# RF900I-8 User Manual

PDF

# Catalogue

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## 1. **RF900I-8** View

#### 1.1 Front View



1.2 Back View



### 2. **RF900I-8** Configurations

2.1 Initial Use

#### **2.1.1 Step 1: Powering the reader**

Plug the **power cable** in, with the **indicator light** on and sound of a short **beep**, reader is ready.

#### 2.1.2 Step 2: Connecting Antenna(s) to reader

Connect the antenna(s) with the antenna port:

#### 2.1.3 Step 3: Connecting Data Line to Reader

Method NO.1: You can connect the reader to your PC via RS-232 serial port:

Method NO.2: You can also connect the reader to your PC via TCP/IP:

#### 2.1.4 Step 4: Operating Reader via Demo

Put the **UHFDemo.exe**, **reader.dll**, **customControl.dll** into the same folder, and double-click **UHFDemo.exe** to run the software.

Open the software and it will shows as below:

#### User Manual

er Setur (RE Setur)		
* HIS2D © TOF-IP O TANT O 4447	Perman Venuer	Get
RS 202	Internal Temperature	
Send Fort COME v Consult	31%	Get
Bauture (1520) - Fiscenset	Read Write GPIC Read GPIC	
Set Sec. v Set	ahot 🕷 Han 🔾 Law	
Tanke Print 192 192 197 193	GPI02 🕷 Hgh 🔿 Live	Peed
ton 400 Streement	Westerno	Web 5501
RS 481 Addema(HED)	GPO4 O Hgh @ Low	Wite GPO4
Paster Sentier (12 Bytes)	None betake	
ининининини 5ж	Gues     Beep after an inventory round     Beep after an inventory round     Beep after a tag is intentified (This setting applies only     to a small manifer of tags because the surplus of sounds	Set
Poset Reader	is the same as the number of tags that are identified.)	Refeat

If the reader is connected via RS232, please select "RS232" in the connection mode, select the corresponding serial port number, and select the corresponding baud rate. The default baud rate is 115200. As shown below:

RS-232 Serial Port:	COM6	¥	Connect
Baudrate:	115200	¥	Disconnect
Set Baudrate:	115200	~	Set

Then click the "Connect" button, if the serial port is not occupied, the following information will be displayed in the **Operation History** below:

Develori Heloy 🗹 Alls Dear	Activate Senii Pott Mantar
If the reader is connected via TCP/IP, you need to perform the following steps:	
1. Make sure there is an Ethernet card in the PC.	
2. Make sure that the settings of the PC and the reader are in the same network segment.	
The reader as a server uses the following default settings:	
IP address: 192.168.0.178	

Subnet mask: 255.255.255.0 Port number: 4001 For specific TCP/IP configuration, please refer to the accompanying document: \TCP-IP configuration\USR-TCP232-ED2 network module detailed instructions-20190624.

When using the reader for the first time, please select the configuration shown in the figure below in the connection mode:

Connection O RS232	CP/IP 0 1	Channel — ANT	O 4ANT	8ANT	
- RS-232					
Serial Port:	COM6	$\sim$		Connect	
Baudrate:	115200	~		Disconnect	
Set Baudrate:	115200	¥		Set	
TCP/IP					
Reader IP Add:	192 168 0	. 178		Connect	
Port:	4001			Disconnect	

Click the "Connect "button, if the connection is successful, the following information will be displayed in the **Operation History** blow:



#### Next we will test the communication with the reader.

Click the button at the position shown in the oval frame in the figure below.

Click the button to read the firmware version, or click the button to read the reader identification, the interface will display the corresponding information in the rectangular frame, as shown in the following figure:

a partial liber partial				
* P0222 © TCP/P	Sealer Channel	TING B TIN	Persoan Version 3.7	Get
15-232			Hend Terpedue	
Seld Port CON	65 (M)	Contents		Get
Readings (115	200 👻	Fisconsect	Read/Web GPO Read GPO	
le lades	- w)	54	GPO1: C High C Love	
Diret	10.00 10	Connect	0PI02: O Hat O Law	Feat
	4201	Water Co.	Wite GPIO	
		-Prevenant	GP03 C Hgh C Save	Vitte GPICI3
S 485 Addees (HER)	0	Se	GPICH C Hat C Lev	Value GPICH
wader identifier(12 Bulan)			Bare Brinste	
	T 17 17 17 17 17 17 17	GH	C Que	
		3at	Seep after an inventory number of the setting apples only	Set
			is the same as the number of lags that are identified (	
	Read Reader			Refeat:

At this point, the connection between the reader and the computer has been successfully completed.

#### 2.2 Setting RF Parameter

After successfully connecting the reader with PC, we need to set some of the most basic RF parameters, such as RF output power and RF spectrum.

RF parameter setting is in the Reader Setup->RF Setup page, as shown in the figure below:

		UHF RFID Reader Demo v3.9.0	R.	
Fander Letus 100014	C Tag Test   GD 10000-68 Tag Test   Sensi Part Nords	6		
Bast Seta (18 Seta	5			
Harvest Treatment Ave		RE Output Power 1 2 3 4	5 4 7 8 and 1	
Current Art	ANT 1 v Ge	5et 32 32 32	22 32 32 32 albe	Ger Se

#### 2.2.1 Setting RF Output Power

RF Output Power is the strength of RF output signal from antenna port whose unit is dBm.

