

Jared Bland Tube Preamp Notes

Distorted Preamps Continued: Metal Preamp Idea

"A grid driven more positive than the cathode changes suddenly from an almost infinite impedance to a few K. In the case of a 12AX7, it's very roughly 5K. In the case of a power tube, maybe more or less. If the driving impedance is less than 1/10 (roughly) of the positive biased grid impedance, it hardly notices the change. The output impedance of a MOSFET follower is well under 1 ohm in most cases. A cathode follower is perhaps 100 ohms to 1K. The MOSFET is a bigger horse." - R.G. Keen.

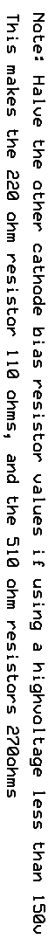
This got me thinking, what about a distortion, very coldly biased, and using a source follower to drive the proceeding grid positive, this is the schematic that followed. I haven't built this yet, so I have no idea how it sounds. I'll experiment once I buy some more MosFETs.

The hard clipping caused by grid current limiting is explained above, the rapid impedance change from 1Meg ohms to a few thousand ohms loads down the circuit before it, and even a normal cathode follower doesn't truly have the power to drive the grid positive, the extremely low output impedance of a source follower can not only drive the grid positive, but can do it well. I took the HT voltage and multiplied by 2/3 to find the rough voltage for the first tube. The divided that voltage by .002, this allows 2mA to flow through the MosFET so it doesn't overheat. Then I took the load line from the B+, the voltage source, and divided by 100k. Then drew the load line the same way as the clean stage above. I then looked at the voltage directly below where the control grid=0v intersects the load line. This gives me the rough voltage the rest of the anodes, plates, will rest at, I then divided that voltage by .002 to find the resistance for the other source followers. I gave adjustments that can be made to accommodate different voltages.

The capacitors from anode to cathode help tame the harmonics of the distortion and can help smooth out any harsh tones. The low output impedance from the source follower means that we have to use larger capacitors to get the same frequency response. These might get brought down to 100nF or even 47nF, that will need to be experimented with. The low source resistance may or may not prevent blocking distortion, So I added a 2k2 interstage resistor, in addition, voltage followers have a tendency to oscillate, and using a resistor can help prevent it.

References:

[1] http://www.geofex.com/Article_Folders/mosfet_folly/mosfetfolly.htm



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