



# RTA 1 SOP

4D Labs Confidential

## Rapid Thermal Annealer System Standard Operation Procedure

*Revision: 1.1 — Last Updated: August/18/08*

### Overview

This document will provide a detailed operation procedure of the RTA 1 system. Formal Training is required for all users prior to using the system.

### Revision History:

#	Revised by:	Date	Modification
1	Liang Hong	09/08/07	Document initial release
2	Liang Hong	08/18/08	Format Updating to include TOC and Doc No.
3			
4			
5			

**Document No. 4DSOP0001**

### Table of Contents

Background Information.....2  
*Description* .....2  
*Potential Applications*.....2  
*System Configuration*.....2  
*Performance Specification (given for standard silicon wafer)* .....3  
*Available gases and maximum flow rate:* .....3  
Operation Procedure.....3  
References and files.....8  
Contact Information.....8

Copyright © 2008 by 4D Labs

The information and materials contained herein are confidential and proprietary of 4D Labs. They are provided for your organization's internal use on a need to know basis. They cannot be duplicated or disseminated for any third party without the express consent of 4D Labs.

## *Background Information*

### *Description*

The As-one model 100 is a rapid thermal processing system, which uses high-intensity visible radiation to heat a single wafer for a short time at precisely controlled temperatures. These capabilities, combined with the heating chamber's cold-wall design and superior heating uniformity, provide significant advantages over conventional furnace processing.



### *Potential Applications*

- Implant Annealing
- Contact Alloying
- Rapid Thermal Oxidation
- Rapid Thermal Nitridation
- Densification and Crystallization
- Glass Reflow
- Silicidation

### *System Configuration*

- 100mm wafer chamber capability
- Cold wall chamber technology for high process reproducibility
- Pyrometer and thermocouple temperature control
- Fast digital PID temperature controller
- Atmospheric and vacuum process capability

*Performance Specification (given for standard silicon wafer)*

- Pyrometer temperature control range : 150 °C to 1300 °C
- Thermocouple temperature range : ambient to 1000 °C
- Temperature control reproducibility :  $\pm 1$  °C
- Temperature accuracy :  $\pm 1$  °C
- Ramp rate : 0.1 °C to 200 °C/s
- Temperature uniformity :  $\pm 1\%$  @ 1000 °C
- Maximum power : 30 kW
- Lamp life time : > 1000 hours

*Available gases and maximum flow rate:*

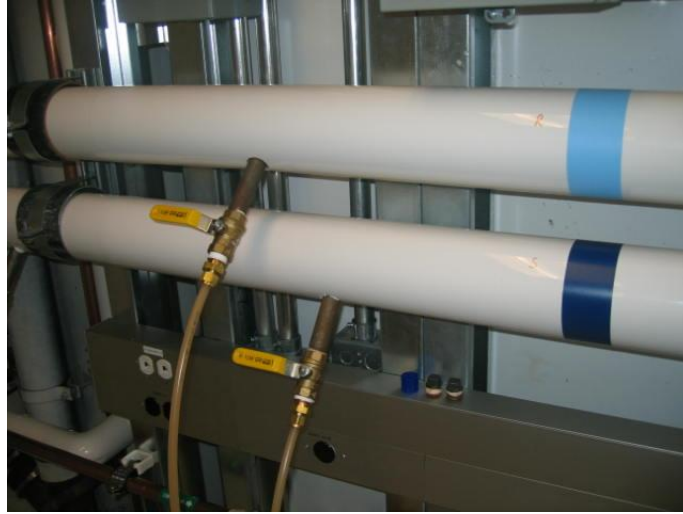
- O2 100 sccm
- Ar 100 sccm
- N2/H2 100 sccm (Not Installed Yet)

*Operation Procedure*

- ❖ Outside of the clean room
  1. Turn on N2, Ar, and O2 gas cylinders located in the grey space.



