



MOVING COIL CARTRIDGE

OWNER'S INFORMATION



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# CE DECLARATION OF CONFORMITY



We declare under our sole responsibility that this product is in conformity with the following standards or standardized documents:

BS EN 60065 in accordance with the regulations 73/23/EEC, 89/336/EEC (from 1 January 1997)

CE 94

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## DISPOSAL

This product must not be disposed of as normal household waste. To prevent possible harm to the environment please separate the product from other waste to ensure that it can be recycled in an environmentally safe manner. Please contact your retailer or the appropriate local government office for collection facilities.

## INTRODUCTION

Thank you for purchasing this Audio Note (UK) product. With the correct care it should give you many years of pleasure and enjoyment.

Please take the time to read all of the information in this manual before connecting your new component to an electrical supply or your system, to ensure both your safety and satisfaction.

Please note that due to our desire to continually improve products, specifications are subject to change without notice. Therefore it is important to refer to the manual that is supplied with your product for the most accurate information; manuals downloaded from our website or obtained from other sources may no longer fully apply to your product.

If you have any questions regarding the information contained within this document or your new component, please feel free to contact us: -

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# IO I MOVING COIL CARTRIDGE

Congratulations on your purchase of the Audio Note (UK) IO I Moving Coil cartridge. It is, without question, one of the finest and most technically significant Moving Coil cartridge available today. No other range of Moving Coil cartridge offers such an unparalleled combination of hitherto unknown performance, information retrieval, dynamic contrast, tonal accuracy and sheer musical enjoyment.

## **Generator Principle**

The moving coil principle was chosen as the basis for the design of the IO range of cartridges, as it offers greater linearity in terms of electrical output from the mechanical movements of the stylus than any other system. We investigated moving iron, moving magnet, strain gauge, electret and electrostatic generators, and even took the unusual step of acquiring a Toshiba cartridge that employed light emitting diodes to generate the signal from the groove, but in the end it was felt that the quality of the moving coil system as described by P. G. A. H. Voigt would yield the best overall results.

## **Mechanical Construction**

To ensure that the stored information on the disc is precisely recovered, it is essential that the mechanical movement of the stylus is accurately translated into an electrical signal. Any extraneous excitations arising as a result of vibrations in the cartridge housing must be eliminated.

Therefore in the design of the Audio Note (UK) cartridges considerable attention has been paid to the rigidity and structural integrity of the body, and to ensuring that the adopted mechanical construction stores the absolute minimum of resonant energy, which will degrade the signal derived from the disc being played.

Mechanical integrity of the cartridge body is an aspect of design that has never been adequately dealt with before, and as a result all other cartridges suffer greatly from colourations derived from internal resonances and/or energy stored in their body assemblies.

To achieve the incredible level of mechanical integrity required for the IO cartridges, all aspects of body design were reexamined, to minimize standing waves and eliminate any resonating air pockets within the assembly.

The benefits of getting the mechanical assembly right would be lost if the complete assembly could not be rigidly mounted in the tonearm, hence the incorporation of the largest possible surface mounting area and the provision of up to six (6!) bolts to secure the cartridge to the head shell.

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## **Magnetic circuit**

Once the mechanical assembly had been perfected the next area to which particular attention was paid was the magnetic circuit.

From numerous tests carried out on a variety of materials and configurations, it was established that different types of magnetic materials exert a subtle influence on the perceived quality of the final sound.

After further extensive research the optimal magnetic circuit was found to be electro magnetically generated. This, however, requires a separate DC power supply and is very costly to implement. This is exactly the system we implemented in our flagship Moving Coil cartridge – the IO Limited – which offers an unparalleled level of performance. However, for the IO I we chose the next best materials; Alnico magnets for the IO II and IO Gold, and for the IO I.

## **Wire Material**

Because of the low impedance and very low output of the IO I, it is essential that the minimum number of electrical connections occur along the wire and that the wire itself is of the highest possible quality. Not surprisingly we chose our custom made Audio Note (UK) 99.99% pure silver wire, and the coil wire extends all the way to the output terminals, avoiding all unnecessary connections.

## **Cantilever, Material and Design**

It is on the design and construction of the cantilever that much of the quality of a cartridge depends. Many materials were investigated, Boron, Beryllium, Sapphire, Diamond and Titanium and all except Titanium were disregarded in the final analysis, due to deficiencies in one or more areas.

It is vitally important for the cantilever and stylus assembly to be as rigid as possible in order to accurately transfer the stylus motion to the coil assembly, without adding any unwanted vibration as a result of flexing or bending.

The optimum cantilever material was found to be an extra thick walled, slightly tapered Titanium tube, the taper being both outside AND inside, since this affords by far the greatest rigidity.

