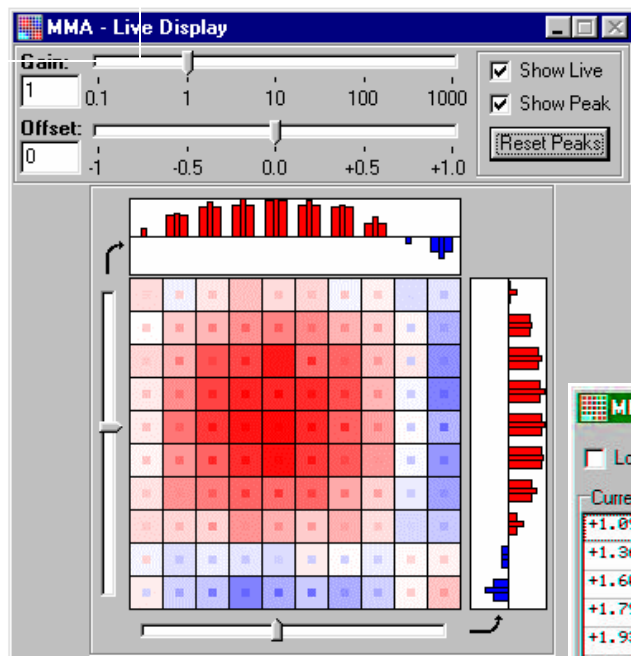


Introducing the Model 910 MMA-Z Multichannel Microelectrode Analyzer with Impedance



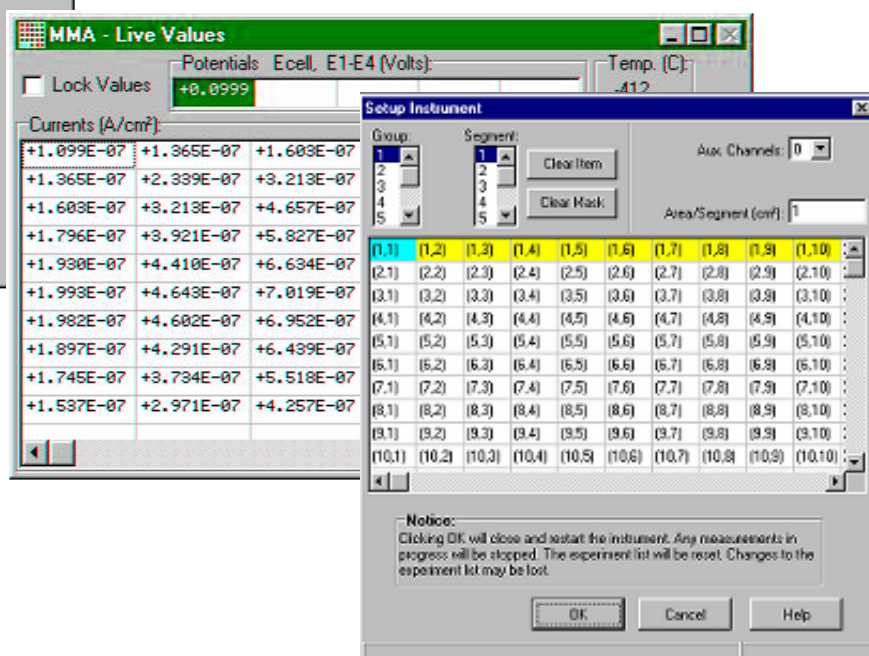
The **Model 910 MMA-Z** is a general purpose DC and AC Impedance capable multichannel instrument for electrochemical measurements on micro-electrode arrays. Applications include biological and chemical sensor arrays and assays; combinatorial electrochemistry and high-throughput materials evaluation; current distribution analysis and electrode interaction; and corrosion science. The Model 910 MMA is a powerful, flexible laboratory tool for the study and development of multi-electrode systems.



The **Model 910 MMA-Z** is equipped for 100 channels of current measurement with sensitive zero resistance ammeters (ZRA), an integrated DPS-based Frequency Response Analyzer (FRA) for full-spectrum EIS measurements. Optional high input-impedance electrometers facilitate potential measurements. On-board microprocessor-based data acquisition system with 16-bit resolution provides wide dynamic range and low-noise current and potential measurement.

