MicroWriter ML® 3 family overview

Durham Magneto Optics Ltd

MicroWriter ML3

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.

In R&D environments it is often necessary to change the mask design frequently. Direct-write lithography tools 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.

The MicroWriter ML3 family comprises three compact, high-performance, direct-write optical lithography machines.

MicroWriter ML® 3 Baby

This is the lowest cost direct-write optical lithography machines available anywhere in the world. It operates at a single resolution of 1 μm with a wavelength of 405 nm and is designed to sit on a standard laboratory. A high quality optical microscope with a x10 Olympus objective allows exposures to be aligned to existing structures or to the edges of the substrate. Despite its low cost, it is still fast with a top writing speed of 20 mm^2 / minute, allowing a typical 50 mm x 50 mm area to be exposed in approximately 2 hours.

MicroWriter ML® 3 Baby Plus

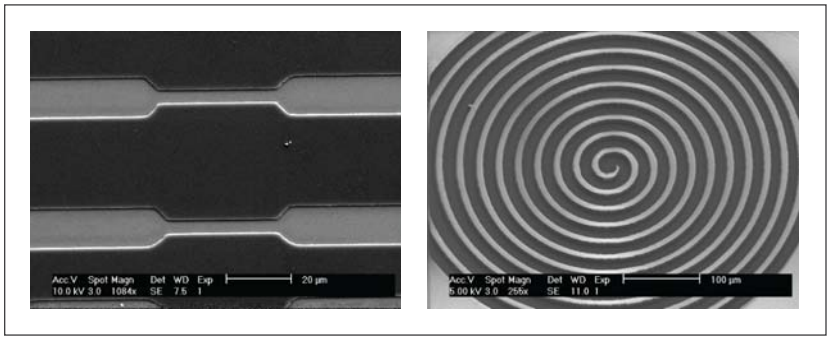
The Baby Plus adds a number of features to the Baby which are usually only found in high-end machines. Two different resolutions (1 μm and 5 μm) can be selected automatically via software and without the user needing to exchange any lens manually. This allows non-critical parts of the exposure to be performed rapidly at 5 μm resolution while retaining high resolution writing for critical parts. Locating alignment markers or edges of substrates is faster thanks to an automatic lens changer on the optical microscope allowing the user to switch between x3 and x10 objectives via software. The MicroWriter ML 3 Baby Plus also features an optical surface profilometer tool and an automated wafer inspection tool for examining fabricated structures. Writing speeds are some of the fastest on the market: up to 20 mm^2 / minute at 1 μm resolution and up to 120 mm^2 / minute at 5 μm resolution, allowing a typical 50 mm x 50 mm area to be exposed in under 30 minutes.

MicroWriter ML® 3

This is our flagship machine and offers no-compromise sub-micron lithography on up to 9” wafers. Four different resolutions (0.6 μm, 1 μm, 2 μm and 5 μm) can be selected automatically via software and without the user needing to exchange any lens manually. The optical microscope contains a full set of high performance bright and sharp infinite conjugate objectives (x3, x5, x10 and x20) with a software controlled automatic lens changer, allowing large substrate areas to be searched rapidly and individual sub-micron objects such as nanowires and crystal flakes to be accurately located. Top writing speeds are very fast: 25 mm^2 / minute at 0.6 μm resolution, 50 mm^2 / minute at 1 μm resolution, 100 mm^2 / minute at 2 μm resolution and 180 mm^2 / minute at 5 μm resolution, allowing a typical 100 mm x 100 mm area to be exposed at 2 μm resolution in under 2 hours. In addition to the optical surface profilometer tool and automated wafer inspection tool present in the Baby Plus, there is also a Virtual Mask Aligner mode in which the pattern to be exposed is displayed on top of the real-time microscope image, allowing the machine to be used like a traditional mask aligner.

Why choose the MicroWriter ML3 family?

- All of our machines are very competitively priced and have fast writing speeds.
- All of our machines have a low cost of ownership. Our lightsources have a lifetime of 20,000 hours and are guaranteed for 5 years.
- All of our machines share a common technology platform, allowing you to upgrade from MicroWriter ML3 Baby to MicroWriter ML3 Baby Plus and to MicroWriter ML3 at a later date.
- There is a well-established user base of MicroWriter ML machines in over 35 laboratories around the world, including national labs and internationally leading Universities.
- We have an international network of trained local service engineers to keep you running.



Detailed comparison of features and performance

	MicroWriter ML® 3 Baby	MicroWriter ML® 3 Baby Plus	MicroWriter ML® 3
Maximum substrate size	155 mm x 155 mm x 7 mm	155 mm x 155 mm x 7 mm	230 mm x 230 mm x 15 mm
Maximum writing area	149 mm x 149 mm	149 mm x 149 mm	195 mm x 195 mm
Exposure resolutions	1 μm	1 μm and 5 μm	0.6 μm, 1 μm, 2 μm, 5 μm
Surface tracking autofocus system?	Yes	Yes	Yes
Greyscale lithography?	Yes	Yes	Yes
Alignment microscope objectives	x10	x3 and x10	x3, x5, x10, x20
Automatic lens changer for exposure resolution and alignment microscope?	No	Yes	Yes
Backside alignment?	No	No	Available as option
Exposure wavelength	405 nm	405 nm	385 nm. 405 nm second wavelength available as option
Maximum writing speed	20 mm^2 / minute at 1 μm resolution	20 mm^2 / minute at 1 μm resolution and 120 mm^2 / minute at 5 μm resolution	25 mm^2 / minute at 0.6 μm resolution, 50 mm^2 / minute at 1 μm resolution, 100 mm^2 / minute at 2 μm resolution, 180 mm^2 / minute at 5 μm resolution
Overlay alignment accuracy at best resolution	$\pm$2 μm	$\pm$1 μm	$\pm$0.5 μm
Minimum addressable grid	200 nm	200 nm	100 nm
Motion stage munimum XY step size	100 nm	100 nm	20 nm
Optical surface profiler Z resolution	Not applicable	200 nm	100 nm
Automatic wafer inspection tool?	No	Yes	Yes
Virtual Mask Aligner tool?	No	Available as option	Yes
Temperature stabilized enclosure?	No	No	Yes
Supplied with vibration isolating optical table?	No	No	Yes
Mask design software?	Available as option	Available as option	Yes
Can be upgraded to MicroWriter ML® 3 Baby Plus?	Yes	Not applicable	Not applicable
Can be upgraded to MicroWriter ML® 3?	Yes	Yes	Not applicable

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Quantum Design

10307 Pacific Center Court, San Diego, CA 92121
Tel: +1-858-481-4400 • www.qdusa.com • info@qdusa.com

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