SHENZHEN CHAINWAY INFORMATION TECHNOLOGY CO., LTD

CM2000/CM500 Module User Manual



Statement

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Chapter 1 Product Intro

1.1 Intro

Chainway CM2000-1 is a single channel UHF RFID reader module with high performance. It can be integrated in mobile UHF RFID readers, fixed UHF RFID readers, UHF card readers, integrated RFID readers and etc. With high integration level, this reliable module is small in size, low in power consumption. It is also resistant to electromagnetic interference and good at heat dispersion. All make it to absolutely satisfy needs of all environments. The module appeals to challenging industries like warehousing, logistics, apparel, production lines and such.

1.2 Brief

CM2000 module can be adopted with multiple types of antennas with output powers as 5dBi, 9dBi, 12dBi. The port is SMA and development board, Windows SDK and demos are provided.

1.3 Device List

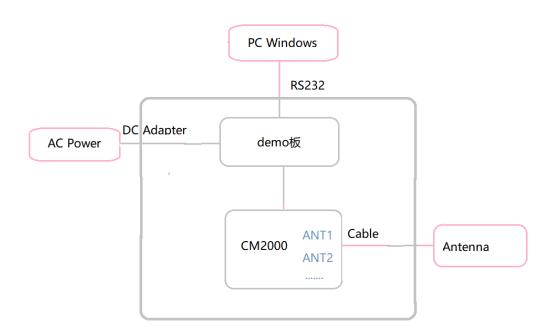
- 1. CM2000 module, development board, FPC, 12V/5A power adaptor.
- 2. UHF antennas: 6dBi, 9dBi, 12dBi etc.
- 3. Feeder line that has adopted with SMA male port, the port on other side needs to be equipped with antenna.
- 4. RJ45 Ethernet cable.
- 5. Serial port cable.
- 6. Demo software, it includes 4 necessary files and UDFAPP.exe is execute program as pic. 1.

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

Pic.1

1.4 Device installation

CM2000 can be connected as Pic.2. PC can connect with development board by cable. Single CM2000 module can connect with different amounts of antennas according to different models.



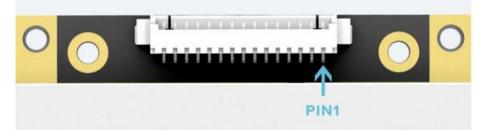
Pic.2

Chapter 2 Module Interface Definition

2.1 CM2000-1/CM500-1

	PIN12	
PIN#	Interface	Description
1	VIN	
2	VIN	3.5-5.25VDC
3	GND	Ground
4	GND	Ground
5	EN	High LLT level (>1.2V) boot the module
	104	Low LLT level (<0.4V) out the module
6	IO1	Reserved GPIO 3.3V TTL level
7	102	Reserved GPIO 3.3V TTL level
8	103	Reserved GPIO 3.3V TTL level
9	RXD	UART receive 3.3V TTL level
10	TXD	UART transmit 3.3V TTL level
11	USB_DP	USB_DATA(+)
12	USB_DM	USB_DATA(-)

2.2 CM2000-4/CM2000-8/CM2000-16



PIN	Interface	Description
1	GND	Positive
2	GND	Positive
3	VIN	Negative
4	VIN	Input voltage range : 3.5-5.25 VDC
5	GPIO3	Reserved GPIO 3.3V TTL level
6	GPIO4	Reserved GPIO 3.3V TTL level
7	GPIOI	Reserved GPIO 3.3V TTL level
8	BUZZ	Driving 3.3V buzzer
9	UART_RXD	UART receive 3.3V TTL level
10	UART_TXD	UART send 3.3V TTL level
11	USB_DM	USB_DATA(-)
12	USB_DP	USB DATA(+)
13	GPIO2	Reserved GPIO 3.3V TTL level
14	EN	>1.25V power-on mode <1.18V standby mode
15	GPIO_5	Reserved GPIO 3.3V TTL level

2.3 Parameter Setup

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

🖳 UHF(1.2.4	4) - [ConfigForm]					
ReadEPC	ReadWriteTag	Configuration K	ill-Lock	UHF Info	Temperature	UDP-ReceiveEPC
Mode Se	rialPort 🔹	СОМ	COM1	۴	Open	

