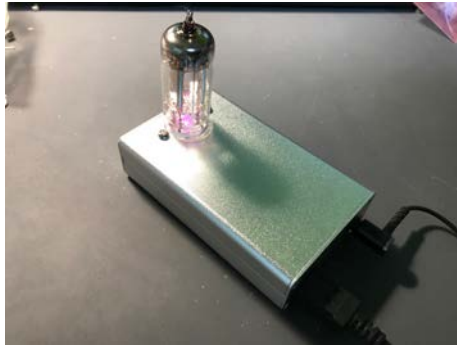


# Additional instruction for assembling TUBE headphone amplifier



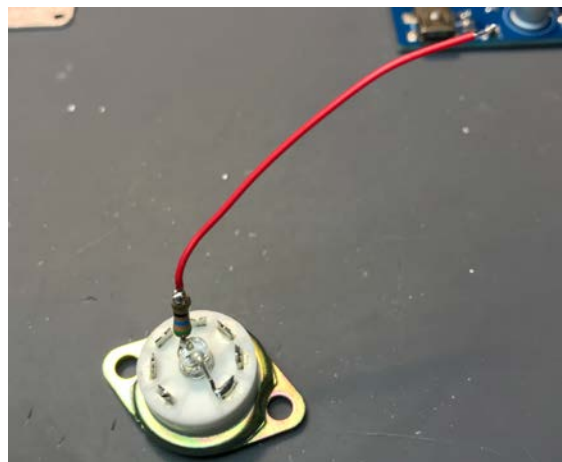
Thank you for ordering TUBE headphone amplifier. This amp is miniaturized and needs some additional information for completing. Please refer for your completion.

Step 1: Cut electrode of tube socket (including center ground) and push LED



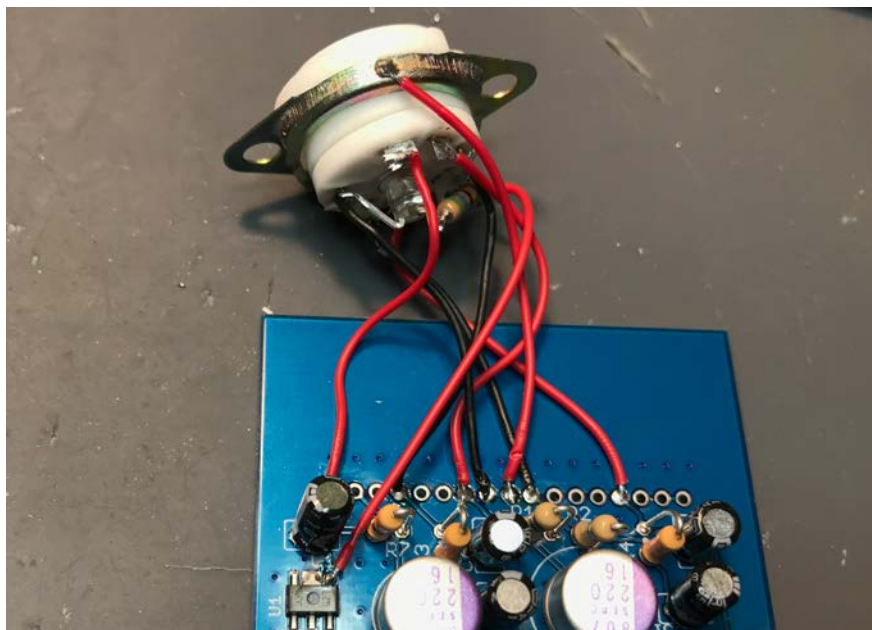
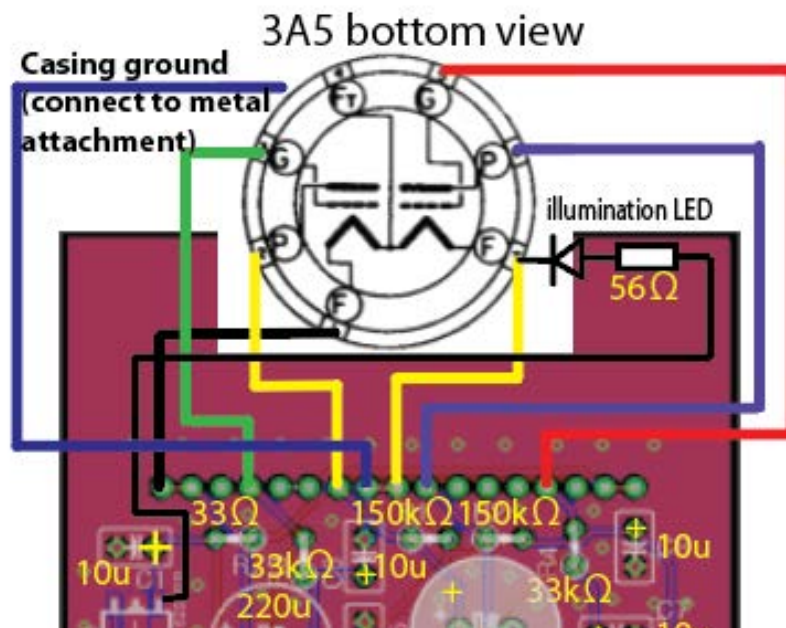
After pushing LED in the center, cut Cathode (shorter lead) lead and bent to #7 electrode of tube socket.

