LED Wi-Fi Lamp Build Instructions

PKI IEEE

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This project will be more involved and will require a greater attention to detail than some of the previous projects. Please take your time when assembling this project. If you have any questions, if anything is unclear, or if you need assistance, please ask.

When soldering surface mount devices (SMD) only remove one component from the tape at a time. These parts are small and can be easily lost. There are not many extra parts so if you do loose one you will have to search for it.

There is not a special order the components of this PCB should be soldered in. It is recommended that you choose one component and solder all of those components at one time. For instance, there are five 10µF capacitors. All five should be soldered before moving on. This will reduce the likelihood of loosing a component.

You may want to look through all of the pages of these instructions before you begin.

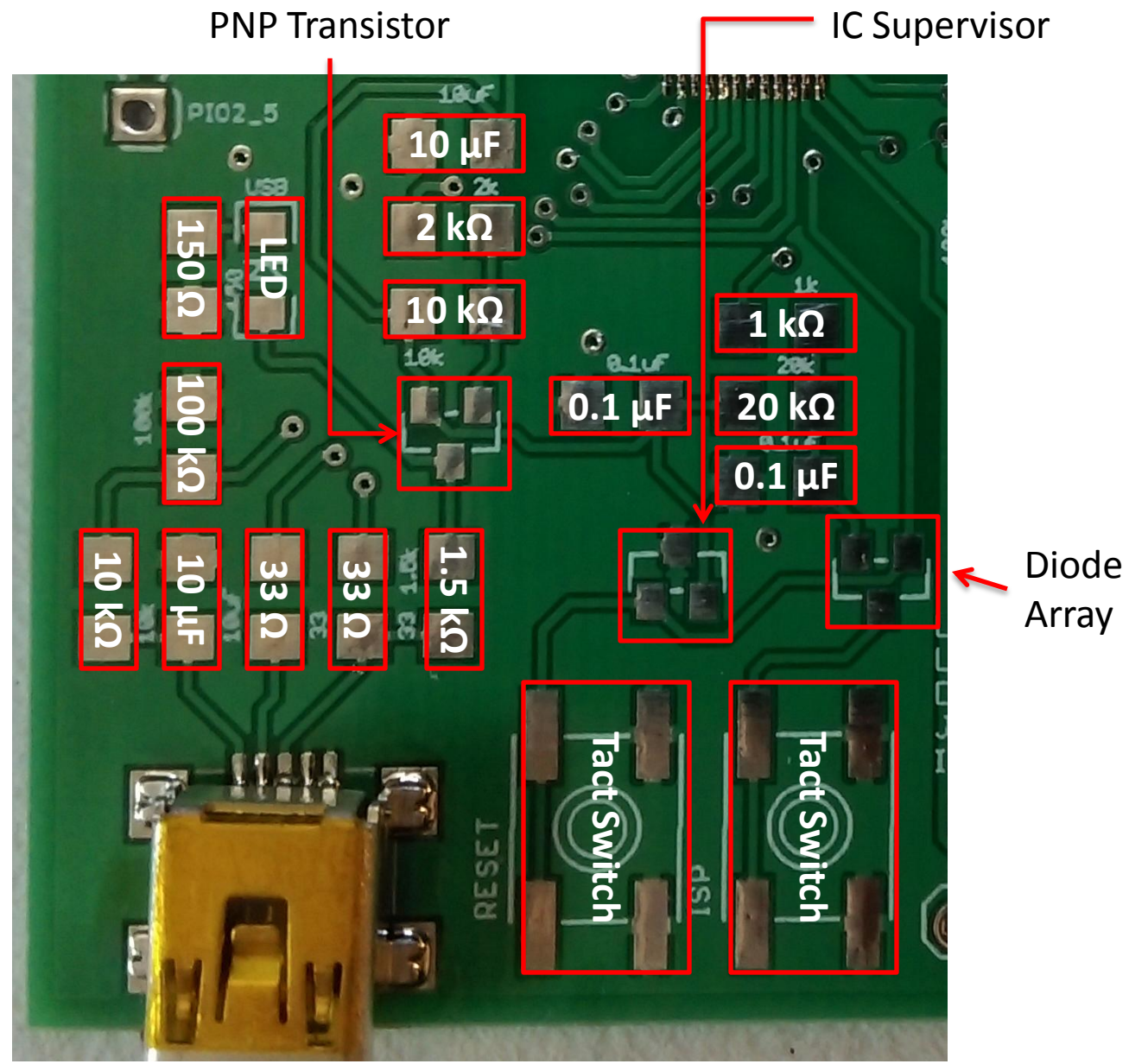| Component	Quantity
Microcontroller	1
100kΩ resistor	5
150Ω resistor	2
1.5kΩ resistor	1
20kΩ resistor	1
10kΩ resistor	2
2kΩ resistor	1
1kΩ resistor	1
33Ω resistor	2
15Ω 1W resistor	2
10Ω 1W resistor	6
10uF capacitor	5
0.1uf capacitor	5
16pF capacitor	2
220uF capacitor	4
12MHz crystal	1
Tact Switch	2
USB Mini B	1
LED (USB, PWR Indicator)	2
Schottky Diode Array	1
3.3V Regulator	1
PNP Transistor	1
IC Supervisor 3.15V	1
PCB	1
N-Channel MOSFET	4
1W RGBW LED	2
ESP8266 Wi-Fi Module	1
Female Headers 4 pin	2
Female Headers 40 pin	1
Barrel Jack	1
DC Supply	1

