



**KAB Special Edition Technics
SL-1200MK2SE and custom modifications**

Manufacturer: KAB Electro Acoustics, P.O.Box 2922, Plainfield, NJ 07062: 908-754-1479 www.kabusa.com

Source: Manufacturer Loan

Price: \$475

Reviewer: David Arthur Rich

The unit includes added QC test bearing friction vertical and lateral, and test of platter for proper fit. KAB will: re-machine the platter center hole to ensure an excellent fit; test the platter for flatness with guaranteed less than + - 0.005" planarity as measured on the platter edge; check and correct the azimuth alignment of cartridge socket. KAB will replace missing hinges for the dust cover and the platter mat may also be changed.

Features:

- * direct-drive system is Quartz locked.
- * the body is die-cast aluminum; the base is heavy rubber, but the feet are spring-mounted.
- * calibrated VTA adjustment helicoid deep-thread technology similar to camera focus rings with lock



- * anti-skating control uses progressive spring tension to gradually apply the reverse skating force as the stylus progresses
- * electronic braking system
- * 8% variable speed
- * the platter is die-cast aluminum, measures 13.1 inches in diameter, and weighs 3.2 pounds.

Specifications:

- Wow and Flutter: 0.025% WRMS (JIC5521) ±0.035% peak (IEC 98A weighted)
- Rumble: -56dB (IEC 98A unweighted) -78dB (IEC weighted)
- Cable capacitance: 100 pF
- Effective tone arm mass: 12 grams
- Tone arm friction: less than 7mg (lateral, vertical)
- Starting torque :1.3 lb-in (1.5 kg-cm)
- Build-up characteristics :0.7s from standstill to 33-1/3 rpm
- Dimensions: 17" x 15" x 6"
- Shipping weight : 26.5 lbs.

In addition to the KAB website, product information may also be found at http://www.panasonic.com/consumer_electronics/technics_dj/



I tested the SL-1200 with these accessories from KAB ElectroAcoustics:

- a) Tonearm Fluid Damper (\$149)
- b) Threaded Record Clamp (threads drilled in central drive mechanism) (\$149)



c) Integrated cartridge/head design with specific alignment for the SL-1200

KAB/Ortofon Concorde Pro / Stylus 40 Integrated Cartridge (\$339)

KAB/Ortofon Concorde Pro / Stylus 30 Integrated Cartridge (\$239)



Other options that I did not test are:

a) KAB/ Stanton Groovemaster II AE Integrated Cartridge with nude Stereohedron stylus \$225 (about 10 stylus assemblies are left)

b) Spring isolator feet (\$200)

c) 78 RPM speed capability (\$175)

Turntable manufacture has emerged as a cottage industry. Among the hundreds of available units, the Technics SL-1200MK2SE reigns supreme for its low rumble, wow and flutter, and exquisite construction. The SL1200MK2 is a living fossil because it remains a DJ favorite: the starting torque of 1.3 lb-in. builds-up characteristics from standstill to 33-1/3 rpm in less than a second, and the bearing assemblies can withstand repeated pounding. During the halcyon days, you could pay-up to purchase Technics with even better performance and Technics had competition from other major Japanese companies. The 1978-

vintage Technics SL1000 MK2 (\$1400) had a better constructed arm mounted directly to rock-like material that must have weighed a ton. But these are gone because the Technics SL-1200MK had the combination of a good price and excellent reliability for the DJ.

The distribution channel for the SL1200 is not the high-end hi-fi store or Best Buys; instead, you are more likely to find the unit at the pro audio section in the back of your local guitar store. In turn, Technics has made concessions for the DJ which audiophiles may not appreciate. The dust cover hinges are removed to give the Grandmaster more working space and some family members have special arm modes to allow for running the turntable backwards without skipping. Also to achieve the low price of the table, some units may have small manufacturing defects that would bother the audiophile but not the DJ. To work around these issues, you need to find someone, like KAB Electro Acoustics, who can QC for small manufacturing glitches that DJs will miss.

