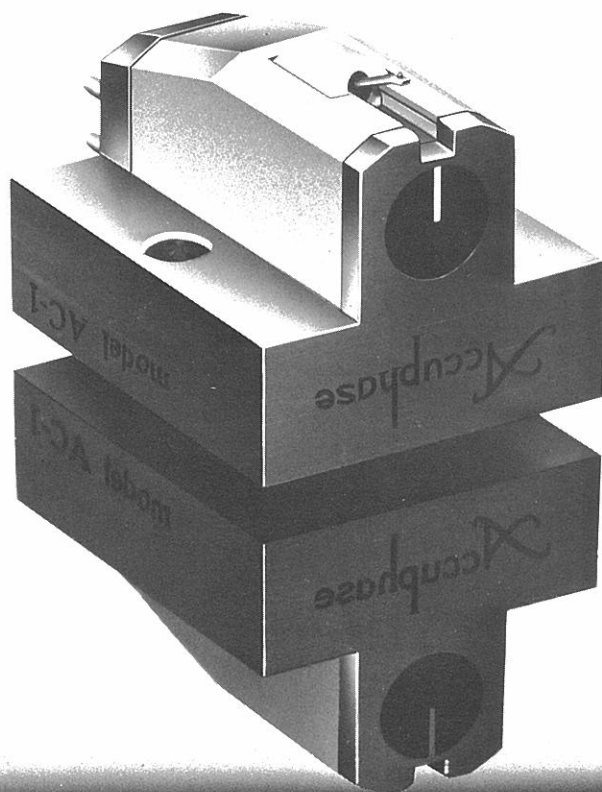


# Accuphase

MOVING COIL PHONO CARTRIDGE

## AC-1



The function of an audio system is to recreate the atmosphere of the concert hall in the home. Audio engineers have concentrated their efforts to attain this objective, and have made great progress in improving the physical character of sound reproduction equipment to meet the growing high fidelity oriented tastes of audio fans.

However, a misguided tendency to lose sight of the original objective has become evident recently causing true hi-fi enthusiasts to refer to it as "the brilliantly declining world of sound." It has caused a renewed appreciation among them for the merits of old, famous, consummate audio equipment.

Among the highly reputed, famous equipment, including cartridges, speakers and amplifiers that have superior basic qualities and have survived the test of time, it is a fact that there are not a few which, while still having room for improvement, can nevertheless render a dimensional depth to musical reproduction that cannot be experienced with most sound systems today. We believe, therefore, that the next big advance in audio perfection, at this time when engineering has attained today's high level, depends on how we can further improve the basic good qualities of such famous equipment by applying modern technology.

Accordingly, Accuphase decided to concentrate its research and high technology on developing a high quality phono cartridge, because of the important role it plays in any sound system. A phono cartridge combines both ultra-precision mechanism and electronics to convert microscopic vibrations into electrical signals. The materials that go into it, and its construction are vital factors in its performance.

In line with the Accuphase tradition always to adopt the best

materials and methods in developing its products, regardless of whether they may be old or new, we decided to apply latest technology to modify and improve Moving Coil (MC) type phono cartridge construction. Together with endless listening tests, we have successfully developed an outstanding phono cartridge which opens a new dimension to audio sound reproduction.

### THE ACCUPHASE AC-1 PHONO CARTRIDGE

While Moving Coil (MC) type cartridges are considered superior for phono reproduction quality, it does not mean that their physical specific character alone will make them better. They must actually be able to deliver superior musical detail, depth and concert hall-like atmosphere, in which the listener gets a closer feeling of instrumental material (and their relative strengths and direction) without fear of misdelivery.

The Accuphase AC-1 Moving Coil cartridge provides a superior performance in all these qualities. It was perfected after the most exhaustive listening tests together with latest construction techniques and discriminating choice of materials to improve the traditional signal generating principle of moving coil cartridges.

