

My name is Andrew and I am @ahall#7894 on the discord or @rushan_ee on twitter. My github for this project is here: [Herushan/Pinecil_LED_Ring: LED ring attachment for the Pinecil V2 soldering iron \(should work for V1 as well as it goes on the body\) \(github.com\)](https://github.com/Herushan/Pinecil_LED_Ring)

This project of making a LED ring for the Pinecil soldering iron came when we talked about a project on the pine64 forum of a project dzid26 did with adding lights to the Pinecil. Started talking ideas and came up with a PCB design that I shared with the discord group and finally got to a style that most everyone liked.

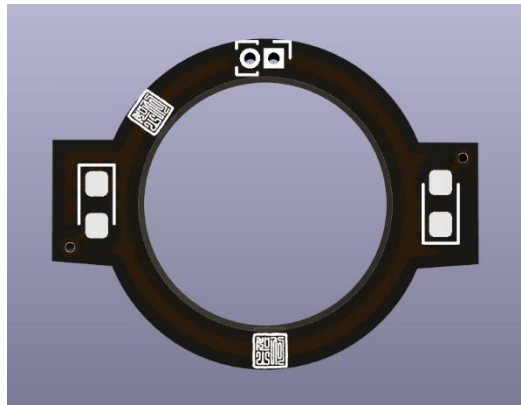


Figure 1. Original PCB draft design with SMD LEDs.

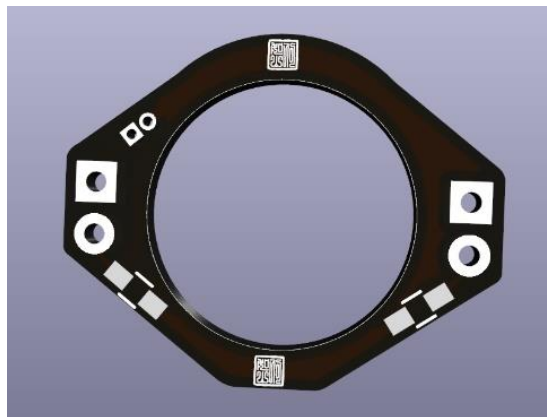


Figure 2. Final design for prototypes with through hole LEDs and SMD resistors.

Once I got the design finished in KiCad that looked acceptable and after making sure all the dimensions worked with the Pinecil.



Figure 3. Width of plastic area for LED Ring to be snug on.



Figure 4. Verify that 1.6mm PCB will fit on ring and allow screw to work (if you use a thumb screw).

When I got the board complete to measurements I put them out on my github site for others to look at if they wanted to. One of the discord members that use another service through the bot “oko_123” was kind enough to take the gerber file and do a 3D print of the board to make sure my measurements worked before I ordered prototypes of the board.



Figure 5. 3D print picture from oko_123 of the LED Ring design.

I ordered prototypes through Oshpark here in the US in their afterdark option as I wanted something cool looking. This option took some time but was worth it when they finally came in and I got to see them. Oshpark does not remove the bites from the board so I had to do some sanding to make them look nice and then to check how close they came to my design dimensions.



Figure 6. Prototype straight from board house before sanding

Once sanded and measured the middle hole was about .05 mm too small which took just a few passes of the Dremel sander to get to snug fit on the Pinecil which is perfect. The end result once the resistors and LEDs were put on that I had on hand which were not quite what I needed with values on the resistors ended up working great.



Figure 7. LED Ring cleaned up and parts soldered on.

The size of the power and GND holes can fit about wire up to $\sim .015$ inches or .4mm in size. I used some 32-gauge wire I had which works great and allows for minor cutting of the shell to get the wires through.

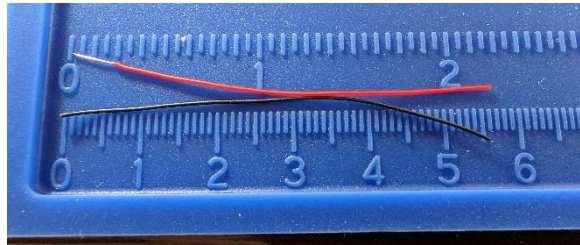


Figure 8. Power wires used for LED Ring prototype.

With the early discussion on the discord, it was determined that the 4.X volt source would be best and not to use the 3.3V on U10 that is missing on the V2 of the Pinecil. This led to pulling power of the C8 and L1 junction which the side of C8 is best to do from and using any ground source which I used pin 5 pad for U10 on my Pinecil V2.

