RFID READER



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1 Software Operation

1.1 Set up testing system

Connect the equipment as illustrated below, structure a simple reader testing system in the studio:



- (1) Connect the reader to PC through the RS232.
- (2) Run the Demo software of the reader on PC, set reader parameters and test reading, writing for the reader according to the notes below.

1.2 Start up test software

The SDK for SL144 contains [application software] ReaderDemo.exe, this program needs to be in the running in under the environment of Microsoft Windows XP or higher version or the operating system IBM pc-compatible computers. Run ReaderDemo. exe to start this software.

SL144

onnect Mode	ConnectReader DisconnectRe	ader
CP/IP		
Reader IP Address:	No. IP Address	Port
Reader Port: 1989		
Host IP Address: 192 . 168 . 0 . 22		
Host Port: 5000	Scan	Stop
RS232/RS485		
Serial Port: COM1 💌 485 Port: 1		
Language		
• English C Simplified Chinese		

1.2.1 RS232 Connection

Computer can communicate with reader through serial port (RS232). The User need to to do initialized Settings through a serial port when start to set the reader, like set IP address to connect to network.

1. Select the output port, see below.

TCP/IP	• RS232	C RS485	

2. Select the serial port for reader and PC.

Serial Port:	COM1 👻
	COM1
	COM3

3. Click [ConnectReader] button, if connected success, Popup the following clew box.



4. If no reader connected to PC through this serial port, or the selected serial port is wrong, the connection will fail, Popup the following clew box.

Varnin	g		X
1	Connect	Reader	Fail!
	備定		

1.2.2 RS485 Mode connection

Computer can implement data exchange with reader through RS485 port.

1. Select the output port, see below.

onnect Mode		
TCP/IP	C RS232	• RS485

2. Select the serial port for reader and PC.

	2		
erial Port:	COM1	-	485 Port: 1

3. Click [ConnectReader] button, if connected success, Popup the following clew box.



4. If no reader connected to PC through this serial port, or the selected serial port is wrong, the connection will fail, Popup the following clew box.



1.2.3 Network connection

Upper Computer can implement data exchange with reader through (TCP/IP).

1. Select the network connection mode, see below.

TCP/IP	C RS232	C RS485

2. Select the reader IP address from the below clew box.

No.	IP Address	port
1	192.168.7.62	1969
2	192.168.7.63	1969
3	192.168.7.66	1969
4	192.168.7.64	1969
5	192.168.7.65	1969
6	192.168.7.68	1969
7	192.168.7.69	1969
8	192.168.7.100	1969

3. Or input the IPAddress of Reader and Port of Reader diredtly, as below;

TCP/IP	
Reader IP Address:	192 . 168 . 1 . 100
Reader Port:	1969

4. Click [ConnectReader] button, if connect success, popup the below clew box.



5. If the reader disconnected to PC through RJ45 port, or the the inputted IP information is wrong, the connection will fail, Popup as below



6. When the user not sure the IP address , chick "Scan", the matched IP are listed :

No.	IP Address		Port	
				_
	Saan	Stop		

1.3 Set reader parameter

Below is the operation page for setting parameter for SL144-

【Reader parameter】:

SL144

Min. Frequency of Carrier: 7:902.	▼ Hard Version: 0100 Reader ID: 1/234587890 000 ▼ Soft Version: 0106 Module Version: 6.8 000 ▼ Work Mode
RF Power Output (OdBm-33dBm): 25 Max Tags of once Reading(1~100): 10	Image: Construction of the second
Address of Reader (1-254): 1	Stop Auto
AutoParameters Working Antenna Auto Mode Continuing C Trigger	ondition of Report Notify Now Timing Notify Number of Tags: 257 Add C Remove Dispause of Report(s): 120 Parameters for Host IP Address: 192 . 168 . 0 . 61 Parameters 500 Parameters 50 . 61 Parameters 500 Parameters 50 . 61
Format of Output	Change Diapause of Reading: 30ms
FRS232 C RS485 C RJ45 C Wi Trigger Level	egand26 C Wiegand34 Fulse Interval 200 (*10us): C SN Selected by User
IP Parameters for Reader IP Address: 192 . 168 . 0 . 100 Port: 1969	ReportFilter Address of Tag 0 Length of Tag 0 EPC (bit): EPC(bit): Tag Data(HEX): Get Filter
Mask: 255 . 255 . 255 . 0	Information SetTime Relay
Gateway: 152 . 100 . 0 . 1 Mac . 010203040506	GetTime Set Relay Get Relay

(1) Select Operation Mode

There are 2 modes for SL144 as below:

🗭 Command	
	Command

- Command: readers begin to work after receive legal control command through RS232 or RS485, and return the command results through that port.
- Auto: the reader read tags automaticly and interval, and output the reading results through setting port (Wiegand and RS485 or RS232) when successful. No ourput If read fail or read illegal tag (need validation).

