

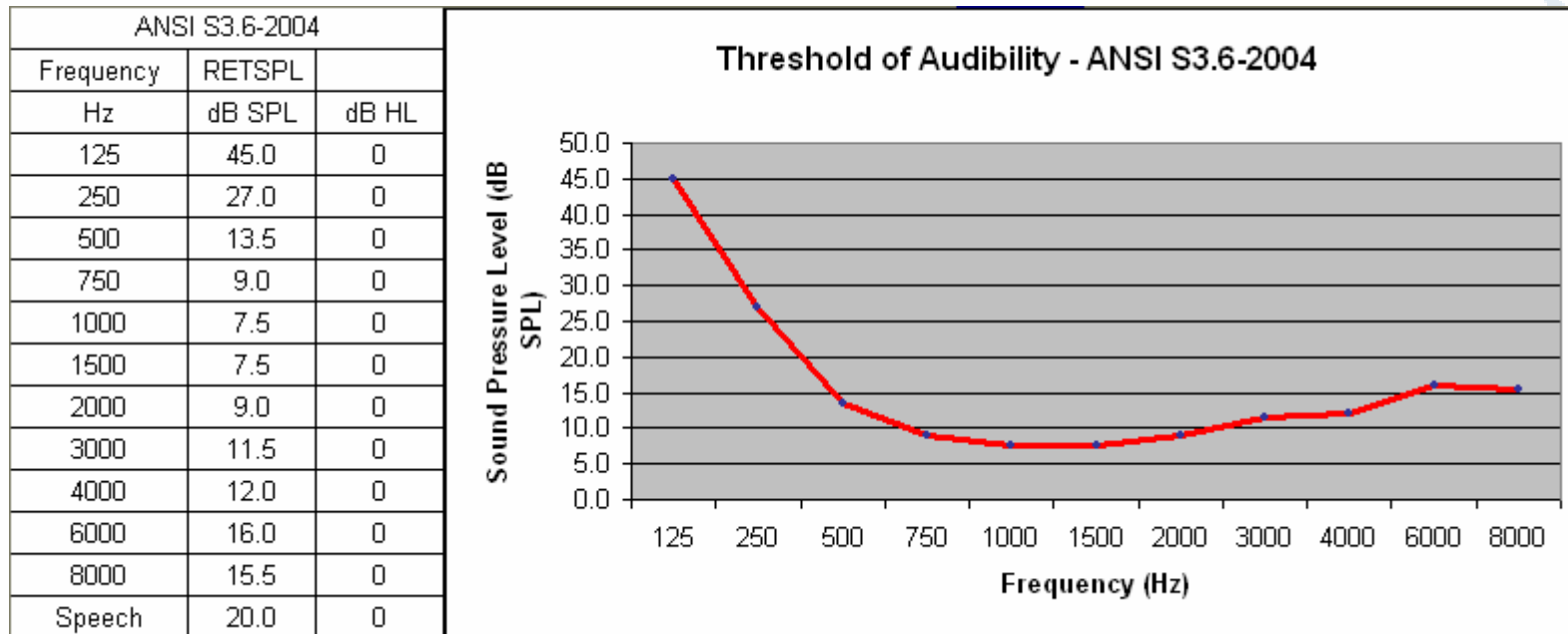


**Portable,
Rugged and Accurate**

Audiometer Calibration System

AUDit V2.0 Update

0 dB Hearing Level = x dB SPL on SLM



0 dB reference in Audiogram corresponds to RETSPL

ISO 389, ANSI S3.6 and manufacturers define the reference zero (RETSPL) levels

- RETSPL differs per earphone model and coupler combination
- For ANSI and for IEC/ISO

Supra Aural Earphones (Air Conduction)



EARPHONE	RETSPL	COUPLER
• TDH 39	ANSI S3.6 Tbl 6	ANSI S3.7 (NBS-9A) AEC100
• TDH 39	ISO 389-1 ¹	IEC 60318-3 ³ AEC100 or AEC101 + adapter
• TDH 49	ANSI S3.6 Tbl 6 ²	ANSI S3.7 (NBS-9A) AEC100
• TDH 50	ANSI S3.6 Tbl 6 ²	ANSI S3.7 (NBS-9A) AEC100
• HDA 280	Sennheiser ²	ANSI S3.7 (NBS-9A) AEC100
• DT-48	ISO 389-1 Tbl 1	IEC 60318-3 AEC100 or AEC101 + adapter
• Holmberg 8103		

1 – When using ‘Swedish’ option

2 – Differs from ISO 389-1 table 2

3 – IEC 60318-3:1998 replaced IEC 60303 as specified in ISO 389-1

Circumaural Earphones (Air Conduction)



EARPHONE	RETSPL	COUPLER	
• HDA200 (type1)	ANSI S3.6 Tbl C.1 ¹	IEC 60318-2	AEC101
• Koss HV/1A (type 2)	ANSI S3.6 Tbl C.1 ¹	IEC 60318-2	AEC101

