Neuro-Audio

Version 2010

one device for all audiological tests

- Auditory brainstem response (ABR)/Brainstem evoked response audiometry (BERA) (air and bone conduction) including EABR
- Auditory steady-state response (ASSR) with possibility of simultaneous stimulation at 4 frequencies for both ears (multi-ASSR)
- Transient evoked otoacoustic emission (TEOAE)
- Distortion product otoacoustic emission (DPOAE)
- Spontaneous otoacoustic emission (SOAE)
- Middle- and long-latency auditory evoked potentials (MLR, LLR/CAEP)
- Pure tone audiometry (PTA) (air and bone conduction)
- Electrocochleography (ECochG)
- Cognitive evoked potentials (MMN, P300)

NEUROSOFT

Medical Diagnostic Equipment Development and Manufacture
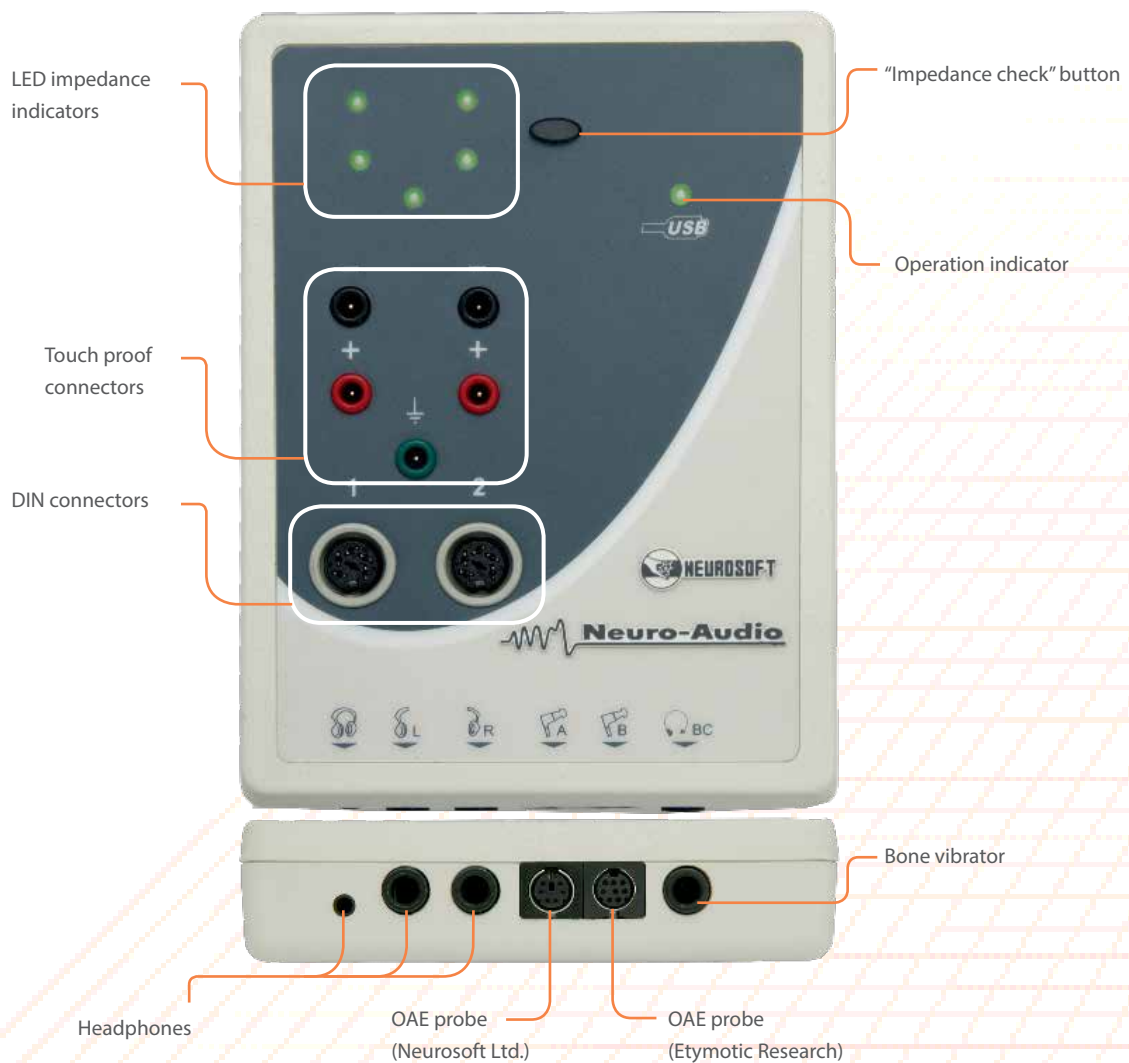
Neuro-Audio (Version 2010) Features

One Device for All Audiological Tests

Most of the tests needed for your daily audiological practice are in just one box with the size of a small book, powered from a personal computer.

