Subject: mulling over crossover questions. Wayne? Anybody?
Posted by Triodeuser on Thu, 30 Oct 2003 11:09:10 GMT
View Forum Message <> Reply to Message

I'm using Azura's that use 8" full range drivers and are beyond loading by the horn around 1500 hz. Also, 1250hz is about where 8" drivers begin beaming.I also have DDS Eng 90-1 constant directivity waveguides that will cover from about 1100 up with 1" compression drivers.Conceptually, my goals are to match and blend as many aspects here as possible while keeping crossover point above the vocal range, also paying particular attention to dispersion at crossover.Right now I'm thinking that what I want to occur is that as the Azura's begin to beam, I want the waveguide to start taking over.Initially, I had been thinking that I would do a first order crossover at a much higher point - say 4k or so, but have been told that was very difficult to do well, due to the 3db/octave rolloff characteristics of CD waveguides.I don't know that it matters, and I don't see what I could do about it anyhow, but from center to center of the horns will be about 29" apart - one reason I think I have to be sure I do it right.So where and how do you think I should start planning my crossover?RegardsKen L

Subject: A few useful documents
Posted by Wayne Parham on Thu, 30 Oct 2003 17:11:26 GMT
View Forum Message <> Reply to Message

Please do a search here, 'cause there's tons of stuff available. Spice, the crossover document and a few dozen posts are just some of the things that may prove useful to you. Below are links to a handful of documents and forum posts that come to mind.Spice
Crossover Document
Crossover Electronics 101 Lab Handhout
Top octave compensation for constant directivity equalization
Two-way system
Horn Phase
Baffle spacing, phase angles and time alignment, revisited

Subject: Re: A few useful documents
Posted by Chris R on Thu, 30 Oct 2003 18:04:52 GMT
View Forum Message <> Reply to Message

Hi Wayne, I'm looking at the Lab Circuits at the Pi-over, and the onlything not shown is the amount of attenuation you are getting.I'm assuming its the 8:25, but I've forgotten how to translatethat to dB. Is it 5dB? 10*log(25/8)? Also, how does onego about picking values for different attenuations?On another note, from Ray Alden's book that RatShack sells, heprovides formulas for attenuation that leaves the total loadequal to the original driver. Its a series resistor and oneparallel to the driver. I suppose it wouldn't lend itself to theHF comp. you use.

Comments? I've included the perl code if anyonecares.Chris./atten.pl -8 driver Z: [8.00] ohms Series resistor: [4.82] ohms Parallel resistor: [5.29] ohms#!/usr/bin/perl -wif (! @ARGV) { $drop = -6; # dB }else { $drop = shift(@ARGV); }$driver_Z = 8; # ohms# split the load between the driver and the resistor$Rp = (10 ** ($drop / 20)) * ($driver_Z/(1 - (10 ** ($drop / 20))));# calc the the combined impeadance of driver and parallel# resistor, and subtract from original Z.$Rs = $driver_Z - (1 / ((1/$Rp) + (1/$driver_Z)));printf(" driver Z: [%3.2f] ohms\n Series resistor: [%3.2f] ohms\n Parallel resistor: [%3.2f] ohms\n",$driver_Z,$Rs,$Rp);

Subject: Resistance and reactance
Posted by Wayne Parham on Thu, 30 Oct 2003 18:19:58 GMT
View Forum Message <> Reply to Message

The attenuation is shown in the response graphs rendered by Spice.One can easily calculate the attenuation of a voltage divider formed with resistors. Where things become a little bit tricky is when the reactive impedance of the driver and of the crossover components is figured in. You can actually get peaking from reactive forces that is greater than attenuation provided by the resistors in the L-pad. Such peaking can form a narrow peak, or it can form a very wide band, having influence wider than an octave. This is dependent on the ratios of resistance to reactance, and so the easiest and best way to analyze the whole picture is with a circuit modeling tool like Spice.

Subject: thanks
Posted by Triodeuser on Thu, 30 Oct 2003 21:42:08 GMT
View Forum Message <> Reply to Message

I will review them.I've read thru the crossover document and some of the other stuff.I regret to say that I no longer seem to have the ability to process that sort of info as well as I used to.Reading thru again may help clarify it somewhat.regardsKen L

Subject: Re: A few useful documents
Posted by Chris R on Sat, 01 Nov 2003 18:53:33 GMT
View Forum Message <> Reply to Message

Hi Wayne, Not to complain, because you are so generous with such goodinfo, but the spice.zip install seems to be broken. On two differentcomputers, when I run aimsp32.exe, it tries to install

the previousprogram I installed instead of Spice. Any idea what's going on?On the first one, I even when hunting for setup.exe from the lastinstalled program and deleted that. No help. I think WinZip iscommon between the two, FWIW.The on-topic question I had is about the crossovers. Doesn't includinga significant series resistor alter the crossover frequency of the cap(s)and coil? The reason I ask is that you've suggested in the past that theEminence 1.6K crossovers are OK to use along with the HF compcomponents verses making up the whole x-over by hand.Thx, Chris

---

Subject: Re: A few useful documents
Posted by Wayne Parham on Sat, 01 Nov 2003 20:09:09 GMT
View Forum Message <> Reply to Message

Check your copy of the Spice executable. You might want to simply download it again and reinstall. I checked the distribution file by downloading it and installing it, and it worked. Sometimes stuff happens to the files on the server; Usually as a result of a move or modification I've done. So I had expected to find something wrong with the distribution file. But I downloaded it and setup using "aimsp32.exe" stored inside the "Pi_Crossover_Spice.zip" file on the server. Everything worked just fine.About the crossover, yes, resistance changes the load and so it alters the transfer function. The crossover point and damping (Q) are affected. in fact, that's precisely

response of the base filter. We needed to create top-octave compensation that is the conjugate of the driver's power response. To do that requires 6dB/octave augmentaton after an initial shelf of flat response. We also need about 10dB padding. And it just so happens that these things shift the base filters enough that they sum nicely given the baffle spacing of the drivers. All these things are needed of the crossover, otherwise, it would not work for our purpose.

Subject: Re: A few useful documents
Posted by Chris R on Tue, 04 Nov 2003 00:59:43 GMT
View Forum Message <> Reply to Message

Hi Wayne, I found the culprit setup.exe under Docs&Settings/userID/temp.Once I deleted that, the installer actually ran the right setup.exe.I love Windows.... NOT!How does one go about creating a Spice model of their drivers?It seems to be something about making an RC tank circuitthat resonates at Fs, but aren't there a range of values that returnthe same center freq? And how does Zmax fit into the picture?Thx, Chris

---

Subject: Re: A few useful documents
Posted by Wayne Parham on Tue, 04 Nov 2003 02:55:09 GMT
View Forum Message <> Reply to Message

Glad to hear you figured out your problem with Spice. I hate little "gotcha's" like that. You can chase 'em for hours.About making a virtual circuit that models mechanical resonance, the idea is to find parallel L,C and R that acts as the mechanical resonator does. R will be set by Zmax, so that one is easy. Then, the values of C and L will be the same at resonance, and since Q is the ratio of reactive impedance to resistive impedance, you will find a the value of inductor and capacitor with reactances equal to Zmax / Qms at Fr.