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Subject: New topic - Any thoughts on this three way  
Posted by [HenryW](#) on Wed, 17 Dec 2003 00:21:36 GMT  
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Some folks may have seen this request elsewhere (my apologies) many month's ago. I want to make a three way akin to the Klipsch Cornwall. The sound is paramount and pretty box is next. The box will be my responsibility, but the world is pretty open to any of your suggestions. Martinelli's horns are gorgeous and he will be one of the first places I go. I like the concept of the tweeter horn and mid horn and would love to have them in wood and possibly as a stand alone. The lows will be through a BR design. Crossovers would be flexible, but I am thinking somewhere above 3.5 khz for the tweet and below 500 hz (or lower) for the woofer. Any input on drivers, lens and woofer will be greatly appreciated and investigated. Critical appraisal of my idea is also encouraged, but probability of changing my mind is slim...Henry

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [Bill Martinelli](#) on Wed, 17 Dec 2003 03:52:14 GMT  
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Hi Henry, Thanks for the compliments. Here are a few things to think about. Do you want to run a compression driver in the mid horn or a cone driver. For a compression driver you will most likely need a 2" format. Sometimes the 2" parts are very pricy. For two inch compression drivers the JBL 2440, 2441 and 2445 sound great. I like the Selenium 405TI pretty well for the price too. You can run a 1" K55 down to 500hz but IMO it's really a better range for a 2" driver. Most 2" drivers will work very nicely well past 3.5khz. It's possible to cross into the tweeter from 6k to 10k driver dependant. For a tweeter your crossing over in a very nice place. A small horn is perfect and there is now strain on the driver from a 6k-10k. Even 3.5k is high enough just about anything. My preference for 1" drivers for the tweeter are BMS4540, JBL 2425/26, PSD 2002. Altec made 1" drivers lots of guys like too. For woofers I prefer the JBL 2226 over all others. Eminence Kilomax, Omega, and Delta, in that order are runners up. There's lots of good 15's around and if you have some parts or know of others they can all sound good. That's the stuff I use and I haven't heard anything different that would make me change. I may doing some work with Ciare Speakers and 18 Sound. I'm told they are good but I've not used them yet. The TAD 1601C and some others are also great if you are interested in pumping the Hi-Test. All of these can crossover at 500-800hz with out a problem. Cone midrange horns are the cats meow. There isn't a lot that betters an 8" or 10" in a 14"x16" horn. (thereabouts) Your bandwidth will be more limited with this though. You'll be lucky to get 2k out of this on the top side and 500hz for the low side is a perfect place. Let me know what your thinking of using for drivers and the crossover points will be more evident. Bill

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [Wayne Parham](#) on Wed, 17 Dec 2003 04:31:02 GMT  
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Hi Henry! I really dig the Martinelli horns too. And my opinions are similar to his too; We sort of come from the same direction on this deal. Basically, there are a lot of valid solutions. The ideal one would be to have three decade-wide subsystems, 20-200Hz LF, 200Hz-2kHz MF and 2kHz-20kHz HF. That's an ideal three-way solution as far as I'm concerned. But actual devices tend to dictate our choices. A 20Hz woofer is pretty substantial, especially if high efficiency, so many times a decision is made to go with a 30Hz or 40Hz solution. This then often allows much higher response from the woofer, and that opens up some design possibilities. Similarly, a 200Hz midrange is also a pretty large device, so sometimes this is shifted up an octave or even more. The trade-off is that as you move up from there, you cut more and more into the midrange band where you split between woofer and midrange. But as you move down from there, your choices of drivers become larger and more limited. A typical solution is to move the midrange crossover to 400 or 500Hz, and crossover to a large compression driver or small cone midrange. Then we look at the tweeters. If you run a subsystem below the tweeter that runs out of steam between 1kHz and 2kHz, then that makes a 1" compression horn an attractive candidate. But if you can crossover an octave or octave and a half higher, then you can use a tweeter that performs better above 15kHz, where most 1" compression horns rolloff. So I think you'll probably want to decide what direction you want to go. A lot of this hinges on your choices of components, and you will find some dependencies here. For example, if you find that you really like a particular modern 2" compression horn, then I'd suggest that you should probably only consider woofers and cabinets that will perform well up past 500Hz, at the least. If you are dead-set on a specific tweeter that needs crossover at 6kHz, then a cone midrange is probably not going to work for you. There are lots of good ways to do this. Wayne

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [wunhuanglo](#) on Wed, 17 Dec 2003 04:32:49 GMT  
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You could consider vintage Altec from 500 hz on up (say a 802 or 902 on a 511 horn) and an APT-50 above 7K or so if you felt you needed it. Look on the Pi forum to see what Bil Epstien did with an 811/806(?) over a 2226 reflex.