Remarks:

- ♦ Command mode is default setting, unless the user select Timing mode when run the reader
- ♦ Reader no response any instruction in Command work mode, unless below :

1: Get Version number 2: Set working status (start or stop auto mode) 3: Clear memory 4: Read the record 5: Update 6 reset.

idRate of RS232/RS485 Port	115200 -	Hard Version:	0100	Reader ID: 1234567890	1
a.Frequency of Carrier:	7:902.000	Soft Version:	0106	Module Version: 6.8	Update Parameter
.Frequency of Carrier:	59:928.000 👱	Work Mode	mand -T	when of Tag	_
Power Output(OdBm-33dBm):	25			TS018000-68	Factory Parameter

(2) Basic Parameters

-Basic Parameters	
BaudRate of RS232/RS485 Port	115200 💌
Min.Frequency of Carrier:	7:902.000 💌
Max.Frequency of Carrier:	59:928.000 💌
RF Power Output(OdBm-33dBm):	25
Max Tags of once Reading(1 \sim	100): 10
Address of Reader(1-2	254): 1

No matter in which operation mode, The user need to set 4 parameters as below

- Baud Rate of RS232/485 Port: set communication rate of RS232 and RS485 port, 9600, 19200, 38400, 57600, 115200bps option
- Max Tags of once Reading: Set the MAX number of labels to read at one time. The quantity on Max Tags of once Reading is according to the requirements. And the less the reading race fast.
- RF Power Output: output power for the reader. Usually this param has been set to the optimal before EX-factry. If the profermance is good, please don't modify this param.
- Min. Frequency of Carrie): set the min operation frequency for the reader.
- Max. Frequency of Carrier: set the max operation frequency for the reader.

For different countries or regions, there are corresponding choices in the listed working frequency based on local radio rules requirement. Users can choose sensitive frequencies according to local conditions. If choose a Fixed Frequency point, set the Min. Frequency equel same as to Max.Frequency; If Frequency hopping, can choose the Min. Frequency of Carrier for fmin,

http://www.stronglink-rfid.com

Max.Frequency of Carrier for fmax, as long as fmax > fmin. As below:

-Basic Parameters	
BaudRate of RS232/RS485 Port:	115200 💌
Min.Frequency of Carrier:	7:902.000 💌
Max.Frequency of Carrier:	59:928.000 💌
RF Power Output(OdBm-33dBm):	25
Max Tags of once Reading(1 \sim :	100): 10
Address of Reader(1-2	254): 1

• Setting buzzer:

Enable Buzzer Close buzzer, the buzzer don't sound when identified tags, only tag information displayed on the PC

Enable Buzzer Open the buzzer, the buzzer sound when identified tags, and tag information displayed on the PC

Diapause of Reading(ms)

10,20,30,40 ms option, the longer the less miss-reading

Diapause	of Reading:	30ms	-	
-	-Wiezand Ou	10ms		-
	areguid od	20ms 30ms		
	Pulse Width	50ms		
	(*10us):	100ms		

RS485 network

Can make networking through RS485. The user need to set an address for each reader before make networking, and enable the reader can connect with PC through TCP/IP. Address range: 1 to 254.

Address of Reader (1-254): 1

Remarks: 1 and 254 are broadcast address, all readers will return application information after receive command with broadcast address.

• Which protocol to read(ISO18000-6B,6C option)



(3) Set network parameter

The used should set the network parameter when connect the reader to PC by TCP/UDP.



Remarks: The repeated MAC address is no permit

- (4) Set Relay (Option)
- Relay work: Check Relay1 and Chick SetRelayStay

Relay1	🔽 Relay2
Set Relay	Get Relay

Relay work off: No check Relay1

Remarks: Relay is option function, parts readers without this function

- (5) Auto Mode Parameters
- Working process



- Read tag module: In Charge of Reading only, Timing or Triggering work way option. The User can set on Interval of reading, Reading from which Antenna, Triggering level, which tyre of tag to be read
- Store tag information module: In charge of Store read-tag information, such as the reading time, store capacity.
- Control & Interface module: Manage the process of reading and exchange date with Upper computer.

Autofarameters Working Antenna ANT1 ANT2 ANT3 ANT4 Auto Mode Continuing C Trigger Format of Output	Condition of Report- © Notify Now C Timing Notify C Add C Remove C Change	Storing Time(s): Number of Tags: Diapause of Report(s): Diapause of Reading:	257 257 120 Oms	IP Parameters for Host IP Address: 192 . 168 . 0 . 61 Port: 5000
C Terse (Standard Fort for Output	☐ Report Output	-Wiegand Outpu Pulse Width	ut	Start Address of ID(0-8): 0
• KSZ3Z • KS485 C RJ45 C Trigger Level • • • • Low • C High	Wiegand25 () Wiegand34	(*10us): Pulse Interva (*10us):	1 200	 ☞ ID of the Tag ○ SN Selected by User

Work way: Continuing or Tigger



- Continuing: the reader read tags in interval, and output the reading results through setting port (Wiegand and RS485 or RS232) when successful. No output If read fail or read illegal tag (need validation).
- Trigger: reader detects signal variation on FIN1 pins automaticly, when detect low electricity at ordinary times; reader starts to send a signal, read label numbers. When FIN1 pins in high level, stop reading card. The readed card number output through the setted data port. If read invalid card, then output 0xfffffffff. There are 2 modes: Low Level or High Level

- Auto Mode © Continuing C Trigger Format of Output C Terse © Standard Port for Output © RS232 © RS485 © RJ45 C Trigger Level © Low © High
- Reading from which antenna : Only ANT1

-Working A	ntenna –		
🔽 ANTI 🔽	ANT2	ANT3 [ANT4

Port for Output

-Port for	Output ——		
• RS232	C RS485	C RJ45	C Wiegand26 C Wiegand34

Remarks: If output is Wiegand, interval is 1s for output Tag ID

• Wiegand output format

3 output forms on Pulse Width & Pulse Interval .Pulse Width IS 40 and Pulse Interva is 200 are default setting.

