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Subject: Paging BillF, GraemeG and SwollenL - Massive horns sub

Posted by [DanR](#) on Mon, 15 Mar 2004 17:09:14 GMT

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What is the biggest, deepest, fattest LOW DISTORTION bass you have come up with? I'm looking for horns that fit through a door and can be carried by two people. All local crews so trucking is not required but portability is. Main emphasis is 20-80hz, so woofers should be low distortion at 20hz to keep the harmonics from entering the throat. Post your websites if you have them. I'd appreciate any input you have for LOW DISTORTION DEEP BASS.

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Subject: Re: Paging BillF, GraemeG and SwollenL - Massive horns sub

Posted by [DanR](#) on Mon, 15 Mar 2004 17:59:23 GMT

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Maybe we could stir up interest in another project horn. I like the labhorn idea, I just would rather use a better woofer to tighten the bass up. I love the size and volume of the labs though. What say you? Would you guys be interested in something like this? Also, what do you think of BagEnd and EAW horns subs? Craig Janssen spoke highly of them (see below). I think I'll speak to Bud Berry or someone else at EAW and arrange a demo. Are EAW subs clean and tight down low?  
Pro Sound Web Live Chat With Craig Janssen

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Subject: 100dB/watt at 20 Hz is overkill.

Posted by [Bill Fitzmaurice](#) on Mon, 15 Mar 2004 18:59:00 GMT

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I personally would recommend against trying for max SPL from a horn-loaded sub to 20 Hz, assuming that means you want to get at least 100dB/watt at 20 Hz, simply because there isn't enough program power down there to justify it. In my 'Tuba 24' article you can read how I did a series of RTAs at a 6,500 seat concert venue featuring over 30 top acts of various genres from C&W to Metal, and consistently the highest power requirements were from 60 to 100 Hz, with levels at even 40 Hz down 25dB from those at 60 Hz. This was not a product of the sound systems being used, usually at least a dozen 18 subs. In terms of what is actually required for live pro-sound a better way to go is a stepped response curve, with maximum SPL from 60 to 100Hz, where it's needed, and a more modest output capability below that where it isn't, and that's where my designs for live-sound subs are heading. On the other hand, for HT a lower Fc is required, but at far lower levels, so my HT designs are aiming for just that, a lower Fc along with lower SPL to keep cabinet size within reason.

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Subject: Magnum hornsub

Posted by [Wayne Parham](#) on Mon, 15 Mar 2004 19:24:23 GMT

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I have a possible suggestion. I'll check with Eminence and see if they have a Magnum version of their LAB12, or if they would be willing to make them for you. You could use them in a horn with the same physical dimensions as the LABhorn and that would keep you from having to reinvent the wheel.

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Subject: Re: 100dB/watt at 20 Hz is overkill.

Posted by [DanR](#) on Mon, 15 Mar 2004 20:04:06 GMT

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If I understand you are saying the deepest bass should not be horn loaded. That squares with what my tech says, because he doesn't want harmonics from the deepest bass to enter the horn. I'm told that increases distortion since mostly the harmonics are boosted by the horn. My thinking is that if we have a very high quality woofer it will alleviate the problem. Maybe a better idea is to keep the bottom end separate from the midbass though and remain horn loaded from the midbass up.

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Subject: Re: Magnum hornsub

Posted by [DanR](#) on Mon, 15 Mar 2004 20:04:47 GMT

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That sounds interesting. Please keep us informed.

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Subject: Re: Magnum hornsub

Posted by [Wayne Parham](#) on Mon, 15 Mar 2004 20:31:24 GMT

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Eminence says they would entertain this idea with a minimum order of 100 units. So if there is enough interest, you can have your low-distortion horn sub. Since the horn uses two woofers per cabinet, that's only fifty boxes. Wouldn't be hard to do that quantity at all. So it looks like a low-distortion horn subwoofer would be well within reach.

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Subject: Re: 100dB/watt at 20 Hz is overkill.  
Posted by [Bill Fitzmaurice](#) on Mon, 15 Mar 2004 22:29:32 GMT  
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You're on the right track. For Pro-sound horn loaded efficiency is necessary only down to 40 or 50 Hz, and if you design the box with a gradual (12dB) rolloff below Fc (minimal reactance annulling so that the driver reverts to direct radiator mode for the octave below Fc) there is still plenty of power available for the lower octave. As for drivers, the biggest problem is that designers tend to use drivers with Fs way too low. Eminence has come out with a 12 inch Magnum (I already have a prototype in hand and it is nice) with a 43 Hz Fs that is much more amenable to horn loading than the Lab12 for pro-sound duty.

