

Eurorack 1A Power Supply

Thank you for building the classic linear Eurorack 1A Power Supply. Linear power supplies are a bit old school but they still offer a very good solution for high end synthesizers. Ultra low noise (no internal oscillator involved), 100 % serviceable (no exotic component) and simple.

Input: 4 wires, separate windings, screw terminal on K1.

Outputs: +12V / -12V /+5V, screw terminal and Eurorack 16 pin connector.

Attention

Building a power supply is a serious job. High energy levels are involved. Please, refrain from building and/or using a power supply if you don't have a minimum level of knowledge in electronics. This is not a project for beginners. Risks are : high temperatures (possible burns), capacitor explosions if incorrectly positioned, and a lot of magic smoke. Not to mention, of course, dangers with mains power supply voltages when dealing with the transformer primary side.

Be careful! Mains power supply voltage is highly dangerous and potentially lethal!

BOM

Ref	Value	Footprint	Qty
B1,B2	KBU4	DIOB-KBU4	2
C2..C3, C7..C8	3300µF	CAP-PRD-7.5-D18	4
C4, C5, C9..C13	1µF	CAP-PRD-2-D5	7
C14..C17	100n	CAP-RR-2.54-L7-T2	4
D3..D6, D8..D10	1N4004	DO-41_LP	7
D7, D11, D12	Yellow LED	LED-3MM	3
F1,F2	2A	FUSE-22.6-5x20-PTF78	2
		Fuse T1,25	2
H1	REGUL_HEATSINK_X4	Special heat sinks, 94x45x30mm, 4.0 K / W, M3	1
K1, K2	AC IN/DC OUT	SCREW-TERM-5.08-4	2
K3	EURO-16	HE10_16D	1
R3,R4	1k	R4_ROUND	2
R7	470	R4_ROUND	1
U1, U3	7812	LM78XXV	2
U2	7912	LM79XXV	1
U4	7805	LM78XXV	1
	clips for heat sink		4
	Heat sink mounting screws	3mmx12mm	2
	Washers	3x9mm Flat	2
	Heat sink mounting screws	3mmx10mm	3
	Washers	3mm spring	3

You will need a 12V 1A per rail, dual winding, toroidal or regular transformer.

Errata

C1, C6, R1, R2, D1, D2 are not used and will be left unconnected.

R5, R6 are not used and replaced by a strap. Use for example one cut leg from a diode.

B2 needs to be reversed (follows the same mounting position as B1). + and – marks have been reversed.

Build instructions

Solder small components first : resistors, diodes, leds, small capacitors.

Then solder Fuse holders, medium caps, and screw terminal.

Solder bigger components : mount small heatsinks on each diode bridge B1 and B2. Use M3x12 screws and M3 nuts. Heatsinks need to be vertical. Place screw on heatsink side, nut on diode bridge side. Tighten well. Use thermal paste if you have some.

Solder diode bridges and finally the last 4 big capacitors.

Bolt the heatsink.

Then place the regulators in their respective positions.

DO NOT SHORT U2 regulator's metal part with heatsink, USE mica insulator for U2. U2's metal body is not connected to ground and MUST not be.

Use thermal paste, if you have some, between regulator's TO220 cases, mica insulators and heatsink.

Install mounting clips in order to fasten the regulators to the heatsink. Then you can solder the regulators. Do not solder regulators before they are fasten by mounting clips. Be careful, clips are hard to remove. You don't need to cut regulator's legs. If they are protruding too much from the PCB's bottom side, then regulators are incorrectly positioned. Mounting clips are in contact with the regulator's plastic cases, not the metal part.

Mount the board with 4 « hex standoffs » (spacers) 10 mm length minimum, 3 mm diameter.

Tests

Before you power on your board, double check every component. Visually inspect for incorrect values, reversed components, bad solder joints (gray, dry, cold...). Check for any possible short.

Use a multimeter : check for shorts, especially between big capacitors pins, input and output connectors.

