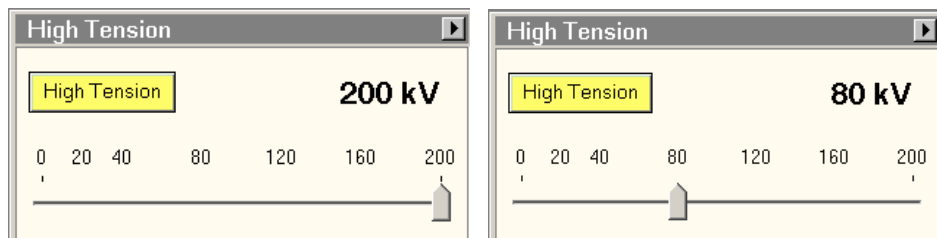


FEI Tecnai 80 kV operation
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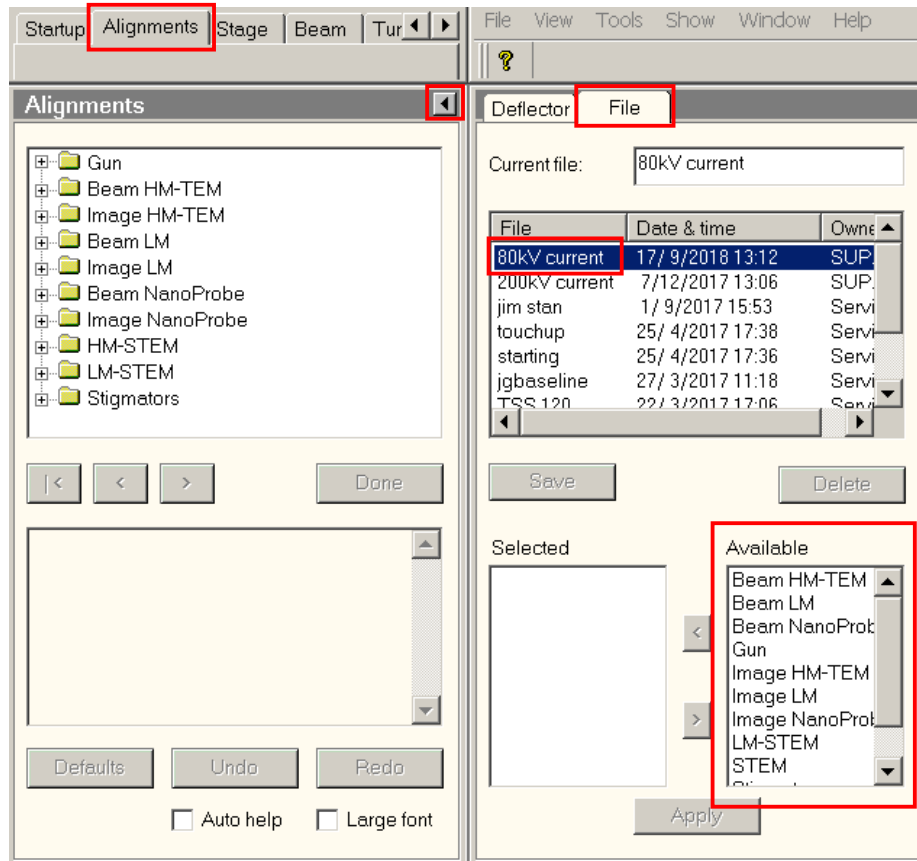
This document assumes the user is already familiar with basic operation of the instrument in TEM mode, use of the Microscope Control interface, and DigitalMicrograph.

1. The *empty* single tilt holder must be left inserted into the column prior to starting this procedure; do not load any specimen into the microscope until instructed to do so in the procedure.
2. Setting the high tension to 80 kV
 - 2.1. In Microscope Control, select the **Startup** tab and then find the “High Tension” control panel; drag the sliding bar from 200 to 80 (it will take ~2 min for the high tension to ramp down from 200 to 80 kV).

