SENSORS FOR TESTING CONSUMER ELECTRONICS

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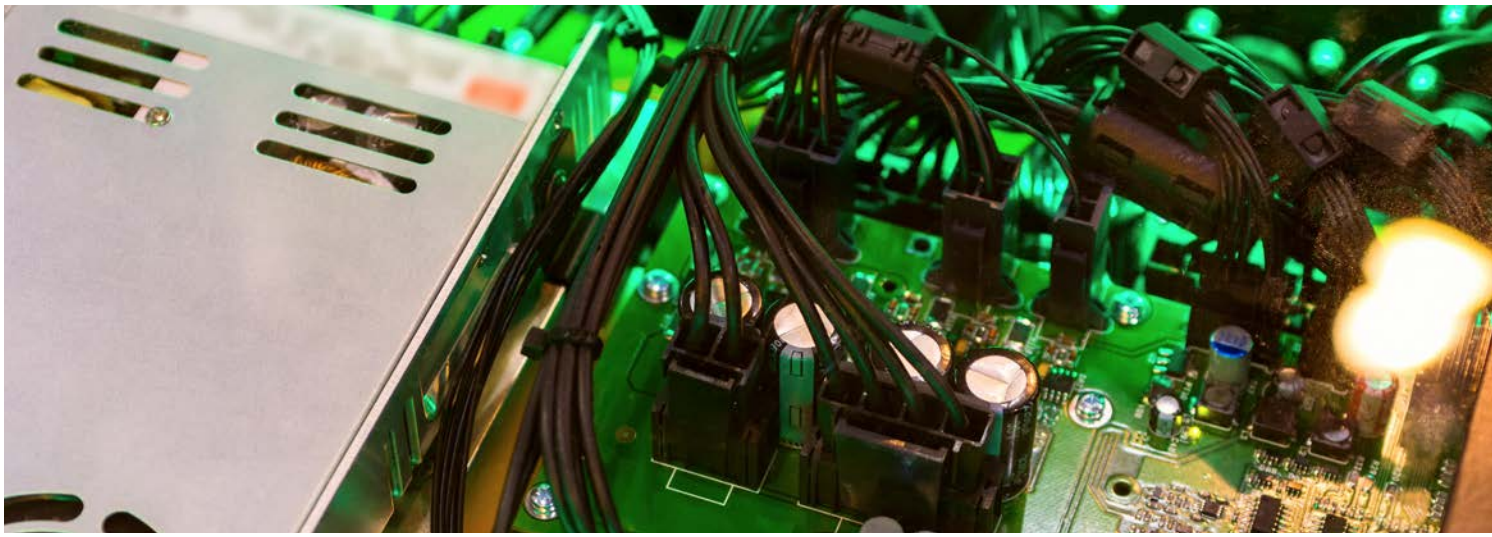


SENSORS FOR TESTING CONSUMER ELECTRONICS

Today's electronics market demands advanced product validation, optimized designs, zero defects, and ever faster time to market.

From drop testing and environmental stress screening, to noise source identification and acoustic testing for speaker and headphone design—PCB Piezotronics and Endevco® support these efforts as trusted suppliers of acoustic, vibration, pressure, and force sensors for some of the largest consumer electronics manufacturers worldwide.

Our portfolio features new and customizable accelerometers with smaller sizes and increasing levels of performance, force sensors with high resolution and fast response times, and new microphone models for low noise floor levels and challenging environmental conditions.

Learn more about consumer electronics testing with PCB.

SENSORS TO MEASURE VIBRATION AND SHOCK:

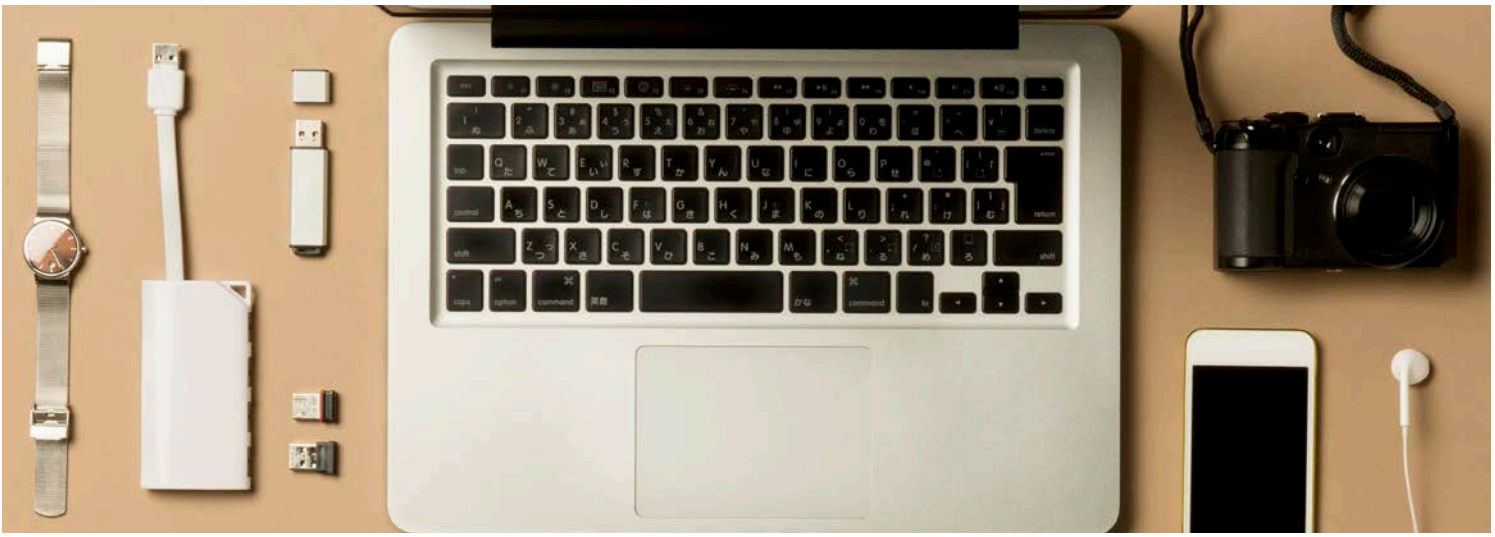
- Piezoelectric Accelerometers
- Piezoresistive Shock Accelerometers
- MEMS DC response Accelerometers

MICROPHONES TO MEASURE ACOUSTICS:

- Pre-Polarized ICP® Microphones
- Phantom powered 48V, 24V or 12V free-field microphones

SENSORS TO MEASURE PRESSURE AND FORCE:

- Piezoelectric Force Sensors
- Piezoelectric Pressure Sensors
- Piezoresistive Pressure Sensors