Why does KAB start with the SL1200? If it can take the punishment of a DJ, it surely should perform like new for years in the home. Furthermore, we are talking 10dB+ better rumble specs than anything else I know of and peak wow and flutter often an order of magnitude lower. The bearing friction of the tonearm is specified to be 0.1% of the minimum recommended tracking force of 0.75 grams. KAB is a brave little company because they dare to unravel mysteries of high-end audio where the one-eyed man is king in the land of the blind. It is far easier to sell expensive turntables and moving-coil cartridges than it is to dispel the mystique of high-end audio. Further, manufacturers of cartridges and accessories may cut and run for fear of being associated with an entity that makes discordant noises with audiophile tenets.

With data in hand, KAB is ready to participate in a debate if an audiophile wants to start one. Take what is doctrine to the audiophile – belt drives trump direct drive. KAB will point out that the new audiophile discs are often cut on a lathe driven by a Technics SP-02 direct drive motor.

Lacking the equipment to do so, I cannot confirm Technics' specifications, nor could I find an independent review of this class of Technics table. The company tended to send out lower-priced units for evaluation. How do I know what was tested? I used the Roger Russel site www.roger-russel.com/magrev.htm. The site is a chronology of reviews in *High Fidelity*, *Stereo Review*, and *Audio* dating from the 1950s till the death of each magazine.

Audio did review the ultimate Technics turntable, the SP-10MK3 (\$2500 with no tonearm). The unit's specification supplied by Technics was even better performance than the SL-1200, and in its review, the unit achieved an unweighted rumble of -68dB (8dB better than its Technics spec) and a weighted wow and

flutter 50% lower than the specified value of 0.021%. The peak-to-peak wow and flutter measurements were dominated by spectrum below 10Hz, quite different than belt drive units. There is a significant spike around 0.5Hz, which was more a measure of the centeredness of the test disc than anything else. At frequencies in the bass region of the audible band, the closed loop servo system of the table reduces the speed variation by negative feedback. The speed sensing element being part of the platter itself Belt-drive turntables cannot sense speed at the platter and correct at the motor because of the high-pass filter function of the belt. If the Technics SL-1200MK2SE exceeds the specifications provided by Technics for the SL-1200MK2SE in the same way that the SP-10MK3 did in the *Audio* review then it is a truly precise device.

To test whether the sound improves upon that of a belt-drive unit, I used my old Thorens TD125MKII with an SME 3009 Series II improved arm for comparison. This was a state-of-the-art combo in the mid 1970's and commands \$1,000 on Ebay in excellent condition. I have the original belt and the turntable bearing shaft has not been lubricated - according to the instructions, this requires, I am not making this up, Caltex Regal oil B, with no substitutions. The users manual states bearing maintenance should be scheduled for several thousand-running hours. Depending on what several means I may not have accumulated that much time on this table.

For the comparison, I used an Audio Technica AT440Mla cartridge (see test results below). The turntable comparison employed the same matched level CD-R based test as I used for my cartridge test (please refer to the sidebar). I recorded my CD-R 10 vinyl test recordings samples on the Thorens / SME and then I recorded them on the Technics. Since I was interested in performance for transcription to CD-R, I turned off the volume and listened on headphones. This ensured no acoustic feedback, which would have occurred with any turntable eight feet away from the flat to 25Hz NHT Xd subwoofer. Without a floating suspension, the Technics may be more susceptible to acoustic feedback than tables in the upper \$1000s, but the problem is eliminated by recording in silence to CD-R and then listening to the CD-R.

By instantaneously switching on the CD-R, the sound was more stable on the Technics. The measurements indicate the results are plausible, but I was surprised at how readily audible it was. Perhaps, the upper midrange was a tad cleaner, though this was not a blind test and hence, I could be biased. Also, the arms are of different effective mass (I did the comparison without the tonearm damper option discussed below). As noted in the sidebar, I wish I could post my wave files on the web site for you to compare.

Using this turntable is a world beyond the Thornes

/ SME combo. It starts instantly, tolerates any record cleaning system, and stops on a dime thanks to Technics' unique electronic brake that brings things to halt in less than a second. No more waiting for what seems forever for the turntable to stop so you can remove your record off the table and put the next one on. With well over one hundred record changes required to make the CD-R's amidst the numerous combinations of turntables, cartridges, and preamps, I would have given up on this survey had it not been for the Technics.

VTA adjustment is made via a helicoid thread knob with lock. On the SME 3009, like many high-end arms, a set screw in the base is released to move the arm up or down by hand. Needless to say, the level of precision you can achieve with this simple set up is an order of magnitude lower and the inconvenience factor is a couple of orders of magnitude higher. Since I was dealing with five cartridges of varying heights, I appreciated the VTA adjustment.

