

Touraj Moghaddam made his name in hi-fi circles as one of the two founders of the UK's Roksan Audio, which began making turntables just when LPs were facing decline following the arrival of CD in the mid-1980s. Yet Roksan achieved success with a series of turntables and related products named after historical Persian people and places — Xerxes, Artaxerxes, Artemiz — and also the Darius loudspeakers, notable for being the first to spring-isolate the tweeters from the bass unit. Roksan did, however, produce CD players and in recent years even digital amplifiers with Bluetooth functionality.

But with Moghaddam's dedication to the art of vinyl replay now vindicated by the revival of interest in the format, today he is with Vertere, which offers the Vertere SG-1 record player, SG-1 and Reference tonearms, and an array of Vertere connecting cables, in all of which Moghaddam has played a significant development role.

AUDIO ESOTERICA: *It's a good time for vinyl — why do you think we're seeing such a resurgence of analogue playback?*

Touraj Moghaddam: Analogue never died — despite serious and aggressive campaigns from the digital technology

TOURAJ MOGHADDAM

VERTERE ACOUSTICS



INTERVIEW TOURAJ MOGHADDAM VERTERE ACOUSTICS

side. That is because analogue — vinyl — is simply a better medium for music replay as it is today. The problem with digital is that it needs to be perfect in order to mimic analogue. In analogue, even if it's not perfect, you can control the errors to be either background noise or generated by the signal.

Think of it like a harmony. You have two people in the room singing the same song. That's like an analogue error on one singer. If you have two people singing different songs that's like a digital error. Your brain can't tolerate non-linearity, so when it's presented with additions or subtractions that are not the original signal or not pure background noise, psycho-acoustically you can't filter it out. That's why with synthesizers that have a clarinet sound, it sounds like a clarinet but it's not a clarinet. You're trying to represent an incredibly complex combination of frequencies and amplitude.

Of course, there are areas where digital technology provides favourable conditions, and in real music terms digital has come a long way. But the last word still remains with vinyl.

AE: *And you think we can go still further? What is it that drives you to continue working with analogue technology?*

TM: We are nowhere near extracting it all from vinyl. Every time we improve the weakest link, it

all gets so much better. So why stop until we get to a 'diminishing returns' situation?

AE: *So what did you see as the 'weakest link' that needed improving when you designed the Vertere products?*

TM: The weakest link in a turntable is the tonearm. That's why I didn't do the record player first with Vertere — I went all out doing this tonearm. I wanted to design the best possible tonearm so that when it was time to design the record player, the tonearm would be the least of my worries.

AE: *It would seem that the tonearm in theory should be a fairly simple thing but it's not. Was the new design influenced by your previous designs like the TMS [Touraj Moghaddam Signature] 3 tonearm?*

TM: The main function of the turntable and the tonearm does not change. And yes, I used the TMS 3 in the process. I went to customers with extremely high-end systems and listened within those contexts. So the role of a tonearm is to support the cartridge and accommodate the record. To support the cartridge, sure, we can have very nice screws, a rigid headshell, good body, etc. To accommodate the record is slightly trickier. Every record has eccentricity and will be going up and down which means the mean line of the groove is constantly moving up and down and

in and out. It doesn't matter whether you have a clamp, a vacuum, whatever. You are dealing with fractions of microns of information. A perfect tonearm will be keeping the body of the cartridge relative to the mean line of the groove in exactly the same place. Then the cantilever and the suspension will be picking up signal.

When I first went to design a turntable, I didn't know what it was supposed to do. But funnily enough, nor did anyone else in the industry at the time. I asked everyone — "When you design a tonearm, what do you do, what is it supposed to do?" The only answers were specific, like "You need a heavy platter, or a light one, you need a sub-chassis, or some kind of isolation." It's like going to an F1 guy and saying, design me a suspension. Sure, but what do you want it to do? What's the engine weight, what's the weight of the vehicle, what type of track is it?

