

B&W 805 Diamond (£3750)

Probably the most anticipated loudspeaker in the company's line-up for decades, B&W's 805 Diamond has finally arrived. Yet under the skin much has changed...

Review & Lab: **Keith Howard**

As soon as B&W introduced diamond tweeters to some of its 800 series speakers in 2005, people began asking for a diamond tweeter to be fitted to the smallest model in the range, the 805. To Worthing's annoyance, some even anticipated the development by cannibalising diamond tweeters from other 800 models to fit to the 805S.

Well, the wait is over – the official 805 Diamond is here. Its price has more than doubled over the old 805S, which is no longer being made, but it's inevitable that the least costly model in the range should suffer proportionately more from the fitting of the costly diamond dome. The good news is that this isn't a mere swap job: B&W has taken the opportunity to re-engineer the 805 thoroughly, to the extent that if you thought you might be able somehow to wangle a new bass-mid driver or tweeter to fit to your old 805S, forget it – they won't fit. There are also some new finishes available, including the high gloss black you see here (which replaces the previous black ash on the basis that it looks rather low-rent by comparison), and a mild cosmetic make-over.

RINGING THE CHANGES

At a glance it is the latter which you notice: the new chrome trim rings about each driver and port at the front (where the continuous plastic moulding that formed the flared port mouth and bass-mid driver mounting trim has disappeared) and the chrome-plated input terminals at the rear. Otherwise the 805 Diamond looks much like its predecessor with its trademark woven Kevlar bass-mid unit cone and tweeter perched above the domed top panel in its decoupled, teardrop-shaped housing, with Nautilus tube to absorb the rear radiation from the dome.

But under the skin a lot has changed. The input terminals, for instance, are more than chrome plated, with metal 'nuts' replacing the previous plastic items. In fact the terminals are now made of oxygen-free copper and, yes, B&W did find that a high

degree of copper purity was necessary to maximise sound quality. Moreover, the terminal 'buckets' on the inside are now crimped rather than soldered to the crossover connecting wires.

As before, that crossover is as simple as they come, comprising an air-cored series inductor to the bass-mid unit and new Mundorf silver/gold/oil capacitor in series with the tweeter. While this electrical network gives first-order crossover slopes, the overall acoustic slopes are steeper because of inherent driver roll-offs.

Changes have also been made to the drivers themselves. As well as the new diamond dome, the tweeter gets a revised surround, selected by listening, a new quad-magnet neodymium-iron-boron motor system designed to enhance sensitivity, and a redesigned housing. The bass-mid unit has a new GRP (glassfibre) voice coil former, revised suspension (the spider material and profile have both been changed) and a new surround material. The motor system remains the same but the driver has a new chassis and there has been a small retuning of the bass alignment.

Because of the deletion of the plastic baffle trim, the bass-mid driver also now couples more effectively to the MDF front panel.

By the way, 800 series cabinets are no longer made in Denmark, where B&W originally went to find the expertise in bending

plywood to make the horseshoe-shaped enclosures. They are now manufactured in the UK, in B&W's Worthing factory where the necessary equipment – and know-how – has been imported and installed.

The point of the diamond tweeter, of course, is to move the first breakup resonance of the tweeter dome to well above the audio range. (You can read more about this in the box-out, below right.) But why it should make such an audible difference to raise the resonance frequency, which is already ultrasonic with

an aluminium dome, by about 1.2 octaves to 70kHz is not entirely clear. Improvement in high frequency



RIGHT: At first glance the 805 Diamond looks much like its predecessor except for a few cosmetic differences – but the engineering changes beneath add up to a significant redesign

phase performance has been suggested but that's likely to be overwhelmed by phase effects imposed by the microphones and electronics used in many recordings, and by some replay electronics too.

So the sound quality benefit of the diamond tweeter remains one of audio's intriguing mysteries.

None of which is to say, incidentally, that the 40micron (0.04mm) thick diamond dome provides flat output to 70kHz or so. Because of dome cancellation effects – at frequencies where output from around the tip of the dome is in antiphase to output from areas nearer the surround – there are inevitable dips in even its on-axis output. But the response is maintained out to the stated 70kHz resonance, beyond which the output falls away fast – at least, to the 96kHz limit of my measurements.

SOFTLY, SOFTLY...

The 805S was never a tonally neutral speaker, and the Diamond is no different. That scooped out upper midrange and lower treble response has the pleasant effect of gifting the



805 Diamond great image depth but it does also soften the sound somewhat. If that's how you like your music presented then fine. If you like a little more bite and drama then you will, at the very least, have to choose your ancillaries with care.

