

LV-Regulator

User Guide

Schematic & Part Values

Thank you for your purchase of LV-Regulator low-voltage regulator kit. This regulator is an upgrade from the H-PS-1 low-voltage regulator, which was intended for heating a tube's heater element. The LV-Regulator, in contrast, was designed for powering audio circuits, such as external DACs and the famous Squeezebox units. It uses an input RC filter (1 ohm – 10k μ F) after the power supply reservoir capacitor (10k μ F) to pre-filter the DC voltage entering the LD1085 regulator. In addition, each electrolytic capacitor receives its own ceramic bypass capacitor and the regulator's output is shunted by a large polypropylene capacitor (4.7 μ F/400V).

The PCB accepts two possible rectifier configurations (full-wave bridge and full-wave center-tapped). In other words, this regulator can deliver +5Vdc or +9Vdc from two different power transformer secondary voltages; for example, for 9V output either a 10Vac or 20Vac center-tapped transformer secondary; or 5Vdc from either a 6.3Vac to 9Vac or a 12Vac to 18Vac center-tap secondary.

When used as a full-wave-bridge rectifier circuit, all four rectifiers are used. But when configured in a full-wave center-tapped configuration, only rectifiers D2 and D4 are used; attach the transformer secondary center-tap to bottom solder eyelet for rectifier D3, the one that attaches to ground. The main advantage behind using a center-tapped power transformer is that the rectification only loses one rectifier voltage drop, rather than the usual two drops: a 0.7V versus a 1.4V voltage drop can make a decisive difference in a low-voltage regulated power supply, such as a 5V regulator.

At idle, without an external load, the regulator draws 10mA of current.

Assembly Before soldering, be sure that the PCB and all parts are oxidation free and shine brightly. Make sure that both the solder and the part leads are shiny and not dull gray. Steel wool can restore luster and sheen by rubbing off oxidation. Clean both sides of the PCB with (at least 90%) isopropyl alcohol, wiping away all fingerprints. Next, make sure you are looking at the top of the PCB, as the heatsink and voltage regulator must be mounted on the top of the boards, although the other parts could be mounted on the back side.

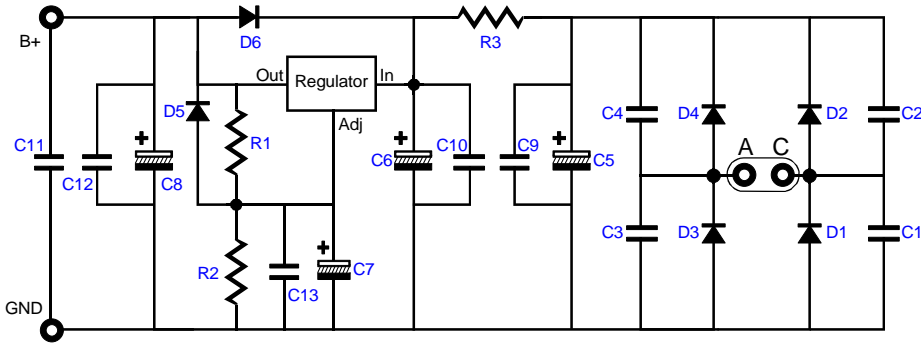
First, solder the shortest parts (diodes D5 & D6) in place, then the next tallest parts (resistors R1 & R2), and then the next tallest... Always carefully observe the polarity markings on the capacitors and rectifiers. It is easier to first attach the three-pin regulator to its heatsink, before soldering the regulator or the heatsink to the PCB. Be sure to use a thin, super thin film of heatsink compound (thermal grease) to both sides of the rectangular separator. Do not over tighten the screw and nut heatsink assembly, as it can deform the regulator's tab.

Operation Be sure to give the regulator PCB lots of air space to breathe freely and limit the output current to no more than about 2A, although the LD1085 is rated for up to 3A of current flow. In addition, do not expose the LD1085 to a voltage differential greater than 30Vdc. The voltage drop across resistor R3 reveals the amount of current flowing into the load. Current equals V_{drop} ; for example, 2Vdc equals 2A of current flow.

Testing Always use a variac and no load, when first applying power to the regulator. Slowly bring up the AC voltage, while looking for smoke or part discoloration. Measure the output voltage and the voltage feeding the LD1085 by measuring the voltage at the left side of resistor R3, the lead which is closest to rectifier D1. If the voltage differential is much less than 2V, the regulator will probably not function well as the wall voltage sags during the day. If the regulator fails to provide enough output voltage, a higher secondary voltage is required. Next, power down the regulator and attach an external load. Only after you are sure that the regulator is working well, should you attach the audio circuit.