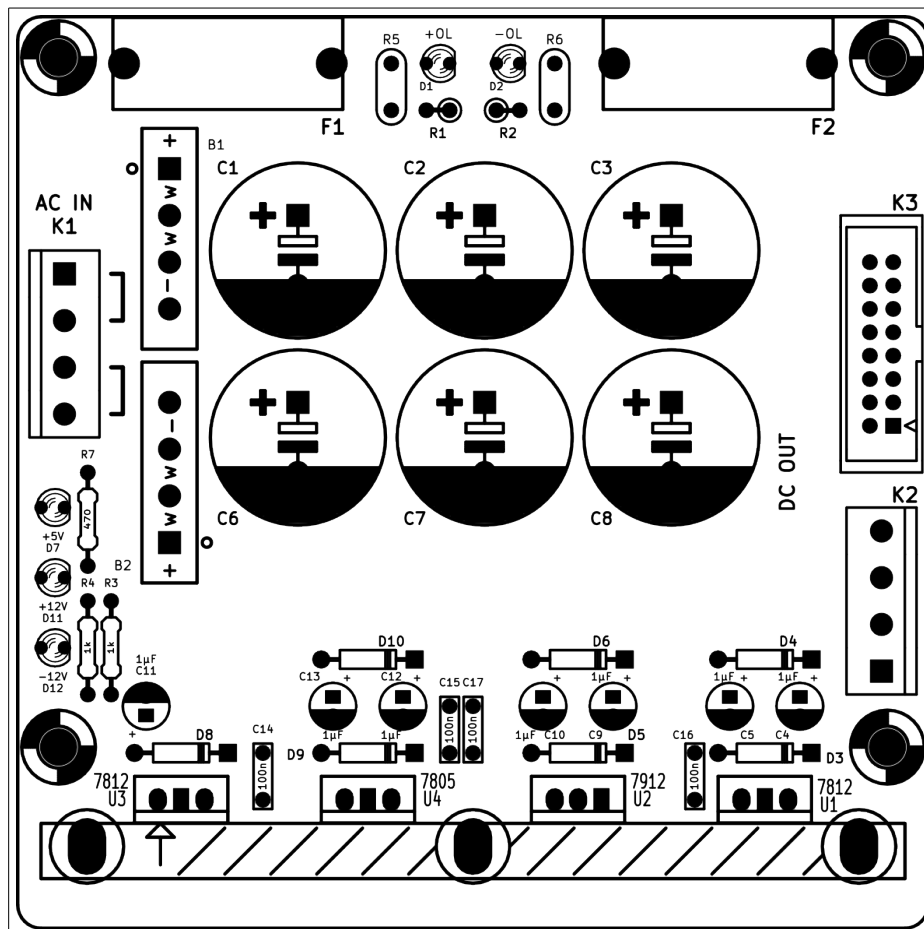
Check for a possible short circuit between U2 case and ground.

