

How can the Micro Seiki BL 91 be improved?

After implementing a number of optimizations for this Micro Seiki record deck, resulting in a customized, heavy weight BL 91 from Micro Seiki, I now have examined a new item for use with this turntable.

In addition to filling the hollow space underneath the platter, a 12 mm acrylic mat in 2 layers on top of this platter and a 1 kg record centre weight (the Micro ST-10 Disc Stabilizer) now an Outer Limit Ring Stabilizer is put through its paces.

1 Platter Outer Limit Ring Stabilizer

A ring weight around the platter edge is a supplementing item that can ensure proper contact of the vinyl record to the meta-acrylate of the platter mat used. Because both these materials are considered equally hard and cannot deform elastically (as opposed to materials such as rubber, felt or leather), for proper "fit" it is necessary that both are flat. In my case the acrylate mat can be considered flat, I discovered after observation. A vinyl record is never really flat, unfortunately. In order to properly "fit" a record to the acrylic mat, I am experimenting with a platter ring weight, or what is sometimes called in full; 'Outer Limit Stabilizer Ring'.



Fig. 1: The Micro Seiki BL 91 record player with centre Puck en platter "ausen" stabilizer ring

Let me continue explaining the function and use of a ring stabilizer.

1.1 Why using a record Outer Limit Stabilizer Ring

My belief is that a record will be in physical contact with a "hard" mat like acrylic on very small edges and facets and for the most part does not really touch the surface of the mat. So a large part of the record floats at a distance of only hundreds of millimetres, or even less, away from the platter mat, but not physically in contact with it. And relative to the size of molecules, miles away. Where the materials are not intimately connected, mechanical properties will be discontinued and little or no energy will be transferred, away from the vinyl. As a consequence, the vibrations created by the playback process will continue to circulate in the approximately 2 millimetre thick vinyl record until it has been converted into heat by internal damping of the vinyl material structure.

Ideally, with a perfectly flat record, the contact surface between vinyl record and mat will at most be about half of the surface containing music because the vinyl contains a groove. Only the "heights" between the groove spirals can contact the mat. Nevertheless, only half the surface of the record should suffice when physically in contact, and considerable energy transfer can effectively take place.

A vacuum system can force most normal records into flat by atmospheric pressure on the entire record surface. With just a centre 'Puck' weight, the record is pushed at the outer label edge onto the platter mat and for the larger part beyond this diameter, only partially. The weight of the record itself helps matters in search for contact with the platter mat, ever so slightly. The weight of an outer edge ring that pushes the vinyl record downwards can be a significant bonus. With both weights together, the effectiveness of a vacuum system can be approached. At least for most part of it, is my assertion.

1.2 Faith to the 'ring'

I hope I am allowed to submerge a little deeper into the idea and the function of a stabilization outer ring. Such a ring weight can, combined with the platter mat and the centre weight or clamp on the label area of the record, have a positive effect on the play back of vinyl records.

The primary goal is to push the record against the mat / platter, preferably with a certain amount of contact pressure. The purpose of this is to transfer/conduct the mechanical vibrations and the associated energy within the vinyl record, away from it as much as possible. Possible drainage of energy is counteracted by mechanical barriers between the record, the mat, the platter, the platter bearing and the chassis on which the bearing is mounted. These barriers are listed here according to the path along which the energy will transfer or migrate away from the source. The first barrier is of paramount importance and this is the very subject this article. Barriers will cause reflections of the energy, back to the source where it might have influence on the stylus tracing the record groove. Where mechanical impedance is continuous, reflections will be minimal. Mechanical impedances of vinyl and acryl closely match and reflections are avoided if air pockets are not present between record and mat. Where the record is in tight contact with the mat, the mechanical energy reflections are lower than where the record is loosely fitting the mat. The contact pressure between the record and the mat is inversely proportional to the mechanical reflections.

From this point of view, it is advisable to force the record with as much of the surface as possible against the mat and with as much force as possible (force that will lead to pressure). Here the outer ring around the edge, along with the centre weight on the label of the record, has its function; press the record against the platter mat.

