

GALAXY DUAL CONTROLLER

GIVE A SECOND LIFE TO YOUR AFM



STANDARD MODES

- Contact Mode
- Oscillating Mode
- Spectroscopy
- Force Modulation Microscopy (FMM)

ELECTRICAL MODES

- ResiScope
- Soft ResiScope Mode
- HD-KFM
- Electric Force Microscopy (EFM)

ENVIRONMENTAL CONTROL

- EZ TEMP
- Environmental Control
- Thermal Analysis
- EZ Liquid

ADDITIONAL MODES

- Piezoresponse Force Microscopy (PFM)
- Conductive AFM (c-AFM)
- STM
- Soft Intermittent Contact
- Magnetic Force Microscopy (MFM)
- Kelvin Probe Force Microscopy (KPFM)

MULTI-PLATFORM AFM CONTROL ELECTRONICS

AFM Configuration

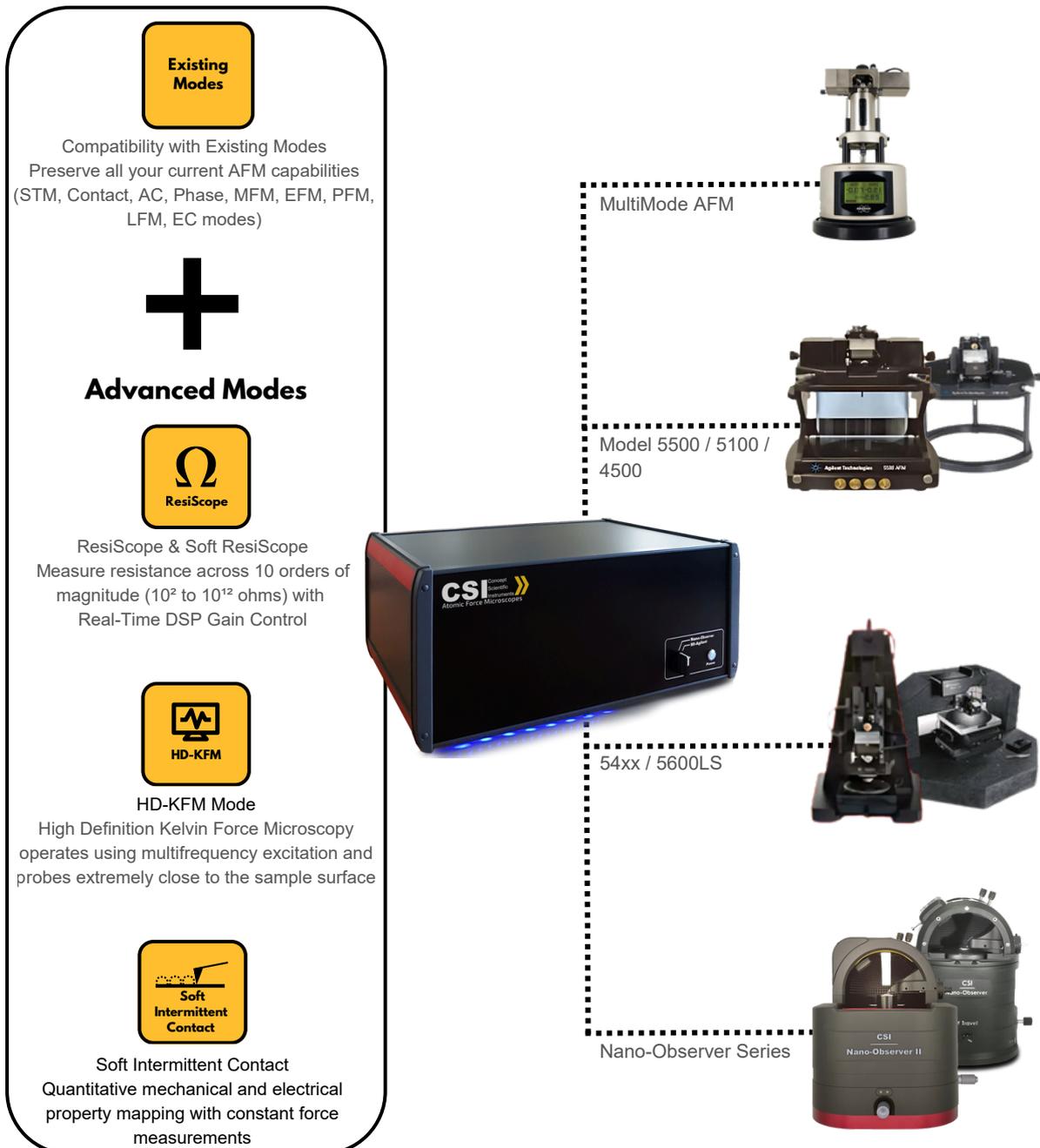
Directly compatible with the : multimode.