So it occurred to me that with a turntable you're measuring the groove with respect to time. Your measurement is your amplitude with respect to time, which gives you the frequency. So now you know what you have to do and then you have to understand the intricate details of





△ THE BEAUTIFUL SG-1 TURNTABLE IS THE ENTRY POINT INTO VERTERE'S VINYL PLAYING SYSTEMS.

measurements. Everything in your design has to go back to the tip of the diamond. The only other thing that you have control over is the axis of rotation.

Also, one of the reasons for going into this film-type bearing is that you have no sliding parts. Even on a gimbal the tip is actually sliding, there is no 'point'. In engineering a point of contact is a surface. Any time it's in contact with another item, there's a defined friction which is a property of the surfaces and the pressure between the two. That is constant when the items are in motion. When it's stationary, to start the motion you have to overcome friction and normally you need twice the force before it starts moving. And the arm is moving left and right, up and down, and every time it changes direction it has to stop and you hit your friction point again. You get a big spike of force to change the direction. If you get rid of this friction

force and have only your normal resistances there, that differential becomes smaller, or half, because it doesn't have to have twice that force and come back. These are the things that you're doing with the tonearm, the counterweight, with the bearings and the anti-skate.

So in the Reference arm, there are a number of issues and design features addressing different tonearm problems — noiseless bearings and elimination of friction, and split geometry allowing optimal reproduction of low frequency cut signals. Using micron-thick silicone to apply anti-skate force eliminates local friction and noise.



When I first went to design a turntable, I didn't know what it was supposed to do. But funnily enough, nor did anyone else in the industry at the time.

AE: One unusual feature, in my experience anyway, is SG-1's fine tracking weight adjustment within the arm. This can be moved along the length of the arm to provide a form of resonance control.

TM: That's quite commonly used so I wouldn't attribute that to me. It's not necessarily used for the resonance reasons but as a guide for counterweight. I'm just combining the two somewhat. And also because the arm is very light. Personally I'm not a big fan of high compliance cartridges. I think medium or low compliance cartridges always do a better job. You have a reasonable, wide spectrum for controlling cartridge and arm resonance. When the compliance becomes higher and higher, which basically means the suspension becomes softer and softer, then very small changes in weight/mass conditions can seriously affect the performance.

It's like a car; you can't have a suspension that is either too soft or too hard. It's again a balance thing. We try to accommodate as many cartridges as possible and I used a variety at the design stage. In fact, with the Reference tonearm you cannot use high compliance cartridges and that's because of the intelligent counterweight at the back. With that articulated counterweight you need a certain stiffness in the suspension.

AE: One interesting aspect in your Reference tonearm is the different materials you're using.

TM: That's more to do with what you're asking of the tonearm. That's not to do with trying to 'voice' the tonearm, as some people say. I only try to eliminate, for example, resonance. The materials are dictated by what you need to achieve, and I have to use whatever material, or even composite or material sandwiches, that will achieve what needs to be done. You wouldn't find the engineers at McLaren saying, "I don't know, I've gone off fibre, can we use titanium?" No.