Pressing the record against the mat can only be accomplished on the label and at the extreme edge, because the rest of the record surface must be freely accessible to the pickup cartridge and the stylus. Below is a schematic illustration shown in Figure 2. The vinyl record is represented as the

black bar from left to right with a slightly thicker central part in grey on which the label is printed. The platter mat is light beige / pink. Green arrows facing down represent force downward. Red arrows pointing upwards suggest the record to float above the mat. The puck weight on the label and the ring on the edge are shown in blue. The centre weight should not be flat at the bottom (against the label) but have a slight extension on the outer edge, as outlined by the two dots left and right.

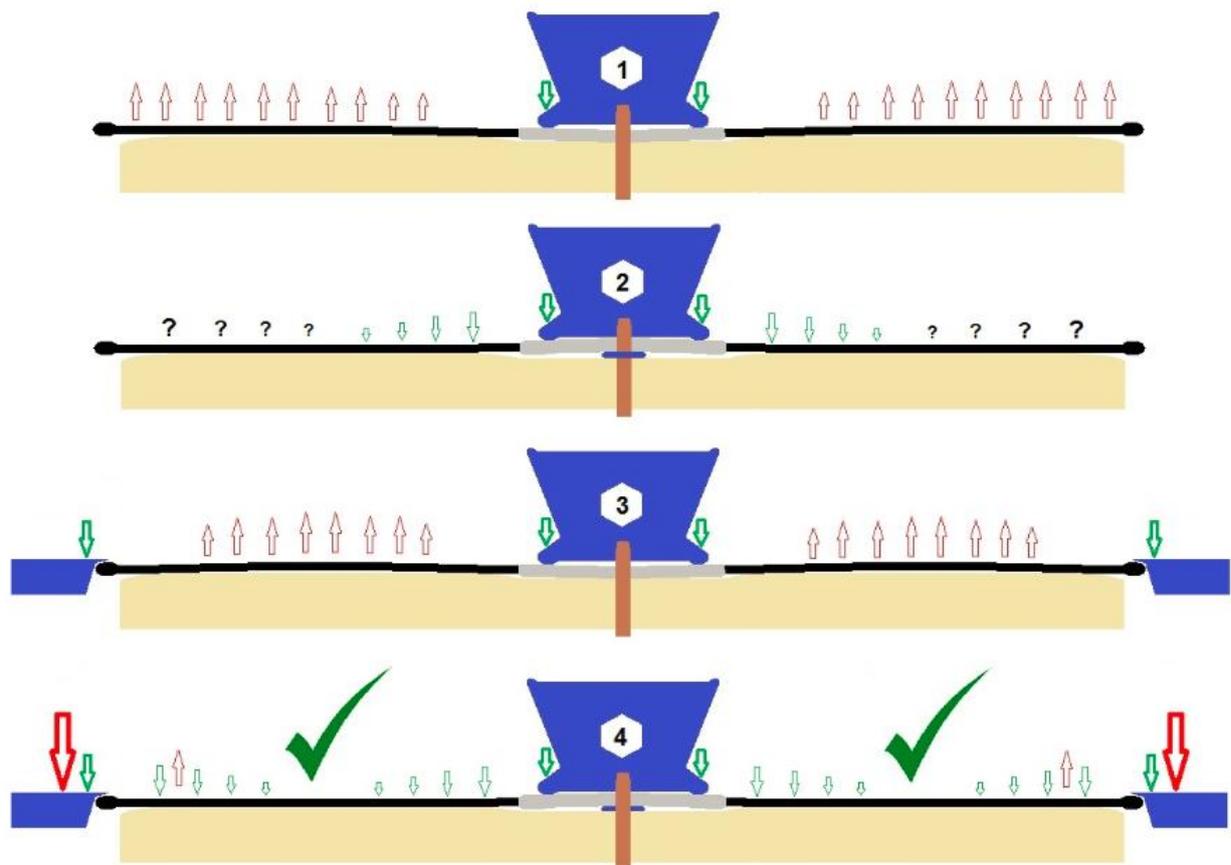


Fig. 2: Schematic showing the effects of forcing a vinyl record downwards by weights

The platter mats which I use have a recess at the record label that is actually more pronounced than needed. This recess is also shown in my schematic sketches and has influence on the effect produced by the centre “puck” weight.

Let’s view the first sketch of the four different sketches. Shown in this sketch, the weight (of the puck) is simply placed on the centre at the platter shaft (in brown). This weight pushes the centre of the record into the recess of the mat, which bends the disc into a bowl shape, ever so slightly. The record forced in this bowl shape, is not pushed on the platter mat much further than the edge of the recess. The weight of the record itself might help the record to become somewhat flatter as the diameter increases, but a correct fit against the mat becomes unlikely.