Another advantage provided by this type of material was the possibility of employing a longer cantilever, which greatly reduces cantilever excursions. This has three main benefits: -

- 1) It is easier for the stylus to track complex, highly modulated grooves.
- 2) The resultant smaller coil movement reduces the nonlinearities in the magnetic field, so the field will 'bend' less.
- 3) Damping can be reduced, as it becomes easier to control stylus movement.

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## Damping

As mentioned above, damping of the cantilever is extremely critical. Too much and the cartridge will sound dull, as a large amount of the critical energy from the record will be absorbed in the damper instead of reaching the coils, reducing the efficiency of the energy transfer from the record (as vibrational energy) to the cartridge (as electrical energy).

Conversely, too little damping will make the cantilever prone to uncontrolled excursions, resulting in unwanted distortions and poor tracking.

Much experimentation led to a precision Butyl rubber damper, offering a wide operating temperature range and minimal hysteresis effects. The tension on the damper is furthermore adjustable, allowing very accurate set-up of each cartridge's individual suspension.

## Stylus Choice

Finally the assembly is completed with the use of a solid diamond stylus. A heroic degree of effort has been expended finding the best possible solution to this, the most critical interface with the "plastic". Having been ultimately unsatisfied with the offerings from the various stylus manufacturers around the globe, in 1995 we contracted a company to develop a process which would allow them to cut and polish a perfect, natural octagon to a level of the best surgical instruments used for eye and other fine surgery, on a diamond less than half the size of the closest, readily available option at that time. This remains to the best of our knowledge the finest diamond in use on any cartridge available today.

The improvements over any standard diamonds use in other cartridges can be briefly described as better tracking of high frequencies, lower surface noise, lower record wear, longer stylus life, smaller tip mass and lower tracking force.

The stylus is first 'pinched' into place by the cantilever and then glued, using a single component epoxy resin, which needs 'baking' for about three hours to harden.

## Test Procedure

After assembly, each cartridge is subjected to a series of tests, one of which involves a fast dynamic frequency sweep, at high amplitude; this method shows up any undesirable problems in the cartridge. Special test equipment and test records had to be developed for this process, which is exclusive to Audio Note (UK).

## UNPACKING AND INSTALLATION

Please take care when unpacking your IO I. Choose a clean, clear location to unpack your cartridge. We recommend that you retain and carefully store all of the original packing materials, in case transportation / shipping is required at a later date.

Open the wooden transit box. You will see that the cartridge is mounted on a wooden insert for protection during shipping. The cartridge is supplied with the removable stylus guard installed, and we recommend leaving it in place during the initial installation procedure.

Carefully remove the wooden insert. Underneath, you should find an appropriately sized hex head wrench. Gently hold the cartridge by its side cheeks, and identify the two mounting bolts that secure it to the wooden insert. Carefully remove the two mounting bolts, and once removed, retain these as they can be used to attach the IO I to your tonearm heashell.

Once the cartridge, mounting bolts and wrench have been removed, place the transit box and insert to one side. Once installation has been completed, return the wrench to the box and store safely for later use.

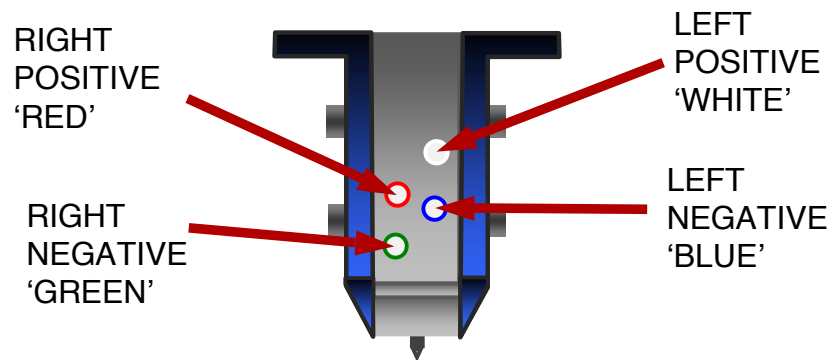
You are now ready to mount your IO I in your tonearm's head-shell.





