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loudspeaker

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B&W

800 Diamond

KALMAN RUBINSON

LOUDSPEAKER

As B&W's 800 Series has evolved, *Stereophile* has reported on its progress. Lewis Lipnick reviewed the Matrix 801 Series 2 in 1987 (www.stereophile.com/content/bw-matrix-801-series-2-loudspeaker), and Wes Phillips wrote about the Nautilus 801 in 1999 ([content/bw-nautilus-801-loudspeaker](http://www.stereophile.com/content/bw-nautilus-801-loudspeaker)). I reviewed the B&W 800 Signature in 2002 ([content/bw-signature-800-loudspeaker](http://www.stereophile.com/content/bw-signature-800-loudspeaker)), and the 802D in 2005 ([content/bw-802d-loudspeaker](http://www.stereophile.com/content/bw-802d-loudspeaker)). This is getting to be a habit.

In the years I've lived with the 802Ds, they've continued to provide wonderful musical experiences, and, like an old married couple, we've adapted to each other. I've adapted to their slight emphasis of the high frequencies and their upper-bass ripeness; they, in turn, have blended comfortably into my room's décor. But recently B&W sent me a pair of 800 Diamonds, the flagship model of their new range, to challenge my resident 802Ds and the audio world at large.

The 800 Diamond doesn't *look* radically different from its predecessors. Indeed, from the introduction, just before 2000, of B&W's Nautilus series, with its distinctive midrange and tweeter enclosures of tapered Marlan, to the new Diamond series, any changes in appearance have been fewer and subtler than those seen in automobiles each year. However, B&W has advanced the technology with each series, and there is always something new under the hood. With the 800 Diamond, though, some of the visible changes are themselves functionally significant.

First, the new grilles for the woofer and midrange cones are attached to the front panels by invisible magnets, as were only the tweeter grilles on the earlier

DESCRIPTION Three-way, vented-box, floorstanding loudspeaker. Drive-units: 1" (25mm) diamond-dome tweeter, 6" (160mm) woven-Kevlar FST-cone midrange unit, two 10" (250mm) Rohacell-cone woofers. Crossover frequencies: 350Hz, 4kHz. Manufacturer's specifications: Frequency range: -6dB at 25Hz and 33kHz. Frequency response: 32Hz-28kHz, ±3dB on reference axis. Dispersion: within 2dB of on-axis response over 60° (horizontal) and 10° (vertical) arcs. Sensitivity: 90dB SPL (2.83V/m). Harmonic distortion (second

and third harmonics, 90dB, 1m): <1.0%, 45Hz-100kHz; <0.5%, 80Hz-100kHz. Impedance: 8 ohms nominal, 3.1 ohms minimum. Recommended amplification: 50-1000W into 8 ohms with unclipped program. Maximum recommended cable impedance: 0.1 ohm.

DIMENSIONS 46.5" (1180mm) H by 17.7" (450mm) W by 25.4" (645mm) D. Weight: 225 lbs (102kg).

FINISHES Cherrywood, Rosewood, Piano Black Gloss.

SERIAL NUMBERS OF UNITS

REVIEWED 0001013, 0001014, listening; 0000505, measuring.

PRICE \$24,000/pair. Approximate number of dealers: 250.

MANUFACTURER B&W Group Ltd., Dale Road, Worthing, West Sussex BN11 2BH, England, UK.

Tel: (44) 01903-221500.

Fax: (44) 01903-221501.

Web: www.bowers-wilkins.co.uk.

US distributor: B&W Group North

America, 54 Concord Street,

North Reading, MA 01864-2699.

Tel: (978) 664-2870.

Fax: (978) 664-4109.

Web: www.bowers-wilkins.com.



ERIC SWANSON

B&W 800 DIAMOND

series. While that provides for a clean appearance when the grilles aren't in place, it also eliminates the need for any fussy swapping of the phase plugs on the Kevlar FST midrange driver. Previous 800s had a solid phase plug of shiny brass, but before affixing the grille it was necessary to unscrew this and replace it with a hollow plastic plug with a hole in its tip, which served to accept the grille's mounting pin. Who wants to mess with that before receiving visitors, especially if they bring the kids?

