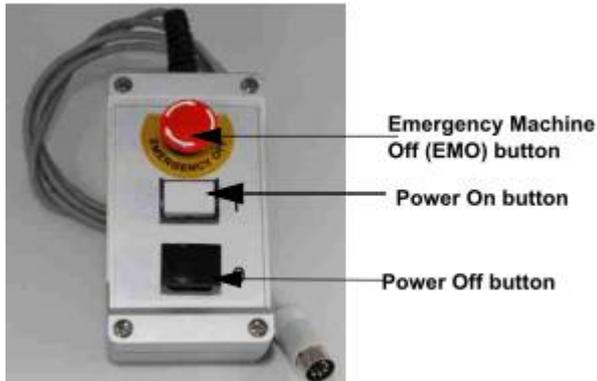


DektakXT Profilometer

Standard Operating Procedure

1. System startup and sample loading:

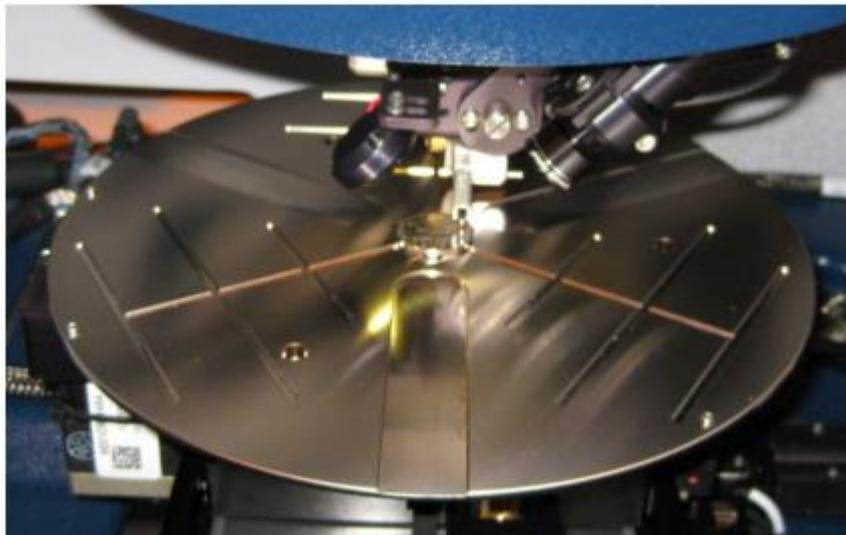
- a. Ensure system is powered on by looking at the controller to the left of the computer. **(It is an online software, hence the hardware part needs to be turned on to use the software)**



- b. Start the Vision 64 software.
- c. Give approx. 20 min time to warm up the system.



- d. Click Unload Sample. The stage will move to the front.
- e. Open the hood and place sample on the stage.



- f. Click Load Sample. The stage will move under the head.

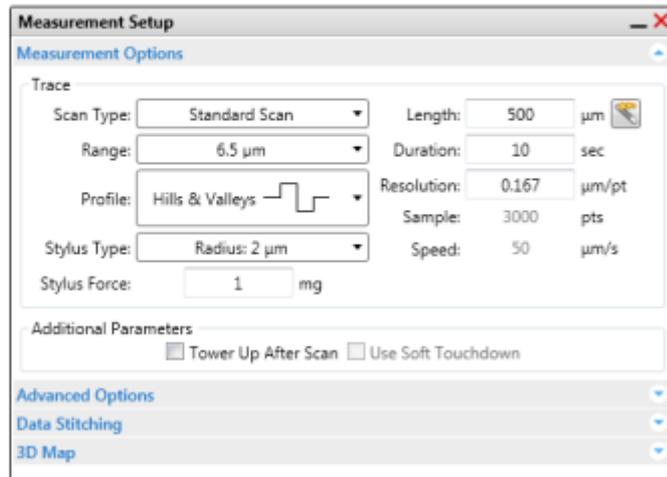




- g. Make sure the sample is under the stylus, then press Tower Down and the stylus will be lowered onto the substrate

2. Taking a scan:

- a. Using the X-Y Stage Control and Theta Stage Control panels, move the sample to the start point of the desired scan. The system will scan upwards across the sample.



- b. Enter the scan parameters in the Measurement Setup window, including Range, Length, Duration, Force, and a 2.0 μm tip diameter.