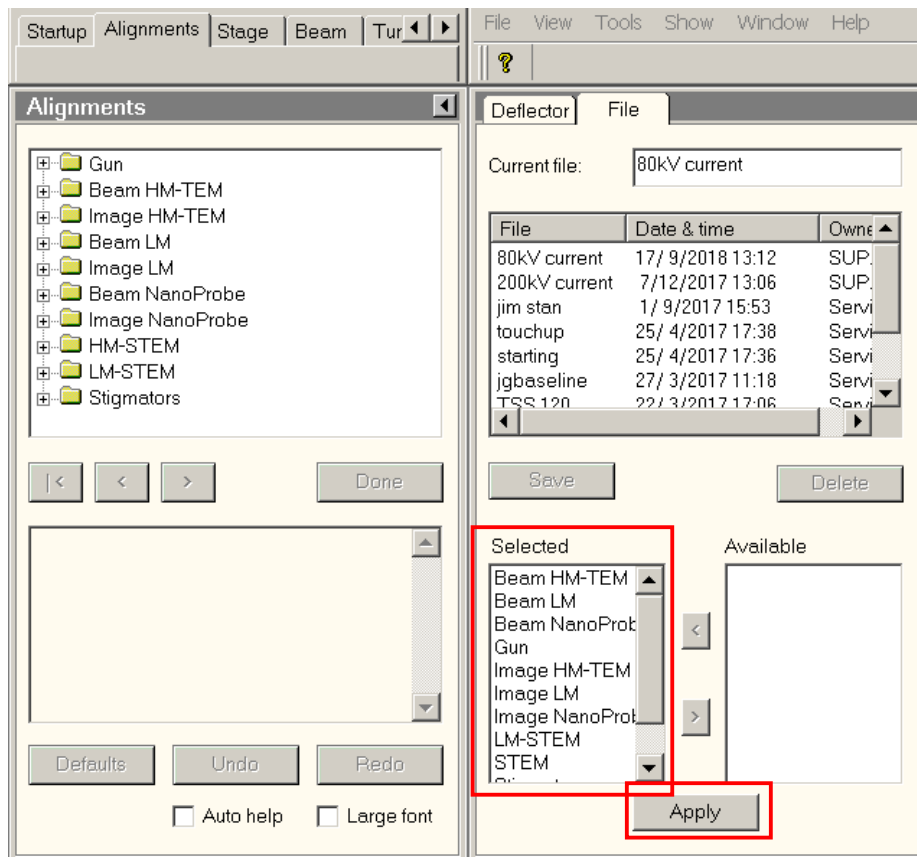


3. Applying base alignments for 80 kV operation

- 3.1. In Microscope Control, select the “Alignments” tab; in the “Alignments” control panel, select the flap out arrow to expand the panel, in the expanded panel, select the “File” tab and then find and select the “80kV current” file from the file list. A list of alignments should now populate in the “Available” list.

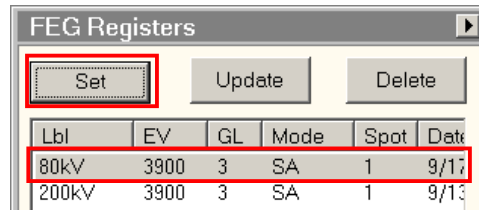


- 3.2. Double click on each of the alignments in the “Available” list; the same alignments will now be moved to the “Selected” list. Finally, select “Apply” to apply the alignments.



4. Applying gun alignments for 80 kV operation

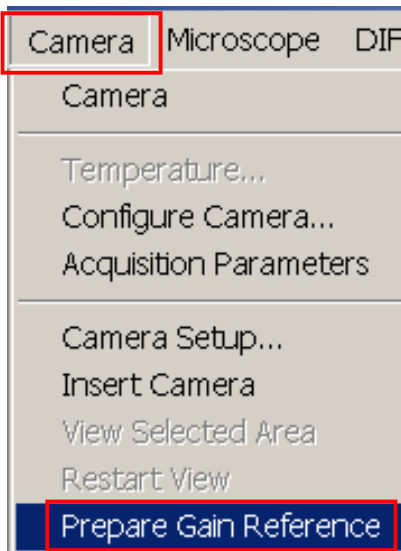
- 4.1. In Microscope control, select the **Beam** tab; navigate down to the “FEG Registers” control panel and select the “80kV” setting; then select “Set” to apply the gun alignment for 80 kV operation.



5. Preparing a camera gain reference for 80 kV operation

- 5.1. With the empty single-tilt holder still inserted into the column, open the column isolation valves and find the beam.
- 5.2. Make sure spot size = 1 is selected; insert and center the #4 C2 aperture and correct the condenser astigmatism.
- 5.3. Set the indicated magnification to 34000 \times , expand the beam clockwise from crossover so it is slightly larger than the 40 mm circle on the viewing screen and center it.
- 5.4. Due to the change in voltage and alignments, there will likely be some drift in the beam; you should wait until this drift stabilizes before proceeding (maybe several minutes); once the drift has stabilized, re-center the beam (again, keeping it slightly larger than the 40 mm circle).
- 5.5. Insert the digital camera.

