Subject: initial thoughts on my ten pi's...
Posted by Adam on Sun, 13 Jan 2002 21:48:05 GMT
View Forum Message <> Reply to Message

Well, my friend and I work for seven straight hours today *partially* assembling just *one* of my four theatre 10 pi's.I finally have the entire enclosure screwed together (once I find any errors and such it will be reassembled with full bracing and plenty of glue). The thing is absolutely monsterous. It's just huge. I clearly underestimated the size of such a speaker, but as long as it sounds good I'm not too worried. They also way soooo much... there's nearly a sheet and a half of MDF in each box, plus woofer and compression driver plus other bracing when finished.Firstly, I'm really concerned about excursion. The smaller box and lower tuning has actually resulted in what seems to be less power handling then the conventional bass reflex boxes that I've built for these woofers before. With only 120 or so watts applied the woofer was moving quite a bit. It could be an error in the box volume or tuning but I'm not sure. I had to displace about a half a cubic foot of volume from the design using some books because the HF horn isn't in place yet. Also, I had to move the port out of the box somewhat because it was too long to properly fit. The system sounds kind of chesty and the lower mids seem to resonate all over the place. However, having said that I'm not sure if it's valid. There is no bracing in the box and there are a lot of vibrations. The two reflectors of the horn are resonating like mad and probably hurting the system by muddy'ing up response. There is as of yet no crossover on the woofer, so any response peaks above the crossover point are coming through loud and clear. There's also no high frequency, which is surely putting emphasis on the short comings of the system. There's no padding or stuffing in the box to even up frequency response and dissipate some of the midrange from the woofer. The internal box volume is probably incorrect. To boot, my listening room is the worst ever, with stupid rattling paneling and a suspended ceiling. These puppies belong in huge rooms or wide open spaces.My *primary* concern right now is the excursion. There is no way this woofer will handle even close to 400 watts at present excursion, which is dissapointing because in 5 cubes tuned to 40 Hz it will. This is my main worry right now and the only thing that can't be explained. I'm hoping wayne can put my mind to ease about this. Anyway I shall post a picture in about a half hour!!!Any input from anybody?Thanks. Hopefully I'll hear from you Wayne.Adam

Subject: pic
Posted by Adam on Mon, 14 Jan 2002 00:42:23 GMT
View Forum Message <> Reply to Message

bad picture, but oh well... I'll get some better ones when they're finished.Adam

Posted by Wayne Parham on Mon, 14 Jan 2002 04:05:28 GMT

Bracing and filling with expansion foam are esential. There are lots of large panels in this system, and they simply must have adequate bracing or the speakers sound terrible. Some previous threads that discuss proper bracing include "Bracing", "ten Pi injection foam - VERY IMPORTANT" and "Bracing: expansion foam".

Subject: Don't even think about it
Posted by JLapaire on Mon, 14 Jan 2002 11:25:45 GMT

How I would love to have 10 pi's in the living room, but I'd have to sit outside...Anyway, until the boxes are braced and stuffed and the tweaks done (like adding the top end (!)) don't even think about listening to them except to check for buzzes, leaks, broken drivers etc. The sound is just WAY too different, besides the fact that the woofer may not be adequately controlled for its own safety.I know Wayne went into this with the detail of authority, but I offer this as the experience of an amateur who has learned the hard way. Plywood's not too bad, but particle board just doesn't burn well, and all of them take too much work to fit them into the stove.Regards,John

Posted by Adam on Mon, 14 Jan 2002 14:06:54 GMT

Thanks for the response Wayne, makes me feel better about the whole setup. I should tell you exactly what I did... PIALIGN recommended an overall horn size to me that was within an inch or two of 24"x24"x48", I just fudged the numbers a bit to fit that which is fine. Pi Align *also* recommended a 2.2 cuft ported chamber which it said was like 10"x17"x23" or something like that. Now, when I apply the 24"x24"x48" recommended horn size into the ratios in the plan, the result is a ported enclosure that is 8" deep, 16" high and 24" wide, which is *different* then what PIALIGN gives me. This chamber is only 1.77 cuft in internal volume. After factoring in about 0.4 cubes of displacement for the woofer, 0.4 cubes for the horn lense and compression driver plus a bit of extra for bracing and port, the result is a 0.77 cuft enclosure for the woofer, which is wayyyy too small! The only thing the top chamber does is compensate for these two descrepancies by adding an additional 1.4 cuft of box volume, to bring things up to the desired 2.2.I currently have about a .5 cuft of old books inside the box to displace the volume that the compression driver lense would normally take up. Unless I made a signifigant design error, the overall horn size that PIALIGN gave me is correct as is the internal box volume and tuning. It's actually more correct then if I had made the entire design bigger (increase box volume without the extension and thereby increase the proportions of the bass horn). Anyway, I'm not a bit surprised about the other things and I'm glad they'll be cleared up. Right now I can't afford all that hardening foam, so I am going to attempt to use some conventional bracing on the two reflector panels... But I doubt it'll work. If it would, I suppose you would have done it that way! :)Anyway that's the story on the enclosure

volume, I hope you can provide some input. I know I didn't mention the descrepancy between what PIALIGN told me and what the ratio plan was telling me, but I felt I had asked enough questions of you for the time being and didn't want to be a bother.Thanks!Adam

