, it can be the arbitrary value, but can't lack.


<2> Click  can see 

Read/Write data(Hex) 

 is used to read large memory of tag.

(2) Write data operation

<1> Input Write data word address

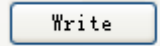
Start address: (Hex):  and Password

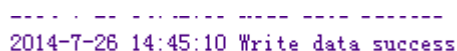
Password: (Hex): 

Start address: 0x00, the first word of data (from left) is written in address 0x00 of the designated storage area, and so on.

<2> Input data what you want to write like

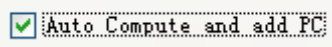
Read/Write data(Hex) 

<3> Click  can see



Note: write data can be used to change the EPC number
(the method is as follows)

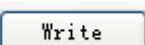
<1> Choose memory , and

select 

<3> Write EPC number

Read/Write data(Hex) 

(EPC memory Address of tag is 2)

<4> Click  can see


```
-----
2014-7-26 14:45:10 Write data success
```

Then query tag EPC, can see

Tag list (No Repeat)			
NO.	EPC	Times	RSSI
1	111122223333444455556666	3	132

Ext Write

is used to Write large memory of tag.

(3) Input erase data address and length

Start address: (Hex):	<input type="text" value="0000"/>
Length (Dec):	<input type="text" value="4"/>
Password: (Hex):	<input type="text" value="00000000"/>

Start address: 0x00, the first word of data (from left) is written in address 0x00 of the designated storage area, and so on.

The difference from write operation: Needn't fill in the data.

<4> Click can see

```
2014-7-29 12:07:56 Block erase success
```

then the data will be set to 0

(4) Write block operation

<1> Input Write data word address

Start address: (Hex):	<input type="text" value="0000"/>	and Password
Password: (Hex):	<input type="text" value="00000000"/>	

Start address: 0x00, the first word of data (from left) is written in address 0x00 of the designated storage area, and so on.

<2> Input data what you want to write like

Read/Write data (Hex)	<input type="text" value="123456789012"/>
-----------------------	---





<3> Click can see


```
-----
2014-7-26 14:45:10 Write data success
```

4.3 Revise the password

(1) Select one tag

<input checked="" type="checkbox"/> Selected tag:	<input type="text" value="E211210100120000000001BA"/>
---	---

Select memory  Password  EPC  TID  User to be operation

- (2) Write access password 
- Access password: default is 00000000, if you have changed to others, you should input right values.
- (3) Revise the access password 12345678: Write

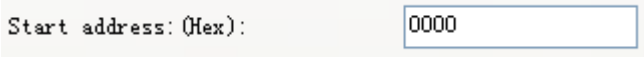





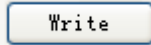


Click .

- (4) Revise the kill password 12345678: Write

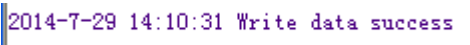




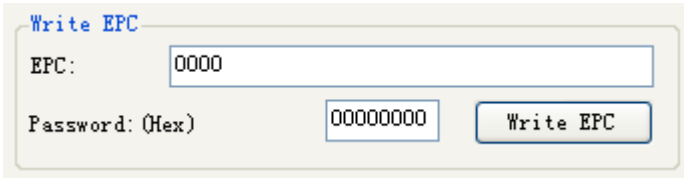



Click .

- (5) If succeed, we can see



4.4 Write EPC



- (1) Write access password (If EPC area of the tag has not set password protection, we can write 8 data arbitrarily)
- (2) Write EPC.
- (3) Click  . (Random write one tag in the effective range of antenna)

When there are many or EPC pieces of tag in the effective range of antenna, and the access password of one tag is the same as you entered, or EPC area of tag set no password protection,

click  at a time, random write EPC number of one tag in the effective range of antenna.

4.5 Lock Operation

- (1) Select one tag

- (2) select memory

to be operation

- (3) select protect type

- (4) Input access password Any storage area in no password protection status still must write the correct access password.(password can not be zero).

- (5) Click then, the option is over.

4.6 Read Protection

Select one tag

- (1) Set Single Tag Read Protection

According to EPC number of the tag, setting read protection, make tag unable to be read and written by any order, even if query the tag, it is unable to get EPC number of the tag. Only NXP UCODE EPC G2X tags valid.

- (2) Set Single Tag Read Protection without EPC

Set Privacy Without EPC

can set tag read protection in the effective range of antenna

Set Privacy By EPC

The difference from : When there are several tag in the effective range of antenna, reader don't know the tag which the order operate.