## IO | INSTALLATION

It is often easier to connect the tonearm wires to the connection pins located at the rear of the cartridge body before it is mounted in the head-shell. The pins are colour coded according to the International Standard Colour Code. Connect the four tonearm wires to the corresponding cartridge pins: -



**UNDER NO CIRCUMSTANCES SHOULD THE HEAD-SHELL WIRES BE SOLDERED DIRECTLY TO THE CONNECTION PINS OF THE CARTRIDGE BODY. HEAT APPLIED TO THE CONNECTION PINS WILL CAUSE IRREPARABLE DAMAGE.**

## IO I INSTALLATION continued...

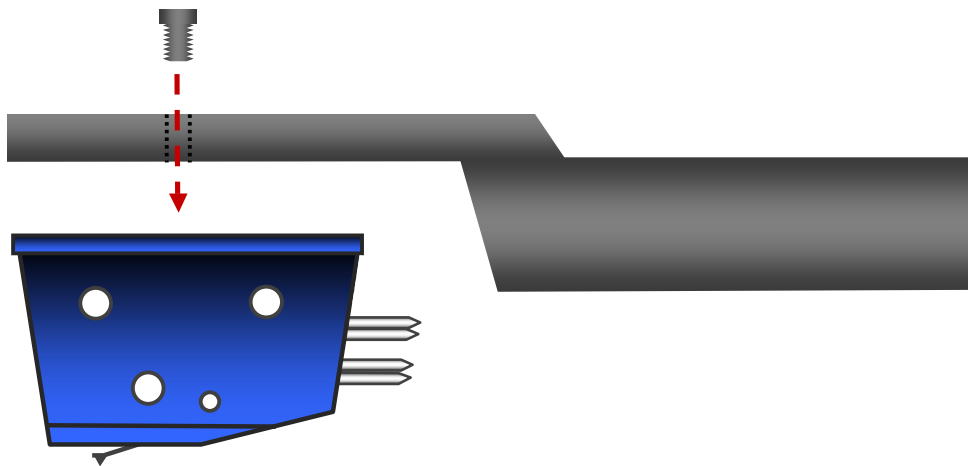
The cartridge body is equipped with mounting holes in the top surface to accept the supplied mounting bolts. They are spaced 12.7mm apart, (across the width of the cartridge body) which is the industry standard distance. Additionally, the IO I has six mounting holes – three per side – rather than the conventional two; this is to provide the most rigid and secure coupling possible between cartridge and headshell.

A pair of high quality hex head bolts and nuts, and an appropriately sized wrench are provided for mounting the cartridge body to the head-shell.

Pass the bolts down (from above) through the mounting holes in the head-shell, and align them with the holes in the top surface of the cartridge body.

Carefully align the nuts below each bolt, and tighten them gently to hold the cartridge securely in place.

Do not fully tighten the bolts until all cartridge alignment procedures have been completed. (Once all alignment has been finalized, an extra four fixing bolts and nuts may be installed if you wish, to maximize the rigidity of the cartridge / headshell interface. Please remember to readjust the tracking weight!).



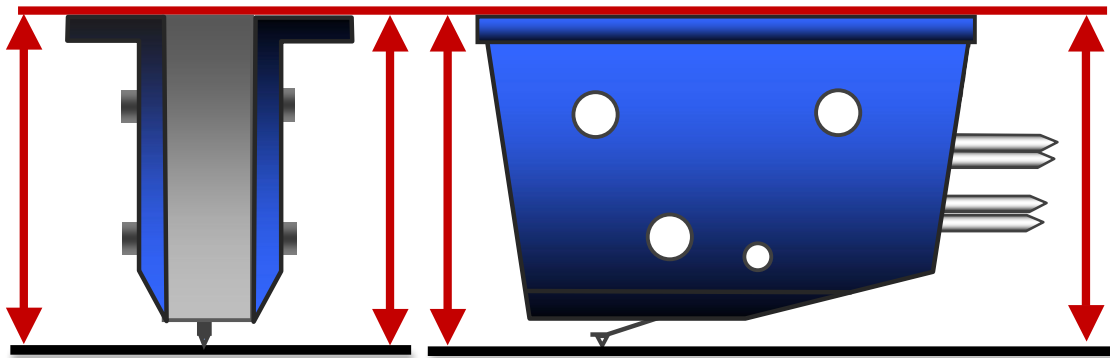
Once the cartridge is in place, set the correct tracking weight. Do this BEFORE the final adjustments are made for cartridge alignment, as this will help to ensure the cantilever is not damaged due to excessive tracking force. Once final alignment adjustments have been made, it will be necessary to check the tracking weight again, as any movement of the cartridge body will change the tracking weight.

The optimum tracking weight for the IO I is **2.5g**. Remember to remove the clear acrylic stylus guard before setting the tracking weight!

## IO I INSTALLATION continued...

To achieve correct cartridge alignment, it will be necessary to use the alignment protractor provided with your tonearm. If in doubt, contact your tonearm manufacturer, or contact your Audio Note (UK) dealer, who will be able to advise you.

It is also important to make sure that the top surface of the cartridge is mounted parallel to the surface of the record, when viewed from the front and side. These adjustments – referred to as Azimuth and Stylus Rake Angle – will have a noticeable effect on tonal and channel balance, and every effort should be made to accurately adjust these settings.