Second, and more significant in terms of performance, the Rohacell woofers have smaller dustcaps, but their smaller size is a function of a B&W's new "mushroom" diaphragm construction, which bonds the cone, dustcap, and voice-coil bobbin into a single unit rigid as a girder. B&W's earlier Rohacell woofer cones had a huge central convexity that was part of the diaphragm's design. A more potent electromagnetic engine drives the new woofers, powered by a motor system with two neodymium magnets to provide



The reflex port fires downward.

a more symmetrical magnetic field over long excursions, thereby reducing distortion and increasing dynamic response.

Third, B&W's diamond tweeter has been reengineered. It has a new suspension, and four high-permeability magnets are used to reduce dynamic compression at high volumes.

Fourth and finally, the use of gold-silver-oil Mundorf capacitors in the HF crossover filter—like the diamond tweeter, once restricted to the earlier 800D—is now used throughout the 800 Diamond series, including the 805 bookshelf and the two Diamond center-channel models, the HTM2 and HTM4. This will contribute to more accurate timbral matching in multichannel arrays.

My review samples were finished in a superlative Gloss Piano Black accented with gold trim lines around each driver. The body of the 800 Diamond is supported above the substantial base by five sturdy pillars, three at the front and two at the rear. The space thus created and the matte silver finish of the base top and pillars create the illusion that the large main enclosure is floating in air. Thus, while the 800 Diamond is

MEASUREMENTS

I used DRA Labs' MLSSA system and a calibrated DPA 4006 microphone to measure the B&W 800 Diamond's frequency response in the farfield, and an Earthworks QTC-40 for the nearfield responses. For logistical reasons, the loudspeaker I measured was not one of the samples auditioned by Kal Rubinson. My estimate of the B&W's sensitivity was 90.2dB(B)/2.83V/m, which is within experimental error of the specified 90dB. This is higher than average, but is offset by the fact that the speaker's impedance drops below 4 ohms for most of the midrange and some of the bass (fig.1). There are minima of 3.15 ohms at 91Hz, 3.1 ohms at 620Hz, and 3.67 ohms at 21kHz. Given that there are current-hungry combinations of 4 ohms and -52° electrical phase angle at 62Hz and 5.3 ohms and -39° phase angle at 8.6kHz, I believe this speaker should be rated as a 4 ohm load rather than the specified 8 ohms.

The traces in fig.1 are free from the discontinuities that would imply the existence of cabinet vibrational resonances; using a simple plastic-tape accelerometer, I found nothing. Fig.2, for example, is a cumulative spectral-decay plot calculated from the accelerometer's output while it was fastened to the side of the 800's bass enclosure, level with the upper woofer. There is almost nothing to be seen.

The blue trace in fig.3 shows the response of the woofers (which behaved identically), measured in the farfield above 350Hz and in the nearfield below that frequency. The upper-bass peak in their output will therefore be due to the assumption in the nearfield measurements that the drive-units are operating in a 2π acoustic environment; *ie*, mounted in a baffle that extends to infinity in all directions. The notch in the woofers' output at 25Hz confirms that this is the tuning frequency of the flared, downward-firing port,

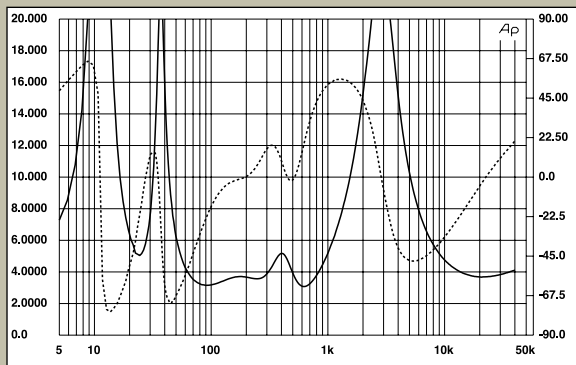


Fig.1 B&W 800 Diamond, electrical impedance (solid) and phase (dashed). (2 ohms/vertical div.)

