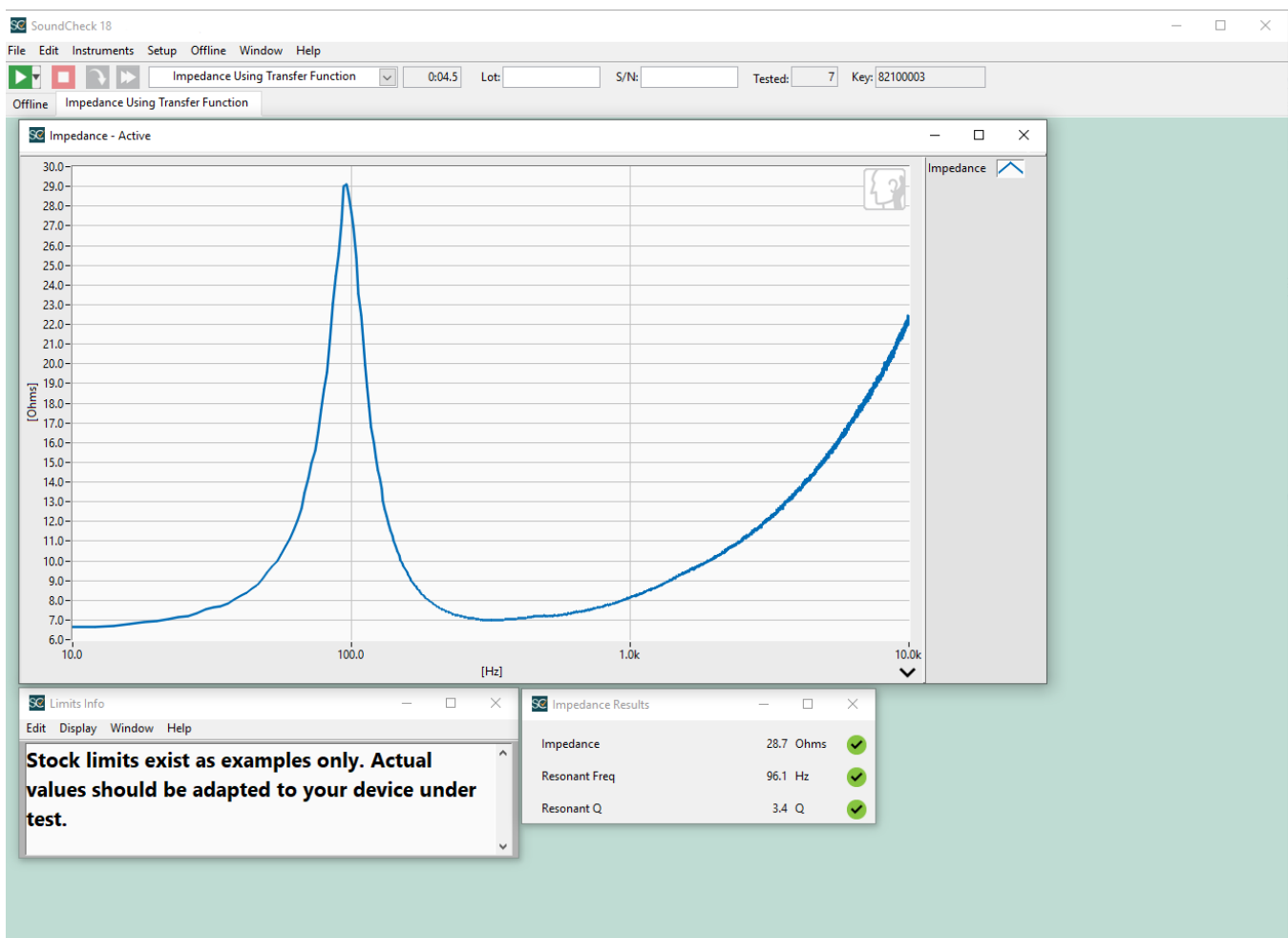


Impedance Using Transfer Function

Introduction

This sequence demonstrates an alternative to the traditional SoundCheck single channel impedance measurement method. A pink noise stimulus (10Hz – 10kHz) is played through the speaker while the signal across the amplifier terminals is recorded by Direct In 1 and the signal across the sense resistor is recorded by Direct In 2. A transfer function analysis step is then applied to the recorded time waveforms to calculate the impedance curve. The curve is then post-processed to calculate resonance frequency, maximum impedance and Q of the resonance peak. A set of arbitrary limits steps are also provided to generate pass/fail results. The final display shows the impedance curve and a results window.



