Turntable Reviews

Spiral Groove SG2 turntable

By Brian Damkroger • Posted: Jun 14, 2010

High-end audio exists at the intersection of art and science. Either discipline can produce a good product, but it takes both to create the very best. The Sonic Frontiers gear I auditioned many years ago, for example, was technically sound, nicely built, and sounded good—just never as sublime as products from, say, Audio Research or VTL. On the other hand, an experienced, insightful designer such as Quicksilver's Michael Sanders can create wonderful products from humble circuits and parts, but be ultimately limited by the underlying technology. But when brilliant design, uncompromised execution, long experience, and artistry all come together, the results can be staggering.

Photograph: TONEAudio Magazine

The evolution of high-end turntables illustrates how such a perfect merger of art and science can be approached from either side. The Linn Sondek began as a simple design that, while compromised in some ways, was implemented so artfully that sonically it transcended its origins. The original idea behind the SOTA turntable, on the other hand, was to build "a better Linn" by correcting the Sondek's design flaws. The SOTA was a vastly superior design, and, like any self-respecting engineer, I bought one.

Unfortunately, the SOTA wasn't realized with the artistry that had made the Linn so special, and never quite delivered on its promise. The net result was a kind of toss-up between the art-based Linn and the engineering-based SOTA, with proponents of each claiming that their approach was better. The designs and performance of both evolved and were improved over the years, the Linn through more advanced engineering of its power supply and chassis, the SOTA through better execution of its design principles, and modifications that sometimes weren't well understood, even by the designer(s), but that resulted in better sound. And somewhere along in there, I replaced my early-model SOTA with a second- or third-generation SOTA Star.

Does a Spiral Groove begin at the inside or the outside?

Allen Perkins has been designing, improving, and redesigning turntables for over 20 years, and well understands the importance of both art and science. He played key roles in the evolution of the SOTA, first as a frustrated owner working on his own 'table, and later as one of the company's managers. One of those roles was to provide telephone support to customers, which exposed him to even more issues with the 'tables, as well as a universe of users' tweaks and modifications. When, eventually, he was put in a position to influence SOTA's designs, he incorporated what he'd learned into improved versions of the existing models and a new, vastly improved turntable model, the Cosmos.

A few years later Perkins left SOTA to form Immedia, his import and distribution firm. But he continued to design turntables. Some of the SOTA's design elements were incorporated in his new turntables, the Immedia RPM-1 and 2, but for the most part, the new designs were

radically different from the SOTAs. One thing Perkins had noticed while developing the Cosmos was that prototype chassis sounded better naked than when hung on springs inside a box. Measurements convinced him that this was because the suspended versions were in constant motion. Ergo, the RPM models eschewed spring suspension and any sort of external box, and the theme of eliminating any spurious movement was applied throughout the designs.

The RPMs began a new design cycle for Perkins. He'd improved the engineering-based SOTA with empiricism and art, and taken it about as far as it could go with the Cosmos. The RPM 'tables were the start of a new line, one that combined what he'd learned from the SOTA's evolution with new, original elements, embodied in an entirely new design. As had the Linn, SOTA, and SOTA Star before it, an RPM combo of turntable and tonearm (footnote 1) served as my reference for a time.

Spiral Groove SG2

The Spiral Groove turntables look similar to the RPMs; as Allen Perkins noted in his interview in the January 2010 issue (p.59), "There are no new ideas in the Spiral Groove 'tables." They do include, however, several refinements that reflect a mix of evolution, new ideas, and more advanced design and production capabilities. The boxless chassis and dense, multilayer construction resemble those of the RPMs, but where the smaller RPMs had a three-layer chassis, the SG2 has five: two thin layers of damping material separating three aluminum plates. The Spiral Groove platters resemble the RPMs', but their structures are quite different. The SG2 platter has layers of aluminum, an impregnated phenolic, vinyl, and graphite; their placement, thicknesses, and even assembly order have been chosen to most effectively couple with the record and drain vibrations away.

For example, the SG2's bearing assembly alone incorporates a number of significant refinements. There are no bronze bushings or press-fit components, both sources of variability and, possibly, unwanted motion. Instead, hardened steel sleeves are used. These can be finished to very tight tolerances, allowing the contact surfaces to be minimized and placed optimally to eliminate any radial movement. Another change to the bearing assembly is that the magnet assemblies used to support the platter's weight have been changed and reoriented based on electromagnetic circuit models, to eliminate stray magnetic fields that might affect the cartridge. The SG2 even uses a different system of elastomer plugs to hang and isolate the motor subplate from the main chassis.

