Eclipse
ABR - OAE - ASSR

Results you can trust

Interacoustics®

leading diagnostic solutions

Eclipse
ABR - OAE - ASSR

A Workable Solution

Critical decisions are made on the basis of test results, so it is essential that those results are accurate and reliable. Eclipse gives you the best possible foundation for achieving that goal.

Based on user feedback
Extensive field testing incorporates feedback from end users, audiology experts and patients. When merged with the newest technologies the Eclipse provides meaningful results for real life situations.

A complete solution
The Eclipse hardware when coupled with a PC includes capabilities for measuring all facets of auditory evoked potentials in addition to Oto-Acoustic Emissions. Data is managed through a single database with reports in print or EMR formats.
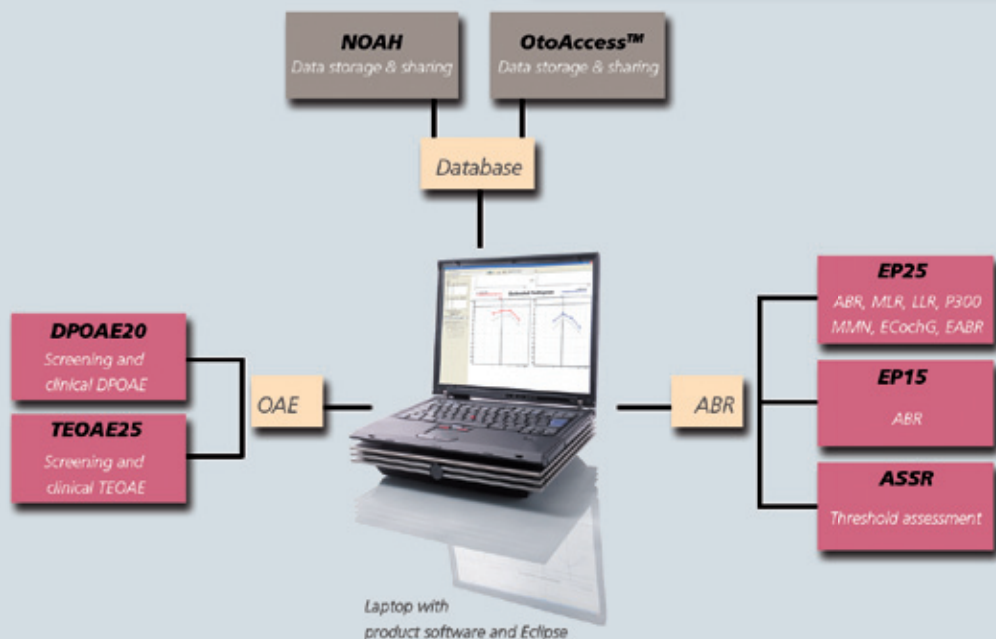
Modular software
Users build their own system by choosing only the modules they need with the ability to add more capabilities as their needs change. The test modules have similar user interfaces to simplify learning and daily use.

Eclipse

- *One platform for all tests*
- *Modular and future safe*

NOAH	OtoAccess™
Data storage & sharing	Data storage & sharing

Database

EP25
ABR, MLR, LLR, P300
MMN, ECochG, EABR

EP15
ABR

ASSR
Threshold assessment

DPOAE20
Screening and clinical DPOAE

TEOAE25
Screening and clinical TEOAE

OAE

ABR

Laptop with product software and Eclipse

Convenience

Automated routines
The Eclipse comes with a variety of common, pre-loaded test sequences to get you up and running in no time. After getting acquainted with the protocols, users may add or modify the test battery to suit their needs. Then, with a simple click of the mouse your preferred test(s) is ready to run and you can focus on the results.

Flexibility
The Eclipse provides an almost unlimited choice in test parameters that enable users to design and view tests to user preferences. Even during the middle of examinations parameters are easily changed without exiting and restarting the test session. This flexibility is central to Interacoustics design.

Test Display
The Eclipse features automatic labeling, easy to read formats and clear layouts making it easier to interpret the onscreen results and the printed reports. Easy to compare previous historic sessions allow you to quickly focus on essential outcomes of the test. Reports can be printed in PDF or exported in XML format.

