

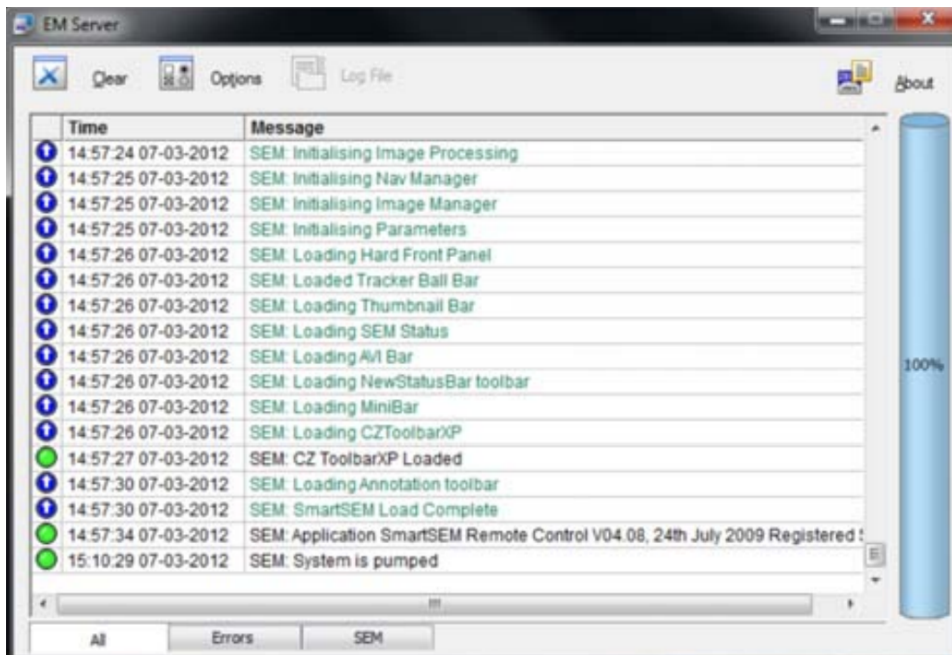
Zeiss Sigma Scanning Electron Microscope - Operation Instructions

Turning the system ON:

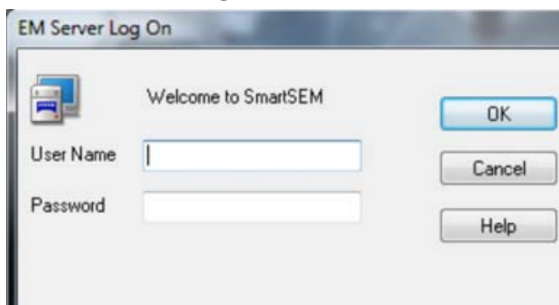
1. Press the green **On** button on the table under the microscope (should light up green).
2. Turn on the **computer** and **Windows** operating system.

