

The SAMBUCO tonearm

Unique *wooden tonearm pipe*

Dynamically balanced

Unique *magnetically supported unipivot design*

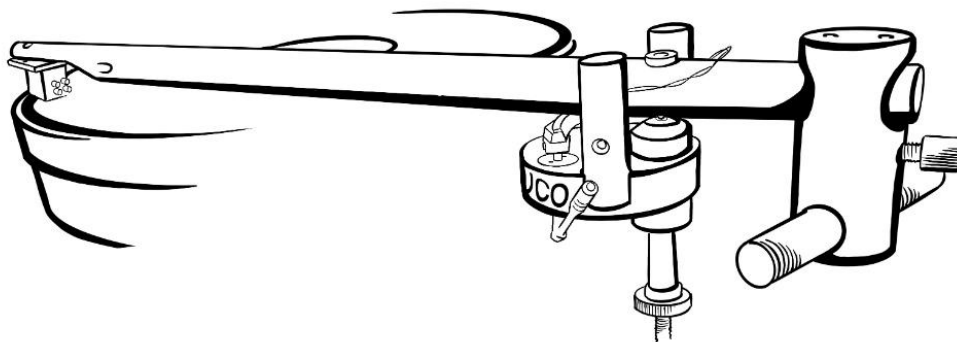
Eddy current damping of the bearing

Frictionless magnetic 3 point anti skating

All *alignments* are possible:

Baerwald, Loeffgren, or

Underhang, zero offset



Installation instruction – 2025

www.sambuco.net

The SAMBUCO tonearm – design philosophy

The SAMBUCO is a unipivot tonearm. Its name reflects the use of Sambucus nigra wood for the tonearm pipe (“Elder wood”). The wooden pipe and all its internal and external treatments were inspired by the art of violin building. It is the secret of a resonance free support for your cartridge.

Remember, old and admired violins are made from wood, not aluminium, titanium, carbon fibre, or any other fancy high-tech material. Wood in combination with varnishes, glues, etc. define the resonance behaviour of a violin. It is hand craft, experience, and patience that will be rewarded by a harmonic sound without “Wolf-tones” and other annoying artefacts.



All SAMBUCO tonearms are impulse tested for their resonance spectrum, and leave the workshop only, if there are no discrete resonances measurable that have a high “Q” (equivalent to a “Wolf-tone”). The SAMBUCO design concept uses the **violine know how to manage resonances**, without the use of dull damping treatments.

The bearing point is magnetically loaded to increase the **bearing contact pressure by almost 1.5 kg** in order to **avoid bearing chatter** and to transmit energy to the mounting base of your record player. Its design includes an eddy current damping at the point of the highest energy transmission to the arm board.

Setting a unipivot tonearm is an iterative process. It offers some additional degree of freedom to compensate for slightly off-centre needles and other artefacts of cartridge production. All SAMBUCO setting screws are made from brass, and they should only be slightly tightened in the beginning. They might not be in their final position yet.

Apart from your precious patience, you will need a good tonearm scale to weight the tracking force, a spirit level, and some household DIY tools, like little Allen key screw drivers.

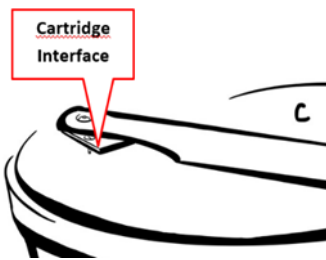
Do it step by step. No shortcuts please! I know it’s a pain, but **“no pain, no gain”!**

Important installation tip: You should always begin the installation job with a needle protector in place! (I am very unhappy that some cartridge designers omit a needle protector. Are they having second thoughts about earning additional money from repairing broken needles?)

SAMBUCO Quick installation guide:

Please do have a look at the instruction videos on <https://www.sambuco.net/wp-content/uploads/2024/12/tonarm-installation1.mp4> step by step. Sometimes a short film is better than many words.....

