the AXIOM©

reference tonearm

picture by Harry Ralston

owner's manual

Text hier eingebenA brief word

A brief word from the designer

The AXIOM is the result of my more than 35 years of intimate research and preoccupation with analog playback - with the specific focus on the interaction of the record groove with the cartridge and tonearm.

A truly universal tonearm, which offers all and every option of alignment – while ensuring the best possible mechanical guidance for any cartridge.

Taking into account the paramount importance of energy transfer in relation to effective moving mass.

Resulting in a level of performance only obtainable, when each and every aspect of the analog audio tracking process is attended to with utmost attention to even the most minute detail.

A level of performance, which transcends prior frontiers and opens new levels of musical realism in the playback of recorded music.

We do share the real passion for music and I am confident that the AXIOM will allow you to hear and enjoy your favorite records like never before.

Please get yourself accustomed with this manual.
Make sure you familiarize yourself with each and every aspect of the AXIOM's options.

Your time will be rewarded with outstanding performance - to the benefit of your whole analog set-up and ultimately your enjoyment of recorded music.

The AXIOM is entirely designed, manufactured and assembled with care and dedication in Bavaria, Germany.

Kind regards

D. D. Brakemeier

Content

Technical features & general design

The **AXIOM** is a pivot tonearm featuring a double nano-gimbal bearing architecture.

The **AXIOM** is a static, full lateral balanced design.

The **AXIOM** features an unique compound arm wand - a combination of surface hardened Titanium and Carbon Fiber pipes blocked together and internally damped by an all new design concept, a concept never before applied in tonearm design and first featured in the **AXIOM** resulting in unmatched fast energy transfer and total absence of any parasitic resonances in the tonearm.

The **AXIOM** was designed to explore the possibilities of analog playback to the utmost degree. To accomplish the best possible analog playback performance, the **AXIOM** offers an unique complete set of alignment features.

Two (2) variants

The **AXIOM** is available in 2 standard 12“ variants:

* with fixed standard EIA 1/2“ mounting slots

* with SME-compliant detachable headshell mount

Alignment options

Leveling the bearing axis

The **AXIOM** can be precisely leveled by the user, independent from the turntable or mounting surface. This is essential to avoid parasitic side-forces prior to alignment and anti-skating setting.

SRA/VTA adjusted at the cartridge

In the **AXIOM** the important alignment(s) of VTA / SRA can be made at the cartridge – without altering the static parameters of the tonearm, while preserving the other set alignments and leaving the arm wand always horizontal.
This again is of paramount importance in a static balanced design to avoid unwanted changes in static settings (namely tracking force) when changing tonearm height to accommodate VTA or SRA.

Offset and Overhang adjustment

Offset is adjusted in the prolonged and slightly widened slots for the cartridge mounting screws. Overhang can be adjusted at 2 spots, both located at the head. First of course in the prolonged 1/2” slots for the cartridge mounting screws. Here the slots allow for up to 5 mm adjustment in overhang and thus effective length. The 2nd spot is at the collar of the headshell where it is clamped to the arm wand. This is an additional spot for further overhang adjustment only IF NEEDED.
The whole headshell can be moved back and forth by up to another 5 mm in this way.
This should hardly ever be necessary.

Azimuth

The headshell’s collar is also the point for azimuth adjustment. By loosening the clamp screw the user may rotate the whole headshell in either direction.

Small indication marks at the rear of the headshell’s collar and on top of the arm wand allow for reference and easy return to former settings.

Dynamic anti-skating

Skating compensation – or anti-skating – adjustment in the **AXIOM** is dynamic and follows the tangential geometry of the **AXIOM**. If carefully operated, it can be adjusted during play. However we recommend that you do ALL adjustment or alignment at the **AXIOM** ONLY with the cartridge / stylus lifted off the record.

Tonearm height – VTA

Tonearm height can be adjusted on the main VTA-tower of the **AXIOM**.

One full turn of the large top knob adjusts height by precisely 1 mm.

Tangential alignment

It is possible to align the **AXIOM** to the standard tangential curves of Baerwald, Stevenson or Loefgren in any version and standard.

The absolute best possible performance however is obtained only by aligning the **AXIOM** to the new **UNI-DIN** tangential curve.

It's geometric design is uniquely based on the **UNI-DIN**, a tangential curve formulated in 2011.

Step-by-step procedures

In the next pages I would like to take you through the mounting and alignment options of the **AXIOM**.

All procedures are illustrated step-by-step.

The pictures will give you most all of the information you need to perfectly mount and set-up the **AXIOM**.

However, I will guide you through this with my comments too and try to give further information whenever the mere picture may not tell the whole story.

We all like to get a new tool working as fast as possible.

May I please encourage you to follow me through this mounting and set-up procedure as precisely as possible and to the very end - it will be to your advantage.

This will ensure that you get the best possible performance from your **AXIOM** and take advantage of all its features and capabilities.

Single-point mounting vs. SME slide base

In this manual we will cover the **AXIOM** mounting with the standard 1-point mounting.

In addition there is the option to mount the **AXIOM** easily onto any existing 9" or 10" SME armboard.

We do offer - as a special order item - a dedicated SME-slide base for the **AXIOM**.
If interested, please ask your dealer for the SME-slide base for the **AXIOM**.

There is no difference in performance between the 2 mounting options.

We further offer other adaptor mounting plates for existing armboards upon your request.

If you are in need of a mounting plate for other existing armboards - to take advantage of existing pre-drilled armboards - please kindly check back with your dealer who will contact us.

GENERAL NOTE

Please make sure prior to setting up the AXIOM that your turntable's platter and armboard are dead level.

Unpacking the AXIOM

The **AXIOM** suitcase
left: **AXIOM** (special order 24ct Gold finish)
right: **AXIOM Annyversary**

Please make sure that all parts are present by unpacking the **AXIOM** and all its tools and accessories:

The **AXIOM suitcase**
containing the following:

the **AXIOM tonearm**

the **AXIOM's accessory box**

Additional variants of **AXIOM Annyversary** only

AXIOM Annyversary SME - for detachable headshell and integrated headshell cartridges.

SME/EIA-adapter allows for overhang and offset adjustment !

AXIOM Annyversary 10" - with central mounting base.

AXIOM accessory box

The **AXIOM's accessory box**
containing the following:

AXIOM alignment template
- detailed description on page 25 -

(2) black knob thumb screws

(2) stainless steel countersunk screws

(1) white knob thumb screw with sharp tip
in 8 mm sleeve

(1) white 20 mm POM adapter

(2) small white 7 mm spindle hood

(1) 100 mm long, 3 mm stainless steel pin

(1) plastic bag with (2) distance stands

(1) small diameter blue spirit level
for use on tonearm bearing pivot

(1) 20 mm round dial scale for SRA / VTA adjustment
at the headshell

(3) standard M5 mounting screws with a choice of length:
- (1) 20 mm length
- (1) 25 mm length
- (1) 30 mm length

(1) 29 mm diameter stainless steel mounting plates
with rim edge on downside.
One each with 8, 14 and 20 mm height.

(1) special M5 knurled head thumb screw

(1) 30 mm diameter stainless steel cover plate for
covering the mounting hole area after set-up.

