Subject: 7 Pi bass cabinet
Posted by PaulW on Mon, 26 May 2008 03:36:52 GMT
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Hi Wayne, I'm just cutting out the sections for my bass cabinets and thinking about changing the style of the rear section - the 'pointy' bit. To soften their looks a bit I was wondering if I could radius the angles instead of having them sharp? This would also mean the rear panels on the apex couldn't run the full width (12 3/8") but would be reduced to about 7" in the middle of the angled part. Would there be any sonic changes in having a wide gap at the apex (rear where it faces the wall) of the cabinet and not having the panels going fully to the outer edges? I hope that makes some sense?Paul W

Subject: Re: 7 Pi bass cabinet
Posted by Wayne Parham on Mon, 26 May 2008 17:35:22 GMT
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Can you draw it up and post or send it to me? I'm not visualizing your idea.The main thing is the cabinet that loads the woofer. The rest of the cabinet is essentially a positioning device.

Subject: Re: 7 Pi bass cabinet
Posted by PaulW on Tue, 27 May 2008 10:39:58 GMT
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I think you answered the question really, but I'll do a quick sketch later and post it for you comments anyway.Thanks.Paul

Subject: Re: 7 Pi bass cabinet sketch
Posted by PaulW on Tue, 27 May 2008 19:41:13 GMT
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Sorry about the childish quality, but hopefully you can see what I mean now?Paul

Subject: Re: 7 Pi bass cabinet sketch

Posted by Wayne Parham on Tue, 27 May 2008 21:34:58 GMT
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Oh, yes, very good. That's actually a very good sketch. What you're doing will work just fine.

Subject: and this is how the really look
Posted by PaulW on Sat, 07 Jun 2008 17:25:37 GMT
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Nearly at the end of the build

Subject: Re: and this is how the really look
Posted by Wayne-o on Sat, 07 Jun 2008 23:53:19 GMT
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Looks nice ,Where did you get the plywood ???

Subject: Re: and this is how the really look
Posted by PaulW on Sun, 08 Jun 2008 00:16:30 GMT
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Local B&Q DIY store - I'm based in the UKPaul W

Subject: Re: and this is how the really look
Posted by Wayne Parham on Sun, 08 Jun 2008 18:18:59 GMT
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Looks great! Please keep us posted on your progress!

Subject: Will do.....
Posted by PaulW on Mon, 09 Jun 2008 00:06:16 GMT
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Although the next post should be a picture of them up and running, only a few little bits and pieces to do now.1st set of 7 Pi's in the UK?Paul

Subject: Up and running and some pictures
Posted by PaulW on Tue, 10 Jun 2008 01:14:09 GMT
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Just got them set-up, hence the room is still a bit untidy, but thought I'd post the pics'Crossover box, using Speakon connectors for all outputs.

Subject: Excellent!
Posted by Wayne Parham on Tue, 10 Jun 2008 16:36:44 GMT
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That's how I make mine too, with an external box to hold the crossover. Looks good!Looks like you have Bottlehead amps. That's a pretty good combination; I like the sound - plenty of volume with full bass and pure mids and treble. How does the system sound to you?

Subject: Re: Excellent!
Posted by PaulW on Tue, 10 Jun 2008 21:19:11 GMT
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Yes they are Bottlehead Paramours - I also use the Seduction Phonostage and Foreplay Pre.OK, the sound, well I have to say that on initial start-up I was disappointed with the results of all my hard labour. The sound was dull, dynamically restrained, with a shut in quality to the vocals, with the overall sound best described as small, bass had a thrummed quality rather than well delineated and was not too clean - not a good start to say the least. So, do these need to be run for a period of break in?I connected them to my AV amp and used a CD system 'burn-in' track on repeat overnight and throughout today. This evening they are far better, there is more punch to the sound, things like 'mark trees' have a real shimmer to them and Hi-Hat rides are clearly discernible from normal cymbal strokes as are both rim and centre strokes. Vocals are open and detailed with good timbre and emotion, a vast improvement on yesterday and I'm far happier. The only issue is that thrummy bass – most of the time it's fine so I suspect this is a room

interaction. The problem would appear to be in the low 100hz region (110-140) at a guess, but I've no way of really measuring this, but I suspect a DIY panel resonator will be on the cards shortly, though I'll wait until I feel the speakers have stopped changing. I also suspect a MagneQuest transformer upgrade wouldn't go amiss to aid overall control as well.I don't know if any of the above has been noted by other builders, but the change over the last 20 hours has been quite dramatic to say the least!Paul.

