Analogmagik Colum
（アナログマジック上欄の注釈）

Home
The Analog Magik Cartridge Calibration Software is designed to facilitate ease of use. Select the required function located on the right side of the Home Page and perform the displayed instructions to achieve optimal cartridge setup.
Prior to performing the desired function, ensure the tonearm/cartridge are correctly aligned using an accurate protractor such as the Acoustic System SMARTractor. Vertical Tracking Force must be set within the factory recommended range.
Connect the phonostage output to the computer soundcard's LINE input and start with the SPEED measurement function.
Typically, setup parameters change when the user adjusts the turntable speed from 33 1/3 rpm to 45 rpm. Analog Magik has provided a 33 1/3 rpm and 45 rpm test LP to facilitate optimal cartridge setup.
Note: test parameters are typically interdependent with each other. The user may be required to repeat specific measurements several times to achieve optimum setup parameters for each measurement function. Meaningful results are limited by equipment quality, as well as inherent vibrations which may interfere with measurements.

Speed
Your Goal: Look for exactly 3150 Hz on both 33 1/3 rpm and 45 rpm.
To achieve the correct turntable speed, play track A3 on the 33 1/3 rpm test LP (3150 Hz test signal), or A2 on the 45rpm test LP. As the test tone is recorded at 3150 Hz, only the correct speed will display the signal as 3150 Hz, with either the 33 1/3 or 45 rpm Test Lp.
With the stylus in the groove, press the program START button. Adjust the turntable speed until the 3150 Hz signal is displayed on the MEASURED FREQUENCY window indicating the correct speed (33 1/3 or 45 rpm).

Azimuth Left
Your Goal: Look for L/R Crosstalk to achieve the highest number, and as close together as possible (within 0.5 dB is possible)

Azimuth refers to the horizontal position of the cartridge when viewed from the front. When azimuth is set incorrectly, Left Channel information will leak to the Right Channel (and vice versa). This is referred to as Crosstalk. There may be a volume imbalance between the Left and Right channel. Optimal azimuth is achieved when the difference between the Left and Right Channel Crosstalk values are as close as possible. Prior to performing Azimuth adjustments, ensure the cartridge is mounted at the zero degree horizontal position on the headshell.

Play track A4 of the 33 rpm test LP (or A3 on 45 rpm) with the Azimuth LEFT function. Record the values displayed on the CROSSTALK (Left --> Right) window. When complete, select the AZIMUTH RIGHT function and repeat, with A5 of the 33 rpm (or A4 of 45 rpm).

Adjust azimuth and repeat the Azimuth Left and Right procedure until the two CROSSTALK values are as close together as possible. Typically (but not always), If L > R rotate Clockwise, if R > L rotate counterclockwise.

A good cartridge can achieve Crosstalk above -30dB, with a difference between L and R as low as -0.5 dB. An average cartridge, around -25 dB with L/R difference around 1 dB. Some cartridges have inherent crosstalk difference of more than 2-3 dB reflecting equipment quality.

Anti-skating, VTF, VTA, and alignment will also affect crosstalk, so if numbers are not meaning, readjust and then repeat measurement.

Azimuth Right

Your Goal: Look for L/R Crosstalk to achieve the highest number, and as close together as possible (within 0.5 dB is possible). If L>R, Rotate Clockwise, if R>L, Rotate Counterclockwise.

Azimuth refers to the horizontal position of the cartridge when viewed from the front. When azimuth is set incorrectly, Left Channel information will leak to the Right Channel (and vice versa). This is referred to as Crosstalk. There may be a volume imbalance between the Left and Right channel. Optimal azimuth is achieved when the difference between the Left and Right Channel Crosstalk values are as close as possible. Prior to performing Azimuth adjustments, ensure the cartridge is mounted at the zero degree horizontal position on the headshell.

Play track A4 of the 33 rpm test LP (or A3 on 45 rpm) with the Azimuth LEFT

function. Record the values displayed on the CROSSTALK (Left --> Right) window. When complete, select the AZIMUTH RIGHT function and repeat, with A5 of the 33 rpm (or A4 of 45 rpm).
Adjust azimuth and repeat the Azimuth Left and Right procedure until the two CROSSTALK values are as close together as possible. Typically (but not always), If L > R rotate Clockwise, if R > L rotate counterclockwise.
A good cartridge can achieve Crosstalk above -30dB, with a difference between L and R as low as -0.5 dB. An average cartridge, around -25 dB with L/R difference around 1 dB. Some cartridges have inherent crosstalk difference of more than 2-3 dB reflecting equipment quality.
Antiskating, VTF, VTA and alignment will also affect crosstalk, so if numbers are not meaning, readjust and then repeat measurement.

VTA
Your Goal: As you adjust VTA, look for as low a number as possible on both L and R channels.
Vertical Tracking Angle (VTA) refers to the angle the cantilever contacts the lp surface. Analog Magik allows the user to measure the actual IMD using the VTA test track. Adjust VTA until Intermodulation Distortion (IMD) registers the lowest number.
Play track A2 on the 33 rpm test LP (A1 on 45rpm) VTA-IMD Test Track and press START after the stylus contacts the LP groove. Record the values displayed on the IMD LEFT and IMD RIGHT window.
Adjust VTA and repeat the measurement procedure. Optimal VTA is achieved when the IMD (Left) and IMD (Right) window displays the lowest set of values.
Note: Observed small nominal differences between the left and right channels are normal.
Measurements are limited by equipment quality and inherent vibrations. Not all cartridges produces meaningful numbers. A good turntable/cartridge will show IMD% of less than 2%, and incremental changes ranges between 0.1 to 0.4% as VTA changes. If net IMD% is above 5%, the inherent level of vibration is too much and results may not be meaningful.

