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Subject: Re: Basshorns verses direct radiators - *<i>It's a question of size.</i>*

Posted by [Wayne Parham](#) on Fri, 27 Jul 2007 14:37:26 GMT

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Outdoors, a large basshorn will outperform direct radiators even without considering radiating pattern. A good modern high-efficiency 18" woofer used in a suitably tuned box as a direct radiator generates about 93dB to 96dB from 30Hz or 40Hz up when used in half-space, depending on the driver. A pair of them as is used in many subwoofers produces 99dB to 102dB or so. Double the number of woofers and you get 6dB each time for the same voltage input across each driver's voice coil. The thermal limit is usually reached above 60Hz or so and is usually about 500 WRMS to 2000 WRMS per driver, depending on the driver. The mechanical limits are usually reached below 60Hz and are almost always reached below 1000 watts, usually less than 500 watts RMS. So what this means is that at the very lowest frequencies, you can't push all the power to the subs without making them distort badly, possibly eventually causing failure. Between this fact and the reality of thermal compression at high power levels, a modern high-efficiency 18" woofer is limited to about 125dB/M at subwoofer frequencies. A good modern basshorn subwoofer generates from 102dB to 106dB from its cutoff frequency upwards when used in half space. This is already 5dB to 10dB more efficient than the direct radiator, literally ten times more powerful. Add to that the fact that a basshorn is not generally mechanically limited at low frequencies because horn loading reduces cone movement. A basshorn's limit is thermal, which means it can take full power at subwoofer frequencies. This means it is able to generate at least 10dB more at full power, sometimes nearly 20dB more. So at full power, a basshorn subwoofer can deliver 10 to 50 times more power than a direct radiating subwoofer. And since the driver doesn't move as much,

basshorn sub has a couple other tricks up its sleeve too, which give it an edge over other basshorns. It uses push-pull drive, which lowers distortion even further than horn loading alone can do. It also uses a patent pending cooling system that increases power handling over 2x. This reduces heat, increases its thermal limit and makes the system more robust. On the matter of

single basshorn of this size does not start to get pattern control until frequency is higher. That's what gives a single horn rising response, it is beginning to become directional at the upper end of its response curve. However, when you add horns, grouping them together, they become directional. A group of four or more is large enough to direct sound forward even at deep subwoofer frequencies. This is a very potent setup, because it is extremely efficient and powerful. Maximum SPL is about 150dB/M for a group of four.