

SOUND INFORMATION



PRESS COMMENTARY

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QUANTUM LINE SOURCE-1

Infinity Quantum Line Source-1 loudspeaker. Dimensions: 5½ feet (H) by 15 inches (D) by 18 inches (W). Weight: 150 lbs. Price: \$1,100. Warranty: "Limited"; 5 years parts and labor, transferable. Manufacturer: Infinity Systems, Inc., 7930 Deering Ave., Canoga Park, Calif. 91304.

We first heard the new Infinity Quantum Line Source loudspeakers at the 1976 Consumer Electronics Show in Chicago. We were mightily impressed with the sound quality of this massive and expensive system and immediately requested a pair for review.

We were particularly interested in the Quantum-1 because, as our regular readers may recall, we reviewed another Infinity speaker, the Monitor Jr., in our fall 1976 issue and gave it high marks. Infinity was using a pair of Monitor Jrs. in Chicago for the rear channels of an ambience-simulation hookup with the Quantum-1, and the overall sonic effect was impressive indeed. As a result, we were consumed with curiosity as to what the Quantum Line Sources could do by themselves.

The Quantum-1 is a four-way system, using a new woofer — the Infinity/Watkins dual-drive unit; a mid-bass coupler; a line array of 6 convex-dome midrange drivers; and 8 of the new magnetic-drive tweeters, also in a line array. A ninth tweeter is located in the rear and can be switched into or out of the system at will.

The Quantum-1, as tall and as heavy as an average-size man, is as imposing in stature as in sound quality.

The woofer is 12 inches in diameter with a 9½-inch piston. It is a paper-cone system, using a dual voice coil — the first application of the Watkins design that we have seen. The idea behind the Watkins woofer is to avoid the impedance rise (and consequently lower power input) of the typical cone woofer at resonance. The

Watkins driver has two voice coils and an external filter network that directs the energy to one or the other of them, depending upon the frequency. The two coils are wound on a common form, which drives the same cone. The keynote is the constant impedance of the system, which, in turn, allows it to accept constant energy from the amplifier, regardless of frequency. The claim is that this technique provides improved bass response from a driver of a given size in a given enclosure volume. (Our measurements verified the relatively constant impedance of the woofer and its prodigious bass output.)

The woofer in the Quantum-1 (functioning in what is basically an infinite baffle) operates only to a frequency of 200 Hz. At that point, the system crosses over to a mid-bass coupler, a nominally 5-inch-diameter driver with a 3¼-inch piston diameter. The cone is heavily coated with a greaselike damping substance. The mid-bass coupler is rear-loaded into a damped transmission line that exhausts in the rear of the enclosure.

Above 600 Hz, the energy is diverted to a line array of 6 soft, treated, convex-dome midrange drivers, each about 2 inches in nominal diameter (1½ inches in working diameter). These are spaced on 6-inch centers, starting about 28 inches above the floor and extending to a height of almost 5 feet.

Above 4 kHz, the magnetic tweeter array comes into play. These drivers are of the newest design, using a samarium cobalt magnet with a conductor plated onto a plastic diaphragm — the magnetic equivalent of electrostatic tweeters. Eight are used, in a vertical line array extending over a distance of more than 41 inches, starting about 27 inches above the floor. In addition, an optional ninth tweeter is positioned in the rear.

The idea behind the line arrays is to establish a

cylindrical radiation pattern for better dispersion. Such an array tends to provide a relatively uniform spread of sound in the horizontal plane, with relatively limited vertical spread. The arrays in the Quantum-I are long enough to cover a range of heights within which the ear level of almost any listener, whether seated or standing, might be expected to fall.

All crossover networks are 6-dB/octave types, operating both ways (both high- and low-pass filters are used). Infinity prefers to avoid the term "crossover" network, however. The company's emphasis has been less on crossover as such than on maintaining the proper phasing and timing of the drivers. In short, Infinity is more concerned with assuring that the sonic energy emanating from each of the drivers reaches the listening area at the same time than with achieving a sharp crossover. The relatively gradual slopes reflect this philosophy, as does the forward location of the woofer, which projects about 1½ inches out from the mounting plane of the other drivers, so that its "effective" plane of radiation lies with theirs. Infinity believes that this care in "timing" is necessary to achieve proper imaging.

