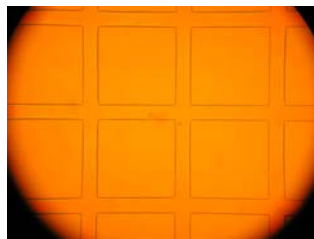
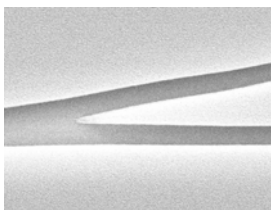
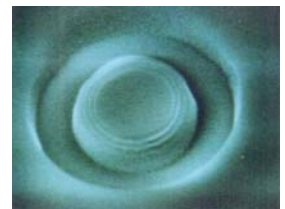
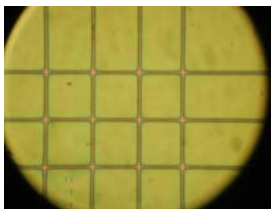
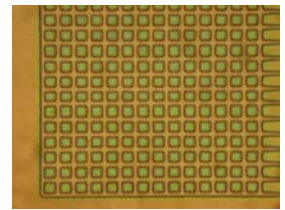
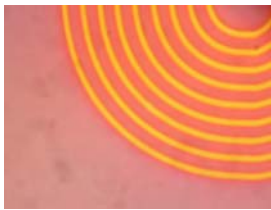
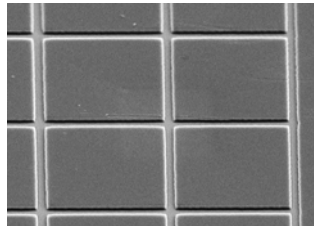


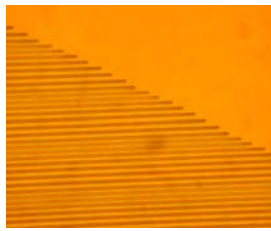


Laser Beam Direct Lithography

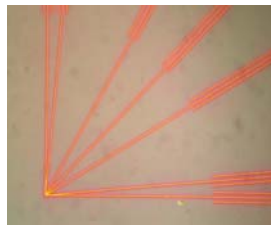
DDB - 201/205



Straight lines pattern

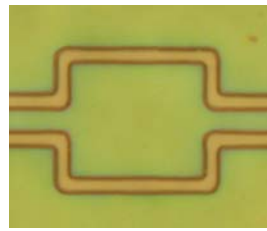


1 μ m line



Radial

Combination of straight lines



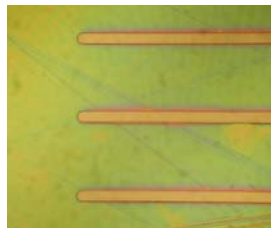
Mixture of 1 μ m lines



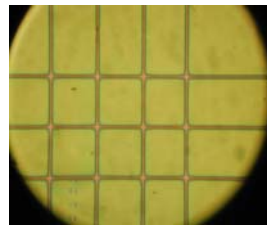
Hexagon



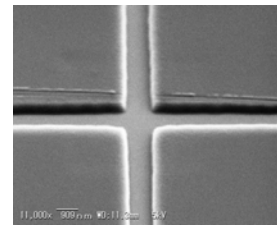
X20, 23 μ m width



x50, 6 μ m width



16 μ m lattice



0.89 μ m lattice

Summary

It is direct lithography system (exposure device) to enable mask-less writing patterns for resist coated on silicon substrate. So it is so effective to prepare new sample for development in a short period.

Based on our several years experience, software is qualified for easy operation and shortage of writing time.

The system is designed for compact life and long life time, and highly precise XY stage, LD (408nm), auto focusing mechanism is incorporated in robust body.

An operator can easily write straight line, circle, arc and their combination, by using CAD software. DDB-210 (1 μ m width) and DDB-105 (5 μ m width) are prepared.

