

Subject: Soundsmith Cartridge alignment Version 4.25 ~ How to align your NEW or Soundsmith rebuilt cartridge – **COPYRIGHT SOUNDSMITH**

To properly enjoy the best performance possible from your cartridge, proper care and alignment are required.

This includes:

Cleaning
Vertical Tracking Force (VTF)
Overhang Adjustment
Anti-skating Adjustment
Azimuth

CLEANING:

How do I clean the stylus?? Do I use a wet cleaner each time, or often? NO!!!

A DRY soft brush is somewhere between good and "OK", **but it is far better is to use some "fun tak"** – this is the blue clay-like stuff you get in the stationery department. Use it just before or after every play. Either make a "pedestal" of the jut the right height, and place a small squashed ball of fun tak on the pedestal at the right height so that you can use the cueing mechanism to allow the stylus to drop onto the fun tak. The other good option is to squash a small ball (half the size of a dime) FLAT (the thickness of a record) onto a business card. Not surprisingly, a Soundsmith business card works very well. Then place THAT card on the platter OR even a record.

Then cue DOWN and up on the fun-tak several times. Be VERY care full not to DRAG the card or turn the platter when the stylus is down on the fun-tak or you risk damaging the stylus or cartridge.

Do this several times, each time moving the fun tak to a new spot when the stylus is raised, so that when it comes down it hits a new spot.

If you need to do this on a B&O table, make the pedestal JUST the right height so the fun tak is JUST under the stylus position & push the arm down a tiny bit to have the stylus hit the fun-tak to allow the stylus to dig into the fun tak.

DO NOT USE THE CLEANING "CLEAR GELLS" that are on the market. These tend to BREAK cantilevers.

Using our method every record should eliminate the need to wet clean ever, BUT if this doesn't cure a distortion problem due to debris build up, THEN either use the supplied brush and some RUBBING alcohol (70%, water 30% NO COLORING OR FRAGRANCE) and gently stroke the stylus back to front only. Only wet clean when the dry clean doesn't work.

DO NOT WET CLEAN OFTEN - TO DO SO WILL POTENTIALLY CASUE SEVERE DAMAGE TO THE STYLUS MOUNTING AND CAUSE THE DIAMOND TO COME OFF. USE THE ABOVE BLUE-TAK METHOD.

If you don't have a good VERY SOFT brush, purchase a WATERCOLOR brush with non-synthetic fibers, one that has bristles that are about 1/8" in cross section. CUT the bristles straight across with a small scissors, making them about 1/8" long. Break or cut off the wood handle so the brush is VERY SHORT, and has very little wood handle. This will minimize accidents and reduce jitter when handling and using.

RECORD CLEANING:

DO NOT TALK towards your records. They are neither listening, nor do they need a talking to. You need to listen to them. The reason is this: when you talk, you spit. Yes, even you. Fine drops. You cannot see them because the record is textured with grooves. When the stylus hits the dried spit, this GLUE then sticks to all the dirt and dust in the grooves. It only takes a few revolutions for this to happen, and so much debris can build up on the stylus, you will have worse than distortion – The stylus may not even track the record.

What do I suggest?? A record cleaner – It's a MUST HAVE item for any record enthusiast. How much do you invest in one?? As much as you are able – the return will be many times its cost.

How cheap can I go?? Get TWO of the SpinClean cleaners. We sell them but you can buy them almost anywhere. \$79.95 each. Why TWO?? Use one for cleaning, and the other for rinsing with DISTILLED water ONLY. DO NOT use tap water in either one.

Want something faster and less work and better?? Get a VPI. Many models to choose from.

Cleaning your records well is the BEST investment you can make in protecting that great sound of your analog system.

VTF - Vertical Tracking Force

As far as vertical tracking force (VTF), always start with the recommended vertical tracking force from the manufacturer for a particular make and model of cartridge. It may be possible to lower it after we have repaired or rebuilt your cartridge, but there are so many factors, including variations in tone arm design and condition, that we urge our customers to invest in a test record that will aid them in finding the correct VTF. Too low a VTF will damage both record and stylus, and too high will cause too much wear.

The proper amount of VTF will vary from cartridge to cartridge, EVEN within a single model, due to manufacturing tolerances. One who plays loudly recorded music will need a bit more, and visa-versa.

When you are adjusting your VTF, if you use a test record, adjust the antiskating beforehand as described below, and then fine tune the VTF to allow no audible distortion with a test record with a tone recorded at 12dB over 0 dB modulation.

