VEECO DEKTAK 8M PROFILOMETER SOP

Revised April 2020

POWER UP

1. Log into the tool in your FOM account.

2. If system is not already on, turn **ON** the Dektak 8 by flipping the power switch located on the rear panel of the E-box connected to the profiler cover. See Fig. 1.

Fig 1. Power switch located on the rear panel of the E-box

3. Turn the monitor **ON** by depressing the power button located on the front of the monitor in the lower middle.

4. Turn the computer **ON** by pressing the power switch located on the front of the computer.

5. Double click on the Dektak32 icon on the desktop or **SELECT START>ALL PROGRAMS> DEKTAK32>** Dektak32 from the Windows toolbar.

6. The Dektak 8 sample stage will initialize and the Start Screen Window will display.

7. Go to **FILE/NEW** to start a new scan.

SAMPLE LOADING

1. To load sample, move stage to the load/unload position by clicking the unload command button in the stage control panel on the right side of the screen.

2. Open guard panel door.

3. Load wafer onto stage, centering wafer on the vacuum stage, then turn on the vacuum via the toggle switch on left of Dektak 8 chassis.

4. Once wafer is mounted, click **"YES"** in the Load Sample dialog box (Fig. 2) to return stage to home position. The stage has finalized homing protocol when the output text in the lower left hand corner displays **"READY"**.

Fig 2. Stage return dialog box

5. Close guard panel door.

6. Press the **"TOWER DOWN TO NULL POSITION STYLUS UP"** icon. This traverses stylus to substrate surface, then releases stylus for additional positioning (without damaging stylus).

    NOTE: Be aware of sample position with respect to stylus tip before lowering.

STANDARD SINGLE SCAN SEQUENCE

1. Click on the scan routines window icon.

    a. Adjust scan parameters by clicking any link (Fig. 3) to open scan parameters dialog box (Fig .4).

Fig 3. Scan parameters window

    b. Scan parameters, see Fig. 4:

    ID - Filename desired

    Stylus Type - 12.5 um radius tip (for note purposes only, does not affect scan)

    Scan Duration - Time required completing scan from beginning to end

        NOTE: The longer the scan duration, the more data points recorded and more time required for scan.

    Scan Type - Standard Scan

    Stylus Force - Force applied to substrate by stylus input range (0.7 to 15 mg)

        NOTE: For soft materials (i.e. photoresist, polymers, soft metals, gold) use low force such as 1 to 2 mg

        NOTE: For hard materials (i.e. chrome, nickel, silicon, glass) use higher force such as 10 to 15 mg

    Measurement Range - Four step ranges, 1 mm, 2620 kA (286.6 um), 655 kA (65.5 um), 65 kA (6.5 um)

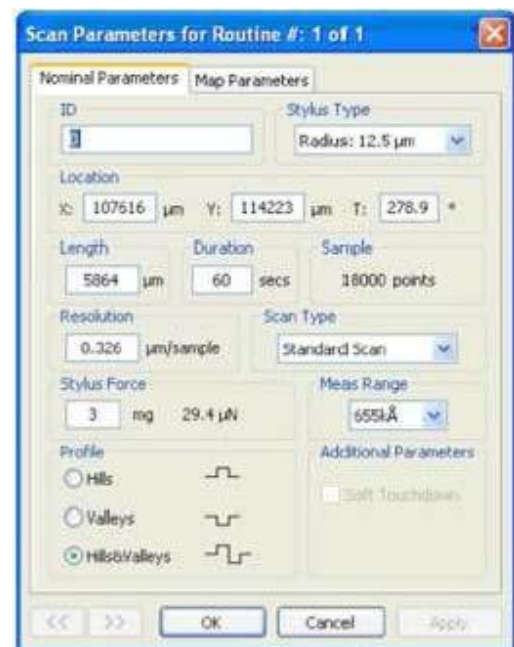   Profile - Hills, Valleys, or Hills & Valleys, depending on feature geometry

Fig 4. Scan parameters dialog box

    c. Click **OK**.

2. Return to the Sample Positioning Window by clicking the Sample Positioning Window icon.

3. Move to desired start position on sample by either:

    a. Left clicking in view window and moving the stage with the mouse

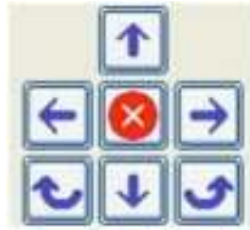   b. Using the positioning arrows (Fig 5) in the stage control panel.

Fig 5. Positioning arrows

4. Go to **EDIT/DEFINE SCAN LOCATION**, to input your start scan position. Click **ENTER** and close.

5. Go to **EDIT/DEFINE SCAN LENGTH**

    a. Using the mouse move to the desired endpoint of scan, keep in mind that the motion of this move is unidirectional (i.e. left/right motion in the viewing window)

    b. Left click mouse to define endpoint

    c. Click **ENTER** and close.

