Bluetooth with iOS and Blend Micro

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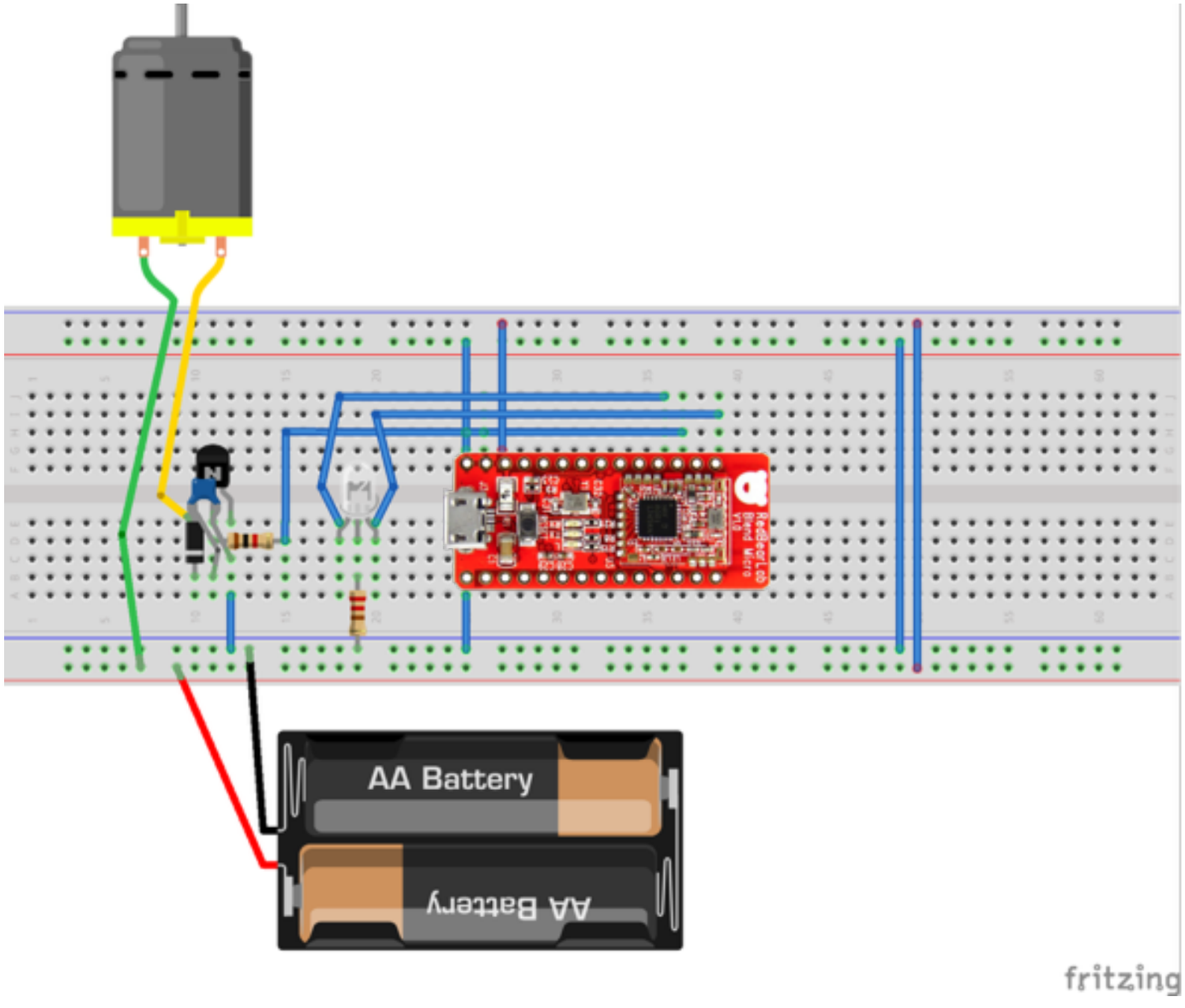
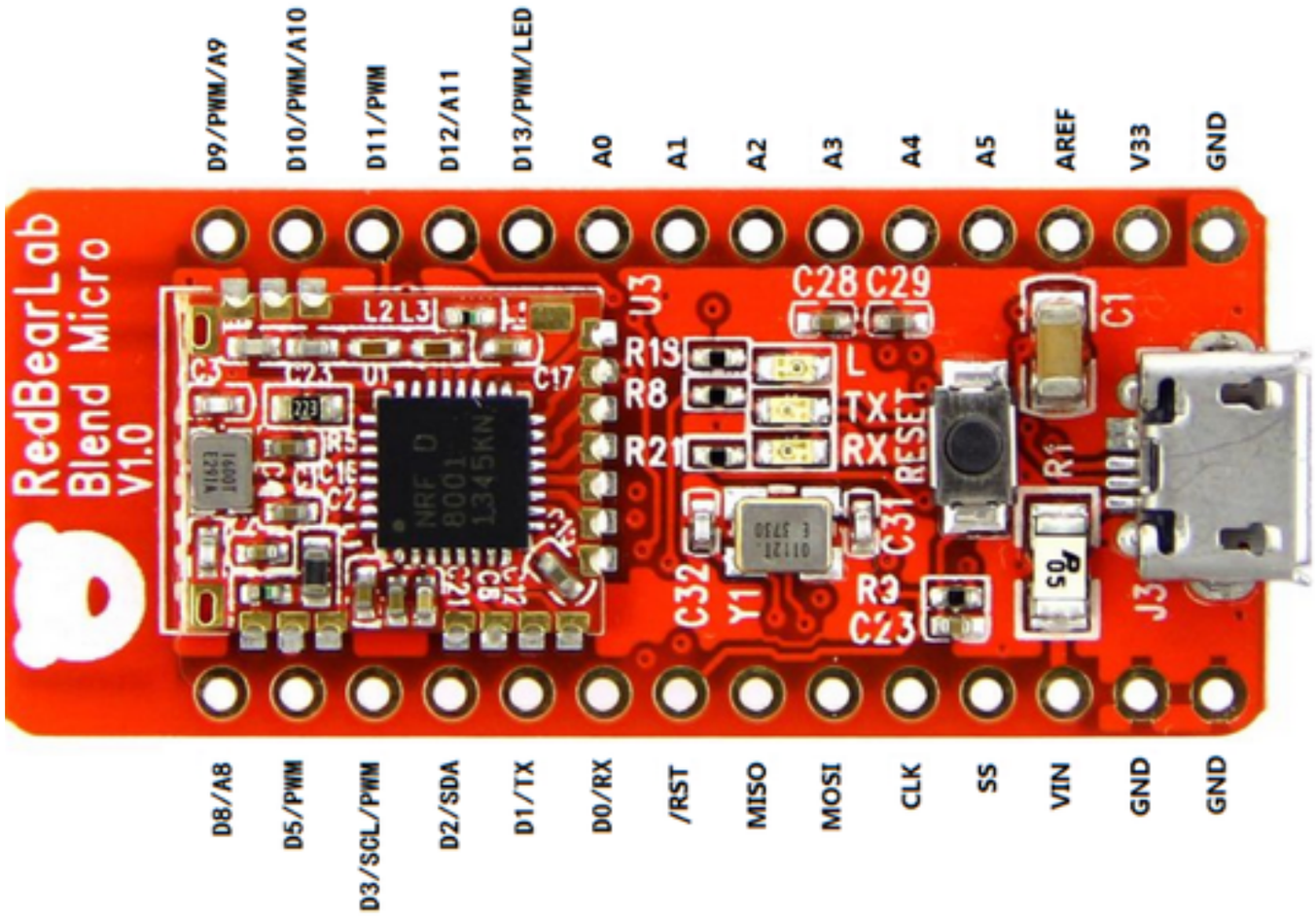
Robot Demo