Step 2: Connect 56 Ohm to the LED Anode electrode

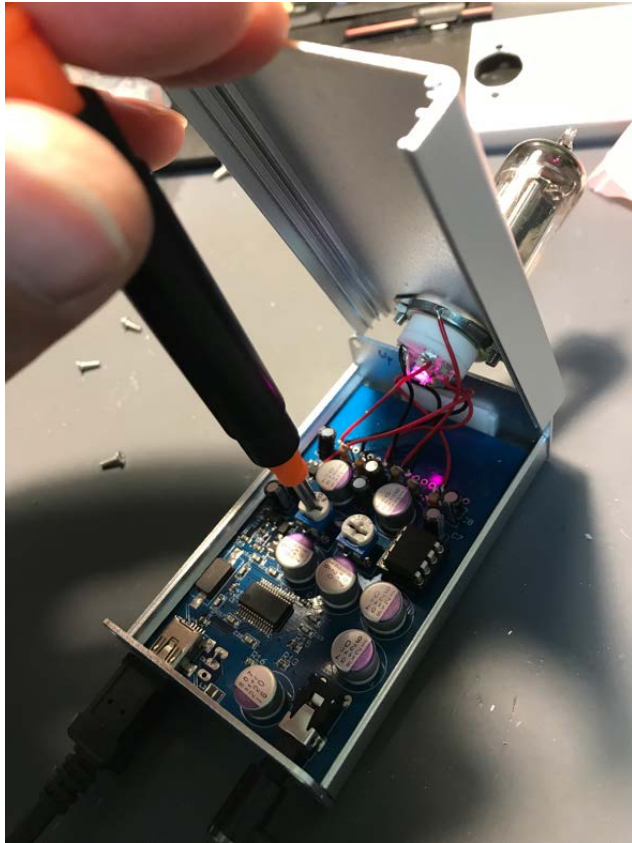


Solder 56Ohm and lead wire as above...

Step 3: connect Tube and PCB



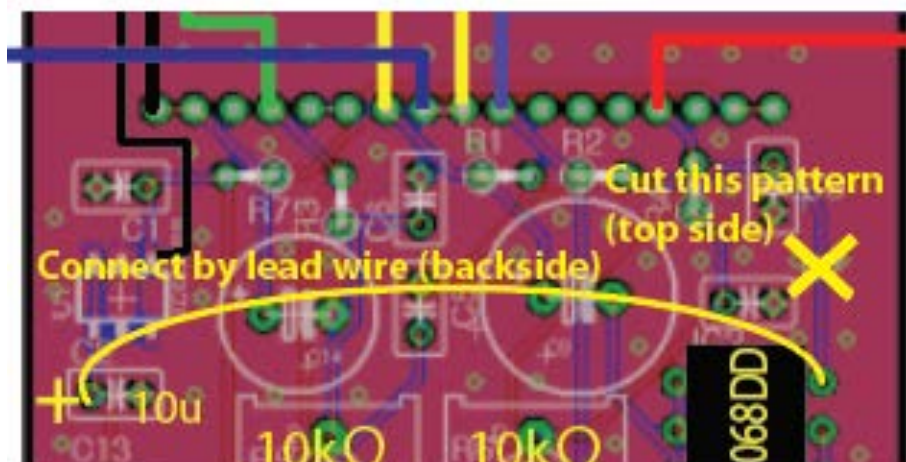
Please don't forget to connect "casing ground" which is connecting to metal attachment of Tube socket. If soldering on the attachment does not work, please polish the surface. The Anode line of LED through 56 Ohm should be connect to the output of 3.3V regulator. Please be careful of bridging...



After finishing wiring and fixing tube socket on the enclosure, you may need to adjust grid voltage for better sound quality (especially white noise). The most of white noise is generated by tube and it is intrinsic (no way to avoid). Please enjoy vacuum tube sound, including its noise!

## Modification for iPhone support

The original circuit will not work with iPhone (or similar portable devices), due to its current draw. By changing power source of Op-amp from high-voltage (generated by on-board voltage booster) to 5V line, I've confirmed its operation with iPhone 6s. Please note that I have not confirmed by another portable device, and also I've confirmed iPad Pro does not work with this modification. One trade-off of this modification is, **high voltage (more than 5V) requiring Op-amp will not work after this modification.** For example, MUSES series will not work.



Cut top side pattern (marked as "x") and connect between #8 pin of Op-amp and + side of C2. After this modification, Op-amp will work by 5V.