

JEOL 1230 TEM Operation

The following procedure is a general operating procedure that the majority of users will apply when working the JEOL TEM. The following should be used as a starting point for your particular work. The settings can be modified to produce the best images of your samples. With that in mind please remember to return the scope to the standard mode of operation for the next user.

Signing on:

1. After signing the paper log, sign on to the Gatan digital camera PC by choosing “Ctrl-Alt-Delete” and entering the password = gatan.
2. Next, you should Login to the JEOL computer. In the right field choose [Login...]. In the center field highlight the “User” field. Backspace to erase previous user’s name and enter emlab. Press “enter”. Highlight [password] and enter your 4-digit password=3333. Hit enter then [Apply].

Sample removal and loading:

***Please Note: If the 5-grid holder is in the Goniometer, be sure the “Exchange” white dot and the Number 1 (also with a white dot) are aligned before removing.**

1. Center the holder by choosing the Specimen Position [Spc Pos...] button in the left field, below the Spot Size and above Z Control, make sure the Point “ON” is green and click on the center of the grid.
2. Prepare to remove specimen holder by choosing “Monitor” in Right Field (CPU) and select “Vacuum”. All should be @ “Ready” state.
3. Switch Goniometer from “Pump” to “Air”. Nothing should happen.
4. Pull Specimen holder **straight out** (only green bars should be showing on the PEG) of Goniometer ~7cm until it stops then turn ~75

degrees Counter-Clockwise until it stops. You can now let go and reposition your hand.

5. Pull Specimen holder **straight out** of Goniometer ~0.5cm until it stops then turn ~15 degrees Counter-Clockwise until it stops. Let go. The square “seat” should be at 12:00. You will hear the Goniometer venting to air and green light will turn off. On the CPU the “Vacuum” SPC field should now read “Air” and will climb to ~245.
6. Gently remove the holder **straight out** from the Goniometer. If there is resistance wait another ten seconds. Be careful not to touch the holder beyond the screw/collar, as this will introduce grease and dirt into the microscope.
7. Raise clamping mechanism on the specimen holder. Place your grid in the holder, then lower and clamp the mechanism.

***Again Please Note: If you are using the 5-grid specimen holder, be sure the “Exchange” white dot and the Number “1” (also with a white dot) are aligned.**

8. When carefully replacing the specimen holder, align the small screw with opening in side of Gonimeter until seated in Goniometer.
9. With slight pressure pushing specimen holder in Toggle switch from “Air” to “Pump”. You should hear the valve opening and the CPU “vacuum” SPC field should still read “Air” but will drop to about 48-47 (indicator will not change from “Air” to “Ready” but you can go ahead and turn the beam on).

Note: The pump-out of the Goniometer is on a timed cycle. If the reading does not reach 50, you will have to wait until the next pumping cycle begins. The pressure will rise but should not be more than 200.

10. Once the SPC on the vacuum monitor reaches below 50 get a good grip on the specimen holder and turn clockwise ~15 degrees until it stops, then allow it to go into the chamber ~0.5cm.
11. Still with a good grip turn clockwise ~75 degrees until it stops and slowly allow it to go into the Goniometer until the square “seat”

nestles into the Goniometer at 3:00. Eventually you will do both of these steps as one fluid step. (Please note: indicator will not change from “Air” to “Ready” but you can go ahead and turn the beam on)

12. Select “HT” in the Head field and confirm the HT is at 80 KV and is READY. In the Left or Center Field select the Beam Current and switch it to ON.

Correcting Z-axis (Height of sample):

1. On the Function box {**FB**} bring beam to crossover with “Brightness” control. Center beam by pressing {BEAM SHIFT} and using the right mouse button.
2. At around 5000X focus on the sample film or a section itself and select [Z-Control] in the left field of the Display. Select [Auto] in the Center Field. When you have focused on the sample, click [Okay].
3. Refocus image if necessary.

Centering the Objective aperture (if needed):

This should be done at the beginning of your session and after changing aperture settings (smaller apertures clockwise turn, larger aperture counterclockwise) or after going from Low Mag back to Mag 1.

1. Move to a clear area on the grid away from grid bars and areas of interest but there must be some film, formvar, carbon, or section to focus the diffraction onto.
2. Bring the centered beam to crossover and select {DIFF} on the Function Box (**FB**). Focus the spot with diffraction “Focus” knob on {**FB**} and center the dark ring around the bright beam using the manual knobs on the aperture. (Do this quickly since a bright beam will burn the fluorescent screen)
3. Select Mag 1 or 2 and you are ready to begin observations.

Recording:

Using the Gatan Digital Imaging cameras and software:

1. Focus and center the area of interest.
2. Make sure the Gatan PC screen is on and make a folder on the desktop. Label with username or Hutch account_date. Example: jdoe_011807. No spaces please.
3. Open the Gatan Digital Micrograph application and insert the camera.
4. For the Ultrascan 1000 bottom mounted camera-Lift up the screen by selecting [Screen] on the left microscope field. For the Orius side mounted camera-Make sure illumination is very dim and then insert the camera. Then select [Start View] on the right panel of the Gatan software and you will see a continuous, quick scan of your sample taken @low resolution. Be sure in the “intensity” box that the box is within the green field.
5. If you would like to focus the image switch from the “Search” to the “Focus” mode and manually focus your sample. The focus lupe, when checked, will collect fast/low resolution images making it easier to focus manually. You can also focus on the fluorescent screen of microscope.
6. Now you can select {acquire Image}. You can save the image with micron bar under the File menu and by selecting Save display as. Include the magnification in the file name. At the end you can transfer images to Fred or burn a CD.
7. To go back to viewing your sample on the microscope screen, select {Stop View} and de-select the “Screen” on the microscope for the Ultrascan camera or just take the camera out for the Orius camera.

Shutting Down:

1. Lower the magnification to ~1000x.

2. Spread the beam maximally. Turn off the beam.
3. Remove your sample from specimen holder.
4. Reinsert sample holder into the microscope.
5. Log off of TEM PC, Gatan PC, and the paper log. Cover fluorescent screen and turn off room lights.