Xetch System SOP

1. Scope

1.1   This document provides procedures and process information for etching silicon wafers with the Xetch xenon difluoride etching system.

2. Table of Contents

3. Reference Documents

3.1 Referenced within this Document

3.1.1 D150 GRC SOP

3.2 External Documents

3.2.1 Xetch System Manual, Xactix Inc. Copyright 2000-2002.

4. Equipment and/or Materials

4.1 Wafer/Sample

4.2 Xetch XeF2 etching system

5. Safety

5.1 Follow all Nanofab safety procedures.

6. Setup Procedures

6.1 Start-up

6.1.1 GRC. Should always be ON

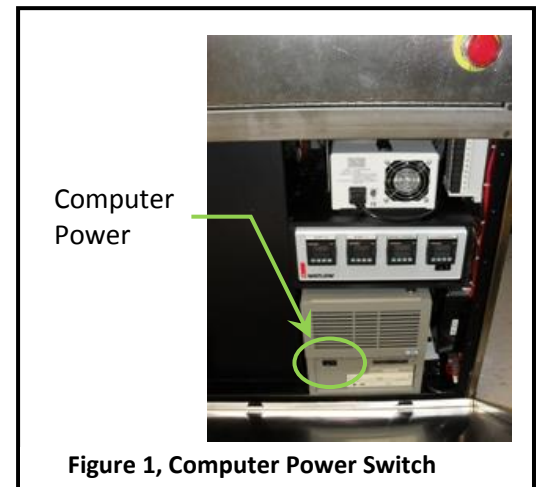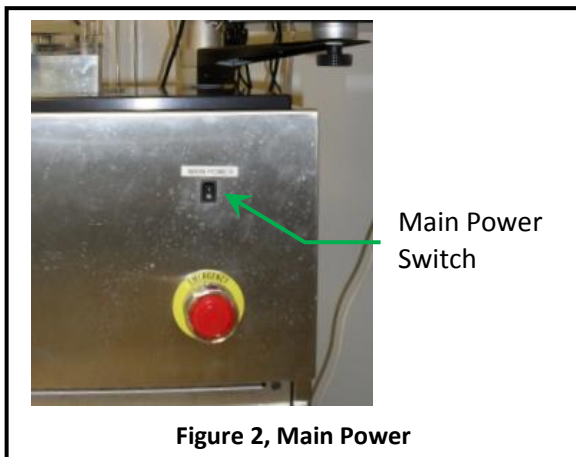   6.1.1.1 Not in Alarm. Observe GRC status through chase door. Contact Nanofab staff if problems.

⚠️ **CAUTION**

Failure to turn on the GRC may result in the release of toxic gases in to the atmosphere ⚠️

6.1.2 Xetch main power should always be on. If off, turn on. (See *Figure 2, Main Power*.)

Main Power Switch

Figure 2, Main Power

Computer Power

Figure 1, Computer Power Switch

6.1.3 Xetch computer should always be on.

    6.1.3.1 Behind lower front panel you will find switch of the computer power. (See *Figure 1*.)

    6.1.3.2 N2 flow should be regulate to 15-20 psi. (See *Figure 3*.)

    6.1.3.3 To Re-adjust regulator if necessary, contact Nanofab staff.

6.1.4 Compressed Air flow.

    6.1.4.1 CDA valve should be open, and flow regulated to 70-80 psi. (See *Figure 3*.)

CDA Regulator   CDA Valve

N2 Bottle Valve

N2 Valve

N2 Regulator

Figure 3, CDA and N2 Valves
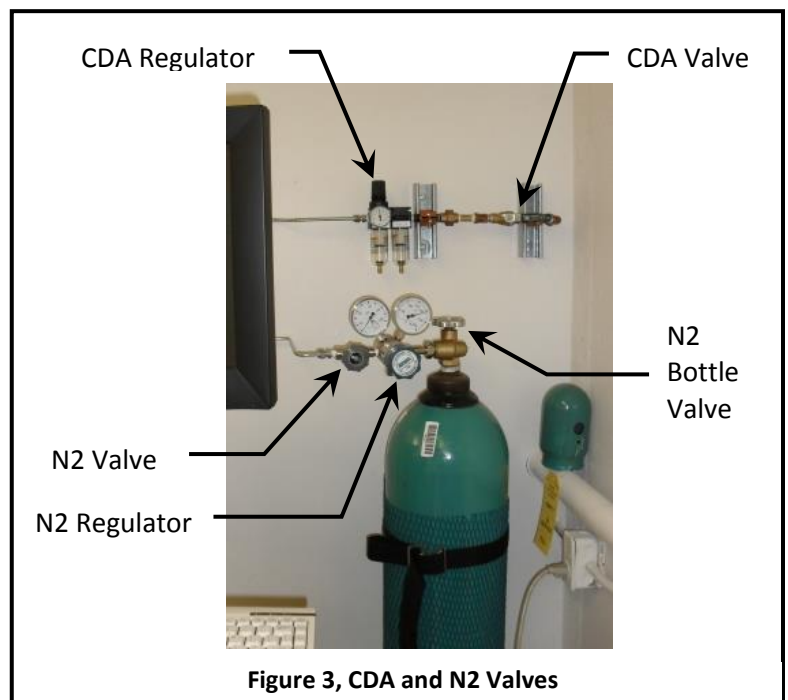
6.1.5   Turn on vacuum pump.
Switch on vacuum pump with the red switch on the wall.

NOTE: **If vacuum pump does not turn on**, contact Nanofab staff.

6.1.6   When the Windows log-in box appears on the screen, click OK.
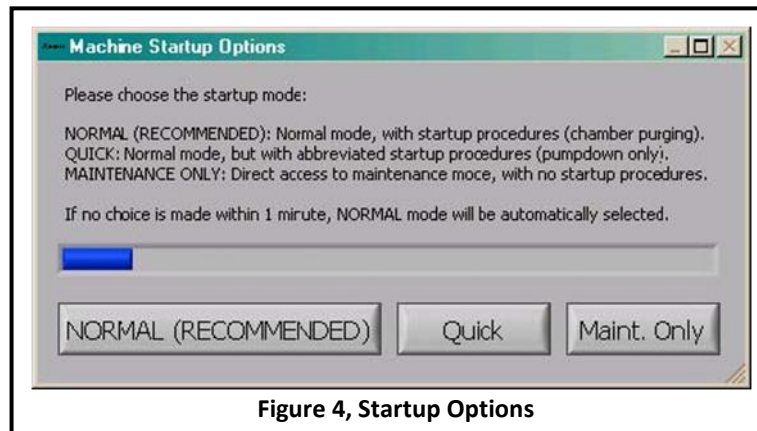
NOTE: User name: Administrator, Password: leave blank

6.1.7   Enable in coral

NOTE: If coral does not allow you to enable, turn off computer for about 5 min. (See *figure. 1*)

6.1.8   Double click on the Xactix Xetch icon on the desktop.

6.1.9   Click on NORMAL to enter Xetch start-up. See *Figure 4, Startup Options*.

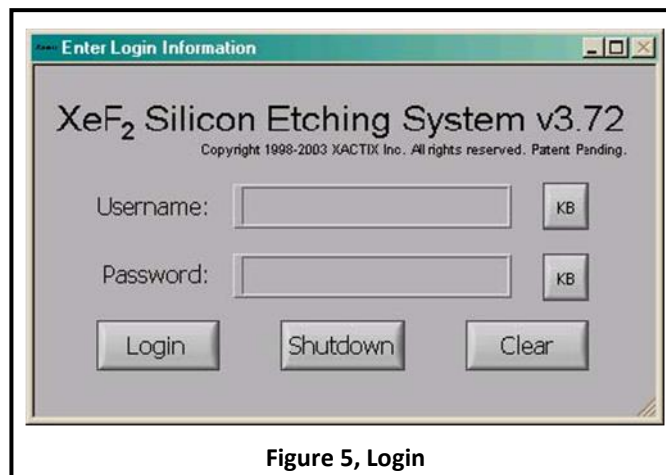**Figure 4, Startup Options**

NOTE: The system will begin a cycle of pumps and purges which takes about 10 minutes.

6.2   **Xetch Log In**

6.2.1   Enter **labuser** for **the user name and password**. See *Figure 5, Login*.

6.2.2   Click Login button.

Figure 5, Login

NOTE: This will take you to the Main Menu.

6.3   **Sample Loading**

6.3.1   Press Load/Unload Sample button on the Main Menu. See *Figure 7*.

6.3.2   Press Yes.

NOTE: The system begins chamber purges and flushing cycles to evacuate the chamber.

6.3.3   Swing the microscope out of the way of the chamber.

6.3.4   Open the chamber lid when the dialogue box comes up. See *Figure 6, Load/Unload Sample*.

6.3.5   Load a sample.

6.4   **Close the lid.**

6.4.1   Press the Done button. See *Figure 6*.

NOTE: The system will go through a cycle of pumps and purges.
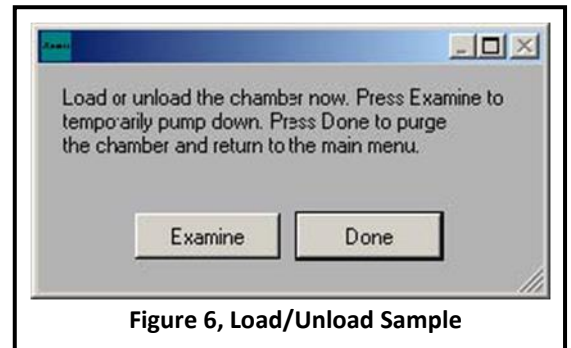
NOTE: This will take you to the Main Menu.

Figure 6, Load/Unload Sample

7.   **Etching Procedures**

7.1   **Record Information on Log Sheet**

7.1.1   You will need to record E.R. or Etch depth, and cycles in comments at disable.

7.2   **Enter the Etch Menu**

7.2.1   Select the Etch Menu button on the main menu. See *Figure 7*.

7.2.2   Enter the lot # of the sample being etched.

7.2.3   Press Done.

7.2.4   This will open the Etch Menu.

7.3   **Select a Recipe**

7.3.1   Select a recipe from the drop down menu, labeled "current recipe" at top left of the screen. See *figure 8*). See *Table 1, Recipe Parameters*.

Table 1, Recipe Parameters						Expected Etch Depth (see NOTE)
Recipe	# of Cycles	Etch Time (seconds)	Total etch time (minutes)	XeF2 press. (Torr)	N2 press. (Torr)	
Test 1	15	11	2.75	1.0	10.0	~ 6 um
Test 2	64	11	11.7	1.0	10.0	~ 26 um
Raj	90	11	16.5	1.0	10.0	~ 33 um
NOTE: Etch depth based on 4" Si wafer with <10% exposed area.						

7.3.2   Modify the recipe as needed to account for wafer size, exposed area, and/or desired etch depth.

7.3.2.1 Change the number of cycles on the Etch Menu to increase/decrease total etch time. See *Figure 8, Etch Menu*.

7.4 **Start the Etch**

7.4.1 Press the Start Etch button to start etching.

NOTE: The system will automatically start and finish the etch process.

7.4.2 Use the optical microscope to view your sample during the etch process.

NOTE: The Change Cycles button may be used at any time during an etch to add/delete cycles to/from the etch in-progress.

NOTE: The Stop button may be used to end an etch prematurely.

7.5 **Unload Sample**

7.5.1 When the etch is complete, follow the procedure in *6.3* to unload the sample.

8. Shutdown Procedures

8.1 **Shutdown**
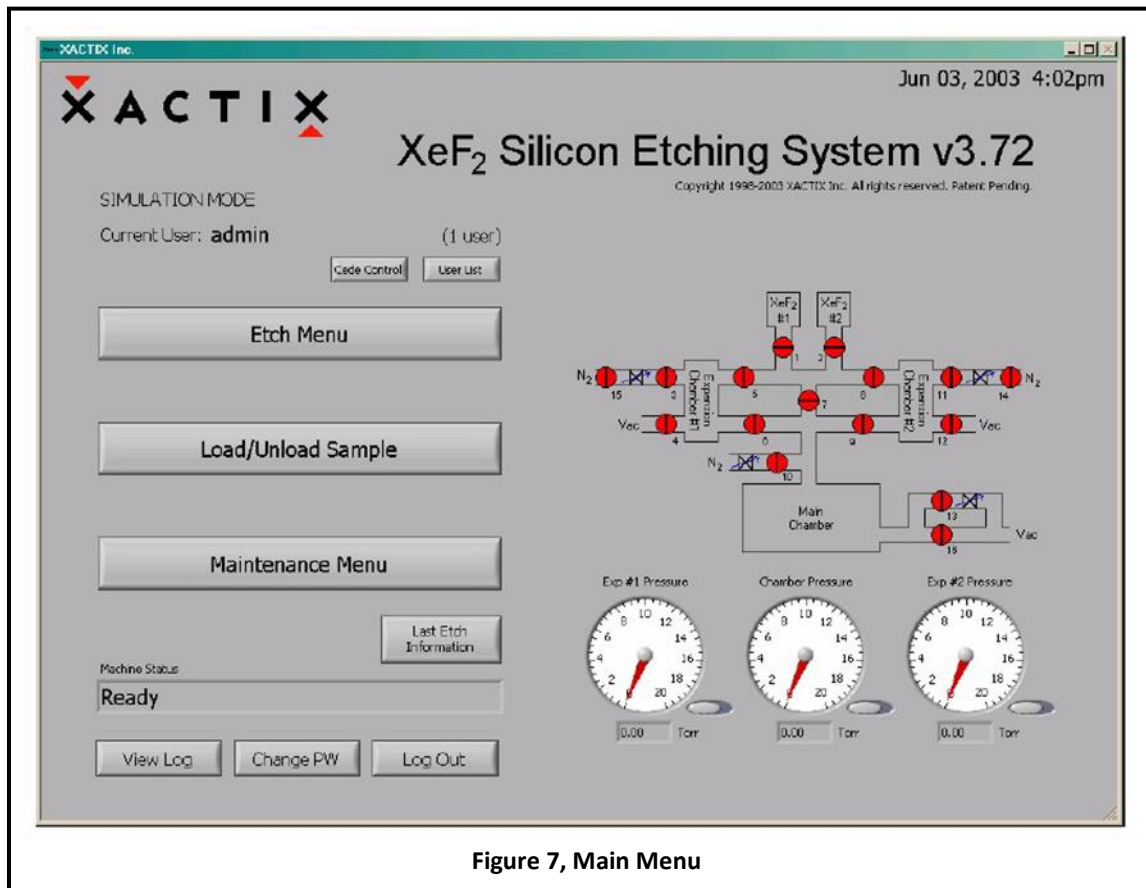
8.1.1 Turn off vacuum pump.