1 - Differs from ISO 389-5:2006 and ISO 389-8:2004

Insert Earphones (Air Conduction)



EARPHONE	RETSPL	COUPLER
• Occluded ear	ISO 389-2 IEC 60318-4	AEC104
• ER-3A	ISO 389-2 IEC 60318-5 ¹	AEC102
• ER-3A	ISO 389-2 IEC 60318-4 ²	AEC104
• 3A (EAR) ISO 389-2	IEC 60318-4 ²	AEC104

1 – IEC 60318-5:2006 replaced IEC 60126:1973 as specified in ISO 389-2

2 – IEC 60318-4:2010 replaced IEC 60711:1981 as specified in ISO 389-2

ANSI S3.6-2004 Normative standards shared w/ IEC/ISO



- ISO 389-1, -2, -3, -4, -5, -7, -8 Zero reference level (RETSPL)
 - IEC 60373 Mechanical coupler (mastoid)
 - IEC 60318-1, -2, -3 Simulator for supra-aural, HF (16kHz)
 - IEC 60645-2, -4 Audiometry: speech and extended frequency
 - IEC 60711 Occluded ear simulator
 - IEC 61094-4 Microphone: WS2P microphone
- ➔ High frequency (up 16 kHz) must be done with WS2P ½” pressure microphone ➔ AEC101 + 2559

NOTE: RETSPL defined in ANSI S3.6 does not always match ISO 389

Audiometer Calibration Parameter



Audiometer Tests	831	824-AUD	AUDit
Hearing level	✓	✓	✓
Bone Conduction	✓	✓	✓
Linearity	✓	✓	✓
Crosstalk	✓	✓	✓
Narrow band	✓	✓	✓
Broadband	✓	✓	✓
Speech	✓	✓	✓
THD		✓	✓
Pulse Test		✓	✓
Frequency Modulation		✓	✓
Ambient Noise level		✓	✓
Masking		✓	✓

SLM only mode is made easy with “reference” / normalized view.
 831 stores up to 4 reference curves.

AUDit Features



- Instrument Database
 - RETSPL for earphones
 - Correction factors for instrumentation
 - Includes serial numbers
 - Import function
- Automated test
 - Fast and simple
 - Pass / Fail indication
- Calibration Database
 - Track evolution of audiometer
 - Recall reports
- Reporting
 - Full or selective test reports

While you can do the tests manually on the SLM, AUDit minimizes the pencil/paper requirements as well as prerequisite knowledge.

Runs on laptop

Win XP, Win Vista

Audiometer Calibration Standards



- IEC 60645-1:2001 Pure Tone Audiometers
- IEC 60645-2:1992 Equipment for Speech Audiometry
- IEC 60645-4:1994 Equipment for Extended High-Frequency Audiometry
- ANSI S3.6-2004 Specifications for Audiometer
 - Specifies classes of audiometers and their required precision and features
- ANSI S3.1-1991 Specifications for Booth Measurements
 - Requirements for ambient noise in audiometric testing areas and booths
- LD AUDit tests according to ANSI S3.6-2004

New revisions of IEC 60645-1 and 60645-2 expected in 2012



- 1" microphone: 2575
- ANSI S3.7:1995 NBS-9A
- ISO 60318-3:1998
- Calibrate with grid
- Use in AEC100 without grid (per standard)
- Use with AMC493A for bone vibrator tests
- Use with AEC103 for insert earphones

AEC100 NBS 9-A Coupler

A rugged artificial ear for testing TDH earphones



COMPONENTS	DESCRIPTION
Microphone	2575 1" pressure mic (not included)
Preamplifier	PRM902 1/2" dia. low noise preamp (not incl.)
MAE100.1	NBS 9-A coupler
SP-MAE100.40	Coupler base
MAE100.3	Protective cap
MAE100.6	Earphone retaining ring
Weight	4.5 N mass and handle
ACC001	Vibration isolation pillow
SPECIFICATIONS	
Materials	Stainless steel base, coupler & mass, alum. ring
Diameter	3.2 in 82 mm max
Height	2.5" (64 mm) 4.4" (110 mm with ring)
Weight	5.5 lbs 2.5 kg

AEC101

→ IEC 60318-1, -2 Coupler 6 cm³



- 1/2" microphone: 2559
- ISO 60318-1:1998
- ISO 60318-2:1998
- ISO 60318-3 with adapter
- Always use with grid cap
- Type 1 and type 2 adapters
- Use with AMC493A for bone vibrator tests
- Use with AEC102 for insert earphones

