

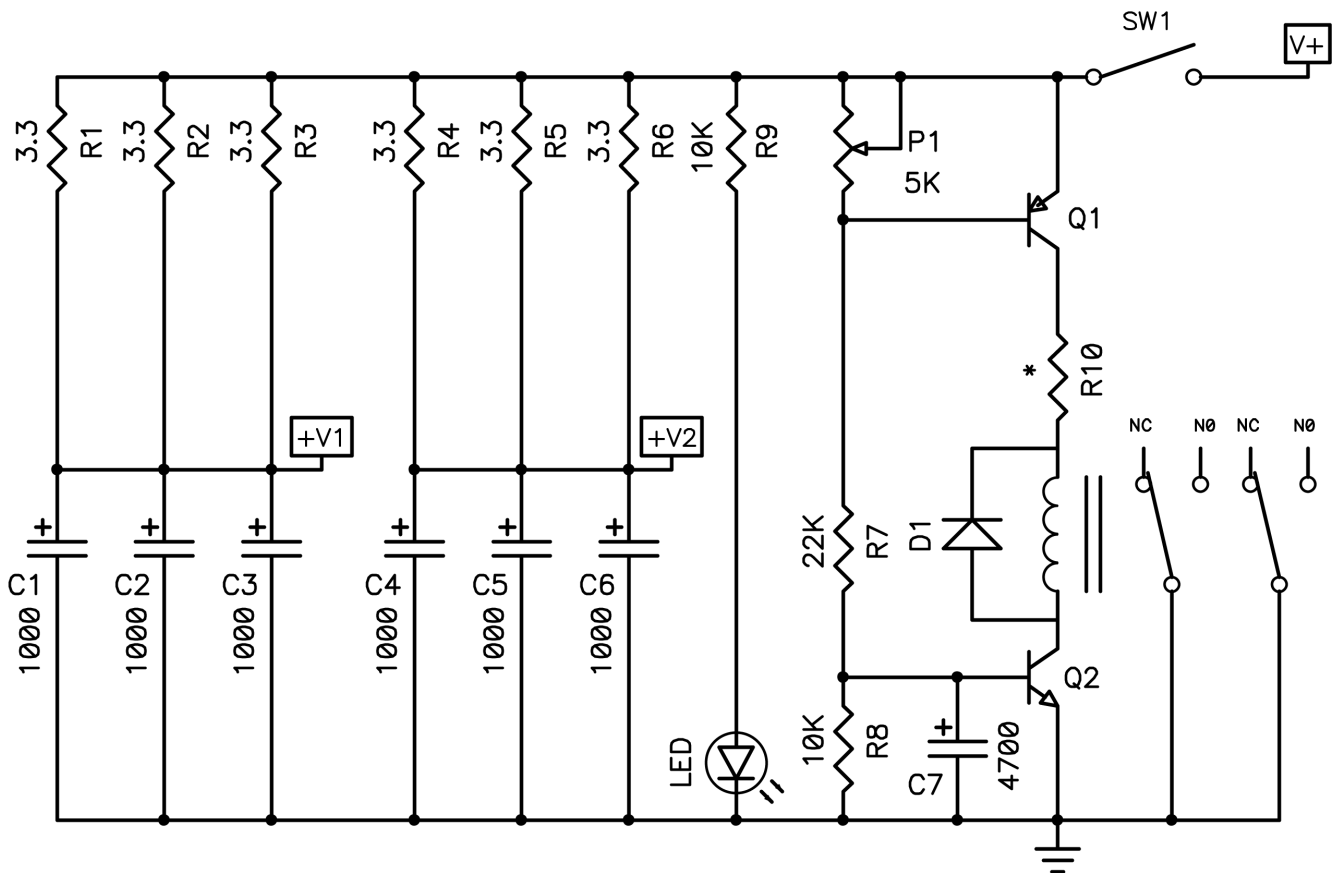
# DIY POWER SUPPLY FILTER / RELAY V0R0

By Nelson Pass

About a year and a half ago I released a power supply filter board and thump suppression relay circuit to go with the DIY Sony N channel VFET amplifier kit. The P channel version did not particularly need this, as the VFET Drain was grounded and so not exposed to the noise of the switching power supply V+. In the case of the N channel version, the supply noise leaked through the VFET by virtue of its low Drain-to-Source impedance, and further, it displayed much larger turn-on and turn-off thumps.