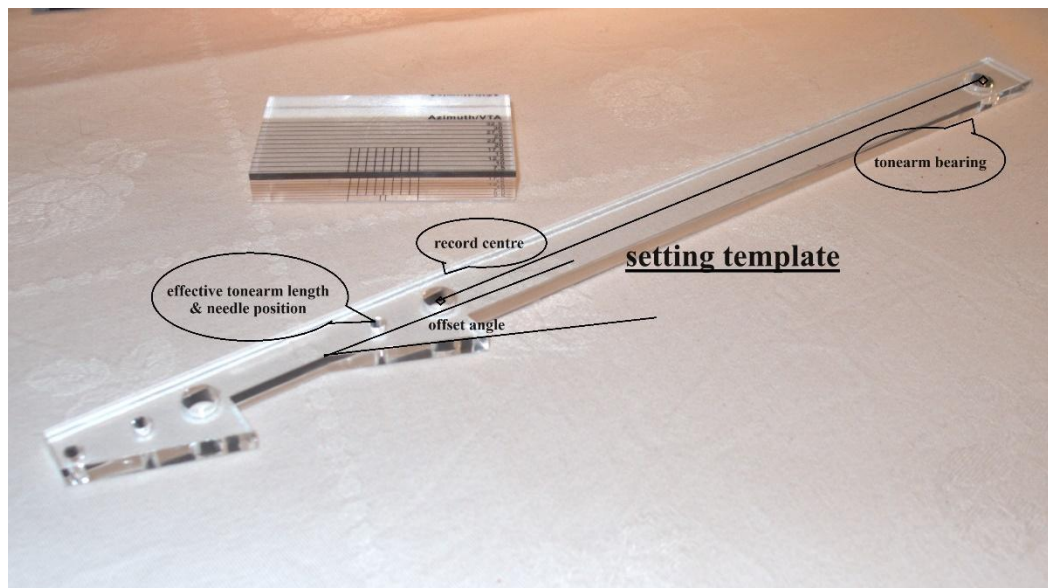
- 1) Only one single mounting hole (6 mm diameter) for the M6 mounting stub (= bearing position) has to be drilled into the tonearm board of your record player at a distance of 222.44 mm from the record centre (222 mm for the 10" (=240 mm) arm length, and 286 mm for the 300 mm (12") tonearm). This is for the Loevgren-alignment.



ALL other alignments are possible with the SAMBUCO! Why? You can change your offset angle with the "Interface" to any angle you want. If you want to experiment with zero-offset alignments, you will need a longer distance between the record centre and the bearing position: 270.30 mm to achieve an "underhang" position for your SAMBUCO 10" tonearm.

A setting template is provided for the **Loevgren-alignment**. Put the 8 mm hole over your record platter centre. The 10 mm hole accommodates a pencil (centred!) to draw an arc on your tonearm base for the tonearm bearing position. This arc will have the correct distance to the record centre. Try to position the mounting hole along this arc so that there is enough space for the tonearm movements. Do have a look at the video!

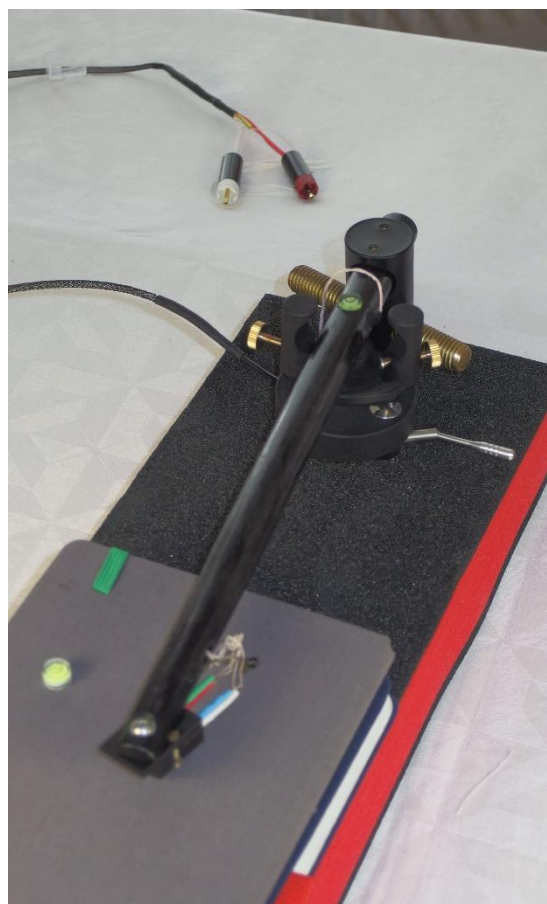
The templates:



2. The SAMBUCO transport protection (the black and red foam block) is designed to facilitate your initial tonearm setting:



Put the foam block on a plane and level surface in front of you.



