Subject: Bandpass subs
Posted by Ralph on Thu, 04 Nov 2004 21:27:19 GMT
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Why don't bandpass subs get more attention on this august forum? They are easily as efficient as basshorns at the lowest frequencies where they are tuned and they are much smaller. Have they been overlooked because they aren't in vogue with the hornies?Ralph

Subject: Re: Bandpass subs
Posted by blades976 on Fri, 05 Nov 2004 02:45:53 GMT
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They are a pain to tune correctly, finicky with drivers, and very peaky in response. If all you want to do is listen to the same rap beat for the life of the speaker then sure, tune it there and you could die happy. Otherwise I feel they are too limited in playing a wide range of music. My 2-cent.

Subject: They are very easy to tune
Posted by adavis464 on Fri, 05 Nov 2004 13:23:53 GMT
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The problem is the lower you tunr them the less efficient they become.The big problem is I've built 4 and they just all have the same sound dull and muddy.I think it bacause of the high mass on the passive radiator to acheive low tuning.There are many other way that work better to reproduce low frequency.Vented box,bass horn.Regards Tim

Subject: Re: They are very easy to tune
Posted by Ralph on Fri, 05 Nov 2004 18:44:44 GMT
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I wonder what *exactly* causes the muddy sound? Resonance or distortion maybe?Ralph

Subject: Re: Bandpass subs
Posted by Ralph on Fri, 05 Nov 2004 18:48:26 GMT
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I can see similarities in horns, transmission lines and bandpass speakers. I am hoping to identify the best traits of each of them.Ralph

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Subject: Re: Bandpass subs
Posted by Bill Wassilak on Fri, 05 Nov 2004 20:12:32 GMT
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I built 1 up using an EV 15B, when I tested it I thought the transient response sucked on them big time, so I ended up re-configureing the cabinet. All the heavy kick drum and bass material that I was putting through them sounded like a big muddy long note, even with various stuffings. Now I know why there often refered to as 1 note boxes.

Subject: All of them that I built
Posted by adavis464 on Fri, 05 Nov 2004 20:48:12 GMT
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sounded really good before adding mass to the passive radiator.(Pre-weighed washers and silicone caulk).In that state they were tuned very high 60Hz to 80Hz which means the effiecny was up they sound preatty good in there passband.But once you start tuning effiency drops and they start sounding muddy.All of them where compound with 2 woofers facig each other and wired out of phase to reduce size.I personally think ins high distortion that give it the muddy sound,because if you tune it low the driver takes alot of power.The effiency ends up being about 85db.I have not built any in 8 years or so.Regards Tim

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Subject: Tuning?
Posted by adavis464 on Fri, 05 Nov 2004 20:56:26 GMT
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It took me 20 min. max to tune each with laud.Add a washer measure and so on until you hit you desired f3.Tuning vented boxes always took me longer.Regards Tim

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Subject: Re: Tuning?
Posted by blades976 on Sat, 06 Nov 2004 04:41:56 GMT
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Tuning to get a specific frequency wasn't the hard part, it was tying to get the thing sounding good over a decent spectrum. Maybe tuning isn't the word I was looking for. I have heard that it is possible to get them sounding good over a decent range, but I haven't had any luck. The constant droning boom gets old real fast.

Subject: Re: Tuning?
Posted by Wayne Parham on Sat, 06 Nov 2004 06:22:52 GMT
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I wonder what something like a JBL 2226 or Eminence Magnum would sound like if tuned in the range where the driver performed well. The 2226 shorting ring is able to keep distortion down as long as the driver is used above 50Hz, but below that, it really starts to rise. So I'm thinking maybe a 2226-based speaker designed for 40Hz to 160Hz would probably be OK. But if it were pushed down even just an octave lower, I'll bet it would lose a lot of efficiency and distortion would skyrocket. I'll bet even a good driver like that might start sounding pretty flabby if it were used 20Hz to 80Hz. It just doesn't have the specs for that range, even if used in a system that is tuned to be used down low.

