

RFID READER / MOBILE PHONE INTEGRATION VIA BT

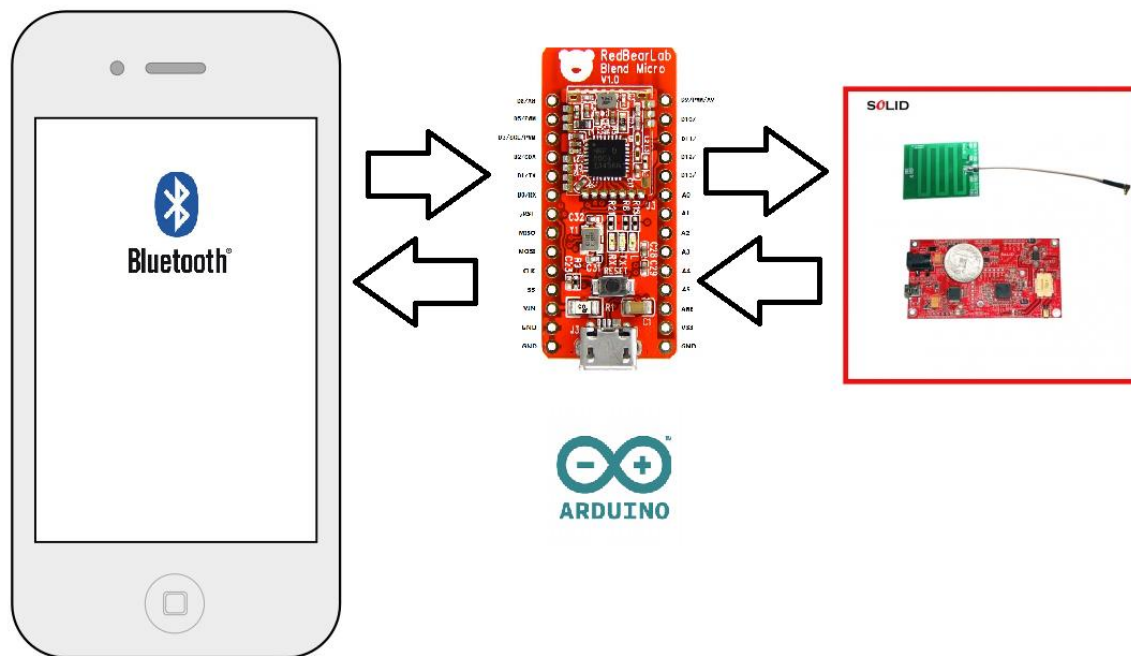


Figure1 – Design Abstract

Introduction

Using a mobile device attachment to scan an RFID tag is the area that I am currently focusing on. The idea is to use a Bluetooth V4.0 (BLE) enabled Arduino to extract RFID data from an AS3992 RFID reader via UART serial port and pass that data to an iOS enabled device via Bluetooth.

Objective

This Application note aims to provide a step-by-step walkthrough to make the RFID reader communicate with the iPhone. It provides code that was used in the project, as well as different connections and configurations implemented in the project to transfer the unique code ID from the RFID reader to the mobile device via Arduino's Bluetooth.

Parts

1. UART Version RFID Scanner



Cottonwood distance reader has many advantages such as: compatibility with different protocols, high reading speed multi-tags reading, linearly polarized antenna, waterproof appearance designing and etc. It can be widely used in RFID systems, and is very friendly to further development based on it.

This RFID reader is configured to use UART to transmit data, which means that it uses 3 pins

Rx ← Receive bits

Tx → Transmit bits

GND – Ground

These three bits will be connected to the Arduino we are using as the following

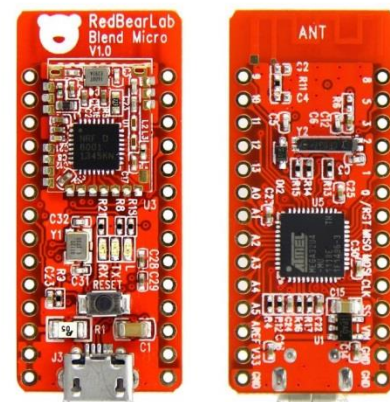
Arduino Side		RFID Scanner
Rx	←	Tx
Tx	→	Rx
GND	-----	GND

This configuration will allow us to transfer Scan orders to the RFID reader and get Data back.

