Better analogue via digital control

THE LATEST INCARNATION OF VERTERE'S SG-1 TURNTABLE IS POWERED BY THE NEW TEMPO SYNTHESISED 'MOTOR DRIVE' POWER SUPPLY AND FITTED WITH VERTERE'S MYSTIC MOVING COIL CARTRIDGE. MARTIN COLLOMS TAKES A LISTEN

Is this a review of a complete record player? Yes it is – Vertere doesn't just make turntables, arms, cartridges and more, but complete record player solutions. For example, this latest version of the SG1 turntable came fitted with an SG1 tonearm and a Vertere Mystic moving coil cartridge, plus a new 'motor drive' – as Vertere calls it, in the form of the recently-announced Tempo. Together the SG1 and Tempo cost £16,000, with the arm adding £3500, the Mystic £2200, and the Pulse R tonearm cable £2600. Vertere also supplied its £130 Techno Mat turntable mat, of which more later, and an Iso Shelf to support the turntable, adding another £895. The grand total for the complete 'record player' system? £25,325.

The SG-1 may look complex, but its set-up is logical: there are no chassis adjustments required as the four-stage design employs long life elastic silicone rubber cord suspensions which are largely self-aligning. Our review model came with a further isolating base – the Iso Shelf – on Vertere feet, this being supplied as an appropriate interface with the marginally smaller footprint offered by my Naim FRAIM equipment stands. There is an exquisite two axis acrylic alignment protractor, another of card for tonearm base fitting a VTA and azimuth alignment block and comprehensive instructions for the turntable as a whole.

Founded by chief engineer Touraj Moghaddam, Vertere is based in the Park Royal area of West London. Moghaddam previously co-founded Roksan in 1985, designing and producing a range of audio products including the well known and very popular Xerxes turntable and also several Roksan loudspeakers which were distinguished by decoupled tweeters to reduce the modulation jitter from enclosure vibration. Xerxes was distinguished by a self-damped sub-chassis construction using proprietary resilient mountings. These partially isolated the inner chassis carrying the platter and arm, and thus control acoustic feedback and vibration emanating from the room structure and acoustic. In contrast to most spring-suspended designs this cost-effective design did not require precision adjustment and became very successful.

The System
Constellation Inspiration 1.0 pre, Townshend Allegri Pro control units; Naim NAP500DR power amplifier, Dartzeel LHC-208 integrated, Naim SuperLine phono pre with SuperCap DR, Linn LP12 player with Keel chassis and Radikal motor control, Naim ARO arm, Lyra Delos cartridge, Naim UnitiCore network server and S/PDIF source; Linn Klimax Katalyst streamer/ DAC Naim ND555 streamer/ DAC with 2x 555 PS(DR) power supplies, Wilson Audio Sabrina X, Magico S-5II, Quad ESL63, BBC LS3/5a (15ohm) speakers; Naim Fraim racks; Transparent XL MM2 , Naim NAC A5 speaker cables, Naim Super Lumina, Transparent MM2 and van den Hul Carbon TFU interconnect cables.

As a graduate of Imperial College London, Touraj has no fear of innovative combinations of science and technology and enjoys designing fine sounding audio products which combine scientific theory with precision manufacture – from the innovative DG-1 entry-level player models such as this latest-generation SG-1.

To read the quietest high-frequency signals the stylus of an LP cartridge must be capable of resolving mechanical information close to the wavelength of visible light. In order to accurately trace these wave-like music modulations, embossed in a narrow, hot moulded record groove, great control of all other associated sources of mechanical vibration must be mandatory for the high resolution reproduction of music, maximising the potential for bringing out micro-detail in the recordings. These are responsible for transparency, image space and depth, ideally maintained to the highest audible frequencies.

Digital motor drive
With this review there is also a new component, namely the new Tempo synthesised power supply, which feeds the installed and carefully selected phase locked synchronous motor. Tempo is a new generation of 'digital' motor drives replacing earlier crystal oscillator locked designs: new digital signal processing generates the stable low noise drive signals, the necessary sine and cosine wave phases feed precision D/A converters which output to the miniature power amplifiers feeding the two-phase windings of the selected synchronous motor.

Tempo employs a gold-plated printed circuit incorporating four fully regulated voltage rails for powering different circuit sections. To minimise noise coupling the digital, microprocessor and DAC circuitry is double shielded using copper foil and a stainless steel cover plate. The motor is electrically floated, separated from the primary supply noise floor, while balanced 'bridged' analogue amplifiers drive the motor windings. The benefit is a highly stable 'locked' platter rotation even under varying groove drag modulations. Achieving excellent pitch stability is key here.