Components in red should be pre-soldered when you receive your board. If one of these three components is missing let an officer know.
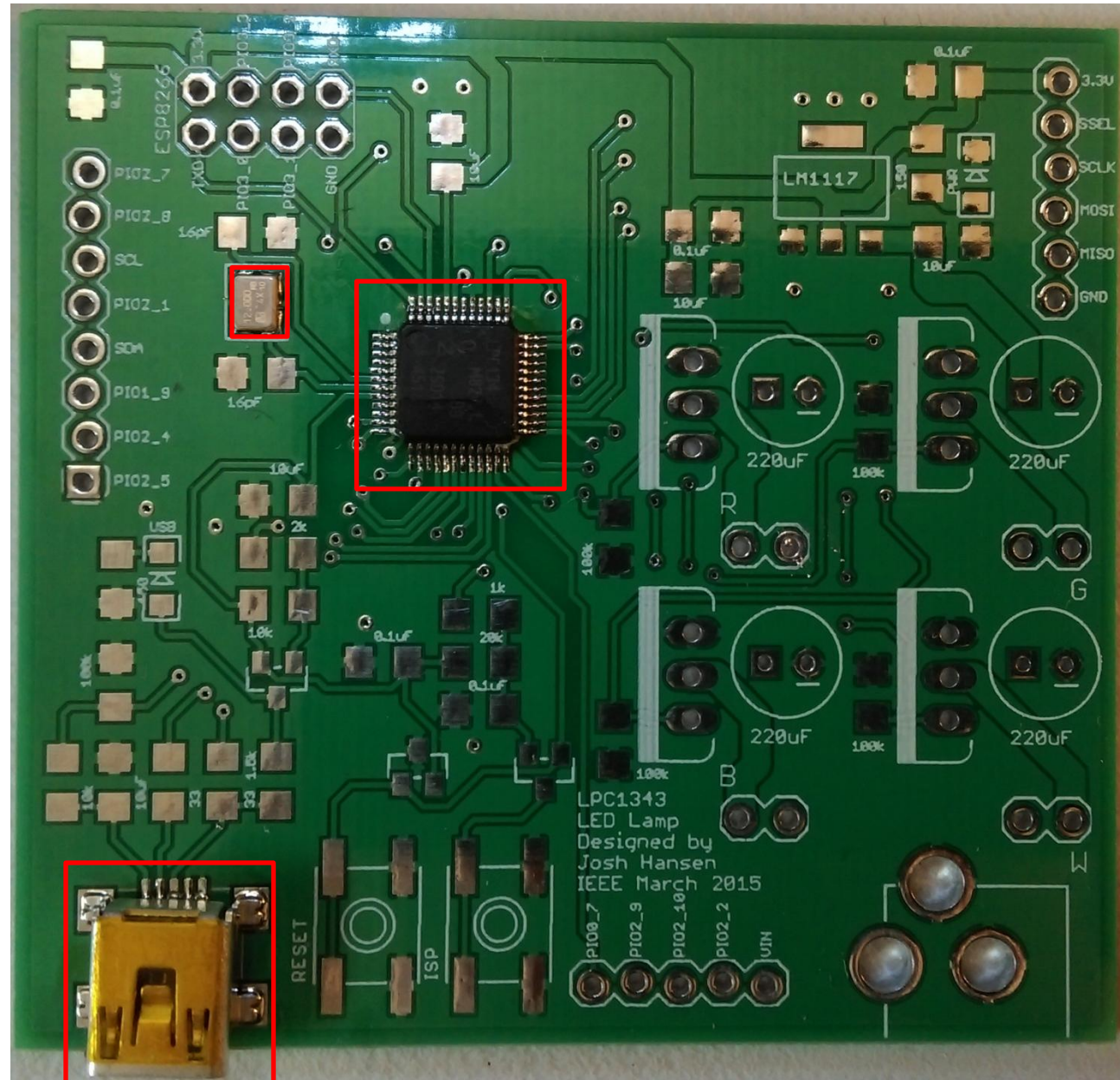
Pay attention to how the red boxes are orientated