Simple Project Demo

Schematic



Blend Micro

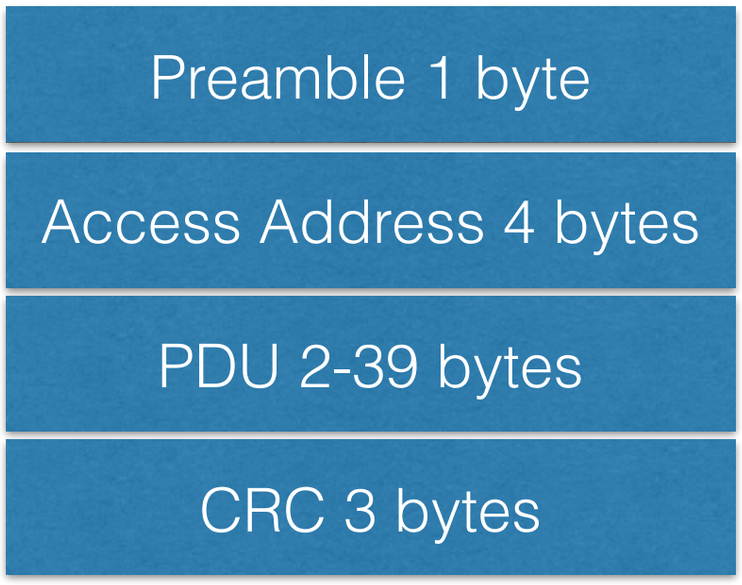


I order from RedBear Labs and it takes about 2 weeks from China via Hong Kong Post

