

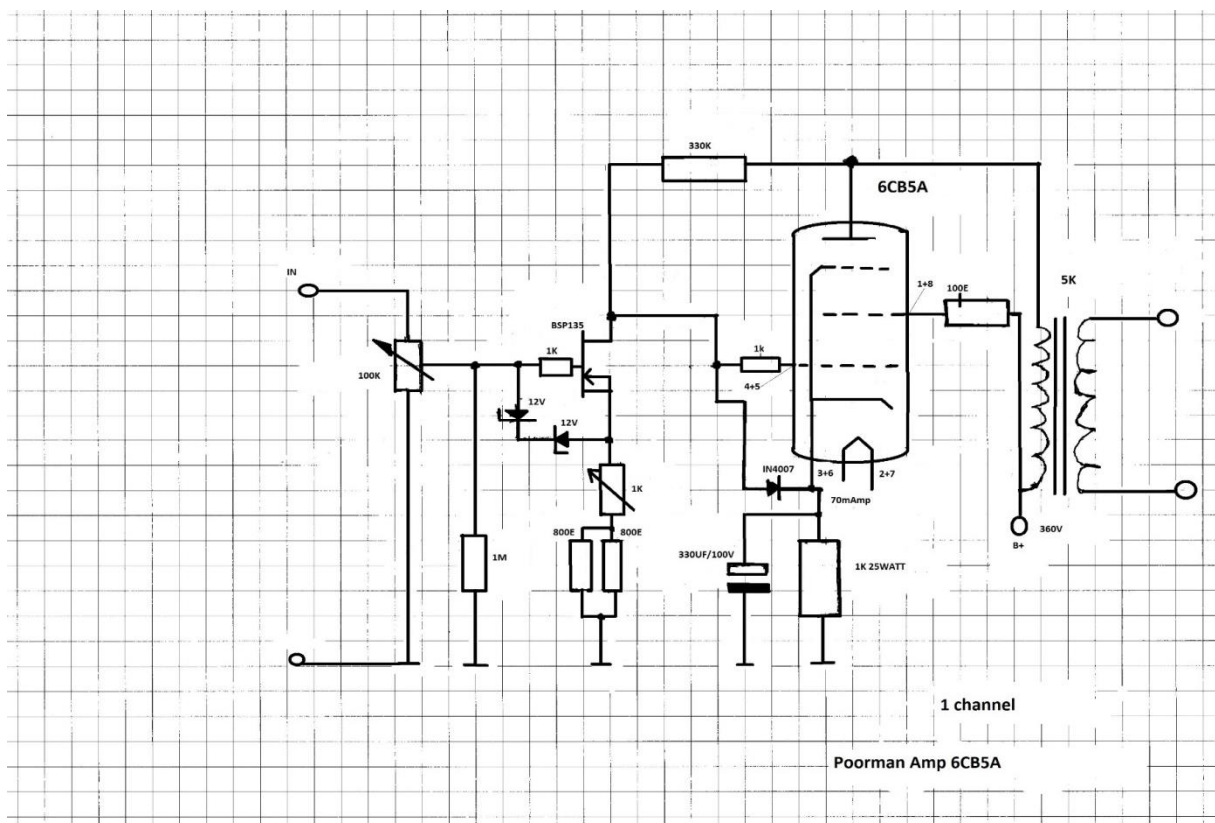
Poorman 6CB5A SE-Amplifier

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Almost everyone applies the famous 300B or 2A3 in high quality SE-amplifiers. I decided to use the 6CB5A pentode power tube. In the literature this special tube, switched in triode mode, often is called the “poor man 300B”, because, when switched as triode, the Ia-Vak-Vgk characteristics are almost equal to the 300B. Besides that, the 6CB5A is inexpensive (below € 10,-) which explains the “poor man” indication.

However, when you use the tube as a real pentode for maximal output power, the plate resistance is rather large, certainly not comparable to the $r_p = 800 \text{ Ohm}$ of the 300B. I wished to drive the output transformer with a low impedance tube, for maximum output power, lowest distortions and widest frequency range.