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [GarMan](#) on Wed, 17 Dec 2003 14:12:54 GMT  
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Wayne, What are your thoughts on using your Four Pi-18 designs as a starting point for a three way? Looks to me that if you add a super tweeter to the 18" woofer and 2" compression, you're covered from 30Hz to 20KHz.gar.

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [Adrian Mack](#) on Wed, 17 Dec 2003 17:04:10 GMT  
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Hi Henry! think Martinelli's horns are really great too. Awesome looking and I hear they sound really good too. I'm doing a 3-way at the moment with HF horn, midrange horn and direct radiating midbass/bass. Quick rundown the HF horn is JBL 2370 horn with P.Audio PA-D45 comp drivers, midrange horn loads an Eminence Alpha 6 driver, and the midbass/bass section is JBL 2225. Crossover point from bass section to mid horn is 300Hz and from midhorn to HF horn will be 2KHz. Adrian

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Subject: Many thanks and..  
Posted by [HenryW](#) on Wed, 17 Dec 2003 20:02:49 GMT  
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I had been thinking only about compression driver's for the horns with the assumption the lens for cones would be larger than I had envisioned - but your suggestion has got me wondering (just what I need, another thought provoking alternative).I will be asking more about your appraisal of the drivers as I spec and start designing - first off deciding what rule I will follow for horn response and bass box. The price of drivers will probably not scare me off as much as building the crossovers will...Thanks again Bill - I'll probably FU via Email in the new year.Henry

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [Wayne Parham](#) on Wed, 17 Dec 2003 20:43:31 GMT  
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That's an excellent approach.

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Subject: Haven't really set the Xovers  
Posted by [HenryW](#) on Wed, 17 Dec 2003 21:05:34 GMT  
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I was just using the one's I mentioned to give as few transitions as possible in that 300 -3K hz range where so much of the impact sound takes place.Thanks bunches Wayne, and one further question - what is the benefit of the decade wide approach?As we get in to the new year I'll be coming at you with Pi align questions as I start the speaker spec/design work.Henry

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Subject: Yep - Epstien's stuff was very attractive  
Posted by [HenryW](#) on Wed, 17 Dec 2003 21:07:52 GMT  
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and is one of the ways I am considering. Thanks a bunch - I have heard plenty of the Altec horns, but never look at specs trying to put into my speaker.Henry

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Subject: After my own spirit  
Posted by [HenryW](#) on Wed, 17 Dec 2003 21:09:38 GMT  
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I look forward to you doing this before I get revved up so you can share the results (and pictures). Thanks a bunch Adrian.Henry

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [GarMan](#) on Wed, 17 Dec 2003 21:14:30 GMT  
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Good enough that Pi Speaker would consider flushing out and adding to its product line in the new year? ;-)

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Subject: Re: New topic - Any thoughts on this three way  
Posted by [Wayne Parham](#) on Wed, 17 Dec 2003 22:45:38 GMT  
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decade ago and back were three-way systems like what you've described. The curent Audiophile Series line is like that too. But most current models are two-way speakers, with the advantage of having only a single crossover point. I don't anticipate making a change to the existing standard

discussions that may be of interest to you. I can answer specific questions on the general forums, but advertisements and product announcements are a no-no here.

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Subject: Re: Haven't really set the Xovers

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Posted by [Wayne Parham](#) on Wed, 17 Dec 2003 22:49:32 GMT

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There's no magic in having each subsystem run a decade. It is a good goal though for a three-way though. The midrange is covered by a single driver rather than being split somewhere in the middle. And the audio bandwidth is fully covered. The numbers just add up.