RF	Outp	ut Po	wer							
1	2	3	4	5	6	7	8	Ant ID	Get	Set
33	33	33	33	33	33	33	33	dBm	Gei	50

The power range is 0dBm-33dBm, in increments of 1dB. The default value is 33dBm (2W). After this value is set, it will be automatically saved in the reader and will not be lost after the reader is powered off. The default RF output power is 33dBm.

To set the output power of the 8 antenna ports at the same time, you only need to enter the required power value in port 1, and the power values of the following ports will automatically follow port 1, as shown in the following figure:

	RF (	Dutpu	ut Po	wer							
	1 33	2 33	3	4	5 33	6 33	7 33	8 33	Ant ID	Get	Set
Ľ	~	00		33	00			33	dBm		

To set the output power of the 8 antenna ports independently, you need to first enter the power value you need to set in port 1, and then enter the power value you need to set in the other required setting ports, as shown in the following figure:

	RF	Output	Pow	er-							
	1	2	3	4	5	6	7	8	Ant ID	C-1	C-1
0	33	32 3	32	32	32	32	32	32	2	Get	Set
									2000		

#### 2.2.2 Setting RF Spectrum

In different regions, there are different requirements for the RF Spectrum. There are two ways to set the RF Spectrum of the reader.

Method 1: Use the default carrier frequency of the reader.

- Please refer to Frequency parameter tablet in Communication protocol for more information about the carrier frequency.
- Frequency range the reader supports: 865MHz-868MHz (ETSI), 902MHz -928MHz (FCC).

Set the desired carrier frequency through the drop-down box and button as shown in the figure below.

RF Spectrum Setup	Tinten Default Propencies							
	RFCC O ETSI	ODW	Frag Range	902.00 +	MHz ~	926.00 - MHz		
	User Datreet Requesters						Get	Set
[] User Define	Stat Pressents	104	free lawses		No Garda			

Notes:

- The start frequency and the end frequency must not exceed the scope of RF spectrum norm.
- Start frequency must be no more than end frequency.
- Set start frequency and end frequency to the same carrier frequency, the reader will work under fixed-frequency.
- When the parameter setting completes, RF carrier frequency of reader will be randomly hopping in the scope of

limited range.

• The default RF spectrum norm is FCC (902MHz-928MHz).

#### Method 2: Set the RF spectrum manually.

The user customizes the spectrum through three parameters: the starting frequency (unit is KHz, such as 860MHz, you need to enter 860,000), the interval between frequencies (the unit is KHz, the maximum frequency interval is 2500KHz, if you enter 2.5MHz, you need to enter 2500), the number of frequency points (Select the number of frequency points according to the input start frequency and frequency interval. The recommended maximum operating frequency range is 860MHz ~ 960MHz. When the number of frequency points is 1, work at fixed frequency according to the start frequency).

For example, if you need to customize the working frequency range from 860MHz to 960MHz, you can get the starting frequency of 860MHz, the frequency interval is 2.5MHz, and 40 frequency points are needed. Then enter the corresponding parameters as shown in the figure below. After this value is set, it will be automatically saved in the reader and will not be lost after the reader is powered off.



#### 2.2.3 Antenna Connection Detector

The function of antenna connection detection is to check whether the antenna is connected to the port before reading and writing tags. If there is no connection, notify the user that the antenna is not connected.

Before use, the user needs to turn on this function and view it through the interface shown in the figure below. The interface for setting this function is shown in the figure below:

Antenna Camedian Detector Note: 1 Needle detecto antenno comercicio do Associato de Marco Luce el 107 potos				
2 Picture data tap operation it return has a shore the treat-bid.	RL Treshuit	3 (8	Get	Set
- To have such that if we first the president to D				100000000000000000000000000000000000000

The sensitivity of antenna detection is set by the user. The sensitivity of antenna detection is the return loss value (Return Loss) of the antenna port, and the unit is dB. The larger the value, the better the impedance matching requirement between the antenna and the antenna port. Generally speaking, for antennas with an antenna port standing wave VSWR  $\leq 1.3$ , this threshold can be set to 3 to 6 dB. For near-field antennas, ceramic antennas or handheld terminal antennas with VSWR  $\geq 1.3$ , the sensitivity can be lowered even lower. If the return loss threshold is set to 0, it means that this function is turned off, and the antenna connection status will not be detected before reading and writing tags.

If antenna is not connected, Reader will stop to operate tags with the following screen display:

Northa	8-15 05 38 42 141 Set working antenna successfully. Current Art. Art2 ann Hatay, 12 1 4 Auto Clear daryf albert, fallure cause . Antenna is meaning
	3-15 OD 20 43 100 data takan seberah subarah subarah subarah Anti-Anti-Anti-Anti-Anti-Anti-Anti-Anti-
	(8-15-09/39-42.27) Real time investory Failure: Talure cause: Antenna is manny 15-15-09-39-42.288 Set werking antenna successfully, Carrent Ark. Ark2
	8-15-05-29-42-218 Peet trie monthly fallow fallow cause. America is maning

#### 2.2.4 Measure RF Port Return Loss

Measure the return loss of the antenna port on the interface as shown in the figure below:

Veasure RF port Return Loss							
RL:	@ 915.00 🗸	MHz	Measure				

Before measuring, you need to set the current working antenna port. The default antenna working port is 1. When measuring the return loss of other antenna ports, you need to set the corresponding working antenna.

