

**Boozhound Laboratories Power Supply**  
Assembly manual (rev.2)

***The Boozhoundlabs Philosophy***

The plan here is to offer kits that let the curious audiophile experience designs that they would otherwise have to build from scratch.

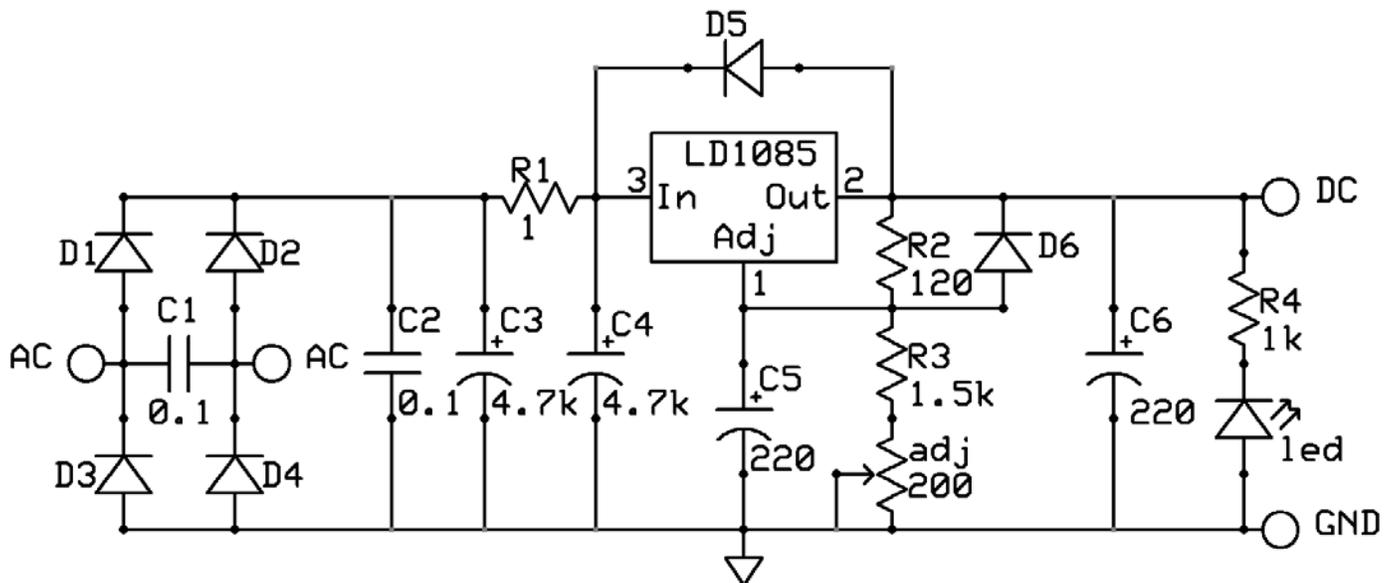
I think simplicity is a huge part of why classic equipment sounds so good, and modern stuff can sound so bad. In the days when capacitors and transformers were expensive, designers minimized the parts count in any design, and this approach is audible even when designing with modern devices. And for those of us who not only want to build stuff, but to understand how it works, simple designs are much more comprehensible, with no "black boxes" that we only understand through the abstraction of a spec sheet.

Why not have fun building stuff instead of just pouring dollars into your system on the quest for ultimate-ness? Part of the fun for me is the ability to try something new without having to shell out the big bucks.

***DANGER!***

**In the process of building this kit you will be working with lethal voltages! Careless or incorrect assembly can result in the loss of life or property. You must possess the ability to safely construct electrical equipment - this manual is not sufficient to provide the required knowledge and experience.**

***The Power Supply***



This is a simple regulated power supply with a bit of extra filtering, implemented using really great audio grade parts.

D1-D4 are Schottky diodes so there will be no switching noise. D5 and D6 are there just to protect the voltage regulator. R1 forms a pi filter with C1 and C2 to filter the power supply ripple before it gets to the rectifier (where the series impedance of R1 is most benign). R4 sets the brightness of the LED, which is completely optional and not included, and which LED you choose depends on what will work with your chassis. You can also use an old school pilot light if you prefer.

All of the capacitors are rated for 50V, so you can replace R3 to set the voltage output to anything short of 50V. Consult the datasheet for the LD1085 Regulator for the information you need to select the correct resistor value.

