Subject: Re: 3 and 4 way crossover
Posted by Wayne Parham on Thu, 18 Jul 2002 02:38:14 GMT
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There are a lot of things to consider when choosing crossover points. The most obvious is the intended range of each of the devices, where they work best in terms of response and distortion. This includes the behavior of the motor, the suspension and the diaphragm. As an example, cone flex causes extended high end but excessive breakup can make it unusable. The voice coil may handle a certain amount of power, but at low frequencies, excursion may be excessive. These are the kinds of things that the crossover designer must consider, first and foremost.Secondly, but just as importantly, in my opinion, is the directivity performance and the behaviors that arise when there are multiple sound sources. These include the collapsing directivity of direct radiators and some horns, the loss of pattern control at low frequency of horns, and the nulls that form off-axis in the same line that drivers are stacked. For example, the matched-directory two-way concept is to crossover to the tweeter horn at the frequency where the directivity of the direct radiating midwoofer collapses to the point where it matches the horizontal pattern of the horn. At the same time, the vertical spacing is set so the vertical nulls are just outside the horn's vertical pattern.Thirdly, where possible, consider the enviroinment the speakers will be used in. Speakers with controlled directivity do this to some degree by limiting early reflections. But if the speaker is placed in stands a few feet above the ground, then self-interference from the floor reflection will cause a notch in the upper bass or lower midrange. By placing the woofer lower to the ground, this can be avoided. A midrange that is placed higher, which would otherwise suffer from a floor bounce notch, can be covered by overlapping the range with the woofer. The distribution of sound sources this way will cover the notch and prevent it from occuring.