Stereo Review

JOOK LEUNG

OHM SOUND CYLINDER SPEAKER SYSTEM

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OHM Acoustics is best known for unique loudspeaker systems based on the patented designs of the late Lincoln Walsh. Essentially, a Walsh speaker uses a single cone driver that faces downward into a closed volume (sometimes with a vent) and radiates its sound omnidirectionally in the horizontal plane from the "rear" of the cone.

Because the sound wave travels along the surface of the cone with a greater velocity than in air, it is possible to design a cone whose shape and material allow different parts of the audio frequency range to be radiated from different sections of the cone at slightly different times and yet emerge in phase from the speaker boundaries. The high frequencies radiate from the narrowest part of the cone (close to the voice coil), while the lower frequencies radiate from the larger cone diameters. Although the highs leave the cone before the lows, they travel further before reaching the outer diameter of the cone, and all frequencies are in the correct phase when the signal enters the room.

The coherent acoustic waveform generated by a Walsh system is closer to that of the electrical input signal, over a wider frequency range, than can be achieved by conventional multiway, front-facing speaker systems using crossover networks. A Walsh speaker closely approximates an ideal full-bandwidth, single-driver speaker, something that has not been realized with conventional speakers.

The new Ohm Sound Cylinder is the smallest, lightest, and least expensive Walsh speaker. The molded-plastic construction has a 6-inch Walsh driver on top facing down into the cylinder, which contains acoustic damping material. At the bottom is a 3-inch-diameter port, which is coupled to the interior through a 5½-inch tube. The entire speaker is supported about 1 inch off the floor on small feet, allowing the low-bass frequencies to be radiated around the circumference of its cylindrical body. The speaker measures 11½ inches in diameter and 31½ inches high, and it weighs a surprisingly light 14¼ pounds.

The upper 6½ inches of the Sound Cylinder, a perforated metal cage covered in black cloth, contains a molded-plastic structure that houses the Walsh driver, a small tweeter, and blocks of acoustic absorbing material. Both drivers have voice coils damped and cooled by ferrofluid, and the system is recommended for use with amplifiers rated for 22 to 100 watts per channel. The Sound Cylinder contains a Thermo-Guard protection system that automatically reduces the speaker's drive level if the voice coils become overheated by excessive input, and the Walsh driver is designed to emit popping sounds as its voice-coil excursion approaches safe limits.

The only published specifications for the Sound Cylinder include a frequency response of 44 to 20,000 Hz, a sensitivity of 89 dB sound-pressure level (SPL) with a 2.83-volt input, and a nominal impedance of 8 ohms. The standard Sound Cylinder is covered with a walnut-grain vinyl material except for its black top section and base. It is also available with genuine oak, walnut, teak, or rosewood veneers, and Ohm can

make custom covers from your own fabric. Price: $549 a pair. Genuine wood veneer is $76 extra, and custom fabric covers are $46 extra. Ohm Acoustics Corp., Dept. SR, 241 Taafe Place, Brooklyn, NY 11205.

Lab Tests

We placed the two speakers about 8 feet apart and 3 feet in front of the rear wall for our tests. Their tweeters were angled inward by 45 degrees, as recommended. The room response, averaged for both speakers, was excellent above 2,000 Hz, varying only ±2 dB from 2,200 to 20,000 Hz. At lower frequencies there were several moderate response fluctuations, with peaks at 1,800, 700, and 270 Hz. From 100 Hz upward, the output was within ±3.5 dB all the way to 20,000 Hz The maximum peak was +5 dB at 70 Hz, making the speaker's overall room response extremely flat.

Our usual practice of combining a close-miked bass measurement, which is unaffected by the room, with a room measurement to form a composite frequency response was somewhat complicated by the unusual natue of the Walsh radiator. Its overall response variation was a very good ±2.5 dB from 50 to 2,000 Hz, falling steeply outside those limits. We also measured the output around the periphery of the cylinder's base, where the vent output actually emerges into the room, and found it to have a maximum at 60 Hz and a 12-dB-per-octave rolloff below and above that frequency. The contribution of the vent was much greater than that of the Walsh cone at frequencies below 100 Hz, where it was virtually the sole contributor to the system's output. Fortunately, the upper part of the vent's output curve spliced readily with the room-response curve, so we formed our composite curve without considering the close-miked measurement of the Walsh driver's output.

