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RDA LPM2100 User Manual

V1.2

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Update records

Version	Date	Author	Description
V1.0	2018/6/29	Liansp	Init
V1.1	2018/7/23	Liansp	Add network registration and UDP examples
V1.2	2018/8/17	ZFF	Add MQTT command example

Chapter 1. Overview

LPM2100 module is a wireless communication module based on the RDA platform supporting NB-IoT, the stamp hole interface, it have two sizes and the single and double frequency band, a total of 4 series of products, the following table:

	Large size (23.6mm*19.9mm*2.2mm)	**Small size (17.7mm*15.8mm*2.2mm)**
Single frequency section	LPM2100 bc	LPM2100 mc
Double frequency section	LPM2100 bg	LPM2100 mg

The series of single frequency band support the following band (low frequency):

- NB-IoT: B5, B8

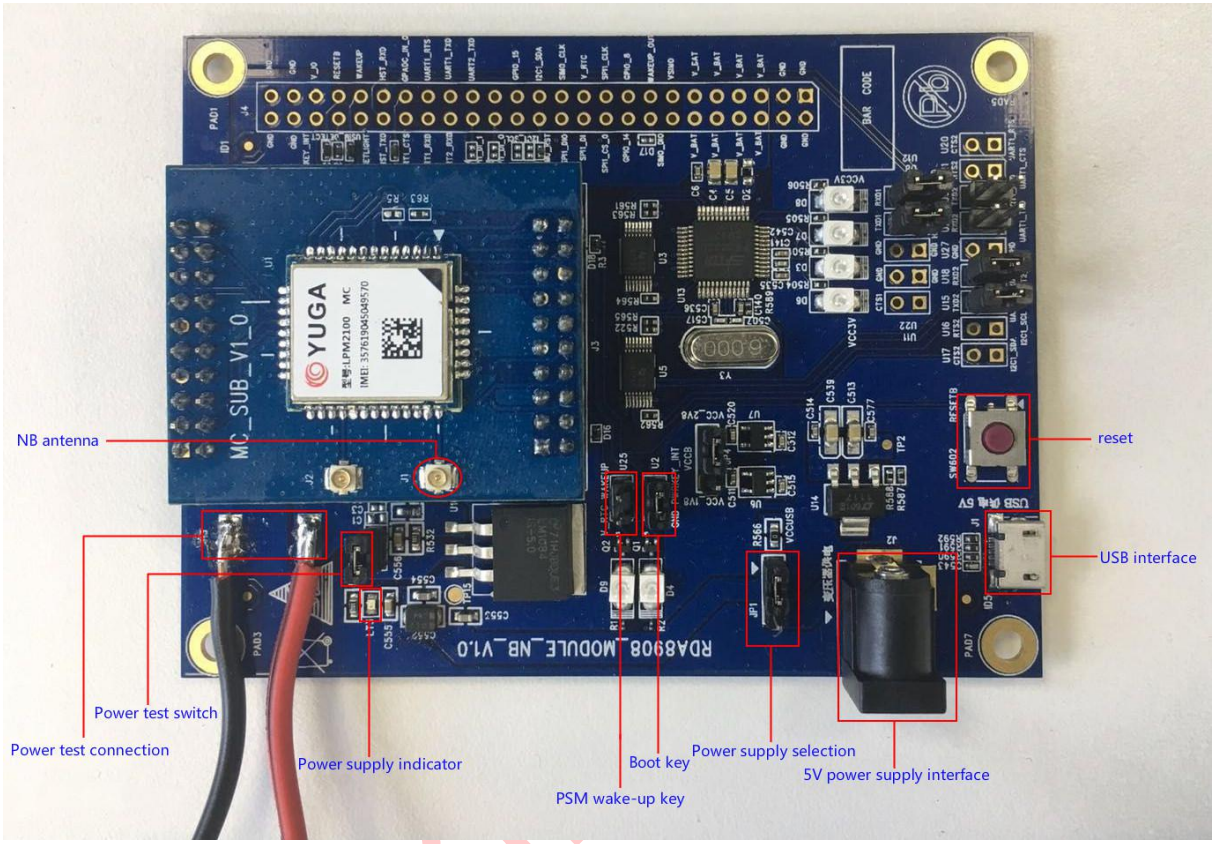
The series of double frequency band supports the following frequency bands (low frequency and intermediate frequency):

- NB-IoT: B3, B5, B8

The LPM2100 module uses low power technology, the sleep current is less than 1mA, and the current in PSM mode is as low as 5uA.