One controller to replace all old electronics, computer and software



Discover the Galaxy Dual Controller, a cutting-edge upgrade for your existing Atomic Force Microscope. This revolutionary controller breathes a second life into legacy AFM systems by combining advanced imaging modes with intuitive software, making it the perfect solution for researchers seeking enhanced capabilities without the cost of a complete system replacement.

Advanced Mode Capabilities



REDISCOVER NANOSCALE INSIGHTS

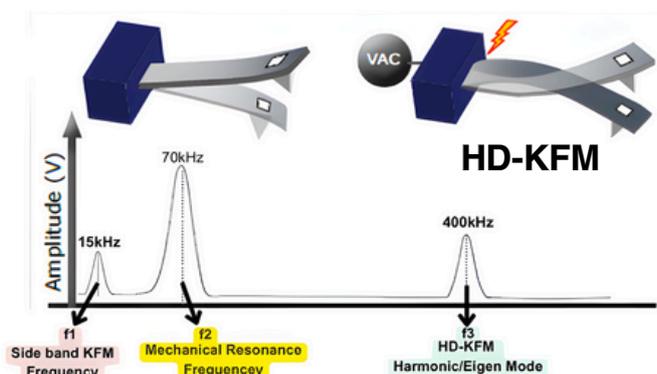
The Galaxy Dual Controller revolutionizes existing AFM systems by combining powerful new capabilities with your familiar instrument. This innovative controller bridges the gap between functioning existing AFMs and cutting-edge techniques, delivering advanced electrical, mechanical, and environmental measurements without the need for a complete system replacement. From high-resolution HD-KFM surface potential mapping to comprehensive resistance measurements spanning 10 orders of magnitude, the GALAXY DUAL transforms your AFM into a versatile nanoscale characterization platform with unparalleled precision and intuitive operation.

New & Advanced Modes

HD-KFM: High Definition Kelvin Force Microscopy

- Enhances surface potential resolution and sensitivity beyond standard KFM
- Includes Electric Field Cancelling (EFC) for pure magnetic measurements (MFM)
- Perfect for high-definition surface potential characterization of nanoscale surfaces

<https://www.csi-afm.com/afm-modes/hd-kfm-iii>

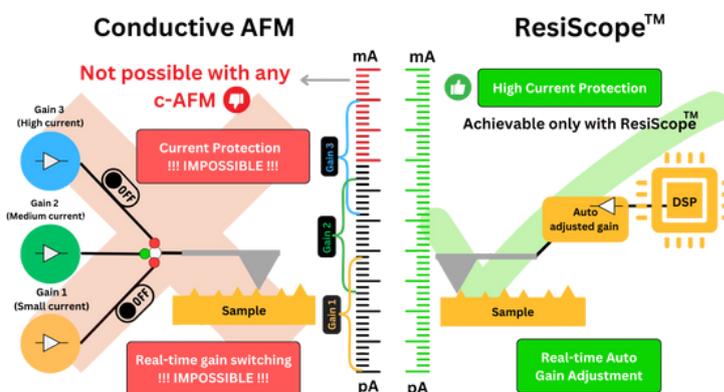


HD-KFM works at 400 kHz using the second eigenmode. That means at least 20× more maps compared to standard KFM.