Subject: Re: Excellent!
Posted by Wayne Parham on Wed, 11 Jun 2008 05:54:11 GMT
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Glad to hear they're coming along.I'm sure you've done this but I'll suggest it just in case - it never hurts to double check connections - Check the wiring and make sure the bass bin, midhorn and tweeter are all connected to the right outputs on the crossover PCB and also make sure they're all phased properly.If you connect the midhorn to the bass bin output and the bass bin to the midhorn output, it will sound pretty unnatural, but you might not catch it right away like if you reversed woofer and tweeter connections. You'll still have bass and midrange if cross-connected, but the bass is weak and the midrange is hollow sounding and rolled off early. So check that and make sure it's right.Also, check the polarity of every connection. The midhorn and tweeter in particular, if phased right sounds like a single driver, if not, sounds like the tweeter and midhorn are independent of each other, you can really hear the disconnect. So check everything and make sure it is all connected properly.

Subject: Re: Excellent!
Posted by PaulW on Thu, 12 Jun 2008 00:36:08 GMT
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When using the 'burn-in' track you can clearly hear the individual drivers coming into play both individually and together then individually as it sweeps up through the frequency, similarly I used a phase check track with only one pair of drivers connected (bass, mid, then treble) to ensure they were wired in phase, then connected them all up. All connections are correct and tight as are the drivers and the speakers continue to improve. That is except in the bass which still sounds thrummy, but now is also loose and a bit boxy, indeed quite indistinct. It feels well integrated with the overall sound, but is difficult to follow, even on well known tracks. Still, early days and I do feel there may be a significant room interaction element. If I get a chance this weekend I'll put together a box resonator trap aimed at about a 100hz, so should have an effect over about 50-200hz and see what that does.Paul

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Subject: Re: Excellent!
Posted by Wayne Parham on Thu, 12 Jun 2008 00:58:00 GMT
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measures very nice and always sounded great to me too. Hope it is as pleasant for you as it has been for me.As an aside, what kind of floor and walls do you have?In America, many homes have concrete slabs and walls are drywall mounted on wood frames. This is pretty good because the concrete slab is non-resonant and the drywall vibrates enough to damp room modes.Two kinds of rooms cause the most trouble:1. Rooms with hardwood floors suspended over a crawlspace. This makes a resonant chamber with the floor acting like a drum head. It's impossible to get bass right in a room like this without doing something to fix the resonance of the suspended floor and crawlspace.2. Solid concrete walls like in a basement room form well defined room modes, and that makes damper panels and/or multiple subs a requirement for good bass sound. I have also seen plenty of homes with plaster walls that are rigid. This is like concrete and doesn't provide much damping.If you have rigid walls, these may help:
 "False wall" bass trap panels for concrete walls

Subject: Re: Excellent!
Posted by PaulW on Thu, 12 Jun 2008 02:00:04 GMT
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The floor is what is known as beam and block, this is a series of reinforced concrete beams (small cavity below) with a cross-section like an upside down 'T'. Between the beams resting on the 'arms' of the T's are concrete blocks (hence the name) and over this is 3 inches of dense foam insulation, followed by seam glued 3/4" tongue and groove chipboard. The walls are cavity block work (from outside to in - 4"brick, 4" air space, but with 2" insulation and a 4" concrete block) with an internal face of 1/2" plaster board held on with random 'blobs' of adhesive with probably about a 3/4" gap where there is no adhesive, this is then plastered over - so as 2 above I suspect.The room itself would appear (based on it's dimensions) to have a modal region between 32 to 177Hz with no multiples but some close clusters in the 60's, 90's and 130's and it's these I feel I need to tackle.I aim to build a 4'x 2'x 4" (WxHxD) panel trap and site this between the speaker, but clear of the wall by about 4 inches, as this is the only easy place to put it - I've got quite a lot packed into this room! I don't know if this will really help, or even if this is the real issue, but the speakers would be more likely to go rather than undertake major remedial work to resolve this issue.Paul