Subject: Re: Tuning?
Posted by adavis464 on Sat, 06 Nov 2004 14:16:54 GMT
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You might want to get an old speaker build articals I don't remember who the author was .He had great success but he tuned his bandpass reverse Less low end wider bandwidth.he used them for pro sound.Don't get me wrong a bandpass can be tuned to sound less (one note Sounding),but everyone wanted real low bass and did not care because they sounded good in home theater use.Now days digital eq's may make all the difference in the world.I will look for the speaker builder articals over the weekend if I find them I will let you know.Regards Tim

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Subject: What's the point
Posted by adavis464 on Sat, 06 Nov 2004 15:09:41 GMT
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When there are many other designs that have wider bandwidth and out perform them.Yes it can be done But? Regards Tim

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Subject: THis is not the point of the original post
Posted by akhilesh on Sat, 06 Nov 2004 17:26:17 GMT
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but why not just get a good powered sub? Something like the Hsu? Pretty low distortion, small size, and convenient. -akhilesh

Subject: Increased output and small size
Posted by Wayne Parham on Sat, 06 Nov 2004 17:28:40 GMT
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I don't build any bandpass systems, so this isn't really my thing; I prefer other arrangements too. But I think the advantages of the bandpass system are increased output and small size.

Subject: Resonance
Posted by Mike.e on Sun, 07 Nov 2004 08:04:22 GMT
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A unit with higher rate of roll off has worse transient response.I guess because its more reactive over a smaller area.Better>worse response1st order dipole2nd order Sealed/horn4th order Ported4th/6th order Bandpass8th+ BandpassPorts use stored energy to enhance bass output. The air has mass,the method of the port stores energy til 'later'.When designing bandpass subs,the whole idea of them is loudness,so quality suffers.Cone excursion on bandpass systems are lower than ported and sealed-but the fact is,in the time domain,once started in motion the sound doesnt stop quickly enough on a resonant system

Subject: Re: Resonance
Posted by Wayne Parham on Sun, 07 Nov 2004 09:07:49 GMT
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Hi Mike,Brian Davies made a comment that I thought was telling. He said that given two systems with the same driver, whatever EQ is provided to make the amplitude response equal will make the transient response equal too. So it's probably not an apples and apples thing - If a system is optimized so transient response is improved, it pays for it with less extension. If bass extension is made deeper, whether by acoustic device or electrical EQ, then the transient response will suffer by the same amount.Wayne

Subject: Apple+apple
Posted by Mike.e on Sun, 07 Nov 2004 10:04:47 GMT
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This is interesting,ive heard of this. Some people liked to think that EQ was different in some way and wouldnt decrease SQ or make GD worse because its electrical...This also makes sense,with the BP systems,with more EQ applied sound worse.. Personally i WOULD go sealed if i had enough Vd-but only when i had enough(ie not at the moment)RegardsMike.e

Subject: Re: Apple with one worm+apple with two worms
Posted by adavis464 on Sun, 07 Nov 2004 14:00:31 GMT
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I used a swan 305(1994) in a 4cuft vented box 91db 1watt1meter f3 28hz.In a bandpass I used 2 in a compound setup to reduce size by half with a passive radiator (box is to small to use vents).With the system un-tuned It measured 98db 65Hz to 400Hz once tuned it was 85db from 20Hz to 100Hz.The effiency dropped and the bandwidth narrowed but that was what the original callculations pedicted but the effiency was about 3db less than predicted.(All calculation were done using KEF's AES paper)When tuning we also stopped at 28Hz it was 88db and it only worked well to about 300Hz.They sound similer to a transmition line.Thats just my experence.Regards Tim

Subject: Congratulations! You've made the 25,000th post!
Posted by daemon on Sun, 07 Nov 2004 15:11:01 GMT
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You've won the 25,000th post game! Please write your address (by private E-Mail if you wish) and we'll send your prize right away!

Subject: Re: Bandpass subs
Posted by Bill Fitzmaurice on Sun, 07 Nov 2004 21:44:09 GMT
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I wouldn't do a 4th order bandpass,unless horn loaded as I did with my Tuba design to get a decent bandwidth. On the other hand a dual chamber 6th order alignment where you tune to two different frequencies instead of one eliminates a single peak response and thus can get a pretty good sound.