2. Blend Micro Bluetooth Arduino

This Arduino uses the Atmega32U4 Arduino chip and nRF8001 BT chip. This device comes with its own BT libraries and iOS app that can be customized to customer needs.

It is a 3.3v, 8 MHz processor that can be overclocked to operate at 16 MHz. this will be very necessary to make the Arduino compatible with the RFID reader .



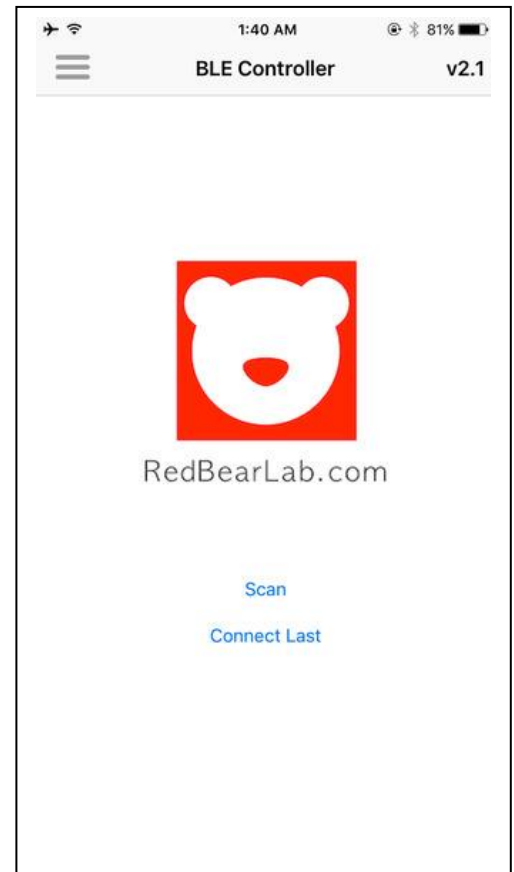
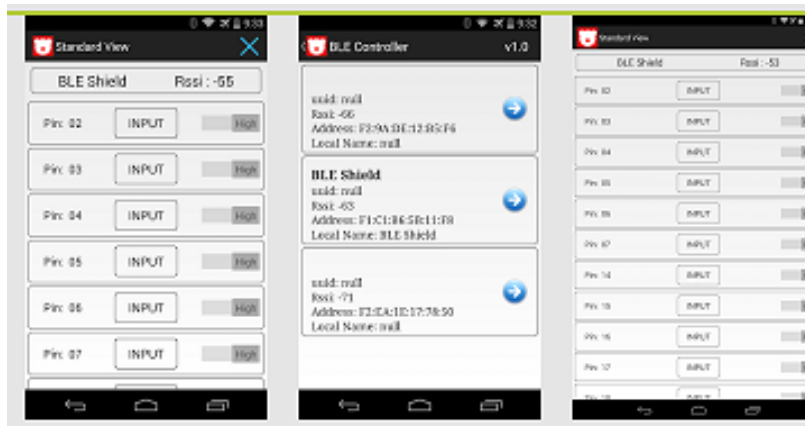
Overclocking

According to the Atmega32U4 specification, this MCU can run at 8 MHz/3.3V or 16MHz/5V. The Blend Micro have been designed to run at 3.3V only in order to reduce level shifting components and make it as small as possible; it is because the nRF8001 chip only accepts 3.3V. The onboard LDO converts 5V from the USB power source into 3.3V for the board.

3. Mobile device App

This App is developed by the RedBearLab and it is designed specifically to communicate with the Arduino shown above.

The App can send and receive messages from the Bluetooth Arduino and show them on the mobile device.



Configurations

1. The RFID Reader.

The RFID reader needs to be flashed using the USB debugger shown below (Silabs Compatible USB Debug Adapter) and the software that comes with it.

The goal for the firmware change is to slow the RFID reader down so it can communicate with the Arduino.

The initial Buad rate is 115200 bps and the desired Buad rate is 9600 bps. This will enable the overclocked Arduino to keep up with the reader.

The hex files are provided by the RFID manufacturer, and the instructions can be found here:

<http://learn.linksprite.com/rfid/how-to-program-the-rfid-reader/>