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

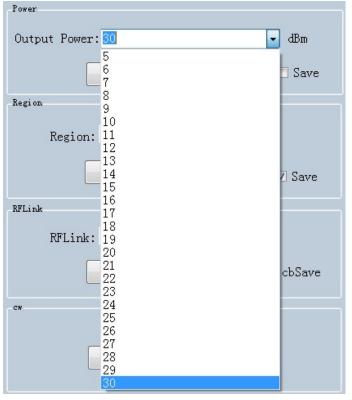
	UHF(1	.2.4) -	[ReadEPC]													
F	ReadEP	C R	eadWriteTag		Configuration	on	Kill	l-Locl	c	U	HF Info	D	Tempe	erature	UDP-Rece	iveEPC
N	lode r	networ	k	•	IP	19	2	. 16	8].[99].[202	Port	8888	Open

9 UHF(1.2.4) - [ConfigForm]	1	
ReadEPC ReadWriteTag Configuration Kill-Lock UHF Info	Temperature UDP-ReceiveEPC	
Mode network • IP 192 . 168 . 1 . 201	Port 88888 Close 语言 English -	
Power	Gen2	FastID
Output Power: 30 - dBm	Target: 000(s0) - startQ: 4 -	○Enable ● Disable
Get Set Save	Action: 000 - minQ: 0 -	Get
Region	Truncate: O(Disable) • maxQ: 15 •	Tagfocus
Region: USA 🔹	Q: 1(Dynamic) • DR: 1(DR=64/3) •	© Enable © Disable Get Set
Get Set Zave	Miller: 10(M=4) • Session: 01(S1) • TRext: 1(Use pilot •	TemperatureProtect
RFLink RFLink: PR_ASK/Miller4.250KHz -	Target: 0(A)	value 75 50-75
get Set CbSave	Set Get	get set
	ANT	Enable
ON OFF	VANTI ANTZ ANTJ ANTA ANTS ANTG ANTT ANTG ANTJ ANTIO ANTII ANTIZ ANTIJ ANTIG ANTIG	Get Set Save
Local IP	get Save	Reset
IP: 192.168.1.201	ANT: ANT1 • workTime: 200 10-65535ms	Buzzer=
Port: 8888	get Save	⊙ Open O Close
<u>.</u>		
		h.

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

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

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



Set regions:



Set RFLink:

RFLink			
RFLink:	PR_ASK/Miller4.250KHz	-	
	DSB_ASK/FM0/40KHz		
	PR_ASK/Miller4.250KHz		cbSave
	PR_ASK/Miller4/300KHz DSB_ASK/FM0/400KHz		Condito

Set continuous wave:

ON	OFF	

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

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

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

Mode:	command mode
	command mode
	auto mode

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

Local IP	
IP:	192 . 168 . 1 . 201
Port:	8888
_	
	get set

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

ANT1	ANT2 A	NT3 📃 ANT4 🛛	ANT5 🔲 ANT6 [🗌 ANT7 📄 ANT8
etra 📃	ANT10 A	NT11 🔽 ANT12	🗖 ANT13 🥅 ANT14 [ANT15 ANT16
	get] [set	C Save
ANT : A	NT1 👻	workTime:	200	10-65535ms
ĺ	get		set	Save

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

IP:	192	168	•	1	•	109
Port:	9999					
[get			s	set	

Set FastID:

FastID	
🔘 Enable	◎ Disable
Get	Set

Set TagFocus:

Tagfocus		
🔘 Enable	◉ Disable	
Get	Set	

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

Temperature	Protect		
value	75		50-75
	get	set	

Set EPC and TID:

EPC And Tid	
⊙ Enable	• Disable
Get	Set 🗖 Save

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

Reset	

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

Buzzer= Open	○ Close	
get	set	

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

Gen2					
Target:	000(s0)	Ŧ	startQ:	4	•
Action:	000	•	minQ:	0	•
Truncate	: O(Disable)	•	maxQ:	15	•
Q:	1(Dynamic)	Ŧ	DR:	1(DR=64/3)	-
Miller:	10(M=4)	•			
			Session:	01(S1)	•
TRext:	1(Use pilot	•		0(4)	
sel:	01(ALL)	•	Target:	0(A)	•
			linkFrequency:	011(250KHz)	-
	Set		Get		

