

Laser Scriber

Standard Operating Procedure

Revision: 1.0 — Last Updated: Jun.6/2014, Revised by Nathanael Sieb

Overview

This document will provide a detailed operation procedure of the Laser Scriber. Formal Training is required for all users prior to using the system.

Revision History

#	Revised by:	Date	Modification
1	Nathanael Sieb	April 7, 2014	Initial release
2	Nathanael Sieb	June 6, 2014	Recipe update
3			
4			
5			

Document No. 4DSOP000X



Table of Contents

General Information	3
Operation	4
1. Start-up	4
2. Operation	4
3. Recipes	7
4. Shut-down	7
References and Files	7
Contact Information	8


General Information

The Rofin StarMark laser system uses a 100W NdYAG laser to mark, etch, or cut various materials.



Operation

1. Start-up

- Open the cooling water valves.
- Press the Power On button on the main system. 
- Turn the switch on the electronics cabinet to the On position.

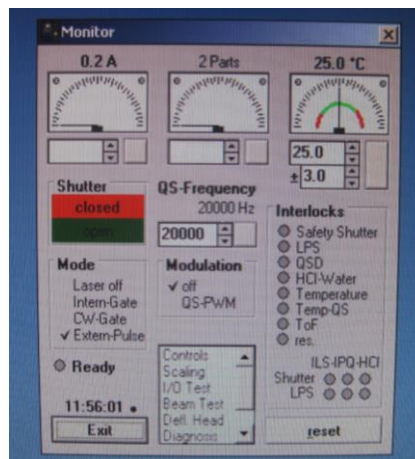


- Leave the key switch in the lamp off position.

2. Operation

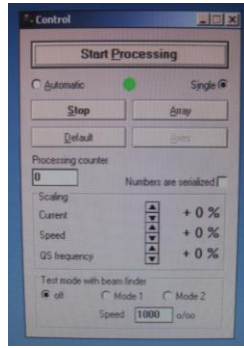
- Open the following software programs:

- Monitor (monitors instrument conditions)

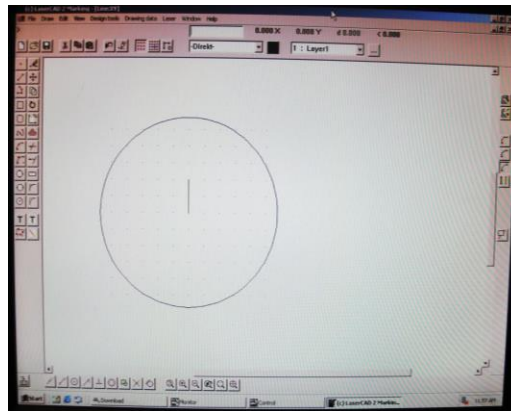




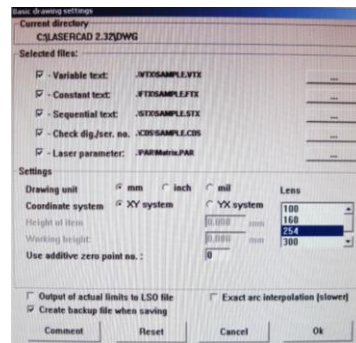
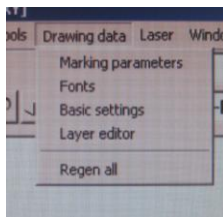
- Controls (controls the write)



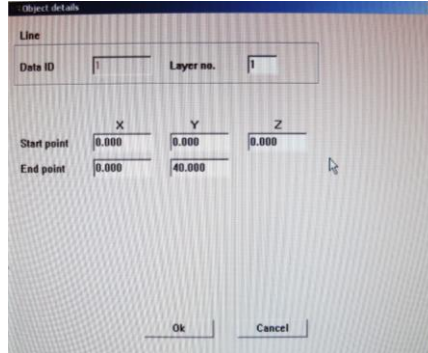
- LaserCAD (design the write pattern)



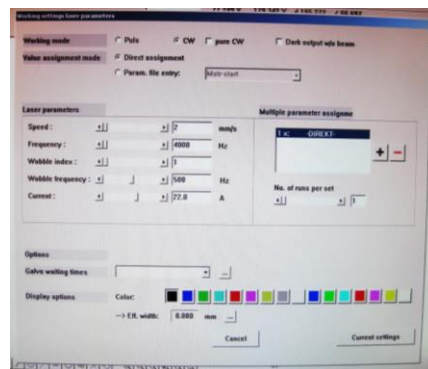
- Open an existing pattern or create a new pattern.
- In Drawing data → Basic settings, make sure that the Lens is set to 254.




- Create the structures as needed (lines, circles, squares, etc.). Double-click on an object to edit its details.



- To change the exposure conditions, select an object or objects. Go to Drawing data → Marking parameters. Edit the write speed, frequency, current, and repeat quantity as necessary.



- When complete, save the pattern and select Upload active drawing to laser  to upload the pattern file to the machine. Select yes to open the safety shutter.
- In the laser controls, select Beam Finder Mode 1 to view a red pilot laser tracing the desired pattern. This red laser is safe to work with, but do not look directly into the laser.
- Align the substrate to the pattern trace.
- Turn the Beam Finder off.
- Turn the key switch to the Shutter Open position.




- To start and exposure, press Start Processing in the laser controls, or press the green Start Marking button on the machine.
- When the exposure is complete, examine the substrate and proceed with further write steps as needed.

3. Recipes

Material	Purpose	Current (A)	Frequency (Hz)	Speed (mm/s)
Silicon (500um)	Cut thru	26.0	8000	1 (repeat x3)
Silicon (300um)	Cut thru	26.0	8000	1 (repeat x2)
Silicon	Cut/Deep Etch	22.0	4000	1
Silicon	Scribe	22.0	4000	2
Silicon	Mark	16.0	4000	100

4. Shut-down

- Turn the key switch to the lamp off position.
- Wait approximately 10 minutes.
- Close the software and shut down windows.
- Turn the switch on the electronics cabinet to the Off position.
- Press the Power Off button on the main system. 
- Close the cooling water valves.

References and Files

Laser Scriber Manual and training notes.



Contact Information

Questions or comments in regard to this document should be directed towards Nathanael Sieb (sieb@4dlabs.ca) in 4D LABS at Simon Fraser University, Burnaby, BC, Canada.