The arm down force adjustment and the cueing lever are the only things reminiscent of a sub-\$500 table. The weakest link is the lack of cue-damping going up. Many Japanese tables of the early 80's had front buttons that engaged motorized cueing of the arm. Since this type of delayed cueing is not of an advantage to a DJ, it is not surprising that this feature got lost during the subsequent evolution of the turntable. The look and feel of the cueing bar might invite concern, but if it can survive years of use in the night club, it is apparently stronger than it looks. In deference to the DJ, a stylus light has been added to make cueing of records easier.

KAB makes available a vast assortment of add-ons for the SL11200 series. Some were listed above and I tested one of their specially designed cartridges. Of the accessories, the \$150 damping system is the most important. The unit itself is better understood from the picture above. The paddle is connected to the arm and sits in a fluid trough that holds viscous silicone. The system looks similar to the one found on current SME arms costing four figures. Unfortunately, the exposed silicone collects dirt over time; KAB claims this will not affect the properties of the fluid.

Those of you who have the last Shure test disc from years past may recall it had a cartridge resonance test. A cartridge may go into spasms (literally trying to jump from the groove) when a band at the arm - cartridge resonance frequency was played by the cartridge. Under this condition the fluid damping system keeps the cartridge in the groove with any cantilever movement almost eliminated and the fluid damper reduces low frequency fluctuations on a VU meter. This is the type of low frequency energy that ported speakers despise. CD-R testing on headphones surprisingly showed the addition of the fluid damper while a measurable phenomenon was not audible. The

results might have been different, were I using test records with organ or highly warped records.

KAB also sent a record clamp that attaches to the center spindle. KAB bores out the center of the spindle so the down force is supplied by the action of screwing the clamp down and not the weight of the clamp. A heavy clamp, sold by others, could hurt the bearing of any table. Be careful of dust on the platter mat or B side of the record or dust will embed the B side of the record when you clamp the disc down. This setup reduced fluctuations on the VU meter, especially before the damping system was activated. Given the need to bore out the center spindle, this option is pricy, your money may be better spent on a cartridge upgrade rather than the record clamp. Since the clamp must be turned many times, applying and removing the clamp can be time consuming. That removes the advantage of the SL1200s ability to allow you to get records off and on the table in a flash. On the upside, the clamp material that touches the label has been chosen so that the clamp will not scratch it.

Except for the mechanical cueing lever, I found no downside to the turntable relative to others I have used. KAB Custom Technics SL-1200MK2SE sounded better because it measures better. I highly recommend the unit as a first step in building a state of the art turntable reproduction system. Later, you can upgrade to a cartridge worthy of the arm and a phono preamp worthy of the rest of the setup.

Cartridges

We move on to the selection process for the cartridges used in this test. This turns out to be a relatively disappointing exercise since many of the best are discontinued. Shure, for example, discontinued the V15 5MR, and even the stylus is discontinued. Fans of the Stanton Collectors series 100 as well as the 881/981 are similarly out of luck, though some upper end Stanton styluses can be found on the web with KAB being one of the few sources and a notable lower priced one. Ortofon remains in business, but there, nothing in a sensible price range that is new. Audio Technica is producing some new cartridges, mostly variants of older designs as a result of material changes (Beryllium, for example, is out, perhaps for safety reasons). The top of the line Audio Technica cartridge included in the survey, with newly optimized coil inductance and resistance, was introduced within the last eighteen months.

Conveniently, I had a Shure V 15 VMR against which I could benchmark the newer cartridges. The Shure did not win in the matched-level subjective testing (see sidebar below), so do not run to Ebay to locate a used one of unknown quality. I also own a Stanton 681EEE which is still manufactured, but I have

the oldest MK 1 model. Stanton was unwilling to supply me with a sample of the relatively new MK 3 version of the 681 EEE; this is a downgrade from the 681EEE-S MK 2 since it replaces the Stereohedron stylus of the MK 2 with an elliptical stylus like the one in the original. If you crave the Stereohedron stylus, you are almost out of luck. The only stylus you can get directly from Stanton for the 681EEE is elliptical; however, KAB has a source with Stereohedron styluses that fit the 681 series.