Subject: Re: Apple with one worm+apple with two worms
Posted by Mike.e on Sun, 07 Nov 2004 22:58:03 GMT
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Congratulations on winning haha!WIth an isobarik setup the sensitivity is half

Subject: Re: Resonance
Posted by Tom Danley on Sun, 07 Nov 2004 23:33:56 GMT
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Hi WayneWhat you say is true as (assuming one has a minimum phase speaker) but so is what Mike E. said about the transient action of the various alignments he listed. The reason is that regardless of how the response shape (transfer function) is obtained, it is the amplitude and phase of those slopes which govern impulse response.The steeper the slope at band edges, the greater the phase shift and so the signal is spread out in time more. Extending Low frequency response alone does not adversely effect impulse response but increasing the slope at either end or narrowing the bandwidth does. Taken alone, a wider bandwidth system (with the same band edge slopes) automatically has better impulse response. While one might associate the increasing group delay numbers with lower frequency alignments with a "problem", one has to remember that in the context of the wave period, a nominal 2nd order alignment at 40 Hz and another at 20Hz, both exhibit a 180 degree rotation in phase through resonance while (because of the period) the lower one has twice the GD. Passing a complex or impulsive signal through both shows as before, the wider BW system has better impulse response, not to mention reproducing the parts of the music the 40 Hz system was too far down in level to produce audibly.The real problem with Bandpass speakers is twofold. First that they are limited Bandwidth (if they have gain) and so automatically suffer "in time". If ported, the real big problem shows up which are the organ pipe resonance's which can be of greater amplitude than the main response and also make for terrible impulse measurements due to the ringing.These (just like the duct in a normal vented box) are at the half wave length multiples for the duct and can present 20 dB + of acoustic gain..The issue is that keeping them high in frequency (way above the crossover) means a short port, small diameter duct, one which will also choke off (falling Qb) easily even at low powers. Really, a passive radiator is the fix for this and its impulse response can be the same as an ideally acting ported system with out the organ pipe resonance's.Nice forum Wayne.Best,Tom Danley

Subject: Re: Resonance
Posted by Mike.e on Mon, 08 Nov 2004 00:46:15 GMT
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^too bad they spelt inadaquate wrong^Hi TomCan you reccomend a text book on areas like this?

Does Olsen mention much of this? Or AES loudspeaker anthology?I enjoy solid facts such as this.I cant go into the local bookstore and flick through all the different audio textbooks and chose one with detail i require-I can order the cookbook-which i dont need :PBTW the forum layout is familiar,simple,and effective. Makes the prosoundweb.com forums look unnatural and complex.CheersMike.e
home

Subject: Re: Resonance
Posted by Wayne Parham on Mon, 08 Nov 2004 01:31:05 GMT
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Hi Tom,Yes, it's two ways of saying the same thing. I think sometimes people get a negative impression of certain traits that "just are." It's like talking about how friction is bad because it wears things out. But without friction, there would be nothing to push against. Same thing with properties like "resonance" or "group delay" or "phase." Sometimes they are excessive, but sometimes, they aren't. Your illustration is a good one:While one might associate the increasing group delay numbers with lower frequency alignments with a "problem", one has to remember that in the context of the wave period, a nominal 2nd order alignment at 40 Hz and another at 20Hz, both exhibit a 180 degree rotation in phase through resonance while (because of the period) the lower one has twice the GD.Wayne

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Subject: Thanks Mike
Posted by adavis464 on Mon, 08 Nov 2004 01:36:48 GMT
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I only won because of you and many others on these forums, people with true knowledge (DYI'ers) it's where the heart of audio is. It's nice to see a place where people of all different walks of life share the same passion on these forums keeps me coming back. Regards Tim

