WallyZenith v2.0 Instructions

The WallyZenith allows you to ensure the left and right contact edges of your elliptical or fine-line contact stylus are properly aligned with the groove walls, avoiding one channel read slightly ahead of the other in time. Stylus/cantilever assembly manufacturers typically have a +/- 5° tolerance error for zenith alignment but WAM Engineering has seen as much as 17.5° zenith error in even the most expensive cartridges. In most all cases, the cartridge manufacturer has no idea how well the stylus has been aligned to the cantilever by their vendor due to the expense and difficulty of viewing and measuring zenith error with laboratory microscopes.

You can use the WallyZenith when you know what your stylus/cantilever zenith error following analysis of your cartridge by WAM Engineering or you may use the WallyZenith to make the corrective alignment by ear.

PREPARATION FOR ALIGNMENT PROCESS

Ensure your cartridge remains safe by rolling back your sleeves or removing any garments with hanging sleeves. Remove hanging necklaces, lanyards, etc. from around the neck that could get caught on the tonearm or cartridge. Have plenty of lighting on the platter area. Turn off your system to protect the speakers.

Set overhang using the WallyTractor before using the WallyZenith.

With VTF set properly and anti-skating mechanism set to zero, use the WallySkater to measure for any horizontal forces within the tonearm. If the reading is more than 5%, contact WallyTools to discuss the situation as such forces will cause misalignment of the cantilever unless certain measures are taken.

INSTRUCTIONS

1. **Secure turntable platter with tape or small wedges so platter does not rotate**
2. **Disengage the anti-skating device on the tonearm (or adjust to zero)**
3. **Set the Vertical Tracking Force (VTF) to your desired amount. Always make this measurement with stylus AT RECORD HEIGHT and stay within the cartridge manufacturer recommended VTF range.**
4. **Place the WallyZenith on the turntable platter**
5. **Practice eliminating *parallax error* before moving to the next step. Refer to Figure 1 below for an illustration of the following:**
    a. **Lift the arm and place in arm rest.**
    b. **Find any one of the small triple parallel line sets that intersect the line radiating from the center to the edge of the WallyZenith and spin the WallyZenith so the triple lines are pointing right at you.**
    c. **Using the magnifying glass on one of these parallel triple line sets, notice the lines have reflections in the mirror. Move your head left-right**

so you can see these reflections move relative to the lines themselves. When you see ONLY 3 parallel lines (i.e., no reflections of lines which make it appear to be 6 lines) then you have the perfect location of your eye with respect to the lines (no parallax error). This will be very important in the alignment of the cantilever.

6. Identify your alignment set
    a. If your cartridge has been analyzed by WAM Engineering, identify your prescribed WallyZenith alignment at the bottom of the cartridge analysis report.
    b. If you plan to LISTEN for your ideal zenith correction, align your cantilever using the WallyTractor as your starting point and follow the SUBJECTIVE ASSESSMENT PROCESS FOR ZENITH CORRECTION section below
7. Choose either the Loefgren or Baerwald alignment
    a. It is very important to remain consistent with the choice of overhang alignment you made when using the WallyTractor
8. Move the arm/cartridge to position 1 of your selected radial line, selecting the set of 3 parallel lines which correspond to your alignment selection (Baerwald or Loefgren). Rotate the WallyZenith so that the stylus falls at the groove intersection of the center line of the 3 parallel lines and the radial line running from the spindle to the edge of the WallyZenith.
    a. Using the magnifying glass, see if the cantilever is exactly parallel and collinear to the center line. No reflections/parallax error should be visible, as per the practice step immediately above. Move your eye/magnifying glass a little left and right to assure what you are seeing is accurate. The cantilever MUST be located such that it appears to be an extension of the center line. See Figure 2 below.
    b. If the cantilever is not exactly parallel with the center line, loosen one of the cartridge screws and twist the cartridge accordingly. Set the stylus back into the groove intersection at position 1 and check again with the magnifying glass. Be patient and determined for exactness at this point. The next steps will give you confirmation of your work.
9. Snug down the cartridge screws.
10. Move the arm/cartridge to position 2, selecting the set of 3 parallel lines which correspond to your alignment selection (Baerwald or Loefgren). Rotate the WallyZenith so the stylus falls at the groove intersection of the center line of the triple parallel lines and the straight line running from the spindle to the edge of the WallyZenith. While adjusting your perspective to eliminate parallax error, confirm the cantilever is perfectly parallel to the center of the three lines.

