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Subject: 4 pi, oh my!

Posted by [EL Jack](#) on Tue, 22 Feb 2011 00:14:44 GMT

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Just picked up a pair of assembled but unfinished pi4 speakers.

Haven't even begun a thorough "test" but I'm already knocked out by their absolute lack of compression. I'm also impressed with the treble response. Listening to the Heifetz Sibelius concerto on Classic reissue right now - wow.

Currently running on solid state (Arcam) but will get it on my Cary monoblocs soon, so I expect it to even sound better on tubes: which leads me to my question - are these a good load for tubes? (I have the Cary KT-88-based monos, which are 25 watts, switchable to 50 - but they don't have a 4-ohm tap).

My other question is with regard to the cabinet - the person who built them didn't make mirror-image pairs (that is, as I look at the speakers the ports are both on the right). Is this the intended design?

Okay, one more question: do folks put these on stands? I was thinking of 3 inches of maple block and 4 hockey pucks per side.

Again, wow and thanks for bringing this great speaker into the world~!

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Subject: Re: 4 pi, oh my!

Posted by [Wayne Parham](#) on Tue, 22 Feb 2011 01:07:33 GMT

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They're a very easy load for tube amps. High efficiency and benign impedance curve. Perfect for tubes.

They are intended to be built and used in mirror images. This is mostly for aesthetics but there is a very small oblique tilt in the position of the forward lobe and the upper and lower nulls. For that reason, I generally suggest the tweeters be outboard. That way the upper null is slightly to the outside and the lower null is slightly to the inside. But it's so slight, it really doesn't matter.

Stands are according to personal preference, but I generally like to suggest that stands be limited to small risers if subs aren't used. This helps reduce floor bounce by keeping the midwoofer/floor distance small. On the other hand, this speaker really works best when used with subs, and in that case, I like to use stands about 9-15 inches. This puts the center of the forward lobe right at listening height. The subs should be blended with the mains, which smoothes room modes, including floor bounce. More about that in the document below:

High-Fidelity Uniform-Directivity Loudspeakers

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Subject: Re: 4 pi, oh my!  
Posted by [EL Jack](#) on Tue, 22 Feb 2011 01:38:31 GMT  
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That's all very helpful, many thanks.

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Subject: Re: 4 pi, oh my!  
Posted by [Matts](#) on Tue, 22 Feb 2011 04:41:17 GMT  
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Ok, what kind of drivers in them? xover? do you plan to put some veneer on them?

"lack of compression" haha!! these speakers ARE dynamic...

I use them with 3.5 watt SET and they work great. With the Cary's you'll get some definite pop.

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Subject: Re: 4 pi, oh my!  
Posted by [EL Jack](#) on Tue, 22 Feb 2011 18:48:56 GMT  
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All standard: Eminence drivers and the base crossovers.

I have previously built a small 2-way but the veneer was not entirely successful. I'll need some help to decide what to do, but I'm inclined to go with a basic black paint.

I just can't believe how these things fill the space with no distortion.

After I spend a couple weeks with them I'll do a review on Audiogon as I strongly believe that more people need to be made aware of these.

My guess is that most folks (including me before yesterday) think there'll be some issue with the high frequencies and the cross-over region, but I'm not getting any issues in those places.

I have three other pairs of speakers (Maggies, Meadowlarks, and Polks, former S-phile Class C, B, and C, respectively) but I think these will be at the top of the rotation.

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Subject: Re: 4 pi, oh my!

Posted by [Wayne Parham](#) on Tue, 22 Feb 2011 19:53:23 GMT

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We pay extremely close attention to the crossover region, because it is so important to a speaker designed for uniform directivity. See the document attached in my last reply for a complete explanation.

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Subject: Re: 4 pi, oh my!

Posted by [Matts](#) on Tue, 22 Feb 2011 23:09:18 GMT

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Mine are plywood cabs, finished with a "faux" mahogany finish that an antique finish specialist did to make them look like an old 50's era dark mahogany "hifi" cab. Very nice! He did a lot of stippling on the edges to cover up the ply effect and faux grain, etc. all over with different shades.

There are lots of finish options that are very ez and look good. You can put a piece of fabric over the top and sides and put nice flowers on them if you're married!

Another thing I find most impressive about these speakers is the proper field effect you get when you listen from another room. I haven't heard any other speakers that do this so well- many recordings sound like live music from down the hall.

Enjoy them!

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Subject: Re: 4 pi, oh my!

Posted by [Bill Epstein](#) on Tue, 22 Feb 2011 23:10:40 GMT

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EL Jack wrote on Tue, 22 February 2011 13:48All standard: Eminence drivers and the base crossovers.

