Subject: Trying to understand bass "quality"....
Posted by wunhuanglo on Sun, 05 Dec 2004 14:41:13 GMT
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In my current set-up I have a measured (Rane RA-30, pink noise) response flat (between -1 and -3dB, in-room at the listening position) to 25Hz.Yet, the bass doesn't seem "right" - the only word I can use is "dry".On real music (say piano trio) everything seems perfectly musical. Kick drum, the left hand of the keyboard seem just fine, realistic.But on "fake" music the bass response just isn't there. Bob carver recommendeds Janet Jackson's Go Deep from "Velvet Rope" as a good bass response demo track - well, it's just not impressive, as in 1812-overture impressive.There are some things that I know are not an issue: there's plenty of Xmax and plenty of power (500 wpc on each bass driver). Stroke and horsepower aren't the problem (if indeed there is a problem).The driver Qts is 0.36 - I'm running them on 48" X 36" open baffles. As I indicated above the EQ is sufficient to support a pretty flat measured response to 25Hz.So the bottom line is - Am I not hearing what I should? Or, is it that I expect to hear the bass response of systems that are bass-heavy?

Subject: Re: Trying to understand bass "quality"....
Posted by Wayne Parham on Sun, 05 Dec 2004 18:51:56 GMT
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Hi Charlie,It's hard to say without hearing it. But I'd like to offer some general thoughts. To me, the octave between 40Hz and 80Hz is what most people think of as bass. That's where dance club bass lives. The range below it is for effects in movies and the range above it is midrange, the lowest part of the male voice being around 100Hz.There are two things that I think are very important below 100Hz. First is distortion. I don't know why, but many discount the importance of this. Some of the horn guys think that the reduction of excursion from horns will reduce it, so they use woofers with rather average or even poor distortion performance. Some even say they think people prefer the sound of distortion in the woofers, presumably because it increases midbass energy. But all that is horse poop if you asked me. Whatever distortion is made between 20Hz and 80Hz turns into harmonics above 40Hz up through the lower midrange. It increases listener fatigue and in extreme cases makes the system sound boomy or bloated.I'm guessing distortion isn't a big problem for you, so I'll move onto the second. You may be experiencing cancellation in the 40Hz to 80Hz range. In wavelength, that's 14 to 28 feet. So in half-wavelengths, where you're going to see cancellation, the critical range is 7 to 14 feet. Try to make sure your two woofers aren't spaced apart within this range, or they will cancel each other in the midbass. Also, consider the effect of boundaries. If a speaker is 3.5 feet to 7 feet from a side wall or back wall, you'll have some cancellation from the wall reflection. If both speakers are set-off from a wall by the same amount, then the effect will be doubled. That's one reason why I like having woofers in corners. Try to keep them within a couple feet from walls, if possible. Use directional mids and tweeters to combat boundary reflection in their bands.Wayne

Subject: A follow-up please, Mr. President?
Posted by wunhuanglo on Sun, 05 Dec 2004 20:36:04 GMT
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Thanks Wayne. I appreciate your insights on this.Would you think that cancellation would be the culprit even if I measure well at the listening position? Would it then be a matter of specific frequencies being lost when being reproduced by both channels? Something not revealed when measuring with pink noise?TIA

Subject: Re: A follow-up please, Mr. President?
Posted by Wayne Parham on Sun, 05 Dec 2004 22:12:35 GMT
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Hi Charlie,My comments were really pretty general, as these are two things I think were worth mentioning for anyone else reading this thread. I'm sure you probably have looked into these matters.But as far as measurements are concerned, it can be kind of hard to get good measurements down low. In room measurements are notoriously difficult and you really can't trust them. Even if you know SPL at one position, move a few feet and you may find that there's a 10dB difference or more.Wayne