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Subject: I'm using one...
Posted by mollecon on Mon, 08 Nov 2004 03:29:59 GMT
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I've build a bandpass-sub (two actually, one for my cousin & one for myself), albeit not a HE type (sensitivity 88dB ½-space). It's using a 10" Peerless unit in a box of ~3cu.ft. It's -3dB points are 28 & 75Hz. It was originally designed for my cousins HT use, but I use mine for music, too. My cousin does occaisionally also. The design was made using the 'optium' alignment in Linearteams calculator. Given the fact that we needed a passive sub, that didn't have to have electrical EQ'ing,

a bandpass sub was a nice way to get extended low frequency response, also considering the fact that the upper roll-of could come in handy.I'm certainly not saying that these things are the last word in deep bass reproduction, but neither my cousin nor I have experienced any real problems with one-note bass or similar distortion problems. I think, as with any design, it's a matter of making the right compromises. I'm very satisfied with mine - especially since they've made it possible for me to get real extended deep end with little cost. They cost ~$150 to build.I must say thatI think that some of the reason for the bad reputation this principle have, is that it's so widely used in cheap 'package type stereo & HT systems, where it's mainly used to at least give an impression of bass to very small satelite speakers with no sound under ~250Hz...

Subject: Re: I'm using one...
Posted by Mike.e on Wed, 17 Nov 2004 08:25:07 GMT
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An interesting paradox,is that while the bandpass gives lower overall excursion,keeping the driver in its linear region,the overhang is as bad as ported,and worse. I think that a flatresponse bandpass subwoofer,will have ok subjective quality,better than most!Ofcourse given the choice id have both horn + sealed/dipole ,none of that high order roll off rubbish

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Subject: Re: I'm using one...
Posted by mollecon on Wed, 17 Nov 2004 08:53:29 GMT
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You're right. I'd PREFER a closed box, or, ideally, a horn - but a horn that works down to 28Hz? Jeez... It would fill my room!What I like about my BP is, that it doesn't exagerate - I've heard way too many subs, that were very busy telling the whole world they were here. My sub delivers when it's supposed to. I think it's 'Q' is about similar to a closed box with Q=1 - not great, but not bad, either. An interesting point is, that my sub isn't exactly small, in hifi terms at least. Btw., the roll-off of my sub IS 12dB/octave a bit down - the initial is probably close to 15dB/oct.What people often don't consider is the influence of the room. It's close to impossible to judge a sub if one don't take that into consideration - the 'Q' from various room modes can make a sub sound quite different, for better or worse, than it's specs will tell you.

Subject: Re: Bandpass subs
Posted by Earl Geddes on Fri, 24 Dec 2004 03:15:24 GMT
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I tried reading this string of posts and most of it didn't make much sense to me, which is

interesting since I wrote the paper on bandpass systems.I always walk away from these kind of discussions with an empty feeling - Like why do people think that there is a single best way to do anything in audio given the huge number of compromises that any system involves? And a list of what types of systems sound best? Where is the data to support such a claim? "Sounds good to me"?My opinion, the room makes more of an effect than any of the factors that are being thrown arround here. Bandpass, ported, sealed, they all have their benefits and drawbacks.What do I do? Actually I use them all. Thats right, I have five LF drivers in my Home Theater. Two are closed, one ported and two more are bandpass. Five woofers spread around the room makes for a very smooth low end with an effortless sound quality. I don't know muddy from slipery, or slimy, but I do know that the more LF sources there are in a room the smoother the frequency and spatial response will be. And transient response - in a woofer? Does that even have any meaning?I'd like to participate in the discussion but I don't really follow it.

Subject: Re: Bandpass subs
Posted by Wayne Parham on Fri, 24 Dec 2004 18:03:32 GMT
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Well, that's true. Placing woofers strategically can help mitigate nulls from room modes. That's a pretty good strategy.

Subject: Re: Bandpass subs
Posted by Earl Geddes on Fri, 24 Dec 2004 20:35:52 GMT
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I don't really think that placement is that important. The more woofers there are clearly the less important each one becomes. Obviously Don'T put them all in one corner, or the corners. Space them arround, but other than that location is not critical.

Subject: Re: Bandpass subs
Posted by Wayne Parham on Sat, 25 Dec 2004 13:54:19 GMT
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Two things that are nice about corner placement are that room modes are energized equally and

conical horns, similar to rectangular horns with 70o flare. I like your idea of using several woofers placed strategically, but then you would have to make sure placement between two units wasn't between about 2' and maybe 7' or so, where there would be half-wave cancellation between radiators in the under-100Hz range. Still, the idea of staggered placement to put woofers in

places where nulls form is a good way to combat room effects if done properly. But if a stereo pair is used, I really like the use of corner placement for bass, particular if combined with 90o horns for HF as well. Directionality is matched, reflections are reduced and the reverberent field is charged very uniformly.