I have previously built a small 2-way but the veneer was not entirely successful. I'll need some help to decide what to do, but I'm inclined to go with a basic black paint.

I think you'll find that painting plywood or MDF is more work than veneer.

For \$75 you can buy a 4x8 sheet of NBL (no black line) walnut, cherry or oak veneer from [tape-ease.com](http://tape-ease.com). One sheet will do the front, top and sides of both speakers. Use the method described by Bob Brines for gluing it on

[http://www.brinesacoustics.com/Pages/Articles/Cabinet\\_Construction/Construction.html](http://www.brinesacoustics.com/Pages/Articles/Cabinet_Construction/Construction.html)

You don't have to trim with a router, a sharp block plane or even a utility knife will do fine to get within an 1/8th, then sand flush.

Enjoy! (and go JBL and B&C as soon as you can!)

### File Attachments

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1) [IMG\\_1739\\_3\\_1.jpg](#), downloaded 17171 times

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Subject: Re: 4 pi, oh my!

Posted by [steve f](#) on Wed, 23 Feb 2011 08:41:45 GMT

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Bill,

What makes the bigger difference, the change of woofer or tweeter?

Steve

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Subject: Re: 4 pi, oh my!

Posted by [Bill Epstein](#) on Wed, 23 Feb 2011 14:45:31 GMT

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I don't know the Omega woofer, only the Delta from the old Theatre 4, but going to the JBL 2226 has to make the bigger change as it's in the music-range, 150 to 1600 Hz. Also, the 2226 has a mid-range that just kills all those darling little 86dB, 6" drivers in the \$10,000 speakers I've heard.

The PSD-2002, while not in the class of the B&C DE-250, is very easy on the ears, doing a great job of conveying the timbre of the music.

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Subject: Re: 4 pi, oh my!

Posted by [EL Jack](#) on Wed, 23 Feb 2011 15:55:15 GMT

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Bill Epstein wrote on Tue, 22 February 2011 17:10EL Jack wrote on Tue, 22 February 2011 13:48All standard: Eminence drivers and the base crossovers.

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[http://www.brinesacoustics.com/Pages/Articles/Cabinet\\_Construction/Construction.html](http://www.brinesacoustics.com/Pages/Articles/Cabinet_Construction/Construction.html)

You don't have to trim with a router, a sharp block plane or even a utility knife will do fine to get within an 1/8th, then sand flush.

Enjoy! (and go JBL and B&C as soon as you can!)

Thanks Bill - as you've figured out, I'm "Mr Black" from AA, and please accept my thanks for pointing out these speakers to me.

I'll check out the veneer method you mention. I previously did it a much more difficult way (with the guidance of a friend who is a woodworker but not much of a finisher...).

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Subject: Re: 4 pi, oh my!

Posted by [Wayne Parham](#) on Wed, 23 Feb 2011 20:25:53 GMT

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I agree with Bill, the quality difference in the 150Hz to 1.5kHz range is noticeable with the upgraded midwoofer. That's the reason for the upgrade, and the reason why I think the woofer is the most important part to upgrade. Tweeter is second, because while it is smoother, I think the improvement is a little less "important" than the midwoofer upgrade. Both woofer and tweeter upgrades are worthwhile though.

the stock build, but the upgraded midwoofers are higher quality "best of class" parts. The difference is largely due to shorting rings being used in the upgraded parts, which makes the motors more linear and decreases distortion. The material and shape of the cones in the upgraded midwoofers also helps reduce breakup, with the end result being smoother midrange with less distortion.

If you're just casually listening for a few minutes at a time, the differences are subtle. You can hear a difference, but it definitely isn't night and day. It's when you really sit down and listen that you notice the quality improvements from the upgraded parts the most. I guess that's subjective, but my point is you shouldn't take this to mean the stock parts suck and the upgraded parts are the only things worth having. That's not the case. The stock speakers sound great. It's just the upgraded versions make the speaker go from a "great speaker" to what I consider to be a "best of class speaker". It's a good-better-best deal with the stock builds being "better than most" and the upgraded builds being the "best".

There is one last thing worth mentioning. There is a difference in the electro-mechanical parameters of any loudspeaker driven at one watt than there is when driven at ten watts, and it shifts even more at a hundred watts. At high power levels, voice coil resistance increases and

this tends to shift the speaker towards an underdamped electrical alignment. Voice coil heating tends to lift the low bass, sometimes causing excessive peaking. At low power levels, the voice coil is cool so there is more electrical damping but the suspension of prosound speakers (designed for several hundred watts) is often stiffer. This change of compliance tends to reduce low bass output. All my designs are made so that they won't get peaky at high power levels, providing good response from flea power to full tilt, but some shift a little more, some a little less. Most shift from moderately overdamped to slightly overdamped, some from slightly overdamped to slightly underdamped.