Subject: Re:Not all pictures are worth a 1000 words
Posted by Bill Martinelli on Mon, 06 Dec 2004 02:48:55 GMT
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Funny how something can look perfect yet not be. First off check your phase with all the drivers. There may be some kind of cancellation. Try a sine sweep with a sine wave instead of pink noise. Pink noise will pick up room mode from other frequencies and fool the equipment. a sine tone is single and pure. You can pin point things with more accuracy since what your looing for is more specific in nature.Like Wayne says, 40-100 hz is the range to be looking in. You might have a room suck out at 50-60hz. Somehting like that could be perceived as lacking.Just because you have "quality" bass, and not some pumped up 90hz room shacking subwoofer. Doesnt mean you should not be happy. Good bass with low distortion and overtones does not mean you "have to get use to Quality bass" because you have never heard quality bass before! Try patching in a graphic EQ to see what you need to push around to get the sound you want. Then move to a Parametric EQ if you need to maintain room EQ. you can fine tune lower frequencies and null spots better.Remember to make any EQ changes and then come back time and again to rethink the settings. More often than not, you push settings around while listening and then bring tham back a click or two later on.Lastly, all drivers are not created equally and certainly dont sound as such. I have had on more than one occasion a pair of drivers for woofers that look great on paper, plot out perfectly in programs, and to make matters worse actually measure on a FFT analyzer with outstanding performace. But, they just dont have the sound I wanted. Dull, lifeless and no

impact or clarity. Anyway theres a bunch of stuff to mess with. good luck and dont pull your hair out.Bill

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Subject: Re:Not all pictures are worth a 1000 words - maybe too true!
Posted by wunhuanglo on Mon, 06 Dec 2004 10:59:32 GMT
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Thanks, Bill. You inspired a thought.Interestingly, I measure (and tame with a 31 slot graphic) a 12dB peak at 50Hz. I guess it's more than likely that, given what Wayne said about the unreliability of in-room measurements, that I'm creating the problem.Maybe that's the issue in and of itself - I thought that by measuring at the nominal "sweet spot" I was doing the best thing possible, but there might be some sort of superposition at that location that has me actually damping the overall bass response.Guess I have to get a bit more crafty....

Subject: Re:Not all pictures are worth a 1000 words - maybe too true!
Posted by Bill Martinelli on Tue, 07 Dec 2004 01:09:13 GMT
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Well, I respectfully disagree that in room tuning is a bad thing. In fact I'm a proponent of in room tuning and virtually opposed to lab and anechoic tuning. Yes, of course in room tuning is more difficult to do. But. Since we don’t often listen to our speaker inside a chamber or laboratory.
We need to have them balanced, voiced or tuned for the rooms we listen in.If in room tuning was such a bad thing. then they would have all kinds of crazy EQ's, feedback destroyers and various other types of equipment for the balancing of studios, halls, rooms and all other venues including homes, home theaters and cars.One of the main reasons anechoic testing is good. Is it gives all things an even playing field to compare against. theoretically the chamber in California is the same as in New York as in Sweden. This chamber also gives you a constant to measure any changes or modifications against. Beyond that. In room testing, although difficult, is a must. Good luck,Bill

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Subject: Guess I wasn't very clear...
Posted by wunhuanglo on Tue, 07 Dec 2004 06:59:03 GMT
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Or maybe I misunderstood Wayne's comment. You and I don't disagree at all.What I was trying to say is that if there's an inherent problem in measuring low frequency response (and I have no theoretical basis for "if" - as far as measuring I'm just "point and click") then what apears to be a huge peak to me may in fact not be a real problem.I may be either over compensating or

misinterpreting the observation.But it seems indisputable to me that, difficult or not, the only place worth measuring and correcting is in the actual environment.In my real life, everybody believes that factory test data is a useful QA tool, but nobody accepts that a piece of equipment works until it's bolted down in the field and run.

