Subject: R2R ladder dac's
Posted by Rusty on Thu, 26 Sep 2019 15:32:08 GMT
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Wondering if anyone has experience with this digital dac format. Using precision resistor networks for digital to analog conversion. Naturally there are some offerings asking obscene prices, but there's a few reasonably priced and diy units, like Soekris. Streaming audio doesn't compel me to 'gear-up' for that format. If this type of dac lent cd listening more involving as vinyl is with me, I've wondered about diying or purchasing a ready made model.

Subject: Re: R2R ladder dac's
Posted by Wayne Parham on Thu, 26 Sep 2019 16:08:44 GMT
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Resistor-ladder DACs were the very first kind. You can actually make one with a parallel port and a series of precision fixed resistors configured as voltage dividers. Each bit has its own resistor, all tied together. Just send the digital stream to the serial port and the resistors sum to create a voltage output.

So the key really is to have very precise resistor values. Nothing else about it is tricky or expensive. You could even buy a bunch of inexpensive resistors and measure them yourself to hand-pick the exact values, sort of like tube matching.

Subject: Re: R2R ladder dac's
Posted by Rusty on Thu, 26 Sep 2019 22:58:42 GMT
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I don't think I have enough knowledge to hack together something like this. I've seen diy boards stuffed with components that would be more my speed. If that even. I'm interested more in if it's even worthwhile looking into. Funny how what's old becomes new again, as you mention regarding it's history. Not unlike tube amplification. My chip based dac didn't really make cd's sound any more involving. I've hardly listened to cd's for about a decade.

Subject: Re: R2R ladder dac's
Posted by Wayne Parham on Fri, 27 Sep 2019 14:16:46 GMT
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It's actually extremely simple. Do an internet search to find some sites that show you how and give it a try. All you need is a handful of resistors and you've got it!

Subject: Re: R2R ladder dac's
Posted by Rusty on Fri, 27 Sep 2019 14:33:07 GMT
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Really! I'll be dogged. Well, I'll go rooting around. It would be better to try it cheap than sink good money into bad. I mean, some of these things are asking multi k for the privilege of owning. Audiophilia, sometimes it seems like a disease to me.

Subject: Re: R2R ladder dac's
Posted by Wayne Parham on Fri, 27 Sep 2019 22:19:56 GMT
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Yeah, honestly, I think this would be a really great project that wouldn't overwhelm you. As I said, look around on the internet to get a feel for it. It's well documented and straightforward, so you won't have to wade through psuedo-science and nonsense. I'm very familiar with this kind of circuit, so we can have a back and forth here on the forum. Maybe you can start a build thread of a Ladder-DAC of your own design!

Subject: Re: R2R ladder dac's
Posted by Rusty on Sat, 28 Sep 2019 15:24:34 GMT
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In doing some cursory investigation into this trick, I found this video showing just how basic in terms of what you can use as a resistor to make a r2r circuit. A piece of paper and a pencil. The guy doing this video piece is a real braniac though if you check out his website. How funny it would be to have an audiophile piece of extruded aluminum that whence opened up you'd find a little sheet of paper inside with pencil lead traces wired to the output.
https://www.youtube.com/watch?v=QTJ63nbxTM8

Subject: Re: R2R ladder dac's
Posted by Wayne Parham on Sat, 28 Sep 2019 16:02:10 GMT
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Yes sir! Easy-peasy!

I like the idea of a ladder DAC without filters. I understand all the conversion issues, the aliasing etc. I still like the idea of a simple ladder DAC without a 20kHz brick-wall filter on the output. The rolloff of the speakers can be the filter.

And later, you can experiment with adding different kinds of filters if you want.

Subject: Re: R2R ladder dac's
Posted by Rusty on Thu, 03 Oct 2019 15:51:54 GMT
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Would this be the simplest, (and cheapest), way to get the r2r circuit? I've read some diy articles where getting the accurate values of resistors as a tedious process involving buying a reel of resistors and methodically measuring them. High tolerance being the key to a stable accurate circuit.
https://www.mikroe.com/r2r-dac-board

Subject: Re: R2R ladder dac's
Posted by Wayne Parham on Thu, 03 Oct 2019 17:33:23 GMT
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You're right that the key to quality is precisely matching resistor values. It's kind of like tube matching. You just get a ton of 'em and measure to find exact matches. The resistors are cheap, so that's not a problem. It's the time it takes to do it that might be kind of a drag.

That little board would be great for an 8-bitter. But I think I'd prefer more resolution that that. Look for something like this:
Analog Devices LTC1597
You could go to a higher resolution than 16-bits, but I'm not sure you would benefit from it 'cause the minute differences of resistor values would probably be greater than the increased resolution you gained.