

NEURO-AUDIO

Clinical ABR & OAE Analyzer, Screening Audiometer



- Auditory EP (ABR, VEMP, ASSR, ECochG) and OAE testing in one unit
- Complete solution: screening, diagnostics, research
- High quality of recording
- Both manual and automatic test control



Neurosoft

HEARING
DIAGNOSTICS

AUDIOMETRY
OAE, ABR

NEURO-AUDIO

NEW STANDARD IN AEP

Neuro-Audio is the most comprehensive AEP diagnostic device on the market. It is also a diagnostic OAE device and a screening audiometer. It is designed to meet the most stringent requirements of today and is ready for the future. It can be easily adapted for daily clinical routine (including newborn hearing screening and follow-up diagnostics) or for advanced cutting-edge research.



15

YEARS IN AUDIOLOGY

WIDE RANGE OF FEATURES

IN A COMPACT UNIT

Neuro-Audio has a high-quality two-channel amplifier and a built-in auditory stimulator with a wide range of intensities and many supported transducers. It is a portable device that has exceptionally high quality of recording. It can record non-sedated ABR easily and does not require a shielded room or audiometric booth!



UPDATED SOFTWARE

The modern and user-friendly software with multiple analysis options is easily customizable to ensure the simple workflow and allow you to focus on a patient. Our software is constantly updated (based on feedback from our users) to stay on the cutting edge of the technology.

CLINICAL APPLICATION

OAE
DPOAE, TEOAE, SOAE



AEP

ASSR
cVEMP, oVEMP
AABR, ABR, eABR
MLR, LLR (CAEP), ECochG
Cognitive ERP (P300, MMN)

PTA



“Working with the Neuro-Audio system is working with a very user-friendly system. The system is robust and open, which creates many opportunities in order to obtain reliable responses. The service and willingness of the people from Neurosoft to improve their system is certainly an asset”.

Robby Vanspauwen, PhD, Clinical Scientist (Vestibular Research), Dept. for Otorhinolaryngology, Sint-Augustinus Hospital, European Institute for ORL, Antwerp, Belgium

POWER OF INTEGRATION

OPTIMIZED FOR YOUR EFFICIENCY

The common database and user interface, built-in protocols for all tests, integrated reference values and automatic algorithms – all of these are ultimately intended to increase your efficiency and optimize test time usage.

FLEXIBLE SETTINGS

You can adjust almost any software setting and device parameter the way you want it and save it as a new protocol for repeated use.

RELIABLE STORAGE OF PATIENT RECORDS AND TEST DATA

All your patient records and test data are stored safely and securely in a single database used by all other Neurosoft devices. Autosave and backup features protect against data loss.

CUSTOMIZED REPORTS

You can customize design and content of your reports using a powerful report template editor. Also you can use a built-in word processor for advanced editing of your reports.

DATA EXPORT

You can easily export the data and PDF reports to another computer or integrate them with your hospital information system (GDT, HL7 protocols are supported).

OUR SOFTWARE SPEAKS YOUR LANGUAGE

The whole graphical user interface and printed reports are translated to many of the world's languages. This makes our software significantly easier to use no matter which country you are from.

SUPPORTED TRANSDUCERS:

INSERT EARPHONES
(ER-3C, ETC.)



AUDIOMETRIC HEADPHONES
(TDH-39, ETC.)



BONE VIBRATOR
(B-71)



LOUDSPEAKERS



ABR

CLINICAL APPLICATION

- Objective audiometry (hearing threshold search using wave V as the indicator).
- Neurology (identification of pathologies in the VIII cranial nerve and auditory pathways of the brainstem).
- Fitting of a cochlear implant (electrically evoked ABR).

CALCULATION OF RESIDUAL NOISE AND FMP (KNOWING WHEN TO STOP)

During recording it's recommended to rely on objective parameters of the response. The residual noise (RN) value helps you determine when to stop averaging. Fmp value indicates presence or absence of a response. Our software calculates these values automatically and shows their reference values. It provides confidence in your results.

WIDE RANGE OF POSSIBILITIES FOR WAVEFORM ANALYSIS

Superimpose ABR waveforms for visual assessment of reproducibility. Just place markers to see the latencies, intervals and amplitudes in analysis tables. Compare results with reference values on the latency/intensity chart. This will improve your efficiency.

