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Q Acoustics Concept 500

Coolly sophisticated to the eye, Q Acoustics' new range-topper is like a swan: the hard work is concealed beneath
 Review: **Keith Howard & Andrew Everard** Lab: **K. Howard**

Even if you hate computer audio, chances are that you listen to it – even if you exclusively play LPs cut from analogue masters – because computers play a key role in the design and development of most modern audio products, loudspeakers in particular. Computers are used for measurement, and they are used for design. Today's computer-aided design processes – in the hands of those who know how best to wield them – facilitate the creation of products which sound better, perform more consistently and more reliably, and cost less too.

The Concept 500, despite the fact that at £4000 it's the most expensive speaker Q Acoustics has yet made, is a case in point. Computer modelling has been applied to all the major aspects of its design, perhaps most significantly to its cabinet. As a floorstander, the Concept 500 obviates the need for a costly stand and puts its extra internal volume to good use in providing both improved bass extension and high-ish sensitivity – two worthwhile advantages.

But its slim, deep proportions – typical of modern floorstanders – bequeath it large side panels that are inevitably prone to bending resonance. In the case of the Concept 500 its two side panels have an area roughly 30 times that of its twin 165mm bass-mid drivers. So for the panels' acoustic output to be, say, 30dB lower than the drivers' (not a stringent standard, but one which many large speakers struggle to achieve) their amplitude of vibration must be approximately 1/1000th that of the driver diaphragms.

If that sounds like an easy thing to achieve, it simply isn't, particularly with the conventional rectangular box cabinet. But it *has* to be achieved, if not bettered, if panel resonances are not to add coloration and mask detail. So the Concept 500 – which was developed with the technical assistance of Fink Audio-Consulting in

Germany [see boxout, facing page] – has had as much attention paid to the design of its cabinet as it has to its bass-mid drivers and tweeter.

Two internal design features are key: P2P (point-to-point) cross-bracing, which controls low-frequency cabinet vibrations; and the Dual Gelcore structure of the enclosure itself. Optimum positioning of the braces is critical and was determined using finite element analysis, before being confirmed by laser interferometry measurements. The two braces immediately behind the twin bass-mid drivers also double as driver mountings.

TRIPLE LAYER DAMPING

Instead of the bass-mid units being screwed to the front baffle around the periphery of their chassis as normal, the magnet assembly is clamped to the cross-brace using a locking nut and compression spring arrangement. This not only means that no trim plate is needed to hide the fasteners, it also banishes the familiar problem of driver screws or bolts loosening over time.

We've seen Gelcore before, in the Concept 20 [HFN Feb '14] and Concept 40 models, but Dual Gelcore goes a step further. Whereas the Concept 20 and 40 have cabinet walls comprising two layers of MDF separated by a non-setting gel adhesive that acts as a constrained layer damping material, in Dual Gelcore three layers of MDF are used, separated by two layers of gel, thereby making the damping even more effective. According to the Concept 500 white paper, between 500Hz and 2kHz cabinet output is lowered

RIGHT: Two 165mm pulp-coned bass/mid units are joined via a 4th-order crossover to a 28mm soft-dome tweeter. The drivers are mounted inside the cabinet using spring-tensioned retaining bolts while a plinth improves stability



FINK AUDIO CONSULTING

The presence of Karl-Heinz Fink at the European launch of the Concept 500 speakers was slightly unusual: the guitar fanatic and speaker designer is often kept in the background by his clients, of which there are many. At least one major car manufacturer, and a global hi-fi brand, would probably rather you didn't know how much of a hand his Essen-based company has in the design and engineering of its audio products. A full-service operation, FAC is able to handle everything from the basics of cabinet and driver design to the sourcing of components and even arranging and supervising production, and it's this package many big names in hi-fi find so appealing. Fink, however, will tell you the secret of his company's success is not a matter of knowing everything about speakers, but rather constantly innovating and investigating new ideas and technologies. 'It's about knowing the questions to ask,' he says, 'and then understanding how the tools we have can answer them right the first time.'

significantly as a result of this complex form of construction, in places by more than 10dB.

