Subject: Low Pass
Posted by Barryso on Thu, 14 Nov 2019 13:39:07 GMT
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Discovered some very weird component matching issues when adding subs to the system.

My plate amp is mono and if you cross it over at 100 hz it sounds odd as mono doesn't work quite right at that frequency. Borrowed a Crown amp and some 100hz 2nd order low pass fmods to use the subs in stereo.

The fmods evidently do something weird with impedance. Simply putting the fmods on the rca plugs (the rca's that will be plugged into the sub amp) dramatically lowers the volume of the main speakers. There's also a frequency shift and the highs and lows seem to just vanish.

This happens before the cable and fmods get plugged into the sub amp. Just putting the fmods on the end of the RCA cable is enough to do it.

The tube preamp has a 200 ohm output impedance going into a solid state amp with a 10k input impedance. The same ugly trick happens when using a solid state preamp with an output impedance of less than 1 ohm. Perhaps it isn't quite so dramatic with the solid state preamp but it's still enough of a change to make the fmods useless.

The borrowed amp is a Crown XLS that has a built in 4th order crossover. The internal crossover is FAR better sounding than the fmods but it doesn't have the preferred 2nd order low pass.

So it's time for plan b. Parts Express has a speaker level crossover that's 100 hz lowpass and is 2nd order. How about a pair of these with a volume pot connected to the speaker outs of a nice Texas Instruments class d amp? Would it make a good sub amp? By putting the crossovers and volume control on the output side of the amp it should bypass the preamp/amp impedance issues.

https://www.parts-express.com/parts-express-100-hz-low-pass-8-ohm-crossover--266-446#lblProductDetails

Has anyone used these or have any idea of their sound quality? Is this a plan or is there a gotcha that I'm not considering?

Subject: Re: Low Pass
Posted by Wayne Parham on Thu, 14 Nov 2019 16:56:03 GMT
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The problems you're talking about are pretty common. They're impedance-matching problems. The load of the passive crossover is interacting with the output impedance of the preamp. And those inline filters are really lossy too, so I don't like using them. I had hoped they would work, but they really don't.

I've found a few easy solutions:

1. The inexpensive second-order crossovers often used in car stereos
2. Amplifiers with built-in second-order tone controls
3. Mini-DSP

Try this out, Barry. It's an example of solution # 2. I think it will work out well for you. It's super easy to do.

Find an amp with built-in bass and treble controls where the low-pass function in the bass control is 100Hz, second-order. You just turn the treble all the way down and turn the bass all the way up, and the resulting transfer function works nicely for flanking subs. It's a happy accident, I suppose. Level-set the amplitude of the subs to match the mains and you're done.

One example is the Audiosource amp100VS. It's just a 50 watt amp, but that works well for people that have 10 watt SET amps for their mains. There are probably many other products of this type. If an amplifier has built-in tone controls that use second-order filters, and if the bass adjustment frequency is 100Hz or so, then the amp will work very well for flanking subs.

I've attached the spec sheet for this little amp. See the link below. You'll notice it lists the bass control as being a second-order 100Hz filter. That's what we want. Nice that the bass and treble controls are on the back too, 'cause that way it's out of sight. They're just set to make it a flanking sub amp.

Look for amplifiers like that.

When searching for amplifiers for your flanking subs, you can always try out a product and send it back if it doesn't blend well. Just open the box carefully and keep all the packing material so you can repackage it properly if it doesn't serve your purpose.
AMP100VS Datasheeet

Subject: Re: Low Pass
Posted by Rusty on Thu, 14 Nov 2019 22:44:01 GMT
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I've recently wondered too about a 12db crossover device having gotten a couple sub drivers recently. I've considered the mini dsp, but for the cheaper 2x4 the output is only 0.9 volts which probably wont drive the amplifier to full volume. Moving up to the HD 2x4 will give 2.0 volts, but is double the price, $205. Thus being a budget minded fellow. I wonder if this product would fill the bill. It has a low level output and a mono sub output. Wonder if this would accommodate 2 subs.

https://www.parts-express.com/rolls-sx45-stereo-two-way-mini-crossover-w-sub-output--245-1184

Subject: Re: Low Pass

Posted by Wayne Parham on Thu, 14 Nov 2019 23:39:12 GMT
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The 100Hz at 12dB/octave (2nd-order) slope recommendation is specifically for flanking subs, which are a type of multisub arrangement. Distributed multisubs are usually run lower and with a quicker slope, often 60Hz at 4th-order or 80Hz 4th-order. The best setups run both, with flanking subs up front by the mains and distributed multisubs at the other end of the room.

