



# LISTEN<sup>INC</sup>

## SoundCheck<sup>®</sup> 8.1 Technical Specifications

### SoundCheck Virtual Audio Test Bench

#### Manual Signal Generator

- Sine
- Pink and White Noise with user-defined frequency range
- Streaming .wav file from disk with RMS and Peak level calibration
- Equalization using calibration measurements or any user-defined curve
- Optional USB knob available for frequency and level control

#### Multimeter

- Average, Maximum, Minimum (RMS and Peak) levels with overload indication
- Linear and Exponential averaging time (Fast, Slow, and user-defined)
- A, B, C and user-defined weightings
- Selectable Max/Min limits with Pass/Fail indication

#### Oscilloscope

- Triggering
- Delta cursor
- Selectable graphical zoom
- View spectrum of current waveform

#### Spectrum Analyzer

- FFT with arbitrary number of spectral lines (only limited by computer speed and memory)
- Hanning, Hamming, Blackman-Harris, Exact Blackman, Blackman, Flat top, 4 Term Blackman-Harris, and 7 Term Blackman-Harris windows
- Triggering
- Complex or power averaging
- Average, Maximum, Minimum level with overload and real time indicators
- Selectable averaging time (Linear & Exponential)
- A, B, C and user-defined weightings
- Pure tone frequency and amplitude extraction with "snap to max"
- Delta and Harmonic cursor with THD readout
- Selectable graphical zoom
- View last waveform of current spectrum
- Save to memory of current spectrum

#### Real-Time Analyzer

- 1/1, 1/3, 1/6, 1/12, 1/24 octave filters with true digital recursive filters
- Average, Maximum, Minimum level with overload and real time indicators
- A, B, C and user defined weighting filters
- Complies with ANSI S1.11 and IEC 1260
- Linear and Exponential averaging time (Fast, Slow, and user-defined)

**Industry Standard Sequences** (Please contact Listen for a complete list)

- IEEE • ITU • ANSI • IEC • TIA
- TBR • ISO • AES • ALMA

### SoundCheck Step Editors

#### Hardware

- Windows Multimedia devices including sound cards (PCI, PCMCIA, USB, Fire wire), Bluetooth, and VoIP.
- NI DAQmx data acquisition cards including NI 4461
- Calibration and settings including sampling rate, bit depth, analog or digital audio, maximum voltage, and alias free frequency limit.
- I/O cards for TTL relay control
- Computer interfaces control with RS-232, GPIB (IEEE-488), footswitch and buzzer.
- DC Connect™ programmable DC power supply and measuring amplifier setup
- Multichannel configuration with table view of channels

#### Calibration

- Measure Input and Output sensitivities for transducers, amplifiers, and signal conditioning devices using built-in routines and store calibration history
- Calibration with external, absolute source including acoustic, vibration, or voltage.
- User-defined physical units (e.g. Pa, V, G, etc.)
- Complex Equalization (amplitude and phase) of input and output devices (e.g. microphones and amplifiers). If the output device is an acoustic source, (e.g. loudspeaker, mouth simulator), SoundCheck can automatically equalize any test signal including arbitrary signals.
- Import of EQ/Correction curves for transducers

#### Messages

- Message steps initiated based on Pass/Fail conditions
- Display text message in local language, input numeric values, Yes/No dialog
- Digital I/O
- IEEE-488 and RS-232

#### Stimulus

- Log sweep ("Farina" sweep)
- Sine (stepped – any linear or logarithmic resolution, and amplitude sweep)
- Two-tone (two sweeping tones for Difference Frequency Distortion or one fixed and one sweeping tone for IM)
- Multitone with linear or logarithmic spacing
- Noise (pink, white, MLS with user-defined bandpass range)
- Arbitrary (any WAV file)
- Equalization
- DC (requires Listen DC Connect or National Instruments hardware)