Application

- Micro machining
- Optical guide patterning
- Wavelength filter
- Diffraction grading or optics
- Other minute patterns

Construction

- Lithography main body
 - : Light source, light collection unit, observation unit, illumination, XY stage, Auto focusing unit (DDB-201)
- Control unit
 - : System controller, personal computer
- Software
 - : Control, writing monitor and CAD software

Features

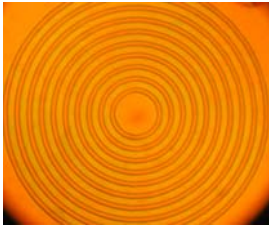
- Due to mask-less writing, production cost and time can be shortened.
- Vector method writing by stage movement and by ON/OFF control of laser beam
- Min. writing width is 1 μ m (DDB-201).
- Complex patterns possible by combination of straight, circle and arc lines
 - Line width can be easily selected by replacement of objective lens. Hence plane pattern is also possible in a short time (DDB-201).
- DXF data prepared by CAD can be applied for writing.
- Min. line width selectable either at 1 μ m or 5 μ m
- Laser spot dancing is drastically eliminated by application of optical fiber for laser beam transmission.

Software

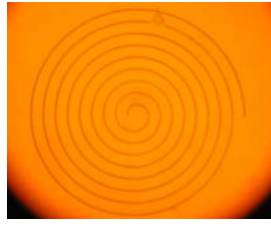
- CAD software : Writing pattern
- Control software: XY stage
 - ON/OFF of laser beam
 - Coordinate, layer control
 - Sorting of writing order
 - Data reading and saving
- Writing monitor software: Monitor screen size
 - Brightness control
 - Writing position
- Saving file : DXF format

Curved line patterns

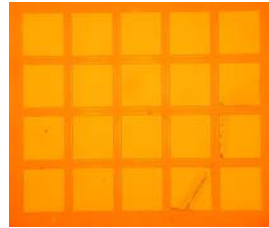
Plan Patterns



110 μm Concentric



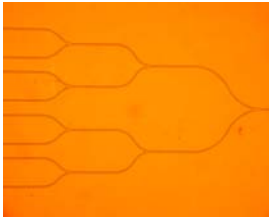
3mm Spiral



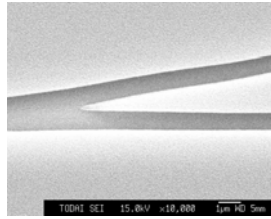
Each 100 μm square



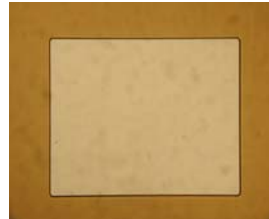
CAD pattern



1 μm width Branch



1 μm width Branch

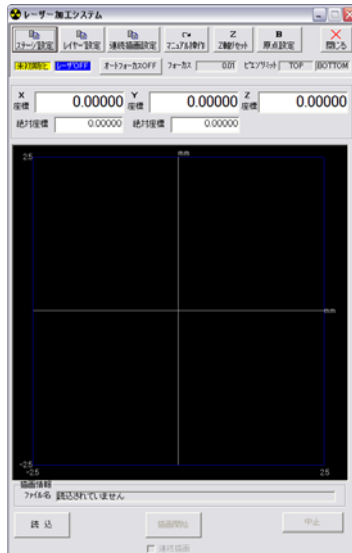


220 sec. (2mm x 1.5mm)