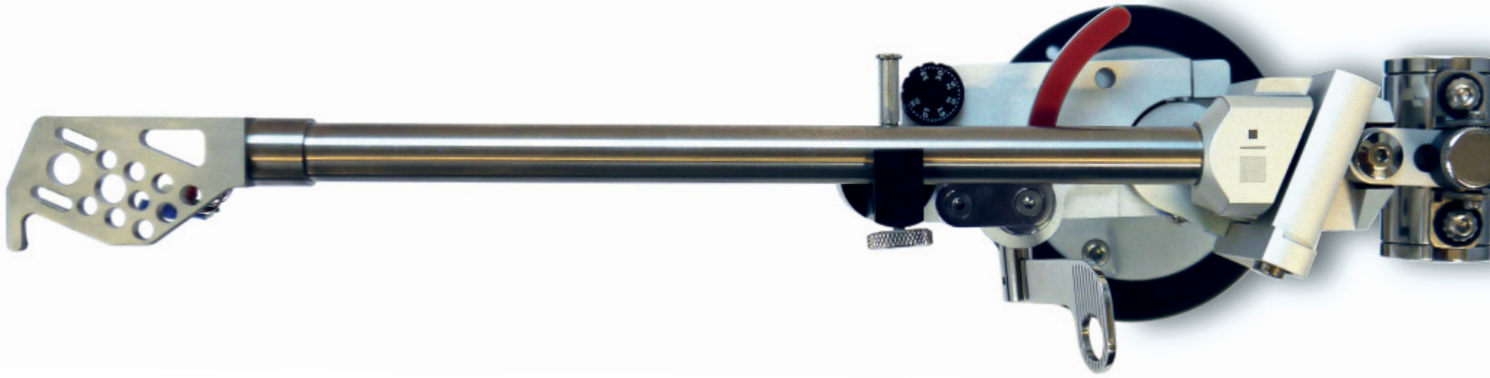
AE: Is there more to achieve? Where do you think vinyl playback will be in say, ten years?

TM: Who knows! Ten years; that's not a very long time. They said vinyl would be dead in 1985 when I first introduced a record player!

AE: Are we likely to see Vertere Acoustics high-end electronics, and maybe even speakers — the isolated tweeters à la Darius?

TM: That is not on the cards — I don't feel the electronics or the loudspeakers pose a serious bottleneck at this point. There are numerous well designed and manufactured products out there.

AE: Yet you do focus on cables at Vertere. Given there are more cable manufacturers now than ever before, most if not all claiming some proprietary technology, how many ways are there to skin a cat? Is there



△ THE STATE-OF-THE-ART REFERENCE TONEARM INCORPORATES A TITANIUM TUBE AND HEADSHELL, AN ALUMINIUM BEARING, TUNGSTEN CARBIDE-LOADED COUNTERWEIGHTS AND AN INTEGRATED CUEING LIGHT AMONG ITS STABLE OF MATERIALS AND TECHNOLOGIES.

something that makes the Vertere Pulse cables genuinely different?

TM: OK, I know where you're coming from. So this goes back to two or three years before I decided to move on from Roksan [in 2011]. I was visiting several VIP customers in markets like Singapore, where there were ten or so people using very similar extremely high-end systems where the main source was one of my record players. And listening to these systems I came across quite a few anomalies where you had almost the same system is the homes of customer A and customer B. I knew the turntables were set up exactly the same but I was getting totally different results. Difference in presentation never bothered me but the differences in timing were completely wrong. You had incoherent harmonic structures, where vocals and instruments just don't sound real.

AE: *How do you mean?*

TM: Say you go to a jazz club and they're playing music through a P.A. system. I guarantee you that, even with a modest P.A. system, when a guy gets up and starts strumming his guitar, you'll immediately think, oh, somebody is playing! You know it's real. And that is true 'high-end'. The things we normally associate with high-end, like manufacturing efficiency and the technical

aspects of a product, you're attributing that to the quality of the reproduction. But that is not the sound quality.

So going back to my Singapore experience, Customer A's system had dynamics and detail... but I could not listen to it for long. Customer B's system made music; I couldn't stop listening to it.

Then, at the first guy's system, my dealer came with the new tonearm cable. We replaced the old one and everything changed. I couldn't believe it. And it wasn't a subtle thing, it was really a transformation.

So I wanted to find out what was going on. I got lots of different cables from dealers, customers and friends. I put them in a system that I knew inside out. And again, the same thing. From unlistenable to music. A complete tonal balance change. So I started thinking about this and began looking at connections between components.

AE: *So coming afresh into the cable manufacturing arena, did you have to build a number of prototypes? Was there a fair bit of experimentation?*

TM: Not a whole lot. My first port of call was to get the best possible microphone cable and use that as an interconnect. After all that's what they use in the studio, right? — what the musicians use. And to be fair, the microphone cable didn't do anything wrong, but it didn't excel at anything in particular either.

