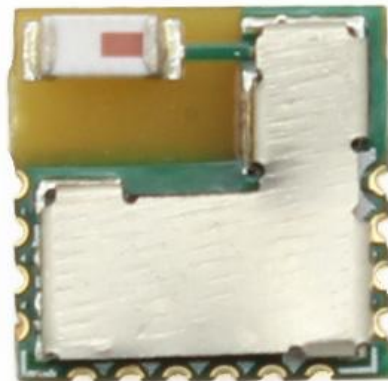


USR-BLE101 User Manual

File version: V1.0



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1. Quick Testing

Module default parameter:

- Baud Rate: 57600
- Mode: Slave pattern

1.1. Hardware Testing Circumstance

- Direction: We test the module in the default slave pattern.
- What do you need:
 - 1> One USR-BLE101 module and one set of USR-BLE-EVK.
 - 1> One mobile phone which support ultra-low power Bluetooth.
 - cellphone with Android system V4.3 or above
 - iphone 4S version or above device with IOS system 7.0 or above
 - 2> One PC with USB port.

1.2. Data transmission testing

We take Android mobile phone as example:

Testing environment: Android V5.0

The software we use: **Android Bluetooth Module Debugger** and **USR-TCP-Test** (please download the software on our website in advance)

Step 1

Weld the BLE101 to the BLE-EVK, please refer to the **pin assignment**.

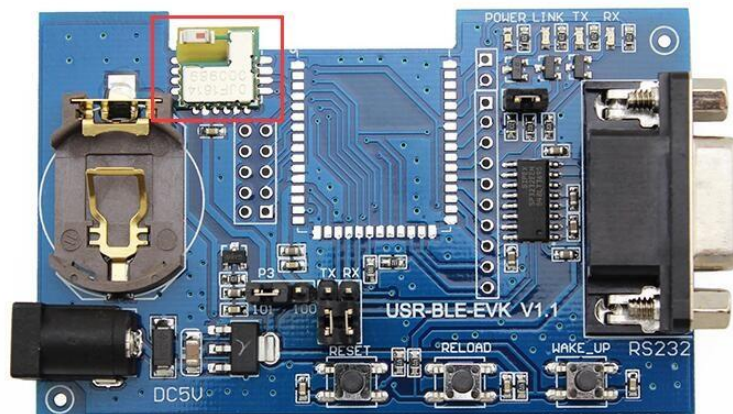


Figure 1 BLE-EVK-BLE101

<TIPS>:

The EVK have the pin assignment corresponding to the BLE101.

Step 2

Connect the power adapter to the EVK, the Link light will flicker once per second. Then connect the EVK to the PC by USB wire.



Figure 2 Connection Sketch

Step 3

Open the USR-TCP-Test on your PC, open the serial port connected the EVK, serial port number is the one on your computer, band rate is 57600, click OPEN. You can click options to change the language.

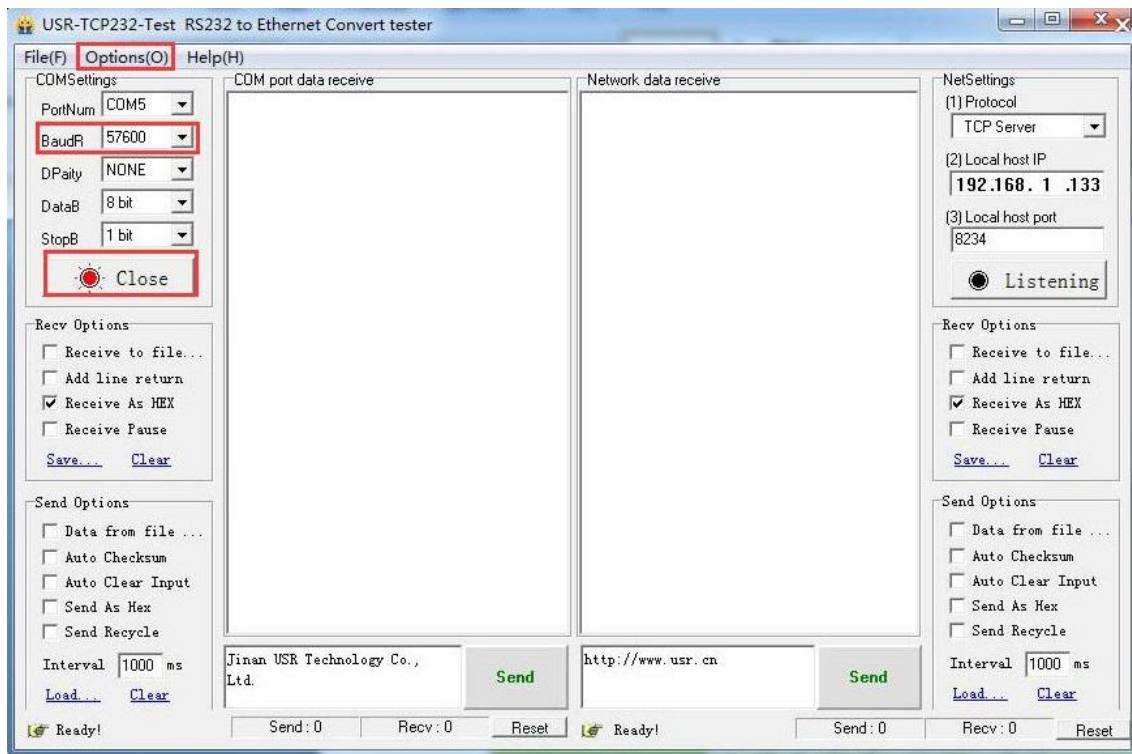


Figure 3 USR-TCP-TEST

Step 4

Click magnifying glass button on the APP Bluetooth Module Debugger, you can search the Bluetooth device named USR-BLE101, as shown in figure 4.

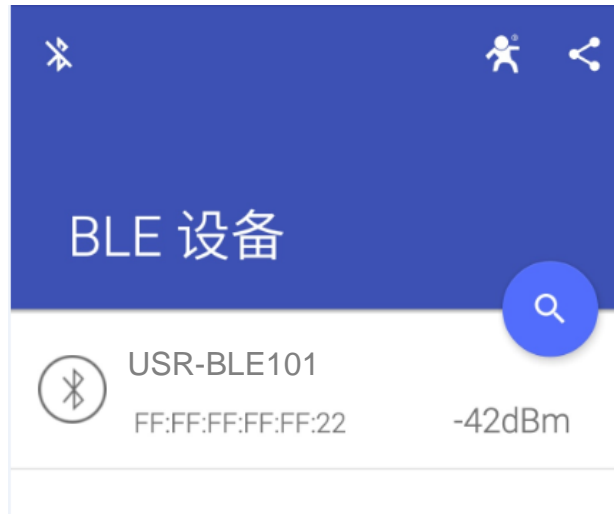


Figure 4 BLE Debugger

Step 5

Click on the device name to connect with it, the LINK light will keep on.

