

BES SM300 Speaker System Review



BES SM300

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Bertagni Electroacoustic Systems (BES) has been manufacturing speaker systems for some years under that name, although a recent reorganization of the company, together with extensive product-design modifications, makes it reasonable to consider them as a new arrival on the hi-fi scene. BES speakers are based on the designs of an Argentine, Dr. Jose Bertagni, and company headquarters are in Costa Mesa, California, where the speakers are manufactured. They are quite different in concept and appearance from other speakers offered for home hi-fi system use, since they do not employ a group of cone or dome radiators enclosed in a box.

The BES speakers (currently there are four models in different size and price classes) are dipole radiators which emit sound equally to the front and to the rear. The “drivers” are large, nearly flat plastic panels clamped at their edges—unlike the usual speaker cone, which has a flexible edge suspension.

The voice-coil and magnet structure of the BES drivers are fairly conventional in appearance, with ferrite magnets surrounding a moving voice coil. The magnet structures also have five holes passing through them, and these provide forced-air cooling as the diaphragm moves. The voice coil is coupled to the vibrating diaphragm through a ring of compliant silicone material which functions as a low-pass

filter. Since the diaphragms are not symmetrical, they are not driven at their “centers,” and apparently the specific location at which the voice coil couples to the diaphragm was determined empirically during the design of the speaker system.

The entire structure—diaphragm and drivers—is supported by a massive cast-aluminum frame. The edges of the diaphragm are specially formed and treated to terminate transverse vibration modes and absorb their energy, so the radiation pattern (according to Bertagni) is more nearly omnidirectional than would otherwise be the case.




The Bertagni literature indicates that in some of their models more than one voice coil drives different parts of a single diaphragm, making it effectively a multiway radiator. The unit we tested, the Model SM300, heads the company’s line and appears to be a true multiway system with physically separate diaphragms as well as driving elements. It is a large, flat panel structure standing 53-1/2 inches high, 22 inches wide, and 6-3/4 inches deep. The removable wooden base is 19-3/4 inches wide and 13 inches deep, and it provides a very stable support for the nearly 70-pound speaker system.

Both the front and rear of the SM300 are covered by an acoustically transparent brown cloth (the grilles are nonremovable), and the sides and top are framed in wood to match the base finish. The grilles are visually divided about two-thirds of the way up, defining the bass-radiator area at the bottom and the middle/high-frequency area at the top. The only visual difference between the front and rear of the speaker is the presence of the input binding posts, mid- and high-frequency level controls (continuously variable), and overload circuit-breaker reset buttons on the rear of the base—a distinct aesthetic advantage.

According to the specifications furnished for the SM300, it is a four-way system with crossover frequencies of 500, 5,000, and 10,000 Hz. There are three voice-coil-type drivers, plus a fourth small piezoelectric driver coupled to the upper left corner of the bass diaphragm. The SM300 is suitable for biamplified operation, with 500 Hz as the recommended crossover frequency, and separate binding posts in the rear provide access to the low-frequency driver and the combined group of mid- and high-frequency drivers. The SM300 can handle considerable power, with a rating of 100 watts for 8 hours (we doubt that any human listener could endure exposure to the acoustic output of that test!). It is recommended for use with amplifiers rated between 15 and 150 watts per channel. Price of the BES SM300 is \$640 each.

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Laboratory Measurements

Like all dipolar radiators, the BES SM300 should be installed at least several feet from any room wall. Since it radiates in all directions, it can be used as part of a room divider, serving listeners on both sides. We placed the two speakers in the recommended positions in our listening room about 9 feet

apart.

The reverberant-field response curve, which corresponds roughly to the total acoustic-output curve of the speaker, was spliced to a close-miked woofer-response curve taken with the microphone close to the grille and at its approximate center. The inevitable reflections from the wall behind the speaker and from other surfaces yielded some midrange variations, but the output was still within ± 3.5 dB from 100 to 10,000 Hz. It rose somewhat at higher frequencies with exceptional smoothness.

The woofer's maximum output was between 30 and 50 Hz, falling off rapidly at lower frequencies and gradually from 50 to more than 500 Hz, where the output was about 10 dB below the maximum level. When we spliced this curve to the reverberant curve, the resulting composite frequency response was within ± 6.5 dB from 20 to 20,000 Hz, with an elevated output below 90 Hz and above 10,000 Hz compared to the broad and relatively uniform midrange level.