My Exposure XVIII Mono amplifiers are hardly backwards in coming forwards, which is a start. I also had the choice of two top-notch CD players as source: the Naim CDX2/DAC/XPS combination I revelled in last month and a Simaudio Moon 750D [see p52]. Of the two, I preferred the Naim with the 805 Diamonds because its dynamic alacrity secured an overall system sound that was better able to retain my attention.

A fine choice for assessing this is the Volodos Schubert piano recording [Sony SICCC 70, Japanese import] I've been turning to a lot recently, which via the Naim/Exposure/B&W combination had a little more of the *joie de vivre* that I expect to hear. To achieve the best sound from the diamond tweeters, by the way, it is essential to remove the protective grilles – although you might want to form the habit of replacing them after every listening session to prevent accidents.

Sympathetically partnered in this way, the 805 Diamond does an unusually fine job of delivering beguiling liquidity of sound on, say, male and female vocals without sounding too sugar-coated. For instance, it revelled in

Radaka Toneff and Steve Dogbrogosz's 'The Moon Is A Harsh Mistress' [Odin NJ 4028-2] – a favourite test track some decades back. Toneff's voice was naturally but not overly warm and the difficult sibilants were handled with notable aplomb by the diamond tweeter. The piano sound was naturally percussive but never harsh and the 'noises off' – presumably Toneff moving about in front of the microphone while Dogbrogosz plays the piano break – somehow made more sense than is often

the case. Overall, the speaker's rendition of this track was as convincing as any I've heard.

Male voice fared excellently too, specifically my established favourite of tenor James Griffett singing that

'The rendition of this test track was as convincing as any I've heard'

moving English folk song 'The Turtle Dove' [Regis RRC1112]. Setting aside the tape print-through that I've bemoaned before, this is as persuasive an advocate of purist microphone technique – here wielded by Tony Faulkner – as you could wish to hear. The 805 Diamonds were perhaps guilty of adding a touch too much chest tone to Griffett's voice but otherwise were captivating, holding his voice rock steady and weaving around it the fine, spacious acoustic of Boxgrove Priory. If it were played in the dark (and particularly if you sat on a hard wooden seat...) the overall effect would be uncannily realistic.

I'm still trying to decide whether *Insen* – the minimalistic/electronic collaboration between Alva Noto and Ryuichi Sakamoto – is a masterpiece or a vexation to the spirit. It really could be either. On Track 6, 'Iano', Sakamoto provides a simple, atmospheric piano line while the accompanying electronic sounds – variously rustles, ☺

DIAMOND DEPOSITS

Diamond has long been a dream diaphragm material for loudspeaker designers not because of its hardness but because of its high longitudinal sound velocity (VL). The textbooks say that diamond has a Young's (tensile) modulus of 1200GPa and density of 3300kg/m³, resulting in a VL of over 19km per second – fully 3.7x that of aluminium, the more normally used tweeter dome material. But B&W says that the relevant figures for its diamond tweeter domes, which are manufactured by 'supermaterials' company Element Six using a chemical vapour deposition (CVD) technique, are about 1000GPa and 3500kg/m³, which translate into a VL of 16.9km/s – about 3.3x that of aluminium. The result is a first dome breakup resonance at around 70kHz, whereas with the 805S's 25mm aluminium dome it occurred at about 30kHz.

LOUDSPEAKER



ABOVE: The chromed terminal posts are made of high purity, oxygen-free copper and have crimped rather than solder connections to the internal cables

peeps and ticks – provide all the rhythmic impetus. The result is strangely compelling – love it or loathe it, you can't ignore it – and the 805 Diamonds made it more so by revealing the nature and manipulation of the electronic sounds in great detail. They also did an unexpectedly good job of conveying the very low synthesised bass notes that this piece contains.

WHAT ABOUT ROCK?

So far the dished frequency response hadn't really been a problem but, as I suspected, the 805 Diamond is not a natural partner for rock music, any more than the 805S was. Free's 'I'll Be Creepin' [Island CRNCD 2 518 456-2] was just too stodgy with a little too much, albeit clean, bass and not enough presence band snap to build a worm hole back to four decades ago. Gwyneth Herbert's 'Annie's Yellow Bag' [naimcd 135] told the same story: the opening bass line was clean but the drum break didn't have the impact required to set this track on fire.

The fact that the 805 Diamond isn't lazy in the bass – B&W has long espoused overdamped bass reflex alignments – prevents it being a write-off on such material but I really can't see the core lack of energy in its sound being acceptable to listeners whose diet is mainly this genre of music.

