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## Surface Angle Calibration

**Purpose:** For use with single pass scan for faster measurement times or for measuring angled connectors. This procedure corrects for the small differences between the internal interferometer mirror and the ferrule surfaces as positioned by ferrule mount with the integral guidepins. Whenever the ferrule mount is changed or repositioned or if the mirror adjustments are changed, use this procedure to calibrate for these different surface angles.

**General:** Perform this procedure in a dust and vibration free environment. The image from the interferometer must be free of any flickering. The ferrules must be clean and free from dust, fingerprints, and any other contamination. Inspect the ferrules for cleanliness. Use dry, filter air and, if needed, a soft cloth and distilled water to clean the ferrule tips. During this procedure, the room temperature cannot change by more than  $\pm 3^{\circ}\text{C}$ .

1. Power and warm-up. Power up the Interferometer and the Compaq PC.

2. Adjust Variable Tilt Stage.

Loosen the locking collar. Adjust the Variable Tilt Stage to  $0.00^{\circ}$  with the micrometer adjustment, which displays units in degrees of tilt. Turn the micrometer adjustment in a clockwise direction (when viewed from above). If you approach  $0.00^{\circ}$  from a counterclockwise direction, go past it and return to it from the clockwise direction. Use the locking collar at the bottom of the micrometer to lock the micrometer in position. See Figure 1.

3. Ferrule mount. Install the ferrule mount. As the two thumbscrews are tightened press the mount against the two front stops. See Figure 2.

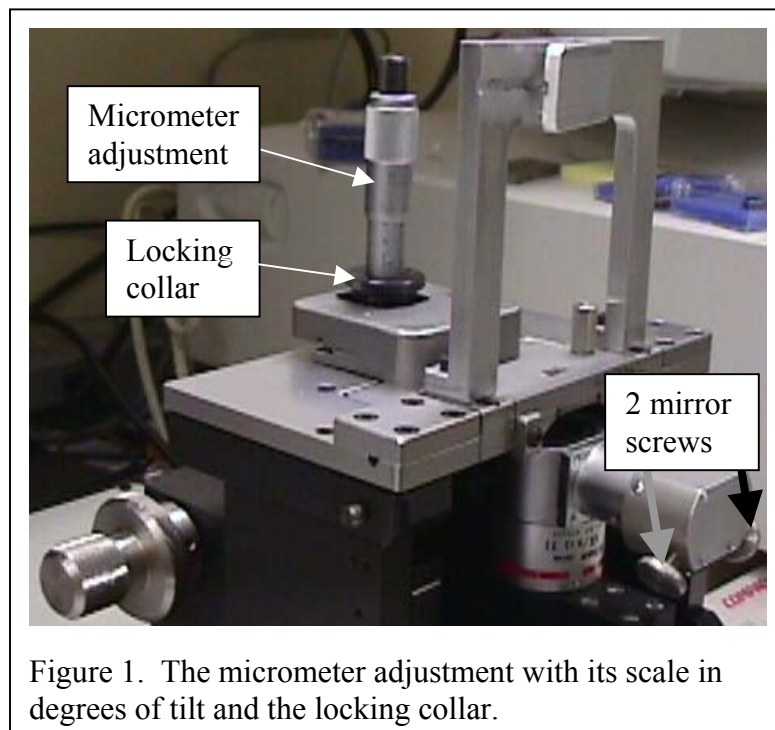


Figure 1. The micrometer adjustment with its scale in degrees of tilt and the locking collar.

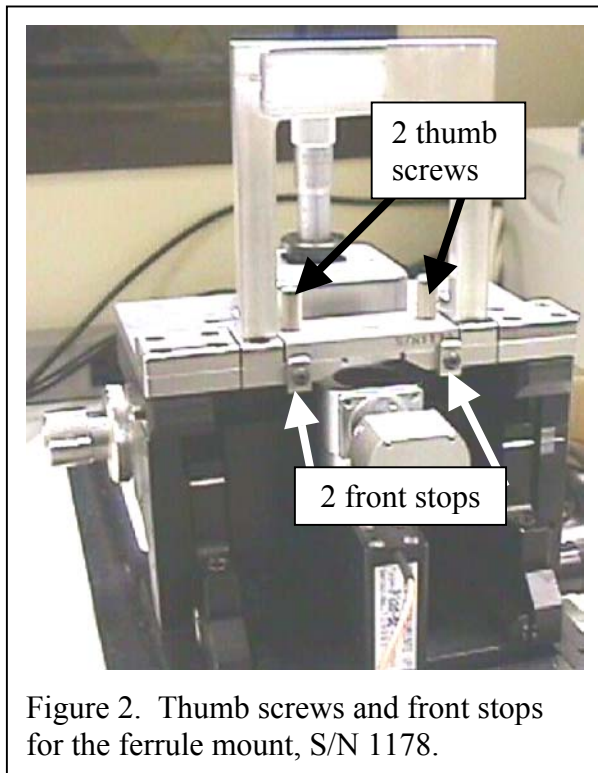


Figure 2. Thumb screws and front stops for the ferrule mount, S/N 1178.

