Subject: Large Heils & Hi-Vi M8A's
Posted by thetubeguy1954 on Thu, 24 Mar 2005 16:39:15 GMT
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I've decided I'd like the use the Large Heil in the middle of eight 8" Aluminum/Magnesium drivers (4 above the Heil 4 below the Heil) The driver's I've decided on are Hi-Vi Research M8A's. Here's their specifications: * Power handling: 80 watts RMS/110 watts max * Voice coil diameter: 1-3/8" * Nominal impedance: 8 ohms * DC resistance: 6.5 ohms * Frequency response: 30-3,000 Hz * Fs: 30 Hz * SPL: 87 dB 1W/1m * Vas: 1.78 cu. ft. * Qms: 4.90 * Qes: .47 * Qts: .43 * Xmax: 5.8 mm * Net weight: 5.5 lbs. * Dimensions: Overall Diameter: 8-1/2", Cutout Diameter: 7-3/8", Mounting Depth: 3-7/8", Magnet Diameter: 4-3/4". I fiqured with a frequency response of 30-3K and with the Heils being able to cross in at 800-1Khz, they should match up fairly well. Where I really need help is:1) Using eight of these per side what will the efficiency of the M8A's now really be? I'm sure it won't remain at 87dB, but I don't know how to deteremine what it will be.2) Given the specifications above, I'm considering an enclosure 10" wide 78" tall and 24" deep. Does this seem acceptable? Does it need to be ported? If so what should port dimensions be? If I can use infinite baffle I'd like to, but what can I expect low end to cut out at?More about the M8A's can be seen here at the link I've provided. This is my 1st attempt at a DIY speaker and I'm aiming for something I can live with for years to come, so ANY and ALL help is greatly appreciated.Thanks, Tom Scata (thetubeguy1954)
http://www.partsexpress.com/pe/pshowdetl.cfm?&DID=7&Partnumber=297-447

Subject: Re: Large Heils & Hi-Vi M8A's
Posted by Thatch_Ear on Thu, 24 Mar 2005 20:46:06 GMT
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Hi, The SPL is an interesting question and since I don't have a lot of experience building arrays I don't know the answer, but it sure beats the hell out of me how using 8 of those will raise the SPL up 10 db, which is where the Heils will be. You can't use the SPLs of the ESS speakers because the woofers were not near as efficient as the AMTs. I do like the idea of multiple fast low FS drivers that will let you cross at 3K. Depending on the roll off you might be able, or need, to cross even higher if you plan on using a 6db high pass.One thing that I have thought that would work very well with AMTs is to build dipole arrays. The only arrays I built (took one to Fred's once) had 12 drivers with 6 per side running out of phase. They were cheap old alnico drivers, had no bottom but were almost like electrostatics when it came to voicing. Reason I thought of this is that multiple drivers using the same air in a dipole configuration are very quick. You will not get extra bass from the box, but you will stay phase coherent with the AMTs, and since the AMT is a dipole it has a weird logic. Against that logic is the speed of different wavelengths, but how much difference that would make in a room shouldn't be noticable.As for how much raising of the SPL you will get from using 8 drivers is something I would like to know myself.

Subject: Re: Large Heils & Hi-Vi M8A's
Posted by thetubeguy1954 on Thu, 24 Mar 2005 21:29:10 GMT
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Hey Thatch, thanks for at least responding to me post. I have my own online group where I posed this same question. The response I got (but I'll need verification) is that:If one driver has 87dB, 2 will have 90dB, 4 will have 93dB and 8 would have 96dB. (That's providing you are using the same driver in all cases) Or as he said it, everytime you double the drivers, efficiency increases 3dB. So like above 2 drivers is 3dB more efficinet than 1, 4 drivers is 3dB more efficient than 2 and luckily for me 8 drivers is 3dB more efficient than 4 and brings the M8A's up near the Heil's efficiency. Hope I'll get more help now on the enclosure as to whether or not it's size is acceptable (I agree with your idea of lack of right-angles) and whether I can/should use it as an infinite baffle or bass reflex. So PLEASE keep the help coming.....thetubeguy1954 (Tom Scata)
http://groups.yahoo.com/group/singleendedtriodes

Subject: Line Array Sensitivity
Posted by FredT on Thu, 24 Mar 2005 21:30:53 GMT
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You'll find the answer to your question in Jim Griffin's white paper on nearfield line arrays in the link below. As I understand it you gain 3dB every time you double the number of drivers. So two 87dB drivers would give you 90dB, four would yield 93dB, and eight would be 96dB. Additionally, as you wire these drivers in different configurations you gain another 3dB if you half the impedance (i.e. two in parallel) and you lose 3dB if you double the impedance (i.e. two in series). In the case of eight woofers you have a choice of four or sixteen ohms nominal impedance, giving you 99dB or 93dB respectively. A hard core SET lover would probably choose the 16 ohm option by wiring two sets of four drivers each in series for 32ohms, then connecting the two sets in parallel to get the 16 ohms (as in the Bottlehead Straight 8 and the Selah Audio XT8 that I'm currently building). You'll probably end up with a minimum impedance about 12 SET-friendly ohms depending on what kind of crossover you use.For more information on modeling the enclosure you might want to download a copy of Win ISD Beta, a feeware enclosure design program, from http://www.linearteam.dk/One more thought. Given the fact that you will have a substantial sum invested in this project, this is your first diy speakerbuilding effort, and you want it to sound knock-your-socks-off-good, you might want to pay someone with line array design expertise to help you with the enclosure and crossover design, and also to verify that the drivers you are considering are a good choice for this design.
Line Array White Paper Link

Subject: Fred has it about right.
Posted by Bill Fitzmaurice on Thu, 24 Mar 2005 23:44:03 GMT
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There are two sources of additional sensitivity. One is radiation efficiency, which doubles (3dB) with every doubling of cone area. The other is power, which doubles (3dB) with every halving of impedance, or, conversely, halves (-3dB) with every doubling of impedance. 8 drivers could get you an additional 18dB over base if all are parallel wired, but only if your amp is happy with the resulting 1 ohm load. So you can either wire to 4 ohms and pick up 12dB or 16 ohms and pick up 6dB. This now begs the question as to whether you know how to wire to either 4 or 16 ohms. If not Fred's other suggestion, using a tried and tested design, is probably sage advise.

Subject: Re: Large Heils & Hi-Vi M8A's
Posted by Jim Griffin on Fri, 25 Mar 2005 00:12:08 GMT
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Fred has pointed out the sensitivity of the array but let me add that you should plan on losing a few dB to baffle step compensation so the array will be a little less sensitive than with perfect array gain assumptions. The sensitivity stuff is in my white paper.If you read my white paper, you will find info that would help you with the crossover frequency but it suffices to say that you'll likely be in the 1000-1800 Hz range depending on the spacing of the woofers.Let me second Fred's suggestion that you work with a person capable of designing the crossover for your line array speakers. Unless you have measuring equipment and expertise, you'll not do justice to the quality of drivers that you have.Jim
Near Field Line Array White Paper