Manual Switch Antenna						
Current Ant:	ANT 1 🗸 🗸	Get	Set			

In the actual application environment, the working status of the environment in front of the antenna can be preliminarily determined by reading the return loss value of each frequency point of the current working antenna. The larger the return loss value, the smaller the electromagnetic wave reflection in front of the antenna. If the measured return loss of the antenna product port is less than or equal to 10dB, it indicates that the electromagnetic wave reflection in front of the antenna is too large. At this time, it is necessary to reduce the RF output power or adjust the antenna installation position. The return loss of the antenna port and VSWR are two different expressions of the same concept. The corresponding relationship is shown in the following table:

Return loss of antenna port (dB)	Standing wave ratio (VSWR) of antenna port
40	1.02
26	1.11
20	1.22
18	1.29
15	1.43
10	1.92

#### 2.3 ISO-18000-6C tag inventory

After correctly connecting the reader and setting the RF parameters, you can read and write tags. Inventory tags, that is, recognizes the EPC code of multiple tags at the same time. This is the core function of UHF RFID Reader and one of the standards to judge a reader's performance.

#### 2.3.1 Real Time Mode

The most commonly used mode is the real-time mode, which means uploading immediately after reading the EPC number of the tag. The user can get the EPC number of the tag as soon as possible.

The advantage of the real-time mode is that the multi-tag recognition performance is good, the response is fast, and the user can get the tag data in the first time without delay. And RSSI (tag signal strength indicator), frequency

parameter (carrier frequency when the tag is read) also change in real time. But it will generate a lot of data. The reader adopts a dual-CPU architecture. Two different chips are responsible for reading tags and transmitting tag data. Reading tags and transmitting tag data are parallel, without interfering with each other, and not occupying each other's time, so users do not need to worry Data transmission will reduce the read performance of multiple tags. Therefore, the multi-tag recognition performance in real-time mode is the best.

provide and the second s		UHF BEID Reader Demo v	1.9.0		1	100
der Sekup 18000-6C Tag Test (50 18	00148 Tag Test Senai Port Honton					_
g Inventory Baul Time Rodal Tag.	Inventory Outfor Roda? Tag I	erestory Part Seitch Satama So	du? Arrent Tag   -	t Tag Rock   HIP Tag		
Inventory Squar 7	w Consult	to fina Januar II 10	linear and	- D W		
ntana Selection	⊋ anz ⊡ ano		/ AME	DART DAR	1	
eta -				the start the start		
Investoried Gaussia	w.	Speed (I sg/Der		Total Tag Commission	AT NO.	
					1	
		Constant Second	Carlor Carlor		ALCON.	
			61	Total Investory Dar	atam(eff)	
			8	Total Investory but	stim(s2)	
			888	Total Investory Dar	55	
ERCEMA (FEE) : 47	No. NEE -	04- 155 (1994-	188 <b>0</b> 	Total Investory by	SS' oreal 3	leve Taga
2000 2000 (782) : 47	No. 1012	1940- 1941 (1974)- 1940- 1951 (1974)- 19 10	1880 Taba	Total Investory for A TET SMT1/2/9/9/	SS SS CEREL	iary Taga r Freque
2000, (788) : 47	Res REEL	1945 Not 1946	antification Court	Total Investory for a. • TET Softr/1/1/W	n O EKEL	lerv Taga r Fragano
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Inventory tags in real-time mode.

Click Tag Inventory (Real time mode) page to switch the software interface to real time mode. Manually tick the connected antenna. Then set the number of cycles for each command. The meaning of this parameter is the number of repeated executions of the inventory command. For example, if it is set to 1, each inventory command executes an anti-collision algorithm. Set to 2, then each inventory command will execute the anti-collision algorithm twice, and so on. The default setting is 1 (the bottom layer of the reader does not support setting other values).

Next, click the "Inventory" button and read the EPC number of the tag. We can see that the EPC data of the tag is immediately uploaded and updated in real time. If you do not click the "Stop" button, the reader will keep real-time inventory tags, as shown in the following figure:



The meaning of the data display is as follows:

Inventoried Quantity	Total number of inventory tags since click on <b>Inventory Tag</b> .
Speed	Speed of identification Tag, unit: piece / sec
Total Tag Communication	Total return EPC data of tags (Including repeated data)
<b>Command Duration</b>	Time of each Inventory Command takes, unit: ms
<b>Total Inventory Duration</b>	Total elapsed time since click on <b>Inventory Tag</b> , unit: ms.
ID	The serial number of data.
EPC	EPC number of tag.
PC	Protocol Control word of tag.
Identification Count	Times of tag identified.
RSSI	The signal strength when tag was identified at the last time.
Carrier Frequency	Carrier Frequency of tag which is identified at the last time.

It is convenient for users to analyze the inventory data, and can choose to save the inventory data such as the tag EPC number in TXT or EXCEL, as shown in the figure below.



#### 2.3.2 Users define Session ID & Inventorying Parameter of Inventoried Flag

According to the user-defined Session ID and Inventoried Flag parameters to inventory, the reader can inventory according to the user-defined session parameters (four types of session S0, S1, S2, S3) and the inventoried flag (two inventoried flags A, B) parameters .

