Subject: Reverse attenuation and HF comp. networks, active X-over
Posted by Chris R. on Tue, 21 May 2002 02:30:01 GMT
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Hi Wayne, I'm about 3/4 way done building an active crossover for bi-ampingthe 3677's I got from JBL. What I began thinking about is the HFcomp network. Since it ends up being a bypassed voltage divider,I was trying to figure out what resistor values to use for a givencompensation. If I need ~10dB of relative boost at 20KHz, startingabove say 12KHz, it seems I'd need a divider with 10dB attenuation,then bypassed for a 3dB point around where I want the boost tokick in. Two questions. Using 10K ohms as the series resistor,what value goes to ground? If I'm feeding the output to the highpass filter, does it need another op-amp buffer between the HF compand the HP filter?Thx, Chris

Subject: Re: Reverse attenuation and HF comp. networks, active X-over
Posted by Wayne Parham on Tue, 21 May 2002 03:34:46 GMT
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The formula is dB = 20 log V1/V2, so you'll need approximately 1/3rd value shunt resistance for a 10dB attenuator. The thing is, you're doing more than just padding, so a resistive voltage divider isn't all there is to it. The crossover provides the traditional voltage splitter function and it also provides some response shaping. The HF filter should be slightly underdamped. Traditional 6dB/octave augmentation is provided for mass rolloff compensation, and the two transfer functions form a response curve that's flat up to about 4kHz, with 6dB/octave augmentation above that. I'd model your circuit with Spice, to verify it provides a transfer function that looks like this:

Subject: Re: Reverse attenuation and HF comp. networks, active X-over
Posted by Chris R on Thu, 23 May 2002 02:17:34 GMT
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Hi Wayne, I haven't decided if you're nuts or you deserve a medal :^). I posted the question pretty late PST and you still responded same night in a later time zone. Anyway, I'm not sure I understand thelast comment about generating a shelving response before augmentation.I'm assuming that what we are attempting to do is produce a filterthat has a mirror response to the published freq. response curvesfor the horns. To me, that means I need flat up to ~12K,

then+6dB/octave (or more) on up. Am I missing something?Thx, Chris

Subject: Re: Reverse attenuation and HF comp. networks, active X-over
Posted by Wayne Parham on Thu, 23 May 2002 02:49:21 GMT
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Subject: Re: Reverse attenuation and HF comp. networks, active X-over
Posted by Chris R. on Thu, 23 May 2002 21:50:45 GMT
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Hi Wayne, Maybe I wasn't clear. What I'm using to divide the frequenciesare 18dB VCVS (Sallen-Key) filter stages. To control horn attenuation,I'm putting a balance pot circuit between the inputs forhigh/low (verses left/right). I was planning on putting theHF comp between the output of the balance buffer and the inputof the HP filter. But now you're going to make me install spiceor write a perl script to verify what you are saying. Seems tome that at freqs below 1/(2*Pi*Rs*C) (there's that Pi thing again :^),the divider will work more like a divider because Xc will be > Rs. Above that freq, the Xc will be less than Rs, hence provide HFboost. It looks a lot like the one used in your x-overs. Wonderwhere I got the idea.)^: Rsacsii art time:



--\/\/\/\------ |___||_____| | || | C #
Rp # # |I got the filter circuits from an old Walter Jung OpAmp Apps bookfrom when I was in school. Gee, I know the formulas are close,but I'll have to look them up AGAIN!Thx, Chris

Subject: Re: Reverse attenuation and HF comp. networks, active X-over
Posted by Wayne Parham on Fri, 24 May 2002 04:01:12 GMT
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Adjust the Q of the high-pass filter, which would then allow you to adjust peaking slightly above 0.707, to around 1.0. Add a voltage divider with bypass capacitance. Then you'll be able to set the filter Q for a flat shelf followed by rising response.