

Hitachi S-4800 Instructions

1. Sign into log book with date, CMRF account number, name, time and starting beam hour meter reading. You must have previously filled out a project description form.
2. Turn the Display power on (if off). Start computer.
3. Log in to Windows with HawkID and password.
4. Double click on PC_SEM icon (PC-SEM window is not open).
5. Enter login name and password, click OK.
6. If you would like to use the IR Chamberscope, turn on power supply box and monitor then select AV1 signal.

Sample Loading

1. The specimen holder should be in the exchange chamber. Press **AIR** button on top of the exchange chamber and wait for beep.
2. Open exchange chamber door using metal handle.

CAUTION: Do **NOT** use exchange rod as a handle.

3. Turn the exchange rod **CW** to the **UNLOCK** position and, wearing gloves, pull to remove the sample holder from the rod. (You may need to push the rod forward to expose the sample holder.)
4. Load your sample stubs onto the sample holder. Verify the following:
 - a. All samples fit under the standard height gauge. No part of any sample should **EVER** be taller than gauge.
 - b. The screw does not stick out below the bottom surface of the T-base.
 - c. Sample stubs are secured with the set screws around the sides of the holder.
5. Replace specimen holder on exchange rod and turn rod **CCW** to **LOCK** position. Pull the rod back until it snaps into the retraction clip. Close exchange chamber and press EVAC.
6. When the system beeps, press **OPEN**.
7. When the door opens, slide the exchange rod **ALL** the way into the specimen chamber and onto the stage.

CAUTION: If the specimen holder is not pushed all the way onto the stage, the specimen holder could fall to the bottom of the specimen chamber.

8. Turn the exchange rod **CW** to the **UNLOCK** position and pull the rod **ALL** the way back until it snaps into the retraction clip.
9. In the upper right hand corner of the monitor, select **HOME**.

Start up

1. Set up the HV menu.
 - a. **Vacc**: Accelerating Voltage – variable from 500V-30kV. Change using the drop down menu.
 - b. **Ie**: Emission Current – typically set to 10 μ A for imaging. May be decreased for a charging sample.
 - c. **Flashing** – If a red/blinking **Please Flash** appears across the top of your image, the tip must be flashed. **Do not flash the tip unless prompted.**
 - i. To flash the tip, turn the beam off.
 - ii. In the **HV menu** click **Flashing**,
 - iii. Make sure **Intensity** is set to **2**, then click **Execute**.
 - iv. When complete turn the beam back on and re-do the alignments.
2. Click ON to apply the high voltage. You will see a window asking for confirmation that the sample height was adjusted with the height gauge. Click OK to confirm.
3. Once a beam is established ($I_e \approx 10\mu A$), switch to **Low Mag** mode to find your sample.
 - a. Click the **H/L** button right of the Magnification Display.
 - b. **LM** will appear to indicate Low Mag mode.
4. If needed, adjust the brightness and contrast (**ABC** button) to visualize the center of the sample holder.
5. Use the track ball to move the stage to find your sample.
6. Switch back to **High Mag** mode. (Step 3a)

Alignment

1. Initial alignments typically should be done at magnifications from 10,000X to 20,000X. Focus and adjust brightness and contrast as needed.
2. Click the **Align** button.
3. Select **Beam Align** and center the bright spot using the **X/Y Stigma/Align** knobs on the control surface.
4. Select **Aperture Align** and use the **X/Y Stigma/Align** knobs to minimize any image translation.
 - a. You want the image to be pulsing in place and not moving laterally.

5. Use the same method to minimize translation for both **Stigma Align X** and **Stigma Align Y**.
Note: YES, adjust both the X and Y knobs for **each** of these.
6. Exit the alignment menu.
7. Go to a higher magnification and focus. You will want to choose a magnification higher than what will be used for imaging.
8. Adjust the **X/Y Stigma/Align** knobs to correct for any astigmatism.

Image Capture

1. Select area of interest, focus and adjust brightness and contrast (if needed).
2. Select the scan speed for the type of acquisition desired.
 - a. For frame integration, select **Fast1** or **Fast2** scan speed.
 - b. For slow scan, select **Slow3** scan speed.

Note: Acquisition parameters can be changed by opening the **Setup** window and clicking on the **Image** tab.

 - c. The image resolution can be changed by clicking on the down arrow to the right of the **Image Capture** button.
3. Click the **Image Capture** button to acquire an image.
4. After capture is complete, the image will appear in the **Captured Images** window at the bottom left of the screen.
5. Click the **Run** button to return to a live image.

Saving Images

To save a single image:

1. Click on the image in the **Captured Images** window to highlight it in yellow.
2. Click the **Save** button.
3. The **Save Image** window will open. Choose the destination for the file by clicking on the **Select** button. Images should be saved to a USB drive, H: drive or temporarily, to the D: drive.
Note: Any files saved to the D: drive will be deleted after 1 month. Any files saved on the C: drive are subject to **immediate deletion** without notice.
4. Enter an image name and click **Save**.

5. Choose a file format under the **Image Type** area. TIFF and Bitmap are recommended. JPEG is not recommended as it is a lossy compression format.
6. If desired, the fields in the Information area can be filled. This information is saved in the text file that accompanies each image file.
7. Click **Save** to save the image. Saved will appear on the image in the **Captured Images** window.

To save multiple images as a batch:

1. Click to highlight all the images to be saved.
2. Click **Save**.
3. Choose **Save All** in the **Save Options** area of the **Save Image** window.
4. Follow rest of procedure as above.

Shut Down and Sample Removal

1. Click **OFF** to turn off the high voltage.
2. Click **EXC** button to move the stage to its exchange position. Wait for the green light next to the **EXC** button to stop blinking.
3. Press the **OPEN** button on the top of the sample exchange chamber.
4. When the door opens, insert the exchange rod as far as it will go and turn **CCW** to the **LOCK** position.
5. Pull the rod **ALL** the way back out until it snaps into the retraction clip.
6. Press the **CLOSE** button.
7. Press the **AIR** button and wait for the beep.
8. Open exchange chamber door using metal handle.
9. Remove sample stubs from the holder. Replace sample holder on the rod if it was removed.
10. Pull the rod back and close exchange chamber.
11. Press **EVAC** button.
12. Sign out in the log book.