Subject: Re: Questions on Midrange Drivers
Posted by Adrian Mack on Tue, 13 Apr 2004 23:45:17 GMT
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Hi GarmanThe little Alpha 6 is more like 93db 1w/1m actually in its pistonic range. These are the 1w/1m figures taken directly from the Eminence Sensitivity Guide page. Using the referance efficiency n0 equation and converting to SPL @ 1w/1m also agrees with an average 93db 1w/1m. Many larger 12" to 18" drivers can do ~98db 1w/1m, some more, some less, and they have higher power handling too. Note this is just generalization, what can potentially happen but also what usually does. I think intended use is more of the issue, small midrange drivers arn't needed for MI apps like Bill said, those guys usually want a big driver that can go lower for thier bass guitars and then cross to a compression driver at the top end. Even in pro/PA horns, most tend to use larger drivers instead because they can get even more output this way and/or they want to cover a lower frequency range. Or they just incorrectly run a 2" driver crossed too low until you here the diaphragms about to snap, hence not needing a small 5/6" midrange driver :P either way!In my horn, and on-axis the Alpha 6 is +/- 2.5db from 300Hz to 2KHz. Off axis response is pretty smooth throughout this range. Off axis and in the horizontal plane, response in the conical horn was best to 1.8KHz or so to just within its coverage angle, a nominal 60 deg between each extreme or 30 left and 30 right. It was the same thing for the vertical plane, 40 degrees between each extreme, though obviously at a little lower levels at the extremes because its asymmetric, so DI is different. I designed it this way to minimize destructive interfernace between subsystems. I'm crossing this horn over to a 1" compression driver at 1.8KHz. Output above 2KHz falls, and you can start to get mouth resonances and stuff happening here too so I'm not going to use it here. Note this is all in my horn though, and as a direct radiator like you're using it, things will be different. Looking at Eminences graph, breakup modes start happening around ~1.3KHz on the Alpha 6 where output rises on axis. I think the 1st breakup mode is actually lower than this, but its damped enough not to show itself. Breakup modes on this driver arn't as severe as on others. Breakup modes on the Alpha 10 show themselves a lot more, although you do have it tamed down with the inductor, so on axis it is smooth but as a result off axis response has fallen even further. Exact figures arn't known however because Eminence dont publish actual off axis response curves for thier drivers. Breakup modes also introduce distortion, so I dont like to use drivers too far into their breakup mode regions unless I see actual distortion figures that prove its low and on and off axis response is reasonably smooth. I'm not sure if I'd want to use an Alpha 6 at 100Hz. Its free air resonance is 118Hz, and 2nd and 3rd harmonic distortion is dramaticaly higher below resonance on any VC motor. Perhaps just cross more around 150Hz or 200Hz. Bare in mind the driver has zero VC overhang and about 1.3mm of linear xmax, although for midrange this isn't important, but below fh you need to examine it. If you cross at 200Hz, the Alpha 6 can easily get close to 115db at 1m at full power (100w) and not exceed mechanical limitations in a box which is nice and flat, I think vented between 5L and 20L tuned between 60Hz and 80Hz worked pretty well, it's been awhile since I've modelled it. I remember there were a lot of alignments that resulted in a flat response for this driver. Adrian