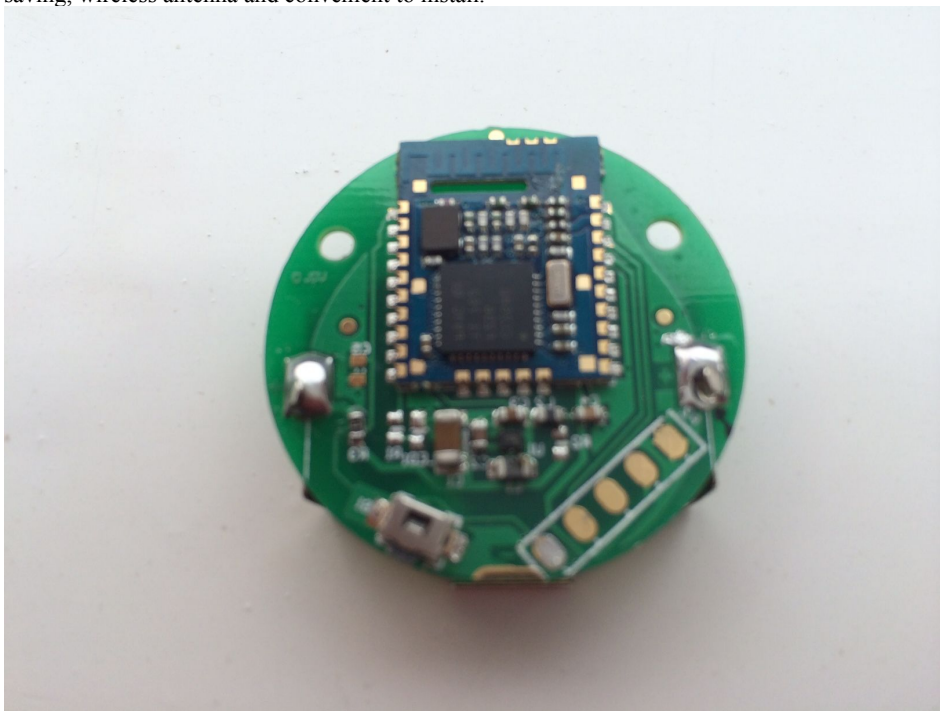# AprilBeacon

Introdution

The AprilBeacon is developed and produced including hardware and firmware all provide by AprilBrother LLC. It is built‐in a CR2450 battery holder. It can work as a standalone system， based on CC2540 BLE 4.0 module，power saving, wireless antenna and convenient to install.

Guide	Parameters
Item	AprilBeacon
Model	202
Operation Voltage	3V DC
Operation Current	4mA
Emission Current	18.6mA （3V supply）
Working temp	-20 － 50 ℃

FCC ID:2ACAL-AB202

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.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could

void the user's authority to operate this equipment.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.

Specifications

* Built‑in iBeacon firmware
* Built‑in a CR2450 battery holder
* Bluetooth Low Energy technology compatible
* Excellent link budget (up to 97dB)
* Suitable for long distance applications
* Accurate digital RSSI
* Compatible with CE and FCC regulation
* High performance and low power 8051 core MCU
* AES security coprocessor

iBeacon Descriptions

* Application for advertisement and location
* Built‑in pairing password to prevent others to modify the settings
* Support customize your own iBeacon configuration including UUID etc.
* Tx Power configurable
* Advertising frequecy configurable
* Support upgrade firmware through OAD (air upgrade)
 ‑ Built‑in JTAG port for customized other application firmware as a standalone system

Default Settings

* Name of iBeacon: BlueBeacon
* ProximityUUID: E2C56DB5-DFFB-48D2-B060-D0F5A71096E0
* Major and Minor: 0, 0 (Only allowed numeric)
* Measured power: -59 (Numeric only)
* Pairing passowrd: 19566 (Numeric only)

Electronic Parameters

Item	Value	Remarks
Firmware	iBeacon	Version 1.3.1
Battery model	CR2450	Coin battery, 3.0Vdc, 1pc
Operation Voltage	2.0-3.6V	DC
Operation Frequency	2400-2483.5MHz	Programmable
Frequency Error	+/- 20KHz	

Modulation|Q-QPSK|
Standby current|100uA|Depends on duty cycle / broadcasting frequency
Broadcasting Frequency|900mS|Duty cycle
Output Power|0 dBm|Default setting, programmable
Receiving Sensitivity|-93dBm|High gain mode
Transmission distance|30 meters|BER<0.1%, Open space
Antenna|50ohm|On board / PCB Antenna
Size|26mm x 34.82mm x 9mm|

Battery Assembly

__Please note that the polarity of the coin battery.__

FAQ

How to change and modify the parameters

A special app source code for developer using. It's provided by AprilBrother LLC.

