
Subject: foam horns and heavy drivers

Posted by [dr.joe](#) on Thu, 15 Jan 2004 23:19:11 GMT

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Thank you all--Wayne especially--for an extremely informative forum!!'m in the process of designing and building cabinets for a JBL system using Pi 800 Hz crossovers: 2235H woofer, 2445H mid-high, 2380A horn and (eventually) 2405H crossed over at perhaps 8 kHz. First, I'd be grateful to learn of any JBL model that used the 2235 LF driver: being a technical ignoramus I'd prefer, for cabinet and port dimensions as well as for the drivers' positions on the baffle, to copy a JBL design, as they are much more likely to have "got it right" than I could ever hope to. I can't seem to find anything on the Lansing Heritage website, but perhaps I've just missed it. . . Second, this may be a really dumb question, but it seems to me that the 30+ lbs. 2445 compression driver really needs to be supported at least using the "structural foam" 2380 biradial horn. For mounting the driver/horn inside the cabinet, I am assuming one would have to have the 2445 resting on, or bluetacked to, something like a brace. Am I on the right track here? Many thanks, Joel Tatelman.

Subject: Re: foam horns and heavy drivers

Posted by [Wayne Parham](#) on Fri, 16 Jan 2004 04:14:28 GMT

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My experience with many of the JBL 22xx drivers is that they are pretty tolerant of cabinet configurations. I think that's why JBL has a relatively small number of recommended enclosures, and they tend to re-use them for several applications. The 2235 works very well in vented cabinets of 2.5ft³ to 10.0ft³, tuned between 20Hz and 30Hz. For a wide range operation, I'd prefer them in 2.5ft³ to 4.0ft³ tuned to 30Hz. For deeper operation, put them in larger 4.0ft³ to 8.0ft³ cabinets and tune them for 25Hz. And for subs, you can max out the box size at 10 or even 12 cubic feet for an EBS alignment tuned to 20Hz. About bracing, you know that you can't really brace something like this too much. There are some situations where stiffening something or holding it more firmly can cause other problems, but this isn't one of them. As long as your braces don't make it difficult to service, I say put 'em in.

Subject: Re: foam horns and heavy drivers

Posted by [Adrian Mack](#) on Fri, 16 Jan 2004 08:22:13 GMT

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Hi Joell'm glad that you picked up those 2380 horns that we talked about over the email. They really are a lot better suited to your application than the 2382's. If your using the Pi Crossover (which I initially suggested), then that'll augment the high frequencies and makes a UHF tweeter not required. You can use a UHF tweeter if you leave out the compensation circuit on the compression driver, but I'd rather not do it this way. Crossover points this high shifts crossover

nulls closer towards the on axis position, and the extra crossover point itself introduces further means for nulls, especially when its this high. I think in a setup like yours, a UHF tweeter just isn't needed for good performance. I'm not sure of which JBL models use the 2235 in particular, but you shouldn't be worried about its performance. Like Wayne said, it's a great driver. As for copying baffle spacing/port dimensions etc - there isn't any need for that. I made a couple of suggestions for the 2235 woofer in one of my emails to you a while ago, and also some recommended port sizes for both low and high power applications. You'll get all the help you need regarding the rest of the setup - baffle spacing, crossovers, etc from people on this forum, and with the parts your using, you'll definitely end up with a very nice sounding system. I'd probably use a brace for a heavy compression driver too. It should hold itself up, but the 'mere thought of snapping or damaging the horn flare, especially when moving the cabinet around, is horrifying. I've used a brace for the compression driver to rest on in my 3-way towers to avoid damage to the horn flare. Adrian

Subject: Re: 2445 mounting
Posted by [GraemeG](#) on Fri, 16 Jan 2004 09:53:04 GMT
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Joel, For heavy drivers like the 2445, I use a panel running full width of cabinet, with a round hole same diameter as rubber surround on driver. when the horn is mounted, the driver is a snug fit in the hole. You can see this in the 12" design on my horns page. Cheers
My horns page

Subject: Re: JBL 2235
Posted by [dwkurfma](#) on Fri, 16 Jan 2004 16:56:46 GMT
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JBL 2235 is one terrific driver. It was used in the JBL 4430 studio monitor, which is about as fine as you will ever find. In that configuration the Enclosure Volume was 5 cubic feet net. Fb was 34 hz. F3 was 35. As Wayne notes, this driver can be configured in many different ways. I would stick with something close to the 4430 configuration in a true two way configuration. If you really want to have fun, add a sub. This will let the 2235 really shine by cleaning up modulation distortion. Do not be afraid to run this driver high. It crosses over at 1k in the 4430 in order to achieve ideal DI matching. Search the JBL pro website. Some goodies below.
<http://www.jblproservice.com/pdf/Studio%20Monitor%20Series/4430LR.pdf>
http://www.jblpro.com/pub/technote/tn_v3n01.pdf
http://www.jblpro.com/pub/technote/tn_v3n03.pdf
<http://www.jblpro.com/pub/obsolete/443035.pdf>
<http://www.jblpro.com/pages/components/2235h.htm>
Have fun! Dan