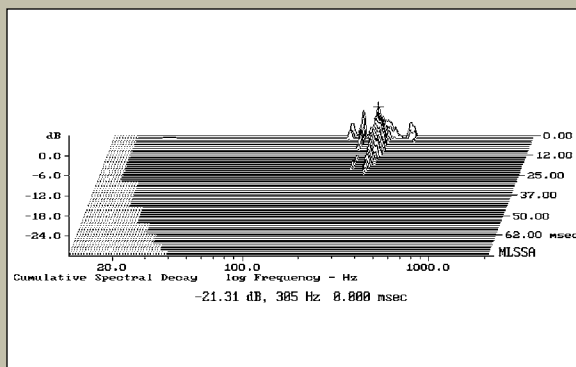


Fig.2 B&W 800 Diamond, cumulative spectral-decay plot calculated from output of accelerometer fastened to center of side panel adjacent to upper woofer (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

only an inch taller than the 802D, and while the 800 Diamond is larger and heavier than the black-based, rosewood-finished 802D, it doesn't look it when placed next to the earlier model.

Set-up

The 800 Diamonds' shipping cartons are huge—I was grateful for the assistance of Park Avenue Audio in unpacking and positioning the speakers. (Actually, I watched, they worked.) Shortly after they had made the cartons disappear, B&W's Doug Henderson and Park Avenue's Dennis Yetikel showed up to advise on the finer points of speaker setup. Henderson had brought along a favorite recording with very full, tight bass, with which he tried to optimize



Tweeter and midrange are acoustically loaded by transmission lines.

the 800s' sound for maximum bass and without excessive bloom. He did that, but I think none of us was really satisfied—there was a lot of bass power, but

with a bit of flab.

Not until I had at last been left alone with the 800 Diamonds did I discover that my Classé CT-SSP surround-sound processor was still configured with bass room-equalization settings for my resident 802D speakers, and that these filters were still in circuit. When I bypassed that EQ, the bass immediately became more taut and defined. (Henderson e-mailed me a copy of his test track and with a little tweaking, I could confirm that the bass was well-defined.)

Sound

But I'm getting ahead of myself. My first impression of the 800 Diamond was that it played much louder than the 802D, even though the two speak-

measurements, continued

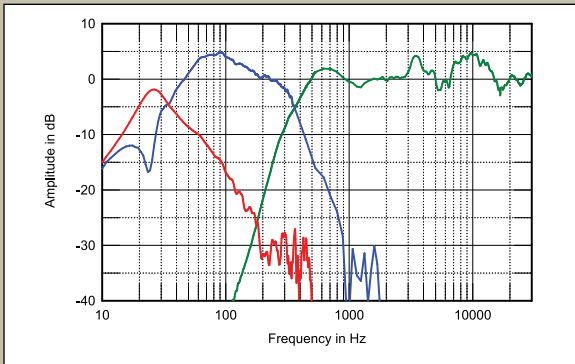


Fig.3 B&W 800 Diamond, low-frequency acoustic crossover on tweeter axis at 50", with nearfield responses of midrange unit (green), woofers (red), and port (blue).

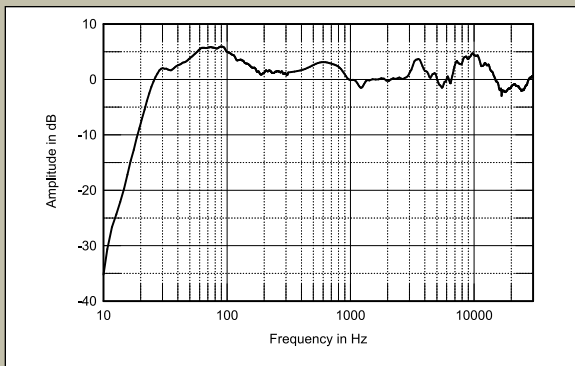


Fig.4 B&W 800 Diamond, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield midrange, woofer, and port responses plotted below 300Hz.

as suggested by the minimum in the impedance magnitude (fig.1, solid trace) at the same frequency. The port's output (fig.3, red trace) covers the range from 13 to 60Hz, making this speaker a true full-range design. The woofers cross over to the midrange unit (fig.3, green trace) at around 370Hz, but the speaker is not as flat in the treble as I would have expected, there being a small peak evident at 3.5kHz, and a broad plateau between 7 and 15kHz.

