

## Audio Traveller AA222/AA220

- Audiometer and Middle Ear Analyzer in one instrument



# Audiometry and Impedance *precision*

The AA222/AA220 is the most comprehensive combination of middle ear analyzer and clinical audiometer available. It combines all of the diagnostic middle ear analyzer tests found on the new AT235 and most of the features available on our popular AD229 diagnostic audiometer – all in one small, lightweight package. This makes the AA222/AA220 ideal for the new clinic, for travelling to alternate locations, and for clinical situations where space is at a premium.



leading diagnostic solutions



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## Middle Ear Analyzer

Interacoustics middle ear analyzers are known for their »endless airflow« engineering technique. This is the perfect method for obtaining a tympanogram on crying children or difficult to test patients when physical sealing is difficult. An automatic adaptive pump speed produces tympanograms with high peak resolution without sacrificing test time. Other pump speed options are available.

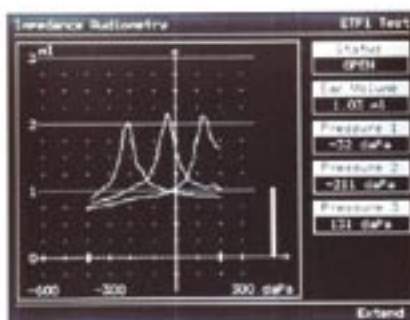
The AA222/AA220 has several other features that makes it easy to use. With the push of one button you can extend the pressure range from +300 daPa to -600 daPa. With the push button on the probe, the examiner can switch between left or right ears for labeling the tests, and initiate the test. Another button labeled »child« automatically produces a moving choo-choo train as a visual distracter for the child.

## Reflex Tests

Traditional ipsilateral and contralateral reflex tests are standard features. The AA222/AA220 has a wide variety of test stimuli available that are usually only found on more expensive instruments. Even wide band, high pass and low pass signals are available. The examiner has two programmable test sequences available from the front panel. The manual function allows the examiner to quickly select a single frequency for test verification. Ipsilateral and contralateral reflex decay is easily accessed through the manual function.

## ETF

The AA222/AA220 incorporates an Eustachian tube function test for intact eardrums. The software program prompts the examiner with instructions for the patient and the net result produces 3 tympanograms on one screen to view changes in peak compliance under different patient conditions.

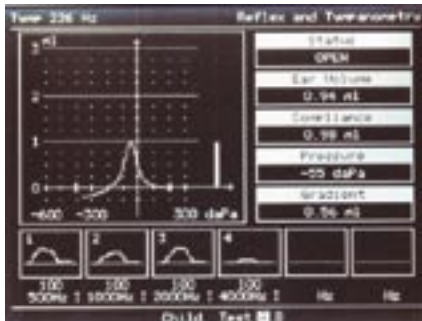


*Automated Eustachian Tube test is available.*

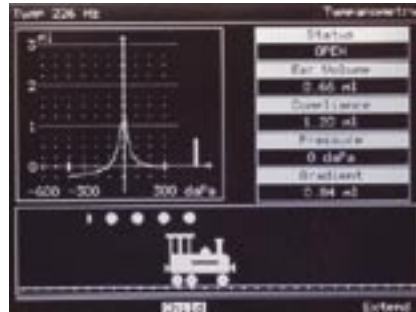


*Clinical Probe System.*

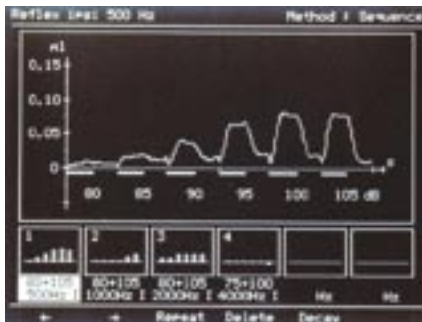




*Tympanogram and reflex test results displayed simultaneously.*



*A moving train may help to keep children quiet during testing.*



*A group of increasing stimuli for reflex testing, clearly displays reflex growth with increasing intensity.*

*Testing with handheld probe*



## Children's Train

It is possible to have a train displayed on the screen, to get the attention of the child. Test results can be monitored simultaneously while displaying the train.

## Probe Systems

The handheld pencil type probe system supplied as standard is very lightweight, and is well suited for both screening and clinical applications.