Subject: Re: JBL 2235

Posted by [dr.joe](#) on Fri, 16 Jan 2004 23:34:33 GMT

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Many thanks, Dan, Graeme, Wayne and Adrian! A great help! For me, copying the 4430 cabinet is probably the way to go. Otherwise, I shall have to choose between, now, five different recommendations for box volume and port tuning--all from knowledgeable people (Wayne and Adrian among them), and all, as your comments show, very suitable for the drivers. One related thing I've been wondering about is achieving a smaller footprint by making the cabinet taller, but narrower and shallower, for example changing a 31" H x 24" W x 23" D cabinet (approx. dimensions of the JBL 4333A) to, say, 36" x 20" x 21". Does one need to worry about skewing proportions? For some reason my computer is using QuickTime to read PDFs, and is only reproducing the first page of each, so I'll probably have to wait until Monday at the office to see what information JBL gives about the 4430. Thanks again, guys! Regards, Joel.

Subject: 4430 Studio Monitor

Posted by [Adrian Mack](#) on Sat, 17 Jan 2004 01:57:13 GMT

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JBL 4430 Studio monitor datasheet, JPEG

format <http://www.lansingheritage.org/html/jbl/specs/pro-speakers/1984-4430-35.htm> The 4430 uses the 2344 horn so it's impossible to copy JBL's design on this one. No problem in changing cabinet dimensions so long as internal volume is kept the same. There are changes - a larger baffle means that the frequency where it behaves as though its in half space condition is lowered, and vice versa; smaller baffles raise the frequency where the baffle forms a half space condition. Sound becomes more constrained with a larger baffle, i.e: increased directionality. Changes of baffle dimensions and shape also affects the severity of cabinet diffraction. About the changes you want to do however - from 31*24*23" to 36*20*21", is a small enough change that you don't need to worry about anything. Adrian

Subject: Response Curve

Posted by [Adrian Mack](#) on Sat, 17 Jan 2004 02:17:24 GMT

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2235 can definitely be crossed as high as 1KHz as you say. In case anyone needs it, here's the frequency response curve for the 2235 (bottom curve on graph)

Subject: Re: 4430 Studio Monitor

Posted by [dr.joe](#) on Sat, 17 Jan 2004 13:48:29 GMT

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Adrian, Thanks for clarifying the cabinet dimensions issue. Now that I've managed to download the pdf of the 4430 studio monitor, I can see that changing dimensions will be less of an issue than I thought. The 4430 is 35.75" H x 21.875" W x 15.75" deep, almost identical dimensions to my Tannoy DMT 15 II monitors. I may have to make the cabs a bit taller to fit everything on the front baffle (ports, woofer, 2380A horn), but haven't done exactly measurements yet. Another option, suggested by one friend, is to mount the horn on top of, not inside the cabinet. This will make vertically aligning the driver voice coils simple. Decisions, decisions. . . As you pointed out, the 4430 cabinet is a adequate model for a bass cabinet, but with the different HF driver and horn that I'm using, no more than that. Will try to work out complete cabinet plans next week. . . Best regards, Joel.

Subject: Re: 4430 Studio Monitor

Posted by [Adrian Mack](#) on Mon, 19 Jan 2004 00:46:08 GMT

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Hi Joel> Another option, suggested by one friend, is to mount the horn on > top of, not inside the cabinet. This will make vertically > aligning the driver voice coils simple. True, but at the same time, that will introduce diffraction as well. Horn tweeters usually are a little longer than the woofer, so pushing the tweeter forward to align the acoustic centers will introduce more severe diffraction around the edges of the mouth as it transitions not to the baffle, but rather to open air. In any case, having some upward axis tilt will optimize the listening position for both on-axis and also above axis positions as well (such as when your standing up) by shifting the nullaxis further up. > you pointed out, the 4430 cabinet is a adequate model for a bass > cabinet, but with the different HF driver and horn that I'm using, > no more than that. That's true. Keep in mind though, some changes of HF horn will change things a lot, particularly the crossover network. In any case - your

2445/2380 combination. Your speaker will just have a little different specifications from the original 4430, but that isn't a concern anyway. In case your interested - there's an AES article which covers design aspects and such of JBL's 4430 and 4435 studio monitors. You can either get it off JBL, or download it from the Pi Speakers website, linked below; Download AES paper Improvements in Monitor Loudspeaker Systems The same sort of design principles discussed in that paper are implemented in the Pi Speakers systems, and that's the same sort of design we've all been directing you to. So you wouldn't have lost any performance in your design anyway, even if you had never seen the 4430 datasheet. Adrian

Subject: Re: Response Curve

Posted by [dwwurfma](#) on Mon, 19 Jan 2004 17:25:30 GMT

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Ah Ha!The 4430 response is not as smooth as the 4435 just past 1k. There is an abrupt dip. I bet it is the from the dip shown in the response curve you provided, which I have not seen before.Thanks for the pic!Dan

Subject: Re: Response Curve

Posted by [Adrian Mack](#) on Tue, 20 Jan 2004 07:12:01 GMT

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Hey DanGot that response curve outta one of the old JBL tech notes on the Lansing Heritage site. Interestingly, the download was available for download from there only, and not on the JBL Pro website. Adrian
