

Bergmann Magne (£8500)

However great they may sound, air bearing designs can seem daunting to the inexperienced. But this Danish turntable package is more user-friendly than most

Review: **Steve Harris** Lab: **Paul Miller**

Trained as a mechanical engineer, Johnnie Bergmann makes the parts for his turntables in his own workshop. 'All the tests and developing and so on, I do by myself,' he says. 'If I have a new idea, I can test it to see if it works or not, and if I have to change it, I can do everything by myself. That's a great thing, definitely.'

'Air-bearing tonearms have a bad reputation for being difficult to set up,' he says. 'One of the first goals for all my turntables was to eliminate the challenges that the air-bearing technique has been known for in the past.'

It was in the 1950s that air bearings began to come into use in military and industrial machine-tool applications. An air bearing is contactless, as air is continually pumped into a tiny gap between the mating surfaces of the bearing. Although the air escapes, sufficient pressure is maintained to keep the surfaces apart under load.

CORRECT GEOMETRY

Virtually frictionless, the air bearing offers tonearm designers the promise of true radial or linear tracking, escaping from the compromised geometry of pivoted arms while avoiding the problems of other types of linear-tracking arms.

In the early air tonearm designs of Coloney and Eminent Technology [see boxout], air was fed into a fixed sleeve, while the inner tube or rod carried the tonearm proper. Later versions have reversed this, with the tonearm mounted on a moving outer sleeve.

Noisy pumps and condensation or oil in the air supply were among the 'challenges' that Bergmann was determined to eliminate from his products. The oil-less Bergmann pump is relatively quiet, emitting only a gentle hum, on a par with domestic sounds from central heating or

a refrigerator. However, I would still want to site it outside the listening room, unless that were very large.

Quietly finished in matt grey-black, the Magne's 45mm-thick composite plinth is wider and deeper than usual, to accommodate the arm assembly. On the back of the plinth is a connector for the air supply and a pair of screw adjusters, which separately adjust the airflow to the platter and tonearm bearings. A pair of phono sockets provide the audio output, and the rather fragile-looking copper Litz wires emerging from the back of the tonearm disappear into the plinth where they are hardwired to the backs of these.

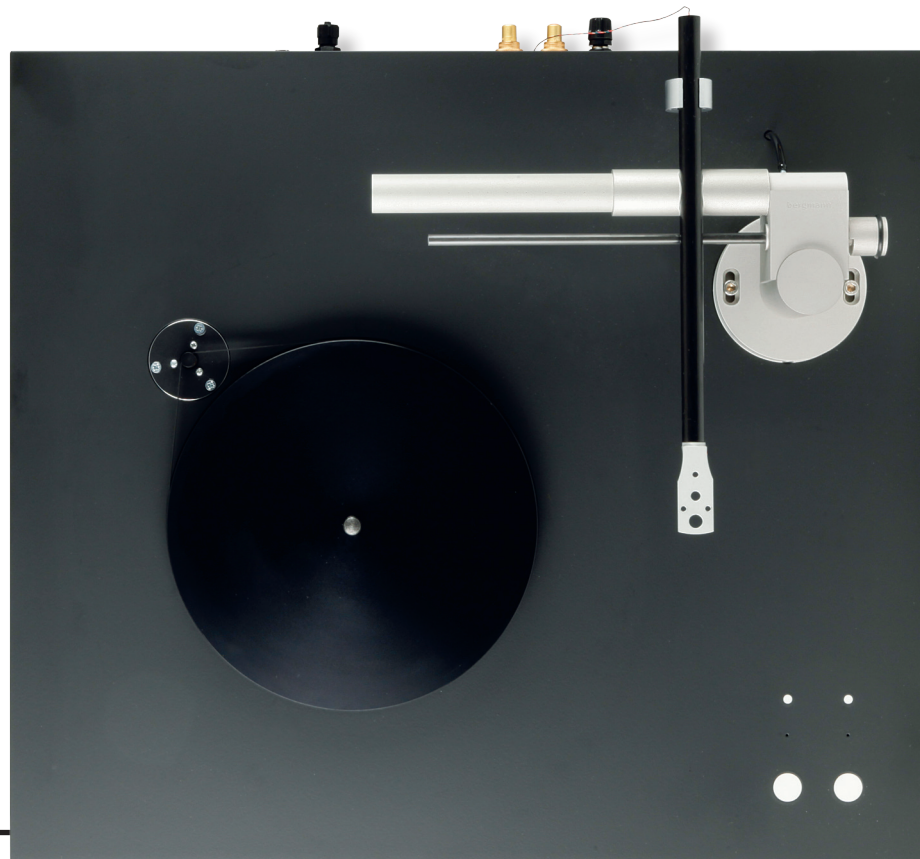
An 8mm-thick polycarbonate upper disc, with a recess in the centre to clear the record label, sits on top of the 5.7kg aluminium main platter, and a 300g record weight is provided. Bergmann says that the polycarbonate mat gives some of the same

