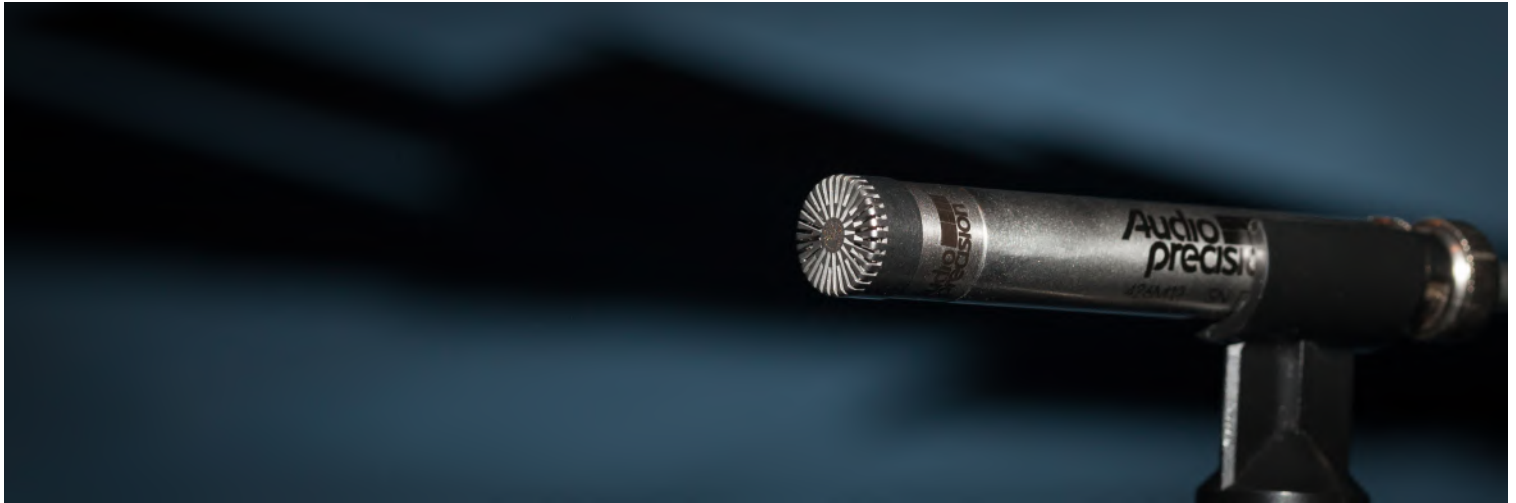




# 378M31 MEASUREMENT MICROPHONE

for Acoustic and Electro-Acoustic Test



## APPLICATIONS

- Precision sound level measurements
- Loudspeaker measurements
- Anechoic chamber measurements
- Research & development
- Hearing preservation and safety
- Environmental noise monitoring

## HIGHLIGHTS

- TEDS compliant
- Sensitivity: 50 mV/Pa
- Frequency range ( $\pm 2$  dB): 3.75 Hz–20 kHz
- Dynamic range: 15.5 dBA–137 dB
- Temperature:  $-40^{\circ}$  to  $+80^{\circ}$  C
- Polarization: Pre-polarized (0 V dc)

## STANDARDS COMPLIANCE

- IEC 61094-4 type WS2F compliant
- IEC 61672 class 1 compliant for premium sound level meter use
- IEC 60651 type 1 compliant
- Calibration reference microphone traceable through PTB, compliant with ISO 9001 & 17025, A2LA approved

Audio Precision offers a selection of measurement microphones designed to provide ready solutions for our customers working in acoustic test.

### 378M31 1/2" measurement microphone system

The Audio Precision model 378M31 is a general purpose measurement microphone recommended for high accuracy applications where high sensitivity is required for free-field response measurements. The 378M31 is a *microphone system*, comprised of a prepolarized microphone capsule combined with a low-noise preamplifier. The preamp is designed to operate on ICP<sup>®</sup> sensor power, and can be used with most 2–20 mA constant current power (CCP) microphone power supplies, including the APx1701. It carries embedded TEDS calibration and identification data; the preamplifier output is available on a BNC jack. **Note:** system calibration and TEDS data are valid only for each specific capsule/preamplifier combination.

