audio-technica®

DUAL MAGNET™ PHONOGRAPH CARTRIDGES

INTRODUCTION

Your new Audio-Technica cartridge is a significant achievement in precision manufacturing. Completely hand assembled, tolerances are held to just thousandths of an inch. Audio-Technica has specialized in precision transducers for over a decade, building an international reputation for accuracy and uniformity. The Dual Magnet Series of phono cartridges is the latest refinement of this tradition of craftsmanship and advanced design.

PRINCIPLES OF OPERATION

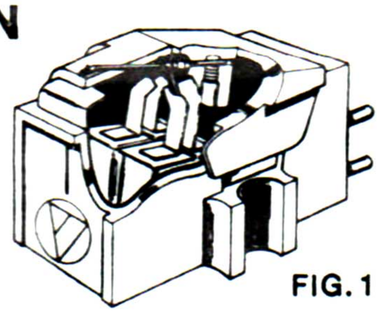


FIG. 1

A primary reason for the outstanding performance of Audio-Technica cartridges is their unique method of translating the motion of the stylus tip into two electrical signals. Unlike all other stereo cartridges, Audio-Technica models employ two independent permanent magnets mounted at 45 degree angles, perpendicular to the two sides of the record groove. With its associated pole pieces and electrical coils, each magnet becomes an electrical generator reproducing only the signal from one side of the record groove, thus maximizing stereo separation.

When only one channel is reproduced, only the magnet for that channel must be moved by the stylus. Because each magnet in the Dual Magnet design is smaller than that of a conventional single magnet cartridge, the effective mass moved by each groove wall is significantly reduced. The magnets, which are still the heaviest part of the moving system, are mounted near the fulcrum or pivot point of the stylus assembly. As a result of these design features, the stylus is not required to move excessive mass, and is free to respond quickly and accurately to the motion of the record groove. In addition to enhancing response, the extremely low effective tip mass reduces the force applied to the delicate vinyl groove and reduces the possibility of groove wall wear and damage.

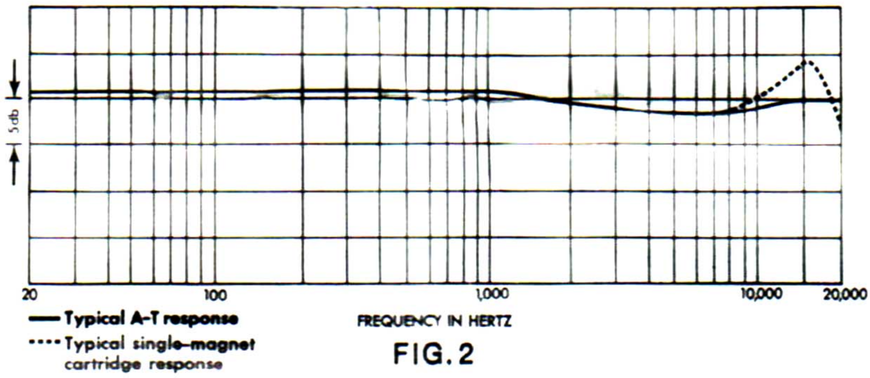


FIG. 2

PRELIMINARY INSTALLATION

Before mounting the cartridge, the stylus assembly should be removed for safekeeping. Hold the cartridge in one hand, grasp the plastic needle housing with thumb and forefinger, and pull directly away from the cartridge. The stylus assembly comes away at a slight rearward angle, as indicated by the arrow in Figure 3. Place the stylus assembly out of harm's way until installation is completed.

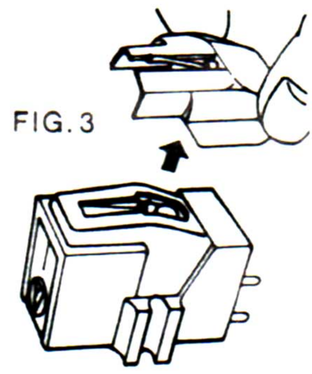


FIG. 3

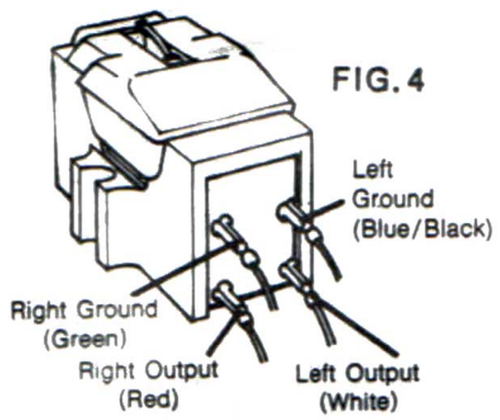
Using the mounting hardware supplied either with the cartridge or with the turntable, mount the cartridge according to the recommendations of the turntable manufacturer. Hardware should be tightened down slightly, so that the cartridge position does

not change, but avoid excessive force which may strip plastic threads or warp delicate parts out of position. After the cartridge is mounted, replace the stylus assembly briefly. The stylus assembly should click into place when fully seated on the cartridge. Check visually to make sure that there is no mechanical interference with mounting hardware. Again remove the stylus assembly for safekeeping until electrical connections are completed.