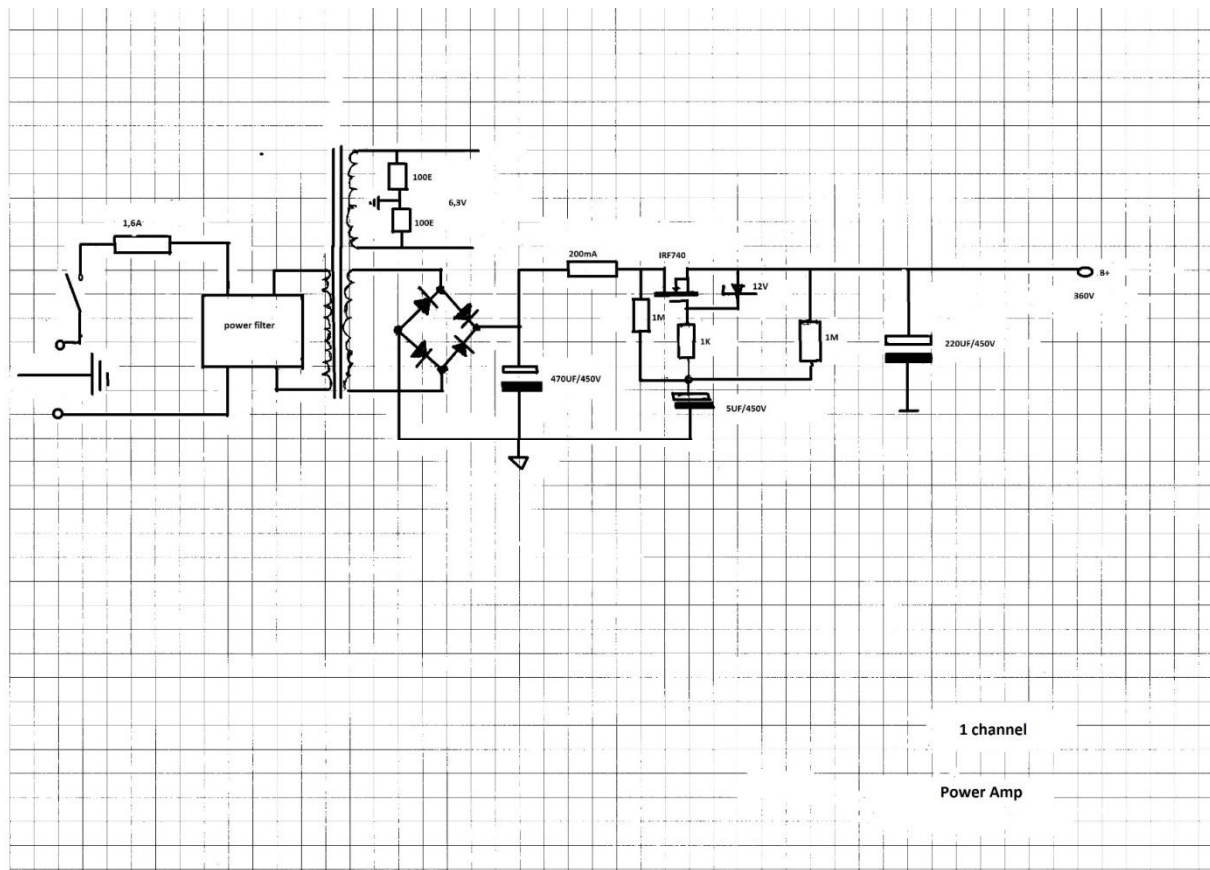
Therefore I applied the Vanderveen-Trans-circuitry: <http://www.elektor.com/vanderveen-trans-tube-amplifiers>. Please see the schematic below:



The BSP135 functions as a voltage controlled current source. The two 12 V zener diodes protect the FET at startup of the amplifier. The adjustable source resistor (1k) sets the quiescent current (70 mA) of the 6CB5A power tube (measure 70 V over the 6CB5A cathode resistor of 1 kOhm).

The output transformer is a Luxor $Z_a=5k$ to $Z_s=5\text{-Ohm}$ with $P_{max} = 70W$.

See the next schematic for the essentials of the power supply.



The power transformer is the VDV-POW80. The circuit around the IRF740 acts as a super capacitor, highly rejecting any hum on the B+ line. The ripple voltage on B+ = 360 V is smaller than 1 mVrms. This B+ circuit can drive both channels. Only 6,3 Vac is needed for to drive the filaments of the power tubes, grounded by two 100 Ohm resistors.

We measured the harmonic spectrum, see below. However, I shall have to repeat this measurement, because too many higher harmonics are shown. Their origin is yet unclear. Pmax is measured at 4 W, which also is less than expected. I hope to explain all of this in a later addendum.

