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Paul McGowan is the co-founder of PS Audio (The 'P') and has been designing, building and enjoying high-end audio since 1974. He lives in Boulder Colorado with his wife Terri and their four children: Lon, Sean, Scott and Rob. His hobbies include hiking, skiing, cooking, artisan bakery. His current major project, apart from playing with stereos, is writing a series of books called The Carbon Chronicles. Book One, the Lost Chronicle, is an ongoing work. You can see their efforts on November 4, 2012 - 18:07 #1 Connecting DAC to amp I am building a computer-based music system. I'm looking to get the Music Hall DAC. Can I connect this directly to an amplifier or would I need a preamp too? I will not be using any other input, only pc to DAC. Articles Content information RSS Comments ATOM All nothing Products Seven 21, 2019 Hello just joined my m500 smsl should be here in a few days I have nad pre and power amps both have fixed inputs and RCA variables I can connect dac directly to the power amp or it is better to use preamp J Set 21, 2019 Hello, We're supposed to not know about the measured performance of either the M500 (@amirm is waiting for one for review) or its preampe. However, SMSL published a measure showing 117db SINAD (at 6V): If this is true, I don't know much preamp that it can work better than that. In general, DAC outputs are cleaner than analog preamp outputs. And without channel mismatch due to digital volume control (Again, usually) So, theoretically, it would be better to use your M500 directly to your power amp. I agree published a measure showing 117db SINAD (at 6V): If this is true, I don't know much preamp that it can work better than that. In general, DAC outputs are cleaner than analog preamp outputs. And without channel mismatch due to digital volume control (Again, usually) So, theoretically, it would be better to use your M500 directly to your power amp. I agree with you. Just one detail: The measure published is for peak 6V, which is around 4.2Vrms. Amir is measuring at 4Vrms for balanced output and 2Vrms for the single final output. September 21, 2019 Ok at power amp then I'll see what difference the preamp c162 makes sound preamp cant improve sound, even if I like the sound of it set 21, 2019 Emergencies have always been the pretext on which the of individual freedom have been eroded. - Friedrich Hayek Seven 21, 2019 Well, the preamp can also add some gain... It can be positive for sound (if clean enough and necessary) in some cases. September 21, 2019 You to add distortion of all devices in the audio string. So, no, a really good preamp won't do anything except add a little more distortion to the audio chain. It makes sense, therefore, to minimize the number of devices in the audio chain. So if your DAC has a volume control and measures well, skip the preamp and go straight to the amplifier. It won't reduce distortion much, but this is a percentage game and not absolute ones. Due to the distortion figures of the speaker, it makes sense to use an active crossing to prevent most of it from being too low (much distortion occurs when small drivers of the mains operate at the end of their excursion, as is the case when they try to reproduce bearish frequencies at moderate to high speed). The crossing will add noise, but (configured correctly) will massively reduce speaker distortion... which is the noise of a much higher magnitude. Not affiliated with any company that sells audio, music or related services. Schrödinger's Audiophile is a thought experiment used to expand our understanding of audiofiles. The experiment begins with the proposal that audiofiles have the potential to be rational or irrational. It ends when an audiophile opens the door to his personal echo chamber to post something that is incredibly wise or deeply stupid. (Awaiting approval of the IEEE glossary) September 21, 2019 Would you say, for example, that using the JDS lab atom as a pre-amp after a fixed voltage DAC will not give a sound as clean as, say, a DX3 Pro used in pre-amp mode? Most likely it is indistinguishable by ear at matched levels. Emergencies have always been the pretext on which the safeguards of individual freedom have been eroded. - Friedrich Hayek Set 21, 2019 Would you say, for example, that using the JDS laboratory atom as a pre-amp after a fixed voltage DAC will not give a sound as clean as, for example, a DX3 Pro used in pre-amp mode? Nope. That's why I said in general. Most DAC outputs are cleaner. Of course, a reference HPA4 won't degrade a Top D50s signal, for example, but it won't improve it either. The Atom will transmit the DX3 Pro output as it is, without adding or removing performance. October 5, 2019 I am coming off an SDAC and running through a vintage NAD 7240p preamp section. It sounded much better to me than directly to amp. It might not have been accurate, but it sounded really good. September 21, 2019 I'm completely new to quasi-audiophile headphones. The component train I have is iMac-->USB-->Topping D50--RCA-->3.5mm-->Rupert Neve RNHP-->Sennheiser HD650. The RNHP has RAC and Balanced XLR connections in addition to 3.5mm. Rupert Neve lists these input levels: Maximum input levels A XLR I/P: +22.8 dBu @1kHz B I/P: +14.7dBu @1kHz, C 3.5mm I/P: +3.3dBu @1kHz Should I change the way I have these things