Subject: Room modes
Posted by Wayne Parham on Thu, 12 Jun 2008 03:58:24 GMT
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Sounds like a well-built structure, but it also sounds very rigid. I'll bet your room modes are very

well defined. If that's the case then any speaker with some bass will energize the modes and they'll stand out.Best thing to smooth room modes is multiple subs and/or room damping.Bass damper panels will improve damping, and that's an important way to smooth room modes. Since every boundary of your room is very rigid, I think damping should be added regardless of anything else you do. No speaker can really sound good in the modal region, at least not a single speaker or a pair. They'll either be weak in the bass and so not energize the modes, or they'll put enough energy into the room to make those nodes stand out like a sore thumb. So I think damping panels should be done, no matter what other steps you might take.Since you say your room is packed, I'm assuming that adding a couple more woofers isn't an option, but if it is, it's another good solution. A couple of LAB12 woofers, each in a 4.5ft3 cabinet, added to what you have now would greatly smooth the modes. You could easily model the room with CARA, trying a few positions to find where energy distribution is smoothest.Either panel dampers or multiple bass sound sources will provide improvements in the form of smoother bass, but both together will most certainly provide the best bass possible.

Subject: More woofers - that I didn't expect!
Posted by PaulW on Thu, 12 Jun 2008 20:36:59 GMT
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A couple more woofers! Doesn't that also mean another amp and some form of filtering, with all the asociated problems with balancing the relative output? I could accommodate two more boxes (and probably not to different from the cost of some room treatment) but not to sure about wanting another amp to drive them! The speakers are still getting better by the day and I've just had a musician friend round who was thrilled by the sound. I still aim to put together a bass resonator (should have enough material in stock as it were) and maybe look to some foam bass traps for the corners a little later.Paul

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Subject: Re: More woofers - helps to smooth room modes
Posted by Wayne Parham on Thu, 12 Jun 2008 21:47:13 GMT
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You could connect pairs of woofers together and drive each pair with a single channel. This isn't to increase output, it's to smooth room modes.One of these times, if you're inclined to experiment, grab a copy of CARA and model your room. Place woofers in various places in the room to find what makes the most uniform response. Simulation takes just a few seconds, and it will show the modes in the room as a function of frequency. It even makes an animation to demonstrate the modes with a simulated frequency sweep.I would start by placing the two additional woofers in different positions in all three planes. One configuration that seemed to generally work well for me was to separate woofer pairs by a few feet, one higher off the ground than the other. Try other configurations too.

Subject: Re: More woofers - helps to smooth room modes
Posted by PaulW on Fri, 13 Jun 2008 00:08:18 GMT
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So is that literally put the LAB12's in a 4.5 cu-foot sealed box and connect them in parallel to the existing pro 15's in the 7 Pi's? If so, I'll investigate some prices.Paul

Subject: Re: More woofers - helps to smooth room modes
Posted by Wayne Parham on Fri, 13 Jun 2008 01:22:49 GMT
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speakers. But it would be better to use a plate amp mounted on the subwoofer box. They don't cost much and will allow you to set the volume level of the subs to help blend them better. Something like one of these will do nicely:
 Plate amps

Subject: Re: More woofers - helps to smooth room modes
Posted by PaulW on Fri, 13 Jun 2008 15:48:15 GMT
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Wouldn't it be easier just to get a couple of small commercially available subs and hook into the system, or is the something special about the LAB12's? One reason for asking this is that my small KEF sub I use for the home cinema set-up has died and I was looking to replace it anyway, but was only going to go for relatively low powered 8" based unit.Paul

Subject: Re: More woofers - helps to smooth room modes
Posted by Wayne Parham on Fri, 13 Jun 2008 16:33:00 GMT
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That would be fine. The LAB12 in a 4.5ft3 box was just a suggestion. I picked it mostly for price/performance. There are plenty other options that would work well for you. The main thing is to use several woofers in strategic places in the room to smooth room modes.