    Only IF you have aligned properly you will be able to see the maximum "Horizontal Tracking Angular Error" PROPERLY. If you did not align well at the points 1 & 2, this step will reveal that.

    About 1° (clockwise - negative) at position 3 (or C) [Fig. 3]
    About 1.8° (counterclockwise – positive) at position 4 (or D) [Fig. 4]

The maximum negative and positive angular error depends on the effective length of your tonearm and accuracy of cartridge installation. This step is very important in that it TRAINS YOU to be sensitive for what 1° of angular error looks like. Many people are very surprised once they develop this sensitivity.

You now have PERFECT horizontal alignment of your stylus/cantilever assembly!

11. **Re-check Vertical Tracking Force (VTF)**
12. **Adjust Anti-skating using the WallySkater.**
13. **If you are not using a WallyTools customized shim for your cartridge, adjust azimuth ELECTRONICALLY. Both the visual inspection of cantilever alignment on vertical plane method and the phase cancelling method are NOT accurate and cannot confirm maximum stereo separation.**
14. **Check the horizontal alignment of your cantilever every 3-6 months. The reason for this is the break-in of the stylus/cantilever suspension and aging of the damping polymers. Such break-in and aging can cause some degree of drift in the stylus/cantilever location.**

SUBJECTIVE ASSESSMENT PROCESS FOR ZENITH CORRECTION – AN OVERVIEW

The best evaluation conditions for the correction of zenith error are performed under these guidelines:

- **Zenith error correction by ear MUST be the last step in the setup process because it is a multivariate test that will be significantly influenced by other setup parameters. As per the WAM Engineering video titled, "Setup Optimization Overview" take the following sequence of steps before beginning zenith error correction:**
  - **SRA and VTA optimization (using microscopy)**
  - **Overhang**
  - **VTF & Anti-skating**
  - **Azimuth**
- **Use ONLY 33rpm records (very important). We recommend using Analogue Productions AAPJ 4418 (33rpm ONLY) Duke Ellington - Masterpieces By Ellington (Mono) as we have analyzed this record in the lab and can confirm it has less than 0.5° cutting zenith error so it can be trusted as an evaluation record.**
  - **We have seen other records with as much as 5° cutting zenith error so if you choose to use a different record for this process, pull out a couple other records to compare whether they agree with each other with respect to the results offered by this evaluation process.**
- **Choose musical tracks within +/- 5mm of the INNERMOST null point (66mm radius for Baerwald & 70mm for Loefgren; use WallyTractor's pivot to spindle ruler and "nipple" end of the ruler jig for this measurement)**
- **Use music that throws a large soundstage with excellent imaging and plenty of high frequency content. Well-recorded classical symphonic music is very good for this. Select up to three records with different content for this effort.**

- **TIP: Keep the headshell screws snug, not tight. When you rotate the cartridge in the headshell, loosen only one screw. This will allow the cartridge body to revolve around the "snug" screw as the rotational axis.**
    - **When rotating the cartridge in the SAME DIRECTION as the previous rotation, ALTERNATE the screw loosened.**
    - **If you need to revolve the cartridge in the OPPOSITE direction from the last rotational adjustment, revolve around the SAME SCREW as before.**
    - **This alternating approach of choosing a screw around which the cartridge is revolved will help keep your overhang from changing too much.**

ZENITH ERROR CORRECTION - SUBJECTIVE ASSESSMENT STEPS

A. Play your selected musical tracks, listening intently to
   a. The sense of overall clarity of the music
   b. The "focus" with which you can "see" the musical performers in space and the separation of instruments in the sound field
   c. The overall sense of musical flow and naturalness

B. Remove record, immobilize platter with tape or wedge between platter and plinth, put WallyZenith on platter, DISENGAGE ANTI-SKATING COMPLETELY and re-align the cantilever to the +1.0 radial line starting at step 7 above