Point it at an atmospheric orchestral piece like Hilary Hahn's reading of Vaughan Williams' 'Lark Ascending' [DG 00289 474 8732] and the B&W is in its element.

Hahn's violin tone was silken and the big, spacious, elegiac orchestral accompaniment soared like the violin. Smaller classical forces fared well too, like Quatuor Ebène's much-lauded disc of French string quartets by Ravel, Debussy and Fauré [Virgin Classics 50999 519045 2 4]. This recording can sound a bit glutinous but the 805 Diamonds did a fine job of cutting through to natural instrumental timbres, revealing the instruments clearly separated in a believable acoustic. ☺

HI-FI NEWS VERDICT

Adding the diamond tweeter has doubled the price of the 805 and put it in an area of the market where there are many fine floorstanders offering greater perceived value and, at their best, a more neutral tonal balance better suited to a broad range of musical styles. But the 805 Diamond has a beguiling sound that, on the right material, is tough to resist. What it does well it does very well indeed.

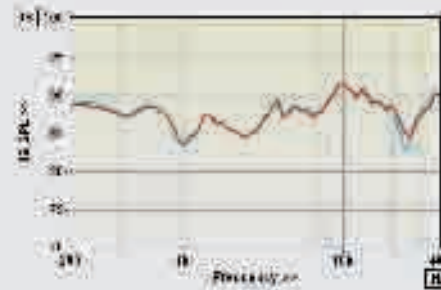
Sound Quality: 84%



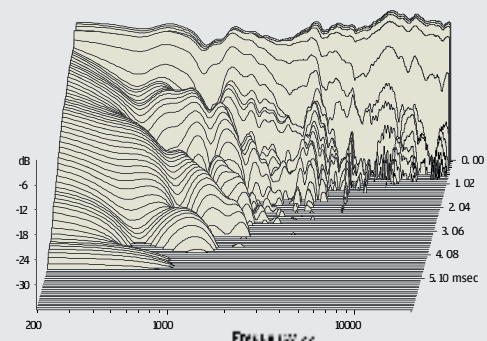
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B&W's claim of 85dB sensitivity for the 805 Diamond accords well with our measurements which returned a pink noise figure of 88.1dB averaged for the review pair – better than we saw with its predecessor. A still higher figure could have been achieved by lowering the impedance but, unlike larger 800 series models of the recent past, the 805 Diamond presents a pretty benign load to its partnering amplifier. We measured a minimum modulus of 4.4ohm, a little lower than B&W's claimed 4.7ohm. Phase angles are high, though, so the minimum EPDR (equivalent peak dissipation resistance) is 2.2ohm at 138Hz but this is still a fairly amplifier-friendly figure. The 805 Diamond – like the 805S before it – has a far from flat on-axis frequency response (measured here on the tweeter axis), the overall trend being notably concave through the presence band, which explains the slightly laidback tonal balance and the high-ish frequency response error figures of ± 4.0 dB for each speaker [see Graph 1, below].

Pair matching is excellent at ± 0.7 dB. There is actually a little less output in the final octave than with the aluminium dome of the 805S, and the -6 dB figure of 22.5kHz (re. 10kHz) for one of the review pair may come as a shock. This appears to be due to a dome cancellation, the tweeter output being maintained to above the 70kHz dome resonance, which is marked by only a small peak in the response (not shown here). The low frequency extension of 45Hz for -6 dB (re. 200Hz) – determined using a diffraction-corrected near-field measurement – accords well with B&W's claims. Some breakup of the woven Kevlar bass-mid cone is suggested in the CSD waterfall [see Graph 2, below]. KH



ABOVE: The response of this latest 805 shows a familiar depression through the presence region



ABOVE: Waterfall shows a clean treble decay but some breakup modes are evident from the Kevlar cone

HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL/1m/2.83Vrms – Mean/IEC/Music)	89.0dB/88.1dB/87.5dB
Impedance modulus min/max (20Hz–20kHz)	4.4ohms @ 200Hz 49.8ohm @ 33Hz
Impedance phase min/max (20Hz–20kHz)	-60° @ 98Hz 63° @ 29Hz
Pair matching (200Hz–20kHz)	± 0.7 dB
LF/HF extension (-6 dB ref 200Hz/10kHz)	45Hz >40 kHz 22.5kHz
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	0.8% / 0.4% / $<0.1\%$
Dimensions (HWD)	418x238x352mm