Choose one 6 mm hole to insert the mounting stub of the SAMBUCO base.

The foam block simulates your tonearm base.

Put a plane surface (f.ex. a book) on the foam block to simulate the relative height (thickness) of your record platter. (A minimum of 30mm is recommended.)

Now you can do all further cartridge mounting work with good view and access from all sides.

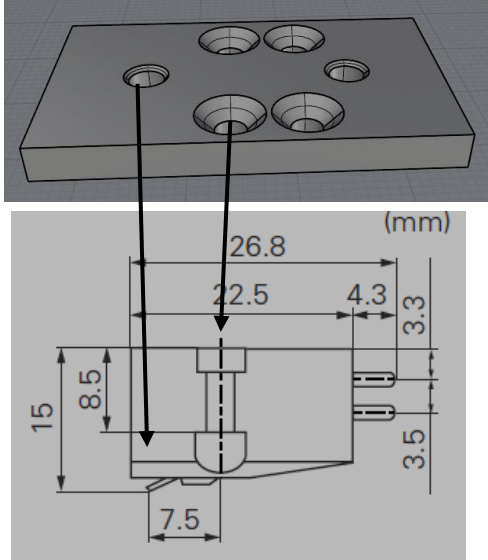
Before you transfer the balanced SAMBUCO tonearm to your record player, you will have to identify a spot for the mounting hole (6 mm diameter), and drill it.

There should be enough place above the tonearm base for the counterweight movement, and enough place under the tonearm base to attach and tighten the M6 screw nut. Accessibility is helpful to fine-adjust the VTA (= the height of the tonearm base).

3. The "INTERFACE"

The **SAMBUCO Interface** plays an important role: It links the cartridge to the tonearm, and it fixes the **offset angle**.

This is a small plate (30*24mm) that has 4 chamfered holes (1/2"; always on top).



Your cartridge needs to be mounted under this interface with two screws. As a result, the needle of your cartridge shall be vertically positioned under an M4 threaded hole on the interface middle axis.

See the exemplary picture of a Denon DL103: The distance between the needle and the two mounting screws is 7.5 mm. You have to choose the right pair of chamfered holes for your cartridge.

4. The SAMBUKO interface accommodates all needle to mounting screw distances from 3mm to 14mm. You have to choose the right distance combination of mounting holes:

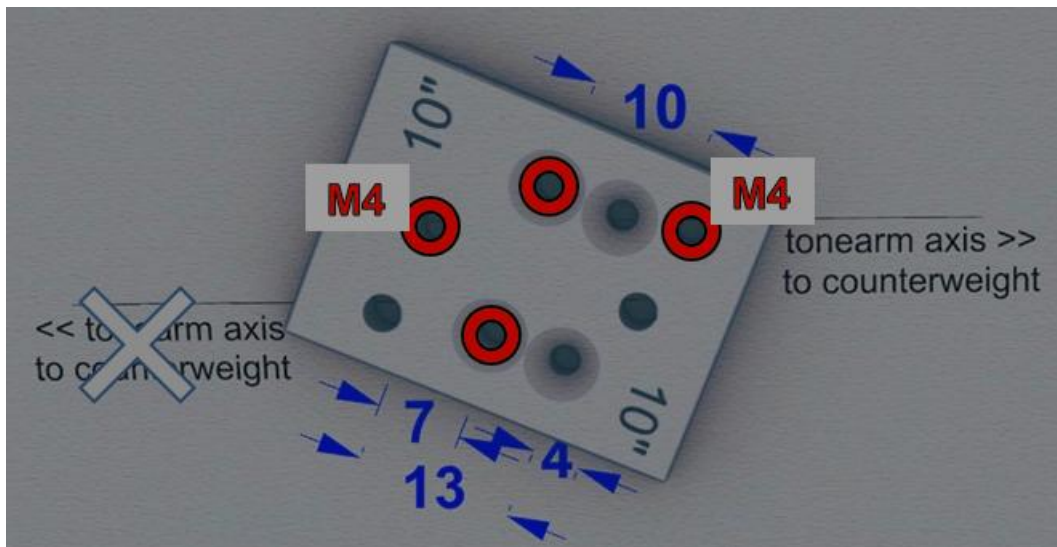
M4 – 4mm (3... 5mm),

M4 - 7mm (6...8mm), ⇔ "7.5mm", your choice for the DL103

M4 – 10mm (9...11mm), or

M4 – 13mm (12...14mm).