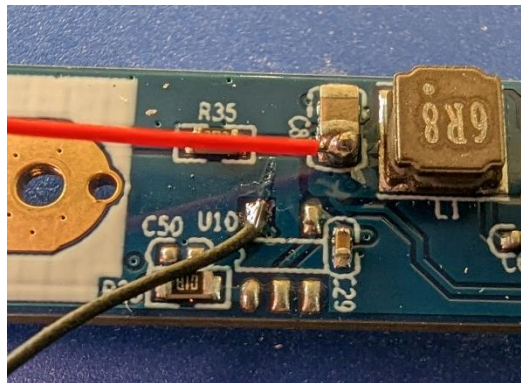


Figure 9. Source points for powering LED Ring.

With the power source soldered it was time to figure out the exit point for the wires to the LED Ring and you want some slack in the wires so you can still disassemble the iron if you need to.



Figure 10. Side slightly open on Pinecil to see where tabs are.



Figure 11. Where I decided to cut a small hole for wires to go through.



Figure 12. How it looks when closed again.

I decided to exit right before the first clip and under the grip of the iron as the wires are small and do not produce any odd feeling. Can do it farther forward and secure wires to side of iron so they do not get too close to the tip contact points as well.

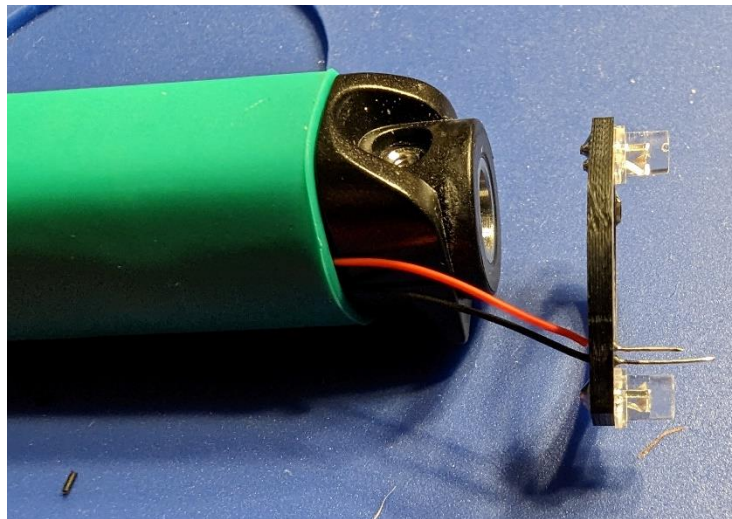


Figure 13. Attaching LED Ring to power wires.

After soldering on the power wires and this is where I wish I added an on/off switch as the lights are always on with the iron at this point. I trimmed the excess wire and put the ring on the tip and tested it out.



Figure 14. Top view of LED ring on iron with no tip installed.



Figure 15. Fully installed without tip or tip retention screw and powered on with iron.

Now that I know the LED ring works, I put the iron tip in and did the aftermarket thumbscrew to make sure it still worked with no issues and have soldered a few hours now with it with no issues. I have some other images showing how the LED ring looks.

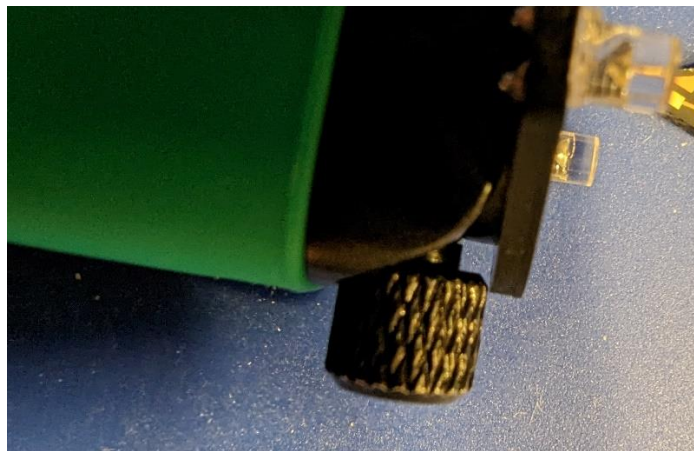


Figure 16. Close clearance between aftermarket thumbscrew and LED ring.

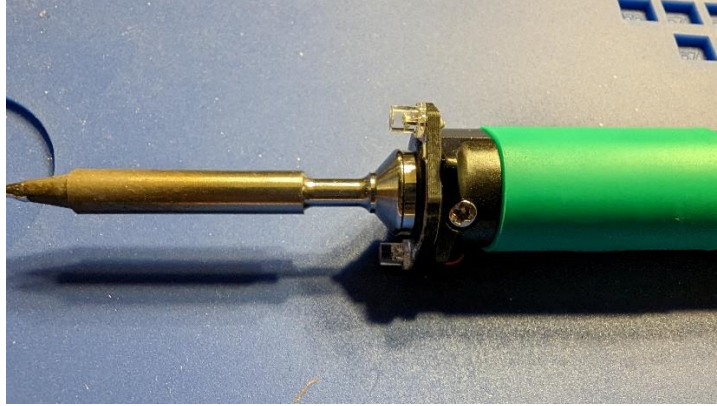


Figure 17. LED Ring on iron with tip not on.

