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Subject: Re: Can't reproduce a square wave

Posted by [Wayne Parham](#) on Wed, 17 Mar 2004 22:17:44 GMT

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I'm not sure that this is an important issue, but it's fun to talk about nonetheless. As I see it, even if there are perfect phase relationships between harmonics, there is another issue that keeps the measurement microphone from seeing a square wave, especially at lower frequencies. That is the fact that pressure dissipates in air, creating a differentiated pulse instead. A square wave requires two well-defined potentials. Each half cycle is represented by a specific potential. In electrical terms, this is voltage, in mechanical, it is position and in acoustic or pneumatic, it is pressure. Here's the problem with the square wave thing: Even if you have a perfect piston driven by the perfect square wave, the pressure developed in open air dissipates. If you are pressurizing a perfectly sealed chamber, you can keep pressure from dissipating, but not out in the open. Outside the speaker cabinet, it's like a very lossy system. That makes it act like a differentiator. So whether or not this is an issue worth noting is probably debatable. But making static pressure changes outdoors from a loudspeaker is pretty tough to do. It's easier to do as frequency goes up, but one could say it is impossible down low, at least without calling upon the Vogon Constructor Fleet from the Hitchhiker's Guide to the Galaxy.

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