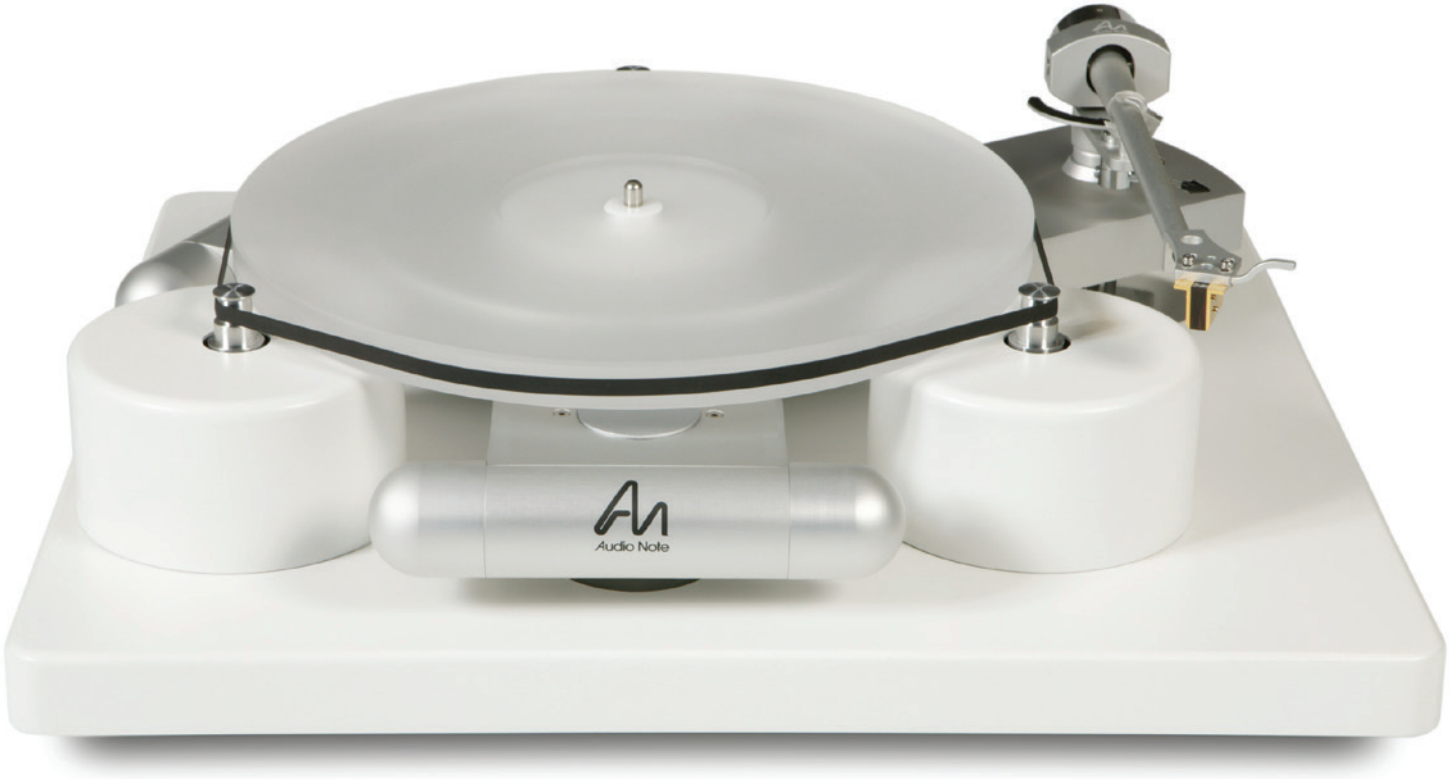


Audio Note *TT Three*

THE THREE-MOTOR TURNTABLE FROM AUDIO NOTE COMES IN THREE VERSIONS, WITH A CHOICE OF POWER SUPPLIES. KEVIN FISKE REVIEWS IT, WITH CHRIS FRANKLAND AND MARTIN COLLOMS ADDING THEIR THOUGHTS AND OPINIONS

The push and shove between the two primary camps of turntable design is, like the risk of contracting the common cold, seemingly ever with us. What divides are different technical approaches to resolving two of the primary challenges of extracting music from vinyl. The first is preventing mechanical and airborne vibration from spoiling playback. The second is overcoming variable stylus-in-groove drag that causes dynamic wow and sucks the life out of dynamics in a blurring of pitch.

