Subject: Re: Stage monitors -- doubled Pi 4s?
Posted by Wayne Parham on Thu, 10 May 2001 22:31:28 GMT
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The four Pi loudspeaker is designed to use a midwoofer and tweeter, and the crossover frequency and positions chosen were selected so that the directivity is matched at the crossover point. The woofer pattern begins to narrow from being almost omnidirectional to hemispherical to practically cone shaped, around 90 degrees in the crossover band. The tweeter also provides 90 degrees of horizontal coverage, so they're matched. Likewise, the vertical angle is matched because the vertical spacing of the woofer and tweeter makes a forward lobe form, with nulls above and below it. This modifies the woofer's natural cone shaped pattern, flattening it on top and bottom. This pattern is matched by the horn's vertical coverage angle, so above the crossover region a narrow coverage pattern is maintained. The design is pretty well optimized, not only by PiAlign for smooth bass response but also by having a crossover that matches the woofer and horn to achieve good off-axis response and ultimately, a uniform reverberent field.The dual woofer system you propoose is interesting though, in that it lets you retain all the benefits of DI matching and gain additinal benefits of adding bass sound sources. That's always a good thing. The way I would implement it is to keep the original physical relationships of midwoofer to tweeter, both in position and crossover, and add to that a second woofer below the first with a simple first-order crossover around 150Hz. This would provide two bass sound sources and would also allow the midwoofer to be higher, closer to ear level, without introducing a floor reflection cancellation notch in the midbass. The pair of woofers operarating together below 200Hz would reduce floor bounce and room modes, and crossover to the single midwoofer above the modal range would allow it to function as a point source up to the DI matching range, where crossover to the tweeter would be done as it is in the existing design.