



artemis labs

SA-1 turntable

as reviewed by Roger Gordon



Frank Schroeder has made a name for himself with his excellent tonearms—the Schroeder Reference, the DPS, the Model One and the Model Two. Unfortunately, due to the intensive hand labor put into each tonearm, production is limited. Thus, most people have only heard the Schroeder tonearms at audio shows and not in their home listening rooms. Besides designing and building tone arms, Frank Schroeder has for many years been acquiring and listening to turntables. He has quite an extensive collection of turntables including an Onkyo PX-100M and a Commonwealth Electronics 16D. In addition, Mr. Schroeder has been designing and building turntables for his own use. At the 2007 Consumer Electronics Show (CES) Mr. Schroeder met with Sean Ta of Artemis Labs and discussed a state of the art turntable that Mr. Schroeder had designed. While Mr. Ta liked the design of that turntable, it was too expensive to manufacture. Instead Mr. Ta commissioned Mr. Schroeder to design a turntable that included many of the innovative features of the state of the art turntable, but which would be much simpler and cheaper to manufacture while sacrificing very little in sound quality. This new design ultimately became the SA-1 turntable.

If you are familiar with the Schroeder tonearms you know that his designs are simple and elegant. The same design concept has been applied to the SA-1. Rather than massive and covered with chrome, the turntable is actually fairly small measuring 17.75" wide, 13.75" deep and 2.75" high (not counting the threaded cones on which the turntable rests). To quote the owner's manual "The plinth is constructed of three layers of bamboo ply and ebony, each bamboo layer made up of three layers of different grain configuration. Medium mass and very high internal damping in

ROGER S. GORDON'S SYSTEM

LOUDSPEAKERS
 VMPS RM 30 floor standing speakers (-3dB at 37Hz) with VMPS Large subwoofer upgraded to VSS specifications (-0dB at 20Hz). VMPS Ambiance Tweeters.

ELECTRONICS
 deHavilland Aries 845-G single ended triode mono block amplifiers on main speakers with two Dayton Loudspeaker 500 watt plate amps (class AB) with variable crossover and single band parametric equalizer on subwoofer. Herron Audio VTPH-2 phono stage and VTSP-3 preamplifier, VacuumState JLTI phono stage, and H.H. Scott 130

stereo preamp with selectable phono equalization.

SOURCES

Turntables: Nakamichi TX-1000 and Garrard 401 with skeletal plinth. Tonearms: Schroeder Reference, Moerch DP-6 with Teres Audio VTA Adapter and red dot and blue dot 12" armwands, and VPI 12.5 with two armwands. Stereo MC cartridges: Van den Hul Colibri XPW and Condor XGM, ZYX UNiverse S-SB, and three Audio Technica OC9/II cartridges. Stereo MM cartridges: Empire ERD-9 and Empire 750 LTD. Mono MC cartridges: ZYX R1000 AiryM-X-SB and Denon 102. Sony SCD-1 with Modwright Absolute Truth Mod, plus SuperClock II, SuperClock II Power Supply, and Richard Kern's Transport Mod.

CABLES

Bent Audio phono cable that includes terminal box for swapping resistors to change cartridge loading, Purist Audio Venustas and Audio Magic Sorcerer interconnects for connecting equipment to preamp, Harmonic Technology Cyberlight P2A with battery Pack IV for connecting preamp to amps, and Audio Magic Sorcerer bi-wire loudspeaker cables.

LINE CONDITIONERS AND AC Sound Application XE-12 cryoed with Elrod Power Systems 3 Signature power cord and Audio Magic Stealth Matrix with Audio Magic Illusion 4D power cord. Power cords: Audio Magic Excalibur and Illusion 4D, Coincident, Purist Audio Design Venustas, Silent Source, and Wireworld Electra III+.

ACCESSORIES

Room Treatment: Listening room designed by Rives Audio utilizing materials from RPG, Inc. and self constructed ceiling panels designed by Rives Audio (See PFO Issue 21). Acoustic Science Corporation Tube Traps used to control bass and diffusion (See PFO Issue 32). Vibration Control: Nakamichi Turntable - Lead Balloon stand with the legs filled with a mixture of kitty litter, sand, and lead shot, with 3" maple butcher-block, and Stillpoints supporting turntable. Garrard 401 - Polycrystal Rack with Herbies Audio Lab Grunge-Buster platter mat. Electronics - Black Diamond Racing Cones under phono stage and pre-amp; Silent Running Audio 3" VR isolation stands under Sony SCD-1 and deHavilland tube amps. Tubes - Herbies Audio Lab HAL-O tube dampers on all vacuum tubes.

