Subject: fullrange cones and whizzers, some observations
Posted by hurdy_gurdyman on Fri, 11 Jun 2004 15:34:00 GMT
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While listening to my new LS-8's last night I started wondering what made these sound so much more precise and smooth in the highs, and somewhat more extended then the LS-12's. EV rates both the LS-12's and LS-8's out to 13-14 kHz range. The 12's only measured to about 11 kHz. I haven't measured the 8's yet. I started looking over the 8's and 12's to make some comparisons visually. The most obvious difference, of course, is size. 12" vs 8". But could there be more then this involved? The cone on the 12" has a curved apex which, as you move toward the outside edge, turns into a flatter surface with concentric rings. These rings are supposed to decouple the high frequencies made in the center of the cone, so the outer edges play just the lower range of frequencies. The 8" driver has a similar curve at the throat, but then flattens out some (but not completely) before reaching the surround, and no concentric rings. This is a more rigid cone. Next comes the whizzers. They are built different from each other. The 12" model has a whizzer with a curved out profile with no bent lip on the edge. The 8" model has a steeper whizzer cone, no curviture, and a flat lip around the outer edge.Both drivers have cast zinc frames built to the same shape, both have AlNiCo slug type magnets (5.6 oz, I believe). Any theories out there as to why the LS-8's sound so much smoother in the highs? It sounds more like a good tweeter playing (I am not using a tweeter with them at this time.) The LS-12's always sounded a bit dull on top without a tweeter added, and had a noticably harder treble in it's range. I'm not saying it sounded bad (it didn't), only that the 8's are better.In fact, the 8's are smoother and more natural throughout their range. You can hear a family resemblence, but the 8's are definatly a more refined sound. Now I need to figure out why.Dave

Subject: One more thing...
Posted by hurdy_gurdyman on Fri, 11 Jun 2004 15:43:13 GMT
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BTW, neither of the EV LS drivers have a "phasy" sound in the treble like my Pioneer B20's had before doing a whizzerectomy. There definately seems to be some manufacturers doing whizzers better then others. Dave

Subject: Re: One more thing...
Posted by Bill Wassilak on Fri, 11 Jun 2004 19:15:00 GMT
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>>From the first entry>>The 8" driver has a similar curve at the throat, but then flattens out some (but not completely) before reaching the surround, and no concentric rings. This is a more rigid cone.Now I need to figure out why. I'll take a stab at it even though I may be wrong, I think it has

to do with the thickness of the cone material. I have a pair of EV's these were the EVM-15B's and before they were reconed they were EVM-15L's. On the 15L's it seemed like it had a lighter cone with the curve-linear shape as EV called it, and it had concentric rings to extend the mid frequencys up. But when I got them back with the 15B cones, the cones were more straight sided and seemed heavyer from thicker cone material, and the mids weren't as pronounced as they were with 15L's. And since your 8's are a smaller diameter they may not of needed the concentric rings on them because the cone would be more rigid. But when they made the 12's they may of used the same material thickness, but it needed the concentric to help boost up the mids a little because of the larger cone area.This is just a guess so don't take my word for it maybe somebody that does recones around here will chime in and explain it better.Bill W.

Subject: Re: One more thing...
Posted by hurdy_gurdyman on Sat, 12 Jun 2004 02:23:13 GMT
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It sounds like a logical theory. I'd bet that would be at least part of the explanation.Dave

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Subject: Re: One more thing...
Posted by Wayne Parham on Sat, 12 Jun 2004 06:35:55 GMT
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I think you and Bill are on to something about cone material and geometry. Klippel and others use lasers to measure the movement of the cone at various frequencies, to be able to perform visual inspections of the ripples that occur across the surface. That's the ticket these days, because since regions of the cone become decoupled from the voice coil, each of these regions wil move independently. Each independently moving section will resonate at its own rate depending on the mass of the decoupled section and the rigidity of the connections to adjacent sections. So the twisting movements become complex. It's like watching the weather, a simple thing that has complex motion.Without the benefit of such instrumentation to see what's happening, understanding and improvement becomes a little more empirical. I've never been a big fan of the idea of doping cones and other modifications like that, but my reason has been that it is hard to do hand modifications consistently. Two similar-looking modifications might cause two completely different characteristics. And I've also typically been dealing with products from companies like Eminence and JBL, both having instruments like Klippel systems to assist them in their design and test processes. They've just had better visibility than I've had, so I implemented components they provided, as-is. But you're dealing with components that were developed at a time when none of this was available. In a very real sense, you have better tools and equipment available to you than the manufacturer did.I don't know why I got off on that tangent, since it really isn't directly related to what you're talking about. The point I was really trying to make is that whizzer cones are an effort to make use of breakup modes in a controlled fashion. Even speakers without whizzer cones, if used as full-range drivers, are intended to be used well past the point where the

cone operates as a rigid piston. The cones are designed to flex gracefully, and so that each decoupled region will resonate in a well-damped mode. The idea is to have small-mass resonances that serve to extend response without having any that are aggressive enough to create sharp response spikes.Now days, a computer model can be made that does a magnificant job of showing how the speaker will behave. Fast motion laser video can be used to literally watch the cone in motion at various frequencies. But prior to modern times when things like those weren't possible, the best thing an engineer could do would be to analyze the structure. It's a lot of minutia work and analysis to find a simple resonant system, and what we're really talking about here is a whole bunch of them coupled together to form a complex system.So that brings me to "why." My guess is that the answer is the cones act differently in the vocal and overtone region as they flex in various twisting modes. They form rippling patterns like waves of water in a pond when excited by a rock being thrown into them. Shape the ponds differently, and the reflections from their shores make different ripple patterns. The patterns are repeatable when the surface is static and a rock is thrown in the same place with the same intensity. But two differently shaped ponds make two different patterns, and this is kinda like what is happening with the two different speaker cones.

Subject: Good explanation
Posted by hurdy_gurdyman on Sat, 12 Jun 2004 12:05:53 GMT
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Good explanation Wayne. What always amazes me is just how good engineers could get those speaker to sound 45 years ago, before computers or space age materials. They must have really put the ole elbow grease into R&D.I'm looking forward to getting a pair of MC-8's to compare with the LS-8's. The MC-8's are a newer ceramic magnet replacement for the LS-8's with lower Qts and smaller voice coil, different shaped whizzer. Did EV's newer stuff get better, or did they go downhill with the cutting corners thing? Did newer tecnology make a better driver? I'll be finding out soon.Dave

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