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MBL's 'digital only' C41 preamplifier takes gold!

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MBL Cadenza C41/C21

A new addition to MBL's Cadenza Line, the C41 is a digital-only DAC/preamp that boasts custom reclocking, digital filtering and a trick that side-steps 'digital clipping'
 Review: **Andrew Everard & Paul Miller** Lab: **Paul Miller**

Based in Berlin, German company MBL is perhaps still best known for its omni-directional Radialstrahler loudspeakers [HFN Jun '21], spreading their output over 360° in the cause of creating sound that fills a room. The idea isn't new – the design was first launched at IFA in Berlin in 1979, in the times when audio was a major focus of that show – but it has been developed and refined over almost five decades, and is still a mainstay of the company's lineup.

But for anyone reading this review and expressing surprise that MBL also makes 'front end' electronics, that's nothing new, either – the 1986 arrival of the 6010 preamp, also known as Der Vorverstärker, created similar incredulity, so bound was the company to its radical speaker design. Since then, MBL has developed and expanded its range, the latest arrival being the £7820 C41 streamer, combining the functions of network player, DAC and preamplifier, and usable straight into a power amp such as the partnering C21, priced £6720 and claiming 180W/8ohm [see PM's Lab Report, p45].

Neither unit is what you'd call a shrinking violet, and although the pairing tested is part of the Cadenza lineup, above which sit the Noble and Reference ranges, it's striking in its looks, and comes in a choice of finishes. You can have the gloss black with gold detailing seen here, the same with Palinux silver/chrome trim, or either of those with an all-white main body.

SIMPLY DOES IT

Whichever you choose, you get the solidity of build and finish concomitant with that whole 'Made in Germany' thing. The C41 alone weighs 15.5kg – a poundage which, though certainly substantial, doesn't probe the higher reaches of high-end daftness. For all that glistening trim and equipment-rack presence, this MBL pairing has a distinct air of 'sensible' about it.

And there's simplicity, too: eschewing the 'bells and whistles' approach of many network-connected players, the C41 has just Ethernet and USB-B inputs for

streaming and playback from a computer, plus AES/EBU, coaxial and optical digital ins. Its output provision is similarly frill-free – a single coaxial digital out and analogue audio available on balanced XLRs and RCAs, their volume controlled by the single front

panel knob to provide that 'straight into a power amp' preamp functionality. Of course, you could also cut out the middleman and run the C41 directly into a pair of active speakers...

The player itself is also decidedly simple, apart from

the use of MBL's True Peak technology [see PM's boxout, p40]. The backbone of the digital-to-analogue conversion employs the almost-ubiquitous ESS Sabre solution, while the streaming capability is implemented using one of those Raspberry Pi 'computer on a board' devices. But why not? If there are tried-and-tested solutions out there, where's the sense in trying to reinvent the wheel? Better to concentrate the design and engineering effort on maximising performance, which is what MBL has endeavoured to do with its own power

supplies, re-clocking and custom DSP/digital filter and upsampling technologies [see PM's Lab Report, p41]. The fully balanced analogue output stage is an MBL staple as well, of course.

Neither is the actual streaming capability exactly groundbreaking as the C41 only accepts file formats up to 192kHz/24-bit, in addition ↻

'Where's the sense in trying to reinvent the wheel?'



LEFT: The C41 [top] and C21 [bottom] are offered in various gloss black/white colourways with gold/Palinux highlights. The displays have adjustable brightness, the C41's indicating input, sample rate, volume level and the menu tree. The latter is navigated via a row of context-dependent buttons



'You can cut out the middleman and run the C41 into a pair of active speakers...'





LEFT: The C41 [top] includes Ethernet and USB ports alongside AES/EBU and coax/optical [all to 192kHz/DSD64]. The coax digital output mirrors all digital inputs while the variable analogue out is on RCAs and balanced XLRs. The C21 [bottom] has matching analogue ins with unswitched 4mm speaker cable binding posts

XLRs, there's a single set of 4mm speaker cable terminals for each channel, and the company's SmartLink sockets, used across the range, allow for system integration.