qualities that he hears with the acrylic platter on his costlier Sindre model, with a sound that is still open, fast and dynamic, but 'a bit warmer'.

The main platter in turn sits on a smaller black metal sub-platter, which is driven by the DC motor via a small pulley and a short flat belt. Until the air pump is switched on, admitting air underneath, this sub-platter actually rests on the plinth, so that the platter cannot turn. If the motor is switched on with the pump off, the motor pulley will only scrub vainly at the belt.

Controls on the plinth top comprise just two buttons to start or stop play at either 33.3 or 45rpm, with tiny blue LED indicators, and two smaller ones for fine pitch/speed adjustment.

Setting up the arm needs care and patience, but it is straightforward. First, the turntable itself should be levelled by means of its adjustable feet, using the



RIGHT: Showing the air-bearing arm layout and, with main platter off, the belt-driven sub-platter. This is lifted by air beneath to create a near-frictionless vertical bearing



spirit level supplied. The cartridge is fitted in the normal way, but you have to make the connections carefully because the connecting tags are soldered directly on to the thin wires that pass through the length of the tonearm.

ADJUSTING THE ARM

With the cartridge in the headshell, the stylus must be aligned with the turntable's centre of rotation, using the gauge provided. To achieve this, the whole tonearm assembly can be moved forward or back a few millimetres after slackening the two large bolts on either side of the mounting pillar.

These bolts also provide the crucial levelling adjustment for the tonearm bearing tube. The tonearm pillar sits on a central ridge or rail running front to back, so it can be tilted slightly to the left or right. To achieve the level condition, you slacken one bolt while tightening the other. But the arm will always remain in its alignment on a tangent to the groove.

Bergmann provides a simple device to make the levelling easy, a short plastic

tube about 2in long, which slips over the air tube. With the air supply switched on, this should just sit stationary on the tube, indicating that the tube is dead level. The slightest deviation will cause it to slide to left or right.

Carrying out this adjustment gives you an appreciation of what 'frictionless' really means. You find that a touch on the mounting screws, even one-twelfth of a turn, will make the difference. That small fraction of a turn on the bolt must translate into the tiniest imaginable angle of incline on the tube, yet this is enough to allow the plastic tube to fall one way or the other by gravity.

To get the arm tube parallel to the platter surface for correct VTA, the arm tube height can be adjusted after slackening the single hex bolt in the back of the pillar. It's fairly easy to set the air supply correctly for the arm, just by adjusting the valve screw until the arm floats completely freely. Bergmann says

'I felt that the system had just got out of the way of the music'

ABOVE: Aluminium platter is topped by a polycarbonate mat and comes with a record weight, while the plinth is a composite material. Controls give speed change and fine tuning

that the relatively large air gap, 50 or 60 microns, was chosen to make set-up easier, as users would find things more difficult with a thinner air film. If there is not enough pressure, the arm tube will not be lifted sufficiently, resulting in friction at the top side. If there is too great a pressure, the arm tube will lift too much, which

will then cause friction on the bottom side.