OPTIMIZED STIMULUS (CHIRP)

The Chirp and Chirp-LS stimuli are designed with a cochlea model in mind (frequency rises with time) to maximize the evoked response. That's why they are optimal for hearing screening and hearing threshold search (wave V is up to twice the size of a click response). Chirp-LS is optimized to be efficient at any stimulus intensity, so it saves your time.

WEIGHTED AVERAGING FOR HIGH-QUALITY RECORDING

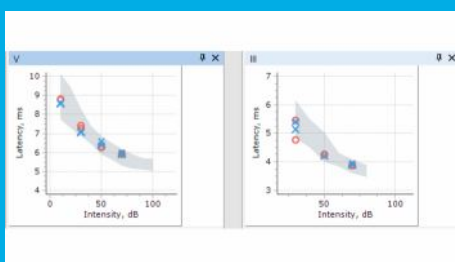
The weighted averaging maintains the steadily high record quality even in the condition of a noisy patient (for example, a lot of movements and muscle activity). As a result the waveform morphology is improved and the residual noise is decreased. It allows saving your time and recording non-sedated ABR from young children.

MINIMIZATION OF MAINS INTERFERENCE

The unique adaptive notch filter (and high harmonic filter) together with the "minimize interference" feature (stimulation rate "jitter") allow recording clear waveforms even with low-quality mains and absence of a shielded room. It saves you time and money.

AUTOMATIC HEARING THRESHOLD SEARCH

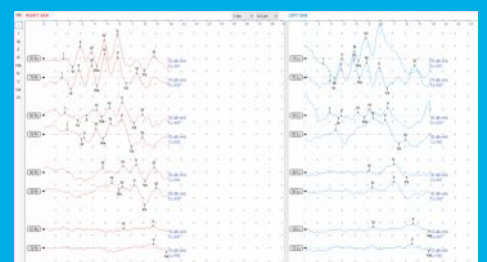
Our software has automatic hearing threshold search protocol. Also you can manually select the list of intensities used during the test which can be modified on the fly. It increases ease of use.



ABR latency/intensity chart



Comparison of Click and Chirp ABR waveforms



Dual displays with unlimited waveforms

CLINICAL APPLICATION

ASSR

Estimation of behavioral audiograms with ASSR. The results of ASSR testing can be used to estimate the behavioral pure-tone audiogram in cases when traditional audiometric testing can't be performed (for example, in infants and young children).

ACCURATE AND OBJECTIVE RESPONSE DETECTION

F-test response detection method accurately and objectively predicts behavioral audiometric thresholds (based on the analysis of the EEG spectrum). The principal component analysis (PCA) method reduces the impact of muscle-induced noises. The fruitful combination of 2-channel recording, Chirp stimulus and weighted averaging allows achieving the most accurate results.

FULL CONTROL

You can independently control any of the 8 frequencies in multi-ASSR test. Depending on patient's state (awake/asleep) you can change the modulation frequency during testing. Also you can change the maximum test duration. Signal (EEG) monitoring is always visible on the screen. All of these allow you to have full control of the test.

MASKING NOISE

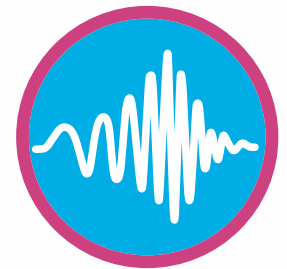
Masking (white noise) allows obtaining accurate audiometric thresholds even in patients suffering from unilateral or conductive hearing loss.

AUTOMATIC HEARING THRESHOLD SEARCH

The hearing threshold search is done automatically with a specified step (in dB) and within selected stimulus intensity range. This makes the test significantly easier to perform and saves your time.