Overhang Adjustment

This adjustment provides a best compromise for your "pivoting" arm - it will minimize distortion if done correctly. Please go to our page (link below) and download the gauge. - instructions are fairly easy and on the print out itself - PLEASE note the metric grid at the bottom of the gauge, and make sure you have printed it out sized correctly. If not, you may have to enlarge or reduce a bit. I use photo quality paper for my final print out, which make a durable gauge! MAKE SURE YOU DIAL DOWN OR TURN OFF THE ANTI-SKATING BEFORE USING ANY OVERHANG GAUGE.

<https://www.sound-smith.com/soundsmith-cartridge-alignment>

Bear in mind that one should always align the CANTILEVER with the grid; the body angle is irrelevant, as is the stylus guard slot, which can be off a bit.

Notice that when down on the record, friction may "pull" the cantilever slightly to one side or the other, so after the antiskating is set correctly, always good to double check the cantilever rides straight, and does not lean to one side.

ANTI-SKATING - (specific VPI information is below)

YES - you DO need antiskating. It is just plain simple physics. BUT.....the industry has gotten it WRONG. (see my notes at the end of this anti-skating message for more details)

Make sure that the anti-skating is well set; there are many ways to tell, but this is a method suggested by Frank Schroder, with which we heartily agree. PLEASE NOTE - this will not agree or work with test records designed for higher amounts of anti-skating. The reasoning from Frank Schroder for this method and level of A-S skating is as follows: the level of antiskating used should create EQUAL forces on each groove wall for ***most*** of the record. Since this force is dependent on the level of recorded modulation (how loud the recorded music is on the disk) setting it for a "worst case" "loud music passage" level is totally inappropriate. Setting it where it provides equal force per groove wall for where music spend 80-90% of its time (30-40% modulation) makes FAR more sense, both from the standpoint of listening, and wear.

Procedure:

When you have it adjusted right, the arm will track on the SURFACE of the record (not in the groove) at the end of the record on the un-pressed flat space where the run-out groove is - it should track SLOWLY INWARDS toward the center at a MUCH SLOWER RATE than IF IT WERE ACTUALLY in the end groove. If you do that, then the best average Anti-Skating is set correctly.

The following is useful, but not all-telling. With medium or high compliance cartridges (NOT with most moving coil design) - LOOK at the position of the cantilever when it is up in the air, and when it is on the record, both at the beginning, and at the end. Look for a change in position both initially upon set-down, as well as after 1-2 minutes. If you DO THIS BEFORE adjusting as above, you will have a gross method to verify that you have problems with skating forces, as it should not change position - if it does, the A-S is VERY wrong. The best way to tell if it is very wrong is to look how the cartridge behaves on the flat surface, as described above.

DETAILS.....DETAILS.....

Almost always, most tables are set so they have too much Antiskating, or an adjustment that cannot be turned down enough, OR the range and fine control is terrible, or you have none.

Usually, most folks use far too much antiskating, as evidenced by the thousands of cartridges I have rebuilt over the last 40+ years - as evidenced by observation of the outer edge (right channel) of the diamond to be worn far more than the inner, or left channel.

A properly designed anti-skating is non-linear, as it should of course increase A-S automatically as the cartridge approaches the inner grooves.

Frank Schroder and I are of the same opinion about antiskating - and that renders MOST records that provide an anti-skating track totally in error - they are recorded at about 80-90% modulation - or HIGHER - and expect you to set the A-S force so that there is no distortion (or equal amounts on both channels if the cartridge tracks poorly).

The problem with these tracks is that since the required level of A-S force is a dependent of the amount of modulation, **it has you adjust antiskating at far too high a level**. This would be OK, if you are listening to music that is (by nature of

the music) at constant maximum crescendo, without normal musical dynamics - going from loud to soft. Very few pieces of music are like this. When you adjust for this level on a "test record", that means that you are very much overcompensated with far too much antiskating as you have adjusted it for where music does NOT spend most of its time. It spends it at about 30-40% modulation levels, and adjusting the A-S with these "test" records results in far too much A-S force; too much stylus force on the right channel, and far too little on the left.