Subject: Re: Low Pass
Posted by Rusty on Sat, 16 Nov 2019 14:32:48 GMT
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That's my aim, flanking subs. So I'll give that Rolls crossover a try using the stereo low pass. For distribution subs using plate amps, whats the best method of running a signal to it? Doesn't running a long interconnect cause problems? I wondered if I should keep the plate amp that has a linkwitz slope close to the preamp output for that reason. And run speaker cables to the sub.

Subject: Re: Low Pass
Posted by Wayne Parham on Sat, 16 Nov 2019 17:13:38 GMT
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Very good. Please report back and tell us your experience with the Rolls crossover. I am always looking at options for flanking subs, so I'd like to grab one and check it out.

As for distribution, obviously balanced pairs are best, but the devices we're talking here are unbalanced. And you're right that unbalanced lines are more susceptible to noise, so length can be a potential problem. Of course, you can always keep the amplifier close to the preamp and crossover, and run the high-level balanced speaker output lines the distance. Then all you have to worry about is the resistance of the speaker cable, and that's rarely a problem in a home.

Another option is wireless connections. I wouldn't use an inexpensive wireless connection for mains, but I've used wireless distribution for surrounds and subs and been happy with it.

Subject: Re: Low Pass
Posted by Rusty on Sun, 17 Nov 2019 15:09:23 GMT
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That's an interesting aspect. Does a bluetooth transmitter receiver have any issues with a lag time with signal? Or interference with wifi? That would be a nice option to running speaker cables from one end of the room to the other.

Subject: Re: Low Pass
Posted by Wayne Parham on Sun, 17 Nov 2019 20:51:52 GMT
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The ones I've used haven't had any problems with interference or latency. Those kinds of problems would be show-stoppers to me.

You can always give one a try and if it doesn't satisfy, return it. That was my approach. I tried hanging some surrounds and connecting them with a little Rocketfish transmitter/receiver system. I figured it it suffered from dropouts or didn't sound good, I'd send it back. But it worked just great.

Subject: Re: Low Pass
Posted by OutOfSpace on Sun, 17 Nov 2019 23:58:56 GMT
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One trick I read about and have used for guitar cables is to used balanced cable (microphone wire with two conductors + shield). The trick is to only connect the shield at one end, ideally the end with the best ground. This way, the any noise would get grounded and the signal would be cleaner. Not balanced cleaner, but better than carrying the signal on the shield, which is where the noise would be induced.
Chris

Subject: Re: Low Pass
Posted by Wayne Parham on Mon, 18 Nov 2019 00:39:56 GMT
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I agree on both counts, the use of balanced pairs when possible and the attention paid to reducing the likelihood of ground loops, which is why you only connect the shield at one end.

But sadly, neither is an issue for Rusty, who has devices that use unbalanced RCA connections.

And I wonder about Barry, who started this thread. His problems were mostly impedance-matching and lossy inline filters. How's it going there, Barry? Did you find a solution that worked for you?

Subject: Re: Low Pass
Posted by Rusty on Mon, 18 Nov 2019 16:45:52 GMT
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Thanks for the heads up on the brand you've tried. I see they have one just for subwoofers. On sale @ bestbuy now. This can eliminate a lot of hard wire headache. Hopefully, if ground loops become evident with wall warts and all the myriad connections, that can be sorted out. Least I'll know the source.

Subject: Re: Low Pass
Posted by Barryso on Mon, 18 Nov 2019 20:11:13 GMT
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Wayne Parham wrote on Sun, 17 November 2019 19:39
And I wonder about Barry, who started this thread. His problems were mostly impedance-matching and lossy inline filters. How's it going there, Barry? Did you find a solution that worked for you?
Hi Wayne,

Even without the fmods there are still impedance issues but very minor. If you attach the cable to the sub amps (without turning the subs on) there is still a change in the sound. A tad less bass or a tad less volume? Don't know exactly what's happening but it's a bit less good with the extra wires attached. Of course when you turn on the subs it's clearly an improvement so it's not really an issue, just an observation.