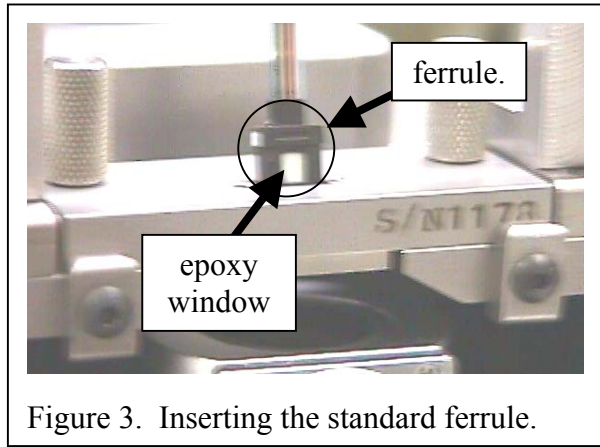


Figure 3. Inserting the standard ferrule.

4. Insert standard ferrule. The standard ferrule used here can be either a ferrule designated as a “Gold Standard Ferrule” or a “Working Standard Ferrule”. Use the same procedure for either type of ferrule. Insert the standard ferrule with the epoxy well facing the front of the interferometer. See Figure 3. Push the standard ferrule all the way down into the ferrule mount until the ferrule bottoms out.

Press the standard ferrule on all four corners.

5. Start the program. Launch “Accis (current version) for NC3005”. You should see a window that looks like Figure 4.

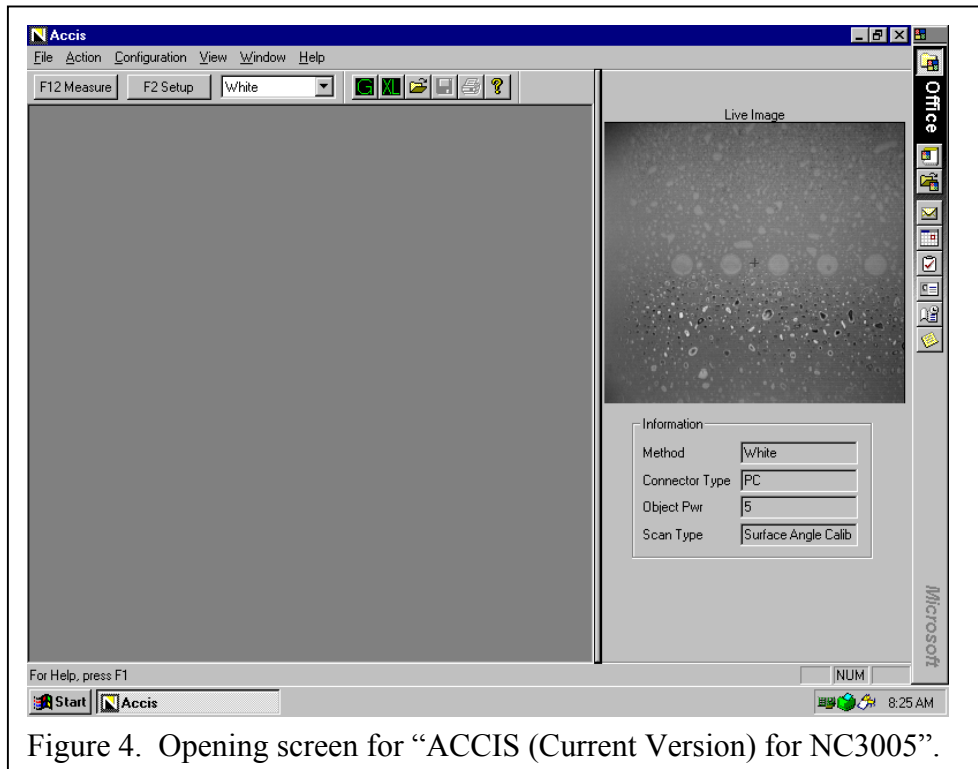


Figure 4. Opening screen for “ACCIS (Current Version) for NC3005”.

6. Setup parameters. Press the “F2 Setup” button at the top-left of the opening screen. Enter the setup parameters in the “Measure Setup” window as shown in Figure 5. Press “OK”.

The image shows a software window titled "Measure Setup" with a close button (X) in the top right corner. The window contains several input fields and checkboxes for configuring a measurement. The fields are organized into sections:

- Company Name:** An empty text input field.
- Object Pwr.:** A dropdown menu set to "5".
- Fiber Dia (um):** A text input field containing "126".
- ROI:** A label for the following two fields.
  - Length(um):** A text input field containing "2900".
  - Width (um):** A text input field containing "675".
- Scan Type:** A dropdown menu set to "Surface Angle Calib".
- Ferrule Type:** A dropdown menu set to "Ceramic".
- Fiber Height Type:** A dropdown menu set to "Planar".
- Connector Type:** A dropdown menu set to "PC".
- Ribbon Style:** A section containing:
  - Style Name:** A dropdown menu set to "MT".
  - Center Locator:** A dropdown menu set to "Templates".
  - Fiber Count:** A text input field containing "12".
  - Fiber Type:** A dropdown menu set to "Single Mode".
- Filter Settings:** A section containing three text input fields:
  - Minimum (%) Modulation:** A text input field containing "9".
  - Heights Used (%):** A text input field containing "20".
  - Top Hts (%) Excluded:** A text input field containing "3".

At the bottom of the window, there is a row of four checkboxes:

- Auto Focus:** Checked ()
- Two-Pass:** Checked ()
- IEC Fit:** Checked ()
- Pass/Fail:** Not checked ()

Below the checkboxes are five buttons: "Save As", "Load", "Default", "OK", and "Cancel".

7. Enlarge the “Live Image”. Press “F5” function key on the keyboard to enlarge the “Live Image” window which now looks like Figure 6.

