Grove - BLE

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Version： 1.0

Wiki: http://www.seeedstudio.com/depot/Grove-EMG-Detector-p-1737.html

Bazaar: http://www.seeedstudio.com/wiki/Grove_-_EMG_Detector

Document Revision History

Revision	Date	Author	Description
1.0	Sep 21, 2015	Victor.He	Create file

Contents

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Under the supervision of Seeed Technology Inc., this manual has been compiled and published which covered the latest product description and specification. The content of this manual is subject to change without notice.

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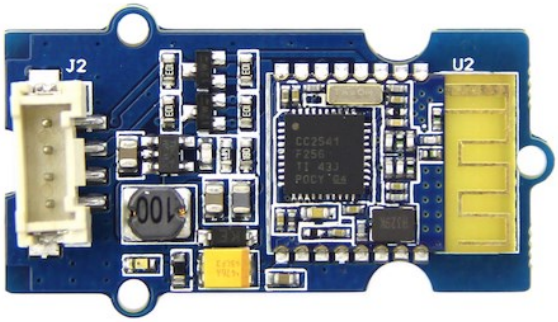
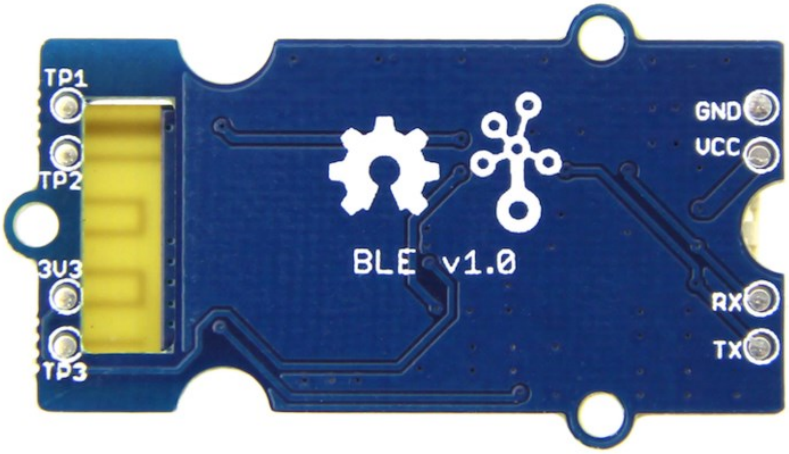
1. Introduction

Grove - BLE v1 (Grove - Bluetooth Low Energy v1) uses a Low Energy Bluetooth module -- HM-11, based on TI CC2540 chip, which has AT command support. As a Grove product it's convenient to use Grove - BLE with Arduino board via Base Shield.





2. Specification

Specifications	Name
BT Version	Bluetooth Specification V4.0 BLE
Working frequency	2.4GHz ISM band
Modulation method	GFSK(Gaussian Frequency Shift Keying)
RF Power	-23dbm, -6dbm, 0dbm, 6dbm, can modify through AT Command AT+POWE
Speed	Asynchronous: 6K Bytes, Synchronous: 6K Bytes
Sensitivity	≤-84dBm at 0.1% BER
Security	Authentication and encryption
Service	Central & Peripheral UUID FFE0,FFE1
Supply Power	3.3v - 5v
Working temperature	–5 ~ +65 Centigrade
Size	20cm x 10cm
Working Current	< 10 mA
Sourcing Current	< 20 mA
Sleeping Current	< 1 mA

Attention: The supply power of HM-11 is 3.3v, but the Grove - BLE is 3.3v to 5v

3. Detailed description

3.1 Pinout

Grove connector has four wires: GND, VCC, RX, and TX.

3.2 Features of Design

We have used TD6810 chip as the voltage regulator, so the range of the supply power can be 3.3v to 5v. Also, there's a level shift circuit which make sure the accuracy of data transmission.

3.3 AT Commands

1）Query module address

Send： AT+ADDR?

Receive：OK+LADD: address

2） Query baud rate

Send：AT+BAUD?

Receive：OK+Get:[para1]

Range ：0~8 ; 0--9600，1--19200，2--38400，3--57600，4--115200，5--4800，6--2400，7--1200，8--230400。Default: 0--9600.

