



**LISTEN**INC

APPLICATION NOTE

# Headphone Testing

## System Overview

SoundCheck™ is an easily configured, Windows-based system for efficient and comprehensive testing of headphones and headphone amplifiers.

Applications include:

- High-speed production testing
- Research and development
- Incoming inspection
- Circumaural (sealed), Superaural (open air), Earbud, and Canal (In-ear monitors) headphones
- Amplifiers

## Production Testing

SoundCheck offers fast and accurate system production line testing. All acoustical and electrical quality-related parameters including frequency response, distortion, rub and buzz, polarity, impedance and sensitivity are measured simultaneously, resulting in fast and thorough headphone evaluation. SoundCheck's unique stepped sine excitation signal (Stweep™) permits such detailed tests to be performed in as little as 3 seconds without sacrificing test accuracy, and its proprietary HarmonicTrak™ algorithm maintains measurement accuracy even in noisy environments.

The software can be configured for one-click access to commonly used tests, and various levels of operator control prevent modification of the test sequence. Results can be presented as a simple pass/fail indication, or a detailed failure mode analysis. Pass/Fail limits can be user-defined, determined by offsetting data from a measurement (e.g.  $\pm 3$ dB from the response curve of a reference headphone), or determined statistically using SoundCheck's statistical analysis module. Detailed results can be exported to other programs such as Microsoft Excel® for additional processing, statistical control, and generating documents in standardized formats.

SoundCheck interfaces with barcode readers, footswitches, and other digital I/O devices such as TTL controlled relays, RS-232, and IEEE-488 to integrate fully with automatic production lines.

## R&D Applications

SoundCheck is a powerful and flexible tool for the R&D laboratory. Its advanced measurement



algorithms enable rapid characterization of prototypes, performing comprehensive tests such as frequency response, phase, sensitivity, distortion, and impedance in a matter of seconds. SoundCheck is available with either a sound card or with National Instrument's data acquisition cards for high precision measurements.

SoundCheck offers unrivalled flexibility at every stage in the test process. Input test signals include sine, noise, and any signal stored as a WAV file (e.g. multi-tone, impulse, tone burst, etc.). In addition, amplitude sweeps can be generated using SoundCheck's Stimulus Editor to study compression effects and determine maximum SPL.

## Industry Standard Tests

- Frequency response
- Phase
- Distortion
- Left/Right earphone tracking
- Maximum sound pressure level
- Diffuse or Free-field corrected responses according to IEC 268-7 and IEC 581-10



