Subject: Horns and Room Size
Posted by Gerald59 on Wed, 20 Oct 2004 23:24:11 GMT
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How big a room is needed for a horn? Does a bass horn work in a small room, say the size of a bedroom?Seems like there would be a size limit. How does the idea of acoustic transformer apply if the room is very small?In that case, the horn isn't matching a small cone to a large space anymore. Does that change things?

Subject: Re: Horns and Room Size
Posted by Wayne Parham on Thu, 21 Oct 2004 06:00:19 GMT
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The thing is that a horn is really a tapered pipe with properties determined by a handful of variables. Three of the main ones that are germane to your point are throat area, mouth area and expansion rate. The throat and mouth are terminating junctions where there is a discontinuity, so that's what distinguishes them. Even if the environment outside the horn is small, the mouth still marks a point where the expansion stops increasing by the flare rate and suddenly opens up.There are a lot of other variables though, and the environment that the horn radiates into is certainly one of them. Another is the chamber that precedes the throat. And the back chamber and the electro-mechanical properties of the driver come into play also. But to address your specific comments about the environment, it most certainly does have an impact, and a large one.Assuming the environment is large, then it can be described by the radiation angle set by the boundaries nearest the sound source. If sound radiates in all directions, like if a speaker is used in wide open space, high above the ground and away from everything, that's called freespace

your very small room may be an example. There is no reason why the radiating angle cannot be

reduces the radiating pattern of a sound transducer so that it is made more directional and stronger in the field desired. There are other things in play also, such as compression before the throat and the expansion rate, but one of the main features of the flare is its radiation angle. So in a very real way, the room becomes a part of the horn and it certainly should be considered when designing or implementing a horn system. A basshorn can be made considerably smaller if used in a constrained environment than it would be if used in freespace.

Subject: Practically
Posted by Mike.e on Thu, 21 Oct 2004 10:42:20 GMT
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my 40hz corner horn worked really well in a small room of 2.2m x 5m x 2m !The small room had a relatively high frequency,below which room gain started filling in the bottom end slightlyCheers!Mike.e
horn info

Subject: Re: Horns and Room Size
Posted by Bill Fitzmaurice on Thu, 21 Oct 2004 11:32:13 GMT
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'A basshorn can be made considerably smaller if used in a constrained environment than it would be if used in freespace'.To expand on Wayne's statement any room will get both boundary loading (if the speaker is placed close to a wall or corner) and cabin gain, which kicks in at 12dB/octave where the longest room dimension is about a half wavelength. A room with the longest dimension at 12 feet will get cabin gain from about 47 Hz, which means that you don't need to build a horn with an Fc of 20 Hz to get response to 20 Hz; 45 Hz or so will do nicely. When you account for cabin gain and boundary effects in the design process you can make basshorns quite small. With the extreme amount of cabin gain available in a car trunk it actually makes it an ideal place for a relatively small basshorn. Going to your question, what traditionally limited the use of horns in small rooms was their physical size, not their sound, but today designers like myself are coming up with horns that take advantage of both boundary and cabin gain to create bass horns small enough for even the smallest rooms, including automobile trunks.

Subject: Re: Practically
Posted by tuber on Thu, 21 Oct 2004 13:11:54 GMT
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what do you mean 'the small room had a relatively high frequency'?

Subject: Re: Horns and Room Size - m value, mouth size & length
Posted by tuber on Thu, 21 Oct 2004 13:20:39 GMT
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some say m values of .5 to .6 are best for bass horns. does this apply to all bass horns, indoors and outdoors alike? if not, what m value is best for small rooms? do you use the same flare coefficient in a small room as big? what size mouth do you use in a very small room like automobile trunks? some use 1/4 size horns inside, some 1/8 or in between like 3/8. in a car, can you use even smaller mouth and length like maybe 1/10 or 1/12? lastly, does fc make a difference

in the m value you choose? i know this is a lot of questions, but it really is a very interesting topic. there is a lot to learn.

Subject: Re: Practically
Posted by Mike.e on Fri, 22 Oct 2004 03:58:34 GMT
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If you read what i typed i said : the small room had a relatively high frequency where room gain starts due to its small sizeCheers!

