
Subject: One output transformer hotter than the other
Posted by [hurdy_gurdyman](#) on Thu, 18 Aug 2005 01:38:16 GMT
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I have an old Scott LK-48-B integrated amp. I've had it in a cabinet since I bought it a few years back and had low speed fans cooling it. I moved it to the top of the cabinet with no fans a few days ago. Now I notice that the right channel output transformer runs hotter than the left, quite noticeably. I checked with a VOM all the voltages. Each output tube plate has 420 VDC, as the schematic says it should (supposed to have 7189 tubes. I am running JJ EL 84's.) I have no way to accurately check bias current, but measure -31 VDC at the grids. Both sides measure the same. I adjusted for 0 volts DC balance between the pair of tubes on each channel. Right channel still runs hotter. After running the amp for 16 hours, I can place my hand on the right tranny and count to 10 without burning, but it's very uncomfortable. The left side is not very uncomfortable, just warm. My question would be if this sounds like it's within normal range for tube amp channel-to-channel variation, or do I have a problem? If I have a problem, what should I do next? Dave

Subject: Re: One output transformer hotter than the other
Posted by [Wayne Parham](#) on Thu, 18 Aug 2005 03:28:57 GMT
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Can you measure plate currents? Alternatively, you might measure the voltage across cathode resistors, and then calculate cathode currents. That might shed some light on things.

Subject: Re: One output transformer hotter than the other
Posted by [Thermionic](#) on Thu, 18 Aug 2005 06:35:39 GMT
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Sounds almost like you have some ultrasonic oscillations. They'll make an OPT get super hot. But, I guess that's really unlikely, as that amp has grid stopper resistors thicker than flies everywhere, and if it was an ultrasonic oscillation that bad the plates would probably be glowing red. Many times, an ultrasonic oscillation will modulate other frequencies, and you'll have a weird audible hum along with it, or even other oscillations at audible frequencies. Thermionic

Subject: Re: One output transformer hotter than the other
Posted by [hurdy_gurdyman](#) on Thu, 18 Aug 2005 11:12:09 GMT
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There's no hot glowing tubes or funny noises. Runs quiet, and has been using these tubes without even a hiccup for almost a year now.Dave

Subject: Re: One output transformer hotter than the other
Posted by [hurdy_gurdyman](#) on Thu, 18 Aug 2005 11:13:40 GMT
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Wayne,I just have an inexpensive VOM that adds resistance when making a current measurement.Dave

Subject: Re: One output transformer hotter than the other
Posted by [Damir](#) on Thu, 18 Aug 2005 11:15:33 GMT
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In "normal" work, power dissipated in winding resistances is low, and possible imbalance between the channels is probably fraction of W.It can be oscillation in one channel (large current through the output tubes), or just layout issue - one OPT closer to some hot components (tubes).

Subject: Re: One output transformer hotter than the other
Posted by [Wayne Parham](#) on Thu, 18 Aug 2005 13:16:44 GMT
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Do you have a schematic? If there is a cathode resistor, you can measure the voltage across it and thereby know the current.

Subject: Re: One output transformer hotter than the other
Posted by [Poindexter](#) on Thu, 18 Aug 2005 21:53:30 GMT
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Great Googly Moogly, they run those EL84s hard! Plate max.Dave, since the 'bias take' resistor voltage of 0.6v (60mA for the two tubes). Measure the DC voltage at either cathode of the pair, and see what you get. Compare to the other pair. I would say that you'd like to see 0.5 Vdc or

so on each side. If they're pretty close, turn the amp off and use your ohmmeter to measure the DC resistance of each half of the primary on each side, and compare likewise. You may have some corrosion or something in one transformer that is raising its DCR and causing the same amount of current to heat it up. Another way to check for this is to test the DC voltage on the plates, as a high R winding will cause more voltage drop across the primary. The plates are pin 7. An odd thing; there's a DC balance pot after the bias adjust so you can set the OP of each tube in the pair, but I didn't see any way to test for this; or a bias take jack either. AFAICS, you'll just have to take off the bottom plate and stick your hot probe on the right spot. The cathodes are pin 3. Questions? Poinz

Subject: Re: One output transformer hotter than the other
Posted by [hurdy_gurdyman](#) on Fri, 19 Aug 2005 14:34:27 GMT
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Poinz, Just before I read your post this morning I did some more tinkering. Pin three has been adjusted on each tube to read 0.5 VDC (was a bit higher.) All plates read the same at about 420 VDC (my meter isn't very fine at this high of a voltage.) I'm getting - 16 VDC at the grids (pin 2.) I believe somewhere I stated -32, but it seems I was looking at the wrong scale (my eyes aren't as fine as they used to be.) No DC off-set between pins 2 of a pair of tubes. I'm going to let it run awhile and see what happens. If the right channel is still hotter, I'm going to assume that it's because it is located between the other output tranny and the 5AR4 and power tranny. If the transformer has something inside it shorting a bit, there's not much I can do about it, so might as well run it. It's been going for about a year on this set of JJ/Tesla EL-84's with no problem, so perhaps I'm just being paranoid. Dave

Subject: Oh. Never mind.
Posted by [Poindexter](#) on Sat, 20 Aug 2005 03:23:29 GMT
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Subject: so then...
Posted by [Thrint](#) on Tue, 30 Aug 2005 09:30:33 GMT
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It has what looks like the same current flowing through it, it does not sound radically different from its cooler twin, and it is next to a heat source.... A short in it would effect only the sound, and would actually make it run cooler. i is the same, but the r is now smaller. Power transformers are another

story.cheers,Douglas

Subject: Re: One output transformer hotter than the other
Posted by [hurdy_gurdyman](#) on Mon, 05 Sep 2005 03:03:16 GMT
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I've decided to temporarily retire the old Scott until I can figure out what's going on. The right channel gets downright hot, the left only warm, but everything measures the same on both sides. Wierd. Also, the left side is a bit "duller" sounding than the right. I've dug out my old Fisher 500C receiver and am using just the amp/preamp section (see posts above.) The Fisher actually sounds somewhat nicer on my old EV LS-8 open baffles. Highs are smoother (softer?) and bass a bit fuller (a good thing with open baffles.) It sure looks ugly, though. Oh well, I guess it's hard to have it all.Dave

Subject: Figured it out!
Posted by [hurdy_gurdyman](#) on Tue, 06 Sep 2005 19:24:03 GMT
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I got the old Scott fixed. Turns out that a 68 ohm resistor in the negative feedback circuit was open. Everything sounds great now.Dave

Subject: Well, almost
Posted by [hurdy_gurdyman](#) on Tue, 06 Sep 2005 22:39:16 GMT
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After several hours of running, the sound is still excellent, but that right tranny still gets way hotter than the left, uncomfortably hot. Maybe it's normal and I'm too much of a worry wort. While I was working on it earlier, I checked carefully the resistance of the right channel tranny vs the left one. They are identical, so no short. Wasn't able to find any more bad resistors. I put my hand on it for about 15 seconds then had to pull off as it was starting to hurt. I can leave my hand on the left on as long as I like.Does this sound like normal extra heating from the rectifier?Dave
