# AEC206

## Binaural Test Fixture


LARSON DAVIS
A PCB PIEZOTRONICS DIV.

# Larson Davis

AEC206 Binaural
Test Fixture
Reference Manual

**Disclaimer**
The following paragraph does not apply in any state or country where such statements are not agreeable with local law:

Even though PCB Piezotronics, Inc. has reviewed its documentation, PCB Piezotronics Inc. makes no warranty or representation, either expressed or implied, with respect to this instrument and documentation, its quality, performance, merchantability, or fitness for a particular purpose. This documentation is subject to change without notice, and should not be construed as a commitment or representation by PCB Piezotronics, Inc.

This publication may contain inaccuracies or typographical errors. PCB Piezotronics, Inc. will periodically update the material for inclusion in new editions. Changes and improvements to the information described in this manual may be made at any time.

**Record of Serial Number and Purchase Date**

AEC206 Serial Number: _____

426M11 Serial Number: _____ Serial Number: _____

AEC304 Serial Number: _____ Serial Number: _____

**Recycling**
PCB Piezotronics, Inc. is an environmentally friendly organization and encourages our customers to be environmentally conscious. When this product reaches its end of life, please recycle the product through a local recycling center or return the product to:
PCB Piezotronics, Inc.
Attn: Recycling Coordinator
1681 West 820 North
Provo, Utah, USA 84601-1341
where it will be accepted for disposal

**Warranty**
For warranty information, refer to our *Terms and Conditions of Sale* on our website, www.larsondavis.com/TermsConditions.aspx.

# i.1 Contact Larson Davis

**Website**
www.larsondavis.com

**Worldwide Corporate Headquarters**
Larson Davis - a PCB Piezotronics division
3425 Walden Avenue
Depew, NY 14043-2495 USA

Toll-free (in the US): 888-258-3222
Phone: 716-926-8243
USA fax: 716-926-8215
E-mail: sales@larsondavis.com

# Table of Contents

# Module 1 Getting Started



## 1.1 Overview

The AEC206 is a binaural test fixture used for testing headphones and earbuds, both supra-aural and circum-aural as well as hearing protection devices.

In the head of the fixture are two 426M11 preamplifiers with AEC304 occluded ear simulators. It is stabilized and mounted on a steel circular base. Included are two sets of pinnae with two hardness grades.

AEC206 complies with applicable portions of the International Standards ISO 4869-3 and IEC 60318-4.

**FIGURE 1-1 AEC206 Anatomy**

# 1.2 Components

The test fixture needs to be removed with care. For this purpose, a sling is provided. With one hand pull the sling upwards, and ease the base of the test fixture out of the case with your other hand. To carry the AEC206, hold both the neck and head simultaneously.

**FIGURE 1-2 AEC206 Components**

SAE206.01 AEC206 Binaural Test Fixture with nylon sling


Pinnae
AEC-L0035 Left Pinna Shore OO-35
AEC-R0035 Right Pinna Shore OO-35

AEC-LA25 Left Pinna Shore A-25
AEC-RA25 Right Pinna Shore A-25

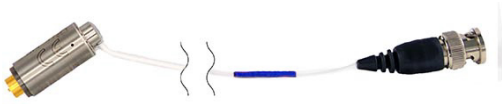
CCS050 hard case with custom foam


ADP105 adapter for a CAL250 calibrator


AEC206-RING Alignment Ring with screws

LEFT
AEC304 IEC 60318-4 Occluded Ear Simulator


LEFT 426M11 short 1/2” Preamplifiers with integrated cable & BNC connector



RIGHT
AEC304 IEC 60318-4 Occluded Ear Simulator


RIGHT 426M11 short 1/2” Preamplifiers with integrated cable & BNC connector

**TAKE NOTE** Each AEC304 and 426M11 are a mated pair. They cannot be interchanged, see 2.3.1 "Mated Pair" on page 2-3.

**FIGURE 1-3 Tools**


Silicon Grease

2.5 mm Hex Driver
For neck, vent, and set screws

2 mm Hex Driver
For alignment ring screws

1.5 mm Hex Driver
For alignment screw

## 1.2.1 Optional Accessories

**CAL250**
Battery operated precision microphone calibrator used for the calibration of the AEC304 and other Larson Davis sound measurement equipment. It has a full 114.0 dB level output signal at 251.2 Hz.

**AEC206-CUP**
Isolation test copper cup with foam insert used for isolation testing to confirm compliance with ISO 4869-3. Requires two cups.

# 1.3 Connecting to Analyzer

A basic headphone test can be made with the following mechanical setup:

**FIGURE 1-4 Basic Headphone Configuration**

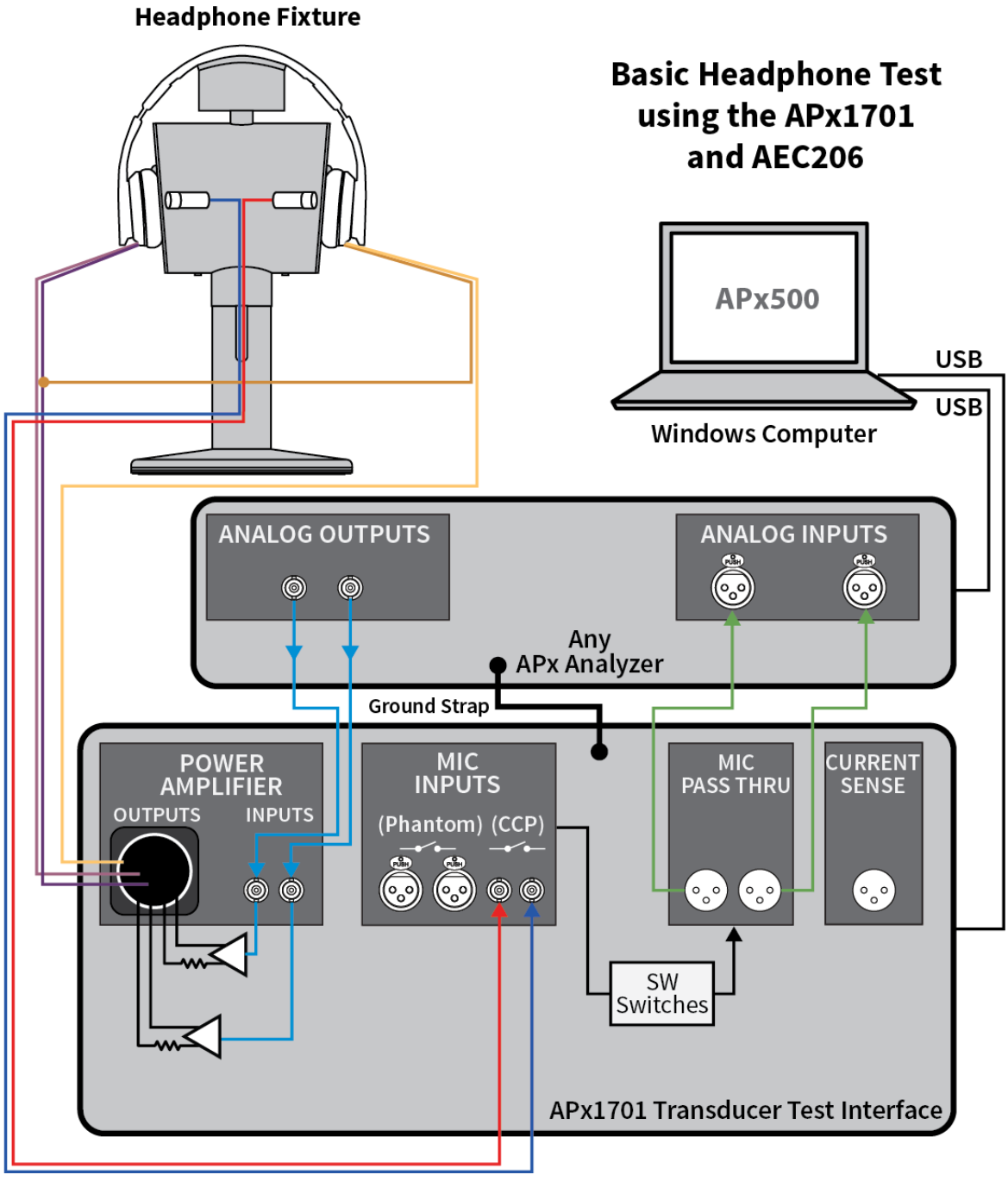
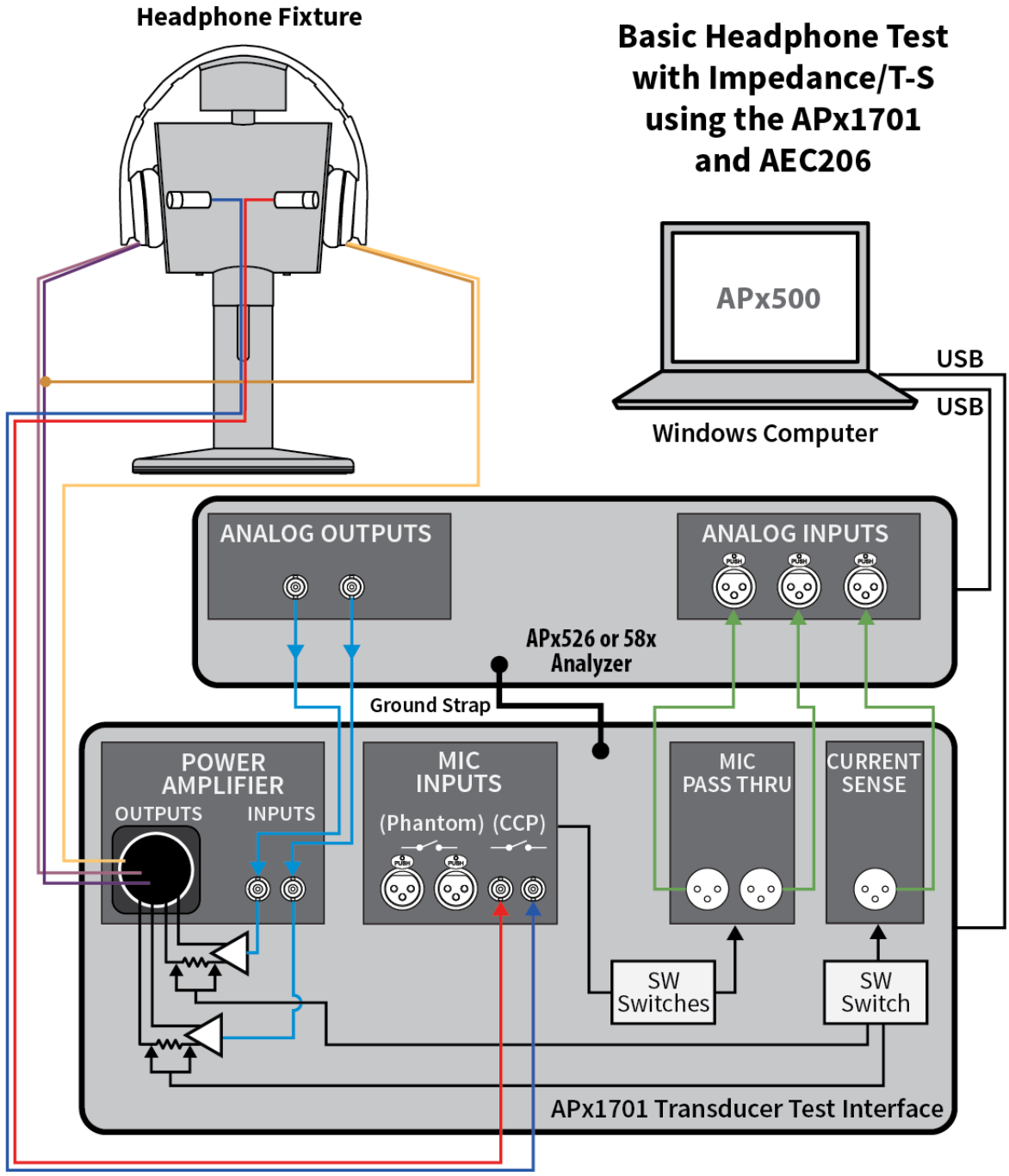


**FIGURE 1-5 Headphone Test with Impedance/T-S**



# 1.4 Performing Calibration

There are several ways the system is calibrated:

**TEDS**
The AEC304 is equipped with TEDS sensors. TEDS (Transducer Electronic Data Sheet) sensors allow TEDS enabled analyzers to automatically read sensitivity data from the sensor.

**Factory Calibration**
Periodically the AEC206 is shipped to Larson Davis for factory calibration. An alternative method for factory calibration is to remove the AEC304 and paired 426M11 and ship to Larson Davis, then reassemble when returned. This alternate method calibrates the AEC304 and 426M11 only, it does not verify that the unit complies with isolation test as described in ISO 4869-3. For information on removal, see 2.3.2 "Removing Ear Simulator and Preamplifier" on page 2-4.

**Acoustic Calibration**
A technician performs a manual acoustic calibration at the beginning and end of the day (or test) to ensure the test was performed accurately.

The following procedures describe an acoustic calibration:

**Step 1** Ensure the ADP105 adaptor is securely on the CAL250.

**Step 2** If pinna and ring are installed, remove prior to calibration. See “Removing Artificial Pinna” on page 2-3.

**Step 3** Place calibrator over the microphone. Gently secure the gasket-tight connection with a push.

**TAKE NOTE** Unless you use the CAL250 on another device, there is no need to remove the adapter between use.

**FIGURE 1-6 Calibration Setup**


**Step 4** Turn calibrator on by pressing the button.

**TAKE NOTE** The CAL250 will run for 60 seconds after you turn it on.

**Step 5** Run the calibration process on the connected analyzer.

**Step 6** When the calibration is complete, position your hand on the bottom half of the calibrator, and then bend it up or down about ten degrees, then pull outward. Do not pull outward

until the connection is loose, otherwise you may break the ADP105 or pull the AEC304 out of the head.