If operate several tags, then the access password of the tag had better be the same.

Only NXP UCODE EPC G2X tags valid.

(3) Reset Single Tag Read Protection without EPC

Reset Privacy

Use for reset the tag read protection.

Only put a tag in the effective range of antenna. Only NXP UCODE EPC G2X tags valid.

Comments: If tag does not support the read protection setting, it must be unprotected.

(4) Detect Single Tag Read Protection without EPC

Detect Privacy

<1> Click

Can't detect tag whether it support read protection order, can only detect single tag whether it is protected. If tag does not support the read protection setting, it must be unprotected.

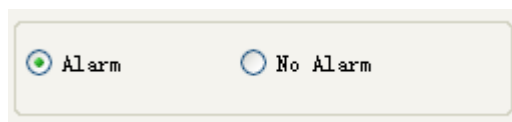
Make sure that there is single tag in the effective range of antenna. Only NXP UCODE EPC G2X tags valid.

4.7 EAS Alarm

Select one tag

☒ Selected tag: E211210100120000000001BA

(1) Alarm setting



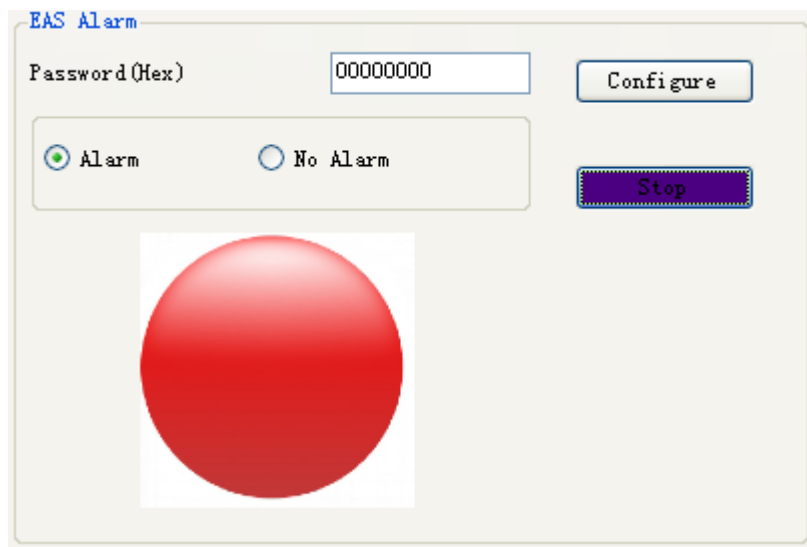
Alarm setting dialog box with two radio buttons: ☒ Alarm and ☐ No Alarm.

<3> Choose alarm

Set or reset the EAS status bit of tag. Only NXP UCODE EPC G2X tags valid.

(2) Check alarm without EPC and access password

<1> Click check alarm



EAS Alarm dialog box. It contains a Password (Hex) field with the value 00000000, a Configure button, and a Stop button. Below the password field is a section with two radio buttons: ☒ Alarm and ☐ No Alarm. In the center of the dialog is a large red sphere icon.

Check the EAS alarm of tag. Only NXP UCODE EPC G2X tags valid.

<2> EAS alarm:

2014-7-29 14:27:37 EAS Alarm

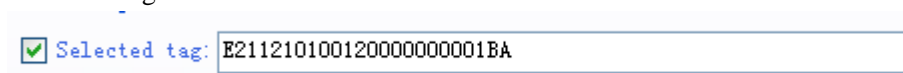


No EAS alarm:

2014-7-29 14:28:26 No EAS Alarm

4.8 Kill Tag (Permanently Kill)

(1) Select one tag



Select one tag dialog box. It contains a checkbox labeled 'Selected tag:' which is checked, and a text field containing the tag ID: E211210100120000000001BA.

(2) Write

Kill Password: (Hex)

Kill password can not be the whole 0. Otherwise, the tag can not be killed, and the tag return response with parameter error.

(3) Click

,if success, the tag is killed.

4.9 Mask conditions

Mask

Mask Start Bit Address (Hex):

Mask Bit Length (Hex):

Mask Data (Hex):

☒ EPC ☐ TID ☐ User ☐ Enable

check enable

Mask

Mask Start Bit Address (Hex):

Mask Bit Length (Hex):

Mask Data (Hex):

☒ EPC ☐ TID ☐ User ☒ Enable

Only check enable can do mask operation.

