

A microprocessor audiometer for industrial hearing conservation programs



Microprocessor Audiometer

The MI-7000 is a microprocessor-controlled screening audiometer designed specifically for use in industrial hearing conservation programs. Both flexible and easy to use, it can be programmed to meet the demands of very large-scale programs where extensive demographic data must be collected, stored, printed, and downloaded with threshold values to a computer database. Yet it can be quickly reprogrammed to allow the operator to press one button to start and print a completed test with no further data entry or control manipulations. Programmed options are battery-backed and remain in effect until changed by the operator. Tones are generated and controlled entirely by digital circuits, allowing the output levels of the MI-7000 to be adjusted through secured keyboard entry. The LCD display simultaneously shows all thresholds established for both ears as well as ongoing test conditions.

MI-7000

Monitor Instruments, Inc.
437 Dimmocks Mill Road
Suite 50
Hillsborough, NC 27278
(919) 732-5400
(800) 853-6785

www.monitorinstrumentsinc.com

MI-7000 Audiometer

Benefits

- **Versatile operation:** Offers quick, one-button operation or large-scale testing with data export
- **Small footprint:** Built-in printer reduces space requirements
- **Time-saving:** Programmable operations streamline testing process
- **Highly compatible:** Works with numerous hearing conservation software packages

Features

- Small, lightweight, and portable
- Fast, quiet, built-in printer
- Built-in talkover (automatic pause while in use)
- Test storage capability
- Numeric keypad for additional demographic/data entry
- Menu for setting programmable operations
- Complies with OSHA test requirements and qualifies as a microprocessor
- Allows for field calibration of output levels
- Wide operating voltage range, automatically adapts to both domestic and foreign supply

Testing features...

- Pause and resume capability
- Switch from automatic to manual as needed
- Start with either ear with option to test 8kHz
- Expanded attenuator range from -10 to 90 (selectable 0-90 dB range for compatibility with OSHA requirements)
- Error messages displayed on screen and in easily understood terms
- "Listening" test controlled by the patient response switch from inside the booth
- Adjustable audible alert for end-of-test and error conditions

Printouts include...

- Three-frequency-threshold averaging
- Time, date, and elapsed time of test
- Selected patient demographics
- Flagged manually determined thresholds
- **Also**, option to print current audiometer settings

Communications features...

- Serial port for external communication
- RS-232 data string compatible with popular output formats
- Compatible with numerous hearing conservation software packages

Specifications:

Test Frequencies: 500, 1000, 2000, 3000, 4000, and 6000 Hz. 8000 is optional

Frequency Accuracy: Crystal controlled, less than 1% error at all frequencies

Frequency Sequence: Start either ear, 1000, 500, 1000 retest, 2000, 3000, 4000, 6000, (optional 8000). Second ear, 500, 1000, 2000, 3000, 4000, and 6000 (optional 8000)

Intensity Range: Expanded to -10 to 90 dB hearing levels in 5 dB steps (0-90 dB range selectable)

Attenuator Linearity: Less than 0.75 dB error for any 5 dB step, less than 1 dB error for any 10 dB step, less than 2 dB accumulated error relative to the calibration level

Tone Rise/Fall Times: 44/32 ms typical

Test Paradigm: Modified Hugheson-Westlake in automatic mode with full manual override capability

Testing Time: On a cooperative individual or biological simulator, approximately 5.5 minutes (testing 8 kHz)

Stimulus Characteristics:

- A. Pulse train is 1.2 seconds with 50% duty cycle (200 ms on and 200 ms off) with three pulsed tone presentations.
- B. Time between pulse train is varied randomly between 1 and 2 seconds.
- C. Patient response window is 1.8 seconds from the beginning of the pulse train.
- D. Pulse train terminates when response switch is depressed.

Error Warnings: Audible alert (when active) with visual display of specific error encountered. The following error conditions are detected and signaled.

- A. Threshold not established at 1000 Hz, first ear
- B. Retest failure at 1000 Hz
- C. Patient responding when no tone is being presented
- D. Switch not released
- E. Failure to establish threshold within allotted time (pause and alert optional at this error)

Audiometer Calibration: All audiometer calibration parameters meet ANSI S3.6 1996 standard for Audiometers and OSHA 29 CFR 1910.95. Output levels calibrated through secured keyboard entry.

Safety: Powered by a Safety Extra Low Voltage (SELV) input from a UL-listed, detachable power supply

Earphone: Telephonics Corporation TDH-49 earphones with MX-41/AR cushions

Power Requirements: 100-240 VAC 47-63 Hz, 1A

Physical Dimensions: 3" high, 9.5" wide, 11.5" deep. Requires 3" of space in rear of unit for paper roll

Net Weight: Unit, 5 lbs; earphone assembly, 1 lb; power supply, 1 lb

Standard Equipment: MI-7000 audiometer with printer, earphone assembly, patient response switch, power supply, AC power cord, patch cords (2), paper roll (2), operator manual

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