Once set up, the Magne inspires confidence that it will stay that way, and I even overcame my initial fear that the tonearm-carrying sleeve might somehow shoot off the left-hand end of the air bearing tube and break the connecting wires. Inevitably, even with careful adjustment of the valves, there is a hiss of escaping air. But this will only be

PUMP IT UP

It seems the air-bearing turntable story begins with the Wayne H Coloney engineering company in Tallahassee, Florida. After seeing an air-bearing demonstration in a physics class in 1975, Bruce Thigpen discovered that engineer Lew Eckhart had already built a complete air-bearing turntable and tonearm. He persuaded Eckhart to help him build his own. Infinity took a license for the design, but only about ten Infinity turntables were made under contract in Japan before the speaker company was bought by Harman in 1983, and its radical turntable was dropped. Meanwhile, Coloney had started manufacturing its own AB-1 air-bearing turntable with Thigpen as project manager, but got into difficulties in 1982 and sold the inventory to Maplenoll. At this point Thigpen set up his own company, Eminent Technology. When he launched his ET1 arm and later, with Edison Price, the ET2, these became the first widely-known air-bearing arms. Another pioneering US arm of the 1980s was the now-obscure Dennesen, but then came the well-known Airtangent from Sweden.



TURNTABLE

JOHNNIE BERGMANN

'When I was about ten years old,' says Johnnie Bergmann, 'my best friend's Dad was an audiophile. And that was the first serious audio system I saw and heard. The main source was an English turntable, the STD 305M, and he had a vacuum hold-down mat. When he played music, even comedy from the radio, I could feel the studio, and the audience listening. I felt that I could see them with my ears. So my interest in audio really started at that time.'

'When I left school, and got my first job, the first pay I got was used to buy a NAD amplifier. A couple of months later I bought some Dali speakers, then a year later a Micro Seiki turntable. The first air-bearing turntable and tonearm I heard about was the Forsell. I could see the idea, and I believed that it was the way to go. At the beginning of the 1990s I made the first drawings of my own turntable, where the platter was not only lifted by air but was also centred by air. So you have no mechanical contact.'

'At that time analogue was dying, so there could be no idea of starting turntable manufacturing. So I hid the drawings away for 12 or 13 years. But I was still curious to see if my air-centred platter would work! I made just one turntable for myself, and at the first test it was working just perfectly!'

'That was in 2001 or 2002. I spent six or seven years doing tests to make it completely reliable. Then in 2008 we went on the market.'



noticeable, I think, if the turntable is sited close to your listening seat. I did not find it an annoyance when sitting five or six feet away from the deck.

The lift/lower device doesn't have the usual damped action but it works smoothly – although because the control is an unmarked knob rather than a lever, it may not be obvious at a glance whether the lift bar is up or down. The only other minor gripe is that the record weight seems too precise a fit on the spindle. It would slip on more comfortably if the spindle top were slightly domed instead of perfectly flat.

PALPABLY REAL

With a Benz Micro Glider SL cartridge installed, I started by putting on Barbirolli and *English String Music* [EMI ASD 521]. The Elgar *Introduction and Allegro* had me captivated immediately. The soundstage had a wide and deep space that allowed the strings to have a real presence, and it seemed that the players were placed firmly in front of me. I enjoyed that sought-after but rarely experienced sensation that the system had just got out of the way of the music.

Bass was exceptionally clean and deep, so that you could feel the space in the recording venue, and the sound of the double-basses within it was palpably realistic. In the midrange, the strings had lifelike attack and body. And the dynamic range of the music was accommodated properly, so that you were free to follow the music without that uncomfortable sense of having to somehow adjust between loud and quiet passages.

