
Subject: Re: New Project IC phono preamp
Posted by [gofar99](#) on Mon, 04 Mar 2024 02:59:14 GMT
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Some notes on the preamplifier. The enclosure should be steel for best EMI rejection. Aluminum can be used but I found that it was not as good. Much of the circuitry is not sensitive to EMI, but the inputs can be. Unfortunately, I did not take photos during the build process. But layout is not critical. The preamplifier does not use input capacitors as I feel the any non-linear components should be kept to a minimum. The same goes for capacitors in the ground side of the inputs. They are often seen for prevention of very low frequency and DC gain. A consequence is that the input signal cannot contain any DC. Since cartridges don't generate any this is not a consequence. At the same time some individual ICs have internal DC offset and this will be amplified. If sufficient it will cause the IC to latch up. I find that when measuring the DC offset at the output some is unavoidable but up to about 2.5 volts is of no consequence. More than that I would use another IC. They are rather cheap so buying an extra or two is not a major expense. I tested several types of ICs and the OP2134 was the quietest. All others were at least 5 db noisier. One, the Burson V5 (a discrete version) didn't like the circuit and had a significant offset and noise level. This was unexpected, but true of two different samples. Others I tried were OPA2604, LM833, NE 5532, TIL82. The preamplifier was built on solder through pef board, but pretty much any PCB arrangement will work. I enclosed the power supply components in a metal sub box. It seemed like a good thing to do, but probably didn't matter as there is no AC inside the PS and the power supply modules don't seem to cause any EMI in the preamplifier. Whatever Meanwell does in the ones I chose works well. I also tried a battery powered version. It used 6 lithium cells. It was not quieter and the complexity and cost didn't seem to justify it. It did not require the power supply modules, but did need a way to recharge the batteries. Granted running the preamplifier for 1-2000 hours before recharging the batteries does have merit. Just not for me.

Performance. Test conditions were; the use of 2 different PC scopes, one external and one internal signal generator, a carefully calibrated passive inverse RIAA device, and a second known SS preamp for comparison. Bode plots were done on one of the PC Scopes. The output load used was 100K ohms. Gain is just under 40 db for MM and MI cartridges and just under 60 db for LOMC. The response was quite flat. Between 20HZ and 20K HZ it was at the limits of the test gear deviating less than +/- 0.1db. It was 2.5 db down at 10HZ and 70K HZ. Wideband S/N unweighted was -90 db for MM/MI and -88db for LOMC. It is possible that the actual S/N is a little better as it seems that the noise floor in my shop has been higher than in previous periods. The noise level without power on the unit, but attached to the test set up was only at -95db. Previously it has been between -102db and -105db.

Listening. Really, really quiet. No hum or noise audible at any output level. Very clean sounding. Great imaging and centering. Mono tracks were really mono, no wandering. The response was as expected full range. I figure this is a good project that will reward a builder with lots of enjoyment. Total cost less the case should be under \$200, if you have a lot of parts on hand even less. I highly recommend that you select the resistors and capacitors in the equalization circuit to as good a tolerance as you can get. I use a LCR meter to get mine to about 1%. Off the shelf resistors may be that good, but capacitors probably not. Inaccurate tolerances up to 5% will be fine, but will cause slight deviations from the RIAA curve.

File Attachments

1) [Insides.jpg](#), downloaded 87 times

2) [IC Phono PreampSchematic Feb 29 2024B.jpg](#), downloaded 74 times
