
Subject: RIAA preamp?

Posted by [Damir](#) on Thu, 03 Feb 2005 17:39:57 GMT

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Hey, just a thought - oversized PS with free 2x300V winding, big chasis - why not put RIAA preamp inside, selectable to the input (100k pot) of the line preamp? I tinkered for a few hours about this idea today - I tried to be as simple as possible ("all in one go" EQ, just one double triode), and without "exotic", hard to find values for the RIAA EQ - R1, R2, C1, C2. The little "trick" is to find the C1 cap with little lower value then standard 10nF, about 9,76 nF (not a big problem actually, most of the standard 10 & 20 % caps I tried are little lower in value). Then, with our RIAA equations: $R1C1=2187\mu S$, $R1C2=750\mu S$, $R2C1=318\mu S$, $C1/C2=2,916$ we can find: $R1=224$ kOhms - our Rout from the first stage is about 3k, and we can use standard E96 value, 221k/1% (even E24 value 220k with small selection) $R2=32,58$ kOhms - little tricky, we can select between some 33k resistors, or use some cobination, or just use E96 value 32,4k $C2=3,347$ nF - "input" capacitance of the second stage is about 47pF, and just use standard 3,3nF cap of your choice (2,5% tol. if possible) If we want to use this preamp to drive more then few cm of cable, then we can use active DN2540 load for $R7=15k$, and use low imp. out. Theoretical amplification is about 80 times/1k, more then enough for "normal" MM cartridges + our line stage. Well, this is just some thoughts/computing/simulations (almost perfect, of course:-)). Is not a problem to build it, problem is that I don't have the quality measuring devices to actually try RIAA accuracy:-(. Maybe...hm...Doug? And, BTW - some other tubes besides E188/7308 can be implemented, probably E180CC, maybe 6N1P or so... Both triodes work with rel. high current, $Ia1=10mA$, $Ia2=9,5mA$. Thoughts?

Subject: Re: RIAA preamp?

Posted by [Manualblock](#) on Thu, 03 Feb 2005 19:12:37 GMT

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Nice idea; what about shielding?

Subject: Re: RIAA preamp?

Posted by [Damir](#) on Thu, 03 Feb 2005 20:46:35 GMT

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Not so sure what you mean, maybe shielded cable? I'd build it close to the input pot, just a few cm of wire. Tube socket can be PTFE material or so + tube shield... I posted this schematic in hope that some discussion can be made... at the end, maybe someone actually build it and try it... I hope that direct coupling between the stages have more advantages then flaws... then cathode decoupling cap C3 (220uF/160V-probably electrolytic) hasn't large negative impact on sound (can

be avoid with active load and Mu-out), etc.

Subject: Re: RIAA preamp?

Posted by [Manualblock](#) on Thu, 03 Feb 2005 21:18:30 GMT

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I would like to combine the two and get rid of one box on the shelf.

Subject: Re: RIAA preamp?

Posted by [PakProtector](#) on Fri, 11 Feb 2005 14:05:18 GMT

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Well, it looks good to me. I have a few ideas. First is to use a Guinevere-style plate load on the final stage. It offers the high drive capability and a little more free gain without interfering with the RIAA parameters. Second, I'd suggest the 6BQ7A/6BK7B valve. It is inexpensive and a little higher gain. Cg-a is comparable to any of the mentioned alternatives. regards, Douglas

Subject: Re: RIAA preamp?

Posted by [Damir](#) on Fri, 11 Feb 2005 20:24:08 GMT

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Close enough to ECC180 and then close enough to E180CC I suggested?-) I hope that I'll find some time to breadboard E188CC version first and see if it's good enough. If yes, E180CC (and little correction for ECC180/6BQ7-A if necessary) is in order... I just don't have the instruments good enough for checking RIAA accuracy, that's the problem. Any idea? Any desire to breadboard it?

Subject: something like it....

Posted by [PakProtector](#) on Fri, 11 Feb 2005 21:27:33 GMT

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I am going to try for a two-stage valve pre for MC. Cascode of the front end stage. Probably a pair of triode strapped, high gm pentodes. Get the first stage gain in neighborhood of 200:1 and feed the RIAA filter and end with a CCS-loaded 6BQ7 perhaps. Getting half or a third of mu-squared from a cascode is not too difficult I think. the troubles I can see from here are mainly the high

output z of the cascode stage and the correspondingly high z RIAA EQ. The Guinevere-style plate load will do a good job of driving cables. I may decide to put in a variable capacitance in the front, as the cascode will be nearly free of Miller effects. Still looking at it. regards, Douglas That and noise....heh-heh-heh!

Subject: 6EJ7

Posted by [PakProtector](#) on Sat, 12 Feb 2005 00:28:55 GMT

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Hey-Hey!!!, Been looking at the sheet to the EF184/6EJ7. Nice, μ ov 60 and g_m of 15 mA/V in triode connection. That leaves a plate z of 4k, which is acceptable. Do you know of a sheet with its triode curves? With that I could generate the cascode plate curves and see what gain I could realize. μ -squared is unbelievable (3600). If I could get 10% of that I'd be in business. regards, Douglas

Subject: Re: 6EJ7/EF184

Posted by [Damir](#) on Sat, 12 Feb 2005 12:37:08 GMT

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Hey, of course, here's the link - www pages by Tom Schlangen (sometimes it is useful to read rec.audio.tubes threads :-)), down there: "Tubes Technical data". Don't tell anybody, but IMO - EF184 is cheap, linear and plentiful - I have some TFK, Valvo and Siemens.
<http://www.tubes.mynetcologne.de/roehren/roehren.html>

Subject: Re: 6EJ7 cascode A

Posted by [Damir](#) on Sat, 12 Feb 2005 20:27:09 GMT

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You probably know this, but just in case... Amplification of the cascode is $A = g_m \cdot R_a$, just like in pentode, where g_m is g_m of "compound device, quasy pentode", or $A \sim g_{m1} \cdot R_a$, where g_{m1} is transconductance of the lower triode, IME - always gives a little "optimistic" values. With unbypassed R_k , $g_{m1} \sim g_m / 3$, and with $R_a \sim 8k2$ - $A \sim 40$. Of course, there are "full" formulas for this ("Valve Amplifiers", RDH, "Vacuum tube amplifiers"). For complicated cascode versions there's always SPICE (hey, I have EF184 pentode 3f4 model - if you feel desire for it...). I also thought about cascode RIAA, but that Rout...

Subject: Re: 6EJ7/EF184

Posted by [PakProtector](#) on Mon, 14 Feb 2005 01:33:27 GMT

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I read through M-J's cascode stuff today. $gm_1 \cdot R_{load}$ is close enough. If I can realize +10 mA/V, a 30k load resistor will get me a gain of ~250. Now we're talking...output z of 30k leaves a 300k RIAA to play with. that's possible. Look at a E180F with gm of 50 mA/V and we can get output z down by a quarter and still keep stage gain in the mid-200's. If it can be done quiet enough, we're almost in std output moving coil area with a follow-up E180F grounded cathode and CCS plate load. I'll call this the 'hand waving' stage....regards, Douglas