Using an aluminum diecast body as a base to minimize vibration and sound coloration, the basic sound quality of the AC-1 was improved to the highest technical limit by the employment of rare-earth samarium cobalt magnet and a high purity magnetic circuitry. An aluminum alloy cantilever with a beryllium core and a double ring damper constructed of two dampers, with differing stiffnesses, have effectively eliminated sound coloration that is so often introduced by the armature.

# Accuphase AC-1

MOVING COIL PHONO CARTRIDGE

## 1 IMPROVED CANTILEVER USES ALUMINUM MAGNESIUM ALLOY WITH BERYLLIUM CORE

High stiffness in spite of low moving mass was achieved with a greatly improved cantilever. It uses a thick-walled, aluminum magnesium alloy material which has a beryllium core in the lower 60% of its length. This construction also has limited the high frequency response to an ample 60kHz, and together with Q damping, it has improved the response between 5,000~10,000Hz with an indented, saddle-shaped characteristic.

## 2 DAMPED DAMPER

The function of a damper is to suspend the armature which includes the stylus, cantilever and signal generating coil, and also to provide a correct amount of braking action to armature vibrations. Therefore, a damper must provide a spring effect to preserve armature movements, while controlling excessive vibrations with the damping effect created by its internal air chamber braking action.

The movements of the armature apply pressure changes to the damper, which, in turn, provides a damping effect on the armature. They will also cause individual vibrations of the damper itself. These vibrations have a close relation to cantilever and shell vibrations, and if allowed, they will induce harmful vibration of the cantilever and distortion in the reproduced sound.

The Accuphase AC-1 cartridge is equipped with a second damper outside the Main Damper to absorb any such harmful damper vibrations.

## 3 POWERFUL RARE-EARTH SAMARIUM COBALT MAGNET ASSURES PERFECT LINEARITY

Rare-earth samarium cobalt, one of the most powerful magnets available, is employed in the AC-1. Perfect linearity of the armature hysteresis curve characteristic over its entire operating area was achieved by setting the magnetic field strength at 65% of the magnetic saturation point.

## 4 PERMALLOY CORE AND LARGE DIAMETER COIL WIRE

High quality permalloy, the most stable magnetic substance, is used for the armature core. High purity copper wire of unusual thickness (0.035mm  $\phi$ ) for a Moving Coil cartridge coil is used in a single layer of relatively few turns to obtain an output of 0.2mV (5cm/sec.), with impedance at a low 4 ohms.

## 5 DIECAST ALUMINUM ALLOY HARD HOUSING

The moving elements of a cartridge receive strong vibrations from record grooves, but this vibration must not be allowed to create sympathetic vibrations of the cartridge housing because they will cause sound coloration. Careful attention was paid to this matter in developing the AC-1 which uses a diecast aluminum alloy

housing body that has sufficient hardness and high internal loss characteristics to prevent such sympathetic vibrations. A flat, smooth shell mounting further assures strong contact.

## 6 STEADY OUTPUT VOLTAGE LEVEL

Playing a warped record may cause a phenomenon that can be likened to continuous variations of the stylus force if the record is so badly warped as to affect correct tonearm action and perfect tracking. In some cartridges, this will cause the center position of the signal generating armature to change, and vary the output voltage level. It will have a harmful effect as the warped record will then modulate the signal voltage.

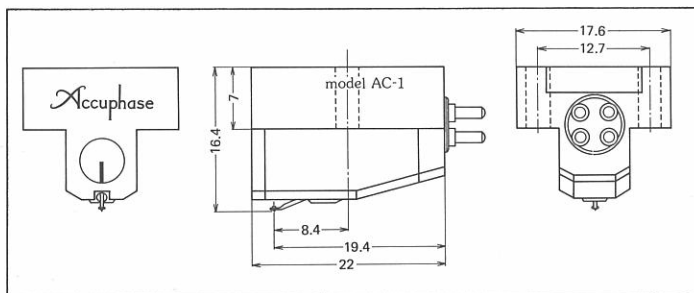
Special attention was paid to prevent stylus force changes from affecting the output level of the AC-1. Its output remains steady, and practically unchanged within the stylus force range of 1.0~3.0 grams.