This Neuro-Audio (version 2010) device has:

• One USB cable to connect device to a computer
• Set of sockets on side bottom panel to connect all
   stimulators: headphones, insert earphones, OAE probe
   and bone vibrator
• 5 touch-proof connectors to plug electrodes

• 2 DIN connectors
• LED impedance indicator and
   "Impedance check" button
• Combined trig-in and trig-out socket (to connect
   to DIB for cochlear implant, for example)

No other devices, cables, batteries, chargers and power supply units needed!

LED impedance
indicators

"Impedance check" button

Operation indicator

Touch proof
connectors

DIN connectors

Bone vibrator

Headphones

OAE probe
(Neurosoft Ltd.)

OAE probe
(Etymotic Research)

Many Supported Transducers

Neuro-Audio (version 2010) supports many transducers
for audiometric tests available on the market.
Headphones: TDH-39, HDA-280
High-frequency headphones: HDA-200, ER-2
Insert earphones: EAR-5A, EAR-3A (10, 50, 300 Ohm;
automatic 0.9 ms acoustic delay correction)
Bone vibrator B-71
OAE probes: Neurosoft probe, ER-10D probe
Loudspeakers for sound-field testing (must be individually
calibrated)

Some of supported transducers

Simple and Fast Workflow

Neuro-Audio.NET software provides a simple workflow to perform tests.

Step 1. Enter patient's information to the database

Step 2. Select from the list what test you want to do

Step 3. Press "Run" button and test is performed automatically

Step 4. Once a test is done, software tries to arrange the markers automatically, however, you can correct them manually. Immediately you see all related graphs and tables. If reference values are set for this test, you see all figures compared with reference numbers

Step 5. Press "Report" button and report is generated in editable format (Microsoft Word)

Unlimited Flexibility

When the software is installed, all tests are preset for daily practice. And you do not need to make any changes. But when you need it, you can change practically any parameter you wish: parameters of acquisition and stimulation, window layout, colors, report, etc.

Shortest ABR Acquisition Time

Neuro-Audio.NET has several signal processing features which significantly decrease ABR acquisition time:

1. Weighted averaging decreases required quantity of sweeps to get a clear trace
2. "Minimize interference" feature helps to reduce electrical interference
3. Chirp stimulus activates all cochlear hair cells simultaneously which increases signal amplitude
4. High frequency stimulation. Even at 50 Hz stimulation you still clearly see peak V. But this decreases test duration by up to 5 times comparing with 11 Hz stimulation
5. Statistical algorithms for online objective analysis of waveforms for response presence (Fsp/Fmp) eliminate observer's subjectivity and save valuable test time