and solder the components in this same orientation.
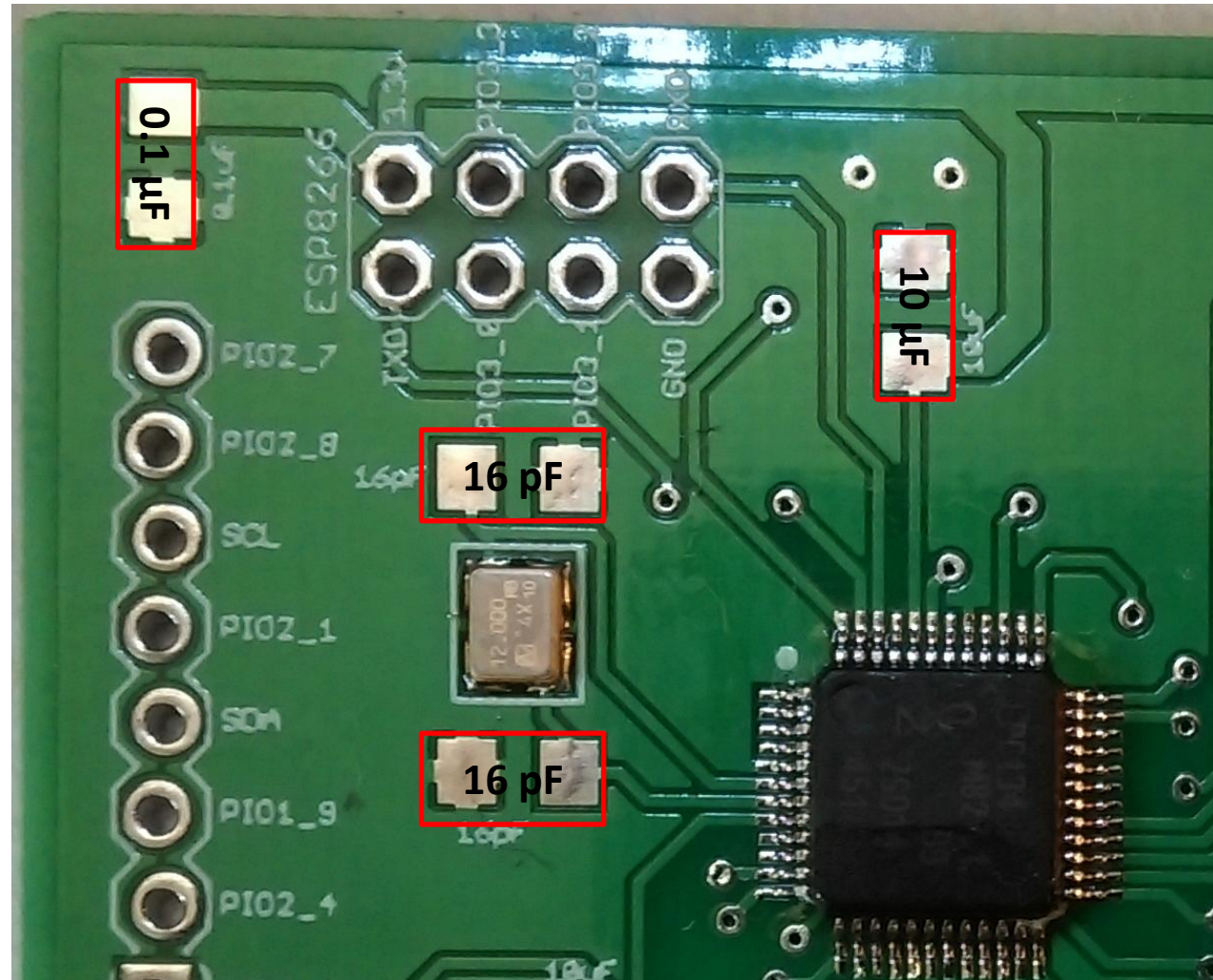
Make sure to place the LED in the correct orientation by matching up the silkscreen with the arrow on the bottom of the LED.

