Subject: Cathode drive
Posted by PakProtector on Tue, 08 Mar 2005 16:42:37 GMT
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Given the wide variatin in grid circuit requirements between power valves like 211, 845 and 833 it seems possible to build a pre-amp to drive the cathodes. It also looks like cathode Z is near constant, even when the grid is drawing current....anybody try this yet?regards,Douglas

Subject: Re: Cathode drive
Posted by Steve on Thu, 10 Mar 2005 01:17:04 GMT
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Dear Douglas, The thought is entertaining, but there are several serious problems. 1) The large signal and drive power necessary would require an output tube, so unless one simply wants more power, one is simply reproducing an output circuit twice.2) The cathode is the filament. This creates complex problems. If the tubes were indirectly heated, the problems would be considerably lessened.In either case, the fidelity would be lessened to a considerable extent.Hope this helps.Steve

Subject: Re: Cathode drive
Posted by Steve on Thu, 10 Mar 2005 01:30:44 GMT
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Dear Douglas, Intering idea, but some problems arise.1) The large drive signal required. Unless one wants more power, you'll end up with two output stages.2) Having the cathode combined with the filament creates alot of problems. If the cathode and filament were different, the problems would be eased.In my opinion, the sonics would be degraded considerably.Hope this helps.Steve

Subject: Re: Cathode drive
Posted by PakProtector on Thu, 10 Mar 2005 12:27:25 GMT
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Hey-Hey!!!,The cathode drive offers a chance to do grid current designs better. Ihave a suspicion that the nearly step change in g1 impedance is responsible for a lot of the troubles with that topology. So this falls into the 'more power' category I guess.Why on earth does the filament cathode cause problems? You will be driving the filament iron as well, but compared to the cathode's load, this is fairly small fraction...Also, providing a power amp for the driver stage is not

such a bad idea IMO. We'd actually put a load on this one.regards,Douglas

Subject: Re: Cathode drive
Posted by Steve on Thu, 10 Mar 2005 17:55:54 GMT
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My suggestion then is to go ahead and try it.Take care.Steve

Subject: Yes.
Posted by Mark Kelly on Fri, 01 Apr 2005 00:17:02 GMT
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Yes it works. I have done it with an SE 801 and got 11 watts output. The sound was lovely - much "fuller" than a standard 801 in A1 and of course three times the power. Cathode Z in in A1 is of course rp /(mu+1). Cathode Zin in A2 is rg in parallel with that which is rg x (mu +1) x rp / (rg x (mu+1) + rp). The value of rg = Ig/E(g-k) and can be estimated from grid current curves or assumed to be roughly 1k. Yes the cathode needs power but this power comes out in the plate circuit thereby raising efficiency - you can get around 55% without too much trouble. For a 211 IIRC you need about 4 watts to drive it - I have a transformer specially built to run PP2A3 into PP211s. If you are serious about this I will lend you the tranny although transport from Australia will likely be as much as getting a tranny built.A much greater problem is RF oscillation - grounded grid transmitting triodes are wonderful RF amps. I found I had to put a snubber across half the primary of the output transformer for the 801 but then I was using a transformer designed as a PP 211 transformer (but my transformers are always air gapped anyway).I wrote a short article about this for Glass Audio it appeared in issue 1 for 1999.

Subject: Re: Yes.
Posted by PakProtector on Fri, 01 Apr 2005 13:21:37 GMT
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Hey-Hey!!!,Hi Mark, thanks for the experience and Math. I think that a suitable TX would be a PP plates to 500R. These seem to be in low demand. Plates to voice coils, that's another story... A 3:1 PP:PP step down ought to do. PP 2A3 is exactly what I had in mind. 5k:500 is 3.33:1 and getting both CT ought to be fairly easy. Probably about what shipping from OZ would be.Now if I could figure a good way to do just a bit of NFB, I'd go and order some bits.regards,Douglas

Subject: Error and feedback.
Posted by Mark Kelly on Sat, 02 Apr 2005 04:47:17 GMT
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DouglasAs you probably realised the formulae I posted are wrong - read (rp + Rp) for rp and they are OK.On the subject of feedback, the possibilities are almost endless. As I was riding this morning I thought of an interesting possibility which is basically an extension of your E linear circuit. The driver transformer would have to have a split primary with each driver fed from an appropriate tap on the output transformer. The excess voltage would be dropped at the cathodes in the from of a large constant current source. 2A3s would probably not be the best way to go - say the 211s are running at 1000V then the CCS would have to absorb 120mA at 750 volts.Probably better to run triode strapped pentodes say EL34s at 500V and 40 mA, meaning the CCS is now 500V at 80 mA, easily achieved with a cascode pentode / MOSFET CCS. The semi remote cutoff of the pentode will increase the third harmonic but this is inside your feedback loop so it shouldn't matter.

Subject: Re: Error and feedback.
Posted by PakProtector on Sat, 02 Apr 2005 14:18:34 GMT
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Hey-Hey!!!,But a HV transmitting valve like an RCA 834 would stand the B+ from the anode taps in the power stage. You'd want a triode there anyway. I have been considering just such an arrangement(great minds do reach similar conclusions). I don't quite like the idea of finding enough 834's. There are a few Hytron valves which are acceptable. They HY51B is similar to 4 parallel sections of a 6SN7 with a plate rating of ~50W and a thoriated tuntsten cathode. I'll bet they look pretty sweet. Probably 866-sized...and these make 834's look common.It is quite funny, when I started this journey, I was quite of the opinion that current production was the way to go. How things change.regards,Douglas

Subject: Re: Cathode drive
Posted by Steve on Thu, 02 Jun 2005 01:17:03 GMT
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Yes, but you only get an approx 4db increase in "loudness", and another added stage. It certainly isn't going to help the fidelity, only hurt it. If you are using a common power supply, there are several frequency dependent musical/sonic feedback loops added. Not good.But if it sounds good to you, that is what counts.Take care.:)Steve