Project Description

Wireless Power Bank
A wireless power bank charges your phone without an input cord, just like a wireless charger. A wireless power bank is embedded with charging coils to produce energy and a battery to store power. It's more like a portable wireless charger on the go.

Essentially a wireless charger has a coil that it uses to transfer energy from the charging pad to the item being charged. Energy is transferred inductively, and this eliminates the need for the use of connectors, improving reliability as connectors are always susceptible to damage, even though major strides forward have been made for the connectors used for items like smartphones.

We have used a 3.7V 2000mAh battery to wirelessly power a phone and have displayed the battery level using a Arduino Nano. The battery is converted into a charger using a 5V Step-up Charging BMS.

Components Used

Arduino Nano
Arduino Nano is a small and compact microcontroller board that is designed based on the Atmel ATmega328P microcontroller. It is a popular board among the Arduino family due to its small size, low cost, and ease of use. It is often used in various DIY projects, robotics, and electronic applications.

The Arduino Nano board features 14 digital input/output pins, 8 analog inputs, and a 16 MHz quartz crystal oscillator. It also has a mini-USB port for programming and serial communication, and a power jack for external power supply.

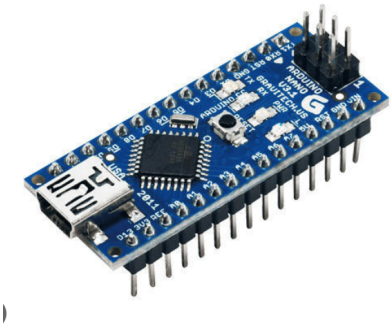

Figure 1: Arduino Nano

3.7V 2000mAh Li-ion Rechargeable Battery
A 3.7V 2000mAh battery is a type of lithium-ion battery commonly used in electronic devices such as smartphones, tablets, and laptops.

Lithium-ion batteries have a limited lifespan and will eventually lose their capacity over time. This is a rechargeable battery and can be used untill expected lifespan.

Figure 2: Battery

5V Step-Up Charging BMS Module T6855
A 5V step-up BMS is a Battery Management System that is designed to boost the voltage output from a lower voltage battery (such as a 3.7V lithium-ion battery) to a higher voltage of 5V.

The protection circuit of a 5V step-up BMS is designed to prevent overcharging, over-discharging, and short-circuiting of the battery. The BMS will monitor the battery voltage, current, and temperature

during the charging and discharging process and will take necessary actions to protect the battery from any potential damage.

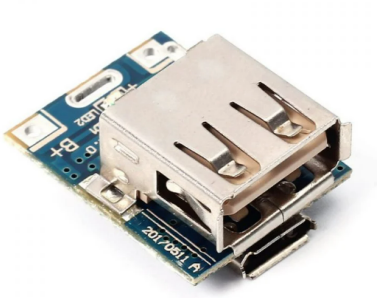

Figure 3: 5V StepUp Charging BMS Module T6855

5V 2A Wireless Power TX MOdule

The Wireless Charging Module can be applied in electronic types of equipment in common use for close wireless charging or power supply. Consisting of a transmitter and insulation coil, it could serve as a replacement for the Wireless Power Supply with stable 5V output voltage. Its small size and insulation coil are more suitable for use in a wireless project.

A wireless TX module, also known as a wireless transmitter module, is an electronic device that allows for wireless communication between two devices. The module contains a radio frequency (RF) transmitter that sends a wireless signal to a receiver module, which is connected to the other device.

The module consist of 2 ICs: 1. XKT-408A / 1215A - It is Generates sinewave signals - Same can be emulated by a custom programming in microcontroller to generate sinewave.

2. T5336 from Elcoteq - Seems like Mosfet Driver in SOIC8 package to drive coils upto 60V peaks on sinewave. Same can be designed with discrete mosfets in H-Bridge.

Figure 4: TX Module

Induction coil

It is a long wire bound around circularly and is a electrical component that is used to generate high-voltage, high-frequency alternating current (AC) electricity.

Figure 5: Induction Coil

LEDs and Current Limiting Resistors (33 Ohm)

Used to display battery levels of the power bank. We have used 4 pairs adnthey display the following:

All 4 on: Completely charged.

3 on : Partially charged (no warning).

2 on : Warning.

1 on and blinking : Critical.

