
Subject: 4Pi with feet

Posted by [lucasmateo](#) on Thu, 17 Oct 2013 15:41:00 GMT

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Hi,

This is my first post here, I've been emailing Wayne for a while for my 4 pi project, and now i'll show some of the work i've done.

I've followed Wayne's plans, and used JBL 2226h woofer/mid and b&c de250 comp. tweeter. I modified the bottom of the speakers adding some MDF solid feet and made the front face thicker to cover the woofer.

I hope you like it, the photos are quite bad, as my iphone is quite destroyed. Next week I'll post some photos with a better camera.

BTW, thanks you all in the forum for all the info posted here

Lucas.

File Attachments

1)	4Pi_IMG_1185.jpg	, downloaded 8560 times
2)	4Pi_IMG_1186.jpg	, downloaded 8622 times
3)	4Pi_IMG_1187.jpg	, downloaded 8591 times
4)	4Pi_IMG_1188.jpg	, downloaded 8610 times
5)	4Pi_IMG_1190.jpg	, downloaded 8649 times
6)	4Pi_IMG_1191.jpg	, downloaded 8657 times

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Thu, 17 Oct 2013 16:03:59 GMT

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I forgot to ask what kind of cable is recommended for internal wiring.

solid cooper, stranded? 16awg? 22awg?

thanks,
Lucas

Subject: Re: 4Pi with feet
Posted by [tom-m](#) on Thu, 17 Oct 2013 20:27:19 GMT
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Your boxes look nice. For the wiring, I think 20 or 22 ga would be a bit small. 16 or 18 should work fine.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Thu, 17 Oct 2013 21:25:24 GMT
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Thanks Tom.
So normal 16awg speaker wire should work ok I think.

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Thu, 17 Oct 2013 21:53:34 GMT
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Looks great! And yes, 16 guage stranded speaker wire is just perfect. That's what we provide in our kits.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Thu, 17 Oct 2013 22:16:08 GMT
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This is my "feet inspiration". Don't tell them

File Attachments

1) [prod_prime.jpg](#), downloaded 8082 times

Subject: Re: 4Pi with feet
Posted by [Bill Epstein](#) on Fri, 18 Oct 2013 01:46:33 GMT
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Is that way cool parallax in Pic #4 or did you build in a tilt?

Excellent casework!

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Fri, 18 Oct 2013 02:46:01 GMT
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Thanks Bill!

The feets on the front are taller than the ones on the back. So the speakers are tilted 5 degrees, its subtle, but it works great in my room. And I liked how they looked tilted!

By making this gap with the floor, I can install the binding posts on the bottom of the speakers, hidden

Here is a side view of the speaker:

File Attachments

1) [Screen_Shot.png](#), downloaded 8023 times

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Fri, 18 Oct 2013 15:41:08 GMT
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Photos from today morning

File Attachments

1) [4Pi_IMG_1192.jpg](#), downloaded 8090 times
2) [4Pi_IMG_1193.jpg](#), downloaded 8147 times

Subject: Re: 4Pi with feet
Posted by [my0x](#) on Mon, 21 Oct 2013 01:18:57 GMT
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Those look great - keep posting your progress!

Subject: Re: 4Pi with feet
Posted by [shallow pockets](#) on Mon, 21 Oct 2013 06:04:59 GMT
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Nice work your doing there.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Sat, 26 Oct 2013 18:25:01 GMT
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Well, 98% done!!!

The 2% that needs to be done involves: Fixing a dent I made when moving one of the speakers, just a little part of the top veneer. Then connecting everything, some screws, some insulating and done!!!

Tomorrow I'll post the finished work, I hope, I don't have much time...

Hope you like it.
Lucas.