Functionality

Improved PreAmplifier
Reducing noise is the single most important component to obtaining quality ABR recordings. The newly re-engineered pre-amplifier from Interacoustics incorporates new technology breakthroughs that reduce noise levels by up to 50%. The benefits are obvious when tests are performed in less than ideal electrical hostile environments.

Patient safety
The Eclipse comes with a dedicated, built-in medical safety transformer. Quality engineered electrical safety specifications ensure complete patient isolation from any possible electrical hazards.

Todd B. Sauter, M.A., CCC-A
Director - Department of Audiology
UMass Memorial Medical Center
University of Massachusetts Medical School

"The Eclipse has the largest number of clinically-relevant advanced features of any comprehensive AEP device currently on the market. The software platform is an excellent blend of parameter flexibility and user-friendliness."

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Auditory Evoked Potentials

Evoked potentials play an increasingly important role in audiology. Neonatal screening, neuro screening, threshold assessment, advanced diagnosis, balance testing are all areas affected by this trend.

Standard ABR is now routinely used for both threshold assessment and neurological screening. With this in mind, we have developed the EP15 with its focus on ease of use and a full set of built-in tests.

For those testing middle and late latency responses (MMN, P300,etc) as well as specialized procedures, we have developed the EP25. This contains all the features of the EP15, but adds the extra functionality needed by more specialized clinics.

EP15 – Diagnostic ABR system

EP15 is traditional ABR, typically used for neurological screening, threshold assessment and intra operative monitoring. The emphasis is on ease of use and clarity.

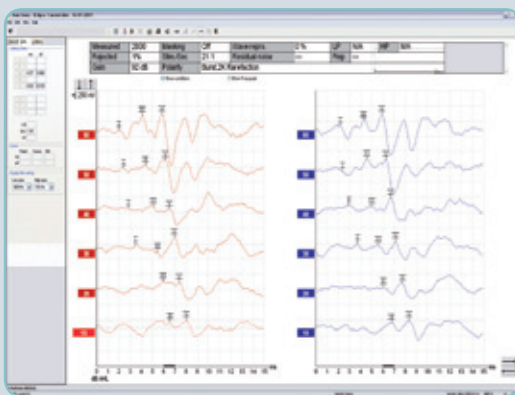- *30ms response window*
- *Early latency tests*

EP25 – Full Clinical ABR system

EP25 is designed for full clinical ABR. The emphasis is on flexibility and a full range of measurements. Includes trigger functions.
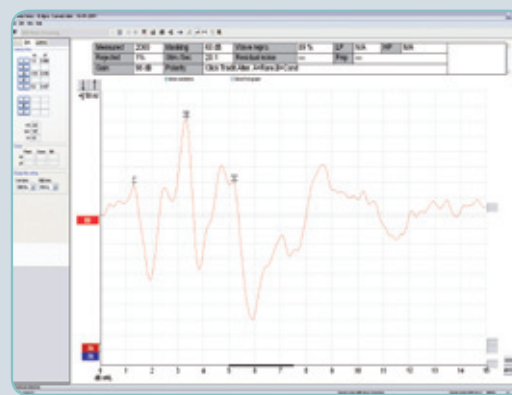
- *980ms response window*
- *Early, Middle & Late latency tests*
- *ECochG markers*
- *eABR*
- *Patented CE-Chirp® and NB CE-Chirp® for threshold testing*

Vestibular EP

This is a special version for the vestibular clinic. It holds protocols such as ECochG and rate study tests dedicated for the vestibular assessment test battery.

Showing Right and Left ear in a split screen format is beneficial e.g. when doing threshold work.
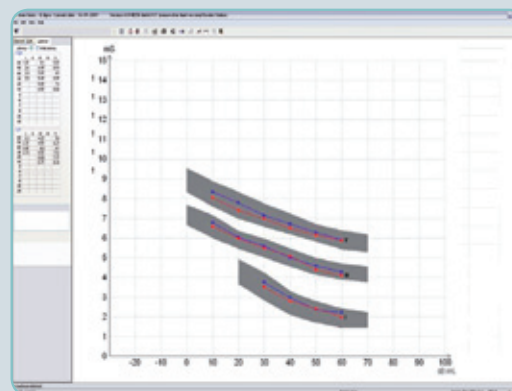

Traditional Clicks available for classic neurologic tests. Automated wave labeling possible.