Actually, to call them 'different' understates the degree of divergence between the two approaches. Polar opposites is more like it. On one hand we have designers that favour a rigid, un-sprung platform and a high mass platter combined with a low noise low-torque drive. On the other are those that prefer a sprung platform with low-mass platter and high-torque drive. In between are vendors that hedge their bets with variations on the two themes. And that is to ignore for the moment what is undoubtedly the third major influence on sound quality: the power supply.

Audio Note (UK) is a proponent of the high-torque, low-mass school of thought. The company liked the three-motor *Voyd* turntable so much that it bought the manufacturing rights, and then went on to develop a £70,000 flagship turntable featuring three one-BHP AC motors for an effective platter torque of around half a ton. It was reviewed by MC in the July/August 2008 issue of *HIFICRITIC*, and is still in production.

The new Audio Note (UK) *TT Three* embodies the essential design principles of that statement turntable but delivers them for a starting price of about one twelfth. It also has three motors, driving by a belt around the perimeter of a 1.2 kg polycarbonate platter that sits on a Delrin sub-platter. The motors are circumferentially symmetrical about the main bearing, as is the three-point spring suspension, thus promoting stability. The suspended system has a resonant frequency of around 4Hz, which the company considers ideal.

The primary chassis is of MDF, sitting on three simple rubber feet . The sub-chassis sits above, suspended on three adjustable springs loaded in extension, rather than compression. The sub-chassis is fabricated of aircraft-grade extruded aluminium; three U-shaped beams joined at the centre around the bearing, one longer to form a mount for a tone arm, the other two shorter and terminating in lozenge-shaped counterweights so that dynamic balance may be achieved. The mount is machined to take Audio Note's own 9in (23cm) arm, but the dimensions conform to Rega specifications, so buyers have a wide choice of alternatives.

KEVIN FISKE

The mu-metal shielded motors – custom made for Audio Note (UK) by Papst – are mounted on the chassis. Power is fed to them via an umbilical cable from a stand-alone power supply. The review sample of the *TT Three* was finished in a very high quality gloss black. Other options are gloss white with a natural aluminium sub-chassis, and matt black.

The *TT Three* is available with three alternative power supplies, resulting in prices at £5,950, £8,500 and £10,450. The power supplies are the work of Audio Note design engineer Darko Greguras who, having listened to a lot of different circuits, came to the conclusion that locking the drive in a feedback loop results in a sound that he considers constrained and metronomic.

Instead Greguras treats the motors as an intrinsic element of the power supply circuit. Instead of a closed loop involving motor shaft or platter, just sufficient control is applied to each phase of the output amplifiers supplying power to the motors, resulting in the desired natural sound. At least that's the claim.

The lowest cost package pairs the turntable with a *PSU-1*, a power supply that employs an in-house-coded digital clock and a three-phase parallel output stage using ICs. The middle price *PSU-2* uses the same basic circuit but features enhanced local power supply regulation for the signal generator, and improvements to the clock and output stage.

The *PSU-3* is fundamentally different, and embodies technology that may well be the subject of a filed patent application by the time this review is printed. It contains an analogue computer, a unique analogue oscillator, and a custom output stage, all of which use discrete components throughout in order to achieve what Greguras says is an optimal subjective balance of energy transfer and damping. All this is because poor motors and supplies make themselves audible in the sound .

Our sample *TT Three* was fitted with an Audio Note's *Arm Three/II* with silver Litz internal wiring and captive silver Litz phono leads. With it came samples of all three power supplies. After they had been powered constantly for 10 days to ensure equal conditioning, they were auditioned with the turntable serially over the course of a single 12 hour listening session. Then, over four latter days I repeated the same sequence to mark my own homework, spending less time with *PSUs-1* and *-2*, and much more with *PSU-3*.