Fast ABR Analysis

1. Automatic ABR marker arrangement with possibility of manual correction
2. A/B buffers to check reproducibility quickly
3. Automatically displayed normative data (reference values) based on patient's age
4. Latency/intensity graphs and analysis tables
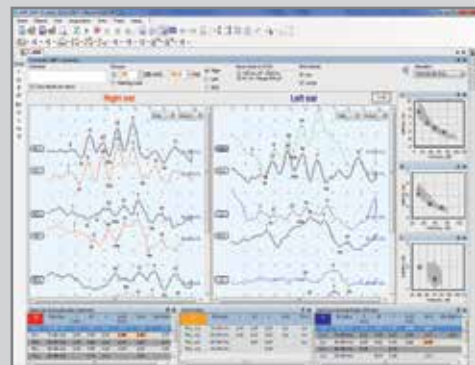5. 64-bit data processing on 64-bit computers
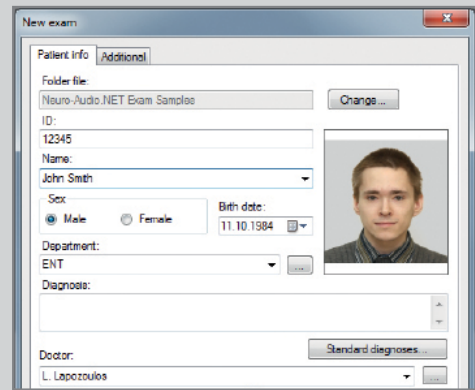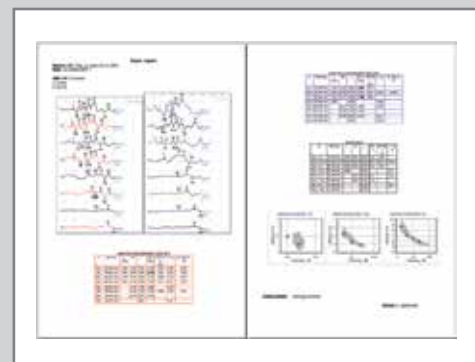

Step 1. Enter patient's information
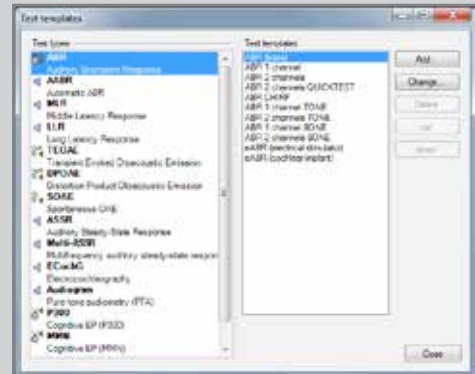
Step 2. Choose what do you want to do
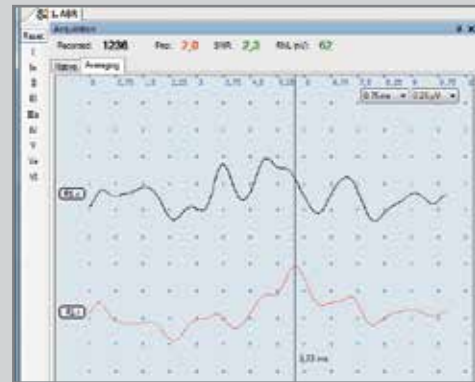
Step 3. Run the test and observe the process

Step 4. See the result

Step 5. Print the report

Automatic ABR Threshold Search Protocol

ABR threshold search is one of the most widespread routine tests in objective audiometry. We developed a special automatic ABR protocol "Objective hearing threshold search". In this mode the whole process is done automatically. You need only to prepare a patient, start this protocol and simply observe the procedure, stopping it when you see the threshold.

New and Traditional ABR

1. Traditional click ABR
2. Tone burst ABR to estimate frequency-specific hearing thresholds
3. Bone conduction ABR for infants with ear canal atresia or other structural malformations
4. Chirp ABR (wideband, frequency-specific)
5. Electric ABR (EABR) for patients with cochlear implants

Screening Mode for OAE

DPOAE and TEOAE tests can be performed in screening mode. In this mode minimum interaction with the machine is needed to perform the test. Software tells you what to do next or does it automatically. The results appear as a simple phrase "PASS" or "REFER". Technician can be easily trained to perform screening tests.

12-point DPOAE mode is available (with frequencies up to 12 kHz).