The second sketch shows the effect of a small ring around the platter shaft (blue). This ring lifts the center of the record somewhat. Together with the protuberance at the outer edge of the puck, the record at the label is forced into a bowl shape upside down. This flattens the rest of the record

against the mat with the force of weight (or pressure of a clamp). It's effect is greatest at the exit groove and becomes less further outwards. I have learned about this shaft ring option from the first version of the Oracle record deck, a design with many interesting innovations. With careful choice of the thickness of the shaft ring and sufficient weight from the puck, the result offers a surprisingly good effect. Doubt remains, however, about the effectiveness at an increasing record diameter and thus the first part of the music per record side. Especially when a record is not perfectly flat.

The third sketch replicates the situation of sketch 1, but supplemented with an outer ring. The label segment continues to cause problems, which cannot be compensated by the outer ring. In fact, when the outer ring exerts a lot of force on the record's edge, the record is forced to flip over the outer edge of the mat, and gets lifted from the mat over most of the surface.

The 4th sketch resembles sketch 3, with the addition of the small shaft ring akin the 2nd sketch, around the platter axis. From the centre the vinyl record is pressed flat at the mat and from the outer edge the record is also pressed against the platter mat. By pressing from the outer edge, irregularities in the record are straightened, partly or even completely. By selection of the outer ring weight the record will balance between the straightening of warps and any possible flipping of the record over the edge of the mat. When the outer ring presses downwards with heavy force (big red arrow), a force might flip the record rim and will raise the part close to the rim of the mat (small red arrow up). In this sense the weight of the ring will have a certain impact on the result, for better or for worse.

1.3 The record stabilizing ring

Let me continue with my experiments with a stabilization ring to press the record down from the edge on the mat.

Previously such a ring was readily available in the Netherlands, but the vendor stopped supplying this fine looking product a few years ago. In Germany I found an alternative, marketed by Techne Audio.

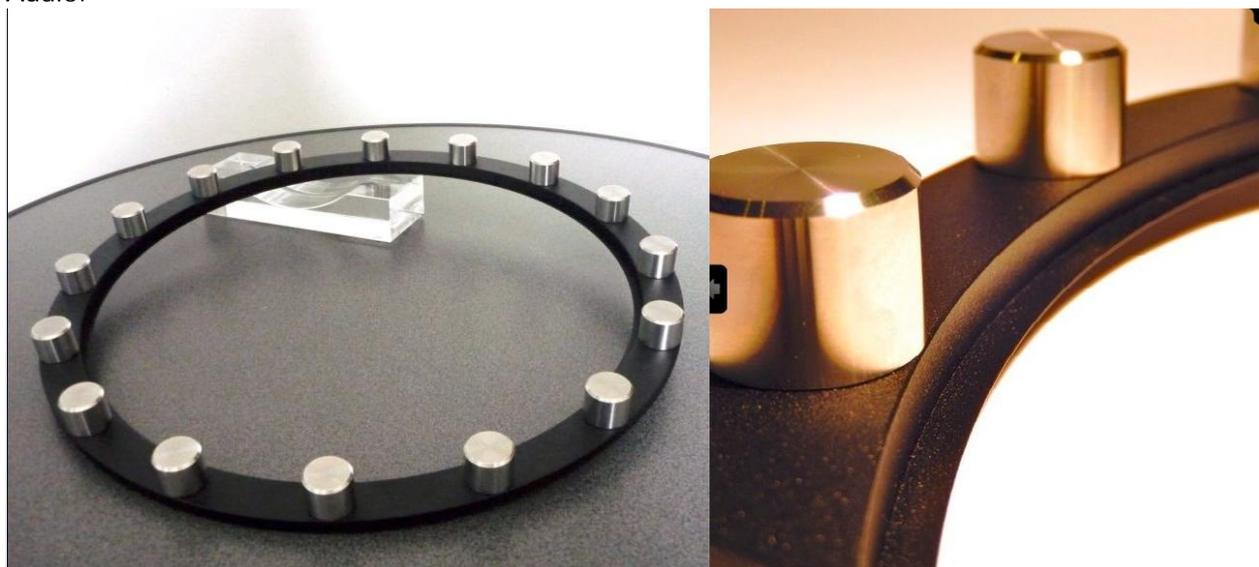


Fig. 3: The offered Außen-ring as found on de website: www.techne-audio.de

1.3.1 Fitting the Micro Seiki BL91 like a glove

This ring fits the Micro Seiki BL-91 as if it was made for it. The ring itself is supplemented with 16 add-on weights, round in shape and attached at the bottom of the ring. These round weights fit perfectly around the aluminum platter of the turntable and thereby will automatically center the ring. The weight of the ring is 425 grams and of the set of 16 weights is 656 grams.



