Subject: need suggestion for EV problem
Posted by hurdy_gurdyman on Mon, 18 Oct 2004 23:25:41 GMT
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The EV LS-12 has a measurable peak of about 7 dB at 5-6 kHz. I'm looking for ideas to minimize this without any negitive effects elsewhere. I'd prefer to not put an inductor in series with the driver/amp, as these are very high Q drivers (about 1.2 Qts) and I'm using a tube amp and don't need the extra resistance. I don't have the test equipment to design a proper zobel circuit, though this is something I'd be open to if someone else has tried this (of course, there may be no impedance proble to correct for here). I'm open to suggestions.Dave :)

Subject: A few fun things to try
Posted by Wayne Parham on Tue, 19 Oct 2004 04:55:34 GMT
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Hi Dave,Zobels are very forgiving of component tolerance. You've got over 25% variance in either the resistive or the reactive component before you can even notice it. So you don't realy need very accurate measurements to know enough to get the Zobel values right.On the other hand, I'm not sure that will help you much here. Without a crossover or other reactive components in the circuit, the Zobel is of limited benefit, in my opinion. In fact, from the KISS perspective, I'd probably prefer to omit it. With crossovers, it's sometimes pretty important but for what you're doing, probably not. It will give your tube amp a more resistive load at higher frequencies though, so I don't suppose it would hurt to give it a try. Use a resistor that's the same value as the driver's advertised impedance, which should be about 1.25 times the DC resistance. Try a 20uF cap in series, then maybe a 30uF and a 40uF. You'll probably find only subtle differences between these three values.Here are a couple things I might be tempted to try. One is a simple electrical filter and the other is a seat-of-your pants acoustic filter. I see that you are opposed to electrical filters, but I'll mention them anyway. The suggestion is free. At 5kHz, the coil inductance value you'd need for a notch filter gets pretty small. You can buy coils that are wound with such large conductors that DC resistance is very small. So that will help you with your concerns about insertion loss. Get a big-ol coil between 0.3mH and 1.0mH and put it in parallel with a resistor of approximately 1.25 - 1.5 times the same value as the driver's advertised impedance. Use a polypropylene capacitor between 2.2uF and 4.7uF in parallel with that. Assuming the EV 12 is 8 ohms as I recall, I'd start with 10 ohms, 0.3mH and 3.3uF all in parallel, and put this little wad of components in series with the driver.The mathmematics show this circuit to have only very subtle response impact and phase change is small too. The resistor across the tank circuit really damps it and it keeps it from doing much. And if you use a good non-inductive resistor, a large-conductor, low-DCR air-core coil and a polypropylene film/foil capacitor, you'll be using all good components too. So you can feel good about that. It's worth a try.Or if you're dead set against the electronics, how about just listening off-axis? At 5kHz, the radiator is beaming so if you turn it 45o, you'll definitely knock off that 6dB peak. You might find that 30o is enough. Just make the baffle tilted; Maybe you can make a very interesting speaker with an angled baffle of some sort. With Qts=1.2, your driver should probably be used in a very large box or open baffle, so it might be cool to use a single sheet or hinged-set open baffle that can be moved or rotated

like a floor-standing mirror or partition. That way you can position it where it sounds best in any room.Just a few thoughts, hope some sound fun.Wayne

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Subject: Re: A few fun things to try
Posted by hurdy_gurdyman on Tue, 19 Oct 2004 12:34:47 GMT
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Thanks for the advice, Wayne. I'm not really opposed to adding an electrical circuit, I just made an assuption that the high Q speakers may be just on the edge of decent bass and adding more resistance might not be a good thing. Sounds like it won't make much difference as far as damping goes. Digging around my parts bin I found two 2.5uF caps, two 1 mH air core inductors and some 8 ohm, 20W non-inductive resistors. This might be a good group to start with and see what happens. The LS-12's I have are in an open baffle, the same ones I've been using for a couple of years now. They are quite flat down to 80Hz, then subs kick in below that. I tried LS-8's for a while, but the 12's just give a bigger sound that I like. Thinking of trying some EV 12TRXB's next. These are the ones with AlNiCo magnets, 16 ohm voice coils, and T-35 tweeters mounted coaxially. Around 0.7 Qts, sensitivity around 95-97dB. I'm negotiating for them now.Dave

