

# Westlake Audio

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## LOW P.E. DISTORTION™ ; THE NEW IMPROVED SOUND OF WESTLAKE AUDIO SPEAKER SYSTEMS ©2004 ALL RIGHTS RESERVED

Westlake Audio has produced World Class Reference Loudspeaker Systems for the Professional and High-End consumer enthusiasts for over 32 years. It has been the company's policy to offer only the highest quality products through a commitment to ongoing improvements of long established products, rather than offer frequent model changes. The company believes that fine-tuning of system execution can produce repeatable sonic improvements that so called revolutionary products often herald, but fail to deliver (at least consistently to the general public).

To the end of best and most accurate sound reproduction possible from readily available technology, the company is proud to announce that all future production will incorporate "Phoenix Effect" (P.E. or P.E. Distortion™) compensation for an improved sonic presentation. The "Phoenix Effect" has been defined by Westlake Audio's President and Chief Engineer, Glenn Phoenix, as "a by-product of all electrical signal flow that causes what is best described as ghosting". The ghosting (similar to but not exactly as we have all experienced viewing a T.V. picture with a mistuned antenna and/or cable system) causes us to not be able to perceive the sound picture as well as the artist; producer and engineer may have hoped we would. Indeed probably not as well as it may exist on the master recording, although the master itself will be encoded with some amount of the effect if it was processed at all in the analog mode. The more processing that has been applied to a recording the more the "P.E" is imbedded in the recording. Once combined with the primary signal, no compensation system can be applied without sacrificing primary signal integrity. A compensation system could be developed and applied at each stage of signal transmission for both active and passive devices. Westlake Audio has for several years manufactured speaker cable assemblies which have a proprietary design which serves to minimize (but not eliminate) the "P.E. Distortion" and will as of January, 2004 offer P.E. compensated (low P.E. Distortion™) signal interconnect cable systems for professional and high end use. The new Lc265.1V speaker product was the first execution of the technique in speaker systems themselves. The "Phoenix Effect" is present in Digital Systems, although the mechanism for its' audible manifestation has yet to be studied. The "effect" is present in all electronic signal propagation; not just signals that represent what we think of as audio.

From a speaker performance standpoint, what does this mean? Well, if the signal you are listening to have had a lot of processing and the imbedded "P.E." is high (meaning that the program signal has been contaminated and thus has a low "potential" dynamic range), then perhaps only a small to modest improvement will be experienced. However if the program source is "pristine" and uncontaminated, (thus a high "potential" dynamic range) then the audible improvement may be great, manifesting itself as improved stereo image, better transient response and an inherent smoothness not previously attainable through high quality sound reproduction.

For this compensation technique to be fully realized it has been incorporated into Westlake Audio speaker systems that may employ as many as 100 proprietary production techniques. The techniques in conjunction with “P.E. Compensation” produce what we feel is the state-of-the-art for sound reproduction, having the highest “effective” dynamic range possible. To best utilize these speakers requires an amplifier system with a high “effective” dynamic range. “Potential” dynamic range is the specification given by most amplifier manufacturers (whether they realize it or not) and is not the “effective” dynamic range, which is limited by the “Spectral Contamination” and output impedance of the amplifier. For the “effective” dynamic range to approach the stated (potential) dynamic range, all distortions, including P.E. must be very low and the output impedance must be as low as is practical. Some brands are better than others, but even from a single brand different results are found. Look for “Low P.E.” or “Low P.E. Distortion™” on the model description.

Although a more conventional definition of this effect using terms more familiar to the engineering community has been established by Westlake Audio’s engineering department, this information must, for the time being, remain proprietary and confidential to Westlake Audio. A full technical disclosure is available to “P.E. Distortion” licensees.

P.E. Distortion is now thought to be the explanation for many of the sound differences that professional and enthusiasts claim to hear between various pieces of equipment that (up until now at least) seem to escape detection by the standard engineering tests. The “effect” is actually a “distortion” but in some forms can be deemed to add artistic value, in the same way that other forms of processing can. The lack of “P.E. Distortion” may be one reason (in addition to the more commonly understood side effects of analog tape compression and tube electronics’ harmonic enrichment) many people still prefer some amount of analog processing, even though digital systems have theoretical advantages.

In a speaker system in particular, the large variances in signal path and current flow often produce the effect in varying amounts throughout the audio band, upsetting the balance of things so to speak. Thus it can be more damaging to the overall sound presentation, especially if the system has a lower operating impedance (which Westlake speakers typically do). The compensation systems themselves are more effective when the systems have more ways (i.e. 2-way, 3-way, 4-way speakers etc.), allowing for better optimization over a smaller bandwidth. In reality it just allows the listener to gain fuller benefit when moving from a 2-way to 3-way or 3-way to 4-way, etc. In the past there was a belief by many listeners that simpler was better. And thus the belief of: “Why pay for more than a 2-way, when it costs more and doesn’t really sound that much better”?

There is an amount of truth to this. As I.M. (inter-modulation) distortion is brought down by going to more ways, the “Phoenix Effect” is often “unmasked”, (or even worsened in the process) and might not be considered flattering to the audio presentation. With the introduction of this technology, multiway speaker systems, properly designed, may take their place as the preferred reproduction system. Listening tests have borne this out, that the improvements to the sound presentation is greater in 3,4, and 5-way systems than it is in 2-way systems.

For more information see “P.E. Distortion: The last barrier to high fidelity?” or contact Westlake Audio at 805-499-3686. Fax, 805-498-2571 or visit [WestlakeAudio.com](http://WestlakeAudio.com) on the World Wide Web. ©2004, All Rights Reserved