

# Stereo Review

## DEFINITIVE TECHNOLOGY BP10 BIPOLAR SPEAKER SYSTEM

*“...a truly outstanding speaker system.”*



*Julian Hirsch, Hirsch-Houck Laboratories*

**D**EFINITIVE TECHNOLOGY'S first product is an unusual loudspeaker that offers exceptional performance for its size and price. The BP10 is a slender columnar speaker measuring 42 inches high, 9 inches wide, and 11 1/2 inches deep and weighing about 60 pounds. Its exterior is completely black, and the four sides are covered by a fabric sleeve that fits snugly around the enclosure. The wood base and top plate have a glossy lacquer finish. The top cap is also available in solid oak. The gold-plated, multiway terminals, which accept dual banana plugs, are under the

base, with a slot for the connecting cable.

There is no visible indication of the number, size, or configuration of the drivers. Actually, the BP10 is a *bipolar* system (hence the “BP” designation) containing a pair of identical two-way speakers. One faces forward conventionally, and the other is on the rear panel, facing backward. Each consists of a 6 1/2-inch woofer and a 1-inch dome tweeter, with the woofer located at the top of the cabinet and the tweeter just below it.

Since the front and rear halves of the system radiate in phase over their full frequency range, their bass outputs augment

each other. In this respect, the BP10 is unlike dipole radiators such as large electrostatic speakers or similar planar systems in which the front and rear surfaces radiate out of phase and tend to cancel each other at low frequencies. Another result of the BP10's bipolar design is that it operates best placed about 8 to 12 inches out from a wall—unlike planar systems, which must normally be placed several feet away from a wall.

The BP10's two woofers share a common enclosure vented by a single ducted port at the bottom of the rear panel. According to the manufacturer, the bass-tuning system was computer-designed to duplicate the loading of a transmission-line system in respect to its bass response and transient behavior while retaining the advantages of a simpler and less expensive cabinet.

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There was no skimping on the design of the cabinet, however. Its sides are made of 3/4-inch particleboard, with front and rear panels of 1-inch-thick Medite (a highly rigid composition material) and extensive internal bracing. The cabinet's rounded edges and narrow profile, plus its frameless cloth grille “sock,” are designed to minimize diffraction, which can impart a boxy coloration to the sound and mar the spatial imaging.

If it becomes necessary to replace a driver or perform other internal servicing of the speaker, lifting the top plate reveals the drawstring that keeps the grille snug to the cabinet. After the drawstring is loosened, the grille can be slipped down or removed for access to the drivers or the crossover network. The designers chose a fourth-order Linkwitz-Riley network to give the BP10 uniform response in the crossover region as well as optimum phase and transient response. The crossover frequency is not specified, but our measurements suggest that it is in the vicinity of 2,000 Hz.

The BP10 uses rugged, high-quality drivers. The woofers have cast-magnesium baskets, mineral-filled homopolymer cones with butyl rubber sur-

### *“Definitive Technology has hit the bull’s eye.”*

rounds and dustcaps, high-temperature voice coils, and massive magnet structures. The fabric-dome tweeters have dual air chambers, one behind the dome and the other connected to the first chamber by a hole through the pole piece, behind the magnet structure. Definitive Technology says that the dual chambers lower the tweeter’s resonance frequency, extend its frequency response, and reduce distortion. An aluminum voice coil, high-temperature wire, and ferro-fluid damping enhance the tweeter’s power-handling ability.

The BP10 has a rated frequency response of 20 to 28,000 Hz, a nominal impedance of 6 ohms, and a sensitivity specification of 89 dB. It is recommended for use with amplifiers rated between 20 and 300 watts per channel.

#### **Lab Tests**

We installed the Definitive Technology BP10 speakers about 12 inches in front of a wall, 7 feet apart, and 4 to 5 feet from the side walls of the room. They were angled a few degrees inward for best imaging at the preferred listening position.

### *“Our measurements showed the Definitive Technology BP10 to be an excellent speaker...”*

The composite frequency response—a combination of the averaged room response of the two speakers at a single microphone position and a close-miked (effectively anechoic) measurement of the woofer response—was notably smooth and free from irregularities between 1,000 and 20,000 Hz, varying less than  $\pm 2$  dB over the range. The bass response combining the outputs of the drivers and the port (corrected for their relative dimensions) was within  $\pm 2$  dB from 40 to 800 Hz. The combined curves overlapped for more than an octave, with a slight dip of 3 to 4 dB centered at 1,000 Hz (which may have been a measurement artifact). The smooth bass and midrange output (between 50 and 700 Hz) averaged about 3 dB higher than the output above 1,500 Hz. The overall response variation was only  $\pm 3.5$  dB from 25 to 20,000 Hz. Even at 20 Hz, the output was down a mere 5 or 6 dB from the average level at higher frequencies.