### Prepolarized free-field measurement microphones

The capacitor (or *condenser*) transducer element in a condenser microphone must carry a charge to function. The 378M31 microphone element is prepolarized to provide this charge, and does not require a polarizing voltage from the power supply, unlike measurement microphones that require a high (often +200 V dc) polarizing voltage. This brings several advantages: less expensive power supplies, simpler two-conductor cabling, and improved performance in high-humidity environments. A free-field microphone is designed for use in a reflection-free environment such as an anechoic chamber, or out-of-doors. The microphone is compensated for the effect of its presence in the sound field, and should be pointed directly at the sound source ( $0^{\circ}$ ).

### TEDS (Transducer Electronic Data Sheet) compliant

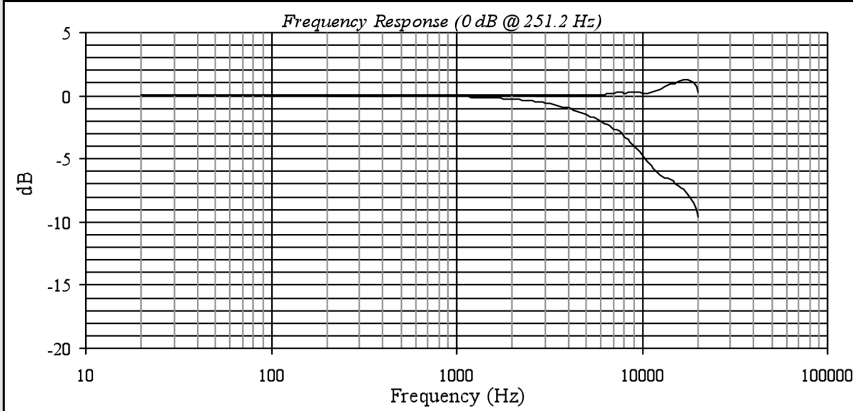
Each Audio Precision measurement microphone and microphone system is TEDS programmed to the IEEE 1451.4 standard for SMART transducers, V1.0 format. TEDS data contain microphone identification and calibration information that can be read by a connected instrument, such as the Audio Precision APx1701 Transducer Test Interface. Read about the APx1701 on the reverse.

# AUDIO PRECISION MODEL 378M31 MEASUREMENT MICROPHONE



## KEY SPECIFICATIONS

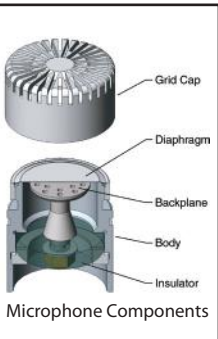
Description	1/2" free-field Microphone system (capsule and preamp)
Application	General purpose
Nominal Diameter	1/2"
Dimensions	0.52" diameter, 3.62" length
Sensitivity	50 mV/Pa
Frequency Range ( $\pm 2$ dB)	3.75 Hz to 20 kHz
Inherent Noise	15.5 dBA re 20 $\mu$ Pa
Dynamic Range (3% THD)	137 dB re 20 $\mu$ Pa
Mating Connector	BNC jack
TEDS Compliant	Yes
Power	CCP 2–20 mA, 10–14 V dc
Recommended Cable	CAB-BNC-10



Typical free-field response of the microphone with the grid cap at 0 degree incidence. The top curve is the corrected free-field curve, and the bottom curve is the pressure response generated by the electronic actuator.

## OPTIONAL ACCESSORIES

APx1701	Transducer Test Interface
CAB-BNC-10	10' BNC to BNC coaxial cable
CAB-BNC-3	3' BNC to BNC coaxial cable
079A11	1/2" microphone holder
482A21	ICP® power supply/signal conditioner, 1 channel, unity gain, AC mains powered
480C02	ICP® power supply/signal conditioner, 1 channel, unity gain, battery powered
480B21	ICP® power supply/signal conditioner, 3 channels, x1, x10, x100 gain, battery powered
488B10	AC mains adapter for 480B21
CAL200	Sound level calibrator, 1 kHz, 94 dB SPL and 114 dB SPL, 1/2" diameter
CAL250	Sound level calibrator, 250 Hz, 114 dB SPL, 1" and 1/2" diameter



## NOTICE

Prepolarized microphones are a mature and robust technology, but care must be taken when handling any condenser microphone. Avoid removing the grid cap; if this becomes necessary, be careful not to touch the microphone diaphragm. The microphone system calibration includes the microphone capsule and the preamplifier. Use of the capsule with a different preamplifier invalidates the calibration. The capsule and preamplifier are banded with a caution tape as a reminder.