At the rear of the base is an array of knobs and connectors that provide perhaps the most flexible equalization system that we have seen. There are separate level controls for the mid-bass coupler, the midrange array, and the tweeter array. In addition, there is a three-way switch/plug that determines the crossover point to the tweeters. Finally, there is a small toggle switch that energizes the rear tweeter.

Two sets of color-coded three-way binding posts are provided. Normally, they are strapped together. But, should you desire to bi-amp the Quantum-I, you may remove the connecting wires and power the woofer separately.

If you should bi-amp the system (and there are good reasons for doing so, as we shall see later), Infinity recommends that you use two wideband amplifiers *without* an electronic crossover. By using the internal passive crossovers within the speaker system you will not destroy the phase coherence built into the system. Furthermore, you should use one stereo amplifier per loudspeaker, connecting the woofer to one channel and the mid-bass through treble to the other, rather than using one stereo amp for the woofers and the other for the remainder. (The woofer uses so much power that it might suck the amplifier's power supply dry if it were used to operate *both* woofers.)

Our impedance measurements verified Infinity's claim that the Infinity/Watkins dual-drive woofer does not show the characteristic impedance rise at resonance that conventional systems exhibit. From 6 ohms at 20 Hz, the impedance dropped to 4¼ ohms at 50 Hz before rising to 11 ohms at 900 Hz. After that, it dropped to 7¼ ohms at 2 kHz, rose to 18 ohms at 6 kHz, then fell to 9¼ ohms at 10 kHz, 4½ ohms at 20 kHz, and 3 ohms at 60 kHz before rising again. Not only on the basis of its impedance curve, but also on a sheer power-consumption basis, we would not recommend paralleling *anything* with the Quantum-I.

In our listening room, we placed the Quantum-I more than three feet out from the rear wall and more than four feet from either end wall. We spent a considerable amount of time (the better part of a day) with test equipment, adjusting the various controls for best performance. We started with Infinity's recommendation: mid-bass coupler at 2 o'clock, midrange driver at 12, tweeter at 12, and tweeter crossover at HIGH. For our room, we ended up with: mid-bass at 10 o'clock, mid-range at 10, tweeter at maximum and tweeter crossover set at the middle position. (Our impedance measurements were based on this setting.)

The results were about the strongest and smoothest bass and mid-bass we have heard to date. In the near field, the woofer was flat ($\pm 1\frac{1}{2}$ dB) from 30 Hz to 200 Hz, its upper range. With the loudspeakers placed as they were, the response from 30 Hz to 1 kHz (in the far field) was also about as smooth and flat as we have measured. Above 1 kHz, the response shelved down rapidly and then flattened out from about 1.5 kHz to the limit of our measurements (14 kHz). On pure-tone measurements, the Infinity Quantum-I proved to be one of the lowest-distortion transducers we have measured.

The efficiency of the Quantum-I is extremely low. We measured a sound-pressure level of 81½ dB at one meter with a 20-volt rms pink-noise signal (0 dBW or 1 watt into the specified 4 ohms). This means that these speakers require about 10 dB more power than more efficient systems — or 10 times the amplifier power. At realistic sound levels, they will suck a 50 watt/channel amplifier totally dry. We would recommend *at least* 200 watts/channel — or, better yet, a bi-amped system. (Good sound doesn't come cheap.) Since the Infinity/Watkins woofer is sopping up the power, we'd agree with Infinity's recommendation that a wideband stereo amp be used to bi-amp each channel — one channel for the woofer, the other for the rest of the drivers.

Our listening tests were pure joy. With adequate power available, the sound quality of the Quantum-I was prodigious indeed. The bass response simply didn't quit. We were literally shaking the building and could feel, if not hear, the sound on the upper floors. Within the listening room, the sound was exceptionally clean and airy. There was *absolutely no* sign of strain. With the speakers spaced out four feet into the room as they were, the entire area was filled with sound. In fact, in the prime listening area, the sound appeared to emanate from behind the loudspeakers rather than from them. This effect was further enhanced with the rear tweeters activated.

We invited several audiophiles in for their comments on the Quantum-I. Their reactions were uniformly favorable, ranging from "the best spatial characteristics — better than quad," to simply "the best sound I've ever heard." We tend to agree. For those who can afford the Quantum-I, and have the power to drive them, we would be hard pressed to recommend a more satisfying system . . . whether used alone or paired with their little brothers, the Monitor Jrs.

The logo for Infinity, featuring a stylized infinity symbol above the word "Infinity" in a serif font.