






Electronic Materials

Displays | Solar/PVs | Semiconductors | Nanomaterials

LED, LCD, OLED, MEMs, Perovskite materials

OPV, Si, DSSC, OFET, Ge, GaAs

the xm difference

-  **Market leading impedance analysis**
-  **Widest voltage and current range available**
-  **Time domain and impedance analysis in a single system**



ModuLab[®] XM MTS is the only electronic materials test system that combines an accurate time domain analyzer and a high performance impedance analyzer into a single “plug and play” modular chassis. Purpose built for electronic materials research the ModuLab XM provides:

- High-performance impedance analysis throughout the entire frequency range and across all three modes of operation
 - Swept sine (highest accuracy and repeatability)
 - Multi-sine/FFT (for increased test throughput especially at low frequency)
 - Harmonic analysis (to study non-linear materials)
- 100 V option module enables tests of operating range and linearity/breakdown properties of materials
- Low frequency <10 Hz impedance/C-V measurements for material purity and degradation studies
- Multi-component system calibration for ensured measurement accuracy
- Market leading frequency range and resolution for analysis of carrier mobility/concentration (1 in 65,000,000)
- Staircase or smooth ‘analog’ ramp waveforms. Important for I-V, hysteresis and polarization measurements.
- Wide current measurement range (over 16 decades of current from 0.1 fA to 2 A) needed for electronic materials that transition between conduction states depending on applied voltage
- All time domain techniques (fast pulse, I-V etc.) use the same ‘core’ hardware module ensuring minimum cabling to the sample and consistency of results
- Available voltage and current amplification modules (100 V amplifier, femto ammeter, 2A booster) for the greatest flexibility in application
- XM hardware and software is compatible with highly efficient, low cryogen usage cryostats and probe stations
- User friendly software with simple three step test setup/run, built-in live waveform displays, connection diagrams and equivalent circuit/ IV fit functions.
- Compatibility with potentiostat modules for Dye-Sensitized Solar Cells (DSSC)

Accessories

Probe stations

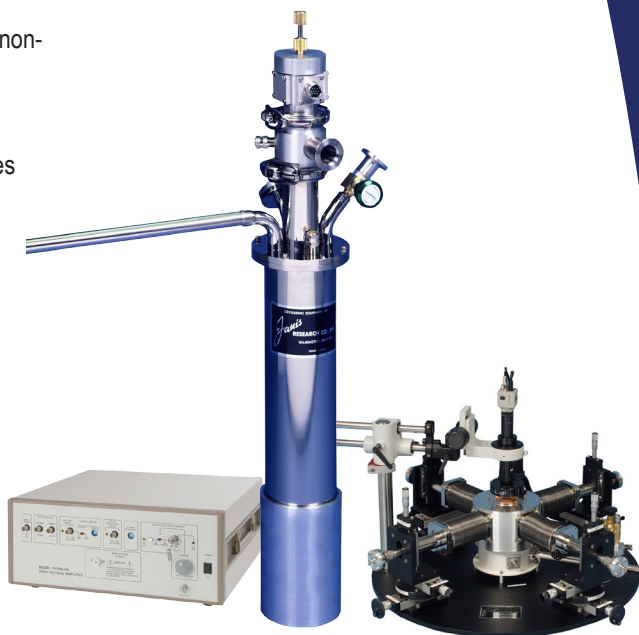
- The ModuLab XM is fully compatible with a wide range of cryogenic and non-cryogenic probe stations that operate from 5K to 475K
- XM provides full time domain and AC test capability via probe stations
- 2 or 4 terminal connections available for high and low impedance samples
- Manual or remote controlled X, Y, Z probe positioning

129610A Cryostat System

Materials researchers often need to characterize the electrical performance of materials over a wide range of temperature, e.g. ionic conductors in solid oxide fuel cells, semiconductor and electronic materials, ceramic materials for aerospace applications

Solartron's 129610A provides :

- Sample in static gas (no sample cracking)
- Very low cryogen usage (typically 250 ml/hr @ 77 K)
- Operation to 78K with LN₂, 5K with LHe
- Switching between LHe/LN₂ operation per experiment.



High Voltage Amplifiers

ModuLab XM internal option modules provide up to ± 100 V operating range and is compatible with external amplifiers for high voltage operation (in the order of 10 kV).

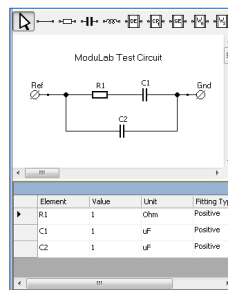
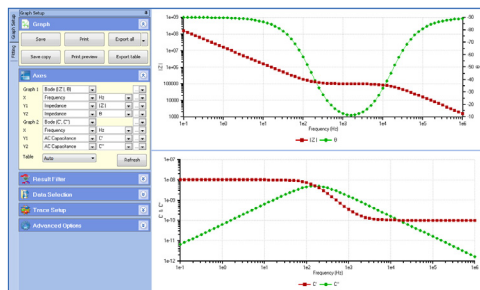
Software

ModuLab XM MTS software is a very flexible and comprehensive materials test software package. A large selection of test types are provided, from standard open circuit, I-V, pulse, C-V, Mott-Schottky to complete multi-step sequences that can include sample temperature control using a cryostat or high temperature furnace.

As test parameters are entered into the software, a waveform diagram displays the timing and levels that will be applied to the sample when the test is run.

Equivalent circuit models may be constructed using a range of components including resistors, capacitors, inductors, distributed elements, constant phase elements, Gerischer elements, and Warburg open / short elements.

A built-in report generator takes test results and outputs them, together with graphs, diagrams and analysis information into your selected word processor software.



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