Subject: M
Posted by Mike.e on Fri, 22 Oct 2004 04:01:41 GMT
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M value affects the last part of the horn near the Mouth- Expo being 1 and Catenoidal being 0The M=0.5-0.6 'optimal' value is applicable for the ideal horns.On a highly compromised conical segmented horn the differences are less apparent-but on full sized horns it makes a larger difference.Download the Dinsdale and Edgar horn files from the link belowCheers!

Subject: I don't use M values in my sub horns,
Posted by Bill Fitzmaurice on Fri, 22 Oct 2004 13:01:45 GMT
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or Hypex flares either for that matter. While the drivers of the 1930s and 40s (when most horn formulas still in use today were arrived at) prevented the use of very high throat impedances, todays small diameter long throw high Bl drivers make it possible to deviate from traditional theory with quite acceptable results.

Subject: Re: I don't use M values in my sub horns,
Posted by pgolde on Fri, 22 Oct 2004 15:05:27 GMT
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As I put the finishing touches on my Labhorns, a project I commited to a while ago, after attending the NYC sub shootout at Paul Bell's club, I have a few thoughts. The first is that I was so into

building a maximum output sub with clean low extension, I kind of overlooked the size and weight issue, these things are large and heavy, and also fairly expensive to build (correctly). Following with interest what Bill F. has done with his tubas, and what Tom Danley has done with B-Deaps, I have a feeling I am building last years model when I look into the huge mouth of this horn. Maybe this will change when I power them up finally. I want to build a pair of Tuba 24's, and A-B them to a single Lab.

Subject: Re: Practically
Posted by tuber on Fri, 22 Oct 2004 15:31:13 GMT
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of course. how could i have missed that.

Subject: Re: M
Posted by tuber on Fri, 22 Oct 2004 15:32:55 GMT
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link?

Subject: Re: I don't use M values in my sub horns,
Posted by tuber on Fri, 22 Oct 2004 15:35:11 GMT
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what profile do you use?

Subject: Re: I don't use M values in my sub horns,
Posted by tuber on Fri, 22 Oct 2004 15:39:53 GMT
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indoors? outdoors? it is important for comparing different size and shape horns, no? not one size fits all.

Subject: Re: I don't use M values in my sub horns,
Posted by pgolde on Fri, 22 Oct 2004 16:05:09 GMT
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Both outdoors (small parties, not festivals) and indoors in rooms for for 100 or so people. The horns are replacing dual 18's. I also listen to them at home (background music for building new speakers)

Subject: Ooops
Posted by Mike.e on Fri, 22 Oct 2004 16:43:55 GMT
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Dinsdale,Edgar files -very important
downloads page

Subject: No magic just different compromises
Posted by Mike.e on Fri, 22 Oct 2004 16:47:15 GMT
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The rules havent changed nor the physics-just different ways of squeesing what we want from higher spec drivesr on an optimal horn.The labhorn is quite cool and amazing FREE! design considering an off the shelf 'normal' woofer *although it has ideal horn specs* its just your average 12"Bdeap is so magical you cant build it anyway (patented)-youd have to buy one (oops i mean buy many many of them to achieve the desired output just like many labhorns are required)The only thing which you could do is put a 15" on a horn and fold it simple S fold style like mine!!!Cheers!
home page

Subject: Re: I don't use M values in my sub horns,
Posted by pgolde on Fri, 22 Oct 2004 18:11:20 GMT
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I am using 15's for midbass. I dont think a hornsub with a 15 inch driver would be the best use of space. I like the idea of smaller less expensive drivers, longer horn path. The Tuba doesnt seem to waste a lot of space with a large flare opening, The B-Deap uses the outside of the box and surrounding walls and floor as the flare.

Subject: Re: I don't use M values in my sub horns,
Posted by Bill Fitzmaurice on Fri, 22 Oct 2004 19:17:26 GMT
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My own. It's nothing that can't be reverse engineered easily enough but I'm not going to give it away.

Subject: Re: I don't use M values in my sub horns,
Posted by Bill Fitzmaurice on Fri, 22 Oct 2004 19:20:15 GMT
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A Tuba 24 won't equal a Lab, but that doesn't mean it might not be enough to do the job for you. Tuba 30 will give the Lab a run for its money, is smaller, a lot easier to build and uses only one driver to boot.