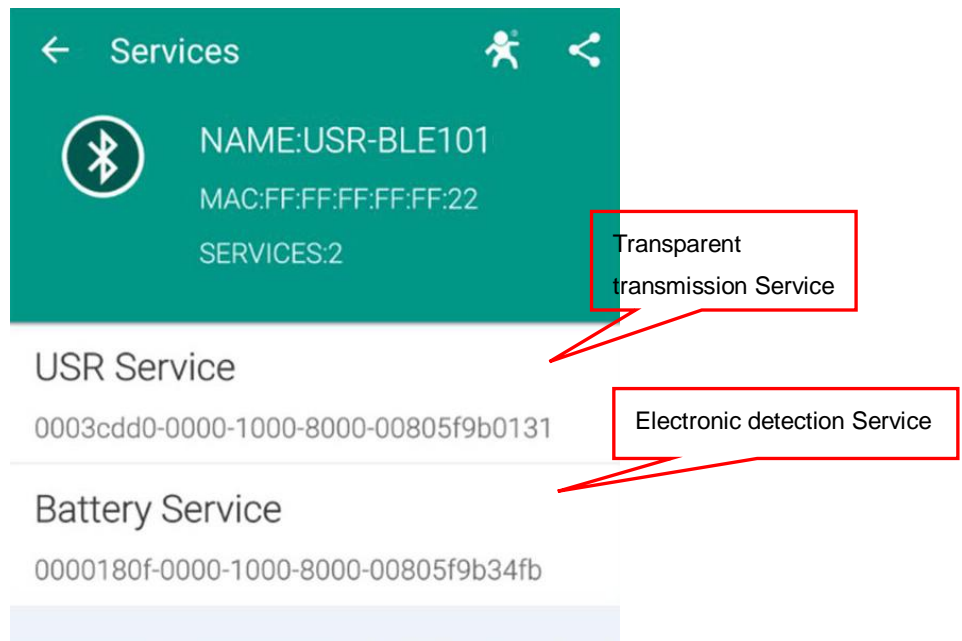


Figure 5 BLE Debugger

Step 6

Firstly, click on the "USR Service", Then click the "DEBUG" option at the bottom. After it, click on "NOTIFY". When it turn to "STOP NOTIFY", listening state begins. Now we can receive data through serial port.
If user want to send data, click on the upward symbol on the left, find out the "WRITE", click it and user can type data. After click "SEND", serial will receive the data you sent.

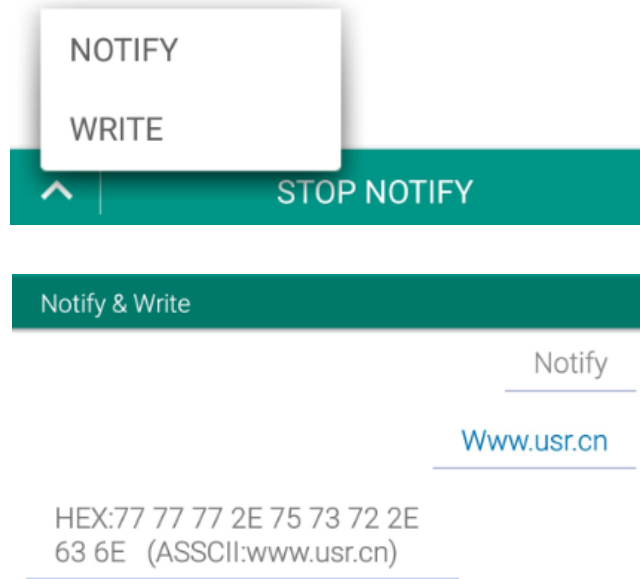


Figure 6 BLE Debugger

<TIPS>:

According to our test result, we found that for BLE, the IOS support better than the Android device, both at searching speed and connecting speed. This is caused by the different operating and hardware.

2. Overview

2.1. Brief Introduction

USR-BLE101 is a module support ultra-low power Bluetooth 4.1. With tiny 10*10 mm size, it is convenient to integrated into user's device. The module can be used in point to point data transparent transmission, users do not need to care the transmission protocol, some simple configuration can make it work. Except data transparent transmission, users can also develop APP on the basis of standardized BLE protocol for your project. This module support MESH network pattern and one-to-many broadcasting, also has built-in iBeacon protocol, user can make it a iBeacon equipment after make simple setup. USR-BLE100 is a versatile, simple, and low-power IOT transmission module.

This module have exactly the same function with USR-BLE100, can replace the BLE100 on the same application.

2.2. Product Features

- Support standard Bluetooth BLE protocol
- Support GAP, GATT, SM, L2CAP protocol
- 1.3uA low-power broadcasting pattern, 150nA sleep mode, and varied awaken mode
- Support master and slave, handover fast
- Varied configuration mode, serial AT instruction, transparent transmission

- Support one-to-many broadcasting, has built-in iBeacon protocol
- Support Mesh network pattern, can build Bluetooth network
- Support UART interface
- 1.9~5.5V single-supply
- Support state of charge(SOC) detection
- Ultra-long transmission distance, up to 120m
- 10*10 mm tiny size

2.3. Applications

- Industrial Data Collection
- Wearable Smart Device
- Smart Meter
- Sport Smart Device
- Medical Smart Device
- Smart Mobile Terminal
- Indoor location
- Information Identification
- iBeacon
- Home kit

3. Functions of Product

This chapter introduce the functions of BLE101, as the following figure 7 shown, user can get a good knowledge of product.

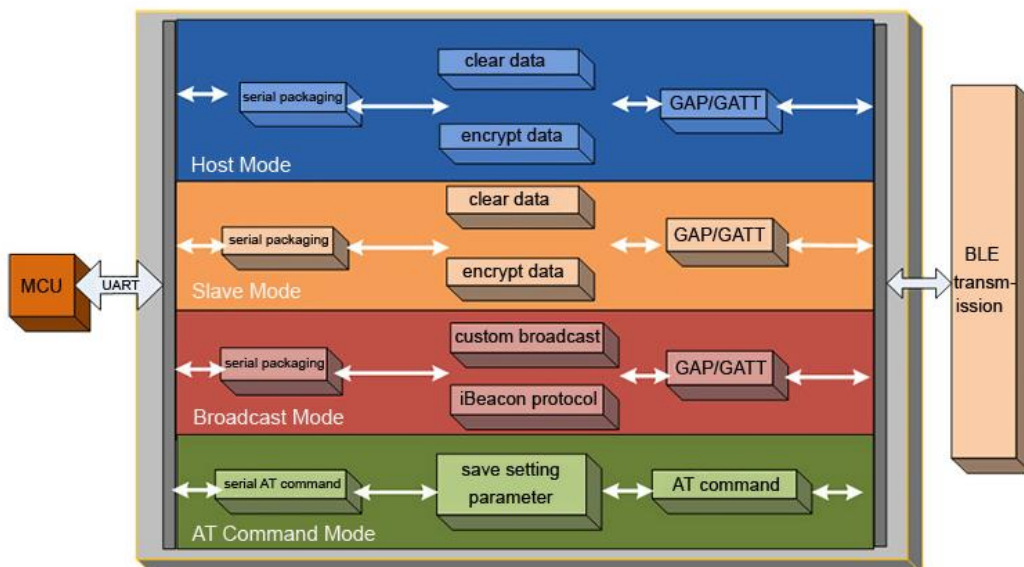


Figure 7 Functions of BLE101

3.1. User configure flow

After power the USR-BLE101, it will work in the setting parameters user set before.

The parameters user need to set in advance:

- ❖ Work Modes
 - Master Pattern
 - Slave Pattern
 - Broadcasting Pattern
 - Mesh Network Pattern
- ❖ Default connection parameter
 - Mac address of the device to connect
- ❖ Serial parameter
 - Band Rate
 - Data Bit
 - Parity Bit
 - Stop Bit

After configure all the parameters and reboot the module, the parameters are stored.

<TIPS>:

You should Set the device into AT command mode before using AT command.

Method: Input “+++a” in USR-TCP232-Test and wait module reply “+OK” to enter AT command mode.

3.2. Work Mode

USR-BLE101 has 4 working modes

- Master Pattern
- Slave Pattern
- Broadcasting Pattern
- Mesh Network Pattern

<TIPS>:

BLE101 default mode is Slave pattern, user can search it by master device like mobile phone.

3.2.1. Master Pattern

USR-BLE101 support master pattern that can connect with a slave device. In this pattern, user can search devices around and choice a slave device to connect. User also can set the MAC address of the slave in advance, so the device can find and connect this slave device when it power on.

<TIPS>:

If user want to transparent transfer data, both the master device and slave device should use USR Bluetooth module.

