If you’re a wiz on the topic of loudspeaker design, you’ll already know that the rather strange ‘tweeter-on-top’ configuration that features on B&W’s CM10 has been a feature of this world-famous British manufacturer’s speakers since 1978, when it first appeared on the ground-breaking model DM7. And if you’re a wiz on hi-fi history, you’ll know that when the DM7 was produced, B&W had been building loudspeakers in the United Kingdom for more than a decade, having been founded ‘way back in 1966.

THE EQUIPMENT

The CM10 is a rare design… and not only because of that tweeter! First, it’s a five-driver, three-way bass reflex design. What this means is that it has not one, not two, but three drivers that are completely dedicated to delivering bass… or, more specifically, to delivering frequencies below 350Hz. This is important because the delivery of good bass (that is, bass that’s powerful, extended, tonally rich and without distortion) requires a speaker to move lots of air. And, all other things being equal, the greater the cone area of a speaker, the better the bass. Thanks to using three 165-mm diameter bass drivers, B&W’s CM10 offers 50 per cent greater cone area than almost any other speaker in its category. So if, like me, you were knocked out by the level of bass on offer, you now know why.

As for that tweeter, why, exactly, is it up on top there? It’s there for a couple of reasons. The first involves decoupling. The reason for decoupling the tweeter is that the movements the dome needs to make to create high frequency sounds are so small
B&W CM10 LOUDSPEAKERS

You’ll certainly fall in love after your first listen to B&W’s CM10s, because they just, well, sound so ‘right’!

Instead of using a conventional roll surround suspension, the FST driver instead has only a narrow ring of foam at the outer edge of the cone. Although this ring flexes with movements of the cone, it doesn’t radiate sound like a conventional roll surround because its area is significantly less. Also, less energy is reflected back into the cone than would occur with a conventional roll surround. However, the fixed suspension is fairly susceptible to vibration, so in the CM10 B&W has decoupled the FST driver from the front baffle (because although it appears to be part of the front baffle, the FST is actually connected to the rear of the cabinet by means of a metal rod).

The cone material of the FST midrange (Kevlar) was specifically chosen because it maintains a more constant dispersion pattern over its operating range than any other cone material, as well as because it’s a perfect impedance match with the fixed suspension. Unlike many other companies, B&W impregnates its Kevlar cones with a stiffening resin after which it seals both the resin and fibre by applying a top coat of polymer, thereby improving performance. These are tricks that most other companies have yet to master, but having been using Kevlar since 1974, B&W is a past master at this.

In every single loudspeaker system that does not have a dedicated midrange driver, the sound will be affected by Doppler distortion, caused by the cone moving long distances to produce low bass frequencies at the same time that it’s also moving short distances to produce midrange frequencies. There’s no way of getting accurate, low-distortion sound from a driver that has to simultaneously produce both bass and midrange sounds.

The CM10 stands 1087mm high, and is 366mm wide and 414mm deep. Weight is 33.5kg. The CM10s are available in a two real-wood veneers (Rosenut and Wenge) or you can buy painted versions in your choice of either gloss black or satin white.

LISTENING SESSIONS

Ever fallen in love at first sight? Even if you haven’t, you’ll certainly fall in love after your first listen to B&W’s CM10s, because they just, well, sound so ‘right’! And it really doesn’t matter what the first track you play is, because no matter what genre of music you choose: classical, rock, jazz, hip-hop, scar, opera... you name it... you’ll

B&W CM10 LOUDSPEAKERS

Brand: B&W
Model: CM10
Category: Floorstanding Loudspeakers
RRP: $5,499
Warranty: Five Years
Distributor: Convoy International Pty Ltd
Address: Unit 7, 1801 Botany Road
Banksmeadow NSW 2019
T: (02) 9666 0700
E: info@convoy.com.au
W: www.e-hifi.com.au

Superb hf extension
Pelucid mids
Balanced lows

Unusual appearance
High centre of gravity

LAB REPORT: Turn to page 85
Test results apply to review sample only.

B&W calls a ‘double dome’, but in fact it’s only the edge of the tweeter’s dome that is strengthened and stiffened by using a second layer of aluminium. This extra thickness stiffens the whole structure and pushes the first break-up frequency out to 38kHz, which increases linearity in the audio band.