Subject: Re:Not all pictures are worth a 1000 words - maybe too true!
Posted by Wayne Parham on Tue, 07 Dec 2004 07:52:57 GMT
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Speaker design and system setup are apples and oranges, in my opinion.Anechoic means "reflection-free," so if a speaker is designed to work best in an anechoic environment, it is designed to work best outdoors. That's really all there is to it. When people do things to improve acoustics inside a room somewhere, they generally improve it in a way that makes it more anechoic.If you're trying to setup your own system in your own room, then you naturally want to deal with the nuances of the room. Deal with the floors and the walls and the rugs and the furniture. That's why thinking about placement might be important. If the woofers are in positions that cancel, it won't matter if they provide perfect response in an anechoic environment. The problem is that they're in a situation that causes destructive interference, and nulls are the result.I've always liked corner placement for bass systems, and using treble frequency horns that match directivity at 90o. It prevents wall reflections from causing cancellation and it provides a good load and directivity for the bass. Corner placement doesn't necessarily prevent cancellation between left and right woofers, but that's usually not an issue unless the room is very small.I guess what I'm saying is that when I've placed woofers in the corners, I generally don't have big issues to deal with. Hollow crawlspaces are an exception, but other than that, corner placement goes a long way towards making the woofers work well in the room.Accurate bass measurement indoors is pretty tough. You can do a close microphone measurement of the bass, but you can't usually gate it like you can the mids and treble. It's not going to tell you what you want to know but it's probably as close as you can get. This kind of measurement doesn't tell you what is going on throughout the room, and how it is charged at different frequencies. You might try placing microphones in a grid spaced at 1 cubic foot points or something; Possibly do a myriad of averaged measurements instead. That's really what you'd have to do to get an accurate picture of room response.As for anechoic performance, as a speaker designer, I find it to be really important. Actually, the only thing I'm concerned about is making a design that is not tailored to my room or to any other specific room. I often design for specific placement, like corners. But I try real hard to do things that will make the speaker right in an anechoic environment. If a corner design, what I want is for the speaker to perform best in an environment that is solid on three sides forming the corner but completely open and reflection free on the other sides.You're right that it's for comparison purposes, but more importantly, it is for making a baseline so that the speaker isn't tilted in response. If a guy uses one of my speakers in a room that is highly reflective, he may have a little more mids and treble. He could then treat his room or EQ the system in some way. Or if his room is shaped so that it really peaks between 50Hz and 100Hz, he can deal with that. But if I designed my speakers specifically to be flat in my room instead of an anechoic baseline, then when other people put my speakers in their rooms, they'd have to equalize for my room as well as for their own room.I assume your comments are intended for system setup but I thought I'd mention this to clarify.

Subject: Re:Not all pictures are worth a 1000 words - maybe too true!
Posted by Bill Martinelli on Tue, 07 Dec 2004 16:24:37 GMT
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"Speaker design and system setup are apples and oranges, in my opinion."I agree 100%. I believe the original question is more related to setup than design. I think there's too much emphasis on designing a system that works in a non realistic room. I'm also happy to be in a minority with that opinion, but there are 'typical' room settings that are closer to reality than an anechoic chamber.

Subject: Re: Guess I wasn't very clear...
Posted by Bill Martinelli on Tue, 07 Dec 2004 16:29:13 GMT
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No, no, not to worry.

Subject: Re: Trying to understand bass "quality"....
Posted by tomservo on Wed, 08 Dec 2004 20:24:41 GMT
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HiIt would be hard to point at what makes your system sound the way it does in your room given the number of possible factors and not hearing it.I would bet however that if you measured the speakers outdoors, where the speakers are primarily the main influence, then you would see the response is rolled off.At low frequencies, indoor speaker measurement's can be better than nothing, but only if you constantly remind your self they are not the speaker but the speaker and room. Its kind of like trying to diagnose a possible noise in your car engine, it is a lot easier if you get out of traffic and stop, shut the radio and other noise sources off first, for a speaker, this is taking it outside. Like the car, this may not be the way you use it but it is the easiest way to find out what the speaker it self is doing and a key in identifying / fixing the problem. This way you know the problem either is or isn't the speaker.Also, like any kind of measurement, what ruler you use will govern the results to a degree. Here, there are several chances to be lead astray by the measurements.For example, a common place to be fooled is to take a measurement with the wrong type of microphone. To take proper acoustic measurements, one needs a "point source" pressure mic, most typical mics have a polar pattern (not an omni directional point source) and this factor usually makes the bass response distance sensitive. Proximity effect they call this and while good for vocals and recording, not good for measurements.For example, while a normal piston radiator's response can be measured in the very nearfield (like ¼ inch away from the radiator), it is a mistake to measure a horn or your speaker this way. The reason is that the larger speakers occupy some of the nearfield space at "up close" distances alters the response. Bass Horns often falsely measure much better at the mouth than at a proper distance. Your speaker has far field cancellation which is also less visible the closer you get to it.If one is concerned with

