Application Note

Characterization of a Sensor with a 1920 Series Precision LCR Meter

One of our customers needed a simple way to measure the resonance of an electro-dynamic loudspeaker as well as the DCR of the speaker coils. The measurements had to be taken several times a day over a several month period.

The IET/QuadTech 1920 Precision LCR Meter, used in a wide variety of sensor applications including medical transducers, hydrophones, and ultrasonic transducers, was connected to a laptop PC by means of an RS232-to-USB adapter. The 1900 Series Application Wizard configured the settings and logged the measurements between the 1920 and the laptop. Sweep of primary and secondary parameters, either logarithmically or linearly, could be performed over the frequency range from 20Hz to 1MHz. –In this application, the Wizard-was configured to sweep the 1920 linearly over the frequency range from 20Hz to 2000Hz in 100 steps. The software configuration screen is shown in Figure 1.
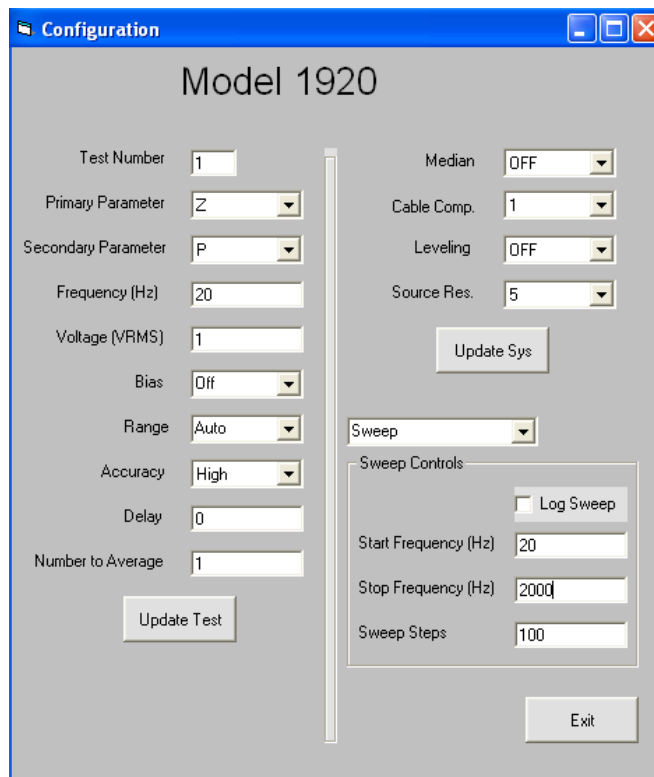

Figure 1 1900 Software Wizard Configuration Screen

IET LABS, INC.
534 Main Street, Westbury, NY 11590

www.ietlabs.com
TEL: (516) 334-5959 • (800) 899-8438 • FAX: (516) 334-5988

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Figure 2 1920 Precision LCR Meter

Fourteen different measurement parameters can be chosen, with any two being displayed. In this application, the customer chose Z and Phase. The graphs are shown in Figure 3.

The customer was looking to see whether the resonance changed over time. The impedance sweep of the loudspeaker shows that the resonance occurred at 175Hz. The resonance was confirmed by looking at the phase, which clearly shows a phase shift at 175Hz.
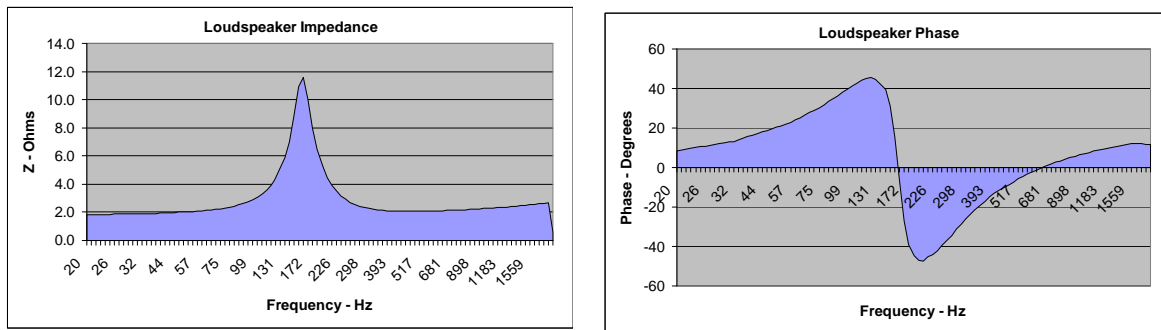

Figure 3 Impedance and Phase Graphs

Summary
The 1920 Precision LCR Meter in combination with 1900 Software Wizard allows for fast and easy characterization of a wide variety of sensors over the frequency range from 20Hz to 1MHz.

The 1920 provides a single instrument solution that performs DCR measurements as well as impedance measurements. The broad frequency range combined with programmable frequencies makes the 1920 an invaluable tool for determining the characteristics of sensors, while the 1900 Software Wizard allowed quick sweeps to be performed and graphed.