Set baud rate

Send：AT+BAUD[para1]

Receive：OK+Set:[para1]

e.g. ：Send ：AT+BAUD1 ，Receive：OK+Set:1. The Baud rate has been set to 19200。

Note: If setup to Value 7, After next power on, module will not support any AT Commands, until PIO0 is pressed, Module will change Baud to 9600.

3） Try connect an address

Send：AT+CON[para1]

Receive：OK+CONN[para2]

Range ：A,E,F

e.g. ：Try to connect an device which MAC address is 00:17:EA:09:09:09

Send: AT+CON0017EA090909

May receive a reply: OK+CONNA --> Accept request, connecting ; OK+CONNE --> Connect error ; OK+CONN --> Connected , if AT+NOTI1 is setup ; OK+CONNF --> Connect Failed , After 10 seconds

Notice: Only central role is used. If remote device has already connected to other device or shut down, “OK+CONNF” will received after about 10 Seconds.

4） Clear Last Connected device address

Send：AT+CLEAR

Receive：OK+CLEAR

5） Query Module Work Mode

Send：AT+MODE?

Receive：OK+Get:[para]

Range：0~2. 0: Transmission Mode; 1: PIO collection Mode + Mode 0 ; 2: Remote Control Mode + Mode 0 . Default 0.

Set Module Work Mode

Send：AT+MODE[]

Receive：OK+Set:[para]

6） Query Module name

Send：AT+NAME?

Receive：OK+NAME[para1]

Set Module name

Send：AT+NAME[para1]

Receive：OK+Set:[para1]

e.g. ：Send: AT+NAMESeeed ， Receive : OK+Set:Seeed

Notice: Name would change after next power on.

7） Query Pin Code

Send：AT+PASS?

Receive：OK+PASS:[para1]

Range : 000000~999999. Default: 000000.

Set Pin Code

Send: AT+PASS[para1]

Receive：OK+Set:[para1]

8） Restore all setup value to factory setup

Send：AT+RENEW

Receive：OK+RENEW

9） Restart module

Send：AT+RESET

Receive：OK+RESET

10）Query Master and Slaver Role

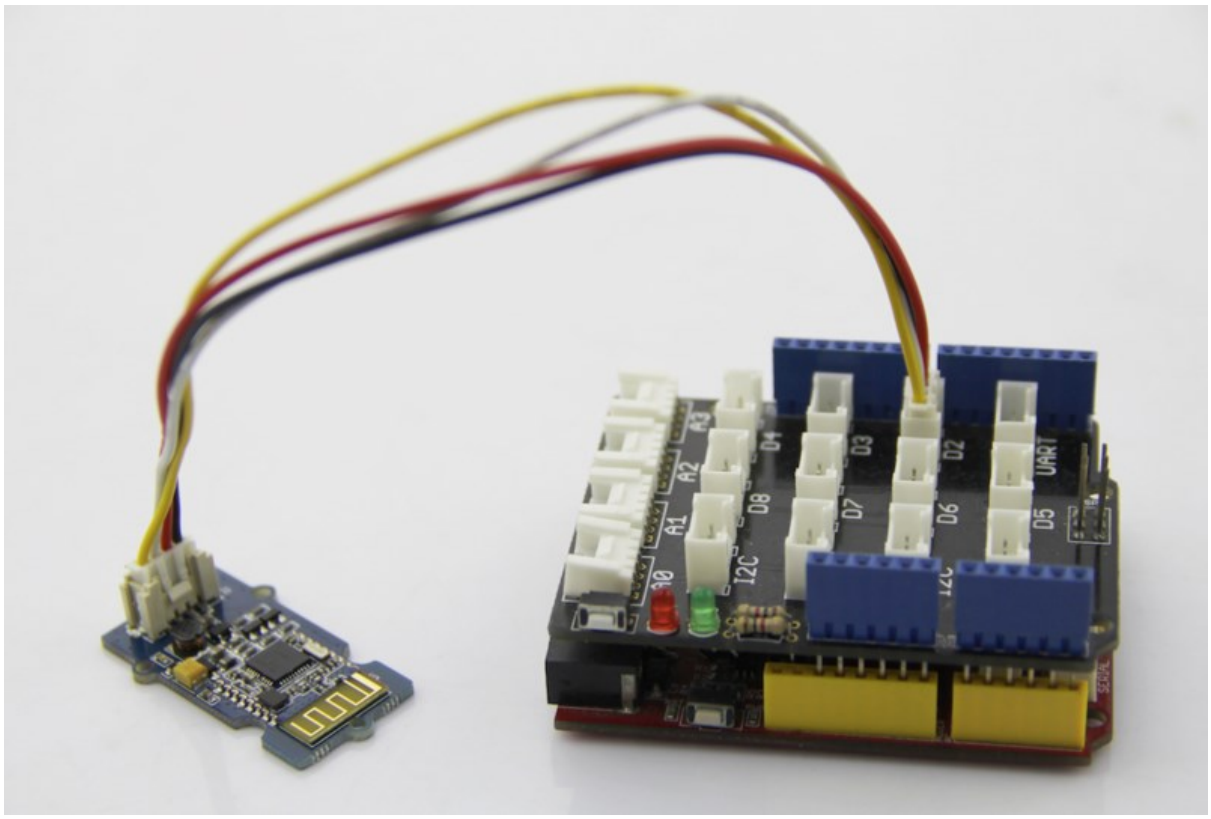
Send：AT+ROLE[para1]