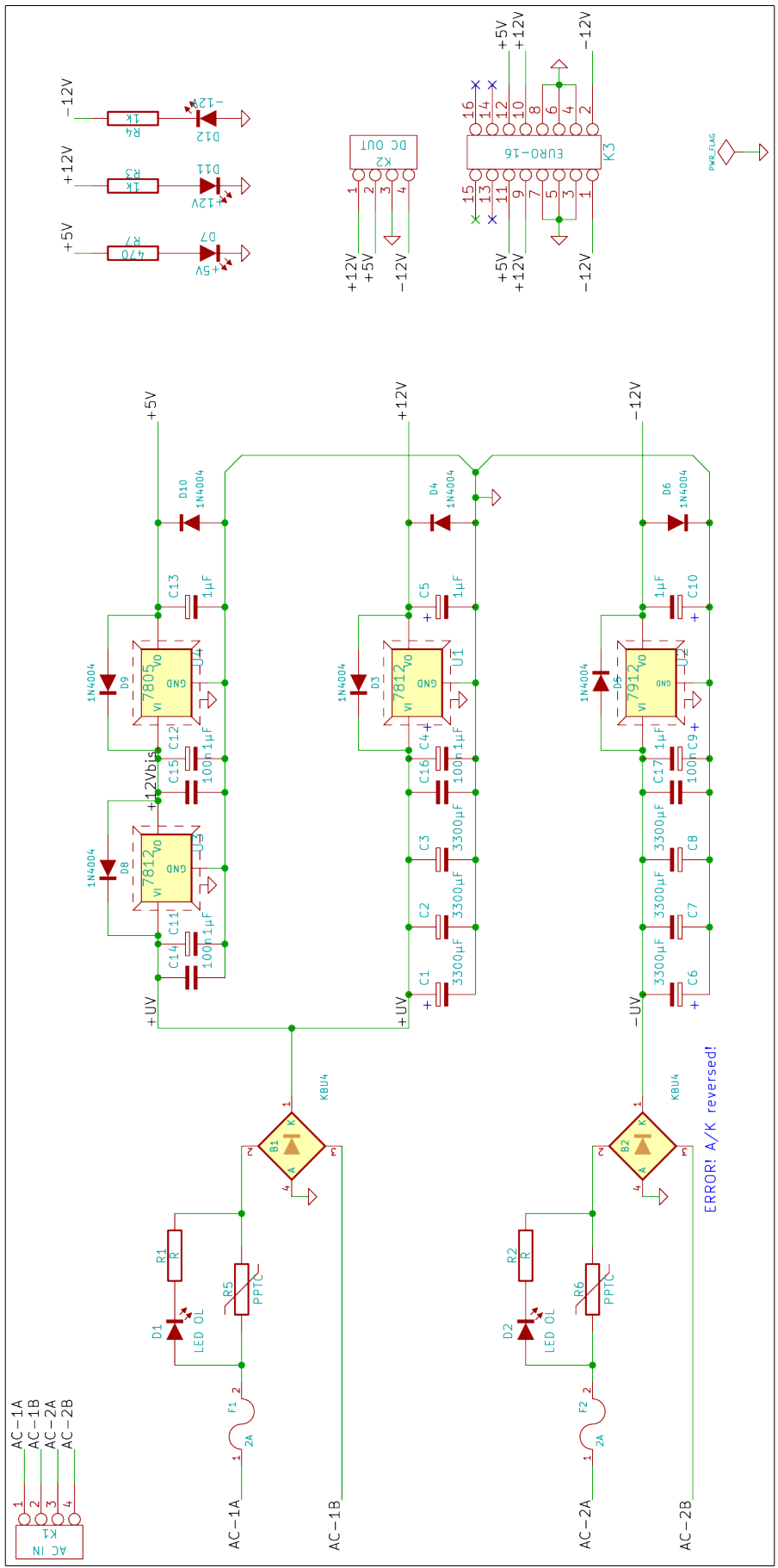
Use of a lab power bench is strongly recommended : power one side of your board with your lab power supply, current limited around 100 mA and check for voltages and over current consumption. At 14 V input, you should get correct output voltages. LED from the corresponding powered side should illuminate. If not, check output voltage and LED position.