Measuring cartridges is a lost art. You need dedicated test discs no longer in print. Tracking notch filters timed to move with a sweep tone on a disk are needed to get above the noise floor of the disk, especially at higher frequencies. I do not have this equipment but since the design of cartridges has been generally static, I will reference measurements made by cognoscenti such as the folks at *High Fidelity* and *Audio*. I am missing references to *Stereo Review* because I could not locate copies of the appropriate back issues. I chose recordings from my collection that sound good (some have not been played for more than a decade) and are worthwhile preserving on CD-R. These include recordings from Decca/London, RCA, Angel/EMI, Philips, Nonesuch and Argo. I could not identify a DGG or Columbia recording worthy of inclusion in this test. I also excluded special audiophile discs and made no attempt to obtain new vinyl from sources that specialize in producing this material today. I will leave subjective evaluations of those recordings to the vinyl-beats-CD crowd, but I did include a 1950's-vintage "Shaded Dog" red-seal RCA in the test collection. Often a "Shaded Dog" will come your way from someone who is willing to part with their vintage collection because they no longer have use for it. When I see a record that has some value I point it out to the owner of the collection but I have yet to find anyone interested in selling this stuff cheaply on the promise that I am going to enjoy them. Most of my recordings had been played many times and the ones from the 1970s had seen a hard life as they were played with an elliptical stylus mounted on Garrard automatic turntables. Some of the records you can pick up from friends, garage sales, or the library may be in worse shape. For some reason a few "Shaded Dog" RCAs I gathered up show signs of limited use. Nonetheless, I expected the cartridges reviewed herein, with high technology styluses, to overcome the damage by tracing some of the less damaged vinyl where possible. I should note I am not going to give you the list of what I used in the test as this will only drive up the price of these records and my object here is not to supply you with a list of test records, but instead point you to a turntable system that will do the best job with the records you already have. I also tried some records that saw limited play, usually because I found the work or the performance to be

uninteresting. I even found a couple of unopened recordings mostly purchased to replace ones that I had played so often I had almost eaten through to the other side of the record. I was quickly reminded that records, especially those produced when oil prices spiked in the 70s, can be noisy even on the first play. This sort of noise can be attenuated by some of the modern stylus shapes while others, designed to track the most highly-modulated grooves of audiophile vinyl, can worsen the situation. When I speak of "tracking," I refer to real world discs. Almost no record that I used achieved the groove velocities that would be considered difficult to track in the same vein as cartridge manufacturers speak about "trackability." This is a function of the simple fact that most vinyl was cut so a KLH all-in-one record player could play it. Before CD arrived I was often driven crazy by some 1950 and 1960's-vintage vinyl audibly which mistracked no matter what stylus or turntable I threw at them. The truth was revealed when CD reissues of these discs appeared. The same "mistracking" could be heard on the CD. It was clear that this distortion was in fact tape saturation and my turntable system had been faithfully reproducing the distortion. How could I have known the distortion was already cut into the vinyl - those hard to track records were, in fact, not hard to track at all. Mistracking is often a phantom - many times you are actually hearing groove wear. When highly percussive instruments were present, it was possible to discern what may have been native mistracking. I was surprised to find that some stylus shapes actually minimized the mistracking due to groove wear. I elaborate on this later.

An Extended Sidebar: A New Methodology to Test Old Technology

Testing vinyl is painful. If you want to AB a cartridge, you need two matched tables and two copies of the same record and perhaps two matched phono preamps (since switching between phono cartridges adds switch capacitance and can create large impulses). To avoid the switching transient at the phono preamp output, you must wait a second or more to let the preamps settle. Syncing the two records is a pain even if the two turntables are locked in speed, and doing a level match to 0.2dB is as tedious as with any matched-level test. The same goes for comparing tables, and even RIAA preamps present problems because you cannot parallel a cartridge input to two preamps owing to loading issues. Therefore, you still need to switch at the input *and* the output. So what to do - use a CD-R as an intermediary.

Here is how I approached the cartridge test with a CD-R on hand:

1) Install the first test cartridge in the normal fashion. Use a good turntable and phono preamp to ensure that the cartridge's sound will dominate.

2) Find a test record with a 1 kHz standard recording level (5cm/sec)

3) Insert a precision trimmer (I used a ten-turn potentiometer for each channel) between the RIAA preamp and the CD-R player. For starters, apply 2dB of attenuation.

