

# MASKLESS PHOTOLITHOGRAPHY SF100



## LARGE AREA IMAGING

### SF100 SPEED & SIMPLICITY

**What a radical idea!** - A benchtop photolithography exposure system that's radically easy to use. Simple, one button exposure in a mere 4 square feet.

**Go where no scientist has gone before** - You call the shots. Miniaturize and pattern designs on virtually any material of virtually any shape and size, even grey scale and features down to 5 microns!

**Faster than a speeding bullet** - Instantaneous prototyping. Pattern prototypes in seconds not the weeks or months needed for systems requiring photomasks.

**A penny saved is a penny earned** - Competitively priced with deliriously low operational and maintenance costs.

**Lean on me** - We give you peace of mind with complete customer service, personalized support and a complete Warranty.

Rapid prototyping just got faster. Now you can automatically, easily, and quickly obtain adjacent pattern stitching for large area imaging, with level to level exposure capability for multi-layer substrates. The SF-100 Auto Stage is our latest addition to the maskless photolithography line. 365 nm energy (i-line) and 429 nm energy (g-line) are standard.

This addition to our product line was designed using our proven and reliable optical design. The SF-100 Auto Stage preserves the best features of the manual tool including one-button operation, grey scale capability, curved and other non-flat substrate patterning, as well as low maintenance and operational costs. The SF-100 product family is the ideal starting tool for new microdevice labs. It is also an ideal complementary system for existing photolithography processes.

#### AUTOMATED STAGE SUBASSEMBLY

The automated stage provides movement in the XYZ and theta directions. It is sized to handle substrates that are up to 6 x 6 inches square. We provide 1 inch of travel in the Z direction to accommodate substrates of various thicknesses.

#### OPTIONAL REDUCTION KIT

Produce features as small as 5 microns using the SF-100's optional reduction kit available for manual and Auto Stage tools. The SF-100 can be purchased with reduction optics or upgraded later in the field.

#### SIMPLE USER-FRIENDLY SOFTWARE

The SF-100 software provides you complete user control. Our proprietary software was written using the industry standard, LabVIEW software, assuring you reliability. A graphical user interface allows operators to easily learn and operate the system.

Laser and Electron Beam (E-Beam) pixel writers have been proven to be very successful in photoresist patterning of fine features. Laser writers produce features of <1.0  $\mu\text{m}$  routinely, while E-Beam lithography systems easily produce features of <0.25  $\mu\text{m}$ . Although both of these systems produce exceptional line quality and small features, both types of systems have difficulty in quickly producing large features. Since both laser and E-Beam systems write features one pixel at a time, their throughput is very slow when designs are very dense or when designs contain large features.

Intelligent Micro Patterning's SF-100 provides a cost effective solution for improving the throughput of laser and E-Beam writers. The SF-100 is an elegantly simple exposure system that provides exceptional imaging quality. Light is introduced into the system using a mercury arc lamp. A direct coupled optical delivery system ensures efficient transfer of this energy to the Smart Filter sub-assembly. The Smart Filter incorporates all of the necessary optical and electronic components needed to transfer an image onto the substrate. Using proven optical design techniques, the projected image is free of distortion and uniform throughout the exposure area. A Windows<sup>TM</sup>-based personal computer is interfaced directly to the Smart Filter, which provides the image for the exposure process and shutter control when an automated system is purchased.

Light emanating from the Smart Filter is projected directly onto the surface of the substrate. Since the area of this image is typically only a few square centimeters, a step and repeat motion is used to expose the entire surface of the substrate. This can be either a manual or automated system. Additionally, by using the high-resolution stereo microscope mounted above the substrate, the user may control image to substrate alignment. This provides the SF-100 system the capability of fabricating multi-layer devices. A removable UV filter (shutter) is placed between the light source and substrate during the alignment sequence so as to avoid substrate exposure during image to substrate alignment. This filter is necessary in order to prevent photo sensitive material from exposing while the substrate is being aligned to the image. The filter is lifted out of the light path using an electronically operated subassembly to provide exposure.

By using the Laser or E-Beam writer to fabricate fine features and then using the SF-100 to pattern larger features, the user is able to drastically increase the throughput of his pixel writer without purchasing an additional pixel writer. Due to the SF-100's cost effective design, proven high reliability, and ease of use, the pixel writer/SF-100 combination maximizes the user's capital resources, while providing the ability to fabricate more cost effective nanotechnology devices.

The result of this mix and match partnership provides the user with:

- \* Efficient use of capital, by maximizing the throughput of each exposure system,
- \* Higher capacity from the existing pixel writer,
- \* Reduced operational, maintenance, and installation costs when compared to those for an additional pixel writer, and
- \* Increased process capabilities by being able to process non-silicon, non-flat substrates on the SF-100.

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## Technical Specifications SF-100 Auto Stage

Light Source	: 200 watt Mercury Arc Lamp
Wavelength	: 429 nm and 365 nm (g- line and i- line)
Power Density at Substrate	: >200mwatt at 429 nm and >20mwatt at 365 nm.
Minimum Feature	: Standard Config. 20um
Optional Reduction Kit	: 5um
Process Time	: <10 minutes for 100 mm silicon wafer (using 3 um positive photoresist)
SF-100 system Footprint	: 3 ft (915mm) wide X 2ft (610 mm) deep(excludingPC)
Substrate Size	: Max. 150 mm wide X max. 150 mm deep. Non-standard shapes can be accommodated.
Warranty	: 1 year parts and labor, per current SF-100 standard product offering
Greyscale	: >1000 levels of greyscale provided as standard
Imaging Array	: 1024 X 768 pixels (over 750,000 pixels per exposure)
Manual Operation	: available using software
Bench Top Requirements	: Granite, air Table or similar required

## Applications in various fields of Science

Nanotechnology,  
 Biotechnology & Microbiology,  
 Molecular Biophysics & Ceramics,  
 RF & Microwaves,  
 Microelectronics,  
 Micro Mechanics,  
 Micro Magnetic,  
 Automotive, Aerospace & Defense,  
 Medical & Environmental,  
 Biodetection,  
 Carbon Nanotubes, Nanofibers, Fullerenes  
 Microfluidics & Fuel Cell,  
 3D Device Fabrication,  
 Microsensors,  
 Microanalysis and Biochemistry,  
 Materials Research on curved surfaces,  
 Chemical Engineering & Cosmetics,  
 MEMS, Carbon MEMS,  
 Photoresist Patterning,  
 Polymers,  
 Bio-optical Nanotechnology, etc.

Our Indian customers include:

**IIT, Kanpur** for development of templates for self-assembly with applications in sub-micron large area patterning, carbon MEMS, sensors and polymer based opto-electronics.

**ISRO, Ahmedabad** for fabricating microelectronic PCB's for use in future satellites.

**For further information please contact**

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Specifications are subject to change due to constant innovation in technology. Accessories shown are not part of standard equipment.

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