POLISHED PAIR

Hooked up to the flagship Bowers & Wilkins 801 D4 Signature speakers [HFN Sep '23] and fed from an Aurender W20SE music server [HFN Mar '23], this MBL combination sets out its stall in short order. Early

impressions might well be of a bold and largescale sound, with excellent instrumental detail and precise soundstaging where the recording allows, but is it a bit too polite and well-mannered at the same time?

As it turns out, this is very dependent on what's coming down the pipe, so playing devil's advocate I fired up 'Medicine Show' from Big Audio Dynamite's *This Is...* album [CBS 26714]. Not the last word in hi-fi, agreed, but a track with plenty going on

'I was treated to a mighty and stately "Great Gate Of Kiev"'

to DSD64 via DoP. Nevertheless, that 'only should be more than adequate for most users' needs. I suppose those of us who occasionally play 352.8kHz/32-bit DXD-resolution or DSD256 (or even 512) files are very much in the minority.

ON THE CARDS

Streaming services? The company cites Qobuz, Roon, Spotify, and Tidal, although it admits some of these may be part of the C41's 'easy expandability and updateability through online updates'. That's not a major problem if these updates are indeed on their way, but it's unusual these days to find a device requiring an SD card to be inserted to carry them out.

The C21 amp has been around for a while, and is part of a range of power amplifiers from MBL – also in the Cadenza

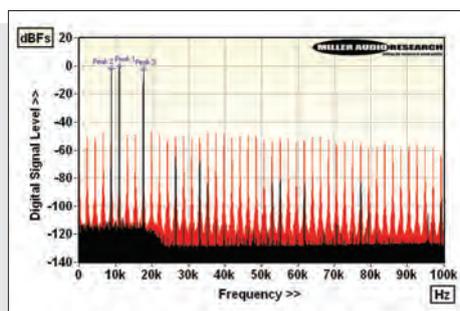
series there's the C15 monoblock, and there are several even more powerful models further up the hierarchy. Like MBL's other designs, the C21 uses its Class D 'Linear Analogue Switching Amplifier' (LASA) architecture, this being said to 'deliver prodigious amplifier power, minimal thermal loss, and go about its business with stoic calm – even when managing loudspeakers with challenging loads'.

The interior layout of the amplifier [see p45] is clean and logical, with a shielded transformer and a bank of 16 massive smoothing capacitors, plus relatively compact heatsinking located up behind the front-panel. Inputs are provided on both unbalanced RCA and balanced

INTERSAMPLE CLIPPING

As illustrated almost every month in our unique 'HD Music' section [see p98], far too many digital downloads and streams are normalised right up to, or very close to, the 0.0dBFS digital limit. This drive to achieve 'maximum loudness' is counter-productive for several reasons – most modern media has a peak-to-RMS range of just a few bits anyway, while running the analogue output at full gas may highlight limitations of its own. More insidious still is the phenomenon of 'intersample clipping', particularly with lower sample-rate CD media. Never heard of it? Here's a brief primer...

During digital recording, music signals are sampled and then quantised to create the binary code that represents the amplitude of each sample in time. However, if the highest digital values are then normalised close to 0.0dBFS, then it's entirely possible that a DAC's oversampling filter will reconstruct signal peaks between samples that notionally exceed 0.0dBFS. It's important to appreciate that the digital

