Subject: Need Math help
Posted by spkrman57 on Wed, 31 Jul 2002 11:33:53 GMT
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Hi, I know this should be easy, but I am putting together (yes, another of my projects) a 16 ohm JBL 2226J and Altec 16 ohm 806A on 32B horn in a Altec A-8 cabinet. For the woofer I will use: 1.4 mh coil, and for the top end: 4ufd/1.2mh/12ufd (1.6khz 3rd order BW). What I have not figure out is resistor values for 12 db attenuation. This is wild guess, but I am thinking that if 15ohm and 30ohm for 8ohm horn, would 30ohm and 60ohm be for 16ohm horn driver. I already know compensation on my Altec horns have ranged from 1-3ufd to suit my listening tastes, so I just need proper values for 12db on 16 ohm drivers. My pc here at work does not open spice or pi-align and can't download from anywhere as that would jepardize my job. Can someone help me out on this one. By the way, the Altec 32B horn in that cabinet is one of the few horns that are cast and will not ring, it is normally used in 800hz 2nd order Butterworth when used Altec 416A woofer. TIA Regards, Capt Ron

Subject: Re: Need Math help
Posted by Wayne Parham on Thu, 01 Aug 2002 04:18:04 GMT
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Calculating the compensation circuit is not always easy. Your tweeter circuit is perfect, and that's what I would use too. For a 12dB compensation circuit, use R1=50, R2=30 and C1=0.47uF. That

drivers. If you want augmentation to begin sooner and be fully there by 15kHz, you might substitute a 1.0uF capacitor for the 0.47uF value at C1.

Subject: Re: Need Math help and clarification of attenuation values
Posted by spkrman57 on Thu, 01 Aug 2002 10:20:56 GMT
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Wayne, Thanks for the info, it is exactly what I needed. I was not sure that a conversion from 8 ohm circuit to a 16 ohm circuit would double the values, but I wanted to be sure. Now I know this may sound stupid, but since the R1 and R2 resistor components form a voltage divider, why do you list for 1.6khz/12 db the values of 25 ohm and 16 ohm, but for the 800hz/12db the values are 20 ohm and 14 ohm. I'm sorry to not catch the reasons why, but I thought a voltage divider would be dependent upon resistance, not frequency. One last question for you, Parts Express has discontinued some popular resistor values (10 watt variety). I was buying qty's of 10 or 20 count of 30 ohm and 15 ohm and they are out or discontinued. Those values, especially the 30 ohm combine to make 30 ohm/15 ohm/10 ohm and 7.5 ohm. I bought the 33 ohm on the last buy. I can

use my 8 ohm 20 watt resistors(in series) to make a 16 ohm(40watt) R2 on most of my projects, or use the 33 ohm (10 watt) resistors(in parallel) for 16.5 ohm(20 watt). I am running Marantz 2215B (15 watts/chnl)for my main power to the speakers. I will be building a 4 Pi-pro soon with my 8 ohm 2226H's which I will go 40 watts on att/comp circuit. My question is how much lee-way is there if I need a 14 ohm value (for R2) and I use 16.5 ohm (33 X 2 parallel). I am guessing that there is more room for error on R1 than R2, am I close in that thinking???? By the way, my Marantz receiver with only 15 watts per channel using the 4 Pi-pro (2226J/2418/2373 in 3677 cabinets) put out 108db at my couch in my 12' X 16' Living room and I am not pushing it hard at all. The 4 Pi-pro rocks, I had to put the Carver(250w/chnl) away because I was worried about permanent hearing loss. The Marantz receivers from the early 70's can power the 4 Pi's decently usually staying in low wattage (close to class "A" to a couple of watts) and put up a great sound stage. Thanks for taking over for JBL since they no longer cater to the consumer crowd with great monitors anymore, These are the JBL monitors of the 90's and the new millenium. Thanks, Ron

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Subject: Clarification of attenuation values
Posted by Wayne Parham on Thu, 01 Aug 2002 16:48:20 GMT
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The tweeter compensation circuit does three things:

1. It matches the amplitude of the midwoofer and tweeter.
2. It provides damping for the tweeter's frequency splitter filter, to set specific Q.
3. It provides top octave EQ to compensate for the power response of the compression driver.

You can play with these values in Spice and see the results.

The resistors I use for R1 and R2 are a combination of 16 ohm, 20 ohm and 30 ohm. With these values, I can make just about anything I want. The 16 ohm value is made with a series/parallel block of 16 ohm resistors, two in series form 32 ohms and then a pair of those networks in parallel bring it back down to 16 ohms. The 25 ohm value is made using 20/30 in series to form 50 ohms, and then a pair of those networks in parallel to get 25 ohms. You can make a 15 ohm resistor using a pair of 30 ohm resistors in parallel.

What is required is to find values of R1 and R2 that match the tweeter level in the region below where mass rolloff starts, i.e. below 4kHz. The initial shelf should also be flat, which requires a specific damping for the crossover filter. Damping is provided mostly by resistor R2, but R1 and the driver are in parallel with R2, so they affect the amount of damping. Basically, to increase attenuation, R1 is made larger and so R2 must be made smaller to compensate, to keep damping the same. C1 is fairly non-critical, but as it is a bypass across R1, it should be made smaller as R1 is made larger, in order to maintain approximately the same ratio of capacitive reactance to resistance. In the end, the transfer function should be flat at some baseline level up to 4kHz, and then to provide 6dB/octave augmentation after that.

Top octave compensation response curve