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Subject: 40hz even seems really impressive with PA  
Posted by [Mike.e](#) on Tue, 16 Mar 2004 00:06:36 GMT  
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When i was at a drum n bass event, they played some techy slow DNB with organ tunes,sounded like 40-50hz,it was great,and it was clean,the DYNACord german line arrays did it with ease! i was suprised how little distortion there was at such high levels.Too bad the cd versions of their songs are so bass-tame :PCheers!

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Subject: Re: 100dB/watt at 20 Hz is overkill.  
Posted by [GraemeG](#) on Tue, 16 Mar 2004 11:07:33 GMT  
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Hi Bill,(A bit tamer than AA over here !)  
You have made reference to the RTA measurements before, and I wonder how this was taken - was it accoustic or line feed from PA input? If the measurements were accoustic, then I would expect that from most PA bottom end cabinets a massive input at below 40Hz WOULD show up as increased level in the 80-120Hz area.With the trend towards bass guitars with fundamental tones around 31Hz, together with low kick drum tuning, we should be looking closer at reproducing these lower frequencies accurately in the PA arena. I quite often have to deal with kick drums tuned down around 40Hz or lower, and with my current PA gear, have to either retune the drum higher or just contain and process the harmonics. I am currently working on a REAL 35Hz PA sub.CheersGraeme(Centauri at AA)

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Subject: Re: Paging BillF, GraemeG and SwollenL - Massive hornsub  
Posted by [GraemeG](#) on Tue, 16 Mar 2004 11:23:19 GMT  
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Dan,Have been investigating this area recently. I too like the labhorn setup, although I have never heard one. For my way of thinking, I don't really see the neccessity to separate sub-bass and mid-bass. A PA bottom end bin SHOULD be able to cover ALL of the low end, say from 200Hz down. For this, the labhorn doesn't go high enough, and I'm not overly impressed by the measured response lumpyness anyway - which seems to be a direct consequence of the too low Fs of the Lab12.At this stage I am not convinced with the need to go quite as low as 20Hz, but certainly believe we should be trying for maximum performance to at least 35 or 30Hz, rather than the common 50 or 60Hz. To this end, I am currently working on a wide range bottom end bin which so far models fairly flat from 35Hz to 200Hz (block of 6), and will get a chance to prototype within a few months when shipment of the appropriate Beyma drivers turn up.CheersGraeme

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Subject: Re: 100dB/watt at 20 Hz is overkill.

Posted by [Bill Fitzmaurice](#) on Tue, 16 Mar 2004 12:59:15 GMT

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My RTAs were taken acoustically with a Phonic PAA2, both at the FOH and throughout the arena. For control purposes I also have taken RTAs of my personal electric bass rig, one which is quite capable of delivering 105dB output flat to 32 Hz. What I've found is that the bulk of sonic energy does not lie in the first octave fundamentals but in the second octave second harmonics, irrespective of whether the instrument being measured is electric bass, kick drum or pipe organ for that matter. There is a simple reason for this, and it has little to do with the capability of sound systems. It is that the human ear just isn't very sensitive to pure tones lower than 60 Hz, and when the second harmonic content of a bass tone is increased in level the brain is fooled into thinking that the fundametal level has been increased as well. This meshes quite nicely with the latest research on the subject by variuos sources as published in the Journal of the AES, where it has been verified time and again that increasing the subjective psycho-acoustically perceived level of bass content is most effectively achieved by the alteration of harmonic levels and not fundamental levels of bass sources. Chances are that when you have problems with kick drums it's not at 40 Hz but at 80 Hz. I've found that when bass levels are perceived as excessive, to the extent of pounding your chest so hard as to literally take your breath away, the bulk of the energy present is around 80 Hz, not 40 Hz. When you retune the drum higher what you're really doing sonically is pushing that all important second harmonic higher to where it is less offensive.

