Subject: "Can't reproduce a square wave"
Posted by Wayne Parham on Tue, 26 Oct 2004 08:19:36 GMT
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I'm not sure there should be a term "absolute phase" since the very definition of phase is a difference in time between two events. It is a measure of the relative timing between two things in cyclic motion. But far be it from me to get hung up on semantics, the real issue at hand is what matters and what doesn't. My point has always been that what we actually hear is frequency anomalies that occur when two signals are phased for destructive interference. We hear the nulls, not the phase.As for square waves, that's something I take issue with as well. Think about it. If you take a diaphragm and move it forward, a positive pressure is created, but only for an instant. The pressure quickly dissipates. That's what prevents a loudspeaker from being able to generate an acoustic square wave when given an electrical square wave as input. It would have to be able to generate and hold a pressure for the entire duration of a half cycle, which grows increasingly difficult as the frequency drops.An acoustic square wave can be approximated at high frequencies, but not down low. As frequency goes up, the speaker cone does a better job of generating an approximate barometic square wave because pressure has less time to dissipate before the next half cycle. Or in tightly sealed chamber, you can create an acoustic square wave from a loudspeaker. But in open space, you can't. Not at all audible frequencies. Not with this kind of motion.There are two ways to make a square wave. You can seal the chamber very tightly so that pressure isn't lost as it disssipates. Or you can use a pump that provides constant flow instead of constant displacement, and thereby constantly replenishes the pressure lost from dissipation.But as for whether we want to have the ability to generate a barometric square wave, that's really an academic exercise. It's just people trying to make a point. The issue is valid - that a signal be reproduced accurately - but the use of a square wave to illustrate it is ill-conceived, in my opinion. The reason I say that is conditions that allow a barometric square wave to be developed aren't solely dependent on the loudspeaker. They are also dependent on the environment and the frequency of interest.In fairness, I think most people are examining square waves at relatively high frequency and they are trying to show that the phasing of their various subsystems - woofer, midrange and tweeter - are good. My issue is that I don't think it is very effective at showing that. There are more meaningful things to look at, and the square wave thing smacks of marketing hype to me, for all the reasons I've mentioned above.Previous thread called "Can't reproduce a square wave"