By contrast, it was great to hear the live atmosphere of Albert King's *Live Wire Blues*

'It came alive with the fire of an impassioned musical event'

ABOVE: Signal wires run direct from cartridge through the tonearm tube, then down to the plinth-mounted phono connectors. Also seen here is the air feed pipe for the tonearm

Power [Stax SXATS 1002], as he let loose that searing guitar intro to 'Blues Power.' The sound of the bass guitar was strong yet clean and never overpowering. Once more, the recorded acoustic was really well conveyed, with King and his band on an appreciable stage in the middle of a really big space. When the audience claps along,

you really felt the claps were coming from all sides, spreading around the beat rather than all hitting it exactly.

Listening to *Tracy Chapman* [Elektra 960 774-1] and 'Fast Car,' the Bergmann and Benz

combination again seemed lucid and transparent. On the vocal the Bergmann seemed to free up the lower resonances in the singer's sound, so that you really felt you were hearing the whole voice in a more natural way. Drum sounds were excellent, from the insistent cymbals in the verse to the big crashes in the chorus, while once again the bass guitar sound was clear and expressive.

Christine Collister's *Love* [ENS 002], painstakingly recorded in 2006 by Rega, sounded really engaging. On the Bergmann, there was a particularly good sense of the vocalist and instruments as tangibly separate entities. I found myself being constantly struck by the timbres of Collister's voice, and could happily discern the different voices in the background group even when mixed very far back. The cello sound on this opening track was clear and well-portrayed, now really

TURNTABLE



ABOVE: Rear panel connections are for ground, audio outputs and air inlet from the pump. In the centre are the two small screw adjusters for air pressure

providing a foundation rather than a distraction. On 'Mad Me', where the accompaniment is founded instead on the bottom strings of Gary Bennett's guitar, these had their full weight too.

Among other cartridges, I experimented with an ancient but fairly low-mileage Goldbug Ms Brier, a beautiful wood-bodied cartridge seemingly from another aeon. It sounded charming, nicely detailed and full of gentle musicality.

More appropriately, though, I also tried a Koetsu Black. Putting on *Dire Straits* [Vertigo 9102 021] and settling back to the 'Sultans Of Swing,' the Koetsu had its usual powerful, gripped-up sound, with a relatively heavy and softened bass. It majored on impact and drive rather than transparency or delicacy, though, here it seemed to be producing a beat that was relentless and grinding rather than floating.

WORTH APPLAUDING

On Blondie's *Parallel Lines* [Chrysalis CDL 1192], the Koetsu put forth a beefy rendition of 'Sunday Girl' with a tremendously powerful beat, really waking you up with the attack of Debbie Harry's 'Hurry up, hurry up...'. 'Heart Of Glass' came over as a real wall-of-sound production, while 'I'm Gonna Love You Too' was just a blast of raw energy.

Returning to the Benz Micro cartridge, I pulled out the recent 2LP version of Joe Lovano's 2009 *Folk Art* album [Pure Pleasure PPAN BST91528]. Here the long bonus track 'Jazz Free' provided a feast of realistic percussion from the two drummers of Us Five. Tom-toms and other drums, gongs and cymbals all

came to life with beautifully natural timbres and long decays, while Esperanza Spalding's bass sounded deep, woody and resonant in the best sense. Lovano's sax sound had immediacy and bite, and when he returned to the theme, you wanted to applaud as he and Spalding ran up a scale in perfect accord.

Finally, still hooked on Cream's live 'Crossroads' from 1968 *Cream Vol 2* [RSO Special 2479 701], I offered this track up to the Bergmann with great expectations, and I wasn't disappointed. It came alive with the fire of an impassioned musical event, with some real space in the sound, and a real freshness to Clapton's urgent vocal – not to mention his powerful guitar. Once again, the Bergmann excelled at the bottom end here, and it really told you exactly the notes that Jack Bruce was playing, and just how Ginger Baker was driving the whole thing. In fact, it told you just what a great performance this was. ☺

HI-FI NEWS VERDICT

Bergmann's no-nonsense Nordic design makes some rivals look like fussy contraptions, and reflects the clarity of engineering thought that has gone into the product. Overcoming some old air-bearing bugbears, it is easy to set up. It then sounds delightful, with spaciousness, rich and rewarding timbres, and informative, accurate bass. Doing justice to the finest cartridges, it is an outstanding example of the art.