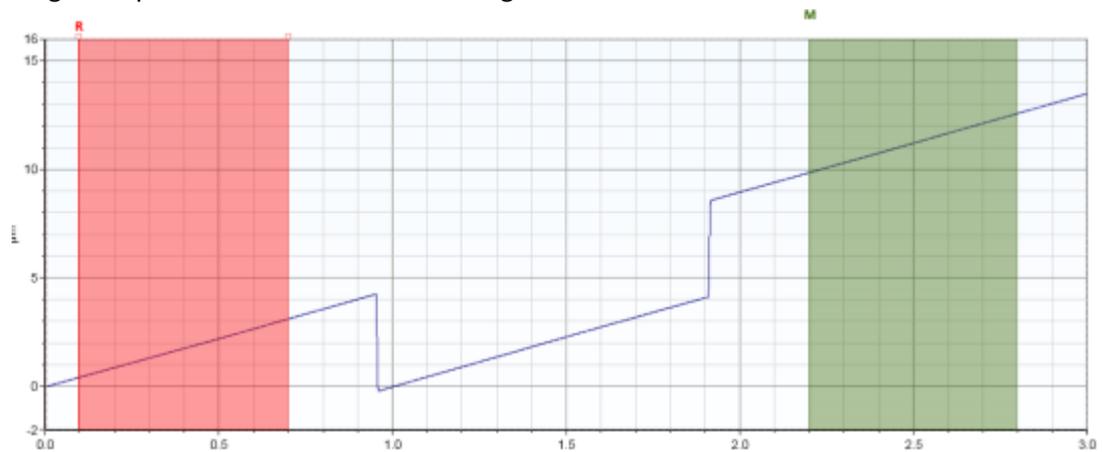
- c. Press Measurement at the top of the software window to start the scan.
- d. After the measurement the Data Analysis window is displayed.
- e. It is always advisable to do a manual levelling of the wafer tilt itself for more accurate results. For this do the step (f).
- f. Turn off the automatic levelling option before manual levelling. Take a scan on the wafer. If the tilt is upward, do anticlockwise rotation of the levelling knob



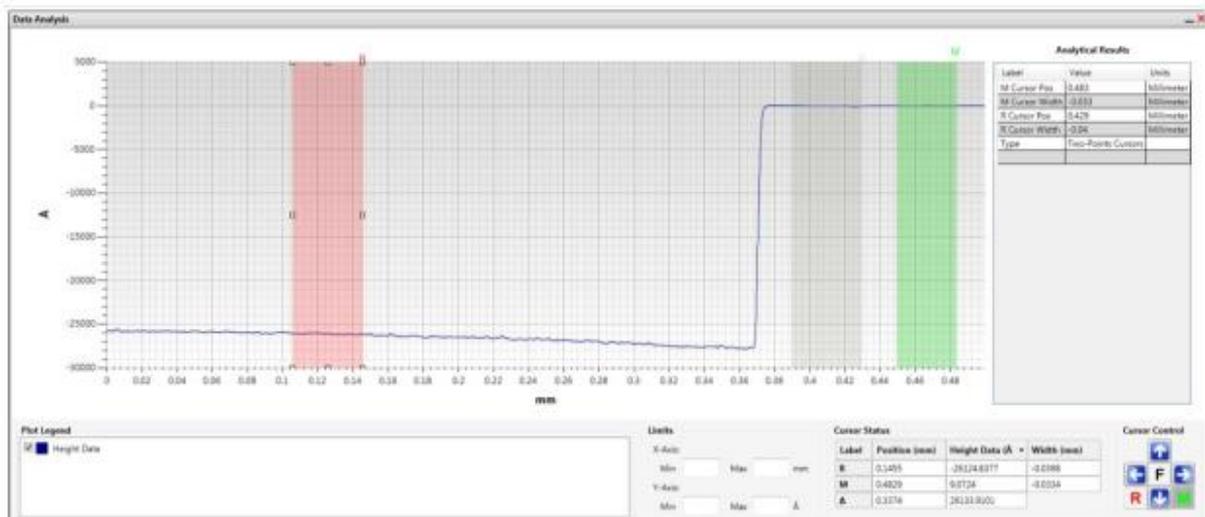
and clockwise rotation for downward tilt.

3. Data analysis:

- a. Move the reference (R) and measurement (M) cursors to two areas of the scan at the same height. Expand the cursors to cover a larger area



- b. Right-click on the plot and select Two-Point Linear Fit.
- c. Move the R cursor to a baseline location and the M cursor to a step height to acquire the desired measurements



- d. Right-click on the Analytical Pane and select Append. There are several analytical options to choose from.

4. Data saving and export:



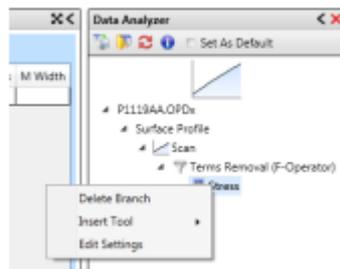
- a. The Save button allows one to save their file as a .opdx file.
- b. The data can be exported by right-clicking on the plot and selecting Export.