Receive：OK+Set:[para1]

Range : 0~1。0--Peripheral: 1--Central: Default: 0.

More AT commands please refer to the Date sheet of BLE module.

4. SoftwareSerial Communication



Grove - BLE can be acted as a master or slave, you can use the one via different demos.**If you are going to use the following SoftwareSerial program, please refer to the way of connection in the previous pic. TX-->D2, RX-->D3.**

Open Arduino IDE, copy the following program and upload it onto the Arduino/Seeeduino board. And then two BLE modules can communicate with each other.

4.1 Demo: BLE Slave

```
#include <SoftwareSerial.h>   //Software Serial Port
#define RxD 2
#define TxD 3

#define DEBUG_ENABLED  1

SoftwareSerial BLE(RxD,TxD);

void setup()
{
    Serial.begin(9600);
    pinMode(RxD, INPUT);
```

```
    pinMode(TxD, OUTPUT);
    setupBleConnection();

}

void loop()
{
    char recvChar;
    while(1){
        if(BLE.available()){//check if there's any data sent from the
remote BLE
            recvChar = BLE.read();
            Serial.print(recvChar);
        }
        if(Serial.available()){//check if there's any data sent from the
local serial terminal, you can add the other applications here
            recvChar  = Serial.read();
            BLE.print(recvChar);
        }
    }
}

void setupBleConnection()
{
    BLE.begin(9600); //Set BLE BaudRate to default baud rate 9600
    BLE.print("AT+CLEAR"); //clear all previous setting
    BLE.print("AT+ROLE0"); //set the bluetooth name as a slaver
    BLE.print("AT+SAVE1");  //don't save the connect information
}
```

4.2 Demo : BLE Master

```
#include <SoftwareSerial.h>   //Software Serial Port
#define RxD 2
#define TxD 3

#define DEBUG_ENABLED  1

SoftwareSerial BLE(RxD,TxD);

void setup()
{
    Serial.begin(9600);
```

```
    pinMode(RxD, INPUT);
    pinMode(TxD, OUTPUT);
    setupBleConnection();

}

void loop()
{
    char recvChar;
    while(1){
        if(BLE.available()){//check if there's any data sent from the
remote BLE
            recvChar = BLE.read();
            Serial.print(recvChar);
        }
        if(Serial.available()){//check if there's any data sent from the
local serial terminal, you can add the other applications here
            recvChar  = Serial.read();
            BLE.print(recvChar);
        }
    }
}

void setupBleConnection()
{
    BLE.begin(9600); //Set BLE BaudRate to default baud rate 9600
    BLE.print("AT+CLEAR"); //clear all previous setting
    BLE.print("AT+ROLE1"); //set the bluetooth name as a master
    BLE.print("AT+SAVE1");  //don't save the connect information
}
```

5. Resources

BLE_apk_for_Android

DataSheet of BLE module

Schematic

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9