One thing I've noticed about the 2226 is that it is stiffer than you expect at low power levels. Even though T/S parameters are technically small signal values, JBL rated the 2226 with values that are more representative of how the speakers acts at about 10% power, i.e. ~60 watts. If you take a JBL 2226 and connect it to your handy-dandy T/S woofer tester, you'll find compliance is a lot smaller than the published figure. That's because the woofer tester is sending it about a tenth of a watt for an input signal, and the electro-mechanical properties are much different than it will be at higher power levels. Personally, I think it was a good idea to publish T/S specs for this woofer that are representative of how it acts at moderate power levels, because this is how the driver is going to be used most of the time. But most manufacturers publish specs that are more in line with what you'll actually measure with less than a watt drive signal.

using the Omega 15 produces more output below 100Hz at low power levels than the version with the 2226. As power levels increase, the alignment shifts and brings up the bottom end but at very low power levels, there is less bass output from the 2226. So if you're running low power tube amps, this might be something to consider. If you're using subs, it really doesn't matter. The improvement in midrange quality makes it worthwhile to upgrade, in my opinion, even with the slightly reduced bass output. But I did think it worth mentioning.

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Subject: Re: 4 pi, oh my!

Posted by [Matts](#) on Wed, 23 Feb 2011 20:45:53 GMT

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Acknowledging what Wayne said about the testing for the 2226, I don't find the bass output to be a "real world" problem using 2A3's w/ max output of 3.5 watts. Since the 2226's have cleaner bass, it sometimes sounds a little quieter 'til you get used to what distortion-less bass sounds like. Also, fwiw, I broke my 2226's in with a 60-watt Adcom ss power amp playing loud hip-hop whenever I left the house for awhile- so I didn't rely on the 2A3's to break them in!!

I built my Pi4's with all Eminence, and I was very happy with them. I replaced the cd first, and was very happy with the B&C and thought it was well worth the money. The 2226 is a great driver-sounds great with all types of music, and it's like having a whole new system.

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Subject: Re: 4 pi, oh my!

Posted by [Bill Epstein](#) on Thu, 24 Feb 2011 03:29:07 GMT

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Quote:Thanks Bill - as you've figured out, I'm "Mr Black" from AA, and please accept my thanks for pointing out these speakers to me  
No thanks necessary, on AA I'm often "outaline"

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Subject: Re: 4 pi, oh my!

Posted by [Psychoacoustic](#) on Thu, 24 Feb 2011 03:45:27 GMT

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Welcome to the family! Have fun with your 'new' 4 Pi.

A little bit off topic, but I have successfully used Selenium 220 compression driver with 2226 and standard 4 Pi crossover.

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Subject: Re: 4 pi, oh my!

Posted by [Doc Jr 8156](#) on Fri, 25 Feb 2011 04:05:59 GMT

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Welcome, Mr. Black. I'm glad you are enjoying your 4Pis now. As Bill said, upgrade to the JBL 2226 and B&C 250 will just add enjoyment every time you fire up your 4 Pi's. With mine, I use triodes and pentodes SET (3-8 watts maximum) as well as puss pull amps (35 watts) even vintage receivers (Macintosh, Marantz, Sansui, Pioneer, and Yamaha) I collected through the years and it never cease to amaze me how loud and clean the sound reproduction these speakers are capable of. I even enjoy them when using SS amps. However, just for kicks if you have an opportunity, try a class D amp (100 watts) and you will hear what the fuss regarding the JBL's are all about. I have 5 different single driver speakers and a Linkwitz Orion with all the whistles but I enjoy my 4 Pi speakers no less than any of those. Lets thank Wayne for the joy these speakers are giving us. The Pi speakers need more and better exposure so more people can enjoy them specially those who love low power tube amps. Godspeed.

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Subject: Re: 4 pi, oh my!

Posted by [vinylvalet](#) on Mon, 29 Aug 2011 13:56:42 GMT

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Wayne, your stands angle the speakers up towards the listener. Was this done for a reason other than aesthetics? What are you aiming for, tweeters firing at ear level? Would conventional stands work as well and how high should they be based on the listening height?

One more question if you don't mind. I live in Costa Rica and have access to all kinds of tropical solid woods (only harvested from fallen trees), in many cases for less money than cabinet grade plywood. Could I go this route and what density would be ideal?