conjunction with a rigid coupling to the supporting platform provide an effective mechanical ground. Vibrations generated by the table are dissipated in the plinth, footfall is controlled despite the lack of a suspension (a can of worms in itself)." The plinth is supported by three 1.2" high cones, one of Dural which is situated in the back and two of a hard polymer which are in the front corners. The Dural cone is screwed in tight and serves as the mechanical ground for the turntable. The front cones can be used for leveling, though Mr. Schroeder thinks leveling the platform on which the turntable rests is preferable to leveling with the front cones. Stillpoint feet are available as an option ⁽¹⁾. Also included with the turntable is a small Delrin puck (\$100 if bought separately) which is used as a record weight. The puck has an oversized spindle hole so that the puck can be placed such that it does not touch the spindle. If the puck does not touch the spindle it can not pick up noise from the spindle and transfer it to the record. While the puck is very small and light, it did make a small but noticeable improvement to the sound, particularly on orchestral pieces or music involving acoustic instruments.



The platter is aluminum, weighs 15 pounds, and is machined to plus/minus 1 microns in all directions. The top of the platter is recessed so that different mats can be securely placed on top of the platter. The SA-1 comes with a foam bubble mat and an acrylic plastic mat. A graphite mat is optional. I found that in my system the foam mat provided too much damping. The acrylic mat did not over damp and provided a warm and pleasing sound. The optional graphite mat was my favorite and the one that I used while doing my listening for this review. The optional graphite mat provided a life and vitality to the music that the acrylic mat lacked. On the other hand, the sound was not as lush. With my musical tastes I preferred life over lush. The choice of a mat is highly system and personal preference dependent. Don't choose a mat until you get the SA-1 set up in your own listening room.

The motor, which is built into the plinth, is a high torque Swiss DC motor. Power is transmitted to the platter via a loop of 1/4" magnetic tape which runs around the outside of the platter. The choice of non-elastic magnetic tape solved some design problems. Elastic belts suffer belt creep which causes subtle speed fluctuations which can smear the sound. The use of a massive platter can minimize the audible effects of belt creep, but then you run into problems with the bearing that has to support a very heavy platter, plus the additional cost of the heavier platter and more

substantial bearing. Non-elastic belts, however, also have problems. If the tension on the belt is too low, the belt slips (micro-slippage) which also smears the sound. This problem can be ameliorated by the correction circuit which all DC motors must have in order to maintain constant speed. However, the constant micro-slippage means that the correction circuit is constantly working so that the speed is never really constant. If the tension is too high, the side thrust on the bearing is too high which causes premature bearing wear as well as possibly introducing sonic problems due to increased bearing noise. To solve the tensioning problem, the SA-1 has the magnetic tape pass over a tension roller so that constant tension is maintained at all times. Besides maintaining proper tension, the tension roller provides other benefits such as taking up the impact of the tape splice as it travels around the motor pulley. In addition, the tension roller acts as a mechanical filter for all other motor related noise that gets transmitted into the tape. Thus, the magnetic tape plus tension roller is providing many of the advantages of an elastic rubber belt (noise isolation) while also maintaining the rigid connection between the platter and the motor like a rim drive turntable.



The speed correction circuit/controller unit for the SA-1's DC motor is contained in an external box connected by an umbilical cord to the DC motor. The power supply for the controller unit is fully regulated so power line fluctuations should not affect speed stability. The controller unit monitors the motor current and increases/decreases the drive voltage as motor current drops/increases due to changes in load. These load changes can be caused by such things as belt slippage, sudden oil film breaks in the platter bearing or motor bearing, or stylus drag. The SA-1 is designed such that stylus drag should not be a major factor in load changes. This is because the motor is under constant drag due to the normal friction losses of the bearing plus the embedding of two magnets in the plinth beneath the platter. These magnets act as an eddy current brake on the platter similar to the eddy current brakes used on the Garrard 301 and 401 turntables. The total drag on the motor due to the bearing friction losses plus the eddy current brake is so large in comparison to any stylus drag that stylus drag is a non-issue.

Getting the SA-1 out of its box and up and running is a very simple and straight forward five minute task. Just take everything out of the box, screw the three cone

feet into the bottom of the plinth, set the plinth on top of your stand, slip the platter over the bearing shaft, thread the magnetic tape belt around the motor pulley, tension roller and platter, place the controller unit near the plinth, connect the umbilical cord, connect a power cord to the controller unit and you are done. Of course, you may want to check for level. Leveling the platter with the two front screw-in cone feet is really easy. If you have a strobe and strobe disk you can check the speed at 33 1/3 rpm and 45 rpm and adjust the speed by turning the adjustment knobs with a small screwdriver. Now it is time to mount your arm and cartridge. This will probably take you considerably longer than setting up the turntable.



