
Subject: Re: Basshorn or Transmission Line

Posted by [Wayne Parham](#) on Sat, 28 May 2005 15:32:03 GMT

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That's the way I see it too. The thing that has always hung me up on basshorns is their size. I like horns, and use them wherever I can, given size and cost constraints, etc. But basshorns always have that resonant quality because of their size. The acoustic impedance of horns becomes resistive as frequency rises, but at low frequency, they are reactive. They appear to act more like tuned pipes down low, and even more so if the mouth is undersized such as is usually the case with basshorns. That, combined with the fact that a basshorn is usually crossed over before acoustic impedance becomes uniformly resistive, brings me to the conclusion that a basshorn acts more like a tuned pipe. One possible design approach is to embrace this instead of trying to overcome it. Some liken a horn to a wide band resonator anyway. There is nothing particularly wrong with resonance, that's what bass-reflex uses, it's what transmission lines use, pipe organs, etc. Instead of expecting the device to act like a horn, maybe it's more appropriate to see it like a transmission line or tapered pipe. That's definitely what the impedance curve suggests for the first octave or two. It might be interesting to design a hybrid, a device that acts something like a horn but that is tuned like a transmission line. Basshorns, because of their size in relation to wavelength, are really just that. Martin King has a series of spreadsheets at quarter-wave.com that allow a person to model a tuned pipe, to best know where to place the driver in the line to reduce unwanted pipe modes, and to prevent notches in response from standing wave cancellations in the passband. His spreadsheets might be useful when designing such a horn/line.