Subject: Re: I don't use M values in my sub horns,
Posted by Mike.e on Fri, 22 Oct 2004 20:32:37 GMT
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I honestly cant see how effective the bdeap is just by looking at it.Its very boundary dependant.Using the room as the flare doesnt really work due to the large discontinuity between final box flare and room expansion of conical shape.Using Direct radiator 15"s for 70hz and up is an effective use.a Hornsubwith a 15" IS a good use of space-but horns are always large.A smaller woofer wont be able to move as much air ;-)I too like the idea of using cheaper drivers on a longer horn-But by the time you count up the cost of wood + cutting costs its almost the same-and why not use a good linear driver than a cheap one for peace of mind.If a 10" or 12" will cure your 40hz Hornsub issue then thats really good- i used an 8" for 50hz on 155litres for awhile!Cheers!Mike.e

Subject: Re: I don't use M values in my sub horns,
Posted by pgolde on Fri, 22 Oct 2004 21:16:51 GMT
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At the subwoofer shootout in NY I witnessed in person what 4 bdeaps did in a large room. Nobody in the room dared walk close to them while running full volume from a PL9 for fear of damaging internal organs. As I walked around the room, it was amazing to hear how even the levels were thruought the room, none of the competeing subs came close, including Bassmax.

Subject: 3/4 cams and basshorns
Posted by Wayne Parham on Sat, 23 Oct 2004 05:45:40 GMT
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I'm sorry to be a curmudgeon, but the "hornsub shootout" thing always rings hollow to me. There are many reasons, but the biggest one is that cabinets of this size depend on direct radiation of the woofer at the lowest frequencies. That sort of takes the "best horn wins" argument out of the equation, since none of them are operating as horns down low anyway. Above 40Hz, we're cooking. But below 40Hz, we're comparing woofers in a large box. By 20Hz, a basshorn that's "small" enough to be portable is horn in name only.The other side of the coin is that room gain lifts the lowest frequencies quite a bit. But that's really the point. At the deepest frequencies, the horn begins to act more like the front chamber of a BP box. So that and the woofer, rear chamber and room are what's most important to response. And of course the EQ used to bump up the bass where horn response falls off.I've seen guys boasting about basshorn performance at frequencies that the flare couldn't possibly support. Models show it shouldn't and measurements show it doesn't. Put it in a room, and boundary conditions help but you still don't have horn gain under horn cutoff, and some response claims fly in the face of that. Down very low, what you really have is room gain from direct radiators in a fancy box.I love horns, and they've been all I've used for 25 years. I love basshorns too. But when I hear claims of 20Hz - and sometimes claims of output under 10Hz - from a 30Hz horn with an 1/8th size mouth, well, I would hope that people would do a better job of interpreting what's really going on. It all reminds me of guys talking about doing 7 second quarter mile times in their Chevy with a "3/4 cam."I can appreciate people here making basshorns that are most efficient above 40Hz or 60Hz. Most program material is above 40Hz anyway, and so having improved efficiency from horn gain above 40Hz or 60Hz is a worthy goal. But I've seen bait-and-switch, fancy marketing names given to well-known properties, and product development put on hold to eek the last bit of profits from a cheap woofer used in a popular design. A superior product is on the backburner because the inferior one is still selling to people that love SPL hype more than they love good sound. The public is told it's the state of the art, and they aren't to be made aware of the improved device until the cow's been milked dry. So I guess I've become cynical about that sort of thing.
All I really wanted to say is that hyped performance of portable basshorns in the octave under 30Hz is really just locker room talk, in my opinion. It's fun for the boys to hang out and talk about those 3/4 cams I suppose, and that's cool, it's fun. But there's always something bigger and better, and I'm not sure I ever enjoyed watching brand rivalries when it's all basically the same stuff.