2. Turn on cooling water supply valve and return valve located in the grey space.



❖ Inside of the clean room

1. Turn on compressed air valve located behind the RTP system.



2. Turn the power switch clockwise to the on position.



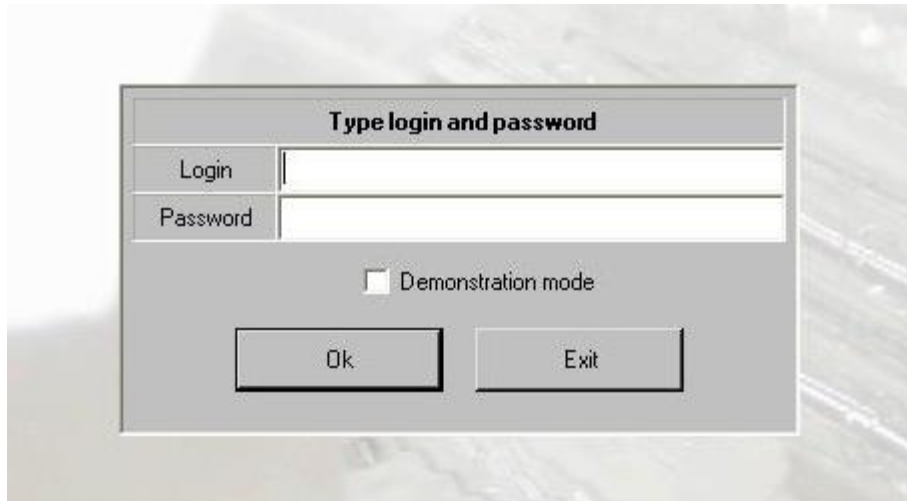
3. Push the green button in the front to turn on the system.



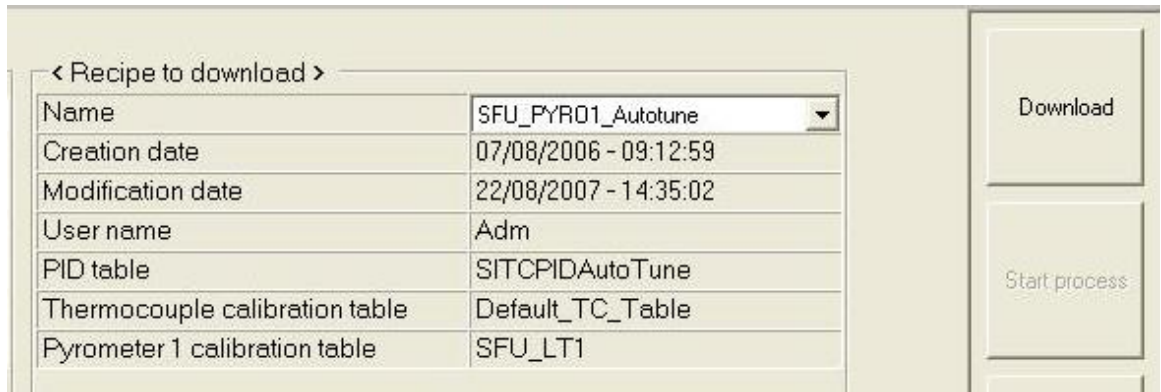
4. Start AS-Project software by double clicking its icon on the desktop.



5. Log in using your user name and password given during the training session.



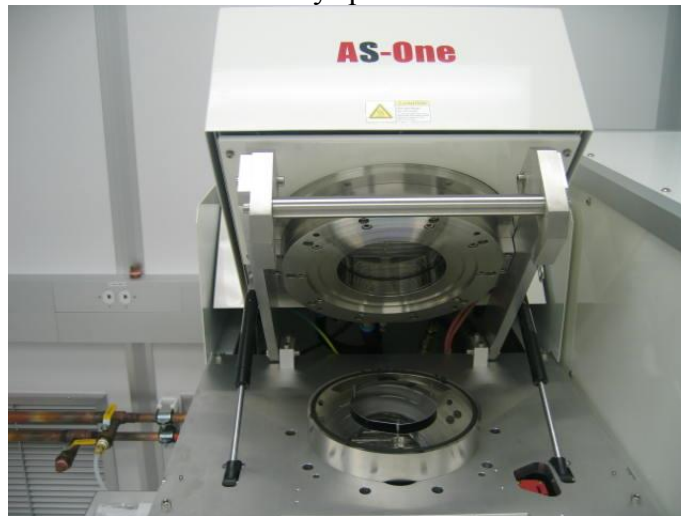
6. If you have a recipe, load the recipe, otherwise, create a recipe and then load the recipe. (Refer to training session regarding recipe creation.)



