FONIX 6500-CX Hearing Aid Test System

Here is some of what is available on this instrument...

- Automatic Test Sequences
  - ANSI '96
  - IEC 118-7 (1994)
  - ANSI '87
  - JIS 2000
  - ANSI '92
  - Profiler

- Digital Readout in Noise Tests
- Phase and Group Delay Measurement
- Spectrum Analysis
  - Comes as standard feature
  - Use a human voice or any sound source

- Quik Probe for Real Ear Measurement
  - Unique hand-held module
  - Insertion Gain and SPL

- Complete Battery Current and Battery Life Measurements

Sophisticated Attack and Release Measurements

Our website has details about all of these great features www.frye.com

---

**ACOUSTIC DRIVE SIGNAL**
- Frequencies: 100 Hz through 8000 Hz in 100-Hz intervals. Accuracy within 1 percent. Frequencies used in sweep presentation are from 200 to 8000 Hz only.

**COMPOSITE MODE AMPLITUDES:**
- Flat or White Noise: Each frequency component, 30 through 80 dB SPL (total signal, 49 through 99 dB SPL RMS) in 5-dB steps.
- Spech Weighting: Response has flat amplitude for low frequency components, a slope of -4 dB/octave starts at 900 Hz, which is 3 dB down. Amplitude from 49 through 99 dB SPL RMS, in 5-dB steps.

**SINE MODE AMPLITUDES:**
- Amplitude Accuracy: ±0.5 dB within 2000 Hz and ±0.1 dB from 4000 Hz to 8000 Hz.
- Frequency Accuracy: ±0.01 kHz.

**CREST FACTOR**
- Composite Mode Signal: Less than 12 dB (±1 ratio of peak to RMS value).

**TELECOIL DRIVE**
- Weight: 17.5”W x 6.5”H x 14.75”D (44.5 x 16.5 x 37.5 cm).

**DIGITAL READOUT OF SOUND PRESSURE LEVEL**
- Frequency Range: 100 through 8000 Hz.
- Resolution: ±0.1 dB.
- Type: True RMS.
- Accuracy: Within 2 dB plus or minus 1 digit from 300 to 1000 Hz, and others within 3 dB.

**SPECTRUM MODE AVERAGING**
- Uses the Noise Reduction button to control the spectral averaging in Spectrum Mode from 2 to 16.

**BATTERY CURRENT MEASUREMENT**
- Range: 0 to 20 mA.
- Resolution: ±0.001 mA.
- Voltagess supplied: 1.37 volts, 1.37 volts. See Appendix A.

**HARMONIC DISTORTION ANALYZER**
- Type: Selectable for 2nd, 3rd, Total (3rd plus 3rd), or Composite 10%.
- Resolution: ±0.1 percent.
- Reading: Percent (%) with respect to total signal. Pure tone readings made at 100-Hz intervals from 400 through 2500 Hz.

**ATTACK/RELEASE TIME**
- Range: 2 to 5000 msec.
- Accuracy: ±10% or 2 msec resolution, whichever is larger.
- Resolution: 2000-8000 Hz: 1.25 msec; 80-1000 Hz: 2.5 msec; 400, 900 Hz: 5 msec.

**AVAILABLE TEST MODES**
- Star Option: Enhanced, Adaptive
- ANSI 96, ANSI 87, IEC

**PRIMARY POWER**
- Color: Ivory module case with dark grey front panel. Black trim and buttons.
- Size: 17.5”W x 6.5”H x 14.75”D (44.5 x 16.5 x 37.5 cm).
- Weight: 20.5 lbs (9.3 kg).

**FONIX M1550E Low Noise**
- Microphone: 45 dB at 1 kHz (allows THD measurement to 1 kHz, when lid is raised (without feedback compensation).
- Frequency Range: 200 Hz through 8000 Hz.
- Measuring Resolution: 0.1 percent.

**TEST CHAMBER**
- Type: FONIX FC 6000.
- Test Area: Greater than 6” x 6” x 1.5” deep (15.5 x 15.5 x 4 cm).
- Internal Acoustic Resolution: Less than 0.5 dB RMS.
- Reflections: No reflections. Light gray with black trim. Black and white test area.
- Size: 13.5” W x 18” H x 11.5” D (343.3 x 45.7 x 29.2 cm).
- Weight: 33 lbs. (15 kg).

**SHIPPING**
- Total Shipping Weight: 130 lbs. (59.5 kg).
- Total Shipping Weight without Quik- Probe Option: 112 lbs. (51 kg).

**STANDARD ACCESSORIES**
- FONIX M1550E Low Noise
- Battery Pills
- Level Calibrator
- Battery Life Measurements

**OPTIONAL ACCESSORIES**
- 6 CC Coupler (044-1004-00) NBS 9A, for checking audiometer headphones.
- Test Chamber Stand: (030-0204-07) Tubular steel stand which brings the testing area or the test chamber to convenient table height.
- Quest QC-10 Sound Level Calibrator: (030-0204-07) For checking of microphone amplifier. 1 kHz, 114 dB SPL.
- Teleco: (044-1001-04) Dimensions per requirements of ANSI S3.7-1995 for testing ear level, eyeglass and body aids.
- HA-1 Coupler: (044-1006-00) Dimensions per requirements of ANSI S3.7-1995 for testing ear level, eyeglass and body aids.

