Subject: Eight Pi
Posted by tomlang on Sun, 06 Feb 2011 16:05:56 GMT
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I have the 8 pi plans (thanks Wayne). The crossover seems unusual to me so I wanted to verify it. First off, there is 8 ohms in parallel with the woofer. In series with this combination is a parallel circuit of a 5mH choke and 4 ohms, making the woofer across a voltage divider of a 4 ohm and 8 ohm resistance but with the 5 mH choke in parallel with the 4 ohms. Just wanted to make sure this is correct as it seems alot of power would be sinked across that resistor network.

Subject: Re: Eight Pi
Posted by Wayne Parham on Sun, 06 Feb 2011 16:12:11 GMT
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The network is correct. It's a voltage divider that is bypassed with inductance to give some boost at the low end. This compensates for the difference in efficiency between horn loaded and reflex loaded regions.

There is a misprint in the tweeter section though. Coil L1 is mistakenly labeled 1.0uF when it should be 1.0mH.

Subject: Re: Eight Pi
Posted by tomlang on Sun, 06 Feb 2011 16:19:03 GMT
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OK, thanks! Is the bass reflex portion the least efficient part of this design? What is the overall efficiency of this design?

Subject: Re: Eight Pi
Posted by Wayne Parham on Sun, 06 Feb 2011 17:11:03 GMT
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Yes, the speaker is least efficient in its reflex region, below about 200Hz. Above that, it's horn loaded.

If the speaker is pulled out away from walls, its sensitivity is 95dB/M/2.83v. When in corners, it's 98dB/M/2.83v. In practice, even when it's back against the wall but not in corners, sensitivity is closer to 98dB in most rooms.

This speaker is a bit of an enigma, in that it is designed to be used in corners but not to need

them. That's an oxymoron, actually. You either have it one way or the other. But the thing is, horn loading works down to 200Hz, so by the time the horn stops working, you're in the room's modal range. That makes directivity ambiguous, and therefore, so is on-axis response. The corner doesn't really provide any directivity below 200Hz anyway. It just helps the midhorn maintain directivity at the lower end of its operating range.

If the speaker had been flat down to 100Hz instead of 200Hz, I probably wouldn't have put in that bypass coil for bass-boost. The octave above 100Hz is a killer. It's a transition region between modal and reverberent regions. It's sort of partially both. So academically, I debated whether to add the bass-boost. A guy could use local subs and run them up a little higher instead. But in the end, I decided the speaker sounded a little too lean without the bottom-end compensation.