The Multimedia Convergence Begins

Unity Audio Introduces The Interactive Speaker

BY TOM MILLER

Amid all the purist two-channel, non-equalized audio systems populating the Sahara Hotel during the 1996 WCES, one company took a step apart. And forward. Unity Audio, demonstrating what appeared to be nothing more than a conventional five-speaker home-theater system – using the laserdisc of *Crimson Tide* — fired a shot across tradition's bow.

While the music swelled and the Crimson Tide submerged on the screen, an engine of change was quietly chugging away underneath a table against the side wall. A computer was at work, marrying the possibilities of one technology to another, with the promise of new levels of performance. This wasn't a dedicated processor, repeating the only task it was programmed for – it was a PC, like the one sitting on your desk. A PC that could run Windows (95, if you live dangerously) while controlling and mitigating the distortion products of a loudspeaker. Or maybe you would like the sound with a little less "edge?" Easy — just punch it in on your keyboard.

It all sounds so simple. But it isn't and won't be for a while. But today Robert Grost, President of Unity has found a way to begin the convergence of media foreshadowed by the burgeoning home-entertainment industry. Drawn ever so slowly to one another, computers, audio systems and home-theater systems are on a path of inevitable combination.

The starting point of Grost's approach is his "Derivative Crossover" design. Using dual voice coils in his speaker drivers, Grost implements a crossover by running the signal going to the second voice coil through crossover components. He then feeds this low-pass signal, out of phase, to the woofer. The out-of-phase signal cancels the corresponding in-phase frequencies from the other voice coil, in which the signal is running full range (since it has not passed through any crossover). The result is that the frequencies from the woofer roll off, creating the crossover slope even though the signal driving the woofer is an unadulterated full-range signal.

Grost recognized that this approach had capabilities beyond creating a crossover in the speaker. He could also use the second voice coil as a pathway to introduce other alterations to the driver's performance without running the music signal through such changes. And so he set out to "import" computer-generated electrical characteristics into the speaker through this path.

Not only is it possible, says Grost, to alter the frequency characteristics of a driver using the pathway of a derivative crossover; other characteristics, such as phase, can be altered, allowing users to tailor the sound of the speaker to their own tastes. Grost even posits a time when the essential characteristics of a certain speaker – such as the Wilson WATT, for example – could be recorded and made available on an Internet web site. Home users could download the characteristics of the WATT and feed them into their own speakers, creating a *faux* WATT. Then, for grins, they could merge the characteristics of the WATT with the THIEL CS7 and Vandersteen Model Three. Frankenstein lives.

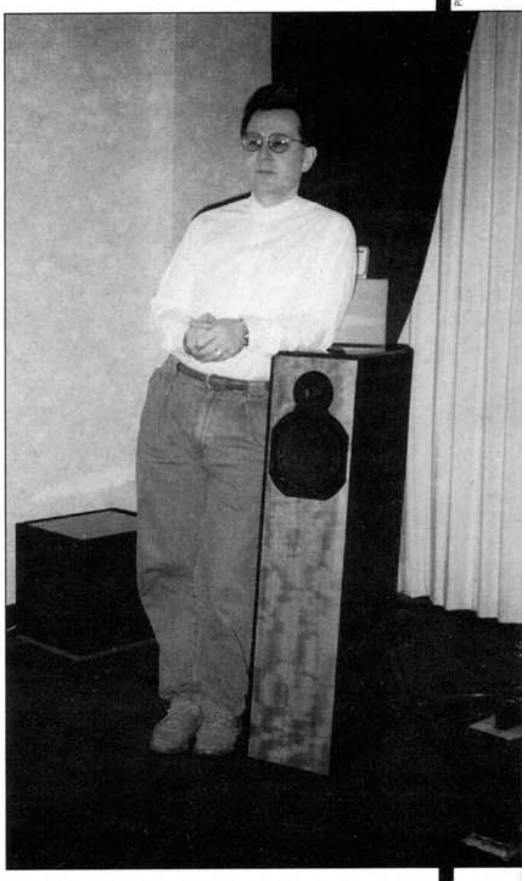
More important, using the computer input, Grost believes it is possible to correct steady-state distortions in loudspeaker drivers. While music is infinitely variable, a speaker's distortion characteristics, such as the resonant frequency and its harmonics, remain steady. Thus, it is possible to measure these distortion characteristics and enter corrective characteristics through the computer crossover, greatly reducing the distortion. And make a less expensive product sound much more expensive! Grost is quick to point out that higher quality drivers and better designed and built speakers will be capable of still higher performance. Grost believes his technology will raise the overall level of performance.

In addition, it should also be possible to measure steady-state room-acoustic properties (e.g., standing waves) and enter corrections through the computer/crossover.

Using a pair of Unity speakers and a PC at the WCES, Grost demonstrated how the computer could change the sound of his speakers. Sitting in the back row behind an attentive crowd, I could not hear the changes in soundstage characteristics that Grost was describing as he altered the sonic characteristics of the drivers. Clearly audible, however, was the change in spectral balance and transient behavior.

There is merit to this approach, and as the home-entertainment world becomes more digital and the computer moves to the center of the system, this technology may help preserve the principles of fidelity. It is an exciting prospect that we will follow closely. ■

PHOTO BY MILLER



Robert Grost explains derivative crossovers and computer controlled speaker performance