Pulse Width	Pulse Interval	Output waveform Pulse Width	Output waveform Pulse Interval
40	200	400us	2ms
10	160	100us	1.6ms
5	100	50us	1ms

◆ ID Output start address (0-8)

It is for tag ID, there is 8Bytes on Tag ID, address0-8

Start Address of ID(0-8):	0
ID of the Tag	
C SN Selected by User	

The relationship among ID Output start address, tag protocol ,output ID (output is Wiegand 26)

ID Output start address	ISO18000-6C (112233445566778899001122)	ISO18000-6B (E0044BDF23010000)
0	223344	044BDF
1	334455	4BDF23
2	445566	DF2301
3	556677	230100
4	667788	010000
5	778899	Unuseble
6	889900	Unuseble
7	990011	Unuseble
8	001122	Unuseble

The relationship among ID Output start address, tag protocol ,output ID (output is Wiegand 34)

ID Output start address	ISO18000-6C (112233445566778899001122)	ISO18000-6B (E0044BDF23010000)
0	22334455	E0044BDF
1	33445566	044BDF23
2	44556677	4BDF2301
3	55667788	DF230100
4	66778899	23010000
5	77889900	Unuseble
6	88990011	Unuseble
7	99001122	Unuseble
8	00112200	Unuseble

The relationship among ID Output start address, tag protocol ,output ID (output is RS232,485)

ID Output start address	ISO18000-6C (112233445566778899001122)	ISO18000-6B (E0044BDF23010000)
0	112233445566778899001122	E0044BDF23010000
1	112233445566778899001122	E0044BDF23010000
2	112233445566778899001122	E0044BDF23010000
3	112233445566778899001122	E0044BDF23010000
4	112233445566778899001122	E0044BDF23010000
5	112233445566778899001122	E0044BDF23010000
6	112233445566778899001122	E0044BDF23010000
7	112233445566778899001122	E0044BDF23010000
8	112233445566778899001122	E0044BDF23010000

• What to be read from Tag:



The User take UID number as tag ID general, sometime User define ID and take it due to Project requirement, especially in Access control case.

	ISO18000-6C	ISO18000-6B
ID of the Tag	EPC	ID
SN Written by User	TID	The data from 220~223 of user

 \diamond The relationship among output form, output tag ID bits and tag protocol.

	ISO-18000-6C	ISO18000-6B
RS232/485/RJ45	All EPC bits	All ID bits
wiegand 26	The operating param [initial address of output card] determin output 32bits of 64 bits ID	The operating param 『initial address of output card』 determin output 24bits of 64 bits ID
wiegand34	The operating param [initial address of output card] determin output 32bits of 64 bits ID	The operating param [initial address of output card] determin output 32bits of 64 bits ID

• Format for Output

Two ourput formats: Terse or Standard: Appendix A with destription



Format of	Output	
C Terse	🖲 Standard	

• IP Paramters for Host

-IP Parameter	s for	Host-		
IP Address:	192	. 168	. 0	. 61
Port:	5000	_		

The reader transfer tags ID to upper PC in Auto mode, so the IP Address of upper PC need to be setted

Remarks: Check "Enable Report Output" Report Output means the reader output 00000000 EPC ID to upper pc if read nothing in Fixed time

• Condition of Report: the output tad ID way in Auto mode

-Co	ndition	of Report-
	Notify	Now
C	Timing	Notify
C	Add	C Remove
C	Change	

- ♦ Notify now: reader will send all tag information in memory module to host only when receiving the "notify now" command from host.
- \diamond Timing Notify: reader will send the tag information read within the interval time at intervals.
- ♦ Add: when reader read tags not in memory module, it will send the tags information to host and store the tags information in the reader.
- ♦ Remove: when the storage time of tag in memory module is out, reader will send the tag information to host, and delete the tag information from reader.
- ♦ Change: when tag is added or deleted in memory module, reader will send the tag information to host.

Storing Time(s):	257
Number of Tags:	257
Diapause of Report(s):	120

- Storage time: The time of read tags information stored in memory module. The unit: second. The parameter controls the work mode of memory module.
- Number of tags : the max quantity of store tag ID which be read. If the quantity more than Max, the earlies record is instead by last one.
- Diapause of reports: How long the read transfer the tag ID to upper PC.

Remarks: the "Dispaude of reports" is unworkable in "Notify now" report

(6) Set Reader Time

2015-01-08 17:21:10	SetTime
	GetTime
	17 <mark>-</mark>

- \diamond Read time : Upper PC get the what time of read
- ♦ Set time: Upper PC update the time to read
- (7) Set Filter: Reader identify the coincident tags base on Filter

_ReportFilter					
Address of Tag EPC (bit):	0	Length of Tag EPC(bit):	0	Set Filter	🔽 Ctrl Relay
Tag Data(HEX):				Get Filter	

- 1; Start address of tag EPC, Bit unit, Such as 6.
- 2: Length of Tag EPC, Bit unit, Such as 3.
- 3: Tag data (hexadecimal): Such as 4.