4) Set the signal level of the CD-R to -20dB to ensure all but the craziest cut disks will not overload the analog-to-digital converter (ADC) of the CD-R recorder while still giving you 70dB of signal-to-noise (SNR) relative to the noise level of the ADC (we assume here the ADC has a worst case equivalent number of bits of 15 which is common for most CD-R recorders). Surface noise and rumble will be far higher than the ADC quantization noise sitting at -70dB.

Make sure the test disc tone is recorded to the CD-R. As an option you can try to match the levels of the tone using the precision attenuator if you have individual ones for the left and right. Unfortunately, an exact match will be difficult because the resolution of the meter on a CD-R does not have sufficient granularity; even a professional one will be coarse around -20dB. The recorded tone is essential to what comes later.

5) Now we go on and record our test music samples from the vinyl. I found four minute cuts to be sufficient and wound up with about ten test recordings per CD-R.

6) Start this step any time, even weeks later, as long as you recorded the tone on the CD-R in step 4. Indeed, while I waited for some cartridges to arrive, almost two months passed before I had all my CD-Rs recorded.

Connect a meter that will resolve 0.2dB differences to the CD player's output. The level meters on the CD-R will not give you enough resolution; instead, you will need something external, probably with some gain in the channel. I used a reel-to-reel tape recorder with large analog meters and applied the gain using the record gain knob. Next, play the tone from your first test disc and establish 0 dB on the external meter. The absolute gain in the meter channel does not matter.

7) Install the second cartridge and put a new CD-R in the recorder.

Play the same record with the test tone you used earlier in step 2 and adjust the trim pots to achieve the same 0 dB on your external meters. You can level balance the two channels (cartridges can have up to 2 dB variations between the channels) if your trim adjuster allows for that as mine does. Noise on the vinyl test disc will make the meter flutter around the signal level. If you get a 0.3 - 0.5dB match to the reference level on the first test CD-R that may be all you can achieve. Make sure you record the tone on the CD for future reference.

8) Repeat step 5.

9) Finalize your CD-Rs and check that the reference

tone on both CDs is the same level. The absolute value of that level does not matter, but ensure they match by 0.5dB at most.

10) Reorder the material from your CD-Rs on a computer, then burn new CD-Rs. Any software for burning CDs that came with your computer should work. I used Sonic Solutions (now a division of Roxio) Record Now. In the end, your CD should have:

- Track 1: First cartridge playing vinyl test cut 1
- Track 2: Second cartridge playing vinyl test cut 1
- Track 3: First cartridge playing vinyl test cut 2
- Track 4: Second cartridge playing vinyl test cut 2
- Etc.

Keep the total disk time to no more than seventy minutes – that is the limit of some CD-Rs recorded with a computer program when played back on a standard CD player. I also found some computer drives get verklempt reading the table of contents (TOC) of a CD-R recorded on a CD-R audio recorder (this applies to CD-R audio discs also). This problem can be overcome by making a bit-accurate copy of the CD-R audio disc using your computer (Sonic Record Now has this option). You can further eliminate TOC problems by making a complete one-to-one audio copy of the bit copy CD (there are now two burned CD-R copies of the original CD-R disk). This second process replaces the TOC created by the CD-R recorder with the TOC created by the burner software on your computer. I do not understand why you have to go through all this, but in its absence, the computer can lock up when you transfer a CD-R track. Note we are not violating any digital rights management here since all the original sources recorded on the CD-R are analog. Computer-savvy readers are invited to send explanations.

11) Now the fun part ... instantaneously AB between the adjacent tracks. Do this as many times as you want. For this review, which involves multiple cartridges and turntables, I must have hit some cuts hundreds of times for a given cartridge, but the record only got played once for each cartridge under test.

If all this sounds like too much work, then just read on. I did it all for you. In the ideal world, we could put the music files on the TSS web site and let you judge the results, but copyright issues prevent us from doing so. Therefore, you need to trust my judgment. Next, I will be reviewing several cartridges, but early on it became clear that it was better to compare only two cartridges on a CD-R. Adding in more cartridges made it more difficult to distinguish differences among them. I cut disks with two cartridges and picked the best, then I took those files and went to the third cartridge (just like championship bowling). Sometimes things were not clear cut, in which case I had to make a no. 1 versus no. 3 disk (not like championship bowling).

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