The amount of current you can supply with this power supply is limited by the rating of the regulator (3A) and the ability to dissipate heat. With the recommended transformer and supplied heat sink in a fanless chassis, this power supply is good for up to 500mA or so. If you need more than that, you need a bigger heat sink or a fan. As-is, the power supply can easily power all of the Boozhound Labs kits at once.

The included heat sink is rated at 9.6 C/W.

### ***Choosing a transformer***

If you are building this kit to supply 18VDC to one or more of the Boozhound Laboratories kits, I recommend the Triad Magnetics VPT30-1670. This is a commonly available and inexpensive toroidal transformer with a 15V secondary that provides 3.3A. It has dual voltage primaries so it can be used in most of the world. This is a 50VA transformer, which is significantly overrated, but it is only a couple bucks more than the 25VA version, and it never hurts to use a larger transformer.

This transformer will allow you to build this kit into my favorite enclosure, the Hammond 1455T1601BK.

To choose a transformer for another output voltage, you need to take the output voltage you want, add at least 5V for voltage drop across the diodes and the regulator, then multiply by 0.7 to get the RMS voltage of the secondary. Anything above this value will work, but as you increase the voltage, you increase the need for the regulator to dissipate heat.

### ***Inventory***

Start by verifying that you have all of the parts you need. I endeavor to make sure I send only complete kits, but it is always possible I missed something. If I screwed up and left something out, please email me immediately at [jsn@boozhoundlabs.com](mailto:jsn@boozhoundlabs.com) and I will make it right.

Here is what is included with each kit, with checkboxes to make it easy to verify that you have all of this stuff:

- ( ) 1 Printed Circuit Board
- ( ) 1 LD1085 Voltage Regulator
- ( ) 4 Schottky Diodes D1-D4
- ( ) 2 1N4001 diodes D5, D6
- ( ) 2 0.1uF snubber capacitor C1, C2
- ( ) 2 4700uF electrolytic capacitor C3, C4 Nichicon KS "High Sound"
- ( ) 2 220uF electrolytic capacitor C5, C6 Nichicon KZ "Muse"
- ( ) 1 1 Ohm 5W resistor R1 brown, black, gold, gold
- ( ) 1 120 ohm 1/2W resistor R2 brown, red, black, black, brown\*
- ( ) 1 1.5k ohm 1/2W resistor R3 brown, green, black, brown, brown
- ( ) 1 10k ohm 1/2W resistor R4 brown, black, black, red, brown\*
- ( ) 1 200 ohm trimpot
- ( ) 1 Heat sink
- ( ) 4 2-wire headers
- ( ) 4 standoffs with 4-40 screws
- ( ) 2 heat sink mounting hardware

\*note that the 120 and 10k resistor color bands are palindromes of each other. Be sure to check the values with a multimeter before inserting the resistors.

LED not included. Choose anything that fits your chassis or leave it out completely.

**No fuse is included! You MUST fuse the AC power as it enters the chassis!**

### ***Assembly***

It is generally a good idea to install the little stuff first and the big stuff afterwards, so that you aren't melting the big stuff trying to get to the little stuff.

I like to solder from the bottom of the board because it is easier to get to things, and the odds of overheating a part are lower because you are that much further from the part itself. Be sure to heat the pad and the leads sufficiently to let the solder flow all the way to the top of the board though. These boards have through-plated holes, so it will be easy.

These boards have traces only on one side whenever possible, leaving the bottom side to be nothing but a huge ground plane. This will reduce grounding problems and make this a very quiet design.

The points where the components do attach to the ground plane will take a bit more heat to solder properly since the ground plane will act as a heat sink.

The wire headers are optional, but make the final assembly in the chassis much easier.

The regulator should be attached directly to the heat sink, which is attached directly to the circuit board. Heatsink thermal paste is recommended, but not included (diaper rash cream works). Note that the case of the regulator is tied to the output voltage pin, so the heat sink must not be grounded.

### ***Integration***

Because of the wide variety of applications, I will leave this to the builder.

Once assembled and powered up, the output voltage can be adjusted precisely with the trimpot. None of the Boozhound Labs kits require a precise voltage, but the perfectionist in me wants an 18VDC supply to provide 18.00VDC :)

I recommend using a filtered IEC power input module **with fuse**.

Remember to connect the circuit ground to the chassis earth.

That's it. You are done! Please enjoy this power supply and send me feedback and photos of your projects!

-jsn