Will be ordering the kit soon. Always a challenge getting parts here from the states without paying the ridiculously high tariffs.

Just finished a pair of Bill Fitzmaurice's Omni15 PA speakers for my band. Really looking forward to this project.

Thank you.

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Subject: Re: 4 pi, oh my!

Posted by [Wayne Parham](#) on Mon, 29 Aug 2011 14:57:53 GMT

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The 7° tilt angle you see in the photos of my setup was chosen largely because the first crossovers put the forward lobe angled downward slightly. Not much, like 5° or so. The nulls were about 15° above the speaker and 25° below. That's why I had stands made with 7° angle, making the nulls be at 23° up and 18° down. The crossover has been changed since then, and the forward lobe is more centered. But I kept the stands, because even with the centered forward lobe, I still like some tilt-back.

Crossover optimization for DI-matched two-way speakers This is very much a perfectionist thing, because that tiny shift didn't make any difference at all. The forward lobe is clean over a very useful range, 90° wide and 40° tall. I've seen "waveguide" speakers with an ultra-thin "strata" lobe, like 15° - only 7.5° above and below the centerline. On those, any shift can move you

speakers have tall enough (40°) vertical pattern to be useful, and HF output outside that falls off pretty sharply, which really helps reduce ceiling slap.

High-Fidelity Uniform-Directivity Loudspeakers Personally, even with the centerline of the forward lobe pointing straight ahead, I find I still like 3° to 5° tilt-back on the stands. This is just about right to cover floor to standing height at normal listening distance, 5 to 10 feet back. The forward lobe spans about 1.8 feet above and below the centerline at five feet, about 3.5 feet above and below the speaker ten feet back. When you angle it back some, this pattern shifts upward by that amount.

We don't want ceiling slap - it's more objectionable than a floor reflection at high-frequency - but then again, the floor is usually carpeted, so the biggest problem from floor reflection is usually in the lower midrange (which we cure with flanking subs). Still, the floor is a closer boundary than the ceiling, and the speaker is directional enough at HF that even with some tilt-back, you just don't get ceiling slap until you're pretty far away.

So in the end, I like the stands to provide 3° to 5° tilt-back. It helps cradle the speakers too, because they can sit back on the backrest, a lip that's about an inch tall.



Subject: Re: 4 pi, oh my!  
Posted by [vinylvalet](#) on Tue, 30 Aug 2011 13:21:41 GMT  
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Thanks Wayne. I'll build stands with the tilt angle.

Any thoughts on the wood?

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Subject: Re: 4 pi, oh my!  
Posted by [Wayne Parham](#) on Tue, 30 Aug 2011 13:43:15 GMT  
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I recommend Baltic Birch or medium density fiberboard. MDF is tonally neutral, without a single natural fiber resonance because it is a semi-homogenous mix of wood pulp fibers suspended in glue. It's really a glueboard. However, it isn't all that strong and is easily chipped, especially on corners and edges. It also soaks up wood like a sponge, and then expands. Baltic Birch holds up better, especially in humid environments or when transported a lot. It is almost as tonally neutral, and is usually free of internal voids. Voids are what make most other plywood product unusable for speaker cabinets, because where there are voids, there is usually debris inside which buzzes.

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Subject: Re: 4 pi, oh my!  
Posted by [vinylvalet](#) on Tue, 30 Aug 2011 14:29:52 GMT  
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Thanks again. I can get baltic birch plywood down here so I'll go with that and add a nice veneer.

My wife will be in the states in a couple weeks and can return with at least some of the parts. Typically, how long will it take you fill an order? I'll be ordering the 4Pi kit with all premium drivers and parts.

Later this year I'll follow up with a 3Pi sub order.

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Subject: Re: 4 pi, oh my!  
Posted by [Wayne Parham](#) on Tue, 30 Aug 2011 18:10:50 GMT  
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Order well in advance. We usually ship kits pretty quickly but I've had trouble keeping up this year. Partly it's because of growth (thanks to everyone here) but partly it's because of the parts availability of some items. Replenishments of some things are taking longer than they used to.

I keep stock of all crossover parts, and many drivers. But I go through a lot of 2226 woofers and DE250 compression drivers. So it seems like every other month, I get backlogged on one or both of those drivers for anywhere from a week to a month. The TD12S often takes several months to fill. Everything else is usually either in stock, or if not, less than a week until the replenishments arrive.

We build the crossovers at time of order. Sometimes I'll have a couple on the shelf, but there are one for the DE250. Then there are the coil, cap and resistor options. So in most cases, we have to build the crossover at time of order.

kits are taking two to four weeks.