
Subject: Horn Loaded woofers

Posted by [Marlboro](#) on Sat, 17 Oct 2009 15:00:36 GMT

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Bill Fitzmaurice and maybe Wayne Parham have plans for building horn loaded woofers.

Bill has made it clear in his own comments on the PE forum, and perhaps on his own business forum somewhere, that certain woofers are better designed for use with a horn loading than others.

You can look at one of the Q measurements and determine whether the woofer is better for acoustic suspension, bass reflex, or open design.

What parameters do you have on a woofer that determine whether its suitable for a horn loaded design? I have a 15mm xmax poly prop woofer which would probably do better horn loaded so that it could keep up with my giant line arrays, but i don't know if its suitable.

Marlboro

Subject: Re: Horn Loaded woofers

Posted by [Wayne Parham](#) on Sat, 17 Oct 2009 19:26:38 GMT

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It depends on what you are trying to do. Traditionally, people wanted stiff drivers with low Q and high Fs. The idea was to "let the horn do the work" and that excursion wasn't required. However, if low bass is the goal, you still need excursion. Sure, horn loading reduces excursion but displacement still rises as frequency goes down. So you shouldn't overlook this when designing a horn.

My suggestion is to model the horn with different drivers and not to get hung up on any particular rules of thumb. You'll definitely see a trend form, and you'll find some merit in the "low Q, high Fs" argument in that it is usually tied to the efficiency/bandwidth ratio. The passband is made wider with such a driver, and for midbass, midrange and certainly higher frequencies, that is generally desirable. But for a hornsub, the opposite is often true. Not only do you not need upper frequency extension, you actually don't want it. So in this case, it's probably best to choose a driver with higher excursion ability, which also tends to usually have a looser suspension, and that means lower Fs. Sure the horn will reduce the resonant frequency, but that's not really all that important. What's important is the efficiency and smoothness of response, and also that you don't reach thermal or mechanical limits prematurely.

subwoofer. It performs very well and I'm very proud of it.

Subject: Re: Horn Loaded woofers
Posted by [Marlboro](#) on Sat, 17 Oct 2009 20:30:09 GMT
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Wayne,

your 12 Pi's are little big to put two of them in my listening room even next to my 8 foot line arrays.

Bill Fitzmaurice has stated several times that people with high efficiency mid and tweeter arrays(my tweeter lines are 108 and the mids 105) will not be able to get the same degree of dynamic range with their low frequencies unless they either put in a folded horn woofer or a line array for the woofer section.

A line array woofer section is a bit beyond my means at the moment since I would need to either scrap my two \$140 12 woofers and buy a bunch of much cheaper 10's(like 6 of them) and build a giant enclosure for them, making a 4 way with the bass broken down into something of 40-165, and then making a subwoofer with just the two 12's for everything below 40. That would probably cost me about \$500 plus the build time.

But a woofer horn would only be the plans and the horn materials. I have everything else, and then I would have the same level of dynamic range perhaps because the efficiency could get up there with 105-108.

But maybe none of this makes sense and I await others who know, to share.

Marlboro

Subject: Re: Horn Loaded woofers
Posted by [Wayne Parham](#) on Sun, 18 Oct 2009 04:32:05 GMT
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Outdoors, I prefer horn loaded subs because of the need for lots of sound. But indoors, I prefer a distributed multisub approach instead. I can get much better quality from four direct radiating subs placed around the room than a single or even two horns when used indoors. The reason is room modes - distributing the sound sources around breaks them up where one or two sound sources cannot.

Of course, this only applies to small to medium sized rooms. Once you get up to gymnasium or auditorium sized rooms, they begin to act more like free space so that's where I'd use basshorns. But never in a home hifi setting - Better to place bass sound sources around the room than to concentrate the low frequency sound in one or two areas.