Touraj explained his conceptual approach to turntable design where he defines the seminal power underpinning the music we hear when playing vinyl records begins with the platter motor. Pure steady rotation, without noise, vibration or speed variation is the goal. 'The motor is the only source of energy in what is otherwise a wholly passive system. It is this 'master' energy that drives the record groove past the stylus, thus resulting in the music we hear. Noise or speed fluctuations in the drive system will adversely impact the music. Detail, dynamics, timbre, timing and musicality are just some of the qualities that will suffer as a result.'

Sculpted clear acrylic
This handsome integral turntable chassis, carved from three massive panels of sculpted, water clear cast acrylic, has optional internal LED lighting and in a darkened room can resemble a futuristic oil rig. Employing an articulated spring loaded torque-demand chassis for the motor, start-up is smooth and is thus kind to the fully machined synthetic rubber drive belt thus avoiding snatch and stretch. The belt is self-aligning on the turned alloy motor pulley while the lower, outermost platter section also has a mild crown for that purpose. Adjustments are provided to centre the belt, which ran perfectly true on our example, while the motor is decoupled via the multiple suspension system and isolates residual noise from the critical top chassis supporting the platter bearing and arm mount.

Described by Vertere as the first turntable design to be fitted with a self-centring, self-aligning single point main bearing, here the spindle is machined from hardened stainless steel to a better than 2 micron finish and concentricity, and sitting on a self-centring tungsten-carbide ball. The housing is of 'high copper' phosphor bronze running in a selected oil, with a clearance held to less than 6.5

microns – a fine specification. Speed accuracy is claimed as better than 0.2%, our test showing it as 0.3%, while wow and was flutter less than 0.15%, and rumble very low, at better than 85dB below the nominal 5cm/sec 1kHz RIAA signal level.

The 3.1kg platter is machined from a single billet of aluminium alloy co-damped by a 3mm acrylic upper platter for the LP support. For those who prefer a mat interface to the LP the accessory Vertere composition cork/felt Techno Mat is available as an alternative (see separate review, held over from our last issue).

The unique Tri Point Articulated (TPA) tonearm bearing is comprised of three precision silicon nitride balls and stainless cone-pivot. The pivot point self-centres, providing stable support and articulation. The bearing pivot is structurally bonded to the aluminium alloy yoke. The generous yoke assembly provides the support required for the arm tube, the main counterweight and the anti-skate mechanism. The pivot point and the counterweight centre of gravity are positioned to be as low as possible and thus render it self-stabilising.

Carbon-fibre arm tube

Roll-wrapped carbon fibre is used in the construction of the arm-tube, providing higher strength and more homogenous fibre structure than a 'Pultruded' or moulded equivalent. The headshell, machined from solid aluminium alloy, is connected to the arm-tube via a structurally bonded alloy insert. Inherently non-resonant, this provides an optimum platform for the cartridge. An adjustable, decoupled stainless ring slides along the arm-tube for fine tracking force adjustment, and the relative position of this ring and the main counterweight can also be used to alter the arm/cartridge resonance frequency and optimise playback performance including effective mass.

Attention to detail is clearly seen in the polished stainless-steel counterweight. Two pairs of silicone de-coupling rings are neatly sandwiched between three machined retainers to provide the necessary grip for the chosen position plus supplying the required partial decoupling for the counterweight.

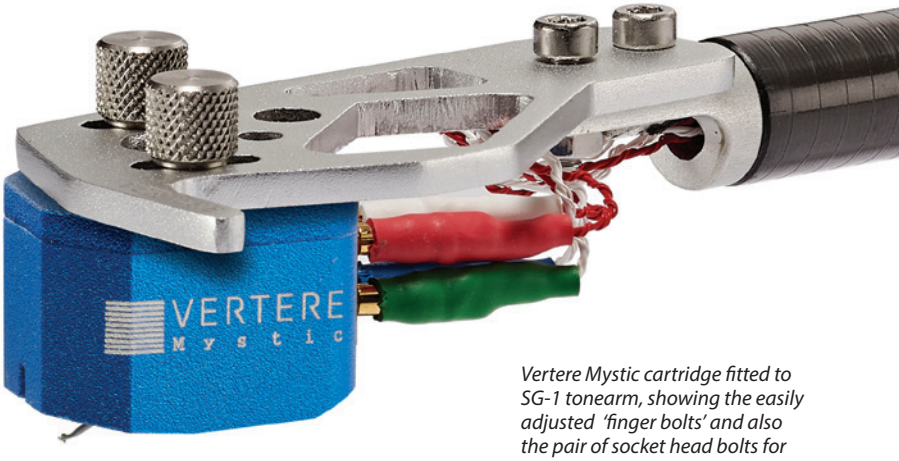
Bespoke components are used for every part of the SG-1 tonearm. Both the cartridge tags and the 5-pin connector pins are designed, machined and gold plated to Vertere specifications. The five-pin connector housing is machined from PTFE stock chosen for superior dielectric performance, and you may choose from two options for the internal wiring of the tonearm: 'standard' and 'hand built'.