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- 1) [4Pi_IMG_1206.jpg](#), downloaded 4983 times
 - 2) [4Pi_IMG_1207.jpg](#), downloaded 4998 times
 - 3) [4Pi_IMG_1208.jpg](#), downloaded 4983 times
 - 4) [4Pi_IMG_1209.jpg](#), downloaded 4961 times
 - 5) [4Pi_IMG_1210.jpg](#), downloaded 4914 times
 - 6) [4Pi_IMG_1211.jpg](#), downloaded 4979 times
 - 7) [4Pi_IMG_1212.jpg](#), downloaded 5028 times
 - 8) [4Pi_IMG_1213.jpg](#), downloaded 4976 times
 - 9) [4Pi_IMG_1214.jpg](#), downloaded 4962 times
 - 10) [4Pi_IMG_1215.jpg](#), downloaded 4990 times
 - 11) [4Pi_IMG_1216.jpg](#), downloaded 4972 times
 - 12) [4Pi_IMG_1217.jpg](#), downloaded 4976 times
-

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Sat, 26 Oct 2013 22:30:56 GMT

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Lookin' good!

Subject: Re: 4Pi with feet

Posted by [Nick77](#) on Sun, 27 Oct 2013 09:10:23 GMT

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Those look sweet, nice woodworking.

What caps did you use?

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Sun, 27 Oct 2013 14:44:51 GMT

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Thanks Nick!

I named them The Quadrupeds, but my girlfriend says they look like a Minion (those little creatures from the movie Despicable Me)

The caps are Dayton audio, The crossovers are standard from Wayne.

Yesterday I applied some modelling clay and tape, today if I find some time I'll apply the insulation, connect everything and test them.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Mon, 28 Oct 2013 12:28:57 GMT

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What type of screw do you recomend?

I have black wood screws like this one, but I've just seen that some people sells this kind of screws, mostly for professional speakers, but I don't know if they are better or not.

The second one is quite more complex to install, and I dont really know where to buy them where I live...

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Mon, 28 Oct 2013 13:13:34 GMT

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I prefer T-Nuts, those shown in your second link.

T-Nut Installation Tips

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Mon, 28 Oct 2013 19:53:14 GMT

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I can buy here 1/4" t-nut, but no 10-32. Is t ok?

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Mon, 28 Oct 2013 23:30:26 GMT

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Thread pitch doesn't matter too much, as long as screw and nut match.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Tue, 29 Oct 2013 00:10:05 GMT
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Thanks Wayne,
I'll try the t-nuts, but as I already have the boxes done, it could be a little harder than the normal wood screws...

but I follow your recomendations

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Tue, 29 Oct 2013 00:18:38 GMT
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It shouldn't be hard to install the T-Nuts. Just drill the holes slightly smaller than the T-Nut shank, so there is an interference fit. The trick is to have a little bit of friction to provide some clamping force, but not so much that the threads strip when you pull them in. Use a dab of epoxy and pull 'em all in with a sacrificial screw. Change screws every three or four T-Nuts, so you don't damage the threads. Basically just follow the directions on the link a few posts back.

Subject: Re: 4Pi with feet
Posted by [Bill Epstein](#) on Tue, 29 Oct 2013 00:28:10 GMT
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Very impressive; crisp details and fit. I love the way you used the legs to angle the cabinets.

Table looks like a TD-125? What are the electronics?

Keep us posted on the listening

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Tue, 29 Oct 2013 01:07:05 GMT
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Tomorrow I'll try to finish everything.

You are right, the turntable is a thorens td-125 and a sme 3009 III, A friend of mine is finishing a tube preamp and amplifier with el34. On the table now is another tube amp borrowed (3-4W, el34 too) a mixer until my friend finish the preamp, a dac micromega and thath all. Records on the white boxes.

I hope tomorrow I can put everything together

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Tue, 29 Oct 2013 23:24:08 GMT

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I had bad luck, 1/4 T-nuts and screws doesn't fit the woofer, the horns neither... And i'm so impatient on this project that I'll use wood screws and order the t-nuts from USA, in two weeks I drill and use the t-nuts...

I've just tried the electronics and everything to work well

I have one question, I connected the red IN to positive IN (+) and black IN to negative IN (-). Is this correct?

Because I used JBL2226 and B&C de250 and both of them used Positive (+) to Black.

I guess for connection is (+) to red and (-) to black...

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Wed, 30 Oct 2013 06:21:34 GMT

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That's right on the connectors. The JBL and B&C drivers are connected weird, seemingly backwards. But the amplifier connection to the binding posts and into the crossover go (+) to (+).

Sorry the T-Nuts you found were too big. Do try and get some that fit, because they are a much better fastener than wood screws.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Wed, 30 Oct 2013 13:12:01 GMT

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Well, finally they are done and running! They look great, later I'll post some photos.