Subject: Re: 3/4 cams and basshorns
Posted by pgolde on Sat, 23 Oct 2004 13:34:16 GMT
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No need to apologize, I am here to learn. I attended the shootout out of curiosity, and I was in the area. Paul Bell was objective and helpful. He was about deciding the best box for your application. I forgot to mention in my last post that of course it was just my humble opinion. Well, back to work on the horns!Cheers

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Subject: Re: 3/4 cams and basshorns
Posted by Wayne Parham on Sat, 23 Oct 2004 13:49:48 GMT
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I also hope that my post wasn't too over over-the-top. This has been a passion of mine for a long time, and I've seen and heard a lot of stuff. There's always room for improvement, but we also have the same laws of physics and the same sets of limits. And really, a lot of these guys are using the same OEM components, so that's something to consider too. Differences between good implementations are slight, certainly not orders of magnitude unless conditions are unequal or something is wrong.

Subject: Re: 3/4 cams and basshorns
Posted by Mike.e on Sun, 24 Oct 2004 06:30:53 GMT
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In order to know what sounds real good-we have to have a rule of good sound to listen to.Thesedays there still doesnt seem to be a good speaker system of which you can compare the latest products to-perhaps monitors would do this job-being the rule to compare against.If people were loving the sound of 2 12"s on a seemingly 30hz cutoff horn playing down to the subsonics-reliant on pyschoacoustics and sealed box operation..... Im glad i have my 2226 to compare things too :-)

Subject: Pay no attention to that man behind the curtain!
Posted by Wayne Parham on Sun, 24 Oct 2004 10:07:00 GMT
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Just for fun, I'll re-tell an old story.P.T. Barnum introduces something at a show claiming it's the biggest, fastest, loudest, and whatever. He has his shills do the introduction and a few in the crowd to cheer it on. So you might want to peer behind the curtain when the show is over to find out the real story."Pay no attention to that man behind the curtain!"Our good Mr. Barnum volunteers to promote this thing, just for the thrill. The effort is to be a donation to the public good. But then after the thing catches on, minor changes are made and the "new and improved" model is immediately offered for sale. Was the promotion really for the greater good? Or was it bait and switch?Now for the best part, Barnum's gadget is based on a relatively cheap main component. It's great as a bang for the buck thing, and it's pretty good and all. But it is certainly not state of the art, and is actually quite common. The really cunning move is to give the impression that it is a top-notch statement product, and that its performance is better than anything else. "Nothing else even comes close."After cultivating this kind of reputation, why bother to make something that truly rises to the level of performance of a statement product? Better to use a catchy technical sounding name and call it a breakthrough. Why bother to introduce an overhead valve version when Mr. Barnum can convince everyone that his flathead version with the flashy name is

great? Secretly, he does everything he can to stop others from introducing overhead valve engines. That might cut into sales, no good in that.All the while, Mr. Barnum looks for a way to take credit for overhead valve technology so that when it hits the market, he can say he was responsible for that too.This is nothing new and shouldn't be shocking to anyone. It is a common story. It is the story of Tesla and Edison. It is the story of Marconi. So it shouldn't be surprising to find it in other businesses too.Be sure to look behind the curtain...

Subject: Pics
Posted by Wayne Parham on Sun, 24 Oct 2004 13:07:19 GMT
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The LABhorn is certainly a capable bass subsystem for clubs and the LAB12 woofer offers good value for the money too. Fitzmaurice's horns look very nice too. I'd sure like to see your horns, so post pics, can you?

Subject: Thank you all for your comments
Posted by Gerald59 on Sun, 24 Oct 2004 18:47:31 GMT
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A most enlightening discussion.

Subject: Re: 3/4 cams and basshorns
Posted by pgolde on Mon, 25 Oct 2004 01:00:32 GMT
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I purchased a throw away camera for taking some pics of the work, since my digital camera broke. I will post as soon as I get them developed hopefully later this week.

Subject: Re: 3/4 cams and basshorns
Posted by Wayne Parham on Mon, 25 Oct 2004 04:27:46 GMT
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Sounds good. Looking forward to it!

Subject: Re: I don't use M values in my sub horns,
Posted by tuber on Tue, 26 Oct 2004 14:56:59 GMT
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not asking for free plans. just want to understand what basic shape the flare is toknow how it acts. also interested in how you arrived at the profile(s) used inyour horns if they aren't a standard shape. on what do you base your work?

Subject: Re: I don't use M values in my sub horns,
Posted by Adrian Mack on Sat, 30 Oct 2004 05:27:36 GMT
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I would imagine Bill builds prototypes and measures the response and modifies it until he gets the results he wants.