Anti-Skating

Your Goal: Adjust Azimuth until both numbers are equalized or as close together as possible (within 0.1-0.2%)
On pivoted tonearms, there is often an uneven pressure on the stylus as the record move towards the center of the record spindle, this will exert greater force on the inner side of the groove wall (Left Channel) versus the outer side (Right Channel). The tonearm's anti-skating adjustment attempts to balance the pressure by applying a counteracting force.
Play track A6 of the 33 rpm test LP (or A5 on 45 rpm) Antiskating Test Track and press the Start button. The window will display the Total Harmonic Distortion (THD) between the Left and Right channel. Play the entire track and observe the behavior of the THD value. Adjust the Anti-skating value until the THD is as close to equal between left and right channels as possible.
A good reading should have THD% less than 1%, and aim to achieve L/R difference is less than of less than 0.2%. Some tonearms have inherent lateral imbalance exerting more pressure on one side, if that's the case nothing can be done. Typically 12" arms tracking at >1.8g VTF requires no anti-skating.

Loading
Your Goal: Choose the setting which yields the lowest number in dB.
Many Moving Coil Phono stages or Step Up Transformers (SUT) allow the user to adjust the resistive loading to accommodate the manufacturer's recommended level. Typically, manufacturers recommend a level which sounds best to the user which may or may not represent the optimal loading choice. Analog Magik permits the user to determine the optimal loading by observing the frequency response while loading adjustments are performed.
Play track A1 on the 33 rpm test Lp and observe the Frequency Response Flatness value (expressed in dB). Change the phonostage or SUT loading and repeat the measurement. Optimal loading is achieved when the frequency response flatness indicates the lowest value. Therefore choose the setting which yields the smallest number in dB.
Note: Volume level must remain constant on the ART Phono Plus sound card.

Tracking Force

Your Goal: Change VTF, and look for the lowest set of numbers in both 300 Hz and 7kHz test track.

Many cartridge manufacturers specify a specific tracking force value. This value is characterized as a range rather than a fixed value (eg. 1.8g to 2.0g on most cartridges). Typically, no consensus exists among cartridge manufacturers on how to determine an optimal tracking force value other than to "adjust by ear". Analog Magik believes the optimal tracking force is one which yields the lowest possible THD.

Changing VTF will affect the distortion level differently between High Frequencies and Low Frequencies. For example, increasing VTF may cause distortion to go UP in high frequencies and DOWN in low frequencies. Adjust VTF until you achieve the lowest possible set of numbers in both the 7 kHz and the 300 Hz test track. Play track B1 (High Frequency Test Tone), and B2 (Low Frequency Test Tone) on the 33 rpm test LP (B1 B2 on 45 rpm) for this test. Adjust the tracking force to a level in which both the THD% is lowest and closest to each other on both the High Frequency and Low Frequency Test tones.

Measurement is limited by equipment quality and inherent vibrations, not all cartridge will yield meaningful results.

Gain

Your Goal: Choose the gain setting which yields the highest set of numbers in dB.

Many phono stages offer various gain levels to accommodate different cartridges, however, most manufacturers encourage users to choose a gain level best suited to the users ear. Analog Magik believes the optimal gain level is one which yields the highest Signal to Noise Ratio.

Play track B3 on the 33 rpm test LP (B3 on 45rpm), and observe the behavior of the signal to noise ratio. Repeat the measurement using a different gain setting on the user phono stage. If a correlation is observed, chose the gain level which yields the highest Signal to Noise Ratio. Look for the biggest Signal to Noise Ratio.

Note: Volume level must remain constant on the ART Phono Plus sound card.

Vibration

Your Goal: Adjust your setup until you see the lowest possible set of

numbers.
Accurate signal retrieval during vinyl play back is dependent on the reduction of unwanted vibrations influencing turntable functionality. An effective method of qualifying vibrations is to measure the Intermodulation Distortion Level (IMD) between two low frequency signals. IMD is essentially signals not recorded on the LP that are reproduced by the stylus, therefore the lowest IMD% value is desired.
Play track B4 on the 33 rpm test LP and press the START button with the stylus located in the record groove. The IMD% value is a good indication of how much "unwanted" signal is being picked up by the stylus. An optimum setup should yield a value lower than 1.5% to 3%.
Repeat the measurement by performing changes to the turntable, such as transitioning from a direct drive design to a belt drive design, adjusting the suspension tension, changing the isolation device, or changing the turntable location. A lower IMD% value will yield a sonic improvement.

Resonance
Your Goal: Adjust tonearm until PEAK FREQUENCY falls within the range 8 Hz to 12Hz.
When selecting cartridges, the total mass of the tonearm will interact with the cartridge compliance (elasticity) and produce a resonance frequency. Optimal resonance frequency is widely observed to be between 8 and 12 Hz. A resonance frequency outside of this range will degrade playback performance.
Play track B5 on the 33 rpm test LP (B4 on 45rpm), press Start with the stylus located in the record groove and play the entire track. The Peak Frequency window will display the Lateral Resonance Frequency. We have included a Vertical frequency track for reference against the horizontal frequency, but this track will detect a peak frequency only if there is significant resonance detected. Otherwise the number will follow the frequency detected under on the test track.
If the Resonance Frequency is not within the 8 to 12 Hz range, attempt to change the frequency by adjusting the tonearm mass. Often, the frequency is affected by changing the headshell mounting bolt tension or adjusting the counterweight.

AES Wow & Flutter

AES Wow & Flutter is basically speed variations of the turntable, therefore it is desirable to achieve the lowest number. Wow & Flutter can sometimes be reduced by adjusting belt tension, or idler wheel/rim drive tension and distance.

The Audio Engineering Society standard requires the sampling time to be approx. 30 seconds, therefore the Wow & Flutter number will take more than 30 seconds to be displayed.