The mono plate amp doesn't really sound as good as the crown but it still works nicely at lower, more traditional sub crossover frequencies like 60 hz. With the mono subs up front (crossed low) and the REL in the rear the 4's just sound great. The subs add texture to the bass and clear up the midrange beautifully.

I'm still bouncing around researching the crossover solutions. There are too many poor reviews of everything out on the net. And when you read the writings of 10 different audiophiles you get 12 different opinions.

:)

One question regarding the amp with the bass control at 100 hz. A stand alone 2nd order 100 hz low pass filter should cut output above 100 hz so that by 150 hz the output is down by 6 db and by 200 hz the output should be down 12 db. Easy. But below 100 hz it wouldn't change output. So in a perfect situation you'd see a flat line from way down low to 100 hz and at that point the output would go down as the frequency goes up.

But a 2nd order bass control on an amp would boost the frequencies at 100 hz and then fall off at 12 db in both directions. So the output would be reduced at 150 and 200 hz as it would with a stand alone crossover but wouldn't the bass control on the amp also cut the output below 100 hz on a 12 db slope, too? So at 50 hz there would be a significant reduction in bass?

Rusty,

A friend uses a wireless connection for his rear sub and it works fine. No idea the make/model but it's never seemed to be an issue in a system that always seems to have something not

working properly. The wireless unit has been flawless. It seems you have a solution already but if you want to know what he's using just let me know.

Subject: Re: Low Pass
Posted by Wayne Parham on Mon, 18 Nov 2019 21:07:24 GMT
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A midrange tone control is a bandpass filter, but bass is low-pass and treble is high-pass. Boost is sometimes done using a bandpass filter, sort of like a parametric filter. And of course graphic equalizers use a series of bandpass filters.

But the low-pass filter in the bass tone control provides curves that look something like the chart shown below. It's not exactly right, because the slope in this chart changes with amplitude. But you get the idea.

File Attachments
1) Bass_Tone_Control.gif, downloaded 570 times

Subject: Re: Low Pass
Posted by Barryso on Mon, 18 Nov 2019 22:15:39 GMT
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"but bass is low-pass and treble is high-pass"

OK, got it. It now makes sense.

Thanks.

Subject: Re: Low Pass
Posted by Rusty on Tue, 19 Nov 2019 17:26:58 GMT
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Quote:Mon, 18 November 2019 14:11
Barryso

Rusty,

A friend uses a wireless connection for his rear sub and it works fine. No idea the make/model but it's never seemed to be an issue in a system that always seems to have something not working properly. The wireless unit has been flawless. It seems you have a solution already but if you want to know what he's using just let me know.

Sure Barry. Better to have as much information and choices as possible. This subwoofer project of mine will be, (if I ever get going on cabinet building), a long term project. I've had on hand for more than a decade, a JBL sub 1500 driver that I procured in a buyout sale on Parts Express. It's fully vetted over on the Lansing Heritage site. Any who, now I've bought some flanking subwoofers that I'm wrestling with implementation with a 12 db crossover like you are. I'm going to try out this Rolls crossover unit powered by a amp I have on hand. Learning of a reliable bluetooth connection to use the JBL as a distributive sub with a plate amp seems now to give me some more impetus to finally get this thing going. Just need to do the sawdust part. Thanks for sharing your experience.

Subject: Re: Low Pass
Posted by Barryso on Wed, 20 Nov 2019 14:19:17 GMT
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Hi Rusty,

Using four subs is the gold standard but I've been making due with 3 for a while. That 3rd sub in the rear makes a big difference compared to just having the 2 up front. You'll have great luck with the JBL in the rear of your room. The rear sub adds a bit more texture to the bass and really opens up the midrange. A real jaw dropper.