This unique probe comprises a detachable tip and a clinical tip. The detachable tip is ideal for screening purposes while the clinical tip provides optimum reliability for tests such as reflex decay. This clinical probe may also be used for handheld application with the main probe strapped to the wrist.

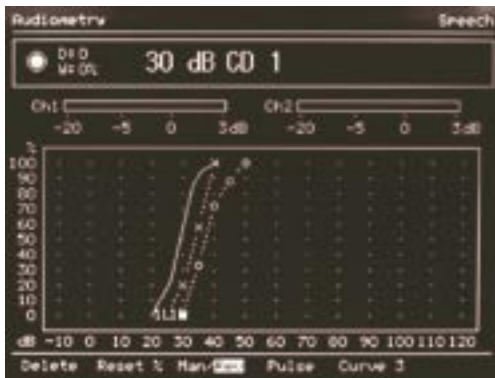
Both probe tips indicate the status of test, as well as the test ear.



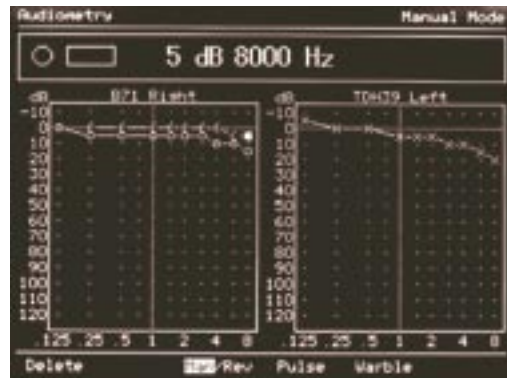
*Detachable probe.*

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*Speech testing - the AA222 only.*



*Pure tone audiometry.*

## Audiometry AA222

The AA222 has testing capabilities for air, bone and speech conduction testing. Dual inputs for a tape or CD player allow the examiner to conduct binaural recorded speech tests and other competing message tests for central auditory processing or hearing aid evaluations. Other tests include pure tone and Stenger speech, ABLB, Auto Threshold (Hughson-Westlake method) and SISI. Outputs are available to connect external speakers and with an appropriate amplifier AA222 will produce 90dB or more of speech in a typical sound room environment. Separate software calibration for all transducers allows the exchange of insert phones or traditional TDH39 phones with the push of a button.

## Audiometry AA220

The AA220 provides all the capabilities of the AA222 with the exception of Speech and Free Field testing.



