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Döhmann's Helix Two Mk3 is a musical masterpiece



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Döhmann Helix Two Mk3

From the man behind the iconic Continuum turntable comes this next-generation range, under his own brand, incorporating a 'negative-stiffness mechanism' suspension
 Review: **Paul Miller & Ken Kessler** Lab: **Paul Miller**

Australia is not only home to some of the world's most fascinating animals but it's also the stomping ground of high-end heavyweights Halcro [*HFN* May '23] and Döhmann Audio, the latter responsible for the finely-engineered, and robustly elegant, turntable that graces the pages of this month's feature review. For Mark Döhmann, Director of Design [see interview sidebar, p45], the 'Two' – one of a pair of decks in the Helix range, now in Mk3 guise – represents his latest thinking on the art and science of vinyl replay.

All previous iterations of the Helix One and Two turntables may be updated to the current Mk3 standard, side-stepping obsolescence, while the brand's UK footprint has just received a boost with its adoption into distributor Absolute Sounds' 'Ten' artisan collection. The Helix Two is more compact than the flagship Helix One, which will accommodate two tonearms, but its more traditional proportions are arguably easier on the eye. The three colourways, matt black and silver at £46,000 or titanium (which looks like 'champagne gold') at £51,500, certainly tick all the boxes. There's a polished carbon-fibre top-plate option too.

BELT AND STRING

The chassis metalwork and subtle red illumination are very stylish while the substantial alloy 'nest' within which the platter rotates [see picture opposite] is very reminiscent of Denon direct-drives of yore. The Helix Two Mk3 is belt-driven, of course, the two clear-polymer bands placed around the lower disc of the three-part platter during setup, before being pulled out and located around the motor pulley using a strategically-placed length of string. It's not very high-tech, but it is effective and

RIGHT: Inverted ground steel bearing [centre], 10:1 ratio motor pulley [top] and circular alloy 'nest' that encircles and protects the platter are all exposed once it is lifted clear. Note the 'Suspension' adjustment dial [top left] used to set the deck with or without the heavy clamp

anyone who used to own a Pink Triangle turntable in the 1980-90s will understand the ritual precisely!

Our sample was also equipped with the Lithuanian Reed 5A tonearm, an exquisite piece of engineering that deserves a full review in its own right. Its 'Double Birch/Thales' geometry, promising near-tangential/bias-free tracking across the LP's surface, is worthy of in-depth testing, and so we will return to this brand and model in the coming months...

NOISE REDUCTION

Back to the Helix Two, where Döhmann, having previously been responsible for the design of the iconic Continuum Caliburn turntable, is now guiding this own-brand venture, already ten years in the making, and warring a clean sheet at an age-old problem. Döhmann himself puts the task very succinctly, 'Vinyl playback involves converting the vibrational energy

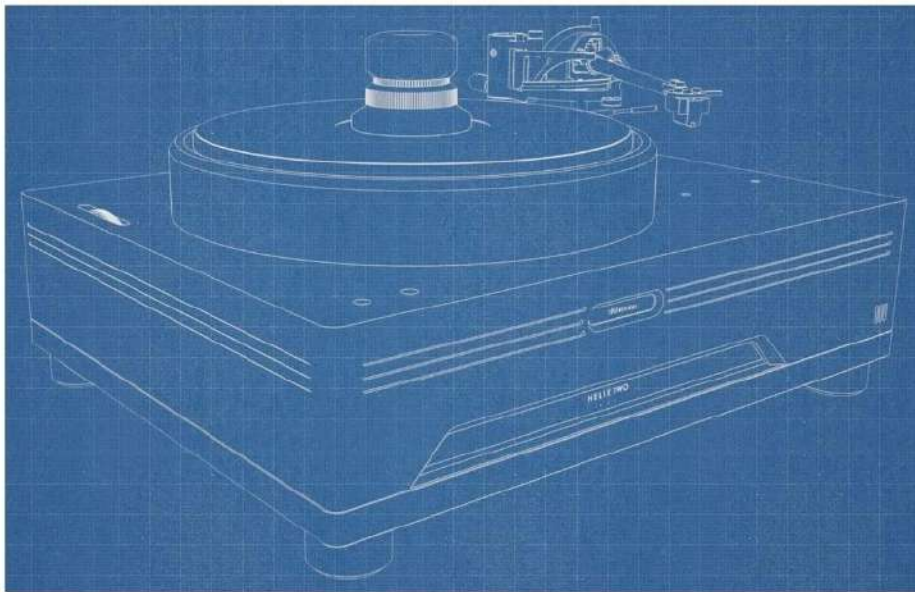
experienced by a stylus as it moves through the grooves of a vinyl record into an electrical signal. The challenge is that there are other forms of vibrational energy (resonance) present in this environment that arise from various sources that are also picked up by the stylus'.