Getting Started and Image Acquisition

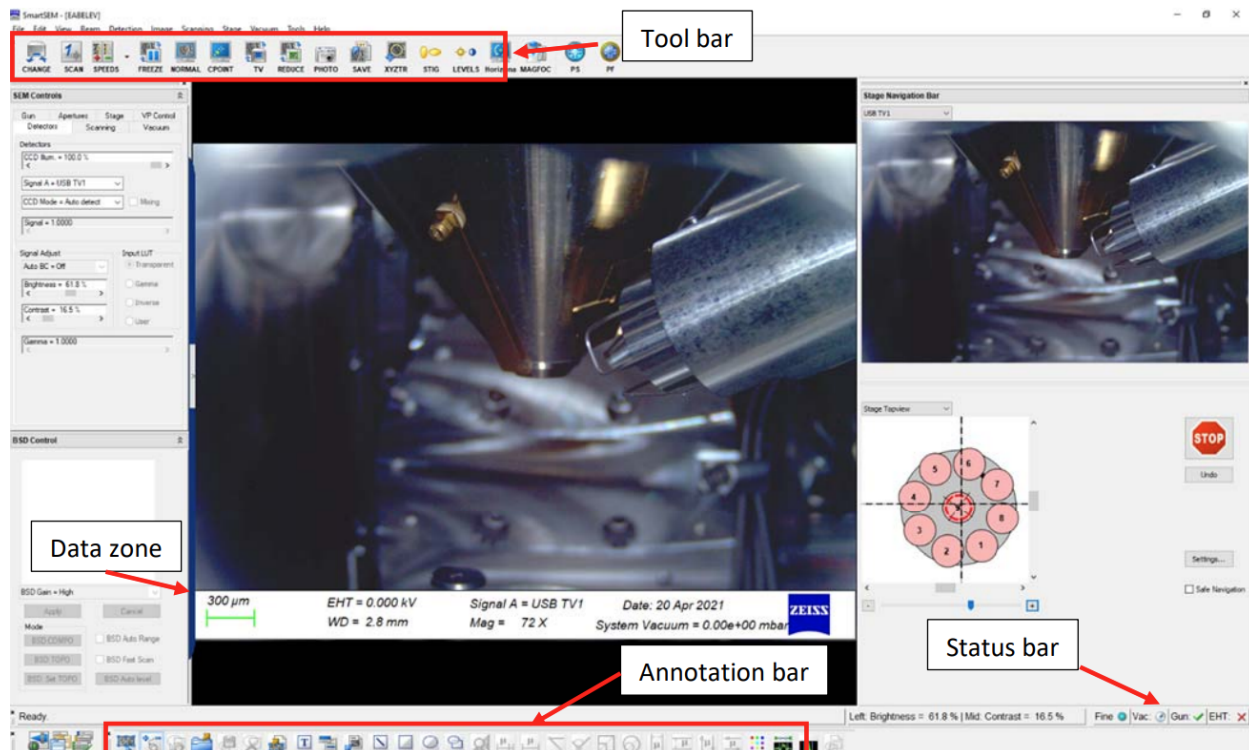
1. Click the **Zeiss SmartSEM** icon. The **EM Server window** and the **EM Server Log On** dialog should pop up.



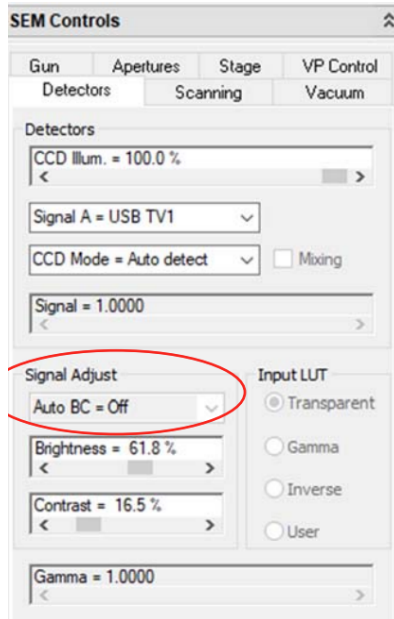
2. Type the **username** (amfadmin) and **password** (A86562489) into the **EM Server Log On** dialog and click **OK**.



3. After software loads, near the bottom of the page, click **Vac:** → **Vent** from the dropdown menu.



4. While venting, mount the samples onto the sample holder. Track which sample is which by placing samples by the numbers indicated on the picture of the holder. Then, gently screw each sample in place in the holder.
5. After venting is finished, open the chamber and load the samples. Make sure that the groove on the bottom of the sample holder aligns with the stage.
6. Make sure that the **EHT:** (gun) is off (indicated with an **x** mark). Close the chamber door and click **Pump** until **Vac. Status = Ready**.
7. Double click **EHT=** in the **Data Zone** and set **EHT Target = 3.00kV** to start. Click **OK**. Then go to the **EHT tab** and turn **EHT:** on. Wait until **EHT:** has a checkmark and the **EHT=** value is correct. The **All:** status should then be showing a checkmark next to it.
8. In the **Stage Navigation** menu, click on **Settings...** and then **Sample Holder Gallery** to set stage coordinates. Start with **Z = 33.0mm** (usually a safe distance for sample to cover without touching the objective lens).
9. Set Detector **Signal A = SE2** (SE2 = scattered electron 2) from the drop-down menu.



