Subject: Horns, waveguides, and acoustic filter chambers
Posted by Wayne_Parham on Fri, 06 Apr 2001 17:14:59 GMT
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You may be interested in the paper called Acoustic Filters, Waveguides and Transmission Lines, by Daniel Russell of the Science and Mathematics department of GMI Institute.This paper describes acoustic filter chambers, low-pass, high-pass and band-stop. The characteristics of each type of chamber are discussed, as well as the properties required and the specific methods of solutions for each.It's a simple discussion about acoustic chambers and ducts, and provides formulas describing their properties. Acoustic chambers that provide high-pass, low-pass and band-stop (notch filter) properties are shown. The paper is written as a laboratory exercise for students of acoustics.

Subject: Re: Horns, waveguides, and acoustic filter chambers
Posted by Art J. on Fri, 06 Apr 2001 20:32:00 GMT
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Im glad your re-posting these articles. In fact the one about Phasing really got me going back then. Ive made improvements to my speakers already with more to come. I will Post about it when time allows and I finish my tests. Thanks, Art

Subject: Re: Horns, waveguides, and acoustic filter chambers
Posted by Wayne_Parham on Fri, 06 Apr 2001 21:41:53 GMT
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Sometimes, I am reminded of one of the interesting discussions we had over the last three months. When this happens, I usually look up the dialog and post it as a single message. These are things that I have found to be either the most helpful or the most interesting in the last few months. Sometimes, they're just "food for thought" and other times they're actual concrete information that makes things work better.As you do tests, please post your results. I enjoy seeing things quantified. Measurements can serve to reaffirm our expectations, and they can also show special situations that cause exception. So measurements are extremely important, because when they do not match expected results, we can then analyze our data to see if the measurement or conditions are at fault, or if actually we are seeing a new situation or "exception to the rule."

Subject: Re:phase shift
Posted by Art J. on Sat, 07 Apr 2001 02:53:49 GMT
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I have the scope and the oscillator but little time. I know theres a phase shift because, as a quick test, I bi-passed the crossovers and that very slight "humming quality" on low voices went away. More later... any time saving help is very appreciated..... Art

Subject: Re:phase shift
Posted by Wayne_Parham on Sat, 07 Apr 2001 12:07:11 GMT
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How are you doing your measurements? Do you run your amplifier signal into one channel on your scope or PC and a microphone signal into another channel? And if so, what methods do you take to ensure that the microphone and amp do not contribute to the phase relationships?

Subject: Re:phase shift
Posted by Art J. on Sat, 07 Apr 2001 13:57:19 GMT
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My basic tests now are using a B+K scope and my nice HP 200 oscillator set up for lissajous patterns. The sweep shows a 45d phase shift at the crossover 500c (bad), in phase at 1600c (also bad cause it dosent matter there 12db down) and 90d out of phase at 250c which goes with out saying. Im looking to go 3rd order in the pass band to gain that extra 45 but im going to have to order a collection of parts for the experiments. Thats where I stand now. Hobby fun yes?

Subject: Re:phase shift
Posted by Wayne_Parham on Sat, 07 Apr 2001 21:00:34 GMT
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This must be a 1st order network. At 500Hz, the tweeter and the capacitor have the same impedance, so phase is 45 degrees. Honestly, I wouldn't consider this to be bad at all.Consider all the capacitors inside an amplifier. The laws of physics are the same in our amps - each RC network has a corresponding phase shift. Most of the caps are fully in the passband because coupling caps and bypass caps are set for 10Hz or some other very low frequency, so their phase

shift is negligible in the audio band. But tone controls and equalizers are killers for phase.

Subject: Solution near
Posted by Art J. on Sun, 08 Apr 2001 12:15:22 GMT
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I believe I found the cause of the 45d phase shift. I have to find time today to re-configure the xover to confirm my tests. Stay tuned.....BIG HINT:The Woofer is 4 OHM (2 - 8 ohm woffers in parellel)The mid is 8 OHMI never presented the "big picture" of the situation. That was an error of ohm-missions on my part. Im a terrible writer.A Tip for Hobbyist;All my cross-over parts are mounted on 'screw down' terminal strips to make it easy to re-configure and change parts.

Subject: Wanna try "click tests" too?
Posted by Wayne_Parham on Mon, 09 Apr 2001 04:15:27 GMT
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A DC transition can be used to excite a speaker at resonance. Since the quick application of DC makes what is essentially a very low frequency square wave, it will have harmonics, some of which are near the resonant frequency of any loudspeaker.I'd love to see you check this one out, and to post your results. Compared with the rest of your work, this will be incredibly easy. All you need is a debounced switch - something that can give you a "clean break." Then apply about 5 or 10 volts DC to your loudspeaker. You will measure the signal that results.Set gain on your scope way up there to measure a very small signal. And have its rate set to show about four cycles at 40 or 50 Hz - pretty slow. What we're trying to capture here is the overring at resonance, set up by the tiny amount of energy of the square leading edge of the DC transition. The small components of harmonics in the resonant frequency bandwidth will excite the system, and you will see a tiny overring.With gain set so high, the initial transient pulse delivered mainly by the tweeter will go way off scale. I'm not interested in this event. What I'm interested in is how much you are able to excite the system at the motor cabinet's resonant frequency. It will be a small and quickly decaying sine wave at the motor cabinet's resonant frequency. In fact, depending on the woofer, it is likely to not be a complete cycle, and only a half cycle or even a partial.So if you're interested to do this during your measurements, I'd love to see you post your results.

Subject: Re: Wanna try "click tests" too?

Posted by Paul C. on Sun, 27 May 2001 21:35:14 GMT
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Does this click test method give the same type of response as the "exploding wires" impulse testing described in the transmission line article I sent you?

Subject: Impulse test
Posted by Wayne_Parham on Mon, 28 May 2001 07:47:59 GMT
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The "click test" (impulse test) is where you send fast rise and see how long it takes for the speaker to settle. We're looking for just the edge transition, and we should see a perfect differentiated pulse as the resulting output. I suggested looking specifically for a resonant overring, and the less that is there, the better.