

Re: High voltage capacitors in audio

Source: <http://sci.tech--archive.net/Archive/sci.electronics.design/2007-06/msg03444.html>

- *From:* John Popelish <jpopelish@xxxxxxxx>
 - *Date:* Mon, 25 Jun 2007 09:52:37 -0400
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MooseFET wrote:

On Jun 24, 8:52 pm, John Popelish <jpopel...@xxxxxxxx> wrote:

ectoplasm wrote:

Thanks for explaining so clearly. That's a very good suggestion to have the 1000uF caps next to the output stage. The rectifier diodes might just as well be there, too, then. All transformer leads will go there directly (15V - 0 - 15V).

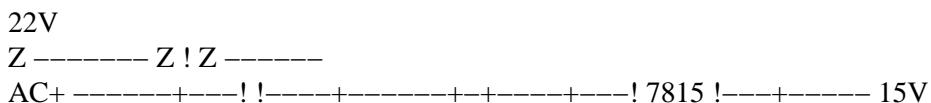
No, directly to the +-22 volt supply, the unregulated one. I think it makes little difference whether the diodes are close to the output pair or remote.

"like" changed to "little"

I disagree with this idea. There can be a highish charging followed by a recovery current spike. These have a lot of energy right in the middle of the audio band. It would be much better to put this stuff elsewhere.

The main difference might be capacitive coupling between the secondary AC and the opamp circuits. Having the diodes more remote keeps all the traces near the opamps having only DC or slightly rippling DC on them, lowering the possibilities for hum injection.

If the bridge and the filter are on the PCB, you need to be careful of how the ground and supply wires go.



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!! bridge! ! 1000! ! ----- !
---- !! ----- ! ----
0.01---- 0.01---- ---- -0.1 ! ----100u
!!!!!!
Z!!Z!-----+-----+----- GND
AC0-----+-----+-----+----- GND
---- mirror image for AC-----

The ground trace hits the points in the order shown. It is a wide trace not a plane until you get to the right side of the drawing.

I think you need a few more Zs in there. The main load on the 1000 uF cap is not the regulator, but the output transistor. Where does the headphone ground return make connection to that schematic, and where is the Z in that path? I would want the regulator to have its ground reference connection be connected to ground at the point where the two channels of headphone grounds first connect together, not at some distant end of their common path back to the transformer center tap. I like what you show from transformer to storage capacitor, but not to the right of that.

The points I put the "Z"s on are places where ideally, a small lossy impedance will be in series. The 0.01uFs on the bridge are to keep RF noise out of the system. They should be right at the legs of the diodes.

All good.

The 1000uF capacitor does the bulk of the filtering. The 0.1 and 100u are right on the legs of the LM7815. If the lead from the 22V to the LM7815 is very long, more capacitance at the input of the LM7815 should be used.

I would keep the regulators close to the storage, if possible. If this is not possible for thermal or other reasons, than the 100 nF input cap bypasses quite a bit of path inductance at the frequencies where it matters. That is its purpose.

I show two ground connections at the output because the layout may actually be sort of like that. The return current of the output should not flow through the ground of the preamp stage to get to the capacitors.

As I spoke about.

[...]

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I.e. the regulators (7815/7915, not to be omitted I think) would be fed from these two storage caps, too (through separate traces for their minor load current).

Right. Keep those 100 nF pairs for each regulator right up against the regulator pins, for stability.

I will add stress to the above. One inch of wire is too much between the LM7815 and the capacitor.

Okay. I stress that! ;-)

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