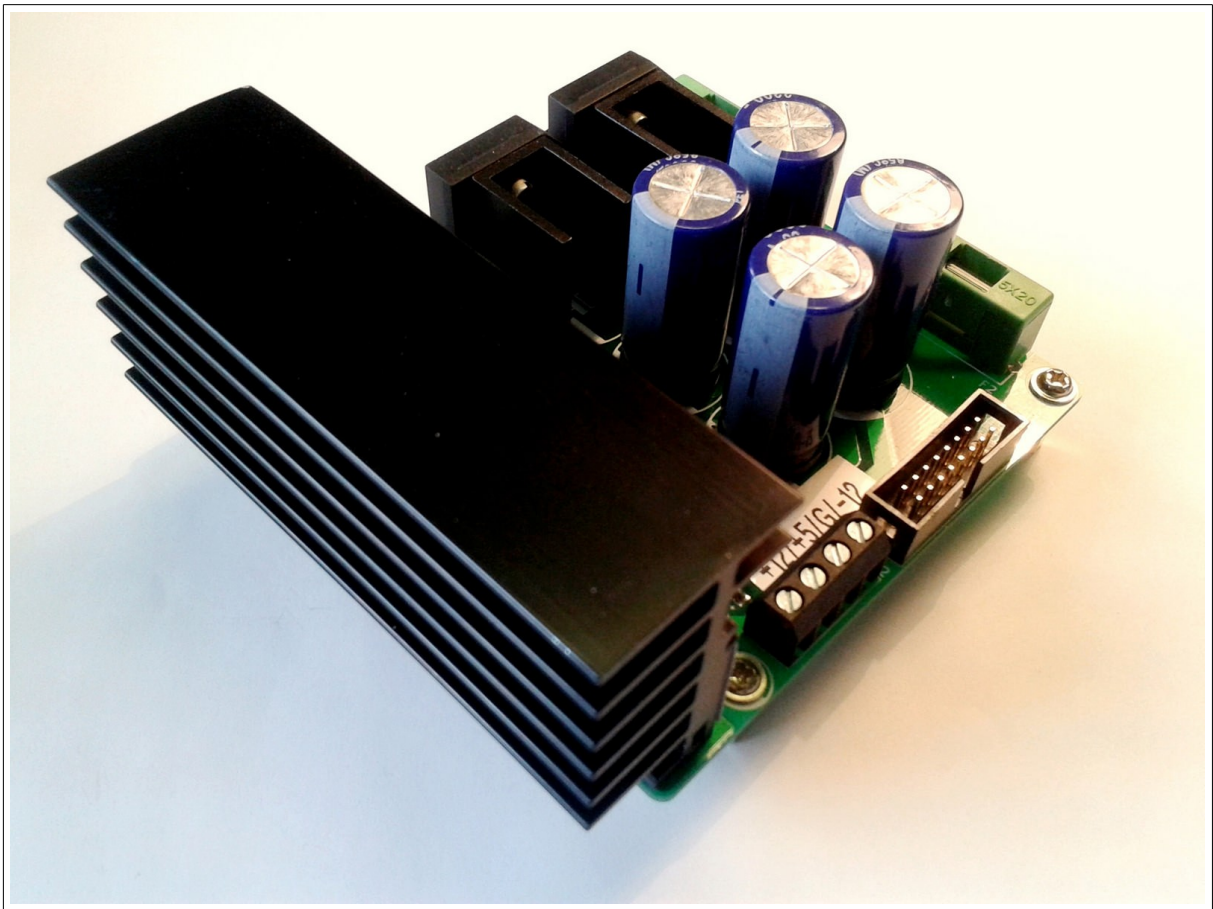
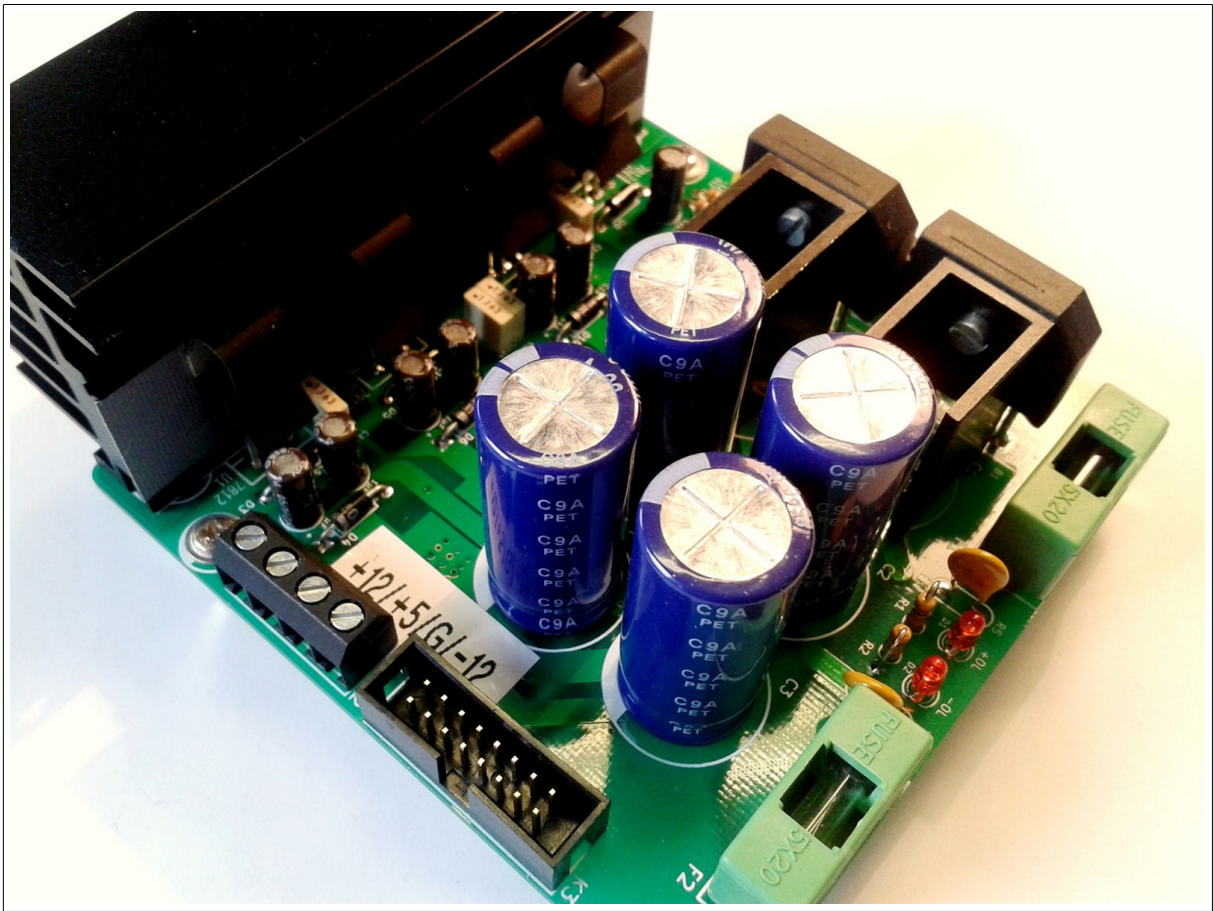
If no output voltage, check regulators position, values, and check for defective fuse.