The setting is for continuous bit in tag ID, All coincident tags be read,

When the coincident Tag EPC NO.length is not on a multiple of 4 bits, fill 0 for completely. Such as EPC 053000000000000000000 and FD700000000000000000000 are both coincident tags, should be read.

Remarks: if ask to Aralm when read the coincident tag, check "Relay 1"

(8) Update Paramter : for update the Basic Paremeter and Auto Model Paramter

Stron	g	Jin	k
	0		

BaudRate of RS232/RS485 Port:	115200	-	Hard Version:	0100	Reader ID: 1234567890	11 1
Min.Frequency of Carrier:	7:902.000	•	Soft Version:	0106	Module Version: 6.8	Update farameter
Max.Frequency of Carrier: RF Power Output(OdBm-33dBm):	59:928.000 25		Work Mode	mmand	Type of Tag	Factory Parameter
Max Tags of once Reading $(1\sim 1)$ Address of Reader $(1-2)$	00): 10 54): 1		🔽 Enable Bu	zzer	IS018000-6C	Ston Auto

(9) Factory Paramter: Back to the factory parameter.

2 The reading and writing test for Tag ISO18000-6C

2.1 The program for reading and writing

nnect Reader Reader Parameters ISO18	000-6C Te	est ISO18000-6B Test Auto Test			
Select Antenna for Test	List II) of Tags			
ANT1	No.	EPC	Success	Times	EPC Length
Read Interval					
List Selected Tag Select Memory Bank C Password © EPC C TID					
Address of Tag Data(bit): 0					
Tag Data(HEX):	-Read and Selec	nd Write Data Block t a Tag Password @	ank EPC C TID C	Vser	
Kill Tag -Select a Tag Kill Password 00000000 Kill CHEW):	Address Length Access	s of Tag Data(WORD): 0 of Tag Data(WORD): 1 Password(8HEX): 00000000	Read	rite	
Set protect for reading or writing Select Memory Bank C Password @ EPC C TID C Use	er Se	lect a Tag			
Lock of Password Bank		ck of EFC TID and User Bank Writeable from any state			
Writeable and readable from any		Permanently writeable Writeable from the secured state			
State	0	Never writeable			
 remainently readable and writeable Readable and writeable from the secured state 	Ac	cess Password (8HEX): 00000000			
		0 1 P 1 1			

(1) The storage of tag ISO18000-6C.

Four partitions:

- A. EPC: for storage EPC code, it can store 96bits EPC code at most. Read & write.
- B. TID: area for storage the ID number setted by the factory, have two kinds of ID number

32 and 64 bits at present. Read Only

- C. User: Each company has a rule.
- D. Password: 32bits access password and 32bits kill password. Read & write.

The four partitions are all with write proction. Write protection means unwriteable when in unsate situation or never writeable Read protection means unreadable on the password Partition

- (2) The reading and writing process for ISO180000-6C tag.
- A. Selection: select a partition From 4 Partitions, then select tags according to specified data in this partition.
- B. Inquiry tag one by one: identify all the tags one by one based on the selection.
- C. Access: access an identified tag. Such as read& write the four partition, set read write protection and modify password
- (3) Tips:
- A. [No Tag!] : read nothing
- B. The memory isn't exist store memory is not exist
- C. [The memory has been protected]
- D. **[**Power is not enough **]**
- E. [Password is error]
- F. [Write Fail!]
- G. [Write Successfully]
- (4) Set antenna.

-Select Antenna	for	Test	
ANT1			

(5) Set Read Interval

The reading interval can select from:10, 20, 30, 50, 100, 200, and 500ms, default is 50ms.

	50ms	-	1
ist Sele	20ms 30ms	^	F
Select M Deasswo	50ms 100ms		D
ddross o	200ms 500ms	*	IC

2.2 Transparent read the EPC No.

Operating steps are as below:

Firstly, select EPC bank, see below:

List Selected Ta Select Memory B C Password © 1	eg Jank EPC C TID
Address of Tag D Length of Tag D Tag Data(HEX):	Data(bit): 0 ata(bit): 0
	List EPC of Tag

Secondly, set the initial address of data bank to be zero, 0 represents identify all the tag in transparent. as below:

Address of Tag Data(bit):	0
Length of Tag Data(bit):	0
Tag Data(HEX):	

Thirdly, click 『List EPC of tag』 button, reader get EPC Number Based on the second step. The identified EPC No. showed in the top right corner 『List ID of Tags』 dialogue frame.

No.	EPC	Success	Times	EPC Length
1	E20090553315018720503D61	86	274	06
2	E200915050140104275004C1	16	274	06

2.3 Get EPC No. according to the EPC data

According to the specific data segment in EPC bank, choose tags meet the condition, read the EPC number.