And there were so many companies out there making all sorts of cables... They were talking about putting components in the cable and conditioning cables. I was gobsmacked. There's nothing in any audio system that can improve what you start with. You can take away, for sure. The best components are the ones that take away the least. It's like, I can't give you a tonearm or a cartridge that can improve what's on the record. I can give you something that has the least possible non-linearities and takes away the least possible.

It's the same with the cables. And the connectors. You need a medium to transmit an electromagnetic wave and you're trying to represent at one end what is happening at the other end with the conductor. In other words,

▽ THE PERFECT MATCH TO THE SG-1 TURNTABLE, THE SG-1 TRI POINT ARTICULATED TONEARM FEATURES A ROLL-WRAPPED CARBON-FIBRE ARM TUBE CONSTRUCTION AMONG A HOST OF OTHER PERFORMANCE ASPECTS.



INTERVIEW TOURAJ MOGHADDAM VERTERE ACOUSTICS

the physical parameters of that medium have a profound influence. Conductors have to be a certain material, of a certain diameter, have a specific plating, the thickness of the plating, the number of conductors, the tightness of the twisting and the contact surface, and so on. All these have an influence on how they deal with different frequencies, efficiencies and amplitudes.

And what kind of anomalies might these bring? Whatever you do with a conductor, you still have your fundamental parameters of inductance, capacitance and resistance. The dielectric you put on also has a big influence and we found that the conductor centricity has an enormous influence and over a long conductor length you must have consistent dielectric behaviour. Then on top of that you have the external influences which can come from RF disturbance, or AC and mains frequency at higher amplitudes/high frequencies, vibrational, etc. It's all a balance of parameters.

I probably still have the very first hand-built Pulse cable. It all started with that. I specified conductors and other things and I found a company in America that could build them to my specifications. The cables are fragile and difficult to manufacture. So they sent the bulk cable and I put them together in a configuration I thought would be appropriate. Those first ones are doing exactly what my cables are doing now. Nothing has really changed dramatically.

The original 'Hand-built' cable with the silver-plated copper strands are extremely thin; you can fit four of them in a single human hair. But it's difficult to make in long lengths and customers were demanding that. The next version, the Pulse-R, lost two of the conductors but is machine-made on one of the best machines available in the world for this task

and can be made to any length while performing on par with the Hand-built. It's also more consistent in terms of centricity of the conductor within the insulation and in the number of turns per foot and their tension.


When we first put this cable in to the system we were amazed at the performance, even in areas we were not expecting. It's like the turntable. I haven't really changed the basic principles of my turntable. I start from the point of understanding what it is that this item is supposed to do. When you know that, then you know certain things that you should not do. Always define the objective. If you don't know what the problem is you cannot find the solution.

Now when it comes to the cables I would never in a million years have expected the differences they have made and I can quite easily demonstrate them to you.


AE: *What are the main design differences between the different lines?*

TM: The most advanced is the Pulse-HB and then Pulse-R, Pulse-B and D-Fi. Pulse-HB has all the necessary internal conductor types of various sizes. Every time we move down a notch one or two of the internal conductor types are omitted. Pulse-R does not have the Vertere Microline conductors and has a modified version of the Hairline conductor. In the case of Pulse-B, Microline and the secondary shield are also omitted. Of course, the omission stops before there are insufficient numbers of conductor types to provide enhanced performance.

AE: *And does your love of music affect the way you approach practical engineering matters?*

TM: In practical engineering matters, I leave it to what I understand and what I can find out to address the issues. But the love of music provides the gauge to see whether what I've done is doing the job or not. 



 ABOVE: THE VERTERE PULSE-HB HAND-BUILT CABLE WITH BESPOKE XLR CONNECTORS; BELOW: PULSE-R IN THE RCA VERSION.

VERTERE IS DISTRIBUTED HERE BY ZENSATI AUSTRALIA: WWW.ZENSATIAUSTRALIA.COM

