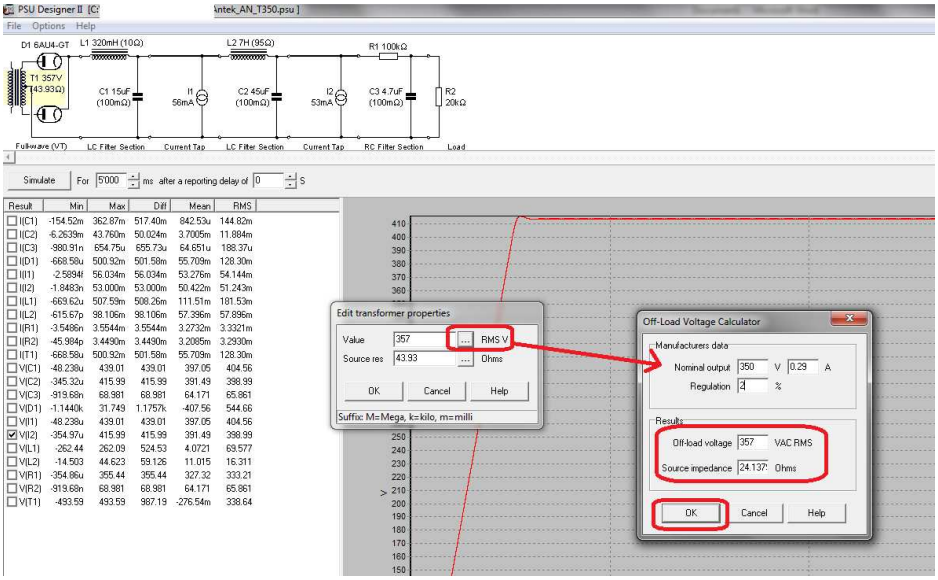
# Using Duncan Amps PSU II

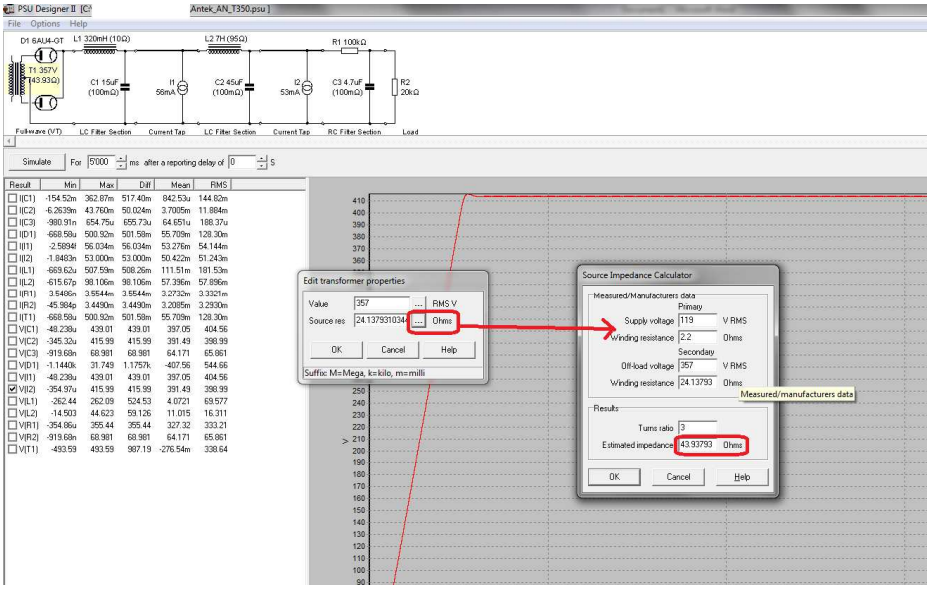
The example below is of a 'flywheel' type power supply using Antek AN 2T350, Triad Magnetic C-40x 320mH choke and Hammond 159Q 7H choke which the user already had. The film caps are also what the user had on hand. This is by no means an "ideal" supply and no claims are made.

1. Right click the mains transformer and enter in the voltage values you expect.
2. Then click the … button beside 'RMS V'. Enter the correct values for the HT secondary.
3. For our example it is 350V and 0.29A. 2% regulation will be ok unless you have accurate manufacturer data:




This give us an Off-load voltage and initial Source impedance value. Click OK.

4. Now click the … button beside 'Ohms'. This is what you will see:




5. Here we enter the Primary Supply voltage as well as the winding resistance. Just a side note, but it's important to set the mains frequency correctly. For USA/Canada its 60Hz and for Europe its 50Hz. I selected 'soft start' in the options since we are using TV damper diodes.

