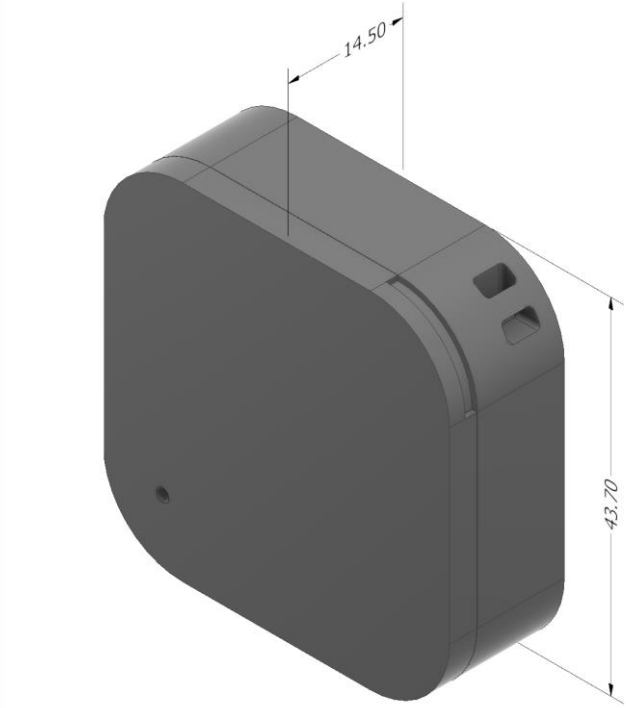
Meeblue

M52

MEEBLUE BEACON M52 WITH NONE SENSOR

BETTER SERVE YOUR BUSINESS

BRIEF DESCRIPTION



Features:

- Working in low-power mode
- In sleep mode at the factory to save more power.
- More convenient to activate the product by pressing button.
- 5 different broadcast data to choose from
- Broadcast iBeacon and Eddystone data simultaneously
- Broadcast two fully user-defined data simultaneously
- Broadcast intervals can be adjusted
- The transmit power can be adjusted
- OTA available
- Compatible with BLE.
- High performance and low power.
- Can get information such as battery voltage from broadcast data
- High performance and low power.
- Accurate digital RSSI. Excellent link budget (up to 97dB).
- Ultra wide range tx power: 4dBm—-40dBm.
- Built-in a coin battery (type: CR2450/CR2477).
- Trigger broadcast by Button
- All hardware interface completely open. Developers do not need to rely on the SDK for development. The requirement of hardware interface can be customized (achieved a certain number)
- Waterproof Level: IP68
- The coin battery can be replaced

Contents

Introduction

The M52 None Sensor is a high-performance product that integrates with the NRF52832/NRF52810 Bluetooth Low-Power Chip, which features higher sensitivity, lower power consumption and Bluetooth 5.0 protocol.

In the future you can reduce the components on this version to make the cost and keep performance. At present, this product is equipped with button, LED and button.

M52 is suitable for many occasions. For Beacon, it not only supports the current mainstream iBeacon and Eddystone protocols, but also supports our well-defined data format. It can easily manage the device while having Beacon function. Whether it is positioning or item management, personnel control, Geo-Location is a very good choice. At the same time, the CR2477 battery can be equipped with a very long life. Based on the default broadcast interval of 852.5ms, it can be used continuously for more than 5 years. At the same time, in order to meet the higher broadcast rate, the model can easily replace the battery while ensuring the waterproof rating of IP68. It also supports a three-color light that can be used to display status and other information.

The rich and versatile functions are only designed to serve your business. If our

products can not meet your needs, we also provide customers with customized firmware and hardware services. Looking forward to your choice, we will continue to improve ourselves to better serve you.