Since there is no properly recorded track that allows proper setting of A-S (there will be such on our new Soundsmith adjustment record), the method that Frank Schroder discovered through careful reverse engineering **works without tools, and without a special record.**

If one sets the stylus on a smooth surface of a record (at the end, in-between the run out grooves) - the tip of the stylus has a drag on the surface that somewhat similar to what it would have if it were in a groove. This is due to a calculation of "force per unit area" with consideration of the rheology of the material - vinyl.

Suffice it to say that it is "similar" enough for this method to work well, **especially since the method was reverse engineered/calibrated properly by Frank Schroder to be correct for 30-40% record modulation.** It then becomes an easy matter to set the A-S and observe the movement of the arm. For a given VTF (any amount of VTF) - set the A-S so that the arm VERY SLOWLY drifts inwards when placed on the SURFACE (NOT IN A GROOVE) at the end of a record. You will have a moment to do this until the stylus "pops" into the run-out groove.

This works for ANY amount of VTF required, for ANY cartridge. It will set the A-S for EQUAL force per groove wall for 30-40% groove modulation levels, at ANY VTF, for ANY cartridge.

Azimuth adjustment:

Azimuth adjustment is important - We realize that some arms do not allow for such, so we have some suggestions how one can accomplish this with a non-adjustable arm - see the end of this section

Always start with the cartridge as physically neutral as possible as viewed from the front. It should be as flat as possible. Your "best setting" is here or not more than 3 degrees from this position, either clockwise or counterclockwise. With many cartridges -

Soundsmith for one, viewing from the front to see the gap between the BELLY of the cartridge and the record surface while playing gives a very good indication of mechanical alignment to the record.

Here is the basic bottom line. You should strive for the best vertical FIT of the stylus in the groove, NOT the "best" electrical" measurement. Why? Because the best performance is when you have the best FIT. Yes, some inferior styli designs (conical) will be far less than fussy about this, but higher performance styli designs require a good fit.

We suggest cueing the stylus down on flat mirror, or onto the record itself with the plaster not turning, of course. DO NOT have the antiskating on. Turn it OFF. That is critical.

We then suggest using a magnifying glass or USB microscope and by looking from the FRONT, adjust the azimuth so the stylus is as vertical as possible. After doing all other cartridge adjustments, you can do some light tweaking as per the below.

To verify a possibly better position, use a test record where one channel is modulated at a time, and LISTEN (or measure properly) the **OTHER** channel **for crosstalk or bleed through**. Do the same thing vice-versa with the other channel. When the crosstalk, or bleed through is roughly the same, that is the best azimuth. Many cartridges can be azimuth adjusted in this manner, because the bleed through for each channel will be roughly the same **for most cartridges when the azimuth is correct**.

It is important to note that most all cartridge azimuth alignment devices measure ELECTRICAL performance, and rely - in part - on equal channel balance and identical channel separation in order to supposedly adjust for best AZIMUTH. It is critical to note that they will not always work to achieve best mechanical fit for stylus to grove azimuth adjustment. In fact, some will actually provide a far worse azimuth recommendation than using a mirror, or an equal reflection in the surface of the record while playing as viewed from the front. As a result, there is a caveat with these devices that rely on identical cartridge characteristics. While it is true that a defective cartridge may have channel asymmetry from the standpoint of one channel having far worse separation than the other, it is also quite common with Soundsmith cartridges to have one channel that has far better separation than the other. Not only will 20-30% of all cartridges have dissimilar channel separation, they will also not have identical channel output when comparing channels.

For example, one channel may be 6dB "worse" for separation than the other at the BEST azimuth setting for the channel with poorer crosstalk performance. In other words, one channel may have extremely good separation or crosstalk when compared with the other. These differences do not indicate a defective cartridge, they simply point out how difficult it is to make a cartridge with identical separation performance and channel

balance. So, how does one adjust under this situation?? In the near future, a device called the CartRight, available in both hardware and software forms will be available through the Soundsmith. This device will permit accurate adjustments to be performed even by the most novice of audiophiles, and will allow perfect azimuth adjustment for any and all cartridges - especially those with any asymmetrical performance.

<http://www.sound-smith.com/cartright/index.html>

Regarding azimuth adjustment tweaking, the method here is to ignore channel balance issue, and then find the critical azimuth point for the **WORST** channel where it **JUST** achieves **best separation** and to stop there. It is likely that you will find that continued adjustment in that direction will NOT result in improvement of separation for that channel.