EP15 – Diagnostic ABR system

- *Reliable diagnostic ABR*
- *User and pre-programmed protocols*
- *Thresholds and neurologic studies*

EP25 – Full Clinical ABR system

- *Advanced clinical ABR*
- *User control over all settings*
- *Trigger in/out of external devices*
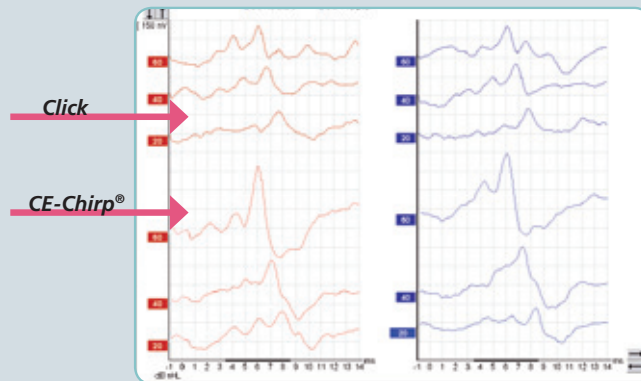

Latency plotted against normal range

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New technologies reduce test time

New CE-Chirp® stimuli provides much larger responses compared to clicks

CE-Chirp®*

The new CE-Chirp® developed by Claus Elberling provides up to twice the response amplitude when compared to traditional click stimuli, an obvious benefit when determining ABR thresholds.

Typical click stimuli have been plagued by the cochlear travel time dilemma – and actually 'smear' or 'distort' the response. A click stimulus contains a broad range of frequency components all having different travel times up the basilar membrane – causing multiple neural responses at different times – thereby reducing its effectiveness to generate a robust neural impulse.

Unlike the traditional click, the CE-Chirp® stimulus is designed to generate optimum neural synchrony by compensating for frequency specific travel times in the cochlea. This timing relationship between lower and higher frequencies of the stimulus unifies the neural responses and typically doubles the response amplitude for easier recognition and analysis.
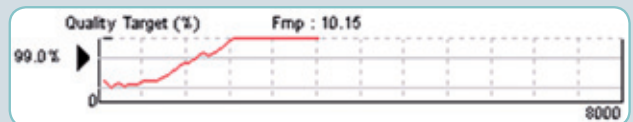
Frequency Specific CE-Chirps®

The same engineering concept is now applied in narrow band stimuli on the Eclipse for threshold evaluation at 500Hz, 1kHz, 2kHz and 4kHz.

Reduced test time

Scientific studies have demonstrated that due to the increased amplitudes with the CE-Chirp®, test times can be markedly reduced.

Improved Response Confidence (Fmp)

The Fmp is a mathematical calculation that incorporates multiple points of the recorded waveform to indicate the quality of the recording. A visual indicator is present during the test and gives the examiner a statistical, objective means to determine when the test may be ended. In most cases, the test will be completed faster and be less stressful for the patient.

The online display of the Fmp, serves as a calculated response confidence. In this example, 99% response confidence was exceeded half way into the test.

Residual Noise readout

The Residual Noise readout compliments the Fmp by indicating when an acceptable noise stop criteria has been achieved. The user can be confident that the tracing is not affected by noise – taking the guesswork out of ABR testing and reducing test time.

Rather than testing for a certain number of sweeps, the residual noise should be used as a stop criteria.

Bayesian Weighting

Bayesian Weighting is a mathematical calculation that compares the noise of the individual response epochs and then, during the averaging, applies greater significance to responses with less noise. This is especially beneficial when patient EEG/EMG activity fluctuates (i.e. relaxed vs active or tense). This provides less noise in the final average, and greater stability to the acquired waveform and prevents it from deteriorating should the patient become active during the middle of a test.