I'll order some t-nuts and screws, but now they are with wood screws.

They have great imaging, they are big but disappear with the music. I think I might have used to

much insulation, as I have tight but shy bass extension (not much, but a little shy). Maybe the mids are a little higher too.

I didn't use shower pan gaskets, I used rubber gaskets (2mm), is this right?

Later I'll post more photos and comments.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Wed, 30 Oct 2013 16:06:04 GMT

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After a two hours auditioning morning I have some partial preview of my legged 4pi.

Preview:

Imaging and soundstage are really impressive, nothing like I've ever had, it doesn't matter if the voices are female, male or tom waits, its always in front of me, amazing. They are really smooth, nothing bright or muddy, very detailed. I was worried about high frequencies, but they were there very detailed.

I noticed that these speakers are really record dependant, some records sound amazing, with a soundstage really wide, detailed, separated instruments... and other records sound regular. Same thing happens with good turntable carts. I think this is not a fault of the speaker, maybe its just too good for those old mp3s...

About mids and lows:

Mids were quite high giving a lot of presence at first listening yesterday at night, this morning I figured out two things, first I've used just two screws for each woofer (for testing) and forgot to screw the rest (i was tired, je) so after tightening every screw this was corrected. yesterday I tested with some bad mp3 I had near me and as I said before I think these speakers don't like bad recorded tracks.

Low frequency is still very tight but very shy. Some records sound better than others but not too much. If I put my ear on the port I can hear bass extension, but mostly from the 40hz or even lower, and very muddy.

I have to hypothesize, first one: I used too much insulation, here in my country we don't use R13 or R11 nomination, so I bought 5cms fiber glass and put a sheet and a half on top, back and port side walls. then another one and a half (7.5cms) between woofer and horn. Second hypothesis is that is used bad internal wiring, it was a standard 18awg (i thought it was 16, but not). Third hypothesis is that wood screws are screwing my beautiful speakers (I'll order some t-nuts). Fourth hypothesis is that the woofers are bad (i bought them used) but they look great, they have nice movement, and the mids have no problem at all.

So, Maybe you can help me, maybe I have to order some other things than the t-nuts from the USA. I live in Montevideo, Uruguay and there are a lot of hifi stores and electronic stores, but no small t-nuts...

best,
Lucas

BTW, this speakers sound great Wayne, I have to thank you again. Even with the tight low lows, it sound great I'm at the office now, but at night I'll take some nice photos and make a separate post.

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Wed, 30 Oct 2013 17:03:44 GMT

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Thanks for your review.

The only way to know for sure whether your speakers perform as designed is to measure them, of course. But to be honest, they aren't intended to provide a lot of deep bass. I almost always recommend they be used with (helper woofer) flanking subs, both for added extension and for smoothing.

Helper Woofer LocationThe response is slightly overdamped, and this prevents them from sounding boomy, even when pushed hard or in rooms with strong modes. I think that's a better approach, especially when blended with subs. And even without subs, I think they sound better this way. But do consider adding subs, positioned just to the side and slightly behind your main speakers. Set them up as described in the thread linked above. I think you'll love that combination, for both music and movies.

Subject: Re: 4Pi with feet

Posted by [Matt](#)s on Wed, 30 Oct 2013 19:06:03 GMT

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Your speakers look great! The way the feet are integrated and you have them sloped is cool. If you're using new 2226s with a smaller tube amp, the bass may develop more as they break. I use mine with a small SET amp, but when they were new I hooked an Adcom SS amp up to the speakers and played it loud whenever I went out...I felt sorry for my dog.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Wed, 30 Oct 2013 20:12:52 GMT

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But the woofers are used so I think they are already broken in. They were stored for 5-6 years, maybe is that?

Later I'll try them with less insulation, some day this week, maybe weekend. By now I'll use them this way, they sound great anyway

Subject: Re: 4Pi with feet

Posted by [Matts](#) on Wed, 30 Oct 2013 22:45:45 GMT

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Yeah, if they're used speakers, they should be broken in. I don't think sitting around would matter. Only re-coning would start the process over. What kinds of music do you listen to?

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Wed, 30 Oct 2013 23:29:15 GMT

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They are breaking in? Or something happened.