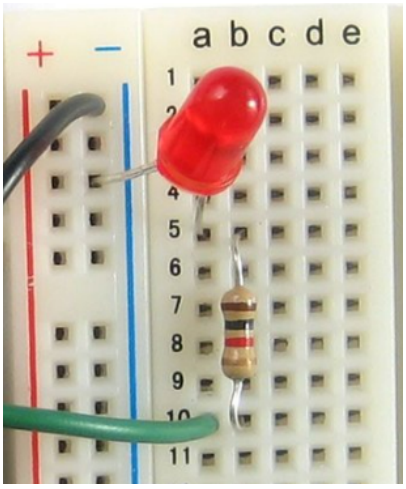

Figure 6: LED and Resistor

Schematic of the Circuit

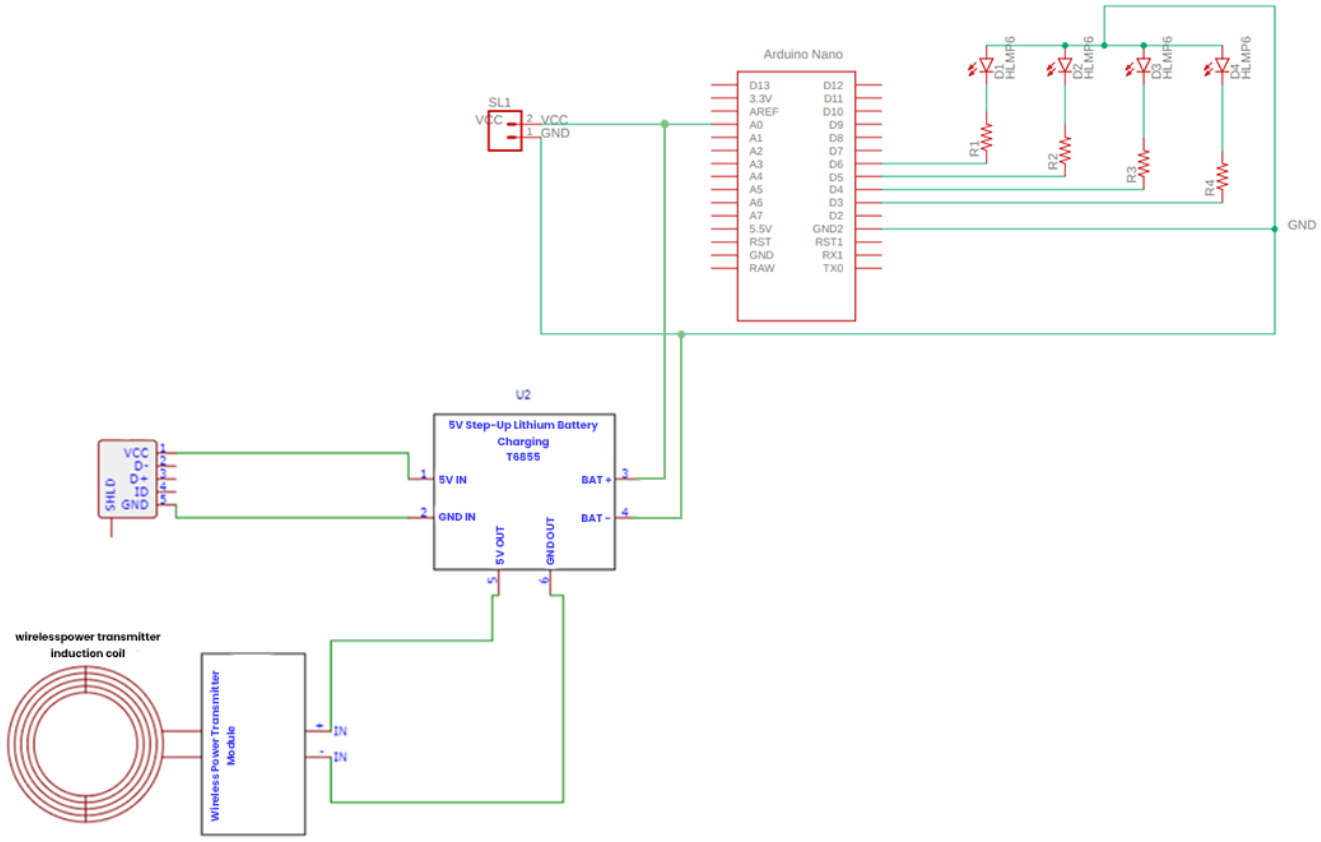

Figure 7: Schematic

Arduino Code for Battery Level

```
// 760=3.7V; 650=3.1V; 409=2V; 204=1V

#define l1 3
#define l2 4
#define l3 5
#define l4 6
#define lipo A0
float lipoV = 0;

void setup() {
pinMode(l1,OUTPUT);
pinMode(l2,OUTPUT);
pinMode(l3,OUTPUT);
pinMode(l4,OUTPUT);
pinMode(lipo,INPUT);
}
void loop() {

lipoV = analogRead(lipo);

if(lipoV¡204){
digitalWrite(l1,LOW);
digitalWrite(l2,LOW);
