



FIGURE 12: The cabinet dimensions.

you must remove the speaker from the wall and disassemble it. As a whole, many improvements can be made on the enclosure, but in my case it served its purpose—to test the lenses.

**THE BIG TEST.** The DOALS are mounted to radiate into three rooms: a family room, a dinette, and a large kitchen. All rooms are open to one another.

In *Photo 5* you can see a portion of the dinette and the family room as well as one of the wall-mounted DOALS. From the wall of the kitchen to the wall of the family room is 38 feet, while the width of all the connected rooms is roughly 13 feet. A perfect environment for the DOALS system.

The first characteristic of the speaker I noticed (after powering up) was that

they seemed inefficient. As I increased the volume, the output didn't appear as great as the efficiencies of the drivers implied. After a moment, I realized this was because I was hearing only a portion of the 180° output. Did this mean they worked? I switched the balance to only one speaker and walked in a half circle around it. The volume didn't change.

Returning the balance to normal, I started from the wall of the kitchen, walked between the speakers to the far wall—38 feet. The volume and resolution hardly changed at all. I continued to walk around; the stereo was prominent wherever I stood and the output was spread uniformly throughout the three rooms. They worked! The only problem was near the walls on which they were hung. As I neared either, the music became slightly distorted. I believe the distortion indicated interference effects created by reflections from the walls.

Surprisingly, even though availability and cost governed the choice of components, the speakers sound good. Now that I know the lenses work, I can use well-known driver and crossover combinations, maybe even dissect and rebuild a set of commercial speakers. Because the lenses are inexpensive to construct, the next step will be to experiment with different lens coatings and alignments. For instance, the volume increased slightly directly between the speakers. Could this be remedied by removing a vertical slice from the middle of the lens?

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PHOTO 5: A portion of the listening area for the DOALS.



#### ABOUT THE AUTHOR

Joseph R. Demers is a fifth year physics and biology student at the University of Dayton. He first became interested in loudspeaker design four years ago when his father described how an Isobarik system worked. Since that time, it has become his primary hobby.