Except for an additional 5-dB rise at 60 Hz, overall system response was well within ±4 dB from 20 to 20,000 Hz, which would be creditable performance for any speaker and is almost unheard of from a system using a single 6-inch driver and a small tweeter! The system's impedance reached a minimum of 6.5 ohms at 58 Hz and leveled off just below 6 ohms in the 10,000- to 20,000-Hz range. Its maximum of 25 ohms occurred at 85 Hz; overall, its 8-ohm rating would appear to be valid. The measured sensitivity was 85 dB, slightly lower than rated.

With an input level of 5 volts (equivalent to a 90-dB overall SPL), we measured the bass distortion from 100 Hz downward in the slot between the cabinet bottom and the floor. The distortion was very low at the high end of this range, about 0.5 percent, and it increased linearly to about 6 percent at 25 Hz, then rose steeply to 24 percent at 20 Hz. We also measured the distortion in the Walsh cone's output; it was only slightly higher than the port distortion but could not be measured below 60 Hz, where its output dropped off rapidly.

Our quasi-anechoic frequency-response measurements made with the IQS FFT analyzer confirmed many of the characteristics visible in the system's room-response curves, including a slight peak at about 1,800 Hz and the superbly flat on-axis response. Measuring the frequency response at angles from 0 to 180 degrees showed clearly that the tweeter supplied almost all of the output above 2,000 Hz. Below that frequency, the measured response of the system was essentially constant in every direction, but at higher frequencies, where the Walsh driver's response was evidently cut off, the inherent directivity of the tweeter determined the system's response.

Since one of the principal characteristics of a Walsh driver is its phase coherence, we were especially interested in the group-delay measurements. From 2,000 to nearly 20,000 Hz, the group-delay variation was only ±0.2 millisecond, excellent performance though not exactly unique. Of course, this was entirely in the operating range of the tweeter, a conventional driver. From 200 to 2,000 Hz the total variation was about 2 milliseconds, also quite good by conventional speaker standards but not exceptional.

In high-power pulse tests, the cone of the Sound Cylinder rattled with an input of 275 watts at 100 Hz into its 14-ohm impedance. At 1,000 Hz the amplifier clipped at 780 watts into 10 ohms, and at 10,000 Hz it clipped at 1,200 watts into 6 ohms with no signs of distress from the speaker.

Comments

The sound of the Ohm Sound Cylinder was smooth, balanced, and thoroughly enjoyable, well beyond what anyone would expect from such a small, light speaker. Its dispersion was subjectively complete, and we were never aware of the speakers as distinct sound sources, no matter how much we moved around the room. The stereo stage was effectively fixed on or just in front of the wall behind the speakers. Walking up to one of the speakers did not produce any significant change of perceived program level. The absence of upper-bass emphasis was striking; voices were essentially uncolored, yet the deep bass of an organ was reproduced cleanly and powerfully.

In A/B comparisons with our reference speakers, we were more aware of their similarities to the Sound Cylinders than of their differences. All in all, there was nothing about the sound of the Ohm Sound Cylinders to which we could take exception. Obviously, personal tastes differ, but these speakers certainly offer impressive value for their price and size.

Our only question has to do with whether this system uses a true Walsh driver. Earlier Walsh systems usually had complex, costly cone structures, but the one here appears, at least in its externals, to be a fairly conventional small dynamic driver. Although the Ohm A and Ohm F gave true full-range response from a single (large) driver, more recent members of the family have used separate tweeters to augment the high-end output and change the polar pattern of the system. Frankly, I don't know where the dividing line exists between a Walsh system and a conventional one, but if the Sound Cylinder is *not* a Walsh system, it must be one of the most remarkable two-way speaker systems with a 6-inch woofer ever created!

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