I changed the cables to a better one, I'm not really a cable fan, but maybe is this?

They sound great, amazing, better than anything I had before. They are truly record dependant, I hear from tom waits to kusturica, some jazz, some modern (james blake...) It depends on my humor.

Some records have great tight defined bass with great extension, some others lack it. I'll listen to them for some weeks, and then try less insulation. This way they sound great, better that I expected.

This photos are from now, its quite late so I have bad light, on the weekend I'll post some nice shots, I used to be a photographer...

File Attachments

- 1) [4Pi_01.jpg](#), downloaded 6473 times
 - 2) [4Pi_02.jpg](#), downloaded 6381 times
 - 3) [4Pi_03.jpg](#), downloaded 6494 times
 - 4) [4Pi_04.jpg](#), downloaded 6357 times
 - 5) [4Pi_05.jpg](#), downloaded 6354 times
 - 6) [4Pi_06.jpg](#), downloaded 6359 times
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Subject: Re: 4Pi with feet

Posted by [Matts](#) on Thu, 31 Oct 2013 23:01:27 GMT

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Sounds like your speakers are doing fine. A lot of records, especially rock, are engineered for the booming tight boxes, and sometimes people interpret that boominess as bass, when it's a distortion. Kind of a quality vs. quantity issue. Also, many rock records don't really have much happening below 60-70Hz, and bass sounds lacking when you listen on a system that goes an octave below that. The Pi4's don't go super deep, but I can rattle my windows with them, even with 2A3's, when I put on Tupac's greatest hits....

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Fri, 01 Nov 2013 00:27:12 GMT

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You are right. And I think the suspension on the JBL were a little stiff the first time I connected them. Now they are sounding great, I'm listening to everything I have again! Now grateful dead is on. It's incredible how loud can they go with just a little set amplifier.

I don't have a weight in my home, but I travel quite often and I can tell that this creatures weight probably more than 50kg each!!! (More than 110lbs each)

They are really heavy, actually I have to move to another place soon and it will be quite hard to move them. I should have used wheels instead of legs.

I used double front face mdf, plus the veneer is solid wood 3mm thick. The legs might weight 2kg too.

Subject: Re: 4Pi with feet

Posted by [my0x](#) on Sun, 03 Nov 2013 03:15:43 GMT

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Nice build - I hope you are enjoying them!

I found that the crossover and the compression driver needs to break in for a while before things start to gel. It's really hard to wait for that to happen after putting in so much effort to wrap them up and get everything together...expectations escalate! My woofers, which were also used (and

at one point I thought were trashed) came alive one evening about 2 weeks in.

The other issue I found was that placement makes a big deal with these speakers - proximity to rear and side walls, height and angle.

I've had to stash mine for a little bit while I renovate the living room - so I'm envious yours are up and running.

Good luck,

Matt

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Sun, 03 Nov 2013 04:27:26 GMT

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Matt,

You are right about placement. My speakers like to have some air around, and I don't know if my ears are getting used or if they are breaking in, but every day they sound better and better. I don't want to change anything until I see they stop changing. Other thing I noticed is that sometimes my ears get tired after some time of listening, but after I love them this stop, so I have some bad reflections somewhere.

It's a pleasure to listen to them, it's quite a difference from other speakers I had, different design approach. I listen about 2-3 hours a day and I'm really enjoying the big babies.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Sun, 03 Nov 2013 22:52:01 GMT

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Some numbers, I made this graphs with REW 5.0 and the laptop internal microphone, so I guess its not very precise, what do you think about this?

Any way I can measure them without expensive equipment?

Then I made this other graphs with Fuzzmeasure, again with the crappy internal mic of my laptop. With and without smoothing.

File Attachments

- 1) [pi4_measure.jpg](#), downloaded 6125 times
 - 2) [pi4_measure1.jpg](#), downloaded 6212 times
 - 3) [pi4_measure2.jpg](#), downloaded 6141 times
-

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Mon, 04 Nov 2013 04:52:43 GMT

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It's a little hot above 1kHz. I'm not completely comfortable with the measurements because the graphs show more top-octave rolloff than I would expect and that's common with uncalibrated measurement systems and microphones.