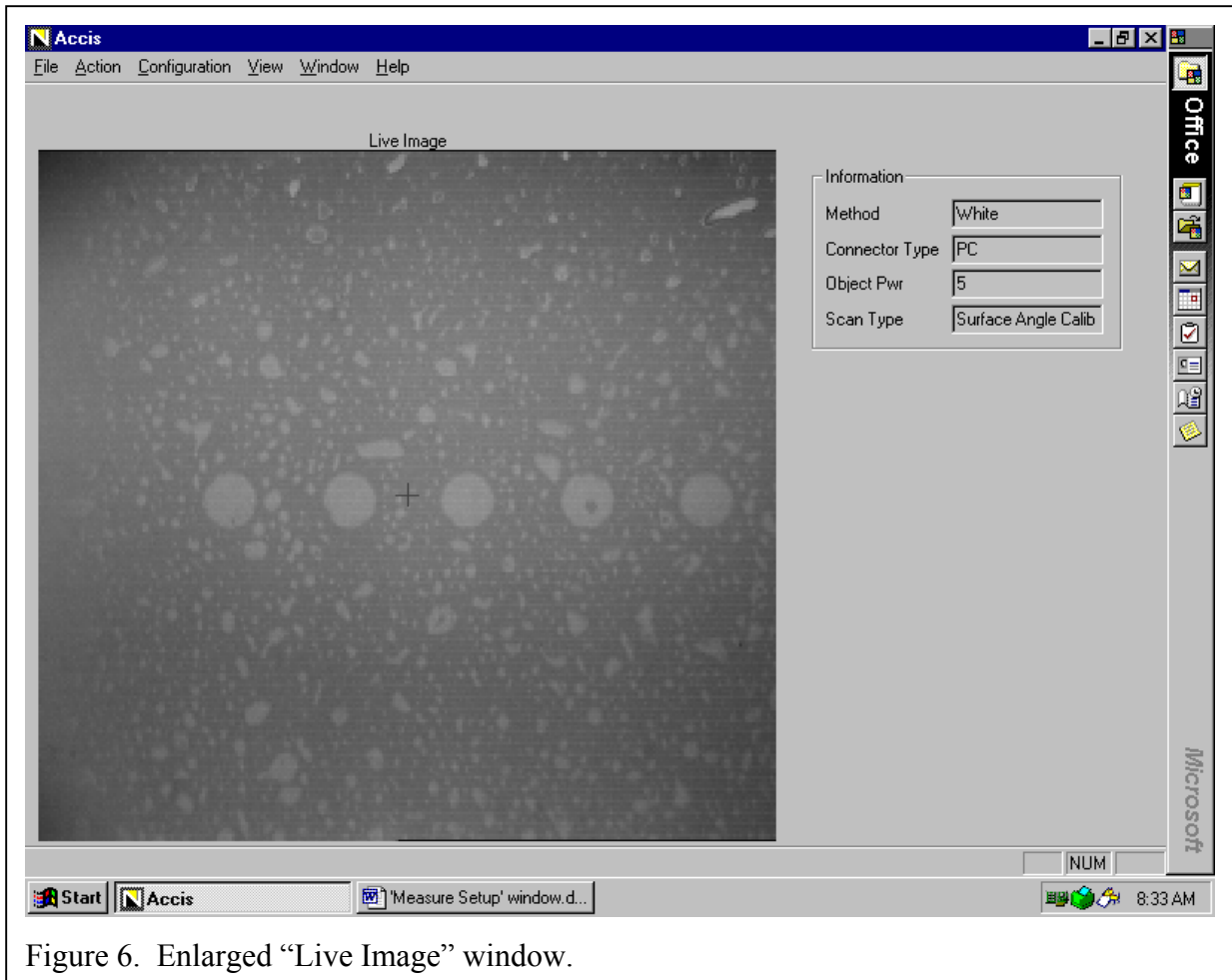
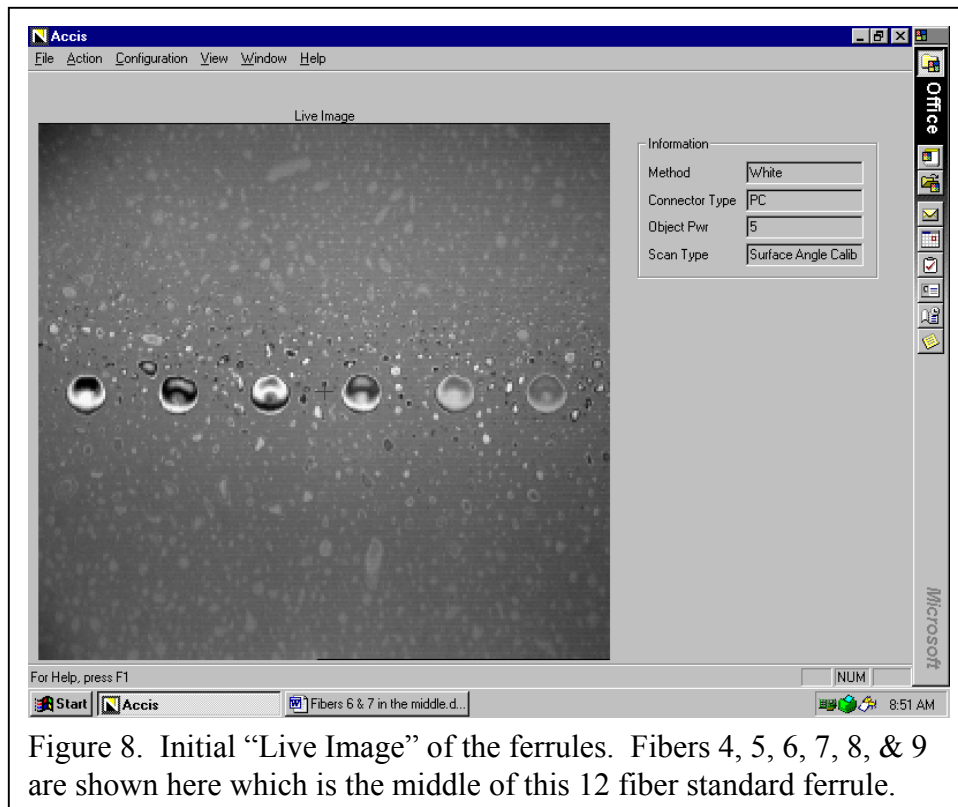
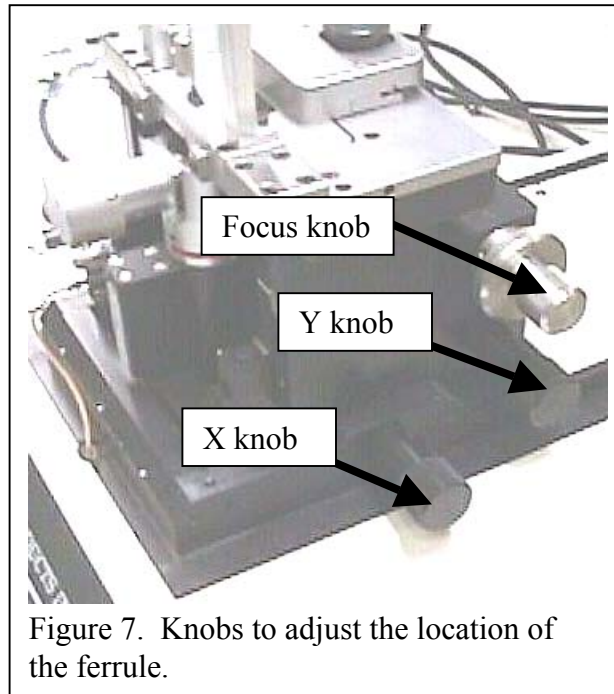