		UHF RFID Read	er Demo v3.9.0	ř.		· · · · ·
der Setur 1900-90 Teg Tee	50 13000-68 Tag Test   Setal	Post Mandar				
Inventory 14	rest for Consult	Auto     Marc Define Jerria	Session II III -	Inventoried Flag		in a
nteens Salartion @ARTI	0.400	ARTA DARTA			i AMTR	
ila Savestori ed S			geed(Tag/Sec) Concept Perstruct	0 <sup>104</sup>	Tag Comparation Construction Enventory Deration(ed)	
				1040		
u Livii	No.12	EI 0 Par ESI	0	bdresh.	<ul> <li>тят О екс</li> </ul>	1. Seve Tegs
at Givit	No. 10	EI 0 Rus REEI	0 PC Identif	Bafresh Isati na Const (MT1/2/)	● TRT ○ ENG V4V. NEST	L See Tep
sa, Linni 13	Re 10	21 0 Nas 2021	0 N Identif	Befreik Isetim Com/OUT1/2/3	★ TRT O ENG V4/. NSS	1. Sava Taga Curriar Pragona

#### 2.3.3 Fast Switching Antenna to Inventory Tags

In the operation of standard inventory tags (real time mode, each antenna needs to be commanded to set the corresponding working antenna before inventory), a single antenna inventory requires at least 200 milliseconds. Only after the inventory is completed, the reader can respond to new commands.

However, in many practical application environments, it is unacceptable to switch the antenna after 200 milliseconds. At this time, the function of quickly switching the antenna of the inventory tag needs to be used.

Use cmd\_name\_fast\_switch\_ant\_inventory command (see R2000 module serial interface communication protocol V4.0).

With this command, users do not need to send antenna switching commands, so it is faster and more efficient. On one antenna, the time consumed to read one or two tags is only about 50 milliseconds. Please refer to R2000 module serial interface communication protocol V4.0 for the specific usage of this command.

We can see the effect of fast 8-antenna inventory tag in the demo program.

Switch the demo program to the fast 8-antenna inventory interface, as shown in the figure below:

header Setup 10000-6C Tag Test	ISO 18000-48 Tag Test Some Port Ma	etter ; Terrenturer West Switch Anton	and the second second		
Inventory	A Read B ARTI = 1 ARTI E Read Y ARTI = 1 ARTI	Regat C S w 1 ART3 w Bread G S w 1 ART7 w	read D Broad 1 ATTN w 1 read R Broad 1 ATTN w 3	Interval Seteran Art hill	Report.
Dets Exemplaries	Quantury:	Egen 4.07	arter) Destinated)	Total Tay Commination. Total Inventory Development	81
Tag Listi	No. 1855	Ner REEL	Betrak	*m Onu	Earte Tags
u u	iii BC	ΡE	Sánntificuítan Compt (88	REAL REAL	Cartier Propose

The working time of each antenna can be set independently. The number of round 1 means that the working time of the antenna is 50ms, and the number of round\*50ms is the working time of the antenna. Set the appropriate number of round according to the number of tags in front of the antenna. The default number of round is 1.

The sequence of antenna switching and whether to select the antenna inventory can be set as shown in the figure below.

	Å		Round	В	Round	с	Round	D Round	
	ANT 1	~	1	ANT2	<b>∨</b> 1	ANT3	<ul><li>✓</li></ul>	ANT4 🗸 1	
	ANT1 ANT2 ANT3 ANT4		lound 1	F ANT6	Round	. G ANT7	Round V 1	H Round ANT8 V 1	
18	ANTS ANT6 ANT7 ANT8 Unsele	ect				S	peed(Tag/Sec)		

#### 2.4 Accessing ISO-18000-6C Tag

Click the "Access Tag" selection box to enter the access tag interface, as shown below:

and the second se	LINE REI	D Reader Demo V1.9	0		- (1)
earlier Setup 18000-6C Tag Test (SO 10000-6B 1	ng Teat Senat Port Maintan				
ag Townstory Boal Time Bodel   Tag Devente	ry Duffer Role) Tag Terentory (?	ert Sritch datema Bola)	Acres Tat Set Tag Book 107 To	4	
Tag Salaction					
Idalacted Tag		Tag List.		(Q)	falsot
Read/Write Tag					
mo mo momero	Access Parmerel (1822)	Star	e AARONOMO : Longele (900)	α; []	Int
Data to be written (MEE)			@ Backs	in Ohin	Reitz
Lick Tag					
Game Parrieral Galla Farmera	0 MC 0 MB	ा स्वाप्त			
C Dyes. C Leite	C Personant Open	C henwest lick	RODERS FARTHORNOLDED		Leth
Bill Tag					
	E121 Patterer(OES)				3611
n n ne	RC .		Data	Data Lea Ant D	2 Operated
ention Nation V Ado Dear				Adapta Sera	Put Hoter

The following will introduce how to access tags one by one.

#### 2.4.1Read tags

The parameters for reading tags are entered in the interface shown in the figure below:

Read/Write Tag					
O ferrer ( ) RC () TO () RE	Access Fassered (HED)	Start Add(0080)	Length (WORD)		Sect
Buts to be written OED			· Noderite	Ofrite [	Frite

Three parameters need to be input to read tags: select the tag storage area to be read, start address and data length. Note: The units of the start address and data length here are both WORD, which is a double byte of 16 bits. After setting the parameters, click the "Read" button.

It should be noted that the input parameters must meet the tag specifications, otherwise an error message will appear.

