Subject: Compression Drivers arrived !!!
Posted by Adrian Mack on Sat, 24 May 2003 08:39:52 GMT
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Hey everyone.My P.Audio PA-D45 compression drivers arrived on Friday :-) They are now installed on a pair of JBL 2370A horns.I have not as yet built the Pi 1KHz Crossover for it yet, so, for testing, I just hooked up a 10 band graphic equalizer, and set the controls to flat (I also played around with other settings), and all freqs below 1KHz I set to -12db so it wouldn't get through much.The sound is a bit strange... sort of "blurry", or "harsh", but thats not exactly the right word, its more like this at higher SPL levels. They do sound quite different from direct radiators. I was thinking, maybe when I build the proper crossover etc, this might fix it. Has anyone got any comments?Adrian

Subject: Re: Compression Drivers arrived !!!
Posted by Wayne Parham on Sat, 24 May 2003 10:29:28 GMT
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You most likely won't be able to try it out effectively with your graphic EQ for two reasons. First, you'd need a lot more attenuation and augmentation control. And second, even with more amplitude range, you still can't make the curve you want. The closest thing you can do will be to generate a curve that has a very wavy line.If you could, you would want your EQ to look like the response curve shown in your Spice simulation. It should be set for minimum levels under 1kHz and then rise at 18dB/octave to the passband level at 1kHz. It should be flat for a couple of octaves and then start to rise at 6dB/octave. You can't really get a curve like that with a graphic equalizer.Try setting all sliders to flat and increase the 8kHz slider halfway up and the 16kHz all the way up. Put a capacitor of about 10uF in series with the tweeter and an 8 ohm resistor across it. That will be give you somewhat of an idea what to expect.

Subject: Re: Compression Drivers arrived !!!
Posted by Adrian Mack on Sat, 24 May 2003 10:56:34 GMT
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Hey Wayne.Thanks for the tip, I'll try that out tomorow. It probably would sound a fair bit better once the right crossover is built of course.Just going back to the power handling post, you told me that parts express has 100W and 200W non-inductive resistors, but the only 100/200W resistors I could find on their website (and 2002 catalogue) are the "dummy load" ones which I dont think you should use for circuits, just test applications. Or did I just miss them?I have been reading the power distribution section in PiAlign.doc. It seems to be that I need to calculate the impedance at the freq in the middle of the target frequency range of each driver. It says to use the series calculations for the woofer/inductor and tweeter/capacitor circuit at 100Hz and 10KHz (for the example). Formula is Zt=Z1+Z2+Z2 and so on, but I dont understand where the frequency comes into that.... so basically, can you help me calculate series impedance at the two freqs for the

woofer and tweeter circuits? The part on parallel impedance also asks it for 100Hz and 10KHz, using the Zt series calculation results from the preceeding part. Again, I dont understand how to do this for the same reason. Say I want the crossover example given in PiAlign.doc to handle 100W, to find the power rating of the inductor, and voltage of the capacitor required to handle 100W, should I calculate the voltage across the system, or the maximum voltage requirements?Thanks!Adrian

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Subject: Formulas
Posted by Wayne Parham on Sat, 24 May 2003 11:33:24 GMT
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You will need to use the formulas for calculating impedance and power through a reactive circuit, which isn't quite the same as pure resistance. The formulas are in the "Pi Alignment Theory" document and in electronics textbooks.Impedance is found using reactive impedance

reactance, in ohmsXC is capacitive reactance, in ohmsF is frequency, in HertzL is inductance in Henries (so mH is H x 10 -3)C is capacitance in Farads (so uF is F x 10 -6)This will tell you the impedance of your coils and caps.If you know the voltage across a component and its impedance, you can calculate the power dissipated by the device using the formula P=E2/Z. If you know the current flowing through a device, you can find power by using P=I2Z. So find the reactive impedance of the device in question at the desired frequency, and substitute that for "Z."

Subject: Re: Formulas
Posted by Adrian Mack on Sun, 25 May 2003 09:37:44 GMT
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Hey Wayne!Ok, I understand most it now :-) So heres what I've learnt for determining the voltage/power ratings of each component for a particular power handling you want. XL =

value of the inductor or capacitor in the woofer circuit (or tweeter for whatever you want) for which you want to calculate reactive impedance. For the power handling equations though, I dont know which cap/coil to calculate reactive impedance for... as some circuits have more than one cap/coil. I would assume I would use the larger result from all the caps (or coils, for whichever your calculating) that are in the circuit to be on the safe side. Series calculation for woofer/inductor circuit is Zt=Z1+Z2+Z3 etc. In this, I would enter the impedance of woofer (8ohm), and also the result from the reactive impedance formula (which is for impedance of caps/coils as you've told me). Is this correct?"Now parallel calculations will be done for the total system impedance at 100hz and 10Khz. Using the formula for parallel impedance and the series Zt values found above, find the system Zt at 100hz and at 10Khz."Parallel connection is Zt=1/(1/Z1)+(1/Z2)+(1/Z3)

and so on... so we have two freqs, 100Hz and 10KHz, you would end up with two figures. Since its obviously two calculations (one for 100Hz, and one for 10KHz), do you include in the parallel calculations (for total system impedance), the impedance of the woofer (or tweeter) itself? I would think so, its probably a very obvious answer. EG: Series impedance of woofer/inductor circuit is 20ohm (for example) at 100Hz, and the woofer itself is 8ohms. So for total system impedance, we would go 1/((1/8)+(1/20)) = 5.71ohms. Is this correct?In PiAlign.doc, it says "Now we have total system impedance, the impedance of each series circuit at two frequencies, and the impedance of each component at two frequencies. Now we can plug these values into our power translation formulas:" I understand how to get total system impedance, and the impedance of each series circuit at two freqs. Just to make sure, the impedance of each coil, and/or cap, is found by using the reactive impedance calculations. So now, say we want the crossover to have a 200W power rating. We could use the forumla E=Square Root of P*Z, which will tell us how many volts the capacitor needs to be to handle 200W. So substitute "P" for 200. For Z, would we use the impedance of the series circuit? (which does have two frequencies so two series circuit impedance results.... which result would be used in this formula?). And now for resistor, use the formula above to get E (voltage) for 200W, then use P=E^2/Z, Z being the series impedance of the circuit. This will tell us the power of the resistor needed for 200W. Whew! Its taken me some time to understand this, I hope most of that is correct. I would appreciate if you could go through the above, and correct anything that I have got wrong, or basically the questions that I have asked above. Just going back to the compression drivers, I tested today using the graphic EQ with 8KHz slider half way up, and 16KHz slider all the way up, and the rest flat, with below 1KHz set to minimum. They sound much better! I did not use the 10uf cap and 8ohm resistor like you have said (I would have to purchase them), I am just wondering, what would be the purpose of this? I will be ordering the proper parts soon anyway :-)Thanks!Adrian

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Subject: Re: Formulas
Posted by Wayne Parham on Sun, 25 May 2003 16:35:09 GMT
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Inductance is L, in Henries.Capacitance is C, in Farads.To find power or voltage, you have to find reactance using the AC formulas, and then Ohms law to find the voltage across each component and the current through each. You may have to use Norton or Thevenin Theorems for complex circuits. The easiest thing to do is to start with the power curves in the last dozen pages or so of

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