Although sedation may be required for some patients, the use of Bayesian weighting reduces the need because it makes testing less susceptible to patient state.

Advanced Electrocochleography

A new analysis method to evaluate the SP/AP area ratio (developed by Al-momani and Ferraro) improves the sensitivity of electrocochleography measurements and is available with the Eclipse EP25. Enhancements to the new pre-amplifier also provide better quality recordings.

CE-Chirp®

Klin. Doz. Dr. Dorothe Veraguth

Head of Audiology Department - University Hospital in Zürich

„Threshold testing was always a difficult task"

"Now with the new CE-Chirp®, we experienced markedly reduced test times and clearly interpretable waveforms around threshold, compared to traditional Click"

University Hospital Zurich

*Elberling, C., and Don, M. (2008). "Auditory brainstem responses to a chirp stimulus designed from derived-band latencies in normal-hearing subjects," J. Acoust. Soc.

Am. 124, 3022-3037

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Eclipse
ASSR

Threshold estimation with ASSR

Interacoustics ASSR is the new generation of ASSR. It is a major breakthrough that provides accurate threshold estimates in half the time required by traditional ASSR.

8 thresholds (4 frequencies bilaterally) can typically be achieved in less than 30 minutes, making Interacoustics ASSR ideal for threshold assessment in very young children and other patients where behavioural audiometry is impractical.

A specially formed stimulus and the Full Spectrum Detection Engine are two of the patented features that enable Interacoustics ASSR to easily outperform traditional ASSR techniques for both accuracy and speed.

Full stimulus control
Intensity levels and start/stop times are independent for each of the 8 stimulus channels (2 ears x 4 frequencies). This enables the user to shorten test time by selecting appropriate stimulus levels based on current and previous results.

It is also possible to switch between 40Hz and 90Hz stimulation rates during a test session if required.

Maximizing the response
Traditional ASSR stimuli do not compensate for the cochlear travel time involved when a stimulus wave travels through a band of hair cells around the test frequency. This omission contributes to the weaker response from traditional ASSR systems. Interacoustics ASSR uses chirp based stimuli developed by Claus Elberling, that causes all the target hair cells to fire simultaneously thereby generating a maximal response.

This shows as a stronger, sharper evoked potential that is easier to detect, especially near threshold.

Faster response analysis
To obtain maximum information from the response, Interacoustics ASSR evaluates phase coherence and response magnitude from seven harmonics of the fundamental modulation rate. This feature is patented and can reduce test time by 50% compared to traditional ASSR systems that do not use the higher harmonics in their response detection.
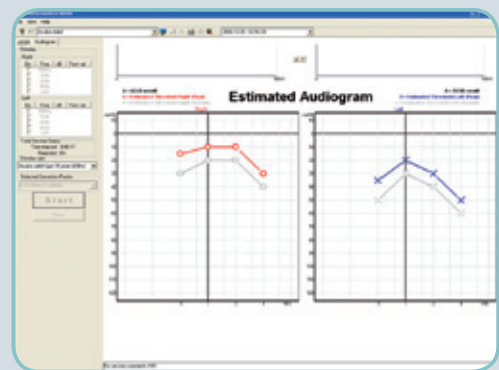
Dedicated Audiogram Transfer to DSL
The Affinity Hearing Aid Analyzer from Interacoustics has a direct import option into the DSLv5 hearing aid fitting algorithm,for the estimated audiogram generated by the Interacoustics ASSR. This transfer function is made in cooperation with Richard Seewald's DSL group of University of Western Ontario, Canada, to make sure that this important transfer is safeguarded against the variety of pitfalls involved.

Other features
• Comprehensive reports
• NOAH compatibility
• Identical electrode montage to ABR

[1]Ekkehard Stürzebecher, Claus Elberling et al. "New Efficient Stimuli for Evoking Frequency-Specific Auditory Steady-State Responses". Journal of American Academy of Audiology 17:448-461 (2006).

[2]Mario Cebulla et al. "Objective Detection of Auditory Steady-State Responses: Comparison of One-Sample and q-Sample Tests". Journal of American Academy of Audiology 17:93-103 (2006).

ASSR audiogram

ASSR detection

Interacoustics ASSR

- New generation ASSR technology

- Faster test time

- Accurate estimated audiogram

- NOAH and DSL compatible

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Otoacoustic emissions

Otoacoustic emissions have applications in neonatal screening, differential diagnosis (e.g. auditory neuropathy) and monitoring (e.g. ototoxicity). Eclipse has separate modules for analyzing distortion product emissions (DPOAE20) and transient evoked emissions(TEOAE25). The two modules share a number of features.

Lightweight probe
The same probe type is used for both modules. Lightweight, with very low internal noise, it is small enough to accommodate neonatal ear tips. It is simple, quick and inexpensive to clean and maintain.

Noise rejection feedback
Recording sensitivity is user controlled. A simple feedback mechanism uses red and green bars to indicate noise and signal levels. A slider bar allows the user to quickly and easily set optimum sensitivity.

Probe check
An automatic check ensures that the probe has been correctly placed in the ear canal before testing.
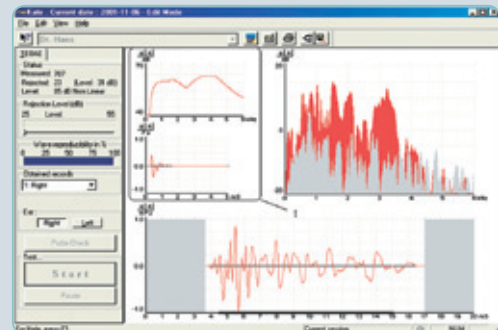
Validity checkmarks
During a test, checkmarks at each test intensity indicate that a valid otoacoustic emission was detected.

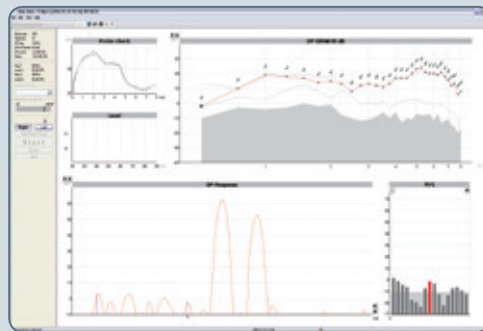### *DPOAE20*

- *Fast and automatic*
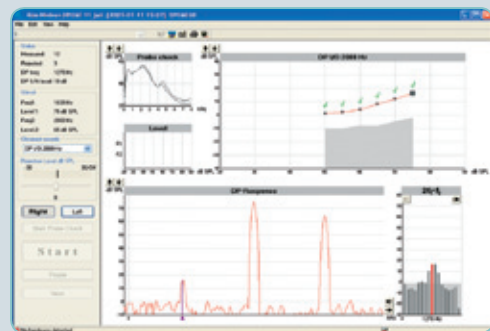- *Dedicated DP-gram*
- *Accurate and safe*

TEOAE25

- *Automated screening OAE*
- *Detailed diagnostic OAE*
- *User friendly interface*

TEOAE25 Clinical view

DPOAE20 DPgram

DPOAE20 input/output

Standards:	IEC 60601-1 (General safety) Class I, Type BF. IEC 60601-1-1 (Safety of systems). Class I, Type BF. IEC 60601-1-2 (EMC).
PC requirements (PC not included):	Operating System: Windows Vista, Windows XP©,Windows 7 (32 bit). Processor: Pentium III, 650MHz or better. RAM: 256MB. Hard disk: 500MB. . Display Resolution: 1024 x 768 or better. USB: 1.1 or higher.
System:	Eclipse Black box to connect to your own PC.
Safety:	Medical Safety transformer built-in. Optical isolation to PreAmplifier. Optical Isolation to PC (optional).
OtoAccess database:	Included Database: SQL. Data format: XML Full network capability Unlimited storage. Patient demographic data. Patient Journal. May also include data from Interacoustics' audiometers, impedance audiometers, and hearing aid analyzers. Easy back-up function. Interacoustics® ASSR may alternatively run under NOAH database.
NOAH:	Interacoustics® ASSR can run under NOAH 3.6 or higher. Estimated Audiogram available for Hearing Aid Fitting NOAH modules. Dedicated audiogram transfer between ASSR and Affinity's DSL 5.0).
Dimensions and weight:	(L x W x H) 28 x 32 x 5,5 cm / 11 x 12.5 x 6 inches. Weight: 2,5 kg / 5,5 lbs excluding accessories
Software modules available for the Eclipse black box:	• ABR (EP15/25) • ASSR • TEOAE (TEOAE25) • DPOAE (DPOAE20)
Included parts:	USB cable 2m Power cable Software CD as ordered OtoAccess™ database software Mouse pad Operation Manual, CE Manual
Optional parts:	UCO15 Optical USB cable for Eclipse (can be delivered with 1 or 5 metres USB extension cable).