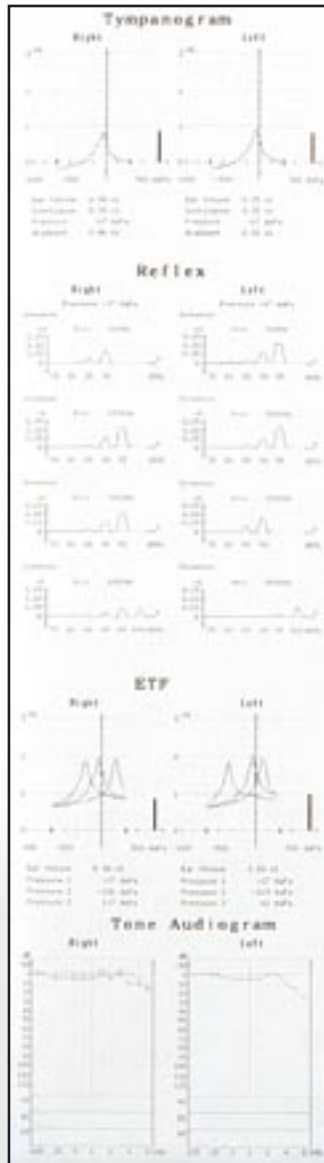
*Test with EAR-Tone 3A.*



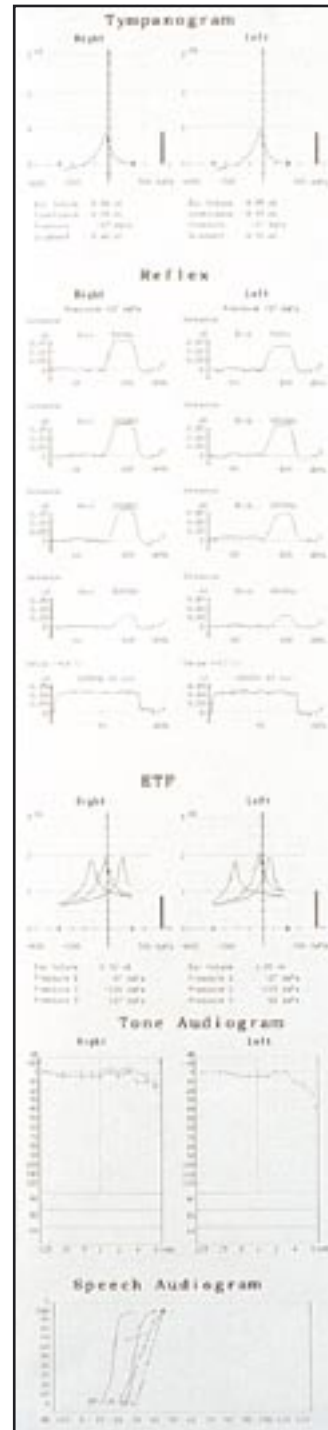
## Printing Options

The AA222/AA220 has a built-in thermal printer that will print all test results.

PC connectivity provides additional options for data storage and full page reports via NOAH or IABase software.



*Example of printout from the AA220.*



*Example of printout from the AA222.*



# Audio Traveller AA222/AA220

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*An optional dedicated carrying case is available.*

## Portability

An optional convenient, lightweight carrying case can be purchased for those who need portability. The carrying case is custom designed to hold the AA222/AA220 and all of its accessories.

## Audiometer Mixing Capability

The mixing capabilities of the AA222/220 include two different speech signals (one to each ear) as well as binaural speech (same speech signal to both ears). Mixing speech and noise in the same ear or two different speech signals to the same ear are possible by using a pre-recorded CD where signals and/or noise are already mixed on the same track.



*Various included and optional parts.*



## Data Storage with Windows based Software

The standard RS232 output provides additional flexibility in the printing and storage of immittance and audiometric reports. All that is required is a standard 9-pin cable connector, and the appropriate Interacoustics or NOAH software.

## General Technical Specifications

### Standards:

Safety: EN60601-1, Class 1, Type B

EMC: EN60601-1-2

Impedance: EN61027/ANSI S3.39,  
Type 2

Audiometer: EN60645-1/ANSI S3.6,

AA220: Type 3 Tone Audiometer

AA222: Type 2 Tone Audiometer,

Speech Type B-E

### Medical CE-mark:

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

### Impedance Measuring system:

*Probe tone:*

Frequency: 226 Hz.

Level: 85 dB SPL with AGC.

*Air Pressure:*

Control: Automatic.

Indicator: Measured value is displayed on the graphical display.

Range: -600 to +300 daPa.

Safety Limitations: -800 daPa and +600 daPa.

Pressure Change Rate: Minimum (50 daPa/s), medium, maximum or automatic with minimum speed at compliance peak. Selectable in the setup.

*Compliance:*

Range: 0.1 to 6.0 ml (Ear volume: 0.1 to 8.0 ml).

*Types:*

Tympanometry: Automatic, where the start and stop pressure can be user-programmed from the setup menu. Eustachian Tube Function: Williams test (non perforated eardrum).

### Inputs:

AA222 only:

CD player or tape recorder. - 1 or 2 channels.

External microphone for live speech. Patient response switch.

### Output:

Audiometry: TDH39 headphones, left and right.

Bone Conduction: B71 bone conductor.

Contra: TDH39 headphone or

CIR22 for contralateral reflex stimulation.

AA222 only:

Free field 1 and 2: Output for external 2 channel power amplifier.

Monitor: Monitor earphone disconnects the internal monitor loudspeaker when inserted.

### Various:

RS232: Input/output for PC connection.

Keyboard: Connection for external keyboard, standard PC type.

Printer: Connection for external printer using HP PCL L3 and Canon Bubble Jet codes.

### Attenuator:

Range: 0 to 130 dB in 1 or 5 dB steps. Typical range is -10 to 120 dB HL. Range is individual for different modes – see table next page.

### Test Types - Acoustic Reflex:

*Automatic Reflex:*

Two independent user selectable protocols. Series of fixed intensities available.

Automated intensity search functions available for threshold search and reflex growth indication.

Free mixing of Ipsi and Contra.

*Manual Reflex:*

Manual control of all stimuli.

May also be used to redo part of automated test results.

*Reflex Decay:*

Manual control, with stimulus duration of 10 sec. Ipsi or Contralateral stimulation.

### Test Types - Audiometer:

Manual Audiometry.