connected? Someone also has suggestions for configuring the D50? Right now I have 00.0dB (cant increase dB with USB connection, you can just decrease it) and Filter in Mode 5 I'm tempted to try the D50S as I have Sony Bluetooth headphones... but honestly, for me it's hard to say if I even need a DAC. Also, curious to know if these components would work well with higher end headset such as HD800s or Focal Utopias, or most other non-electrostatic headphones. September 22, 2019 Thanks for the reply. I didn't realize it was just receiving... I'm pretty sure I don't have any use cases for bluetooth then. Not sure I can justify the extra \$50 for the S. Model I'm sure I have RCA-RCA cables so I'll try that and see if I notice any difference. Filter mode 5 (fast deployment linear phase) is the most suitable IMHO. Others here may disagree with me on this. Bluetooth in the D50S is to receive only, that is, pair the phone to the D50S, and not pair your BT headphones to the D50S. BT headphones do not need (cannot use) a separate DAC. The maximum output for the RNHP by published specification is ~5 Vrms @ 150 ohm. It should be enough for HD800S or Focal Utopias, or most other non-electrostatic headphones. connect a DAC to an amp; if I need a pre-amp? Volume /impedance matching? Some DACs have pre-incorporated, but how do I know? Specifically, I'm looking at connecting the Musical Fidelity V90 DAC to the Aktika GT-102. As for specifications, the V90 DAC has a maximum of 2.2V line level output, which exceeds the input sensitivity of most of the 1V power amp, which means I don't need a pre-amp? And the output impedance of the V90 is 47 ohms, and the GT-102 input impedance is 50K Ohms, is 1:1000 relationship right? Also, the V90 doesn't have a volume knob, so do I need a pre-amp? - Start of discussion • #2 • January 1, 2019 Found this: - No volume control makes the DAC a bad choice to run without a Pre. - You need a pre if your amps and/or DAC has no gain/volume control and if you plan to run multiple input items (rotating table, streamer, tape cover). - Schiit Sys - \$49 awesome. - Start of discussion • #6 • January 2, 2019 I was worried about volume control too, but only found out that a volume knob can be added to the Aktika, although its entry impedance falls to 10K Ohms. Stereophile Class A DAC (albeit a little old) + Class B amp is too tempting! That Schiit is interesting, and mod! 3. - Similar to the SYS is the JDS Labs OL Switcher that gives you 3.5mm and RCA on, and headphones and RCA out. Same price ball park. - Paul nailed it to the #2. I have a Mytek Brooklyn+ and already had a balanced audio technology VK-33 tube pre. Jo Jo always run the Mytek through the BAT and decided to run directly to my ampers as I has a volume control. Maybe I was used to the sound of the tube, but I much preferred the sound running through the BAT. But back to your question, you can go straight to your amp if your DAC has a volume control as others have said. - I was worried about volume control too, but just found out that you can add a volume knob to the Aktika, although its input impedance falls to 10K Ohms. Drops to 10K ohms... - Fun! But technically, the Z input of your amp becomes the resistance of volume control in parallel with the input impedance of the amp which, if you mainly resist 51K, would require a volume control at 12.5K to reach the input of 10K Z. These are not available, but the 10K volume controls are, which would put it at 8360 ohms. You can always put in greater resistance volume control and keep total input Z up. What's funny is the concern for 10K. Any well-designed DAC should be able to drive a load of 10K (or lower) without any problems. I don't know what a Stereophile Class A DAC (albeit a little old) + Class B amp is too tempting! You might consider ignoring class at this point. There are good points to both, and bad. It's much more about designing specific circuits than the amplifier class. The LM3886 is an AB amp class anyway, which is obvious based on the inactive power of the amp. That Schiit is interesting, and the new Mod 3. A preamp gets him many advantages. If you don't want to, you can try the simple approach, realizing that there are limitations: Basic: amp;amp;sr=8-18&keywords=passive+volume+control A little better: amp;amp;sr=8-5&keywords=passive+volume+control You give up the selection of earnings and contributions, but they are cheap. - Start of discussion • #10 • January 23, 2019 Thanks for the entry boys. Drops to 10K ohms... - Fun! But technically, the Z input of your amp becomes the resistance of volume control in parallel with the input impedance of the amp which, if you mainly resist 51K, would require a volume control at 12.5K to reach the input of 10K Z. These are not available, but the 10K volume controls are, which would put it at 8360 ohms. You can always put in greater resistance volume control and keep total input Z up. Okay, that's how volume control affects input impedance. Middle school physics ftw lol. What's funny is the concern for 10K. Any well-designed DAC should be able to drive a load of 10K (or lower) without any problems. I don't know what a Class A Stereophile is You might consider ignoring class at this point. There are good points to both, and bad. It's much more about designing specific circuits than the amplifier class. The LM3886 is an