Sound Quality

Beginning the audition with the *PSU-1*, several positive characteristics were immediately apparent. Hum levels are vanishingly low. The drive system is also remarkably aurally unobtrusive, not much noisier than some of the single motor designs that I am familiar with and way less busy than the *Voyd* that I once owned, this despite the fact that on the *TT Three* the motors are capable of generating around 50 kgs of effective platter torque.

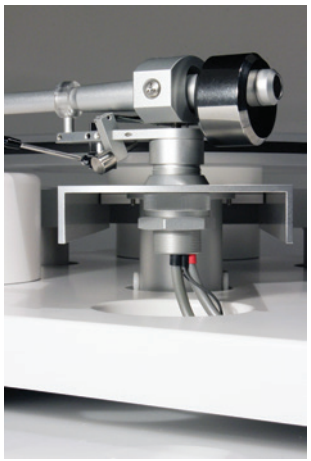
Lowering the stylus onto my vinyl brings early confirmation that the high-torque, low-mass approach to turntable design has distinct merits. Even with the cheapest of the three supplies the *TT Three* gives a seemingly inexorable impulse to musical performances. Notable too are great tonal neutrality and lack of colouration, a satisfyingly tuneful deep bass extension and a free-breathing dynamic range. There seems a startling absence of stored energy which might cause slur and overhang; the *TT Three* builds transients with alacrity, then releases without a lingering backward glance. Musical timing, as might be expected given this ability, I judge to be excellent.

I do not recall hearing sufficient of these desirable qualities in such generous measure from any high-mass turntable of my acquaintance, no matter how costly. Indeed I was caused to ponder if the *TT Three* might illustrate an *Engineering Truth*; that the high-mass low-torque approach is sub-optimal, and can only made to sound acceptable if a *lot* of effort is put into mitigating its fundamental flaws. Remember that old joke? "Which is the best route to Basildon?" "Well, I wouldn't start from here."

All of which begs a further question: if the multi-motor, light platter, suspended chassis design is the best way of retrieving information from vinyl, why isn't it the industry standard? The answer is multi-faceted. The parts inventory is much more expensive, it's technically difficult to get three motors to work properly in unison, and if as a vendor your thing is high-mass, unsprung, single motor designs that are uncomplicated to manufacture and that generate strong margins, then why change a successful formula?

Swapping the *PSU-1* for the *PSU-2* confirms that the *TT Three* as an electro-mechanical platform is capable of giving considerably more. The extra £2,500 for the *PSU-2* buys a heightened sense of relaxed musical flow, greater openness and an improved dynamic swing. Female voices sound more rounded, sweeter, more natural, with less grain and glare. There is a stronger sense of depth on well recorded material, and sound stage focus also improves.

Moving to the *PSU-3* results in a greater still step-up in sound quality; the subjective gap being wider than that between *-1* and *-2*. It is almost as if the turntable was originally intended to be paired with the *PSU-3*, and that the other two power supplies are value-engineered to hit particular price-points. That



Specifications

Design	Three motor belt drive turntable
Speeds	33/45 rpm
Platter	Lightweight Lexan
Finishes	High-gloss black or white, power supply in black acrylic with gold or natural aluminum buttons
Dimensions incl. tonearm (WxHxD) power unit	48x18x44 cm, 30x14.5x42 cm
Weight	11 kg (turntable), 5 kg (power supply)
Price	£5,950, £8,500 and £10,450 depending on power supply choice

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takes nothing away from them: personally I'd still have this turntable partnered with either of the supplies over similarly priced alternatives.

With the *PSU-3*, the turntable delivers more of everything: the qualities noted earlier are there, but stripped of further layers of background noise and grain, and underpinned by a quite startling increase in tonal density, image placement, and dynamic range and energy. With electronic music the gains are evident, but not reliably diagnostic. To coin a phrase, electronic music is what it is; there is no agreed benchmark for how it *should* be presented. We can't know whether what we are hearing is colouration or accuracy. But turn to acoustic performances and our memory of what a symphony orchestra or a natural human voice sounds like, confirms that the *TT Three/PSU-3* delivers the promised naturalness plus a measure of full-throttle dynamic punch and agility, not to forget tonal complexity which much closer to the real-world experience than we've likely heard before from LP.