Chapter 2. Introduction of development board

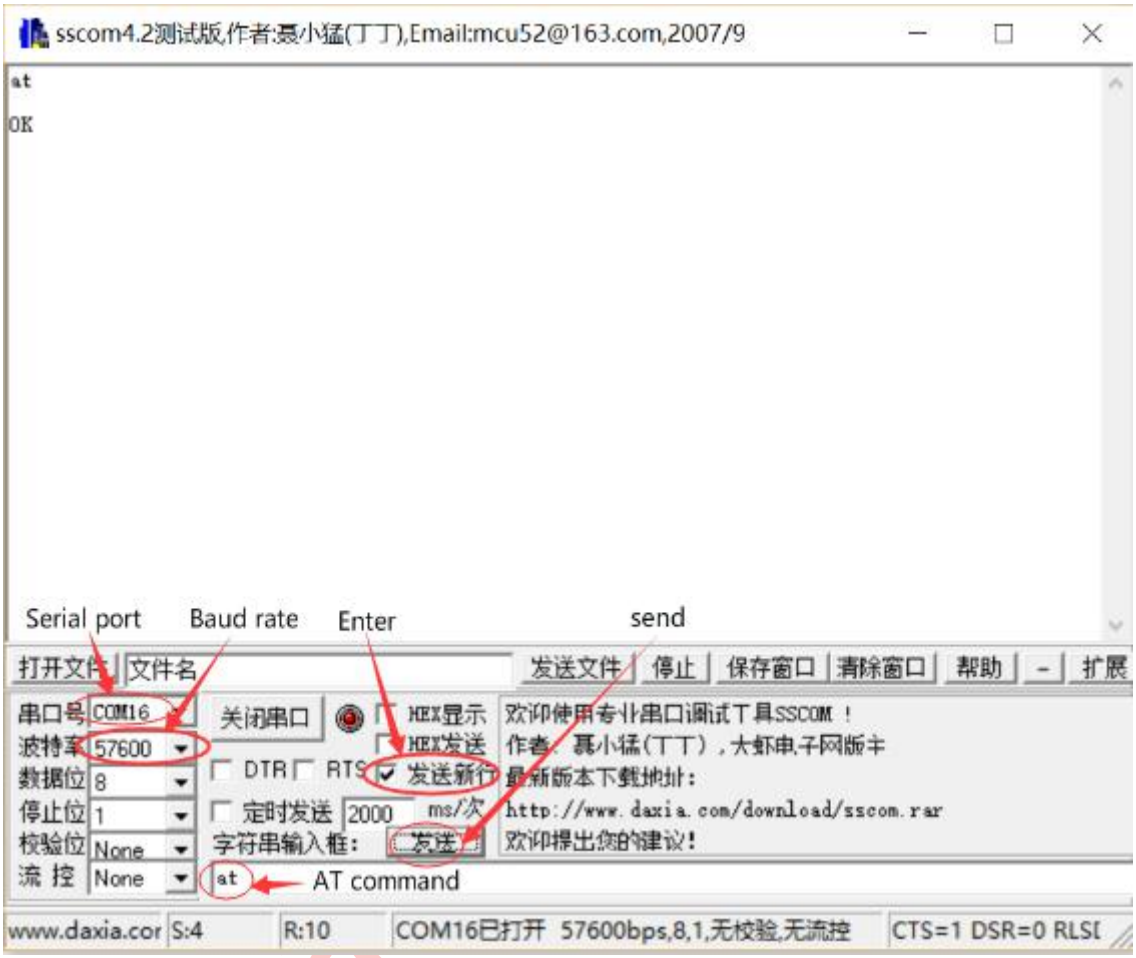
The LPM2100 development board is a small board + bottom structure, and the module is welded on the small board, the small board and the bottom plate are connected by 40 pins. As follows:



- ✧ Power supply can be powered by an external 5V power supply interface or powered by a USB interface.
- ✧ The module is powered on automatically, and the power indicator is on after normal power-on.
- ✧ In addition to power supply, the USB interface also virtualizes two serial ports. The first one is to upgrade the debug serial port, and the second is the AT command serial port.
- ✧ Press the reset button to restart the module for about 1 second.
- ✧ After the module enters the PSM, short-circuit the PSM wake-up button, and the module exits from the PSM state.
- ✧ If the module is to be tested for power consumption, first remove the power test switch jumper, and then directly supply power to the module at the power test connection. The voltage range is 3.4V~4.2V, typically 3.8V.
- ✧ SIM card interface is at the bottom of the small board, pay attention to the SIM card notch facing outward

Chapter 3. Basic AT command

First find the port corresponding to the AT interface, open the serial port tool, the default baud rate is 57600, here is the common SSCOM as an example, set the following picture:



3.1 Query product information

AT command: ati

Returns: return the manufacturer ID, module ID, software version identifier

ati YUGA LPM2100 U02C-V2.2 OK

3.2 Query SIM card

AT command: at+cpin?

Return: +CPIN: READY indicates that the SIM card status is normal. Other values indicate no card or the card is not inserted.

```
at+cpin?
+CPIN:READY
OK
```

3.3 Check signal

AT command: at+csq

Returns: the first parameter is the signal strength, the range is 0-31, 99 is no signal

If the value is too small, please check if the main antenna is connected.

```
at+csq
+CSQ: 24,99
OK
```

3.4 Query registration status

AT command: at+cereg?

Returns: the second parameter is the registration status, 1 is registered, and the other values are registration failures.

```
at+cereg?
+CEREG: 1,1,"5b49","0190321b",7
OK
```

3.5 Query support band

AT command: at+nvsetband?