6. Run the programmed Standard Scan.

3D MAP SCAN SEQUENCE

1. Click on scan routines window icon.

    a. Adjust scan parameters by clicking any link (Fig. 6) to open scan parameters dialog box (Fig.7)

Scan Parameters	
Scan Type:	Standard Scan
Scan ID:	0
Location:	107616 µm, 114223 µm, 278.9°
Scan Length:	5864 µm
Scan Duration:	60 sec
Scan Resolution:	0.326 um/sample
Meas Range:	655kÅ
Stylus Force:	3 mg
Profile:	
Stylus Type:	Radius: 12.5 µm

Fig 6. Scan parameters window

b. Scan parameters:

ID Filename

Stylus Type - 12.5 um radius tip (for note purposes only, does not affect scan)

Scan Duration - Time required completing scan from beginning to end

Scan Type - Map Scan

Stylus Force - Force applied to substrate by stylus input range (0.7 to 15 mg)

> **NOTE:** For soft materials (i.e. photoresist, polymers, soft metals, gold) use low force such as 1 to 2 mg.

> **NOTE:** For hard materials (i.e. chrome, nickel, silicon, glass) use higher force such as 10 to 15 mg.

Measurement Range - Four step ranges, 1 mm, 2620 kA (286.6 um), 655 kA (65.5 um), 65 kA (6.5 um)

Profile - Hills, Valleys, or Hills & Valleys, depending on feature geometry
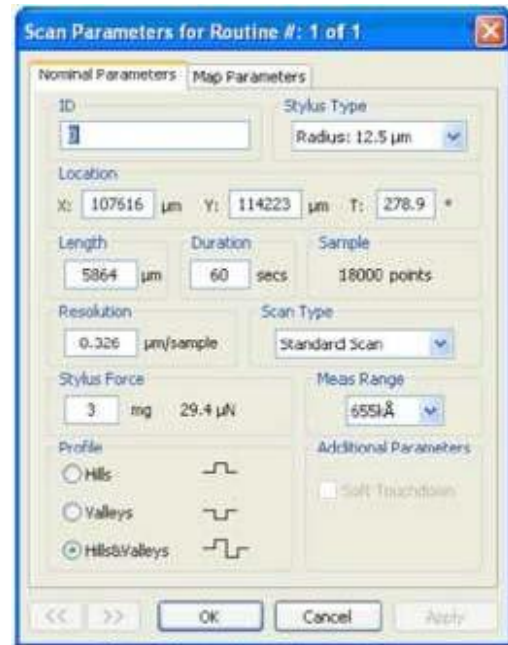

Fig 7. Scan parameters dialog box

c. Click **OK.**

2. Return to the Sample Positioning Window by clicking the Sample Positioning Window icon.

3. Move to desired start position on sample by either:

a. Left clicking in view window and moving the stage with the mouse.

b. Using the positioning arrows (Fig 8) in the stage control panel.

Fig 8. Positioning arrows

4. Go to **EDIT/DEFINE MAP AREA**

a. Move to the desired X direction endpoint (Left/Right unidirectional motion in view window).

b. Left click in view window to define point.

c. Move to the desired Y direction endpoint (Up/Down unidirectional motion in view window).

d. Left click in view window to define point.

e. Map Parameters dialog opens (Fig 9).

5. Input:

a. Lateral parameters - # profiles, this depends on desired resolution and feature size (min. resolution = 1 um).

b. Choose desired image resolution.

c. Check Re-Null Tower under Additional Parameters.

6. Run the programmed Map Scan.

7. To analyze map scan:

a. Minimize Dektak32 window.

b. Open Vision software by double clicking on icon on desktop.
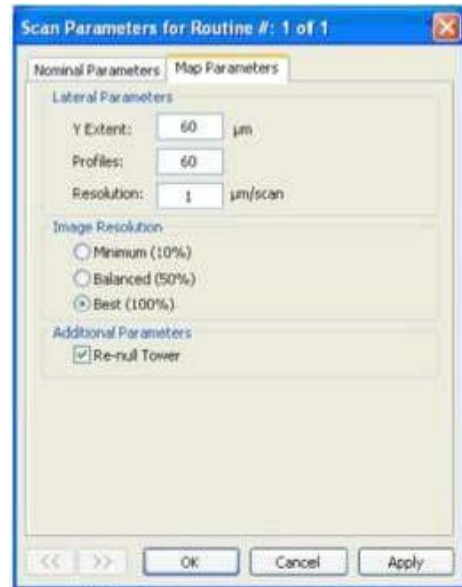
c. Go to **FILE/OPEN** stored dataset

Fig 9. Map scan parameters dialog box

SAMPLE UNLOADING

1. To unload sample, move stage to the load/unload position by clicking the unload command button in the stage control panel on the right side of the screen.

2. Open guard panel door.

3. Turn the vacuum **OFF** via toggle switch on left of Dektak 8 chassis and remove sample.

4. Close guard panel door.

5. Once sample is removed, click **"YES"** in the Load Sample dialog box to return stage to home position. The stage has finalized homing protocol when the output text in the lower left hand corner displays **"READY"**.

6. Logout from the tool in your FOM account.