

MicroWriter ML[®]3 Baby

Durham Magneto Optics Ltd

The MicroWriter ML[®] products are a range of photolithography machines designed for rapid prototyping and small volume manufacturing in R&D laboratories and clean rooms.

Conventional approaches to photolithography are usually based on exposing through a chromium-glass mask manufactured by specialist vendors. In R&D environments it is often necessary to change the mask design frequently. Direct-write lithography tools (also known as digital mask aligners or maskless aligners) overcome this problem by holding the mask in *software*. Rather than projecting light through a physical mask, direct-write lithography uses computer-controlled optics to project the exposure pattern directly onto the photoresist.



MicroWriter ML[®]3 Baby is a compact, high-performance, low-cost direct-write optical lithography machine which is designed to offer unprecedented value for money in a small laboratory footprint. Measuring only 70cm x 60cm at its base, it sits on a standard laboratory bench or desk and plugs into a supplied laptop computer. Its only service requirement is a standard power socket. A light-excluding enclosure with safety interlock allows it to be used equally well in an open laboratory environment or in a clean room. Easy to use Windows[®] based software means most exposures can be set up and launched with just a few mouse clicks.

Key features and specifications:

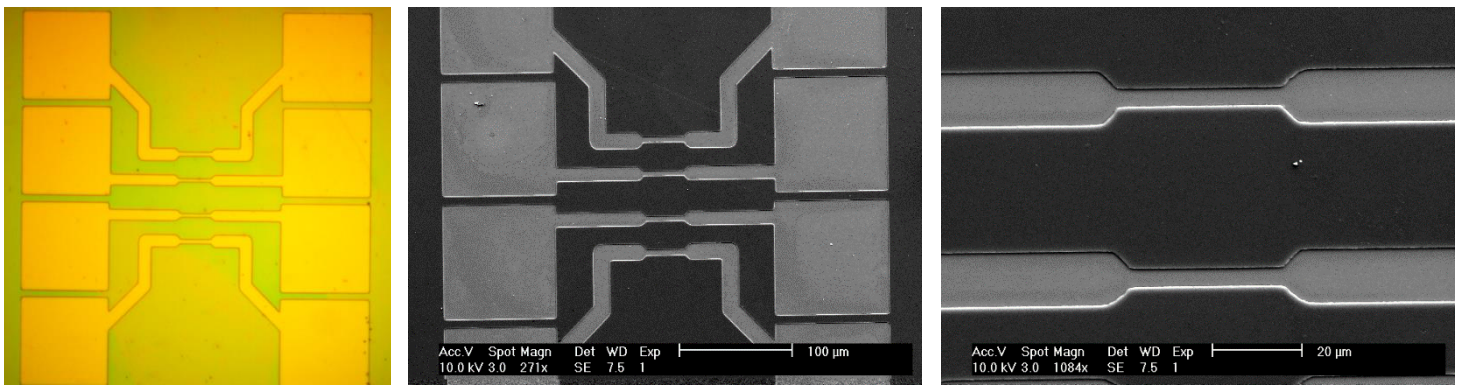
- 149mm x 149mm maximum writing area.
- 155mm x 155mm x 7mm maximum wafer size.
- 1 μ m resolution across full writing area.
- 405nm long-life semiconductor LED lightsource suitable for broadband, g- and h-line positive and negative photoresists (e.g. S1800, ECI-3000, MiR 701). Replacement 385nm lightsource available as option, suitable for g-, h- and i-line photoresists (e.g. SU-8).
- XY interferometer for precise motion control.
- Fast writing speed: up to 20mm²/minute (1 μ m resolution), allowing a typical 50mm x 50mm area to be exposed in approximately 2 hours.
- Autofocus system using yellow light – no minimum wafer size.
- High quality optical microscope camera with Olympus infinite conjugate x10 plan objective lens and yellow light illumination for alignment to lithographic markers on the wafer ($\pm 2\mu$ m 3 σ alignment accuracy). Additional x4 digital zoom can be selected in software.
- Grey scale exposure mode for 3-dimensional patterning (255 grey levels).
- Software API for external interfacing and control.
- 0.2 μ m minimum addressable grid; 0.1 μ m minimum sample stage step size.
- Acceptable file formats: CIF, BMP, TIFF.
- External dimensions: 700mm (w) x 700mm (d) x 700mm (h), excluding laptop computer.
- Light-excluding enclosure with safety interlock.
- Designed for desktop use – no optical table required.
- Easy to use, Windows[®] based control software supplied.
- Supplied with pre-configured 64-bit Windows[®] 10 laptop computer for 'plug and play' installation.
- All cables supplied.
- Extremely competitively priced for University and industrial R&D budgets.

- Can be later upgraded to MicroWriter ML[®]3 Baby Plus or MicroWriter ML[®]3 for higher performance.

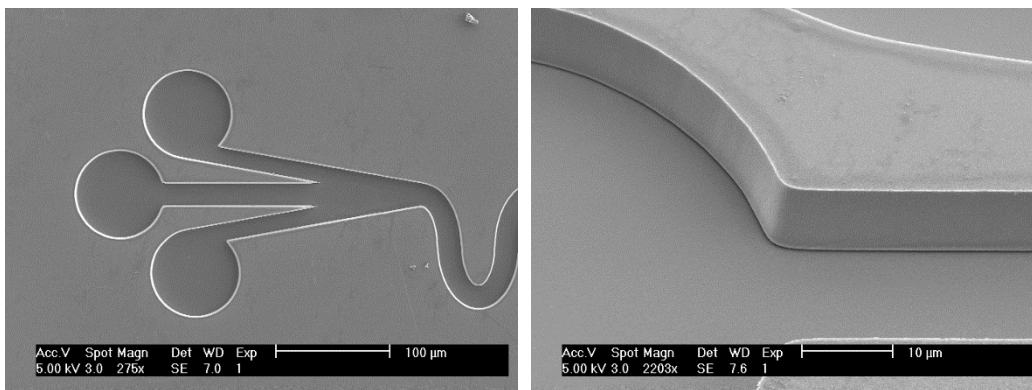
Designed for R&D in:

- Microelectronics and semiconductors
- Spintronics
- MEMS / NEMS
- Sensors
- Microfluidics and lab-on-a-chip
- Nanotechnology
- Materials science
- Graphene and other 2-dimensional materials

Examples of fabricated structures



Electrical transport measurement chip: MicroWriter ML[®]3 Baby built-in optical microscope image of exposed AZ[®] ECI 3007 positive photoresist developed in AZ[®] 326 MIF developer (left); SEM images after metallisation with 20nm of gold (centre and right). Square contact pads are 100μm wide; central wires are 3μm wide.



Microfluidic device: SEM images after metallisation with 20nm of gold of AZ[®] 9260 12μm thick positive photoresist developed in AZ[®] 326 MIF developer.



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