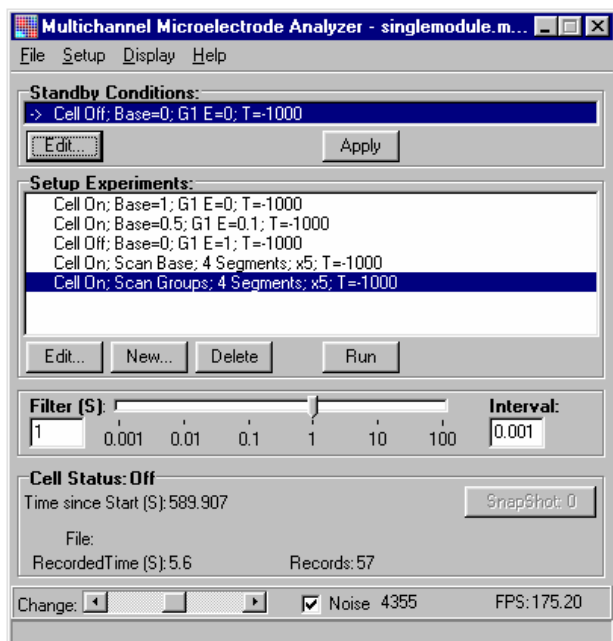
Typical Applications

- Chemical & Biological Sensor Arrays
- Combinatorial Electrochemistry
- Battery Electrode & Electrocatalyst Materials Development
- Current Distribution Mapping
- Corrosion Science & Engineering
- Inhibitor & Coating Evaluation



Electrochemical Impedance Spectroscopy (EIS) combined with traditional **DC Electrochemistry** such as Potential Scans, Square Waves, or Cyclic Voltammetry, may be performed on either the entire array, or on a group of segments. Combination arrays of working and reference electrodes are possible by mixing the signal conditioning group electronics. A built-in potentiostat provides polarization control of the electrode array with a common counter and reference electrode. Offset polarization of electrode segment groups is possible with 12-bit resolution.

Windows graphical interface provides for **real-time display** of current and/or potential for each electrode. User-defined spatial arrangement to accommodate your electrode array configuration.



A profile of row and column data may be selected with peak and average values displayed in real time. Data collected by the local microprocessor is updated every 40 milliseconds and presented in the display window. Raw data is logged to an ASCII file that can be easily imported into standard spreadsheet or graphic display programs for off-line analysis. A time-stamped snapshot of the entire electrode data can be recorded.

A convenient MMA software control panel is provided for setting the gain, offset and averaging parameters of the displayed data. This feature permits easy normalization for display purposes without affecting the raw data.

Controls are also provided for the internal potentiostat to set the applied potential of the working electrode as well as the desired offset value for each group of electrode segments. Additional channels are available for electrode substrate

and/or cell temperature control. A batch preset menu is used to set the conditions for the electrode that may be applied as a step function.

Specifications

- Working Electrode Inputs: 100 channels, interchangeable electronics in 10 groups of 10
- Current range (DC+AC peak): $\pm 100 \mu\text{A}$, 3 nA resolution
- Voltage: $\pm 10 \text{ V}$ input, 305 μV resolution; Electrometer: $10^{10} \Omega \parallel 30 \text{ pF}$
- Integrated Impedance Analyzer:
 - Measurement mode: Single-sine frequency; 2 gain/phase measurement, 1 generator channel
Sequential AC measurement of electrodes
 - Frequency range: 1 mHz to 1 kHz, at least 10 steps per decade
 - AC excitation amplitude: 0 to 2.82 V_{RMS}
 - Measurable impedance: 500 to $10^7 \Omega$ for the full frequency range @ 100 mV_{RMS} excitation
500 to $10^5 \Omega$ for the full frequency range @ 10 mV_{RMS} excitation
 - Measurement cycles/chnl: 1 to 1000
 - Impedance accuracy: $\pm 1\%$ Magnitude error, $\pm 5^\circ$ Phase error for full frequency range
- Auxiliary channels standard: 4 extra electrometer inputs for analog signals
- Internal potentiostat: $\pm 10 \text{ V}$ compliance @ 10 mA maximum
- Applied potential range: $\pm 5 \text{ V}$, resolution of 165 μV
- Group offset potential range: $\pm 5 \text{ V}$, resolution of 2.5 mV
- Risetime: 3 ms (-FS to +FS, 10% to 90%, 4.7 k Ω load)
- Maximum Data Rate: 20-100 frames/s (depending on electrode configuration)
- Temperature control: Set-point contrlr, Type J T/C (0 to 200 $^\circ\text{C}$); 5V/1A heater (user supplied)
- Working Electrode Interface: Model 910A: 321-pin ZIF PGA socket with guarded signal inputs
Model 910B: five 68-pin connectors with mating ribbon cables
- Host Computer Interface: Two RS232 serial links to Pentium PC with high speed interface
- MMA software: MMA Live/MAAView, ZView, supported under Windows2000/XP Pro

© Copyright 1999-2006 Scribner Associates, Inc. Price and specifications subject to change without notice.