The transistor, diode, and IC supervisor all have the same package. To avoid confusion, these three parts are not in your kit. When you are ready to solder one of them, come get it from an officer. Also please make sure you solder each of these three components in its correct place as shown.

PNP Transistor

IC Supervisor

10 µF

2 kΩ

150 Ω

LED

10 kΩ

1 kΩ

100 kΩ

0.1 µF

20 kΩ

0.1 µF

10 kΩ

10 µF

33 Ω

33 Ω

1.5 kΩ

Diode Array

Tact Switch

Tact Switch

PIO2_5

Bottom-Left of PCB

Again, there is not an order these components should be soldered and they do not have a polarity.

Top-Left of PCB

Solder all surface mount components shown in red first. Again, pay attention to how the red boxes are orientated. It is possible to solder components across the wrong pads if you don't pay attention.

Make sure to place the LED in the correct orientation by matching up the silkscreen with the arrow on the bottom of the LED.

Once you have all the SMD components soldered, ask an officer to check your board if you want. Once you solder in the capacitors and mosfets it will be difficult to make changes to some of the SMD parts.
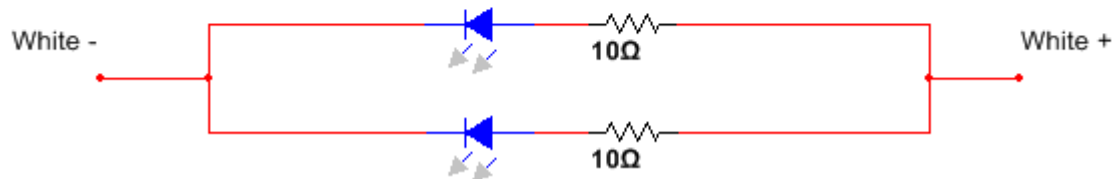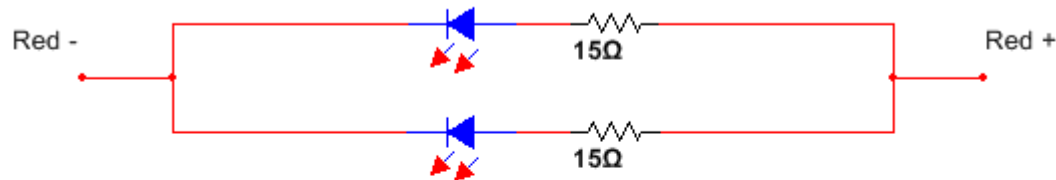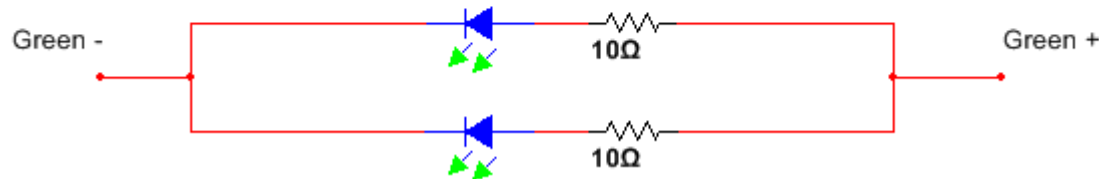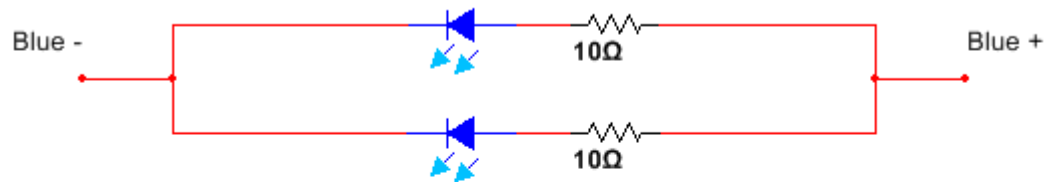
Once you are comfortable with your SMD parts, solder the mosfets, large capacitors, DC power jack, and headers. Use the completed image on the next page as a reference and pay attention to the polarity of the capacitors and the orientation of the mosfets.
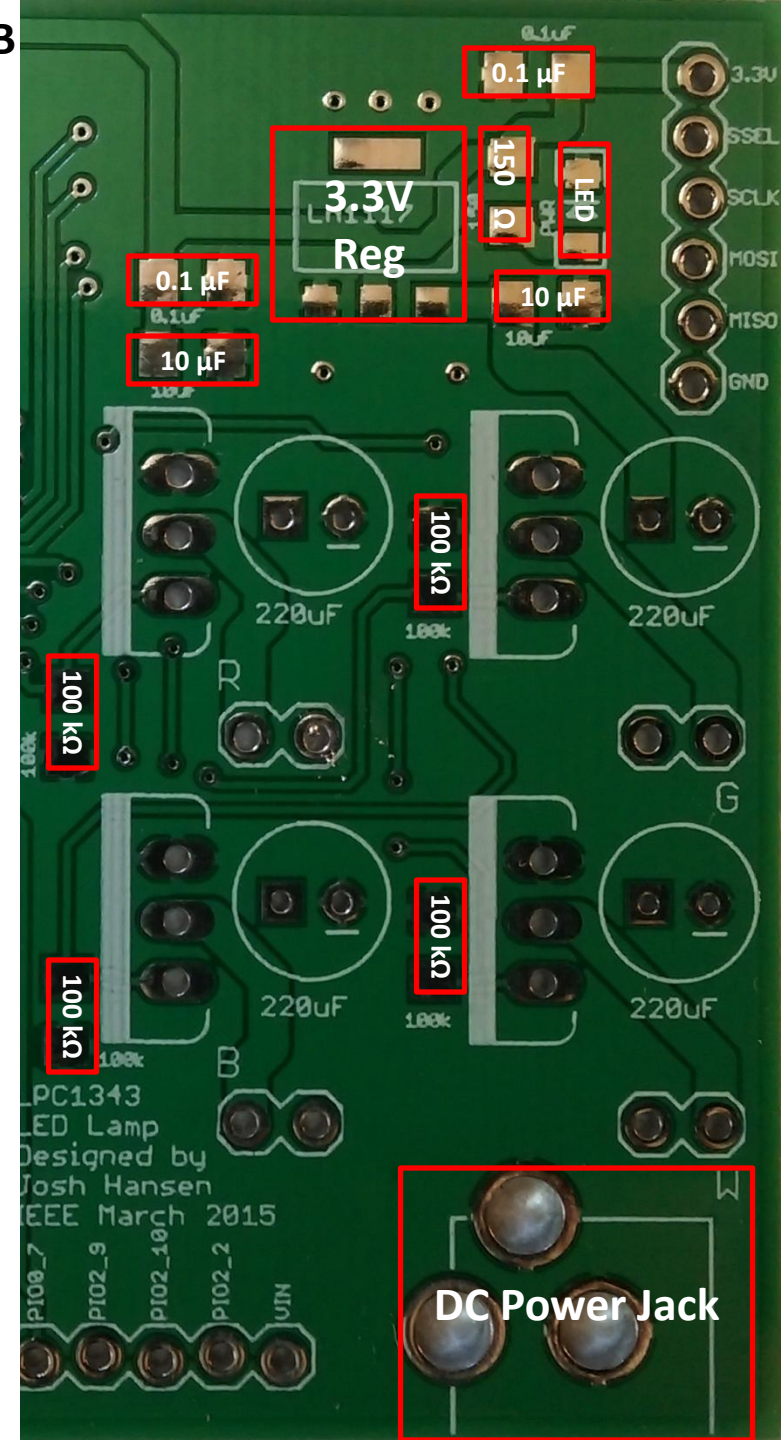
Completed board for reference.
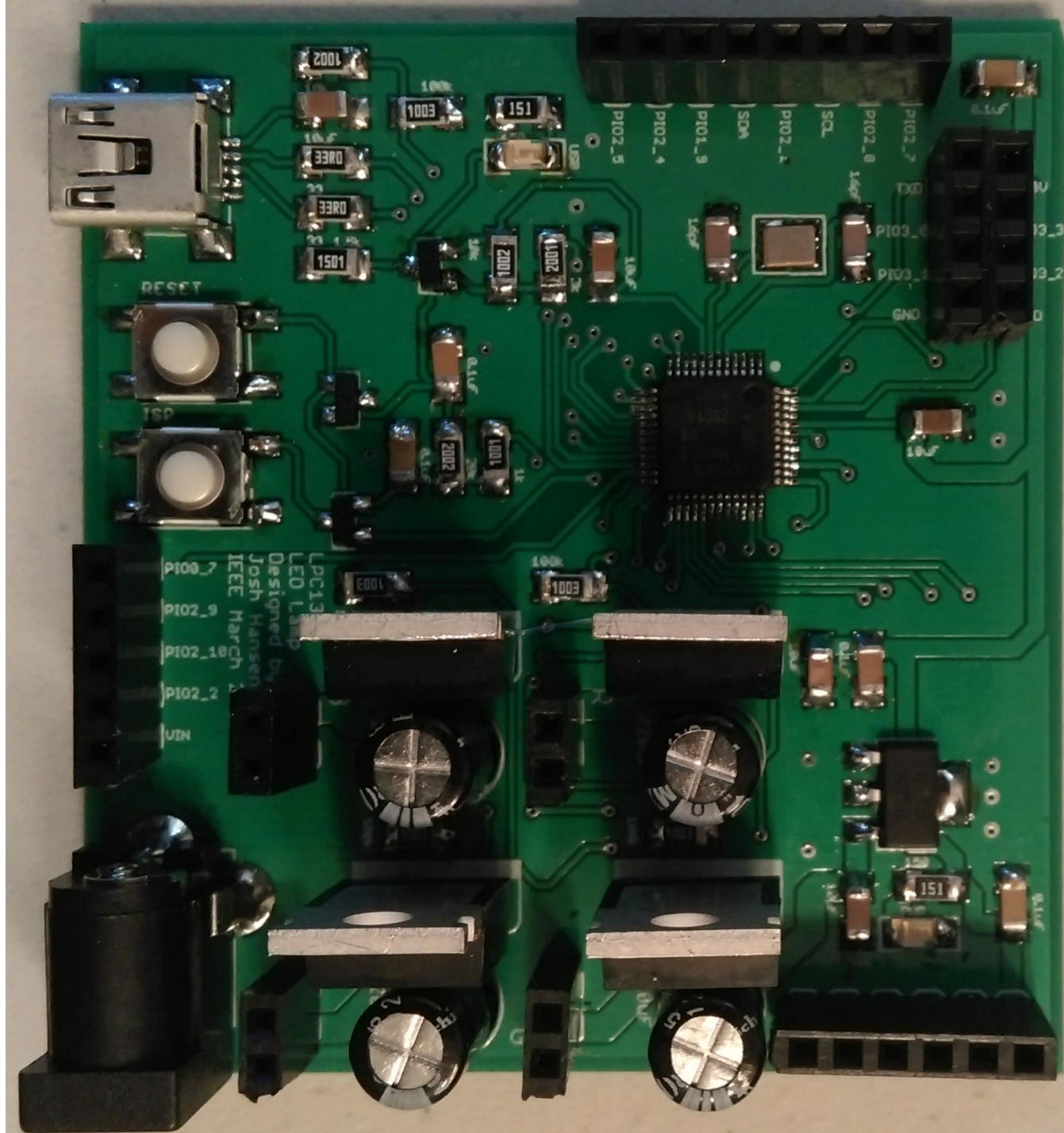
This is the circuit for the LEDs that you will need to create using the resistors and wire provided. Notice that the red LEDs use 15 Ω resistors while the other three use 10 Ω. Also notice that every LED has a resistor in series. You should have no extra resistors when you are done.

Blue -   10Ω   Blue +
                                          10Ω

Green -   10Ω   Green +
                                          10Ω

Red -   15Ω   Red +
                                          15Ω

White -   10Ω   White +
                                          10Ω

This is an example of how the circuit from the previous page was implemented. This is only one way of doing it, it doesn't have to be done this way. Pay attention to the silk screen markings for the LEDs. The G for green and the B for blue can look the same. If you can't tell which is which, ask.

Keep the amount of wire used to a minimum. If you are using one of the cube cases you will want just enough wire to go from the LEDs to the PCB. If using the lamp structure you will need more wire to go from the LEDs to the PCB.