C. Maintain a written log of which radial line was last used in order to stay organized through this process.

D. RE-ENGAGE ANTI-SKATING and listen again to the sonic characteristics mentioned in Step A above.
   a. If the performance improves or you are uncertain of whether there is an improvement, add another degree of zenith correction by re-aligning at the +2.0 line and listen again. (see footnote 1 below)
   b. If the sound has deteriorated, re-align at the -1.0 line and listen again,
   c. Pay close attention to the disengagement and re-engagement of anti-skating

E. Keep changing the zenith error correction in 1 degree increments until such point that the increased improvements eventually become a deterioration in the performance. At this point, head back in the opposite direction in 0.5 degree increments. You should expect to hear it improve and then, within about 1.5 degrees or less of total "fine correction" alignment efforts you will hear a deterioration again. Re-align at the alignment set with the best possible performance.

F. Different records can be cut with varying cutting zenith error. For this reason, you might fine tune your results by dialing in using other records. Since engineers can err with equal likelihood in a counterclockwise vs clockwise fashion, aiming for the MEAN gives you the best chance of getting the most out of all of your records. You accomplish this by checking your work using multiple records.

G. Document the radial line at which you landed so you can repeat the alignment in the future should you ever move the cartridge to another tonearm.

H. If this process becomes too tedious or you remain uncertain about your results, consider sending your cartridge to WAM Engineering for analysis.

ILLUSTRATIONS

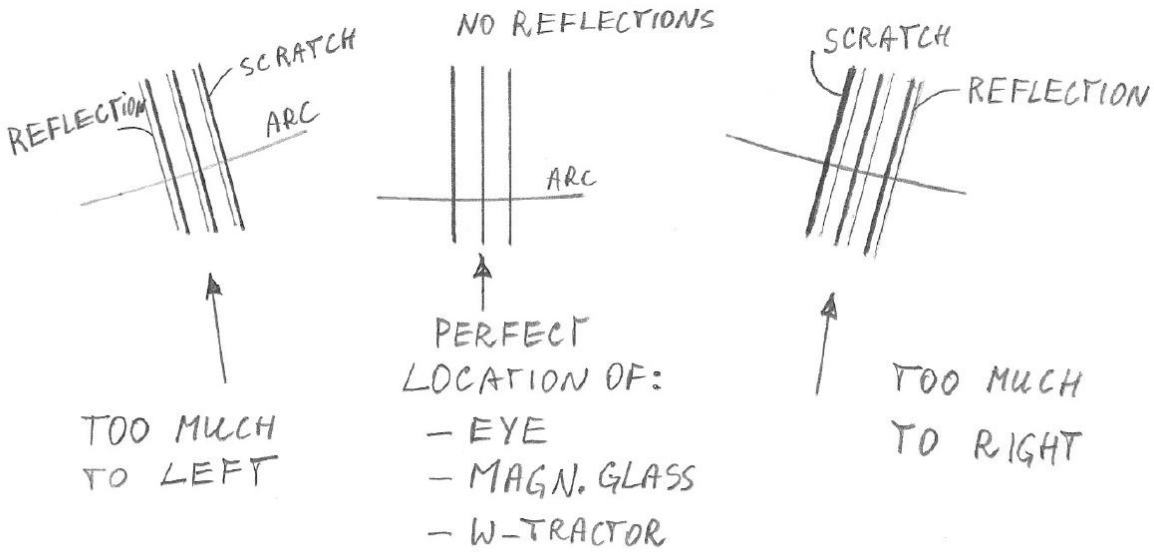


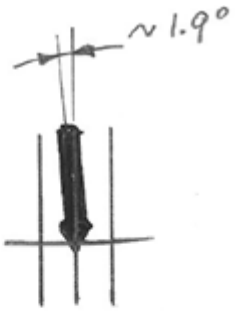
Fig. 1

POSITION: 1 or 2

Fig. 2

POSITION: 3

Fig. 3



POSITION: 4

Fig. 4

ENJOY ANALOG FOREVER!!! - ***Wally Malewicz***

wallyanalog.com / wallyanalogtools@gmail.com