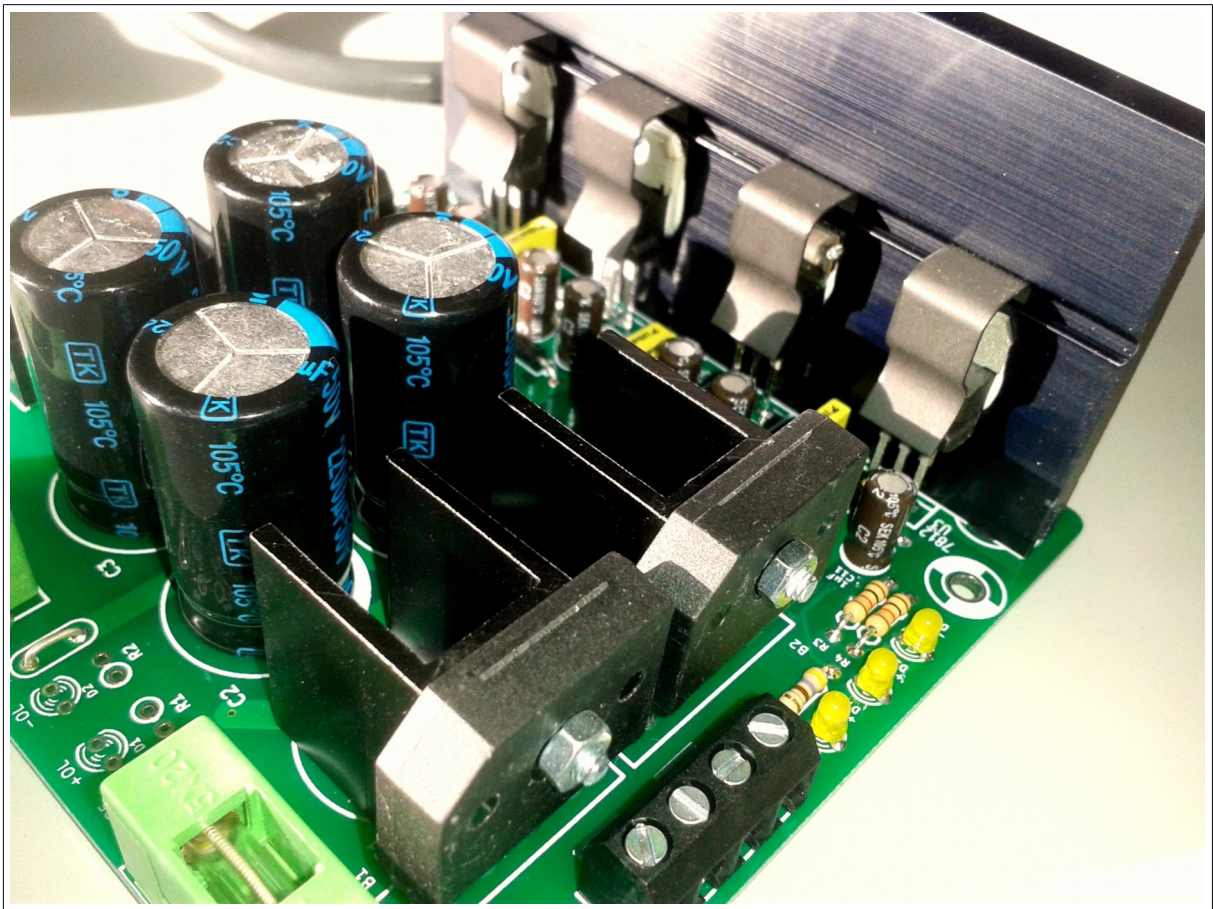
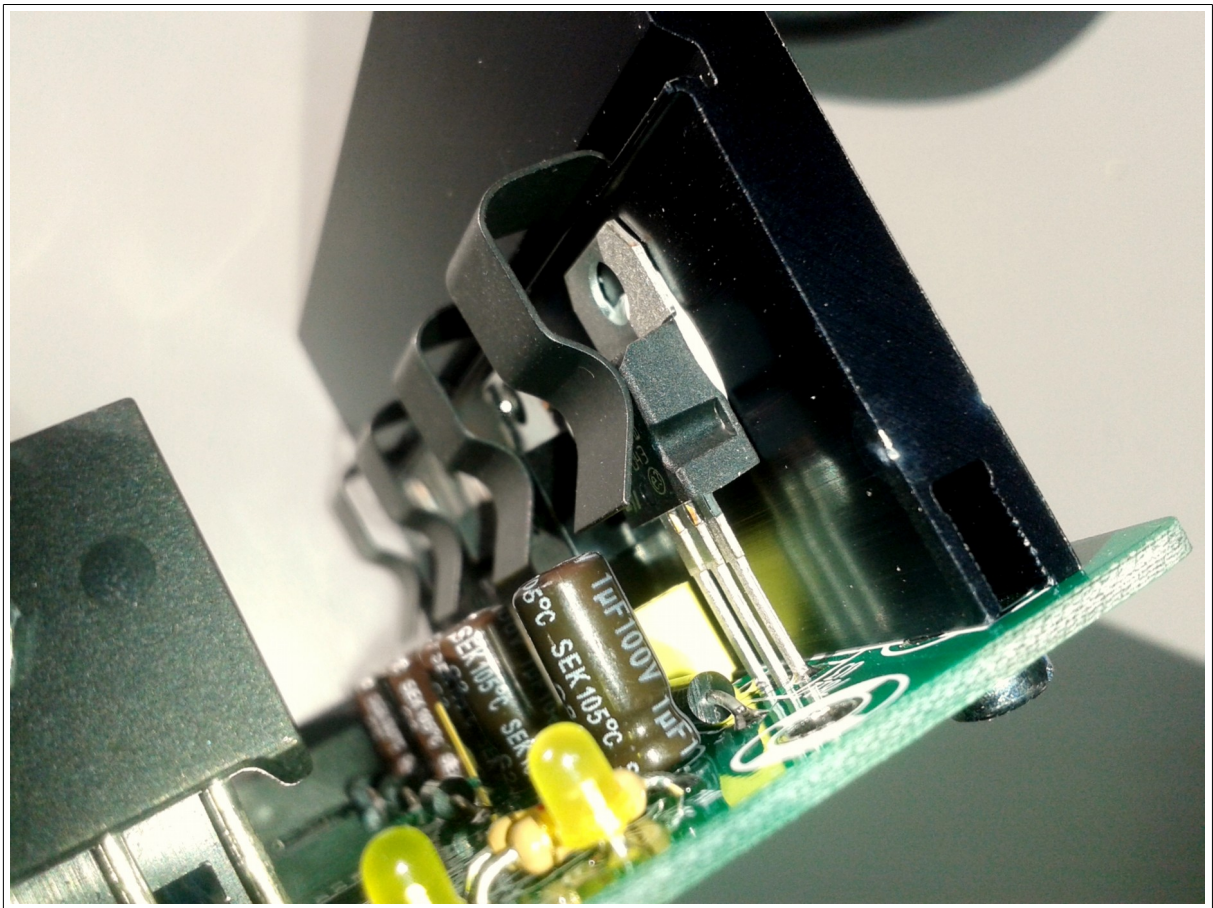
Once first side is tested ok, check the other side, use lab power supply on the second side and check second rail.