## AC-1 GUARANTY SPECIFICATIONS

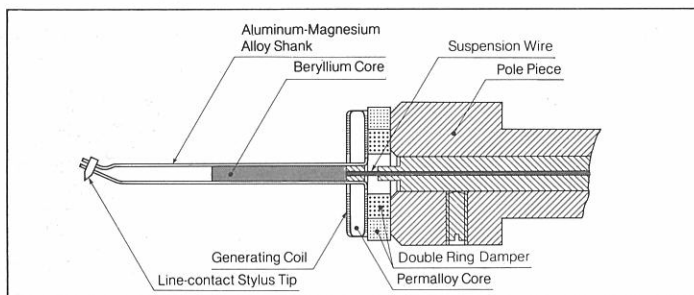
### PERFORMANCE GUARANTY:

All Accuphase product specifications are guaranteed as stated.

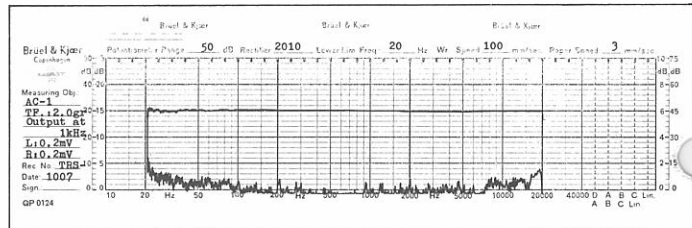
GENERATING ELEMENT	Moving-coil
OUTPUT VOLTAGE at 1kHz, 5cm/sec.	0.2mV
FREQUENCY RESPONSE	20Hz to 60kHz 20Hz to 20kHz $\pm 1.0$ dB
CHANNEL SEPARATION at 1kHz	30dB
CHANNEL BALANCE at 1kHz	0.5dB
COMPLIANCE: Horizontal	$15 \times 10^{-6}$ cm/dyne
Vertical	$15 \times 10^{-6}$ cm/dyne
OUTPUT VOLTAGE TOLERANCE vs	
TRACKING FORCE	0dB at 1.0gr. to 3.0gr.
INTERNAL IMPEDANCE	4 ohms
RECOMMENDED LOAD IMPEDANCE	higher than 50 ohms for head amplifier higher than 3 ohms for step-up transformer
VERTICAL TRACKING ANGLE	20° (new IEC/DIN standard)
TYPE OF STYLUS	Line-contact diamond
STYLUS TIP RADIUS	$6\mu\text{m} \times 35\mu\text{m}$
TRACKING FORCE RANGE	1.5gr. to 2.5gr.
RECOMMENDED TRACKING FORCE	2.0gr.
WEIGHT, net weight	9.5 grams



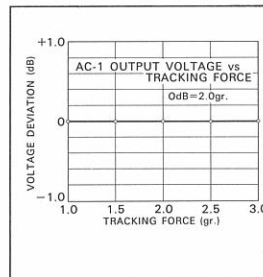
MEASUREMENTS OF AC-1



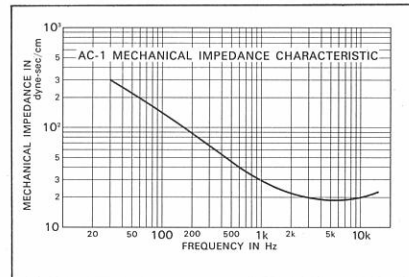
CROSS SECTION OF MOVING ELEMENT



FREQUENCY RESPONSE & CROSSTALK



OUTPUT VOLTAGE TOLERANCE vs TRACKING FORCE



MECHANICAL IMPEDANCE CHARACTERISTIC

**Accuphase**  
ACCUPHASE LABORATORY INC.