Subject: Re: Resonance
Posted by Wayne Parham on Wed, 29 Dec 2004 20:16:25 GMT
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Hi Mike,I linked this from another post and just noticed something. In your original list, horns are listed with sealed cabinets. But in reality, a horn generally rolls off much faster than 12dB/octave.Wayne

Subject: Re: Resonance
Posted by Mike.e on Wed, 29 Dec 2004 23:37:37 GMT
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Hi wayneYeah I was just considering it in the simplest sense,ie front loaded rear sealed and thought 'yeh its just 2nd order' Oops!Interestingly the roll off changes slightly,or atleast seems to on a Log frequency scale in mcbean. Also I listed horns beside sealed because i thought they were similar in fidelity.Cheers!

Subject: Re: Resonance
Posted by Wayne Parham on Thu, 30 Dec 2004 00:28:23 GMT
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I mentioned it only because the slope was significant to the discussion about group delay.Whatcha doing for New Years?

Subject: Re: Resonance
Posted by Mike.e on Tue, 04 Jan 2005 07:41:06 GMT
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New years was quiet,just attended local celebrations down in town.The music was celtic,the club

was closed,i found a few mates as most are elsewhere. Didnt get to the massive drum n bass camp in Nelson-didnt have the $ spare. So quite mediocre,but plenty of time to think,and do some audio study.Cheers!

Subject: Re: Resonance
Posted by Wayne Parham on Tue, 04 Jan 2005 22:00:29 GMT
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The New Years holiday in New Zealand is celebrated until the 5th, isn't it? American's have to shake off their hangovers and get back to work on the 2nd; This year, the 2nd is a Sunday so we get back to it on the 3rd. But I see that New Zealanders have holiday on the 3rd and 4th too. Cool! Is that the case every year?

Subject: Re: Resonance
Posted by Mike.e on Thu, 06 Jan 2005 06:05:00 GMT
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well im not sure but lastyear when i worked,i was back at work the next day on the 1st-i got holiday pay though,time and a half or something similar. Most things are open as usual on the 2nd atleast.Im not sure of the actual holidays.Speaking of hangovers,I wouldve had one today,fortunately i dont get them-the tequila is just wearing off from the nextdoor antics! Toy Viking hats,boomy 60hz plastic lofi system,bob marley,and shots of everything-it got messy! hahaCheersMike.e

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Subject: Re: Resonance
Posted by Wayne Parham on Thu, 06 Jan 2005 06:28:07 GMT
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I see. I have a calendar that shows holidays for New Zealand on January 3rd and 4th, so I was thinking I should be jealous of you.

Subject: if you look at the pros and cons
Posted by Mike.e on Thu, 06 Jan 2005 14:18:53 GMT
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it ends up equal im sure - aslong as you look at enough of thempeaceful unpolluted small population...expensive woofers, expensive travel, dangerous roads

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Subject: Re: Bandpass subs
Posted by Earl Geddes on Sat, 08 Jan 2005 19:36:42 GMT
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There is absolutely no reason why a bandpass system has to be high Q - "single note". If it is then you don't know how to design one. They can be nearly any bandwidth that you want - just like the dual ported design.And as far as there "transient response" - please! No bandpass subwoofer system has any transient response. That's why its called a "subwoofer". The transients occur somewhere else.

Subject: Re: Increased output and small size
Posted by Earl Geddes on Sun, 09 Jan 2005 20:00:57 GMT
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Consider this.A bandpass system has its front cavity tuned to be centered on the speakers resonance when placed in its rear enclosure. The front box size and port dimensions determine the system Q. Thus the bandpass system has substantial output below the speakers resonance! In any direct radiating system the system never has output below the systems resonance.Bandpass system play louder and lower than any direct radiating system, but have limited bandwidth. In a subwoofer this is just what we want. All this talk about transient response, bandwidth, etc. is misguided when talking about a bandpass system because bandpass systems are INHERENTLY low bandwidth, slow transient response systems. But they do what they do better than a direct radiator ever can. And when properly mated with a mid bass system can work very well indeed.