There are 2 ways to connect the slave device:

- ❖ Search device--should configure the following parameters first:
 - 1> Set the work mode as Master Pattern
Input "AT+MODE=M{CR}"
 - 2> Open search function
Input "AT+SCAN {CR}"
 - 3> Set the device reference number
Input "AT+CONN=1 {CR}"
 - 4> Waiting for the indicator light is Always is connected, now the Master and Slave devices can transparent transmit data.
- ❖ Search MAC address- -can use this method when you know the slave device's MAC address:
 - 1> Set the slave's MAC address the BLE101 default connect to when power on
Input "AT+CONNADD=FFFFFFFFF11 {CR}"
 - 2> Reboot the BLE101
Input "AT+Z {CR}"

3.2.2. Slave Pattern

USR-BLE101 support slave device pattern, in this pattern, device completely conform to BLE 4.1 protocol and compatible with 4.0 protocol, user can develop APP according to the BLE protocol. This pattern contain a serial transceiver "Service", user can find it through UUID. There are 2 channels, read and write, user can transfer data through those channels.

There is no need for user to concern to protocol if only use USR-BLE100 modules as Master and Slave, the serial ports of 2 devices can transparent transfer data immediately. It develops an easy wireless transmission channel for the user.

<TIPS>:

In this pattern, user need to set the work mode of BLE101 as slave pattern, user can develop APP to connect the device by UUID, UUID is: 0x31, 0x01, 0x9b, 0x5f, 0x80, 0x00, 0x00,0x80, 0x00, 0x10, 0x00, 0x00, 0xd0, 0xcd, 0x03, 0x00.

The AT command about slave pattern:

- 1> Set the work mode as Slave Pattern
Input "AT+MODE=S{CR}"
- 2> Inquiry module's connection status
Input "AT+LINK?{CR}"
- 3> To disconnect the current connection

Input "AT+DISCONN{CR}"

- 4> Close broadcast data if don't want to be searched

Input "AT+ADP=OFF{CR}"

3.2.3. Broadcast Pattern

In this pattern, user can realize one-to-many broadcast. User can set modular broadcasting data through AT instructions. Module can continuous broadcast in low-power pattern. This mode can be used to ultra-low power, small-data-sets, simplex transmission application occasions, like wireless measurement, indoor location and so on.

<TIPS>:

User can call BLE standard interface program to gain the broadcast data in their APP.

The AT command about slave pattern:

- 1> Set the work mode as Broadcast Pattern

Input "AT+MODE=B{CR}"

- 2> Set the broadcast data, data length should be within 30 bytes in hexadecimal mutation.

Input "AT+ ADVDATA =0201041Aff4c000215B9407F30F5F8466262626288777755552255"

- 3> Gain the broadcast data from BLE listening software:

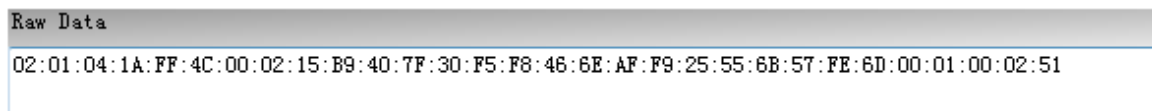


Figure 8 BLE Listening Software

3.2.4. Mesh Network Pattern

USR-BLE101 support Mesh network pattern, can connect many modules with network easily. By using star network and relay technology, each network can link 65000 or more nodes, networks can be interconnected, and finally countless BLE modules can be interconnected or manipulate directly through mobile phone, pad or PC. It doesn't need gateway, even if one device is broken, other device will skip it and choose the nearest device to transfer. The whole networking process just need a power-on device and communication password.

<TIPS>:

This pattern has some limits. Module need to constantly switching modes when transfer data, so the amount of data is limited to 20 bytes per time, and transfer will delay 1~10 seconds. This mode is similar to UDP that can not ensure data would be sent to specified module.

Setting steps:

- 1> Set the work mode as Mesh Network Pattern

Input "AT+MODE=F{CR}"

- 2> Set communication password

Input "AT+PASS=123456{CR}"

- 3> Reboot the module to get into Mesh network pattern

Input "AT+Z{CR}"

- 4> Now set several modules as Mesh network pattern, when one module send data, the modules around will receive the data, and send this data to their surrounding modules. When the terminal serial device reply data by serial port, the first Bluetooth module will receive this reply eventually.

3.3. Packet Mechanism

Low-power Bluetooth aimed at small-data-sets transmission. According to the different serial baud rate, BLE connect intervals and different contracting intervals, module will has different capacity of data. But, in any case it will not exceed the theory of 4K byte/s. Test shows that loss probability is lesser when forwarding rate is below 2K byte/s. To be safe, whether high speed or low speed, it's better to do check retransmission in the upper.

The serial port of USR-BLE100 can receive up to 512-byte packets per time, module will send automatically according to the size of the packet, the maximum load for each wireless packet is 20 bytes according to the standard. The packets mobile device send must packet (1-20byte per package) by itself to transfer. Module will forwarding to its serial port in turn when receive.

Module has two packet sending pattern, one is 20 bytes per package, another one is 100 bytes per package. The latter can only be applied to set USR-BLE100 modules separately as Master and Slave to communicate. If user use APP communicate with salve should choose 20 bytes per package.

<TIPS>:

When serial packet is within 100bytes and 512 bytes, the data can be received at a time. But it need reserved time to transfer data through Bluetooth, or it will rear end.

Setting steps:

- 1> Forbid the serial max output

Input "AT+MAXPUT=OFF{CR}"

If you use two BLE101 separately as Master and Slave to transparent transfer data, you can set it as "ON"

- 2> Set the serial packet speed, default value is 100 ms

Input "AT+UARTTM=200{CR}"

3.4. iBeacon Protocol

USR-BLE send specific ID to surroundings through BLE broadcasting technology, the software received this ID will take action according to it. For example, set iBeacon protocol in shop will make the server transfer information to iPhone and iPad, or make server send coupon and points to customer. In addition, user can use

iBeacon to send information to software when home appliance broken or stop working. Now WeChat also support iBeacon, when user use “shake”, the ID registered in the background will receive related information. The Bluetooth pendant key in popular use APP and the gyroscope of mobile phone to locate module, always be used to indoor location.

iBeacon protocol is made up with four parameters: UUID, Major, Minor and TX power.

- **UUID** UUID is used to separate your beacon devices from other beacon devices. The beacon devices with the same UUID can be scanned if one APP search this UUID.
- **Major** Major is used to identify all related beacon as one group. For example: all beacons in one store will be assigned to the same major number, so the APP will know which store are the customer in.
- **Minor** Minor is used to identify specific beacon device. For example: each beacon device has a sole number, so you can know the exact location of the customer.
- **TX Power** It is used to identify the distance between you and the beacon device. You need to know the RSSI (Signal Strength) when apart from the beacon device 1 meter, then get the RSSI at present, you can calculate the distance between you and the device.

Setting Steps are simple:

1> Set the work mode as Broadcast Pattern

Input “AT+MODE=B{CR}”

2> Set the parameter of iBeacon protocol

Input “AT+IBEACON=B9407F30F5F8466EAFF925556B57FE6D,1,1,175{CR}”

3> Reboot the module

Input “AT+Z{CR}”

4> Test the function by using a normal APP, use IOS system, download the APP “Locate Beacon” from APP Store. Then open the Bluetooth of your iphone.

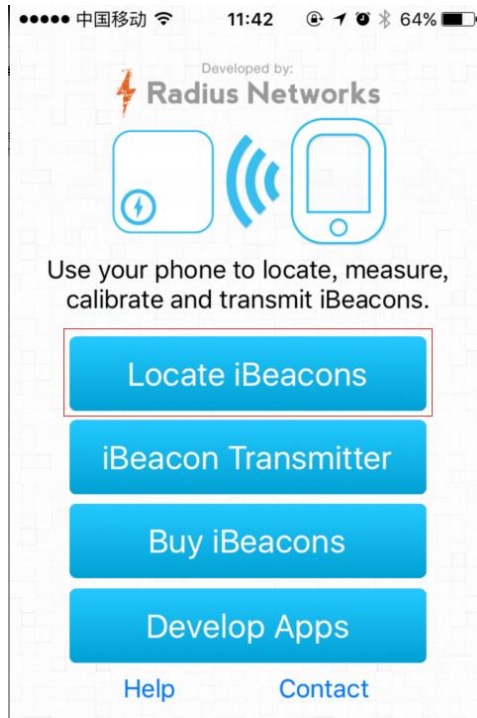


Figure 9 Locate Beacon

5> Click the first button, if the BLE101 works well, the detailed information of the module will come out.