## CALIBRATION AND WARRANTY

Audio Precision measurement microphones are made in the United States. The microphones are manufactured to the highest standards, using a combination of systematic quality control, the finest materials, and clean-room assembly. The products are exposed to an extensive aging program in climate-controlled test chambers to ensure the most stable product. Each unit is qualified and comes with a traceable calibration certification, and is backed by a five-year warranty.

## APx1701 TRANSDUCER TEST INTERFACE



If you are making acoustic measurements with your 378M31 and an APx analyzer, consider adding an APx1701 Transducer Test Interface to your setup. The APx1701 provides the correct power to the preamplifier and will read the TEDS data and pass it on to the APx500 measurement software. The 1701 also features a high-performance two-channel power amplifier optimized for acoustic test, switchable hardware for loudspeaker impedance measurements, and complete control and automation integration with the APx500 measurement software.

# Audio Precision 378M31 Measurement Microphone System

## Complete Specifications

	ENGLISH	SI	Notes
<b>Performance</b>			
Nominal Microphone Diameter	1/2"	1/2"	
Frequency Response Characteristic (at 0° incidence)	Free-Field	Free-Field	
Sensitivity	50 mV/Pa	50 mV/Pa	[3]
Sensitivity ( $\pm 1.5$ dB)	-26 dB re 1 V/Pa	-26 dB re 1 V/Pa	[3]
Frequency Range ( $\pm 1$ dB)	7 Hz to 10 kHz	7 Hz to 10 kHz	
Frequency Range ( $\pm 2$ dB)	3.75 Hz to 20 kHz	3.75 Hz to 20 kHz	
Lower Limiting Frequency (-3 dB)	1.0 to 3.0 Hz	1.0 to 3.0 Hz	
Inherent Noise	15.5 dBA re 20 $\mu$ Pa	15.5 dBA re 20 $\mu$ Pa	[2]
Dynamic Range (3% Distortion Limit)	137 dB re 20 $\mu$ Pa	137 dB re 20 $\mu$ Pa	[2]
TEDS Compliant	Yes	Yes	[4]
<b>Environmental</b>			
Temperature Range (Operating)	-40 to +176 °F	-40 to +80 °C	
Temperature Coefficient of Sensitivity (+14 to +158°F (-10 to +70°C))	0.005 dB/°F	0.009 dB/°C	[2][3]
Static Pressure Coefficient	-0.013 dB/kPa	-0.013 dB/kPa	[2][3]
Humidity Coefficient of Sensitivity (0 to 100%, non-condensing)	$\pm 0.001$ dB/%RH	$\pm 0.001$ dB/%RH	[3]
Influence of Axial Vibration (0.1g (1 m/s <sup>2</sup> ))	63 dB re 20 $\mu$ Pa	63 dB re 20 $\mu$ Pa	[2]
<b>Electrical</b>			
Polarization Voltage	0 V	0 V	[1]
Excitation Voltage	20 to 30 VDC	20 to 30 VDC	
Constant Current Excitation	2 to 20 mA	2 to 20 mA	
Output Bias Voltage	10 to 14 VDC	10 to 14 VDC	
Maximum Output Voltage	$\pm 7$ Vpk	$\pm 7$ Vpk	
Output Impedance	<50 Ohm	<50 Ohm	
<b>Physical</b>			
Housing Material	Stainless Steel	Stainless Steel	
Venting	Rear	Rear	[5]
Electrical Connector	BNC Jack	BNC Jack	
Mounting Thread (Grid)	0.5 - 60 UNS	0.5 - 60 UNS	
Size (Diameter x Length) (with grid)	0.52 in x 3.62 in	13.2 mm x 91.9 mm	
Size (Diameter x Length) (without grid)	0.50 in x 3.58 in	12.7 mm x 90.9 mm	
Weight	1.63 oz.	45.8 gm	[2]
<b>Notes</b>			
[1] Prepolarized			
[2] Typical			
[3] re 250 Hz			
[4] TEDS Capable Digital Memory and Communication, compliant with IEEE 1451.4			
[5] Venting through Preamp			

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