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ABR Specifications

EP15 / EP25 Specifications:

Standards:	IEC 60601-2-26 (Electroencephalographs). IEC 60645-1/ANSI S3.6 (Audiometers). IEC 60645-3 (Auditory test signals)
PreAmplifier:	Two channels (standard) EPA4 Cable Collector (4 electrodes). Standard 50 cm. Option: 5 cm or 290 cm One Channel (optional) EPA3 Cable Collector (3 electrodes). 50 cm Gain: 80 dB/60 dB. Frequency response: 0,5 - 5000 Hz Noise: 4nV/√Hz. 0.22 µV RMS (0 – 3 kHz) CMR Ratio: Minimum > 118 dB. Typical 130 dB <100 Hz Radio Frequency Immunity: Typically 25 dB improvement over previous available designs Max input offset voltage: 2,5 V. Input impedance: 10 MΩ. Power: From main unit.
Impedance check:	33Hz rectangle. Impedance information for each individual electrode. No unplugging of electrode leads required. Readout directly on Amplifier. Measuring Current: 19µA.Ranges: 0.5kΩ-25kΩ.
Transducers:	Ear-Tone ABR insert phones included. Independent calibration for TDH39 (optional). Independent calibration for B71 (optional).
Broad Band Stimuli:	CE-Chirp® with cochlear delay compensation. Click. Rate: 0.1 – 80.1 per sec.
Frequency specific stimuli:	Tone burst: Frequencies: .5kHz to 4kHz. Envelopes: Blackman, Gaussian, Hanning, Hamming, Bartlett, Rectangle, and manual rise/plateau/fall. NB CE-Chirps®: 500Hz, 1kHz, 2kHz and 4kHz. Bandwidth +/- ½ octave
Intensities:	20 – 135.5dB peSPL in 1dB steps (-10 – 100dB nHL in 1 dB steps)
Masking:	White noise. 0 - -40dB relative to stimulus.
Weighting:	Bayesian.
Quality Indication:	Response Confidence Targets of 95%, 97,5% or 99%. Fmp calculation based on 5 points with selectable range.
Residual Noise calculation:	On-line during measurement. Selectable stop criteria. 5 points calculation with selectable range.
Number of channels:	2 channels. (EPA3: 1 channel).
Number of curves per session:	Unlimited.
Auto protocols:	Several automatic test protocols included. As many automatic tests as desired may be designed and added by operator. Manual control during automatic testing is available.
Data acquisition:	Analysis time: 0-980ms window. Acquisition start: +/- 2ms from stimulus onset. A/D resolution: 16bit. Points per trace: 450 displayed.
Gain:	Automatic: Before each new intensity is tested, the best suitable gain is automatically selected. Manual: 6dB steps from 74dB to 104dB (10µV to 320µV input).
Rejection:	Selectable.
Raw EEG:	Displayed online. Refresh rate: 10Hz typical.
Filters:	Digital filtering for Low Pass and High Pass. Low Pass FIR filters without time shift of wave peak. High Pass filters analog Butterworth 0.5 to 100Hz 6/12dB octav. On the EP15/EP25 or from any reader station in a network it is possible to apply different visual filtering during testing as well as after the test is completed.
Patient communication:	Talk forward.