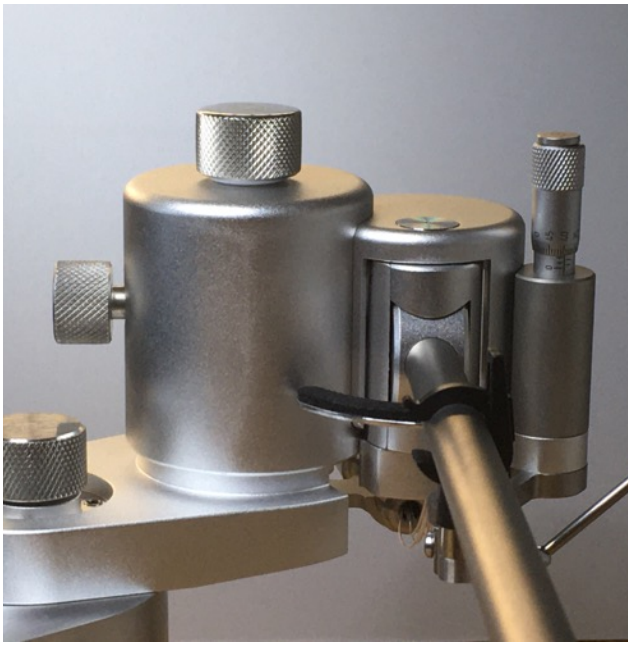
Please remove(1) of the lateral weight assemblies and the main counterweight with the small secondary counterweight from the accessory box.

Also please take the (3) different height 29 mm diameter stainless steel mounting washers.

Please do open the tool box to have easy access to the various bits.

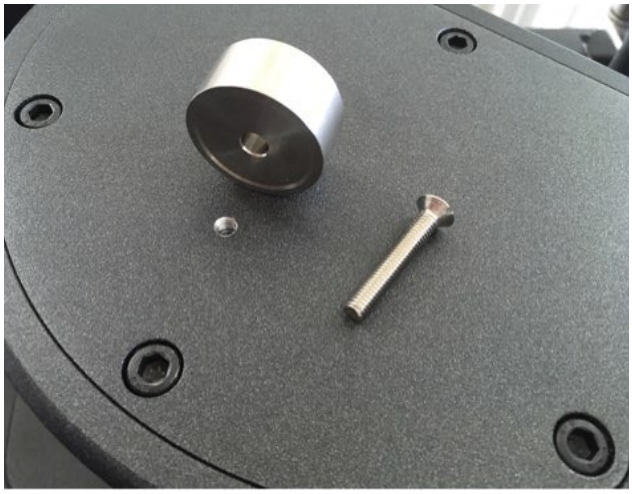
You'll need some of them each at a time now.

Special order 10" version of **AXIOM Annyversary** with 238 mm P2S and central mounting base.

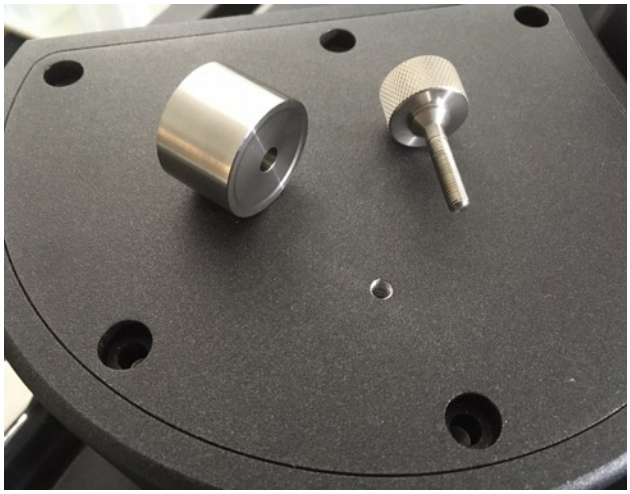


2021 version of **AXIOM** w/micrometer VTF and new knurled thumb mounting screw.

Mounting the AXIOM



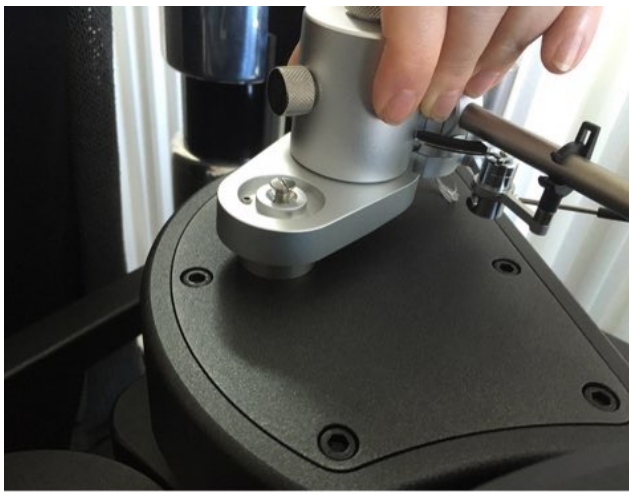
Please take one (1) of the 3 different height D29 mm stainless steel mounting washers and a M5 screw which is according to the washer.
For the smallest height washer take the shortest screw, for the middle height the middle … etc.



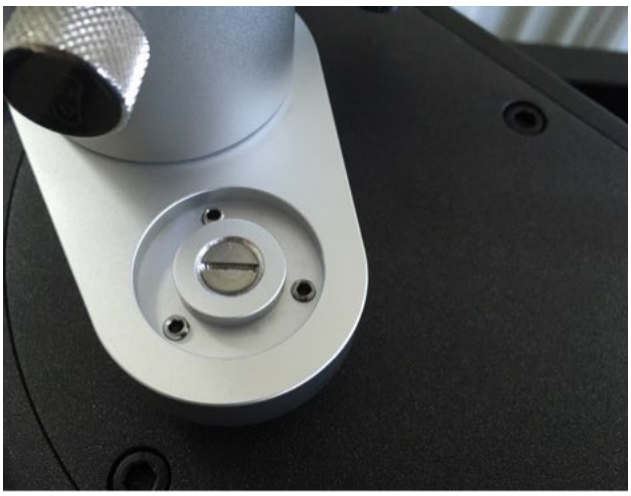
Place the washer with the „rim“ side down over the thread hole.
You can also use the special thumb knurl head screw - if you don’t need to cover the mounting hole later with the (purely cosmetic) cover plate.

Gently place the **AXIOM** - holding it at the VTA tower like in the picture - over the plain top of the washer holding the screw in the other hand.

Place the screw through the mounting hole in the **AXIOM’s** mounting board.

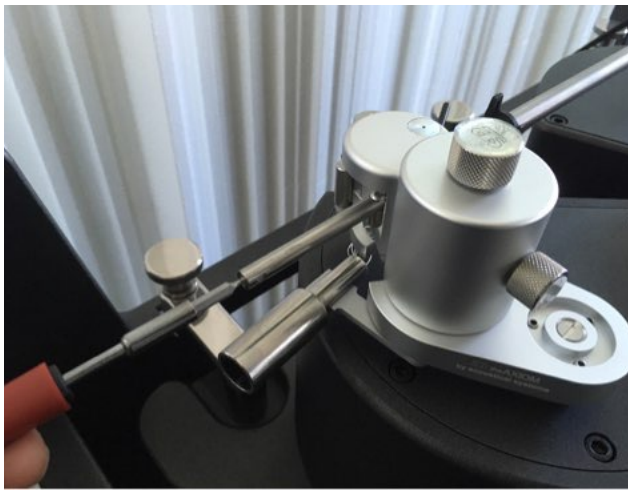


Gently screw the M5 screw down - not tighten it, but just holding the **AXIOM** in place and still allowing for some little „play“.