Subject: Re: 7 Pi bass cabinet
Posted by Matts on Wed, 25 Jun 2008 05:27:10 GMT
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Paul, do you have any upgraded iron in your Paramours? I have a pair with the original upgraded output transformers, and they made a huge difference in the quality/quantity of the bass. I imagine the upgrades currently sold would be even more of a difference. I just finished a second pair of Pi 4's, and am familiar with the upgrade process, so it didn't bother me to have no bass to start out with. I also used Auricaps in the xovers, and they take a good 50-100 hrs to smooth out. Be patient! Get some hip-hop on 'em... haha

Subject: Re: 7 Pi bass cabinet
Posted by PaulW on Wed, 25 Jun 2008 09:29:34 GMT
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Matts - I have only the original iron in the Paramours, which I run on 4 ohms which providers a slightly 'tighter' sound, but with reduced output and slight loss of 'air' about the sound overall. I will be considering the MagneQuest iron later as an upgrade option, when funds become available.The bass is almost sorted now after bringing in some room treatment - just a few more changes to make. So now my focus is moving toward the treble which I'm finding a bit hard edged - still low hours yet, but as the bass gets better the treble seems to worsen.Paul

Subject: Re: 7 Pi bass cabinet
Posted by Matts on Wed, 25 Jun 2008 20:52:42 GMT
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Paul, So far, much of what you're experiencing seems to me to be normal for new speakers. I'd wait until you have 100 hours or so on them to tinker too much. Have you tried the 8-ohm taps? You'll be shocked at what the upgraded iron does over the whole freq spectrum. You may have room modes, etc. that do need correcting, but I'd wait until the speakers stabilize before going all out. If you upgrade caps to Auricaps or something, you go through it again... Wayne breaks his speakers in fast- with a zillion watt Crown or two. hahahaha.

Subject: Re: 7 Pi bass cabinet
Posted by PaulW on Thu, 26 Jun 2008 00:29:37 GMT
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Hi Matts, I use the 4 ohm tap (in preference to the 8) as although this provides a slightly less open sound and reduced output, overall the bass is better controlled and the tendency for the upper frequency shout is reduced. I'd hope the MagneQuest iron did provide a significant upgrade as the output transformer supplied as standard costs under $5! I'm also running the HF compression horn with a small (thin) amount of wadding placed in the throat to further tame the hard edge I'm hearing - hopefully this will tone down a bit over time and I can remove the wadding. But may also be an indication of upper frequency 'room effects'.Paul

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Subject: Uniform directivity
Posted by Wayne Parham on Thu, 26 Jun 2008 18:50:52 GMT
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The B&C DE250 is one of the smoothest compression drivers I've ever heard or measured. For that matter, it's one of the smoothest tweeters of any type I've measured. It doesn't reach beyond

good as it gets, in my opinion.The crossover is nailed down too. It was designed taking into account the characteristics of each driver and the sound source locations to provide constructive summing, not just straight on the forward axis but also at all angles off-axis within the 90° x 40° coverage angle. The net effect is that the reverberent field is uniform.But if you're used to the sound of a typical direct radiator that falls off off-axis, then having a uniform reverberent field can sound fuller. There is definitely a difference. It's unnatural to me to hear speakers with non-uniform polar response, so I would expect people that are used to hearing a non-uniform sound field would notice the difference when the reverberent field was made to be uniformly charged.Uniform directivity has been one of my main design goals for a long time. My speakers have been built like this for well over a decade, so I'm used to it. When I walk around in my room, the sound is balanced no matter where I go. I can even leave the room, walk down the hall, and the sound volume falls off but the spacial balance doesn't change. It is nice to be able to move freely in the room and hear the same tonal balance wherever I go. I like not having to sit in a specific central spot to have the sound "click" for natural imaging. When I'm listening to my speakers, the sweet spot is very large.That's the benefit of constant directivity. It makes the spectral balance uniform throughout the room. I think speakers that generate a uniform reverberent field are much more natural sounding than those that don't.