Fig.4 shows the B&W's response averaged across a 30° horizontal window centered on the tweeter axis. Below 300Hz, this graph shows the sum of the individual nearfield responses, taking into account both acoustic phase and the differing distances of each radiator from a nominal farfield microphone position. Again, the boost in the upper bass is an artifact of the nearfield measurement condition. Under anechoic conditions, this speaker

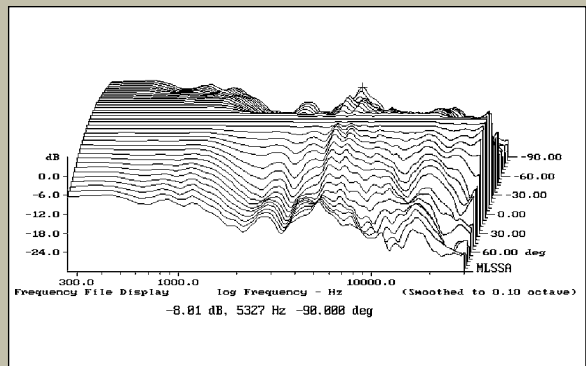


Fig.5 B&W 800 Diamond, lateral response family at 50", normalized to response on tweeter axis, from back to front: differences in response 90-5° off axis, reference response, differences in response 5-90° off axis.

ers' claimed sensitivities are identical. It wasn't long before I realized that the cause was a distinctively more smooth and balanced midrange that projected voices and melodies into the room. As a result, for a typical comfortable listening level, my preferred volume settings for the CT-SSP were 4–5dB lower than for the 802D. That's significant in terms of amplifier power, and may go a long way toward mitigating the general observation that B&W's past 800 models demanded gobs of power.

There's another way to look at this phenomenon. Both the 802D and 800 Diamond could play at very high levels without distress, but I found I could play the 800 at much higher levels without evoking any listener stress. The 802D seemed to have a slight built-in "loudness compensation" that tipped up both the upper-bass and mid-treble; while that was warmly pleasant at normal listening levels, at much higher levels it sounded somewhat overwhelming. Strangely, the larger 800 Diamond had

less artificial "authority" at all levels, while lacking nothing in terms of power, impact, bass extension, or weight.

Boccherini's *La Musica Notturna delle strade di Madrid*, from the Stuttgart Chamber Orchestra's *Die Rohre—The Tube* (SACD, Tacet S 074), which sounds so impressive through the 802Ds, was even better with the 800 Diamonds, with

both ample and tight, as revealed by the fourth movement of Mendelssohn's Organ Sonata 1 in F, as performed by Thomas Murray (CD, Raven OAR-390); as the pedal notes descended, each shudder was not an ambiguous roar but had a clearly discernible pitch.

Bigger ensembles were magnificently portrayed by the 800 Diamonds.

MY FIRST IMPRESSION OF THE 800 DIAMOND WAS THAT IT PLAYED MUCH LOUDER THAN THE 802D, EVEN THOUGH THE TWO SPEAKERS' CLAIMED SENSITIVITIES ARE IDENTICAL.

greater definition in the plucked and bowed strings. There was notably less resonance in the upper bass, which contributed to a more open soundstage as well as to specificity of instrument placement. The 800's bass capabilities were

The last movement of Rachmaninoff's Symphony 1 can seem, in some hands, to go on forever, but André Previn and the London Symphony whip it up real good in their classic recording from 1975 (CD, EMI 64530-2)—I really loved the

will offer full-range low frequencies. And again, the small peaks in the treble behavior can be seen.

How these peaks are perceived will also depend on the speaker's dispersion. Fig.5 shows the lateral dispersion, normalized to the response of the tweeter axis. Although B&W claims that its large-diameter midrange unit has wide dispersion, you can see from this graph that the midrange driver becomes quite directional above 1kHz. In all but small rooms, this will work against the audibility of the small presence-region peak in the on-axis response, meaning that the 800 Diamond will sound more neutral in this region than is suggested by the on-axis measurement. Similarly, what appears to be a narrow off-axis flare at 5.3kHz is actually a small on-axis suckout filling in to the speaker's sides. Finally, this graph shows that the tweeter is a little more directional in the

top audio octave than is typical for a 1" diaphragm; again, this will ameliorate the effect of the on-axis boost in the same region in all but small rooms.