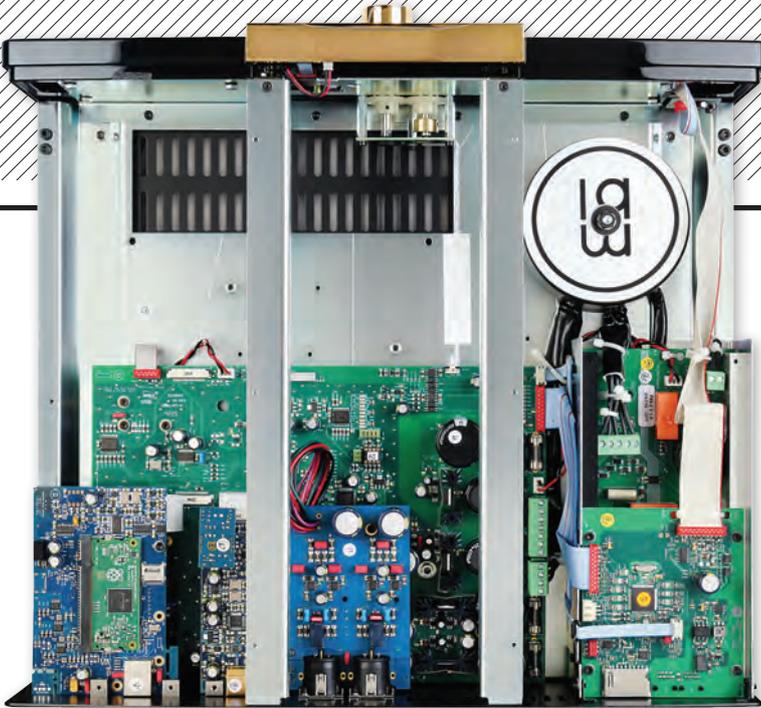


data is not 'clipped' but that in the process of upsampling this data, signals are realised that lie above this digital glass ceiling, beyond which is a netherworld of catastrophic clipping and momentary bursts of distortion. Of course, if the interpolator is designed with a few dB of headroom in tow – as is the case with MBL's 'True Peak Technology' – then these peaks, known

as 'intersample overs', are carried through without clipping. Few commercial DACs have this headroom, or so it seems. To test the efficacy of MBL's custom upsampler I programmed a digital feed based on integer (and half integer) divisors of the 44.1kHz sample rate with a combined peak value of 0.0dBFS and an RMS value of -6.4dBFS. The inset Graph [above] compares the result of this data passing through a well-known converter equipped with a Burr-Brown DAC [red spectrum] with the clipping-free output of MBL's C41 [black spectrum]. Proof positive I'd say, and something we'll be keeping an eye on in future DAC reviews. PM

LAB REPORT

MBL C41



ABOVE: Screened toroidal transformer [top right] feeds regulated PSUs [bottom, centre] for the C41's network/digital input board (with Raspberry Pi module) [bottom left] and balanced analogue output board [blue, bottom centre]

over many layers, all of which the MBL C41/C21 system revealed with clarity to spare. What you don't get is all the 'Spaghetti Western' grit, or the fullest punch in the bass.

STERN TEST

Seeking to find out what's going on here, next off the server was the 'Young Person's Guide To The Orchestra', from Michael Stern's *Britten's Orchestra* album with the Kansas City Symphony, an excellent Keith 'Prof' Johnson production for Reference Recordings [RR-120SACD]. As the title suggests, this is a fine 'check disc' for instrumental timbres, which I why I use it so much when assessing products, and while this MBL pairing sounded a little loose

in the bass, there was no denying the scale and musical flow.

True, there are set-ups capable of even greater timbral colour, and a bit more snap and sting, especially in the percussion, but the C41/C21 gives a fine sense of the



LEFT: MBL's all-alloy remote also caters for its disc players and preamps. Input, volume, display dim, mute and standby are used for the C41

music reaching out to capture the listener, making what could seem like an academic exercise – indeed, that was its original purpose – an involving musical experience. Just the thing to get those 'young persons' interested in orchestras!

