Subject: Re: Time alignment vs reality
Posted by Paul C. on Tue, 09 Jul 2002 13:05:00 GMT
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When I record live in a concert hall, I like to position the mics, JUST TWO MICS, on a double mic holder about 8" apart, and angled out about 20° each from straight ahead. I put them back about the third or 4th row, or right in front of the orchestra pit for a band or orchestra on stage. I jack them up about 10' or so. This gives excellent stereo imaging upon reproduction.If the mics are spread out, the effect is rather unrealistic at home, sounding unnaturally spread. We hear direction not by volume difference, but by phase difference, between the left and right ear.Due to the distance between our ears, and the relative length of very low frequency wavelengths, we get pretty much the same phase in each ear. That is, both ears hear the peaks pretty much simultaneously, as well as the valleys, of low frequencies. But for shorter wavelengths, there can be quite a difference.Where the wave lengths are around twice the distance between the ears, the phase can be 180° out from left ear to right ear... the left hearing a peak, the right a valley. And other frequencies, other phase differences.And that is for a single sine wave.But real sounds have all sorts of frequencies, and an orchestra, lots of instruments, lots of overtones, lots of notes. The brain is quite a complex processor to be able to handle all of that, yet it does so quite easily. Amazing!Time alignment is most critical on transients, that is, short, percussive sounds. When a drumhead, or other object is struck, all the frequencies produced are peaked at the time of impact, and decay from there. If these peaks do not get to your ears all at one time, the sound is smeared. This is why the fewer the crossover points, the better. And not only that, position that crossover point down in a region where the wave lengths are longer, and easier to align. I do not want time alignment , phase shifting, going on up around 8Khz-10khz. Or even at 5 khz. That will smear the sound.As Wayne does, a two way, with crossover in the 800hz-1.6khz range, this leaves percussive sounds pretty much intact, and the upper partials are easier to align with the lower, longer wave lengths. So, you do not have things arriving over several cycles to the ear, but within one cycle.This is what time alignment is all about. Good transient response. Listen to percussion instruments... if that sounds convincing, the speaker is pretty good in the time alignment area.With sustained tones, it means nothing, but where it causes a notch or peak at crossover... a frequency anomaly.Now, the ear (really, the brain) will tolerate fixed resonances, or holes. It hears this as the ambient room sound. After a few minutes of listening to music in a particular room, the brain sets up a sort of reverse filter, and pretty much ignores this effect. Now, if it is really bad, like poorly designed speakers with a one note bass thump, yes, you notice that. But the narrower and lower those resonances, the easier the brain ignores it.This is sort of like wearing tinted glasses, after a while, you no longer see color shifts.Well, like Forest, that is about all I have to say on that subject.