The B&W's tweeter is a high 45.5" from the floor; fortunately, its plot of vertical dispersion (fig.6) indicates that the balance changes only slightly below that axis. A suckout at what I assume is the upper crossover frequency, 3.5kHz, develops more than 5° above the tweeter, however. The blue trace in fig.7 shows the average of the left and right loudspeaker responses, taken at 1m in Kal Rubinson's listening room with XTZ. (Ignore the dropoff above 20kHz, which is due to the measurements being taken with a 44.1kHz sample rate.) The midrange and treble show a broadly flat response trend, though there is some peakiness evident between 3 and 4kHz. The trace is shelved-down below the middle of the midrange in this

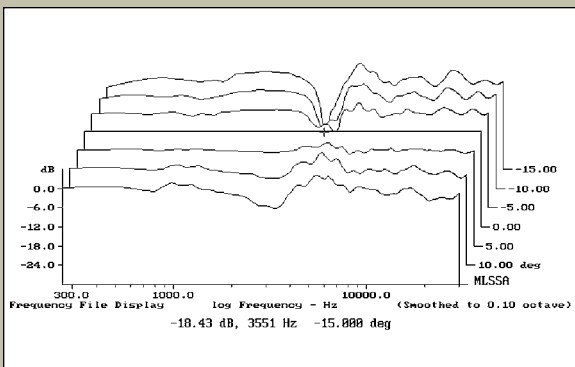


Fig.6 B&W 800 Diamond, vertical response family at 50", normalized to response on tweeter axis, from back to front: differences in response 15–5° above axis, reference response, differences in response 5–15° below axis.

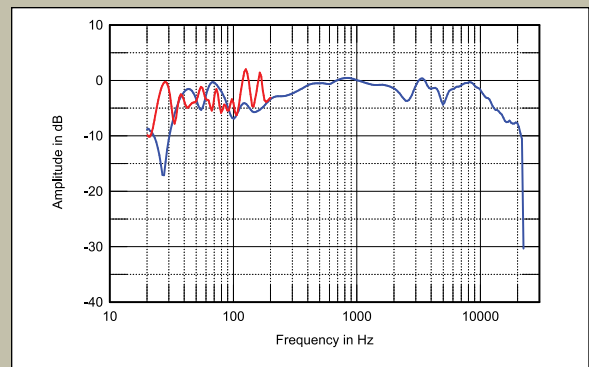


Fig.7 B&W 800 Diamond, 1/6-octave smoothed, averaged response of left and right speakers at 1m in KR's listening room (blue); spatially averaged LF response of left speaker at listening position (4m) in KR's room (red).

snarling brasses, and oh, that bass drum had awesome weight. Even better was Prokofiev's Symphony 5, with Dmitri Kitayenko conducting the Gürzenich-Orchester Köln (CD, Phoenix Edition 135). The two-channel sound through the 800 Diamonds was as powerful and spacious as these forces' earlier set of Shostakovich's symphonies (SACD/CD, Capriccio 71 029) was in multi-channel! The large orchestra was presented as deep and wide, with brass that sparkled and sizzled, sweet upper strings, and weight from the lower strings and percussion. Inner detail illuminated the wind instruments.

If there was any fault to be found in the 800 Diamond, it was the revealing treble of that diamond tweeter. When the recording was a good one, like those mentioned, the highs had a preternatural purity that was simultaneously illuminating and sweet. This made listening to even older recordings of chamber music a delight—for example, the delicacy and coherence of Schubert's *Notturmo*, with members of the Beaux Arts Trio

and pianist Menahem Pressler (CD, Philips 438 700), which is a bit brighter than the recent version from Christian Tetzlaff, Marie-Elisabeth Hecker, and pianist Martin Helmchen (SACD/CD, Pentatone PTC 5186 334). The older recording conveys a sense of time stopped, while the newer makes more

of remastered classic classical recordings. And love them as I do, I found that some Mercury Living Presence SACDs—eg, conductor Paul Paray's collection of works by Chabrier (475 6183), and most of the Eastman-Rochester Symphony Orchestra discs, including those of Hanson's symphonies (Mercury 475

