



# Auditory *precision*

The EP15/25 is a 2 channel ABR system which offers a choice of two different hardware platforms with similar options for basic or advanced ABR software running in a Windows® format. Hardware choices include the standard customized Interacoustics MedPC platform which includes a medical PC and medically approved power supplies or the Eclipse black box, which can turn your office laptop or desktop PC into a powerful diagnostic tool with the simple connection of a USB cable.

A variety of automatic test protocols come pre-programmed with the instrument which are valuable for optimizing your clinic's start up time. Once a comfort level has been established with the operation, a multitude of software options allow you to customize your preferred test setups which can be initiated with a single click of the mouse. Test parameters include clicks, stimulus polarity, tone bursts, various signal envelope selections, waveform reproducibility, automatic intensity sequences, masking level and more.



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# ABR Systems EP15 and EP25

- Efficient Auditory Examinations

## Application

The EP15/25 meets a wide variety of ABR needs – from screening to diagnostic. Automatic test functions make it ideal for waveform based screening while the manual programming features allow for comprehensive clinical based studies ranging from frequency specific threshold tests to operating room applications. High quality waveforms are generated with special filter algorithms that negate the need for separate smoothing functions.

## The EP15 or the EP25?

The appropriate ABR software choice is dependent on your applications. If all you need is a 2 channel ABR system that will perform high quality early latency recordings, then the EP15 is for you. Advanced auditory ABR functions such as; ECoChG, Middle Latency, Late Latency, MMN, P300, cochlear implant stimulator control and VEMP testing are available on the EP25. In either case, all test sessions are recorded and stored in a single patient file for easy retrieval and reviewing. The EP15 may be upgraded to an EP25 at a later time should your testing needs change.

## Standard Features

- 2 channels
- Bone conduction
- Integrated database
- Preprogrammed auto tests
- Automatic Jewett Mark suggestion
- Waveform reproducibility indication
- Split left/right recordings
- Simultaneous recording of condensation rarefaction stimuli
- Normative data indication
- Soft attenuator
- Wave editing during testing
- Digital filter application (during and after test)
- Single curve display
- Add, subtract curves
- Low noise amplifier
- Advanced rejection algorithms
- Upgradeable with other applications (OAE, VNG and more)

## EP25 Software Features

- Cochlear implant stimulator control
- ECoChG recordings with markers
- Late Latency (P300, MMN etc.)
- Middle Latency
- VEMP

## Recording

### Auto Tests

The EP15 and EP25 come with several pre-programmed automatic test routines. An infinite number of additional auto tests are easily designed to conform to your clinical applications. Prior to starting a test, you may view all of the available pre-set protocols from a pull down menu. Then it is as easy as selecting the test routine and pressing Start! The automated protocols can be manually over-ridden at any time or modified within the test session giving the examiner complete control over each individual test.

### Display Modes

All of the test curves are displayed on the screen in order of intensity and sequence of Right and Left ear. For ease of editing, a single curve display is available which clears the screen and enlarges the curve under consideration. The sharper image makes it easier to identify and mark the wave. Waves are easily moved to superimpose like waves and Right/Left waves may also be separated. Customized normative data, by age range and gender, may be displayed to assist in identifying the regions for waveform marking. It is also used in analyzing the data when doing intensity/latency function testing.

*Display gain, timescale, filtering etc. may be controlled after the test is completed.*

## Waveform Reproducibility

The EP15 and EP25 offer a unique solution to quantifying the quality of ABR recordings. A predetermined region of the ABR recording compares the replication of two tracings that are being collected simultaneously in the background. Using a mathematical algorithm, the system evaluates the curves' reproducibility and provides a visible and automatic 'benchmark' by which the operator can determine if the quality of the recording is sufficient. This 'benchmark' may be pre-set to run automatically, thereby allowing the system to stop the recording and move on to the next test in the sequence. This feature is a tremendous time saver which in turn quantifies the results for quality assurance purposes.

## Convenient Features

### Editing During Testing

The operator may edit waveforms as they accumulate while other tests are still in progress.

### Patient Communication

An integrated talk forward function makes it easy to communicate with the patient without removing transducers.

### Advanced Rejection

ABR data are run through several different rejection engines to ensure better quality waveforms.

### Impedance Monitoring

The EP25 preamplifier includes an impedance monitor to quickly identify the status of each electrode.

### Automatic Jewett Marks

At the push of a button, all waveforms will automatically be assigned suggested Jewett Marks, based on customized normative data.

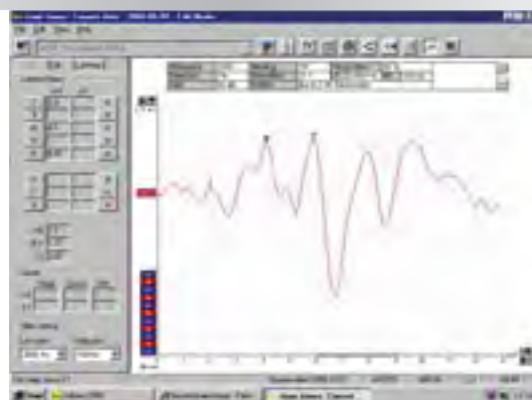
### Manual Control

All recording parameters may be controlled manually – even during an automated protocol session.

### Soft Attenuator

The soft attenuator feature gradually increases the stimuli intensity until it reaches the predetermined setting. This reduces the risk of startling an infant or shocking the patient with a loud stimulus.

*The same session as displayed at the doctor's screen but shown in Single Curve Mode*



# ABR Systems EP15 and EP25

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## Data Interpretation and Storage

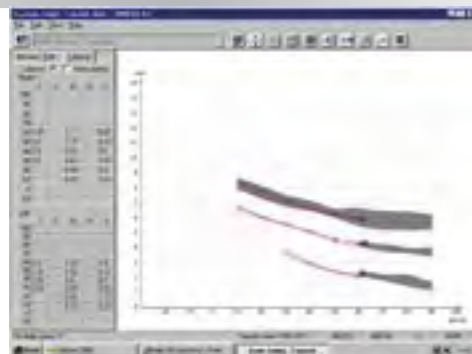
### Advanced Waveform Manipulation

Several functions are available for doing more advanced waveform evaluation. Features include evaluation of the contralateral recording, adding/subtracting waveforms, freezing a wave to superimpose on a previous test session, comparing the A/B condensation and rarefaction tracings (e.g. ECochG cochlear microphonic) and deleting or hiding waves for report purposes. Modifying the digital filters after the data has been collected allows one to view the effects of the low and high pass settings on the test session.

### Normative Data

A separate normative data screen is available in the system setup which allows the end user to generate customized latency/intensity reports and help in identifying specific wave locations during the editing process. Data that may be entered is based on the expected normal latencies of wave I, III and V with respect to stimulus intensity, age range and gender.

*For easy evaluation latencies are plotted against norm data, which are indicated by the shaded areas.*



## Backup/Import/Export

Backing up test data is essential for securing patient information. An easy integrated backup program lets you save to your hard drive, floppy disk or even an external storage medium.

Individual sessions may also be exported to a disk medium, sent through a network or sent by email to other locations.

## IaBaseII

The heart of the EP data base system is IaBaseII. This database program is specifically designed by Interacoustics to manage data from a number of Interacoustics products so that all audiometric data for an individual may be stored in one patient file. VNG, OAE, audiometric and impedance test data from Interacoustics instruments may also be downloaded into this program.

The EP15/25 also allows storage in the NOAH database.



*Grey shaded areas indicate norm data for easy evaluation in Single Curve Display mode.*

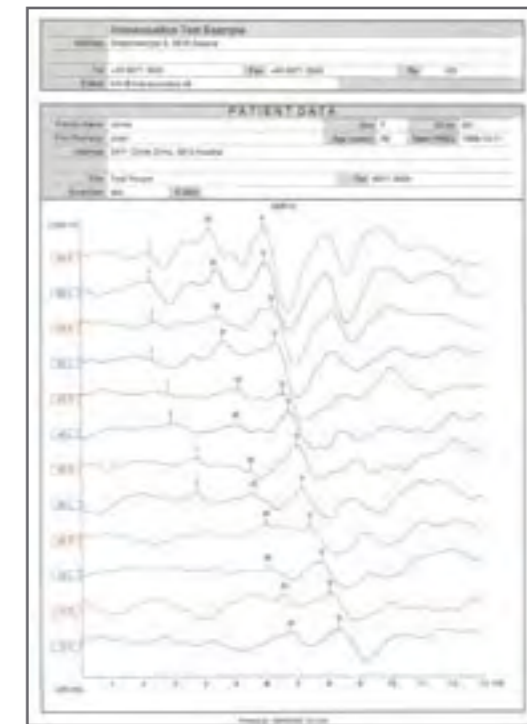
## Reports and Printouts

### Report Writer

The EP software has a user friendly report writer where default standard letters with your clinic's typical findings may be integrated, stored and retrieved on command. The reports may be modified before printing to accommodate each patient's results or diagnosis.

### Printouts

Printouts may be one, two, three or four pages in length depending on the amount of information desired. Printouts include a cover page with report, waveform page, intensity latency graph page and individual waveform numerical data page. Each page includes the clinic and patient demographic information.

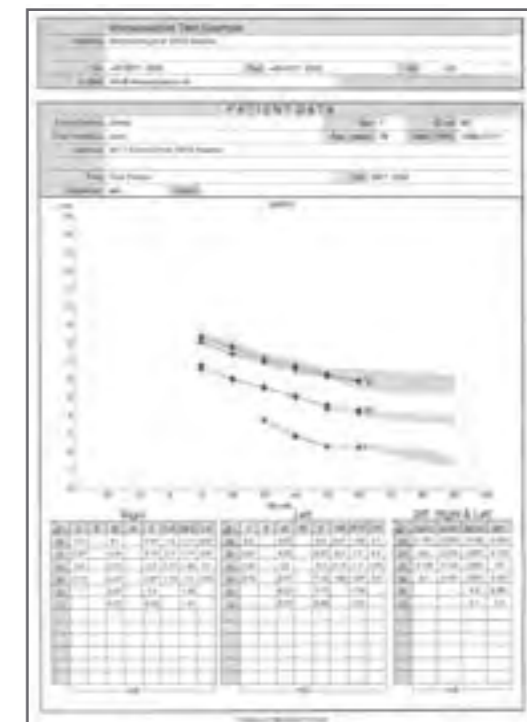


## Networking / Remote control

The EP15/25 software and the database allow operation within computer networks. This allows stored sessions to be viewed from other PCs within the network.

With optional networking software, the EP system also allows you to perform on-line monitoring of recordings in progress and even control the test from a remote location within the computer network.

Similar monitoring and control of the EP system is even possible over the internet.



*Example of printouts from the EP15 / EP25.*

# ABR Systems EP15 and EP25

## - Efficient Auditory Examinations

### The Hardware

The EP15/EP25 can either be integrated into the Interacoustics MedPC using a familiar Windows® operating format or can run on your own PC via the Eclipse black box.

### The MedPC Stand Alone System

The special PC housing and engineering design of the MedPC incorporates medical safety features, enhancing the ABR waveforms and providing superior patient isolation as required by most medical settings.

### The Eclipse Black Box

With a simple connection of a USB cable, you can turn your office laptop or desktop PC into a powerful diagnostic tool with the Eclipse and the EP15/EP25 software. An optical USB cable will ensure medical safety.

### The PreAmplifier

The Interacoustics preamplifier ensures a noise free operation and makes routing of electrode leads much less critical than with traditional systems.



### Upgrade Possibilities

The MedPC and Eclipse can be upgraded with the ABRIS Infant Screening module and the OAE modules from Interacoustics.

The MedPC can also be upgraded with the VNG module.

Furthermore, the EP15 can always be upgraded to an EP25.



*Both the MedPC and the Eclipse are very flexible, offering the possibility to upgrade with other software from Interacoustics.*

### General Technical Specifications

#### Standards:

EN 60601-1 (General safety) Class I, Type BF  
 EN 60601-1-1 (Safety of systems) Class I, Type BF  
 EN 60601-1-2 (EMC)  
 EN 60601-2-26 (Electroencephalographs)  
 EN60645-1/ANSI S3.6 (Audio-meters)  
 EN 60645-3 (Auditory test signals)

#### Medical CE-mark:

Interacoustics A/S meets the requirements of Annex II of the Medical Device Directive 93/42/EEC. Approval of the quality system is made by TÜV – identification no. 0123.

#### System:

Stand alone system on MedPC with Windows® or Eclipse Black box connected to your own PC.

#### PreAmplifier:

2 channels  
 Gain: 80 dB  
 Frequency Response: Up to 8000Hz  
 Noise: 6.0µV/√Hz  
 0.33µV RMS (0-3kHz).  
 CMR ratio: >115 dB at any frequency between 0.1Hz and 100 Hz  
 Input impedance: >10MΩ  
 Accepted electrode offset: >300mV  
 Power: From main unit

#### Impedance Check:

30Hz rectangle.  
 Impedance information for each individual electrode.  
 No unplugging of electrode leads required.  
 Readout directly on Amplifier.  
 Measuring Current: 30µA.  
 Ranges: 0.5kΩ-25kΩ (EPA25).

#### Transducers:

Ear-Tone ABR insert phones included.  
 Independent calibration for TDH39 (not included).  
 Independent calibration for B71 (not included).

#### Stimuli:

Click and Tone Bursts  
 Rate: 0.1 – 80.1 per sec.  
 20 – 130dB peSPL in 1dB steps  
 -10 – 100dB nHL in 1 dB steps

#### Tone Burst:

Frequencies: .5kHz to 4kHz  
 Number of cycles: 1 – 3120  
 Envelopes: Blackman, Gaussian, Hanning, Hamming, Bartlett, Rectangle, and manual rise/plateau/fall.

#### Masking:

White noise  
 0 - -40dB relative to stimulus.

#### Number of Channels:

2 channels.

#### Number of Curves per Session:

Unlimited.

#### Automatic Tests:

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: 15-900mS 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 system:

Two rejection engines work in tandem: One traditional voltage based system and one biologically weighting system.

*The EP15/EP25 can run on the Interacoustics MedPC or on the Eclipse black box which can be connected to a PC.*



*The Eclipse.*

# General Technical Specifications - continued

## 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.  
On the EP25 or from any reader station in a network it is possible to apply different filtering during testing as well as after the test is completed.  
Analogue input filters: 0.5Hz to 100Hz - will track test selection.

## Waveform Control:

Automatic jewett marks - post recording HiPass filtering - post recording LowPass filtering - general display gain - individual curve display gain - automatic single curve display - normal latency indication - superimpose waveforms - manual curve position control - automatic curve position control - compare curves between sessions - display curve's rare. and cond. parts - display contralateral curve - merge curves - generate differential curves - hide curves - delete curves - single split screen for left and right curves - automatic intensity indexing - automatic curve spacing - displayed time scale control - recording onset control - peak to baseline calculation - peak to trough calculation - double cursor - curve comments label, etc.

## Included Parts:

EPA25 Preamplifier  
ETB15 Standard Electrode Cable with Buttons  
ETU15 Universal Electrode Cable  
ETR15 Electrode Cable with Re-usable electrodes  
PEG15 Set of 25 Single Use Pre-Gelled Electrodes  
TEB25 Tip Trode Electrode Cable Set with Buttons (only EP25)  
TEU25 Tip Trode Electrode Cable Set universal (EP25 only)  
10 pcs. of Tip Trodes for ECochG (EP25 only)  
20 pcs. of Infant Eartip (2 x 10)  
EarTone ABR Insert Ear Phones  
SPG15 Tube of Skin Preparation Gel Electrode Gel  
Windows® (MedPC only)  
Keyboard and Mouse (MedPC only)  
Interacoustics Mouse Pad (MedPC only)  
Dust Cover (MedPC only)  
IaBaseII Software  
Operation Manual  
CE Manual

## Patient communication:

Talk forward with built in microphone.  
Talk back with built in loudspeaker.

## Database:

Included – unlimited storage. Patient demographic data. Patient Journal.  
May also include data from Interacoustics' audiometers and impedance audiometers.  
Easy back-up function.

## Cochlear Implants:

The EP25 may be controlled or may itself control stimulators for cochlear implants.

## Networks:

The EP15/EP25 may connect to a network. Subsequent marking and editing, including filter changes etc., may also be carried out from other reader stations at any time, without the EP15/EP25 being available.  
With optional software, even tests in progress may be monitored and controlled from any reader station in the network.

## NOAH:

Module available for EP15/EP25 for NOAH 3.0 (optional).

## 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 software features not included with the EP15:

ECochG recordings with markers  
Middle Latency  
Late Latency (P300, MMN etc.)  
VEMP  
Cochlear implant stimulator control

## Dimensions:

MedPC: (W x D x H) 36.5 x 25.5 x 38 cm / 14 x 10 x 15 inches.  
Eclipse: (L x W x H) 28 x 32 x 5,5 cm / 11 x 12.5 x 6 inches.

## Weight:

MedPC: 12 kg / 26.5 lbs including all accessories.  
Eclipse: 2,5 kg / 5,5 lbs excluding accessories

## Optional Parts:

TDH39 Headset  
B71 Bone Conductor  
UCO15 Optical USB Extension Cable for Eclipse Black Box (can be delivered with 1 or 5 metres USB extension cable).

## Modules available for the Eclipse black box:

- ABR
- ABR Infant Screening
- OAE

## Modules available for the MedPC:

- ABR
- ABR Infant Screening
- OAE
- VNG



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