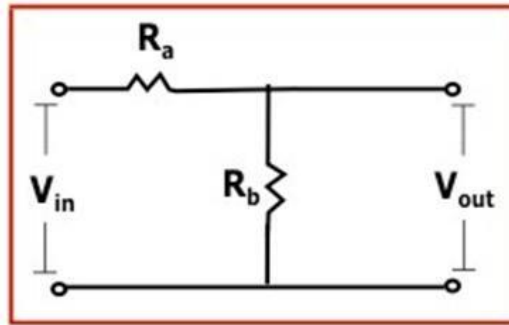


Figure 10 Locate Beacon

- 6> Change the distance of the mobile phone and the module, you can see the distance data changed. When leave or enter the identify region again, you can receive the message.
- 7> This software is just a debug tool, user need to develop your own APP according to your need, or add WeChat Shake to gain more functions.

3.5. State of Charge(SOC) Detection

USR-BLE100 collecting voltage through built-in ADC, transfer through specific "Service". Considering many customers use Bluetooth will use battery in most cases, we add a measure function to access battery power in real time. User only need to part voltage on the battery, part 1.024V voltage to AD collection pin when battery in maximum power. Module monitor the change of voltage in real time, and report through private channel.



V_{in} = Input Voltage
 V_{out} = Output Voltage

Input Voltage V_{in} :	<input type="text" value="3"/>	V
Series Resistor R_a :	<input type="text" value="1929.69"/>	Ω
Parallel Resistor R_b :	<input type="text" value="1000"/>	Ω
Output Voltage V_{out} :	<input type="text" value="1.024"/>	V

Figure 11 SOC Detection

Setting Steps are simple:

1> Open the SOC function

Input "AT+BATEN=ON{CR}"

2> Inquiry the state of charge

Input "AT+SHOW{CR}"

Or read the state of charge through "Service".

The Service UUID is: 0000180F-0000-1000-8000-00805F9B34FB, user can use standard Bluetooth protocol to read it.

3.6. Low-power Pattern

USR-BLE101 has many low-power patterns, can provide longer using time for the customer using battery.

- **Auto Sleep Pattern:** User can set a time through AT instruction. When no connection ,serial port has no data and standby time exceeds the set time, module will enter sleep mode automatically. In this pattern module Bluetooth can broadcast and connect, serial data can awake the module at anytime.

AT+AUTOSLEEP=ON,4{CR}

- **Deep Sleep Pattern:** Enter this pattern need AT instruction. Then, Bluetooth still can broadcast and connect. There are two awake methods: make connection and use awake pin. In this pattern, power consumption can reach about 1.5uA , many slave work in this pattern.

AT+DEEPSLEEP{CR}

- **Sleep Pattern:** This pattern still need AT instruction to enter, any peripheral will not work in this pattern, power consumption can reach about 150nA, user can use awake pin to awake it.

AT+HIBERNATE{CR}

<TIPS>:

The low-power patterns here are only relative to the slave, the master does not have low-power mode. User can make it stop working when the master does not work, awake it and search to make connection when user need.

3.7. Data-transmission Encryption

In order to ensure the security of data transmission, user can choose plaintext transmission or encrypted transmission. User can use AT instruction to encrypted transfer, then serial data will be PC1 encrypted by password, the module received data can decrypt only when it has the same password. It ensure the safety of data transmission.

Setting steps:

- 1> Open the data transmission encryption function

Input "AT+TREN=ON{CR}"

- 2> Set the password

Input "AT+PASS=123456{CR}"

<TIPS>:

There are built-in decrypt function in USR modules. If user want to use this pattern to encrypted transfer through master and slave, he just need a coincident password. Data will be encrypted in one port, decrypted in another port. If user develop APP to encrypted transfer, it need the decrypted function of APP to make sure that data can be transferred.

3.8. Indicator Light Status

There is a indicator light(pin) in USR-BLE100 module, it display differently in different modular status. The specific situation as shown below.

Table 1. USR-BLE100 Light Definition

Module Status	Indicator Status
Master Searching	Light 3 times per second
Slave Broadcasting	Light 1time per second
Connection Established	Light keep on

Low-power Pattern	Off
Data Transmission	Light gleam

3.9. Password Matching Verify

To ensure the safety of the device, USR-BLE101 support password matching verify. You can open this function by AT command. After open this function, if devices like mobile phone searched the modules to connect, it need type in the 6 bits password through data transmission Service--Write in 10 seconds, otherwise the device is disconnect. AT command as below:

AT+PASSEN=ON{CR}

3.10. Firmware Update

USR module updated firmware continuously to ensure the stability of the products. User can update the firmware by serial port using our update tool.

- 1> Open the update tool: Bootloader Host

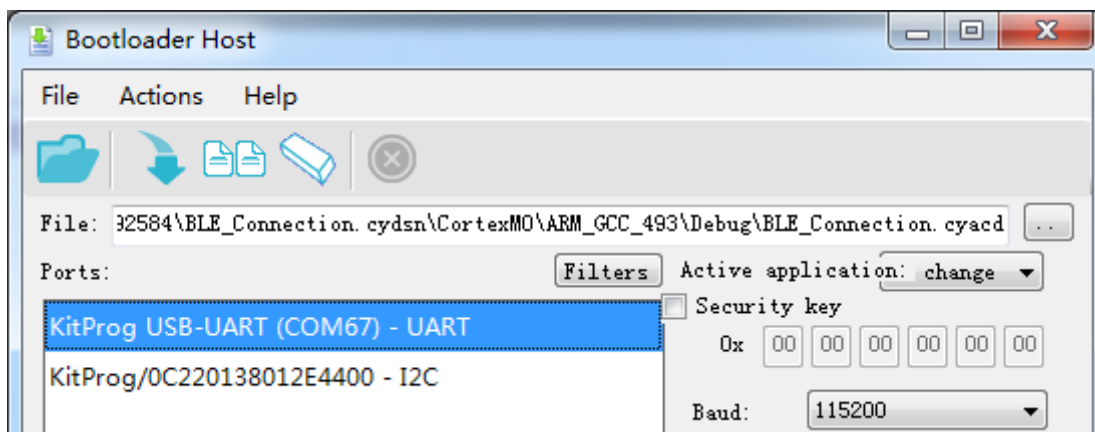


Figure 12 Bootloader Host

- 2> Click the button shown in the figure to find the firmware file, the expanded-name is .cyacd

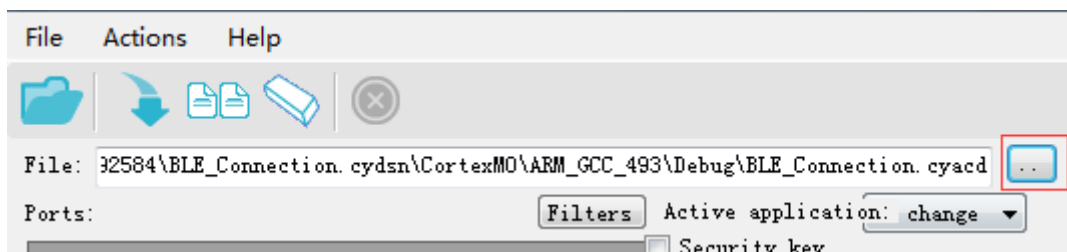


Figure 13 Bootloader Host

- 3> Find the serial COM number connected to the Bluetooth module.