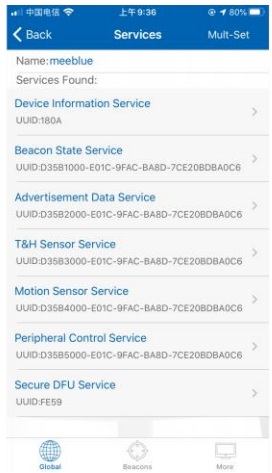
Active The Beacon

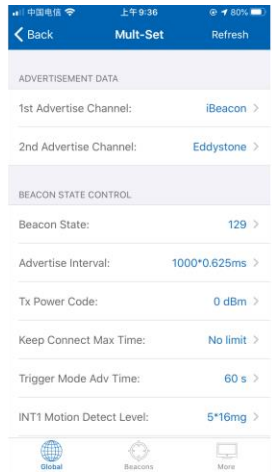
The beacon is in sleep mode by default setting. So when you get the beacon, yo u need to activate it.

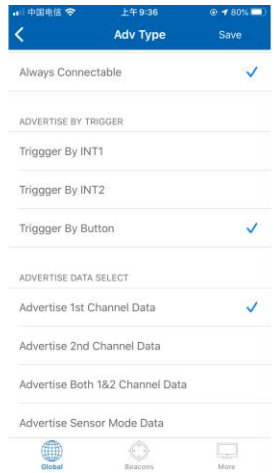
First please download our tool app CheckBlue from App Store or Google Play and go to the Global page. Then please take out Beacon, press and hold the button in the middle of the product, after long press button 1.5 seconds, you can see the LED start flashing. At this time, please hold Beacon close to the mobile phone, click on the displayed items to start to connect. It will pop up a box in during connection, prompt to enter the verification code, at this time, please enter the corresponding verification code of the product, then you can continue to connect. The default verification code is "meeble". After you enter verification code, it will jump to the Services page. On this page, you can see all the services owned by the device, and each service has a corresponding description. Click the Mult-Set button in the upper right corner to configure all the functions of Beacon accordingly.


CheckBlue
取消
CheckBlue
工具


Setting
Normal
Details
Sort:1
Rssi>-33
Scanning for BLE Peripherals...
meeblue
Connectable: true
RSSI: -32
Local name: --
Update time:09:35:55.923
Calculated broadcast interval: --
ID:765E0FB9-7187-921B-24CF-B5B4A3BB03A0


Back
Services
Mult-Set
Name:meeblue
Services Found:
Device Information Service
UUID:180A
Beacon State Service
UUID:D35B1000-E01C-9FAC-BA8D-7CE20BDBA0C6
Advertisement Data Service
UUID:D35B2000-E01C-9FAC-BA8D-7CE20BDBA0C6
T&H Sensor Service
UUID:D35B3000-E01C-9FAC-BA8D-7CE20BDBA0C6
Motion Sensor Service
UUID:D35B4000-E01C-9FAC-BA8D-7CE20BDBA0C6
Peripheral Control Service
UUID:D35B5000-E01C-9FAC-BA8D-7CE20BDBA0C6
Secure DFU Service
UUID:FE59


Back
Mult-Set
Refresh
ADVERTISEMENT DATA
1st Advertise Channel:
iBeacon
2nd Advertise Channel:
Eddystone
BEACON STATE CONTROL
Beacon State:
129
Advertise Interval:
1000*0.625ms
Tx Power Code:
0 dBm
Keep Connect Max Time:
No limit
Trigger Mode Adv Time:
60 s
INT1 Motion Detect Level:
5*16mg


Adv Type
Save
Always Connectable
ADVERTISE BY TRIGGER
Triggger By INT1
Triggger By INT2
Triggger By Button
ADVERTISE DATA SELECT
Advertise 1st Channel Data
Advertise 2nd Channel Data
Advertise Both 1&2 Channel Data
Advertise Sensor Mode Data

Default Setting

- Default State: Sleeping(Can be customized as activated and sleep automatically during transportation.)
- Default Authentication Code: meeble
- Broadcast Interval: 852.5 ms
- Tx Power: 4 dBm
- Device Name: meeblue

Advertisement Data

There are five kinds of advertisement data to choose from, including:

- 1st advertisement channel data
- 2nd advertisement channel data
- 1st & 2nd advertisement channel data
- Real-Time fixed advertisement data
- MEEBLUE defined custom beacon fixed data

1. The first channel and the second channel advertisement data can be completely defined by the user. This means that you can use these two channels to broadcast arbitrary data at the same time without any restrictions, such as broadcasting two

different iBeacon data at the same time, simultaneously broadcasting two different Eddystone data, or other arbitrary data.