Döhmann's response to all this unwanted resonance is multi-faceted, employing constrained-layer damping, tuned-mass dampers and critically pre-stressed material composites. This engineering is built into and around the polymer-constrained steel plates that form the suspended subchassis, including all the interconnected parts that hold the inverted bearing, the Swiss-made, three-phase AC motor and laminated armboard. ➔

RIGHT: Döhmann's compact but heavy (38kg) Helix Two Mk3 is available in titanium [top], silver [bottom] and matt black [p45] colourways. Machining and finish quality is superb







LEFT: Schematic or line drawing illustrating the Helix Two's compact shape and key aesthetic features. The Minus K suspension is not shown

The Helix Two's suspension is separate and acts as the 'foundation layer' of its defence against incoming vibration. It's a variation of the BM-10 'Benchtop Vibration Isolation Platform' designed by the pioneering brand Minus K from California [see boxout, below] and confers good isolation from sub-1Hz up to around 100Hz. Beyond this, Döhmman is relying on its tuned-damping and 'pre-stress accumulation (and) release' strategies

to deal with extraneous noise – this is the basis of what it calls its 'mechanical crossover'. The latter – the pre-stressed elements – are particularly focused on mitigating, or at least channeling, chassis vibrations caused by motor and platter bearing noise [see Lab Report, p47]. Frictional dissipation between the constrained layers accounts for about 20%, and the (new) polymer damping material about 80% of the impact, with the use of

these lossy materials most important in dealing with the highest frequencies.

THE ART OF DELEGATION

Among the many upgrades incorporated in the Two Mk3, this distributed approach to vibration management is extended to every part of the deck, including the bearing, motor and armboard. The alloy armboard, for example, has now been replaced by one fashioned from a lightweight, rigid fibre/polymer laminate that offers improved self-damping in a specific frequency range identified by Döhmman. The armboard is further decoupled from the subchassis via tethers, just as the motor has its own regime of vibration control.

It's all part-and-parcel of the brand's 'Resonance Suppression Architecture' (RSA). Incidentally, Döhmman is also wedded to TLAs (three letter acronyms), of which 'RSA' is just one of ten declared on the Features section of the turntable's website...

I mention this because the Mk3 version of the substantial, screw-down record clamp now also includes its own 'RSA'. The original clamp was a traditional compression type but the Mk3 includes a (Sorbothane-like) cross-linked polymer that's injected into a chamber in the top section to specifically address any spindle resonances. The lower section of the clamp, with its broad contact area, is designed to present needle chatter from travelling through the vinyl and ricocheting back out into the playback medium.

HARD METAL

The Helix's inverted bearing is a typically no-nonsense oil-lubricated hardened steel shaft running within steel bushes, the common coefficient of expansion allowing for very tight tolerances. The thrust pad is fashioned from tungsten carbide and runs on a silicon carbide ball – it'll likely outlive us all. The outer sleeve of the bearing is integrated into the lower alloy portion of the platter, maintaining a low centre of gravity, while the top portion of the platter is machined from a hard polymer and includes the spindle. The spindle and bearing are otherwise unconnected...

Incidentally, the platter surface is covered with a fibrous mat, just 0.4mm

RIGHT: Front and rear of Döhmman's outboard PSU includes a combined 5-pin data and supply connection adjacent to a main power toggle switch. The rocker on the PSU fascia is retained for a 'future vacuum [hold down] system'

MINUS K

Incorporated in 1993, California's Minus K Technology operates at the sharp end of industrial and scientific vibration control. Laboratories carrying out critical laser experiments, high resolution microscopy or other imaging, or NMR spectroscopy with huge, super-cooled magnets, all need to be very mindful of how the smallest of external vibrations will impact on the performance of these often very large instruments. Costly active isolators typically employ slaved sensors and actuators to mitigate incoming vibration – active noise cancellation – while passive 'air suspension' tables, using bladders and pumps, have also been a common go-to solution for heavyweight industrial isolation.

Minus K's solution is passive and elegantly 'tunable' but side-steps the potentially noisy pump of a pneumatic platform for what it describes as a negative-stiffness mechanism (NSM). In its ultimate form this technology would comprise three isolators stacked in series: a tilt-motion isolator on top of a horizontal-motion isolator on top of a vertical-motion isolator. For a turntable only the vertical and horizontal isolators are employed – the former taking the form of a stiff spring whose compliance can be adjusted, according to the mass placed atop, by either compressing or relaxing the spring from below. This is the function of the 'Suspension' wheel that sits proud of the Helix Two Mk3's top-plate and allows the springs' compliance to counter the weight above (no more, no less, hence the phrase 'taking the stiffness out of the spring').

In practice the low ~0.5Hz suspension frequency is achieved by the flexure of thin metal supports from which this spring assembly hangs – it is these flexures or cantilevers, not the support spring, that sets the compliance of the suspension. Horizontal isolation, typically at 1.5Hz and above, is achieved by a series of beam columns – flexible rods – that connect between the top (load) and bottom (spring) plates. Readers can learn more from Minus K's own video <https://www.youtube.com/watch?v=m9J8-YAMQKo>. PM



ABOVE: Subtle illumination reveals the 33.3 and 45rpm speed buttons [top left] and the suspension 'tuning' indicator [lower right]

thick and impregnated with an elastomer. The material is culled from the automotive racing scene where it's used to cut down on 'wheel squeal'. Again, this is another damping layer, albeit one that's apparently very difficult to cut to shape without taking the edge off every tool it encounters!

The motor is in the same plane as the bearing, so there's no yawing effect where the pulley might otherwise be fighting against the suspension. It's a three-phase design synchronised at a very high 100kHz and runs at an approximate 10:1 ratio with the platter, so the drive spindle spins at ~333rpm when the platter is set for

33.3rpm. The partnering outboard PSU [pictured below] isolates the filtered DC output from the AC mains input within two separately screened enclosures. So that unusual appearance is not just a hi-fi fashion statement...

KEN LISTENS

It is, perhaps, a truism that the initial, immediate exposure to a new component or, indeed, a complete system is both the formative, and ultimately the lasting impression. So the validity of the debut audition of a new product can be optimised if you know that the component

has been run in and set up beyond reproach. So it was with my first burst from the Döhmnn Helix Two Mk3 in my own system, as it had been fully tested and described by PM before reaching me.

Obviously, my own amps and speakers were well-used and familiar, while I fitted the deck variously with two different DS Audio cartridges of which I had a few hundred hours' worth of familiarity. This preamble is necessary in order to impress



MARK DÖHMANN

Founder and Design Director Mark DöhmANN spent his formative years working in the aerospace sector. This is a pathway claimed by a large number of audio engineers, but in this case we can see exactly how those experiences have informed the design of the Helix One and Two.

'The parts of an aircraft are shaking and vibrating all the time', says Mark, 'they just want to separate from one another. For example, on take off, the turbines on an A320 created such a violent vibration that the noise travelled up the fuselage, from the wings, leading to a beating effect in the first-class cabin – it sounded like someone starting up a chainsaw'.

That's not the case now, we assume? 'No, but to ameliorate that particular vibration we used tuned mass dampers (TMDs), actually a leaf with a weight on the end, connected to the root of the wing. The airline I worked for was the launch customer for the A320 and we were the first to uncover what was essentially a "passenger discomfort" issue. But left unchecked it could have ended up in fatigue. It's something that aircraft engineers are always looking out for', says Mark.

And the techniques used in minimising airframe resonances are just as applicable in turntable design? 'Yes, engineers will often use passive solutions to deal with active problems – TMDs, constrained-layer damping and also by deliberately deforming a plate (like hand-tuning a cymbal) to address stress in a particular area. We use all these techniques to manage unwanted vibration in the Helix.' PM



ABOVE: Seen here in its matt black livery, the Helix Two's black-anodised top-plate may also be ordered in a special carbon-fibre finish

upon you the impact that this turntable has had upon me. But I must also tell you that I am doing my utmost to resist hyperbole and declare it 'the best ever'. Before you read another word, however, I will state that this seemingly straightforward, uncluttered turntable is a game changer.

STEALTHY STEREO

How so? It is, to my ears and whether or not the measurements concur, one of the quietest performers I have ever used. This in itself bestows upon the ultimate playback such worthy attributes as a lower noise floor, greater dynamics, and a sense of ease which makes the Helix Two Mk3 one of those components that will have you listening until 3am. Moreover, it's so commanding and transparent that it caused me to reassess my own understanding of not just the DS Audio pick-ups but, of all things, my collection of diminutive LS3/5A speakers.