The *PSU-3* power unit is the senior partner in the pairing, allowing the turntable to transcribe more faithfully and completely what is on the record. Apart from the previously mentioned 'hi-fi' sound quality gains, the power supply gives microgroove playback a dimension that I initially struggled to put my finger on and which even now is a real challenge to fully articulate. Relaxed, natural and freewheeling are three descriptive words that come to mind, but they are inadequate and perhaps somewhat misleading too.

The *PSU-3* doesn't sound loose or uncontrolled; pitch stability is truly solid with the two less costly supplies, and timing is beyond reproach, yet with the *PSU-3* power unit is an uncanny sense of unrestrained musical ebb and flow underpinning it all that just sounds somehow more convincingly realistic. Let me try to tell this another way. I have written in the past that some (actually quite a lot) of solid state amplification makes me physically tense and uncomfortable, akin to how some people feel when sitting under 50Hz fluorescent light.

They have a feeling of unease that can lead to fatigue. We sense that the subtly pulsed illumination is not wholly natural, and our brain goes into overdrive and make sense of the input that we are expecting to be analogue, ie continuous, but isn't.

A turntable is of course an analogue playback device, so it may seem counter-intuitive or just plain daft to say the *TT Three/PSU-3* sounds more *analogue* than any vinyl rig that I have heard. But that's inescapably how it sounds: more analogue, by which I mean more natural.

Which brings me back to a point that I hinted at early in this review. Acoustic and structural isolation, along with mitigation of stylus drag pitch stability, are two vital engineering challenges in turntable design. But as the three alternative power supplies available with the *TT Three* clearly show, where the motor or motors get their power from also has a profound influence on the sonic result.

Much of the technology used by Audio Note (UK) in the *TT Three* and the first two power supplies is prior art, albeit cleverly combined for maximum effect. The *PSU-3* though, is a remarkable piece of new and original thinking that has been painstakingly conceived, engineered and voiced with evident success by Audio Note's Darko Greguras.

The three 'versions' of *TT Three* raise the bar on vinyl playback at each of their price-points. Audio Excellence somehow seems to me a rather thin recognition of such an achievement.

Second Opinion

CHRIS FRANKLAND LISTENS SEPARATELY TO A SECOND REVIEW SAMPLE OF THE TT3 AND GIVES US HIS IMPRESSIONS

I suppose it took all of 30 seconds. It may have been slightly less, but certainly no more. I mean, what can you do in half a minute? Well, you could change your listening forever.

And it changed for me. My cherished record collection suddenly took on a new lease of life on Audio Note's *TT3* (with a PSU-1 power supply – and the *Arm Two* and *Io1* cartridge that I had been using on a *TT2)*. I found myself reaching for record after record as my old favourites were revealed in a new light, with more detail, more dynamics, more poise and control, more subtle layering and more, dare I say it, tunefulness and swing.

Make no mistake, the *TT3* is, quite simply, a game-changer. My advice is don't listen to it unless you are prepared to shell out the required £5,950 – in this case. Because you are going to want it and, once heard, there's no going back.

I couldn't wipe the smile off my face as albums I knew revealed new nuances of playing. Guitar notes had better shape and body, you could tell how they were being plucked, shaped and released. I began to hear more of what Earl Klugh, Larry Carlton, Kevin Eubanks and George Benson had surely intended to convey. A Steve Gadd drum solo I knew well had a new snap, control, dynamic and

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ON MASS, VIBRATION – AND WHY MOTORS MATTER