A quasi-anechoic FFT response measurement confirmed the overall shape of the speaker’s frequency-response curve, which sloped downward smoothly by about 4 or 5 dB from 700 or 15,000 Hz. Above 15,000 Hz, the on-axis response

fell off linearly to about -14 dB at 28,000 Hz.

The difference between an on-axis frequency-response measurement and one made 45 degrees off-axis was negligible below 10,000 Hz. At higher frequencies, the two response curves diverged, with a typical difference of about 12 dB up to about 17,000 Hz. The group delay was constant within  $\pm 0.1$  millisecond from about 3,000 to 25,000 Hz. Even in the woofer range, the delay remained less than 1 millisecond down to about 200 Hz.

### *“The two small woofers not only reached down to the lowest musical frequencies, but they did so with surprisingly low distortion.”*

The system’s minimum impedance of 3.5 ohms occurred at 200 Hz. Impedance was 4 ohms at 35 Hz and 4.5 ohms from 5,000 to 10,000 Hz. The maximum was 8 ohms at 65 and 900 Hz. The phase angle of the impedance was less than 22 degrees over the full 20- to 20,000-Hz range.

The BP10 generated a 90-dB sound-pressure level at 1 meter with an input of 2.83 volts of pink noise. At 1,000 and 10,000 Hz, our amplifier clipped (at 850 and 1,100 watts, respectively) before the speaker drivers were overloaded by a single-cycle high-power pulse. At 100 Hz, however, the woofer cone reached the limits of its suspension excursion at an input of 150 watts into a 4.7-ohm impedance.

The woofer distortion, with 2.83 volts input, was between 0.3 and 0.4 percent from 150 to 800 Hz. It increased smoothly at lower frequencies to 1 percent at 100 Hz and 1.6 percent at 80 Hz. The effective crossover frequency between the cone and port output was 75 Hz, where the distortion was about 2 percent from each source. The port distortion remained less than 2 percent down to 43 Hz, reaching 5 percent at 30 Hz.

### *“...the BP10 proved to be all that was claimed for it.”*

#### **Comments**

Our measurements showed the Definitive Technology BP10 to be an excellent speaker by any normal standards of performance. Not only did it have a smooth, flat frequency response, good dispersion, and very little evidence of cabinet diffraction or resonances, but it delivered an impressive amount of clean bass from its two small drivers.

As I have often pointed out, speaker measurements are but a part of the story. The final proof of performance lies *only* in the listening, and that was where the BP10 proved to be all that was claimed for it. This slender, inconspicuous black box delivered an effortless, seamless sound essentially free of spurious emphasis (or de-emphasis) of any part of the spectrum.

The two small woofers not only reached down to the lowest musical frequencies, but they did so with surprisingly low distortion. Side by side with some other speakers twice its size, the BP10 managed to hold its own (or better) in practically every comparison. The other speakers were somewhat more expensive than the BP10, and, naturally, they sounded slightly different (which would be true of any speakers one might compare in this manner), but they and the BP10 were inarguably peers.

The BP10’s imparted an excellent sense of space, probably in good measure a result of their rear-radiating drivers, whose output reflects from the wall behind them. These spatial properties were well demonstrated by the Chesky “Jazz Sampler, Vol. 1,” a CD that has an interesting imaging test track. Short bursts of random noise pan between the left and right speakers and also go up, across, and down to the other speaker. Some speakers fail to reproduce the appearance of up/down travel, whereas others, like the BP10, convey the sensation in a surprisingly effective manner.

### *“...a truly outstanding speaker system.”*

Another point in favor of the BP10 is its relatively unobtrusive size and styling. Its shape makes it suitable for service as a pedestal supporting a small vase or sculpture. Since there is little in its appearance to suggest its function to a nonaudiophile, the BP10 could add an attractive decorative feature to a room while serving at the same time as a truly outstanding speaker system.

It appears that Definitive Technology has hit the bull’s eye squarely with its initial product. The BP10 is an innovative solution to the problem of providing true high-fidelity sound from attractive and reasonably sized speakers at an affordable price.

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