10. Set **Signal Adjust** to **Auto BC = BC** (BC = brightness/contrast), then use the knobs to adjust magnification, focus, brightness, contrast, etc.



Magnification



11. Set Scanning components with the below as a starting point:
 - a. **Oper. Mode** = Normal
 - b. **Scan Speed** = 3
12. Noise Reduction
 - a. **Pixel Avg** to Search Image
 - b. **Resolution**: 1024 x 768 (for searching image)
13. Identify a region of sample to image and zoom in as much as possible using the **Magnification** knob. Using the **Focus** knob, focus the image as much as you can. You can push the **Reduced Rastor** button for a specific region of the sample to enable faster and sharper focus and push it again to exit it. Use the **Stigmator X & Y** knobs to minimize image stretch/distortion upon moving in and out of focus.

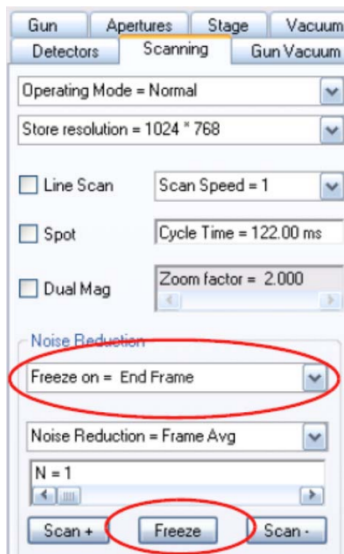


- Click the **Wobble** button and use **Aperture X & Y** knobs to minimize image oscillations. It is recommended to use >10,000X magnification for aperture adjustments.

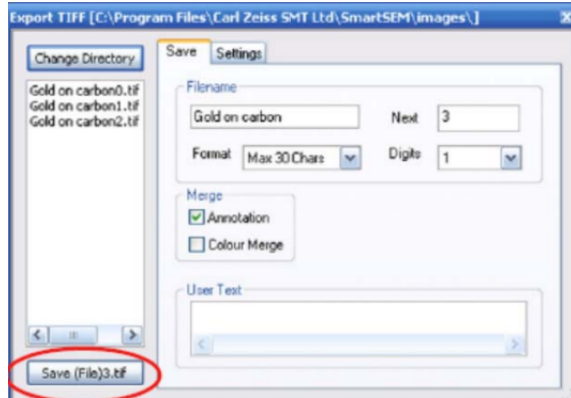


Saving an image

- Choose **Scan Speed 5/10** and under **Noise reduction**, choose **Freeze on = End Frame Line Avg** ~10-20 lines.
- Under **Noise reduction**, choose **Noise Reduction = Freeze Avg** and then click the **Freeze** button to capture the image (red dot in bottom right corner of **Data Zone** signifies ready to save).



- Select **Resolution** of 3072 x 2304 (for saving image)
- Click **File** → **Save Image** from the **SmartSEM** menu.
- Enter a path and a file name.
- Click **Save** (usually people save the file type as a .tif).



7. To continue imaging, select **Image** → **Unfreeze** from the SmartSEM menu or click **Unfreeze** on the **Scanning** tab.

Ending your session

1. In the **ChamberScope** view, click the **All:** button in the status bar and select **EHT Off** from the pop-up menu.
2. Click **Vac:** → **Vent** to vent the chamber.
3. Once the chamber is vented, open the door and remove the specimen holder off the stage. Then, close the chamber door immediately.
4. Click **Vac** → **Pump**.
5. Select **File** → **Log Off** from the **SmartSEM** menu. Click **Yes** to confirm in the pop-up message.
6. Select **File** → **Exit** from the **SmartSEM** menu. Click **Yes** to confirm in the pop-up message.
7. Shut down the **PC**.
8. Press the yellow **STANDBY** mode button (it should light up yellow) before leaving your session.