AB amp class anyway, which is obvious based on the inactive power of the amp. A preamp brings you many if you don't want to, you can try the simple approach, realizing that there are limitations: Basic: amp;amp;sr=8-18&keywords=passive+volume+control A little better: amp;amp;sr=8-5&keywords=passive+volume+control You give up the selection of earnings and contributions, but they are cheap. I remember the output impedance to the amp entry impedance ratio should be over 10 at least, 100 is a good relationship. I just wasn't sure if there's an ideal range. I guess not. Stereophile has its 'Class Classification' of different components that I find useful. Most products have good reviews, but how they compare to each other, especially when the price is not targeted. - In the past I have used Emotiva XDA-1 as a preamp. Worked great, but had a limitation, volume control. I now have an XDA-2, very similar to -1, but with a resistive scale volume control instead of the XDA-1 digital volume control. (Shame on you, Emotional!) Check the classifieds, which come out from time to time. Very decent as DAC goes. Too bad the XDA DACs didn't get an analog input or two like the DC-1 did. Emotional currently doesn't have a DAC on the market, but there's a DC-2 coming very soon. Or so they say. - I remember the output impedance to the amp entry impedance ratio should be over 10 at least, 100 is a good relationship. I just wasn't sure if there's an ideal range. I guess not. This is just a rule of thumb. What brings you is a very slightly loaded amp, and minimal loss. The way an amp drives a load depends on many other factors alongside a 10:1 ratio. - Start of discussion • #13 • January 23, 2019 This is just a rule of thumb. What brings you is a very slightly loaded amp, and minimal loss. The way an amp drives a load depends on many other factors alongside a 10:1 ratio. I wonder how volume control will affect the amp sonically. I was told by the designer to turn the DAC volume to maximum (if the DAC has volume control), and use GT-102 volume control. That way I get a better sound quality. I wonder why... I wonder how volume control will affect the amp sonically. Volume control will have a huge impact. It will radically change the volume. And nothing else. I was told by the designer to turn the DAC volume to maximum (if the DAC has volume control), and use GT-102 volume control. That way I get a better sound quality. I wonder why... But from what I see on the website the GT-102 has no volume control. Is this a mod? There's a little sense to what it says where it has the origin output as high signal level as possible you can get over any source of lost noise this way. High entry, you can always dasize. A couple of things about volume controls, the passive guy. These are nothing more than a resistance with a variable tap that turns all this into a variable voltage divider. Volume Volume Follow a logarithmic resistance stopper that allows you to have a wide range of control, unlike a linear taper that would put the top 6dB from mid-control upwards, and everything else below that. But this also creates a problem: left/right tracking. Good volume controls will attenuation both left and right signals within a fraction of one dB of each other from total dithing to ~40 or ~50dB of dith. Since volume control is a resistance, and each resistance is a source of thermal noise, it is an advantage to use lower value control, such as 10K or lower (lower resistance = lower thermal noise). The noisier point of control will be where the windshield wiper is at a medium resistance point where total resistance is at the highest point. Assuming driving control with a low source of impedance the thermal noise level (Johnson) of a 10K volume control would be around ~117dBV... in other words, not a problem. Volume controls are not a distortion-generating device unless they wear out and get dirty or crack. But a good one will last years. On the list of things you worry about that have an impact on sound quality, they are a long way off. At the top would be the acoustics of the room, speakers and speaker placement. These things affect sound tremendously. All electronics have a questionable impact at all, especially if tested correctly (yes, I'm talking about the 'evil ABX DBT test'). You can forget about cables, speaker wire (largely) power cords and conditioners, audio connectors, etc. And if electronics designers have done their job, forget about all the passive components as well. But I would suggest stop worrying about minutia, and deal with things that really hit SQ audibly. It's problem to solve is like connecting your DAC which has no volume control to your amp that has no volume control, and still provide volume control. Passive volume control will make you control, but no gain, with the lowest possible parts count (if that sort of thing worries you). Otherwise I would personally use a good preamp because it puts me volume control plus a lot of other functions that make life easy. Thank you. I'll do a little more reading/research on this. And yes, Aktika gives you the option to install a volume control. - Thanks for the input guys. Okay, that's how volume control affects input impedance. Middle school physics ftw lol. I remember the output impedance to the amp entry impedance ratio should be over 10 at least, 100 is a good