Subject: Xover and line array
Posted by JP Haggar on Tue, 04 Apr 2006 18:25:47 GMT
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HelloSo far I have built 2 speaker projects , one 3 way and one Back horn loaded with full range driver but none gives me the sounstage I had in mind = big life size filling my room L shape 60 sq meters with a lot of punch and a large sweet spot !!!when looking for a third project I found line arrays and I think that this system would deliver what I want . Could someone give me some feedback ? I found a few projects like : James's line array using PL14 vifa bass/mids and stryke audio ribbon (I could substitute the stryke audio with the BG ribbon would this be better?), unfortunately I am not very good with crossover design and I couldn't find a diagram for the crossover of this project , but only a description of it , does anybody know where I can find help for this Xover ? did somoene already construct this speaker ? any comments would be welcome . I found also that GR Reasearch Danny is designning a new line array kit the LS 9 that seems to be a very good project but it seems that Danny has some delay with the woofer production (almost one full year now). I have a budjet of around 2000 $ if someone could give me some advise I would be grateful.Thanks JP Haggar

Subject: Re: Xover and line array
Posted by Jim Griffin on Wed, 05 Apr 2006 13:23:51 GMT
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JP,I have two ideas for you to consider. One would be to consider an active crossover (models from Rane, BSS, dBX, DEQX, Behringer, etc.) if you do not wish to develop your own crossover. Now this way will necessitate multiple amplification channels (for a three way crossover a six channel amp) and perhaps other considerations but it would do the job. This approach would be the science fair project in that you would need to work out the crossover for whatever choice of drivers that you might have. Plus some measurement capability would be needed to more easily deal with the crossover point and levels. The second thought is to contact Rick Craig at Selah Audio (www.selahaudio.com) and ask him about his Linus 3 line array kit that uses the Dayton (Parts Express) RS drivers as the woofers. This kit is not shown on Rick's website but he does have a photo (linked) in his gallery. Rick uses, I believe, the RS150 woofer together with the Fountek Neo CD2.0 ribbon tweeters (that is a true ribbon driver) and he has worked out a passive crossover for this combo. I suspect that this parts kit may cost a little more than your budget ($2400 at last report) but it would be a significant step upward in performance vs. the other options you are considering. Jim

Subject: Perfect line array
Posted by JP Haggar on Sat, 08 Apr 2006 21:14:09 GMT
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JimHere is what I understand from your message and the reading I've been through : 1-Every body seems to agree that the Fountek Neo CD 2.0 is a good candidate for the tweeter array at a somewhat fair price . Using 8 of these you make sure you have enough vertical coverage and an acceptable near/far field transition distance .2-Choose a good Mid/Bass driver from 5 to 7 inches(vifa PL 14 or similar???)make an array just a bit longer than the tweeter array place them as closely as possible and if you can trim the flange to reduce the center to center distance it's even better3-Connect the drivers by feeding more power to the center elements and less to the outer ones.4-If you are not an expert xover designer buy a Behringer ultradrive proDCX2496 loudspeaker management system . 300 $ approx .use multiple amplification .Or you can still try crossing over(passively) at a frequency that has a shorter wavelength that the distance from woofer center to center using a second order or higher slope ??5- You have a versitile system that could be ajusted to any type of room .Questions :1- Is it better to have separate enclosures for each woofer or one big for all the line ?2- Is the project still worth trying ? or should one stick to prooven designs ?3- Why do line array designers like Selah Audio and others changes so many times their designs in a very short period of time ? and their old designs are not available anymore , it makes you think they are not very convinced and that there is still a lot to learn about line arrays . ThanksJP

Subject: Re: Perfect line array
Posted by Jim Griffin on Sun, 09 Apr 2006 00:53:33 GMT
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JP,Comments on your points first:1. Yes on the 8 Fountek NeoCD2.0.2. Essentially yes. With the Neo2.0 the crossover can be low enough so that trimming flanges would not be necessary.3. You don't necessarily need to power taper. If you do, just a little. 4&5. Essentially yes but clearly a passive crossover would be best for less complexity (just a single set of stereo amps and less wiring). An active crossover would offer more flexibility if you like to tweak.Now for your questions:1. One enclosure is usually preferred but it usually partitioned with internal braces to strengthen the cabinet. You could thicken the cabinet walls as an alternative but braces are really superior in my mind to a cabinet that weighs twice as much. 2. Line arrays are more complex to design and build than other speakers so one would not go into them without either build a proven design or having the expertise to work through the details.3. Selah Audio (and several other small custom builders) is a custom builder that builds speakers per requests from their customers. So you'll see far more variety in speaker designs and finishing options vs. a company that has a large factory assembly line operation to satisfy a specific product line for their dealers. Selah builds turnkey fully assembled systems and can supply parts kits for customers who wish to build their own enclosures. It is a lower overhead, lower cost, and more flexible way to do business versus high markup high end audio. Jim

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Subject: Re: Perfect line array
Posted by Rick Craig on Thu, 13 Apr 2006 03:43:15 GMT

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As Jim noted I do many custom designs so that's why you'll see a wide variety of arrays. Some changes are also due to new drivers being available. After using the Dayton RS180's in an array I couldn't justify keeping any of the Linus designs in production because the Dayton / Fountek combination surpasses those designs in every way (except it costs more).