6. Now simply click on one of the fields below and the Estimated impedance will be calculated.

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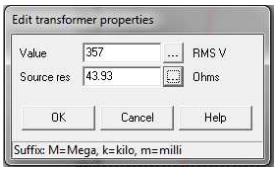
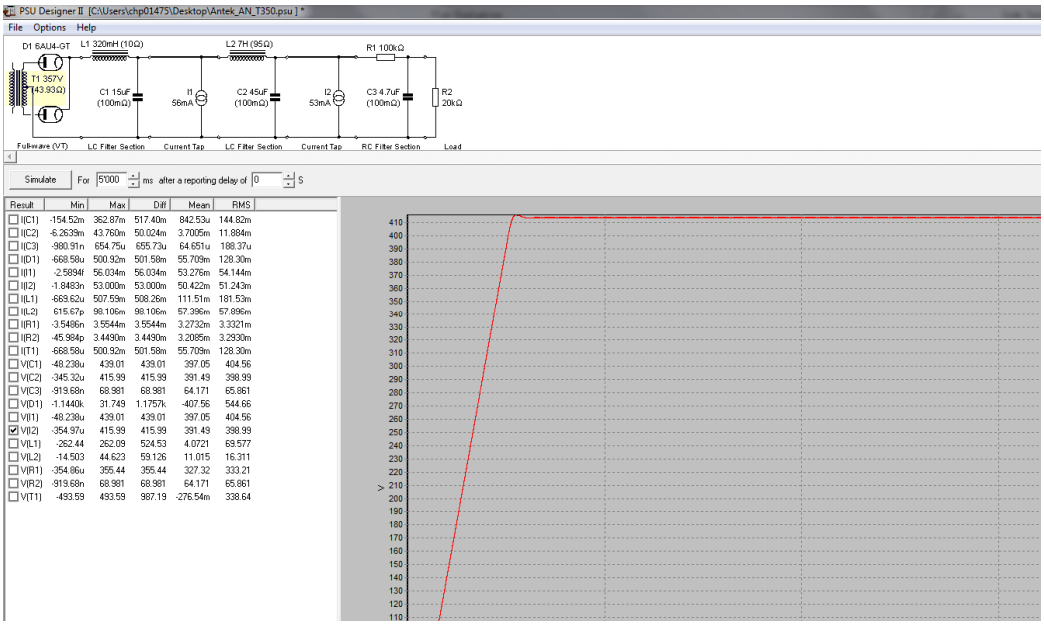
7. See how the Turns ratio comes up as an even number? This is a good sign. ☺
8. Now we can see these values for our transformer HT secondary:




Click OK and check that the correct values appear in the software.

9. Now we can start simulating. I ran this simulation a few times and come up with this using 6AU4-GT damper diodes. For damper diodes, the "soft start" option can be used. For solid state, do not use "soft start":




10. You will see that I put a current tap between the chokes. This is to represent the current draw of the other channel. I assume that there is a 2nd Hammond choke for that channel. You will see that the current draw I chose is slightly more than the sum of the 1st channel – it also includes the current of the load resistor.

    Note: Duncan amps won't let you put the load resistor in parallel with a current tap, so I simply split this resistor into two parts (100k + 20k ohm in this example). It could simply be a single 120k resistor, or could actually be a resistor divider which you might use to reference heater voltage.
    Some designs employ a lower value, higher rated load resistor to continuously draw current from the supply.
    You *want* to use a load resistor in your design so that your caps do not hold a charge when you turn off your amp.

11. If you want higher B+, you can *decrease* C1 somewhat. I only chose 15uF since you had it in your original diagram. This is up to you.