real sensitivity etc, larger Bass speakers in general really need to be measured far enough away so that the measurement shows the actual acoustic output sans nearfield spatial distortion.I usually do it at 2 meters for speakers up to about 30inches max and then larger distances, up to 10 meters for say 2 - 4 large horns like the Bdeap's where I work.These distances result in measurement's which closely relate to the actual acoustic performance and there for are much more accurate for computer projections.Affordable Fractional octave analyzers were a break through in the 80's but here too one needs to be careful, a 1/3 octave device is a poor loudspeaker measurement tool.Adjusting the balance on a PA or stereo is not the same as measuring a speaker.For example, your ears have approximately a 1/6th octave resolution (in bands that for some reason are called a Bark), if one wanted to see a measurement that was equal or better to what one hears, then an even greater resolution is needed.I usually set the smoothing on my TEF machine to 10% usually which is 1/10 octave.Why does this matter?EQ can quite exactly "fix" the amplitude and phase response of a woofer or bass horn as measured outside. Any "lift" needed to flatten its response also corrects the speakers phase response which was also "wrong" due to what ever you fixed with the EQ.EQ is Great!!!! Right?On the other hand, lets say you were trying to fix the bass response of the speaker in the room.Here, the measured response is a mix of the speaker response acting on the room gain and a myriad of reflections and standing waves etc.Here a high resolution measurement would show the total response as being a series of very deep notches and more broad peaks with a general slope (room gain) added on to the speakers actual response.Deep notches are the "clue" of an out of phase reflected sound, one which arives N ½ wave lengths later and cancels the original signal, being out of phase. A deep LF notch could be possibly produced by the lf radiation of a speaker being reflected off the rear or side wall, or ceiling fwiw. Its frequency would then be a function of the distance to the wall etc.Time problems like this are not "minimum phase" and so EQ is unable to fix them, worse, any attempt to do so causes more problems than it fixes. The reason is that the "hole" you are trying to fill (due to cancellation) is caused by the original signal being returned at X time delay so it is out of phase.Boosting the level at the notch frequency also boosts the cancellation signal so the notch depth is unchanged while the Q increased (filling in either side of the notch).When such a situation is viewed on a 1/3 oct rta, one does not see the deep notch, just a small dip. Boosting with an EQ to get back to "flat" on the rta does so while messing with the phase response. The reason is one is dealing with a non-minimum phase problem using a minimum phase device to try to fix it and measuring with something far too corse to see what matters. A rule of thumb in Live sound is to (in general, to avoid problems caused by trying to eq a non-minimum phase problem) only use a graphic eq to CUT peaks, not boost dips.That is to say the potential problem is the phase response of the eq is no longer the compliment to the speaker+rooms response even if the amplitude appears to be better on the rta.At low frequencies, such undesired phase shifts can represent a pretty large slice of time and even if the response was flat, such wild changes in time vs frequency are also audible (and such things are why eq's have a bad reputation and the reason for the thumb rule).It is the potential blessing and curse nature of EQ that makes its use not shall we say universal and with a nearly equal chance to do harm or good, it is important to know when to use it and what can be fixed and what cannot.I am not saying that this IS what you hear but assuming you have decent stereo ears, that any of these things could be at the root of the difference between what you measure and hear.Anyway, it would be interesting to temporarily switch to a sealed box (which is acoustically simpler) that was (according to its outdoor measurements) eq'd flat to 25 Hz and then see how it measured and sounded in your room.Fortunately there are free or nearly free computer programs available for measuring speakers, some MLS, swept sign and so on, most of which can tell much more about what is going on with a speaker than an RTA. Probably a number of people on this list can

recommend one.If the weather and space permit (you do need to be 20-40 feet from a building etc), even measuring your speaker with an rta outside and eqing to "flat" or somewhat drooping response based on that may be helpful in tracking down your "in room" issue.Hope this helps.Tom Danley

