# THE DOALS PARTY SPEAKER

BY JOSEPH R. DEMERS

A party doesn't seem like a party without music. Although some readers may hire professional musicians, many of us depend on a powerful stereo. I was recently at a party in which the host was entertaining his hundred or so guests with loud music. The music emanating from the speakers wasn't unusually loud when I was in the back of the room, but as I moved closer to the stereo, conversation became impossible. Since I couldn't talk to anyone and since it wasn't an entertaining party, I tried to figure out ways to spread the speakers' output, but retain their tremendous resolution.

I continued my pondering for the next six months or so, and I came up with a number of ways to prevent the one-side-of-the-room stereo effect encountered at countless gatherings. All the solutions depended on separating the speakers and placing them more toward the center of the room. But, unless the output could be spread more uniformly, people would simply move from the middle of the room into the corners.

A simple solution would be a speaker with three tweeters, three midranges, and a couple of woofers all pointing in different directions. Another solution might be ceiling speakers scattered throughout the room. In either case multiple drivers are needed. (A clarification is necessary here. When I write about multiple-driver systems, I mean multiple drivers used in one frequency range, and when I speak of single-driver designs, I mean ones in which a single driver is used for a range of frequencies.)

The most noticeable problem with multiple-driver systems is the reduction of resolution, which occurs when two drivers radiating the same channel in synchronicity are separated by some distance. The separation of the drivers distorts the timing/phasing which enables the listener to pinpoint, from the music, where the instruments are located. For example, with common directional speakers, you can determine that the horns were a little to the left, the violins were to the right of center, while the singer was directly in the center during the recording. If, however, a second tweeter is hooked up to each speaker and is pointed in a slightly different direction, it is impossible to tell where the horns, violins, and singer were.

Considering the problem further, I contemplated spreading the output of single-driver systems with a lens. I imagined a stacked type of assembly with a lens for the midrange and a lens for the tweeter, but none for the woofer because lower frequencies are naturally omnidirectional.

What was finally created was a vertically phase coherent, vertically diffractive, semicircular omnidirecting speaker. Whew! Since that description was on the windy side, I shortened it to DOALS: Demers Omnidirecting Acoustic Lens Speaker. I had to include my name to get such a catchy title. And, as such, a patent was applied for on the unit.[1]

**DESIGNING THE LENS.** At first, I wondered if it were possible to design a device that would redirect the drivers' output without destroying the acoustic quality or the overall resolution of the speakers.

My first idea was a simple reflective device, a cone mounted under a driver in such a way that when the wavefront hit the nonresonating surface it was reflected 360° in the horizontal plane. Crude, but workable. Even if I could design an acceptable lens, it could only be placed in the center of the room. That means cords for people to trip over, a convenient place to set one's drink, possibly a loss of stereo, and a simply unaesthetic approach. If only the speakers could be placed against a wall, or better yet, hung, unobtrusively, from a wall. Such an arrangement would require that I create a speaker with a 180° output. How could I do this?

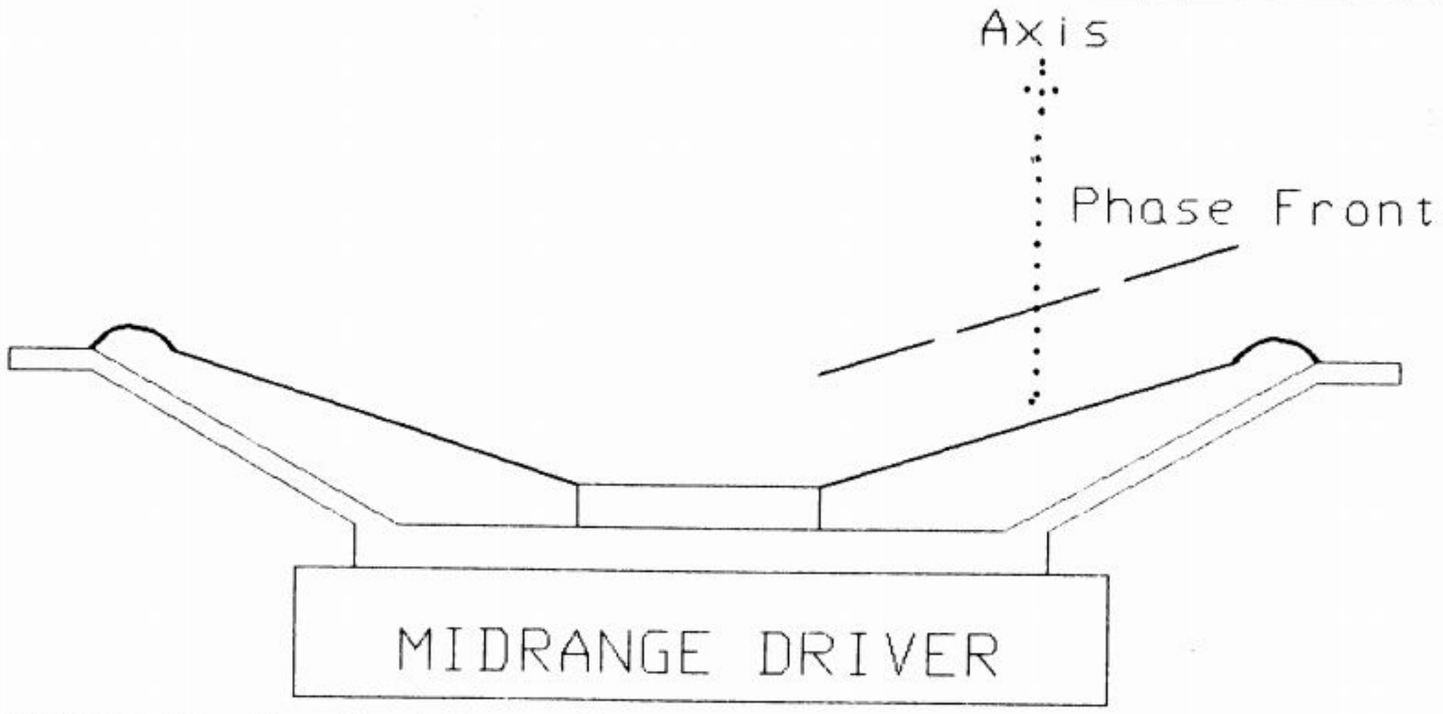


FIGURE 1: The phase front at an angle to and moving down the driver's axis.