digitalWrite(l3,LOW);
digitalWrite(l4,HIGH);
delay(500);
digitalWrite(l4,LOW);
delay(500);
}
if(lipoV¿204  lipoV¡409){
digitalWrite(l1,LOW);
digitalWrite(l2,LOW);
digitalWrite(l3,HIGH);
digitalWrite(l4,HIGH);
}
if(lipoV¿409  lipoV¡650){
digitalWrite(l1,LOW);
digitalWrite(l2,HIGH);
digitalWrite(l3,HIGH);
digitalWrite(l4,HIGH);
}
if(lipoV¿650){
digitalWrite(l1,HIGH);
digitalWrite(l2,HIGH);
digitalWrite(l3,HIGH);
digitalWrite(l4,HIGH);
}
}
```

PCB Board Schematic

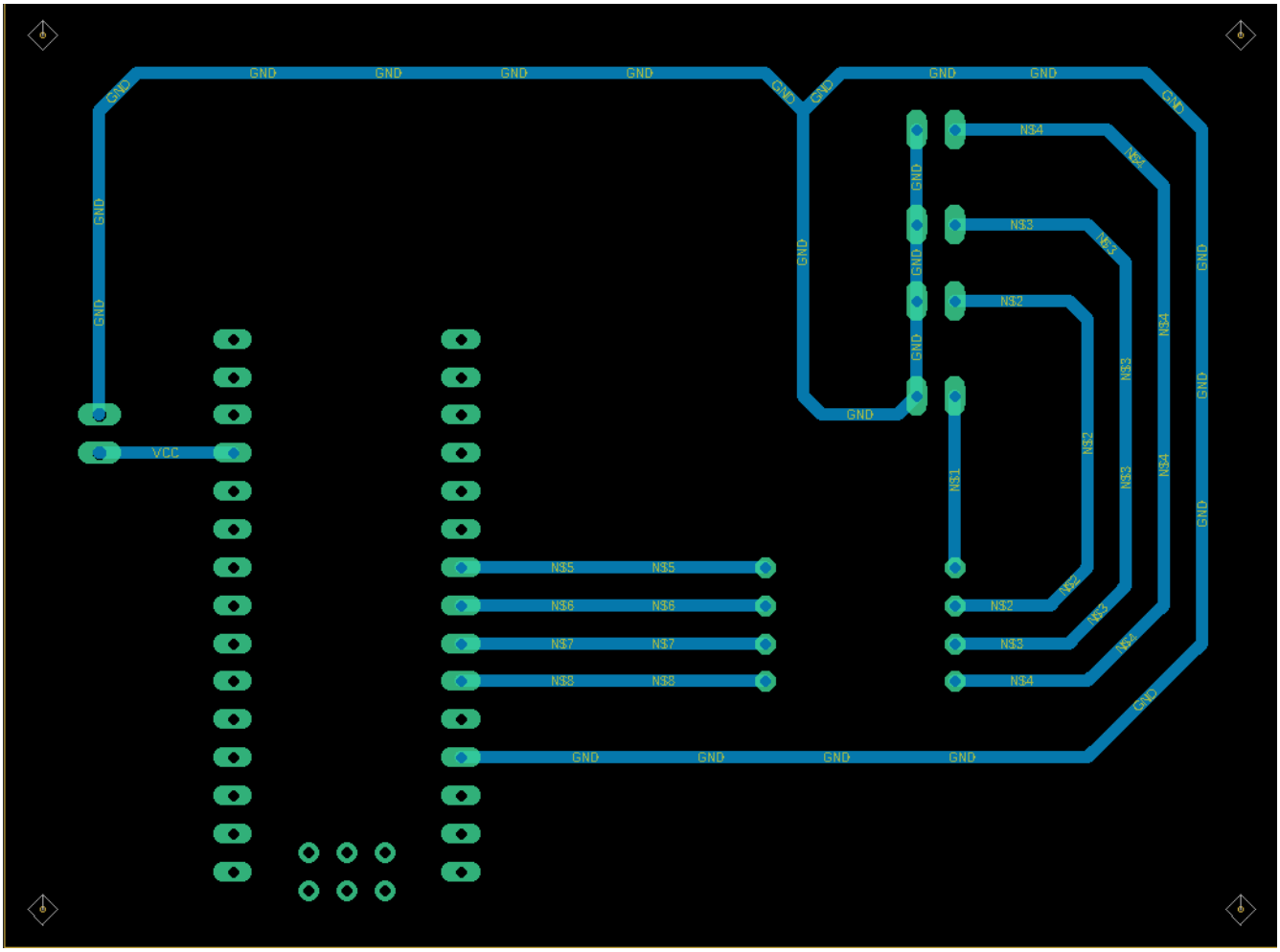

Figure 8: PCB Board