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Subject: Some simple Array questions

Posted by [Eric](#) on Fri, 07 Apr 2006 19:45:47 GMT

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I have a few questions about Array's. I've found some great links but most of them are dead. I'm thinking of building my own high end array. I have a room, 25x20x20, which then expands into a loft area that also rises 20' and makes the real room 25x28x20 with a foyer coming out, also at 20 feet, extending 14' near the back of the room. I purchased a Yamaha RX-V2600, C-950 DVD player, and a set of Definitive Technology 7002's. I have the matching Deftech speakers for center/surrounds. Since it was such a big room based on budget and the large sound they produced I went with them. Someone helped me pick them out and I can't say they were a bad choice. However the room doesn't do well with bipolar speakers. The built in subs do great for HT but I really lack the definition I wanted, especially in bassy hard rock/alternative. Their low volume performance I also do not care for. I started to look into Array's and they seem to be the answer to what I am looking for. Solid definition across the range, excellent low volume clarity and strength, the WALL OF SOUND effect, etc. My 7002's for stereo honestly sound like crap to me. It's the room, not the speakers but I am limited in movement. They are already 12" out from the wall as is. We generally listen to DVD Audio and SACD in 5 channel mode so that really masks a lot of what I do not like. The starter questions are. Some papers I read referred to the speakers in an array as woofers. Can an array be made up of tweeters and mid ranges with separate subs? Or is woofer referring to a mid range? I plan on doing the fronts along with 2 subs first. I have an Outlaw Audio ICBM and it supports stereo subs. Later on I'd like to replace the center with a center array and rear's also. Budget wise... I'd say \$1,500 for the front arrays but it always comes down to dollar per performance. If \$1,500 will get me 50 percent better "performance" than \$1,000 then I'd do it, if \$2,500 gets me 10 percent over \$1,500 then I won't. I won't make a large investment just to skimp out on 10-15 percent. What about amps? I'll be test driving it with just the 135 off of the Yamaha, but what kind of expectations should I have in purchasing an amp(s)? The construction is not a problem. I have access to some pretty decent CNC equipment so I just need to draw it up and can have the sections made. Thanks

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Subject: Re: Some simple Array questions

Posted by [Jim Griffin](#) on Sat, 08 Apr 2006 19:01:12 GMT

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Eric, You might try my near field line array white paper for some pointers on line arrays. Your room and placement are both issues with your current speakers. First, with your elevated ceiling you are living in an echo chamber. Any point source type speaker will radiate upward and out and then reflect from the distant walls/ceiling/floor and create reflections into the echo range of the ear. The ear reacts so that sounds within a 5 to 45 ms range are perceived as one sound provided that any reflected sound is lower in amplitude. Reflected sounds (from the ceiling, plus side and rear walls) in your room can be greater than 50 ms in your room so the ear perceives those as echos--that is not good. The placement issue is that if you have bipolar speakers like the DefTech's placed within 12 inches from a wall then you have serious reflections from the front wall which are likely about the same amplitude as you directly radiated sound. Bipolar speakers need

to be at least 4 or more feet away from the front wall for this reason as they radiate as much sound rearward as they do forward. The goal is to lower the front wall reflected energy. Any speaker--even monopolar ones--sound their best if spaced away from walls so I would say that even monopolars would work best if at least a couple of feet away from walls. For a near field line array (see my white paper to be aware as to what that means) would radiate so so that the sound propagates parallel to the floor and ceiling while in the near field. Hence, you mitigate any floor and ceiling reflections which would help your sound to be better in your room. You still may need side and rear wall treatments--ficus or other plants, bookshelves, drapes, etc. to lower the side wall reflections for any kind of speaker in your room. The Linus 2 array that Rick Craig ([www.selahaudio.com](http://www.selahaudio.com)) and I designed is likely the lowest cost near field array that fits your under budget. They use Vifa TC14WG-08 mid-range drivers and Silver Flute YAG20-1 planar tweeters. The drivers are available from Madisound and with crossover components would run in the \$1250/per pair range. I can provide plans of the Linus 2 if you are serious about them. For even better sound Selah Audio (Rick Craig) can provide a kit and plans for the Linus 3 for about \$2400 which uses Dayton RS midranges and Fountek NeoCD2.0 ribbon tweeters. Both of the Linus designs need to work with subwoofers for the lowest bass octave or so in your room--I like stereo subs and given your room size you'll need them. Photos of the Linus 2 and 3 arrays are available at these links:  
<http://www.selahaudio.com/sitebuildercontent/sitebuilderpictures/linus2.jpg>  
<http://www.selahaudio.com/sitebuildercontent/sitebuilderpictures/linus3c.jpg> Thanks, Jim