RESIDUAL NOISE CALCULATION

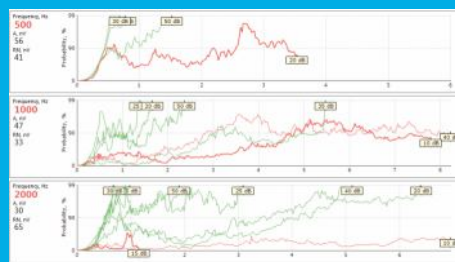
The monitoring of residual noise (RN) and response amplitude (A) for each frequency helps answering the question whether to stop the recording or continue it. It gives you confidence in the obtained results and shortens the test time.



CHIRP STIMULUS



ASSR estimated audiogram



ASSR response probability charts

Saved trials (right ear)				
dB nHL	500 Hz	1000 Hz	2000 Hz	4000 Hz
15			19% 65mV	
10		87% 33mV	50% 45mV	
20	84% 41mV	99% 58mV	99% 28mV	
25		99% 111mV	99% 35mV	53% 18mV
35		100% 25mV	99% 86mV	
30	100% 75mV		100% 89mV	99% 15mV
40	99% 94mV	91% 23mV	99% 20mV	99% 41mV
50	99% 81mV	99% 53mV	99% 51mV	99% 25mV

Table of ASSR trials

VEMP

CLINICAL APPLICATION

Diagnostics of saccular/utricle and inferior/superior vestibular nerve function in patients suffering from dizziness.

EMG SCALING OF WAVEFORMS

To facilitate comparison of the results obtained from left and right sides, Neuro-Audio software has the feature of scaling the recorded waveforms by averaged EMG. This ensures confidence in results.

PEDIATRIC VEMP (EMG HISTOGRAM)

It is very difficult for children to sit still during the whole test. That's why the unique function was designed especially for them – recalculation of the recorded VEMP responses with the specified EMG range (that can be modified after recording at any time). All sweeps that don't fall in the required EMG range are automatically rejected. It saves your time considerably.

HIGH STIMULATION LEVEL

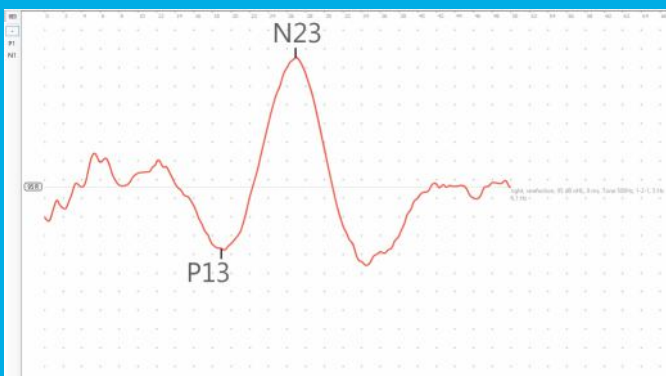
VEMP is generated in response to loud stimulus. That is why the maximum stimulus intensity is of great importance for this test. Neuro-Audio can stimulate up to 100 dB nHL with clicks and up to 110 dB nHL with tone bursts (for insert earphones). For bone conduction testing the unique bone vibrator amplifier (purchased separately) can be used to stimulate up to 80 dB nHL.

AUTOMATIC VEMP RATIO CALCULATION

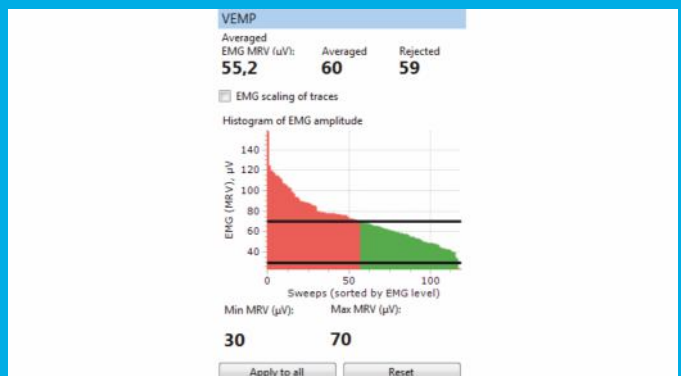
The VEMP ratio (asymmetry between ears) is calculated by the Neuro-Audio software automatically, and the value is displayed on the screen and in the report to be printed. Just place two markers on the waveform.