Operating steps are as below:

Firstly, select EPC bank, see below:

Select Memory 2 C Password (•	ag Bank EPC C TID
Address of Tag Length of Tag D Tag Data(HEX):	Data(bit): 0 Nata(bit): 0
	Tint RDC of The

Secondly, set the *[*initial address of data *]* bank, unit with Bit, the start address only should be whole number Such as the 12.

Thirdly, set the [length of the data], unit by Bit, such as 3.

Fourthly, select **[**Tag data (HEX)**]** for the unit, such as 4, see below. Here the so-called conditions is aimed at a regional data in some tags consecutive patients (bit), who meet the conditions of the tag will be read. The length of the conditional values is not multiple 4Bits, low fill 0.

Address of Tag Data(bit):	12
Length of Tag Data(bit):	3
Tag Data(HEX):	
4	

No.	ID	Success	Times	EPC Length
1	555555555555555555555555555555555555555	7	7	06

2.5 Get EPC bank data of the specified tag

EPC bank of ISO18000-6C tag have three parts, sequence is as follows:

- CRC-16 is PC value and the redundancy circular check code of EPC No, CRC are 16bits, is the BF50H in the picture.
- PC comperent from the length of EPC No. and application code. The length of PC value is 16bits, is the 3000H in picture.
- > EPC is EPC No. Picture as below: E200H (the first character of EPC No.).

Can read any EPC block data, operating steps are as below:

The first step, select EPC storage area, as below:

-Select Memor	y Bank-		
C Password	← EPC	C TID	C User

The second step, select tag, for example [E20090553315018720503D61], as below:

Select a Tag 01. E20090553315018720503D61 -	Select Memory Bank C Password • EPC C TID C User
Address of Tag Data(WORD): 0 Length of Tag Data(WORD): 3 Access Password(8HEX): 00000000	BF503000E200 BF503000E200 BF503000E200 BF503000E200 BF503000E200
Written Data(HEX):	Read Write

The third step, select the start $[\![$ address of Tag data $]\!]$, unit by word, such as 0,

The fouth step, set the [length of the tag], unit by word, such as 3,

The fifth step, press [read] button, reader began to read the label EPC number according to the first four steps setted conditions. The data displayed in the upper-right corner.

2.6 Read the TID bank data of specified tag

Can read any TID block data, operating steps are as below:

The first step, select TID storage area, as below:

-Select Memor	y Bank		
C Password	C EPC	📀 TID	C User

The second step, select tag, for example [E20090553315018720503D61], as below:

The third step, select the start address of Tag data, unit by word, such as 0, as below:

The fouth step, set the length of the tag, unit by character, such as 3, as below:

01. E20090553315018720503D61 V	C Password C EPC • TID C User
Address of Tag Data(WORD): 0 Length of Tag Data(WORD): 3 Access Password(8HEX): 00000000	E2003412013E E2003412013E E2003412013E E2003412013E E2003412013E
Written Data(HEX):	Read Write

The fifth step, press [read data] button, reader began to read the label TID number according to the first four steps setted conditions. The data displayed in the upper-right corner.

2.7 Read the USER bank data from specified

tag

Can read any USER block data, operating steps are as below:

The first step, select USER storage area, as below:

```
Select Memory Bank
C Password C EPC C TID © User
```

The second step, select tag, for example [E20090553315018720503D61], as below:

The third step, select the [address of Tag data], unit by word, such as 0, as below:

The fouth step, set the *[length of tag Data]*, unit by word, such as 3, as below:

Select a Tag	Select Memory Bank C Password C EPC C TID © Use	er
Address of Tag Data(WORD): 0	00000000000 00000000000 00000000000 0000	~
Access Password(SHEX): 00000000 Written Data(HEX):	Read Write	e

The fifth step, press [read] button, reader began to read the label USER number according to the first four steps setted conditions. The data displayed in the upper-right corner.

2.8 Get PASSWORD bank data from the

specified tag

If the password does't be read protection, it can read any password block data; the password bank has two parts as below:

- (1) Kill password: 32bits
- (2) Access password: 32bits
- Operating steps are as below:

The first step, select password storage area, as below:

-Select Memor	y Bank-		
Password	C EPC	C TID	C User

The third step, select the [address of Tag Data], unit by word, such as 0, as below:

The fouth step set the $\c {\c length}$ of tag Data $\c {\c length}$, unit by word , such as 4, as below:

Select a Tag	Select Memory Bank • Password C EPC C TIL	D C Vser
Address of Tag Data(WORD): 0 Length of Tag Data(WORD): 4	AAAAAAAA888888888 AAAAAAAA888888888 AAAAAA	<u>^</u>
Access Password (8HEX): 00000000	1	~
Written Data(HEX):	Read	Write

The fifth step, press [read data] button, reader began to read the label USER number according to the first four steps setted conditions. The data displayed in the upper-right corner. AAAAAAAA is kill password, 888888888 is access password.

2.9 Write to EPC bank

Can write16, 32, 48, 64, 80 or 96bits EPC No. to the EPC bank at present. CRC-16 and PC value automatic generation according to written EPC. The operation steps are below:

The first step, select EPC storage area, as below:

-Select Memor	y Bank-		
C Password	← EPC	C TID	C User

The second step, set the EPC No. length, such as 6, means 9bBits, as below:

The third step, if the EPC bank has been set password lock, should fill [Access password], such as 88888888, see as below:

The fourth step, fill EPC No. to [writen data (HEX)], united by HEX, such a [45679464 ABCDABCD35467684].