For example, EPC mask:

Choose EPC area:

☒ EPC ☐ TID ☐ User

Mask Start Bit Address (Hex):

Mask Bit Length (Hex):

Mask Data (Hex):

Only the first byte of tag's EPC is DA could response.

For example, TID mask:

☐ EPC ☒ TID

<1>Query TID

Can see TID

NO.	EPC	Times	RSSI
1	E20034120141F1000DF52E26	8	133

<Mask condition>

Mask

Mask Start Bit Address (Hex):

Mask Bit Length (Hex):

Mask Data (Hex):

☐ EPC ☒ TID ☐ User ☒ Enable

For example change EPC :

<2> select

☐ Password
 ☒ EPC
 ☐ TID
 ☐ User

and

☒ Auto Compute and add PC

Start address (Hex):
 Length (Dec):
 Password (Hex): (EPC memory Address of tag Is 2)

Read/Write data (Hex)

2014-7-29 14:39:20 Write data success

5. Buffer operation

(1) Select EPC/TID query. For example: EPC

☒ EPC
 ☐ TID

☒ ANT1
 ☐ ANT2
 ☐ ANT3
 ☐ ANT4

Select antenna

This demo is used Q=6,S=0 for TID query, S= AUTO for EPC query, Target A to inventory tag, if there are some tag.

Tag Number:

Speed:

cmd time(ms):

Total number:

Total time(ms):

(2) is used to read tag in the buffer, if there are tag

Tag Number: 00000000

Speed: 139

Total number: 176

cmd time(ms): 1266

Total time(ms): 1266

标签列表:

No.	EPC	Length	ANT	RSSI	Times
1	E20028505003013911909FC0	0C	01	48	02
2	E2002850500301631190A020	0C	01	45	02
3	E20028505003012813508E24	0C	01	4A	02
4	E20028505003010514108506	0C	01	40	02
5	E20028505003013222602C9B	0C	01	4D	02
6	E20028505003025712309D44	0C	01	48	02
7	E20028505003011922602C67	0C	01	4A	02
8	E2002850500300591410844E	0C	01	41	02
9	E20028505003005714108446	0C	01	48	02

- (3) Clear Buffer is used to clear tag information in the buffer.
- (4) Read and Clear Buffer is used to read out tag and clear tag in the buffer.
- (5) Get Buffer Tag Number is used to get

6. Auto real-time-query mode

- (1) on reader work mode setting, you should set reader to

Work Mode

Mode Select: Real-time-inventory mode

Set

- (2) on page "Real time inventory", Click

Start

to get data, if reader read tag, you can see that:

Stop

Data

Tag Number:

89

Total Time(ms):

1250

No.	EPC	Length	ANT	RSSI
1	E2002850500300412180320F	12	0001	31
2	E20028505003012014108542	12	0001	3E
3	E200285050030033141083E6	12	0001	42
4	E200285050030082141084AA	12	0001	2D
5	E20028505003014322802C7	12	0001	33
6	E20028505003014321803475	12	0001	35
7	E20028505003022822602E1F	12	0001	4D
8	E20028505003013222802C9B	12	0001	45
9	E200285050030097141084E6	12	0001	46
10	E200285050030080141084A2	12	0001	38
11	1951CAFE10201010100020101004AAAA	16	0001	28
12	E200285050030081141084A6	12	0001	3D
13	E200285050030025141083C6	12	0001	43
14	E2002850500300111410838E	12	0001	3F
15	E200285050030032141083E2	12	0001	44
16	E20028505003020522802DBF	12	0001	4F
17	E20028505003019512309C4C	12	0001	3B
18	E20028505003013911909FC0	12	0001	46
19	E200285050030158218034B1	12	0001	3D
20	E2002850500301812180350D	12	0001	43
21	E2002850500300431420840F	12	0001	47

7. 18000-6B Test

7.1 Query Tag

Click button start

Start

☒ Single
 ☐ Mutiple

if read tag, we can see:

No.	ID	ANT (4, 3, 2, 1)	Times	RSSI
1	E004000085D94502	0001	1	112

7.2 Read and Write Data Block / Permanently Write Protect Block of Byte

Select one tag from tag list. and double click. Then we can see

Current Selected UID: E004000085D94502

(1) 'Read data' input data for example:

Start address (Hex): 08 Read length (Hex): 08

Start address: 0x00 stand in start to read data from first word in the designated storage area, 0x01 stand in start to read data from second word in the designated storage area, and so on. Range is 8~223. Beyond this range, reader will return parameter error.

Read length: pointed to the number of bytes to read. Range is 1~32. If **Start address** + **Read length** greater than 224, or Read length greater than 32 or is zero, reader will return parameter error information. The high bytes of Read length write in the low address in tag.