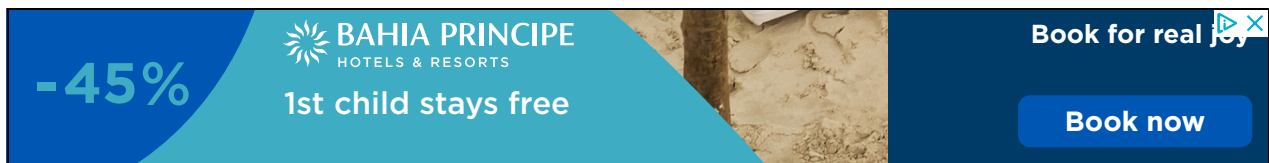
The midrange-level control on the speaker affected the entire band above 300 Hz, with an overall adjustment range of about + 4, -6 dB. The high-frequency control influenced only the output above about 11,000 Hz (it apparently controls only the "super tweeter") with a control range of + 9, -2 dB. The BES claims for omnidirectionality, at least in the horizontal plane, were completely confirmed by our tests. There was only a very slight difference between the high-frequency response from the right and left speakers, with the latter being measured on axis and the former about 30 degrees off the axis. Subjectively, we noticed that walking around the speakers caused no significant change of sound quality or apparent frequency response. Although the highs were stronger when one bent over to position an ear on the axis of one of the tweeters, the "beaming" of the speaker system as a whole was far less than we have heard from most.



The quasi-anechoic frequency response of the BES SM300 was measured at a 1-meter distance and on the level of the grille division between the lower and upper sections using our INDAC FFT analysis system. A speaker with such a multiplicity of drivers and unorthodox diaphragm structures could be expected to show a ragged response in such a measurement, and it did. There was a deep null at 12,500 Hz, which was a function of the microphone position. After a rather flat response from about 200 to 2,000 Hz, there were sizable peaks at about 3,000, 6,000, 10,000, and 16,000 Hz. The output fell off above that frequency owing at least in part to the test system's 17,000-Hz upper limit.

With 1 watt of pink-noise excitation, either in the octave band centered at 1,000 Hz or over the full range of 20 to 20,000 Hz, the output's sound-pressure level at 1 meter was 87 dB. Although 6 dB lower than rated, this figure is perfectly satisfactory, corresponding to the more efficient acoustic suspension systems or the least efficient vented systems that we have tested. The impedance of the SM300 was among the most uniform we have measured, averaging about 10 ohms from 25 to 20,000 Hz and a minimum of 6 ohms at 20 Hz. The bass resonance was barely visible in the impedance curve as a peak of 16 ohms at 33 Hz.

The bass distortion was very low, probably due to the very large radiating surface of the woofer and the correspondingly small physical excursions required of it. At a 1-watt input the distortion varied almost randomly between 1 and 2 per cent from 100 to 20 Hz. At 10 watts input it was not very different down to 40 Hz (between 1.2 and 3.2 per cent) and increased to 4.5 per cent at 25 Hz and 9 per cent at 20 Hz.



Comment

The measurements of the BES SM300 show it to be a “different” and rather interesting system compared with most others we have used and heard. First of all, these are good speakers, as smooth, pleasant, and balanced as any we can think of. We had viewed Bertagni’s claims for omnidirectionality with skepticism, since dipoles are inherently very directional (to their sides). However, we were soon convinced that these speakers did just what was claimed for them. The sound had the open, airy quality that we have always associated with a good “omni” system, and there was a near-total lack of localization of the sound source even when one was quite close to one of the speaker panels. They sounded just as good off to the sides as to the front or rear. The warmth and power of the deep bass was a pleasure to experience because it was completely unmarred by any heaviness or muddiness. The greatest bass output of this speaker is in a range rarely excited by music (and not at all by voices), so that coloration on vocal material was negligible. On the other hand, deep-bass program material was reproduced with telling effect.

In addition to their powerful bass performance, the SM300s have a crisp, well-defined top end. It is perhaps misleading to call attention to the speaker performance in specific regions of the audio-frequency band, for the most appealing quality of these speakers is their balance: it is possible to listen to them for hours on end and hardly realize that one is hearing a speaker at all. Although we experimented with the midrange and high-frequency level adjustments on the speaker, we preferred the center or “flat” settings.

The size and general qualities of the BES SM300 would seem to favor its use in a larger-than-normal listening room. Nevertheless, we never felt overpowered by the system—acoustically, that is; the units are not easy to ignore visually. If one can physically accommodate a pair of large panel radiators in one’s listening room, we suspect that the sound of these speakers would be much appreciated. We can think of few speakers we have tested over the years that were as easy to live with as the BES SM300, and we felt genuine regret when the time came for them to be returned to the manufacturer.

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