But then again, putting aside the top-octave rolloff, the chart looks about right except for that amplitude shift at 1kHz. So that makes me wonder if the woofer is a little low or the tweeter a little high.

What compression driver are you using? What resistor values are installed in positions R1 and

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Mon, 04 Nov 2013 05:07:31 GMT

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The compressor is a B&C DE250, the XO is the one you sent me (by mail you said it was made for the B&C, but I didn't check it). I bought the JBL used and I don't know if they were reconed, maybe you can know looking at the pictures.

I'm finding them a little fatiguing after some hours. But the place where they are is not the best.

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Mon, 04 Nov 2013 06:28:39 GMT

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I'm not really sure what compression driver you listed in the notes on your crossover order, but I can check tomorrow. Then again, that doesn't matter really - Please double check the values installed on your boards. The R2 resistors (four closest to the edge of the board) should all be

that.

If the R1/R2 values are right, then I know what your tweeter SPL is, and that leaves only the woofer. You can't tell the condition of the woofer by looking at it - Some third-party recones look very much like OEM parts, but they're not. Some are really bad, to be honest, with horrible breakup and other nasty things. Yours don't look that bad, but they do look like they are less sensitive than they should be, by about 6-8dB from your charts.

I'd like to see absolute SPL values, as measured on an LMS system at a known distance and drive voltage. I'm sort of assuming the compression driver is good, since it's a new part. Under that assumption, I can sort of use the tweeter as a baseline, since I know what it does. I suppose it is possible that the compression driver is abnormally "hot", but I find that extremely unlikely. And even if the R1/R2 values were set for the PSD2002 instead of the DE250, that would only explain 2dB shift, not the level we're seeing in your charts. So I am leaning towards woofers being out-of-spec at this point.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Mon, 04 Nov 2013 14:29:57 GMT
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Thanks Wayne for your assistance.

I made this amateur measurements because I've been listening to the speakers and found them with less bass and a little on the bright side as I said on previous posts. They sound really good actually, but depends on records and placements.

So the measurements and your comments confirms what I feel.

I've called my country's JBL service and they told me that reconing is USD200/woofer. I think its quite expensive but I bought the woofers quite cheap, so maybe I take the woofers to them. The woofers were reconed as I can see glue on the side of the spiders. So I think is the woofers too.

Tonight I'll open the speakers and take a look at the crossovers.

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Mon, 04 Nov 2013 16:16:34 GMT
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That's a fair reconing price. Do make sure you are getting genuine JBL cones. As long as they are genuine parts, they'll bring the drivers back to being 100% good as new.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Mon, 04 Nov 2013 20:48:06 GMT
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You said 20 and 30 for R1, and 16 for R2, so I guess this is ok. So it might be the woofers.
What do you think?

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1) [4Pi_crossover_photo.jpg](#), downloaded 6704 times

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Mon, 04 Nov 2013 21:10:28 GMT
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Yes, very good. Those are the right values for R1 and R2. Just making sure we didn't have the wrong configuration for your loudspeaker.

Must be the woofers. Get 'em reconed, and you'll know that everything is perfect.

Subject: Re: 4Pi with feet
Posted by [HPower](#) on Tue, 05 Nov 2013 14:59:19 GMT
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Hey lucasmateo,

Great job on you 4Pis, they look fantastic

As Wayne knows from a couple of our previous emails I was having trouble sourcing a pair of used 2226s that were both affordable and worthy of such a build.

\$200 sounds about right for genuine JBL reconing, up here in Canada I was quoted \$300 plus tax per woofer.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Tue, 05 Nov 2013 16:24:19 GMT

Thanks Tom!

I've just left my JBL for reconing. They were really kind, they even showed me the original JBL reconing kit, and it was original. U\$211/woofer, quite expensive, but I think its a fair price as I see, almost the same than US and cheaper than Canada!

Maybe they are done for Friday, maybe Monday, I'll post the news.

They told me they were very old, and they had been probably stored for years in a place quite humid, the suspension is a little stiff and they were reconed, but a good reconing the told me.

They sell the 2226H new for U\$700, and the Eminence for U\$322.

Subject: Re: 4Pi with feet
Posted by [Matts](#) on Tue, 05 Nov 2013 17:24:14 GMT
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Those drivers are expensive, but they're worth it. If you keep them for home use in your Pi's, they should be good for years & years. Good luck with them!