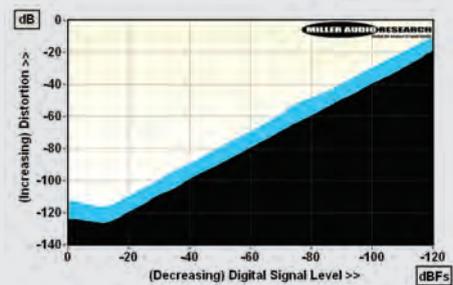
AUDIO FROM A-Z

With music of a more pared back nature, the precision of the C41/C21 duo becomes even more apparent. Playing 'Adam Alphabet' from the Neil Cowley Trio's *Entity* [Hide Inside Records; HIDELO003], there was still that slight lack of intimacy, but the piano was persuasively focused in the soundstage, and the bass and drums powerful without dominating matters, driving the track along. And intimacy wasn't lacking in Madeleine Peyroux's take on Leonard Cohen's 'Dance Me To The End Of Love', from her 2004 *Careless Love* album [Rouder Records/Universal 0602498235836], not least due to the retro-style recording of her voice. Okay, the band occasionally gets lost in the wash of sound, but the effect is superbly appealing.

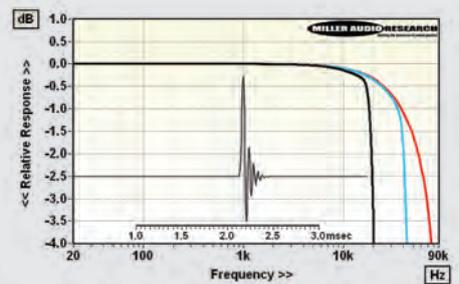
So, yes, this combination can sound big and lush when required, as it proved with the smooth flow of the Budapest Festival Orchestra under Ivan Fischer in the 'Siegfried Idyll' from the *Wagner: Opera Excerpts* recital [Channel Classics CCSSA32713]. Here the MBL C41 and C21 offered good insight into the orchestra, but above all provided a compelling view of the romantic, unhurried sweep of the piece. ➔

This new Cadenza C41 is a clear evolution over the older C31 [HFN Sep '12] despite there being very little uplift in price (about £1000) in some 12 years. The C31 was limited to 96kHz playback, the C41 to 192kHz/DSD64, just as the former employed a Crystal CS4398 DAC and the latter an ES9038PRO. Some core philosophies are retained, albeit improved, including the balanced analogue output stage which, at maximum volume ('70' on the display), still delivers 4.0V from a 97ohm source impedance. In the C41, however, the C31's 113dB A-wtd S/N ratio is improved to a very wide 115.8dB regardless of digital input. Low distortion was another hallmark of the C31 and it's lower still through the C41 – a feature of both MBL's own core DSP as it is the ESS DAC – at 0.00005-0.00035% (20Hz-20kHz, re. 0dBFS). Distortion is lowest over the top 10dB of the C41's range [see Graph 1], falling to a minimum of 0.00003-0.0002% (also 20Hz-20kHz). Low-level resolution is true to ±0.2dB over a full 110dB dynamic range and digital jitter is almost fully suppressed at <8psec via all digital inputs over all 44.1-192kHz/24-bit rates.

The response, meanwhile, is modified by MBL's own slow roll-off minimum phase digital filter and, of course, the incoming sample rate, resulting in slightly early treble roll-offs of -3.55dB/20kHz and -1.25dB/20kHz with 44.1kHz and 48kHz files, respectively, before reaching out to -6.2dB/45kHz and -10.9dB/90kHz with 96kHz and 192kHz audio media [Graph 2]. MBL's filter operates in place of one or more of the seven digital filters bundled into the ESS DAC and trades greatly reduced post-ringing (and zero pre- or acausal ringing) for a relatively limited stopband rejection of just 19dB. For an independent analysis of MBL's 'True Peak Technology' see our boxout on p40. PM



ABOVE: Distortion versus 48kHz/24-bit digital signal level over a 120dB range (black, 1kHz; blue, 20kHz)



ABOVE: Impulse (time) and frequency responses with 48kHz (black), 96kHz (blue) and 192kHz (red) inputs

