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Subject: Intermodulation, phase and Doppler distortion  
Posted by [Wayne Parham](#) on Fri, 11 Aug 2006 21:59:23 GMT  
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Intermodulation distortion is actually caused by two things, each being somewhat related and both involving excursion. One is Doppler distortion, where the cone is moving back and forth from a low frequency tone so a higher frequency cone movement must ride upon this shift, which causes a phase shift. The other is a non-linearity caused when the driver is pushed nearing or exceeding Xmax, where the voice coil has less drive force because it partially moves out of the gap. This causes it to become non-linear at high drive levels. One way to reduce IMD is to reduce bandwidth, so if you crossover the woofer to mid at a lower frequency, you'll reduce IMD. I don't really notice it unless excursion is high, so if you're not pushing a midwoofer too hard, it isn't generally a problem. But if you are pushing a subsystem far enough that IMD becomes noticeable, the best way to solve it is by reducing bandwidth. Either crossover the lower point higher or the higher point lower, or both. Doppler distortion in loudspeakers Phase, Time and Distortion in Loudspeakers Phase Correction - Myth or Magic

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