MODEL **1064**

ChipMill

A fully integrated solution for millimeter-scale delayering of both logic and memory semiconductor devices. The ChipMill integrates signals from multiple detectors via an artificial intelligence feedback control algorithm to adjust milling parameters in real time. The result is the precise removal of device layers and a highly planar surface.

Model 1064 ChipMill specifications	
Ion source	**Type:** Hot filament electron impact **Beam energy:** 100 eV to 10 keV; continuously adjustable in 5 eV increments **Beam diameter:** 0.5 to 2 mm; adjustable, dependent upon energy level **Maximum current:** 10 µA **Current density:** 5 mA/cm^2 (10 µA in 0.5 mm beam) **Working distance:** 25 to 100 mm **Raster range:** 10 mm **Beam control:** X-Y electrostatic deflection **Filament lifetime:** 200 hours **Filament serviceability:** Easy to change **Cooling:** Air
Load lock	**Pump down time:** < 60 seconds **Venting time:** < 20 seconds
Milling uniformity	For a 10 mm diameter milling area: surface planarity is better than 50 nm
User interface	User-friendly interface for the setup of milling parameters and display of images and analytical data A touchscreen located near the load lock facilitates sample exchange Stack light indicator allows the determination of milling operation status from a distance Remote operation

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Automatic termination	Milling operations can be terminated by time, chip structure, or chemical composition
Sample stage	**Milling plane:** Established by automatic height detection **Milling angle range:** 0 to 10° **Rotation:** 360° continuous **Rocking:** 0 to 179°; adjustable in 1° increments **Sample size:** 15 x 15 mm, 3 mm or less thickness **Milling area:** 10 mm diameter
Sample image acquisition	Camera **Field of view:** 1 cm Electron beam column • **Accelerating voltage range:** 0.5 to 10 kV • **Resolution:** 100 nm • **Working distance:** 16 mm
Detectors	Secondary electron detector (SED) Backscatter electron (BSE) detector Energy dispersive X-ray spectroscopy (EDS) detector Secondary ion mass spectrometry (SIMS) detector
Process gas	**Type:** Argon **Purity:** ≥ 99.995% **Flow rate:** Adjustable ~0.1 sccm **Nominal pressure:** 15 to 30 psi
Control gas	**Type:** Argon, dry N_2, or clean dry air **Nominal pressure:** 55 psi, ±5 psi
Vacuum system	**Two-stage pumping:** Oil-free diaphragm pump and turbo-molecular pump **Vacuum detector:** Pirani and cold cathode full-range gauge

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Enclosure	**Width:** 112 cm [44.1 in.] **Height:** 180.6 cm [71.1 in.] **Depth:** 52.4 cm [20.6 in.] **Weight:** 287 kg [632 lb.]
Power	220/240 V, 50/60 Hz, 1500 W
Warranty	One year

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Document Number SP1064 Revision 00 05/2022