Select a Tag	Select Memory Bank
01. 77777777777777777777777777777777	(rassword (* frc (fib (User
Address of Tag Data(WORD): 0 Length of Tag Data(WORD): 6 Access Password(SHEX): 888888888	Write Successfully!
45679464ABCDABCD	35467684 Road Write

The fifth step, press write data button, reader began to write the label EPC data according to the first four steps setted conditions. The written data displayed in the upper-right corner.

The sixth step, get EPC No., check if the written right or not.

Remarks:

- Put only a tag in the write radio frequency, otherwise, several tags may all writed the same EPC No. As write EPC No. don't choose a specified tag, so don't have to choose select a tag.
- (2) All EPC No. are write from address 0, reader don't identify address of Tag data.
- (3) When the written data more than 2 Bytes, show wrong information, may only partial data has been written wrong.

2.10 Write to User bank

The operation steps as below:

The first step, select USER storage area, as below:

-Select Memor	y Bank-		8
C Password	C EPC	C TID	🖲 User

The second step, select a tag, such as [45679464ABCDABCD35467684], see as below:

The third step, select the initial address of user bank, such as 0, see as below:

The fourth step, set the length of data, such as 4, see as below:

The fifty step, if the user bank has been set password, then has to fill the [Access password], such as 88888888 see as below:

The sixth step, fill data to [written data(Hex.)], such as [1234567891234567].

Select a Tag	Select Memory Bank
01.45679464ABCDABCD35467684 💌	(Fassword (Eft (IID (* User
Address of Tag Data(WORD): 0 Length of Tag Data(WORD): 4 Access Password(8HEX): 888888888	Write Successfully!
ritten Data(HEX): 1234567891234567	Read Write

The seventh step, press [writte] button, reader began to write the label USER data according to the first four steps setted conditions. The written data displayed in the upper-right corner.

The eighth step, get USER Data, check if the written right or not.

Remark: When the written data more than 2bytes, show wrong information, may only partial data has been written wrong.

2.11 Modify the PASSWORD of tag

The operation steps are as below:

The first step, select password storage area, as below:

-Select Memor	y Bank-		
· Password	C EPC	C TID	C User

The second step, select a tag, such as [45679464ABCDABCD35467684], see as below:

The third step, select the initial address of user bank, such as 0, see as below:

The fourth step, set the length of data, such as 2, see as below:

The fifty step, fill the [Access password], such as 88888888, see as below:

The sixth step, fill new password to [written data(Hex.)], such as [AAAAAAAA].

Select a lag 01.45679464ABCDABCD35467684 -	C Password C EPC C TID . User
Address of Tag Data(WORD): 0 Length of Tag Data(WORD): 2 Access Password(SHEX): 88888888	Write Successfully!
Written Data(HEX): AAAAAAAA	Read Write

The seven step, press [write data] button, reader begins to write password according to the condition set be the above sixth step, such as write kill the tag. The written data displayed in the upper-right corner.

The eighth step, get new password, check if the written right or not.

Remark: When the written data more than 2bytes, show wrong information, may only partial data has been written wrong.

2.12 Write protection for EPC-TID -USER bank

The TID bank of ISO18000-6C tag is locked and be readable only.

There is protection for reading on EPC bank and USER bank of ISO18000-6C tag, but write, the write protection as below:

Lock of El	C TID and User Bank
🖲 Writeal	le from any state
C Permane	ntly writeable
🗍 Writeal	le from the secured state
🦳 Writeal 🦳 Never v	le from the secured state riteable
C Writeal C Never v Access Pas	ele from the secured state riteable sword(8HEX): 00000000

- Writable from any state- can write without password, and can set to permanently writable, Writable from the secured state or Never writable in the future.
- > Permanently writable- can write without password, and can't set to be Writable from the

secured state and Never writable;

- Writable from the secured state- only can write with the password, and can set to permanently writable, Writable from the secured state or Never writable in the future.
- > Never writable-can't write even with password.

2.13 Write protection for PASSWORD bank

The password of ISO18000-6C tag can be read and write proteted, the password situation wouldn't effect use the password. Protection function:

Readable and Writable from any state- can read and write without password, and can set to permanently Readable and writable, Readable and Writable from the secured state or Never reader or writable in the future.

Permanently readable and writable- can read and write without password, and can't set to be readable or Writable from the secured state and Never readable or writable;

Readable and Writable from the secured state- only can read orwrite with the password, and can set to permanently readable and writable, readable and Writable from the secured state or Never readable or writable in the future.

Never readable or writable-can't read or write even with password.

Remarks: set read write protect for tag, should know the access password of tag in advance.