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Subject: Re: Some simple Array questions  
Posted by [Eric](#) on Sat, 08 Apr 2006 22:01:43 GMT  
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Jim, Thank you for the response. I guess I am trying to figure out how to quantify the difference between the \$1250 Linus, the \$2,400 Linus, and the assumed value of my 7002's. I already know I will be getting better bass response musically out of a separate sub. They are great for HT but lack in heavy music. Here are some shots of the room:  
<http://i65.photobucket.com/albums/h232/econnelle/LivingRoomSpeakers005.jpg>  
<http://i65.photobucket.com/albums/h232/econnelle/LivingRoomSpeakers004.jpg>  
<http://i65.photobucket.com/albums/h232/econnelle/LivingRoomSpeakers003.jpg>  
<http://i65.photobucket.com/albums/h232/econnelle/LivingRoomSpeakers002.jpg>  
<http://i65.photobucket.com/albums/h232/econnelle/LivingRoomSpeakers001.jpg>  
Just for reference the ceiling is about 20' at the top, but should give you a general idea. Also the shot around the TV my Deftech's are sitting out about 10". The skylights screwed up the white balance so the colors are off quite a bit. It's maddening to have such a big room with so little space. Is either array going to be 'superior' to my Deftech's? In clarity, crispness, range of sound production and most importantly to me low volume reproduction. My boss has a set of the very high end Wilson Audio's (15K range), in a room full of people even at the lowest volumes the sound fills the room and cuts through the conversation, mine get drowned out. Granted I'm not looking to compare to his speakers, just a general idea of one of the things I find mine deficient in. If I go the cheaper route and build the Linus 2, is going to the Linus 3 a matter of swapping out parts or is the cabinet construction different? Thanks, Eric

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Subject: Re: Some simple Array questions  
Posted by [Jim Griffin](#) on Sun, 09 Apr 2006 00:17:26 GMT  
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Eric, Very nice home. As I said earlier, the biggest issue with your sound is that the DefTechs are ill suited to your room from their radiation pattern. They radiate over a very broad area as they are nearly omnidirectional hence minimal directivity of the sound. Thus sound bounces around the room and creates the sound that you don't like. Furthermore, you have them placed far too close to the wall. Near field line arrays would help alleviate much of your room issues plus a monopolar speaker will allow closer placement near the wall. To get the bass that you desire in your room you'll need two subwoofers. I would suggest that you use no center channel, i.e., a phantom center channel. All surround processors allow for a phantom setting and with the front speakers as close you have the DefTechs, you will have more than adequate fill with the arrays. Ideally, for a 5.1 set-up you could use a set of line arrays for the rear surrounds. Line arrays for the rears would better match the intensity and sensitivity of the front arrays. Bottom line: 2 pairs of arrays and two subs would be what I suggest. A set of near field line arrays in your room would yield virtually constant sound intensity throughout the room with no hot spots even on the side of the room with the front arrays. Near field radiation falls off at half the rate of a point source and the wide image will enable good sound to be heard throughout the room. The Linus 2 and 3 arrays differ from each other enough (drivers, components, and cabinet) that I would not suggest a stepping stone approach from the 2 version to the 3. What you might do is to build a set of Linus 3 arrays and subs for the front speakers and try that out in your room for a while and then you can choose to build another pair later. Jim

