Subject: Re: Horn flares for compression drivers
Posted by Wayne Parham on Fri, 04 May 2001 05:18:35 GMT
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My favorite horns provide constant directivity with 90 degree horizontal coverage and approximately half that vertical coverage angle. The reason is simple: This is where you want the sound. You don't want it directed at the ceiling or floor, but you do want it to fill the room and be uniform throughout the room. Another reason is that sound sources stacked vertically generate nulls above and below the forward axis, so it is desirable to limit vertical coverage within these nulls.With constant directivity horns, the sound sources are in phase at all locations within the horizontal coverage pattern as long as they're phased right on-axis. Summing is constructive at angles within the nulls set by the vertical distance between drivers, so it is best to set the nulls just outside the vertical coverage angle of the horns. It all comes together that way, with constructive summing at all angles within the pattern.Not all constant directivity horns are alike. There are several mechanisms for pattern control, so naturally there are lots of ways to make a CD horn. I personally don't care much for the ones with sharp angles, prefering instead those with smooth flare walls. A horn begins to narrow at low frequency just before it loses pattern control and widens way up. So many horns have the last section flare greater than the main body of the horn. I prefer a gradual curve to a sharp break. The edge causes a reflection which manifests itself as ripple in the response curve.I prefer horns that are large enough to provide pattern control, but aesthetics sometimes make a compromise necessary. Having a fairly high crossover point helps here, because horn size goes down as frequency goes up. In the case of the three Pi and four Pi speakers, matching directivity of the direct radiating midwoofer pins the crossover frequency to a range of about 1kHz to 2kHz. That is a good place to crossover anyway, for a lot of other reasons besides directivity and horn size.