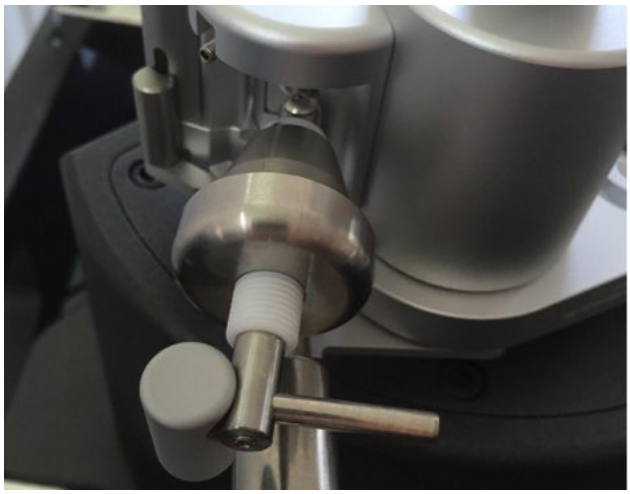
Now please note the 3 grub screws in a circle - each at 120° - around the mounting screw in the center. We will return to the mounting screw later.

From the **AXIOM's** accessory box please take the long tool box and open it.
Select the „1.5“ Allen bit and put it in the tip of the bit holder

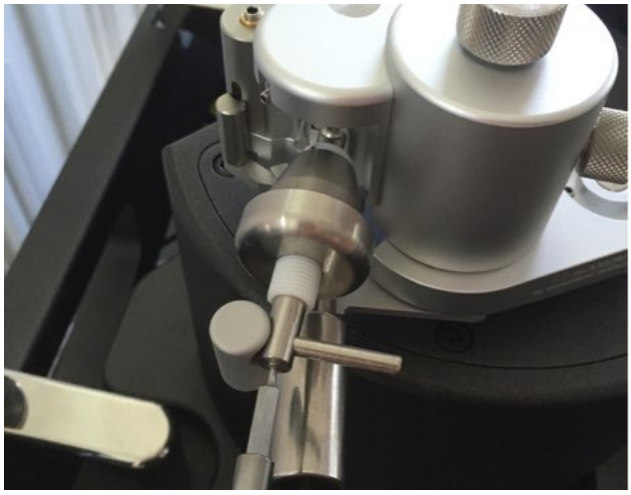


Please turn back the M3 grub screw in the end of the counter bar by 1-2 revolutions.

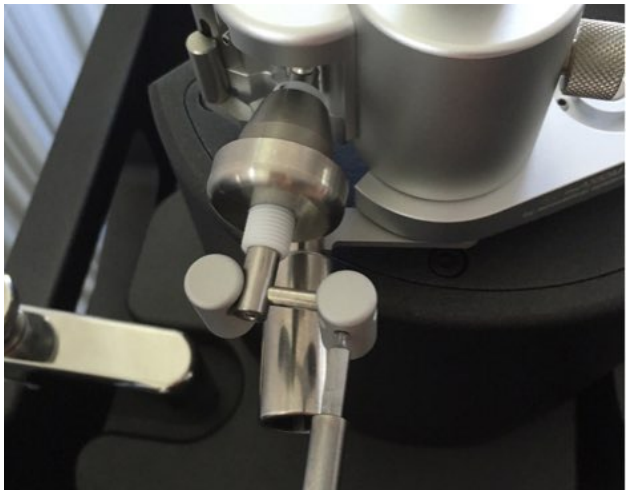
Please slide the counterweight + small auxiliary weight over the counter shaft.



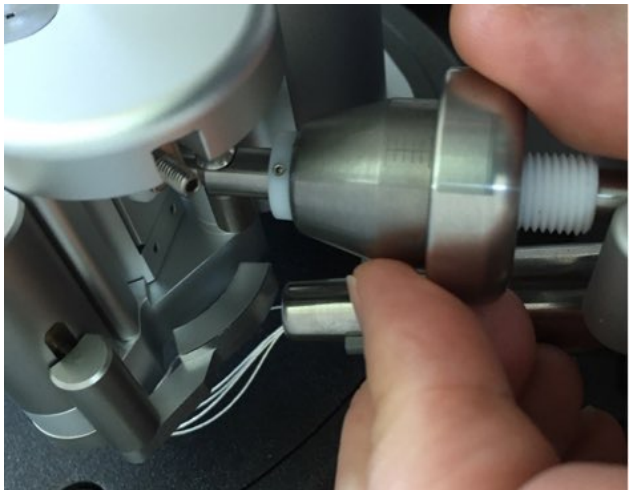
Please put the lateral weight bar - with (1) cylinder attached - through the cross-hole at the end of the counter shaft.



Now please re-tighten the M3 grub screw in the rear end of the counter shaft while the lateral cross bar is in a position like pictured.



Now attach and fix the 2nd cylinder as pictured.
Place it at the end of the lateral rod.
This way you counterbalance the breakdown torque effect of the offset angle.



Gently shift the counterweight towards a preliminary position suitable to act as a good first balance.

In addition to the main counterweight there are secondary counterweights with different payloads. (2) coming with the AXIOM. These will cover all but cartridges with more than 22 grams weight. Further each Axiom comes with 2 pair of lateral weights: (1) Aluminium and (1) stainless steel. This allows for very precise fine-tuning of effective moving mass with **ANY** cartridge.

The new version of **AXIOM** (since 2020) features a stainless steel collar at the forward end of the Teflon sleeve for the counterweight.
This stainless steel collar can be ordered for older versions and easy install by the AXIOM's owner.

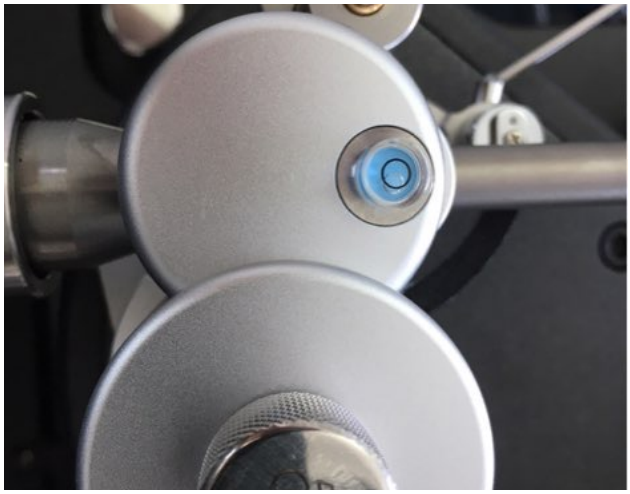
With very gentle torque only fix the counterweight in place.
For this please use the 0.9mm Allen bit.

Levelling the AXIOM's bearing plane

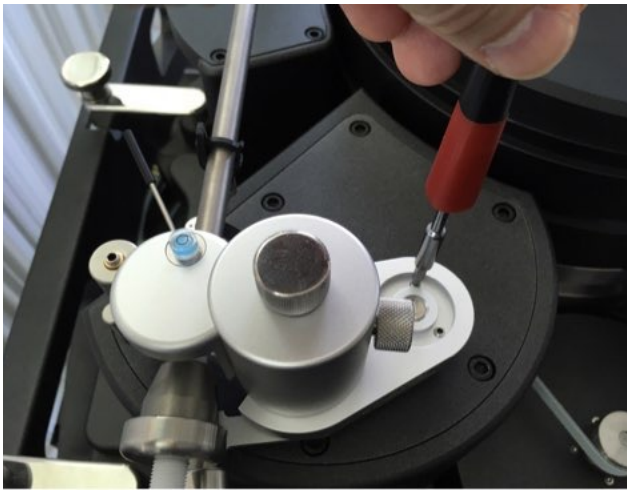
Please take the small blue precision spirit level from the accessory box.