HI-FI NEWS SPECIFICATIONS

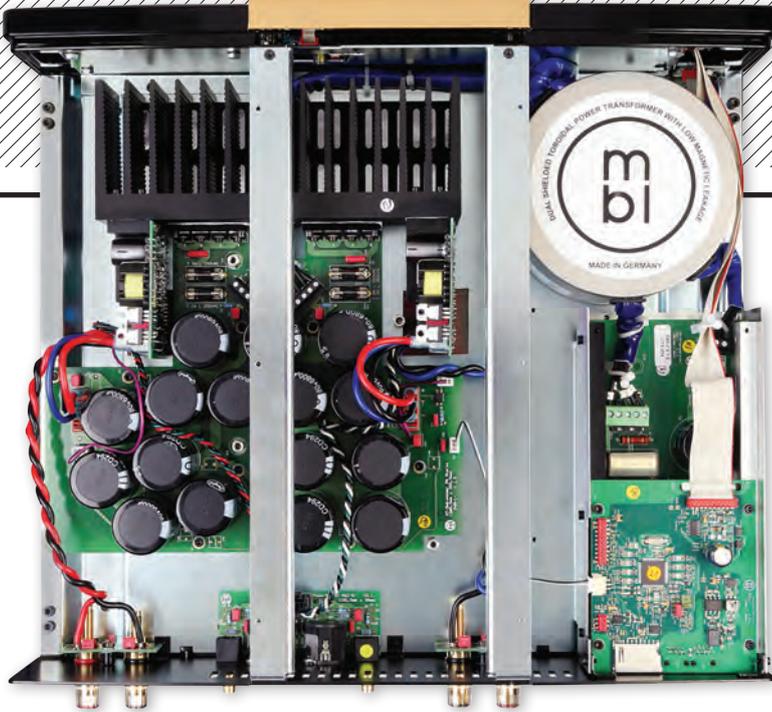
Maximum output level / Impedance	3.99Vrms / 97ohm (XLR)
A-wtd S/N ratio (USB/Coax; re. 0dBFS)	115.8dB / 115.8dB
Distortion (1kHz, 0dBFS/-30dBFS)	0.00005% / 0.00025%
Distortion & Noise (20kHz, 0dBFS/-30dBFS)	0.00035% / 0.0005%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0 to -1.3dB/-6.2dB/-11dB
Digital jitter (48kHz / 96kHz / 192kHz)	5psec / 6psec / 8psec
Resolution (1kHz @ -100dBFS/-110dBFS)	±0.1dB / ±0.2dB
Power consumption	22W (1W standby)
Dimensions (WHD) / Weight	450x145x445mm / 15.5kg

LAB REPORT

MBL C21

While we have teamed-up the new C41 with this C21 power amp – MBL's own suggested pairing – the latter is, in fact, a ten-year veteran of the Cadenza range and host to the brand's 'mk1' LASA (Linear Analogue Switching Amplifier) Class D output stage. As a result, its performance pre-dates the Ncore-based LASA 2.0 technology employed in the N15 power amplifier [HFN Feb '22] from the Noble range. Certain LASA traits are retained, including a very useable dynamic headroom – something rarely encountered with Class D stages where power output under continuous and dynamic conditions is typically the same. So, while the C21 meets its rated 180W/8ohm and 300W/4ohm specification at 2x200W and 2x350W, respectively, it goes on to deliver a full 265W/8ohm and 510W/4ohm under dynamic conditions (1kHz/10msec at <1% THD) before falling back to 352W/2ohm and 205W/1ohm [see Graph 1, below]. Graph 1 also suggests that the C21 is arguably better suited to 4ohm rather than 8ohm loads, the former enjoying a lower 0.003-0.01% THD rather than 0.001-0.025% over a 1-50W range (all re. 1kHz).