Fig. 4: The Micro Seiki BL-91 with the outer ring in place

These round weights run just free of the two flip switches of the Micro Seiki deck, which makes these switches a tad difficult to operate. The fact there is just enough height for the ring with the weights is due to the 12 millimetre meta acrylate mat in use. This height is the maximum admissible mat size, to still allow the platter shaft to center the record as well as a puck, and lifts the record holding the outer ring just out of range of the 2 flip switches.

Nevertheless the speed adjustment knob had to be removed, as it was hit by the round weights on the ring. Without this knob a small screw driver is needed for speed adjustments, which is rarely required as the motor speed is extremely stable.

The total weight of the ring can be adjusted by varying the number of round weights. The most logical variations are found by fixing 16, 8, 4 or 0 round weights under the bottom of the ring, each of which represent 41 grams of added weight.

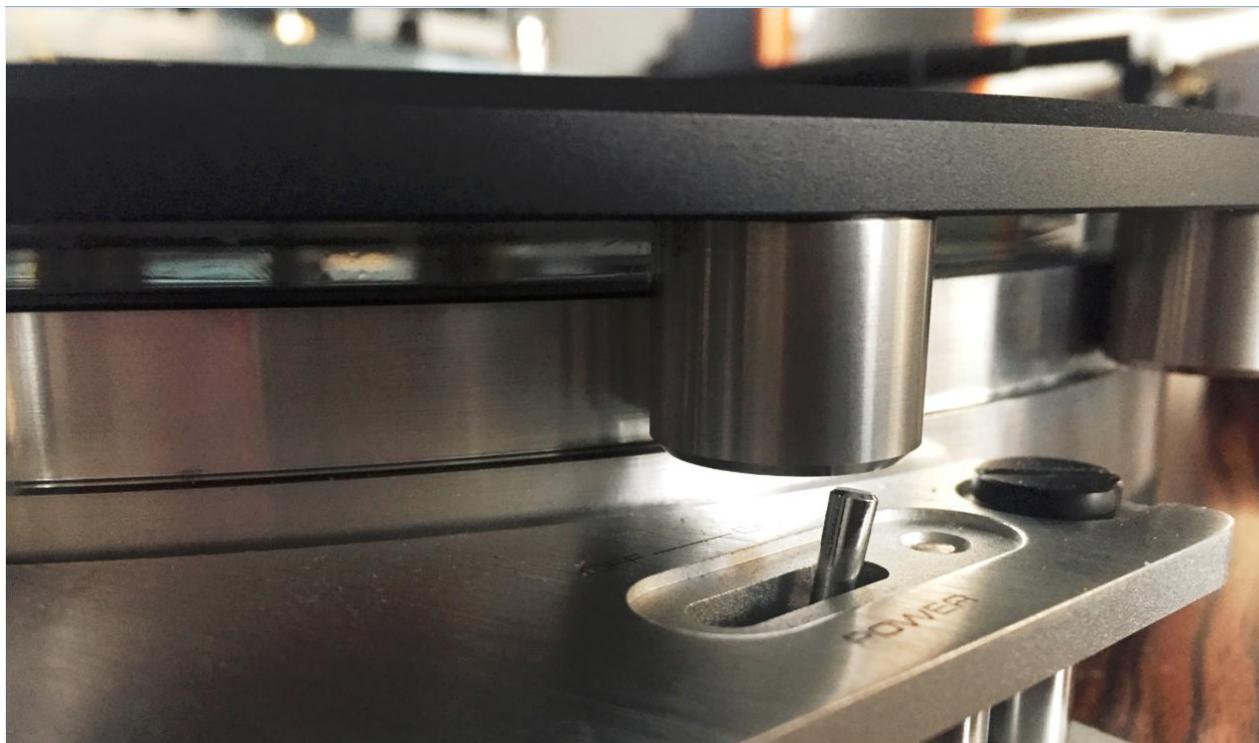


Fig. 5: The round weights move around just free of the flip switch and center the ring on the platter

1.4 The sound of 'ringing'

The desired goal is the resulting improvements of the sound of the music on the played records. In order to determine this, next to concentrated listening tests to rotating vinyl records, I also perform another test method; the "loose tile technique" (thanks to my Dutch fellow vinyl enthusiast Marco van Schoonhoven for this inventive formulation).

