
Subject: Vifa two way

Posted by [GGeorge](#) on Mon, 07 Jun 2004 22:35:36 GMT

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Hello all, I'm thinking about building some line source speakers for left and right and smaller sealed two way speakers for center and surrounds. It would be really great to use the same drivers in both. I haven't decided ribbon or dome but for the small speakers, I'm thinking of something like a small sealed box with Qtc of 0.7 and drivers mounted in vertical alignment. 12dB crossovers with impedance compensation. Doesn't seem too difficult to get a speaker like that very right. See any downsides?

Subject: Re: Vifa two way

Posted by [Bill Wassilak](#) on Tue, 08 Jun 2004 13:20:43 GMT

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Go over to the array speaker section here and ask Jim Griffen, he'll be able to answer questions about line arrays for home. Also see message [athttp://www.audioundtable.com/ArraySpeakers/messages/26.html](http://www.audioundtable.com/ArraySpeakers/messages/26.html) You can see some of the line arrays he builds, your biggest problem with line arrays that I see is getting the mid and tweeters close enough to together so you don't get comb filtering problems. HTHBill W.
Jim's white paper on Line array design

Subject: Re: Vifa two way

Posted by [Bill Fitzmaurice](#) on Tue, 08 Jun 2004 18:37:35 GMT

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I've just finished a line array TL using eight fours per side in a three foot box. Qts .77, Fs 105 Hz; they are very linear from 100 to 6kHz. They also cost \$0.87 each. When it comes to arrays don't waste money on expensive drivers. Bill's correct about the spacing; you can't have wide tweeter frames. I used a dozen 3/8" domes per side that were frameless round jobbies that I glued into holes in the baffle, so the dome to dome spacing came in at about an inch, which is good to about 10kHz for wavefront integration. Above that they comb, but only on the vertical plane of course, so that's a minor concern. BTW, they cost me \$0.27 each. These speakers cost me less than \$60 for the pair, lumber included, and they sound quite literally like a thousand bucks. Go with no less than 18dB slopes. Assuming the midwoofer and tweeters are in lines that are side by side keep that distance as tight as possible and you need at least an 18dB slope to minimize crosstalk between the elements which would lead to serious combing on the horizontal near the crossover frequency.

Subject: Re: Vifa two way
Posted by [Ben](#) on Wed, 09 Jun 2004 11:02:19 GMT
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Well, one thing you might consider is intermodulation. Back in the day, you had speakers that never saw 100 watts and excursion of a quarter inch, max, peak to peak. Intermodulation distortion wasn't such a big deal because the cones weren't moving very far. Many new small frame woofers are made to allow much more excursion, and that spells trouble for midrange if you push them hard. Think about it.

Subject: Re: Vifa two way
Posted by [Adrian Mack](#) on Thu, 10 Jun 2004 04:40:27 GMT
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Have you got any pictures of that line array Bill? I would like to see them! What sort of output could you get from this line array? Most of the

Subject: Re: Vifa two way
Posted by [Bill Fitzmaurice](#) on Thu, 10 Jun 2004 10:19:43 GMT
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These Onkyo tweeters are rated at 20w, so with 12 per side they're quite adequate; the same for the 15w midbass with eight per side.

Subject: line array [Re: Vifa two way]
Posted by [lon](#) on Fri, 11 Jun 2004 19:29:19 GMT
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This looks like a good use for my fly cutter. Will details be in _aX_?lon (who still has all ten fingers)

Subject: Re: line array [Re: Vifa two way]
Posted by [Bill Fitzmaurice](#) on Fri, 11 Jun 2004 20:19:09 GMT
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Yes, but I just finished the speakers and haven't written the project up yet, so I doubt it will see print before winter. A fly cutter or hole saws are a must with all those holes to cut.

Subject: Re: line array [Re: Vifa two way]
Posted by [lon](#) on Sat, 12 Jun 2004 04:12:57 GMT
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I noticed you cut holes in a lot of stuff like the Tubaproject. So if I could draw in some remarks that TC had about approaches to audio, do you see any of these Tuba designs and Array designs coming together as a complete solution or are they just discreet ideas? I am still thinking back to the Snail designs of yore and wonder if anybody ever built them (?) Or maybe just for professional concert use. I liked the concept for its complexity and elegance but it never has become part of the vocabulary of the hobby... or has it?

Subject: Re: line array [Re: Vifa two way]
Posted by [Bill Fitzmaurice](#) on Sat, 12 Jun 2004 12:45:15 GMT
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I cut holes in internal parts for a variety of reasons. The primary one is to reduce internal reflective surfaces, the secondary to reduce weight. In the Tubas holes in the cross braces are necessary for an unimpeded sonic pathway across the horn. My current home hi-fi setup of a Tuba 18 sub with TLAH mains (Transmission Line Array Horn) takes advantage of the respective merits of each concept. The end result of full spectrum 99dB sensitivity with minimum size and cost is one that I'm quite pleased with. With the exception of Snail III all those boxes were pro-sound oriented, as are my DR horns. I'm aware of some people using Snails and DRs in the home, but the designs are less than ideal for that, which is why I came up with the TLAH.