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Subject: Wow!
Posted by wunhuanglo on Wed, 08 Dec 2004 23:05:34 GMT
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Thank you for your detailed thoughts. Gives me quite a bit to work with.I appreciate your help.

Subject: Re: Trying to understand bass "quality"....
Posted by akhilesh on Thu, 09 Dec 2004 20:08:37 GMT
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Maybe: distortion. Very few subwoofers offer low distortion. Mot are in the 5% range. -akhilesh

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Subject: Re: Trying to understand bass "quality"....
Posted by Earl Geddes on Fri, 24 Dec 2004 03:53:17 GMT
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TomI don't want to critique your discussion, most of which I agree with, but some I do not. I would say that any attempt to discuss the perception, measurement, or design of a LF system without discussing the room is pointless - unless the room is of a large theater size or outdoors. In small rooms the speakers and the room are one thing at LF's. Some response irregularities at LF in rooms are minimum pahse, but some are not. What I keep saying is that for small rooms if one uses a lot of LF sources spread arround the room - a well designed room I hope - then there will not be a problem with peaks and dips and nonminimum phase or EQ. The response will be smooth everywhere.I have used multiple LF drivers for many years now and won't use anything else. This approach is not really practical in all situations, and then one has to make adjustments, but if it is doable then it should be done. I'd much rather have five lower cost woofers than one super-sub.As far as the orignal post goes, I don't think that you can seperate the perceived bass from the entire system. Electronic bass has a lot of higher harmonics that add to the "punch" of the sound. Mesiingthese up with a poor midrange and you will have a poor perception of the associated LF signal. Audio is a single percption of an acoustic event. All associated factors are relevent. SO even higher frequencies can influence the perception of LF's.Just some thoughts.

Subject: Re: Trying to understand bass "quality"....
Posted by tomservo on Sat, 08 Jan 2005 19:14:14 GMT
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Hi EarlSorry for the delay, I have time and inspiration to write in spurts it seems.In that rambling post I was trying to say that since they are home made speakers, it would be good to determine if they are behaving first, by removing the room and measuring them and to be sure to use the right kind of microphone (especially since it is a bass issue).Also, to say that in a living room, an RTA is not sufficient resolution to separate a cancellation notch which can never be fixed with eq (being a time problem and trying to fix it is often harmful to the sound quality) from a broader dip or peak which can be fixed.If one can have multiple lf sources, this would seem to be a good way of defeating specific room modes but the woofers I get to play with are too large to have very many in a living room at one time.Cheers,Tom Danley"All associated factors are relevent. SO even higher frequencies can influence the perception of LF's."Absolutely true.A fellow from Zenith TV once told me once that focus group testing showed that good sound makes the picture better too, perception is a complicated thing.

Subject: Re: Trying to understand bass "quality"....
Posted by Earl Geddes on Sat, 08 Jan 2005 19:44:22 GMT
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At Honda they tested the sound quality of variuos cars by having listeners listen to sounds and rate the sound while looking at a picture of the car. The correlation tracked the picture NOT the actual sound. Perception is a very dangerous thing in audio. Thats why I sepend so much effect on good blind subjective tests - the only way to get to the truth.I had a meeting at CES with a group of Acoustic consultants that get together know as the "Acoustics Guild". Most of us do Home Theaters. The overwhelming preference was for three or four subwoofers. From a "solutions" standpoint, we have all found this to work. I use four smaller subwoofers rather than one big one, so placement is not such a big deal.But then again, even a lot of woofers won't cure a room with insufficient LF damping - got to get those modes damped down first! Then you can start to talk about "bass quality".