Cochlear implants:	The EP25 may be controlled or may itself control stimulators for cochlear implants. EABR (FDA approved).
HELP:	On-line Help for buttons, entry fields etc., as well as an electronic operation manual with search functions and cross references are included.
EP25 features (not included with the EP15):	ECochG recordings with markers. Middle Latency. Late Latency (P300, MMN etc.). Cochlear implant stimulator control.
Included parts:	EP15 / EP25 Software CD Preamplifier ETB Standard electrode cable with buttons ETU Universal electrode cable ETR Electrode cable with re-usable electrodes ETS Electrode cable spring PEG15 Set of 25 single use pre-gelled electrodes ETT Tip trode electrode cable set (only EP25) TTE25 Tip trode gold electrodes 10 pcs. for ECochG (EP25 only) 20 pcs. of Infant eartip (2 x 10) EarTone ABR Insert ear phones w/foam tips SPG15 Tube of skin preparation gel Ten20™ Electrode gel Gauze Swabs LBK15 Loop Back unit for system performance check Alcohol pads (100 pcs.)
Optional parts:	TDH39 Headset DT48h Headset B71 Bone conductor EPA3 Cable collector (one channel/3 electrodes)

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Eclipse
ASSR

Standards:	IEC 60601-2-26 (Electroence-phalographs). IEC 60645-1/ANSI S3.6 (Audiometers). IEC 60645-3 (Auditory test signals).
PreAmplifier:	Two channels (standard) EPA4 Cable Collector (4 electrodes). Standard 50 cm. Option: 5 cm or 290 cm. One Channel (optional) EPA3 Cable Collector (3 electrodes). 50 cm. Gain: 80 dB/60 dB. Frequency response: 0,5 - 5000 Hz. Noise: 4nV/√Hz. 0.22 µV RMS (0 – 3 kHz). CMR Ratio: Minimum > 118 dB. Typical 130 dB <100 Hz. Radio Frequency Immunity: Typically 25 dB improvement over previous available designs. Max input offset voltage: 2,5 V. Input impedance: 10 MΩ. Power: From main unit.
Anti Aliasing Filter:	Analogue 5kHz 24dB / octave. (30kHz Sampling rate).
Impedance Check:	33Hz rectangle. Impedance information for each individual electrode. No unplugging of electrode leads required. Readout directly on Amplifier. Measuring Current: 19µA. Ranges: 0.5kΩ-25kΩ.
Transducers:	Ear-Tone ABR insert phones included. Independent calibration for TDH39 (not included).
Number of Channels:	2 channel response detection. (EPA3: 1 channel). 8 channels for stimulus control.
Auto Protocols:	Test protocols included for children and for adults (sleeping and awake). Customized protocols can be created by user.
Stimuli:	NB CE-Chirps® at 500Hz, 1kHz, 2kHz, 4kHz. Bandwidth: +/- ½ octave -3dB. Very steep roll offs. Simultaneous stimuli: 8 (4 frequencies in each Ear).
Modulation Rates:	90Hz and 40Hz. Can be changed within the same session.
Masking:	White noise. 0 – 100dB HL.
Stimulus Control:	Independent control of up to 8 simultaneous stimuli (max. 4 per ear). Independent stimulus level control for each of the 8 stimuli, with dynamic range assistance. Independent start / stop control for each of the 8 stimuli.
Data Acquisition:	2 channels. Separate Detection Algorithm for each Channel. A/D resolution: 16bit. Manual Start and Stop: Global as well as for each stimulus. Time out limits: Max 15min. (Default: 6 min.). Manual change in +/- 1 min. steps. False Pass Probability Settings: 1% and 5%.
Gain:	Manual: 6dB steps from 74dB to 110dB (5µV to 320µV input).
Rejection system:	Manual increase and decrease of rejection limits during data acquisition.
Raw EEG:	Online display of both channels. Refresh rate: 10Hz typical.
Included Parts ASSR:	ASSR Software CD. Preamplifier. ETB Standard electrode cable with buttons. ETU Universal electrode cable. ETS Electrode cable spring. ETR Electrode cable with re-usable electrodes. PEG15 Set of 25 single use pre-gelled electrodes. EarTone ABR Insert ear phones w/foam tips. 20 pcs. of Infant eartip (2 x 10). SPG15 Tube of skin preparation gel. Ten20™ Electrode gel. Alcohol pads (100 pcs.). Gauze Swabs.
Optional Parts:	TDH39 Headset. EPA3 Preamplifier (one channel/3 electrodes).