Subject: Labs Fired Up , Pics on the way
Posted by pgolde on Sat, 30 Oct 2004 20:15:08 GMT
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Was I supposed to break these things in?If I have have to do it with the drivers in the horn, my house will break as well. Ran some test tones and a little music, using my driverack to adjust filters. This is my first bass horn project, amazing how clean and powerful, easily took all the power my amp had to offer. I am running a Behringer EP2500 through a Driverack PA. The tops are EV DL15x with DH2A (currently passively crossed at 800Hz) powered by an EV P1250 amp. I tripped the power strip breaker playing a 32hz tone at full power and no noticable pop from the Driverack. I am going to try the sonic impact amps to drive these speakers with batteries from an mp3 player. Back to my fun, thanks for listening.

Subject: Re: Labs Fired Up , Pics on the way
Posted by Wayne Parham on Sat, 30 Oct 2004 20:21:16 GMT
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Yeah, you should probably break 'em in at 600 watts or so. That'll about do it.

Subject: Re: Labs Fired Up , Pics on the way
Posted by blades976 on Tue, 02 Nov 2004 00:40:10 GMT
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Make sure to break em in in a residential neighboorhood around 11:00pm.

Subject: Or the sub behind the fence
Posted by pgolde on Tue, 02 Nov 2004 01:02:38 GMT
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Finished the sab on Halloween, couldnt resist having some fun with the kids.
http://mysite.verizon.net/vzeehga0/ please excuse the cookie cutter web site
http://mysite.verizon.net/vzeehga0/

Subject: Re: Labs Fired Up , Pics on the way
Posted by Wayne Parham on Tue, 02 Nov 2004 03:15:56 GMT
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Subject: Re: Or the sub behind the fence
Posted by Wayne Parham on Tue, 02 Nov 2004 03:19:09 GMT
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Those are really cute pics of the kids, and great detail of assembly. Cool!Check out what Blades976 says about break-in. Don't let 'em get away from you!

Subject: Re: Labs Fired Up , Pics on the way
Posted by pgolde on Tue, 02 Nov 2004 17:45:54 GMT
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I actually got a lot of compliments from some neighbors who came from a few blocks over to see what all the noise was about. I had a scary Halloween cd playing at full volume, cant get away

with that any other night.

Subject: Very cool!
Posted by Mike.e on Sun, 07 Nov 2004 08:09:29 GMT
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Hi,very fun stuff!Hopefully soon i can get my horn made for my jbl 15" 2226 !Only 35hz but smaller at ~500litre. Designed for wall/corner usage. I actualy have enough SPL right now,with its bass reflex box,but i want a horn for sure,after hearing my 8" on horn!RegardsMike.e
homepage

Subject: reflex vs. horn
Posted by pgolde on Sun, 07 Nov 2004 14:43:25 GMT
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Hi Mike,Cool website. The Jbl is a very kick ass speaker in a reflex, put it in a properly designed horn and I think you will take it to a new level. I found the Lab has a very different sound than the EVX 18's, lower extension, cleaner, louder, more HIFI. The EV's need no eq and sounded great, awsome rock and roll speaker, very musical. The single lab I am running does require eq to sound good, since I dont have 3 others built, or a corner to put it in. I could run the 18's to 800 Hz with no problems, but the Lab is crossed at 80Hz and allows me to get much higher, cleaner spl from the 15's I am using for midbass. I dont think the Lab is too much for them though, need to get some measurements at high levels. I am currently building test mics with the Panasonic mic capsules WM-61. The problem with the horn is with such clean output at high levels, the room comes alive and has an even greater effect than with the 18's, besides the fact that it is more notcible with the cleaner output from the horn. Have fun, looking foward to your comments on your horn when finished.PG
http://mysite.verizon.net/vzeehga0/

Subject: Sure thing
Posted by Mike.e on Sun, 07 Nov 2004 22:56:12 GMT
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Il update the HI EFF forum when its complete.(i cheat,and get the joiner to cut my mdf perfectly so i dont stuff it up with a jigsaw)Ive actualy feel quite comfortable with the quality,and SPL from my jbl and 240w plate amp,but i know theres more to be had!Id love to do some measurements too! ECM8000s apparently have everything all inside them,pre amp etc,plug and play.RegardsMike.e

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