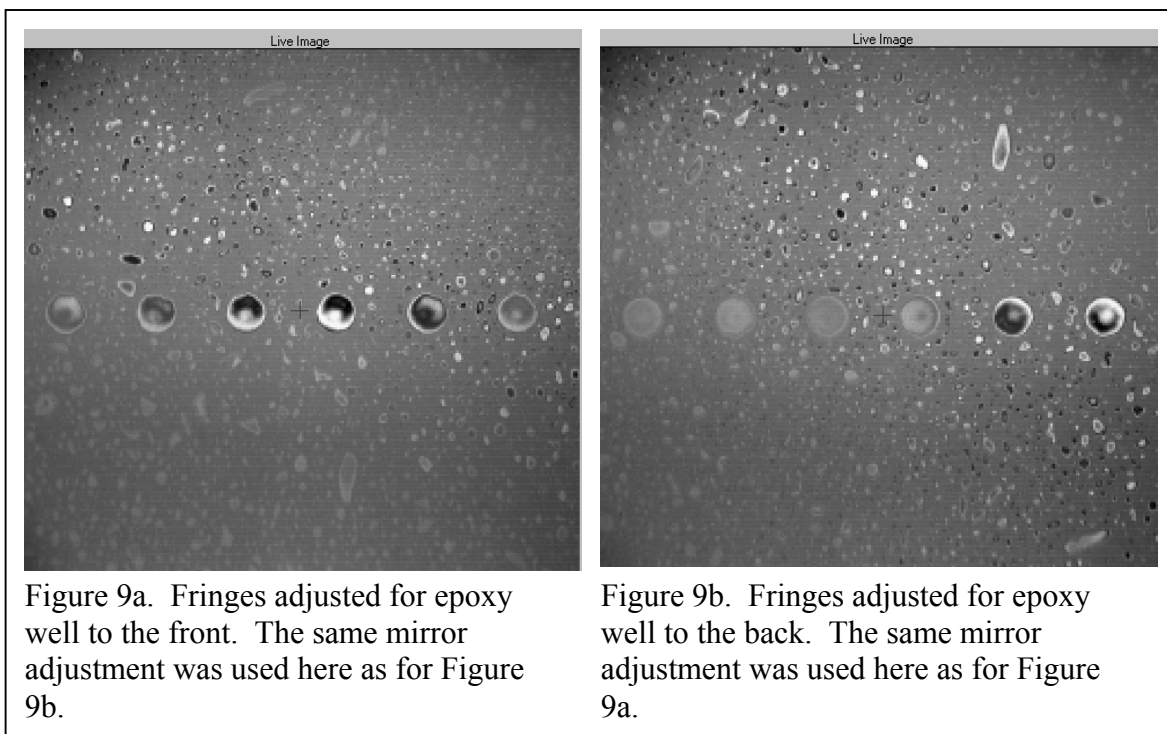
Figure 6. Enlarged “Live Image” window.

8. Move the ferrule. There are three knobs on the side of the interferometer, named X, Y, and Focus. See Figure 7. Use the X & Y knobs so that the middle of the ferrule is in the middle of the view. For a 12 fiber ferrule an equal number of fibers will be to the left of center and to the right of center. Adjust the three knobs so that the “Live Image” window of the ferrule looks like Figure 8.