2.14 Write protection for EPC bank

The first step, select the EPC bank, as below:

Select Memory Bank				
C Password	€ EPC	C TID	C User	

The second step, select a tag, such as [45679464ABCDABCD35467684], as below:

The third step, select the Writable from the secured state (or Writable from any state, or permanently writable or never writable), as below:

The fourth step, fil the 1 [access password], the access password for tag

[45679464ABCDABCD35467684] is 88888888, see as below:

-Select a Tag 01.45679464ABC	DABCD354	67684 💌
Lock of EPC TID C Writeable fro C Permanently w Writeable fro C Never writeab	and User m any st riteable m the se le	Bank ate cured state
Access Password(8HEX): Protect	88888888

The fifth step, press [set protecting] button, popup the below dialogue box:

Varnin	g	
⚠	Are you sure to protect this	tag?
	<u>是(U)</u> 否(U)	

The sixth step, press [no], then the above operation invalid, press [yes], according to the before four step setted condition, if success, popup the below frame, represents the EPC bank has set to be password lock.



The seventh step, write data to EPC bank, check if the set protection success or not.

2.15 Write protection for USER bank

The first step, select the USER bank, as below:

-Select Memory Bank-		
C Password C EPC	C TID	🖲 User

The second step, select a tag, such as [45679464ABCDABCD35467684], see as below:

The third step, select the Writable from the secured state (or Writable from any state, or permanently writable or never writable), as below:

The fourth step, fill the 1 [access password], the access password for tag [45679464ABCDABCD35467684] is 88888888, see as below:

-Select a Tag-		
01.45679464	ABCDABCD354	67684 💌
-Lock of EPC I	ID and User	Bank
C Writeable	from any st	ate
C Permanentl	y writeable.	
📀 Writeable	from the se	cured state
🔿 Never writ	eable	
Access Passwo	ord(8HEX):	88888888
S	Set Protect	

The fifth step, press [set protect] button, popup the below dialogue box:



The sixth step, press [no], then the above operation invalid, press [yes], according to the before four step setted condition, if success, popup the below frame, represents the EPC bank has set to be password lock.



The seventh step, write data to USER bank, check if the set protection success or not.

2.17 The read-write protect for PASSWORD bank

The first step, select the user bank, see below:

-Select Memory Bank-	
• Password C EPC	C TID C User

The second step, select the access password (or kill password), see as below:

Password	
C Kill Password	Access Password

The third step, select a tag, such as [45679464ABCDABCD35467684], see as below:



The fourth step, select the Readable and Writable from the secured state (or Readable and Writable from any state, or permanently readable and writable or never readable or writable), as below:

P	assword Kill Password 🕟 Access Password
C	Writeable and readable from any state
C	Permanently readable and writeable
œ	Readable and writeable from the secured state
С	Never readable and writeable

The fifth step, fill the [access password], the access password for tag [45679464ABCDABCD35467684] is 88888888, see below:

Access Pa	ssword(8HEX):	88888888
	Set Protect	l.

The sixth step, press [set protect] button, popup the below frame:



The seven step, press [no], then the above operation invalid, press [yes], according to the before four step setted condition, if success, popup the below frame, represents the USER bank has set to be password lock.



The eighth step, write data to USER bank, check if the set protection success or not.

2.18 Kill tag

Caution: Once the tag has been killed, it does not answer the reader ever.

-Kil	l Tag lect a Tag	
0	1.2222222222222222222222222222222222222	-

The third step, press [Delete Tag] button, popup the below frame:



The foutth step, press [no], then the above operation invalid, pres [yes], according to the before three step setted condition, if success, popup the below frame, represents the tat has been killed.



The fifth step, read the EPC No. to check if killed the tag successful or not.

3 The reading and writing test for ISO18000-6B tag

3.1 Program for reading and writing

If have to test functionality and performance of the reader, it can be made according to the

following way operation. First introduce the operatin way for ISO18000-6B standard tag as below:

	List ID of Tags		
ANT1	No. ID	Success	Times
Interval 50ms			
Select Tag			
LabelFresent List Tag ID			
Read and Write Data Block Address of Tag Data(0/8-223): 0 Length of Tag Data(1-32/4): 1 Written Data(Hex):	Select Tags by Condition © Equal Condition © Greater than Condition Address of Tag Data(0-223 Condition(<=8 HEX Number)	O Unequal (O Less than 3): 0): 50 Selected Test	Condition 1 Condition
	List III of	Deterred table	
Read Write a Byte Write 4 Bytes			<u>.</u>
Read Write a Byte Write 4 Bytes Write Protect Address of Tag Data(8/0-223): 0			-

3.2 Identify all the tag ID

Operation steps as below:

Set antenna:

-Select Antenna	for Test	
ANT1		

Press the 『List tag ID』 button, and put tags in radiation field, reader keep to read tag ID of tag automaticly until pop-up 『List tag ID』 button. The card number showed in the 『List ID of Tags』 frame as below:

No.	ID	Success	Times
1	E004965D17010000	51	142
2	E0040000E2A09C01	8	142
3	E00400006D9F9C01	7	142
4	E0040000CF869C01	7	142

Remove the tag during the antenna radio frequency area can test the reading distance and range.

3.3 Read data

The start address of reading is 0-223.

The length range of reading block is 1-32.

The operating step for testing the reader's **[**read**]** function is as below:

Select a tag which will be read from select a tag frame (this frame show the result of list tag of ID).

ANT1	No.	ID	Success	Times
Interval	1	E004000071E39406	32	429
10ms 💌				
Select Tag				
01. E004000071E39406 💌				
LabelPresent List Tag ID				

• Select the initial address and block length of reading operaton.