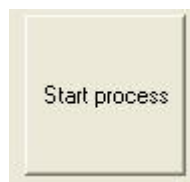
7. Unlock the chamber door to load a sample by clicking “Door Locked”.



8. 4” wafer can be loaded directly on to the three pins after taking off the existing 4” wafer.
9. all other sized sample and wafers should be placed right on top of a 4” silicon wafer. One 4” wafer is always placed in the chamber.

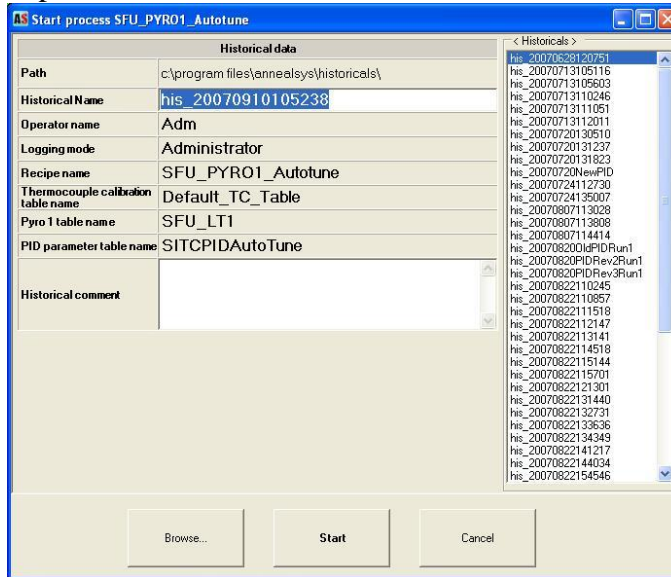


10. In the software, lock the door by clicking “Door Unlocked” and click “start process”.

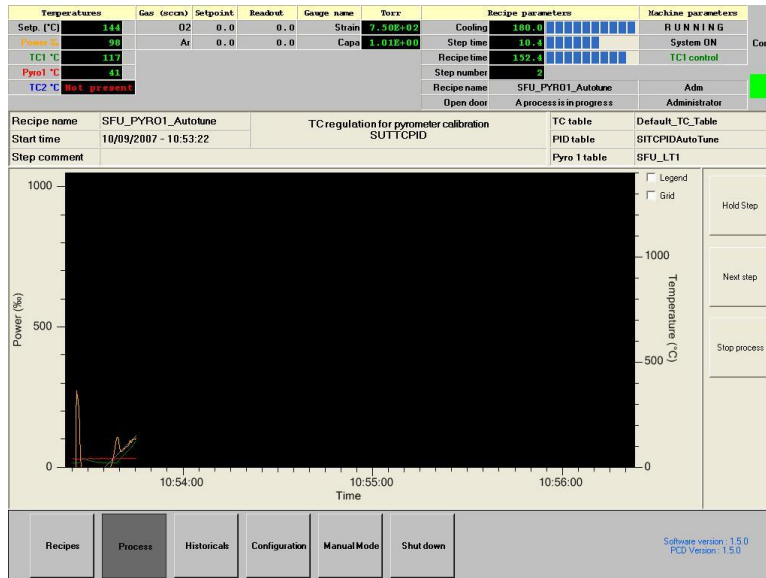




11. A dialog window allows you to confirm and change log file name, click ok to start the process.



12. Heating diagram displays during the process, when process is done, click ok.



13. The system will cool the chamber for 3 minutes. However, it is recommended to wait until the thermal couple reading is below 70 degrees.

Recipe parameters				
Cooling	134.2		Setp. [%]	0.0
Step time	0.0		Power %	0.0
Recipe time	0.0		TC1 °C	204.2

14. Unlock door, take your sample out and make sure the 4” standard wafer is placed back to the system if you took it out.
15. Lock the door in software.
16. Shutdown the software.



17. Push the off button in front of the system and turn the power knob counterclockwise to off.



18. Turn off the CDA valve behind the system.
19. Turn off all gas cylinders and cooling water valves in the grey space.
20. Log file can be reviewed and saved from the computer via usb stick.

### ***References and files***

RTP manual by AnnealSys.

### ***Contact Information***

Questions or comments in regard to this document should be directed towards Liang Hong (liangh@sfu.ca) of the 4D Labs at Simon Fraser University in Burnaby, BC, Canada.