ResiScope™ Current & Resistance Mapping

- Measures over 10 decades with high sensitivity and resolution
- Features fast auto-ranging driven by a Digital Signal Processor (DSP)
- Compatible with oscillating modes (e.g., MFM, EFM, KFM) for comprehensive sample characterization in a single pass
- Ideal for semiconductors, photovoltaics, metallic structures and 2D materials science applications

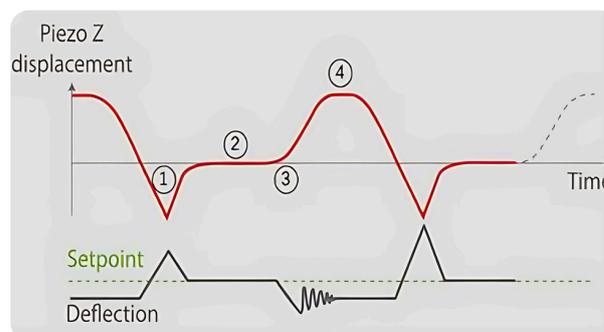
<https://www.csi-afm.com/afm-modes/resiscope-iii>



Soft IC Mode (The 3rd AFM Mode) Soft Intermittent-Contact Mode

- Maintains constant force during measurements for quantitative electrical and mechanical data
- Smart DSP Z-actuation control
- Combines benefits of contact and resonant modes, excelling with soft biological samples, gels or polymers.
- Compatible with advanced techniques like Soft MEKA, Soft ResiScope, Soft PFM, and Soft SThM

<https://www.csi-afm.com/afm-modes/soft-intermittent-contact-afm>



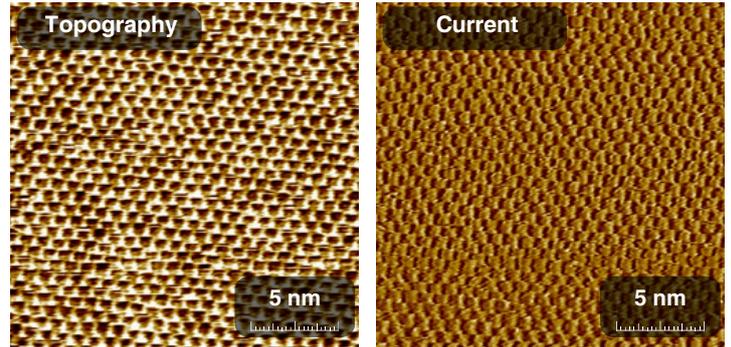
1. Topography & stiffness
 2. Constant Force = Quantitative Measurements
 3. Adhesion
 4. Next point
- Soft IC is compatible with: ResiScope, SThM, PFM and c-AFM

GALAXY DUAL CONTROLLER

KEY FEATURES & APPLICATIONS

High Resolution AFM/STM Imaging

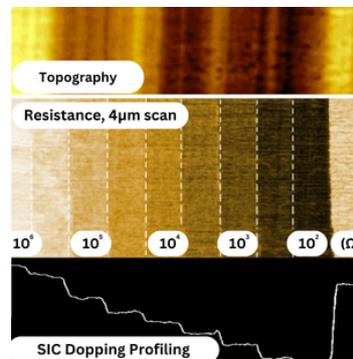
The Galaxy Dual Controller combines a high-bandwidth feedback loop with ultra-low-noise electronics and 24 bit DAC control for precise scan control, enabling stable and reliable atomic resolution imaging without the need for filtering or post-processing. Its advanced architecture minimizes electronic drift and maximizes signal-to-noise ratio, ensuring consistent performance even in demanding high resolution STM/AFM experiments



Raw data of STM Atomic resolution on HOPG using 5100 Agilent STM Head

Semiconductor Research

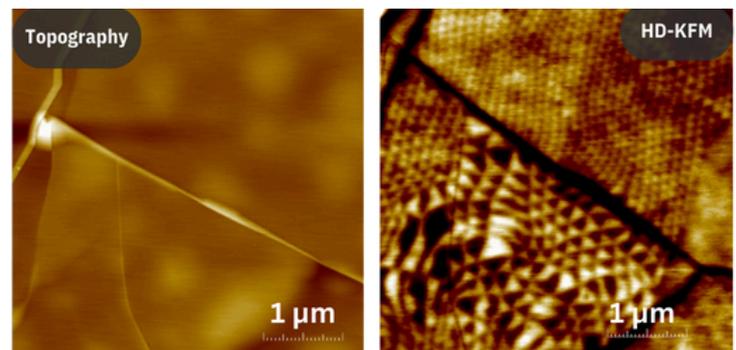
ResiScope™ provides a powerful solution for semiconductor analysis, enabling high-resolution electrical characterization essential for modern device development. In semiconductor doping studies, the ability to map resistance variations with nanometric precision is critical for understanding dopant distribution and its impact on device performance.