Chapter 3 Read and Write EPC

3.1 Read EPC

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

	1.2.4) - [ReadE		444.									1	-	1					
	PC ReadWr	riteTag	1070		Kill-Lock					-	7								
	network	*	IP	192	. 168 .	1	201	Port	8888	Close	语	English							
Filter																bank			(
Data:											0	Ptr:	32	(bit) ngth: 16	(bit)		O User	Save	Set
										1							 0 0001		reset
ID	EPC													TID			 Rssi	Count	ANT
1	E20000	019731	0027914	90F3C3													-67	3	1
2	E20000	019730	F012223	005D85													-75		1
3	160135	574															-73	2 3 6	1
4	111122	222333	3444455	556666													-68		1
5	160135																-72	3	1
6			8019010	90AB56													-55	3	1
7	160135																-66	3	1
8	111122																-71	4 3 3 2 5	1
9			F3681EC	880468													-63	3	1
10 11	160135		5005416	101111													-66 -78	3	1 1
12			5005416 1222222														-74	2	1
13	160135		1222222	223333													-69	3	1
14			0761200	000503													-80	2	1
14	512010	300000	0101200	000000													00	2	1
			Tot	al:	14														
									Clear				Sta	rt					
			Tim	ie:	4(s)			L											

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

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

🛃 UHF	1.2.4) - [ReadEPC]																
Read	PC ReadWriteTag	Configuration	Kill-Lock	UHF Info	Temperature	UDP-Re	ceiveEPC										
Mode	network •	IP 192	. 168 .	1 . 201	Port 8	888 C	lose	语言	English		•						
Filter													bank				
Data	16 01						<u>^</u> 2		Ptr:	32	(bit) ngth: 16	(bit)		O TID	O User	Save	Set
																	reset
ID	EPC									_	TID				Rssi	Count	ANT
1	16013555										110				-45	158	
2	16013545														-52	156	1 1 1 1
3	16013530														-44	160	1
4	16013533														-59	110	1
5	16013574														-71	63	1
-																	
		Total:	5						_	_							
					C	lear	_			Sta	rt						
		Time:	9(s)					L	-								

3.2 Read & Write Tags

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

🖳 UHF(1.2.4) - [Rea	dWriteTagForm]						
ReadEPC Read	NriteTag Configuration Kill-Lock UHF Info	Temperature UDF	-ReceiveEPC				
Mode network	• IP 192.168.1.201	Port 8888	Close	语言 English			
filter Data:	2 00 51 57 88 18 01 90 10 90 AB 56		12	e EPC OT	ID O User Ptr: 32	(bit) Length:96	(bit)
Read-write				BlockWrite			
Bank:	EPC -			Bank :	EPC	•	
Prt:	2			Prt:	2		
Length:	6	(word)		Length:	6	(word)	
Access Pwd:	0000000			Access Pwd:	0000000		
Data:	E2 00 51 57 88 18 01 90 10 90 AB 56		12	Data:			0
	Read				Erase	Write	
Set QT							
QT:	Not reduces range 🛛 👻 private Memory	map 👻					
	Get Set						

filter		
Data:	82 00 51 57 88 18 01 90 10 90 AB 56	12
Read-write		
Bank: Prt: Length: Access Pwd:	EFC RESERVED FPC TID USER 00000000 (word)	
Data:		0
	Read	

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

Data:	E2 00 51 57 88 18 01 90 10 90 AB 56	12		
Read-write				
Bank:	EPC -			
Prt:	2			
Length:	6	(word)		
Access Pwd	0000000			
Data:	E2 00 51 57 88 18 01 90 10 90 AB 56	12		
Read				

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

filter				
Data:	E2 00 51 57 88 18 01 90 10 90 AB 56	12		
Read-write				
Bank:	RESERVED -			
Prt:	0			
Length:	4	(word)		
Access Pwd	: 00000000			
Data:	20 18 20 18 20 18 20 18	8		
Read				

