Subject: Spatial conditions
Posted by Wayne Parham on Fri, 22 Mar 2002 21:05:00 GMT
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Try to avoid placing speakers between 2 feet and 8 feet from walls. If possible, keep them closer than 2 feet, or further than 8 feet. It's best if a nearby wall is directly behind the speakers, so that midrange and treble reflections are minimized. Directional speakers can be placed in corners to good effect.The reason for this is simple. A cancellation notch appears at the 1/4 wave frequency, set by the distance to the wall. Distances nearer than 2 feet are shifted high enough into the midrange that the rear wave is probably pretty weak, assuming the speaker is directional at midrange frequencies. Greater than 8 feet and the wavelengths are long enough that the notch is shifted down too deep to matter. But between 2 feet and 8 feet, the 1/4 wave frequency is in the bass range, where the rear wave is probably omnidirectional and will reflect back to produce a notch in response. The notch you'll find from speakers set 2 feet from a wall is at 140Hz, and the notch from 8 feet is 35Hz. Any distance between these two will cause a notch between 35Hz and 140Hz.Beyond that, all of my designs have a specific placement in mind. The five, six and seven

such as on the floor and against the wall, or in a corner raised off the floor, maybe on a short stand, up a foot or foot and a half.These are spatial conditions, sometimes referred to as free

placement will sound very lacking in bass if suspended in free space. Likewise, speakers

you can "get away" with placement on either side of optimal, but not to an extreme. In other words, since I've suggested quarter space placement of my bass-reflex speakers, you will probably enjoy them in half space or eighth space too. Half space placement will sound a little bass-shy and eighth space placement might sound a bit bass-heavy, but both are still very satisfactory.A notable exception to this generalization is when using horn-loaded speakers designed for eighth space placement, because there is more happening than just spatial

performance to be only slightly affected. In this case, the flare formed by the walls "expansion" into the room is actually forming the last part of the horn's flare, and so implementation must be in eighth space or performance is seriously impacted.Other places where this generalization doesn't work well are environments that are either excessively reflective (like a school gymnasium) or those that have an attached resonating chamber (like houses with raised hardwood floors). In each of these conditions, the spatial relationship is still effective, but there are other acoustic filter functions that completely overwhelm the effects produced by the spatial condition.But unless you have rock walls and no absorbent material, or you have a highly resonant chamber under your

specifically directed to place them in corners or free space, or you find they just don't sound good