

CAPRES M4PP SEM Module

In-Situ Scanning Electron Microscope Sheet Resistance Probing

M4PP SEM Module



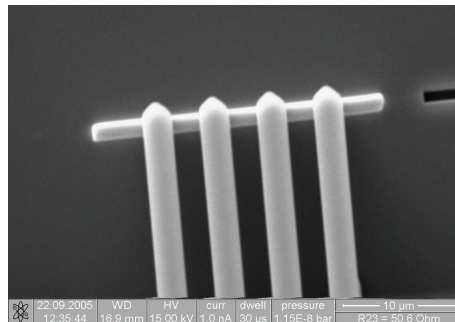
CAPRES M4PP SEM Module brings microscopic sheet resistance characterization to Scanning Electron Microscopy (SEM) and Focused Ion Beam Systems (FIB).

SEM ultra high resolution imaging and CAPRES' Microscopic Four Point Probes (M4PP) form a powerful tool for analyzing the local electrical properties of materials and devices:

- Align the probe by SEM inspection to test submicron features
- Use the proven four-point technique to measure electrical resistance accurately
- Characterize structures electrically without breaking SEM vacuum
- Perform nondestructive measurements with ultra-low contact force probes
- Compatible with SEMs from FEI, Jeol, Hitachi, Zeiss, Seiko and others

SEM Module Application Brief

Example application:
Measuring the resistivity
of nano-scale Pt wires
(1 μm x 1 μm x 25 μm)
supplied by FEI COMPANY



Platinum wire measured value

$$R = 50.8 \Omega$$

$$\rho = \frac{R \cdot A}{L}$$

$$\rho \sim 10 \mu\Omega\text{m}$$

The M4PP SEM Module is an ideal addition to any SEM system for studying electrical properties of nano- and microscale structure. Applications include surface layer transport measurement, interconnect probing, and characterization of inhomogeneous or microstructured advanced materials:

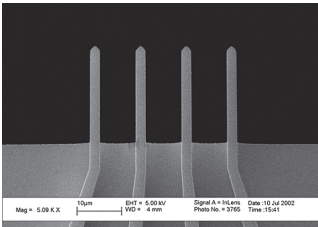
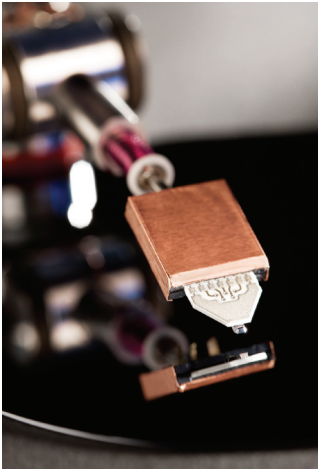
- Nano-wires and -tubes
- Ultra-thin films and mono-layers
- Electronic surface states
- Device interconnects
- Polycrystalline films
- Organic materials



CAPRES A/S

COPENHAGEN APPLIED RESEARCH

CAPRES M4PP SEM Module Technical Specifications



10 µm pitch probe

The CAPRES M4PP SEM Module expands the capabilities of standard Scanning Electron Microscopes (SEM) with in-situ Microscopic Four Point Probing (M4PP). The M4PP SEM Module consists of a probe holder that attaches to a micro manipulator inside the SEM chamber, a stand-alone instrumentation unit, and software for control and data acquisition.

Probe types:

Probe spacing (pin pitch): 5, 10, 15, 20, 25, 30 µm

Instrumentation unit:

Measurement range: 1 mΩ – 10 MΩ

Measurement current: 50 pA – 1 mA

Dual frequency lock-in: 1.5; 3.1; 6.1; 12.2; 24.4; 48.8; 97.7; 195.3; 390.6; 781.3; 1562.5 Hz

Compliance voltage: ±1 to ±12 Volt DC

4 : 4 multiplexer: To select current and voltage pins

Surface detection trigger output: TTL-level

TCP/IP control: Ethernet

Software: Instrumentation unit can be controlled from Lab-View® or via terminal program commands.

Power supply unit:

100 V – 240 V AC 50/60 Hz

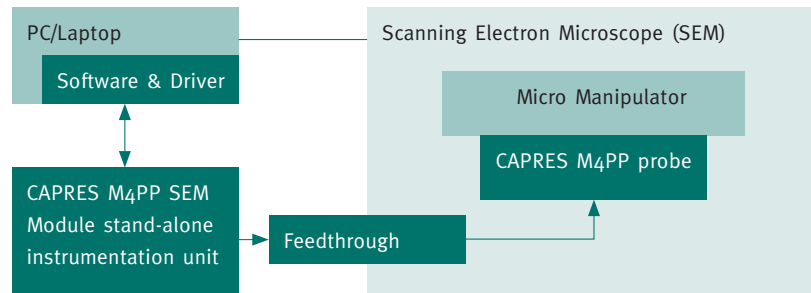
Instrumentation unit size: 110 x 80 x 170 mm³

Power supply unit size: 110 x 80 x 170 mm³

SEM electrical feedthrough: Depends on SEM type and model.

Preliminary specifications subject to change without notice

M4PP SEM Module Schematic



■ Supplied by CAPRES A/S

The M4PP SEM Module is designed for the Micro Manipulator, MM3A, from Kleindiek Nanotechnik GmbH, and can be used in SEM's from FEI, Jeol, Hitachi, Zeiss, Seiko.

Please contact us for more information about the CAPRES M4PP SEM Module.



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