Standards:	IEC 60645-3 Audiometer
Probe:	TEOAE and DPOAE capable. Weight: 3 grams. Replaceable probe tip
Upgradable:	EP15 or EP25 ABR system. ASSR. DPOAE20/TEOAE25

DPOAE20 Specifications:

Stimulus:	Frequency Range: 500-8000 Hz. Frequency Step: 50 Hz. Level: 30-75 dB SPL (70 dB for freq. above 6kHz). Level Step: 1 dB SPL. Transducer: Dedicated DPOAE20/TEOAE25 probe
Recording:	Analysis time: Minimum 2 sec to unlimited test time A/D Resolution: 16 bit, 3.7 Hz resolution Artifact Reject System: Adjustable: -30 to 30dBSPL or off. Applicable during testing. SNR Criteria: 1-20 dB SPL
Displays:	Probe fit - with stimulus and intensity. Response. Level fit. DP-gram or Input/Output
Auto protocols:	Preprogrammed tests. Additional tests preprogrammable by user. Checkmark indication for S/N R passed Timer of test with manual override.

TEOAE25 Specifications:

Stimulus:	Linear or non linear clicks. Level: 50-90 dB SPL. Level Step: 1 dB SPL. Transducer: Dedicated DPOAE20/TEOAE25 probe. Accuracy: 0.5 dB. Bandwidth: 400 Hz – 4000Hz +/- 2dB Recording: Analysis time: 25 to 32000 samples. A/D Resolution: 16 bit, 3.7 Hz resolution. Artifact Reject System: 25 – 55 dB SPL or off. Applicable during testing. SNR Criteria: 5 individual frequency bands can be set 1-30 dB SPL.
Displays:	Probe fit – with stimulus and frequency response display OAE time window, OAE FFT. 1kHz Pass / Refer bands. 1/3 octave bands, 1/6 octave bands, 1/12 octave bands. dB OAE, dB Signal to Noise ratio
Auto protocols:	Preprogrammed tests. Additional tests preprogrammable by user. Checkmark indication for S/N R passed

Automated screening:	Algorithm included. Optional user defined algorithms. Security system - password protection
Included Parts DPOAE20/TEOAE25:	DPOAE20 and/or TEOAE25 software CD OAE Probe, complete BET25 Assortment Box with eartips for OAE NEOPT Neonatal Probetip

Read more here:
www.interacoustics-us.com/us/Eclipse

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Interacoustics – the best choice

With over 40 years of experience, Interacoustics is dedicated to supplying its customers with the best possible solutions for their audiologic needs. This is accomplished by maintaining a continuous dialogue with healthcare professionals working in all sectors of audiology. Our equipment meets the highest possible engineering standards and we provide design know-how that can only come from close contact with clinical practice.

Solutions on every scale

Designing equipment for every size of clinic in so many countries puts us in the unique position of being able to offer solutions that fit your requirements exactly. Audiometry, tympanometry, electrophysiology, hearing aid testing, balance investigation are all within our scope and can be integrated to suit your needs.

Design for diagnosis

We design equipment to make testing and interpretation easier. This means better interfaces, well designed screen layouts, printed reports and interaction over networks with databases and electronic records systems. In most cases, you can configure the settings and layout yourself.

Support worldwide

The Interacoustics name is not only your guarantee of quality and functionality, but also for support. We operate in over 100 countries worldwide through a well coordinated network of distributors and service centres to ensure that you receive total support and service.

Products in this group:

- Eclipse Hardware
- EP25 Advanced ABR
- EP15 Clinical ABR
- Interacoustics® ASSR
- TEOAE25 Sreening and Clinical TEOAE
- DPOAE20 Screening and Clinical DPOAE

Related products:

- OtoAccess™ database
- OtoRead Handheld OAE

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Sales and service in your area:

Read more here:
www.interacoustics-us.com/us/Eclipse

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