WHEN THE RECORDING WAS A GOOD ONE, THE HIGHS HAD A **PRETERNATURAL PURITY THAT WAS SIMULTANEOUSLY ILLUMINATING AND SWEET.**

of the passionate contrasts; the 800 Diamonds presented both with sweet, round string tone and no harshness or grain. However, with lesser source material, the 800 Diamond's tweeter could reveal blemishes with clinical honesty. Digital music files streamed at low bit rates demanded a high-frequency filter, as did some high-definition downloads

6181)—had more sizzle and snap than was comfortable for me.

But most important, the 800 Diamond sounded absolutely devastating with really good recordings, particularly in its revelation of voices, both solo and in groups. I've pretty much given up on "audiophile preferred" recordings, but demos at the 2011 Consumer

measurements, continued

graph, due to the necessarily short time window used for the FFT analysis, so I have also shown the spatially averaged low-frequency response of the left speaker, taken across a 48" horizontal window centered on the listening position (red). The peaks in the upper and mid bass are due to the resonant modes of Kal's room, but this trace shows that the 800 Diamond's in-room response does extend almost down to 20Hz.

In the time domain, the 800 Diamond's step response on its tweeter axis (fig.8) reveals that all four drive-units are connected in positive acoustic polarity, and that the decay of each blends smoothly with the start of the next lower in frequency. This implies an optimal implementation of the crossover, and correlates with the good frequency-domain integration of their outputs seen in

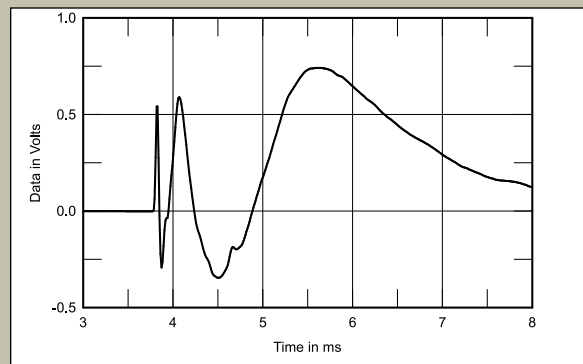


Fig.8 B&W 800 Diamond, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

fig.4. The speaker's cumulative spectral-delay plot (fig.9) is very clean in the region covered by the tweeter, but less so in the upper midrange. There is a slight ridge of delayed energy centered on 3.5kHz that coincides with the slight peak in the on-axis frequency response. The effect of this is difficult to predict, but I suspect that it might increase the feeling of increased resolution of detail.

Overall, the B&W 800 Diamond's measured performance suggests that its balance has been optimized by listening; the various small departures from neutrality tend to balance one another. What surprised me was how similar its behavior in the test lab was to B&W's 802D, which Kal Rubinson reviewed in December 2005 (see www.stereophile.com/content/bw-802d-loudspeaker-measurements). The sonic differences KR describes lie in the details.—John Atkinson

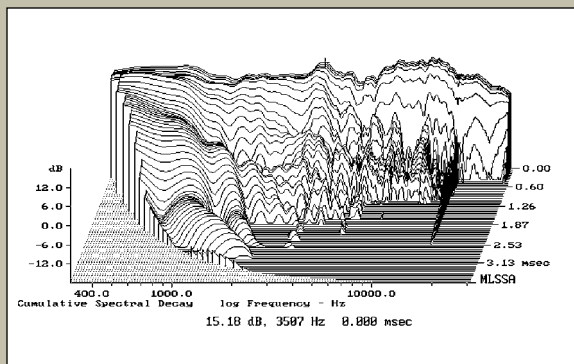


Fig.9 B&W 800 Diamond, cumulative spectral-delay plot on tweeter axis at 50" (0.15ms risetime).