Subject: Re: Perfect line array
Posted by JP Haggar on Thu, 13 Apr 2006 04:19:07 GMT
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Yes I understand ! in that case why not keep the Dayton/fountek RS8 in the list of the available arrays ? it would complement your list with a choice of lower priced design ,for someone like me who cannot afford the Alexandrite or the XT 8 !Are the Dayton RS 180 drivers the best you can use in it's price range ? what about the vifa P17 or PL 17 drivers ?Thanks

Subject: Re: Perfect line array
Posted by Rick Craig on Thu, 13 Apr 2006 04:42:12 GMT
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I've not included it on my site because I don't have a picture for the RS8 design. The prototype was an unfinished cabinet and I failed to take a picture. The RS180 is the best value of any 6.5"-7" driver I've tested (and I've tried about all of them). The P17 and PL17 are decent drivers but older technology.

Subject: Re: Perfect line array
Posted by Steven Homrighausen on Tue, 30 May 2006 14:13:03 GMT
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What about the Ascendant Audio Poly 6.5"? I've been tempted to build my first array using this driver and the Fountek... It seems like a good choice. The drivers are on sale right now, and seem to be a great bargain for the price (copper shorting ring, 'phase' plug, high Xmax, high power handling). I know that others have surely looked at the Adire Extremis 6.8 - this is a similar driver with higher sensitivity, more 'upgrades', and about 1/3 the price...http://www.ascendantaudio.com/poly_6.5_page.html

Subject: Re: Perfect line array
Posted by Rick Craig on Tue, 30 May 2006 14:40:25 GMT
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I don't know about that driver but I have tested the Extremis. The Extremis has some performance issues that eliminate it from being a good array driver. I found the Dayton RS180 to be better and it costs less than the Adire or Ascendant woofers.

Subject: Re: Perfect line array
Posted by Steven Homrighausen on Wed, 31 May 2006 14:53:17 GMT
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Do you remember the performance issues with the Extremis? It's possible that this driver would not have the same issues... If you have specifics, it might be worth picking up a couple of these drivers and test them to see if they have simlilar issues. $70 for a pair of them to play with might not be too bad.

Subject: Re: Perfect line array
Posted by Rick Craig on Wed, 31 May 2006 15:38:16 GMT
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The motor in the Extremis is not very strong so the sensitivity is low. I also found the Qes to be too high for a properly damped ported box. A sealed enclosure performed well but you would still need to add a subwoofer. At that point the other drivers available perform better (smoother frequency response, higher sensitivity)and in the case of the RS180 it's much lower in cost. It doesn't make much sense to have the extra excursion capability if you're not going to use it anyway.I think the best Extremis application would be a small sealed subwoofer with added equalization.

Subject: Re: Perfect line array
Posted by Steven Homrighausen on Thu, 01 Jun 2006 00:11:54 GMT
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I've also heard about similar issues with the Extremis. The Ascendant Audio driver is 88dB 1W/1M - and only $35. I just ran a model on this driver in the same size enclosure with same tuning frequency as the RS180-8 and this driver has slightly more extension. It also handles a bit more power.I was hoping that someone out there has heard the driver. From what I've read, it

has a pretty good sound - but I've heard nothing about anyone using them in an array. I know that the inductance is .05mH - so it has potential for greatness from that standpoint.Thinking about the benefits that an array offers - the extra excursion might not be used. But it is there if you need it (eight of them would have a maximum potential of around 126dB - what would you possibly use for a tweeter with THAT?)On the subject of tweeter - generally regarded as 'best bang for the buck' (PT2?)? How about the 'upgrade' from there (NeoCD2.0?)?

Subject: Re: Perfect line array
Posted by Rick Craig on Thu, 01 Jun 2006 00:40:34 GMT
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The sensitivity is really 85db because it's a 4-ohm driver rated at 1W/1M. There's no free lunch I've used the PT2's but I like the Fountek much better. The PT2 is limited in how low it will cross as well as sensitivity.

Subject: Re: Perfect line array
Posted by Steven Homrighausen on Thu, 01 Jun 2006 02:21:42 GMT
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Wouldn't that be 91db @ 2.83v for four ohms 88db 1W/1M? (I think it's actually closer to 92db since Re = 3.2 ohms...)What about sensitivity for PT2 vs. Fountek (real world) - what numbers are you talking about (is it 94db vs 98db or am I remembering incorrectly?)

Subject: Re: Perfect line array
Posted by Rick Craig on Thu, 01 Jun 2006 02:56:17 GMT
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Send me one to test and I'll let you know how accurate the numbers are The PT2 is rated at 94db but because of the contouring needed you actually lose a couple of db's. The Fountek is a true 98db and will work with a much wider variety of woofers.