Read TID area:

C12.1

Data:	E2 00 51 57 88 18 01 90 10 90 AB 56	12		
Read-write				
Bank:	TID -			
Prt:	0			
Length:	6	(word)		
Access Pwd:	0000000			
Data:	E2 00 34 12 01 3C FA 00 09 AC AB 56	12		
Read				

Read USER area:

filter				
Data:	E2 00 51 57 88 18 01 90 10 90 AB 56		12	
Read-write				
Bank:	USER -			
Prt:	0			
Length:	4	(word)		
Access Pwd:	0000000			
Data:	12 34 12 34 12 34 12 34	*	8	
		-		
Read				

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

3.3 Lock UHF Tag

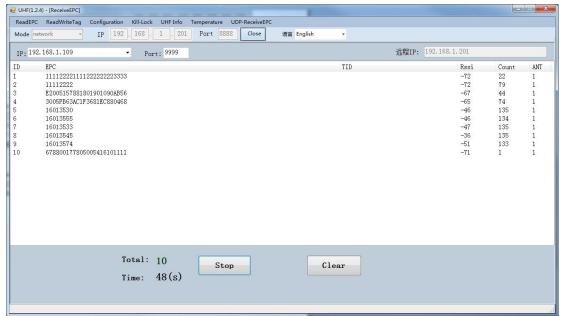
Click "Kill-Lock" in main menu to enter Tag locking function. For this function, user could execute "Lock", "Kill", "Open", "Permanent Open" and "Permanent Lock", to execute "Lock" function, password is needed. If user wants to kill UHF tag, need to enter password and tag will be wasted permanently.

💀 UHF(1.2.4) - [Kill_LockForm]					
ReadEPC ReadWriteTag Configuration Kill-Lock UHF Info Temperature UDP-ReceiveEPC					
Mode network • IP 192. 168. 1. 201 Port 8888 Close	语言 English -				
filter					
Data: E2 00 51 57 88 18 01 90 10 90 AB 56	bunk ● EPC ○ TID ○ User Ptr: 32 (bit) Length:96 (bit)				
lock	Blockfernalock				
Access Fwd: 20 18 20 18 Can't use the default password	Bank: USER -				
Open O Lock O Permanent Open O Permanent Lock	Ptr: 0				
	Access-pwd: 0000000				
○Kill-pwd ○Access-pwd ○EPC ○TID ◎USER	ReadLock: Read -				
LockBata:00 08 00 Confirm	block-1 block-2 block-3 block-4 block-5 block-6 block-7 block-8				
Kill	block=9 block=10 block=11 block=12 block=13 block=14 block=15 block=16				
Access Pwd: 20 18 20 18 Can't use the default parsword kill	Maibuf: Confirm				
filter					
E2 00 51 57 88 18 01 90 10 90 AB 56	12				
lock					
Access Pwd: 20 18 20 18	Can't use the default password				
● Open ○ Lock ○ Permanent Open ○ Permanent Lock					
⊙ Kill-pwd ○ Access-pwd ○ EPC ○ TID ◎ USER					
LockData:00 08 00 Confirm					
Kill					
Access Pwd: 20 18 20 18	Can't use the default password				
kill					

3.4 UDP-ReceiveEPC

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

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



3.5 Others

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

Warning

1) This product conforms with standard EN50332

2) Parameters of Power adapter: INPUT: DC12V/2000mA

3) Extreme Operating Temperature : -10~+45°C

4) To comply with RF exposure requirements, a minimum separation distance of 20cm must be maintained between the user's body and, including the antenna.

5) This product can be used across EU member states.

6) RF ID:

RF ID: 865.7-867.5 MHz, Maximum power: 11.956dBm

Declaration of Conformity

Hereby, Shenzhen Chainway Information Technology Co.,Ltd. declares that this UHF RFID Module is in compliance with the essential requirements and other relevant provisions of directive 2014/53/EU.

FCC Statement

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.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

FCC ID: 2AC6ACM2000-1

Installation Guidance

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.