Choose the nearest option.

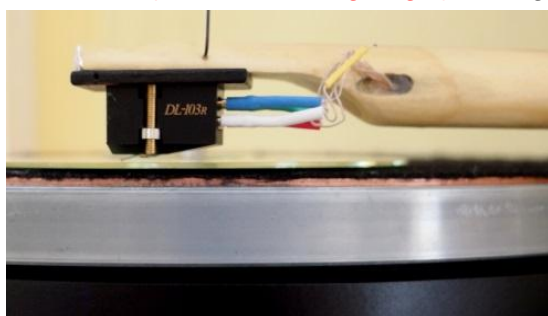


For distances 3.. 5mm or 9..11mm you will horizontally rotate the interface by 180°, and use the other pair of M4 threaded holes to screw it to the tonearm.

Put some grease between the Pick Up and the interface, and between the interface and the tonearm. Make sure that all surfaces of the interface are in good, parallel contact to the tonearm and the cartridge. This ensures **good energy transfer from the cartridge to the tonearm**.

Grease - in the SAMBUCO concept - is not used as a lubrication. Grease - being a liquid - cannot be compressed, therefore it supports the transmission of vibration. It is used to seamlessly link parts together that should work together: Cartridge – tonearm – counterweight. No weak or rattling joints!

5. VTA (vertical tracking angle) setting:



The SAMBUCO tonearm has a small round spirit level above the bearing. It will help to simplify the first setting. The tonearm, particularly the cartridge interface should be perfectly parallel to the record surface. This is ensured by raising or lowering the SAMBUCO arm base above the tonearm board with the mounting stub. First loosen the M6 steel nut under the tonearm board. Adjust the black M6 screw nut (above the tonearm board) until the tonearm is at its correct height.

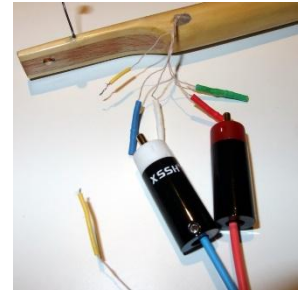
6. Insert the M6 mounting stub with the SAMBUCO tonearm base into the mounting hole on your record player. Do not tighten it yet. One black M6 screw nut shall remain above the mounting board. It shall allow to adjust the VTA (= height of the tonearm above the record surface) later on. The second M6 steel screw is detached and then fixed again under the tonearm board. It shall be tightened later on, when the VTA setting is correct. Just finger-tight to ensure good energy transfer, and to avoid accidental repositioning of the tonearm base. *(The SAMBUCO transfers a lot of energy via the bearing to the tonearm board of your record player. Dense and rigid **tonearm boards** work better as an **energy sink**. If sufficient space is available, and no other objections (like a spring-loaded sub-chassis) prevent a heavy armboard, then make it heavy. Some users have added a heavy washer (f.ex. lead) under the arm board.)*



There is a second adjustment done by the same mounting stub: You can rotate the SAMBUCO tonearm base horizontally. On top of the (round) tonearm base you will see a small groove. It should point towards the record centre or slightly behind it. This ensures that the two anti-skating magnets are in a good position to do their job. Then tighten the M6 steel counter lock nut under the tonearm board to fix the tonearm in its position.

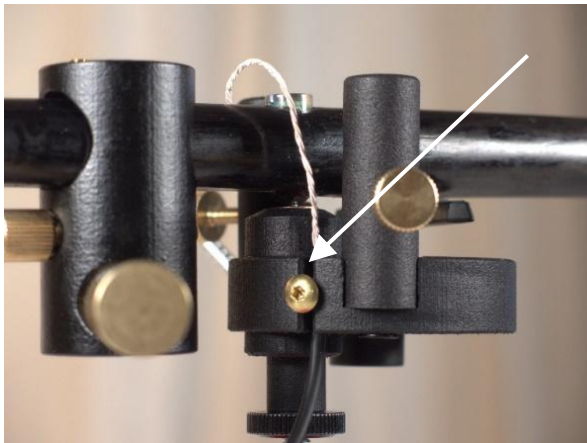
7. Fix the cables to the cartridge. The SAMBUCO tonearm cable is wired from the cartridge to the RIAA preamplifier, without any interruption. It is a balanced cable concept, although it ends at low mass RCA Cinch plugs. (Option "A")

(If your RIAA preamplifier has a balanced XLR input, you can replace the Cinch plugs by XLR plugs: just solder the wire from the central Cinch contact to the XLR "signal+", and the usual Cinch mass contact (-) to the XLR "signal -".)