However the relay action on this circuit was not good enough to prevent thumps on turn-on and turn-off, and while it limited the thump still caused complaint. This supply filter and relay are designed to do the job with more finesse. It is useful for single supply amplifiers and line level circuits.

Here is the revised schematic.



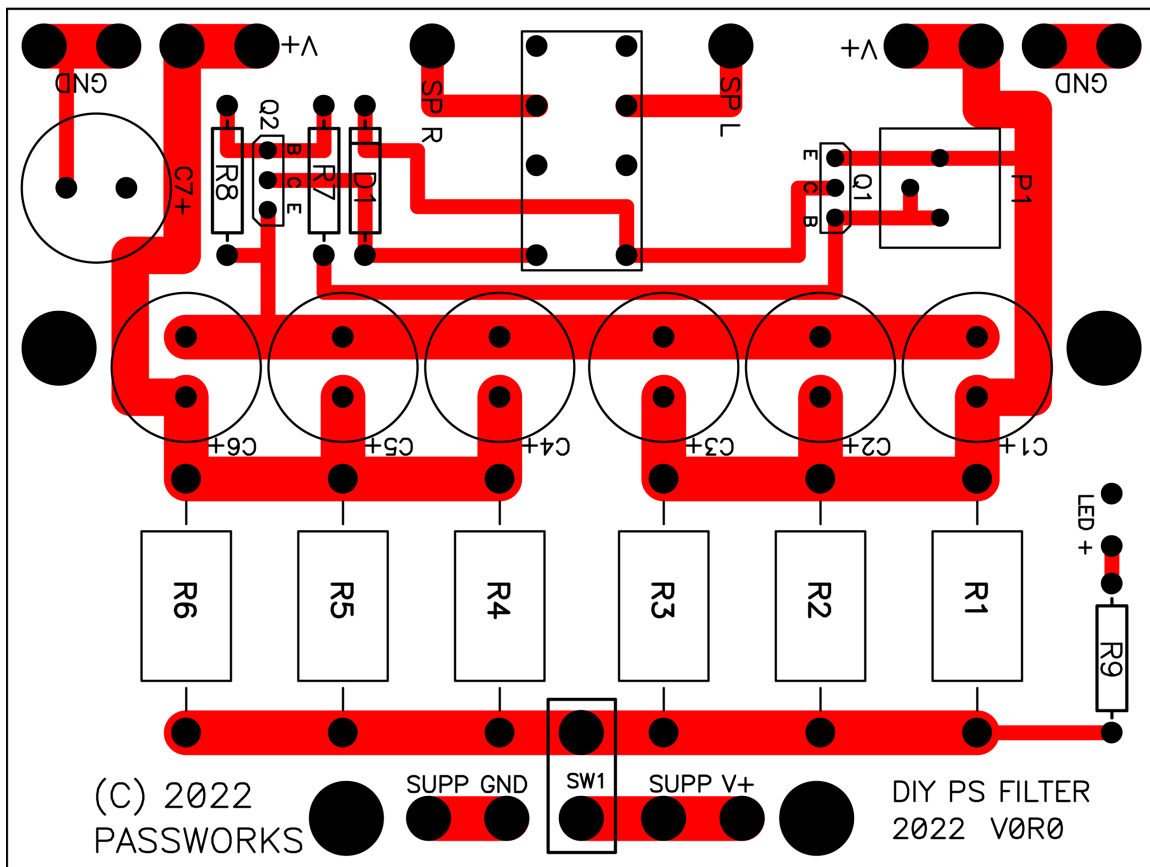
A new control circuit has been added which further delays the relay turn-on but quickly shorts the output of the source when the supply voltage starts to drop. P1 is used to adjust the sensitivity of the turn-off. Note that the supply filters have two separate outputs, one for each stereo channel. No problem paralleling them to one channel if you like.

