

Audio Technica

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ATP Series Stereo Phono Cartridges

circa 1977

INTRODUCTION

Audio-Technica ATP Series cartridges were developed to meet the specific needs of professional record playing. Careful study of the problems of radio and TV studios, portable and fixed disco installations, theaters, libraries, and similar applications was the first step in creation of this new series.

Special attention was paid to ruggedness and ease of use. The ATP Series cartridges use a rigid, tapered tube for the stylus cantilever, specially strengthened so that records can be safely "back-cued" without harm. A high visibility paint dot on the stylus tip eases cueing, even in poor light. Each cartridge is designed to track at the practical pressures preferred for most professional tone arms.

But underlying each ATP Series cartridge is the Dual Magnet design that insures smooth, peak-free response, excellent stereo separation, and uncommonly low distortion. Rather than having both stereo channels share a single magnet, ATP cartridges use two tiny magnets whose location mirrors the construction of a modern stereo record cutter head. The magnetic system for each channel is isolated, with separate coils, pole pieces, and magnets for each side. Each ATP Series cartridge is also carefully polarized to insure correct stereo imaging and eliminate mono dropouts.

Each ATP cartridge is also 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, including microphones, headphones, and phono cartridges for well over a decade. In that time the tradition of craftsmanship and advanced design has built an international reputation for uniformity and accuracy.

Foremost among performance improvements found in the Audio-Technica cartridge is frequency response. Figure 1 indicates typical frequency response of an ATP Series Dual Magnet cartridge. Also shown is the actual response curve of a high priced, highly regarded cartridge. Note the substantial

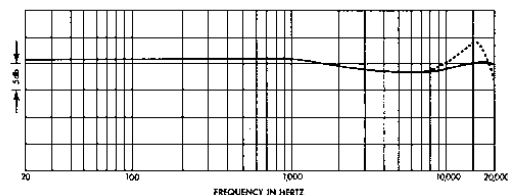


FIG. 1 ——— Typical A-T response Typical single-magnet cartridge response

peak at about 20,000 Hz in the high priced cartridge, followed by a rapid drop-off in high frequency response — a characteristic which has become widely accepted as part of conventional magnetic cartridge performance. Compare the actual ATP response curve which exhibits a flatness and smoothness of response more like that of a good amplifier. The sound which results from such a smooth curve is natural and uncolored, without the high frequency harshness which results from peaky response. A major side benefit of smooth high frequency performance is decreased groove wear.

PRELIMINARY INSTALLATION

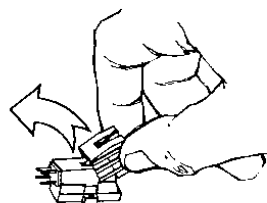


FIG. 2

Before mounting the cartridge, the stylus assembly should be removed for safekeeping. Hold the cartridge in one hand, grasp the plastic stylus assembly with thumb and forefinger, and gently rotate front end away from cartridge body as shown in Figure 1. Place the stylus assembly out of harm's way until installation is complete. Use the clear plastic stylus guard to protect the stylus tip.

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. 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. Hook the back of the stylus assembly to the bottom of the cartridge body, then rotate up until the assembly fits flush with the front and top of the cartridge body. Check visually to make certain 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 phono inputs. Connect the turntable wiring to the cartridge, observing the lead designation furnished with the turntable. The cartridge pins are coded "L" and "R" for the left and right channels respectively. The "+" and "R" for the left and right channels respectively. The "+" terminals are the output terminals (at the top) while the bottom terminals are ground connections. 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 internal cartridge connections and void your warranty.

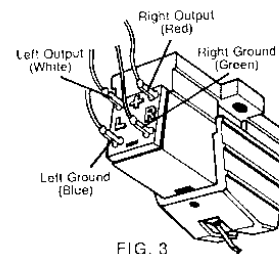


FIG. 3

For monophonic operation, the left and right output terminals should both be connected to the tone arm signal lead, and the left and right ground terminals connected to the tone arm ground lead. With these connections, vertical output from the cartridge is cancelled, thus reducing any record noise 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 cartridge specifications. This is a critical adjustment, since tracking force higher or lower than recommended will result in increased distortion and shorter 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 new cartridge.

CONNECTION TO SYSTEM

Using the shielded audio cable supplied with the turntable or tone arm, connect the cartridge to the magnetic phono input(s) of the amplifier or receiver. Carefully observe left and right channel markings. Extremely long cable (10 ft. or more) should not be used due to signal loss and possible hum pickup. A separate ground wire between the turntable chassis and electronics chassis may also be required to eliminate hum. Many turntables have this wire attached, ready to connect to a ground screw on the back panel of the electronics.

If hum persists, check the audio cable for broken wires or mis-wiring at the cartridge terminals. Distorted or unbalanced sound may also be caused by poor wiring or wires slightly touching together.