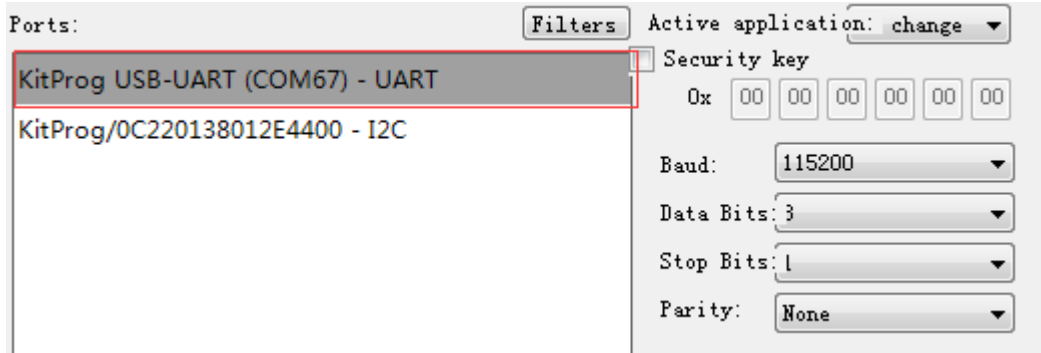


Figure 14 Bootloader Host

The COM number connected the module in my computer is COM 67, click it and you will see the serial parameter of this COM on the right, choose band rate as 115200.

- 4> After all is ready, reboot or re-power the module, click the download button in ONE SECOND after the module is restarted.

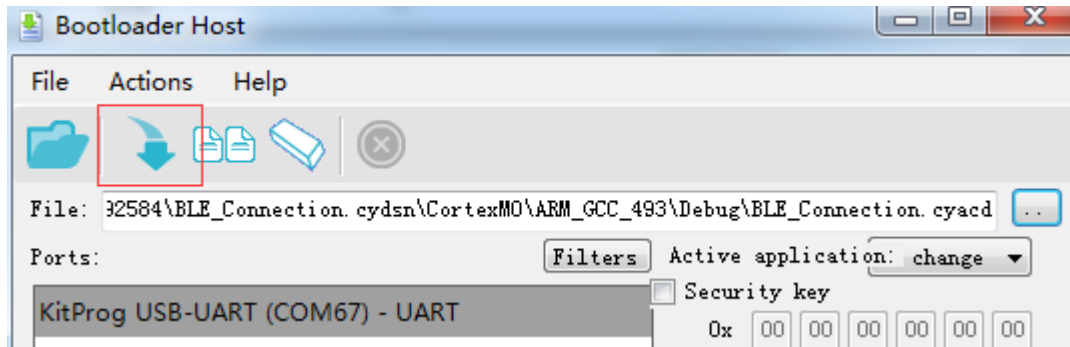


Figure 15 Bootloader Host

- 5> Check the progress bar below, if it is moving means updating now; if not start moving or shows error info, please retry step 4. Please ensure the click action in one second.



Figure 16 Bootloader Host

- 6> After the progress bar end, it shows a successful updating window. Then reboot the module to use the new firmware.

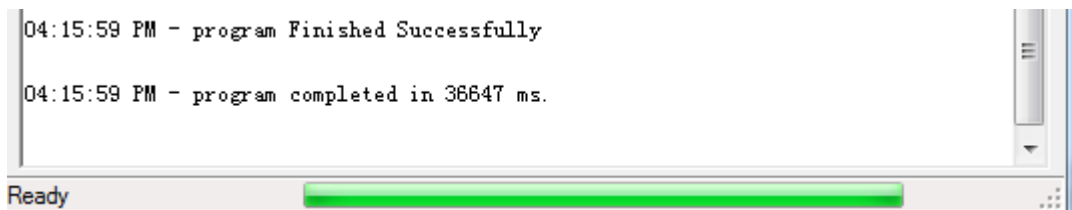


Figure 17 Bootloader Host

4. Hardware Description

4.1. Product Hardware Info

4.1.1. Pin Assignment

This is the pin assignment of USR-BLE101:

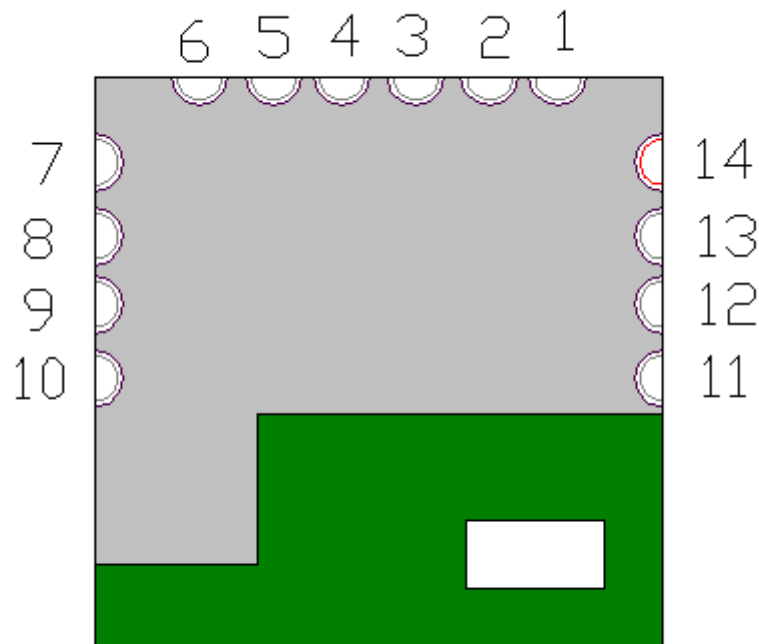


Figure 18 BLE101 Pin Assignment

Table 2 USR-BLE101 Pin Definition

Note: in signal type, P means power, I means input, O means output, N means cannot use

PIN	Name	Signal Type	Definition
1	NC	N	/
2	VDD	P	1.9V ~ 5.5V digital power pin
3	SWDCLK	I/O	Program debug clock pin
4	SWDIO	I/O	Program debug data pin
5	UART_TX	O	Serial output data pin
6	UART_RX	I	Serial receive data pin
7	LINK	O	Connection state Indicator light pin
8	XRES	I	Reboot pin
9	GND	P	Power ground pin
10	VDD	P	1.9V ~ 5.5V module power

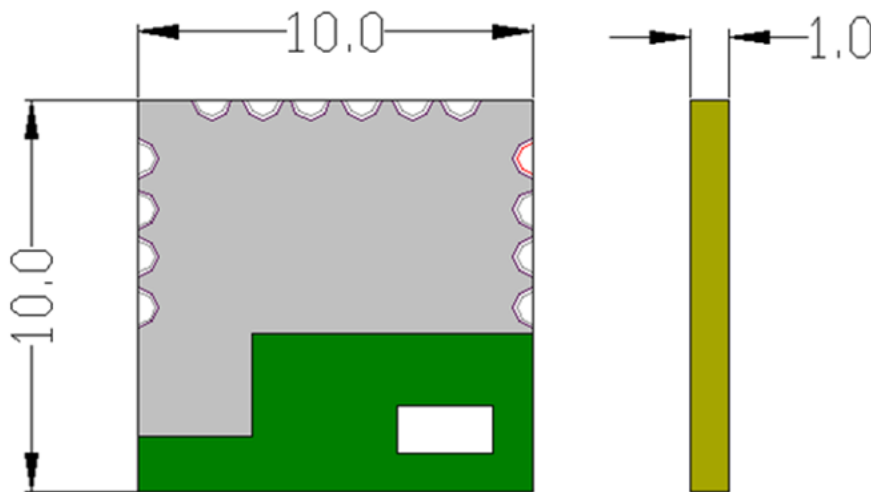
11	Reload	I	Factory resetting pin
12	Wake_Up	I	Wake up pin
13	NC	N	/
14	AD	O	State of charge detection pin

<TIPS>:

The module minimum system recommend to be: VDDD, VDDR, GND, UART_TX, UART_RX, LINK, XRES, Reload, Wake_Up pin, among them the two VDD pins can connect together to supply power.