In a world where most hard-dome tweeters start breaking up a bit above 20kHz, that’s a huge achievement. B&W has also recycled technology it developed for its famous Nautilus speaker ($95,000 per pair!) in the CM10’s tweeter, because the output from the rear of the CM10’s tweeter’s dome is absorbed by a ‘Nautilus’ tube, effectively reducing unwanted resonances and preventing reflections.

Look closely at the CM10’s midrange driver and you’ll see that it, too, is a unique design: completely different from a conventional midrange driver. B&W calls this design a ‘fixed suspension transducer’ (FST).

High centre of gravity
Unusual appearance
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On TEST

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immediately recognise that you’re listening to a superb pair of loudspeakers… that you’re in the presence of greatness. The overwhelming impression is of the music sounding ‘whole’ so that there’s no longer bass, midrange and treble, but instead just a seamless ribbon of sound, transitioning ever-upwards without limitation. And when I say ‘ever-upwards’, the high-frequency extension of B&W’s new tweeter is almost as astonishing as its dispersion… it goes so high it should come with a bat warning!

More seriously though, if you’re paying good money for high-res audio tracks that push response beyond CD’s 20kHz limitation, the CM10’s tweeter is made for you. And while you’re auditioning, check its dispersion by moving around—don’t stay anchored in the ‘sweet spot’ even though it’s so alluring. Off-axis you’ll find the treble is just as sweet… and just as extended. It’s truly very impressive!

The sound of the FST midrange is something else. It’s a well-known fact (at least in speaker designer circles) that when B&W built its first FST, many speaker builders were ordering them so they could use them to build designs using it for use in their own homes. Because B&W wouldn’t sell them commercially, they were ordering them clandestinely, one at a time, under the guise they needed a ‘spare part’ for a B&W speaker whose FST driver had been damaged.

If that doesn’t give you an idea of how good the FST midrange driver sounds, even the briefest audition of a track featuring your favourite female vocalist will prove the point—and most especially if she’s accompanied by solo acoustic guitar or a grand piano.

The sound has a pellucidity that has to be experienced to be believed.

B&W has, thankfully, resisted the temptation to use the enormous spare capacity of its three bass drivers to deliver excessive bass, or even to push the bass forward in the mix. Instead, it’s tuned them so there’s absolutely no distortion audible, even when you have turned the volume control ‘way up. So far as deep bass is concerned, the CM10 has more bass extension than most people will ever need. (Aficionados of the pipe organ may disagree.) Another advantage is that the speakers sound ‘deep’ even when you’re playing at very low volume levels…. a welcome trait that is, unfortunately, very rare to find.

B&W CM10 LOUDSPEAKERS

**CONCLUSION**

Where B&W leads, other loudspeaker manufacturers often follow… but when it comes to the CM10, it’s very unlikely that others will follow, because there’s just so much high-tech built in that it would be very hard to copy this design and impossible to do so and sell it for the same price as B&W. Which means that if you want a speaker that sounds this good… and costs as little! … then B&W’s CM10 is the only game in town.

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**Jutta Dziwnik**
LABORATORY TEST REPORT

Newport Test Labs measured the frequency response of the B&W CM10 speakers as being very flat indeed. The first example of this is shown in Graph 1, which shows the in-room response of the CM10s via a trace that is the averaged result of nine individual sweeps measured at three metres, in a grid with the central grid point on-axis with the tweeter. The source stimulus was pink noise, which is a very difficult signal for any loudspeaker, particularly in the treble, as there is equal energy in every octave, so the speaker is working at maximum capacity right across the audio band. As you can see, the CM10’s frequency response was exceedingly flat, extending from 41Hz to 20kHz ±3dB.

Although the flatness of a frequency response is important, the balance is also important, in that the ±3dB variations in the response should be distributed equally across the audio band. You can see that there’s no ‘tilt’ on the CM10’s response at all: the roll-offs are in the deep bass and the high treble, as they should be. Importantly, across the midrange, the response is superbly flat and linear, extending from around 200Hz to 6kHz within ±1dB, and from around 100Hz to 10kHz within ±2dB.