OPERATING SUGGESTIONS

The low tracking force and high compliance of Audio-Technica cartridges provide the highest levels of performance available, but also make them susceptible to damage if handled improperly. If a few simple cautions 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. 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 still too common is cleaning the stylus tip with a finger. It is usually ineffective in removing accumulated debris, and can harm the stylus cantilever if too much force is applied. Regular use of a special stylus cleaning brush is preferred. For best maintenance of the stylus, consistent use of ATP607 Stylus Cleaner is highly recommended.

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.

PRINCIPLES OF OPERATION

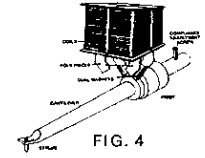


FIG. 4

A primary reason for the outstanding performance of Audio-Technica Dual Magnet 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, maximizing stereo separation.

When only one channel is reproduced, only the magnet for that channel must be displaced 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.

The particular combination of mass, compliance and damping designed into Audio-Technica cartridges yields the extremely smooth frequency response shown in Figure 1. An additional advantage of this smooth response is the relatively small effect which the capacitance of the connecting cable has on the frequency response curve at the amplifier input. With a peaky cartridge, a variation in cable capacitance can drastically alter the frequency response. With Audio-Technica cartridges, however, this effect is minimal.

The tube which positions the stylus tip and transmits its motion to the magnets is selected for rigidity and low mass. Models ATP-1, ATP-2 and ATP-3 employ a tapered tube which narrows substantially as the stylus is approached. Tracking ability is improved significantly because the tube taper reduces the amount of mass at the stylus end of the tube. The tapering cross-section and the larger diameter at the rear of the tube provide a rigid structure which transmits motion of the tip accurately to the magnets without resonance effects.

TYPES OF STYLI

ATP styli are of 2 general types — spherical and elliptical. While the cone-shaped stylus with a spherical (rounded) tip has long been a standard, Figure 5 shows why more sophisticated styli are now preferred.

As the cutting stylus cuts the original master record, it swings perpendicular to the direction of the record running underneath it (Fig. 5a). During playback with a spherical stylus however, the angle of stylus contact with the groove is constantly changing (Fig. 5b). Thus the cartridge output is not exactly the same as the signal input to the cutter head on the master record.

For this reason the elliptical stylus was developed. With a smaller radius on the sides than on the front of the stylus, the tip more closely matches the original cutting stylus shape (Fig.

5c) providing more accurate tracing of very small (high frequency) groove modulations. However, the smaller effective tip radius requires lower stylus pressure to avoid excessive wear of both stylus and record.

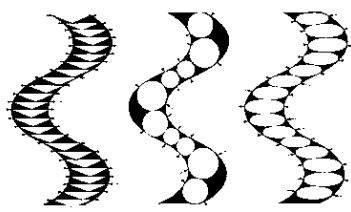


FIG. 5A FIG. 5B FIG. 5C

Model ATP-2 has a .4 x .7-mil tip, while Model ATP-3 has a .3 x .7-mil tip to more effectively trace the highest audio frequencies. The Model ATP-3 also employs a "nude" diamond tip which is mounted directly into the stylus tube without a metal casing around the diamond. Elimination of this extra mass improves

the tracking ability of the stylus assembly, and extends frequency response.

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 will provide the same level of performance found in the original cartridge stylus.

Cartridge Model	Replacement Stylus	Stylus Assembly Color
ATP-1	ATP-N1	White/Red
ATP-2	ATP-N2	White/Blue
ATP-3	ATP-N3	White/Bronze

SPECIFICATIONS	ATP-1	ATP-2	ATP-3
Generating Element	Dual Moving Magnet		
Frequency Response (Hz)	20-20,000	15-22,000	15-25,000
Output at 5 cm/sec. (mV)	5.3	5.3	5.3
Channel Separation (1 kHz/10 kHz)	21/16	23/17	23/17
Channel Balance (dB)	1.5	1.5	1.5
Stylus Tip Size (mils)	.6* Spherical	.4 x .7 Elliptical	.3 x .7 Nude Elliptical
Stylus Assembly Color	White/Red	White/Blue	White/Bronze
Tracking Force (grams)	3-5	3-5	2-3
Vertical Tracking Angle*	20°	20°	20°
Recc. Load Imp. (ohms)	47,000	47,000	47,000
Cartridge Inductance (mH)	600	600	600
DC Resistance (ohms)	500	500	500
Terminals (diameter)	.050"	.050"	.050"
Cartridge Weight (grams)	7.2	7.2	7.2
Mounting	1/2" Centers		

*New IEC/DIN standards.

Audio-Technica Dual Magnet™ cartridges are protected by the following patents: United States Nos. 3,720,796 and 3,761,647; Canada Nos. 856,351 and 909,683; England Nos. 1,232,210 and 1,283,404; Switzerland Nos. 478,502 and 505,437; West Germany Nos. 1,772,665 and 1,941,569; France No. 6,928,056; Sweden No. 347,636; Japan No. 1,083,037.

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 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. (Note: some states do not allow the exclusion of consequential damages so this exclusion may not apply to you). 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: Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224.

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