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NAUTILUS MOVING IRON PHONO CARTRIDGE

rev2

Owner's Manual and Technical Description

Mounting Instructions

The Nautilus has the ability to accept long mounting screws into its body due to the unique design. You do not need to use screws of an exact required length. You must, however, make sure that since the screws first enter the relatively soft threaded composite material before they enter the brass, that they are threaded correctly. They should not bind, or cross thread. If you encounter difficulty inserting the screws while turning, stop immediately and make sure the screws are the proper 2.5mm metric thread, and that you have not started them in at an improper angle.

Supplied with your Nautilus are our EZ-Mount screws made of both nylon and metal, as well as other non magnetic screws of varying lengths. The nylon washers are LOCKING type, and must be threaded onto any screw you use. If you wish to shorten any screw, it is advisable to first install a supplied nut, and after shortening the screws, remove the nut to repair the threads.

Electrical Loading

The Nautilus is designed to be used with a Moving Coil Preamp at about 48 – 54 dB of gain. Some have successfully used the Nautilus with a Moving Magnet preamp, assuming that there is sufficient gain in both the MM preamp stage and the line stage following it.

The MINIMUM RESISTIVE LOADING for the Nautilus is critical. Please look on the bottom of the wooden box for marking as to that value. For current production is it typically 1500 Ohms minimum. Best loading is usually between 1500 Ohms and 3000 Ohms. Bear in mind there is no harm in using a high resistance or typical 47K MM load, but you may experience a somewhat peaked high end. Conversely, loading BELOW 1000 Ohms WILL result rolling off the high end, depending on how low you go. Although this loading value is often done to taste, loading too much below the stated values WILL result in a marked loss of high frequencies, and top end presentation of the cartridge – in other words, it WILL sound dull and lose imaging if you set the load resistance too low.

Capacitive loading may have some effect, but will be minimal. Loading requirements will be determined by your system, and your personal listening preferences.

PLEASE NOTE AGAIN that loading **well below** 1000 Ohms will absolutely result in loss of high frequencies and sonic performance.

Please also note that some designs of “current amplifier” preamp circuits will not allow loading in the range required, causing the Nautilus to sound very dull – basically caused by improper loading, resulting in SEVERE loss of high frequencies.

Unlike other medium output cartridges, the Nautilus is a six sided fully shielded cartridge, and being such, is one of the world’s most hum-free and RF free cartridges. When properly used with shielded cable from your tone-arm, there should be absolutely no hum whatsoever.

Tracking Force

The Nautilus is designed to operate between 1.6 grams and 2.2 grams. Optimal force is usually 1.7 – 1.9 grams, but may be marked on each cartridge box. Higher VTF may be used, but will result in the cartridge eventually “bottoming” on the record. The cartridge is designed such that no damage will occur to the record or cartridge when that happens.

Hookup

Normal color codes are used for hookup: as viewed from the rear of the cartridge in the normal position, RED is top right, White is top left. Grounds are below them, green on the right, blue on the left.

Questions, questions, questions....

How long will my Nautilus last?

All diamond styli last approximately 1000 hours when aligned and used correctly. Soundsmith can re-tip your Nautilus for a fee of \$450 at this time, restoring the diamond to new condition. If the Aluminum cantilever is snapped, it is still possible to rebuild the cartridge. **Unlike many other manufacturers of fine cartridges, you will find that The Soundsmith is very interested in protecting your investment over the long term. Your Nautilus cartridge can always be rebuilt for a modest cost, regardless of any abuse, wear out or failure.**

Adjustments

We have included a few pages on cartridge alignment with your Nautilus, which you are strongly encouraged to read and follow. One of the advantages of the Nautilus its ability to

provide perform reasonably well even without extremely critical alignment, but we strongly advise you do attempt to do so, just as you would carefully balance the tires on your car before expecting any performance from them. It is strongly advisable therefore, to perform cartridge alignments to the best of your ability. Aligning an advanced stylus and cartridge design carefully and correctly will allow you to enjoy its full benefits. While some expensive cartridge designs employ lower cost, less aggressive styli shapes and therefore enjoy the benefit of somewhat easier alignment, they can also suffer at times from less than optimal performance. We made the decision to use one of the best stylus shapes available, to allow those who demand the best performance possible to realize such if careful alignment and record care are employed.