ELECTRICAL CONNECTIONS

Four terminals are provided at the rear of the cartridge — an output and ground connection for each stereo channel. For proper performance of your system, the correct wiring must be carried through to the amplifier inputs. Connect the turntable wiring to the cartridge, observing the lead designation furnished with the turntable. The cartridge pins are color coded, using a well-established standard in the turntable industry. DO NOT SOLDER TO THE CARTRIDGE TERMINALS. USE SLIP-ON LUGS TO WHICH TONE ARM WIRES HAVE BEEN SOLDERED BEFORE PLACING ON CARTRIDGE TERMINALS. Heat applied directly to the cartridge terminals will damage the internal cartridge connections.

FIG. 4



For monaural operation, the left and right signal terminals should be connected to the monaural signal lead, and the left and right ground terminals should be connected to the ground lead. With these connections, vertical output from the cartridge is cancelled, thus reducing record noise which is primarily in the vertical direction.

FINAL INSTALLATION

Re-install stylus assembly. Following the procedure recommended by the turntable or tone arm manufacturer, carefully set tracking force within the appropriate range shown in the specification table. This is a critical adjustment, since tracking force higher or lower than recommended, will result in increased distortion and decreased record life. Similarly, the tone arm's adjustments, if any, for stylus overhang and anti-skating must be set properly if maximum benefit is to be obtained from your cartridge. Anti-skate setting for Shibata models should be 1.2 times standard elliptical value, or as indicated on your turntable.

After all tone arm adjustments have been made, the stylus may remain installed in the cartridge. However, the plastic stylus guard should be used to protect against accidental damage, as at any time when the turntable is not in use.

CONNECTION TO SYSTEM

Once the cartridge is properly installed in the tone arm, the turntable may be connected to the rest of the music system. Normally, two shielded audio cables are run from the cartridge connections on the bottom of the turntable to the magnetic phono inputs on the amplifier or receiver. Make sure to observe left and right channel markings. As with any low level magnetic device, extremely long cables (10 ft. or more) should not be used because of signal loss and possible hum pickup.

In addition, a separate ground wire is required between the chassis of the turntable and the electronics chassis to prevent hum. Usually this ground wire comes attached to the turntable, ready to connect to a ground screw found on the connection panel of most electronics.

One of the most common problems encountered in system hookup is hum from the phonograph input. Usually this can be traced to a bad audio cable connecting the turntable to the amplifier, or the absence of the separate ground wire mentioned above. The instructions furnished with most turntables cover the method of connection in detail.

Another problem sometimes encountered during initial system setup is distorted or unbalanced sound from the two phono channels. Usually this can be traced to a mix-up of wires in the turntable. Wires at the cartridge terminals might be interchanged, or slightly touching together. Be certain the cartridge wiring is exactly as shown in the connection drawing, Figure 4.

OPERATING SUGGESTIONS

Audio-Technica cartridges provide the highest levels of performance available, but are also susceptible to damage if handled improperly. If a few simple precautions are observed, your cartridge will provide excellent service for many years.

Most stylus damage is caused by rough treatment while the tone arm is being operated by hand. A finger used to lift or set down the tone arm should always be placed **under** the tone arm finger lift, never over it. This prevents pressing down on the tone arm, which is likely to put excessive force on the stylus assembly.

The stylus should be set gently on the record, never dropped. A damped cueing device which lowers the tone arm gently to the record is found on many record changers. Model AT6005 Pneumatic Lift is also available from your dealer separately as an accessory. Use of such a device adds an extra measure of safety for your cartridge and records.

Another common cause of stylus damage occurs when cleaning or dusting the turntable area. Keep the plastic stylus guard in place when not using the turntable. The dust covers made for most turntables represent a good investment not only in keeping the turntable clean, but in preventing this kind of stylus damage.

Another practice common with stiffer and therefore more rugged low-performance cartridges is cleaning the stylus with a finger. While this practice may be safe enough with low performance cartridges, it may well spell disaster to a delicate, high performance stylus. Best results can be obtained with regular use of an AT607 Stylus Cleaner, available from your dealer. The stylus should be cleaned with a **rear to front motion** of the brush, never front to rear and never side to side. An accumulation of dirt on the stylus indicates that the records themselves are dirty, a condition which will shorten record life and reduce the potential performance of your cartridge.