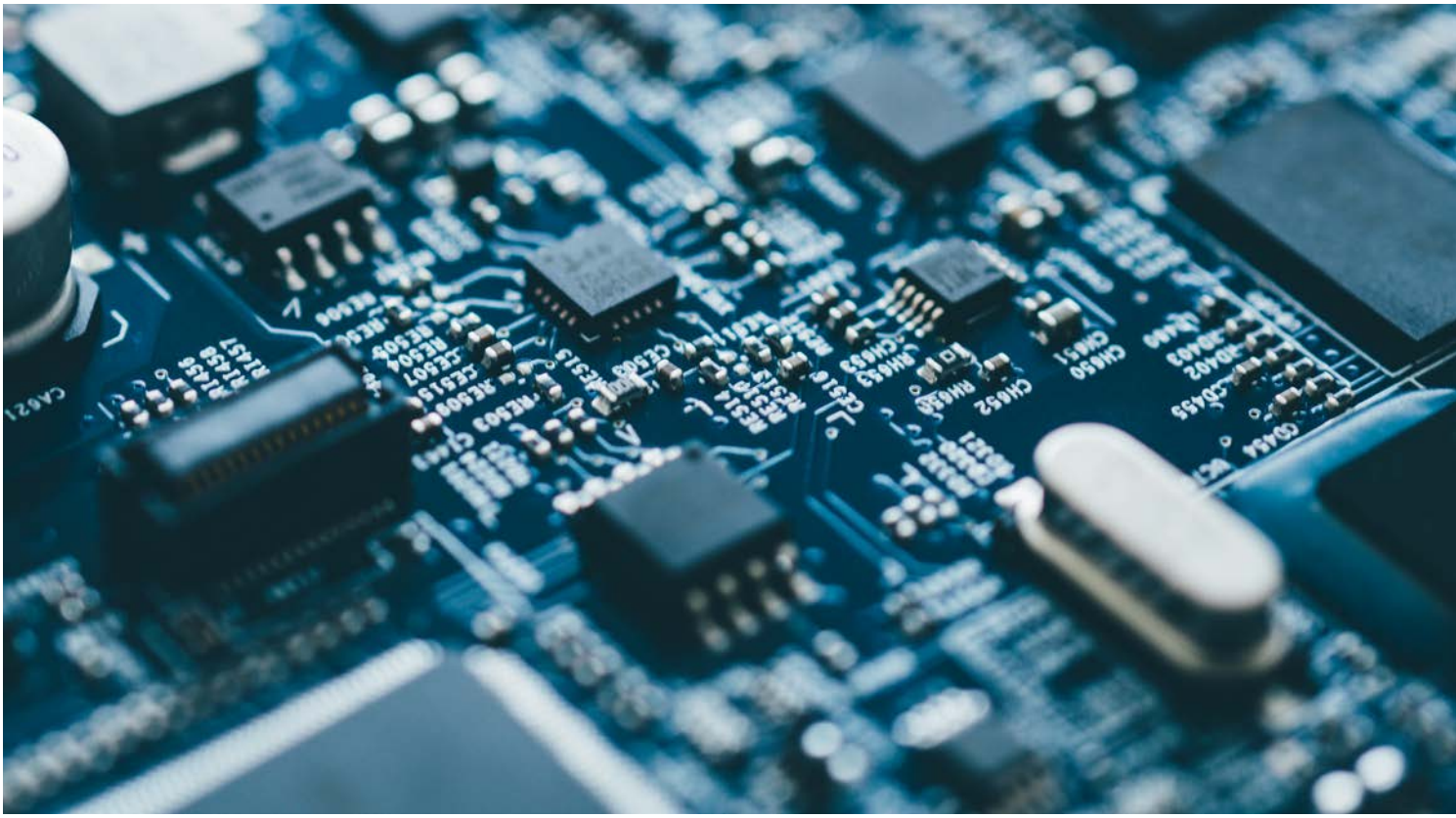
SENSORS TO MEASURE VIBRATION AND SHOCK

PIEZOELECTRIC ACCELEROMETERS

Piezoelectric accelerometers are ideal for environmental stress screening and general vibration testing on consumer electronics. Integrated Electronics Piezo-Electric (IEPE) technology, pioneered by PCB Piezotronics under the trademark ICP®, contributes to their small size, ease of use, and accuracy over a wide frequency range, making them one of the most popular sensor types for vibration and shock testing.




SPECIFICATIONS				
Model Number	**PCB 356A01**	**PCB 356A04**	**PCB 356A09**	**PCB 352A91**
Description	Ceramic shear triaxial ICP® (IEPE) accelerometer	Ceramic shear triaxial ICP® (IEPE) accelerometer	Ceramic shear triaxial ICP® (IEPE) accelerometer with adhesive mount	Single axis ICP® (IEPE) accelerometer
Measurement Range	±1000 g pk	±5000 g pk	±500 g pk	±5000 g pk
Sensitivity (±20%)	5 mV/g	1 mV/g	10 mV/g	1 mV/g
Frequency Range (+/-5%)	2 to 8000 Hz (y or z axis) 2 to 5000 Hz (x axis)	1.2 to 10,000 Hz	2.0 to 8000 Hz (y or z axis) 2.0 to 5000 Hz (x axis)	1.2 to 10,000 Hz
Key Features	Ideal for small component qualification, environmental stress screening, and measurements with space restrictions	Ideal for small component shock testing, environmental stress screening and electronic board testing	Miniature, lightweight Ideal for structure response testing where sensors must fit within devices, powertrain NVH and component/system testing	Miniature, lightweight Ideal for small component shock testing, environmental stress screening and electronic board testing



SPECIFICATIONS				
Model Number	**PCB 352C23**	**PCB 352A73**	**Endevco 65-100**	**Endevco 7250B Series**
Description	Miniature, lightweight, single axis ICP® (IEPE) accelerometer	Miniature, lightweight, single axis ICP® (IEPE) accelerometer	Triaxial IEPE accelerometer with adhesive mount or M2.5 thread	Subminiature, lightweight, single-axis IEPE accelerometer
Measurement Range	±1000 g pk	±1000 g pk	±50 g pk	±2500 g pk and ±500 g pk
Sensitivity (±20%)	5 mV/g	5 mV/g	100 mV/g	2 mV/g and 10 mV/g
Frequency Range (+/-5%)	2.0 to 10,000 Hz	2.0 to 10,000 Hz	20 to 6,000 Hz (x or y axis) 20 to 10,000 Hz (z axis)	2.0 to 30,000 Hz
Key Features	Ideal for small component vibration testing and circuit board qualification	Ideal for small component vibration testing and circuit board qualification	Ideal for general purpose vibration testing and structural analysis.	Hermetically sealed for use in extreme environments. Ideal for high frequency vibration measurements on small objects