The loose-tile-technique: To get a quick insight into whether the desired goal (which is to intimately push the record against the mat / platter, preferably with some contact pressure) is achieved act as follows: "Weight press an LP" on a stationary platter, and knock on the surface of the vinyl record at as many positions as possible and listen whether somewhere and at how many positions the "loose tile" effect is evident.

"Weight pressing" means pushing the record on the platter using a stabilization puck on the center and a stabilization ring around the edge of the disc. I will knock on the disc with a blunt object with some mass like a solid pen or an AA battery. The loose tile effect is a very specific and well-recognized sound of a tile under which (or beyond which) an air bubble has formed instead of firm cement or wall, when knocking against the tile.

I employ this tile-tapping method to quickly check the effects of weight-pressing with discs of different thicknesses and with different degrees of curvature. No record is completely flat in my experience and this does compromise the goal to push the vinyl record flat against the platter mat. The tile-tapping can also simplify choosing the thickness of the shaft ring at the platter axis and the mass of the ring around the record edge on the other hand.

The mass of this specific outer limit stabilizer ring can be adjusted due to the construction used; At the bottom of the chosen Techne Audio ring, 16 weights are screw fixed. By removing more or less

of these weights, the mass of the whole can be reduced. Thus, the weight can be adjusted between 425 grams and 1081 grams, with the removal of 4 weights at a time to ensure proper balance remains.

1.4.1 Tile telling results

As results of the tile-tapping test I summarize ;

- Disc thickness (discs of 180 grams or more versus 130 gram) does not make much difference.
- The shaft ring (around the platter axis) may not be much thicker than the depth of the recess. The label area is too strong to bend with a 1 kg puck. So, this ring in the center of the platter must be about as high as the recess of the mat is deep.
- The mass of the central puck does not actually have a clear upper limit. Less than 1 Kg is (too) low. 2 Kg can be added very well, but adding more mass may be too much to deal with.
- The mass of the ring around the limit of the record can also be relatively high. Less than 1 Kg has as disadvantage that warped discs are not properly pushed flat. In excess of 1 Kg produces a slight chance of thin discs to flip, so these get loose at just inside the outer edge of the mat. Maybe I might experiment removing 1 series of 4 weights (= 164 grams) to lower the total mass to about 910 grams.
- Warped discs continue to cause problems. Smoothly bowl-shaped records can be relatively well controlled. Partially curved records and records with nodules are not pushed completely flat against the platter mat. A vacuum system gets better results, tightening with a ring may bring comparable results only for reasonably flat records.
- Nice flat records (for example of 180 gr) can be pushed beautifully onto the platter mat and sound very well when properly Weight Pressed.

1.4.2 Music sound results

We now get to listening results that were identified. The results of a comparison between a record rotating with and without the stabilizing ring around the edge of that record.

The platter mat used on the Micro Seiki BL-91 is made of hard, smooth acrylic (meta acrylate) and the record must be held in place in order not to be able to slip. To accomplish this the center puck is used with and without employing the outer ring stabilizer. With the records used, only the first few tracks were played, as here the influence of the outer edge ring was relatively large.

The discs used included pure analogue recordings of music from the free jazz style, something I play regularly currently. The vinyl records, from for example the label ECM, are beautifully recorded (to my idea) and I consider the spatial representation more than sufficient to facilitate listening tests.

What I did notice with a ring around the edge of the record and without;

- Expected was a clear difference in bass reproduction and this proved to be true. Much tighter and with far better extension? ... Well, actually, that would be an exaggeration. I do hear a nice, firm bass, more precise, with sharp impulses and sounding more natural to my ears. This enables me to hear more of the bass players notes without any suggested extra volume of the low frequencies.
- I find the differences in reproduction of middle and high frequencies less easy to express. The difference I perceive is the accuracy with which voices and instruments are presented and appear to be floating in space. In the middle-frequency area, a veil seems to be lifted. Perhaps the perceived veil (without the outer ring) is a by product presented in the higher frequencies of the sound spectrum (due to vibrational vibration in a poorly damped vinyl record).