Subject: Re: Uniform directivity
Posted by PaulW on Thu, 26 Jun 2008 19:55:02 GMT
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I absolutely agree with everything you've said and the more I adjust and add/remove elements of room treatment, I'm coming to the conclusion that perhaps the speakers are just to big for the room (approx 195 sq feet). This combined with the seating position at no more than 11 feet makes for a very intense listening experiance. I would also mention that due to their overall clarity

I have been, without realising it, playing these at much higher volumes than normal, it is only when trying to hold a conversation you realise just how loud they really are. Anyway, I'm getting there, the bass is much better balanced now, but I may have to live with a small amount of wadding in the compression horn until I can remedy these higher register (room?) artifacts I'm hearing. It is also worth perhaps noting that I'm very treble intolerant and find most speakers far too bright for my liking - so it really is issue for me to resolve as best I can. At a recent gathering of Hi-Fi enthusiasts I had to leave the room several times due to the overall sound, others didn't seem to mind finding the presentation a bit bright, for me it was just plain painful!I actually like the 7 Pi's very much and will be aiming to remake the mid horn cabinet again as I'm not happy with the one I've done and add a more aesthetically pleasing surround for the DE250/H290.Paul

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Subject: B&C DE250 packaging
Posted by Wayne Parham on Thu, 26 Jun 2008 21:24:49 GMT
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There is one other thing I forgot to mention that may or may not be an issue. At least it is worth looking at.I am very happy with the B&C DE250 in all areas except one. Their packaging for shipping really sucks. They are just put in a cardboard box without any padding. The driver is first put into a plastic bag, then set into the box, but no foam padding is used at all. In contrast, JBL uses a formed styrofoam basket to hold their drivers in the box, which pads them nicely and protects them from impacts. Eminence uses foam in place packaging, which snuggles foam around the driver and protects it. The B&C driver has no protection at all, and so they bump each other during transit and are extremely vulnerable to shock damage.I don't recall if you got your drivers from me or not, but regardless of where you got them, it might be worth it to do at least a visual inspection. If they're damaged, send them back in for warranty service or replacement. If you can do some measurements, you can check them that way. If not, you might disassemble them and look for debris in the gap.I've checked several drivers and in every case, I have found evidence of minor shock damage. There are chips in the magnet and small fragments in the bag. Most times, the chips are very small but in one case it was large enough I felt the need to measure the driver to ensure it was working properly. I expected it might not be up to spec, but it was. I've spot checked several, and so far, all have measured fine. But I always wondered how many times tiny particles from the magnet made their way down through the throat screen and into the gap.

Subject: Re: B&C DE250 packaging
Posted by PaulW on Fri, 27 Jun 2008 00:17:24 GMT
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I've no way of measuring them myself, but because I did have one of the Omega Pro's damaged in transit, all the drivers were visually inspected quite closely and nothing untoward was evident and there are no visible fragments in the gap under the diaphragms (just looked). The only point

of concern I had about the DE250's was that mine didn't have screw terminals, just push tabs, unlike those shown on the spec sheet.I really suspect the problem I'm having is due to a combination of my ears and the room.Paul

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Subject: Re: B&C DE250 packaging
Posted by Wayne Parham on Fri, 27 Jun 2008 00:33:36 GMT
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I'm very glad to hear the DE250 drivers weren't damaged and look fine. I haven't had any troubles with them so far, they've all measured fine. I've just been concerned about the packaging for the reasons I mentioned earlier.When they're working right, they're just sooooo smooooooth.