Here is the link for the transmitter. I apologize for not realizing ahead of time he'd pick a pricey solution. He's using JL subs so he went with a JL wireless device.
https://www.crutchfield.com/S-gH8UTY0nXNi/p_136TRX/JL-Audio-JLINK-TRX-High-Fidelity-Audio-Transmitter-Receiver-Kit.html?XVINQ=GLX&awkw=165289662985&awat=pla&awnw=g&awcr=86915025745&awdv=c&awug=9003887&gclid=EAIaIQobChMIwKKfxtT35QIVBaSzCh1JaQ55EAQYBCABEgJKufD_BwE

It's a lot more expensive than the Best Buy gear. He's had no issues with the JL transmitter but he has had many recurring issues with the JL sub amplifiers. He's swapping one of them out every 6 months or so and then months later he has to do another one. It never ends. All the amps have been replaced at least once, one of the subs is on amp number 3. I'm leery of recommending them even though the company replaces them for the cost of shipping.

When you get some time on it please post about your experiences with the Rolls crossover. I'm looking forward to hearing how it works in your setup.

Barry

Subject: Re: Low Pass
Posted by Rusty on Wed, 20 Nov 2019 15:23:51 GMT
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Thanks Barry. Whew. Yeah that JL gear is a might bit out of my price range. But thanks anyway. Keeping my fingers crossed regarding the plate amp I have. It's a PE amp. What I'm glad to hear is your description of the benefits you've experienced with this multi sub set up. I've been very curious about it for some time. As we all probably experience is a question of space to accommodate these not too diminutive boxes within our living space. Plus, as you have found out, implementation.

Subject: Re: Low Pass
Posted by Barryso on Sun, 02 Feb 2020 13:22:54 GMT
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Rusty, did you ever get a chance to play with the Rolls crossover?

I've ended up with a quasi minidsp-type fix.

The solution was hiding in an upstairs closet. A DBX Driverack PA was originally purchased 15 or 20 years back to try room correction but I wasn't happy with the results. It was being run full range and seemed to rob a lot of the magic from the tube system at the time. It went into the "sell it" pile and I hadn't thought of the thing in years.

Pulled the Driverack out of exile and added a volume control and a Texas Instruments TPA3255 class d amp. The TI amp is far superior to the old plate amp and the front subs are now in stereo. The bass is cleaner and now has far better texture. I was hoping the sonic shortcomings of the Driverack wouldn't be an issue if it was just being used for the low frequencies and it seems quite fine doing just that.

"Best" settings are still a work in progress but it's sounding great.

Subject: Re: Low Pass
Posted by Barryso on Sun, 02 Feb 2020 13:27:22 GMT
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A couple more sub oddities.

The first oddity is regarding the Amp Camp Amp. The amp reverses phase, which isn't all that odd, but it reverses the speaker outputs inside the amp. It's red speaker terminals are really ground and the black is really positive. This allows you to hookup your postitive speaker wire to the amp positive as if everything was normal.

Long one short, I'd forgotten about the phase and hooked up the REL positive leads to what is really the amplifiers negative terminals.

#$%^!

No wonder it didn't sound right. Changed the connections so the sub positive is now actually on

the amps positive terminals (which are the black ones!).

Another oddity:

Came across an article regarding REL subs that clearly states they don't work with a class d amp in the same way they'd work with a class a or a/b amp. Evidently there's still some potential on the class d amp ground and it will create issues with the REL plate amp.

REL recommends using the subs two positive leads normally, as you would on any other amp, but getting ground from an RCA cable coming out of your preamp and running that lead into an RCA input on the sub plate amp. No idea if the added ground potential effects the sonics but evidently it's bad for the plate amp.

Anyway, the TI amp is now running the subs so it's not connected to the REL. But it's worth mentioning as it's a common issue with REL subs now that class d amps are getting popular.

Subject: Re: Low Pass
Posted by Rusty on Sun, 02 Feb 2020 16:44:49 GMT
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I'm curious Barry regarding this Amp Camp amp. Looking briefly online I get the notion it's a class A, low watt stereo amplifier? So I'm confused if your saying it's used on your subwoofer(s). But I'm glad to read your getting use out of a re purposed piece of audio gear with your DBX device. Thus, with that you can achieve the 12 db crossover for the flanking subs? My project is stymied with the cold weather. My table saw is garage bound. And with no heat out there in the midwest winter. My initiative is frozen like the ground.