Automatic Audiometry: Auto threshold according to ISO 8253-1 (Patient controlled Hughson Westlake). The threshold is determined by the activation of the patient response.

SISI: With automatic scoring calculation (5 dB included for familiarisation).

Warble: 5Hz sine, +/- 5% modulation.

ABLB: Automatic loudness balance test (Fowler).

Stenger: Binaural pure tone (AA222 also speech stimulation).

AA222 only:

Live voice speech.

Prerecorded speech.

Binaural speech.

**Memory:** Internal memory for two ears.

Each ear: 6 Ipsi and 6 Contra recordings. Each may have up to 6 stimuli. Also, there is memory for additional manual reflex recordings. (Total max. 78 reflexes per ear).

### Printer:

Type: Thermal printer with recording paper in rolls.

Paper Width: 112 mm.

### Examples of Compatible Windows

#### Software:

IaBaseII Database Program and

Diagnostic Modules software.

IA-NOAH-Imp and IA-NOAH-Aud

Module for interfacing to NOAH.

**Cabinet:** Plastic.

### Power Supply:

UPS400 (included) 100 - 240V.

# General Technical Specifications - continued

**Consumption:**  
15VA, max. 45VA.

**Operation Environment:**  
Temperature: 15 - 35 °C.  
Rel. Humidity: 30 – 90%.

**Storing / Handling:**  
Temperatures below 0 °C and above 50 °C may cause permanent damage on the instrument and its accessories.

**Warm up time:** 10 minutes at room temperature (20 °C).

**Dimensions: LxWxH 36x26x10 cm / 14x10x4 inches.**  
Weight: 2.8 kg / 6 lbs.

**Air Freight Packing:** 48x31x37 cm / 19x22.2x14.6 inches.  
Gross weight: 6.5 kg/12.4 lbs.

## Frequencies and Intensity Ranges:

Frequency	Reflex								Audiometry			
	Contralateral						Ipsilateral					
	TDH39		EAR-Tone 3A		Insert/CIR22				TDH39		EAR-Tone 5A	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Hz	dBHL		dBHL		dBHL		dBHL		dBHL		dBHL	
125	-10	90	-10	90	-	-	-	-	-10	90	-10	95
250	-10	110	-10	105	0	100	-	-	-10	110	-10	100
500	-10	120	-10	110	0	105	10	105	-10	120	-10	110
750	-10	120	-10	115	-	-	-	-	-10	120	-10	120
1000	-10	120	-10	120	0	110	10	110	-10	120	-10	120
1500	-10	120	-10	120	-	-	-	-	-10	120	-10	120
2000	-10	120	-10	120	0	105	10	105	-10	120	-10	120
3000	-10	120	-10	120	0	100	10	100	-10	120	-10	120
4000	-10	120	-10	115	0	95	10	100	-10	120	-10	120
6000	-10	120	-10	100	-	-	-	-	-10	120	-10	105
8000	-10	110	-10	95	-	-	-	-	-10	110	-10	100
WB noise	-10	120	-10	120	0	100	10	105	-	-	-	-
LP noise	-10	120	-10	120	0	100	10	105	-	-	-	-
HP noise	-10	120	-10	120	0	100	10	105	-	-	-	-

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## Included Parts AA222/AA220:

TDH39 Audiometric headset  
 CIR22 Insert earphone for contralateral reflex stimulation or masking or monitoring  
 TDH39 Single earphone w. HBZ26 headband for contralateral reflex stimulation  
 MTH400M Monitor headset w. boom mic.  
 B71 Bone conductor  
 APS2 Patient signal  
 ATP-AT235u Universal probe system with shoulder strap, wrist strap  
 BET50 Box of 65 assorted eartips  
 TPR26 3 rolls of recording paper  
 UPS400 External switch mode power supply  
 Power cable 120 or 230 V (Please specify)

IFC69 (9 pins) computer cable  
 IA NOAH Aud Software  
 Dust cover  
 Operation / Multilingual CE manual

## Optional Parts AA222:

EARtone 5A Insert phones  
 ACC400 Carrying case (portable option)  
 CAT40 Calibration unit, 0.2-0.5-1-2-3-4-5 ml  
 IES-2 Impedance ear simulator  
 EM400 Electret talk back microphone  
 MTH400 Monitor headset

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EARtone 5A Insert phones  
 ACC400 Carrying case (portable option)  
 CAT40 Calibration unit, 0.2-0.5-1-2-3-4-5 ml  
 IES-2 Impedance ear simulator

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