**GUARANTEE**
- The FONIX 6500-CX and its accessories are guaranteed to be free from manufacturing defects which would prevent the products from meeting these specifications for a period of one year from date of purchase.

**FRYE ELECTRONICS, INC.**
P.O. Box 23391 • Tigard, OR 97281-3391 • USA
(503) 630-2722 • (800) 547-8209
Fax: (503) 639-0128
www.frye.com • e-mail: sales@frye.com

--

Copyright © Frye Electronics, Inc. 2002. All rights reserved. Frye Electronics products protected by U.S. and/or foreign patents and/or pending. FONIX is a trademark of Frye Electronics, Inc. 01/02
The FONIX 6500-CX is the world's most complete hearing aid analyzer. Frye Electronics keeps it that way by continually updating the programming as new hearing aids and revised standards are introduced.

Whether the testing is done in a sound chamber or in the real ear, the FONIX 6500-CX has the answers you need to evaluate and fit hearing aids.

Testing to Standards
Quality control in the manufacturing of hearing aids is based on testing to published standards. Currently the FONIX 6500-CX provides test sequences for the ANSI, IEC and JIS standards. Because these measurements are fast and accurate, the FONIX 6500-CX is used by virtually all the world's hearing aid manufacturers. In addition, there are provisions in the programming that can be used, when needed, to prevent incorrect results (testing artifacts) when testing sophisticated circuits.

Composite/Real Time Signal
Testing to pure-tone standards is only a small part of the capability of the FONIX 6500-CX. The real time composite signal provides measurements several times a second. Along with great speed, measurements with this complex signal provide immediate information about the presence or absence of intermodulation distortion, while avoiding the "artificial blooming of the lows" caused by the use of pure tones in the measurement of Automatic Gain Control hearing aids.

Multiple Option Package
Most users purchase the Multiple Option package so they have instant access to input/output curves, gain, averaging, and telecoil measurements. The CIC option provides nonstandard, but realistic and validated measurements, of these very small in-the-canal hearing aids.

The Star Option
Testing Digital Aids
With the recent introduction of digital hearing aids, other testing problems arose and have been overcome by additions to the programming of the FONIX 6500-CX. Noise reduction circuits of these aids can interpret conventional test signals as noise and alter the response of the hearing aid. The Digital Speech in Noise program in the Star Option provides randomly interrupted real time signals that the aid interprets as speech, leading to accurate test results. It also provides bias tones to see how the aid responds in the presence of noise at different frequencies. The ICRA and the ANSI 92 speech spectra are provided.

Quik-Probe Option
Speed and Accuracy in the Fitting Process
The FONIX 6500-CX would not be the most complete hearing aid analyzer without a great real ear measurement capability. The QuikProbe Option is just that. The composite, real time signal and its variations, the ICRA and ANSI digital speech signals, are basic to the ability to do tests quickly and accurately. The hand-held module adds to the convenience. Experienced users tell us how quickly they can use the module to get the needed results. And, you can use the spectrum analysis mode to show how the real speech of an accompanying person reaches the aided ear. The spectrum analysis can be a great counseling tool.

Confirming your fitting with real ear measurements is the mark of the dedicated professional. The hearing aid client and third party payers will also appreciate this validation of the fitting. And don’t forget to keep a record of how each hearing aid went out the door!

Enhanced DSP
Enhanced DSP is an exciting new test for digital aids that is unique to the 6500-CX. It measures both the group delay—the digital aid’s processing time—and the phase of the hearing aid. The group delay of the digital aid is especially important for monaural or open vent fittings because sound can travel faster to the unaided ear than the aid can process it for the aided ear, creating an echo effect. The phase measurement is important for binaural fittings to ensure that the hearing aids are working together as a team. (See the supplemental Enhanced DSP brochure for more details.)

Spectrum Analysis
Live Speech and Environmental Sounds
The spectrum analysis mode, a standard feature on all FONIX 6500-CX units, allows you the versatility of testing the aid with your choice of external signals, whether it be environment CDs or live voice. You can also test for the occlusion effect or apply any number of signals used in research or clinical practice.

Customizing the Menus
In order to make it convenient for the user to take advantage of the versatility of the FONIX 6500-CX, we have added the ability to customize the menu choices. There are five custom setups available, in addition to the default menu. This is handy because different types of hearing aids may require different settings, and different users may have their own testing preferences. Having six different customized menus can be a great time saver.

New 6050 Sound Chamber
We have recently upgraded the sound chamber for the FONIX6500-CX. This new sound chamber has improved seals and will provide greater isolation than our previous chamber. In addition, we have arranged the physical layout and construction of the hearing aid test area to allow greater flexibility in the positioning of hearing aids and couplers.

Visit www.frye.com
Learn more about the Quik-Probe and other options and features on the 6500-CX. Our website contains a wealth of information on all of our FONIX instruments, as well as useful resources for the hearing health professional. We have application articles, downloadable workbooks and manuals, an audiological event calendar, and much more.