9. Adjusting the mirror screws. With a delicate touch and a very fine motion, adjust the 2 mirror screws. See Figure 1. Use one screw at a time. The fringe patterns should cover between 30 and 50% of the Live Image window. Carefully remove the standard ferrule, rotate it 180° so that the epoxy window faces the rear of the interferometer, and re-insert the standard ferrule using Step 4 above. Adjust the Focus Knob so that the fringes are in the center of the Live Image window.

The goal is to have the fringe pattern cover about 30 and 50% of the Live Image window for both rotations of the standard ferrule. The direction of the fringes need not point in the same direction or 90° to each other. Carefully adjust the mirror screws until this condition happens. See Figures 9a and 9b for an example. These adjustments will take several 180° rotations of the standard ferrule and subsequent mirror adjustments.



10. Get ready to measure. Press the function key “F12” on the keyboard. The Live Image window becomes smaller. Rotate the standard ferrule so its epoxy well is facing the front of the interferometer. Adjust the Focusing Knob so that the fringes are in the middle of the Live Image window. See Figure 9a.

On the Menu Bar press “Configuration” and “Option”. In the “General” tab enter the “Group Name”, MMDDA for month, day, and “A” (for the first file of the day). For

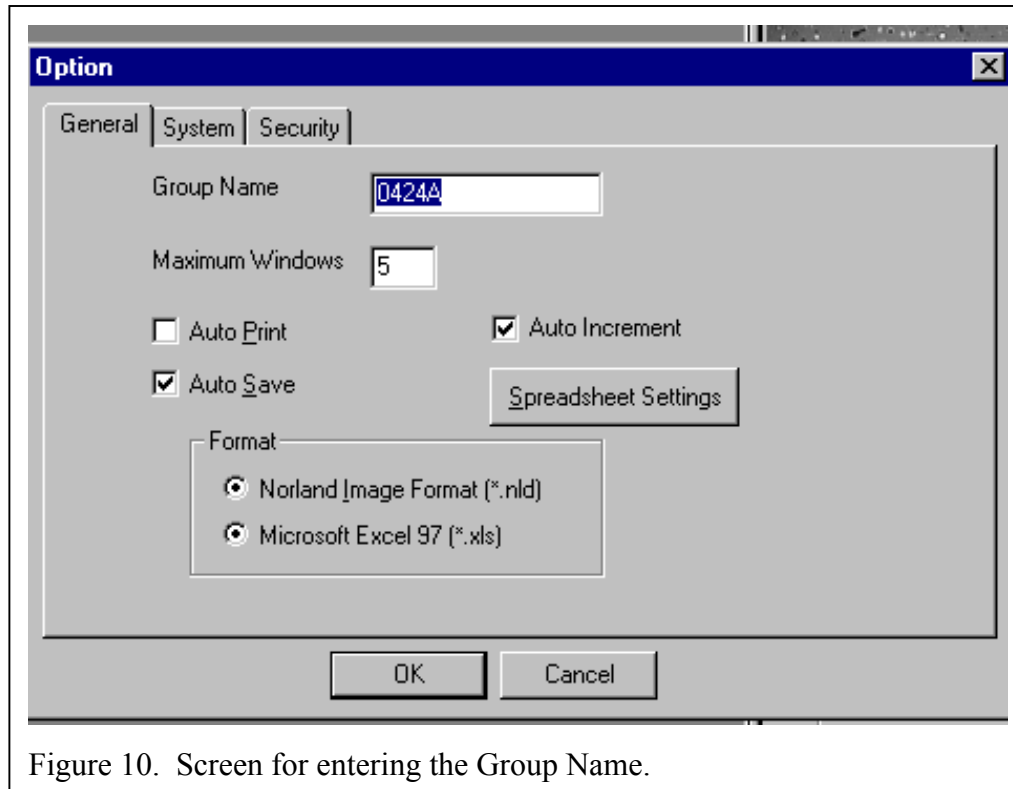


Figure 10. Screen for entering the Group Name.

example, if the calibration occurred on April 24, 2001, enter “0424A”. See Figure 10.

11. Measure. Press “F12 Measure” at the top of the screen. Adjust the X Knob so that the left 5 fiber holes are centered in the 5 template circles. See Figure 11. Adjust the fringes to the center of the Live Image window, using the Focus Knob. See Figure 9a. Press “OK” in the “accis” window.