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Subject: Re: Some simple Array questions  
Posted by [Eric](#) on Sun, 09 Apr 2006 15:14:19 GMT  
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Jim, Thanks again for the reply. I will need a center channel for SACD and DVD-A. Those are strictly Analog formats so there is no way for me to use a phantom center channel. On the digital side I could but not for those 2 formats. In your last sentence, did you mean to say Start with a 2 array, and then build a 3? The last sentence contradicts itself so I assume you meant the other way around. This sounds like exactly the way to go and I appreciate your help. Now the hard question...will the 2 or 3 sound "better" than my 7002's? I know it's a bad question to ask but from a purely technical standpoint. If the 2 is going to be good enough to exceed my 7002's I'd probably do that to keep the wife happy for now. That way I'll have some money left over to do a bigger and better sub. What DIY sub do you recommend to match up to either the 2 or the 3? How well will my 135watt Yamaha RX-V2600 run the array? I assume an amp is preferred but how soon is it necessary? Amps are voodoo to me. If my Yamaha will produce decent sound I'd rather do that first, build the rears too, center, and then look at going from there. Another question then. Better sound, 2 with a good amp setup, or 3 running strictly off of the Yamaha? I wish I had looked into this more before I purchased my setup. Most people are amazed by the setup but after listening you start to nitpick things that could be improved upon. Thanks, Eric

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Subject: Re: Some simple Array questions  
Posted by [Jim Griffin](#) on Mon, 10 Apr 2006 02:36:01 GMT  
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Eric, Yes, you can use a conventional center channel for SACD and DVD-A. While it may not be the absolute optimum but it would sound OK. A center channel speaker derived from the drivers similar to those in the arrays would be a closer tonal match. I'm more of a stereo kind of guy myself vs. multichannel music but to each his own. Multichannel video disks are OK for movies but I'm not happy even with music DVDs--especially when in some mixes the sound comes from a different direction vs. where the video shows a performer at a different location. By the way, I've had Yamaha DSP (7.1 channels) surround sound in some form since 1990. Dolby Digital and DTS formats don't do it for me except for movies. Hopefully, multichannel SACD and DVD-A are better than DVDs in terms of audio. On the text in my reply: I think I said things correctly. I'm saying that the best ultimate situation would be to use arrays for the fronts and rears (2 pairs) and two subs. What I'm suggesting in the last paragraph is to start by building one pair of arrays and trying that for a while and ultimately build out the rest of the system. I suggest also that the Linus 3 is superior enough (vs. the Linus 2) that the Linus 3 that it would be my preference. Either the Linus 2 or Linus 3 should easily trump the DefTechs in your room. One thought is to build the Linus 3 for the fronts and the Linus 2 for the rears. Best though would be all Linus 3's. On the subs if you go with the Linus 3 I would work that issue with Rick Craig at Selah Audio. I like the Peerless XXLS in either the 10 or 12" range. You might go to a 15" set if you are a real basshead and can tolerate larger cabinets. My preference for music is a sealed box sub but that would not give you the whack of a vented sub for movies. On the the 135watt Yamaha RX-V2600 receiver: It should drive the arrays and the rest of the surround sound system just fine. For the subs I suggest separate plate amps for each one. Usually, you'll need more power for the subs than your receiver can supply. Plate amps that have parametric adjustments would be nice to allow some correction for room modes in your space. That should do it. Jim

