

Turntable design involves a host of compromises. Touraj Moghaddam outlines Roksan's priorities:



Roksan TMS3

The drive system would use a drive belt to exert sufficient torque to ensure 'constant' speed, while acting as a motor noise filter and without allowing the motor to dictate the speed.

Construction should be neither sprung nor completely solid. The structure has to use rigidity and minimal mass where it can 'hold' items rigidly (motionless), and use compliance to provide mechanical filters where a rigid, low mass approach does not work (eg tonearm or motor drive).

The main bearing should provide sufficient support for the platter mass with minimal noise and friction, but also define the axis of rotation so noup side down bearings and no air cushions. The Xerxes.20 uses Roksan's unique self-centering, self-aligning true single point main bearing. The bearing sleeve is gun-drilled from solid phosphor bronze, and the only contact is between the polished spindle tip and a captive tungsten carbide precision ball.

The platter should provide sufficient inertia to dictate the speed, with as low a mass as possible to avoid energy storage and bearing wear and noise.

The Xerxes.20/TMS inner and outer platters are both machined from solid aluminium alloy instead of castings, to ensure the material is homogeneous.

The complete platter is constructed of two parts, each designed as a tuning fork and hence it's free from any nonlinearity. Their natural frequencies are linearly damped, as these two parts are joined together by friction only. The platters are machined to extremely high tolerances, and high peripheral mass distribution maximises the inertia-to-mass ratio and reduces undue pressure on the bearing contact point.

Torque and inertia go hand in hand. When the platter has sufficient inertia to dictate the speed, the belt has to provide the necessary torque to keep it going.

The motor must rotate at constant speed so a synchronous motor is most appropriate. It is important that the motor is not too powerful so it does not dictate the speed. It should be used to top-up the energy that keeps the platter rotating. To avoid dictating the speed, there must be a mechanism by which the motor keeps in synchronous mode with minimal belt tension modulation. The Xerxes.20/TMS motor lower bearing allows the motor body to rotate about its own axis, constrained by a linear spring: this corrective system has a

frequency well below 1Hz when combined with the electromagnetic field of the motor coils. The motor is controlled a power supply that reduces noise and provides the motor with the signal that it requires to operate under design conditions.

The mat should support the record as 'chaotically' as possible, and be as resistive as possible to reduce 'character' imprinting and eliminate non-linear behaviour. A thin fibrous material, hard at high frequencies and softer at low frequencies, without any rubber or similar non-linear material, provides a good support. Clamping the record will directly connect it to the rest of the structure, so any 'noise' in the structure will get into the record and impair performance.

Any damping working with mechanisms dealing with the internally induced motion/noise should be resistive and thus as linear as possible. All other areas that require some form of damping should be designed according to the requirements of those parts. In short the more linear the damping, the better.



Roksan Xerxes.20plus

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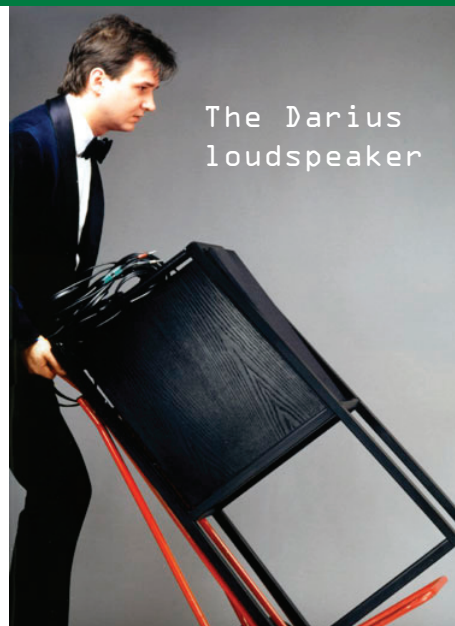
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Interview with Touraj Moghaddam



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The Darius Loudspeaker

Did you know?

The Darius loudspeaker was designed alongside the original Xerxes in early 1985. As with the Xerxes, the Darius was the first loudspeaker design which tackled the adverse effects of induced vibration between drive unit, cabinet, and stand/support.

The Darius was the first loudspeaker with a sprung tweeter. This innovative design isolated the tweeter from unwanted vibrations in X, Y and Z directions. (Suspension frequency: X<4Hz, Y<3Hz and Z<2.5 Hz).

The Darius was the first loudspeaker to use a 10mm internal spike to fix the resonance of the bass driver magnet and it was the first loudspeaker to have an exoskeletal stand, specifically designed to support the Darius cabinet at the 8 apices (the primary nodes of the cabinet) via 8 adjustable spikes to ensure direct coupling of the cabinet to ground with negligible movement. It used a setup arrangement rather like a microphone pair setup which when combined with the above design features resulted in a performance second to none.

The Darius was soon becoming a reference for many, where dynamics, depth, absolutely stables pinpoint imaging and amazing bass response from such a small cabinet mesmerized the audiences around the world.

20 years later today, the pioneering principals of this amazing loudspeaker are still being used and admired in some of the best designs around.



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Summer Break:

Roksan is on holiday from Mon. 28 July until Fri. 8 August.