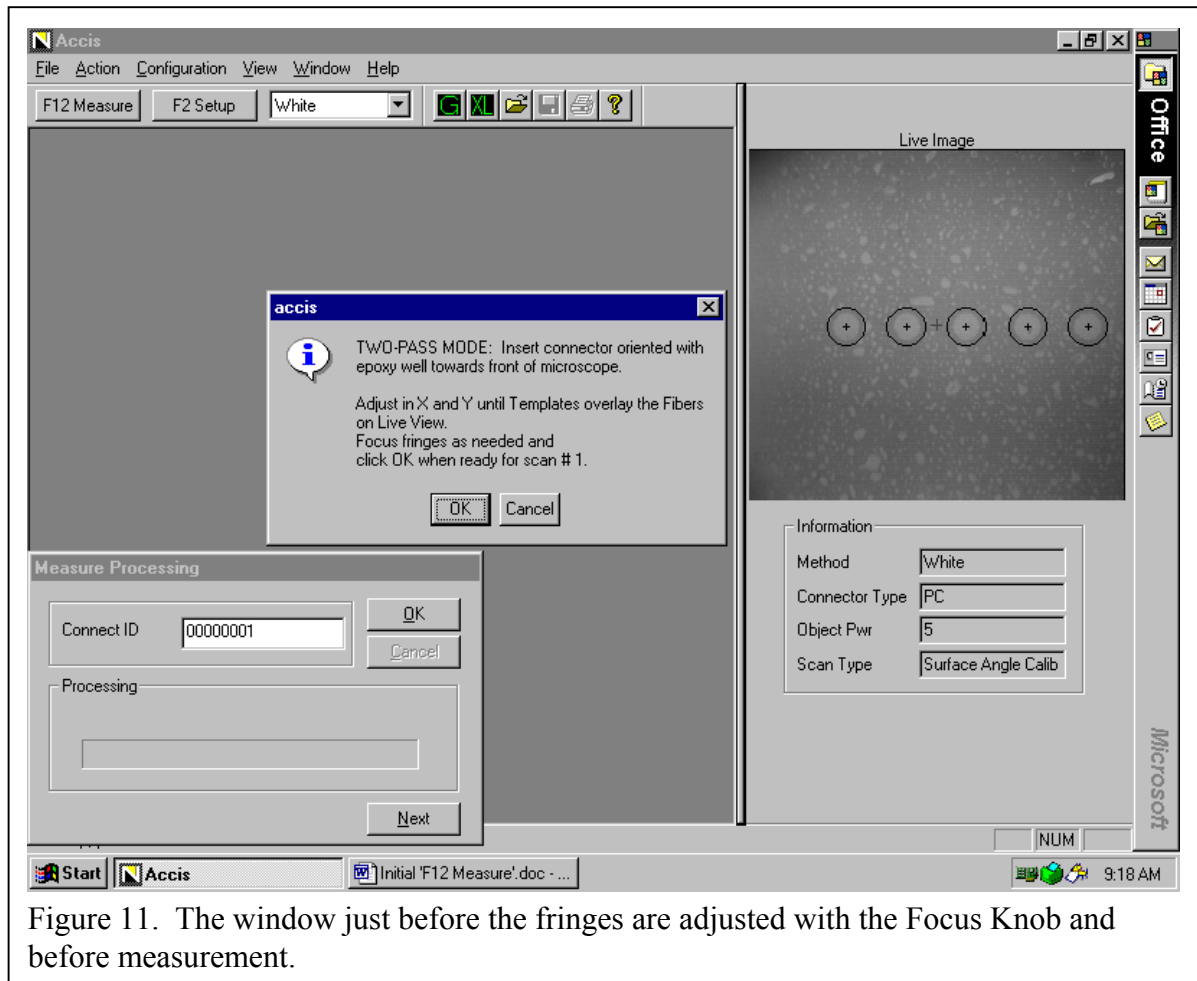


Figure 11. The window just before the fringes are adjusted with the Focus Knob and before measurement.



12. During the scan. During the scan carefully, without any table vibration, enter the file name in the “Measure Processing” window, e.g., “0424aSurfCal” (date, run ID, & type of run). At the completion of this scan the message shown in Figure 12 will be displayed. Remove, rotate, carefully re-insert the standard ferrule, and re-seat it. See Step 4 above. Adjust the location of the fiber holes using the X & Y Knobs. Adjust the location of the fringes using the Focusing Knob. See Step 8 above. Press “OK” in the “accis” window.

Occasionally the following message may be displayed in the “accis” window: “Problem applying Autofocus. Please adjust focus to bring fringes back into view. Then click RETRY to perform Autofocus again, or click CANCEL to skip Autofocus and proceed to scanning.” When this occurs use the Focus Knob to bring the fringes back to the middle of the Live Image window and press “Retry” in this “accis” window.

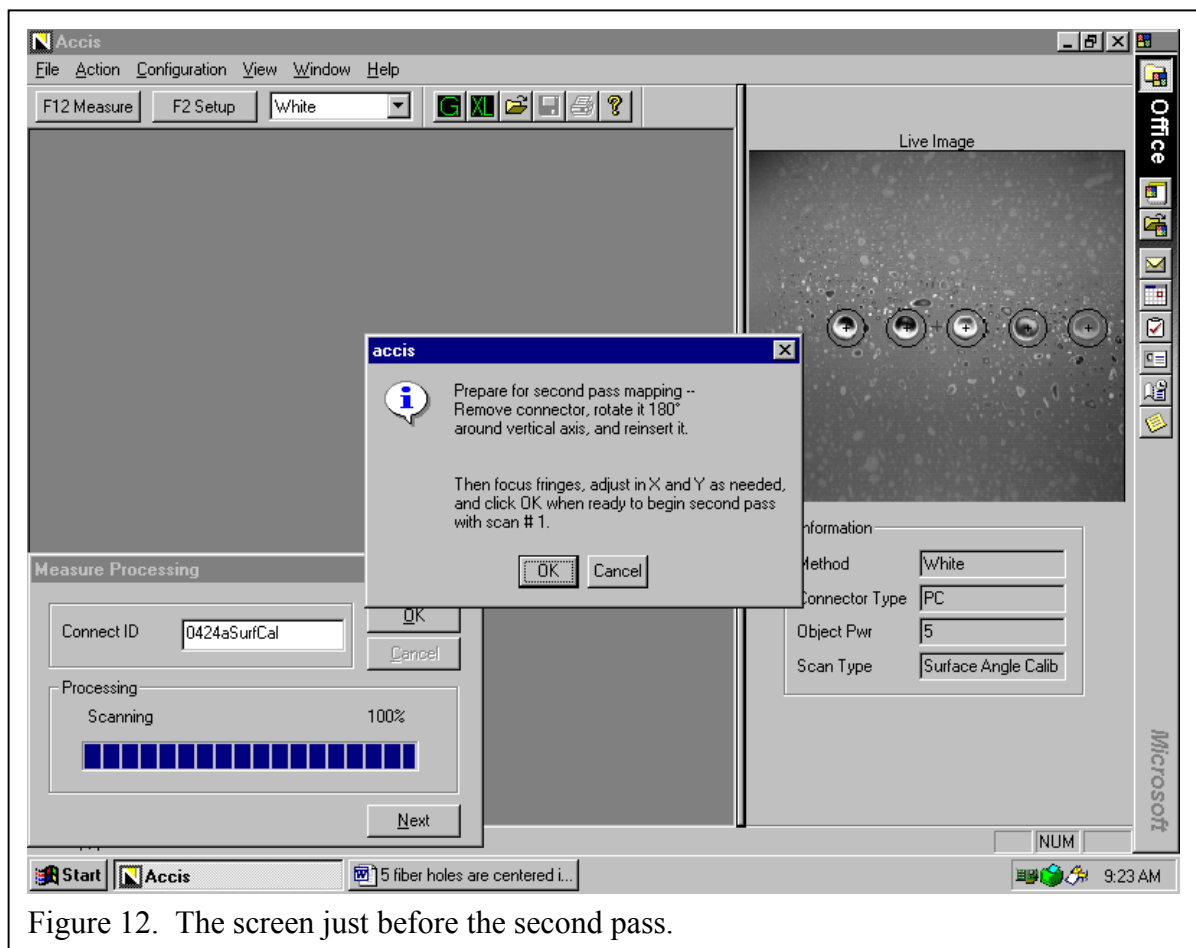


Figure 12. The screen just before the second pass.

13. Results. At the conclusion of this second run the message shown in Figure 13 will be displayed. Write down the values of the X & Y Angle Correction Factors. For example, X Angle Correction Factor = -0.010 and Y Angle Correction Factor = -0.061. Press “OK” in the “accis” window. In the next “accis” window press “Yes” to the question “Do you want to save the result?”

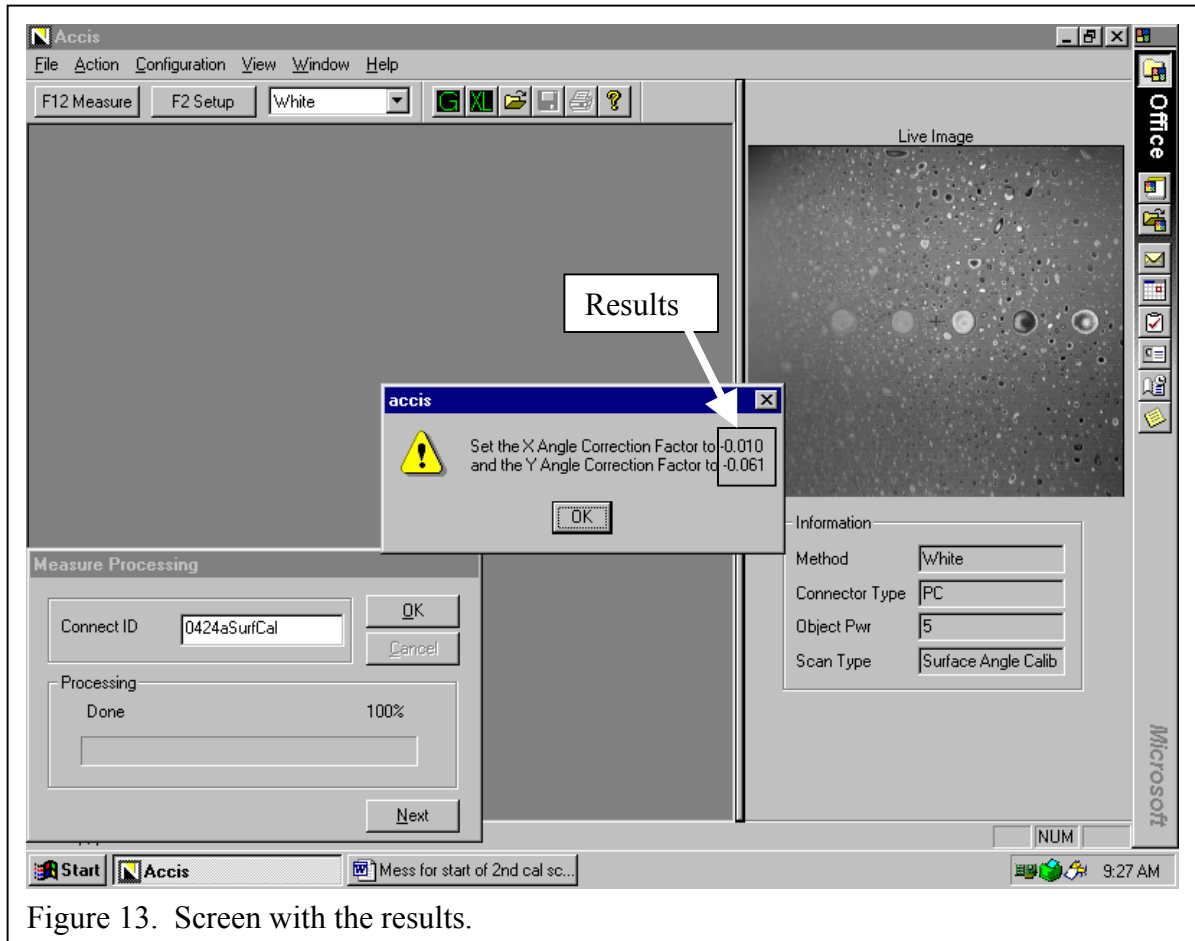


Figure 13. Screen with the results.