2. When configuring advertisement data in sensor mode, the data of the first channel and the second channel will be disabled, and only the data in this mode will be broadcast. In this mode, the broadcast data includes: Beacon's fixed ID, temperature value, humidity value, and current battery voltage value, as well as time stamp of the countdown of the trigger mode.

3. When configuring MEEBLUE defined beacon fixed data, the data of the first channel and the second channel will be disabled, and only the data in this mode will be broadcast. In this mode, the broadcast data includes: Beacon's fixed ID, battery voltage value, and ten Bytes of custom data, we split these 10 bytes into 6 bytes + 2 bytes + 2 bytes mode. The first six bytes are MINI-UUID, the length is 6 bytes. The middle two bytes are Major value. The last two bytes are Minor value. And the broadcast data also contains the time stamp of the countdown of the trigger mode.

The default advertisement data of the first channel is iBeacon data

The iBeacon’s BLE raw data format is as follows, with a length of 30 bytes.

0x{01 06 1A FF 4C 00 02 15 D3 5B 76 E2 E0 1C 9F AC BA 8D 7C E2 0B DB A0 C6 00 01 00 01 CB}

In these 30 bytes 0x{D3 5B 76 E2 E0 1C 9F AC BA 8D 7C E2 0B DB A0 C6} is iBeacon

Proximity UUID

The immediately following 0x{00 01} is iBeacon Major value

The after 0x{00 01} is iBeacon Minor value

The last 0x{CB} is iBeacon Measured Power Value

The default advertisement data of the second channel is Eddystone-UID data

The raw data format is as follows.

0x{02 01 04 03 03 AA FE 15 16 AA FE 00 C5 D3 5B 76 E2 E0 1C 9F AC BA 8D 7C E2 0B DB A0 C6}

The part 0xC5 is Measured Power Value

The after 0x{D3 5B 76 E2 E0 1C 9F AC BA 8D} is Eddystone-UID's Namespace ID

The following 0x{7C E2 0B DB A0 C6} is Eddystone-UID's Instance ID.

The Real-Time mode fixed advertisement raw data format is as follows

{02 01 06 03 03 00 40 17 16 00 40 E4 BD 66 D9 7B 43 D8 0C D3 5B 76 E2 E0 1C 45 E0 1E 5E FF FF}

0x{02 01 06}: BLE Flag

0x{03 03 00 40}: Advertisement data service UUID 0x4000

0x{17 16 00 40 E4 BD 66 D9 7B 43 D8 0C D3 5B 76 E2 E0 1C 45 E0 1E 5E FF FF}: Advertisement data service data.

Details for service data: 0x{E4 BD 66 D9 7B 43 D8 0C D3 5B 76 E2 E0 1C 45 E0 1E 5E FF FF}

0x{E4 BD 66 D9 7B 43}: Device unique ID

0x{D8 0C}: Battery voltage

0x{D3 5B 76 E2 E0 1C}: Custom Beacon Mini UUID

0x{45 E0 1E 5E}: Real-Time stamp

0x{FF FF}: Trigger mode count down second. 0xFFFF means Trigger mode disabled

The Custom Beacon fixed raw data format is as follows

0x{02 01 06 03 03 00 30 17 16 00 30 E4 BD 66 D9 7B 43 C6 0C D3 5B 76 E2 E0 1C 00 01 00 01 FF FF}

0x{02 01 06}: BLE Flag

0x{03 03 00 30}: Advertisement data service UUID 0x3000

0x{17 16 00 30 E4 BD 66 D9 7B 43 C6 0C D3 5B 76 E2 E0 1C 00 01 00 01 FF FF}: Advertisement data service data.