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Subject: Doping?
Posted by akhilesh on Tue, 19 Oct 2004 14:13:41 GMT
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HI Dave,How about coating the driver cone with something to change the mass distribution? I don't know the equations, but someone like Wayne or Martin might. It seems like the peak may be caused by excited resonance because of cone breakup (i am not even sure if cone break-up can cause resonance but I am going to go ahead & speculate anyway!!). Changing the mass distribution may alter this. Just a (very speculative) thought.-akhilesh

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Subject: Re: Doping?
Posted by hurdy_gurdyman on Tue, 19 Oct 2004 14:29:37 GMT
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akhilesh,That's something I've been thinking about all along. I've used Dammar varnish before with good results. The bad thing is, it's non reversable, so if it makes things sound worse, I'm stuck with it. I suspect that a whizzer resonance is causing the problem, but don't know for sure. I may just buy a bottle of Dammar and give it a go. Thin coats shouldn't do enough harm to cause a problem, and may help. I wish someone else had already done the experimenting on these old EV drivers so I'd know what works and what don't.Dave :)

Subject: Re: Doping?
Posted by akhilesh on Tue, 19 Oct 2004 21:36:39 GMT
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HI Dave,Thanks for humoring my speculative suggestion. Given the pricelessness of the drivers, it may make sense to look ata) the equations to see the effects the driver mass distribution has on the frequency reproduction. b) It may actually make a difference if you just doped a circular segment on the driver, as opposed to the whole driver if very little mass addition were required. ...one would have to calculate the added mass because of the varnish to decide how many coats were needed.c) Another question willl increasing the mass reduce the relative peak, or will the entire spectrum shift the same....again the equations will tell us this. My guess is that added mass will reduce the resonant frequency, and if the peak is due to some sort of resonance it will probably change. Anyone reding this post should be aware that I am just a hobbyist, and not an acoustic engineer. These are just speculative thoughts in my mind that I am sharing since this is a hobby forum. Folk like Martin & Wayne on this forum have much more seriously developed knowledge in the area, and will probably be able to comment on whether the doping idea will work. Just my 2 cents.-akhilesh

Subject: Re: Doping?
Posted by Wayne Parham on Wed, 20 Oct 2004 02:52:20 GMT
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Doping a speaker cone will add mass, changing its electro-mechanical parameters. It will also stiffen the cone, making its breakup mode behavior much different. The mass change will modify how the speaker behaves at low frequencies, and it is easy to model and predict the pistonic behavior. But what isn't so easy to predict is how the modification will make the speaker act at high frequencies, where the treatment of the paper will alter the cone's flexibility and the way ripples align on its surface. You might reduce a breakup mode resonance, but you might increase it instead. Or you might just shift it and create others in its place.

Subject: Re: Doping?
Posted by akhilesh on Wed, 20 Oct 2004 12:42:16 GMT
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That's kind of what I thought, intuitively at least! Thanks for confirming it, Wayne!-akhilesh

Subject: Re: Doping?
Posted by GM on Wed, 20 Oct 2004 21:07:31 GMT

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Yep, I use my trusty ol' mechanic's stethoscope to find where the resonance is and deal with it as required rather than taking the 'shotgun' approach.GM

Subject: Re: Damar & Dacron
Posted by AstroSonic on Thu, 11 Nov 2004 20:31:48 GMT
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Dave,Your suspicion of whizzer involvement seems on target. The 'mechanical crossover' from main cone to whizzer is specified as 4500 Hz. Have you tried placing some dacron between the whizzer and main cone? This often helps resolve whizzer-related peaks. Some of the peaking could also be caused by edge resonance of the whizzer. A few coats of damar on the outer quarter to half inch of the whizzer might be all thats needed. Probably no need to coat the entire cone and whizzer. Avoid getting damar where the whizzer is joined to the cone - it hinders decoupling of the whizzer, causing a loss of HF.Best Regards,Bob

Subject: Re: Damar & Dacron
Posted by hurdy_gurdyman on Fri, 12 Nov 2004 04:21:10 GMT
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Thanks for the suggestions, Bob. I think I'll try the dammar just around the edge of the whizzer. It makes sense to my way of thinking.Dave