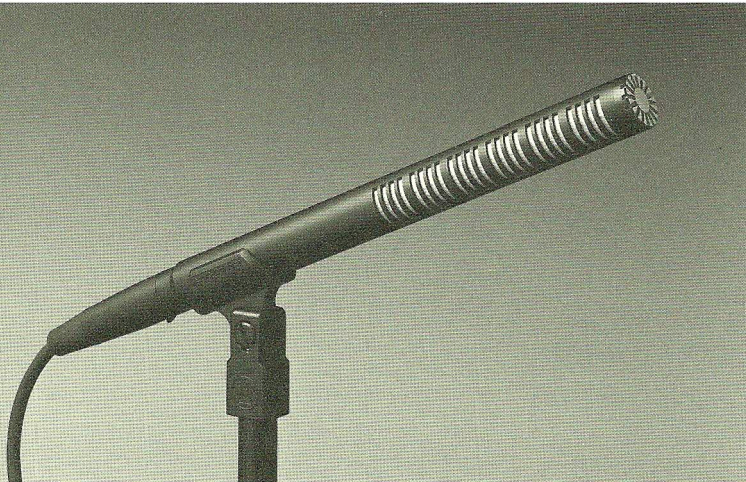


AT4073a

LINE + GRADIENT CAPACITOR MICROPHONE



Description

The Audio-Technica AT4073a is a transformerless, externally polarized line + gradient capacitor microphone. It has been specially created to meet the critical long-distance pickup demands of broadcasting, film/TV sound, professional recording and theater sound reinforcement.

The AT4073a features a broad-band, linear on-axis frequency response, with maximum rejection of sounds from both the sides and the rear of the microphone. Rear polar lobing, common in shotgun microphones, has been greatly reduced and the off-axis response remains highly uniform. The resultant lack of sound coloration on- and off-axis makes the AT4073a particularly useful for miking dynamic action in film/TV audio as well as in "spot" miking techniques in the music studio or theater.

The effective working distance of a directional microphone is determined in great part by its polar pattern and the uniformity of its off-axis response. These factors help determine the signal-to-ambient-noise ratio. Of course, the electronic signal-to-noise ratio also affects the usable miking distance. This distance may be less than desired if the overall system signal-to-noise ratio is poor due to low microphone sensitivity or noisy electronics. The AT4073a provides extremely high output and a noise floor that is hardly measurable, much less audible. It may be used with confidence in distant miking applications and even under the stringent demands of modern digital recording systems.

The AT4073a balanced output is direct-coupled. This results in a clean output signal, especially under high-output conditions. The microphone is totally free of the distortion associated with conventional transformer-coupled outputs.

The AT4073a sets new standards in small size and light weight. Overall length is 9.13" and it weighs just 4.0 oz. The AT4073a adds practically no noticeable weight to the end of a fish pole or the top of a micicam. Through the use of an advanced, proprietary Audio-Technica design, the interference tube of the AT4073a provides a narrow acceptance angle that would require a tube 50 percent longer using conventional technology.

Another unique Audio-Technica engineering innovation in the AT4073a provides two additional benefits. An ordinary line microphone has its capsule positioned immediately at the rear of the interference tube. Audio-Technica engineers, however, have located the capsule entirely within the tube. Both the diaphragm and the side ports are exposed to the same acoustic environment.

One significant result of this unique capsule positioning is that the AT4073a is less sensitive to noise caused by wind turbulence or the "encounter" noise of panning action. The second benefit is a marked reduction in proximity effect. Recordings made at varying distances remain more consistent in response, making both production and editing quicker, easier, and less costly.

The AT4073a is also exceptionally resistant to mechanical or handling noise, thanks to careful control of structural resonances and the low mass of the capacitor diaphragm.

An integral second-order 150 Hz hi-pass filter may be selected to "roll off" the low-frequency response, thereby attenuating unwanted low-frequency ambient noise such as from traffic or air-handling systems. The switch is recessed to prevent accidental activation.

The AT4073a is built from the inside out to withstand the rigorous conditions of field use. Construction-grade aluminum alloy is used in the forming of the dual-concentric cylindrical interference tube. Major component parts are machined with exacting precision and assembled in a nested technique that eliminates damage from inertial shift.

The AT4073a will operate in conjunction with any remote "phantom" or "simplex" power source supplying from 11 volts to 52 volts DC. This voltage not only powers the microphone's impedance converter, but is stepped-up to a higher voltage internally to polarize the capacitor element.

Architects and Engineers Specifications

The microphone shall have a frequency response of 30 Hz to 20,000 Hz. Its capacitor element shall be of a DC bias design and shall obtain its polarizing voltage and impedance converter power from an external 11V to 52V DC phantom power source. Nominal open-circuit output voltage shall be 70.8 mV at 1 kHz, 1 Pascal. It shall have an output impedance of 100 ohms and its output shall be transformerless balanced.

The microphone shall operate on the wave interference principle with a lobar polar response above 1500 Hz and shall employ a highly-directional capacitor element to maintain its directivity below 1500 Hz. The capacitor element shall be totally incorporated within the wave interference tube. The interference tube shall incorporate a series of passive acoustic radiator membranes arranged in a linear acoustic taper as part of its acoustic circuit. The phase shift occurring in this acoustic circuit shall act to enhance the lobar directional characteristic of the microphone at frequencies below the cutoff normally dictated by the tube length. The end of the tube opposite the element shall incorporate an acoustically-damped end cap that acts as a stabilizer of on-axis frequencies above 3 kHz.

The microphone housing shall be of lightweight, turned structural-grade aluminum alloy. The microphone shall have a diameter of 0.83" (21.0 mm), a length of 9.13" (232.0 mm), and a weight of 4.0 oz (114 g).

The Audio-Technica AT4073a is specified.

Unique Interference Tube Design

The ability to control low-frequency directivity in conventional "shotgun" microphones is limited by the length of their interference tubes – the longer the tube, the more directional the microphone and the lower the frequencies over which the tube still exercises control. Below the effective cutoff frequency of the interference tube, line microphones depend on the directional capabilities of the microphone element mounted at the rear of the tube.

Audio-Technica has pioneered a unique interference tube design* in the AT4073a. The sideporting system of the new Audio-Technica interference tube incorporates two acoustically-damped slots combined with an extremely narrow longitudinal side port. The latter acoustical aperture is terminated in a series of miniature membranes, arranged in an acoustic taper. Pressure changes in the narrow side port cause these membranes to reradiate a specific band of frequencies into the tube. The taper is calculated to allow the lowest frequencies of the band passed to enter the tube at the farthest point from the capacitor element and the higher frequencies of the band passed to enter close to the element.

Low-frequency sound waves arriving from off-axis see this path into the interference tube as a series inductance and resistance. This L/R combination causes an increase in phase shift at frequencies below the normal tube cut-off. The result is directionality equal to conventional line microphones with interference tubes 1.5 times the length of that on the AT4073a.

*U.S. Patent No. 4,789,044