I think it is a fairly good bet that Frank Schroeder used one of his Reference tonearms while he was prototyping the SA-1. Thus, the Schroeder Reference tonearm should be compatible with the SA-1 turntable. For this reason and because it is relatively easy to move the Reference back and forth between turntables I used my Schroeder Reference arm during this review. For most of the listening I had my Van den Hul Colibri XPW mounted on the Reference. Towards the end of the listening I swapped the Colibri out for my Van den Hul Condor XGM. The Condor is a very different cartridge from the Colibri having better bass and dynamics than the Colibri but lacking the finesse and 3-D imaging of the Colibri.

Having set up the SA-1 with arm and cartridge I spent the next week playing music. Right out of the box the SA-1 sounded very good. No matter what I played, rock, classical, folk, jazz, the SA-1 played music. After putting about 20 hours on the SA-1 (it was a demo unit that was already broken in) I got down to serious listening comparisons. I selected five LPs for my listening comparisons:

Decca Ace of Diamonds SDD 227 - Beethoven, *Choral Fantasy* with Julius Katchen, Pierino Gamba and the London Symphony Orchestra

Columbia OC40158 - Judas Priest, *Turbo Lover*, track one, side one

Island 12 WIP 6598 - The Secret Policeman's Ball (1979), Pete Townshend on acoustic guitar singing *Pinball Wizard* and *Drowned*

Classic Records 45rpm reissue of Louis Armstrong doing *St. James Infirmary* from Audio Fidelity "Satchmo Plays King Oliver"

Warner Bros 25491-1 - *Trio* with Dolly Parton, Linda Ronstadt, and Emmylou Harris, track one, side one

For the first comparisons I used my Nakamichi TX-1000 turntable. The TX-1000 is a direct drive turntable that was designed in the early 1980s. When sold from 1983-

1986 the MSRP was US\$8,000. Aside from the unique self-centering mechanism to correct for off-centered spindle holes, the TX-1000 was one of the best direct drive turntables ever made. To keep a level playing field I did not use the self-centering feature ⁽²⁾ when playing LPs on the TX-1000. I moved the Reference arm back and forth between the SA-1 and the TX-1000 twenty-three times. I got very good at moving the arm. Towards the end the time it took to move the arm, move the interconnects, reset VTA (the platters are of different heights), and realign the cartridge using a continuous curve protractor took slightly less than five minutes. Five minutes is still too long to do an accurate comparison because you start to lose your aural memory after 30 seconds. However, as I was going back and forth between the two tables I was struck by how similar the tables sounded. On both turntables the music was coming out of a black, silent background. The soundstages were similar in size. Bass reproduction was about the same—well within the slight variations in VTA setting. The emotional content of the music was about the same; i.e. I enjoyed the music played on either table. After about 15 swaps, I concluded that I did like the music slightly better on the SA-1 versus the TX-1000. However, I had been using the TX-1000 with the stock glass platter which is a known weak point on the TX-1000. Since the SA-1 was using an optional graphite mat, I put a Harmonix TU-800EX graphite mat on the TX-1000 and did eight more comparisons. With graphite mats on both turntables I now slightly preferred the TX-1000.

Having learned as much as I could by doing comparisons between the SA-1 and the TX-1000 I now was ready to start doing comparisons between the SA-1 and my Garrard 401. I knew before starting that the idler wheel 401 was not going to be as quiet as the SA-1. But would the SA-1 have as much PraT (Pace, Rhythm and Timing) as the 401. The reason why people, including me, like idler wheel turntables with high torque motors is that those turntables have lots of PraT. They are real fun to listen to particularly if you play rock 'n' roll. On the first comparison between the SA-1 and the 401 it was obvious that the SA-1 was much, much quieter. Regarding PraT, it was a close call. After a number of comparisons back and forth I concluded that the 401 has slightly more rhythmic drive but it was so close I could be deluding myself. The fact that the belt drive SA-1 has PRaT like an idler wheel 401 should not have surprised me though. Mr. Schroeder has a fully tricked out Garrard 301 idler wheel turntable (Loricraft PSU, OMA slate plinth, Kokomo bearing, etc.) amongst his many turntables. I am sure he compared his SA-1 prototypes against a number of his turntables including his 301.