Keep records stored vertically in their jackets except when being played, and clean each side of the record just before it is played. You'll be amazed at how much better a clean record sounds, and how much longer it lasts. Your dealer offers several Audio-Technica record care products. Used regularly, any of them will insure more musical pleasure from every record you own.

REPLACEMENT STYLI

Audio-Technica grain-oriented diamond styli are carefully selected and polished for minimum wear to themselves and to your records. However, after an extended period of play, even the finest diamond stylus becomes worn. For this reason, it is best to have the stylus inspected annually, or whenever it appears that wear or damage may be a problem. The dealer from whom you purchased this cartridge is equipped and competent to inspect and evaluate the stylus.

Should a replacement stylus be required, accept only a genuine Audio-Technica replacement stylus. Only genuine Audio-Technica styli with the genuine A-T circle monogram, as on your original stylus, will provide the same level of performance found in the original cartridge stylus.

AUDIO-TECHNICA U.S., INC.
33 Shiawassee Avenue, Fairlawn, Ohio 44313

Form No. 0101F

Printed in Japan

SPECIFICATIONS	AT10	AT11	AT11E	AT12E	AT12XE	AT12Sa	AT13Ea
Generating Element	Dual moving magnet						
Frequency Response (Hz)	20-20,000	15-22,000	15-25,000	15-26,000	15-28,000	15-45,000	10-30,000
Output (at 5 cm/sec.) (mV)	4.8	4.8	4.8	4.2	4.2	2.7	4.2
Chan. Sep. (dB 1 kHz/10kMz)	25/15	26/16	26/17	27/18	28/19	30/20	29/20
Channel Balance (dB)	2.0	1.5	1.5	1.5	1.5	1.0	1.0
Stylus Tip Size (mils)	.7	.7	.4 x .7 Elliptical	.4 x .7 Elliptical	.3 x .7 Nude Elliptical	Bonded Shibata	.2 x .7 Nude Elliptical
Stylus Assembly Color	Red	Yellow	Green	Blue	Caramel	Ivory	Orange
Tracking Force (grams)	2 to 3	1½ to 2½	1½ to 2½	1 to 2	1 to 1¾	¾ to 1¾	¾ to 1¾
Vertical Tracking Angle†	20°	20°	20°	20°	20°	20°	20°
Load Impedance (ohms)	47,000	47,000	47,000	47,000	47,000	47,000	47,000
Cartridge Inductance (mH)	1000	1000	1000	1000	1000	450	1000
DC Resistance (ohms)	1200	1200	1200	1200	1200	500	1200
Terminals (diameter)	.050"						
Dimensions	5/8" x 1 9/64" x 11/16"						11/16" x 1 3/16" x 11/16"
Mounting	½" centers						
Cartridge Weight (grams)	5.5	5.5	5.5	5.5	5.5	5.5	5.8
Replacement Stylus	ATS10	ATS11	ATS11E	ATS12	ATN12XE	ATN12S	ATN13

†20° is new IEC/DIN standard. Specifications stated above have been measured using the following test equipment: B&K 2305 Graphic Level Recorder; B&K 4416 Response Test Set; B&K 2113 Measuring Amplifiers; JVC TR1007 Sweep Frequency Test Record; A-T 6605 Spot Frequency Test Record and AT-1009 Tone Arm. In the interest of industry standardization, full details of the test set-up, equipment adjustment, and procedure are available on request.

FULL ONE YEAR WARRANTY Audio-Technica Dual Magnet cartridges and styli purchased in the U.S.A. are warranted for one year from date of purchase by Audio-Technica U.S., Inc., to be free of defects in materials and workmanship. In the event of such defect, product will be repaired promptly without charge or, at our option, replaced with a new product of equal or superior value if delivered to Audio-Technica U.S., Inc. prepaid. If satisfactory repair or replacement cannot be made, purchase price will be refunded upon substantiation of purchase price and date. Warranty excludes normal stylus wear, failure due to abuse, or operation outside specified ratings. Consequential damages are excluded. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. For instructions on return for repair of Audio-Technica products, whether in or out of warranty, please write Service Department, Audio-Technica U.S., Inc., 33 Shiawassee Avenue, Fairlawn, Ohio 44313.

Audio-Technica Dual Magnet cartridges are protected by the following patents: United States Nos. 3,720,796 and 3,761,647; England Nos. 1,232,210 and 1,283,404; France No. 6,928,056; Canada Nos. 856,351 and 909,683; Switzerland Nos. 478,502 and 505,437; Sweden No. 347,636; West Germany Nos. 1,772,685 and 1,941,569. Shibata Stylus U. S. Patent No. 3,774,918.