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PHONOPHILE TONEARM RESONANCE CONTROL KIT

OWNER'S MANUAL

DESIGN CONCEPT

The Tone Arm Resonance Control Kit is designed to:

- Make any tone arm a more stable platform for holding the cartridge steady during large stylus excursions (as in loud bass passages)

- Reduce higher frequency resonances in the headshell and counterweight. This yields significantly better dynamics as well as deeper, cleaner bass and better midrange/treble resolution.

A good-sounding tone arm has to strike a balance between high inertia to resist music-induced stylus forces and low inertia for negligible resistance to the relatively slow cartridge motions needed to track record warps and record eccentricity. Conventional engineering wisdom holds that the "ideal" balance is struck by arms of 7 to 12 grams equivalent mass[1] for high compliance, soft suspension cartridges (i.e. those designed for 1.0 to 1.2 grams downforce) and 15 to 25 grams for high compliance, stiff suspension cartridges (1.8 to 2.5 grams). This "ideal" inertia is based on the widely believed engineering rule-of-thumb that tone arms need to be tuned to a resonant frequency between 7 and 11 hertz[2], a hypothesis that falls apart when tested by ear.

[1] An arm of 10 grams equivalent mass has the same inertia as an idealized arm with no mass except for 10 grams at the headshell.

[2] The 7 to 11 hertz rule is typically rationalized by a need to avoid tone arm resonant frequencies anywhere near the alleged 2 to 3 hertz resonance of typical suspended turntables. Perhaps that may have been true for 1948 suspensions, but the best turntables today are unsuspended or have very highly damped resonances so there's no reason to believe the 7 to 11 rule without careful listening test verification. Defenders of the rule also like to allege that record warps and eccentricity fall in the 2 to 3 hertz region and therefore cause mistracking distortion in arms with low resonant frequencies—a claim that is equally subject to being proven or disproven by listening tests. These tests are badly needed: standard filter theory implies that any strong resonance has audible phase and amplitude distortions 4 to 6 octaves above the resonant frequency; that would mean tone arm resonances of 7 to 11 hertz cause distortions right in the heart of the bass and lower midrange regions. Put another way, there is every reason

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In audio, as in the rest of science, a good test always trumps theory —no matter how elegant or plausible. To test whether today's standard arm inertias are "ideal" or not, we added weights to the headshells of current, widely used arms (and added sufficient counter-balancing weights at the rear of the counterweights). Our test subjects ranged from Stanton and Rega arms at the low end to the world reference 12" ebony Schroeder arm at the high end. Low compliance cartridges tested were Denon, Dynavector, Grado and Koetsu; high compliance cartridges were Soundsmith, Shure and a retipped Denon modified for high compliance. Tests were conducted with both slightly warped and seriously warped LPs.

The results were unequivocal: for every arm and cartridge tested, sound quality improved significantly with the increased headshell and counterweight mass. As expected, bass extension and articulation was clearly better. Unexpectedly, the midrange/treble transparency and detail improved even more markedly. Achieving these excellent results was crucially dependent on the use of brass and the use of point contact mountings for the weights. Throughout the tests, the extra inertia caused no audible warp-related distortion.

INSTALLATION TIPS

1. Bond the small, domed brass weight to the headshell, using a small drop of superglue on each of the weights four tiny mounting pads. Before gluing, clean the mating surfaces with a cotton swab dipped in alcohol. Place the weight so that it does not block the cartridge mounting screws and makes sure that all four mounting pads are clear of any holes in the headshell.

2. Remove the counterweight and, with its rear face up, bond the larger toroidal brass weight to the rear face. Clean the mating surfaces as above.

3. Set vertical tracking force as usual.

4. If later you wish to remove the weights (e.g., to sell the tonearm), simply use acetone or nail polish remover to dissolve the superglue.

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to test whether conventionally designed arms wouldn't sound much better with greater inertias and lower resonant frequencies.

Mapleshade • 871 North Howard Street • Baltimore, MD 21201
410-685-4618 • info@mapleshadestore.com • www.mapleshadestore.com