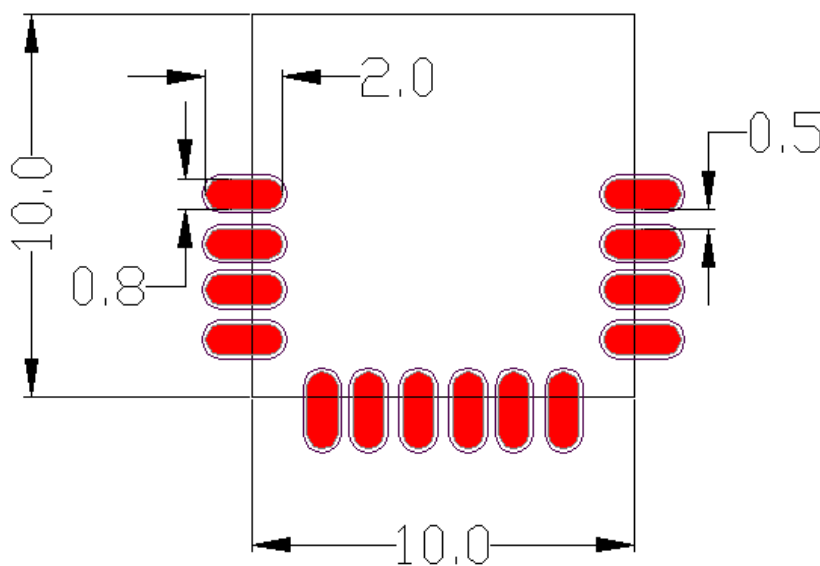
4.1.2. Dimension

The size is 10*10*1.0 mm, Error is ± 0.2 m.



Unit: mm

Figure 19 BLE101 Dimension



Unit: mm

Figure 20 Encapsulation Size

4.1.3. Evaluation Kit

USR Team also supply evaluation kit for user's development, see below image:

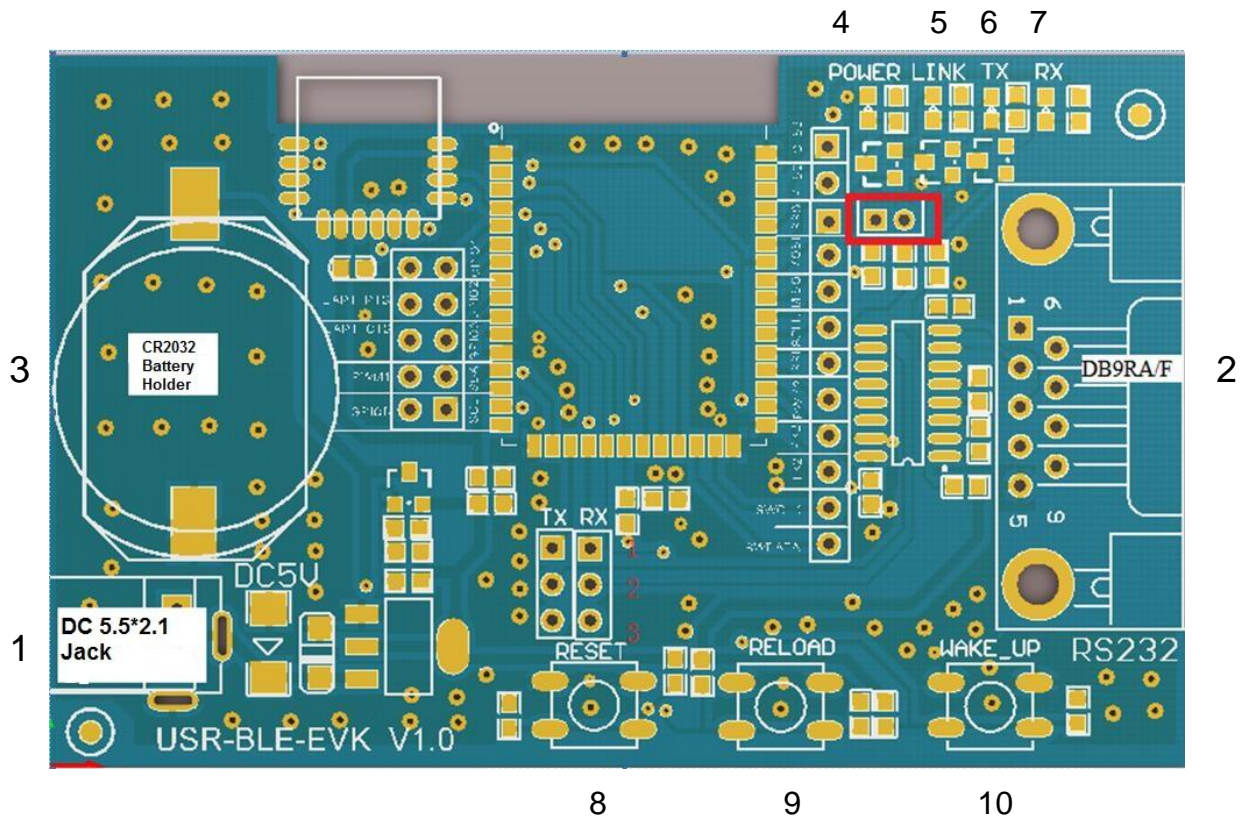


Figure 21 USR-BLE-EVK

This kit is used for USR-BLE100 and USR-BLE101, with RS232 interface. For USR-BLE101, need to connect the jumper to 2 and 3 (the red fram).

Power supply method can choose 5V DC adapter and 3V button battery, battery model is: CR2032.

When use 5V DC adapter, this EVK have Anti current flowing backwards circuit, to avoid supply power to the button battery.

When use 3V button battery, to reduce the power dissipation, user can move off the jumper in the RED frame of the figure, to avoid the indicator light dissipate power.

The following table is the evaluation kit interface description related to the BLE101 module.

Table 3 USR-BLE-EVK interface description about the BLE101 module

Function	Number	Name	Description
Outer Interface	1	DC 5.5*2.1 Jack	5V power input
	2	DB9 RA/F	9 pin female interface
	3	Battery holder	2032 battery holder
LED Light	4	Power	3.3V power
	5	LINK	Link
	6	TX	UART0 transmit
	7	RX	USRT0 receive
Button	8	RESET	Reset

	9	RELOAD	Reload
	10	WAKE_UP	Wake up

4.2. Recommend Circuit Design

4.2.1. Typical Application Circuit connect

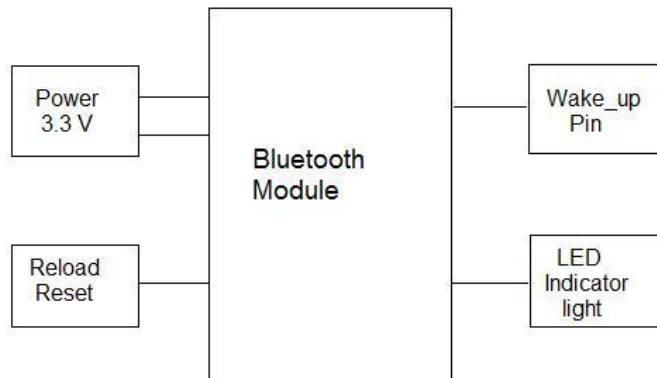


Figure 22 Application Circuit Connect

4.2.2. Power Supply Interface

Recommend use Switching Power Supply, VCC Working Voltage: 1.9V ~ 5.5V, recommend 3.3V. Use mail power pin to supply power, the pin should parallel connect proper energy-storage capacitor and high-frequency capacitor. Please refer to figure 23 below.