Not all contact stubs on cartridges have the same diameter. You might need to adjust the contact clamps on the wire. Widen them with a small peak, or tighten them with the pressure of your fingers. Take care for the usual order: RED: right channel +, GREEN: right channel -, WHITE: left channel +, BLUE: left channel -.

You will notice a fifth wire: this is accompanying the signal wires to absorb any radio interferences picked up in the air and pulls it to "ground". It will be fixed to the earth/grounding post at your preamp. (If you opted for XLR plugs, you can solder this wire to the "shield"-post of the XLR, or leave it on the mass contact of your RIAA pre-amp.)



The tonearm cable shall be secured in a slot on the SAMBUCCO base. This makes sure that the wire between the tonearm and the tonearm base stays in a defined arc. Option "B": Tonearm wiring goes from the cartridge to a 5 pole male connection socket. There you have to plug in your preferred phono cable (female 5 pole plug) to your RIAA preamp.

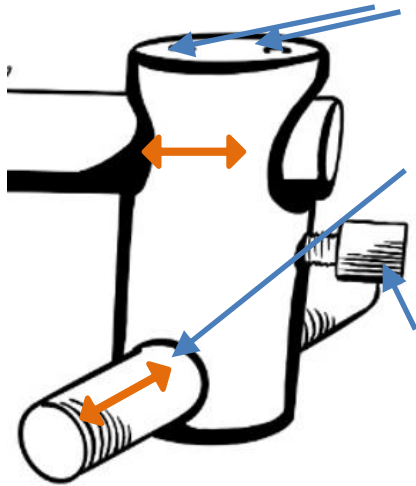
Some cartridges offer to additionally "ground" the metal encasement of the generator. (The old Shure V15 moving magnet allowed for this feature, if you had separated the metal encasement from the negative signal wire.)

Do not forget to ground the platter and/or the enclosure of your record player, to avoid hum!

Attention: The SAMBUCCO tonearm cable was chosen for its tonal superiority. It is very thin (33 AWG) and might break if you pull it with force.

8. Bringing the tonearm into balance & downforce:

There are four brass adjustment screws on the counterweight:



1) Two little M4 Allen screws on the top. If released, you can slide the counterweight back and forth.

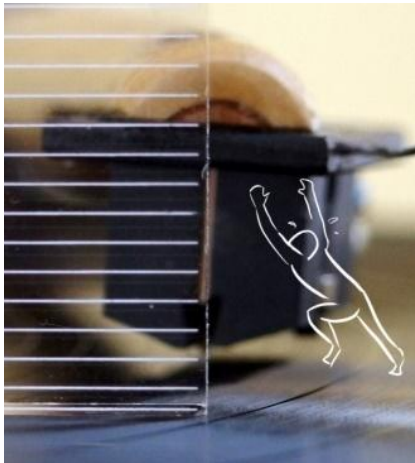
2) One big M14 thread stub. If you turn it, you can adjust the lateral (left-right) balance of the tonearm (\Leftrightarrow Azimuth).

3) One M6 stub for fine tuning the downforce.

Start by slightly unlocking the two M4 Allen key screws. You should then be able to slide the counterweight back and forth.



Try to fix them again, when the recommended tracking force is roughly seen on your tonearm scale. (Deduct the weight of the needle protector from the measured downforce.) Fine adjustment (\pm 0.3 grams) will be done with the M6 brass stub. (Clockwise rotation increases the downforce).

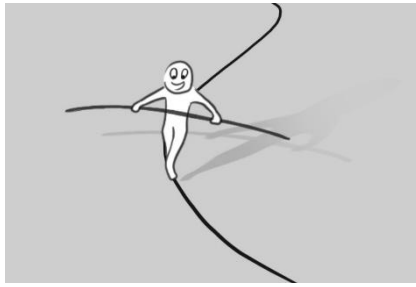


The lateral balance (Azimuth): Your tonearm should ensure that the needle (without the protector now) is perfectly upright in the record groove.