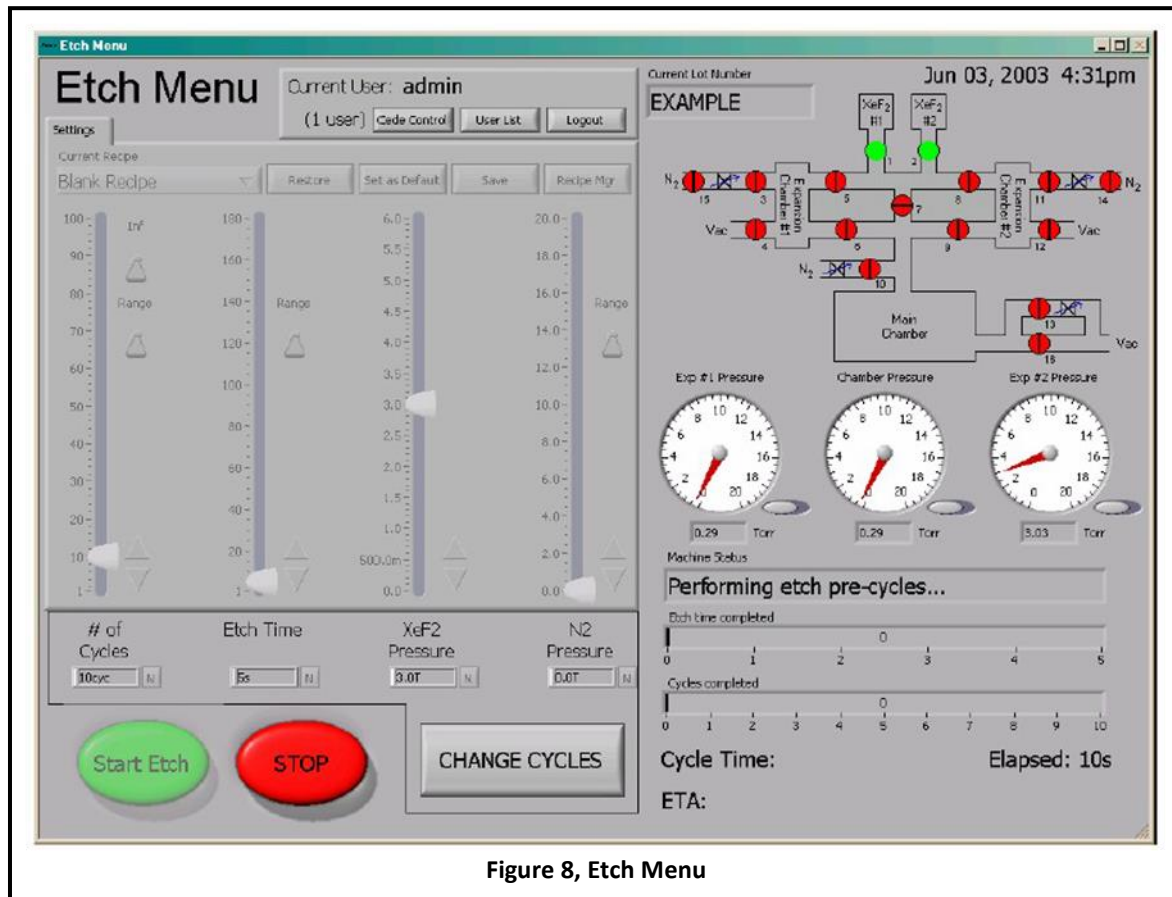8.2 **Figures**

Figure 7, Main Menu

Figure 8, Etch Menu

9. Process Notes

9.1   Etch Characteristics

9.1.1   For a 4" Si wafer with 10% exposed area, expected etch rate is ~2 um/min.

10. Revision History

Rev	Date	Originator	Description of Changes
1	15 Dec 2009	Sam Bell	