That said, MBL's LASA output stage avoids the load-dependent response issues seen with other, older, Class D solutions. In practice, the C21 offers a fairly uniform 0.011-0.035ohm source impedance (20Hz-20kHz) alongside a response that holds to -0.75dB/20kHz, within -0.2dB, into all loads from 8ohm down to 1ohm. The A-wtd S/N ratio is slightly below average at 80dB (re. 0dBW), not because of an increase in white noise often seen with Class D amps, but courtesy of a spurious peak at 7.4kHz. Without this, likely inaudible tone, the C21's A-wtd S/N would be closer to a very fine 88dB (re. 0dBW). PM



ABOVE: Shielded toroidal mains transformer [top right] supplies separate linear PSUs [centre left] that feed the C21's two LASA (Class D) output modules [top left]. MBL's SmartLink control PCB [bottom right] mirrors that fitted to the C41 [see p41]

Another atmospheric Channel Classics recording – this time Anna Fedorova's solo piano from *Intrigues Of The Darkness* [CCS47124] – saw this Cadenza pairing making the most of the reverberant acoustic and the weight of the piano, both in the almost terrifying Scriabin 'Black Mass' sonata and the selections from 'Pictures At An Exhibition'.

BY JUPITER!

The notes tumbled together in the 'Limoges' section of the latter, and then I was treated to a mighty and stately 'Great Gate Of Kiev'. This wonderful recording features sensational playing from the Ukrainian-born pianist, and the C41/C21 relished conveying all its complex and intertwined qualities.

What's more, this player and power amplifier appear to have a natural affinity with vocals, presenting them with clarity, intelligibility and plenty of presence. However unfashionable it may be with the music snobberati, Chris Martin's vocal on 'Jupiter', from Coldplay's *Moon Music* album [Parlophone; 48kHz/24-bit download], is so vivid in its simplicity, and excellently focused. Even as the track gets louder and more anthemic, as Coldplay tends to, that clarity was maintained to fine effect by the C41/C21. Meanwhile the band's 'Alien Hits/Alien Music', which can be rendered as a confused wall of sound, instead took on the effect of a wall of fascinating elements, each completely distinct.

Switch to the good time ambience of Paul Heaton's 'The Blues Came In', from his *The Mighty Several* release [EMI EMICDXX2126], and the track sounds big and bold, the lyrics clear (always a good thing with Heaton's work), and that element of fun and fine songwriting and performance very much intact.

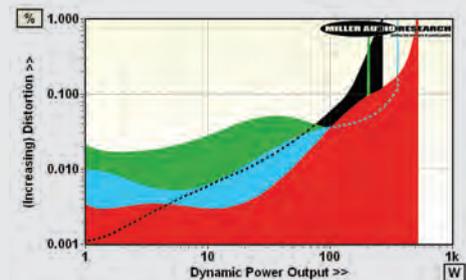
COMMUNICATION KING

And that's the beauty of this two-box combination from MBL: it may be lacking a little when it comes to the multifunctionality available elsewhere, the styling may be a little ostentatious, and the sound might just be on the polite and precise side when one might want it to be rather more abandoned and raunchy. But... it communicates so much of the music's heart and soul that it's impossible not to get on board! ♪

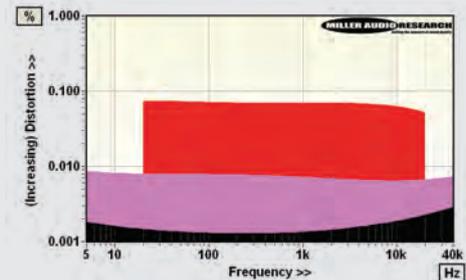
HI-FI NEWS VERDICT

Is the MBL C41/C21 pairing just a little too straitlaced for its own good? Maybe, if your system is so disposed, but what it lacks in the 'down and dirty' stakes it more than compensates for with its measured, precise delivery of fine recordings, and the ambience it can reveal with atmospheric content. So throw caution to the wind because there's much to admire here, and with many delights in store.