DRIVER REFINEMENTS

Care has been taken with the internal acoustics too. Tall, narrow cabinets tend to suffer so-called organ pipe resonance within the enclosed air, associated with the longest internal dimension. To suppress this, the Concept 500 cabinet incorporates Helmholtz Pressure Equalisers (HPEs): twin internal pipes, mounted on the inside of the cabinet side walls, which link the two ends of the cabinet to the centre and significantly reduce the pressure differentials of the fundamental internal length mode. We saw something very similar used recently inside the Yamaha NS-5000 [HFN Jun '17].

Just as a bad cabinet lets down good drivers, poor drivers fail to exploit a good one. So considerable design effort was also expended on both the 165mm bass-mid unit and the 28mm soft dome tweeter. In the former, a 35mm diameter voice coil aids power handling and cooling, and features twin dual layers of copper clad aluminium wiring (CCAW), the effect of which is to provide added 'shove' without increasing moving mass.

These are wound on a glassfibre former, which obviates the eddy current effects of an electrically conductive alternative. Elsewhere in the motor, a copper pole piece cap and aluminium shorting ring help reduce distortion further. Care has been taken not to use an extremely lossy roll surround, as although this helps control diaphragm resonances it can easily result in lacklustre sound quality.

A rubber gasket isolates the tweeter from cabinet vibrations, and care has been taken to minimise resonances within the cavity behind the tweeter's coated microfibre dome. The dome and its surround, together with the profiling of the front plate, have been designed to provide wide dispersion and thereby better maintain off-axis output at high treble frequencies. This reduces disparity between the on-axis spectral balance and that of the first side wall reflection, which obviates the 'deadened' treble character that can otherwise result.

Marrying the drive units is a fourth-order Linkwitz-Riley crossover, the components of which are safely distanced to prevent interaction of the inductors with the drivers' radiated

magnetic fields. A highlight here is a big 10x10cm air-cored inductor from Mundorf which provides significantly lower distortion than the originally specified component, which had a laminated steel core. Capacitors are high spec polypropylene film types, with a Mundorf Supreme used in series with the tweeter. The high-pass and low-pass sections of the crossover are split, allowing bi-wiring or bi-amping, and jumpers on the back panel allow tweeter output to be adjusted by ±0.5dB.

REVELATORY RESULTS

Two things are immediately apparent about the Concept 500 speakers once you get them wired up. The first is that, while relatively easy to drive, they are ruthlessly revealing of source material, and the second is that plenty of care is needed to get the best from them.

The main question revolves around the port in the rear panel [see p37]. →

'Computer modelling drove all aspects of its design'

LOUDSPEAKER

RIGHT: Cutaway shot clearly shows the positioning of Q Acoustics' P2P (Point-to-Point) cabinet reinforcement and constrained, three-layer construction with 'Gelcore' lamination. The crossover is mounted on a rear access panel

and its two-part bungs, comprising an outer ring and a central core, provided to restrict air-flow. Having the whole bung in place makes the speaker more room-friendly when it comes to positioning, but it limits the absolute bass response, as KH notes in his lab report [p37]. I was far from disappointed with the way the speakers sound with the bungs in place, and if you're forced to 'shove the speakers back' in the quest for domestic harmony, their use should definitely be investigated.

However, without them the bass is certainly both weighty and capable of tight control – if, that is, you have the space to let the speakers breathe away from corners as we did in the editor PM's listening room. It's also worth paying attention to the side walls, for while that wide-dispersion tweeter design does a fine job of stretching the 'sweet spot' across the width of a sofa, this can be at the expense of some confusion caused by reflections.

I'd suggest a metre or so in from side and rear walls is ideal, and I ended up with about a 25° toe-in, which focused things nicely. And if you're single-wiring the speakers, try both sets of terminals – I found the upper ones made the speakers just a shade more forward, the lower ones adding a smidge of weight to the sound.

VANISHING ACT

All that said, the Concept 500s are not just remarkable speakers for the money, but striking by any standard in the way they combine weight and power with finesse and detail – but most of all in their ability to just 'vanish' into the room, leaving the listener to concentrate on the music. They're not exactly huge, but they are visually quite striking, especially in the white/light oak finish (there's black/rosewood too), so their sonic vanishing act is all the more impressive.

By creating realistically-scaled, three-dimensional soundstage pictures, and focusing elements with them, they rapidly dispel any idea of the sound coming from the speakers. Instead it's able to stand free, not just in the lateral plane between (and indeed beyond) the enclosures, but also in depth, with performers appearing not just before the listener, but also all the way back beyond the wall behind the speakers.

'The bass line slams in with a truly thunderous attack'

These are among the least 'hi-fi' speakers I've encountered in a very long time – all too often I find myself listening to what the speakers are doing rather than enjoying the music, but the Concept 500s shift the focus firmly on to the recording, and the way the rest of the reproduction chain is affecting it.

Having spent more time listening to these speakers since the main sessions in PM's room, I can attest to the fact that even seemingly insignificant changes to the rest of the system are readily apparent through the Concept 500s.

So yes, they're highly revealing, but what these speakers are really all about is delivering the music, which they do to remarkable effect. With the opening of Supertramp's 'School' [*Crime Of The Century*; A&M 0600753307885; 96kHz/24-bit], the ethereal 'down a tunnel' harmonica sounds way back beyond the back wall of the room, the voice equally disembodied, but then the speakers →



ALEX MUNRO

Q Acoustics describes itself as 'a young brand. No heritage. No tradition'. Some may cavil at that but what comes with it is a modern, efficient and enlightened way of doing business. 'We have our own R&D department in Woking,' says brand manager Alex Munro, who was previously at long-established loudspeaker makers KEF and Tannoy, 'but we've relied heavily right from the start on two partners – Kieron Dunk as industrial designer, and Karl-Heinz Fink as acoustics designer. We are a multi-brand organisation so our R&D department provides support for not just Q Acoustics but also QED, Goldring and Alphason, and the R&D-hungry world of distributed multi-room audio in Systemline.

'Karl-Heinz has facilities superior to anything we have in-house. His company is in line with a larger brand like KEF or B&W, because that's what he does. It's a specialist world. In the same way, Kieron Dunk's approach to the appearance of the product and the fit and finish is also more in keeping with a much bigger brand.

'It's a real partnership approach which means that you achieve a much more considered product development. We get together every two or three months and typically go somewhere as far away from the office as we can, stay overnight, have dinner together and spend much of a day talking about how we see our current position and our future. We call that our "steering group" and it determines the ongoing direction of the brand.'

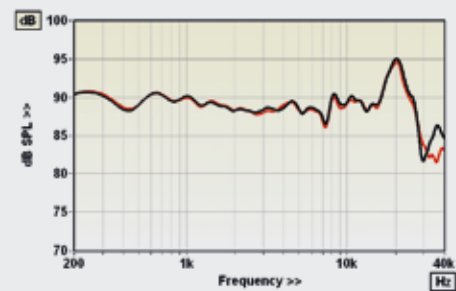


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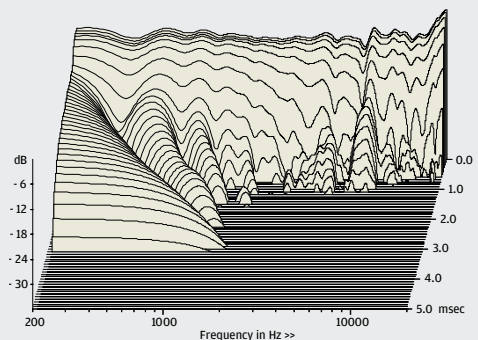
Q ACOUSTICS CONCEPT 500

The Concept 500's internal volume is less than you might imagine because of its three-layer cabinet walls. So how has Q Acoustics balanced the trade-off between sensitivity and bass extension? It claims 90dB sensitivity, which is justified by our measurements if you simply average the FFT bins, but adjust for pink noise and it reduces to 89.4dB. Together with the 'music' figure of 89.0dB, this suggests its spec. is just slightly optimistic. As for bass response, diffraction-corrected nearfield measurement showed the LF extension to be 50Hz (-6dB re. 200Hz) – pretty typical for a modern floorstander of this size. Putting the optional foam bung in the port raises the -6dB point to a high 78Hz, a loss of almost two-thirds of an octave and probably only acceptable where a room is badly affected by LF resonance or the speakers have to be used close to walls.

The forward frequency response [Graph 1, below], measured at 1m on the tweeter axis, shows a distinct presence band depression and unusual 20kHz peak not associated with a ridge in the cumulative spectral decay waterfall [Graph 2]. Note, though, that there is a discernible but well damped resonance associated with the response switchback at 7.7kHz – otherwise the CSD waterfall is commendably clean. Frequency response errors of ± 4.3 dB and ± 4.2 dB are unduly pessimistic because of that 20kHz peak, while pair matching over the same 300Hz-20kHz span was remarkably good at just ± 0.5 dB. Finally, the minimum EPDR (equivalent peak dissipation resistance) of 2.1ohm at 102Hz suggests that the Concept 500 is easier to drive than many competitors, but a second dip to 2.3ohm at 348Hz complicates the issue. KH



ABOVE: The 500's forward response is generally flat in trend, albeit with some loss in the presence band



ABOVE: Cabinet/driver resonances are well damped but note notch here and in the response at 7.7kHz

HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL/1m/2.83Vrms – Mean/IEC/Music)	90.1dB/89.4dB/89.0dB
Impedance modulus min/max (20Hz–20kHz)	3.8ohm @ 198Hz 32.7ohm @ 70Hz
Impedance phase min/max (20Hz–20kHz)	-53° @ 82Hz 49° @ 62Hz
Pair matching/Response error (300Hz–20kHz)	± 0.5 dB / ± 4.3 dB/ ± 4.2 dB
LF/HF extension (-6dB ref 300Hz/10kHz)	50Hz / 29.8kHz/31.3kHz
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	0.6% / 0.2% / <0.1%
Dimensions (HWD)	1150x400x350mm

LEFT: Three sockets on the 500's rear access panel accept jumpers that trim the bi-wirable crossover's HF level by ± 0.5 dB. Q Acoustics' huge reflex port may be partially or wholly shorted by supplied concentric foam bungs

definition, crashing below the mix in truly gripping manner.

They pull off a similar trick with the thumping Texas boogie of ZZ Top's 'La Grange', from *Tres Hombres* [Rhino/Warner 7599-27381-2]. The opening riff sounds tightly-defined and the vocal suitably dirty and rough, and then the drums and the main guitar and bass line slam in with truly thunderous attack, maintaining that gritty edge but defying the feet to stay still. The wide-open sound helps greatly here, and if you choose to listen carefully the soundstaging is there to be appreciated, but above all the track motors on with unstoppable impetus.

BREAKING BOUNDARIES

And the speakers even stay clean when you push the levels higher – as this kind of sound will surely make you want to do – allowing them to shift air with real deftness and power. But these aren't just flat-out boogie speakers. The Concept 500s brought the scale and detail of Mahler's *Symphony No 3* to life, in the new Channel Classics recording by the Budapest Festival Orchestra under Iván Fischer [CC SA 38817; *NativeDSD.com*]. Each orchestral section was immediately audible in a wide, deep soundstage seemingly pushing out the walls of the listening room. And the various timbres were simply delicious! ☺

HI-FI NEWS VERDICT

The sum-up is pretty simple: the Concept 500s are nothing short of sensational value for money, and capable not only of revealing exactly what your system is doing, but also embarrassing some pricier rivals. Beautifully finished and with a rich, yet tightly-defined sound, they respond well to care with positioning and being driven by highly accomplished electronics. Get that right, and they're an absolute bargain.

Sound Quality: 88%



prove capable of fine focus and slam when the band kicks in.

What these speakers definitely do is convey the weight and scale of music with serious conviction – as with the taut rhythms of themes from 'Pirates Of The Caribbean', arranged for orchestra and piano on *Hans Zimmer – The Classics* [Sony 88985322812], where the stabs of the scoring and the balance between solo instrument and the surging 'band' is thrilling. As is, I might add, the powerful low bass on test favourite 'She Burns' by Foy Vance [*The Wild Swan*; Gingerbread Man Records/Elektra 0825646161850].

It's all too easy for the bass figure on this track to get subsumed by all that's going on above it, but via the Concept 500s it has both depth and