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Subject: Linus 2 vs Linus 3  
Posted by [FredT](#) on Mon, 10 Apr 2006 10:34:33 GMT  
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Eric, I decided to jump in here because I built the Linus 2 and the XT-8. The Linus 2 uses Vifa TC series woofers and Silver Flute planar tweeters. The Linus 3 uses Parts Express reference series woofers and Fountek ribbon tweeters. The XT-8 uses Vifa XT series woofers and Fountek ribbons. I can't comment on the difference between the Vifa TC woofers and the PE reference woofers, but I would expect the PE's to sound significantly better, especially in the critical midrange. I can comment on the difference between the Silver Flute planars and the Fountek ribbons: The Silver Flutes are \$30 tweeters that sound about as good as most \$30 tweeters - not the last word in resolution. The Founteks are as good as it gets - clearly better than the \$80 Scan Speak 9500 domes I used in another project. If your budget doesn't permit you to get the ten woofer Linus 3, you might consider building the nine woofer Day Tek as an interim step. It's very much like the Linus 3 (same PE reference series woofers, just using nine instead of ten) with a single Fountek ribbon per side instead of the Linus 3's eight. I believe you could build the

enclosure from the start with the intent of adding the other ribbons, and Rick would provide the additional ribbons and a revised crossover when you do the upgrade. You can see pictures of the Linus 2, Linus 3, and Day Tek at the Selah Audio picture gallery linked below. I'm suggesting this approach because I believe if you build the Linus 2 you'll probably be looking at upgrading to the Linus 3 in a year or so, which means starting from scratch. If you build the Day Tek (and subsequently upgrade) or the Linus 3, like my XT-8, this one will probably be the "keeper" that doesn't leave your system because you will not be able to find anything that sounds better for under \$20K. Jim or Rick, what's your take on this?

Selah Audio Picture Gallery

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Subject: Re: Some simple Array questions  
Posted by [Eric](#) on Mon, 10 Apr 2006 17:16:47 GMT  
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Jim, I do not care for DD/DTS music either. DVD Audio however is stunning if done right. I've listened to DVD-A and DVD-DTS on the same disc back to back and they don't even compare. SACD...for certain genre's its great, Jazz/Classical, but I've yet to hear a SACD outside of those two that sound better than their DVD-A counterpart. I would eventually build a center channel array. I did email Rick on the Linus 2 and 3. He suggested the RS-8, priced in the middle of the two but he said it was the sweet spot piece. A lot more money for the next step up, and although superior for what I am looking for not a big enough gain for nearly 2x the cost. I like the idea of an array in the rear also since that is where DVD-A/SACD thrive is having 5 full range speakers. Part of the reason the format never took off IMO. Hardly anyone has 5 full range speakers and if you don't have a bass management box, or an extremely pricey receiver then it sounds like crap. Mine did. There is no .1 channel so your sub is useless and they are sending stuff sub 80hz to your rears and center. The ICBM bass manager did wonders for the sound. Thanks for your suggestions and help. I purchased one of the \$140 DIY kits from Parts Express today to give myself a hand at building a speaker and cross over. I am more and more interested in doing this. Between the emails to you and Rick, plus posting on another forum it seems like the Array will solve every complaint I've had about my setup and get me where I want to be. Thanks again, Eric

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Subject: Re: Linus 2 vs Linus 3  
Posted by [Jim Griffin](#) on Mon, 10 Apr 2006 19:33:55 GMT  
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Fred, Thanks for the reply. I agree with your assessment. The Linus 3 or the Xt-8 are keepers. The Day Tek might be a reasonable rear channel set of arrays for Eric who could later be upgrade them if he wishes. Jim

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Subject: Re: Linus 2 vs Linus 3  
Posted by [Rick Craig](#) on Thu, 13 Apr 2006 03:36:13 GMT  
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In hindsight I think the Linus1 was more balanced than the Linus2 but with the additional tweeters the Linus2 improved coverage for standing listeners. I agree with Fred that the Fountek-based designs are far better sounding and worth the extra \$. If someone is on a limited budget I would start with the RS8 modified to use a single ribbon per side. The additional ribbons could be added at a later time. The Dayton 7" is an excellent driver and much better in tonal quality / lower distortion compared to the MCM and Vifa 5" drivers used in the Linus designs.

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