



LISTEN INC



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1995 - 2005

10 years of audio test and measurement

APPLICATION NOTE

Audio Electronic Testing

SoundCheck™ is a comprehensive and flexible audio measurement system that can be configured for a wide variety of audio electronic R&D and production test applications. It provides the accuracy and thoroughness needed in the lab and the speed and test integration required in a factory environment.

Applications

- Preamplifiers and amplifiers
- Surround sound
- Mixing boards
- PC audio
- MP3 players

User Configurable

SoundCheck is a software-based system which relies on the computing power of your PC. Not only is this more economical than most hardware based systems, but computer upgrades actually increase the performance of your system, unlike a system that uses hardware-based DSP processing where the performance remains constant for the life of the instrument. SoundCheck is built on the popular National Instruments LabView^{®1} test environment, which facilitates integration with the large library of complimentary instruments. There is no expensive proprietary test hardware, because SoundCheck works seamlessly with a wide range of off-the-shelf data acquisition devices ranging from sound cards (including USB, Firewire, and Bluetooth PC Audio devices) to high precision data acquisition boards. This minimizes downtime as, in the event of a hardware failure, you are not forced to return the special hardware to the manufacturer and suffer a production line shut down – you can simply plug in



For professional audio electronic applications requiring balanced analog and digital inputs and outputs, professional soundcards from Lynx or Digital Audio Labs provide an ideal interface.

an inexpensive replacement card and be back on line instantly.

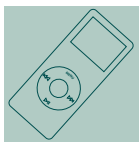
With a choice of front-end input devices and a modular approach to software, you can configure a system optimally suited to your needs, yet expand and evolve it to accommodate changing requirements. Full channel extensibility makes it particularly economical and flexible for audio electronics testing including surround sound systems. This flexibility of hardware and software configurations facilitates migration of test procedures from the product development lab to production test, and SoundCheck can even be used on a laptop for field audit applications where portability is essential. After the initial purchase, SoundCheck can easily be upgraded with additional channels, hardware, and software upgrades to accommodate changing performance needs while maintaining your test process core and infrastructure.

Features

- **Measure frequency response, phase, crosstalk, THD+N, S/N, and more.**
- **Accurate** – 118dB dynamic range and amplitude ± 0.008 dB.
- **Multichannel** – expandable up to 32 channels.
- **Fast** – measure 16 channels in 2 seconds with multitone.
- **Cost effective** – systems start at under \$7000.
- **Analog and digital measurements.**
- **Extensive production test facilities** - e.g. PLC control, limits, and statistics.
- **Easy automation** - SoundCheck uses a simple point & click programming language.
- **Flexible report generator** – produce reports in Word, Excel, HTML, and databases.

High Performance

Using professional-grade 24-bit audio hardware SoundCheck offers the instrument grade performance that you need for characterizing today's audio electronic devices. Its ultra-low distortion and flat amplitude response make it ideal for testing high quality preamplifiers and amplifiers.



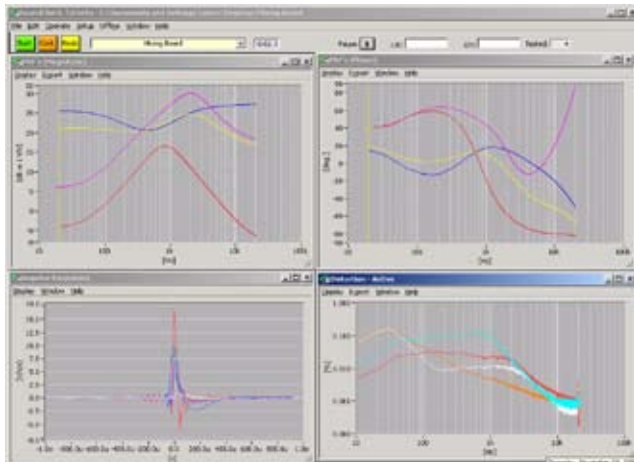
Audio Electronic Testing

Fast

SoundCheck is fast, with many unique software algorithms designed to enhance speed. As an example, a two-channel 1/3 octave sweep from 20Hz to 20kHz with frequency response and THD+N measurements on both channels can be done in under four seconds. Using SoundCheck's multitone techniques, even greater speeds can be achieved.

Synergistic Audio Electronic and Transducer Testing

SoundCheck has been one of the leading acoustic and transducer testing systems for over a decade, so it is perfect for testing devices such as MP3 players with combined electronic and acoustic test needs. Not only is it the most cost-effective solution, but the challenges of integrating the hardware and reports from two different systems are avoided.



Complete analysis of a 7.1 (8-channel) surround sound receiver. All 8 channels were measured simultaneously.

Easy Test Development

Most audio electronics testing involves more than a single measurement, typically a suite of tests involving a series of measurements each with an associated test stimulus, and often post-processing of test results. Tests are run via a powerful sequence editor which enables tests to be created and modified via a simple point and click interface. SoundCheck's Sequence Wizard even writes the test sequence for you, based on your answers to questions about the device under test and the test environment.

Factory Test Friendly

SoundCheck has built-in features such as relay drive and remote contact sensing to support fixture control, support for foot switches and bar code scanners, and several levels of operator authority which facilitate integration into a production test environ-

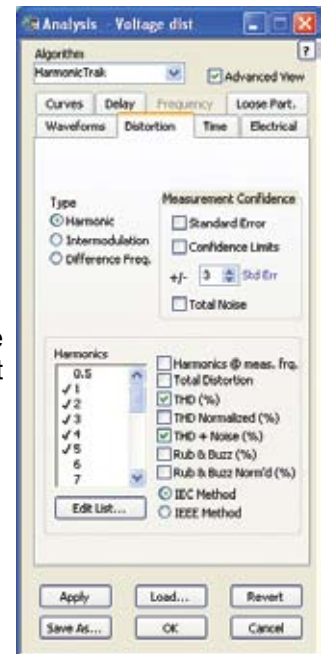
ment. As it is built on the popular National Instruments LabView platform, it is easy to integrate with other test equipment and into larger test environments with ActiveX¹ links or National Instruments' TestStand¹.

Production line test applications typically require a simple "pass/fail" output based on comparing test results to pre-determined limits. SoundCheck's comprehensive limits testing capability allows you to define these limits using numbers from a test specification, statistical data from previous tests, or graphically by adding limits.

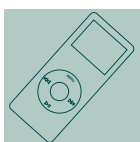
Comprehensive mathematical functions allow sophisticated data post-processing routines to be used. SoundCheck contains post-processing algorithms specially designed for audio electronic applications which allow resampling and sampling rate correction for digital measurements.

Professional User-defined Test Reports

SoundCheck can handle anything from a database entry and simple pass/fail ticket for a production test application to a comprehensive 25-page engineering report including graphs and tables of data for product certification, and everything in between. Highly flexible graphs give you a wide choice of formatting choices, and data can be exported to Microsoft¹ Word¹, Excel¹, or Access¹ or saved as HTML for viewing via a web browser. SoundCheck interacts with Access, SQL, or Oracle¹ databases in enterprise environments and can be configured to produce statistical summary reports automatically.



SoundCheck provides comprehensive distortion analysis capability. Choose from several harmonic and intermodulation distortion measurements including THD, THD+N, individual harmonics and others.



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