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Subject: MAG12 - Preliminary Announcement

Posted by [Wayne Parham](#) on Tue, 16 Mar 2004 16:22:52 GMT

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Eminence has stated that they are interested in making an improved 12" subwoofer based on their Magnum technology. This offers significantly lower distortion by virtue of the flux control ring and other improvements. The truly exciting news is that they have said they expect the price of this

high-fidelity MAG12 will only be about \$25.00 more than the LAB12. If there is enough interest to make a production run of 100 or more, this product will become a reality. The woofer is intended specifically as a low distortion subwoofer, suitable for use a variety of cabinets, including the LABhorn. The proposed target specifications make it suitable for use as a direct radiator, bandpass or horn subwoofer. The simplest implementation is a 2ft3 to 5ft3 vented box tuned to 20Hz. It's most common implementation is likely a low-distortion, high-fidelity drive unit for the LABhorn, or other suitable bass horn. I'll provide a head count to Eminence to give them an idea of interest in this improved MAG12 subwoofer. So please write to me if you are interested in this and I'll pass the word.

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Subject: Re: Paging BillF, GraemeG and SwollenL - Massive horns  
Posted by [Wayne Parham](#) on Tue, 16 Mar 2004 16:37:02 GMT  
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Sounds juicy! Keep us posted. I've always thought similarly to what Bill said, in that bass horn must be very large to get under 40Hz and keep response flat. If the installation can be made permanent or semi-permanent, then the horns can be made large enough to reach below that, but for portable stuff, I've sort of concluded that 40Hz was a good lower limit for horns. Seems like between 20Hz and 40Hz, everything is pretty much from direct radiation anyway, whether in a horn cabinet or not. So I like the idea of having direct radiating subs and horns from midbass up, at least for relatively small sound production work like clubs and theaters and, of course, people's homes. But if you can stipulate that several horns be used, then each one can be made a little smaller and still get the job done. For large-scale setups, that becomes an option. Or if the installation can be made permanent or semi-permanent, then you can really come up with some neat large bass horns. And then there's the reality that 40Hz is a pretty good goal for bottom end, and if bass is solid down there, it generally satisfies completely. 120dB between 40Hz and 80Hz sounds very powerful indeed.

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Subject: hmm  
Posted by [Mike.e](#) on Tue, 16 Mar 2004 22:52:11 GMT  
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I'll consider it, but I'm already spending 299\$ US on the lab12, another 50\$ just means I gotta wait longer for the basshorn accessories such as paint, mdf, connectors.. Cheers

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Subject: Re: 100dB/watt at 20 Hz is overkill.  
Posted by [Wayne Parham](#) on Tue, 16 Mar 2004 23:12:39 GMT  
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I'd like to see more of your work, Bill. I know you discussed this elsewhere, but I'd like to mention it again. It would be great to have a website with blueprints or photos of your DIY projects. Any plans to make a website?

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Subject: Where are you?

Posted by [Bill Fitzmaurice](#) on Tue, 16 Mar 2004 23:13:50 GMT

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The Lab 12 is \$140 at Parts Express; hope you're not in the US, as even retail is only \$210.

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Subject: Re: 100dB/watt at 20 Hz is overkill.

Posted by [Bill Fitzmaurice](#) on Tue, 16 Mar 2004 23:40:09 GMT

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At this point no. I might consider it if I wasn't so busy coming up with new designs, which on average I do at a rate of four per year. Along with everything else I do this barely leaves me time to write up my projects for AudioXpress. Besides, I have a deep loyalty to Ed Dell at Audio Amateur, without whose support I would not have got to where I am today. For now his publications will have to remain the only source for my designs. It would be nice if the AudioXpress website was more user friendly as far as obtaining my plans, and those of everyone else published there for that matter, but that's not a factor within my control.

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Subject: Re: hmm

Posted by [Wayne Parham](#) on Wed, 17 Mar 2004 00:01:54 GMT

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Naah, even this new MAG12 could be yours for that kind of money, probably less than \$300.00 delivered to your door. You can get the LAB12 for \$200.00, including insured parcel post to New Zealand. But I definitely understand the issue of \$\$\$bucks\$\$\$. I'm impressed when a twenty-something fellow is as techno-savvy as you are. It's hard to plop down the cash for expensive hobby projects, and the good stuff always costs a lot. You can really see this in auto parts and sound equipment. So kudos to you for using your intelligence to make up for your budget crunch.

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Subject: Re: 100dB/watt at 20 Hz is overkill.  
Posted by [Wayne Parham](#) on Wed, 17 Mar 2004 04:58:39 GMT  
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That's a pity. It does limit access of your designs to those that have purchased the magazine. Not that the price is unreasonable or anything, just that it prevents you from being able to illustrate a point in a discussion here or on other online discussion forums.