Multi-ASSR: State of the Art Implementation

- Minimization of test duration: stimulation of both ears simultaneously using 4 carrier frequencies (500 Hz, 1 kHz, 2 kHz and 4 kHz) in each ear.
- Independent intensity control for each of 8 stimuli.
- Effective stimulus enhancing the response amplitude (exponential modulation, narrow-band chirp)
- Accurate objective technique of response detection (F-test)
- Two-channel recording improves the signal-to-noise ratio and reduces test time
- The same electrode placement as in ABR can be used
- Automatic conversion of frequency-specific ASSR thresholds to estimated audiogram
- Weighted averaging (with improved accuracy, reduced test time)
- Independence from patient's state (2 modulation modes: awake (40 Hz) and asleep (90 Hz))
- Modulation mode can be changed during test (if awake patient fell asleep, for example)
- Monitoring of response amplitude and noise floor per ear and per frequency
- All ASSR data are displayed on a single screen (including response probability and spectrum)
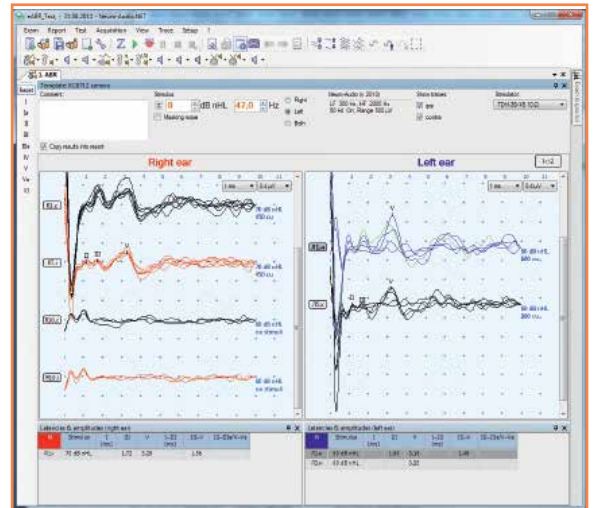
EABR test
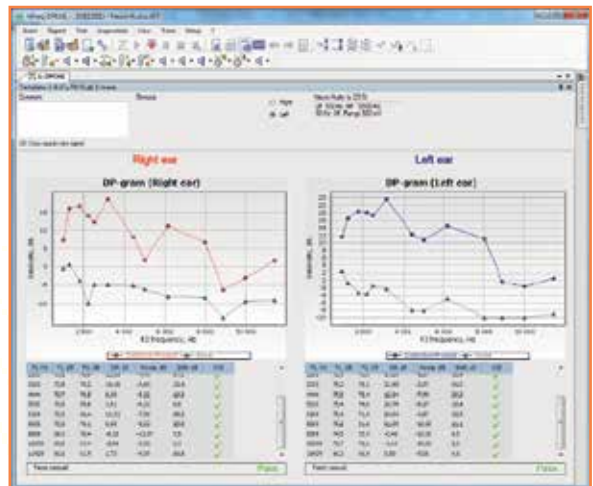
DPOAE test
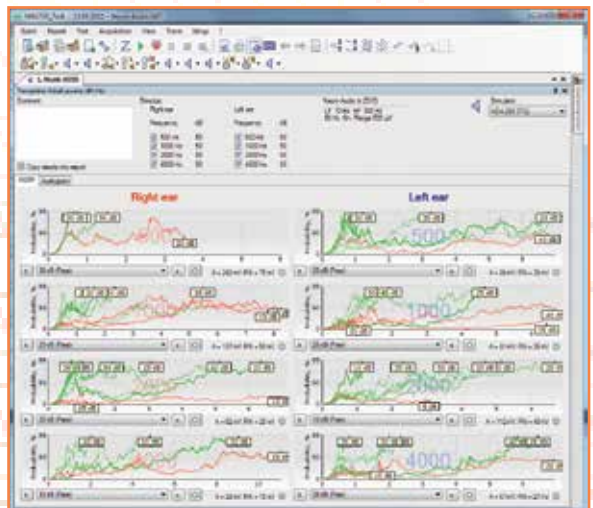
Multi-ASSR test

Multi-ASSR: estimated audiogram

Pure Tone Audiometry with up to 16 kHz Stimulation

Pure tone audiometry test with air and bone conduction can be performed with the same device and in the same software, with the same interface which is used for objective test. You do not need to register or recall your patient when you go to PTA test. You just press "New test" button.

Test can be performed automatically (Hughson-Westlake algorithm), or you can control it manually using hot keys on PC keyboard. Patient responds to the stimulus using a remote button.