5. Other features:

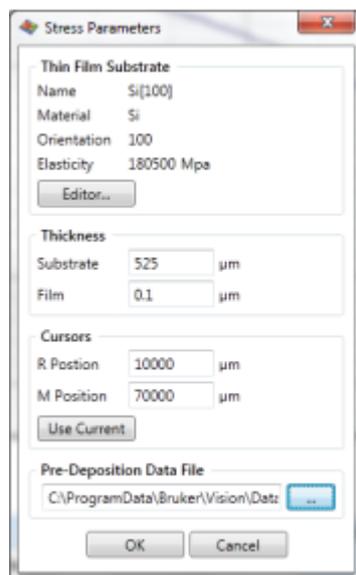
5.1 Stress Analysis:

- a. Load the pre-deposition sample as described in section 1.

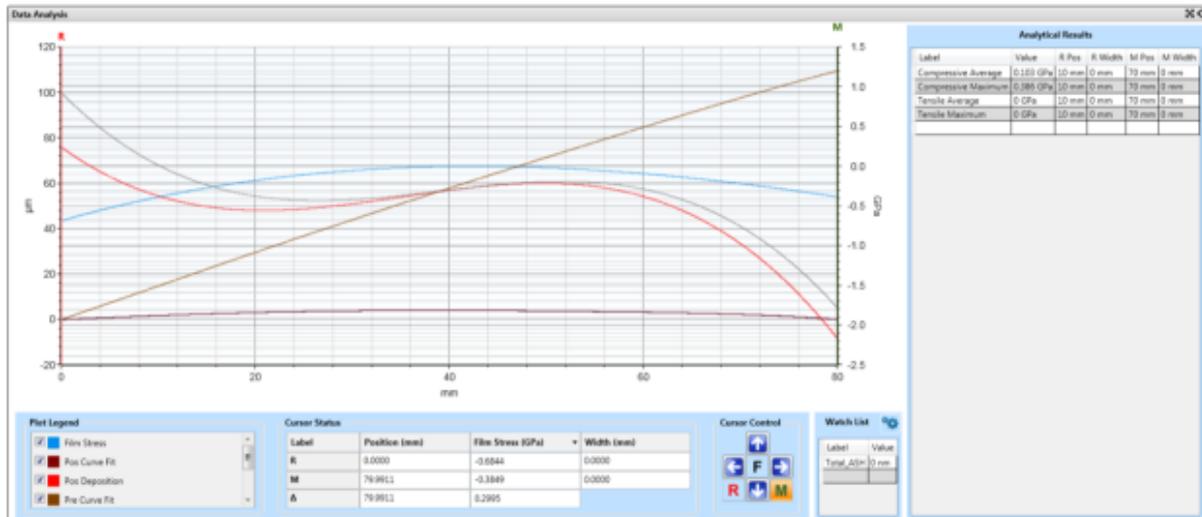
- b. If 8" substrate is used then ensure that the steel balls are inserted in the proper slots on the stage. The wafer and wafer flat must be aligned against the three pins on the stage.
- c. Set-up a scan recipe as described in section 2 to scan across >80 % of the sample. Save the recipe or write down the settings in a notebook.
- d. Run the scan and save the pre-deposition scan file. There is no need to level the scan.
- e. Deposit the film on the wafer.
- f. Load the post-deposition sample on the stage in exactly the same orientation as the pre-deposition sample.
- g. Use the same scan recipe as the pre-deposition sample and scan the wafer.
- h. Save the post-deposition scan file. There is no need to level the scan.
- i. In the data-analysis screen, open the post-deposition scan file.
- j. In Analysis Toolbox, select Stress to add the branch to the Data Analyzer.
- k. In the Data Analyzer, right-click on Stress and select Edit Settings.



- l. Select the correct substrate and input the correct thicknesses information. Input the R and M cursor positions in micrometers. Select the pre-deposition scan file. Press OK.



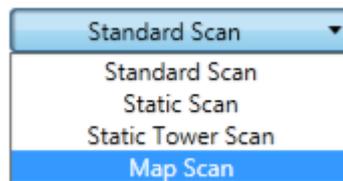
- m. The plot and data summary are displayed.



- n. The data table can be exported by right-clicking on the table and selecting Export Analytical Results.