The specific read tag operation is shown in the figure below:

(1) Select the tag that needs to be operated (read in the real-time inventory interface, and all the read tags will be displayed in the drop-down list), and click the "Selected" button on the right.

(2) Select the storage area that needs to operate the tag. In the example, select the EPC storage area.

(3) Enter the access password, the default is 00 00 00 00.

(4) Enter the starting address and data length. The upper four bytes of the EPC storage area are two bytes of CRC and two bytes of PC, so the starting address of the EPC number is 02 (unit word, Start reading after the upper four bytes).

Data length input 6 (unit word, read 12 bytes).

(5) Click "Read " to read the contents of the corresponding storage area of the tag and display it in the data column of the list box.

			LITHE RED	Pleader Dem	5 V 0.9.0			
Realise Setup 18000-6	C Tag Tell (SO 1000	0.68 Tag Test Senal Pot Mar	tar:					
Tag Towastery Boal Tag Access	Time Bolle) [Tag To	wantery Dullfer Rodel   Tag	Torentory II a	at Soutch Antonna	Wede) Arrow Tag Sat Tag	Tesh MT Tes		
2 Selected Ing	00 00 00 00 00 00			Tag Lint 00	00 00 00 00 00		- 43 - 1 T	Select
Read/Write Tag	9			-		0		0
C Turner R	nc om o	USE Access Passes	orid (1882.) O	0 00 00 00	Nert, All 00301 02	Lingth (90837)		Read
Data to be exitte	080.0					* Machfrida	Otili	Write.
Look Tag								
C Access Fairs	eert Okill fu Okek	annet Otto Oteres	⊂ 110 eent. Open	O 108 O fersent 5	Access Passard	Dett.1		Levik
Eill Tag		Rill Patament 00	RD ( ) ( )	-			1	K-11
13 FC 1 18 00	CHC 30 CC	87C 00 00 00 00 00 00 03		20 00 00	Bats 00 00 03 02 03 17 00 04 09	p Deta 1	.es. Aut 10 1	Operated B

As many tags are manipulated, how many pieces of data will be displayed in the list.

#### 2.4.2 Write tags

The interface of the tag writing operation and the reading operation are in the same area. The difference is that the writing operation also needs to provide information such as access password and writing data.

The password area is the part of the password (password) in the tag storage area. Including kill password and access password. Both the kill password and the access password are 4 bytes. Among them: the address of the inactivation password is  $00H \sim 03H$  (in bytes); the address of the access password is  $04H \sim 07H$  (in bytes).

Read/Brite Tag							
0.0 mm 0 mm 0 mm 0 mm	Antona Pasterorii (1833)	00 00 00 00	Diari ANOTED	100	Longth (WORD)	E. 1	first
late to be written OEE1					(B) Machfreite	Onis	Tritic

The specific tag writing operation is shown below:

(1) Select the tag that needs to be operated (read in the real-time inventory interface, and all the read tags will be displayed in the drop-down list), and click the "Select" button on the right.

(2) Select the storage area that needs to operate the tag. In the example, select the EPC storage area.

(3) Enter the access password, the default is 00 00 00 00.

(4) Enter the starting address and data length. The upper four bytes of the EPC storage area are two bytes of CRC and two bytes of PC, so the starting address of the EPC number is 02 (unit word, Start reading after the upper four bytes). Data length input 6 (unit word, write 12 bytes).

(5) Enter the data to be written in the "Data to be written (HEX)", such as "112233445566778899AABBCC", 12 bytes.

(6) Click the "Write" button to write the content that needs to be written into the corresponding storage area of the tag and display it in the data column of the list box.

	UHF RED	Header Demo v3.9.0	- D
mader Setur: 18000-9C Tag Text	ISO 18000-68 Tag Test   Senai Port Horston		
'ng Tennatory Gual Tana Moda) Tag Assess Tag Salastian	Tag Inventory Gulfar Sola) Tag Inventory Gu	an Seitch Antonew Rode) Arrent Tag Set Tag Hanh (RD Tag	
🕑 Selected Tag 20 00 30 80	10 16 01 40 00 00 00 00	Tag List. 30 08 10 30 10 39 01 40 00 00 00	4 Sidect
Destroy I IIC 0 11	E C KER Arress Factored (1823) 0	0 00 00 00 00 00 00 00 00 00 00 00 00 0	. Best
Bata to be written (000)	22 33 44 10 56 TT IN IN AL IN CC	Budfrite C	Trite Veite
Link Tue			0
O ADAME PADINGE C/1		Access Passer(022)	Lok
())) The			
	ELL Pactored (02)		1011
2 K OK 36.00 39.09	EPC 30 00 10 EE EE 20 00 00 40 00 00 00 00	Bata Bata Ler	Aut 12 Operated
0-00-15 11 27/05 155 Wee Tag	1		

How many tags are successfully operated, how many pieces of data will be displayed in the list. Unlike reading tags, there is no content in the data column in the figure above. The user can read the same area of the tag again to verify that the data is written correctly. As shown below:

#### User Manual

B.			UNF RED	Reader Demo v3.9	0		19 S.
ender Seilar 10000-	C Tag Test 100 180	00-68 Teg Test   Senat Port #	Aonitian				
'ng Inventory Geal Tag Access Tag Selection	Tine State)   Tag 2	anastery(Buffar Nois) [1	'ag Downtery (Pai	t Sector Antoneo Modo)	Access Ted Set Tag Back	SUT Tag	
P Selected Tag	11 II II M 55 66	77 10 10 44 10 10		Yag Least. 11 22 33	44 55 66 17 66 99 AA 88 C	c: v)	Salact
Real/Brits Tag							
7 mm	ac Om O	ann Access Fas	word (1923) 1 00	00 00 00 Tai	t såd omstall i Kal	ena.00002 0	Tool
Date to be writte	.00031					Rodfrite Offrite	Rrite
Lock Tag							
C Access Tata	ord O BIL 24	and Ott	Om	0.000	1		
O Open	Obe	Ote	matant Tyra	O Personal Lock	ACCULA FALLWORT (MEL) ;		Lava
Gill Ter							
		Sill Peneers	0822)	1			1013
ы к	CRC	nt	Wattena	Trans-stores	Data	Fata Losi Aut I	2 Operated
			2 8 8 W 10 10 1	11 10 10 10 44 10	66 TT 28 10 44 18 11	10 1	

Note that the maximum write length at one time is 32 Words (64 bytes, 512bits).

#### 2.4.3 Lock Tags

The operation interface of the lock tag is shown in the figure below:

Party rad						
O Access Passeord	O Eill Passeed	0.110	ं प्राय	0 698		
					Access Passerd OIL)	Lock
O Open	C) Lock	ON	maket Open	C Personal Lock		

The lock tag must provide an access password to proceed.

After the operation is successful, the following information will be returned:

0 0	donan Fanno Ipadi	4 OB	Li Passori	Tarnau	0123 en 9 m	O UIR	Access Password (MEI)	80 68 00 88		Link
8122 T	4		10	1 Patreer 8 002						вц
1	PC 30 00	CRE 45.54	11 = 32 44 59	800 66 TT 88 70 AA	H CC		Eats.	Data Lea	Ant D	Operated. J
5-08-15 #abon (	11.36.21.432.G	ch Tag Auto Cear	1					C Ace	uta Secul	fat Nordar

Similarly, how many tags are operated, how many pieces of data will be displayed in the list.

#### 2.4.4 Kill Tags

The operation interface of the kill tag is shown in the figure below:

1111 146	
E111 Parsword (HEI)	2411

The killing tag must provide an kill password, and the kill password cannot be 00 00 00 00. Therefore, to kill a tag, you must first modify the content of the kill password in the password area through the write tag command.

After the tag is successfully killed, the following information will be returned:

	06	EPC .	Deta	lists Len	Ant II	Specated.
30.09	45.84	11 (22 30 44 55 66 77 98 99 AA BE CC			1	1

Like all operations of accessing tags, how many tags are killed, how many pieces of data are displayed in the list.

#### 2.4.5 Tag Selection

In many cases, we hope that no matter how many tags there are in the radio frequency area, only one tag with a known EPC number can be accessed. At this time, the tag function (EPC matching function) of the selected operation needs to be used.

In the accompanying demo software, taking the real-time inventory mode as an example, the operation is as follows:

- First, use real-time inventory mode to inventory tags, and get all EPC numbers.
- Then go to the interface of access label and select the EPC number to be matched. As shown below:

Formerst O BEC O DB O 1938 Access Faturerst (BEC) III III III III III	
* Factored © BT: © 128 . 0 288 Access Factored (082) . 11 21 24 .	
Data to be written (MRE): [11 22 29 44	the set we we lot set the set of the set
	型 (0) 41 (0) 22 (0) (0) 第 (0) 10 (0) 10 至 (0) 41 (0) 22 (0) (0) 10 (0) 10 (0) 10 至 (0) 41 (0) 22 (0) (0) (0) 10 (0) 10
ank Tag	虹 (0) 41 (0) 22 74 73 (2) 97 (0) 10 (2) 15 田 (0) 10 (13 (0) 00 (11 (0) 16 (2) 18 17 74 18 45
Okress hereord O BEE hereord #185 O BE	00 (m 00 00 00 14 09 M 10 (00 00 17 40 08 09 M 18 10 19 42 10 (00 01 17 40 08 09 M 18 10 19 42 10 (00 01 18 40 07 01 41 05 00 17 42 10 (41 05 00 17 40 18 10 19 10 19 42
Chen Blob Ohmentike Ohmen	〒単41.0年2510日町00.0円20.34 数000日第41240日10日11 22.0日116月210日10日11日 23.0日116月21日1日1日日11日 20.0日01日11日11日11日11日 20.0日01日11日11日11日11日11日
811 Tag 811 Pageword 0821 [31 22 33 44	E 10 41 06 22 10 46 30 06 70 36 90 E 20 50 17 46 90 69 84 46 56 76 46 00 26 20 16 20 14 96 76 00 26 20 16 40 42 42 40 20 20 20 36 40 E 20 41 16 16 16 16 16 20 20 20 16 10 16 16 E 20 41 16 16 16 16 16 20 20 20 16 10 16 16
9 NC 100 805 30:00 404 112:314:58:85.77:59:86.48.88.02	00 0 0 0 0 0 40 42 42 10 20 20 20 7 4 4 12 24 12 13 11 24 12 24 12 34 12 34 12 0 0 11 0 42 0 44 00 12 10 10 10 10 10 10 12 0 0 11 0 10 10 0 0 0 10 10 10 10 10 12 0 0 11 0 10 10 0 0 0 10 10 10 10 10 11 1
	<u></u>

After the selection is completed, click the "Select" button, and the following figure will be shown after successful operation:



We see that the "Selected Tag" checkbox on the left has been ticked, and the selected EPC number appears in the text box on the left.