**TOP SURFACE OF CARTRIDGE BODY SHOULD BE PARALLEL WITH RECORD SURFACE, WHEN VIEWED FROM THE FRONT AND SIDE.**

Once the final cartridge alignment adjustments have been completed, check the tracking weight again, to ensure that it is correctly set at **2.5g**.

You are now ready to enjoy your record collection!

# CLEANING AND SERVICING

## **Cleaning**

The IO I requires no special maintenance or cleaning.

**UNDER NO CIRCUMSTANCES SHOULD ANY LIQUID OR SOLVENT-BASED CLEANING SOLUTIONS BE APPLIED TO THE DIAMOND OR CANTILEVER. DAMAGE CAUSED TO THE CARTRIDGE BY THE USE OF LIQUID BASED CLEANING SOLUTIONS WILL NOT BE COVERED UNDER WARRANTY.**

Build up of dust or fluff can be gently blown away, and only in very extreme circumstances should a small, soft artist's brush be used to clean the diamond or cantilever, moving the brush, slowly, gently and extremely carefully from back to front, never in the opposite direction or from side to side.

## **Cartridge Life**

The operational life of a cartridge can be affected by a variety of factors, such as frequency of use, ambient temperature, humidity, quality of vinyl being played etc. Our approximate estimates for the lifespan of the IO I is within the region of 1000 to 3000 hours, depending on and not limited to the factors mentioned above.

## **Rebuilding**

We offer a very affordable rebuilding service for all Audio Note IO cartridges, should they become damaged or if they have reached the end of their operational life. If you wish to have your IO I rebuilt or retipped, please contact us directly: -

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e-mail: [info@audionote.co.uk](mailto:info@audionote.co.uk)

## TECHNICAL SPECIFICATIONS

<b>OUTPUT VOLTAGE</b>	0.04mV / 5cm / sec
<b>INTERNAL IMPEDANCE</b>	1 Ohm
<b>MATCHING IMPEDANCE</b>	3 – 4 Ohms
<b>FREQUENCY RANGE</b>	10 – 50KHz, +/- 2dB (dynamic test)
<b>SEPARATION</b>	Greater than 30dB at 1KHz
<b>COMPLIANCE (TYPICAL)</b>	Horizontal 10 Vertical 15
<b>WEIGHT</b>	11g
<b>STYLUS PRESSURE</b>	2 – 3g 2.5g optimal
<b>CANTILEVER</b>	Titanium
<b>STYLUS</b>	AN Type 2 Diamond
<b>NOTE</b>	Due to Audio Note (UK)'s ongoing research and development program, specifications are subject to change without notice.

## WARRANTY INFORMATION

Audio Note (UK) warrants this product to be free from defects in materials and workmanship for two years from the original date of purchase from an appointed Audio Note (UK) dealer, and agrees to cover the cost of parts and associated labour required to correct such defects, subject to terms & conditions.

This Warranty is offered to the first purchaser only.

Any valves supplied with the unit are warranted for three months from the original date of purchase.

If the product fails in normal domestic use and during the Warranty period due to the above described faults or defects, Audio Note (UK) will, at its discretion, repair or replace the item free of charge within a reasonable time once it has been returned to Audio Note (UK) or an appointed Audio Note (UK) dealer or service engineer.

Audio Note (UK) is not liable for any shipping charges incurred whilst transporting the product to or from Audio Note (UK) or an appointed Audio Note (UK) dealer or service engineer, should the item require service or repair during or after the Warranty period.

If the product must be shipped, please use the original packaging materials and include a copy of the original sales receipt along with a note explaining, in as much detail as possible, the problems you are experiencing with the unit.

**Only use a reputable Courier Service or Shipping Agent, and ensure that your product is insured during transit.**

**Any servicing, repairs or modifications not authorized by Audio Note (UK), or carried out by persons other than appointed Audio Note (UK) service engineers will invalidate any warranty.**

This Warranty does NOT cover: -

Damage sustained whilst in the possession of a shipping agent, retailer or consumer and not caused as a direct result of defects in materials or workmanship.

Damage caused by normal wear and tear.

Damage or defects caused by abnormal or unreasonable use.

Damage caused by accident, acts of nature, misuse or neglect.

Damage caused by a failure to follow the operating and installation instructions supplied with the product.

Damage caused by improper or careless cleaning.

Audio Note (UK) reserves the right to refuse warranty for any component of which the serial number has been removed, defaced or tampered with.

## CONTACT INFORMATION

If in the future your Audio Note (UK) product requires servicing, or if you require technical support or have any questions regarding this or any of our other products, please contact your local Audio Note (UK) dealer.

Alternatively, please feel free to contact us directly: -

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