

Tweaks, optimizations, and silly changes to T2

Some DIY builders enjoy modifying audio projects, either to improve the results, or to add their own personal touch, or perhaps sometimes, to be different merely for the sake of being different. Here are a couple of ideas that may appeal to tweekers, hot-rodders, and six digits of precision SPICE simulation aficionados. Needless to say, if you don't understand a tweak, you shouldn't implement it.

1. Add a clamp-on ferrite core to the wall wart cable

Mouser sells 100s of them in this area of their website: All Products -> Passive Components -> EMI Filters / EMI Suppression -> Ferrites -> Ferrite Clamp On Cores

Even though T2 includes filters to remove high frequency hash and noise produced by its SMPS wall wart, adding even more filtering may provide further improvements. A simple way to do this is to add a clamp-on ferrite core. If you wish to explore the world of *very elaborate* ferrite filtering, Google search for "Common Mode Chokes" by W1HIS also known as Chuck Counselman. Wow.

2. Measure and rearrange the 68 ohm 3 watt resistors

The voltage gain of T2 is relatively modest: 6 dB. Some T2 builders might be a little disappointed if their unit's gain came out slightly less than 6 dB, merely because the gain setting resistors are 5% tolerance instead of 1% tolerance. We can stack the odds to prevent this from happening, without buying any new parts.

Simply attach labels to the eight 68 ohm, 3W resistors: call them A thru H. Then measure and record their resistances. I did this just now on my collection of eight resistors. My results were:

(RA = 67.68) (RB = 67.46) (RC = 67.50) (RD = 67.59)
(RE = 67.58) (RF = 67.44) (RG = 67.54) (RH = 67.43)

Now assign RA thru RH to schematic positions R25-R28 and R75-R78 according to this table of rules:

Lowest measured resistance --> R25

2nd lowest resistance --> R75

3rd lowest resistance --> R26

4th lowest resistance --> R76

5th lowest resistance --> R27

6th lowest resistance --> R77

7th lowest resistance --> R28

highest resistance --> R78

Following those rules, I would arrange my resistors RA thru RH as follows:

Lowest resistance --> R25	is RH = 67.43
2nd lowest resistance --> R75	is RF = 67.44
3rd lowest resistance --> R26	is RB = 67.46
4th lowest resistance --> R76	is RC = 67.50
5th lowest resistance --> R27	is RG = 67.54
6th lowest resistance --> R77	is RE = 67.58
7th lowest resistance --> R28	is RD = 67.59
highest resistance --> R78	is RA = 67.68

Now when I assemble my T2, I will stuff the resistor labeled “RH” into the circuit board footprint R25. I will stuff the resistor labeled “RF” into the circuit board footprint R75. And so on, down the line, finishing with the resistor labeled “RA” into circuit board footprint R78.

Performing this tweak doesn’t cost any extra money, but it does take time. It also gives you, the builder, a more intimate connection to your finished T2 headphone amplifier. You *hand-selected* the resistors in its Class A output stage. It sounds so good because *it was hand-built, by you!*

3. Experiment with additional bypass capacitance on NEGPWR

T2 is powered by a wall wart that contains an SMPS. These do not like to see large amounts of bypass capacitance on their output, which is one reason why I installed “only” 331 microfarads of supply bypass capacitance. However I cannot prevent you from experimenting on your own T2, to see what happens when you add more, more, more bypass capacitance all over the board. Maybe the SMPS will completely fail to start up. Maybe it will work perfectly. Maybe the sound will improve when you add more, more, more. If you’re curious, give it a try. Even if the experiment ruins / destroys your wall wart, that’s not the end of the world. The wall wart costs less than \$12 from Mouser.