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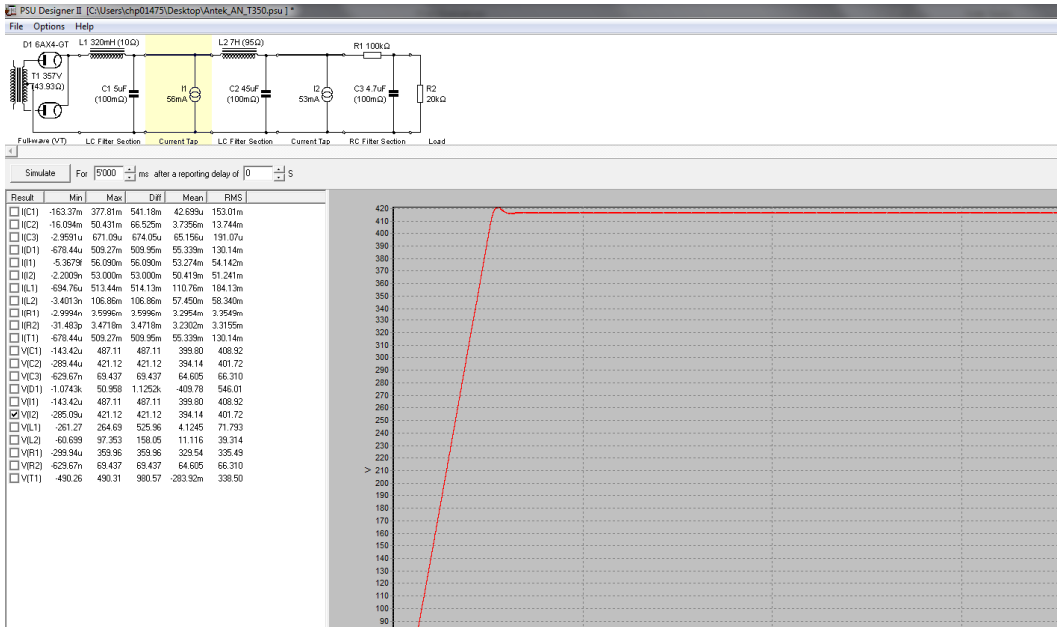
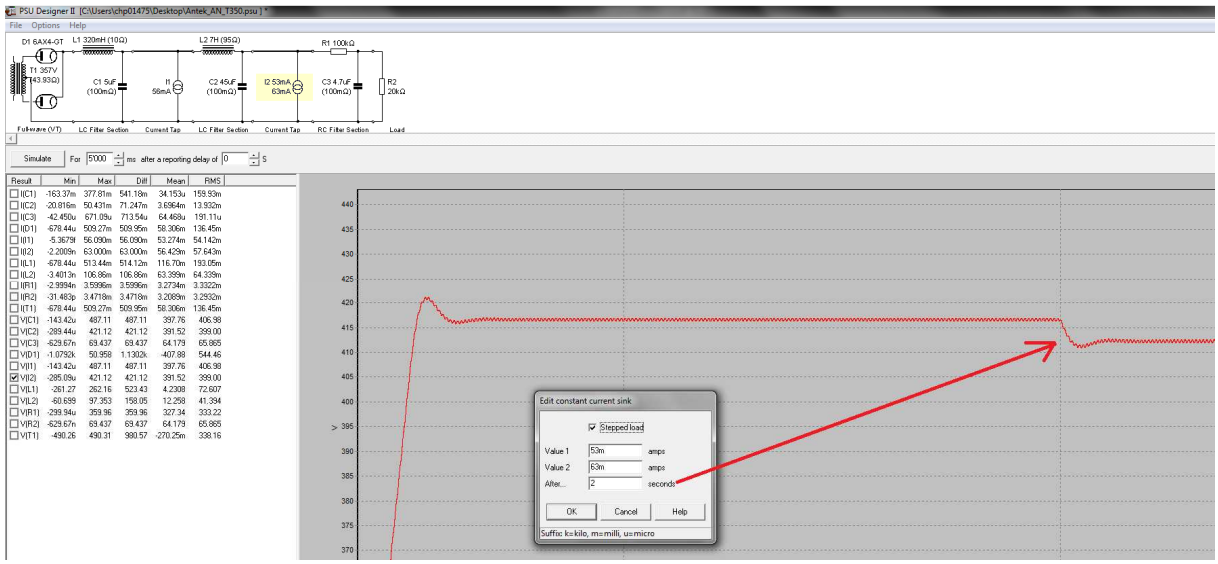
12. Here is what it will look like with 6AX4 and a lower value of C1:




13. This next step always brings some discussion, but you can also see how the power supply responds to a sudden current swings:




14. Edit the second current tap and make it a stepped load. Make the second value a change of 10% or greater, and after at least 2 seconds.

15. This test will basically show you how stable your when it is stressed. Most users don't pay attention to this, but it is a simplified way of simulating transient recovery. Some diy'ers claim that it has no impact for Class-A amplifiers since they are constantly drawing current. However hitting a bass note at any reasonable volume on a single ended amplifier is an event that you can clearly scope. Nothing replaces a measurement.

Best regards

Ian Jan 10, 2017