Lift the tonearm. Grab the counterweight with a firm, secure grip, then turn the big M14 brass stub (by hand). This will change the lateral balance of the tonearm. It acts like the balancing stick of a tightrope artist. Turning the M14 stub will slightly alter the downforce. Correct it with the M6 fine-tuning stub.

Thoughts on static and dynamic balance

Imagine the SAMBUCO as a tightrope artist.

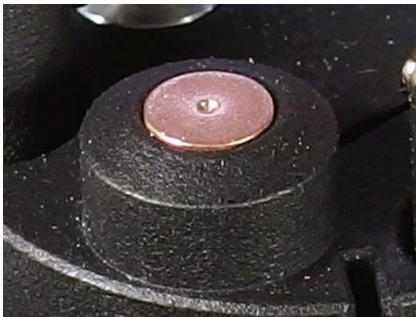


The **geometry and mass balance of the SAMBUCO tonearm** creates equal momentum forces around the bearing point: => no momentum differences at the needle tip of the cartridge. The bearing point is almost on the same plane as the record, so the tonearm should be immune to warp wow effects.

Explanation: The centre of gravity of the tonearm has to be slightly lower than the bearing point level, otherwise the tonearm would “capsize”. Do not worry if the tonearm seems to be a wobbling affair when you lower it on your record. It stabilizes as soon as the needle is in the groove. The high performance of a good unipivot tonearm is defined by its balanced mass, not by a high bearing point level.

*The SAMBUCO counterweight is designed to **add inertia** in the horizontal plane, like a balancing stick used by brave tightrope artists. Most tonearms offer a lot of inertia for vertical movements of the pickup diamond. Usually there is little left-right inertia to oppose **torsional diamond work in the groove**. The balancing stick is positioned 90 degrees against the cartridge cantilever axis (= the record groove axis). Apart from stabilisation it allows for fine tuning of the horizontal tracking angle (HTA or Azimuth), a critical set up topic for Uni-pivots.*

9. The SAMBUCO bearing:



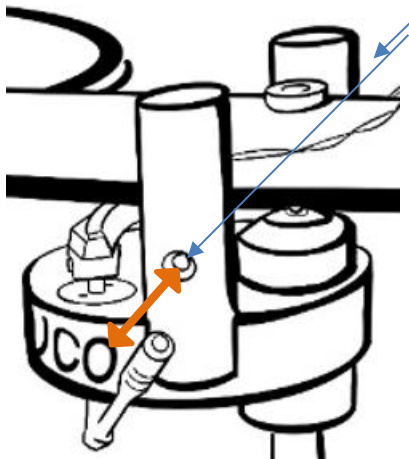
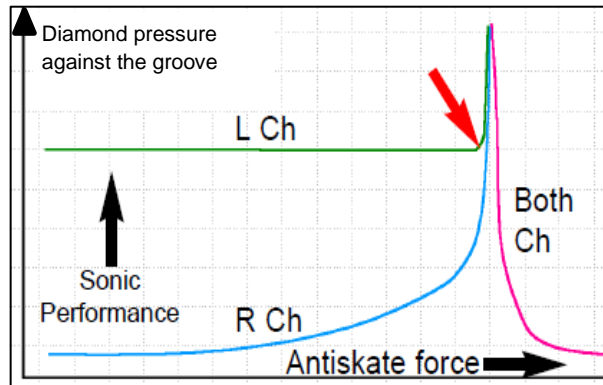
The bearing is a unipivot concept. It is enhanced by magnetic attraction, and an eddy current damping of the bearing point. Try to keep the copper bearing pan clean, so that the small steel bearing ball (part of the tonearm) can move unobstructed by dust or other little obstacles attracted by magnetism. Cautiously lift the tonearm (You will have to overcome the magnetic loading (1.5 kg!) of the bearing point) to allow for cleaning

the bearing pan (use a cotton stub with some isopropanol). After cleaning you can put just a drop of low viscosity oil into the bearing pan. (Less for damping, but more for lubrication and dust protection. I prefer to leave the bearing “dry”.)

10. Plug in the RCA plugs into the RIAA preamp and slowly increase the volume (no record yet). This exercise will tell you about any hum or noise interference. You might need to check your grounding wires and the physical position of the tonearm cable. If your environment is vulnerable to hum, or if you prefer to listen to moving magnet cartridges (high impedance), I have recommended to opt for the “Option B” wiring concept. It uses a balanced and shielded connection from the record player to your RIAA preamp.