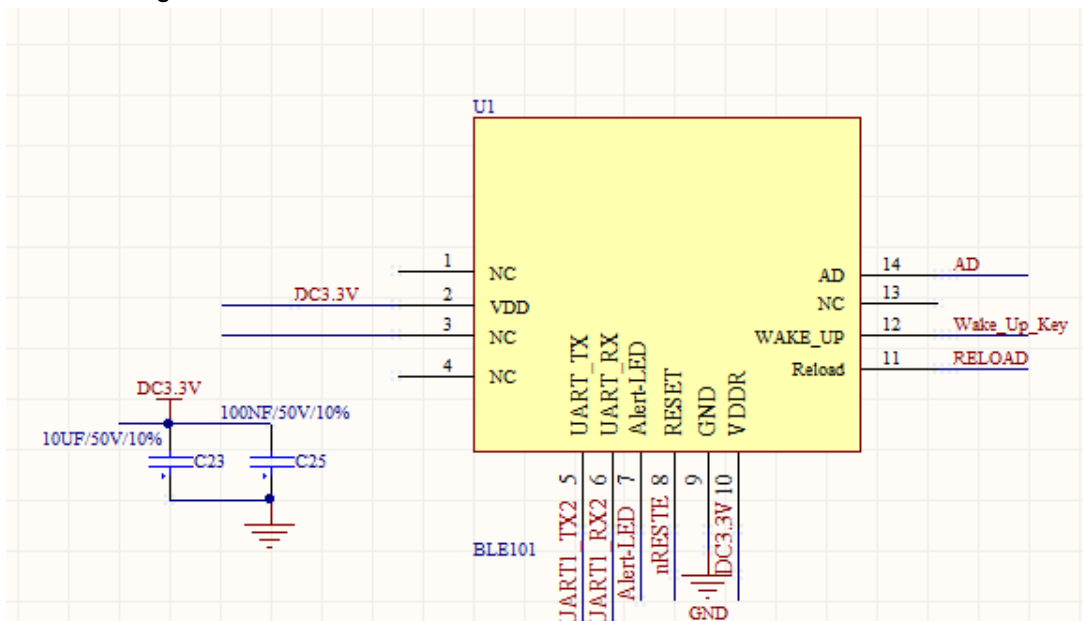


Figure 23 Power interface design

Table 4 Power Consumption

Symbol	Parameter	Min	Type	Max
V_MAIN	Power supply voltage	1.9V	3.3V	5.5V
I _o	Supply current capability	60nA	/	12mA

4.2.3. Reboot, Reload and Wake-up Function

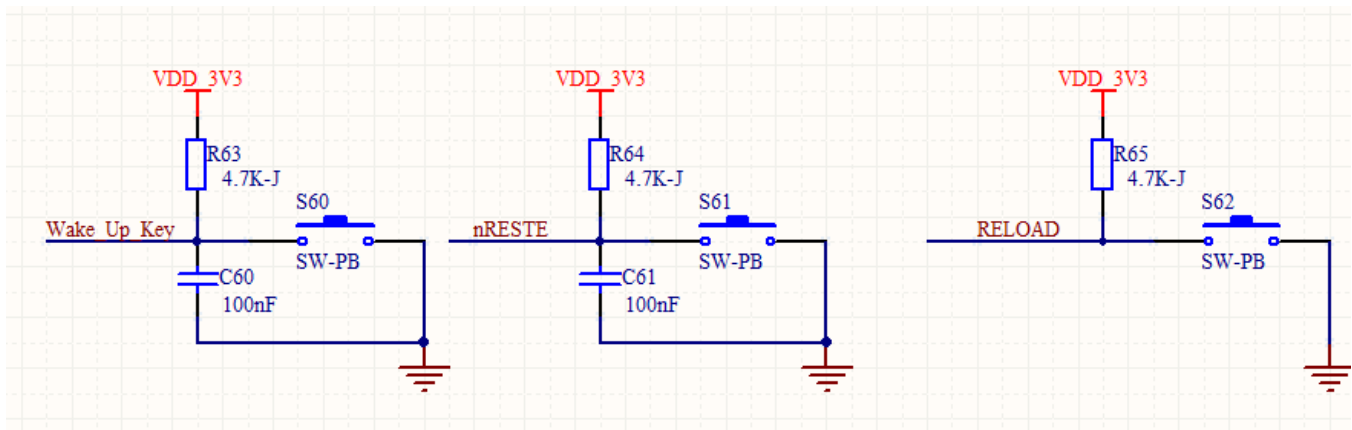
nReload: Module's circuit have 10K register, pull up it to 3.3V, connect to a button or configure pin, when press the button, the pin is pulled down, hold it more than 3 seconds, the module will restore factory default.

nReset: Module's circuit have 10K register, pull up it to 3.3V, when module power on or have a error, MCU need to reset the module, pull down the pin at least 0.5 second, then pull up or hang in the air, the module will reset.

Wake_Up Key: connect to a button or configure pin, when press the button, the pin is pulled down, hold it more than 3 seconds, the module will get to normal working state.

All those pins can hang in the air if don't use.

Please refer to the circuit design as below:


Figure 24 Reboot, reload, wake_up design

5. AT Command

5.1. AT Command Configure

5.1.1. Serial AT Command

USR-BLE101 has varied work modes, it will enter the mode you set last time when start-up, user can switch into AT command mode by sending serial command.

There are two steps to switch other modes into AT command mode:

1. Input “+++” in serial port, then module will reply a confirmation code “a” when received “+++”;
2. Input “a” in serial port after received “a”, module will reply “+OK” to confirm, then module will enter instruction mode;

User also can directly input “+++a” and wait module reply “+OK” to enter AT command mode. User can send specific instruction in AT format after enter this mode.

5.1.2. Transparent Transmission AT Instruction

USR-BLE101 also support transparent transmission AT Instruction, user can use APP or the module connected with it to set parameters in this pattern. User just need to input the 6 digits password of the module and AT instruction to query or set the module’s parameter. For example, if user want to query module’s version number, he should input “000000, AT+CTVER enter”. Like this, user can set and query parameter without entering AT instruction pattern in data transmission period.

5.2. AT Instruction Set

Table 5 AT + Instruction

Instruction	Description
Universal Command	
NAME	Search/Set Module Name
MODE	Search/Set Pattern Mode
MAC	Search Module’s MAC Address
CIVER	Search Software Version Number
TPL	Search/Set Module Transmission Power
SHOW	Show NAME, Pattern, MAC, Connection, Power and so on.
PASS	Search/Set Mode Password
PASSEN	Search/Set Paired Validation
UART	Search/Set Mode Serial Parameter
UARTTM	Search/Set Serial Packet time
AUTOSLEEP	Search/Set Sleep Automatically
DEEPSLEEP	Enter Ultra-low Pattern
HIBERNATE	Enter Sleep Pattern
HELLO	Search/Set Welcome Words
ENTM	Pull Out Instruction Pattern
RELOAD	Resume To Default Setting
Z	Restart Module
Linkage instruction	
LINK	Search Mode Connection status
SCAN	Search Slaves Surrounded
CONN	Quick Connect By Search Reference Number
CONNADD	Search/Set MAC Address Default Connected
DISCONN	Disconnect Current Connection
ADP	Search/Set If Broadcast In This Pattern
ADPTM	Search/Set Broadcasting Speed
Characteristic Function	

BATEN	Use/Forbidden Power testing
MAXPUT	Use/Forbidden maximum output
TRENC	Use/Forbidden PCI Encrypted Transmission
IBEAON	Search/Set iBeacon Function

<TIPS>:

The command below both have two lines, the first line is the command need to send, the second line is the data received after send the command. Take 5.2.1 for example.

5.2.1. AT+NAME

Function: Inquiry/Set module's name

Format:

Inquiry present parameter:

Send: AT+ NAME?{CR}

Receive: {CR}{LF}+ NAME:name{CR}{LF}{CR}{LF}OK{CR}{LF}

Set:

Send: AT+NAME=name{CR}

Receive: {CR}{LF}OK{CR}{LF}

Parameter:

name: module's name

5.2.2. AT+MODE

Function: Inquiry/Set module's working mode

Format:

Inquiry present parameter:

AT+ MODE?{CR}

{CR}{LF}+ MODE:mode{CR}{LF}{CR}{LF}OK{CR}{LF}

Set:

AT+MODE=mode{CR}

{CR}{LF}OK{CR}{LF}

Parameter:

Mode: module's work mode

M: Master mode

S: Slave mode

B: Broadcast mode

5.2.3. AT+MAC

Function: Inquiry module's MAC address

Format:

Inquiry present parameter:

AT+MAC?{CR}

```
{CR}{LF}+MAC: mac {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameter:

mac: module's MAC address, such as FFFFFFFF

5.2.4. AT+CIVER

Function: Inquiry module's software version

Format:

Inquiry present parameter:

```
AT+CIVER?{CR}  
{CR}{LF}+VER:V1.0.0{CR}{LF}{CR}{LF}OK{CR}{LF}
```

5.2.5. AT+ TPL

Function: Inquiry/Set module's transmit power

Format:

Inquiry present parameter:

```
AT+TPL?{CR}  
{CR}{LF}+TPL:size{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ TPL =size{CR}  
{CR}{LF}OK{CR}{LF}
```

Parameter:

Size: module's transmit power

- 1: -18 dbm
- 2: -12 dbm
- 3: -6 dbm
- 4: -3 dbm
- 5: -2 dbm
- 6: -1 dbm
- 7: 0 dbm
- 8: 3 dbm

5.2.6. AT+ SHOW

Function: Inquiry module's basic information

Format:

Inquiry present parameter:

```
AT+SHOW{CR} or AT+ SHOW?{CR}  
{CR}{LF}+SHOW:{CR}{LF}NAME:name{CR}{LF}MODE:mode{CR}{LF}MAC:mac{CR}{LF}PASS :pa  
ss{CR}{LF}ADP:size{CR}{LF}ADPTM:time{CR}{LF}LINK:status{CR}{LF}Battery:num{CR}{CR}{LF}  
OK{CR}{LF}
```

Parameter:

name: module's name
mac: module's MAC address

pass: module's password
size: module's transmit power
time: module's broadcast speed
FAST: fast broadcast
SLOW: slow broadcast
status: module's connection status
ON: module connect successfully
OFF: module connect failure
num: battery level

5.2.7. AT+PASS

Function: Inquiry/Set module's password

Format:

Inquiry present parameter:

```
AT+ PASS?{CR}
{CR}{LF}+ PASS:password{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+PASS=password{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

password: module's six-number password

5.2.8. AT+PASSEN

Function: Inquiry/Set if enable connect verify. When the slave device enable connect verify, the Master device which is connected to this Slave need to send six-number password in ten seconds. Over time or password wrong will cause the connection break.

Format:

Inquiry present parameter:

```
AT+ PASSEN?{CR}
{CR}{LF}+ PASSEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ PASSEN =status{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

status: connect verify enable status
"on": enable
"off": disable

5.2.9. AT+ UART

Function: Inquiry/Set module's serial parameter

Format:

Inquiry present parameter:

```
AT+UART?{CR}
{CR}{LF}+UART: baud rate, data bit, pari, stop{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ UART = baudrate ,databit,pari,stop {CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

baud rate: module's serial baud rate, any value between 2400 and 115200

data bit: digit data, can be 5, 6, 7, 8, 9

pari: parity bit

0: no parity

1: odd parity

2: even parity

stop: stop bit

0: 1 stop bit

1: 1.5 stop bit

2: 2 stop bits

5.2.10. AT+UARTTM

Function: Inquiry/Set module's serial packet time

Format:

Inquiry present parameter:

```
AT+ UARTTM?{CR}
{CR}{LF}+ UARTTM:time{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ UARTTM =time{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

time: serial packet time is 0~300 ms.

5.2.11. AT+AUTOSLEEP

Function: Inquiry/Set module's auto sleep mode

Format:

Inquiry present parameter:

```
AT+ AUTOSLEEP?{CR}
{CR}{LF}+ AUTOSLEEP: status ,time{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ AUTOSLEEP =status,time{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

status: whether or not to open the auto sleep function

ON: open

OFF: close

time: auto sleep waiting time, it is this value*5 seconds

5.2.12. AT+ DEEPSLEEP

Function: Set module to get into Deepsleep mode

Format:

Set:

```
AT+DEEPSLEEP{CR}
{CR}{LF}+OK{CR}{LF}
```

5.2.13. AT+ HIBERNATE

Function: Set module's to get into Hibernate mode

Format:

Set:

```
AT+ HIBERNATE {CR}
{CR}{LF}+OK{CR}{LF}
```

5.2.14. AT+ HELLO

Function: Inquiry/Set module's start up welcome words

Format:

Inquiry present parameter:

```
AT+ HELLO?{CR}
{CR}{LF}+ HELLO: string {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ HELLO =string {CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

string: welcome words, less than 20 bytes.

5.2.15. AT+ ENTM

Function: Set exit AT command mode

Format:

Set:

```
AT+ENTM{CR}
{CR}{LF}+ENTM:OK{CR}{LF}
```

5.2.16. AT+ RELOAD

Function: to restore factory settings

Format:

Set present parameter:

```
AT+RELOAD
{CR}{LF}+RELOAD:OK{CR}{LF}{CR}{LF}OK{CR}{LF}
```

5.2.17. AT+Z

Function: to reboot the module

Format:

Set present parameter:

```
AT+Z{CR}
{CR}{LF}+RST:OK{CR}{LF}{CR}{LF}OK{CR}{LF}
```

5.2.18. AT+ LINK

Function: Inquiry module's connection status

Format:

Inquiry present parameter:

```
AT+ LINK?{CR}
{CR}{LF}+ LINK: status {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameter:

status: module's connection status
ON: connected
OFF: disconnected

5.2.19. AT+ SCAN

Function: search for the slaves around

Format:

Inquiry present parameter:

```
AT+SCAN{CR}
{CR}{LF}No:num Addr:mac Rssi:size {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameter:

num: slave's reference number
mac: slave's MAC address
size: slave's signal strength

5.2.20. AT+CONN

Function: build quick connection by searched reference number

Format:

Set present parameter:

```
AT+CONN=num{CR}
{CR}{LF}+CONN:num{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameter:

num: slave's reference number

5.2.21. AT+ CONNADD

Function: Inquiry/Set module's default connected MAC address when power on

Format:

Inquiry present parameter:

```
AT+ CONNADD?{CR}
{CR}{LF}+ CONNADD:mac{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+CONNADD=mac{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

mac: the MAC address module default connected

5.2.22. AT+ DISCONN

Function: set the module to break the current connection

Format:

Set:

```
AT+ DISCONN{CR}
{CR}{LF}OK{CR}{LF}
```

5.2.23. AT+ ADP

Function: Inquiry/Set if the module start to broadcast

Format:

Inquiry present parameter:

```
AT+ADP?{CR}
{CR}{LF}+ADP: status {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ ADP = status {CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

status:

ON: start broadcast

OFF: stop broadcast

5.2.24. AT+ ADPTM

Function: Inquiry/Set the module's broadcast speed

Format:

Inquiry present parameter:

```
AT+ ADPTM?{CR}
{CR}{LF}+ ADPTM:time{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ ADPTM =time{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

time: broadcast speed

FAST: fast broadcast
SLOW: slow broadcast

5.2.25. AT+ BATEN

Function: enable/stop state of change detection

Format:

Inquiry present parameter:

```
AT+ BATEN?{CR}
{CR}{LF}+ BATEN:status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ BATEN =status{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

status:

ON: enable this function

OFF: stop this function

5.2.26. AT+ MAXPUT

Function: enable/stop MAX output

Format:

Inquiry present parameter:

```
AT+ MAXPUT?{CR}
{CR}{LF}+ MAXPUT:status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ MAXPUT =status{CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

status

ON: enable this function

OFF: stop this function

5.2.27. AT+ TRENC

Function: Inquiry/Set data-transmission Encryption

Format:

Inquiry present parameter:

```
AT+ TRENC?{CR}
{CR}{LF}+ TRENC: status {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:


```
AT+ TRENC = status {CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

status: if open this function
ON: enable this function
OFF: stop this function

5.2.28. AT+ IBEACON

Function: Inquiry/Set iBeacon function

Format:

Inquiry present parameter:

```
AT+ IBEACON?{CR}
{CR}{LF}+ IBEACON:uuid, major, minor, rssi{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set:

```
AT+ IBEACON = uuid, major, minor, rssi {CR}
{CR}{LF}OK{CR}{LF}
```

Parameter:

uuid: iBeacon device identification code
major: major number
minor: minor number
rssi: the signal strength when the distance is one meter (can not be negative value)

6. Contact Us

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8. Update History

2016-4-21 V1.0 first version