,then click **Read** ,

Read data(Hex): 1212349870000000

If success,

(2)'Write data' for example:

Start address(Hex): 10 Write length(Hex): 04

Write data(Hex): 11223344

Then click **Write**, if success, 2014-9-13 10:12:01 Write data success

(3) Lock address(Hex): 10 **Lock** lock The specified byte.

(4) Check lock address(Hex): 10 **Check lock** Check The specified byte whether locked.

8. Config TCP/IP

8.1 Web config

1. Select **Operation**, click **Search**.

If device connected.

List of device			
Device Name	Device IP	Device Mac	
NP-RE	192.168.0.250	00.F0.0A.03.0F.5B	

Select the device

NP-RE	192.168.0.250	00.F0.0A.03.0F.5B
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2. Select **IE**, default user name and password are admin.

连接到 192.168.0.250

M2M CXT3216

用户名 (U):

密码 (P):

☒ 记住我的密码 (R)

确定 取消

Login.

Home	Summary Information
Basic Settings	Model Name:
Network	MAC Address: 00.f0.05.aa.bb.cc
Server	IP Address: 192.168.0.250
Serial Channel	Subnet Mask: 255.255.255.0
Password Settings	Gateway: 192.168.0.1
Power manage	Primary DNS Server: 208.67.220.220
Log Out	Second DNS Server: 208.67.222.222
	Firmware Version: V1.2.2.R3

(1) Select **Network**, default:

Home

Basic Settings
Network
Server
Serial Channel
Password Settings
Power manage
Log Out

☐ Automatically obtain IP address:

搜索

复制

BOOTP: ☐ Disable ☒ Enable
DHCP: ☐ Disable ☒ Enable
AutoIP: ☐ Disable ☒ Enable
DHCP Host Name:

☒ Use the following IP configuration:
IP Address: 192.168.0.250
Subnet: 255.255.255.0
Default Gateway: 192.168.0.1
Preferred DNS server: 208.67.220.220
Alternate DNS server: 208.67.222.222

Ethernet Configuration

☒ Auto Negotiate
Speed: ☐ 10Mbps ☒ 100Mbps
Duplex: ☐ Half ☒ Full
MAC Address: 00.f0.05.aa.bb.cc

Network Type

☒ Ethernet

Submit

Finished click

Submit

 .

(2) Select

Serial Channel

 ,

Serial Channel List

Serial Channel List							
Name	Remark	Uart Baudrate	Ethernet Protocol	Channel Setting	Serial Setting	Connection Setting	Hostlist Setting
Channel1		57600	TCP	Channel	Serial	Connection	Hostlist

Refresh

Click

Serial Setting

Serial

Serial Settings

Channel 1

☒ Enable Serial Port

Port Settings

Protocol: FIFO:
 Flow Control: Baud Rate:
 Data Bits: Parity:
 Stop bits:

Pack Control

Max packet length: Merge length:
 Idle Time: (ms) Net Idle Time: (ms)
 Latch: (ms)
 Enable Match Packing: ☐ Match 2 Bytes Sequence: ☐ Yes ☒ No
 Send Frame Only: ☐ Yes ☒ No Match Byte: (Hex)

Finished .click

Connection
Setting

Click

Connection

Connection Settings

Channel 1

Connection Protocol: TCP

Connect Mode

Worked As: Server

Active Connect: None Start Character: 0X61

Endpoint Configuration:

Local Port: 27001 Remote Port: 61

Remote Host: 127.0.0.1

Use Hostlist: ☐ DNS Query Period: 1800

Disconnect Mode

☐ Hard disconnect

Inactivity Timeout: 255 (Secs)

KeepAlive: 10 (Secs)

Submit

Finished click OK

(4) The end select Power manage

Power manage

New configurations will NOT take effect until rebooted.

Warning! Both serial and ethernet connections will be dropped and data may be lost while rebooting.

- ☐ Load defaults
- ☐ Load defaults and reboot
- ☐ Reboot
- ☒ Save and reboot

Submit

Click Submit, Restart your device.

Exit

9. FCC Statement

This device comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device does not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this device is modified without authorization from Friendcom, the device may no longer comply with FCC requirements for Class B digital devices. In that a case, your right to use the device may be limited by FCC regulations. Moreover, you may be required to correct any interference to radio or television communications at your own expense.

This device 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 device generates, uses and radiates radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user may take one or more of the following measures:

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

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.