Subject: KT88 and 6550 - Operational shifts
Posted by Wayne Parham on Sun, 19 Jul 2009 19:32:52 GMT
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I run KT88's or 6550's in an Audio Note amplifier about 4 to 6 hours a day, on average. It sees a lot of service. In general, the Audio Note Kit 2 is a reliable amplifier but if an output tube goes bad, it will probably smoke the cathode resistors and may kill the output transformer or power transformer as well.

What I've found after many years of service is the most common failure mode is an gradual increase in quiescent current, rising until it becomes excessive. It is like the control grid and screen grid become shorted, although that's not what's really happening (I've measured). I think something shifts internally to make the screen grid become more influential on cathode-to-anode current flow, especially after a few minutes of warm-up. Whatever the cause, the symptoms are an increase in quiescent current, just like a bias shift.

I spoke with Albert Porter (writer for Positive-Feedback Online) at LSAF 2009 and he said his amplifier uses a bank of sixteen 6550 tubes. With that many in service, it occurred to me that he has even greater visibility of statistical failure modes than I do. Sure enough, he said that was a fairly common failure mode for him too. When the grids "short", he has plenty of stock to swap from.

I keep a large stock of tubes too, but the problem is the tube still works, and the amplifier sounds good so it hasn't shifted so far on its load line to become non-linear. You can't tell the tube is approaching this condition unless you open it up and put a meter on it. Usually my first indication is a burning smell (no kidding) from the cathode resistors getting hot.

To me, this screams for a simple solution. I think 6550 and KT88 tubes are best used with a fuse in series with the cathode or the plate. More in the post below:
Fused cathode mod for Audio Note Kit 2