Graph 2 shows the high-frequency response in greater detail and with the high-frequency measurement limit stretched up to 40kHz, measured 15 degrees off-axis from the tweeter, with the grille in place. You can see the tweeter’s response continues to roll off gently above 20kHz to be around 5dB down at 27kHz, after which there’s a rise to the dome’s resonant peak at around 36kHz. Graph 3 shows this same response again (as the blue trace) together with traces measured directly on-axis with

![Graph 1](image1)

Graph 1. Averaged frequency response using pink noise test stimulus with capture unsmoothed. This trace is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter. (B&W CM10)

![Graph 2](image2)

Graph 2. High-frequency response, expanded view, 15-degrees off-axis. Test stimulus gated sine. Microphone placed at one metre 15 degrees off-axis with dome tweeter. Lower measurement limit 600Hz. (B&W CM10 Loudspeaker)

![Graph 3](image3)

Graph 3. High-frequency response, expanded view. Test stimulus gated sine. Microphone placed at one metre on-axis with tweeter without grille (black trace), on-axis with grille (red trace) and 15-degrees off-axis with grille (blue trace). Lower measurement limit 600Hz.

![Graph 4](image4)

Graph 4. Low frequency response of bass reflex port without bung (red trace); with half-bung (yellow trace); lowest woofer (black trace); middle woofer (green trace); highest woofer (blue trace); midrange driver (pink trace). Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas. (B&W CM10 Loudspeaker)

![Graph 5](image5)

Graph 5. Impedance modulus of left (red trace) and right (yellow trace) speakers without bung; with full bung (blue trace; high-pass section (brown trace); low-pass section (pink trace)) plus phase (dark blue trace). Black trace under is reference 3-ohm precision calibration resistor. (B&W CM10 Loudspeakers)

![Graph 6](image6)

Graph 6. Composite response plot. Red trace is output of bass reflex port. Dark blue trace is anechoic response of bass driver. Light blue trace is one response of midrange driver. Pink trace is gated (simulated anechoic) response above 600Hz. Black trace is averaged in-room pink noise response (from Graph 1). (B&W CM10 Loudspeaker)
the grille (red trace) and without it (black trace). You can see that on-axis, there’s a suck-out at around 5.2kHz, but this would seem to be a microphone-related measurement artefact, which is why it doesn’t show in the 15° off-axis trace. Even if it is speaker-related, it’s too sharp to be audible, which is why it doesn’t show at all on the pink noise trace. (And if you’re at all concerned, don’t aim the speakers directly at the listening position: offset them 15°. Listening off-axis also ameliorates the extent of that high-frequency resonance at around 36kHz, but since this frequency is ‘way above the limit of human hearing, it would make no difference to perceived sound quality.

The low frequency performance of the CM10 was measured by Newport Test Labs using the nearfield technique. You can see that all three bass drivers are operated in parallel and so deliver almost identical low-frequency responses below the crossover point. At higher frequencies, the traces are not identical due to differences in the rear-loading on the cones caused by the fact that they’re different distances away from the bass reflex port, and at different positions in the cabinet in relation to its height. You can see that although the electrical crossover is at 350Hz, the acoustical crossover is a little lower, at around 325Hz.

The performance of the FST midrange driver (pink trace) is absolutely outstanding: very flat with superbly controlled roll-offs. The output from the bass reflex port is shown without the bung (red trace) and with it (yellow trace), showing the expected reduction in output accompanied by a shift downwards in frequency of the port’s maximum output (from 20Hz down to 15Hz).

Graph 5 looks a little complex, because it shows multiple impedance modulus. The impedances of the left (red trace) and right (yellow trace) speakers are shown without their bungs in place, and you can see that they track very closely, indicating good quality control at B&W’s Chinese factory. It also shows the two resonant peaks in this enclosure configuration are at 15Hz and 60kHz, with the ‘saddle’ at 25Hz, which indicates to me that with favourable room positioning, the in-room response of the CM10 could extend below 30Hz. There’s also an impedance trace with a full bung (blue trace) which essentially turns the speaker into an infinite baffle, rather than a reflex design. This results in a single resonance, at around 50Hz. Irrespective of what configuration you choose, the CM10’s impedance dips below 4Ω from around 80Hz up to around 400Hz, and to a low of 3Ω at 125Hz, so you should use an amplifier that’s capable of driving low-impedance loads… preferably down to 2Ω. Although B&W rates the nominal impedance of the CM10 at 8Ω, I’d personally rate it as being nominally 4Ω.

Newport Test Labs measured the sensitivity of the B&W CM10 as being 87.8dB SPL at one metre, under that lab’s usual stringent test conditions—which is around 2dB lower than B&W’s specification of 90dB SPL, but a little higher than the average of 87dB SPL recorded by most speakers. In sum, the measured performance of the B&W CM10, as tested by Newport Test Labs, was outstanding in every aspect.

Steve Holding