The new Vertere Mystic moving coil cartridge is priced at £2,200 in the UK, and the design aim was to avoid taking any one feature to the extreme, including stylus profile, cantilever, coil windings, suspension, optimised output level and source impedance. Touraj indicates that he has aimed for a balance of design and technology which would endow it with a degree of tolerance in the face of the multiple demands made on a cartridge when tracking the grooves, to provide greater consistency. There is said to be the right level of damping which stabilises the stylus contact for a neutral background noise floor and optimal tracking. These, together with the optimal profile and polish on the micro-elliptical, high resolution naked diamond stylus, help to extract better musical information.

Sound Quality

From the beginning it was clear that this was a completed player of remarkable neutrality and

It is now some 90 years since two channel stereo LP technology was first developed. In 1932 Stokowski recorded his first stereo disc with Bell Labs in Philadelphia, and on vinyl rather than the usual shellac master. It claimed a 60 dB dynamic range, rather better than then current 78 rpm discs, and with an improved frequency response extending to 10,000 Hz. Here parallel grooves were assigned left and right channels for excellent separation. The master disc was gold-coated by vacuum-sputtering. Later Arthur Keller filed a patent in 1936 for the alternative 45/45 method employing one groove, this to become familiar as the longer playing LP. The resulting patent application was not logged until 1936 because his employer Bell Telephone did not see an immediate commercial application for the method and in fact Keller was unaware of Blumlein's prior 45/45 invention for EMI which dated from the early 1930's.



Vertere Mystic cartridge fitted to SG-1 tonearm, showing the easily adjusted 'finger bolts' and also the pair of socket head bolts for headshell fixing to the arm wand.

consistency. The output was agnostic of system electronics or loudspeakers with a timbre and resolution neutrality and pitch stability closer to mastertape than is usually encountered. Inspiring confidence in its power of discrimination, poorly pressed discs were exposed for the thieving rubbish they were and are. Those made with recycled co-polymer vinyl with shredded labels included in the mix, also those issues with too much crammed in and running too long into the exit grooves, really do give vinyl a bad name.

Contrast that with high quality pressings from the 1950's and 60's , also later premium reissues from those classic releases. On this Vertere combo musical performances take over, overcoming this still improbable source of an electrical music signal, arriving from a hard stone gliding down a wavy furrow in soft plastic previously embossed from a master plate by heat onto a thermoplastic disc. The oft-frequent audible tell-tale colorations arising from the mechanical origins of LP replay were largely absent.

A familiar performance of the Beethoven violin concerto, Leonid Kogan on violin, with the Paris Conservatoire Orchestra, Constantin Silvestri conducting: released on EMI, this 1958 original tape recording has been remastered and reissued by Reson and sounds beguiling: for its spatiality, natural timbres, fine imaging and a lack of technical artifice. It just had to be played right through to the work's conclusion. This happened time and again with the Vertere player; there was no reason to stop and hunt for tracks to try out while the continuing replay musicality was reward enough. My record stack was hunted for worthy examples. And with so many of these, once the stylus was down, there was no incentive to break the spell and lift the cartridge out of the groove.

There was something about the resolution, image quality and stability plus the sense of control, the recovery of detail and transparency, a wide dynamic range plus a sheer neutrality which time and again proved convincing. On several occasions there was the feeling that it was the mastertape, and not a vinyl groove, providing the source of music, such was the sense of calm and stability. I had trouble finishing this review as I continued playing so many records.

This player did not sound at all 'digital', whatever that means: appropriate adjectives would include relaxed, involving, tuneful, spacious, unforced, unfatiguing, flowing, gracious harmonious, natural…just what you would expect of a great analogue disc player. Somehow it manages to take the listener closer to the sound of the master tapes while it did not have a romantic timbre as found with many combinations, evinced as a touch of upper bass richness, a rounded upper mid with an overly spacious presence range, often followed by a bit of a sting at the highest frequencies regarded

by some as offering a hint of extra sparkle and air. Instead, this Vertere player sounded very neutral, nominally as 'accurate' as CD but somehow more musically familiar and natural.

That excellent recording, *Sylvia* by Delibes (Richard Boynge on Decca), sounded more like the original tape than previously experienced, and was full of fire and expression. Stable and confident, this Vertere consistently seemed to bring the listener closer to the master tape, or the direct cut master, and you could not really hear the replay process 'working' with this complete player, rather it presented a harmonious whole, a music path which did not get in the way of musical pleasure.