Subject: Re: Low Pass
Posted by Barryso on Tue, 04 Feb 2020 00:23:23 GMT
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Hi Rusty,

Don't blame you for not doing work in the winter cold. Both the winter cold and summer heat are great ways to kill motivation.

Yes, the Amp Camp Amp is an 8 watt class A amp and it's being used as the main amplifier for the system. The REL sub has a built in plate amp that connects to the outputs of the main amp rather than using the outputs from the preamp. The REL is in the rear of the room.

The front subs are driven by the preamp (preamp --> Driverack --> volume control --> class d amp). It's set to a 12db slope but the frequency gets varied a bit ... still trying to figure out which frequency works best. The 4's are not pulled out from the walls on stands as Wayne suggests, they are on the floor next to the wall so they don't quite need the standard flanking sub settings. Again, still playing with the settings as it's only been about a week.

Eventually the 4's will go on milk crates and get pulled from the wall when somebody is around to help me lift them. Then we go full flanking sub. :)

It's easy to live with the system as it is right now so there's no real rush.

Subject: Re: Low Pass
Posted by Rusty on Tue, 04 Feb 2020 17:21:37 GMT
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That clarify's my cornfusion, thanks. My single biggest factor for implementing subs, (for years), and not withstanding weather extreme's for box building. Is just the issues with space. These boxes take up some living space. And my old theater 4 Pi's have seemed to have reasonable bass extension, but they are big. I'll find a way somehow. It's a part of my audio bucket list. I got time now, being retired. Hope to hear of your final choice of integration of your multi subs. What you've said of it so far about it has whetted my appetite.

Subject: Re: Low Pass
Posted by Barryso on Sat, 15 Feb 2020 13:04:08 GMT
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Changed the setup again.

Pulled the 4 pi's away from the wall and changed the sub crossover from 60 hz to 100 hz. This is Wayne's standard 3 and 4 pi flanking sub setup except my 4's are still on the floor.

Everything is more better. Better bass, textures, imaging, clarity. All more better. For example, upright bass and piano have more body and sound more natural.

It's so good it makes me want to climb to the top of a mountain and scream Yiddish curse words as loudly as possible.

Wish I spoke Yiddish.

Rusty,

I've wanted to hear the Theater 4's. The one's in my room are what used to be called the Pro 4's and they likely don't go anywhere as low as the theaters.

Space is an issue here, too, and there's no telling what the front subs will eventually be. Right now they are an old pair of speakers that go down to 30 hz ... which is fine for the music I play. Even with "compromised" front subs the overall presentation is excellent.

The 3 pi subs Wayne brings to the Dallas show are excellent sounding if you have the room for

them. If the Theater 4's go low enough and you just want subs for room correction then you might do OK with something smaller, like say an old pair of good speakers that were just sitting around unused. All those extra woofers doing their flanking/multisub thing make a dramatic difference.

Subject: Re: Low Pass
Posted by Rusty on Sat, 15 Feb 2020 16:53:06 GMT
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So Barry, your using some old two way speakers as flanking subs? What you're describing sonically makes me ache for springtime to get going on box building. I bought two PE 10" sub drivers when they came on sale. Suppose to be pretty good I've read, and hopefully can do the augmentation to my mains as laid out by Wayne's flanking sub guideline. I'd have liked to do the Pi sub route. But that space issue again. Also, the long standing use of a 15" JBL driver as the remote sub has been my ultimate quest. Sitting boxed for years now. I take you have it nearly nailed down in your long odyssey. I'm getting anxious to start mine.

Subject: Re: Low Pass
Posted by Barryso on Thu, 26 Mar 2020 21:05:52 GMT
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Hi Rusty,

Yes, the "subs" are two way monitors that go low. A set of purpose built subs would do likely do better, as they'd have more surface area, but the speakers sound good and don't take up a lot of room.

Been listening to a lot of music for the past few weeks. Been playing with the 4 pi setup, too, but some of the changes have been reversed after a bit. They weren't really better, just different.

However, the front flanking sub crossover got pushed up from 100 to 120 hz a few nights ago. So far it seems an actual improvement rather than just a change. It does nice things to piano and male vocals.

It's no fun being stuck in the house but at least there are good tunes.