Details for service data:0x{E4 BD 66 D9 7B 43 C6 0C D3 5B 76 E2 E0 1C 00 01 00 01 FF FF}

0x{E4 BD 66 D9 7B 43}:Device unique ID

0x{C6 0C}: Battery voltage

0x{D3 5B 76 E2 E0 1C}: Custom Beacon Mini UUID

0x{00 01}: Custom Beacon Major Value

0x{00 01}: Custom Beacon Minor Value

0x{FF FF}: Trigger mode count down second. 0xFFFF means Trigger mode disabled

Get Battery From Advertisement Data

Note: No matter in which data mode, connectable mode or non-connectable mode, the battery power, device name, and transmit power information will be broadcast automatically unless low_power_mode is enabled.

In Advertisement data, you will see a service data in with 0x5000, the length is 8 bytes or 2 bytes depending on the configuration of advertise_battery_type.

When the length is 8 bytes. The service value like 0x{D3 5B 76 E2 E0 1C C6 0C}

0x{D3 5B 76 E2 E0 1C}: Device unique ID

0x{C6 0C}: Battery voltage

When the length is 2 bytes. The service value like 0x{C6 0C}

0x{C6 0C}: Battery voltage

Calculate battery voltage

Battery_Voltage = 0x0C*256+0xC6 = 3270mv

Structure data analysis of Beacon State

```
typedef struct
{
    uint16_t Broadcast_Interval;
    uint16_t Trigger_Mode_Adv_Time;
    uint8_t     Advertise_Type;
    int8_t  Tx_Power;
    uint8_t Keep_Connect_Max_Time;
    uint8_t INT1_Motion_Strength;
    uint8_t INT2_Motion_Strength;
    uint8_t TH_Sensor_Save_Interval;
    uint8_t low_power_mode;
    uint8_t advertise_battery_type;
    uint8_t adv_ibeacon_in_sensor_mode;
    uint8_t default_advertise_data_type_in_sleep_mode;
    uint8_t Reserve[2];
    uint32_t current_time_stamp;
```

} Beacon_State_Data_t;

This structure contains the control of all the entire Beacon state, size 20 bytes. The following table shows the data of the entire structure diagram.

Name	Description	Unit	Range can be configured
Broadcast_Interval	Broadcast interval	0.625ms	160-16384
Trigger_Mode_Adv_Time	Length of time for broadcast after trigger mode trigger	100ms	5-65534
Advertise_Type	Refer to the detailed introduction below	--	--
Tx_Power	Transmit power	dBm	4,3,0,-4,-8,-12,-16,-20,-40
Keep_Connect_Max_Time	Maximum length of time allowed to connect after being connected	minute	0-255 0: Without limit
INT1_Motion_Strength	Motion Strength for INT1	16mg	Unavailable for this model
INT2_Motion_Strength	Motion Strength for INT2	16mg	Unavailable for this model
TH_Sensor_Save_Interval	The storage interval of temperature&humidity data	minute	Unavailable for this model
low_power_mode	Advertise 31 bytes only to save battery	--	0x00: Disable 0x01: Enable
advertise_battery_type	Choose battery advertise type	--	0x00: ID+Batt 0x01: Only Batt 0x00: None
adv_ibeacon_in_sensor_mode	Active application in background mode		Unavailable for this model
default_advertise_data_typ	Select advertisement data when activated		0x01: 1st Channel Data

e_in_sleep_mode	by key press from sleep mode		0x02: 2nd Channel Data 0x03: Both 1st&2nd Channel Data 0x04: Real-Time Data 0x05: Custom Beacon Data
Reserve	Reserve data for future use	--	--
current_time_stamp	Current time stamp, please note the time zone.	second	2020-01-03 11:45

Selection of Advertise Type

Advertise type is controlled by one byte. We call this Beacon State Main.

The following table is the information represented by each bit of this byte. When the value is 1, it means enabled, when the value is 0, it means disabled.