Topography (top) and resistance mapping (bottom) of a SiC sample showing clear differentiation between doping regions

2D Materials & Moiré Patterns in hBN

HD-KFM is particularly valuable for studying 2D materials due to its exceptional resolution and sensitivity. The examples highlight the technique's capabilities in this rapidly growing field: Hexagonal Boron Nitride (hBN) and Moiré Patterns.



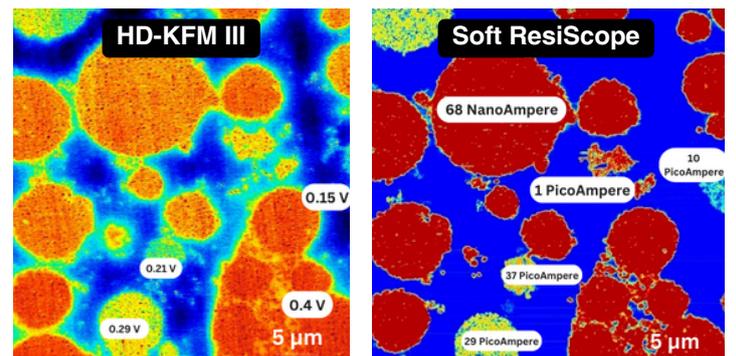
Topography

Moiré pattern

Battery Sample & Multi-Mode Analysis

HD-KFM™'s ability to measure surface potential with high resolution makes it particularly useful for studying battery materials and interfaces.

Our technology allows seamless switching between measurement modes with a single click in the software.



Surface Potential (HD-KFM - Left): Displays charge distribution, where warmer colors indicate higher potentials and cooler tones represent lower potentials. Current Map (Soft ResiScope - Right): Highlights conductivity variations, showing high current regions in red (e.g., 68 nA) and low current zones in blue (e.g., 1 pA).

GALAXY DUAL CONTROLLER

KEY FEATURES & APPLICATIONS

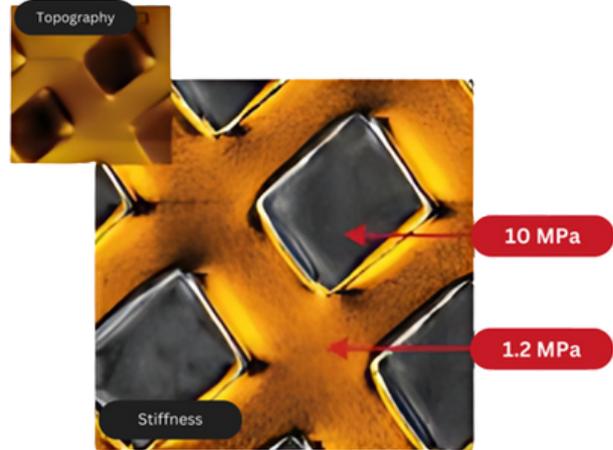
Soft MEKA

Mapping Mechanical Properties

Soft MEKA combines the advantages of contact mode and force spectroscopy, enabling precise mechanical property mapping without friction forces or slow data acquisition.

This mode provides detailed mapping of adhesion, stiffness, and Young's modulus.

- ✓ Phase and stiffness mapping for polymers and composites
- ✓ Quantitative adhesion and modulus measurements across interfaces
- ✓ Friction-free operation to preserve delicate material structures

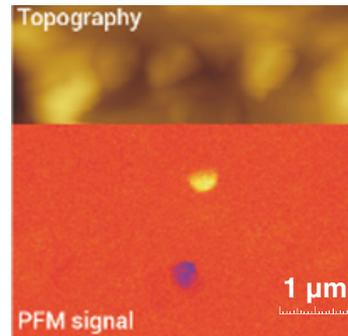


This PDMS scan provides detailed mapping of stiffness. The stiffness map distinctly highlights regions with different mechanical properties, ranging from 1.2 MPa to 10 MPa.

Soft PFM:

Piezoelectric Characterization

- High-sensitivity piezoresponse detection
- Local polarization mapping capability
- Domain structure analysis
- Minimal sample perturbation during measurement

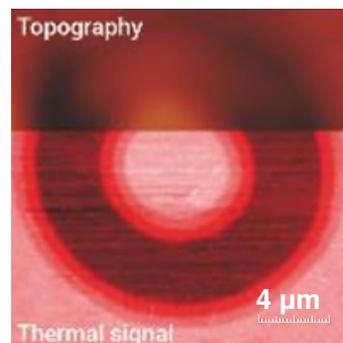


Soft PFM scan of a BTO-PVDF sample. This scan demonstrates high-sensitivity piezoresponse detection, enabling detailed mapping of local polarization and thorough analysis of domain structures with minimal sample perturbation.