---

Posted by Wayne Parham on Mon, 14 Jan 2002 17:20:46 GMT
View Forum Message <> Reply to Message

Do you mean the "Pi Alignment Theory" whitepaper? It is the only document I publish that has

think of any document I might have sent that has dimensions other than those. Are you talking about dimensions that the PiAlign program gives?

Posted by Adam on Mon, 14 Jan 2002 21:32:46 GMT
View Forum Message <> Reply to Message

You sent me a text document called "PIALIGN" which includes a large essay on pi speakers and plans for the normal bass reflex boxes and corner horns using measurements based on x,y and z ratios. You've said the ten pi was essentially a scoop flair added to the normal reflex box so that's what I did, scaling the units to fit as needed. I included wood thickness and driver volume offsets when calculating box size. That's what confused me because it didn't match what I expected it was much smaller. That's why I fudged it some.Adam

---

Subject: Re: initial thoughts on my ten pi's...
Posted by mikebake on Mon, 14 Jan 2002 23:39:08 GMT
View Forum Message <> Reply to Message

BTW Adam, my Behringer x-over has mute buttons for each driver/frequency range; my system is set up correctly, and I am using JBL drivers; if I mute the mid/highs and listen to just the woofers, it sounds wierd; I could easily draw the conclusion that the woofers are doing bad things.....I agree with the other post that you should not draw any conclusions without the highs present, and before the project is correctly completed. On my system, with just the woofs playing, muddy seems to be the operative word, but it's just the perception without the full range reproduced..

Hang in there and complete the project as closely to the design parameters as you can.

Posted by Wayne Parham on Tue, 15 Jan 2002 02:19:42 GMT
View Forum Message <> Reply to Message

In the PiAlign program, there is a section at the far right of the screen that allows you to enter displacement volumes. There is also a little utility program called "Volume.exe" in the distribution archive that helps you calculate offset volumes. You can approximate the volume of drivers and other parts inside the cabinet using composites of primitives. For a full description of this process, please see the earlier post called "Displacement calculations (or measurements)".

Posted by BillEpstein on Tue, 15 Jan 2002 03:08:00 GMT
View Forum Message <> Reply to Message

I haven't verified this for myself but I heard from an associate that the foam filler, not sure whether DAP or Great Stuff is available in a contractor size, not just those little aerosol cans. Much more affordable says my source. Check Depot or Lowes or DAP online.

Subject: ahhh.....
Posted by Adam on Tue, 15 Jan 2002 10:39:30 GMT
View Forum Message <> Reply to Message

Well that's just a stupid on my part then... I didn't notice that part at all. All I saw were sections for higher frequency horns off to the right and I completely ignored them.I punched in the wood thickness and the woofer displacement and low-and-behold, the numbers match up very consistantly with the proportions now. PIALIGN recommends the same tuning (hmm?) but has a new box volume of 1.79 cuft. I did indeed plot the 2.2 cuft box in unibox a while ago and things looked good. I just did it again now. Oddly enough, the response curves for the two alignments (1.8 cuft and 2.2 cuft) are nearly identical, but I suppose upon further examination there isn't a *lot* of difference between the volumes. In 1.8 cubes, response is down almost exactly 6 db at 50 Hz, while in 2.2 cubes tuned to the same frequency, response is down about 5 db. So either one seems to work.I'm glad we cleared that up. It still leaves the excursion issue unexplained, but I'll leave that to rest for now. I don't know. Unibox tells me that the motor will still handle 400 watts

over most of the frequency band and you're telling me the same thing, so maybe I'll just shutup.I'll stiffen up those panels and get everything good to go, and I'll let you know the *finished* results.Thanks for your help dude!!!Adam

---

Posted by Adam on Tue, 15 Jan 2002 10:42:28 GMT
View Forum Message <> Reply to Message

I will do that, thanks... A friend of my dad uses some hardening foam stuff to build racing boats, I might try to get some off him.Adam

---

Posted by tom clark on Wed, 16 Jan 2002 05:21:35 GMT
View Forum Message <> Reply to Message

Hello Wayne-What is the benefit of going with the horn?Thanks again for sharing your knowledge.

Posted by Wayne Parham on Wed, 16 Jan 2002 06:24:46 GMT
View Forum Message <> Reply to Message

Horn loading improves efficiency, increases maximum output and reduces distortion.