PIEZORESISTIVE AND MEMS DC RESPONSE ACCELEROMETERS

Piezoresistive accelerometers measure shock and impact over a wide frequency range, and afford a wider operating temperature range when compared to mechanically isolated ICP® accelerometers. Their rugged design allows for high performance over a variety of applications, from drop test simulation on small electronics to crash dummy testing for automotive safety testing.

SPECIFICATIONS			
Model Number	**Endevco 713AL series**	**Endevco 726CH series**	**Endevco 727 series**
Description	Triaxial piezoresistive accelerometer with multimode damping	Lightweight piezoresistive accelerometer with multimode damping	Extremely lightweight piezoresistive accelerometer
Measurement Range	± 2000 g	± 2000 g	2KG/6KG/20KG/60KG
Sensitivity	.030 mV/V/g	.030 mV/V/g	100/30/10/3 µV/g
Frequency Response	0 to 3 kHz (±5%)	0 to 5 kHz (±5%)	0-10/0-20/0-50/0-100 kHz (+/-5%)
Key Features	Ideal for crash testing and similar applications that require minimal mass loading and a broad frequency response	Broad frequency response with minimum zero shift. Ideal for automotive and product safety testing applications	Ideal for drop testing of consumer electronic devices

SPECIFICATIONS			
Model Number	**Endevco 728 series**	**Endevco 7310A Series**	**Endevco 7360A Series**
Description	Lightweight piezoresistive accelerometer with adhesive mount	Angular rate silicon MEMS sensor with gyroscope technologies and custom electronics and packaging	Six-degrees of freedom (6DOF) sensor that features three DC accelerometers and three angular rate sensors
Measurement Range	2000 g and 10,000 g	100 to 18k deg/sec	Accelerometer: ±2 to ±500 g Angular Rate: 100 to 18k deg/sec
Sensitivity	200 µV/g and 16 µV/g	20 to 0.111 mV/deg/sec (±15%)	Accelerometer: 1000 to 4 mV/g Angular Rate: 20 to 0.111 mV/deg/sec (±15%)
Frequency Response	0 to 8 kHz (±1 dB)	0-1000 or 0-2000	Accelerometer: 0-550 to 0-5000 Hz Angular Rate: 0-1000 or 0-2000
Key Features	Ideal for shock measurements in mobile electronic devices	Ideal for safety testing and other system designs requiring accurate measurement of angular velocity	Ideal for component and consumer safety testing, and automotive safety testing

MICROPHONES FOR ACOUSTIC MEASUREMENTS

PREPOLARIZED ICP® MICROPHONES

PCB Piezotronics provides a variety of acoustic measurement products, including prepolarized and externally polarized condenser, array, probe, low profile surface, and special purpose microphones. Microphone products are complemented by an assortment of preamplifiers, signal conditioners, A-weighting filters, handheld calibrators, and accessories.

PCB microphones are a staple for many of the top names in consumer electronic, for products ranging from haptics testing that require extreme low noise testing to loudspeakers, headphones and earbuds that require high amplitudes with minimal Total Harmonic Distortion (THD) levels.




SPECIFICATIONS				
Model Number	**PCB 378B02**	**PCB 378C20**	**PCB 378C13**	**PCB 130F Series**
Description	1/2" ICP® (IEPE) prepolarized, free-field microphone and amplifier system, TEDS compatible	1/2" ICP® (IEPE) prepolarized random-incidence condenser microphone and preamplifier, TEDS compatible	1/2" ICP® (IEPE) prepolarized pressure field microphone featuring extended frequency range, TEDS compatible	1/4" prepolarized free-field ICP® array microphones with integrated preamplifier, TEDS compatible
Sensitivity	50 mV/Pa (± 1.5 dB)	50 mV/Pa (± 1.5 dB)	12.6 mV/Pa (± 2 dB)	45 mV/Pa (± 3 dB at 250 Hz)
Frequency Range	(± 2dB) 3.75 - 20,000 Hz	(±2dB) 3.75 to 16000 Hz	(±2dB) 3.15 to 20000 Hz	(± 2dB) 10 Hz to 20 kHz
Key Features	Ideal for precision sound level measurements, transfer path analysis, tests within anechoic chambers and non-contact defect detection	Ideal for cabin measurements, environmental testing, room acoustics and tests within reverberation chambers	Ideal for testing within small closed couplers, impedance tubes, or confined spaces	Ideal for holography & beamforming, sound pressure mapping, multichannel measurements, noise source identification and non-contact defect detection

When acoustic measurements need to be made in demanding environments and applications, a variety of PCB specialty microphones are available.





