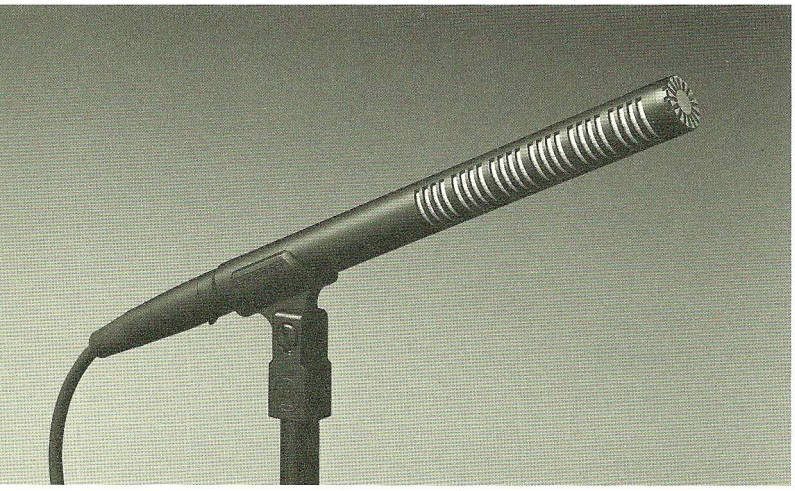
AT4073a

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 minicam. 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

AT4073a

Specifications†

ELEMENT	Externally polarized (DC bias) capacitor
POLAR PATTERN	Line + Gradient
FREQUENCY RESPONSE	30-20,000 Hz
OPEN CIRCUIT SENSITIVITY (1 kHz)	–23 dB (70.8 mV) ± 1 dB, re 1V at 1 Pa*[1]
IMPEDANCE	100 ohms balanced, transformerless
MAXIMUM INPUT SOUND LEVEL	126 dB SPL, 1 kHz at 1% T.H.D.
NOISE, TYPICAL (A-WEIGHTED)[2]	14 dB SPL
DYNAMIC RANGE, TYPICAL	112 dB, 1 kHz at Max SPL
SIGNAL-TO-NOISE RATIO, TYPICAL	80 dB, 1 kHz at 1 Pa*
HI-PASS FILTER (LOW-END ROLL-OFF)	150 Hz, 12 dB/octave
POWER REQUIREMENTS	11-52V DC phantom
CURRENT CONSUMPTION, TYPICAL	3.2 mA
WEIGHT (LESS CABLE AND CLAMP)	4.0 oz (114 g)
DIMENSIONS	9.13" (232.0 mm) long, 0.83" (21.0 mm) body diameter
ACCESSORIES FURNISHED	AT8405 snap-in clamp for ⅝"-27 threaded stands; protective carrying case; reticulated, open-cell foam windscreen

† In the interest of standards development, A.T.U.S. offers full details on its test methods to other industry professionals on request.

* 1 Pascal = 10 dynes/cm² = 10 microbars = 94 dB SPL

[1] Measured at diaphragm

[2] Using Audio Precision System One

Optional Accessories:

- AT8202 adjustable in-line attenuator for use with low-impedance microphones.
- AT8314 2-conductor, shielded, vinyl-jacketed, broadcast-type cable with XLRF-type connector at microphone end, XLRM-type connector at equipment end. Available in 10', 20', 25', 30', 50' & 100' lengths.
- AT8407 universal "clothes-pin" stand clamp fits both tapered and cylindrical microphones.
- AT8410a shock mount for boom or stand operation. Universal "clothes-pin" stand clamp fits both tapered and cylindrical microphones.
- AT8415 low-profile shock mount for boom or stand operation.
- CP8506 four-channel 48V phantom power supply (AC powered).
- CP8508 single-channel 24V phantom power supply (AC powered).

One-Year Limited Warranty

Audio-Technica microphones and accessories purchased in the U.S.A. are warranted for one year from date of purchase by Audio-Technica U.S., Inc. (A.T.U.S.) 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 A.T.U.S. or an Authorized Service Center, prepaid, together with the sales slip or other proof of purchase date. ***Prior approval from A.T.U.S. is required for return.*** This warranty excludes defects due to normal wear, abuse, shipping damage, or failure to use product in accordance with instructions. This warranty is void in the event of unauthorized repair or modification, or removal or defacing of the product labeling.

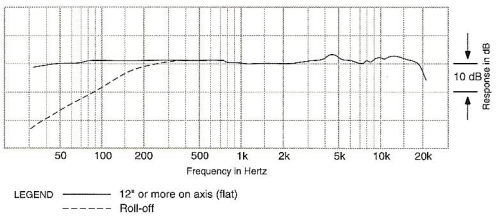
For return approval and shipping information, contact the Service Department, Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224.

Except to the extent precluded by applicable state law, ***A.T.U.S. will have no liability for any consequential, incidental, or special damages; any warranty of merchantability or fitness for particular purpose expires when this warranty expires.***

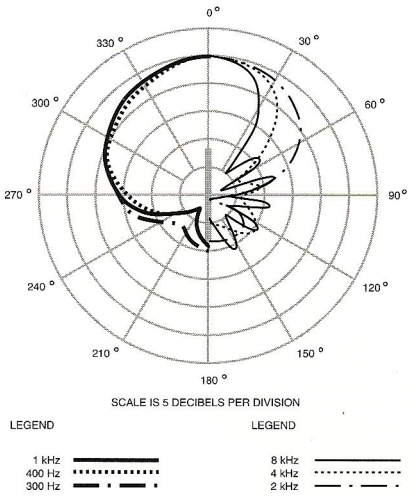
This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Outside the U.S.A., please contact your local dealer for warranty details.

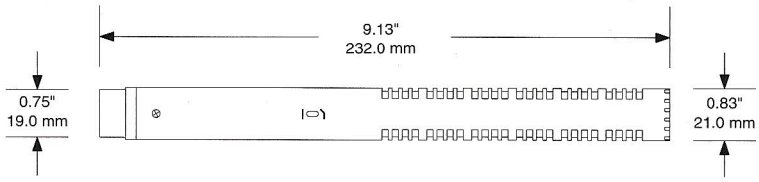
Frequency Response



Polar Pattern



Dimensions



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