Subject: DSP for subwoofer(s)
Posted by Rusty on Sat, 19 May 2018 16:55:58 GMT
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Hello Wayne, hope your doing well.

I was looking at doing subwoofers for my old Theater 4 Pi's.

Actually I've been satisfied with the bass output of the eminence delta's in it. But I've had in box, (for many years) a real nice JBL 1500 subwoofer that really I should hear that this thing lives up to it's legacy. Space though is an issue. Those thermionic Pi's take up a lot of space. And I think the Pi subwoofer's are just too large a box unfortunately. Wonder if the Parts Express RSS10 subwoofer's could give adequate output then having the JBL behind the listening position.

Most electronic crossovers though only have high crossover slopes.

To implement these subs I've contemplated using the mini DSP device. I have a nice Hafler 9505 I could power the two 10's and a plate amp for the JBL.

My long winded question, (drum roll) is, The DSP seemingly has all the functions for crossover types and slopes, and fairly cheap, but I'm really not interested in doing all the measurement aspect using a usb mic. Essentially, using your recommendation of running the main speakers full range, I just want to plug in the crossover point, slope and level, listen and hopefully be done.

My thinking is your multi sub approach is fundamentally more important than all this DSP configuring and doing tedious minute measuring and tweaking. Your crossover network budget wise is tempting, works best with modifications. I just want to use the power sources I have and implement it the easiest non tweaking, modifying way. I'm older and retired and my impetus now involves a bit of loitering and lollygagging. Not fussing with complicated audio disciplines as in the past.

Subject: Re: DSP for subwoofer(s)
Posted by Wayne Parham on Sat, 19 May 2018 17:41:59 GMT
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You're right - the main thing is number and placement of subs.

I understand that you want to use a DSP crossover because it gives you the ability to choose any crossover point and slope you want, so will be easy to set the requisite ~90Hz second-order low-pass slope for the flanking subs. That's a great idea.

As an aside, using DSP for subwoofer EQ is overkill. It's not bad at all, but will give less and less improvement in overall sound quality as the number of subs increases. And if using a small number of subs, EQ becomes more important, but then again, you can only EQ for one position. All other places in the room will suffer. I would argue that if you're going to use just one sub, it should be placed nearfield and the volume adjusted accordingly. You'd still have only one good

spot in the room - right where the subwoofer is located - but EQ would be less necessary because you would be very close to the subwoofer.

Anyway, I digress. Back to the multisub approach:

Ideally what you want is a pair of flanking subs and a pair of distributed multisubs. The mains are run fullrange, or for really high-output requirements, the mains can be high-passed at the Helmholtz frequency to prevent overexcursion. That just removes the content that wouldn't be heard anyway. The flanking subs are low-passed around 90Hz to 100Hz, second-order. They are placed just beside, behind and below the mains. The distributed subs are placed at the opposite end of the room, and are low-passed around 50Hz to 60Hz, fourth-order.

After you've done that, you will have achieved at least 90% of the best you could accomplish. The main thing is the placement of the subs, the fact that they are distributed around the room. But if you want to try to get even closer to perfection, you can fine-tune the position and the EQ of the distributed multisubs. Focus on them one at a time. Start with the nearest sub, and after you've gotten the best response, go to the farthest sub. Be sure to measure at several locations when evaluating EQ. You're looking for overall smoothing, not just best response at one place.

Subject: Re: DSP for subwoofer(s)
Posted by Rusty on Sun, 20 May 2018 15:57:21 GMT
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All right! I had a good idea! Call it a lucky shot on my end. Thank you Wayne for your great way of clearing up a messy thought. But it's good to know that a notion to keep it simple would be validated by someone who really knows what it's all about. I just need a crossover for the flanking subs basically, the rest resides in your's and other people's wisdom of the way system's work optimally. Now I need to refrain from loitering and lollygagging enough to make some boxes and find out what this JBL and it's two siblings can do for my listening pleasure.

One other small detail I'd like your advise on is I listen almost exclusively to vinyl. My turntable is wall mounted but would vented subwoofer enclosures as a precaution benefit by a rumble filter with a high slope like 24 db on the low end to stop over excursion? Thank you again Wayne, your one of the few giver's on the net without a monetary agenda. Your time and expertise is incalculable.

Subject: Re: DSP for subwoofer(s)
Posted by Wayne Parham on Mon, 21 May 2018 14:58:52 GMT
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I've run vinyl for decades, and still do. I always thought it was kind of fun to crank up the speakers and watch the cones move at VLF where they are unloaded in vented cabs. Long before the days

of computer modeling programs, I noticed some (too small) vents chuffed when that happened. It became a useful real-world test for excessive vent airspeed.

That said, even with RIAA equaliztion, the VLF content (even from badly warped albums) is pretty small. I've never damaged a driver with the record-warp VLF even with hundreds of watts of input power. The main thing it causes at high power levels is excessive IMD. But you get that from any sort of VLF content.

So applying a high-pass filter just for records isn't really necessary, but it can't hurt to high-pass at the Helmholtz frequency. This isn't done just for record warps, but for any content below the frequency where the cabinet loads the driver. That has no drawbacks, even when blending mains with multiple subs for modal smoothing.

My general rule is high-pass is optional if the amplifier never reaches above 10% of the maximum power level of the driver. It's just not needed. But if you're pushing the mains hard and there's a lot of bass, it is a good idea to high-pass the mains at the Helmholtz frequency. You'll know if you need it.