Subject: Time alignment
Posted by stupid newbie on Wed, 24 Dec 2003 05:48:42 GMT
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How come noone lines up their voice coils when they build horns? Shouldn't that be a good place to start? Is it b/c so many 18 db/oct crossovers? Just curious. Does anyone even care if their horns are in phase, or can you even make them in phase d/t their crazy phase respnse anyway? Many thanks in advance.

Subject: Re: Time alignment
Posted by Adrian Mack on Wed, 24 Dec 2003 06:55:18 GMT
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Hi again,Aligning voice coils is a good idea. But not absolutely necessary - things like cancellation from diffraction is a much more important aspect of the design. In terms of getting phase within a good tolerance window, there are other things to consider too. EG: Appropiate baffle spacing to avoid 1/4wavelength rippling, crossover overlap, dispersion limiting etc. Since one can't make a speaker phase aligned at every freq - only at one single freq and position, then people try and get performance within a nice little window, say within +/-90 degrees or so. Static phase isn't audible anyway, so even a little further deviance from this is not a problem. Interferance patterns/diffraction should be the first major concern. This is the most important thing, that came way before the object of "phase alignment" in designing my 3-way towers. The last thing you want is to be moving around your listening environment and hearing cancellations and reinforcements everywhere you go. It happens when the distance between listener and point sources are changing - so you can see why time alignment people define their "sweet spot"; the position where the distance between listener and point sources are equal. Remember though your listening environment introduces a ton of reflections and phase angles causing some positions in your room to combine constructively and others destructively. Still however it is very important to reduce possible causes for this in the design itself. BTW: High order crossovers are capable of larger phase shifts but also remember that much of that is in the stopband, and well attenuated where it doesn't have any effect. In the passband, phase shift is only little; that means theres no problems in using high order crossovers regarding phase. It is preferred in fact because it reduces overlap, and hence comb filtering issues between the subsystems. Adrian

Subject: Re: Time alignment
Posted by Adrian Mack on Wed, 24 Dec 2003 09:48:22 GMT
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When I say "aligning voice coils", I mean aligning the acoustic centers of course.

Subject: Re: Time alignment
Posted by Wayne Parham on Wed, 24 Dec 2003 15:43:32 GMT
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You guys are definitely on the right track here, at least in my opinion.I like to discuss ways to limit anomalous behaviour rather than to discuss time alignment. It may seem at first to be splitting hairs, but the reason to me is plain. There is no way to time align speakers using today's technology. I'm not talking about baffle-mounted speakers vs. those arranged with specific placement. When I say "today's technology," I'm also talking about speakers that employ careful placement of drivers and crossover slopes. Even those fail to achieve true time alignment.The reason is that the electronics, the cabinet and even the drivers themselves are partially reactive and partially resistive. They exhibit complex phase behaviour that moves around. You can't find a speaker that is perfectly resistive (zero degrees) or even perfectly reactive, having a fixed angle of phase shift. Nor can you find a design that has a set, fixed delay, like maybe what could be corrected with baffle offset or digital delay device. Everything is moving around with respect to frequency and position.That's why I like to discuss ways to minimize anomalous behaviour. You can make design choices that optimize performance at a specific location or field of operation. Such design choices usually limit dispersion and frequency overlap between adjacent subsystems so that phase between subsystems is close. That won't provide perfect time alignment, but it will keep the system from generating nulls in the target listening area.

Subject: Re: Time alignment
Posted by stupid newbie on Thu, 25 Dec 2003 01:50:11 GMT
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wow, that's all really good information, thanks to all of you. This really helps. I think I've got it all figured out now. If there is anything I can do in return, I'd be happy to. Thanks again!