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Subject: Pictures and stuff, many

Posted by [Adrian Mack](#) on Thu, 18 Dec 2003 07:29:29 GMT

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Hi HenryAm already well into it! Everything is purchased, and the towers are half way built. Lately been doing heaps of experiments and tweaking on midrange horns, got +/-3db from 300Hz to 2KHz in my small midrange horn, only about 28cm axial length, and 38 by 28cm mouth. Pictures of towers: Above picture shows the bottom part of the enclosure. It goes inside the outer panels, which is Tasmanian Oak. Here are the front baffle boards for the enclosures. On the bottom is the JBL 2225H 15" hole, the middle is the hole for the midrange tractrix horn, and the top is the hole for the 2370A horn. Below the 2225 hole there should be two holes for the ports, but they weren't cut yet at the time the picture was taken. Above shows how the front panels are going to attach. Hence you can see what I meant by those boxes going at the bottom. The thing on the right hand side is the other box tipped on its side. You can see the proper veneered bottom has been attached to the plain MDF, so its double layer 18mm MDF. Above shows the sides of the enclosures. It's pre-veneered MDF in Tasmanian Oak! These go on the sides of the boxes like the picture above so you can see how it goes together. Another shot of the front and how it attaches to the 2225H box. Top left hand corner is a block out from my thumb. And here are some pictures of the midrange horn: My crappy digital camera took this one in half black and white for some reason :P And that bench you see to the left is actually red, not green. I have previously built other midrange horns too, but decided to use the one above as its the smoothest response over the widest range. My website [http://www.geocities.com/adrian\\_mack/homepage.html](http://www.geocities.com/adrian_mack/homepage.html) has some piccies of the tractrix horn. Go to the Pi Speakers Forum and you'll find heaps of pics and stuff scattered all over the place. Here are some piccies of JBL 2370A horns with P.Audio PA-D45 comp drivers attached Last pic there looks like the horn flare is not proper black, it actually is, like in the first two pics. And here is the 2225I really enjoy the sound of that midrange horn and the other parts too. When it all finally comes together I'll let you know what I think. Don't think I can go wrong here though, especially with components like these. Adrian

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Subject: Re: Pictures and stuff, many

Posted by [Wayne Parham](#) on Thu, 18 Dec 2003 09:10:22 GMT

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Are you planning to veneer or paint these speakers? You've put a lot of effort into them, and they

just look super.

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Subject: Very, very nice  
Posted by [HenryW](#) on Thu, 18 Dec 2003 14:18:27 GMT  
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Great work Adrian.

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Subject: Re:Ambitious  
Posted by [BillEpstein](#) on Thu, 18 Dec 2003 22:25:07 GMT  
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That is just flat out creative and meticulous work. Anxiously looking forward to seeing the finished product. Unless you're like me and "finished" never comes!

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Subject: Re: Pictures and stuff, many  
Posted by [Adrian Mack](#) on Fri, 19 Dec 2003 04:54:01 GMT  
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Thanks Wayne. I'm thinking perhaps I'll put lacquer over the MDF which is pre-veneered in Tasmanian Oak. I think this is what is usually done with veneers, maybe I'll ask around first and see what others have to say about finishing veneer.

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Subject: Re: Very, very nice  
Posted by [Adrian Mack](#) on Fri, 19 Dec 2003 04:55:20 GMT  
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Thanks, I appreciate it. Have you gotten any solid plan worked out for your 3-ways yet?

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Subject: Re: Pictures and stuff, many  
Posted by [Wayne Parham](#) on Fri, 19 Dec 2003 05:12:38 GMT

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Oak can really look nice with the right finish. Maybe post something about looking for finish selections over on the Craftsmen forum. You know Bill Martinelli and Bill Epstein; They're both great woodworkers and will probably give you a lot of wonderful suggestions.

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Subject: Re:Ambitious  
Posted by [Adrian Mack](#) on Fri, 19 Dec 2003 06:00:04 GMT  
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Thanks a lot Bill. I really liked your Twin Towers too!

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Subject: Re: Pictures and stuff, many  
Posted by [Adrian Mack](#) on Fri, 19 Dec 2003 06:11:24 GMT  
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Good suggestion, have just posted over there.

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Subject: Oh No - I keep learning too much...  
Posted by [HenryW](#) on Fri, 19 Dec 2003 23:00:10 GMT  
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I am still gathering data, where I decide to Xover will determine the speakers and the bass box. I keep looking at yours and don't be surprised if I am influenced in that direction...I anticipate starting the box and baffles by late winter.

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