14. Enter the results. On the Menu Bar press “File” and “Close”. Press “Action” and “Autocal”. A screen like Figure 14 is displayed. In the “Calibrate” window, enter the values for the Surface Angle Correction Factors that were just determined. See Step 13. For example, enter X Angle Correction Factor = -0.010 and Y Angle Correction Factor = -0.061 over the previous values of -0.178 and 0.079, shown in Figure 14. Press “OK”.

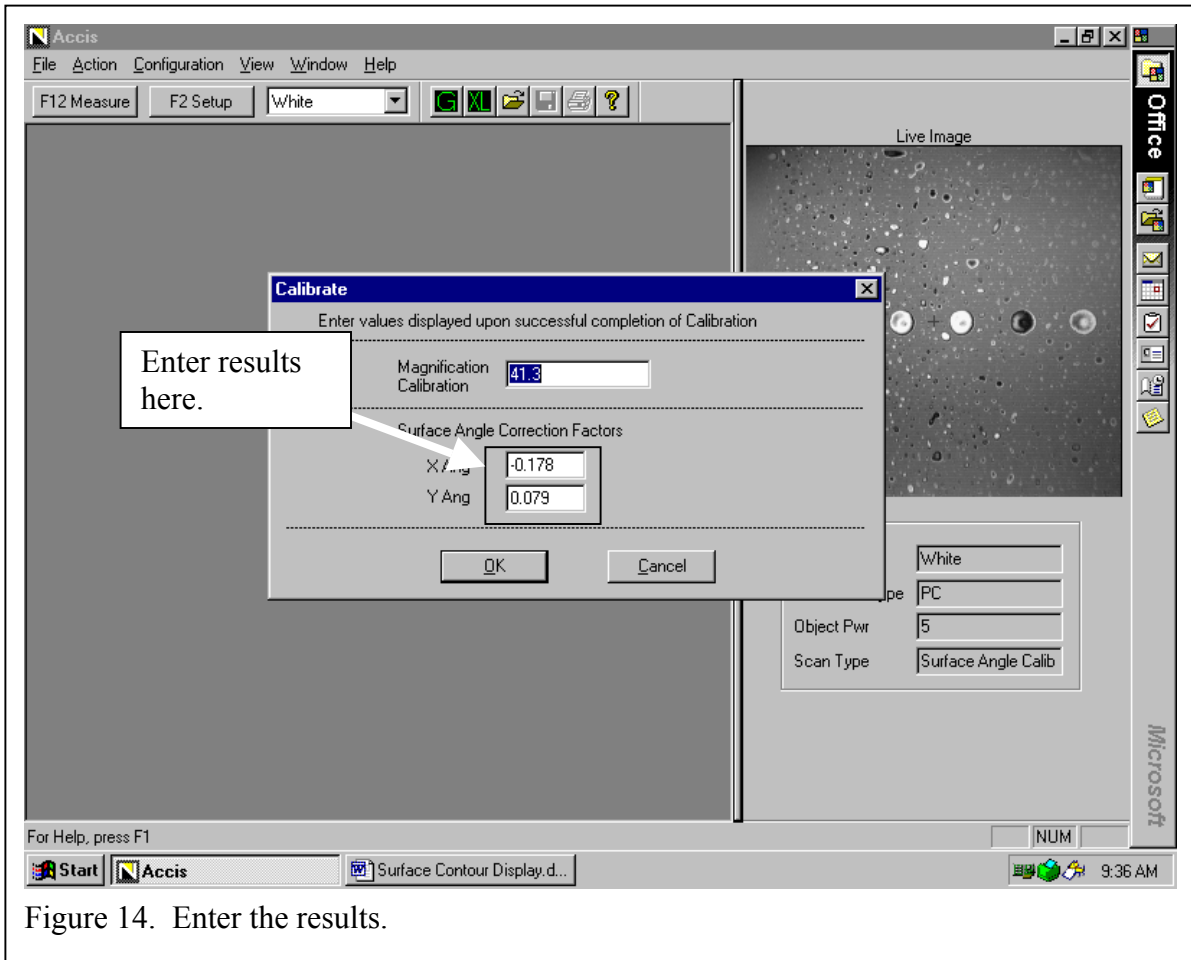


Figure 14. Enter the results.

15. Finished. The interferometer is now calibrated for surface angle with this ferrule mount and this mirror adjustment. Do **NOT** adjust the mirror adjustment screws or ferrule mount until the next calibration procedure is to be done.

Remove the standard ferrule, cap it, and replace it in its box and properly store it.

16. Return to set up menu and chose “Normal” scan type. Uncheck the box labeled “Two-Pass” at bottom of screen.

17. Select checkbox labeled “Use angle correction factor” in lower right hand corner. The system is now set up to run single scan measurements with the angle correction factor.