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There are way too many refinements to list, but they add up to higher performance and, not surprisingly, price. Where the RPM-1 cost about $5000, the SG2 will set you back $15,000. Much of the higher cost is accounted for in the more precise machining and assembly operations. The original SOTA 'tables appeared to have been built to a price point; RPMs were a big improvement, I felt, built of components produced to spec by a competent machine shop. The shop that produces Spiral Groove components—the seventh to try—specializes in high-precision aerospace components and tools for microsurgery. "They love doing it," Perkins told me; "they view it as something new, and an interesting challenge."

Use and Listening

My SG2 came with an armboard pre-drilled for the Tri-Planar tonearm I'd be using—see Sidebar—so setup was a simple five-minute operation. The Tri-Planar protractor also made mounting and aligning the Lyra Titan *i* cartridge easy, so in no time I was ready to go. The SG2 was set up on my Finite Elemente stand and plugged into a system consisting of a Sutherland PhD phono stage, Placette Active line stage, VTL MB-750 Signature monoblock amplifiers, and Wilson Audio Specialties Sophia II loudspeakers. I used Stereovox signal and speaker cables for most of my listening, and Audience power-conditioning and delivery gear throughout. In addition to the Titan *i*, I also used the vastly different Grado Signature Reference cartridge. In cases where I wanted to isolate what the Spiral Groove–Tri-Planar setup was doing, I compared its sound to that of my reference VPI HR-X turntable and arm by swapping cartridges and conducting back-to-back listening sessions.

I'd been living on a pretty steady diet of downloads, iPods, and CDs at the time, and was totally unprepared for what I heard when the needle dropped into the groove of that very first LP. The music, "Accidents Will Happen," from Elvis Costello's *Armed Forces* (Columbia JC 35709), spilled out of the speakers, bloomed, and completely took over my listening room. My first thought was that the instruments and voices had popped from two dimensions to three, like some sort of foldout book, and the detail and tonal palette had gone from sepia to Technicolor.

The performance had a totally different feel from the CD. The precision and impact of transients, as in Steve Nieve's chiming piano riffs in "Oliver's Army," gave the music an urgency and wave-like drive that was beyond some tipping point, and felt closer to live music than to the digital version. Even on slower, more introspective tracks, each note

evolved and ended in a way that had me unconsciously leaning forward in anticipation of the next one. An example from that first listening session was "Death of an Unpopular Poet," from Jimmy Buffet's *A White Sport Coat and a Pink Crustacean* (Dunhill DSX-50150). Steve Goodman's acoustic guitar flourishes were obvious exclamation points in the piece's rhythm, but even the delicate celesta notes deep in the mix had the same urgency and impulsion.

The SG2's timing and pace were especially dramatic on recordings of acoustic instruments played in a natural space. I listened to Artur Rubinstein's performance, with Fritz Reiner and the Chicago Symphony, of Rachmaninoff's Piano Concerto 2, on both LP and CD (RCA Living Stereo LSC-2068). The sound of the digital version was lovely, but through the SG setup, it became a *performance*. I was in Chicago's Orchestra Hall with the performers, breathing the air and feeling the excitement. The SG2's uncanny temporal precision and solidity locked me in to the music's timing and swept me along as it unfolded. Even after weeks of listening, long after I'd been thoroughly recalibrated to the sound of LPs, I remained a little awestruck by the SG2's energy. Each time I cued up a record, even at the end of a long listening session, the first passages would always catch me a little off guard, in the way a live performance will.

Back-to-back comparisons with other front ends, both analog and digital, highlighted the strengths of the SG2-Tri-Planar setup. In one, I listened to the Reiner-Chicago performance of Ravel's *Rapsodie espagnole* (RCA Living Stereo LSC-2183) through several digital and analog combinations. I began by listening to the recording on three different CDs: the RCA reissue and two discs I'd burned from the LP, one using the SG2-Tri-Planar-Lyra setup, the other using my VPI HR-X fitted with the Grado Signature Reference. The performances differed in their tonal balance and resolution of detail, but all were lovely and had a similar feel.

I next played the LP, beginning with the VPI-Grado rig, and immediately heard a dramatic difference: detail, vivid tonal colors, and the energy of a live performance were brought into my room, as well as the performance space itself. Musicians and stage became more tangible and three-dimensional, and instead of hearing cues and mentally reconstructing the space, I could *feel* the ambience.

Staying with the VPI HR-X 'table but replacing the Grado cartridge with the Lyra Titan *i* brought about a number of changes. The Titan *i* shifted the tonal balance upward and made instruments' timbres more lean, particularly from the midrange down. It also extended and opened up the stage, and focused more sharply on individual sections and performers. Even my perspective changed, from mid-hall to front and center. Switching cartridges had definitely changed a lot of things, but the one thing that absolutely *hadn't* changed was the performance's pace and timing.

For the next sessions, I replaced the VPI HR-X with Spiral Groove SG2 and Tri-Planar, first fitted with the Lyra Titan *i*. This made another significant change, though of a different sort than when I'd changed cartridges. Switching from the VPI to the Spiral Groove retained everything the former had brought to the performance while noticeably upping the intensity. Now, with the lights out, the tension just before the opening passage gave me goose bumps and made the hairs on the back of my neck stand up—just as happens at a live performance. With the SG2 in the system, I started slightly at each note as the strings descended through the slow opening passage of *Rapsodie espagnole*. Images were more sharply focused than with the HR-X, and popped out of the background to an even greater extent. The biggest difference between the turntables, though, was that with the Spiral Groove the music seemed to pull me into its current, lock me there, and sweep me along with the flow.

These comparisons also confirmed what I'd suspected about the Spiral Groove's tonal characteristics. I couldn't attribute any particular anomalies or tonal balance to the SG2—or to the HR-X, for that matter—but they did give my system slightly different tonal flavors. The differences were smaller than that between the Lyra and Grado cartridges, but the VPI-fed system had a consistently deeper and more powerful bottom end. Bass drums, and prominent rock or jazz bass lines, commanded a little more of my attention with the VPI, and seemed to have warmer, richer timbres. Conversely, the Spiral Groove sounded more authoritative in the midrange and lower treble. Women's voices, brass, violas and violins, and most rock-guitar leads stood out more with the SG2.

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But even these subtle differences were elusive. When I listened to the VPI, it seemed as if the cellos and double basses had more power and richer timbres. When I switched back to the Spiral Groove, however, I was hard-pressed to find differences in loudness or timbre. It was clear, however, that the notes started and stopped a bit more precisely with the SG2, and that individual instruments within a section could be discerned more distinctly. Perhaps the best way to summarize the differences I heard in the back-to-back comparisons is to say that the SG2's temporal and spatial precision gave it a leaner, more authoritative sound than the VPI, but with no loss of musicality.

The SG2-Tri-Planar combo let both cartridges produce large, open soundstages, albeit ones slightly different than with the HR-X. Through the SG2, the stage of the Rachmaninoff recording was a rectangular box that filled the space between and behind the speakers, its width and height roughly constant from front to back. In contrast, the HR-X produced a wider stage that extended beyond the speakers by a distance equal to about one-fourth the distance between them. The VPI's stage was shallower than SG2's, however, and shaped more like a truncated pyramid, with both width and height decreasing toward the back of the stage.

The SG2-Tri-Planar combo also did a superb job of resolving fine spatial detail and re-creating the ambience of a recording space, whether it was Chicago's Orchestra Hall or a small booth surrounding a singer in a multitracked studio recording. The wonderful boxed set *San Francisco Opera Gala* (London OSA 1441) was a fascinating study in microphone placement and mixing. The singers were beautifully portrayed, and clearly positioned on a stage set within a smallish but exquisite portrait of War Memorial Opera House. The orchestra, on the other hand, while positioned more or less correctly at the foot of the stage, was completely separate from the singers—a kind of "box o' orchestra" assembled from multiple microphone feeds, each recording an instrument or section too closely to capture any real hall ambience. These inconsistencies didn't matter at all with respect to enjoying the performance—that's not the point. The point is that the spatial resolution of the SG2-Tri-Planar combo made these sorts of details blindingly obvious, when I chose to listen for them.

Focusing more closely, individual images were *perhaps* slightly smaller with the SG2-Tri-Planar than with either the HR-X or CDs, but, as with the timbral differences, it was difficult to be certain because the images were better focused and more sharply

bounded. A great example of this was *Friday Night in San Francisco*, a spectacular live recording of guitarists Al Di Meola, John McLaughlin, and Paco De Lucia playing at the Warfield Theater (Columbia Half-speed Mastered HC 47152). Each guitarist was a tightly focused, detailed image through the Spiral Groove system—it was easy to picture the three players, their instruments, the stage around them, the audience—all within a single, coherent space. I'd never before heard so clearly how each moved slightly around his microphone as with the Spiral Groove.