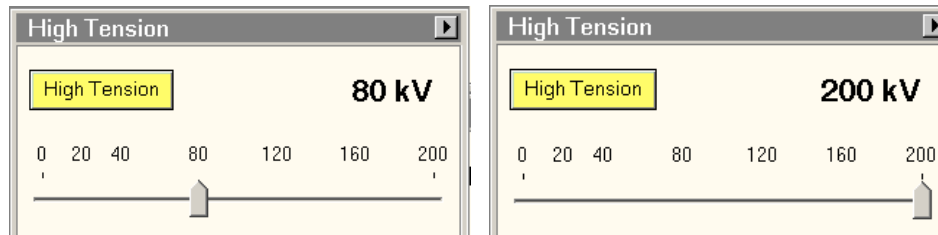
- 5.6. In DigitalMicrograph, select “Camera” from the pull-down menu and then “Prepare Gain Reference” and follow the instructions to generate a new gain reference.



- 5.7. Retract the camera and flip the viewing screen back down; insert and center the #2 C2 aperture; close the column valves; at this point, a specimen may now be loaded into the TEM for observation.
6. When you are done with operation at 80 kV, reinsert the empty single tilt holder back into the column (just as you would when normally finishing with your session).

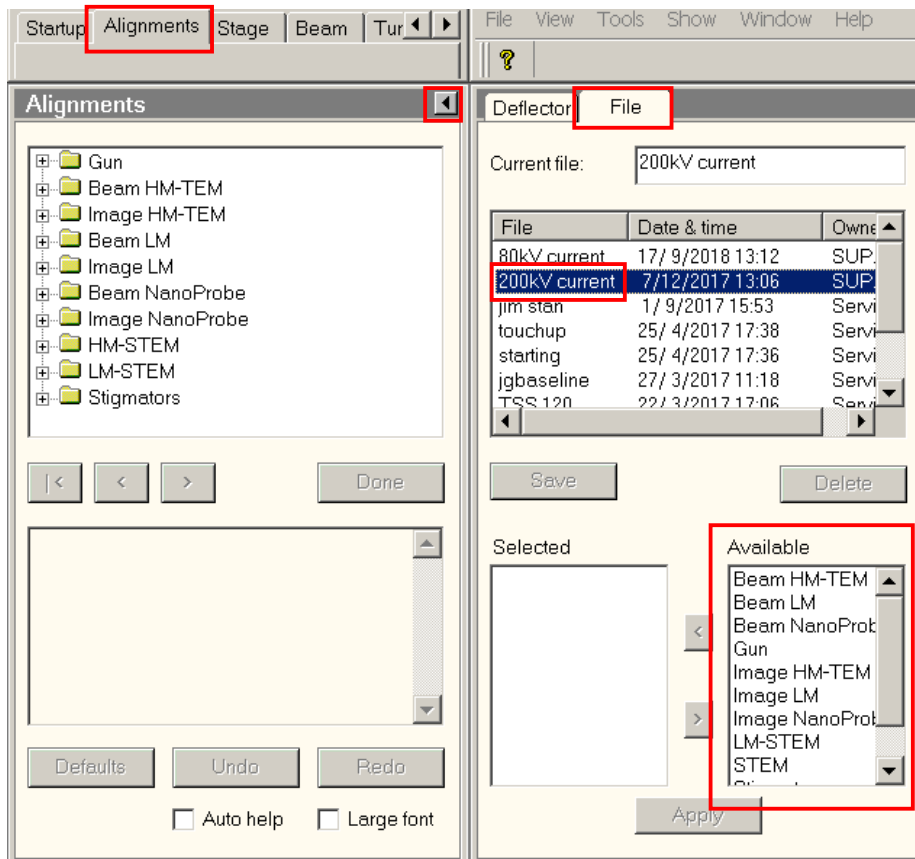
7. Setting the high tension back to 200 kV

- 7.1. In Microscope Control, select the **Startup** tab and then find the “High Tension” control panel; drag the sliding bar from 80 back to 200 (it will take ~2 min for the high tension to ramp up from 80 to 200 kV).