* Compile the special APP source code to your iOS device
* Connect to the BlueBeacon module, and then modify the parameters by compiled APP
- Reset the iBeacon module
- Please see image below.
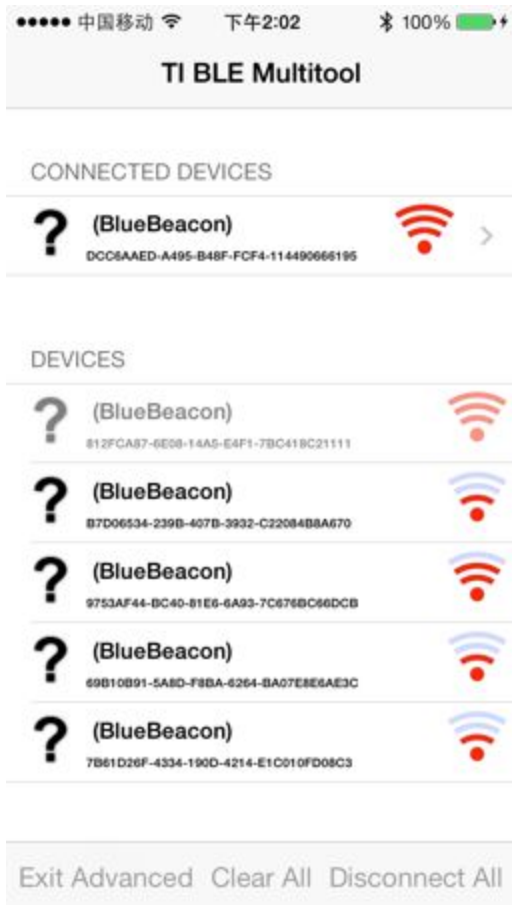
The following parameters / services are integrated into the service OxFFF0, please see the below table 1. Please be sure of that all of values have been changed to HEX before input.

Characteritics	Function	Value Range	Remark
FFF1	read/write proximityUUId	128 bit	hex
FFF2	read/write major number	0~65535	hex
FFF3	read/write minor number	0~65535	hex
FFF4	read/write measured power	-1~-255	location accuracy adjust, hex
FFF5	read/write tx power	0~3	tx power level
FFF6	change pair password	0~999999	pair passcode

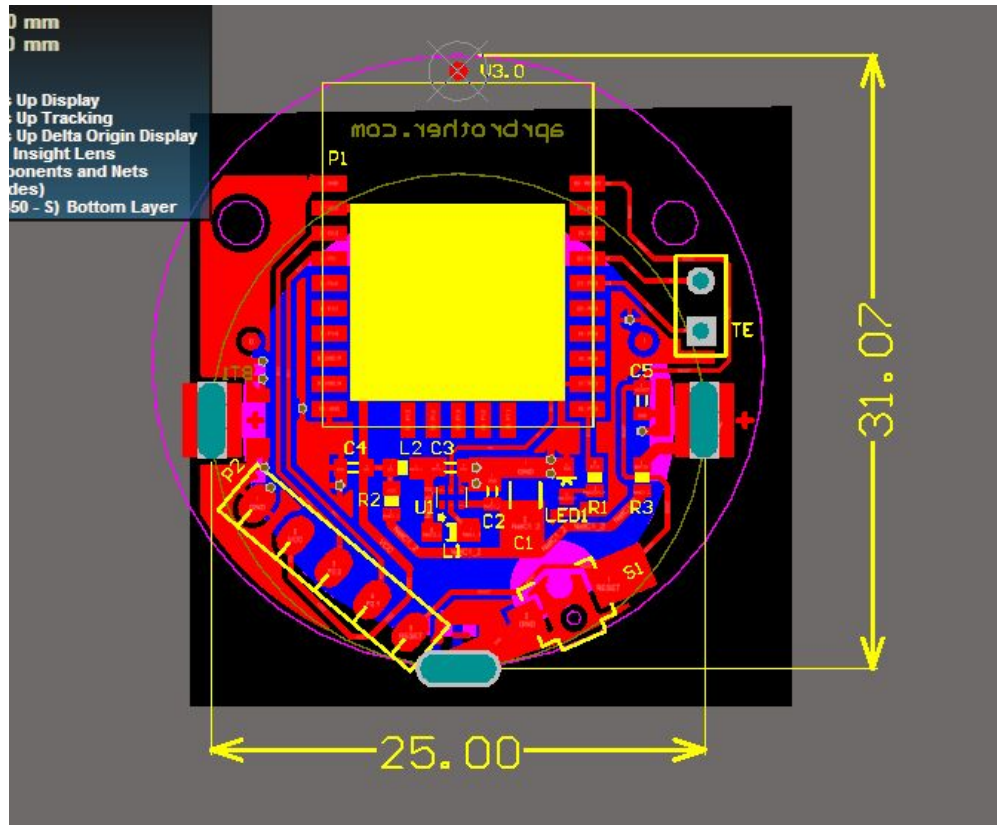Regarding to the setting of tx power, please see the table below.

Tx Power Level | Value |
---- | ---- | ----
0 | 0dBm
1 | +4dBm
2 | -6dBm
3|-23dBm

How to generate a valid UUID by customer

Please run the OSX command ```uuidgen``` to generate it.

How to connect JTAG pins

The P2 pins is JTAG ready. From left to right: GND, VCC, P2.2, P2.1, REST. Please see the image below.

How to upgrade the firmware through Air (Bluetooth)

The iBeacon module has built‑in OTA (over‑the‑air) service for upgrading.
The customers can upgrade the latest firmware via the tool of OTA.
The OTA tool is Multitool provided by TI, please download it from Apple store.

Here is an example for how to uploading the firmware to iBeacon by A.

1. Download app Multitool.
1. Open iTunes at your PC and connect your iPhone with usb cable.
1. Click the iPhone in iTunes - Click Application tab - Make the page down, find the "File Sharing" - Choose Multitool
1. Drag the firmware file to Multitool's Documents area
1. Open Multitool in iPhone，follow these step to upgrade.
2. Found the iBeacons module and tap it
1. Click "Update FW" at bottom right

2. Select "safe mode", then tap "Select FW File"

![9](oad_9.png)
![10](oad_10.png)
![11](oad_11.png)

9. Click Shared files
10. Click the bin file to upgrade. Please keep the iPhone awake.

![12](oad_12.png)
![13](oad_13.png)

Remarks:
- The current version of specification is V1.0, and the modified date is March 3, 2014.
- The latest firmware name is iBeacons‑1.3.1‑imgB.bin .

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

Correct Disposal of this product. This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.