Having compared the SA-1 against my vintage turntables it was time to match the SA-1 against modern competition. I took the SA-1 (\$8,000) with Reference arm (\$6750) and Condor cartridge (\$3500) over to a friend's house. My friend sells audio equipment out of his home and usually has ten to thirteen turntables set up and ready for testing. He did not have any Schroeder arm boards for any of his turntables. Therefore, we set the SA-1 up on one stand and swapped interconnects in and out of the phono stage with two other turntable/arm/cartridge combinations keeping the other electronics all the same. The electronics were:

Herron VTPH-2 phono stage though we did also use the new Whest

ASR Emitter 1 Exclusive integrated amp

Magico V-3 speakers

Crystal cables

The two turntables we used for comparison were:

Transrotor Zet (\$7500)

Origin Enterprise arm (\$7700)

Dynavector XV-1st (\$5500)

Avid Reference (\$20,000)

Triplanar arm (\$5000)

Air Tight PC-1 (\$6800)

For software we used:

Nancy Bryan - Lay Me Down, Analogue Productions reissue, side two, track one.

Decca SXL 2011 reissue, Stravinsky, Petrushka side one, track one

We did a number of comparisons between the SA-1 and the Transrotor and between the SA-1 and the Avid. With the Nancy Bryan track we preferred the SA-1 and the Transrotor over the Avid. However, the SA-1 and the Transrotor were so close that it was a matter of personal preference as to which one was 'better'. With the Petrushka track it was not close. The SA-1 was the clear winner with a bigger soundstage, cleaner imaging, and more you-are-there sound.

As a further check we fired up another system:

Avid Sequel (\$8000)

Dynavector 507 MkII arm (\$4750)

Magic Diamond cartridge (\$6500)

Airtight 2001 preamp (\$25,000)

VAC Phi 200 amp (\$9800)

The same Magico V-3 speakers (\$27,000) in the same room, same seats

After suitable warm-up we played the Petrushka on this new system. Again we preferred the SA-1 with its Reference arm and Condor cartridge. It just sounded more like live music.

So what did this visit to my friend's home prove? We were comparing apples to oranges after all—changing three variables instead of just one. Well, while we did not do a direct comparison (changing only one variable) between the SA-1, the two Avids and the Transrotor, I think the SA-1 demonstrated that can run with the Big Boys in an expensive high end system.

Conclusion

If you are into bling and wish to impress your friends with a 1,000 lb chrome covered turntable that requires the manufacturer to install it on your site, the SA-1 is not for you. If you want to spend your time listening to music rather than fiddling with your turntable, you need to give the SA-1 a listen. Based on my listening comparisons I think the SA-1 is a very fine sounding turntable. I would have been very, very happy to have it remain in my listening room as one of my turntables. To my ears, the SA-1 is as quiet as a direct drive. It has excellent speed stability. It doesn't take up a lot of space in your listening room, which for those of us with smaller listening rooms is important. The SA-1 is very easy to set up and once set up you can forget about it.

And most importantly, the SA-1 allows the emotional content of the music to come through to you. Is it a perfect turntable? No, because there is no such thing. However, the SA-1 definitely deserves a listen if you are in the market for a turntable in this price range. Be sure to try all three mats when you are doing your demoing as they make a considerable difference to the sound. **Roger Gordon**

SA-1 Turntable

Retail: \$7800 (US)

Artemis Labs

web address: www.artemislabs.com

(1) I use Stillpoints www.stillpoint.us under my Nakamichi turntable and have found them to be more effective than the original air bladders in the corner towers. I did not get a chance to try the optional Stillpoints under the SA-1.

(2) The SA-1 actually has a manual self-centering mechanism. The spindle has a tapered shape with the bottom of the spindle slightly narrower than at the top. This means that as the record rests on the platter, the record should not be touching the spindle. This isolates the record from any noise emanating from the spindle (as does the over sized hole on the Delrin record weight). It also provides a means of some correction for records that have their spindle hole punched off-center. On records with off-center spindle holes, if you put the needle in the run-out groove you will see the tonearm move back and forth sideways with each revolution of the record. By gently nudging the record with your finger nail you can move the record closer to the spindle. With practice you can actually nudge the record at the right spot so that the side to side movement of the tone arm is minimized thus reducing wow on sustained notes. This is essentially the way the Nakamichi CT Dragon does its self-centering correction though it uses a manual sensor arm in conjunction with its mechanical "finger nail". The Nakamichi TX-1000 uses a different mechanism that utilizes an automated sensor arm and a moveable platter.