nRF8001, 3.3v, 17 io Pins

Bluetooth Packets

Advertising Packets on Channel 37, 38, 39



There are 2 types of packets, Data and Advertising, each with variable lengths. BLE Data packets consist of an 8bit preamble, 32bit access codes that are defined by the RF channel used, a variable PDU ranging from 2-39bytes and a 24bit CRC. This means the shortest packet can be as small as 80bits or as long as 376bits. It also means a transmission time can range of 80microseconds to 0.3milliseconds. Advertise packets on the other hand, have PDU containing a 16bit header and up to 31bytes of data.

http://j2abro.blogspot.com/2014/06/understanding-bluetooth-advertising.html
http://home.eng.iastate.edu/~gamari/CprE537_S13/project%20reports/Bluetooth%20LE.pdf
http://www.warski.org/blog/2014/01/how-ibeacons-work/

BLE Services

Peripheral

Service

713d0000-503e-4c75-ba94-3148f18d941e

Readable
Writable
Notify
Encrypted

RX UUID Characteristic (notify)

713d0002-503e-4c75-ba94-3148f18d941e

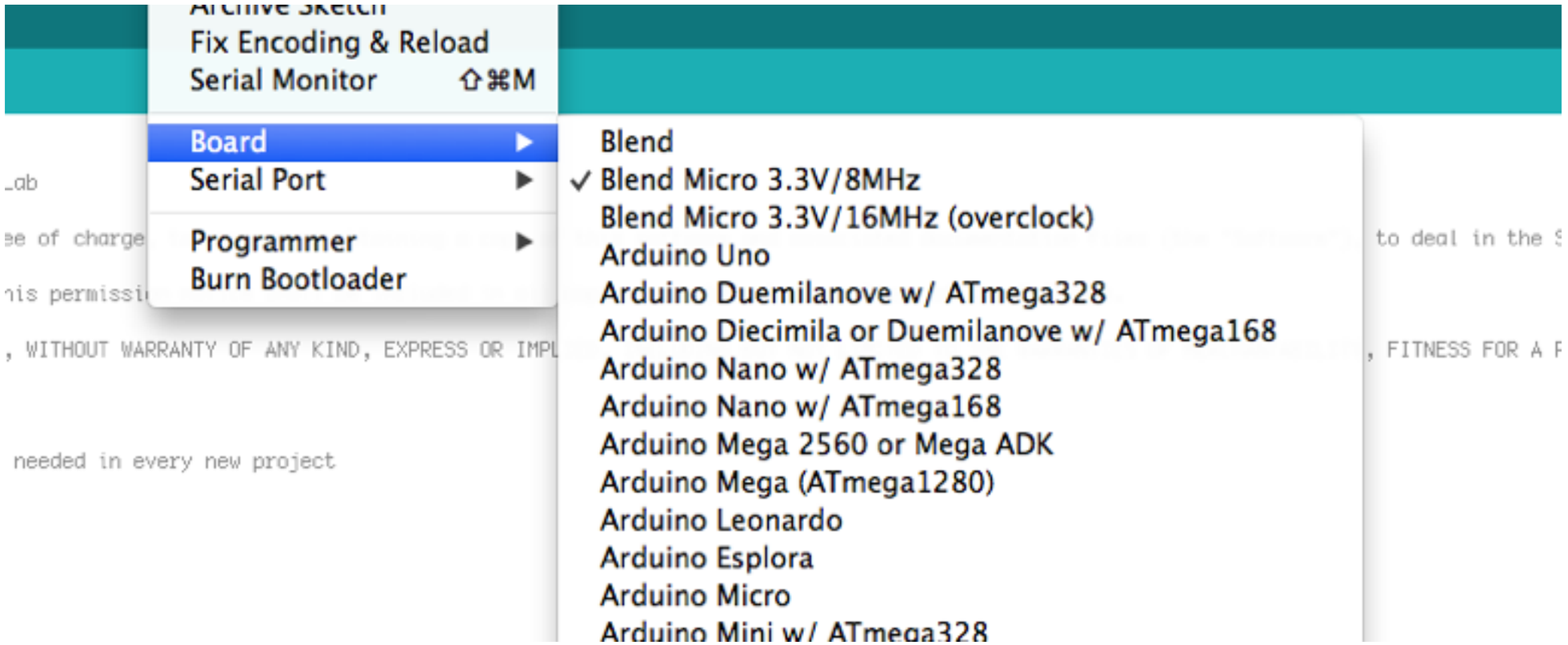
TX UUID Characteristic (write no response)

