Subject: Backhorns
Posted by Bradford on Fri, 07 May 2004 14:06:25 GMT
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Are backhorns actually horns or are they more of a tapered transmission line? The reason I ask is that I can't figure out why some say backhorns are more efficient and others say no. Seems like the backhorn would add bass but nothing beyond, so it is like a tapered pipe. Since this is usually used with Lowthers and the like, I'll ask over there too. Your thoughts?

Subject: Re: Backhorns
Posted by Illuminati on Fri, 07 May 2004 15:54:49 GMT
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A horn IS a tapered pipe. The geometry of the taper sets frequency, bandwidth and dispersion.

Subject: Yes and no.
Posted by Bill Fitzmaurice on Fri, 07 May 2004 20:09:26 GMT
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Yes, a horn is a tapered pipe, but classic tapered pipe cabinets have the driver at the larger end and the exit at the smaller end, the intent being to only reinforce the output in the lowermost frequencies at and just above the quarter-wavelength measurement of the pipe, usually on ther order of 3 to 5dB. This configuration is generally referred to as a Transmission Line or a Tapered Quarter Wave Pipe. To eliminate resonances within the pipe and slow the speed of sound within it to achieve a lower Fp the pipe is filled with dampening material.A rear-loaded horn has the driver at the small end, the exit at the large, and achieves gain on the order of 6 to 10dB on average. It's usually used with wide-range high-efficiency drivers which because of their low Qts values cannot get flat response down to the driver Fs in other box configurations. The rear-loaded horn is usually configured to add gain only to the bass frequencies, generally 100 Hz and lower, to bring those up to the same dB level as the higher frequencies emanating from the front wave of the driver cone. The folding geometry is configured to attenuate the passage of frequencies above the intended pass-band for the horn; in addition, a rear chamber behind the driver prior to the horn entrance (throat) also acts a low-pass filter, to both accentuate the frequencies wihtin the desired horn pass-band and attenuate those outside of it. Horns may have damping material lining or stuffing the rear chamber, but the horn itself is left bare.

Subject: Re: Yes and no.

Posted by Bradford on Fri, 07 May 2004 21:58:04 GMT
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The difference is all below 100 hz so a backhorn speaker has the same efficiency as a box then, right?

Subject: Absolutely no.
Posted by Bill Fitzmaurice on Fri, 07 May 2004 22:44:50 GMT
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The rear-loaded horn has gain; a 'box' does not. Rear-loaded horns are usually combined with low Qts drivers that have nominal SPL ratings of 95-100dB/watt but little bass response without horn loading of the rear wave; the horn gain raises the bass response to the nominal SPL rating of the driver. 'Boxes' that use high Qts drivers don't need the additonal bass gain of a folded horn to have good bass response but on the other hand they also have typical sensitivities of 85-90dB. Therefore, on average rear-loaded folded horns will have sensitivity ratings 10dB higher than other cabinet styles. By the way, efficiency is not the correct term when applied to how loud a speaker is for a given power input. This is generally stated as sensitivity, and usually stated as 'X'dB/1watt/1meter.

Subject: Re: Yes and no.
Posted by roncla on Wed, 12 May 2004 01:58:40 GMT
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The volume of air that exists between the back of the driver and the horn throat is called the cavity of the horn. Any enclosed volume of air with a port (in this case, the throat of the horn) will act as a 1st order low-pass filter where: Upper cut-off frequency = c * At / (2 * p * V)Where:V = Volume of cavityAt = area of port, i.e. horn throat areac = Speed of soundIn two-way horn systems where the front of the driver loads a mid-horn, and the back loads the bass horn, it is of great importance that the dimensions of this cavity be calculated correctly. This is to ensure that there is a mechanical crossover between the two horns. However, in a back-loaded-only system such as this, it is really not that critical. The cavity's only mission here is to create a roll-off from a frequency where wavelength = an odd multiply of the horn's length, to avoid annulling when the out-of-phase waves from the back of the driver meets the in-phase waves from the originating at the front of the driver. We want to load ca 3 octaves into the horn (40Hz-320Hz). Theory then prescribes a relatively small cavity (ca 1,5 litres, space taken up by driver included) which also ensures good coupling of the cone's movements to the horn.