Subject: Re: 4Pi with feet
Posted by [dheflin44](#) on Tue, 05 Nov 2013 18:01:43 GMT
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Hi lucasmateo,

Your 4Pis look great...Very professional looking finish. Can you share how you got the recessed routing for the H290C so precise?

Thanks,
Darrell

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Tue, 05 Nov 2013 20:14:22 GMT
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A friend who is a very talented carpenter helped me with the woodwork. We used 18mm MDF first layer, then a second 18mm MDF layer at front but with the horn exterior measures (CNC cut) and a last 3rd layer of a 3mm plywood with veneer as finish layer. Then theres is a 12mm MDF layer and a 2mm PVC between the horn and the first layer to achieve the exact dimensions.

Total front face is 39mm (1.54 inches) and where the H290C is on 32mm (1.26 inches) (that is what I remember)

The last 2 layers (18mm MDF and 3mm plywood) were cutted by a CNC router with a 1mm margin.

The PVC layer is a shower pan liner.

If you look at the first photos you can see the layers, I can take some shots if you want.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Fri, 08 Nov 2013 18:03:51 GMT

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Well, I have news.

First, the JBL guys gave me one of the woofers, the second woofer was bad centered... no words. They'll give it to me later or tomorrow morning. (btw: the cones that were installed were original.)

Second, they sound much better, I've measured the speaker with the same crappy laptop and it looks much better. They still have to break in, but the sound now is much more smoother, and bass is much more balanced and present (my first concern when I first listened to the speakers.

I've also changed the internal wires with some Van den Hul 14awg (the cheap one) cable I had stored.

Here's the graph. What do you think now?

(T-nuts will arrive next week. Wood screws are a pain to reinstall...)

File Attachments

1) [4Pi_measurement_new_woofers.jpg](#), downloaded 6259 times

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Fri, 08 Nov 2013 18:38:34 GMT

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Excellent. The overall timber is much more balanced. Amazing how much SPL was lost in the older woofers. My guess is the original voice coils had been overheated and partially shorted.

While I can still see the microphone's loss in the top octave and I can also notice ripple from reflections in the environment, the basic spectral balance in the speaker shows clearly. I'd say everything is right now.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Fri, 08 Nov 2013 21:06:09 GMT

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My living room is not the best place to make measurements and not the best to listen...There are lots of reflections. I'm moving anyway... The top octave rolloff have to be the bad measurements as it doesn't sound like that.

The other speaker has arrived, the dome is not so neat as the first one, but it looks fine. Tomorrow I'll test it.

Do you know a good way to protect the woofers?

<http://www.parts-express.com/pe/showdetl.cfm?partnumber=261-825>

<http://www.parts-express.com/pe/showdetl.cfm?partnumber=262-866>

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Fri, 08 Nov 2013 21:17:58 GMT

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Grilles are the best way I know of to protect the speaker cones. If there are no pets or kids, you can remove the grilles if you want. But where there are "curious fingers" (or paws), having a grille in place can save a few hundred bucks.

I like using grilles with embedded magnets to hold them in place. That way when they are removed, there is no visible mounting clamp. I think it's kind of a neat touch.

The trick is to drill a hole in the cabinet, glue in a small magnet and cover it with veneer. Then use a mating magnet in the grille. This creates an invisible mount.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Fri, 08 Nov 2013 21:27:00 GMT

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Cool.

Can I use the metal grille that parts-express sells? Can I use a magnet with those grilles?

I have both, pets and curious fingers.

Congratulations Wayne, that was your message number 16.000 !

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Sat, 09 Nov 2013 00:38:40 GMT

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Sure, you can use those metal grilles. They are designed to mount with screws.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Sun, 10 Nov 2013 14:46:33 GMT

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Well,

I've been listening to this babies for a while and even if they are still breaking in there's a huge difference with the first listening sessions. Its night and day, all the bass and mid problems I found the first time are gone, now its really smooth, I think I wont be able to measure this as I don't have the necessary equipment nor place to make it.

The soundstage and image the 4pi make is unbelievable, very tight and defined bass, natural voices in the front, separated instruments. All I need, and more, it has an INCREDIBLE dynamic range. Definitely a speaker for a long time, to best this I think I'll have to buy car price speakers (maybe a cornerhorn?), but I dont have corners for speakers)

In sometime I'll post some new photos with grilles. I'll use some rare earth magnets, and VOX style grilles. I don't have the time now, and I prefer to enjoy the speakers rather than continue working on them, maybe January.

I hope this thread helps others to make their own 4pi. It takes time, and its an expensive project but it really really worth it.

I want to thank ell you guys who helped me on this project, specially Wayne. This is the first speaker I make, and it was a very successful project. Next project will be the grilles, and then two subwoofers.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Sun, 10 Nov 2013 17:46:11 GMT
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One last take with the reconed woofers.

File Attachments

1) [4Pi_photo.jpg](#), downloaded 8820 times

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Sun, 10 Nov 2013 21:06:48 GMT
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Looks really great!

Subject: Re: 4Pi with feet
Posted by [Duncan McBride](#) on Sun, 17 Nov 2013 03:34:47 GMT
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The cabinet design is inspired. Well done.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Mon, 18 Nov 2013 00:17:03 GMT
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Thanks Duncan. I ordered some parts to make the grills, the magnets won't be invisible but I hope they look good. The grill cloth will be a black VOX cloth.

Subject: Re: 4Pi with feet
Posted by [tubemax](#) on Mon, 25 Nov 2013 21:16:10 GMT
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Hi Wayne,

After reading all of this positive reviews of everybody building 4 Pi's, I would like also to get the plans for 4 Pi and start slowly collecting the parts needed for 4Pi. Still not sure if I'll start with entry

level (all Eminence drivers) or just wait for a very long time and go for upgraded version...

Best regards,
Max

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Mon, 25 Nov 2013 23:12:48 GMT
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You've got mail!

Subject: Re: 4Pi with feet
Posted by [tubemax](#) on Tue, 26 Nov 2013 21:13:42 GMT
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Thanks Wayne!

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Wed, 27 Nov 2013 13:16:57 GMT
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Guys,

Next week I'll post some photos with the grills I'm working on The woofers are breaking in now

I have a question on inductors, I've found on parts express 1.5mH, 1.0mH, but not 0.5mH 15AWG air core inductors. Can I use 0.47 or 0.55?

<http://www.parts-express.com/jantzen-047mh-15-awg-air-core-inductor--255-408>
<http://www.parts-express.com/jantzen-047mh-15-awg-air-core-inductor--255-408>

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Wed, 27 Nov 2013 14:53:05 GMT
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Yes, go with 0.47mH.

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Fri, 29 Nov 2013 03:34:52 GMT
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Vox grills arrived, I'll start the grills now.

I've noticed that when I made the recessed routing for the horn to make the front very flat I ended with the horn about 6mm forward than the original plans. Is this ok? They look great and sound the same so I think it ok, but I'm not an expert.

Happy Thanksgiving!

Subject: Re: 4Pi with feet
Posted by [Wayne Parham](#) on Fri, 29 Nov 2013 14:48:54 GMT
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Yes, that 1/4" shift only amounts to about 2°. It's totally fine.

Subject: Re: 4Pi with feet
Posted by [dmeckstr](#) on Sun, 01 Dec 2013 07:45:28 GMT
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Lucas,

I love how you did these and your woodwork is really great too! I have been planning to build some of these for a long time now, but it's ok that I didn't get to it, since now I can steal your design!!

David

Subject: Re: 4Pi with feet
Posted by [lucasmateo](#) on Sun, 01 Dec 2013 14:16:27 GMT
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Hehe, you are welcome David!
If you need help just ask. I think the feets looks great, you just have to continue the side panels

with the tilt you like and then add some mdf sheets under to make them solid. I made them 3"x3", but I can check the heights if you want.

The binding post at the bottom is a nice detail too.

I forgot to put some magnets under the veneer so now I will have some magnets on the front, as I won't veneer again, at least not this year!

Good luck David!

Subject: Re: 4Pi with feet

Posted by [NWCgrad](#) on Thu, 05 Dec 2013 01:29:05 GMT

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Really nice looking build! I like the subtle slant to the cabinets.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Mon, 09 Dec 2013 22:52:02 GMT

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Thanks Steven!

I'm moving again, I change home more often than car.

New home is smaller, the living room is small and with some difficult shapes. I've made some plans for you, my expert friends. I drew the living room part of the house and two possible options I thought, maybe you have better ideas. measures in meters.

I'll be moving in some weeks, so I cant test now, but I should buy some furniture in advance... so your opinion is welcome

File Attachments

- 1) [op_a.png](#), downloaded 5578 times
 - 2) [op_b.png](#), downloaded 5475 times
-

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Tue, 10 Dec 2013 16:37:02 GMT

I would try both setups to see which one sounded best. Both setups have the speakers a little close to ipsilateral (nearest side) walls, with one speaker having much more wall reflection than the other. This will tend to make the one by the wall sound different than the other - a little heavier, more "congested" sounding. That will probably mess up the imaging, "pulling the sound" to one side, the side with the full wall.

Beyond that, option "A" has the advantage of not having the listener so close to the back wall. When the listeners are very close to the wall behind them, it tends to exaggerate the sound reflected from behind, which sounds unnatural. It isn't the same as having surrounds, and is more like listening in a really small room, sort of "echoey sounding." Think bathrooms and caves.

But option "B" has the speakers a little further apart from each other, which will tend to give more of a "sweet spot." If the reflected sound off the wall behind the listeners isn't too strong, this is a good setup because it allows more lateral movement, more people on the couch.

Having speakers close together isn't necessarily bad, but there is a sort of "Goldilocks placement", where the speakers aren't too close together or too far apart:

Imaging, placement and orientation

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Tue, 10 Dec 2013 19:01:27 GMT

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Thanks Wayne,

It seems that I will have to try first. Option B is not bad I think, as it doesn't have a complete wall behind, so there will not be too much reflections... I can place the speakers on the top, they will be closer...

BTW, the woofers have started to break in, and they sound much better now, mids are more defined and bass a little tighter. I've been using a solid state amp, because with the 5w set amp, the break in period would last forever.

Tomorrow arrives the vox grill cloth, so maybe next week I have the speakers completed, with t-nuts, 15awg inductors, and beautiful vox grilles. I'll post some images.

Subject: Re: 4Pi with feet

Posted by [Matts](#) on Tue, 17 Dec 2013 20:13:44 GMT

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I've found Pi4's sound excellent from other rooms and around corners, so you should be able to find a good placement easily enough. The still some degree of spatial characteristics outside the

room. The sweet spot is sweet, but down the hall or in the next room has fine sound as well.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Tue, 17 Dec 2013 20:43:58 GMT

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I'll move in January, so I have time to try.

I've noticed that Matt, they sound quite good all over the house, even in other rooms as you say. The bass is better with distance, So I think it will sound more balanced in the new room, I'll have to try some places, but I'm pretty sure it will sound good.

The woofers have been breaking in a lot, its quite impressive, this speakers are the best I've ever had by far. I can recommend them to anyone without a doubt.

I didn't find the time to make the grills nor change the coils inside with 15awg. Maybe in January I'll post more images with new grills.

Subject: Re: 4Pi with feet

Posted by [Matts](#) on Thu, 26 Dec 2013 22:24:10 GMT

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I like the way my system sounds good all over the house. You can also experiment with speaker height- I get more bass when they're flat on the floor, but when I listen to jazz or classical, I put a block of wood under the front of them, which decouples the floor and tilts them up some. I've had them on stands, about a foot off the floor and titled a little, but was worried about dogs and kids.

Subject: Re: 4Pi with feet

Posted by [lucasmateo](#) on Mon, 31 Mar 2014 00:03:41 GMT

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Grilles done, dogproof and kidfingersproof speakers.

Now the woofers are really broken in, 4pi are truly awesome.

Subject: Re: 4Pi with feet

Posted by [Wayne Parham](#) on Tue, 01 Apr 2014 15:32:20 GMT

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Oh, wow, those really look great!

Subject: Re: 4Pi with feet

Posted by [Matts](#) on Fri, 04 Apr 2014 19:30:14 GMT

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Very nice build! Another thing to look forward to- it seems that no matter how I upgrade the rest of my system, the Pi4's reflect the upgrades fine. They just sound better and better...