Final Display for *Impedance Using Transfer Function* sequence



Software Requirements

- SoundCheck 18
- 2004 – Post Processing
- 2021 – Transfer Function

Hardware Requirements

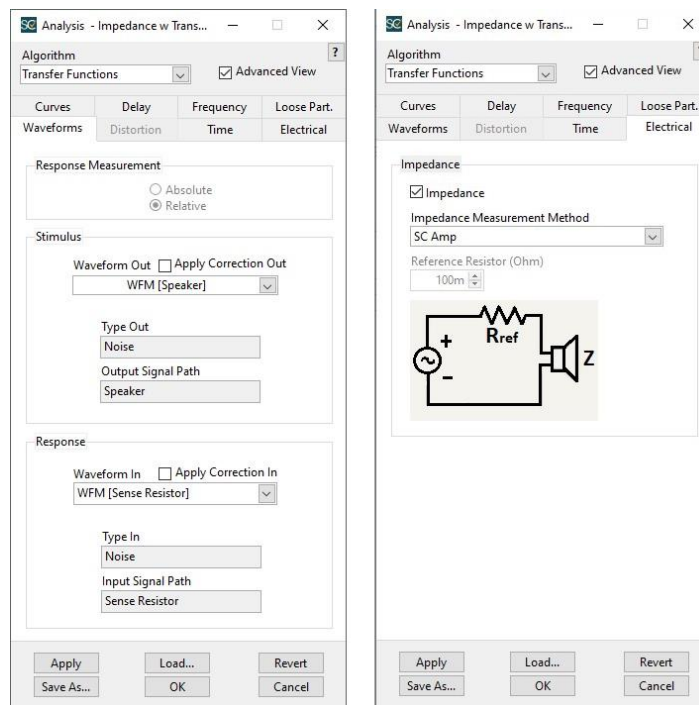
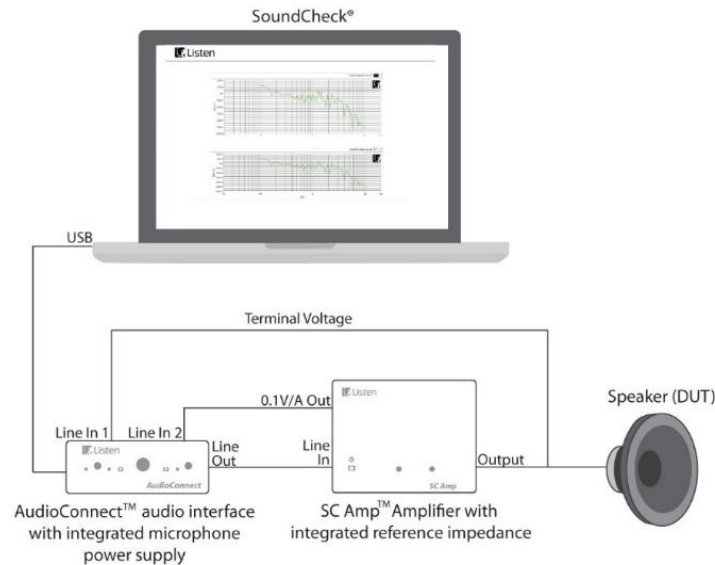
- Audio Interface – Listen AudioConnect or similar
- Power Amplifier – Listen SCamp or similar
- Impedance Reference – Listen Impedance Box or SCamp Impedance Reference Output

Hardware Setup & Calibration

1. Calibrate the amplifier as instructed in the SoundCheck manual.
2. Connect output 1 of your audio interface to the input of the amplifier.
3. Connect the impedance reference (connection types will vary depending on reference type).
4. Connect the amplifier output to the loudspeaker
5. **Connect input 1 of the audio interface across the terminals of the amplifier. Use a balanced cable with a 1/4" TRS plug or XLR at the sound card and a 1/4" TS (or dual, banana, alligator clips, etc.) at the amplifier – wired for "differential" ground (shield and ground tied to each other) for this connection.**
6. Connect the output of the impedance reference to input 2 of your audio interface. Use a balanced cable (1/4" TRS) for this connection.

You are ready to start the sequence.

System diagram



If you are using another impedance reference device besides a SC Amp you will need to reconfigure the Electrical tab settings of the Analysis step to match the reference resistor value and configuration. This can be done by selecting the Impedance Box option in the Measurement Method dropdown and entering your custom reference resistor value below in Ohms.

Sequence Logic

Type	Step Name	#	Out	In
Sti	Impedance w Noise	1	Amp ch 1	
Acq	Play & Record Impedance w Transfer	2	Amp ch 1	Speaker Sense Resistor
Ana	Function	3		
Lim	Imp Test for Signal	4		// Applies limits for testing the presence of an input signal
Mes	No Signal	5		
Pos	Est. Resonance	6		// Estimates the resonant frequency of the impedance curve
Lim	Impedance	7		// Applies a maximum impedance limit value
Lim	Resonant Freq	8		// Applies an upper and lower limit to the resonant frequency value
Lim	Resonant Q	9		// Applies an upper and lower limit to the Q of the impedance curve
Dis	Impedance Using Transfer Function	10		

Further sequence development

Ways in which you could modify or further develop this sequence include:

- Add autosave steps to store your data and results
- Test for loose particles
- Incorporate the impedance test into a larger suite of tests similar to the *Complete Test* sequence