SPECIFICATIONS					
Model Number	**PCB 378A04**	**PCB 378A07**	**PCB 376A31**	**PCB 376A32**	**PCB 376A33**
Description	1/2" ICP® (IEPE) free-field, prepolarized microphone with mated preamplifier, TEDS compatible	1/2" ICP® (IEPE) free-field, prepolarized microphone with mated preamplifier, TEDS compatible	1/4" phantom powered 48V, 24V or 12V free-field microphone and preamplifier	1/4" phantom powered 48V, 24V or 12V free-field microphone and preamplifier	1/2" phantom powered 48V, 24V or 12V free-field microphone and preamplifier
Sensitivity	450 mV/Pa	5.8 mV/Pa	2 mV/Pa (± 3 dB)	50 mV/Pa (± 1.5 dB)	12.6 mV/Pa (± 2 dB)
Frequency Range	(±4dB) 5 Hz to 20 kHz	(±2dB) 0.13 Hz to 20 kHz	(+2 /-3dB)4 Hz to 100 kHz	(±2dB) 3.75 Hz to 20 kHz	(±2dB) 3.15 Hz to 31.5 kHz
Ideal Use	Ideal for computer disk drive testing, electric vehicle sound quality, noise source location and sound power measurements	Ideal for environmental testing	Ideal for loudspeaker design and high definition recording	Ideal for loudspeaker design and high definition recording	Ideal for loudspeaker design and high definition recording

SENSORS TO MEASURE PRESSURE AND FORCE

PIEZOELECTRIC FORCE AND PRESSURE SENSORS; PIEZORESISTIVE PRESSURE SENSORS

Piezoelectric force sensors specialize in dynamic measurements where micro-second response times are required, such as drop and impact testing, force summing, and surface strain sensing applications. Piezoelectric pressure sensors specialize in measuring dynamic pressure events, while Piezoresistive pressure sensors are suitable for dynamic measurements requiring high output and miniature size.

SPECIFICATIONS					
Model Number	**PCB 740B02**	**PCB 201 Series**	**PCB 208 Series**	**PCB 113 Series**	**Endevco 8510B Series**
Description	ICP® adhesive mount strain sensor	Quartz, low profile ICP® force rings with high resonant frequency	General purpose ICP® quartz force sensor	High frequency ICP® pressure sensor	Rugged, miniature pressure transducers
Measurement Range	100 pk με	10 to 5000 lb	10 to 5000 lb	50 to 15000 psi	1, 2 and 5 psig
Sensitivity	50 mV/με (± 20 %)	500 to 1 mV/lb	500 to 1 mv/lb (±15%)	100 to 0.5 mV/psi, and 0.44 pC/psi	200 (±50), 100 (+55/-25), and 60 (±20) mV/psi
Frequency Range	0.5-100,000 Hz	90,000 Hz upper frequency limit	36,000 Hz upper frequency limit	>500 kHz resonant frequency	55, 70, 85 kHz resonant frequency
Key Features	Ideal for ground vibration testing, modal analysis and transfer path analysis	Ideal for drop testing, product testing and micro-second duration events for end of line testing	Ideal for drop testing and integration into force plates, automation and machine tool processes and material sample testing equipment	Ideal for shock tubes and closed bombs, time-of-arrival measurements, and explosion, blast and shock wave testing	Small size, high sensitivity, and wideband frequency response

CABLES

SPECIFICATIONS				
Model Number	**010G Series**	**PCB 078G Series**	**PCB 002C Series**	**PCB 003C Series**
Description	4-conductor, shielded, FEP cable, 4-socket plug to (3) BNC plugs 5-50 ft. available	4-conductor, twisted shielded, Polyurethane cable, 4-socket plug to (3) BNC plugs 5-50 ft. available	General purpose coaxial cable, white FEP jacket, 10-32 plug to BNC plug 3-50 ft. available	Low-noise coaxial cable, blue TFE jacket, 10-32 coaxial plug to BNC plug 3-50 ft. available

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