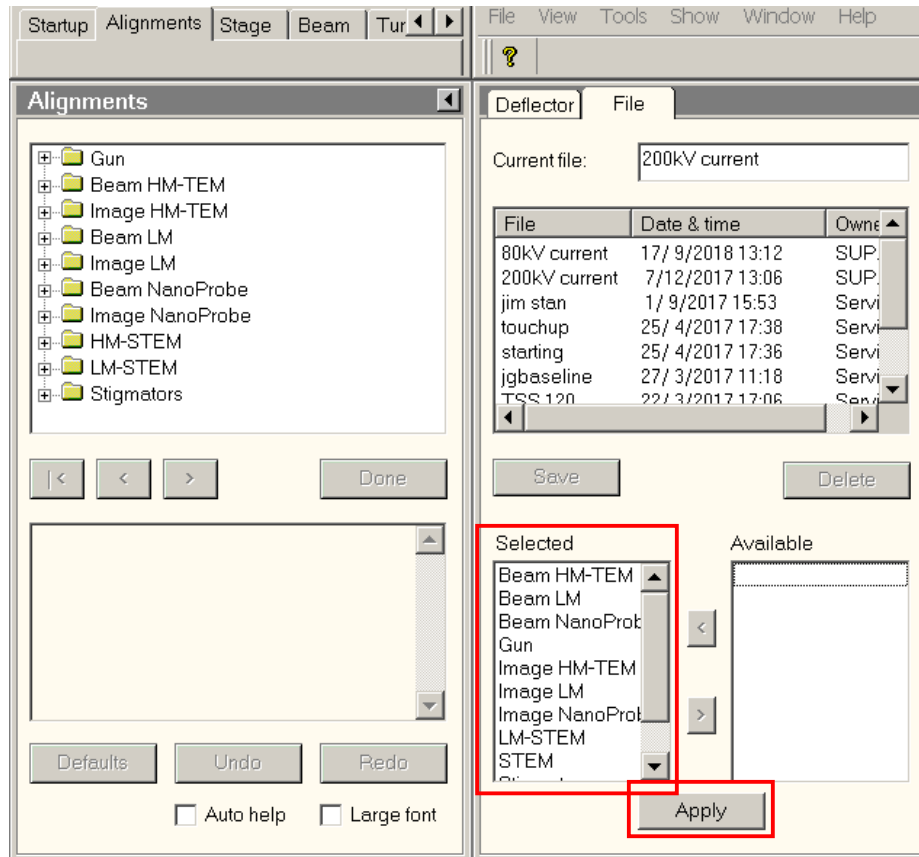


8. Applying base alignments for 200 kV operation

- 8.1. In Microscope Control, select the “Alignments” tab; in the “Alignments” control panel, select the flap out arrow to expand the panel, in the expanded panel, select the “File” tab and then find and select the “200kV current” file from the file list. A list of alignments should now populate in the “Available” list.

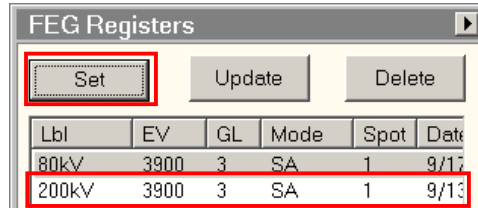


- 8.2. Double click on each of the alignments in the “Available” list; the same alignments will now be moved to the “Selected” list. Finally, select “Apply” to apply the alignments for 200 kV operation.



9. Applying gun alignments for 200 kV operation

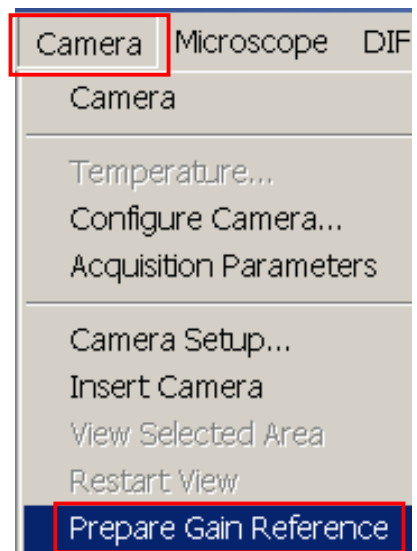
- 9.1. In Microscope control, select the **Beam** tab; navigate down to the “FEG Registers” control panel and select the “200kV” setting; then select “Set” to apply the gun alignment for 200 kV operation.



10. Preparing a camera gain reference for 200 kV operation

- 10.1. With the empty single-tilt holder still inserted into the column, open the column isolation valves and find the beam.
- 10.2. Make sure spot size = 1 is selected; insert and center the #4 C2 aperture and correct the condenser astigmatism.
- 10.3. Set the indicated magnification to 34000 \times , expand the beam clockwise from crossover so it is slightly larger than the 40 mm circle on the viewing screen and center it.
- 10.4. Due to the change in voltage and alignments, there will likely be some drift in the beam; you should wait until this drift stabilizes before proceeding (maybe several minutes); once the drift has stabilized, re-center the beam (again, keeping it slightly larger than the 40 mm circle).
- 10.5. Insert the digital camera.

- 10.6. In DigitalMicrograph, select “Camera” from the pull-down menu and then “Prepare Gain Reference” and follow the instructions to generate a new gain reference.



- 10.7. Retract the camera and flip the viewing screen back down; insert and center the #2 C2 aperture; close the column valves; the instrument is now ready for operation at 200 kV again.