Sound Quality: 85%



ABOVE: Dynamic power output versus distortion into 8ohm (black), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads. Maximum current is 14.3A



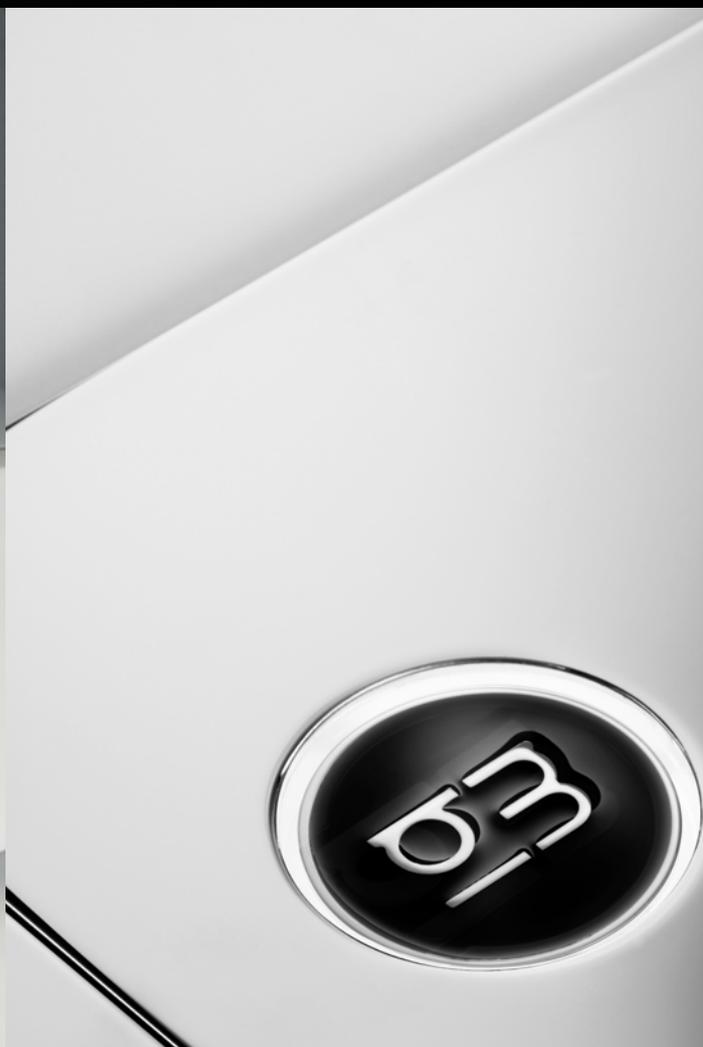
ABOVE: Distortion versus frequency versus power output (1W/8ohm, black; 10W, pink; 100W, red)

HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	200W / 350W
Dynamic power (<1% THD, 8/4/2/1ohm)	265W / 510W / 352W / 205W
Output imp. (20Hz-20kHz/100kHz)	0.011-0.035ohm / 0.39ohm
Freq. resp. (20Hz-20kHz/100kHz)	+0.00dB to -0.75dB/-8.3dB
Input sensitivity (for 0dBW/180W)	273mV / 3700mV
A-wtd S/N ratio (re. 0dBW/180W)	80.2dB / 102.8dB
Distortion (20Hz-20kHz, 10W/8ohm)	0.0065-0.0079%
Power consumption (idle/Rated o/p)	34W / 439W (1W standby)
Dimensions (WHD) / Weight	450x145x445mm / 20kg



*Colour finishes Option: black / gold , black / palinux, white / gold, white / palinux.
Center section Option: complete gold / complete palinux. Side parts Option: piano finish.





This changes everything!

"It communicates so much of the music's heart and soul that it's impossible not to get on board!"

Andrew Everard & Paul Miller, from Hi-Fi News Magazine



C41

Network Player

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