The analog output of the the gain circuit connects to the Normally Closed (NC) pins of the relay. This arrangement shorts the output of the gain stage until C7 charges on turn-on and again when the rail voltage drops below an adjustable set point.

All the parts are generic, depending on power supply voltage and degree of filtering desired. The ones listed here are for a 24V supply at 1 amp R7 is chosen for about 1 mA current. The values here are very flexible, and R10 is selected to adjust the current for supply voltages greater than the coil rating.

R1-6	3.3 OHM	5W
R7	22K	.5W
R8, 9	10K	.5W
R10	0	
P1	5K	TRIMPOT
C1-6	1000 UF	25V - .5" diameter .2" hole spacing
C7	4700 UF	6.3V - .5" diameter .2" hole spacing
Q1	PNP TRANSISTOR – KSA992	120V, 500 BETA
Q2	NPN TRANSISTOR – KSC1845	120V, 500 BETA
D1	1N914	GENERIC DIODE
LED	LED	GENERIC
RELAY	DPDT 24V	DIGIKEY 2449-J104D2C24VDC.20S-ND

Here is the circuit board, showing the top side traces.

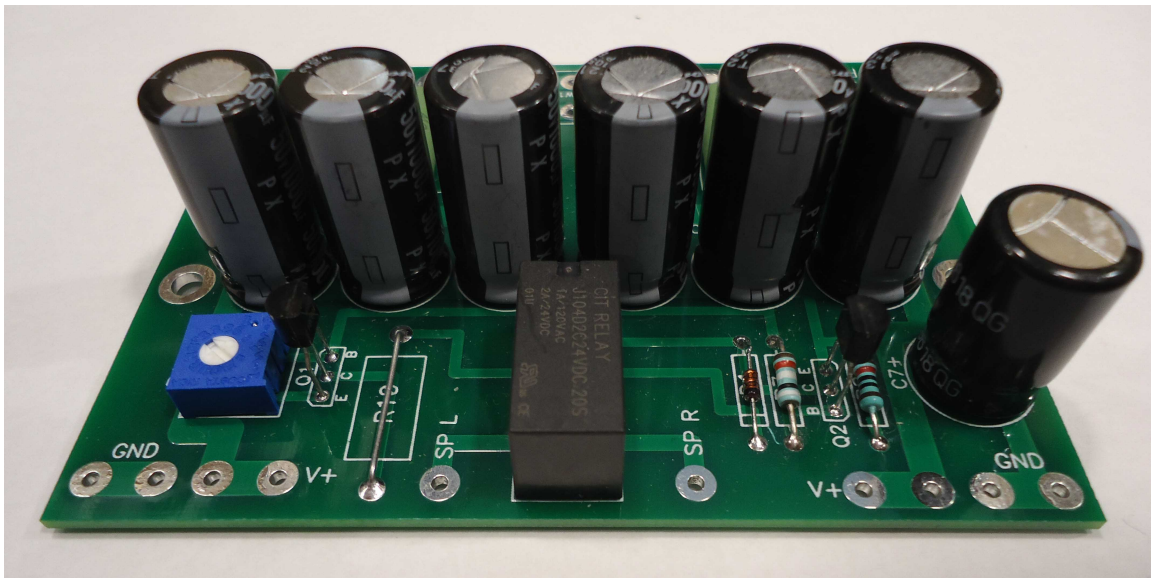


As a concept this specific circuit is designed around single-ended amplifying circuits with capacitor coupled outputs. In this example it is assumed that grounding the output is preferred over a switched connection from source to load, audiophiles being somewhat suspicious of series switch contacts carrying signal...

The basic switch circuit also works perfectly well with line level audio circuits and is easily adapted to other supplies, including minus and dual voltage types – simply a matter of scaling for voltage and current. The DPDT switch gives flexibility in what gets connected and not.

It just takes a little imagination, and you are encouraged to play with it.

A low cost kit has been prepared for the “store” at [www.diyaudio.com](http://www.diyaudio.com) and will be available shortly.



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