Full-Wave Bridge

AC input to pads A & C

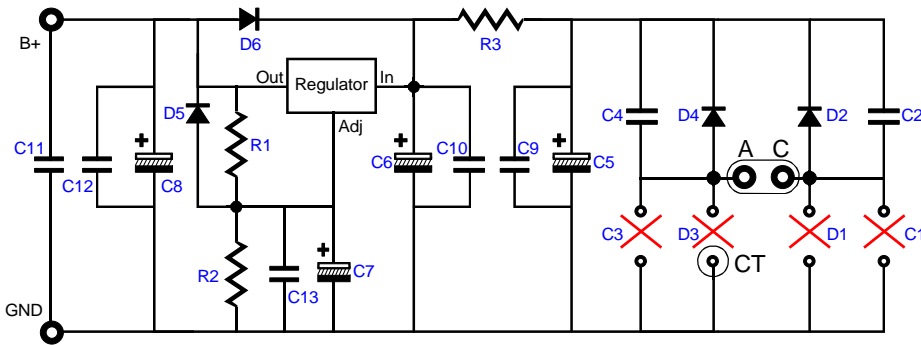


Parts:

- C1-C4, C9, C10, C12, C13 = 0.1µF - 50V
- C5, C6 = 10µF - 16V
- C7, C8 = 1kµF - 16V
- C11 = 0.1µF - 10µF Film or PIO
- D1, D2, D3, D4 = MUR410G
- D5, D6 = 1N4001
- R1 = 124
- R2 = 374 ohm for 5Vdc
787 for 9Vdc
- R3 = 1 ohm 2W - 5W
- Regulator = LD1085, LT1085, LM317
- Vac Input = 7V - 8V AC for 5Vdc
9V - 12V AC for 9Vdc

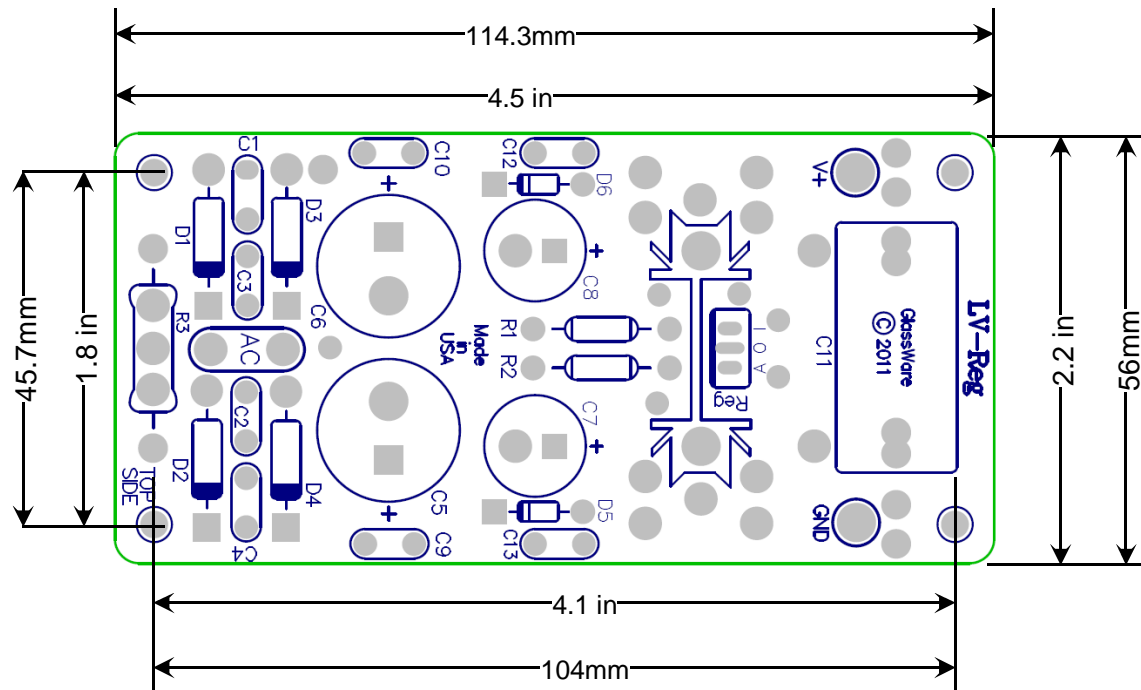
Full-Wave Center-Tap

AC input to pads A & C & D3



Parts:

- C2, C4, C9, C10, C12, C13 = 0.1µF - 50V
- C5, C6 = 10µF - 16V
- C7, C8 = 1kµF - 16V
- C11 = 0.1µF - 10µF Film or PIO
- D2, D4 = MUR410G
- D5, D6 = 1N4001
- R1 = 124
- R2 = 374 ohm for 5Vdc
787 for 9Vdc
- R3 = 1 ohm 2W - 5W
- Regulator = LD1085, LT1085, LM317
- Vac Input = 14V - 16V CT AC for 5Vdc
9V - 12V CTAC for 9Vdc



LD1085

Top View