FULL SET OF VEMP PROTOCOLS

By default Neuro-Audio software includes the comprehensive list of VEMP protocols, including cervical and ocular VEMP tests (cVEMP and oVEMP) and bone conduction VEMP test with bone vibrator amplifier (purchased separately). This streamlines your workflow.

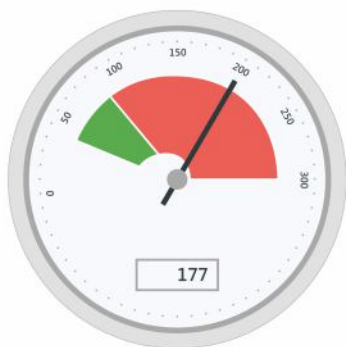
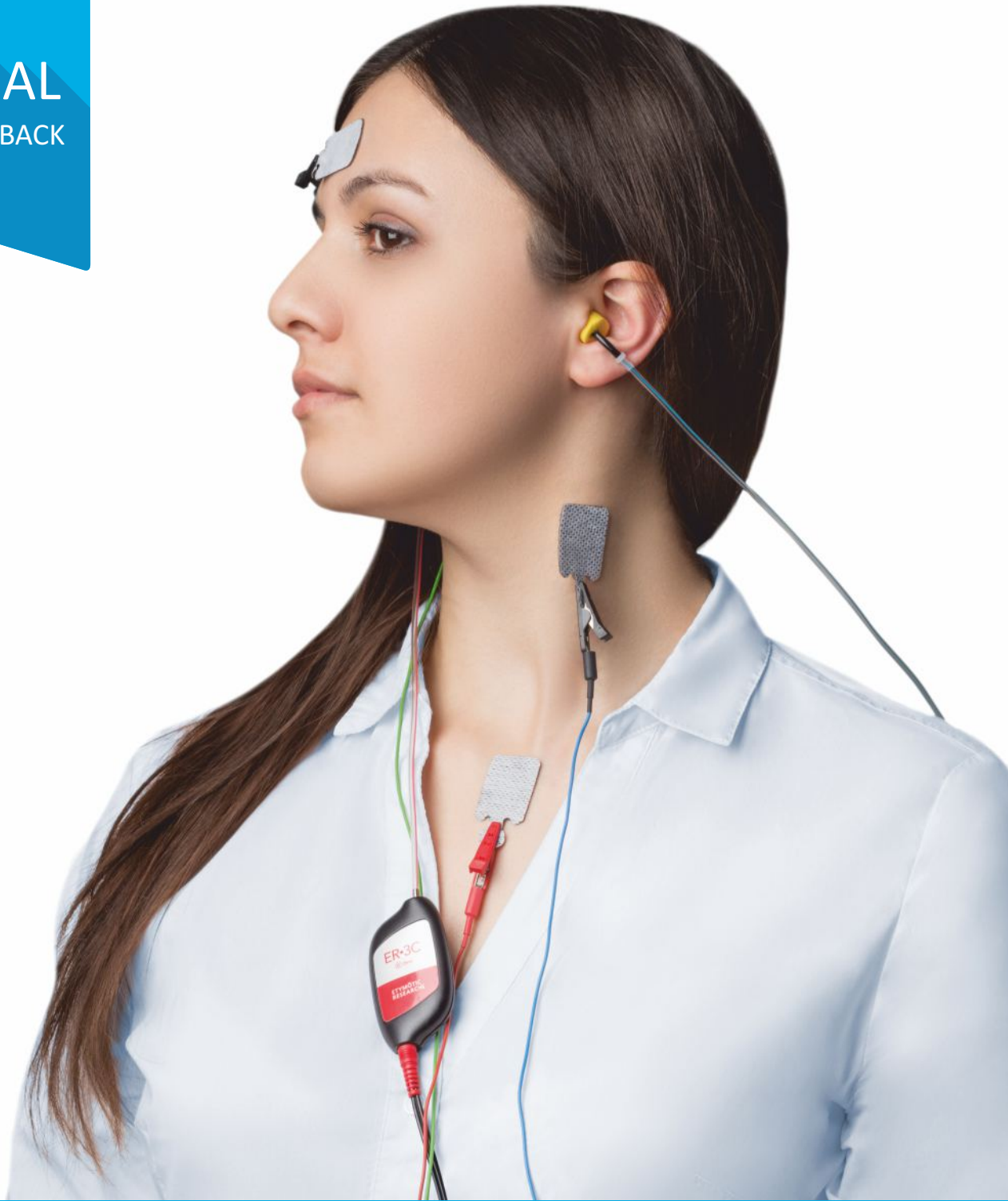


