
Subject: A 11 year long quest
Posted by [gofar99](#) on Thu, 30 Sep 2021 02:51:28 GMT
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Hi Everyone, Ever since the first tube based phono preamp I have wanted them to be quieter. I'll admit that the first few were nice sounding, but hummy and noisy. Later ones were really quiet but I felt that S/N of -75dbv was not the limit. Gradual improvements along the way brought it close to -80. So now I revised the design and completely over hauled the power supply as it seemed to be the thing holding me back. It was. Now with a different transformer, a medical grade SMPS for the heaters (neither over \$20US, final three stages of filtering with poly caps and a capacitive multiplier in place of the regulators it is really, really quiet. I have reached the level where the tubes themselves are the biggest source of noise. They are selected EH7025s. With the better pair I show on the scope -93dbv, the worse pair -90. (see the image). The peak in the image is an artifact of the scope. Response is within +0.5db/-0.5db from 20HZ to 20K. The preamp has the same lovely sound as all the previous ones as that part is not changed. I'll post a schematic and photo of the guts in a day or so. In my system the listening level (on the preamps digital display) is right at -40db. When I increase it to 00 I need to have my ear within 6 inches of the speakers to hear anything. 40dbv is a ratio of 100 to 1. That is a lot of headroom!

File Attachments

1) [Better channel noise2.png](#), downloaded 426 times

Subject: Re: A 11 year long quest
Posted by [Wayne Parham](#) on Thu, 30 Sep 2021 14:30:05 GMT
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Very nice!

That's so important with high-efficiency speakers. You can hear any hint of noise on an efficient speaker, so to have that dead-quiet in between passages is really hard to find and is only realized in the best amplifiers.

Subject: Re: A 11 year long quest
Posted by [Rusty](#) on Fri, 01 Oct 2021 16:24:13 GMT
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I've come to realize that too. My new tubed line preamp with phono I hooked up to my old Hafler DH220 amp. And I can hear it's slight hum on the phono end. But using my tubed amplifiers it's smooth as baby's feet. Pi speakers let it all through. Like a spaghetti western know as The good, bad and ugly. The good is most music recorded, the bad is some and the ugly, is just that.

Subject: Re: A 11 year long quest
Posted by [positron](#) on Sun, 18 Sep 2022 04:20:02 GMT
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Bruce, I was wondering if the +/- 0,5db was from the RIAA, the rest of the circuit, or a combination of both. (I don't have the schematic.)

For public.

Stanley Lipshitz presented an AES paper sometime back. He covered both passive and active RIAA types. According to the article, some sources/manufacturers are up to 7% off. If anyone is interested, here is a link/calculator based on his equations. (I found my simulator was off by several tenths of a percent.)

<http://www.mh-audio.nl/Calculators/CalculateRIAA.html>

I would make sure the coupling capacitor next to V1 is plenty large in value as its reactance "adds" to R1.

Just a thought that might help the public.

pos

Subject: Re: A 11 year long quest
Posted by [gofar99](#) on Tue, 20 Sep 2022 18:07:10 GMT
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Hi, Yes indeed some of the formulas are off. I had to tweak the values to get the response I wanted. Getting RIAA accurate is not a simple task. This is what I do.

I use a general purpose calculator like the nl you listed (BTW that is a good site for many calculations) one to get some close values. Then comes the tedious part. I test the whole preamp not just the eq part. This allows for anomalies in the circuitry as well as the EQ. I use two different PC based scopes and a passive inverse RIAA like in the below schematic. One of the scopes does Bode plots. I checked its signal generator with the second scope to verify that it was not a source of deviation. The test and verify process indicated that the max deviation between 10HZ and 100KHZ was less than 0.1db with an input signal of 1.0 volts. Feeding this into the inverse EQ is where things can get a bit fuzzy. I have to accept that when built as indicated and fed a proper low Z input the results will be within about +/- 0.1db. To error on the cautious side I automatically presume it to be +/- 0.25 db. Then with that fed into the preamp (47K / 100pf in the cables no additional cap in the preamp) I run the plot. With tweaked values in the internal EQ it comes out well below +/- 0.5 db 20HZ to 20KHZ. Usually the values are in the negative 0.3db range. Either the values on the input side when added to the preamp tend to cancel (maybe) or it is spot on. Most of the plots are virtual straight lines with a tiny deviation on the negative side at

the bottom end. So again to be safe I just tell everyone that it is +/- 0.5db. That value is low enough to be swamped by quirks in the cartridges. My experience has been that regardless of cost of the cartridge (mine go from \$100 to over \$1500) the linearity is worse than the 0.5db range.

File Attachments

1) [RIAA.jpg](#), downloaded 185 times

Subject: Re: A 11 year long quest
Posted by [positron](#) on Wed, 28 Sep 2022 00:22:38 GMT
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Hi Bruce,

Sounds like you have the frequency response pretty accurate, just being cautious with +/- 0.5db.

Cheers and all the best.

pos