Please take the 2.5 mm Allen bit from the tool-box.

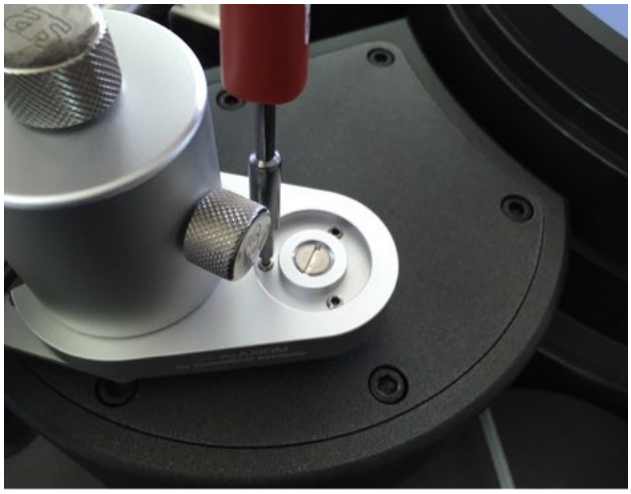
Place the precision spirit level on the bearing cover plate.



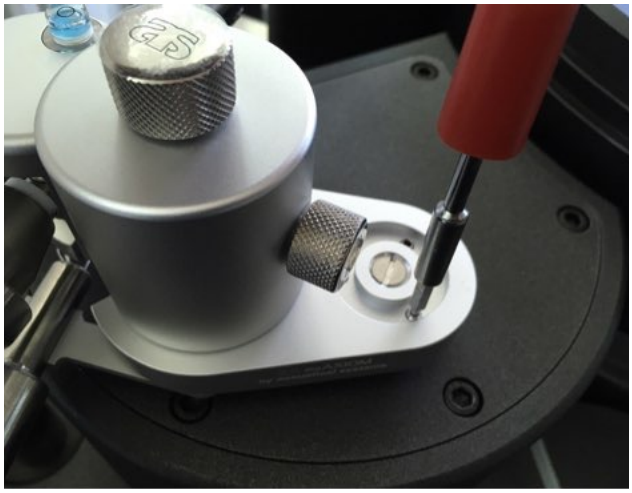
Make sure you view down on the spirit level exactly from above with your index eye.
Please close or cover your other eye.



Please attend each of the 3 grub screws around the mounting screw gently and only with quarter turn - one after the other.
You may watch how the bubble in the spirit level reacts to up and down movement of the screw.



While attending one screw after the other at a time you get more and more accustomed to the routine. Most important is that you don't do too much (i.e. engage and fasten too hard..) at a time and always leave a litte bit of „headroom".

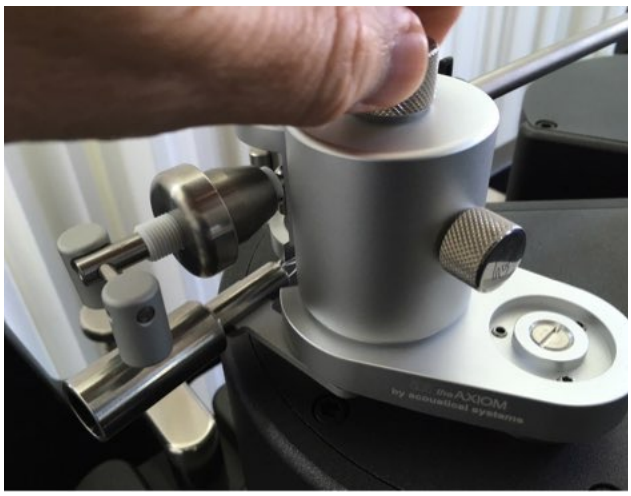


Work in turn - clockwise or counterclockwise - and that way you approach more and more a perfect level for the horizontal bearing.

When you are done all grub screws will be fastened with fairly tight (= high pressure) torque and the bubble will be perfect center.
Now the bearing plane is perfect level.

Raising and lowering the pivot

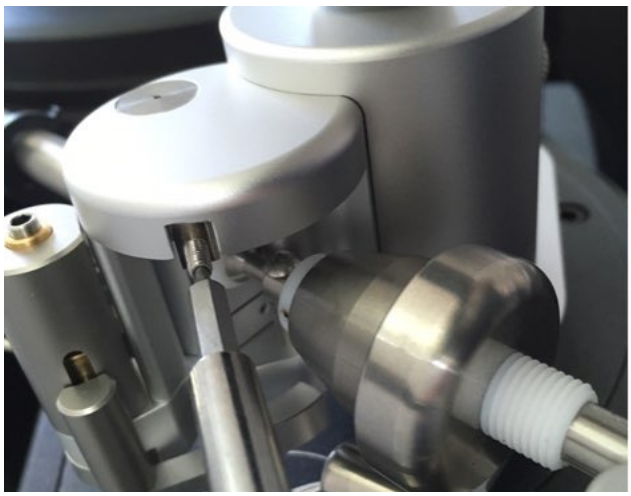
To adjust tonearm height / VTA first undo the locking screw with 1/4 turn counter-clockwise.



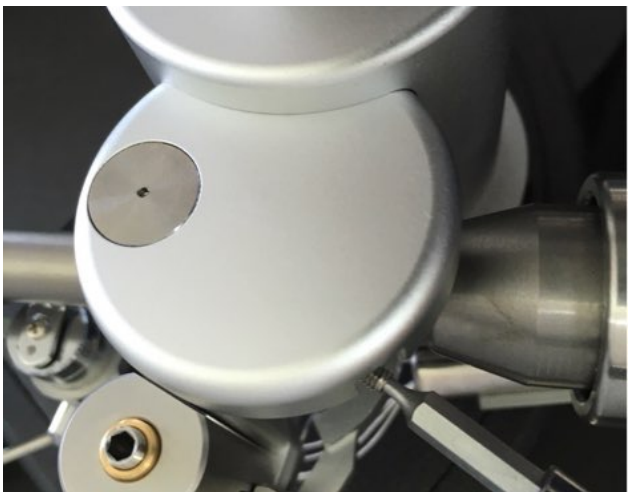
Then - and only after unlocking the side screw!! - you may adjust tonearm height by turning the top screw. Clockwise turn lowers the tonearm's height. Counter clockwise turn lifts the tonearm's height.

With the **AXIOM Annyversary** the procedure to adjust tonearm height is the same: first unlock the side locking screw just a tiny bit.

Then - and only after unlocking the side screw!! - you may adjust tonearm height by turning the top half of the micrometer. Here clockwise turn lifts the tonearm's height. Counter clockwise turn lowers the tonearm's height. You can read out relative change and value at the front scale in 100th/mm precision for repeat settings.