What caused this Damascene revelation was my definitive lowest octave challenge, the drumming of Levon Helm. In this case it was not any of my go-to tracks from The Band's eponymous second LP, but one from *Music From Big Pink* [Mobile Fidelity MFSL1-039]. What made me sit up and take notice was that I was hearing it through Falcon Acoustics and Audiomaster21 LS3/5As, and hearing both bass extension and scale, at a level, that I would have presumed unavailable from my favourite small monitors [see *HFN* Jun '23].

That experience alone was enough to render me enamoured of the Helix Two Mk3, which forced upon me the realisation that I always had been walking on eggs, so to speak, with LS3/5As, fearful of blowing a drive unit. Whatever this turntable was doing, it was delivering signals to those speakers which didn't simply challenge

their boundaries, it expanded them. That's how the bass drum thwacks in 'The Weight' made me and a fellow listener sit up, smile and shake our heads in disbelief.

Naturally, I turned to two other front-ends to determine how much of this was the DöhmANN deck's doing. To our delight, the speakers *were* capable of much more, precisely as the Helix Two had revealed. What changed, however, from turntable to turntable – and what is absolutely crucial

to appreciate if you are fortunate enough to be considering a deck in this price category – is the way that overall presentation changed from deck to deck.

We are categorically *not* talking about 'right or wrong', 'correct or incorrect', 'accurate or inaccurate' but something far more subjective. What it begs is that the DöhmANN Helix Two Mk3 cannot be auditioned in isolation. Ideally, it will face its rivals with the same arms and cartridges and, obviously, LPs because the trial is about the very hard-to-discern qualities which underscore the Law of Diminishing Returns.

PERFECT POISE

So revealing is the DöhmANN Helix Two Mk3, thanks to its quietness and cool tranquillity, and so poised and confident is its reproduction, that it exposed precisely the nuances which one expects to be served when moving up the high-end ladder. Where it differed from other decks with almost identical prices but sharing only belt-drive and massive platters as common design elements, was in presentation: soundstage, the sense of air, the continuity. And I repeat, this is not

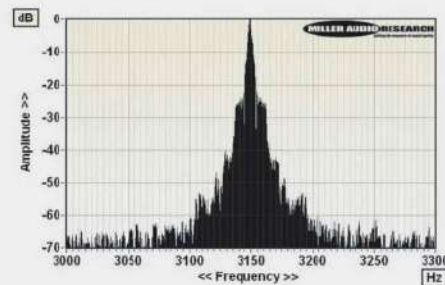
'I'm doing my utmost to resist declaring it "the best ever"'

LAB REPORT

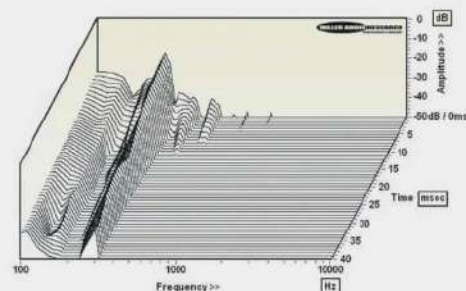
DÖHMANN HELIX TWO MK3

While Döhmänn's Helix Two Mk3 is accompanied by an 'external advanced DC power supply' [see p43], the decoupled Swiss-made motor is an AC-synchronous type whose absolute speed may be adjusted in very fine steps (± 0.1 rpm at the spindle, or ± 0.01 rpm at the platter) so that perfect pitch may be achieved [see Graph 1, below]. The deck's peak-wtd wow is an impressively low 0.02% – so it will *sound* pitch stable – but the peak-wtd flutter is higher at 0.08% principally due to a diffuse cluster of sidebands at ± 10 Hz, clearly revealed on the W&F spectrum. Such higher-rate sidebands are not uncommon [HFN Jan '22, Mar '22, Feb '23] and are typically linked to bearing/suspension modes or in this case, perhaps, the 'high torque adjustable drive (HTAD) as the same ~ 10 Hz and lower amplitude ~ 20 Hz modes are visible on the un-wtd rumble and noise spectrum (not shown here) at -56 dB re. 1kHz/5cm/sec.