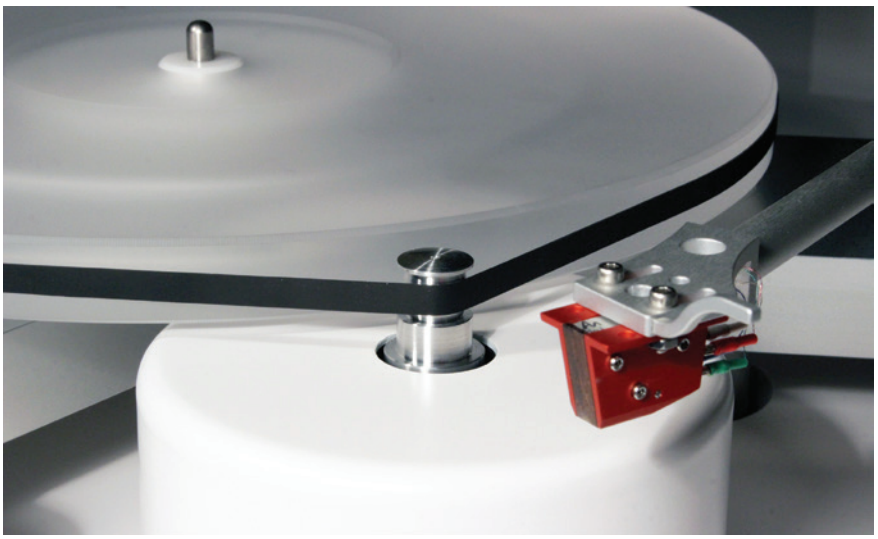
LP disc players with spring or compliantly suspended sub chassis need careful design as failure to resolve the behaviour of this complication will fatally compromise the result.

To address this difficulty many designers eschew the complication, aiming instead to bury the environmental and feedback noise ingress to the assembly in the LP noise floor by applying copious mass and rigidity. Potentially speed stability is high as the platter cannot move relative to the drive, which may even be direct, while the platter may also employ high mass/inertia to get desirably low levels of wow and flutter (unwanted speed fluctuations of lower and higher frequency).

High mass may well reduce the amplitude of vibrational interferences, perhaps from environmental sources, local roads, machinery such as aircon, refrigerators and the like, not least to omit the contributions of the working loudspeakers. The stylus of an operating player may resolve mechanical information down to the wavelength of light so high mass and a good player foundation is most helpful to control such noise. Conversely mass alone is not the optimum solution and environmental vibration, including that induced by the operating loudspeaker, still leaks into the assembly where is resides for longer periods.

Those that value the quality of good timing in disc reproduction may well admire the weight and power of high mass designs, but they may also need the upbeat timing and agility of good spring-suspended chassis players, which have much lower mass and in consequence, a more rapid energy decay behaviour. It is that lack of energy storage and the quick recovery after an unwanted vibrational input which is so valued.

For these designs a single drive via a resilient belt is most common, famously including the Thorens *TD160*, to the everlasting LINN *LP12*, while small speed/pitch stability errors remain as commonly the chassis swings slightly in use. A balanced drive from two motors is an improvement while three is better still. Power and speed stability may now be excellent but while the motors still may act as weak transducers, and are thus slightly transparent to the characteristics of the power supply amplifiers. This is why the quality of the motor power supply matters, and why three turntable versions are possible by simply exchanging the motor electronics.



subtlety – and there were beats I had missed before in fast runs that were now laid bare. Hi-hat and cymbals soared as they should and the subtlest of detail was there to hear.

Vocals too took on new depth, humanity and emotion and had more space around them. Indeed layering and separation of different instruments, vocals and backing vocals was mesmeric. Whether it was Ben Sidran, Linda Ronstadt, Van Morrison or Yolande Bavan on Lambert Hendricks and Bavan's sublime live album from the 1963 Newport Jazz Festival (mono, if you please!), their vocals were more expressive, real, detailed and open.

Bass lines? Whether it was the funky slap of Marcus Miller's electric bass or the fleet-fingered fluidity and soulfulness of Charnett Moffett's acoustic, extra notes appeared, they were weightier, melodies more tuneful and the fast runs of notes much better controlled than I had ever heard them. The *TT3* had a rock-solid grip.

Dynamics were extraordinary on the *TT3*. Cymbals crashes soared, drums were tight and powerful, and massed strings had a fullness and ability to crescendo in a way that took the breath away.

OK, I agree – all of this sounds a bit OTT, but it is how it was. I had expected the *TT3* to be good, but not THIS good.

Not only did it look and feel like a top-quality product – my sample was finished in an elegant matt black – but it was bringing detail and dynamics out on albums I knew well, better than any turntable I have used to date. I rest my case.

Thanks to Geoff at Soundcraft Hi-Fi in Ashford, Kent, for his help during my preparations for this review.