The SG2 did a particularly good job of locating and defining the guitarists in the z, or depth, dimension. The space behind each player was just that: space, filled with the Warfield's ambience and stretching from the performer back to the rear wall of the stage. As a kind of flip side to the SG2's focus and sharp boundaries, I sometimes felt as if the VPI setup were producing a more natural, or at least a more evocative, portrayal of how performers mesh with a surrounding space. The differences were subtle, but sometimes it seemed as if the SG2 were actively *placing* images on the stage, like chessmen on a board. With the VPI, the images and surrounding stage were simply there.

Why does it sound the way it does? Art or science?
The function of a turntable-tonearm combination is simply to describe. It must position an LP and cartridge so that the only relative motion between the two is the groove moving by at a constant, specific speed, along a line that produces zero cartridge output. Accomplishing this is difficult. The undulations in a record groove can be as small as a few hundred nanometers (about 0.00001", or $^{1}/_{400}$ the width of a human hair). Call your local machine shop and ask how much it costs to *measure* these sorts of dimensions, let alone machine them. The answer will help explain the prices of the best turntables and tonearms. Retrieving ever more information from those tiny grooves gets real expensive real fast.

Allen Perkins's design goals of simplicity, stability, channeling vibrations away from the stylus/record interface, and eliminating all extraneous movement—all make perfect sense when you consider a turntable's function and the scale of the information to be retrieved. His major design elements—no springs or exoskeleton, a very rigid armboard, a dense and multilayered chassis and platter, a motor and spindle respectively decoupled from the chassis and bearing, materials that drain vibrations away from the record, a pure-sinewave power supply, maintaining a constant friction on the bearing—all reflect a solid technical basis and sound engineering.

On the other hand, exactly *how* Perkins makes all of these elements work together is an art based on his decades of experience. It also reflects the way he wants an audio system to sound: clean, detailed, and precise, with a great sense of the music's timing and a huge, open soundstage populated by tightly focused, three-dimensional images. He explained to me every aspect of his design of the SG2, and while all of the big stuff made sense, most of the details were things I would never have thought of, and some were completely counterintuitive—I *still* don't think they should work. But they do.

The net result
The Spiral Groove SG2 performed its functions very, very well. Its pace and drive, and the precision with which notes started and stopped, indicated exceptional speed stability, and suggest that any variations are several orders of magnitude smaller than the approximately 0.5–1.0% changes that are clearly audible as such. The superb resolution of detail, the spatial precision of the images and soundstage, showed that the SG2 did excellent jobs of managing vibrations and resonances, both external and its own, and of preventing them from affecting the relative positions of the cartridge and record.

The SG2 also meets Allen Perkins's design goals of aesthetics and ease of use. This turntable is understated but very nice looking. It's well built, simple to set up, and bulletproof in operation. Mating it with a Tri-Planar tonearm created a superb, stable platform that allowed two very different cartridges to sound their best, the only caveat being that the Grado's body hung low, very close to the record surface, and occasionally touched slightly warped LPs. The SG2 has only a center clamp, which didn't hold down the records as securely as does the VPI's perimeter-clamping system, or as would a vacuum hold-down system of the sort Perkins used in the

SOTA

Cosmos.

Is this combination of art and science worth $15,000?
$15,000 is a lot of money; adding the Tri-Planar and the Titan *or* Grado cartridge brings the tab to nearly $25,000. Is it worth it? That depends on your priorities, and whether the competition is a new roof, your kids' first year of college, or a different vase for the foyer. Sure, I could live with a good $1000 front end or digital sources, but if I did, I'd listen to a lot less music than I do now. I can't make value judgments or choices for anyone else, but I can say that the SG2 is as good as any turntable I've heard, regardless of price.

The Spiral Groove SG2 exists at the intersection of art and science, of theory and practice, of calculation and experience. It combines both halves of each pairing of those influences, and, like other examples of the very best high-end gear, it transcends expectations—it's something special. Mated with either of my cartridges, it created the best analog front end I've had in my system, and one as good as any I've heard. The combination faithfully transcribed the energy and beauty encoded in the grooves by the artists and engineers, and provided a more lifelike energy and drive than I've heard with other systems. A Spiral Groove SG2, a Tri-Planar tonearm, and a high-end cartridge will have you tapping your foot and sitting on the edge of your seat. Don't audition unless you're prepared to buy.