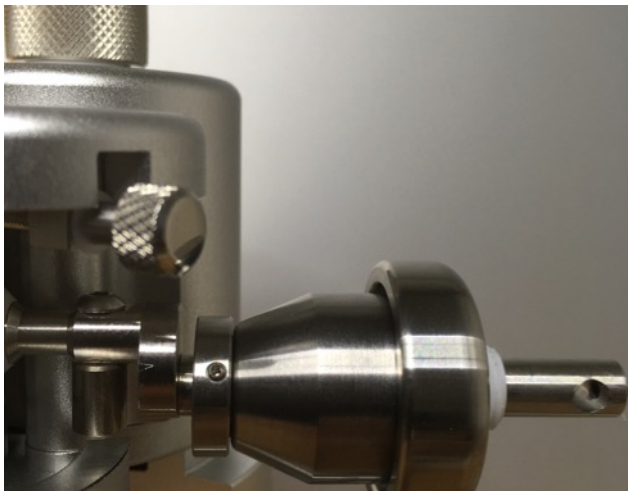


The anti-skating device on the **AXIOM** is a non-touch and dynamic type.
By turning the screw with the 1.5 mm Allen bit inward (clockwise) you INCREASE anti-skating.
Counter-clockwise turn DECREASES anti-skating.



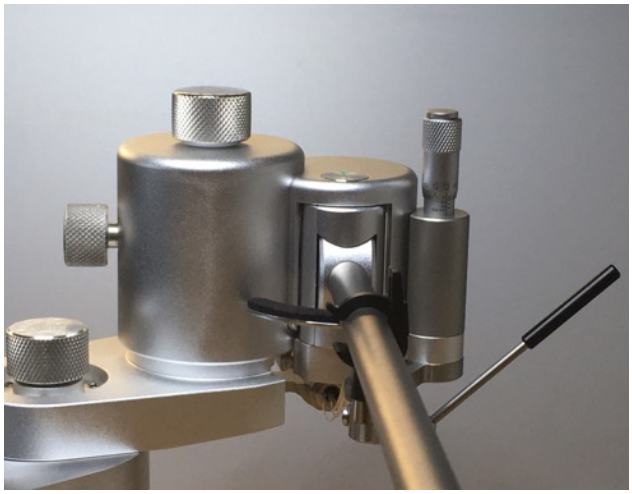
A good setting to start is with the grub screw's end still visible when viewing down from above the bearing housing.

The anti-skating device on the **AXIOM Annyversary** is driven by a micrometer with scale indication.
This scale is RELATIVE value. The scale is to return to settings with utmost accuracy.



Starting April 2021, the **AXIOM's** anti-skating is now no longer with grub screw and Allen bit, but with a small knurled head thumb screw.
It still works in exactly the same way as before.

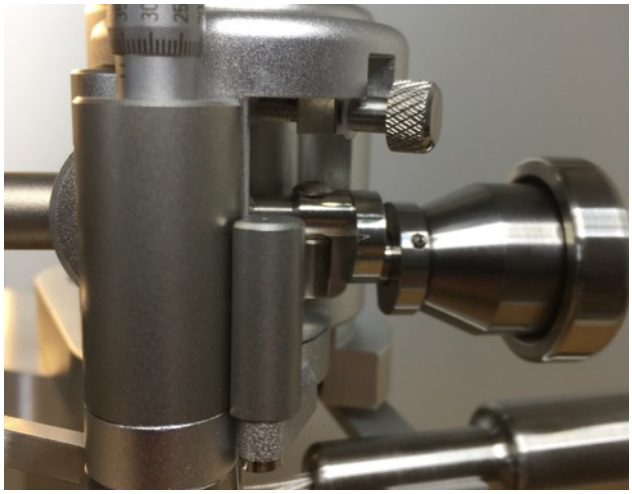
Setting dynamic VTF



In addition to the static VTF setting by counterweight(s), the **AXIOM** features a non-touch dynamic VTF setting.
This is now operated by a micrometer adjustment.

Increasing the value shown on the scale = increase of VTF.

This is NOT linear an increase and NEITHER an absolute scale.
It is for very fine reference and the ability to always return to a former setting with utmost precision.
Precision here is 1/100th of a mN = approx. 0.001 gram!



In addition to the static VTF setting by counterweight(s), the **AXIOM** features a non-touch dynamic VTF setting.
This is operated by a micrometer adjustment.

IMPORTANT - PLEASE NOTE:

Any VTF setting by the dynamic VTF / micrometer has to be IN ADDITION to at least 92% static VTF setting by counterweight.

The magnetic dynamic VTF setting is ONLY for fine-tuning the perfect VTF for the given cartridge by utmost precision.

This can - very careful ! - be done while playing a record and thus allows a fine-tuning of the cartridge's performance, which is hardly possible on other tonearms.

Optimizing cartridge mounting

How to mount your cartridge of choice for best performance

Here are just some standard recommendations:

For mounting your cartridge, please use **NON- magnetic** M2.5 screws and plastic washers under the screws head. We recommend using Titanium screws.

If you can't use Titanium screws, please use brass/gun metal M2.5 screws. They are non- magnetic and provide good energy transfer.

Aluminum is too soft and does not give enough coupling for perfect energy transfer.

Stainless steel screws always have a minimum of magnetism - do not use them. You will loose sound quality.

Do use, if possible, a torque driver with precisely adjustable settings.

For M2.5 cartridge screws please use torque settings according to 80-90% of maximum as recommended by German engineering norm for DIN 912.

This ensures perfect energy transfer - and thus gives you the most dynamic and detailed, uncolored sound from your cartridge.

Detailed recommendations regarding mounting screws, settings and special tools are available from acoustical systems upon your request.

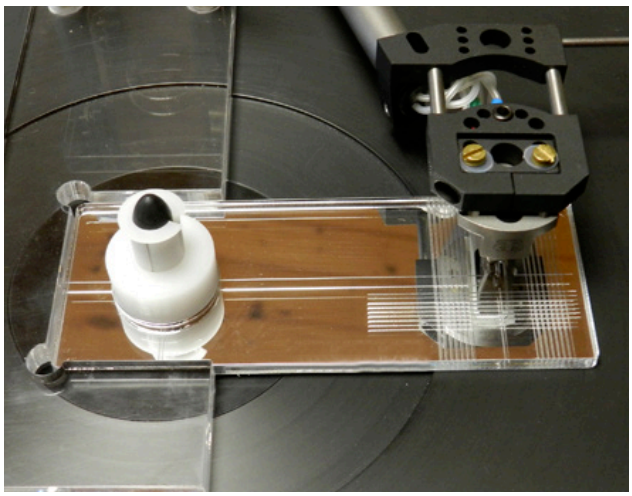
Recommended torque values for cartridge mounting screws for optimum energy transfer

M2.5 torque	
Titanium	0.75 Nm = 75 cNm
Stainless steel	0.58 Nm = 58 cNm
Brass	0.45 Nm = 45 cNm
Aluminium	0.35 Nm = 35 cNm

Best sonic results can be obtained with the special **SMARTscrews** - custom made out of Titanium Timet 1100 (if you are interested please ask your dealer).

Recommended top quality „Made in Germany“ torque drivers for 1/4“ bits.
left: fixed torque - middle and right: adjustable torque

Setting Azimuth



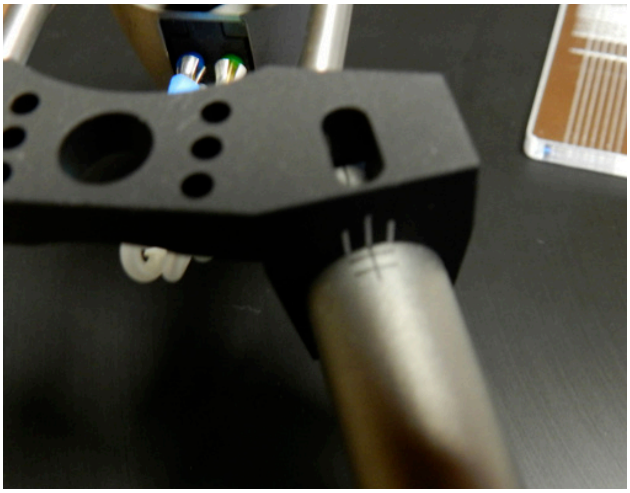
The **AXIOM's mirrored alignment template** ensures a super precise 1-point alignment to the **UNI-DIN tangential curve**.

The **AXIOM's** geometry is tailored to the **UNI-DIN** geometry designed and introduced by acoustical systems in 2011.

If you are interested in the background of this all-new tangential alignment - please check back on acoustical-systems.com website for an essay I have written about **UNI-DIN** and its unique features.

The **AXIOM's** template is a special tailored variant of **UNI-DIN.**

Tailored to the use with **AXIOM** and **AQUILAR** tonearms **ONLY**.

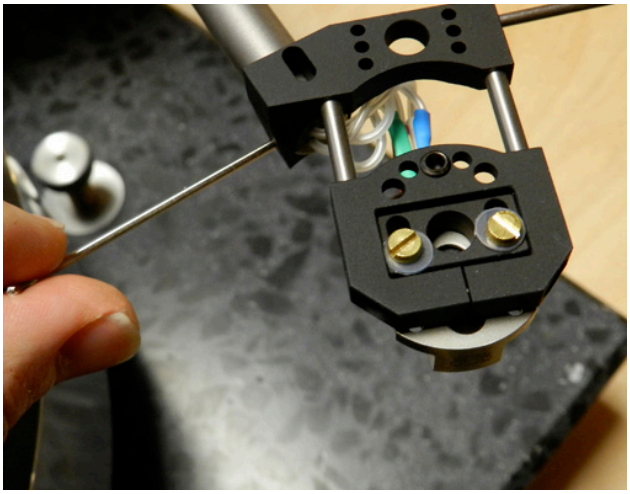


Make sure that the stylus meets the single point sweet spot in the mirrored template while your cartridge's cantilever is in line with the center line behind the sweet spot.

The template features the same precision and construction as our **SMARTractor** universal alignment tool.

Should you need to adjust azimuth, please look at the rear collar of the **AXIOM's** headshell**.**

The markings will allow easy return to former settings and give you a good indication of direction and position.



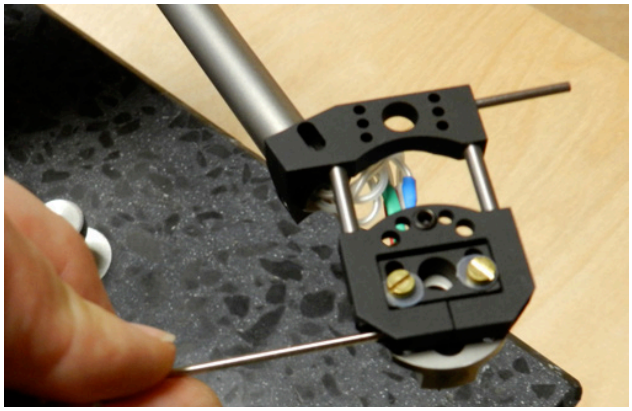
You need to completely loosen the lockscrew on the lower side of the headshell's collar, using the 1.5 mm Allen bit.

Do lock the screw again after finding the right azimuth.

PLEASE NOTE: good finger-force applied is always enough on a tonearm/headshell!

Don't over-tighten with excessive wrist-/hand-force applied.

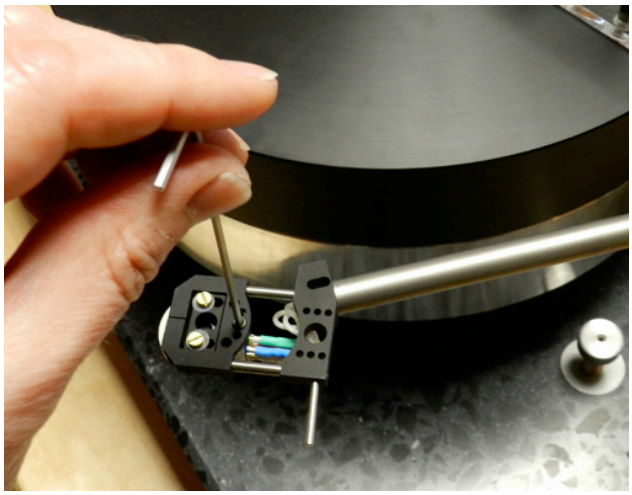
Setting SRA / VTA



The **AXIOM** is one of only two tonearms on the market - the other being it's "little brother" the **AQUILAR** - allowing you to set SRA and VTA at the cartridge without altering static settings.

If you need to adjust SRA / VTA, first loosen the hidden screw on the front side in the **AXIOM's** headshell.

This screw actually tightens a clamp fixing the



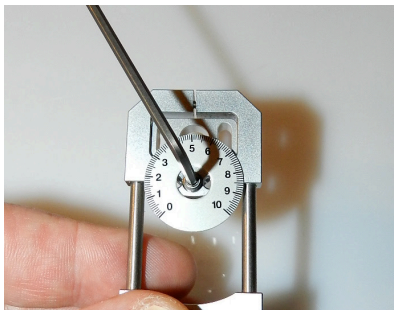
Now take the 2.0 Allen key in the accessory box for adjusting the grub screw at the rear top end of the headshell.

Clockwise rotation will turn down the tail of the cartridge and thus will decrease the SRA°.

The total mounting plate angle allows for freely changing SRA for most all cartridges from 97° down to 84°.

To accomplish this for other tonearms you would need to move them up and down their towers by more than 2.5" up and 2.5" down - practically impossible.

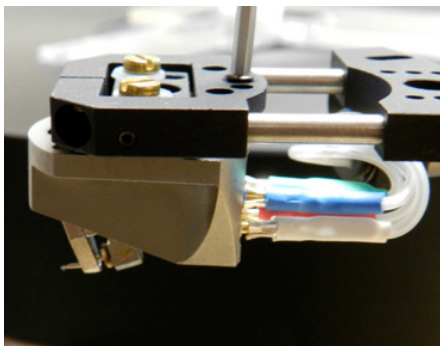
You can use the small round scale you'll find in the accessory box packed with the small blue spirit bubble and the **SMARTstylus**.



Placed around the SRA / VTA grub screw and the short leg of a Allen key used as a indicator arm you can very precisely return to former settings.

Likewise this change in SRA will of course also influence the VTA angle of your cantilever.

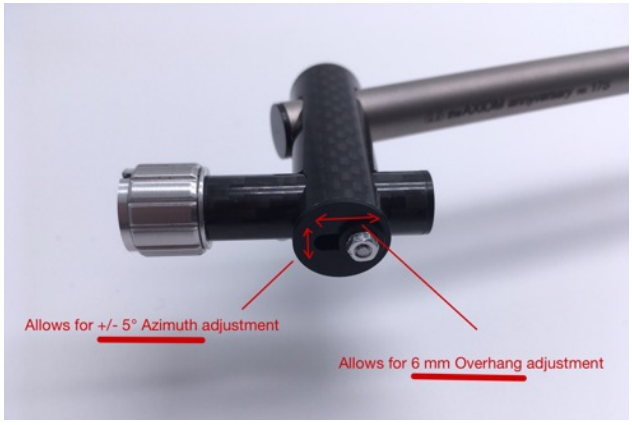
To raise the SRA° make some "room" first by turning the set screw up to the desired position. Now with 1 finger carefully press the rear bottom of your cartridge upwards.

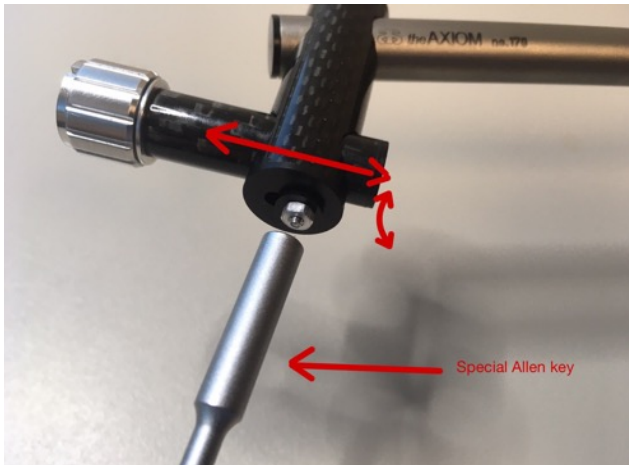


When done, please tighten the headshell clamp again by turning the screw clockwise.

You can use the 20 mm round scale to return to former settings and keep track of SRA adjustment.

Adjustments at SME-adapter





The ***ULTRA LIGHT*** adapter head of the **AXIOM Annyversary SME** allows for adjustment of both - Azimuth and Overhang.

Either of the 2 adjustments is operated at the same point and with a single lock.

The necessary lightness here to avoid resulting excessive moving mass does ask for steady hands and concentration in operating.

It is best to position the stylus OVER a tangential template to know before the desired position.

To operate the lock-mechanism, the **AXIOM Annyversary SME** comes with a special Allen key to open and re-lock the small lock-nut.

Please un-lock the small lock-nut with a 1/4 turn counter-clockwise only and shift to the desired position. Unlock very gently only, to avoid the lock becoming too loose. A few tries will give you a good feeling of the right amount of force applied.

Once achieved: lock again in place with 1/4 turn clockwise.

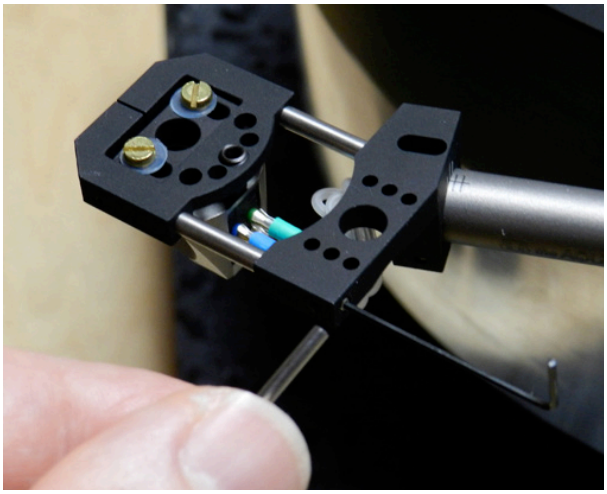
While doing this the achieved position should be secured by 2 fingers with gentle grip.

Any locking and un-locking shall be operated with finger-force only - NOT with wrist force. Too much force applied here may damage the light assembly.

The **AXIOM Annyversary SME** comes with a different selection of main and secondary counterweights.

This to counterbalance also higher weight integrated headshell cartridges as well as heavier headshells.

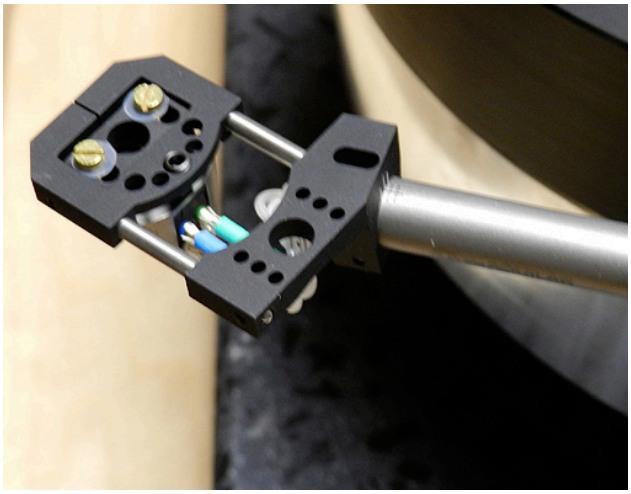
Removing finger lift



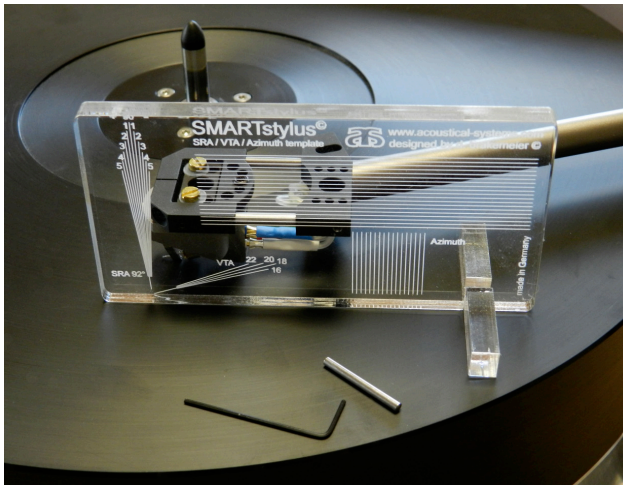
The **AXIOM** allows for the easy removal of the fingerlift.

Please select the 0.89/90 Allen key from the accessory box. Undo the rear M2 grub screw at the upper left of the headshell's rear.

It fixes the fingerlift in place.



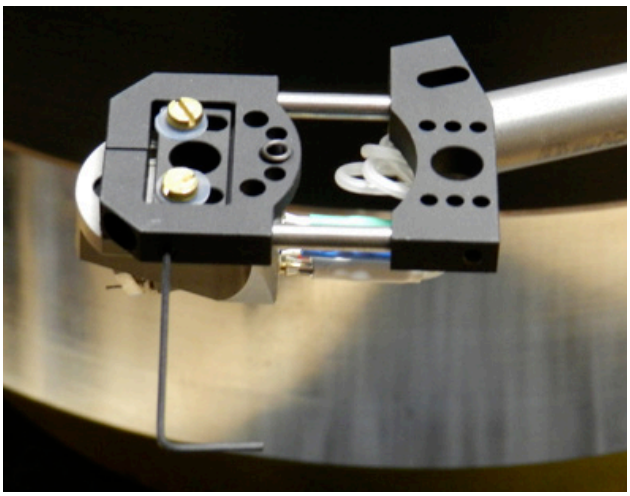
Undo the screw and remove the fingerlift.
You can easily restore the fitting by reversing this routine.



This feature was incorporated for 2 reasons - first to offer the purist the option to eliminate another "not necessary" feature.

But also to allow for perfect close use of the **SMARTstylus** - thus paving the way for easy and fast fine-tuning of SRA and VTA - to a level hardly possible otherwise.

Don't underestimate the fundamental positive effect of this additional alignment option of the **SMARTstylus** - especially when made possible in this close perspective! - It can enable you to achieve the ultimate level of performance from your analog set-up.



The exchangeable and adjustable mounting insert is available in 2 versions:

- “standard” with 5 mm thickness (1 pc included)
- “extra” with 8 mm thickness - suitable for small body cartridges

Exchanging cartridge mounting plate

Should you ever need or want to exchange the mounting plate, you can easily do so by turning the 2 small black ball plunger grub screws on each side of the headshell.