At low frequencies it was very neutral with uniformly voiced bass tunes, also reaching deep. The Mystic cartridge sounded so precise and well balanced as to have little recognisable identity, a quality I value from my own Lyra. Sounding delightful on classical music, it can also rock with the best of them with easy foot-tapping involvement, allied to an impressive time coherence over the whole frequency range. It was tuneful and suitably punchy on rock bass, notably dynamic in the midband, expressive and focused in the treble, yet without unnatural emphasis.

Conclusions

Here's a well thought out, excellently engineered record player equipped with all the adjustments you might require to fully optimise analogue disc replay. It is so neutral that there was no need to realign the review playback system to account for those possible timbre differences between analogue and digital disc sources. The finish and build is top class, as is the sound quality: a HIFICRITIC Audio Excellence Rating is fully deserved.

HIFICRITIC Lab tests

Using reference discs, bearing rumble was found to be very low, better than -75dB, while wow and flutter was first rate confirming the high precision and speed stability. On load the speed was just 0.3% fast, with very low weighted wow and flutter at 0.04% NAB and 0.08 % DIN, quite excellent results. The arm/cartridge low frequency response was set nicely at close to critical damping, and almost ideally placed at 8.2Hz.

Those stacked suspensions are stable and gave excellent rejection of environmental vibration, engendering a wide dynamic range with negligible acoustic feedback. Tonearm friction was very low, rated at <20mg, while structural resonances were well controlled.

The geometry was highly accurate for the effective length, minimising tracing distortion, while the cartridge was well aligned.

Specifications Vertere SG-1 Tonearm

Bearing	Tri-Point nitride ball zero play on hardened cone
Arm tube	Non-resonant, high-rigidity roll-wrapped carbon fibre
Anti-skate	Bias-curve adjustable mechanism
Counterweight	Decoupled stainless-steel
Fine-tuning	Sliding adjustment sleeve for tracking weight and arm/cartridge resonance frequency.
Arm length	240mm effective, 17.5 mm overhang, 22.9 degree offset

Specifications Vertere Mystic

Type	Moving coil
Coil Impedance/geometry	40Ω LC-OFC /cross-coil winding
Loading	680Ω – 1.5kΩ/ 220pF – 470 pF
Channel Balance	>1.0 dB
Output Level	0.5mV, Samarium-Cobalt magnet
Recommended tracking force	2.0g (1.9g – 2.1g)
Frequency Response	10Hz – 40kHz nominal
Cantilever	Two-piece Telescopic, Aluminium alloy 7000, resonance damped
Stylus	Diamond, nude Micro Elliptical
Weight	9.1 g: solid aluminium body, tri-point contact for stable mounting

Specifications Vertere SG-1 turntable

Type	Belt drive
Motor	24 Pole Synchronous 6 Point Body Contact Support Spindle Support Acetal Ball Bearing
Motor Mount	Acetal Platform – Articulated 2 Ball Race Bearings and Silicone Motor Spring
Pulley	Super Precision Aluminium Alloy
Drive Belt	Precision Ground Polymer
Platter	Super Precision Aluminium Alloy Single Piece 3mm Bonded Acrylic Record Interface
Bearing Spindle	Precision Hardened Stainless Steel: Roundness / Concentricity and Finish < 2 Micron
Bearing Housing	High Copper Content Phosphor Bronze Clearance < 6.5 Microns
Plinth Structure	Clear Cast Acrylic with optional finishes Special Metallic Black or Metallic Pearlescent White and Metallic Champagne 30mm Thick Top and Bottom Plinths 25mm Thick Sub-plinth and 15mm Mid-plinth
Isolation System	3 Stage Compliant and 2 Stage Rigid 12 Decoupler Sets and 12 Tuned Silicone Ring / Bobbins
Speeds	33.3 and 45 rpm (<0.2%)
Wow and Flutter	<0.1%
Rumble	<-85dB

Specifications Tempo Motor Controller

Type	Crystal-referenced 'motor drive'
Input	30V DC from a selected, low noise universal mains plug top supply
Output	Pure sine and 90 degree phase shift cosine waves at approximately 17.5V
Dimensions	220 x 128 x 58 (D x W x H mm) Incl. Selector & Feet
Net Weight	1.3kg

HIFICRITIC AUDIO EXCELLENCE

Prices

SG-1 inc Tempo and Pulse R cable	£16000
SG-1 Arm HB	£3500
Pulse R Tonearm Cable	£2600
Techno Mat	£130
Mystic cartridge	£2200
Iso Shelf	£895

Below: the Vertere SG-1 bearing assembly