Length of Tag Data(1-32/4): 1 Written Data(Hex): Read	Address	of Tag Data(0/8-223):	Jo.
/ritten Data(Hex):	Length o	of Tag Data(1	-32/4):	1
Read	ritten	Data(Hex):		
Read				

- Press [read] button, the program will start repeatly read automaticly until pop-up this button.
- The reading result showed at the [information].

Each line displayed the result of one reading operation, display with Hex firstly.

ÆX:FF FF 00 00	
ŒX:FF FF 00 00	
TEX:FF FF 00 00	

3.4 Write HEX

The initial address range of writing operation is 8-223.

The block length of writing operation is 1-4Bytes.

The operating step of test reader's [write] function:

• Select a tag which will write data from [written data].

Written	Data(Hex):	
	1122	

• Input the initial address of writing operation.



- Press [write a Byte] button, the program will start repeat write data automaticly until pop-up the button.
- Write success or not showed in the [information frame], see below.
- [write success!] represents this operation success.

Address of Tag Data(0/8-223): 18	Select Tags by Condition © Equal Condition © Unequal Condition
Length of Tag Data(1-32/4):	C Greater than Condition C Less than Condition
Written Data(Hex):	Address of Tag Data(U=223): Condition(<=8 HEX Number):
Read	List ID of Selected Tags
Write a Byte Write 4 Bytes	Information
Write Protect Address of Taz Data(8/0-223):	Write Successfully! Write Successfully! Write Successfully! Write Successfully!
Set Protect Check Protect	Write Successfully! Write Successfully! Write Successfully!

[write fail!] represents this operation failed, the reason is tag far from the reader too long or this bank write protection damaged.

Remarks: if the written data more than 4Bytes, [writen fail!] may due to patial bytes written failed.

Select Tags by Condition: users can select the coincident tag ,then click [List ID of Selected Tags] button, the tags meet the conditions will be read and show in "List ID of Tags ", uncoincident don't output not be read.

Equal Condition	🔘 Unequal Condition		
Greater than Condition	C Less than Condition		
Address of Tag Data(0-223):	0		
Condition(<=8 HEX Number):			
	1		

Example: Tag ID is E0040000128A8A01, input 4 to "Address of Tag Data" ($0 \sim 233$) And 06 in "Condition", Check "Equal Condition" and click "List ID of selected Tags" button, There is nothing ouput on the "List ID of Tags" (because the start address is 4, reader compare the fourth BYTE of tag as to the condition. i.e., 12, and 12 is not equal to 6, and not meet the condition ,so that the tag is not able to read. If condition is 12,the ID meet it and be read. If the User choose "Unequal Condition" or "Greater than Condition" the tag ID be read. But "Less than Condistion" not, because the start address is 4, in this tag ID mean 12, the condition is 06, 12 great and Unequal to 06.

3.5 Write protection

The operation step is as below:

• Select a tag which will plan to protection from [select tag].

Serect	lag			
	01.E004000019939C01	-		

Add the address of the tag in [Address of Tag Data] frame. The address range is 8-223. Such as

rite Protect	
Address of Tag Data	(8/0-223): 0
Set Protect	Check Protect

◆ Press 『set protect』 button, see as below:



Press [yes], program will continue protect this tag. If failed, will popup the below dialogue frame:



• Press [yes], try again, protection success, will pop up the below dialog frame:



Detect the specified bank of the tag been protected or not (detect address range is 0-223).
 Press [detec the protection situation] button, pop up the below frame show that this specifed bank has been protected.



4 Auto Test Setting

Remarks:

the belows only workable when connected with Upper PC

- Start or stop Auto work mode
- ➢ Clear memory
- ➢ Get Tag information

When turn to Auto mode, the former ID information will be clean

The auto settings should be checked before Auto work.

No	Rivet Time	Red Time	Count	datona (Trme	RPC	— /
H0.	TITSC IIme	End IIme	Count	Ancenna	Type	_ htc	— <i>v</i>
						-	
<							>

• Whether to display the original records: output the original ID info.

No.	First Time	End Time	Count	Antenna	Type	EPC	
1	2012/12/26 11:43:05	2012/12/26 11:43:05	0011	01	04	E20090553315018720503D61	
<							>
(1):D Tag:E	isc:2012/12/26 11:45:10, 20090553315018720503D61	Last:2012/12/26 11:45:	10, Count	:00001, Ant	:01, Type	:04,	
(1):D Tag:E	isc:2012/12/26 11:45:10, 20090553315018720503D61	Last:2012/12/26 11:45:	10, Count	00001, Ant	:01, Туре	:04,	
(2):D Tag:E	isc:2012/12/26 11:45:10, 20090553315018720503D61	Last:2012/12/26 11:45:	10, Count	00001, Ant	:01, Туре	:04,	
(2):D Tag:E	ise:2012/12/26 11:45:10, 20090553315018720503D61	Last:2012/12/26 11:45:	10, Count	00001, Ant	:01, Туре	:04,	
(2):D	isc:2012/12/26 11:45:10,	Last:2012/12/26 11:45:	10, Count	00001, Ant	:01, Type	:04,	20