Subject: Re: line array [Re: Vifa two way]
Posted by [lon](#) on Sat, 12 Jun 2004 13:15:09 GMT
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Is this for a solid state source or tube? Like you, I don't have a permanent long range goal but just keep experimenting. The TLAH sounds like a Voigt pipe with an array on the baffle instead of one or two drivers. Where is the terminus of the horn? I am not using any design programs yet and am fiddling by ear. The big test for me is organ recitals rather than cannon explosions. And I've been trying to do everything with length rather than more driver hardware. One of my listeners liked a PVC tube arrangement I put together purely as an experiment: one PVC tube the

height of the listening room which about 10 ft. The driver was way up near the ceiling and the terminus down near the floor and both on PVC elbows. It did sound pretty good for those low notes but I couldn't live with it. I chopped it down and have some bends with less length. But this put me on another idea: PVC is real flexible. I could have 2 drivers on elbows (sort of looking like a letter "F") but I don't know how that would give the ability to shorten length and maintain the low rumbles. I will get to wood someday. :-)

Subject: Re: line array [Re: Vifa two way]

Posted by [Bill Fitzmaurice](#) on Sat, 12 Jun 2004 18:48:41 GMT

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With 99dB sensitivity it can be driven by anything, though to keep the driver count down (at 8 woofers instead of 16) it does have a 5 ohm impedance. Of course that's with 8 ohm drivers; using 16s or 4s you can go 8 drivers for 8 ohms. I wasn't concerned about the impedance as with that sensitivity it won't be drawing a lot of current. You're correct about the configuration, though the exact details I can't reveal until publication. The problem with PVC is that if left unstuffed it's a very resonant speaker, a one-note if you will, and even stuffed isn't as good as a tapered line. Ten feet gives quarter-wave tuning at 28 Hz, and that's probably well below the Fs of a driver small enough to fit it, so a mis-match there. Two drivers is the way you mention is feasible, with tuning perhaps a third-octave apart to smooth things out.

Subject: Re: line array [Re: Vifa two way]

Posted by [lon](#) on Sat, 12 Jun 2004 20:33:54 GMT

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Ok, well my imagination is whirring away on the idea of an array with a horn thingie that looks like a trapezoid. My PVC experiments are due to the fact that I only have a few hand tools to play with. I can cut PVC with a hacksaw, mount it on some 70 cent shelving, add a couple elbows and a closet flange. The speaks in the 4" PVC are RS 1197's. Real budget stuff. So without spoonfeeding me too much, what length should the toobz be? Only stuffing I use is behind the driver in the elbow. Any more than that and things start to sound muddy. It may be the type of stuff I play like organ recitals but the resonance effect seems to enhance rather than detract. And yes, I'm aware of the term one-note bass... the kind I hear through the wall when my apartment neighbors have their subs cranked. Sometimes I think they have car stereo in the house... no audible _melody_ of any sort. The guy that made the Voigt pipe with a discontinued Audax full range said that most music is down in the 500 - 2000 range. If that is true just about any mid woof should play tunes. Wayne (hello Wayne) mentioned an Eminence 6" for the purpose. All I see in the PE catalogue is one 6" called 100W Midrange, PE part number 290-400. I do not know if that is the item or not. I am watching for your website to be completed as well. ;-)

Subject: Re: line array [Re: Vifa two way]
Posted by [Wayne Parham](#) on Sun, 13 Jun 2004 02:00:40 GMT
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Hi Lon, Eminence makes the Alpha 6 and recently introduced a few new 6" drivers as well. The new LA6 speakers have baskets formed so that they can be clustered close together for arrays. Wayne

Subject: Re: line array [Re: Vifa two way]
Posted by [Bill Fitzmaurice](#) on Sun, 13 Jun 2004 12:01:16 GMT
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Your pipe needs to be a quarter wavelength long at the lowest produced frequency, but there's no point in a ten foot 28 Hz pipe with a driver that has an Fs of 100 Hz. A good rule of thumb is to have the pipe frequency perhaps 20% below Fs, but Qts and a lot of other factors come into play, too many for a simple explanation. Pipes should be fully stuffed or they become resonant devices with all sorts of midrange aberrations. The idea of stuffing is that it suppresses mids for a non-resonant device but the lows essentially blow right through the stuffing. Unstuffed pipes are only recommended for pipe organs where you want single note propagation. Most music is in the midrange as far as definitive content is concerned, but it's the nuances of the low fundamentals and high harmonics that make it interesting. I'd say the new Eminence line array 6 (available at Parts Express) leans more towards high power pro use than home; for the home I like the idea of very wide range drivers in the four to five inch range. You can get very flat response over a wide bandwidth with small drivers, and by using six or more you get the sensitivity up to where the SPL is quite adequate.

Subject: Re: line array [Re: Vifa two way]
Posted by [lon](#) on Sun, 13 Jun 2004 16:19:37 GMT
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Ok thanks. PE hasn't sent me a fresh catalogue for a while.

Subject: Re: line array [Re: Vifa two way]
Posted by [lon](#) on Sun, 13 Jun 2004 16:37:38 GMT
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I'm a low power sort on all counts. ;-)
Projects take forever because I acquire the

backgroundneeded pretty slowly. I have a pair of Fostex FE127's (4.5 in) on hand. They are in a some old Speakerlab BR cabs at about 2.5 cu. ft. I have them set up by the computer here and everything runs through a Yamaha RP U100 which is a small receiver with a USB connection. Power is 30 watts per channel.