Electronics Show exposed me to many impressive examples. Thanks to Philip O'Hanlon of On a Higher Note, who gave me a CD-R copy of his "Demo Mix XIII," it was easy to try some of these tracks with the 800s. Wow! In the *Agnus dei* from Ariel Ramirez's *Missa Criolla*, conducted by José Luis Ocejo, tenor José Carreras's voice simply floated in space, but with great warmth and presence, as the supporting voices and instruments were arrayed across the soundstage (CD, Philips 420 955 or First Impression Music LIMK2HD040). The voices of Shirley Horn ("Beautiful Love," from *You Won't Forget Me*, Verve 847 482-2) and Renée Fleming (singing Leonard Cohen's "Hallelujah," from her *Dark Hope*, Decca 80014186-2) were magically close and lush, and cushioned in a relaxed, spacious ambience. These recordings, of course, were selected for just these qualities, but if memory serves, none of the hotel-room demos I heard at CES could approach the delight of what two 800 Diamonds did in my living room. My taste in Ms. Fleming's repertoire, however, veers to Richard Strauss and his devastatingly luscious valedictory, *Four Last Songs* (Renée Fleming, Münchner Philharmoniker/Christian Thielemann, Decca 478 0647). Here Ms. Fleming's glorious soprano soared over the spacious carpet of Strauss' orchestra and thrilled me more than Cohen's wry "Hallelujah." For any audiophile worth his salt, what could be more satisfying?

Comparisons

How did the 800 Diamond compare with other speakers that have graced my room in recent months? Without hearing them side by side, I must rely only on my notes to supplement my memory, but here goes. From the midrange down, the Canton Reference 3.2 DC that I reviewed in June 2010 seemed most similar in performance to the B&W, but while the Canton was a bit reticent with voices and throughout the upper midrange, the B&W was more transparent and open. The trade-off was that the Canton was more than forging of steely

ASSOCIATED EQUIPMENT

DIGITAL SOURCES Sony XA-5400ES SACD/CD player, Oppo BDP-83SE universal Blu-ray player.

PREAMPLIFICATION Parasound JC2 BP, Classé CT-SSP surround-sound processor, Meridian HD621 HDMI audio processor & 861 Reference v4/V6 digital surround controllers.

POWER AMPLIFIERS McIntosh MC303 (three-channel), Bel Canto Design REF1000mkII (monoblocks).

LOUDSPEAKERS B&W 802D, Canton Reference 3.2 DC, Revel Ultima/2 Studio.

CABLES Digital: Black Cat Veloce. Interconnect: van den Hul Flat 180, AudioQuest Vodka HDMI, AudioQuest Cheetah/DBS balanced. Speaker: AudioQuest Mont Blanc/DBS biwire. AC: JPS Aluminata.

ACCESSORIES APC S-15, Environmental Potentials EP-2450 power conditioners.

—Kalman Rubinson

violins and the hashy HF of Web radio streamed at low bit rates, where the B&W was fairly ruthless.

As for B&W's own 802D, see my comments above; in brief, the 800 Dia-

mond was distinctly more even throughout the audioband. The 800 Diamond lacked the 802D's generous warmth in the range around 100Hz and, yet, it had a stronger low end with decidedly more dynamic punch. This performance makes me wonder if JA will find the same "awkward combination" of low impedance and phase angles in

BOWERS & WILKINS' 800 DIAMOND WAS, OVERALL, SIMPLY A PLEASURE TO LISTEN TO.

mond was distinctly more even throughout the audioband. The 800 Diamond lacked the 802D's generous warmth in the range around 100Hz and, yet,

the bass as he did with the 802D. As for the Revel Ultima2 Studio (reviewed in March 2008), memory won't permit me to say much more than that I recall it sounding as open and balanced as the 800D, but with a bit less focus in the extreme HF. Hie thee to an audio salon and compare them for yourself.

Conclusions

Bowers & Wilkins' 800 Diamond was, overall, simply a pleasure to listen to. B&W continues to improve the underlying technology of its 800 series speakers and the result is apparent in the 800 Diamond's sound. Its overall honesty, attested to by the 800 series' heritage as studio monitors, lets the 800 Diamond get the most information out of all recordings without, as far as I could tell, any practical limitation in dynamic range. Better yet, the 800 offered the same balanced sound at all listening levels, and the pair of them threw a remarkably huge and detailed soundstage. And surprisingly for such large, elegant-looking speakers, they seem to disappear from your awareness to leave the listener alone with just the music.