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Subject: New Zealand/.  
Posted by [Mike.e](#) on Wed, 17 Mar 2004 07:55:30 GMT  
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-hence 50-90\$ US shipping costs + distributor mark upIf i lived in USA id have the lab12 and plate amp by now :P

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Subject: My philosophy is-  
Posted by [Mike.e](#) on Wed, 17 Mar 2004 07:59:24 GMT  
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-when you have 30,000\$ debt u might as well spend your money on something to get enjoyment and experience out of:-)Since im doing electronics,it involves ALOT of PC work,my CISCO networking is all online stuff,their tricky,u cant copy and paste the notes :P gota take screenshots of all the crap ur supposed to remember:PCheers

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Subject: Re: MAG12 - Preliminary Announcement  
Posted by [DanR](#) on Wed, 17 Mar 2004 16:33:36 GMT  
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I'll try 4 of them. Please write to me when they are available.

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Subject: Re: MAG12 - Preliminary Announcement  
Posted by [jason](#) on Wed, 17 Mar 2004 19:37:57 GMT  
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I would like to try them. Just let me know when they are available.

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Subject: Re: MAG12 - Preliminary Announcement  
Posted by [hulkss](#) on Thu, 18 Mar 2004 23:47:39 GMT  
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I'll take 4 of them.

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Subject: Re: MAG12 - Preliminary Announcement  
Posted by [bill W.](#) on Fri, 19 Mar 2004 03:52:08 GMT  
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I am absolutely going to build (6)labsubs-during my summer vacation.I want to use the best available driver for them,so if these mag12`s are for sale at that time, put me down for 12pcs.

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Subject: Driver Frame Diameter  
Posted by [hulkss](#) on Sat, 20 Mar 2004 16:07:44 GMT  
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Will Eminence use the same frame casting for the new driver? My cabinets have baffle plates cut to precisely fit the existing design.Brad

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Subject: Re: Driver Frame Diameter  
Posted by [Wayne Parham](#) on Sun, 21 Mar 2004 03:51:28 GMT  
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Yes, that's the idea. The only change is in the magnetic structure, machining it to accept a flux stabilization ring for improved performance down low.Eminence will build us anything we want, and they've said they'll make this if there is a commitment for 100 pieces. So far, we've got just about that. One person has said they want 64, and several have said they want 2 to 12. So it looks like it is a real possibility. Now we just need Eminence to tell us where and when, and I suspect we'll have to pool our funds and make a deposit. After they've told us how much deposit is required and when we can expect delivery, I'll post that information here.

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Subject: Magnet weight  
Posted by [jason](#) on Mon, 22 Mar 2004 00:43:19 GMT  
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Whats size is the Magnet going to be and will be have increased power handling?thanksjason

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Subject: Re: Magnet weight  
Posted by [Wayne Parham](#) on Mon, 22 Mar 2004 01:15:31 GMT  
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I'll have to get back to you on that because I don't know. The goal of the Eminence engineers to provide a driver having the same specs except to add a flux stabilization ring to reduce distortion.

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Subject: Project News  
Posted by [Wayne Parham](#) on Thu, 25 Mar 2004 21:32:36 GMT  
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Chris Rose at Eminence contacted me about this project and said that it is underway, full steam ahead. However, this effort has reached a point where it has become somewhat commercial, so I

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Subject: Magnet structures  
Posted by [Wayne Parham](#) on Thu, 25 Mar 2004 21:42:27 GMT  
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Here is an interesting document written by John Eargle that compares various magnet structures and what performance can be expected from them. A horn provides 10dB to 15dB gain and a similar reduction in distortion. But the geometry of the driver's magnetic flux can do that much or more where distortion is concerned.

Three magnetic structures are compared, each having physical symmetry, but each made with a different material or technology. One is an alnico magnet, the other a ferrite and the third is a ferrite magnet with a flux stabilization ring. So this shows what is gained by incorporating this structure. Each page is a high-resolution scanfile, so if your browser scales them down to a small size, you might right-click and save them to your local computers and print or view them with a paint program or image viewer.

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Subject: B12 - Eminence requests that the driver formerly known as MAG12 be called the B12 instead

Posted by [Wayne Parham](#) on Thu, 23 Sep 2004 02:50:53 GMT

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Just a note to say that the Eminence flux-stabilized subwoofer project is to be known as the B12. Status of the project is shown at the links below. [MAG12 Subwoofer project update](#) [Subwoofer project update](#) [B12 Subwoofer Project Update](#) [B12 status update](#)

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