Returns: the first parameter is the total number, followed by the number

```
at+nvsetband?
+NVSETBAND: 2,5,8
OK
```

3.6 PING instruction

AT command: at+ping=”IP”

Because some operators' NB cards are directed cards, if your server IP is not bound to the NB card, you can't access the server. First, use the PING command to test whether the card and the server are bound.

```
at+ping="121.41.100.43"
OK

Reply from 121.41.100.43: bytes= 36 time = 889(ms), TTL = 255
Reply from 121.41.100.43: bytes= 36 time = 599(ms), TTL = 255
Reply from 121.41.100.43: bytes= 36 time = 159(ms), TTL = 255
Reply from 121.41.100.43: bytes= 36 time = 467(ms), TTL = 255
Reply from 121.41.100.43: bytes= 36 time = 680(ms), TTL = 255
Ping statistics for 121.41.100.43
Packets: Sent = 5, Received = 5, Lose = 0 <0%>, max_delay = 889 ms, min_delay = 159 ms, average delay = 558 ms
```

3.7 Network registration example

The module will automatically register the network after booting, and the user needs to manually activate the APN.

```
at+cpin?
+CPIN:READY
OK

at+csq
+CSQ: 23,99
OK

at+cereg?
+CEREG: 1,1,"5b49","0190321b",7
OK

at+cgact=1,1
```

```
OK

at+cgdcont?
+CGDCONT:1,"IP","CMIOT.MNC004.MCC460.GPRS","10.162.12.128",0,0
OK
```

3.8 TCP example

In this example, the 121.41.100.43 TCP test server implements the echo service (what is received back), and is not guaranteed to be available.

```
at+cipstart="TCP","121.41.100.43",1234
OK

CONNECT OK

at+cipsend
> 12345<CTL+Z>
SEND OK

+IPD,5:12345

at+cipclose
CLOSE OK
```

3.9 UDP example

In this example, the 121.41.100.43 UDP test server implements the echo service (what is received back), and is not guaranteed to be available.

```
at+tsocr="DGRAM",17,56,1
1
OK

at+tsost=1,"121.41.100.43",1234,9,"test12345"
1,9
```

OK

+TSONMI: 1,9

at+tsorf=1,128

1,121.41.100.43,1234,9,746573743132333435

OK

at+tsocl=1

OK

3.10 Telecom COAP example

In this example, the IMEI of this device has been registered to the telecom platform.

at+gsn

358433082445355

OK

at+ncdpopen="180.101.147.115"

OK

at+nnmi=1

OK

at+nmgs=4,01313233

OK

+NNMI: 4,AAAA0000

at+ncdpclose

OK

3.11 MQTT example

In this example, the subject of the subscription and publication is consistent

AT+MQTTCONN="203.156.205.55",61613,"11111111",60,0,"admin","password"
OK

AT+MQTTSUBUNSUB="home/garden/fountain11",1,0
OK

AT+MQTTPUB="home/garden/fountain11","hello yuge",0,0,0
OK

+MQTTPUBLISH:1,home/garden/fountain11,10,hello yuge

AT+MQTTSUBUNSUB="home/garden/fountain11",0
OK

AT+MQTTDISCONN
OK

Chapter 3. Power saving mode

The NB module adds eDRX and PSM to the common module to save power.

4.1 PSM mode

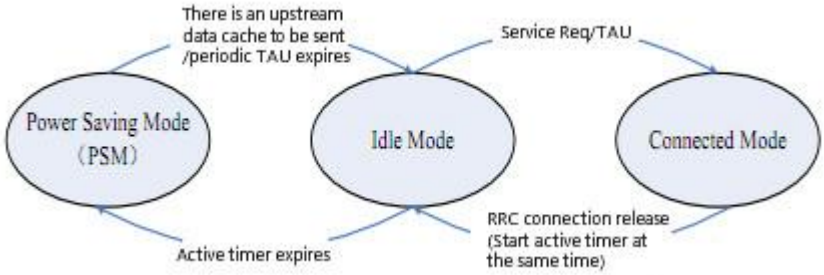
Open command: AT+CPSMS=1

To enter the low power consumption, you must first set AT+CSCLK=2 and AT+NVSETPM=2; after the device registers with the network, if the network supports PSM, the module will be required to enter PSM mode.

The PSM principle is that after the module is in the idle state for a period of time (the duration is determined by the timer T3324), it enters the shutdown state and starts the boot timer T3412. The value of the timer is specified by the network.

When the timer T3412 expires, the module is restarted; or the power module of the pull module is actively powered on, and the PSM exits.

The state transition is as follows:



4.2 eDRX mode

Open command: AT+CEDRXS=1

The eDRX principle is an enhancement of the original DRX technology, and supports a longer paging cycle to achieve power saving purposes.

The general DRX paging cycle is 1.28s/2.56s, while the eDRX can be 10s, 20s, 40s, 80s, or even 40min.