#### Acquisition

- Play & Record, or any combination of Signal Generator, Multimeter, RTA, and FFT
- Capture response time waveform as a WAV file
- Multichannel-multicard acquisition
- Triggered record
- Record level monitoring



## SoundCheck<sup>®</sup> 8.1 Technical Specifications (cont)

### SoundCheck Step Editors (cont)

#### Analysis

##### Time:

- Impulse Response
- Auto-Correlation
- Cross-Correlation
- Time Envelope
- Loose particle detection
- Automatic delay compensation

##### Frequency:

- FFT & DFT (any size)
- Hann, Blackman-Harris and Flat Top windows
- Auto-spectrum & Cross-spectrum
- Spectral Scaling: RMS or Power Density
- Frequency and phase response including harmonics
- Complex or power averaging
- Relative or absolute response
- Coherent Output Power
- Coherence & Non-Coherence
- Signal-to-Noise Ratio
- Measurement Confidence
- Impedance

##### Algorithms:

- Broadband RMS to measure unfiltered level of an AC or DC signal
- Time Selective Response ("Farina" method) to measure free-field and impulse response of fundamental AND harmonics. This includes deconvolved time response and choice of time windows.
- Heterodyne to measure frequency and phase response with optimal accuracy
- HarmonicTrak™ Algorithm tracks level and phase of any user-selected harmonics including sub-harmonics or intermodulation products; no limit to number of harmonics
- Loose particle detection
- Multitone
- Dual Channel Analysis

##### Distortion:

- THD and Rub & Buzz
- Normalized THD and Rub & Buzz distortion (harmonics compared to amplitude of fundamental at measured frequency)
- THD + Noise
- Intermodulation or Difference Frequency
- Difference Frequency
- Non-Coherent Distortion

#### Recall

- Automatically recall data or results

#### Post-processing

- Complex math: Addition, subtraction, multiplication, division, offset by constant (X, Y, or Z dimensions), change sign, reciprocal, absolute value, square, square root, exponential, and logarithm
- Scalar (Ave, Power, Max, Min, Resonant Frequency, Q, Notch, Loudness)
- Windowing (time and frequency)
- User-defined Equations (e.g. Thiele-Small parameters)

- Change resolution to Nth octave or user defined linear or logarithmic
- Nth Octave synthesis
- Power Summation of any user-defined frequency range
- Group delay
- Unwrapped phase
- Search range to find intersection of two curves (e.g. -3dB points of crossover network)
- Curve smoothing with 1/3, 1/6, 1/12, and 1/24 octave or user-defined linear or log resolution
- Loudness rating according to IEEE and ITU-T; example sequences for TIA and other industry standards included
- Attack & Release time calculates the time for the response signal to rise or decay, respectively, by a user-defined amplitude in dB or linear units
- Directivity Index
- Resampling and sampling rate correction
- FFT / Inverse FFT

#### Statistics

- Average
- Max, Min, Mean
- Standard Deviation with user-defined sigma
- Process Control (Cp & Cpk)
- Best and Worst Fit to Average with ranking
- Yield

#### Limits

- Pass/Fail
- Absolute
- Floating (x & y directions)
- Aligned to a pre-defined value (e.g. 0 dB at 1 kHz)
- Dynamic, using live measurements
- Waveforms, single values, and curves
- Control of significant digits
- Margin, Critical and Failed points

#### Display

- Multiple displays can be placed on the screen to view curves, single values, and test results with PASS/FAIL indicators; display layout can be transferred to Word or as HTML document; curves with different units (e.g. dB SPL and Ohms) can be displayed in one graph with no limit to number of curves displayed in a single graph; data from any one graph can be exported directly to a new Excel file or pre-defined template
- Displays include XY graph, table, results, text, polar plots and embedded images
- Default template and duplicate
- Save to image file
- Lock display to protect display layout

#### Printing

- Report generation to Excel, Word, HTML or image files
- Use of templates (Excel, Word)
- Print preview
- Direct print to file or printer
- Automatic file naming