Azimuth

An approximate azimuth setting can be viewed by looking at the front of the cartridge, while it is playing mid-point on a record. By looking at the gap between the metal bottom of the cartridge and the record surface, one should attempt to make this gap even. Back-lighting this can help to visualize this gap. Best azimuth is obtained by obtaining equal channel separation via a test record. Often, quite remarkable channel separation can be achieved with the Nautilus design, and with it, a very high degree of groove tracing with ultra- low jitter IF the azimuth is carefully done. As a result, it is **STRONGLY** suggested that a test record be obtained, and best channel separation be achieved by small changes in the azimuth. You might be surprised at how tiny azimuth adjustments can have a great effect on absolute separation. Separation figures of well over 40dB have been achieved, whereas very small misalignments can reduce that to 30dB.

Stylus Rake Angle – (or VTA)

Normal SRA is achieved when the cartridge, as viewed from the side, should have the top FLAT of the body (headshell) parallel with the surface of the record, and the arm parallel with the record surface. Adjustment of the rear of the arm up or down from that point will affect the high frequency performance, imaging and channel separation.

Some thoughts about the Nautilus design.....

What happens to the energy that is “Stored”?? The energy that goes up the cantilever moves the generating element. If that element can be made small enough, good things happen. But what happens to the energy that goes into the cartridge body?? The Nautilus employs a very unique “Energy Distribution System” to insure that the energy gets into the cartridge body properly, and into the tone arm to be damped. It is one of the features of the Nautilus, and one of the major contributing design efforts towards perfection.

Moving mass

Magnetic cartridges have three elements necessary to generate a voltage; a magnet, coil assemblies, and an “iron” or ferrous component of some shape. The performance of any magnetic cartridge is largely dependent on how little “moving mass” it has; this is both the

mass of the stylus at the end of the cantilever, as well as the total mass of the voltage generating parts that the stylus must move. While there are some advantages to specific designs, both moving magnet and moving coil cartridges are at a distinct disadvantage in regard to moving mass as they are required to move either a relatively large magnet, or a “coil assembly”. The coil assembly in reality is a series of wire windings often on a metal core, more properly labeled as an “armature”.

In a moving iron design, one has the potential to reduce the moving mass to a very small value by virtue of the having the required two relatively massive elements (coils and magnet) held in fixed position.

It is important to understand that while it is true that all designs have trade-offs, a designer must arrange the order of trade-offs carefully. Reducing moving mass is at the top of the list for Soundsmith; less inertia in the generating elements means faster starts and faster stops. It also means a much easier job of damping the unwanted “ringing” of the moving system, a system that must make sudden, accurate and controlled directional changes to follow the modulations of the groove walls of a record.

In order to obtain accurate vinyl reproduction, the stylus must remain in near constant contact with the groove walls. The larger the moving mass, the greater the jittering of the stylus, meaning that it is in reality taking “samples” of the groove walls from moment to moment, and averaging or guessing at what is taking place in between those samples. A “digital” sort of rendering, if you will. Lower mass? Less jitter. Less jitter means more time in contact with the groove, which means detail and micro detail. If a cartridge can’t stay in contact with the groove walls, you can’t hear everything that is on the record. In a very real sense, it’s that simple.

The obvious question, “Why doesn’t everyone make cartridges this way, if reducing the moving mass is an absolute requirement for accuracy?” the answer to that is simple as well. It’s very hard to do so. A properly designed Moving Iron cartridge requires an ultra-high level of precision in manufacturing, and potentially low product yield. It is not the best path for profitability, only sonic ability.

Another advantage of this design is the inherent high level of channel separation. Unlike MC cartridges, a slight rotation of the generating element in The Nautilus (moving iron) due to manufacturing tolerances or aging does not affect the separation at all. Furthermore, unlike moving coil cartridges, our Moving Iron designs CANNOT rotate out of azimuth position from use, or abuse, maintaining the critical azimuth position for the life of the cartridge.

It is our hope that your carefully crafted, hand-made Soundsmith Nautilus cartridge will bring you many years of listening pleasure. The simple fact is, when we sit at a microscope for hours making each one, that is primary in our thoughts.....we hope that each one will bring some joy to the listener.

Peter Ledermann ~ President