Soft SThM:

Thermal Analysis

- Temperature mapping with nanoscale resolution
- Local thermal analysis with minimal perturbation
- Detection of subsurface thermal properties
- Preservation of heat-sensitive samples during measurement



Soft SThM scan of silicon steps beneath SiO layer. This scan reveals temperature mapping with nanoscale resolution, providing highly sensitive local thermal analysis while minimizing thermal perturbation of the sample.

Simplified AFM Upgrade: Powerful Analysis, Effortless Transition

NanoSolution Software redefines AFM operation by combining automation with ease of use. The software configures the entire electronic controller, enabling easy transitions between different AFM modes on the same scan area without repositioning. New users are guided through optimized workflows that produce publication-quality images, while experts retain full access to advanced parameters for demanding applications.

» Simplified AFM Excellence: Powerful Analysis, Effortless Operation

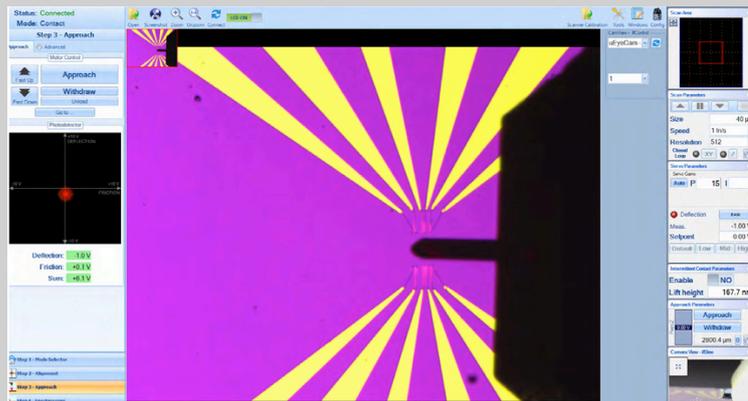
- Smart Mode Selection: One-click configuration automatically optimizes all electronic parameters without requiring technical expertise
- Guided Workflow Design: Clear, logical progression through setup steps with visual prompts ensures proper AFM configuration
- Balanced Automation: Auto settings (tune, approach, gain, setpoint) enable quick results, while preserving complete parameter access for in-depth research applications



Mode Selector



Workflow
Step by step



Camera integration

SPECIFICATIONS

Controller Specifications

XY drive resolution	24-bit control - 0.06 Å
Z drive resolution	24-bit control - 0.006 Å
6 DAC Outputs	6 D/A Converters – 24-bit (XYZ drive, bias, aux...)
8 ADC Inputs	8 A/D Converters – 16-bit
Data points	Up to 8192
Integrated Lock-in	Up to 6 MHz (software limited)
Interface	USB 2.0
Controller Power	AC 100 – 240V - 47-63 Hz
Operating System	Windows 11

Accessories

- Liquid cell
- Temperature plate
- Thermal analysis
- Environmental chamber
- Magnetic field generator



The Galaxy Dual Controller represents a breakthrough upgrade solution for existing Atomic Force Microscopy (AFM) systems, specifically designed to revitalize and modernize Multimode, 5100, 5500, 5600LS, and 54xx AFM/STM platforms. Rather than requiring a complete system overhaul, this advanced controller breathes new life into existing AFM setups by seamlessly integrating cutting-edge features with current hardware.

The system maintains full compatibility with existing AFM modes including STM, Contact, AC, Phase, MFM, EFM, PFM, LFM, and EC modes while adding advanced capabilities such as HD-KFM (high-definition Kelvin Force Microscopy) for enhanced sensitivity and resolution, and ResiScope for resistance measurements ranging from 10^2 to 10^{12} ohms.

Equipped with a real integrated lock-in amplifier, low-noise electronics, and 24-bit drive architecture, the Galaxy Dual Controller offers researchers expanded analytical possibilities and improved performance through its intuitive NanoSolution software, making high-definition AFM imagery accessible to both novice and expert users.

Local contact:

