

Operating Procedure STS Etcher

Rev. 10/22/01

SYSTEM REQUIREMENTS

1. The only materials allowed in the system are
Silicon Polysilicon
Silicon dioxide Photoresist
Silicon nitride
- NO** other materials may be on your wafer!!!
2. The system requires 100mm (4in) wafers. If you have smaller wafers or pieces you may use the ***STS Carrier Mounting Procedure*** to secure them to a carrier 100mm wafer.
 3. If you intend to etch deeper than 200 microns, you must mount your sample to a carrier 100mm wafer using the ***STS Carrier Mounting Procedure***.

GETTING STARTED

1. The system requires a significant amount of nitrogen to operate. Prior to using the system ensure that there is enough nitrogen to run your process.
 - a. Locate the dewars for the STS that are near the furnaces.
 - b. Check the dewar gauges.
 - c. Check the dewar log next to the dewars to ensure you have enough nitrogen
 - d. Record on the dewar log your start time.
2. You will need to turn on the nitrogen to the ***two*** vacuum pumps for the system. Two control boxes are located near the computer monitor.
 - a. The **Pump #1** control is the bottom box. Flip the toggle switch up to **PURGE ON**.



- b. The **Pump #2** controller is located on top.
01. Press the **SETUP** button and the SETUP indicator should light.
 02. The display will ask for a password — **202**.
 03. Use the **UP** Arrow to enter a **2** as the first digit.
 04. Press **ENTER**.
 05. **0** is the second digit so just Press **ENTER**.
 06. Use the **UP** arrow to enter a **2** as the third digit
 07. Press **ENTER**.
 08. Now the display should read ***“SETUP MENU, Inlet Purge”***
 09. Press the **DOWN** arrow once
 10. Now the display should read ***“SETUP MENU, Gas Ballast”***
 11. Press **ENTER**
 12. Now the display should read ***“GAS BALLAST, OFF”***
 13. Press the **UP** arrow to turn on the gas ballast.
 14. Press **ENTER**.
 15. Press **NORMAL** button.

INTERACTING WITH THE CONTROL COMPUTER

Locate the system control computer on the table next to the system.

You should see several system windows on the screen.

The windows are titled:

- A) Process Control - ICP
- B) ICP View
- C) Sequencer
- D) Machine Plan View
- E) Transfer

These windows will control the system and inform you about the operating status.

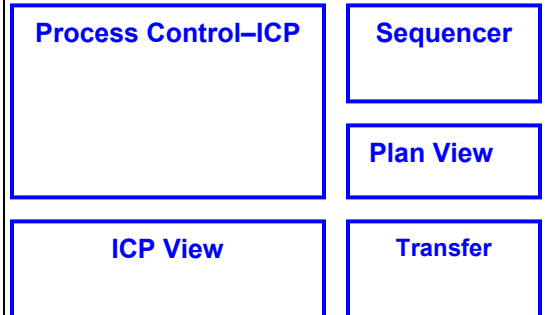
In the blue banner across the top of the screen you should see the term **Monitor Mode**.

ACTIVATING THE SYSTEM

1. Using the mouse, click on **EDIT** in the tool bar on the top of the screen
2. Click on the **Operator Mode**.
3. Chose the **Standard Mode** and click on **Change**.
4. Type in the password and hit enter.
5. Click on **Change**.
6. In the blue banner across the top of the screen you should see the term **Standard Mode**.

SEQUENCER WINDOW CHOOSING YOUR PROCESS SEQUENCE

1. Using the mouse, click on **OPEN** in the sequencer window.
 - a. A pop-up window will arise; there are several sequences in the window to choose from.
 - b. Using the mouse click on the sequence you desire. Example: WIETCH.
 - c. Click on **OPEN**.



2. Using the mouse, click on **BATCH** in the sequencer window.
 - a. A pop-up window will arise; using the keyboard type in the number **(1, 2, 3, etc.)** of wafers you intend to etch in this session.
 - b. Click on **OK**.
3. Confirm **Naming Mode** window is **MANUAL**.
4. Click on **Next Carousel** window.
5. Type in the name of your wafer and press **ENTER**.

SYSTEM LOAD LOCK

LOADING YOUR WAFER

1. You may now lift the lid the lid (It should open very easily – very little effort is required).
2. Place your wafer onto the carousel with the wafer flat in line with the white lines on the wafer holder.
3. Close the lid and latch it using the handle.

SEQUENCER WINDOW

STARTING THE SEQUENCE

1. Click on **RUN**.
2. The load lock will now pump down. The Transfer status display will indicate **“Acquiring [your wafer name].”**
3. The wafer will automatically be placed in the chamber.

PLAN VIEW WINDOW

WAFER TRANSFER

You can watch the wafer transfer from the load lock to the chamber by watching the screen in the **Machine Plan View** window.

PROCESS CONTROL-ICP WINDOW

HELIUM LEAK UP CHECK

Once the wafer transfer is complete, the system will automatically begin your etch process.

1. The display will first tell you that it is **“Running process [SEQUENCE] on [your wafer name]”**
2. The system will first perform a Helium leak up check. The display will indicate **“[SEQUENCE]: XXXXX: Checking Helium Leak Up Rate.”**
3. Observe the display directly above the Process Status display, it will indicate the helium leak up rate (HeLUR) in mT/min.
4. The Helium leak up rate must be less than 8.0 mT or the system will abort.
See ***LEAK CHECK ABORT*** procedures.
5. When the Helium leak up check is complete record the rate in the log book.

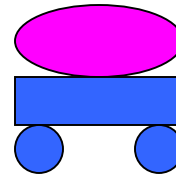
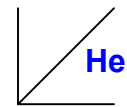
SETTING ETCH TIME

1. **DURING HELIUM LEAK UP CHECK, you can change your etch time.**

Locate the display with **HH:MM:SS** displayed — above and left of the Process Status display.
The icon for the etch time looks like:

2. Click on the display and change the time to your etch time. The data is in the form: **HH:MM:SS**
3. Once the gas stabilisation is complete, the etch will automatically begin.

In the Process Control –ICP window locate the helium leak up check icon. Located directly above the Process Status Display.



HH:MM:SS

PROCESS CONTROL-ICP WINDOW

ETCH COMPLETE

At the end of the etch, the Process Status display will indicate **“Standby Step: pumping out”**

The system will automatically remove the wafer from the chamber and place it in the load lock.

The load lock will vent.

SYSTEM LOAD LOCK

UNLOADING YOUR WAFER

1. A **Red Alarm Screen** will pop up to indicate that you need to be ready to unload your wafer.

During the venting, the ICP process will be running **DEFAULT**.

2. Once the load lock has vented, the lid will be slightly open.
3. Lift lid and remove your wafer from the carousel.
4. Close the lid and latch it using the handle.

YOU MUST WAIT FOR THE SECOND VENT TO BE COMPLETED.

5. The load lock will now pump down automatically but you will see another **Red Alarm Screen** that indicates you need to unload your wafer again.
6. Once the load lock has vented the second time, the lid will be slightly open.
7. Lift the lid then close and latch the lid.
8. Before proceeding to the next step, ensure **TRANSFER** window status reads: **Release of [your wafer name] complete. Ready.**

If additional etch time for same wafer is needed, go to Page 3 and begin at **“SEQUENCER WINDOW: Choosing Your Process Sequence.”**

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11. Press **ENTER**
 12. Now the display should read
"GAS BALLAST, ON"
 13. Press the **DOWN** arrow to turn off the gas ballast.
 14. Press **ENTER**.
 15. Press **NORMAL** button.
8. Record on the nitrogen dewar log your end time.
Calculate the nitrogen remaining and record it on the log.