**FIGURE 1-7 Remove Calibrator**


**Step 7** Repeat calibration on the opposite side.

# Module 2 Assembly



## 2.1 Overview

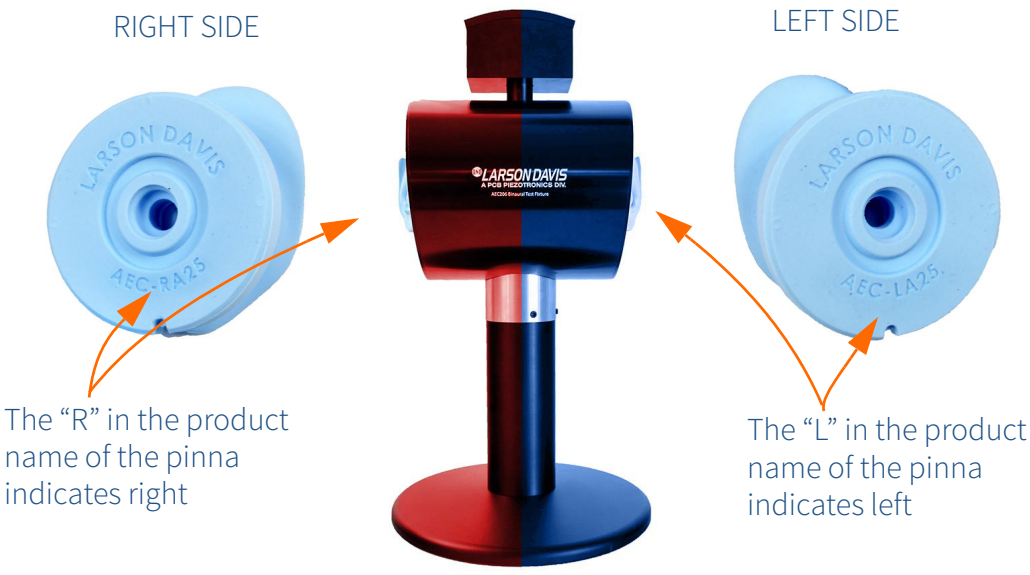
Assembly and disassembly should only be done after reading all the procedures. Additionally you can find assembly instruction videos online, see https://www.youtube.com/user/LarsonDavisPCB

### 2.1.1 Left and Right Identification

**TAKE NOTE** The preamplifier cables are marked with blue or red to identify which is left and right.

The AEC206 is binaural, meaning it is a two ear system. The “face” of the device is the side of the head with the logo, and the left and right sides are in reference to that “face”. The figure below has been colored to represent left (blue) and right (red).

**FIGURE 2-1 Left and Right**



# 2.2 Mounting Artificial Pinnae

The AEC206 has two pinna options:

- Artificial Pinna shore OO-35; left and right
    - Primary use
- Artificial Pinna shore A-25; left and right
    - Alternative option, for example, free field checks

**TAKE NOTE** The pinna can be installed before or after the ring has been installed. If the ring is already mounted, ease the pinna into the space with your finger until the edges are flush under the plate.

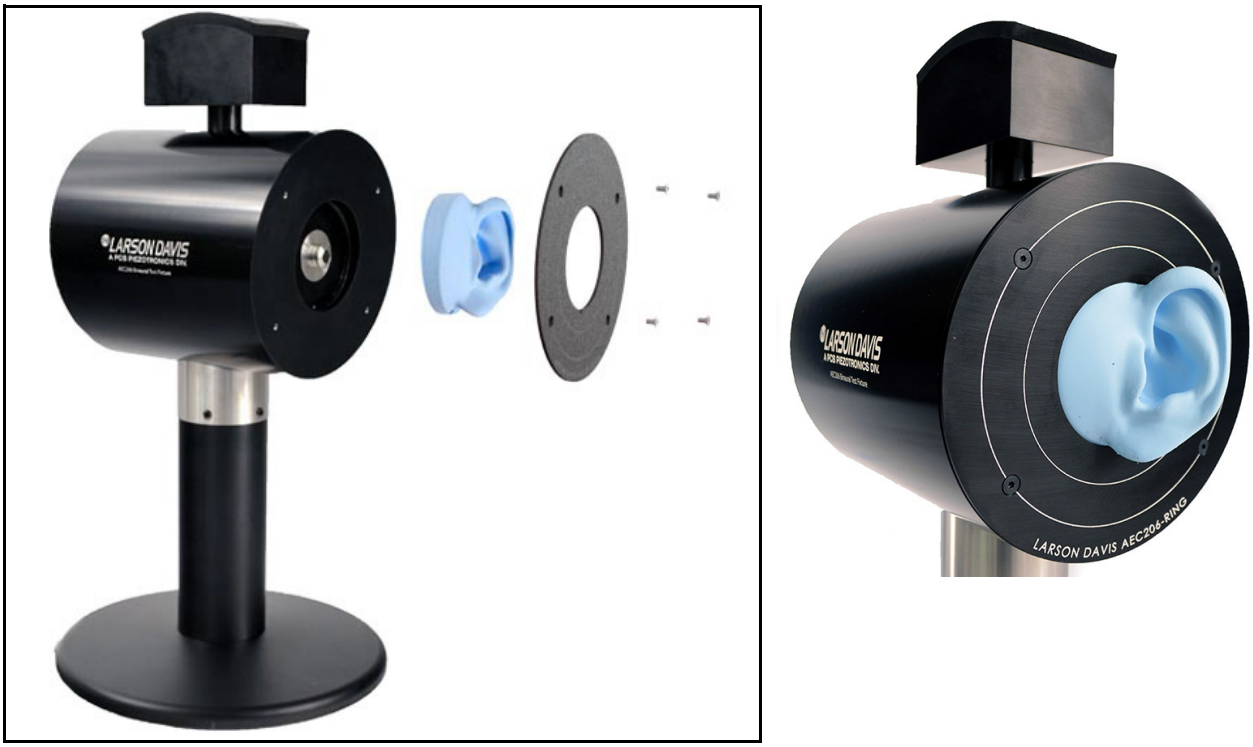
**TRY THIS** If you lift up the earlobe, the notch in the pinna and the notch in alignment ring will make a small circle. This indicates that you have mounted them correctly.

To mount the artificial pinnae, follow these steps:

**Step 1** Align the bottom notch on the back of the pinna with the alignment screw on the AEC206, push into place.

**Step 2** Mount the alignment ring using the supplied 2 mm hex driver and the four 2.5 mm screws. Gently turn the screws and stop once they are secure. Do not over tighten.

**FIGURE 2-2 Pinna Assembly**



### 2.2.1 Removing Artificial Pinna

Follow these steps to remove the pinna:

**Step 1** Use the 2 mm hex driver to remove all four screws from the ring.

**Step 2** Remove the artificial pinna and the ring.

## 2.3 Ear Simulator and Preamplifier

### 2.3.1 Mated Pair

The preamplifiers and ear simulators cannot be interchanged. They are in sets, or mated pairs. Each pair consists of one preamplifier and one occluded ear simulator. Additionally, a left pair can only be used for the left ear testing and the right pair can only be used for right ear testing. See “Left and Right Identification” on page 2-1.

The AEC304 and 426M11 are mated to ensure correct calibration data from TEDS. If devices are mixed then the calibration data provided by TEDS will be incorrect.

Refer to the labels and certifications to know which items are paired based on the serial numbers.

**FIGURE 2-3 Paired Serial Numbers**

## 2.3.2 Removing Ear Simulator and Preamplifier

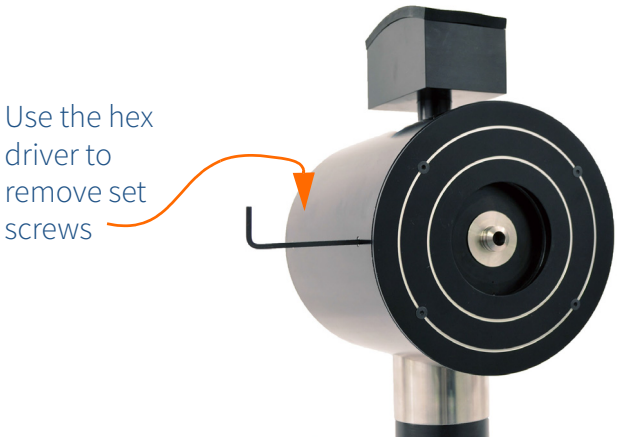
The AEC304 will already be assembled in the head of the AEC206 test fixture. Larson Davis recommends that the entire system be shipped for factory calibration, however, the following procedures describe removing the ear simulator and preamplifier to ship to Larson Davis separately. It is important to reassemble using the steps below exactly in order to maintain acoustic quality, see 2.3.3 "Assembling AEC304" on page 2-7.

To remove the AEC304 follow these steps:

**Step 1** Disconnect the preamplifier cable from the analyzer.

**Step 2** Using the supplied 2.5 mm hex driver, remove the set screws on the head by turning the recessed set screw counterclockwise. Ensure you store the screws as they are imperative to the acoustical quality of the device.

**FIGURE 2-4 Remove head set screws**




**Step 3** To release the vacuum like seal inside the head, allowing for easy removal of the head, you can loosen one AEC304 and set it out slightly, though this is not necessary. DO NOT pull cable slack; only remove <1 inch of cable.
Alternatively, to assist in removal, you can attach the calibrator and pull horizontally. Extreme force is not necessary and may result in damaging the equipment.

**Step 4** Using the supplied 2.5 mm hex driver, release the clamp on the neck by turning the neck screws counterclockwise until two or three threads are visible.

**FIGURE 2-5 Loosen neck set screws**

**Step 5** Hold the base down with one hand and pull from the hat to separate the head and the neck. There is a vacuum seal to the head and the neck, additional force may need to be applied to the base, however avoid twisting, this may cause the cables to break. Set head next to the stand with the cables loose.

**FIGURE 2-6 Remove head and neck**


**Step 6** Gently pull the wires from the gasket by pulling away from the stand. If they don't come loose easily, use a hex driver to remove the washer and gasket, then gently pull the cables out of the gasket.

**FIGURE 2-7 Gently remove cable from stand**

**Step 7** Gently pull the AEC304 completely out of the head. Feed the cable up through the head and out the side.

**FIGURE 2-8 Remove AEC304**


**Step 8** Separate the 426M11 from the AEC304 by unscrewing the two devices. Do not unscrew the ear canal extension.

**FIGURE 2-9 Separate Preamplifier and Ear Simulator**

## 2.3.3 Assembling AEC304

Ensure the correct AEC304 and mated 426M11 are to be installed on the correct side. To learn more see 2.1.1 "Left and Right Identification" on page 2-1.

**FIGURE 2-10 Left and Right**


**TAKE NOTE** It is important to follow these steps exactly to ensure the quality of the acoustic testing.

To install AEC304 follow these steps:

**Step 1** Connect AEC304 to 426M11 preamplifier by pushing together and screwing hand-tight.

**Step 2** Insert assembly into the cavity of the head, feeding the cable down through the bottom. Push until set.

**FIGURE 2-11 Insert AEC304**

**Step 3** Using the 2.5 mm hex driver, unscrew the washer/gasket screw completely. Pull off assembly, and then separate the washer from the gasket.

**FIGURE 2-12 Remove Gasket**

**Step 4** Place head next to stand. See Figure 2-13.

**Step 5** Measure approximately six inches of cable starting from the neck insert and running down, and at that spot gently push the cables into the gasket as shown below. The length of cable between the gasket and neck insert should be ~6 in.

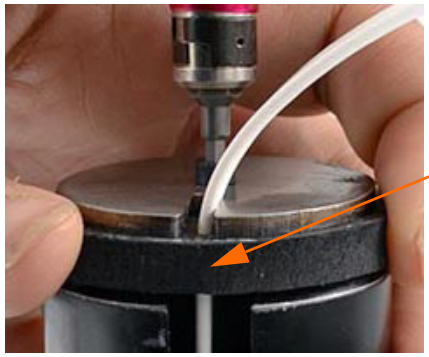
**FIGURE 2-13 Insert cables into gasket**

**TAKE NOTE** Align the gasket slit with the center of the cavity in the neck, so the cables run down into the neck.

**Step 6** Place gasket on the neck with cables running down into the cavity. Place washer on top and screw together with a torque of 20 oz-in to provide an optimal seal.

**Step 7** While turning the screw, squeeze the slit of the gasket together. After you let go, the slit should be fully closed.

**FIGURE 2-14 Secure gasket**



Squeeze the slit in the gasket shut as you tighten the screw.

**Step 8** Liberally grease the edges of the gasket.

**FIGURE 2-15 Grease gasket**

**Step 9** Feed the slack of the cables into the head. Ensure all cables are all the way in before moving on to the next step, if the

cables are not in when placing the head, you risk cutting the cables.

**FIGURE 2-16 Cable slack**

**Step 10** With the head vertically aligned with the neck, mount the head onto the neck. You will feel resistance and a pressure build up in the head, this is normal.

**CAUTION** Do not twist head or neck when connecting.

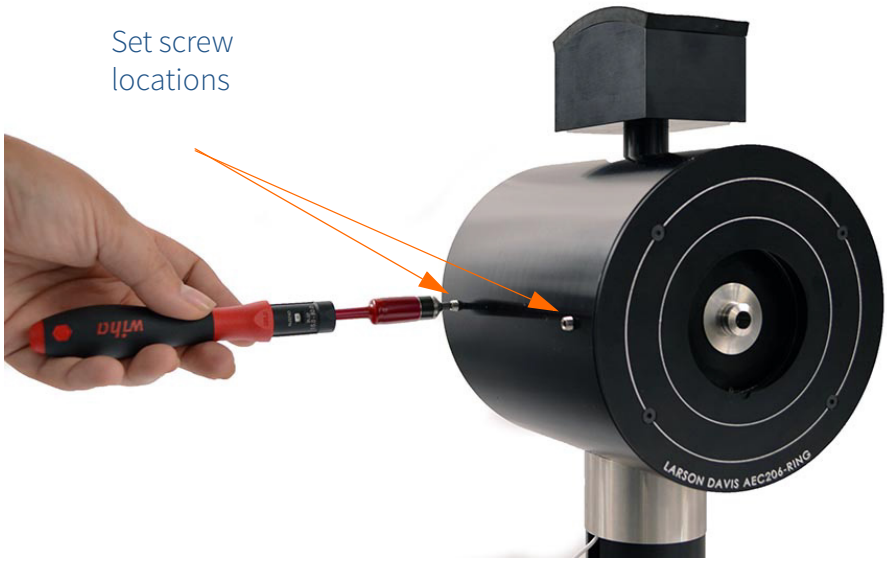
**FIGURE 2-17 Mount head on neck**

**Step 11** Screw neck screws until set, hand-tight.

**FIGURE 2-18 Neck set screws**


**Step 12** Ensure the AEC304 is completely pushed into the head. Using a torque screwdriver set to 40 oz-in, turn the set screws on the head until push rod is clamped.

**FIGURE 2-19 Set push rod**



# 2.4 Storage

Use the sling to ease the AEC206 back into the case; With the sling around the space between the hat and the head, hold the sling and the base of the device, and then ease into the case. You can store the ear simulator and preamplifier in the AEC206, and not in their cases. Package the pinnae in the plastic bags that were provided before placing in case, to keep them clean.

**FIGURE 2-20 Case with Components**

# Appendix A Technical Specifications



## A.1 AEC206

### Standards Met

AEC206
IEC 61010-1 (2010-06) Edition 3
ISO 4869-3:2007 Section 5.1.4 Acoustic Isolation
Acoustics -- Hearing protectors -- Part 5

- Measurement of insertion loss of ear-muff type protectors using an acoustic test fixture

AEC304
IEC 60318-4:2010 occluded-ear simulators

**Table A.1 Safety Marks**

| | |
|---|---|
| CE | CE-mark indicates compliance with the EMC and Low Voltage, and RoHS Directives |
|  | WEEE mark indicates compliance with the EU WEEE Directive |

### Options

CAL250 Class 1 acoustic calibrator with 1 in opening and output of 114 dB re 20 µPa at 251.2 Hz. ADP019 adapter for 1/2" microphones and calibration certificate
AEC206-CUP AEC206 acoustic isolation test cup
Replacement pinna

- AEC-L0035 Left pinna with hardness Shore 00-35
- AEC-R0035 Right pinna with hardness Shore 00-35
- AEC-LA25 Left pinna with hardness Shore A-25
- AEC-RA25 Right pinna with hardness Shore A-25

AEC206-RING alignment ring for AEC206
AEC206-SPARE kit of spare parts for the AEC206 including hex drivers, grease, screws.

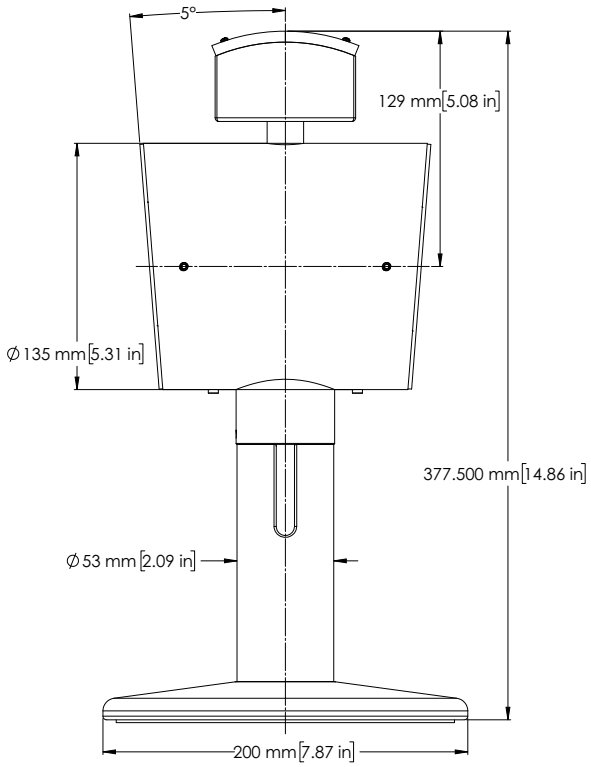
### Personal Characteristics

Weight (case and all components): 18.3 kg (41 lbs)
Weight (test fixture only): 9.46 kg (21 lbs)
Size (height x width): 37.8 cm x 20 cm (7.9 in x 14.9 in). See Figure A-1 Dimensions.
Cable Length: 5 ft (1.5 m)
Electrical Connector: BNC

### Microphone

Information for the 377C13 microphone included in the AEC304 occluded ear simulator can be found at www.pcb.com

**FIGURE A-1 Dimensions**



# A.2 426M11 Microphone Preamplifier

### Performance

Nominal Microphone Diameter 1/2 in
Gain: -0.20 dB
Frequency Response(± 0.2 dB) (re 1 kHz): 10 to 126,000 Hz
Frequency Response (-3 dB) (re 1 kHz): <0.6 Hz
Phase Linearity (<1 °): 63 to 20,000 Hz
Distortion (3 V rms input at 1 kHz): <-70 dB
Output Slew Rate: 2 V/µS
TEDS Compliant: Yes

### Environmental

Temperature Range (Operating): -40 to 70 °C (-40 to 158 °F)
Temperature Range (Storage): -40 to 85 °C (-40 to 185 °F)
Temperature Response: <0.03 dB
Humidity Range (Non-Condensing): 0 to 95% RH
Humidity Sensitivity: <0.03 dB

### Electrical

Excitation Voltage: 20 to 32 VDC
Constant Current Excitation: 2 to 20 mA
Impedance (Input): $2x10^{10}$ Ohm (20 G?)
Capacitance (Input): 0.2 pF
Output Bias Voltage: 10 to 14 VDC
Impedance (Output): <50 Ohm ?
Output Voltage: ± 8 V
TEDS Compliant: Yes

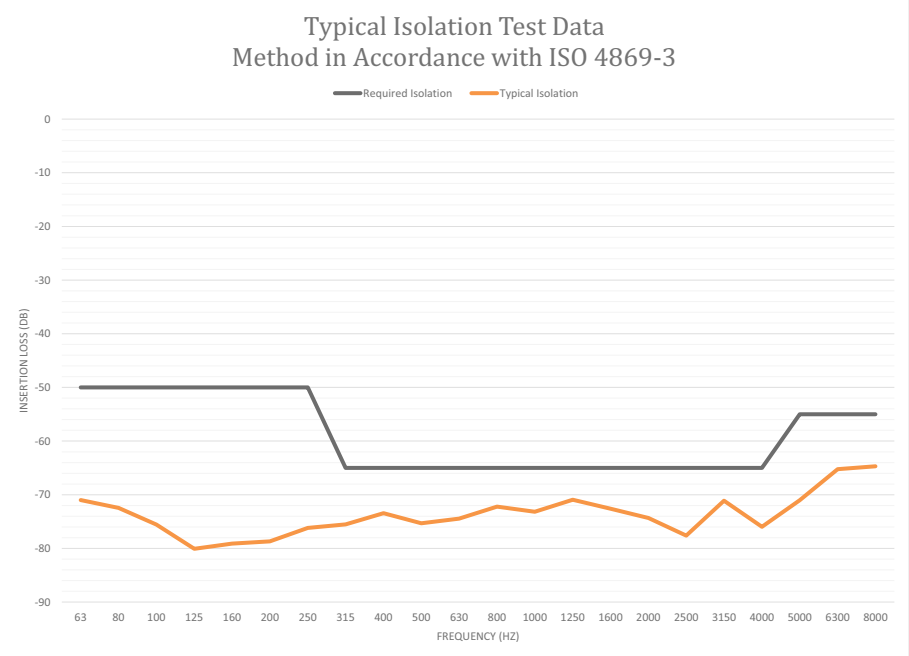
### Physical

Housing Material: Stainless Steel
Size (Diameter x Length): 12.7 mm x 35.7 mm (0.5 in x 1.4 in)
Weight: 3.6 gm (0.13 oz)
Electrical Connector: BNC Plug
Cable Length: 1.5 m (5 ft)
Mounting Thread (Microphone to Preamplifier): 11.7 mm - 60 UNS

# A.3 Isolation Testing

Tested in a random incidence field per 5.2.2 method in accordance with ISO 4869-3.

**FIGURE A-2 Isolation Testing**



# A.4 Transfer Functions

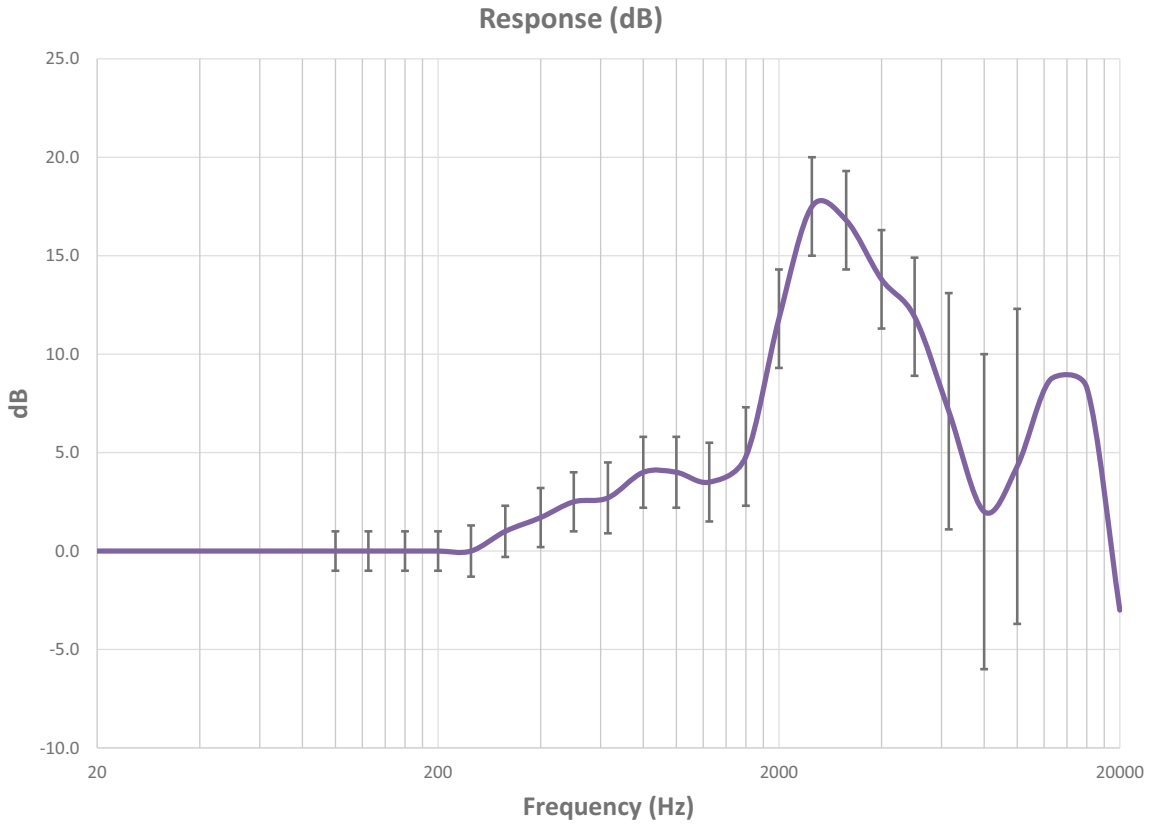
The AEC206 is designed for headphone and earbud testing, where the sound is closely coupled to the ear. For free field and diffuse field head related transfer functions, it is assumed that a head and torso would be present rather than the actual geometry of the AEC206. The following transfer functions are in accordance with ANSI S3.36 (2012).

### Free Field Response

**Table A.2 Free Field Response**

| Frequency (Hz) | Response (dB) | Tolerance (dB) |
|---|---|---|
| 100 | 0.0 | ±1 |
| 125 | 0.0 | ±1 |
| 160 | 0.0 | ±1 |
| 200 | 0.0 | ±1 |
| 250 | 0.0 | ±1.3 |
| 315 | 1.0 | ±1.3 |
| 400 | 1.7 | ±1.5 |
| 500 | 2.5 | ±1.5 |
| 630 | 2.7 | ±1.8 |
| 800 | 4.0 | ±1.8 |
| 1000 | 4.0 | ±1.8 |
| 1250 | 3.5 | ±2 |
| 1600 | 4.8 | ±2.5 |
| 2000 | 11.8 | ±2.5 |
| 2500 | 17.5 | ±2.5 |
| 3150 | 16.8 | ±2.5 |
| 4000 | 13.8 | ±2.5 |
| 5000 | 11.9 | ±3 |
| 6300 | 7.1 | ±6 |
| 800 | 2.0 | ±8 |
| 10000 | 4.3 | ±8 |

**FIGURE A-3 Free Field Response**

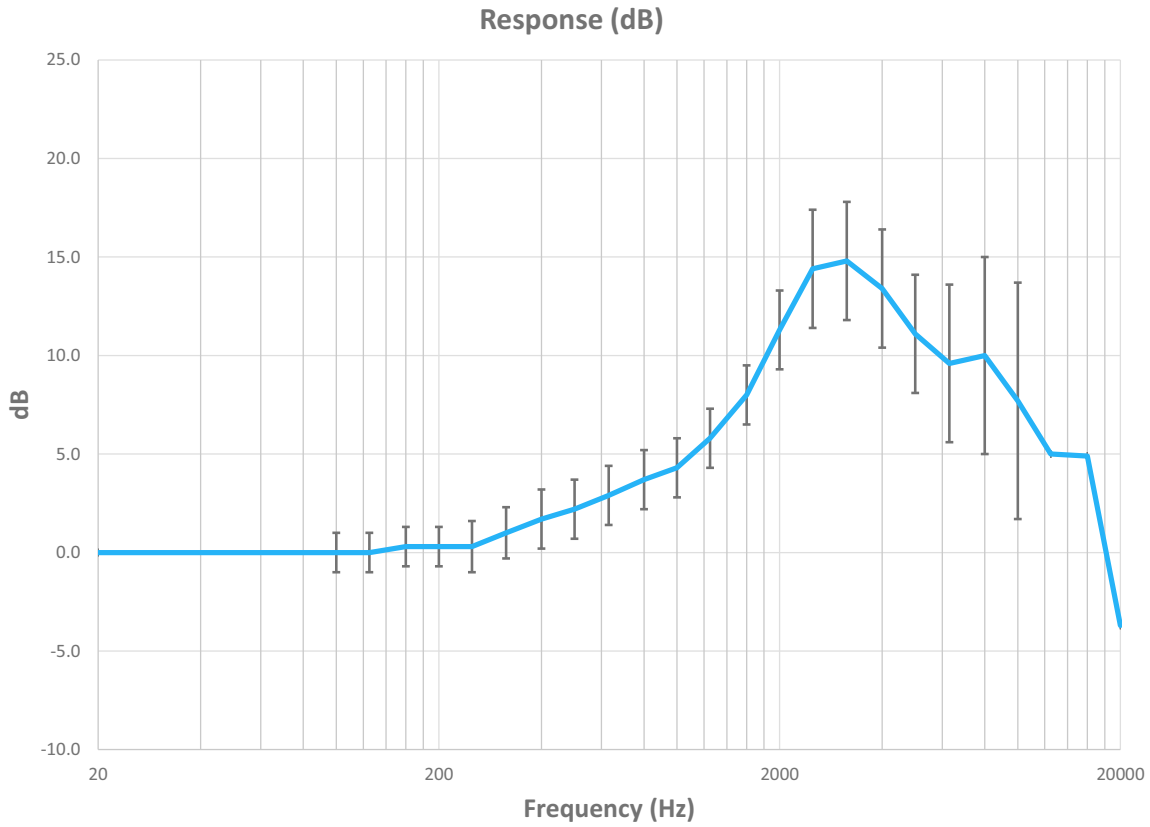


## Diffused Field Response

### Table A.3 Diffused Field Response

| Frequency (Hz) | Response (dB) | Tolerance (dB) |
|---|---|---|
| 100 | 0.0 | ±1 |
| 125 | 0.0 | ±1 |
| 160 | 0.3 | ±1 |
| 200 | 0.3 | ±1 |
| 250 | 0.3 | ±1.3 |
| 315 | 1.0 | ±1.3 |
| 400 | 1.7 | ±1.5 |
| 500 | 2.2 | ±1.5 |
| 630 | 2.9 | ±1.5 |
| 800 | 3.7 | ±1.5 |
| 1000 | 4.3 | ±1.5 |
| 1250 | 5.8 | ±1.5 |
| 1600 | 8.0 | ±1.5 |
| 2000 | 11.3 | ±2 |
| 2500 | 14.4 | ±3 |
| 3150 | 14.8 | ±3 |
| 4000 | 13.4 | ±3 |
| 5000 | 11.1 | ±3 |
| 6300 | 9.6 | ±4 |
| 800 | 10.0 | ±5 |
| 10000 | 7.7 | ±6 |

**FIGURE A-4 Diffused Field Response**



## Ear Drum (DRP) to Ear Reference Point (ERP) transfer function

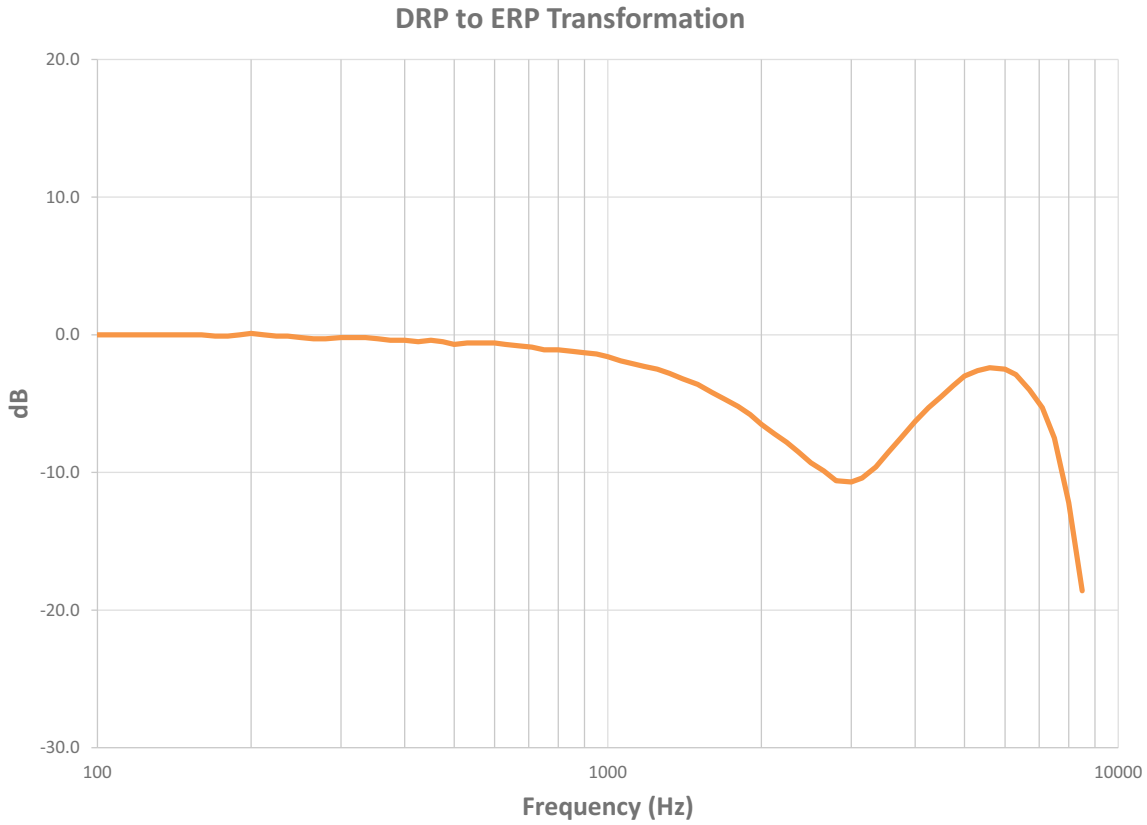
### Table A.4 DRP to ERP Transfer Function (Sheet 1 of 2)

| Frequency (Hz) | $S_{DE}$ |
|---|---|
| 100 | 0.0 |
| 106 | 0.0 |
| 112 | 0.0 |
| 118 | 0.0 |
| 125 | 0.0 |
| 132 | 0.0 |
| 140 | 0.0 |
| 150 | 0.0 |
| 160 | 0.0 |
| 170 | -0.1 |
| 180 | -0.1 |
| 190 | 0.0 |
| 200 | 0.1 |
| 212 | 0.0 |
| 224 | -0.1 |
| 236 | -0.1 |
| 250 | -0.2 |
| 265 | -0.3 |
| 280 | -0.3 |
| 300 | -0.2 |
| 315 | -0.2 |
| 335 | -0.2 |
| 355 | -0.3 |
| 375 | -0.4 |
| 400 | -0.4 |
| 425 | -0.5 |
| 450 | -0.4 |
| 475 | -0.5 |
| 500 | -0.7 |
| 530 | -0.6 |
| 560 | -0.6 |
| 600 | -0.6 |
| 630 | -0.7 |
| 670 | -0.8 |
| 710 | -0.9 |
| 750 | -1.1 |
| 800 | -1.1 |
| 850 | -1.2 |
| 900 | -1.3 |

### Table A.4 DRP to ERP Transfer Function (Continued) (Sheet 2 of 2)

| Frequency (Hz) | $S_{DE}$ |
|---|---|
| 950 | -1.4 |
| 1000 | -1.6 |
| 1060 | -1.9 |
| 1120 | -2.1 |
| 1180 | -2.3 |
| 1250 | -2.5 |
| 1320 | -2.8 |
| 1400 | -3.2 |
| 1500 | -3.6 |
| 1600 | -4.2 |
| 1700 | -4.7 |
| 1800 | -5.2 |
| 1900 | -5.8 |
| 2000 | -6.5 |
| 2120 | -7.2 |
| 2240 | -7.8 |
| 2360 | -8.5 |
| 2500 | -9.3 |
| 2650 | -9.9 |
| 2800 | -10.6 |
| 3000 | -10.7 |
| 3150 | -10.4 |
| 3350 | -9.6 |
| 3550 | -8.5 |
| 3750 | -7.5 |
| 4000 | -6.3 |
| 4250 | -5.3 |
| 4500 | -4.5 |
| 4750 | -3.7 |
| 5000 | -3.0 |
| 5300 | -2.6 |
| 5600 | -2.4 |
| 6000 | -2.5 |
| 6300 | -2.9 |
| 6700 | -4.0 |
| 7100 | -5.3 |
| 7500 | -7.5 |
| 8000 | -12.2 |
| 8500 | -18.6 |

**FIGURE A-5 DRP to ERP Transfer Function**



# A.5 Declaration of Conformity

PCB PIEZOTRONICS Inc.
LARSON DAVIS
A PCB PIEZOTRONICS DIV.

*EU Declaration of Conformity PS102*
***In Accordance with ISO/IEC 17050***

| | |
|---|---|
| **Manufacturer:** PCB Piezotronics, Inc.<br>3425 Walden Avenue<br>Depew, New York 14043 USA | **Authorized European Representative:** PCB Piezotronics Europe GmbH<br>Porschestrasse 20-30<br>41836 Hückelhoven,Germany |

**Certifies that type of equipment:** Artifical Ear Coupler Systems

**Whose Product Models Include:** AEC(M)XXX, AEC(M)XXX.Y, ACE(M)XXX-Y, ACE-Z-Z, ACE(M)XXX-*

Note:
(M) – indicates an private labeled version
"XXX" – is a place holder for up to 3 numbers
"Y"or"-Y" – is a place holder for a letter or number indicating optional configurations
"Z-Z" – is a place holder for up to four alpha numeric characters
"*" – indicates a decriptive suffix

**This declaration is applicable to all Artificial Ear Couplers and associated accessories of the above series which have the CE mark on their data sheets and where those data sheets refer to this Declaration of Conformity. The data sheets for all model numbers referenced above which include the CE mark on such data sheets and refer to this Declaration of Conformity are hereby incorporated by reference into this Declaration.**

| | | |
|---|---|---|
| **Conform to the following EU Directive(s) when installed per product documentation:** | 2014/30/EU<br>2011/65//EU | EMC Directive<br>RoHS Directive |

**Standards to which Conformity is Declared:**

| | | |
|---|---|---|
| **Harmonized Standards** | EN 61326-1:2013 | Electrical equipment for measurement, control and laboratory use – EMC requirements |
| | EN 61326-2-3:2013 | Electrical equipment for measurement, control and laboratory use - EMC Safety Standard |
| | EN 61010-1:2010 | Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements |
| | EN 50581:2012 | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances |
| **Emissions Test Standards** | EN 55011:2009+ A1:2010 | Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of Measurement Class B, group 1 |
| **Immunity Test Standards** | EN 61000-6-1:2007 | Electromagnetic Compatibility (EMC) - Generic standards — Immunity for residential, commercial and light-industrial environments |
| | EN 61000-6-2:2005/ AC:2005 | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards — Immunity for industrial environments |
| **Other Standards Applied (non-OJEU)**<br>**Immunity Test Standards** | EN 61000-4-2:2001<br>EN 61000-4-3:2006<br>EN 61000-4-4:2004<br>EN 61000-4-5:2005<br>EN 61000-4-6:2006<br>EN 61000-4-8:2001 | Electrostatic discharge (ESD)<br>Radiated, radio-frequency, electromagnetic field immunity<br>Electrical fast transient (EFT) / Burst immunity<br>Surge immunity<br>Immunity to RF conducted line disturbances<br>Power frequency magnetic field immunity |
| **Test Reports** | EMC Report<br>Safety Report | EMC of Microphones, Preamplifiers and Signal Conditioners contained in the AEC series system were tested independently for EMC and Safety. Reference PS064, PS075, PS077, and PS083. |

*I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) Standard(s) and this Declaration is issued under the sole responsibility of PCB Piezotronics as the manufacturer:*

**Place:** Provo, UT **Date:** 08/22/17

Signature: Carrie Termin
Name: Carrie Termin
Title: Regulatory Affairs and Product Certification Specialist

**- ISO 9001 Certified PCB Piezotronics, Inc. Phone: 716-684-0001 FAX: 716-684-0987**

PS102 Rev. C 08/22/2017 Page 1 of 1