SENSORS FOR RESEARCH & DEVELOPMENT

EXPERIENCE IS THE BEST TEACHER

DEVELOPING TOMORROW'S ENGINEERS

ACOUSTICS LABORATORY PROGRAM

DISCOUNTED SENSOR KIT ■ EXPERIMENTS (INSTRUCTOR'S GUIDE) ■ INDUSTRY EXPERT LECTURE ■ POSTER

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PCB PIEZOTRONICS INC.
MTS SYSTEMS CORPORATION

ACOUSTICS LABORATORY PROGRAM

The study of acoustics is an exciting new discipline that helps manufacturers make products quieter and more reliable. Acoustics engineers help design interior spaces, music venues and products such as musical instruments, speakers and headphones for optimal sound quality. Acoustics studies help us understand how sound is perceived, the effect on the human ear and how to preserve human hearing. This Acoustics Program provides commonly used sensors and accessories and an Instructor's Guide for a variety of experiments. Precision and array microphones are provided to perform the experiments for microphone calibration, directionality patterns, and insertion loss. The program also includes an industry expert lecture and technical poster.

INCLUDED PRODUCTS	MODEL	QTY
Precision 1/2" Free-field Microphone 15.5 dBA to 137 dB and 3.75 Hz to 20 kHz	378B02	1
Precision 1/4" Pressure Microphone 50 dBA to 173 dB and 4 Hz to 70 kHz	378A14	1
1/4" Array Microphone, BNC connector 24 dBA to 122 dB and 10 Hz to 20 kHz	130F20	4
Acoustic Calibrator (±1%) 1000 Hz	CAL200	1
1/4" Acoustic Calibrator Adapter	ADP024	1
Cable - 10 ft. (BNC to BNC)	002T10	10
Cable - 10 ft. (10-32 to BNC)	002C10	2
1/4" Microphone Holder	079B10	2
1/2" Microphone Holder	079A11	10

All sensor kits and optional products are new and within specification.

OPTIONAL PRODUCTS	MODEL
1/2" Low Noise Microphone	378A04
Surface Microphone	130B40
High Temperature Probe Microphone	377B26
1/4" High Amplitude Array Microphone	130A23
1/4" High Amplitude Free-field Microphone	378C01
Miniature Tripod	079B16
Windscreen for 1/2" Microphone	079A06
Windscreen for 1/4" Microphone	079A07
Nose Cone for 1/2" Microphone	079B21
Nose Cone for 1/4" Microphone	079C20
Cable - 10 ft. (SMB to BNC)	003V10
Accelerometer	352A21
Digiducer	333D01
4-Channel Signal Conditioner	482C15
1-Channel Battery Powered Signal Conditioner	480E09

LABORATORY EXPERIMENTS

Learning Objectives

#1 - MICROPHONE CALIBRATION

How to perform an “in-field”, single point, single frequency calibration and microphone linearity check to verify that the microphones are measuring accurately.

#2 - SOUND DIRECTIONALITY

How to measure the directivity, or directionality of sound sources and microphones.

#3 - INSERTION LOSS

Understand the fundamentals of acoustic barriers and insertion loss characteristics of various materials.

#4 - SOUND FIELD MEASUREMENTS

How sound travels in a room and how to determine direct field vs. diffuse field.

#5 - SOUND QUALITY

Understand the difference between subjective and objective sound measurements by comparing test data to a Jury Study.

#6 - HELMHOLTZ RESONATOR

Learn how to control passive noise using Helmholtz resonator techniques.

#7 - SOURCE LOCALIZATION

Learn about source localization and how humans perceive sound locations.

#8 - REVERBERATION

How to measure reverberation in a room.

Step-by-step Instructor’s Guide to experiments is provided.

POSTERS

- Acoustics
- Pressure
- Vibration
- Force & Industrial Strain

INDUSTRY EXPERT PRESENTATIONS

- Acoustics - Overview of how and why to measure sound, source-path-receiver theory, coherent and incoherent sources, and microphone sensor options.
- Pressure - Overview of sensor design, key specifications, common applications, mounting, and pressure sensor options.
- Vibration - Overview of piezoelectric theory, common terminology, accelerometer construction, mounting, and accelerometer sensor options.
- Force & Industrial Strain- Overview of sensor construction, key specifications, operational basics, mounting, and force & strain sensor options.

ADDITIONAL UNIVERSITY PROGRAM BENEFITS

- Sensor samples (non-functioning) as available
- Discounted PCB® seminar registration fees for professors and students
- “White Papers for Sensors” program for professors and students
- “Share your experiments” (photos and step-by-step) for discounts against future sensor purchases

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