- In reproduction of spatial clues I also expected a clear improvement and recognised some change. A change and a bit of a surprise. Instruments did not seem to be further away in the space of the sound image, but the instruments and voices in front of the sound image are presented more up front. Perhaps this coincides with the fact that the individual instruments sound clearer and seem to be projected less far away. The spatial cues in the back of the sound image do not seem to be further away, but are also presented "clearer".
- In general, the dynamics of music seem to be more present and sound more easy to the ears. The ease in reproduction of the musical lines is mostly found in the mid frequency area. This creates a feeling of enhanced 'naturalness'.

Listening to more music I seem to occasionally observe previously unknown details. Listening more extended after the listening sessions performed so far, might reshape some of my judgment later on. For now I conclude that I do perceive these differences. Despite the fact that I hoped for a more spacious sound image at the back of the sound stage, which effect cannot not be verified, I think that all my observations with the use of the outer limit ring make for an improvement.

I also think that this improvement in sound is similar to the improvements I know from my years of experience with vacuum systems sucking the record at the platter mat, the same way the lacker is being sucked to the 'lathe' while cutting music onto it. With the additional remark that a vacuum system offers even more convincing improvements.

Tolkien's ring? These first impressions are positive and affirmative.

1.5 The ring in use

The Techne Audio outer ring covers part of the lead-in groove of the record, requiring the precise positioning of the stylus on the record. When lowering the tone arm too far on the outer edge of the record, the cartridge will touch the inner edge of the stabilizer ring. In case of a protective cartridge body, the cartridge may be pushed slightly inward and jump into the first musical content. But in case of naked carts, the coils and generator can hit the edge of the stabilizer ring. In both cases, the stylus and cantilever can hit the surface material of the stabilizer ring. The two last situations can cause damage with a spinning ring, possibly ruining a dear and costly cartridge.

Vinyl listeners reporting their experiences with a similar product, the VPI outer ring, indicate that this ring fits on a very small part of the record edge limit and does not cover the lead-in groove. Furthermore, a few users of the VPI product notice that some records are too small and the VPI ring fails to fit on the outer edge of the record and thus does not sit on the records edges but slips down onto the platter.

The Techne Audio ring will never slip over the edge of vinyl discs, but as a consequence the lead-in groove will be partially covered. I would love to compare the inner diameters of the VPI and Techne Audio stabilizer rings and find a compromise in dimensions with only positive results and no negatives.

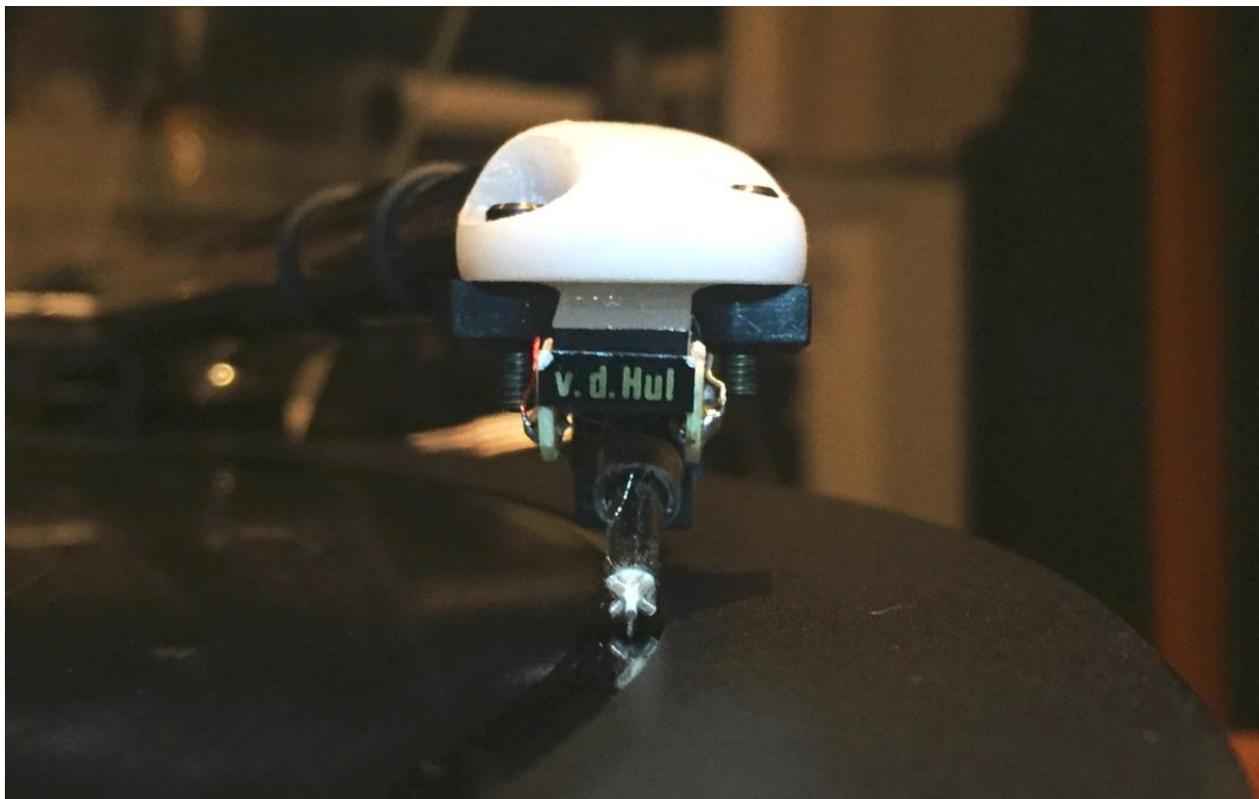


Fig. 6: The stylus on the record outer groove close to the stabilizer outer ring from Techne Audio

To avoid damage and also to facilitate listening to the first part of music on a record, I put the stylus into the lead-in groove area on a stationary platter and start the turntable afterwards.

Because I do not currently use a tangential but a pivoted tone arm, the stylus / cartridge / tone arm will move to the centre of the record into the groove as soon as the platter starts to move. That the stylus will not crawl the wrong way towards the edge of the record, if the stylus accidentally has landed on the vinyl between the spiralling grooves, is due to the transverse forces created by the geometry of a pivoted arm. Also the shape of the edge of the record and the skating force on the tip against the horizontal surface of bare vinyl is helping here, and has always guided the tone arm into the desired direction into the music.

With use of a precise arm lift, a steady eye and sufficiently bright light on the record deck, cueing the tone arm when using the Techne Audio outer ring at a rotating platter is possible, but just barely. Somehow, in my case some of the above conditions are systematically lacking, so caveat emptor.



Fig. 7: Again the stylus on the record and again the generator coils and cross visible in the reflection

Another picture of the stylus in the groove. And again the mirror image of the coils and anchor of the Colibri can be seen in the smooth surface of the lead-in 'groove'. I find the magnification of the mirror image an interesting detail, which is caused by the record becoming slightly thicker at the edge. Because this edge is slightly thicker than the record elsewhere, this transition area (= not by accident the lead-in part) is a bit concave in shape.

1.5.1 Another, slightly more theoretical point

Performing the 'Schoonhoven Tile-tapping test' I repeatedly found the last part of the record side sounds clearest, as if this part is pressed with extra force against the platter mat. This test result provides a reference to which I compare my observations on larger diameters when trying to optimize the contact pressure of the complete record surface by varying weights on the outer ring.

Thinking from one perspective; just around the label area the weight of the centre puck is pressing most effectively and thus the resulting contact pressure is the largest compared to other spots on the record, at a larger distance from the platter centre.

Again thinking, but from another perspective; maybe the lead-out groove also adds to the noticed effects. The spiral of the record's groove swings from the last music content with increased speed to the circular lead-out groove. Due to the increased speed a lot of the vinyl surface is not cut between the spiralling groove. As a result, almost 100 percent of the vinyl surface can be pushed in contact to the mat when the two are united! Much more than the estimated 50 percent where the music is recorded.

Whatever might be the cause, I do notice a very good tile-tapping effect on the part of the record surface right next to the label. Whether the same positive results will be heard in the music at this particular position on the record surface might be worth further investigation, out of pure interest. To investigate this, a record must be found with on one side music proceeding considerably further towards the end than on the other side. I will have to find a record with these specific properties.

Henk Schenk