Connectable	Trigger by INT1	Trigger by INT2	Trigger by Button	Custom-Beacon data	Real-Time mode data	2nd channel data	1st channel data

The first four bits control the mode of Beacon broadcasting. When all trigger modes are Disabled, Beacon will continue to broadcast without interruption. The last four bits control the data content of the Beacon broadcast. Please kindly be noted that the data of the first channel and the second channel can coexist, but when Custom Beacon Data or Sensor mode data is enabled, only Custom Beacon data or only Sensor mode data will be broadcast, and Custom Beacon data has higher priority than Sensor mode data. You can also easily configure it directly through CheckBlue. The following is the

introduction of each bit

- Connectable: Whether connection is support
- [Unavailable for this model] Trigger by INT1: Trigger broadcast by INT1
- [Unavailable for this model] Trigger by INT2: Trigger broadcast by INT2
- Trigger by Button: Trigger broadcast by Button
- Custom Beacon data: Broadcast Custom Beacon fixed format data
- Real-Time mode data: Broadcast data in Sensor mode
- 2nd channel data: Broadcast the configuration data of the second channel
- 1st channel data: Broadcast the configuration data of the first channel

Services Introduction

The Base UUID of MEEBLUE Beacon is D35B0000-E01C-9FAC-BA8D-7CE20BDBA0C6, all UUID is a 128bit representation. When we say that the UUID is 0x1000, the actual UUID is D35B1000-E01C-9FAC-BA8D-7CE20BDBA0C6

This point will not be described later.

Service 0x1000

Characteristic	Property	Value Length	Function
0x1001	Read/Write/N	7 Bytes	Authentication Control

	otify		
0x1002	Read/Write	10 Bytes	Beacon State Control
0x1003	Read/Write	20 Bytes	Device Name Change

Note: The value needs to be input the port should be converted to hexadecimal ASCII characters. For example, the corresponding hexadecimal ASCII for meeblue is{0x6d,0x65,0x65,0x62,0x6c,0x75,0x65}, then the value should be input is 0x6d6565626c7565.

Service 0x2000

Characteristic	Property	Value Length	Function
0x2001	Read/Write	20 Bytes	The begin 20 bytes of 1st channel
0x2002	Read/Write	12 Bytes	The end 12 bytes of 1st channel
0x2003	Read/Write	20 Bytes	The begin 20 bytes of 2nd channel
0x2004	Read/Write	12 Bytes	The end 12 bytes of 2nd channel
0x2005	Read/Write	10 Bytes	Custom Beacon UUID+Major+Minor

Note: The first byte of characteristic 0x2001 and 0x2003 is Effective length of the entire data.

Service 0x5000

Characteristic	Property	Value Length	Function
0x5001	Write	1 Byte	Light LED
0x5002	Read/Notify	1 Byte	Button Detect, 0x01: Single click, 0x02:Long press
0x5003	Read/Write	2 Bytes	Battery voltage information

Notes: When write value 0x01 to characteristic 0x5001, The LED will flash.

Electronic Parameters

Name	Details	Description
Chip model	nRF52832/NRF52810	Nordic Semiconductor 512K(NRF52832)
Battery model	CR2450/CR2477	Coin battery, 3.0Vdc, 1pc
Operation Voltage	1.7-3.6V	DC
Max temperature (°C)	+85	--
Operation Frequency	2400-2483.5MHz	Programmable
Frequency Error	+/- 20KHz	--
Modulation	Q-QPSK	--
Radio current consumption with DC/DC at 3V	5.3 mA – TX at 0 dBm	7.5 mA – TX at +4 dBm
Sleep current	2.3 uA	without any sensor
Output Power	+4 to -20 dBm in 4 dB steps	Programmable
Receiving Sensitivity	-93dBm	High gain mode
Transmission distance	70meters	BER<0.1%, Open space
Antenna	50ohm	Onboard
Size	43.7 x 43.7 x 14.5mm	Based on CR2477 battery
Waterproof level	IP68	Soaked in water at a depth of 1.5 meters for more than one hour

Revision history

Date	Revision	Changes
2020-01-08	1.0.1	First release
2020-01-15	1.0.2	Fix information errors
2020-04-07	1.1.0	Fix some errors, and add battery Description

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.