713d0003-503e-4c75-ba94-3148f18d941e

GUIDs for RedBear Blend Micro

Arduino IDE Setup

It worked first time for me



Eight steps in instructions, follow them carefully

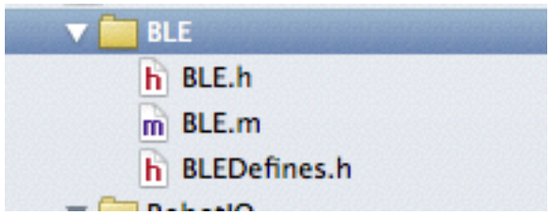
http://redbearlab.com/getting-started-blendmicro/

BLE Arduino Sketch

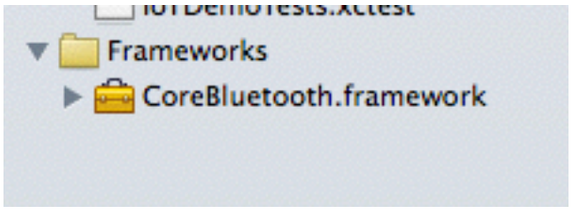
Over to Arduino IDE

Source Code in C

XCode



Two headers and one source file



CoreBluetooth Framework

Easy setup

Objective-C

Read/Write

`respondToRequest:withResult:`

Notification

`updateValue:forCharacteristic:onSubscribedCentrals:`

Peripheral Code (CBPeripheralManager)

Objective-C

Read

```
readValueForCharacteristic:
```

Write

```
writeValue:forCharacteristic:type
```

Subscribe

```
setNotifyValue:forCharacteristic:
(CBPeripheralDelegate)
peripheral:didUpdateValueForCharacteristic:error:
```

Central Code (CBPeripheral)

BLE Objective-C Code

Over to Xcode

Parts

Item Name	Approximate Price	Source
Blend Micro	$35.00	Red Bear Labs
GM-9 Motor	$8.50	Solarbotics
KSP13TA NPN Transistor	$0.25	Mouser
SPR-39MVWF Dual State LED	$0.65	Mouser
QRD-1115 Optical Switch Reflective	$1.50	Mouser

GUIDs for RedBear Blend Micro

Computer Vision with Javascript

Computer Vision with Javascript

```
findRedObject();

function findRedObject(){
  var currentImage=document.getElementById("image_0");
  var driverCanvas=document.getElementById("driverCanvas");
  driverCanvas.width = currentImage.width;
  driverCanvas.height = currentImage.height;
  var context = driverCanvas.getContext("2d")

  context.drawImage(currentImage, 0, 0, currentImage.width, currentImage.height);

  var imgData=context.getImageData(0,0,driverCanvas.width,driverCanvas.height);

  var redPixels = 0;
  var totalPixels = 0;

  for (var i=0;i<imgData.data.length;i+=4){
    var red = imgData.data[i];
    var green = imgData.data[i+1];
    var blue = imgData.data[i+2]
    if((red>green*2)&&(red>blue*2)&&(red>100)){
      redPixels++;
    }
    totalPixels++;
  }

//function getUrlContents(“go=15_15”);
```

Other Suppliers

Mouser: http://www.mouser.com (components)
Sparkfun: http://sparkfun.com (components)
RedBear Labs: http://redbearlab.com (BLE board)
SmoothOn: http://smooth-on.com (molding supplies)
MakerBot: http://www.makerbot.com (3D Printing)
OSH Park: http://oshpark.com (PCBs)

Links

- Getting you Arduino IDE setup: http://redbearlab.com/getting-started-blendmicro/

- RedBear Labs example Objective-C code: https://github.com/RedBearLab/iOS

- EyesBot Blog: http://eyesbot.com/blog