Subject: 300B project, part 3 - PS model
Posted by Damir on Mon, 22 Aug 2005 17:16:08 GMT
View Forum Message <> Reply to Message

I simply use the parts I have and PSU Designer II (Duncan Amplification). I have 370+370V/0,3A transformer, and L-input PS is not possible, I need B+ about 410-430V. Then, I choose C-input with small first cap, two independent PS on the same HV winding, each with its own tube rectifier (5V4G) and CLCLCLC configuration... Let`s see:-I1 current tap (4mA) is actually resistor load, about 100k-I2 current tap is 300B (80mA) -I3 current tap is driver (18mA)Actual parts I used:C1 = two 4,7µF/630V Wima MKP4 in parallelC2 = 200µF/500V Mundorf M-Lytic HV electrolyticC3 & C4 = 47µF/600V M-Tubecap polypropyleneL1 = 10H/250mA/98 Ohms, AE-EuropeL2 = 10H/150mA/140 Ohms, SchmidbauerL3 = 10H/~50mA/285 Ohms, salvaged/old stock Current ratings of the chokes is overdimensioned. All parts (especially caps) must be for 500V working voltage minimum.On PSUD diagram we can see 30ms "segment", 1s after "turn on".-The green line is ripple voltage, Vc1~80Vpp, from 400-480V. The DC voltage is Vc1 = Vc1p - Vripple/2 = 480 - 80/2 = 440V.-Vc2 is yellow line, after first Pi-filter (L1/C2).Vc2 = Vc1-RwL1*IL1 = 440 - 98*(0,018+0,08+0,004) = 430V. We have little ripple, Pi filter lower it S1=Vrc1/Vrc2 = (2Pi*f)^2*L*C == (2*3,14159*100)^2*10*200*10^-6 = 789,57 times, and Vrc2 == Vrc1/S 0 80/789,57 = 0,1Vpp.-Vc3 is blue line, our B+ for output stage, after L2/C3 filter.Vc3 = Vc2 - RwL2*IL2 = 430-140(0,08+0,018) = 416,5V. Our second Pi-filter lowers the ripple voltage 185,5 times and we theoretically have just 0,54 mVpp ripple here.-Vc4 is a white line, our B1+ for the driver, after L3/C4 filter.Vc4 = Vc3 - RwL3*IL3 = 416,5 - 285*0,08 = 411V. Third Pi-filter lowers the ripple voltage to just 0,003mVpp theoretically.-Red "spikes" are ripple current waveforms on C1. Although we "draw" about 158mArms from our transformer, C-input means sharp peaks of 465mAp! That`s why we prefer L-input, if we can...-Actual measured voltages on breadbord shows only a few volts difference in comparison with simulation.