High-frequency audiometry is supported (up to 16 kHz) with these transducers: HDA-200 and ER-2.
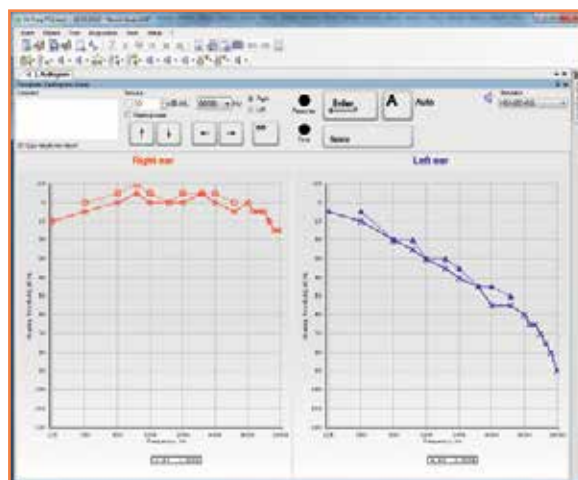

16 kHz pure tone audiometry

And More

- Traditional single-frequency ASSR
- MLR, LLR: middle and long-latency evoked potentials
- You can use calibrated loudspeakers to perform tests in a free sound field
- MMN and P300 for cognitive function evaluation
- ECochG: electrocochleography test

Traditional single-frequency ASSR

At the Cutting Edge of Science

Access to all amplifier, stimulator and signal processing settings allows you to create your own custom test templates, for all your scientific research needs. And if you feel you miss some flexibility or feature, you can always contact our powerful engineering team directly. We are open to innovations!
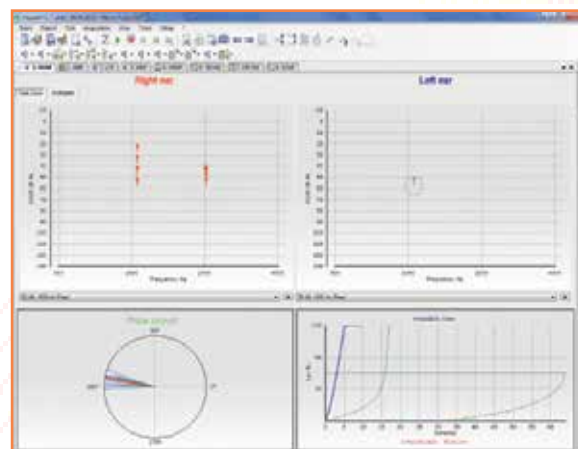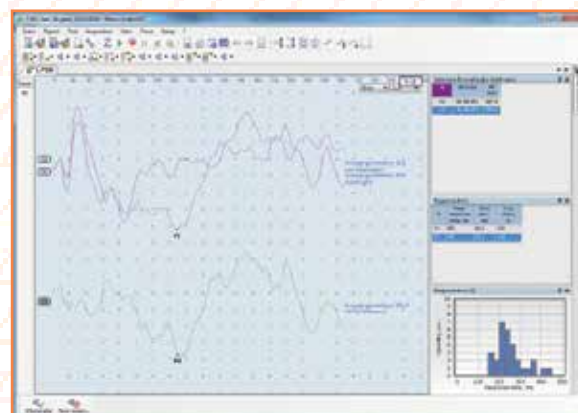
P300 test

Delivery Set

- •Electronic unit
- •Holder
- •Auditory stimulator for EP
  (TDH-39 headphones)
- •OAE probe
- •OAE probe tip – 3 pcs.
- •Probe tip extractor
- •Set of ear tips (universal) (4-13 mm diameter)
- •Test cavity
- •Dental floss for probe tip cleaning
- •Cup electrode with cable – 5 pcs.
- •Pup-jack linker
- •Electrode adhesive paste (100 g)
- •Abrasive paste
  for skin preparation (160 g)
- •Neuro-Audio.NET software
  with ABR, MLR, LLR and OAE modules
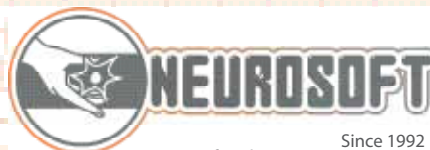- •Technical manual, user manual

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Variants of Delivery Set

Three delivery set variants are available, these are Neuro-Audio (version 2010), Neuro-Audio/OAE (version 2010), Neuro-Audio/ABR (version 2010)

Available Techniques	Neuro-Audio	Neuro-Audio/OAE	Neuro-Audio/ABR
ABR / BERA	+	ABR option*	+
MLR, LLR/CAEP			
TEOAE	+	+	OAE option*
DPOAE			
ASSR	ASSR option*		
ECochG	ECochG option*		
Cognitive EP (MMN, P300)	Cognitive EP option*		
PTA	PTA option*		

+ included in the base delivery set
* is supplied optionally by special order