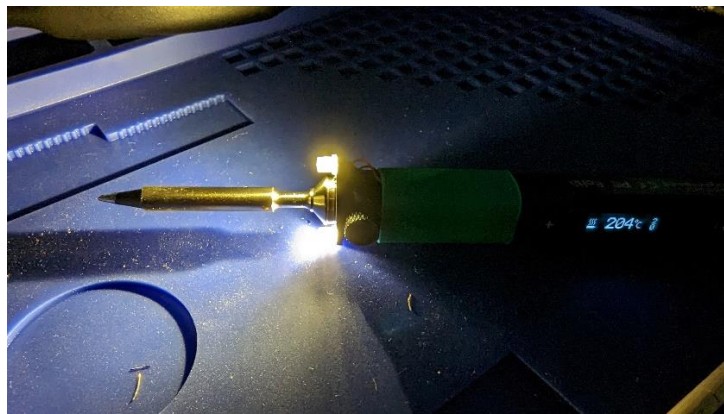


Figure 18. LED Ring on iron when on.

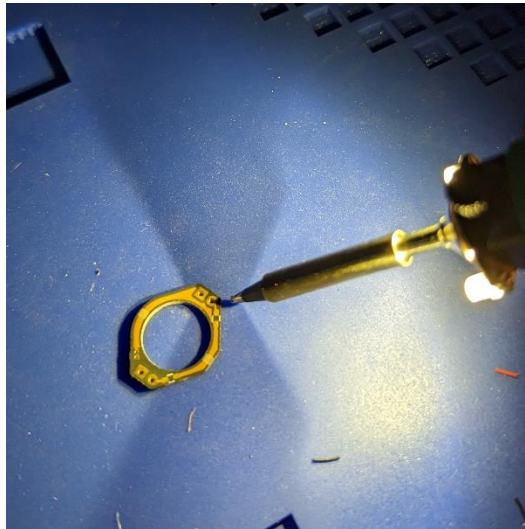


Figure 19. Holding iron with LED ring and noticed some shadowing with tip from lights in a dark room.

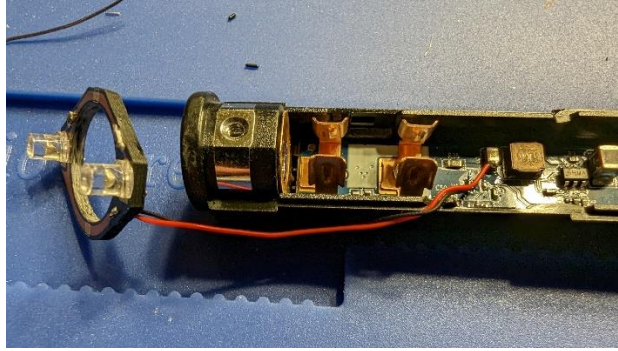


Figure 20. Slack with wires so you can still disassemble and assemble with LED ring attached.

The LED ring light prototyped turned out great and is small and effective for its purpose. Some want to see a SMD LED version and if it is possible to have an on/off switch as well. Looking at some options and updates to this design but as is it works well and is a viable lighting option for the Pinecil.

WARNINGS:

- ❖ This will void your warranty for the pinecil and you need to make sure the iron is not plugged in when soldering the power connections to the Pinecil board or the LED Ring.
- ❖ The voltage is 4.6 Volts for the power supply so most 3-3.2V LEDs will need around 75 ohm resistor to properly work.
- ❖ This version uses 3mm LEDs and 0603 sized SMD resistors.
- ❖ Putting conformal coating or clear nail polish over power/all solder joints on ring is recommended to prevent accidental shorting.
- ❖ Current design powers on/off with iron so no independent on/off switch. -looking at adding one but hard with keeping small size of lights.
- ❖ Lights do cast shadow with tip and looking at ways to minimize the effect but not a big issue for me (could maybe angle lights instead of flush mount to PCB).
- ❖ SMD can work at the 0805 Size with the through hole pads.
- ❖ Some thumb screws may not work with this modification.
- ❖ If you do this on V1 you would have to solder GND wire for LED light ring to pad 5 of U10 chip (GND pin of chip).