Sound Quality: 87%

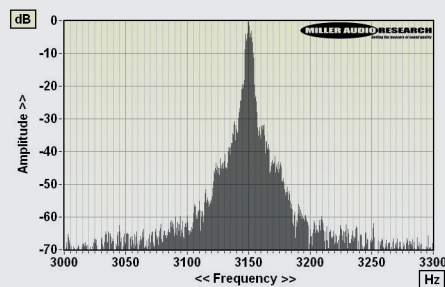


LAB REPORT

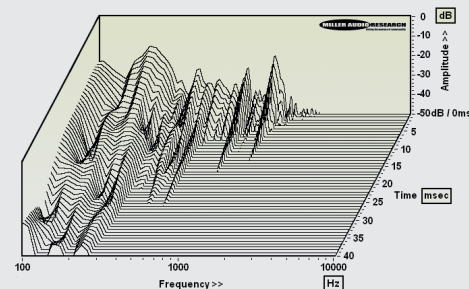
BERGMANN MAGNE (£8500)

Ordinarily our wow and flutter plot [Graph 1, below] would reflect the relative speed accuracy of the deck as supplied. In this case the Magne was running some 5% fast, so our spectrum illustrates the deck's performance after I had tweaked its speed – the fact that it's now spot-on 33.33rpm reflects the precision to which Bergmann's DC motor can be adjusted. The sharpness of the peak indicates the low drift and wow and flutter suffered by the Magne, its combined peak-weighted figure of just 0.05% putting the deck right up in the top flight. The 'air bearing' also delivers very low levels of transmitted rumble, the -71.8dB residual very much lower than the audible 'whoosh' of air that escapes from under the platter and through the tonearm's sleeve. For many listeners, placing the deck to avoid this rush of white noise will prove the biggest distraction. That, of course, and the relatively protracted 7sec start-up of its 6kg platter.

The linear-tracking tonearm is another example of Bergmann's precision engineering, the effective mass of its lightweight carbon tube increased to some 11g by the bonded aluminium headshell while replay errors are necessarily minimised by its geometry. Popular high-end MCs of low to medium compliance will be perfectly suited to the arm which, thanks to both its relative simplicity and internal tube damping, exhibits no obnoxious resonances [see Graph 2, below]. The short and rigid carbon tube has its main break deferred to a high 225Hz with other resonant modes at 925Hz and 1.4kHz quickly brought under control. Readers may view full QC Suite reports for the Bergmann Magne air-bearing turntable and linear-tracking tonearm by navigating to www.hifinews.co.uk and clicking on the red 'download' button. PM



ABOVE: Wow and flutter re. 3150Hz tone at 5cm/sec (plotted ± 150 Hz, 5Hz per minor division). Bergmann's electronic speed control allows precise adjustment



ABOVE: Cumulative tonearm resonant decay spectrum, illustrating various bearing, pillar and 'tube' vibration modes spanning 100Hz-10kHz over 40msec

HI-FI NEWS SPECIFICATIONS

Turntable speed error at 33.33rpm	33.327rpm (-0.02%)
Time to audible stabilisation	7sec
Peak Wow/Flutter	0.02% / 0.03%
Rumble (silent groove, DIN B wtd)	-69.4dB
Rumble (through bearing, DIN B wtd)	-71.8dB
Hum & Noise (unwtd, rel. to 5cm/sec)	-55.8dB
Power Consumption	1W (motor) / 8W (pump)
Dimensions (WHD)	495x165x440mm