A New Breed of Audiometer

Frye Electronics has leaped ahead of the competition with a new, revolutionary audiometer built around an Android Tablet. With an intuitive touch-based interface that provides the controls of a traditional audiometer, the FONIX Colt Audiometer is easy to use for both beginning and experienced clinicians.

Touch Interface

In the past, audiometers used push buttons and knobs to perform a variety of basic functions. These audiometers had limited functionality, but were generally easy to use because all the controls were in front of the user. Later-generation audiometers added new functionality, but often at the expense of the user interface, requiring users to use a mouse to navigate through multiple menus in order to adjust settings. The FONIX Colt Audiometer is a new third-generation audiometer, combining the easy-to-use controls and layout of a traditional audiometer with the advanced flexibility of a computer-based audiometer.

No mouse or complicated menus are required for operation of the FONIX Colt Audiometer, and the layout of the controls mimics that of a traditional audiometer, with all the virtual knobs and buttons easily visible to the user. To perform measurements, the user simply touches those controls, and the audiometer responds instantly with a color change or other visual clue to indicate that the operation has been performed.

Advanced Hardware Platform

While the user interface of the FONIX Colt Audiometer is handled by the Android Tablet, the hard work of accurate signal generation is performed by the hardware platform. This platform is an electronic work of art, containing the latest, most advanced collection of analog and digital circuits available. Flexibility and power are combined in one sleek package.

Graphical Display

The FONIX Colt Audiometer display contains graphs for both the left and right ear audiogram that are updated automatically as the clinician performs the test.
If desired, the two audiogram graphs and associated controls can be interchanged with a simple touch, making operation easy whether the patient is facing towards the clinician or away from the clinician.

**Freedom of Movement**

If desired, the user can simply lift the tablet from the platform and, taking advantage of the built-in wireless Bluetooth technology, perform the audiometric operations from a more convenient location. The operator does not have to be tied down to a desk in front of a traditional audiometer or computer.

**Puretone Testing**

The FONIX Colt Audiometer is capable of performing pure-tone air measurements up to 12000 Hz and bone measurements up to 8000 Hz using TDH headphones or sound field speakers (actual output dependent upon the transducer).

The clinician can control each channel of the audiometer completely independently (dual frequency knobs are available via the navigation menu), but several controls have been added to make standard clinical testing easy so that the clinician can focus on the patient instead of the audiometer controls.

The Interlock and Tracking buttons provide helpful functions for certain tests. Interlock causes both stimulus buttons to activate simultaneously when only one is touched. Tracking locks the attenuators together; when one is changed, the other tracks along.

A touch on either of the pure tone graphs changes the display to that of an enlarged single graph and makes its surface touch sensitive. A touch at a desired frequency/amplitude intersection activates the test tone. A press by the patient on the response switch then sets a mark on the graph. When the test is complete, a touch on “return” at the lower left hand screen returns to the complete pure tone display.

**Speech Testing**

Speech testing is included with both the FONIX Audiometric Speech tests and the ANL (Acceptable Noise Level) test built directly into the Colt Audiometer’s Speech Test Screen. An external CD or MP3 player is not required; the user simply selects the desired test and audio track from the Speech Test controls and performs the test normally.

The Score Calc box on the Speech Test screen allows the user to automatically calculate the speech test score as the test is running. Simply mark whenever the patient gets a word right or wrong. The percentage of right to wrong answers is automatically calculated.

**Patient Data**

The user’s and the patient’s identifiers can be entered onto the test screen using the built in keyboard. Touch the “Save” button to save the audiogram to an android based file, or use the “send” button to load the data to an external computer.
**GENERAL CHARACTERISTICS**

Size: 11.3 in x 11.5 in x 4.2 in (28.7 x 29.2 x 10.7 cm)

Weight: 3.8 lbs (1.7 kg)

Power: 100 - 240 VAC

**PURE TONE SIGNALS**

**Frequency range**

Air conduction and sound field: 125 – 12000 Hz

Bone conduction: 250 – 8000 Hz

Frequency accuracy: +/- 1%

**Intensity Range (Air Conduction)**

- 125 Hz: -10 to 70 dBHL
- 250 Hz: -10 to 90 dBHL
- 500 – 4000 Hz: -10 to 120 dBHL
- 6000 Hz: -10 to 110 dBHL
- 8000 Hz: -10 to 100 dBHL
- 12000 Hz: -10 to 80 dBHL
- Speech: -10 to 100 dBHL

**Intensity Range (Bone Conduction)**

- 250 Hz: -10 to 45 dBHL
- 500 – 750 Hz: -10 to 60 dBHL
- 1000 – 3000 Hz: -10 to 70 dBHL
- 4000 Hz: -10 to 70 dBHL
- 6000 Hz: -10 to 50 dBHL
- 8000 Hz: -10 to 45 dBHL
- Speech: -10 to 60 dBHL

**Intensity Range (Sound Field)**

Single speaker

- 125 Hz: -10 to 60 dBHL
- 250 Hz: -10 to 80 dBHL
- 500 – 6000 Hz: -10 to 100 dBHL
- 8000 Hz: -10 to 90 dBHL
- Speech: -10 to 80 dBHL

**ATTENUATORS**

Range: -10 to 110 dBHL (120 dBHL with +10 dB boost pressed) in 1, 2, or 5 dB steps.

Accuracy: +/- 1.5 dB

**SIGNAL FORMAT**

**Warble:** 10% frequency deviation at a modulation frequency of 5 Hz (+/- 0.5 Hz)

**Pulsed:** 2.5 Hz (+/- 0.5 Hz). 50% duty cycle (+/- 20%)

**White noise:** flat (+/- 2 dB) to 8 kHz

**Speech noise:** Weighted random noise with a sound pressure spectrum density constant from 100-1000 Hz, falling off at a rate of 12 dB/octave from 1-6 kHz, +/- 5 dB.

**Narrow-band noise:** As defined in ANSI S3.6

**CHANNEL INPUTS**

- **Tone:** pure, pulsed, warble(FM), pulsed warble
- **Speech Microphone:** with adjustable gain control
- **Noise:** Speech, narrow band, or white
- **External:** 100K input impedance.

**VU METERS**

Range: -20 to +3 dB VU

Accuracy: +/- 1 dB at 0 dB, +/- 2 dB at -10 and -20 dB

**MONITOR**

Stereo Monitor Output: with adjustable volume

**CHANNEL OUTPUTS**

- **Speaker:** 10 watts RMS typical into 8 ohm sound field speakers (optional)
- **Earphones:** TDH39P, 100 ohm or Eartone 3A, 50 ohm
- **Bone vibrator:** B71, 100 ohm
- **Line:** For external amplifiers 100 ohm or higher load

**SOUND FIELD SPEAKER**

125 to 12000 Hz Response

> 90 dB SPL output at 3 ft (1 m) with 4 watts RMS input at 1000 Hz at a 45° azimuth

**BUILT-IN SPEECH TESTING**

- Spontee, NU-6, and Maryland CNC word lists
- Acceptable Noise Level (ANL) Test

**REGULATORY**

Designed, manufactured, and tested to meet US, Canada, European and international regulations including: ISO 13485, IEC 60601-1, 93/42/EEC, ANSI S3.6, IEC 60645-1

Our appreciation is extended to Dr. Joseph Rapp, AuD., of Camas, Washington, for the use of his professional facilities in making the Colt audiometer photo seen on the cover of this brochure.