Next, all tag access operations will only be performed on tags with this EPC number.

If you want to cancel the matching of EPC, just uncheck the checkbox of the selected tag. As shown below:

Ing Salection		
Telected Tag	Tag List: 82 00 41 06 02 04 00 54 06 10 38 95 -	Salees

#### 2.4.6 Error Display Might Be Returned

Errors occur if wrong operations done:

•Inventory success, access failure:

Iperatia Barago 🖉 ana Gaar	E antipute Derival Port Building
20-00-00 philling had be fulled, the by Ten Incompiled has seen a failed	

There are two steps to get access to tags: firstly, tag inventory; secondly, access tags. Picture above shows the inventory is successful, but we can't access to tags.

Two reasons why:

1. Parameters incorrect: for example, zones (password/ EPC/ TID/ User) to be read do not exist.

2. Tags beyond the area that the radio frequency electromagnetic field cover: distance when accessing to tags is about 60%-70% of tag inventory; in this case, please proceed the tag closer to antenna.

•Wrong password:



Reason why: wrong password is set.

•No tags to be operated :

```
Operation History: 20 Anto Clear Clear Activate Seriel Port Handtor
2014-04-10 17:32:52 Look tag failed, due to There is no tag to be operated
```

The above prompt will appear if there are no tags available for operation in the radio frequency area.

For the meaning of other returned information, users can refer to the document: **R2000 module serial** interface communication protocol V4.0.

Every time the UID of the tag is successfully read, the buzzer will beep once. If the buzzer beeps slightly longer, it means that the reader has activated the anti-collision function and recognized multiple tags at the same time.

#### **2.5 Other Settings**

#### **2.5.1Operating Temperature Monitoring**

When the reader is used continuously at high intensity, heat will be generated. The user can monitor the internal working temperature of the reader through the built-in temperature sensor to avoid overheating (the working temperature exceeds 65 degrees Celsius). If the temperature is too hot, you can stop reading and writing tags for a period of time.

The operation interface for monitoring temperature is as follows:

Internal Temperature			
	29°C	Get	

#### 2.5.2 Set GPIO Level

GPIO is the general-purpose input and output interface. It provides users with the function of triggering and controlling each other between peripheral devices and readers. This reader provides two optically isolated inputs (GPIO1 and GPIO2) and two relay outputs (GPIO3 and GPIO4).

01:	O Low	Read
02: 🖲 High	⊖ Low	Read
03: 🔵 High	◯ Low	Write GPIO3
04: 🔘 High	◯ Low	Write GPIO4
	03: () High 04: () High	03: O High O Low

The operation interface is shown in the below:

Users can read and write GPIO through serial commands in their own applications.

#### 2.5.3 Setting Buzzer Status

The buzzer provides users with sound information about the status of the reader.

The user can turn off the buzzer, or set it to sound once every time the tag is inventoried.

It can also be set to beep every time a tag is read, but this will reduce the efficiency of multi-tag recognition. This function is more used to test tags or readers.

The operation interface is as follows:

Buzzer Behavior		
◯ Quiet		
O Beep after an inventory round	Set	
Beep after a tag is identified.(This setting applies only to a small number of tags because the number of sounds is the same as the number of tags that are identified.)		

It should be noted that the buzzer sound after successful power-on self-test is not controlled by this setting.

After the setting is completed, the state of the buzzer will be kept in the FLASH inside the reader and will not be lost after power off.

#### 2.5.4 Changing The Serial Communication Baud Rate

Users can change the communication rate of the serial port by themselves. The reader supports two baud rates of 38400bps and 115200bps. The default is 115200bps.

The user can set the baud rate through the following interface:

RS-232			
Serial Port:	COM6	<b>~</b>	Connect
Baudrate:	115200	<b>v</b>	Disconnect
Set Baudrate:		<b>~</b>	Set

After the setting is successful, the new baud rate will be saved in the FLASH inside the reader, and will not be lost after the reader power off, restart the reader to make the setting effective. At this time, it must communicate with the reader at the new baud rate.

caution:

- If the interface used by the user is a TCP/IP interface, then the TCP/IP module must be changed to the corresponding serial port rate. For specific operations, please refer to the TCP/IP interface configuration document attached with the reader.
- Inventory tags in real-time mode will generate a lot of data, please try to use 115200bps baud rate.

### **3 Develop your own RFID Application**

Users can operate most of the functions of the reader through the demonstration program, but in the actual application environment, it is necessary to develop their own programs.

The accompanying document: R2000 module serial interface communication protocol V4.0.doc provides a complete interface for operating the reader.

This interface is based on serial communication, so no matter the user's physical interface is RS232 or TCP/IP, the reader will follow the definition of this interface.

The demonstration program provides an important function, which is the transmission record of the serial port. The user can compare the communication protocol document with the actual serial port data during the operation of the demonstration program to quickly grasp the content of the communication protocol.