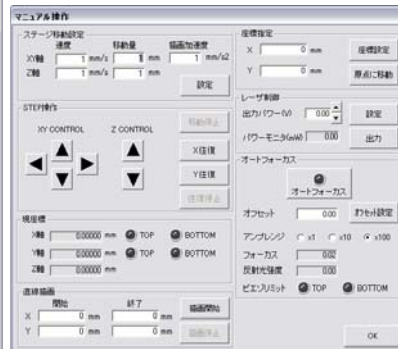


Circle patterns

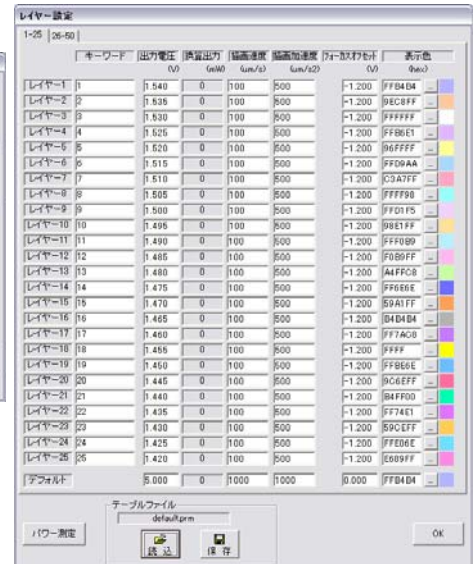
Main Screen



Manual Operation Screen



Layer set up Screen



Brief Specification

Model	DDB-201	DDB-205
Stage movement	50mm X 50mm	
Writing area	10mm X 10mm (desired position in stage movement area)	
Positioning resolution	10nm	100nm
Line width	1 μm	5 μm
Writing speed	50 μm/s ~ 1mm/s.	50 μm/s ~ 5mm/s.
Auto focusing	Range ± 40 μm	NA
Laser	LD (408nm)	
CCD camera	400,000 pixel color	
Writing pattern	Straight line, Circle and Arc	
PC and Software	Windows®, Control/CD/Writing monitor software	

Options

- Electric driven alignment
: Positioning by electric rotation stage and software
- Objective lens replacement
: One touch replacement (x50 or x10 lens) (DDB-201 only)
- Vibration isolation table
: Manual pumping type

10nm Positioning Resolution

High Precision XY Stage

Summary

It is high precision XY stage for laser lithography, is equipped with ultrasonic motor and high resolution encoder. The resolution is 10nm.

Operation without back-rush can be ensured by high speed control by PC. Very fine movement is effected in combination with sophisticated software.

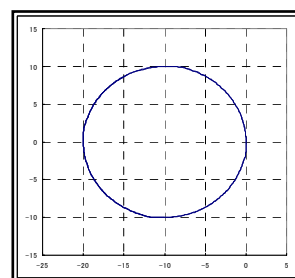
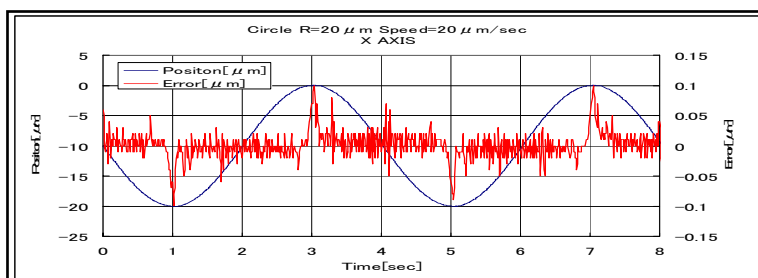


Application

- Laser writing, processing
- Semiconductor line inspection
- Bio technology

Specification (Model AXY-5060-01)

Drive type : Ultrasonic motor
Moving range : 50mm x 50mm
Position resolution: 10nm
Max. speed : 1mm/sec.
Moving tolerance : $3.5 \mu\text{m}$ /full stroke
Orthogonal error : $5 \mu\text{m}$ /full scale
Dimension : 256x256x102mm



※Control signal for $20 \mu\text{m}$ dia. Circle (Control error max. 100nm, moving speed $20 \mu\text{m}/\text{sec}$.)

Actuator for objective lens

Summary

This is Piezo actuator for objective lens. Lens focusing can be easily controlled by input of driven voltage.

Specification (Model ACT-150-90)

Displacement : $150 \mu\text{m}$
Max. load volume : 300g.
Resonance frequency : 90Hz (at 100g load)
Recommendable drive voltage : 0 to 100V max.
Applicable lens diameter : Less than $\Phi 39\text{mm}$
Dimension : W68 × D20 × H62mm



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