Undo them by 1-2 revolutions anti-clockwise.

Now undo the front clamp lock screw - just 1 revolution anti-clockwise - and you can remove the mounting plate (press down to remove) and insert another mounting plate. If interested in additional mounting plate(s), please ask your dealer for details.

Turn back the M2 ball plunger grub screws on each side and tighten the lock screw to close the headshell’s clamp again

Setting anti-skating

It is best to set anti-skating last - after lateral balance, cartridge alignment and precise levelling of the pivot plane have been achieved.

Otherwise the anti-skating would further have to battle with uncertain and parasitic side forces due to the pivot plane not being dead level - and/or the inevitable breakdown torque force in all pivot tonearms not being compensated by lateral balance and thus applying additional force on the inward groove wall, directly resulting in extra skating force.

The anti-skating is applied by turning the knob screw on the side of the top right of the bearing house inward i.e. clockwise rotation.

On its tip is a magnet which interacts with opposite magnets on the inner vertical bearing house.

Thus compensating skating force is achieved without friction and in dynamic mode - in correspondence to the tangential curve.

Specifications

After lateral compensation and pivot balance having been achieved, the skating force depends to a considerable degree on applied tracking force and stylus shape. This is also the reason why you do not find an “anti-skating” scale here. It would - in most all cases - be misleading.

For best results, I strongly recommend not just trusting a “skating force track test record”, but use a good, pure - and demanding in its dynamic scale - acoustical recording of a single voice with guitar to perfect the fine tuning of the anti-skating setting.

„Opus3“ and similar audiophile purist labels do offer many such well suited recordings.

Now you are done with mounting and initial set-up.

Thank you for your care and patience while following me through this manual.

For the dedication and precision you have applied to mounting and aligning your **AXIOM**, you will be rewarded with endless hours of the most detailed, colorful, dynamic and distortion-free sound from your favourite records.

We did our best to provide as complete a manual as possible. Should you have any comment or constructive criticism to share, we would very much appreciate to hear from you and your experiences. Feedback for us is very important and helps us to further improve our designs - by tuning them to your needs and demands.

Please do contact us - we highly value direct feedback from the experienced users of our components.

After all - the **AXIOM** was designed for you.

Now enjoy your records!

Design-inherent geometry:
UNI-DIN

Effective length w/Loefgren A:
10” = 250 mm
12” = 300 mm

Pivot to Spindle:
10” = 238 mm
12” = 288 mm

Offset angle: variable approx. 14° - 23°

Overhang: variable approx. 5 to 16 mm

Effective moving mass net:
12” = 18,8 grams

Inner wiring: soft aged pure silver litz wire

Resistance inner wiring: 0.9 Ohms/m

Capacitance inner wiring: 25 pF/m

Cartridge weight balanced:
5.2 to 30 grams

Adjustment ranges:

Pivot plane adjustment: +/- 6° horizontal

Arm wand height adjustment: 15 mm

Offset angle adjustment: +/- 4°

Overhang adjustment: +/- 5.5 mm - max. 11 mm

Azimuth adjustment: +/- 8°

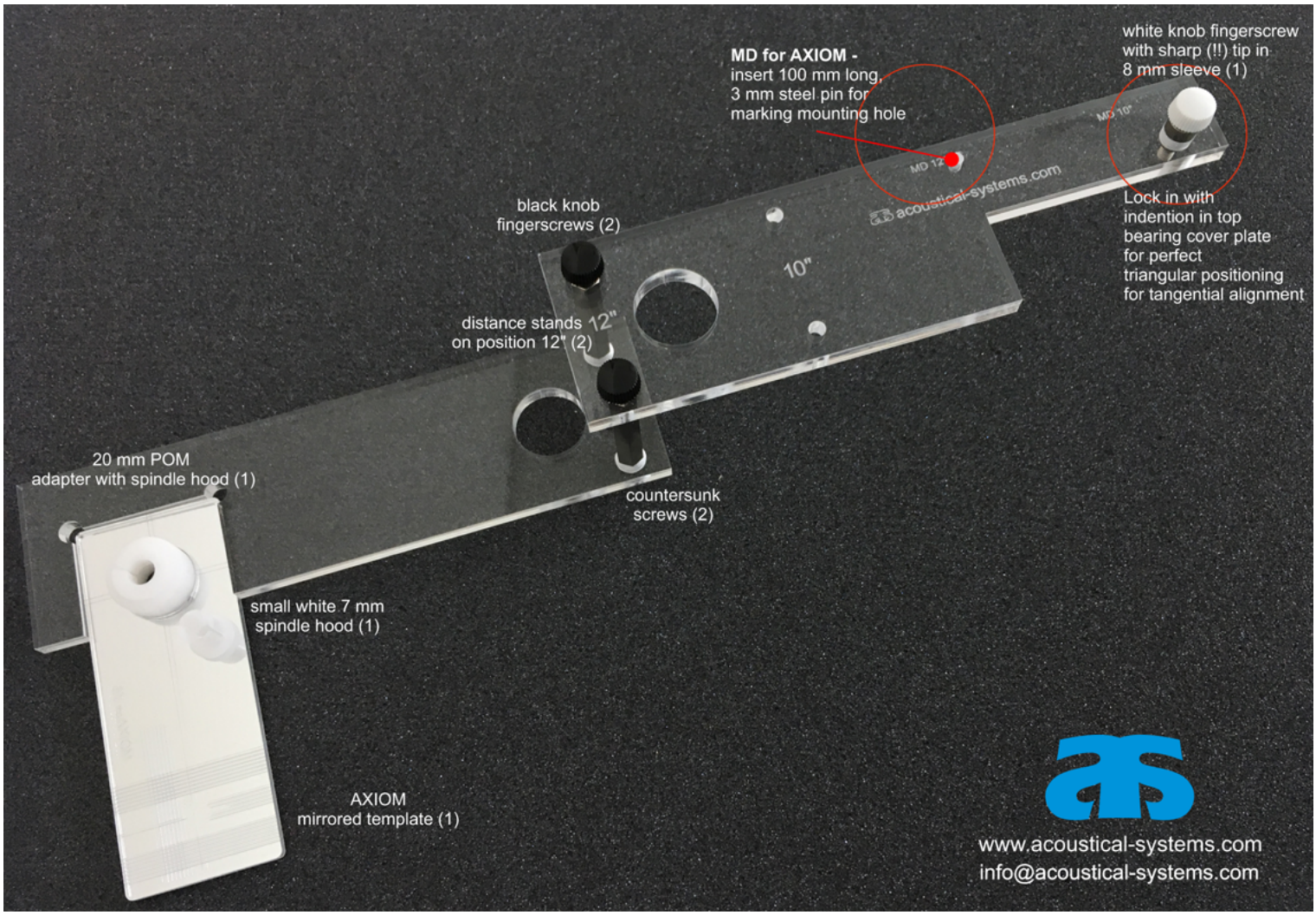
SRA angle adjustment: 97° to 84°

VTA angle adjustment 28° to 14°

IMPORTANT - PLEASE NOTE

This product can be recycled. Products bearing this symbol must NOT be thrown away with normal houshold waste. At the end of the product’s life, take it to a collection point designated for recycling of electrical and electronic devices. Find out more about return and collection points through your local authority.

AXIOM alignment template - fully assembled



General note:
Technical data, minor design and specifications are subject to change without prior notice.

Manufactured and assembled in Germany

For further infomations:

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info@acoustical-systems.com