Subject: Re: Perfect line array
Posted by Steven Homrighausen on Mon, 05 Jun 2006 14:45:24 GMT
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That makes sense to me. With $500 to spend on tweeters - is it better to have eight PT2's per array, or two Founteks (or one Fountek and save the extra $250). I understand that a single (or two ribbon/planar stacked) will have a small 'optimal' listening height, while listening height would be less critical for a longer array. I'm trying to fully understand the quality difference between the drivers, and advantage of a longer array.A 3rd option would be a line of ND20FB (rear mount PE tweeter). C-T-C spacing would be 1.5", so comb effects would start around 9040Hz (which is close to the 'relaxed' 10k sited in your whitepaper). 40 per array would be ~$160 per array. With this driver, the xover would need to be the highest of the three options (due to fs of the tweeter). I'm not sure about the xover for the two situations above - could the PT2 be crossed lower (needing a steeper slope?) since there are eight working together (vs. a single PT2)?How would the efficiency of 40 dome drivers increase in an array? Is it the same as mid-bass/woofers? I know that ribbon/planar drivers have little vertical dispersion, so they don't increase efficiency like dome drivers when in stacked in an array. My theory is that the drivers will have increased efficiency at all frequencies below 9040Hz in the case of the ND20FBs (wavelength = C-T-C spacing).I've read and re-read your whitepaper, and I understand most of what it is saying. I'm just trying to get some of the hypothetical situations straight in my head before moving ahead.

Subject: Re: Perfect line array
Posted by Jim Griffin on Wed, 07 Jun 2006 01:52:44 GMT
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Steven,I think that you mean my Near Field Line Array white paper. Rick and I have worked together in the past. He is the professional speaker builder while I'm the part-time sometimes university professor and tinkerer into line array theory.Of your tweeter choices, the PT2 line will work but ribbon tweeters will take things to the next level. A few worries with the PT2's is to get their sensitivity to blend with the woofer line's output. The small Neo dome tweeters will work with limitations because of their arrayed sensitivity falling as you go upward in freqeuncy. Their sound fields will provide directivity (increasing sensitivity) but as you go above a wavelength c-t-c distance, their arrayed gain will decrease so you may have to compensate for their performance.
Jim

Subject: Re: Perfect line array
Posted by Steven Homrighausen on Wed, 07 Jun 2006 15:08:06 GMT
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You have my sincere apology for not giving credit for the wonderful white paper that you've given to the DIY community!!!So… which is better a true line array with PT2s, or a quasi-array with two Fountek ribbons per array (I could add more later…)? You verified my understanding about using dome drivers – they will benefit with increased sensitivity (directivity), but only at or below a wavelength c-t-c distance. In the case of drivers with 1.5" c-t-c that would be just over

9kHz – the tweeter line would fall off above that frequency. This drop caused by comb effects, if I understand correctly.The issue with comb effects would become an issue at a lower frequency with larger c-t-c spacing. Is it possible to predict the roll-off of the upper end based on number of drivers, c-t-c spacing, line length, etc? Is it best to just build it and measure?I've seen different arrays that use multiple large flange dome tweeters spaced accordingly (4.5" for example). If you have 12 of these in an array, you'd have to mitigate the roll-off starting at around 3kHz.. One example is at zalytron.com their Axon 812 array has eight 6.5" drivers and 12 tweeters spaced 4.5" apart (there are different configurations on that site as well). I've been trying to understand how this system could be 98dB @ 2.83v when a single tweeter is only 90dB.

Subject: Re: Perfect line array
Posted by Jim Griffin on Wed, 07 Jun 2006 23:29:46 GMT
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Steven,If you can add more Fountek ribbons later, I would vote for that approach vs. a full line of the PT2's. If you can not add additional tweeters, then I would suggest the PT2's. Regarding comb line effects: I give some guidance (spacing, choice of driver type, the freqeuncy range coverage,etc.) in the white paper but the best answer is to build and measure. The white paper stuff is intented to get you in the ball park but ultimately the correct answer is to measure. From a design viewpoint you would be safest if you use a conservative critieria on spacing--like c-t-c spacing of less than a half wavelength vs. one wavelength. Frankly, the Axon array isn't a high quality design based on the drivers used and the limited length and spacing of the tweeter line. Using either planar or ribbon tweeters would be much preferred to the large tweeters used in the Axon design. The 98 dB SPL value is clearly bogus or based on very optimistic assumptions. Maybe they have reinvented acoustical physics.Jim

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Subject: Re: Perfect line array
Posted by Steven Homrighausen on Thu, 08 Jun 2006 20:24:19 GMT
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That's the information that I was hoping to get on the Fountek (or two) vs PT2s (in an array). Thanks.That's also what I thought on the designs like the Axon array. There have been several that I've seen lately - a few too many people jumping on the LA bandwagon, trying to make a profit. This part was more of an (in)sanity check on my part.

Subject: Re: Xover and line array
Posted by Danny Richie on Thu, 08 Jun 2006 23:58:12 GMT

Sorry for the delays in driver development, but I wanted the drivers to be perfect for the application and the XBL^ technology took a while to learn.Woofers are under production now and so are the custom planar magnetic tweeters. I even have cabinets being produced. Everything should begin arriving here in about 4 weeks.Not only will kits be available but fully assembled speakers as well.Danny