Start the system

1. Process gases should already be on and no pressure adjustments needed.
2. Turn on the chiller and vacuum pump with the switches on the wall over the system.
3. Switch on the MAIN breaker to the sputterer on the bottom front of the machine and make sure the MAIN ON light is illuminated. The ROUGHING VALVE, GATE VALVE, and FORELINE toggle switches should all be in the down (off) position.
4. Press POWER ON button. The AC ON, +15, 15, and +5 should be illuminated.
5. Switch VENT to OPEN the chamber. This will allow high purity Nitrogen to enter the chamber for venting.
6. Switch VENT to CLOSE once the chamber lid opens.

Loading Targets

1. Remove the platen by removing the screws on the drive shaft.
2. Determine which targets to change; the RF (right) source or DC (left) source.
3. Remove the deflector ring from target required to be changed.
4. Remove the shadow ring by removing the two screws.
5. Remove the target clamp by removing the socket head cap screws.
6. Remove the existing target and replace with the desired target.
7. Replace the target clamp, shadow ring, and deflector ring for the respective source.
8. Replace the Platen.

Note: DO NOT leave the Platinum target in the sputtering machine when finished; always insure that you DO leave a target in each source location when finished.

Loading Samples

1. Note the Sample location number for each of your pieces.
2. 4" wafers can be placed directly on the Platen face down.
3. Utilize insert rings for 3" and 2" wafers, glass slides or suspending pieces. Only Kapton Tape should be used in the system.

Pump Down

1. After closing the lid switch the ROUGHING VALVE OPEN while applying pressure to the top of the chamber. The Baratron Pressure gauge (Capacitive Manometer AKA CAP MAN) will begin to read when pressure is below 2000 mTorr.
2. Allow the chamber rough to below 100 mTorr.
3. Once the chamber pressure is below 100mTorr, switch the ROUGHING VALVE CLOSED.
4. **Switch the FORELINE VALVE OPEN.**
5. **Start the Turbo pump by moving the momentary toggling switch to START position.**
   The yellow LED marked < 27000 should be illuminated. The green = 27000 LED should illuminate within 2 minutes after the Turbo reaches its 27000 rpm.
6. Once the Turbo pump is up to speed, **switch the GATE VALVE ON.**
7. After running the Turbo for 5 minutes turn on the ion gauge.
8. **Switch the Ion Gauge ON.** Wait until ion gauge pressure reads 5x10^5 mTorr or less; this is your system base pressure. The bottom-right toggle can be in either the 2 mA or the 0.1 mA position. The 0.1 mA is the desired position. The gauge can be degassed by flipping the DEGAS toggle to the ON position; the red LED will be illuminated. The system will degas for approximately 2 minutes.

**Deposition**

Turn off the Ion GAUGE and toggle GAS #1 switch to the up position. Adjust the chamber pressure using the adjacent GAS #1 flow valve.

**RF Sputtering**

1. Set the Source Switch to the RF side (right).
2. Set the RF OUTPUT toggle switch to TARGET 1. Toggle the RF POWER toggle to the up position.
3. Turn on the R301 Power Supply and the two MC2 black components situated to the left of sputtering machine.
4. On the R301 Power supply set your desired wattage using the up and down arrows to the right of the display.
5. Press the RF ON/OFF button. The LED above the button will switch from blue (no power applied) to RED (power applied).
6. After pre-sputtering move your sample into activated plasma cloud by toggling the ROTATE PLATEN switch.
7. When you have finished your deposition:
   a. Turn off power by pressing the RF ON/OFF button on the R301 Power Supply. The blue LED should now be illuminated.
   b. Turn off the R301 Power Supply and the MC2 components.
   c. Toggle the RF POWER switch to the down position.
   d. Toggle the Source Switch to the center position.

**DC Sputtering**

1. Toggle the Source Switch to the DC side (left).
2. Power on the DC controller box.
3. Press “SETPT” button and adjust the large knob until the desired set point for power is reached on the display.
4. To begin DC sputtering, switch on the DC power switch (from main panel).
5. Rotate your wafer to position it over the DC target. Make sure your sample holder number is on the left side of the number indicator block. Monitor your deposition time.
6. When deposition time is finished switch off DC power switch and bring the Source
Switch to the middle position.

**Plasma Etch (Optional)**

Set the Source Switch switch between the two Deposition potentiometers to the RF (right) side.

1. Set the RF OUTPUT Switch to the PLASMA ETCH position.
2. Run PLASMA ETCH for 2 minutes and switch OFF.

**Vent & Sample Removal**

1. Turn off the Argon GAS #1 switch
2. Turn off the Turbo pump using the STOP momentary toggle switch.
3. Wait for 1 minute as the turbo pump spools down.
4. Close the GATE Valve.
5. Close the FORELINE Valve.
6. Toggle the VENT switch and wait for approximately 2 minutes. You should nitrogen entering the chamber.
7. After the chamber opens, toggle the VENT toggle to the CLOSED position.
8. Remove your samples.

**Note:** DO NOT leave the Platinum target in the sputtering machine when finished; always insure that you DO leave a target in each source location when finished.

**Shut Down**

1. **Close the lid and Switch the ROUGHING VALVE OPEN** while applying pressure to the top of the chamber (or using the quick clamps). The Baratron Pressure gauge (Capacitive Manometer AKA CAP MAN) will begin to read when pressure gets below 2000 mTorr.
2. **Allow the chamber rough to below 100 mTorr.**
3. **Switch the ROUGHING VALVE CLOSED.**
4. Turn the system off using the red OFF push button and turn off the MAIN breaker.
5. Turn off the mechanical pump and chiller at the wall switches.
6. Record your work in the equipment log book.

**Trouble Shooting and Historical Information:**

1. Nitrogen tank for venting - set to 10 PSI
2. Argon tank for sputter gas - set to 10 PSI
3. Nitrogen tank for compressed air - set to 80 PSI
4. Check the oil level of the mechanical pump, the level should be between the top and middle markings on the sight glass.
5. Turn on the chiller. Set the temperature to 22 C, set pressure to 40-50 PSI, and check the water level.
6. Chiller must be on to maintain turbo pump and for RF deposition to function.
7. Chiller water must be highly resistive to maintain electrical isolation to sputtering sources.