Subject: 3 Pi plans
Posted by Mabob on Thu, 14 Dec 2017 08:01:13 GMT
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Hi Wayne

Found your excellent website! It has a ton of information for any noob DIY speaker builder like myself

I´d like to build something that is an update from my Beta 12CX coaxials with APT50 drivers. The Pi 3 seem like a good candidate, so can I have the 3 Pi plans please.

Trying to stay on a tight budget so I´ll start off with the Delta 12LF and PSD2002 drivers. The waveguide will be a problem since I´m situated in Europe. I´ll have to start with something like a JBL 338800-1 / Dayton H6512... Don´t know what this will do to the sound?

Thanks for sharing your wast knowledge!

Mathias

Subject: Re: 3 Pi plans
Posted by Wayne Parham on Thu, 14 Dec 2017 14:52:00 GMT
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You've got mail!

You'll want to use our H290C waveguide. The design calls for it. But you can source all other components locally.

Subject: Re: 3 Pi plans
Posted by tubemax on Thu, 14 Dec 2017 22:33:31 GMT
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Hi Mabob,

Please listen to Wayne, you definitely need to get original horns from him, without it is not going to be a Pi 3 speaker at all, as it's crossover is fully based on H290C acoustic response!
So, if you can, do it correctly from the start-up to avoid wasting double money later on...

Best way to get Horns is to set-up account by cheaper forwarder (I did it by Myus.com) and ship way cheaper than usual shipping rates by Pi speakers.

Horns shipped from Wayne to USA forwarder where this summer 115,- Euro + shipping costs of forwarder to Europe (about ± 30,- Euro) so in total about ± 145,- Euro for one pair of H290C horns - not bad!

Also, very important, if possible try to order as well 2 x 100 WATT 8 Ohm power resistors from Wayne or Parts-express as this specific part is nowhere to be found in Europe!

Good luck with your new project, I'm almost ready with mine...

Subject: Re: 3 Pi plans
Posted by Mabob on Sat, 23 Dec 2017 20:59:48 GMT
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Hello Tubemax

Thanks for your input and yes I understand the importance of using the specified waveguides. What elements are you using in your build?

Not too bad if it's possible to have them shipped for around 150€. My biggest concern now is if these will be overkill for my garage. The acoustics are probably quite bad (concrete floor, plasterboard walls and ceiling) Would it be wiser to just go with a econowave design and get a dirt cheap waveguide like Dayton H6512, PSD2002 driver and a Delta 12LFA?

If I go down the cheap path, I'll probably regret it... Then again if I order Waynes H290C, I might as well build PI4s since I have the room to accommodate them. Decisions decisions...

Subject: Re: 3 Pi plans
Posted by tubemax on Sun, 24 Dec 2017 00:13:44 GMT
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Hi Mathias,

I'm already using upgraded B&C DE250 driver with upgraded cross-over's with thicker coils, metal film resistors and quality Jantzen capacitors. Delta 12LFA is pretty good sounding driver but I guess a upgraded woofer would be a even better sounding unit in the future upgrade path.

I was thinking about 4Pi initially but abandoned idea due to the driver costs (440,- Euro for just one new JBL 2226) and the fact that is not going low enough in the frequency extension - which means you will need one subwoofer per channel as well.

Also, after a week of brake-in period, both drivers are just starting to loose a little bit and woofer is really going very deep - almost hitting 30Hz in the room response but still remaining tight, composed and in control - I like it!
Combination of H290C horn and B&C 250 driver is phenomenal - just smooth, relaxed and never biting - really high grade sound and totally unlike any other horn or dome tweeter I ever listened to

in my life.

But, I have another problem which is unfolding - WAF factor.

It's so bad that I may need to loose Pi's and sell them (wether complete or in the parts) or face every day fight over why I made so big speakers in our small room... they do look and sound big but not everybody understands this...

I did not see this coming and it feels like a cold shower at the moment...

Subject: Re: 3 Pi plans
Posted by Mabob on Wed, 27 Dec 2017 22:41:18 GMT
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Hi Max

Checked your build thread, very nice!!!

I won't be running any subs so its great to hear that they go low. Don't know what it'll be in my space since it's about 60m2 and has a 3.5m ceiling height...

issue if I tried to bring big ones into the living room.

I blame the bloody design magazines which are filled with white small speakers in sterile white

Ok, need to start gathering parts for my build. Won't happen overnight but I'll get there! Btw Strange that a simple thing like the resistor can't be found in Europe?

Subject: Re: 3 Pi plans
Posted by tubemax on Wed, 27 Dec 2017 22:58:02 GMT
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Hi Mathias,

Thanks, well after two weeks of breaking-in, they continue to go deeper and stronger in the bass range, also playing a lot better on low level now. They are definitely stellar speakers with huge sound but WAF factor is merciless so they are going for sale now.
I have send you a private e-mail with details if you are interested...

Yes, brain washing in the magazines is to blame for, I agree!

Best regards...

Subject: Re: 3 Pi plans
Posted by Mabob on Sat, 29 Sep 2018 23:38:53 GMT
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Hi folks!

I'm going to wake this old post back to life.

Long story short, what happened was that for about nine months ago
I purchased the 3Pi kit from tubemax for a very decent price. Big
Thank you to tubemax for handling the the packaging and shipping from
The Netherlands like a pro!

It's been a slow long build alongside more important and urgent stuff.
(What could be more important than your favourite hobby? :evil:)

Since the crossovers were already built, the only thing left for me
To do was to build the cabinets. I had a good browse around the web to
Find a cabinet design that pleaseed me.

I think the Pi3 cabinets are quite wide and the bass driver being "only" a 12" I've found it be a bit out of proportion. I would say that the Pi4 with a 15" looks way better.

So what I did to make it look slimmer was to give the baffle generously rounded corners which will be coloured differently from the straight surface... The colour scheme is still to be decided on, but it might be a black baffle with walnut colouring on the rest of the boxes.

The looks are of course important, but what really matters is sound quality :d
I've had the half finished speakers up and running for a few days now. With only a few hours of listening there's been both smiles and a few questionmarks...

I'll tune back in as soon as I have had some more proper listening time 8)

File Attachments
1) IMG_20180921_192545.jpg, downloaded 1150 times

Subject: Re: 3 Pi plans
Posted by Wayne Parham on Mon, 01 Oct 2018 02:44:14 GMT
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Your speakers look great! Can't wait to see them finished. Do keep us posted please.

Subject: Re: 3 Pi plans
Posted by drake on Fri, 05 Oct 2018 17:20:55 GMT
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Wayne Parham wrote on Sun, 30 September 2018 21:44Your speakers look great! Can't wait to see them finished. Do keep us posted please.

I have to agree with Wayne that they look really great and the finished product would definitely be worth checking out. I do hope that I can be able to design such a thing from scratch because it would save on costs.

Subject: Re: 3 Pi plans
Posted by Wayne Parham on Fri, 05 Oct 2018 19:57:25 GMT
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drake wrote on Fri, 05 October 2018 12:20I do hope that I can be able to design such a thing from scratch because it would save on costs.

These are kits, so you don't have to design and test. You just have to build the cabinet, or have a professional cabinetmaker do it for you. Some of the builders have made some really beautiful cabinets.

Subject: Re: 3 Pi plans
Posted by Mabob on Thu, 28 Feb 2019 11:52:14 GMT
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Hello

I´m back with a few pictures of the finished speakers. I've been enjoying them for a few months now and this is how the setup in my Man cave/garage look right now.

The coating is a tinted acrylic lacquer which was a pain to apply evenly. Next cabinets will definitely be veneered.

My listening impressions so far is that the high end is very good. There's no harshness whatsoever even if you really crank it up! I can also hear vocals like never before :) Loads of stuff I didn't even know that was there!

Bass extension is not enough for my liking/room, therefore I built a BFM Table Tuba to take care

of the lowest notes. I still feel that on certain music/recordings there is a bit too little attack/energy on drums or even guitar? Hard to put a finger on it... Anyone else experienced something like this? Using a Onkyo home theater amp, but haven't used Audyssey for calibration.

Overall very impressed and happy with the speakers!

Mathias

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1) 3pi2.jpg, downloaded 918 times
2) 3pi4.jpg, downloaded 1049 times

Subject: Re: 3 Pi plans
Posted by Wayne Parham on Thu, 28 Feb 2019 14:59:47 GMT
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Those look stunning!

To improve the upper midbass and lower midrange, you have two options that come to mind right away:

1. Upgrade the midwoofer to the Definimax 4012HO. It's a drop-in swap, with only a single capacitor change on the crossover. Swap the 10uF capacitor in position C4 to a 20uF cap.

2. To mitigate room effects, incorporate flanking subs. They will improve the frequency response between 75Hz and 150Hz in most rooms. Without flanking subs, there is response ripple and almost always at least one huge notch in this range. It can make vocals sound throaty and guitars can sound weak or shrill, depending on the room. Sometimes the effects are subtle, sometimes they're huge. But flanking subs will always improve this range, reducing the intensity of the anomalies significantly, by at least 2x.

When adding flanking subs, you can put the hornsub at the opposite corner of the room and crossover very low using a summed LFE channnel. Let your hornsub handle the deepest bass - High-pass at 30Hz (24dB/octave) to prevent over-excursion and low-pass at 60Hz-80Hz (24dB/octave) to prevent localization. Placing the hornsub relatively far from the mains helps smooth low-frequency room modes.

Flanking subs are placed just beside, behind and below each of the mains. They are sent a low-passed copy of the signal sent to the mains they are flanking. Flanking subs are low-passed at 100Hz (12dB/octave) which allows plenty of upper midbass to reach the subs. In fact, they're even generating some lower midrange, up to around 150Hz, because of the gentle crossover slope.

Flanking subs are really like a woofer of a three-way setup, blended with the midwoofer in the mains. But since they are a couple of feet beside, behind and below the mains, they smooth higher-frequency room modes and self-interference from the nearest boundaries. The worst offender is generally the self-interference notch caused by the reflection from the wall behind the speakers.

By using both the hornsub and the flanking subs, you will have a multisub setup that will really make the bass smooth. The three subs in their different positions will all contribute to smooth the lower-frequency room modes, from 30Hz up to 100Hz. And as I said above, the flanking subs will smooth the region between 75Hz and 150Hz or so.

It's an upgrade path with incremental updates that you can do as time and finances permit.

Subject: Re: 3 Pi plans
Posted by Mabob on Fri, 01 Mar 2019 13:13:09 GMT
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Thank you for the in depth answer Wayne!

This answers pretty much all the things I've been wondering about the use of flanking subs.

I was looking at the Definimax woofer, and even if it would be an update I won't go down that road at this moment. These are quite pricey and availability is not very good here.

The obvious choice for flanking subs would of course be the 3pi subwoofer, but being on a tight budget I'm looking for a budget alternative to this.

What I'm wondering is that if the flanking subs don't have to go very low lets say nothing below 40hz, could I get away with something less beefy than the LAB12? I really like the BFM Table Tuba and was wondering if the T18 loaded with a 10" would be up for the job? The horns are quite easy to drive, they don't need much power.

I can see one more way for an update and that is the 6Pi cornerhorn, since I have the corners for them. Would this be a good way to go for dealing with the issues in the bass?

Subject: Re: 3 Pi plans
Posted by Wayne Parham on Fri, 01 Mar 2019 16:11:29 GMT
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Flanking subs are really just "helper woofers" except that they are generally tuned to provide deep extension. That way you get both benefits - Blending in the 75Hz to 150Hz range gives SBIR

smoothing and extension below that gives more deep bass nodes. That allows one or two distant subs to complete the total multisub package.

But for SBIR smoothing, you only need to blend in the upper midbass range. You could get a pair of Alpha 10 drivers and put them in 3-5ft3 cabinets tuned to 40Hz. Set 'em up a couple feet beside, behind and below the mains and send each the requisite signal (100Hz 2nd-order low-passed copy of the main speaker being flanked). Or you could get another pair of Delta 12LF drivers and do something similar.

The main thing is that the acoustic center be a couple feet away from the mains in all three dimensions. That makes bass horns unsuitable for flanking subs because they're too long. The acoustic center can't be made close enough to the mains. Could be done with delay, but I would rather see hornsubs be used as distant multisubs.

As for constant directivity cornerhorns, if you have the right room, that's really the best way to go. They don't even need flanking subs because they don't suffer from self-interference from the nearest boundaries. They are acoustically close to the nearest boundaries, so they're more like vertical ground planes than reflectors. See the links below for more information:
Speaker placement and wavefront launch
Room modes, multisubs and flanking subs

Subject: Re: 3 Pi plans
Posted by Mabob on Mon, 11 Mar 2019 22:15:15 GMT
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Thanks for all the information on flanking subs and the corner horns. After much consideration and I think that I will upgrade my 3pi.s to 6pi cornerhorns. I think that way I'll make the most of my limited space.

The back wall is about 3m wide and if I build flanking subs I'll get the speakers too close to my listening position. It'll also be a good challenge to build the mid horns, I really like the look of them!

One thing that bothered me about building flanking subs was finding the right amplification with proper filters. My HT amp has no pre outs, only sub out, which is a mono signal I think. And the plate amp I have has a much steeper lowpass filter than the one you recommend.

So at the moment 6pi feels like the way to go. Additional multisubs might be used if I feel it's necessary. If I understand it right, there is nothing wrong with horn subs as long as not being used as flanking subs?

Built some speaker stands to get them down to the right level. This was a big update that didn't cost much :roll: should have done this ages ago!

Well, I'm eager to start a new build, so can I have the 6pi plans please!

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1) IMG_20190309_195213.jpg, downloaded 949 times

Subject: Re: 3 Pi plans
Posted by Wayne Parham on Tue, 12 Mar 2019 19:43:42 GMT
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perfect for use with flanking subs.

The way to implement flanking subs is to use the left and right preamp outputs as input signals for the left and right flanking subs. You use a 100Hz second-order low-pass filter for the crossover.

But if you have the right corners, constant-directivity cornerhorns are even better. They don't need flanking subs because they're acoustically close to the walls. The wavefront illustration in

sound system in a room that doesn't have corners suitable for constant-directivity cornerhorns.

In the meantime, run your hornsubs in the opposite corners from your constant-directivity cornerhorns. The hornsubs can be run from the LFE channel, which sums all channels and has a steep low-pass filter to prevent localization. This is a Welti multisub setup and it does a great job of smoothing the low frequency room modes.

Subject: Re: 3 Pi plans
Posted by Mabob on Wed, 13 Mar 2019 18:12:15 GMT
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Thanks for the Six Pi plans and nice words about my build!

I really like the way they look on the stands and I'm sure I would be satisfied with this setup after adding flanking subs. What stops me going down that road at the moment is that I would have to upgrade to a pre and poweramp combo plus adding filters.

That being said I just picked up an old Crown XLS402 poweramp :d Still missing a signal source and filters, so saving that one for the moment.

As you said

"if you have the right corners, constant-directivity cornerhorns are even better. They don't need flanking subs because they're acoustically close to the walls."

Just went over the size measurements for the Six Pis and noticed that they will intrude less in my room compared to Three Pi/Flanking subs.

Will be checking out joshua43214 detailed build log of the midhorn!