After checking the Open serial port monitoring check box in the lower right corner, all upstream and downstream serial port data will be recorded, as shown in the figure below (after opening the serial port monitoring, the response speed of the software will become slower, so you should usually close the serial port monitoring.):

6	LIHF RFID Reader Demo v1.9.0	÷ 0
Reader Setup   19000-6C Tag Test   ISO 18000-6E Tag Test   Sena Port	Heter	
225-08-05-02 01-46-786 A0-54 01 74-02-67	10-10-10-10-10-10-10-10-10-10-10-10-10-1	
1025-06-15 02-01 46 804, 42 06 01 28 00 00 01 00 00		
120-06-15 (22-01 46-364 A0 11 01 36 C4 35 (6 C2 00 00 17 46 (6 00 12)	1 10 10 11 11 14 14 13 11 16 C4 10 00 E2 00 41 06 22 34 51 63 06 60 07 23	
120-06-15-52-01-46-880, AQ-07-01-08-CA-20-00-11-02-11-12-12-12-02-06-1 1	T 31 AU 13 CT RE CK 30 CC 12 CO #1 00 Z2 O4 C2 35 OK 00 CC 16 35 OH AU 13 CT RE	30 00 ft2 00 #1 00 22 0# 00 39 56 70 D0 53
2025-08-15-22-01-46-395-40-13-01-96-04-36-02-06-41-46-22-04-00-74-7 2026-08-15-02-01-46-319-A0-13-01-96-04-38-08-02-05-00-10-96-08-48	FF 70:06 99 20 EED 10 20 EED 62: 22 EEZ 40 13 01 880 C4 30 88 E2 50 41 06 22 64 00 56 66 80 D4 61 36 EED	
2020-08-15 02-01 46 944 A0 13 01 88 C4 20 00 00 00-08 49 43 42 42 10 1 2020-08-10 02 01 46 577 40 13 01 89 C4 30 10 F3 00 41 65 27 04 00 98 1	0 30 38 41 33 33 4. TO 26 CB 32 44	
S26GF 活動計26977 AG 10 0 単位計算数目ののの特殊の目前1 第56GF 活動計26977 AG 10 0 単位計算数目ののの特殊の目前1	17 10 DE 27 47 42	
525-08-15 02-01 47.010 A0 13-01 48 C4 35 00 E2 00 41 06 22 04 00 48 1	E (0) CH (2) 30 (2) A0 13 11 HB (2) 30 90 12 10 HB (H (2) 01 40 12) 39 43 10 11 39 447	45 10 01 00 CA 00 00 E2 00 41 06 22 04 01
222-08-15 02-01 47 542 40 13 01 08 CA 31 00 E2 00 A1 06 22 04 01 42 1	E (0) OC (44 3)A BE AC 13 OF RE C4 30 99 62 99 00 17 35 00 51 83 30 99 65 91 35 AC	
129-06-15 02-01 47 007 AD 13 01 00 C4 10 00 E2 00 00 19-86 00 01 41 0	E TO DE DE 20 CO AN O DI 20 CA SE COLO 10 DE 17 AN DE CO 14 TE CO 24 AT 20 22 E 300 DC 4E 45 (7 AT 13.01 38 C4 32 05	
2025-38-15 (2) (2) 47,088 122-00 41 08 22 (34 02 19 06 00 DC FB 30 48 A3 1025-06-15 (2) (0) 47 108 A0 13 (1) (0) (24 36 18 02 (0) 00 18 24 3C (1) 13-	13 01 88 C4 30 00 E2 00 03 19 68 0C 91 61 06 89 D5 88 49 D6 30 80 55 56 36 14 A0 13 01 98 C4 30 00 82 00 41 36 22 04 03 54 06 10 04 55 37 63	
2023年15位の3713×43年11時に32回の初位のの143年63 225時15位の47146-401311時に4回回52回31利初始的第1	C.然格特許藉住#20回行的發展的發展的非常沒有如果的 # 的复数体况了器性性静脉的原则和强烈体性障害性情况和非常能	
825-36-15 (2-31 47 152 A) 11 21 46 C4 28	and the second	
建设在自动机构 使目前的问题面目的非常容易的非非	6 00 DC 89 39 35	
1000-108-15 02:01 47 225 AU 11 01 08 CA 30 00 62 00 01 18 34 0C 01 08	集的 44 4C 33 4E AU 13 91 8B C4 30 00 82 3B 80 17 40 时 85 96 3B 5F A2 3B 96 7	40 13 07 MI CA 30 10 00 00 06 45 40
100-06 15 00 01 47 263 40 13 01 98 CA 15 00 06 00 45 41 42 42 33 3	010 38 41 32 81	
2020-00-15 02 01 47 287 AU 13 01 00 04 30 00 02 00 41 06 22 04 00 17 1 2020-00-15 02 01 47 292 AU 13 01 98 04 19 00 62 00 00 11 48 09 01 02 1	A 00 04 A5 32 F2 15 00 5F 81 38 28 A3 13 01 88 C4 34 05 E2 60 11 75 08 00 62 8C 20 76 82 FA 13 00	
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COLUMN 18 22 21 48 211 for underst senses a round by Course but here		
beaton Hatay, 57 33 (2) Ado Clear seon and investored Rag investory		Relivate Send Polt Mantas

The purple-blue information is the data sent by the PC to the reader, and the red information is the data returned by the reader to the PC.

The function of manually sending data can be used by users to debug serial commands, and it has the function of automatically calculating the checksum.

In addition, the attached document also includes the complete source code of this demo program (based on the C# language development of the .Net platform) for user reference, so that applications based on this reader can be developed at the fastest speed.

#### FCC Warning

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.

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.

**Radiation Exposure Statement** 

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 and your body.