In other words, if one channel is always much better in terms of less crosstalk than the other, tune the azimuth by using the worse of the two channels. Again, the best way to tune the "worst" channel is to find the point where the crosstalk "just" becomes minimized and go no farther. Verify that the other channel is still better in that it has less crosstalk. If you NOW FIND that you have NOT gone more than a tiny bit off the neutral position to do this, you have probably hit the best azimuth.

If you find you are way off neutral, that is wrong, and something else may be wrong with your setup.

FOR ARMS that do not allow azimuth: our new ES cartridge line allows azimuth adjustment using one white Alumina rod (supplied with the cartridge). For any other cartridge on an arm that does NOT allow azimuth adjustment, cut two fine strips of business card, about 1/4 the width of the cartridge, and place them on top of one another, and then on top of the cartridge, running FRONT TO BACK to create a pivot or fulcrum. Then, by alternately slightly tightening and loosening each of the mounting screws a tiny bit each, one may "tilt" or rock the cartridge as viewed from the front to achieve a slight azimuth adjustment, which should be all that is required, to achieve top performance. When the proper point is found, tighten both screws by the same amount to "lock" the setting in place.

ATTENTION VPI OWNERS: If you are not aware that your turntable platter needs to be perfectly level with respect to gravity, PLEASE be aware. It is mandatory for Unipivot arms to be LEVEL with gravity for proper operation.

If you have an under-slung counterweight (MOST VPI tables) you will greatly benefit from obtaining the Soundsmith "Counter-Intuitive", a device that allows you to independently and easily perform fine adjustments of VTF and Azimuth. If your VPI counter weight is

all the way forward already, you will need to offset the small amount of weight added by the Counter Intuitive with a set of EZ-Mount screws. The links are here:

<http://www.sound-smith.com/intuitive/index.html>

<http://www.sound-smith.com/screwset/index.html>

ANTI-SKATING AND VPI IMPORTANT ISSUES:

Yes, you DO need antiskating. BUT - the industry has gotten it wrong.

Some of us who own VPI tables are aware that in the past, VPI's suggestion was to twist the signal cable one way or the other to affect a proper antiskating force. I have found that this is a fairly gross method, which does not allow for fine adjustment. **VPI is now providing an anti-skating device, however, our new Vivenda Soundsmith Anti-skating device (available soon) allows for easier adjustment, as well as allowing the arm to once again be easily removed, a feature that is well worth having. The other advantage is that the Vivenda device, adjustment for antiskating now FOLLOWS the tone arm, so that multiple arms can again be easily used without having to adjust the antiskating for each arm each time. With the VPI supplied string type antiskating device,** one must appreciate that its use does take some time to get right, as one is working against not only the skating force for the cartridge itself, but the side force from the stiffness of the signal cable as well. I have had some luck using the VPI anti-skating device by adding small brass washers (if needed), sometimes between 3 and 5 of them, to the far small arm that does not have the nylon string attached. I positioned them between the rubber o-rings that they supply to hold them in place and at the proper height - and it allowed me to adjust the force to exactly what was needed. Patience is often required.

The way to start with the VPI arms with EITHER design of anti-skating device is to FIRST INSTALL either type of device, but if using the string type VPI device - DO NOT HOOK UP THE NYLON WIRE FROM THE ARM TO THE ANTISKATING DEVICE. Then, PLUG IN the tone arm wire WITHOUT twisting it. If the tone arm skates INWARDS as described above in the antiskating directions, then you are OK. If it moves OUTWARDS, you can try to twist the tone arm till it moves inwards. You MAY have to actually unplug and twist the ARM CABLE WIRE, (PLUG IT BACK IN EACH TIME) till the stylus tracks INWARDS AT ANY SPEED on the RECORD surface near the end lead out groove.

What you may find in fact is that with the signal cable twisted one way, the stylus skates outwardly FAST, and with one more twist, now skates inwardly fast. In any event, INWARDS is your (gross) setting point. You want to find the point where the twisting JUST gets the arm to skate inward.

THEN - HOOK UP THE ANTISKATING NYLON WIRE (or adjust the Vivenda Soundsmith device) AND add JUST enough Anti-skating to slow it down to the desired rate as described above. Using one or more washers (if needed) on the far arm of the device will ADD antiskating (and slow down the arms inward speed) as will hooking the nylon wire higher up on the other arm. MAKE SURE that you position the angle (CW or CCW looking DOWN at the device) so that it will NOT flip over to the right when you are at the end of the record..... PATIENCE.....PATIENCE....