

A Hegeman Subwoofer

Here's an unusual subwoofer design that follows a different path to achieve good low-frequency sound. **By Cornelius Morton**

In 1969 the late A. Stewart Hegeman, of Harman-Kardon Citation fame, introduced a unique speaker bearing his name, the Hegeman Model 1 (Photo 1). It consisted of a handmade 8" bass/midrange driver firing upwards into a spherical reflector, resembling a ball cut in half, resulting in a circular horizontal pattern. The dome tweeter was mounted in the flat top of the reflector and fired into a similar smaller reflector mounted to the underside of a metal grille. Because the vertical spacing of the two driver-reflector assemblies was small, the two sources merged into a point source at listening distances greater than 4'.

The inside of the box was even more interesting. Instead of being open, it consisted of six tubes of various lengths opening just under the bass driver with the far end of the tubes closed off so that each tube became a quarter wave-length resonant stub. Each stub presented the driver cone with a high acoustical impedance around the center frequency of the stub. By centering the stub frequencies about the resonance frequency of the driver, the stubs provided a controlled damping to the driver, virtually eliminating the driver resonance peak and associated impedance fluctuations.

Stewart continued producing the Model 1 along with a few Model 2s—a 10" driver—until 1977, when failing health and finances forced him to cease production. At that time he gave Don Morrison, of Toronto, Canada, a six-week course in speaker building along with a truck load of cabinets, driver parts, and so on. Don resumed production in Toronto and continues

to produce a much improved version today. See his website at <http://www.donmorrisonaudio.com/>.

IMPRESSIONS

Several years ago a friend found several Model 1s on eBay and shortly after our audio club auditioned them. The first impression was of very good quality sound reproduction, so we moved on to the sound stage.

I was seated about in line with the left speaker and another member was about 6' away in what should be the sweet spot. A female vocalist was singing and I had her placed just up on a staircase behind the speakers and about 3' to the right of the center line. I asked the member in the sweet spot to point to the vocalist—we both did and it was the same spot! At the time I was using a pair of Magnepans, which were nice but had a very confined sweet spot.

The next impression was of the bass, which was very articulate, with no sense of overhang and no bass boom, just the sound of instruments. I was hooked.

I had some understanding of quarter-wave stubs from a long-term association with radar systems. Quarter-wave waveguide stubs are very similar in function to quarter-wave acoustical stubs. While searching for additional information, I located Don Morrison and explained what I was attempting. Don was very friendly and helpful. After providing history and a ton of information and hints, he commented that only a nitwit and masochist would try to build these things, wished me luck, and said to keep in touch.

The Magnepans are now gone, re-

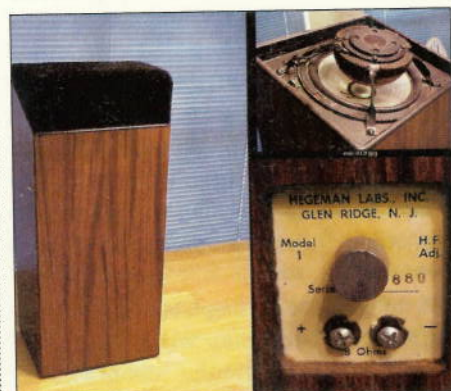


PHOTO 1: Hegeman Model 1.

placed by what looks like a pair of flying saucers on top of small boxes. But the tight bass response of these clones was what led to thoughts of subwoofers. To date I have built three 12" models and two 10" units. This has been an evolutionary experience with improvements added to each.

One of the 12" versions resides with a friend in Texas, another with the owner of the Hegemans, and I have the third.

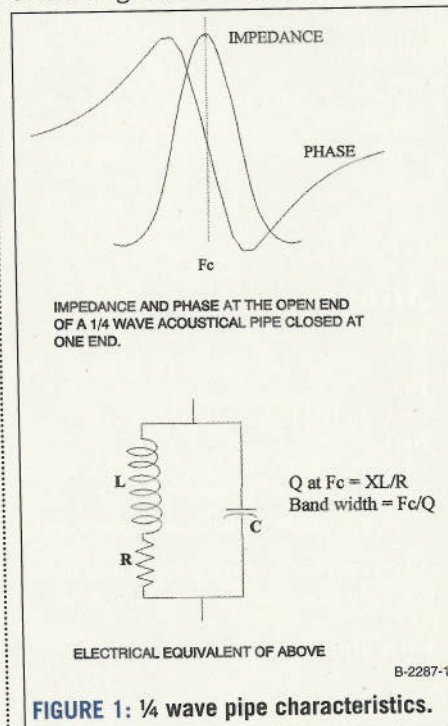


FIGURE 1: 1/4 wave pipe characteristics.