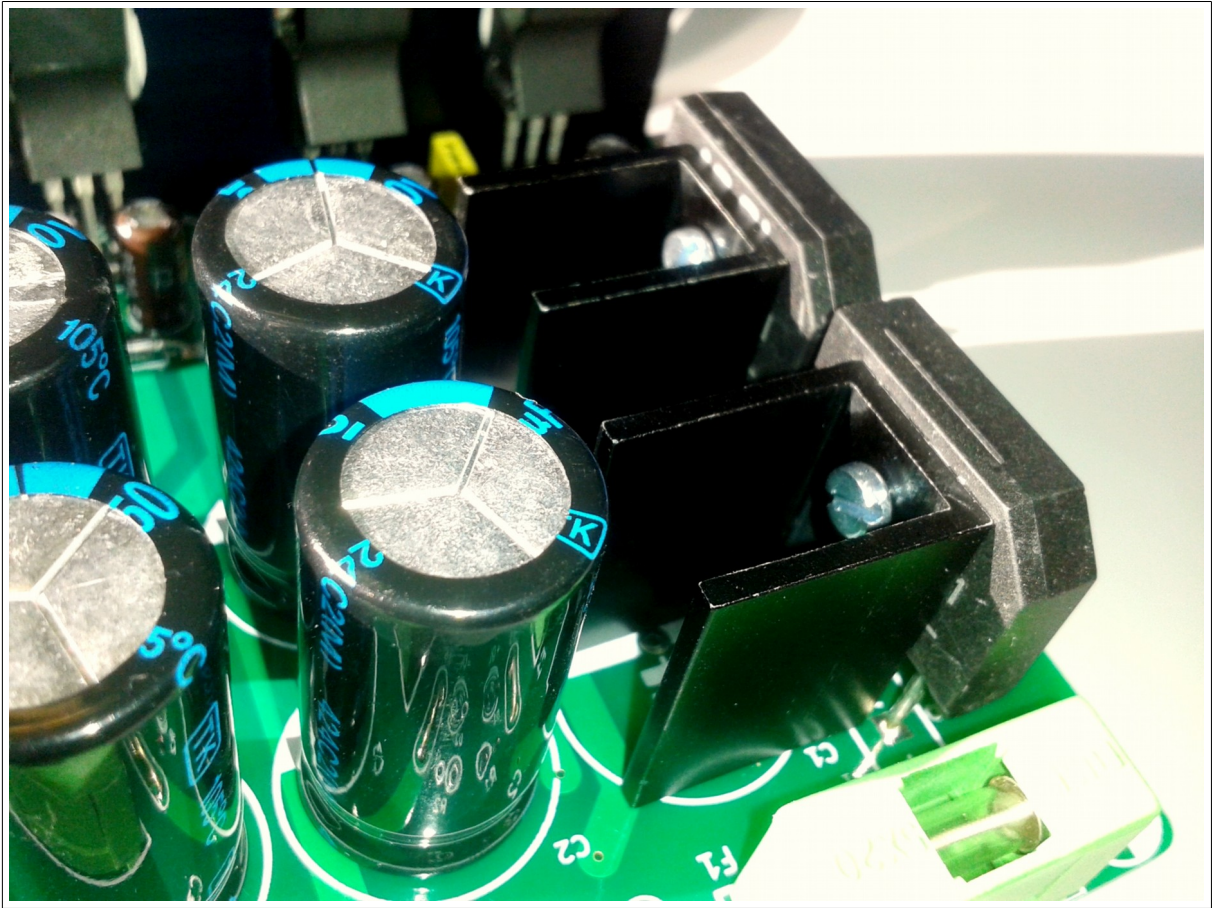
Use a dual winding transformer only. Connect each winding on K1 terminals, one per rail.











Revision notes

- 20151227 : in errata section, incorrect reference C2, C6 is correct.