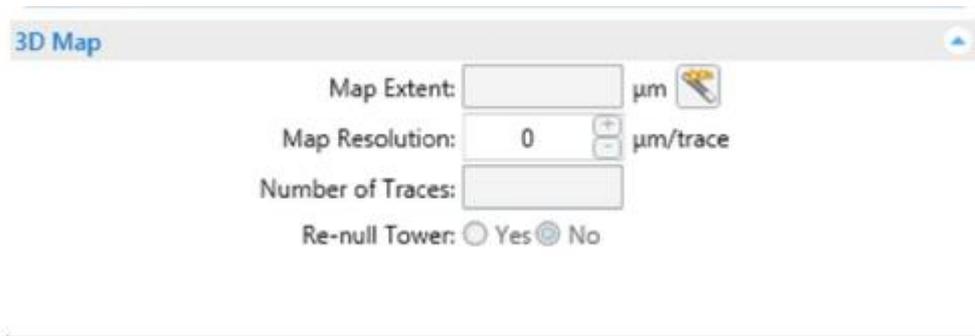
5.2. 3D Mapping option:

- Open the front door of the enclosure. Place the sample in the center of the stage with the scan start site under the stylus. Close the door to the enclosure
- Use the auto stage controls to fine-position the area of interest in the center of the Live Video Display.
- Slowly lower the tower assembly to bring the area of interest into focus. To do this, click the **Tower Down** button on the toolbar
- If necessary, adjust the illumination level of the video image. To do this, use the slider on the Illumination Bar at the bottom of the right pane of the Live Video Display.
- On the **Measurement Options** tab of the **Measurement Setup** dialog box, select **Map Scan** as the **Scan Type**.

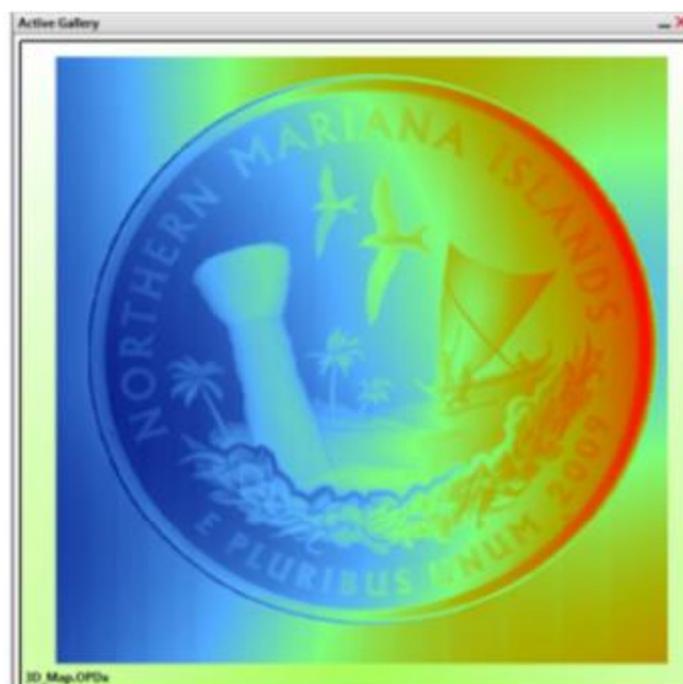


- Select your other options on the **Measurement Options** tab of the **Measurement Setup** dialog box. For definitions of the parameters in the **Measurement Options** dialog box, see [Setting the Measurement Options](#).
- Make your settings on the **3D Map** tab of the Measurement Setup dialog box.
- Click the **Reset Dektak** button to initialize the stage.

- i) Enter your parameters on the **3D Map** tab of the **Measurement Setup** dialog box. If desired, click the **Teach** button and follow the on-screen instructions to drive the stage to the appropriate positions.



- j) If you want to log the statistics and analytical results to a database, open an existing database or set up a new one. Most of the time you will use the database that you have designated as the default in your Analyzer recipe. This default database automatically opens. However, you must select **Logging Enabled** on the Analyze tab to activate the logging process.
- k) Initiate the scan measurement by clicking the **Measurement** button on the Ribbon and then selecting **Measurement** (which can include a loop count) or **Single Acquisition**. The events that now occur are described in What Happens During a Scan Measurement.
- l) At the end of the measurement, an end-measurement message appears. Click **OK** to open your selected graphical output plot—by default, the 2D contour plot



To shut down the DektakXT system:

- 1 Close the Vison64 software.
- 2 Press the black OFF button on the EMO Box. This shuts off power to all system devices but the computer, monitor, power supply adapter, and 24 VDC control circuit in the EMO Box.
- 3 Select Start > Shut Down from the Windows 7 Start menu, and then click Shut Down in the dialog box that appears.
- 4 Turn off the monitor.
- 5 Make entry in the log book.

Please keep in mind the following points while using the system:

- Do not open multiple windows at a time.
- If the system is not in use for 8-9 hrs. giving 20 min. warm up time is mandatory.
- For smaller samples please check if the stylus is coming on the sample surface while lowering down.
- During manual levelling do not rotate the knob much. Take a scan, check and rotate a little bit to get the proper alignment. Do it again if not aligned.