relationship. I just wasn't sure if there's an ideal range. I guess not. Stereophile has its 'Class Classification' of different components that I find useful. Most of the they have good reviews, but how they compare to each other, especially when the price is not targeted. Hi Shangi-la - interesting thread. You are touching on the central theme of passive line stage preamps - of necessity you have varying impedances. The great thing about this is that you get a bad grip on the low lows (where you want it) and very gradual changes to high volumes (where you don't need it). That's why passive pre-amps have never been caught except for a few models (. So, I would like to get the Schiit module myself. But follow the link if you want to explore. Good luck with the kit! Looks awesome. - You are touching on the central theme of passive line stage preamps - of necessity you have varying impedances. The upswing in this is that you get poor control in low volumes (where you want it) and very gradual changes in low/high environments are totally separate. If you are getting poor control in low and gradual volumes at large volumes you are using a linear pot, that is the wrong taper. That's exactly the problem that audio taper and log taper pots solve. And they solve it completely. A linear pot varies its resistance linearly with rotation, which, as I mentioned earlier, places the ~6dB point in the middle of the control range. You only have 6dB of range for half of the knob rotation. An audio taper pot does not vary its resistance linearly with rotation, but follows a modified logging feature. There are also pots of true record, even reverse logging pots for other applications..... No, they [passive pre-amps] have never caught up because they don't provide gain, buffer and input selection... as well as all those other features that you find in a good preamp. In other words, application and functionality very limited. The link actually sent details all problems, but does not mention control law matters. The advantages they claim, however, are highly yarn to favor their product. It is, after all, advertising. - The question of variable impedance and control range in low/high environments are totally separated. If you are getting poor control and low and gradual volumes at large volumes you are using a linear pot, that is the wrong taper. That's exactly the problem that audio taper and log taper pots And they solve it completely. A linear pot varies its resistance linearly with rotation, which, as I mentioned earlier, places the ~6dB point in the middle of the control range. You only have 6dB of range for half of the knob rotation. An audio taper pot does not vary its resistance linearly with rotation, but follows a modified logging feature. There are also pots of true record, even reverse logging pots for other applications..... No, they [passive pre-amps] have never caught up because they don't provide gain, buffer and input selection... as well as all those other features that you find in a good preamp. In other words, application and functionality very limited. The link actually sent details all problems, but does not mention control law matters. The advantages they claim, however, are highly yarn to favor their product. It is, after all, advertising. Yes, all the good points. And yes, you can use an audio taper pot. But a volume control works, as you say, in the registration domain and typically provides 80 dB of variable dithing, or 10,000:1 in terms of voltage. It's hard to get it right with just one pot. These days, with the linearity, noise figures and bandwidth of modern op-amps, why not just build an active pre-amp? Faster, better and cheaper, pick them three. - In the past I have used Emotiva XDA-1 as a preamp. Worked great, but had a limitation, volume control. I now have an XDA-2, very similar to -1, but with a resistive scale volume control instead of the XDA-1 digital volume control. (Shame on you, Emotional!) Check the classifieds, which come out from time to time. Very decent as DAC goes. Too bad the XDA DACs didn't get an analog input or two like the DC-1 did. Emotional currently doesn't have a DAC on the market, but there's a DC-2 coming very soon. Or so they say. yep - Yes, all the good points. And yes, you can use an audio taper pot. You must use an audio taper pot. Every preamp on earth does. The use of a logging/audio pot results in a direct dB/rotation grade ratio. It is no harder to adjust to the low and than the high end. But a volume control works, as you say, in the registration domain and typically provides 80 dB of variable dithing, or 10,000:1 in terms of voltage. It's hard to get it right with just one pot. The practical control range of any volume control is 50-60dB, not 80, even in AVRs with digital control where everything follows perfectly. If you need 80dB of control you also need a silent function or ~20 pad. These days, with the linearity, noise figures and bandwidth of modern op-amps, why not just build an active pre-amp? Faster, better and cheaper, Three. That's kind of a point except building a single-stage unity gain op-amp buffer is far beyond most people's skills. Nobody learns to weld anymore. Make life simple. Buy a preamp. When it comes to proper opamp performance, These days began around 40 years

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