The DIN-B wtd through-bearing rumble is excellent, however, at -70.5 dB, falling only slightly to -70 dB through-the-groove where the effectiveness of the RSA-equipped record clamp proves itself to the tune of ~ 0.4 dB. It must be said that none of these standard measurements attempts to quantify the efficacy of the integrated Minus K vibration isolation system [see boxout, p42]. Finally, a brief word about the partnering Reed 5A 'tangential-tracking'/double-pivot tonearm. Our sample, equipped with a Wenge wood arm wand, showed a low-Q beam resonance *below* 100Hz with associated modes at 140Hz and 225Hz plus a higher-Q bending/harmonic at 280Hz [see CSD waterfall, Graph 2, below]. Despite its evident complexity, the arm's resonant behaviour is remarkably benign. PM



ABOVE: Wow and flutter re. 3150Hz tone at 5cm/sec (plotted ± 150 Hz, 5Hz per minor division). The fine speed adjustment allows for precise tuning



ABOVE: Cumulative resonant decay spectrum for Reed 5A tonearm, illustrating various structural support and tube vibration modes (100Hz-10kHz over 40msec)

HI-FI NEWS SPECIFICATIONS

Turntable speed error at 33.33rpm	33.33rpm (-0.01%)
Time to audible stabilisation	4-5sec
Peak Wow/Flutter	0.02% / 0.08%
Rumble (silent groove, DIN B wtd)	-69.5 dB (-69.9 dB with clamp)
Rumble (through bearing, DIN B wtd)	-70.5 dB
Hum & Noise (unwtd, rel. to 5cm/sec)	-55.8 dB
Power Consumption	14W
Dimensions (WHD) / Weight	480x200x400mm / 38kg



ABOVE: Rear view shows the double-belt drive system, 5-pin PSU connector and up/down buttons for the Helix Two's fine speed control. The void under the armboard [left] allows tonearm leads to be 'dressed' without compromising the suspension

to suggest one was right and the other two wrong – it is something as amorphous as when you have an eye test and you're asked which dot in the circle is clearer.

Having accepted that the Helix Two Mk3 delivers bass as deep and powerful as any I have heard in my room, I dug out a 12in single from one of the most fragile-sounding (and underappreciated) ensembles in rock history: Wilson Phillips. This trio of sublime vocalists' 'Release Me' [SBK Records 12SBK11] oozed harmony to rival that of their parents, which hovered over the soundstage with an airiness that can only be described as 'gossamer-like'.

'Pseudos Corner' might be in my future for that, but I cannot deny the recording its staggering impact. After an *a cappella* intro, massive percussion kicks in, displaying precisely the opposite sonic qualities, not least transient attack that takes one's breath away. The Döhmänn Helix Two Mk3 wasn't reining in the audible gifts it bestowed upon me, beyond its own inherent brilliance and the way it forced a reassessment of the aforementioned speakers and cartridges. It made me realise that Wilson Phillips should be mentioned in the same breath as The Everly Brothers and The Hollies.

ROCK-IT FUEL

Ah, the DS Audio cartridges! These had already proven how much quieter they were than any which housed coils and magnets. But it took stygian silences of Döhmänn's Helix Two Mk3 to let me hear just how quiet they are. If there is a downside, and this may only affect those who constantly change cartridges, it might be the lowering of one's regard for others which

are still superb performers. It's like finding out your partner snores.

What threw everything into chaos was discovering that the designers are headbangers, Aussies who used LPs from the likes of AC/DC when voicing this deck. Out with the Ramones' eponymous debut [Sire 9103 253] and the portions of 'Blitzkrieg Bop' where it's just vocals and drums, contrasted with the needles-on-the-meters-are-barely-moving main sections, emphasised the deck's skills at handling both raucous wall-of-noise passages with segments that exploited all the space on offer. Yes, those double-tracked vocals were as easy to isolate as any unplugged LP you care to use as a counter to the thrash.

I left Döhmänn's turntable with the nastiest rocker ever: the mono version of 'You Really Got Me' from The Kinks' *The Journey – Part 1* [BMG BMGCAT7400LP]. Nascent, primal fuzz guitar, snarling vocals – this was as far from Wilson Phillips as it gets. But the results were the same: the Döhmänn Helix Two Mk3 really is an open window. ☺

HI-FI NEWS VERDICT

Despite turntables out there in excess of £250,000, for me, the £25,000-£50,000 sector seems the most hotly-contested for wealthy music lovers. Döhmänn's Helix Two Mk3 joins a must-hear group of five or six like-priced rivals. And make no mistake: with roots in the fabled Continuum, it has pedigree to ensure greatness. This turntable redefines LP playback, at a 10th of the cost of the dearest. I am astounded.

Sound Quality: 90%

