

Proposal for a

DWL 200

Laser Lithography

System

Prepared for

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Section I

Configuration of the Proposed System

1.1 Base Granite

DWL 200 granite system with air cushions for vibration isolation.

1.2 Air-cooled HeCd Laser

Wavelength:	442 nm
Power:	125 mW
Typical lifetime	4000 hrs
Guaranteed lifetime	2500 hrs or one year (whichever comes first)

1.3 Optical System and Metrology

Lens system with high reflective mirrors.

Acousto-optic modulator and deflector system.

Two camera system with optics and video-monitor for substrate observation, metrology and alignment.

1.4 4mm Write Head

Focal length of write lens	4 mm
Minimum Feature Size	0.8 μm

For the general performance specifications of this write head see the table in the appendix.

1.5 Stage System

Drive:	DC Motors
Active write area:	200 x 200 mm^2
Substrate thickness:	0 to 6 mm
Interferometer resolution:	10 nm

1.6 Environment Chamber

Provides a stable environment for the system:

Airflow (adjustable):	0.3 – 0.5 m/s
Temperature Stability: (at $\pm 1^\circ\text{C}$ outside the box)	± 0.1 °C
Air quality (if clean room environment has class 100 or better)	Class 10

1.7 Electronics

System Control Electronics including:

- Real Time Pixel Generator
- Image Processing Hardware
- Modulator and Deflector electronics
- Interferometer, Stage and Autofocus control electronics

State of the art Control PC and Conversion PC with the following configuration:

RAM:	512 MB
Hard disk:	≥ 100 GB
Video Monitor:	17" TFT

1.8 Software

System Controller Software, based on OS9.

Graphical User Interface, based on MS Windows.

Conversion Software, based on Linux.

1.9 Grey Scale Exposure Mode

Grey Scale Exposure Mode is a process to create 3 dimensional structures using a single exposure. This mode varies the laser intensity to achieve varying exposure depths in thick resist.

Number of grey scale intensity levels: 64

Section II System Options

2.1 Additional Write Heads

The standard system comes with one head. It can be changed by the operator in just a few minutes. For the specifications of the write lenses please refer to the appendix "General Performance Specifications"

2.1.1 2mm Write Head

Focal length of write lens	2 mm
Minimum Feature Size	0.6 μm

2.1.2 5mm Write Head

Focal length of write lens	5 mm
Minimum Feature Size	0.8 μm

2.1.3 10mm Write Head

Focal length of write lens	10 mm
Minimum Feature Size	1.6 μm

2.1.4 20mm Write Head

Available with Krypton laser only (see below for laser specifications):

Focal length of write lens	20 mm
Minimum Feature Size	3.2 μm

2.2 Water-Cooled Kr-Laser instead of HeCd-Laser

Wavelength	413 nm
Power	300 mW
Typical lifetime	5000 hrs
Guarantied lifetime	3000 hrs or one year (whatever comes first)

This option includes a water/water heat exchanger, which is recommended for water cooled lasers. It provides an adequate cooling media that circulates in a closed cycle, and prevents laser shutdown due to fluctuations in the water pressure. The closed cycle is cooled by the heat exchanger using a separate cycle with constantly flowing tap-water.