AEC101 IEC60318 Coupler

An optional coupler for extended frequency earphone testing



COMPONENTS	DESCRIPTION
Microphone	2559 1/2" random incidence (not included)
Preamplifier	PRM902 1/2" dia. low noise preamp (not incl.)
AEC101.F	IEC 60318-1 coupler
MAEC101.06	Type 1 adaptor plate
MAEC101.07	Type 2 adaptor plate
MAE100.6	Earphone retaining ring
Weight	4.5 N standard, 9.5 N bag for circumaural earphones
ACC001	Vibration isolation pillow
CCS002	Fiberglass reinforced weather-tight case
SPECIFICATIONS	
Materials	Stainless steel base and coupler cavity, Delrin® conical ring, aluminum plates and retainer ring
Pressure Leak	Custom precision orifice
Dimensions	2.2 in H x 3.2 in dia. 56mm H x 81mm dia.
Coupler Weight	3.2 lbs 1.4 kg

AEC201 & 377A13 can be used with Model 831

AEC102 / AEC103

→ IEC 60126 Couplers

2 cm³



- Use AEC102 for ½" microphone
- Use AEC103 for 1" microphone



AEC104

→ IEC 60711 Coupler



- Includes matched ½" microphone



AMC493A → IEC 60373 Mechanical Coupler



- Use with AEC100 or AEC101
- Calibrate as pair with AEC100 or AEC101
- Comes with weight ring
- For use with B71 bone vibrator

AMC493A Artificial Mastoid
Use this innovative transducer for bone vibrator testing

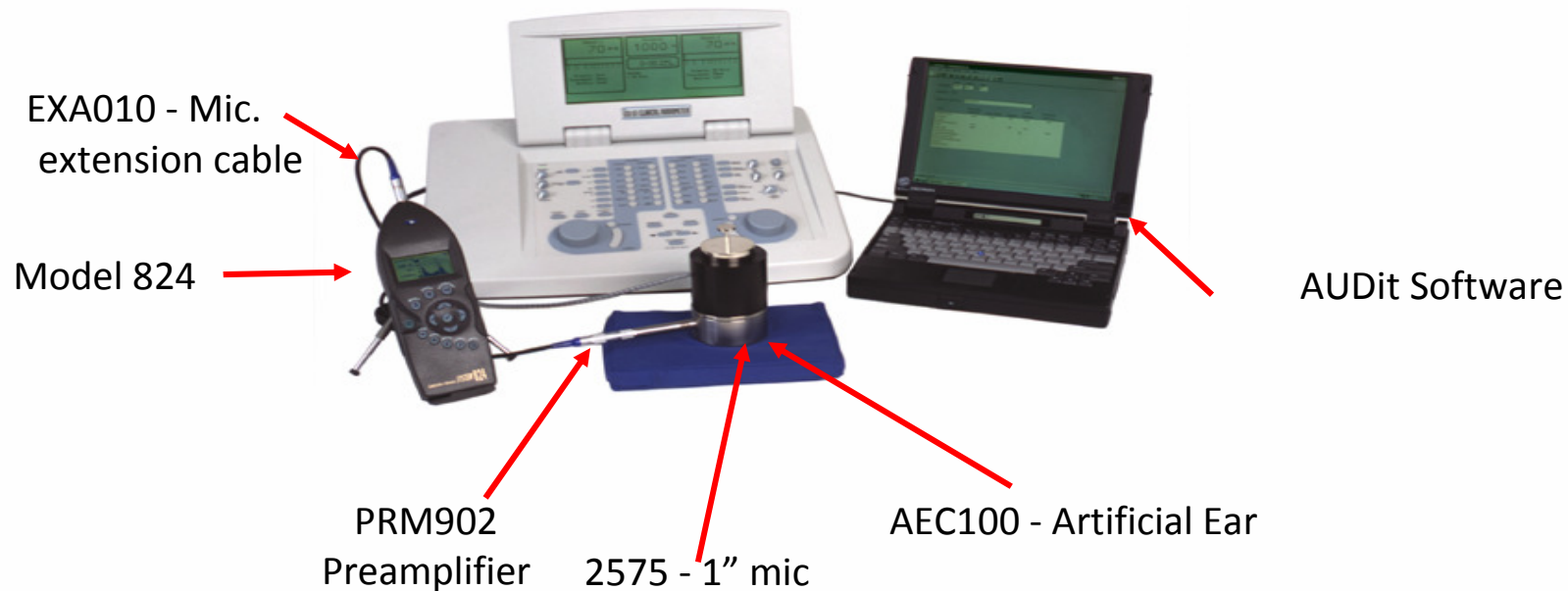


COMPONENTS	DESCRIPTION
AMC493A	Artificial mastoid coupler (use with LD AEC100)
SPECIFICATIONS	
Frequency Range	250 Hz - 8 kHz, individually calibrated
Static Force	5.4 N with added mass ring
Materials	Black anodized, laser etched aluminum disk with polymeric inserts, stainless steel mass
Dimensions	0.42 in H x 1.2 in dia. 10.8 mm H x 30 mm dia.
Weight	0.3 oz. 8.7 g, coupler only

LD Audiometer Calibration System



The Larson Davis 824 Audiometric Calibration System combines the powerful real-time frequency analysis features of the 824, and the AUD software to automatically compare test results against tolerance limits based on world standards for audiometers



Since 20+ years LD offers audiometer calibration systems based on sound level meters, starting with Model 800B!