Normal cVEMP response



VEMP analysis panel

VISUAL BIOFEEDBACK



VEMP amplitude depends on sternocleidomastoid muscle tension. That's why it's important to maintain the same tension level during the test. Neuro-Audio has the biofeedback feature: the muscle tension level indicator which is displayed in the main recording window and also on the second monitor for the patient (optional). It helps you to perform the test correctly.

VEMP EMG biofeedback dial

AEP

AABR, MLR, LLR/CAEP,
ERP, ECoChG

CLINICAL APPLICATION

- Newborn hearing screening (AABR).
- Diagnostics of Ménière's disease/endolymphatic hydrops (ECoChG).
- Objective test of sound/speech recognition in the auditory pathway from the ear to the cortex before/after hearing aid fitting (CAEP, cognitive ERP).

FULL SPECTRUM OF AEP: FROM SCREENING TO RESEARCH

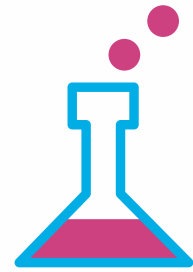
Neuro-Audio can be used to record auditory evoked potentials for newborn hearing screening (AABR) as well as other diagnostic and research purposes. The software includes predefined protocols for all AEP types in order to increase your performance. If you perform AEP research studies, you can fully customize all the hardware and software settings. You are free to experiment!

AABR: FAST & OBJECTIVE HEARING SCREENING

Just place the electrodes on a patient and start the AABR test. It only takes a few minutes to get simple "Pass"/"Refer" result. The test can be performed for patients of all ages and even when a patient is asleep.

ECOCHG: CALCULATION OF SP/AP AREA RATIO

Besides SP/AP amplitude ratio calculation, Neuro-Audio software calculates SP/AP area ratio. Just place three markers on the response waveform. The area ratio calculation makes ECoChG significantly more sensitive to diagnose Ménière's disease (according to John Ferraro).



FOR DIAGNOSTICS
AND RESEARCH



Normal ECoChG response

CLINICAL APPLICATION

Behavioral pure tone audiometry allows obtaining frequency-specific hearing thresholds (audiograms) for air and bone conduction and also in a sound field. It is used for adults and older children (starting from 5 years of age) who can reliably demonstrate a change in behavior when a test sound is heard.

PTA

- Complies with IEC 60645-1:2012 (Type 4: screening/monitoring) requirements.
- Air and bone conduction testing, testing in a sound field.
- Automatic mode (Hughson & Westlake), manual mode (with mouse and keyboard)
- Contralateral masking noise (white noise)
- Silence mode (audiometric booth is not required)
- High-frequency audiometry (up to 16 kHz) with special headphones

CLINICAL APPLICATION

- Objective analysis of cochlear function for patients of all ages.
- Newborn hearing screening.

OAE

- Complies with IEC 60645-6:2009 (Type 1: diagnostic/clinical) requirements.
- Full spectrum of OAE tests: from screening to advanced diagnostics.
- DPOAE up to 12 kHz (early objective detection of ototoxic and noise-induced hearing loss).
- Completely automatic test (including probe fitting and in-ear calibration of stimulus).



TEOAE analysis



DPOAE analysis

NEUROSOFT AUDIOLOGY PRODUCT LINE

Neuro-Audio



Audio-SMART



aScreen



APPLICATION

Clinical ABR&OAE analyzer

Diagnostic/screening ABR&OAE and middle ear analyzer

OAE screening

TESTS

ABR, MLR, LLR, ECoChG, VEMP, ASSR, P300, MMN, PTA, TEOAE, DPOAE, SOAE

Tympanometry, AR, AR decay, ETF, TEOAE, DPOAE, ABR

TEOAE, DPOAE

HARDWARE

PC-based

Portable standalone

Portable smartphone-based

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