11. Anti-Skating:

The skating force is pulling your tonearm towards the record centre. This causes more pressure on the inner groove (left channel information). This force is not linear and has to be compensated to ensure good balance between left and right channel information.



The skating force starts relatively high, then decreases in the middle grooves, and then increases again at the final grooves. The anti-skating concept of the SAMBUCO is based on 3 magnets. One is fixed under the tonearm. Two magnets are located in the small columns on the tonearm base and can be “on the fly”, if you have a “slow hand”. The outer magnet slightly “pulls” the tonearm, whereas the inner magnet “pushes” the tonearm in order to compensate the skating force.

Tuning: I recommend Frank Schröders method of monitoring the arm while it is traveling on a record without grooves. These records are difficult to get, but you can use the flat side of a CD instead, and simulate the record rotation by moving the record platter with your fingers for a short travel (10 cm). Do not let your needle drop on a felt mat! Your AS-setting is in a good starting position, if the tonearm is only slowly moving towards the record centre. (-> look at the explanatory video!)

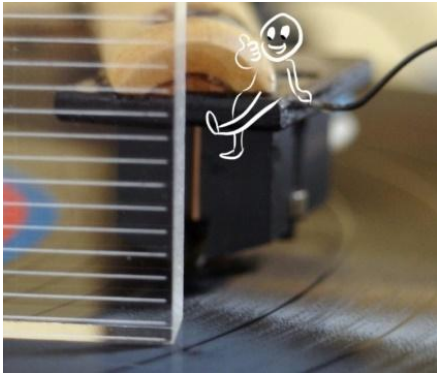
Have a look at my anti skating video: <https://www.sambuco.net/wp-content/uploads/2024/12/anti-skating-final.mp4>

Further fine-tuning is advisable and recommended with a good vocal record. Ideally you should use a mono recording. Normally singers are recorded to appear between your loudspeakers. If the voice is too far to the left, you will have to increase the antiskating force. Turning the Allen key or adjustment screws clockwise will lower the distance of the anti-skating magnets, and thereby increase their effectiveness. If the anti-skating force is too high, then decrease the distance. In some situations, I rotated the anti-skating columns away from the tonearm completely.

Do not underestimate your antiskating effort!

The SAMBUCO will honour you with a great performance, and there is no additional cost.

12. Final checks:



All settings influence each other. It makes sense to check again. It is “iterative”!

- 1) **Downforce**? Does the tonearm wire interfere with the free movement of the tonearm? “Dress it!”
- 2) **VTA and Azimuth**: Is the needle in a perfectly vertical position?
- 3) **Tonearm lift**: Is the horizontal bar under the tonearm at a good operating height?

*Enjoy, and remember: things improve after some “**burn in**” time.*

Yours, Lukas Julinek - Vienna, Austria, 2025

Email: info@sambuco.net if you need support!

A final remark on the SAMBUCO design concept:

I prefer **strong counterweight coupling** against springy links or even decoupling the counterweight. This is my interpretation of Isaac Newton's **impulse theorem**: If the mass of the moving parts of the cartridge (i.e. Diamond, cantilever, and coils) is very small against the total tonearm mass, then a maximum of the groove dynamics is transformed into electrical energy.

Imagine the SAMBUCO as the heavy mass of a seismograph that stays inert while an earthquake shakes the rest. The SAMBUCO opposes diamond acceleration in the groove with an inert balanced tonearm mass. The counterweight end of the SAMBUCO tonearm is a progressive energy sink. It aims for **low energy storage** and **minimum energy reflection**. Decoupled counterweights have the potential to store energy, and later give it back to the tonearm – at the wrong moment in time.

Security information, environmental concerns:

The SAMBUCO tonearm contains a number of different materials that were chosen for their acoustic benefits: wood, natural glue, epoxy glue, Nylon, neodymium, brass, steel, shrink pipe, natural oil, and wire. Depending on your location there will be different regimes about disposing these materials.

Like a violin the SAMBUCO is an expensive and sensible item. Do not expose the tonearm to heat, direct sunlight, or any other environment that a precious violin would not tolerate.

Electrically the tonearm is a passive element that transmits very small voltages generated from a pickup cartridge. Do not plug any tonearm wire (RCA plug) into any other connection, except the RIAA input of a pre-amplifier.

Any legal dispute will be settled in courts situated in Vienna, Austria.