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R·I·T

Title: Wyko RST Plus

Semiconductor & Microsystems
Fabrication Laboratory **Revision: A** **Rev Date: 05/23/06**

Approved by:

_____ / / _____ / /
Process Engineer Equipment Engineer

1 SCOPE

The purpose of this document is to detail the use of the Wyko RST Plus. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

2 REFERENCE DOCUMENTS

- RST Plus Operator's Guide
- Wyko Surface Profilers Technical Reference Manual

3 DEFINITIONS

n/a

4 TOOLS AND MATERIALS

4.1 General Description – The Wyko is a surface profiler that uses optical interference techniques to perform a non-contact analysis of a sample. The software is version 1.8.

4.2 Capabilities

4.2.1 PSI Mode – The PSI mode uses phase shifting interferometry, has a maximum height resolution of 1600Å between adjacent pixels and is intended for smooth surfaces. In this mode the optical path length of the test and reference beams is modified causing a shift in the fringes. The shift in fringes in monitored by a detector. This mode uses a red filter.

4.2.2 VSI Mode – The VSI mode uses vertical scanning interferometry, has a maximum height resolution of 500 µm and can be used to measure surfaces that are rough or that have a lot of surface topography. In this mode the interference fringes using white light are monitored as the focus of the system is varied. This mode is good for most measurements.

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5 SAFETY PRECAUTIONS

5.1 Hazards to the Tool

5.1.1 The Wyko is a delicate optical instrument that should be operated carefully.
5.1.2 The Wyko is very sensitive to vibration and must be still during a measurement.
5.1.3 Always make sure that there is enough space between the lens and the sample to prevent damage.

6 INSTRUCTIONS

6.1 Initial State Check

6.1.1 The system is controlled by a computer which is normally left on. If the computer is off it may be restarted under the table.
6.1.2 Turn on the camera monitor.
6.1.3 Verify the air table is working properly. If the air table is not floating, have a staff member adjust it.

6.2 Resetting the System

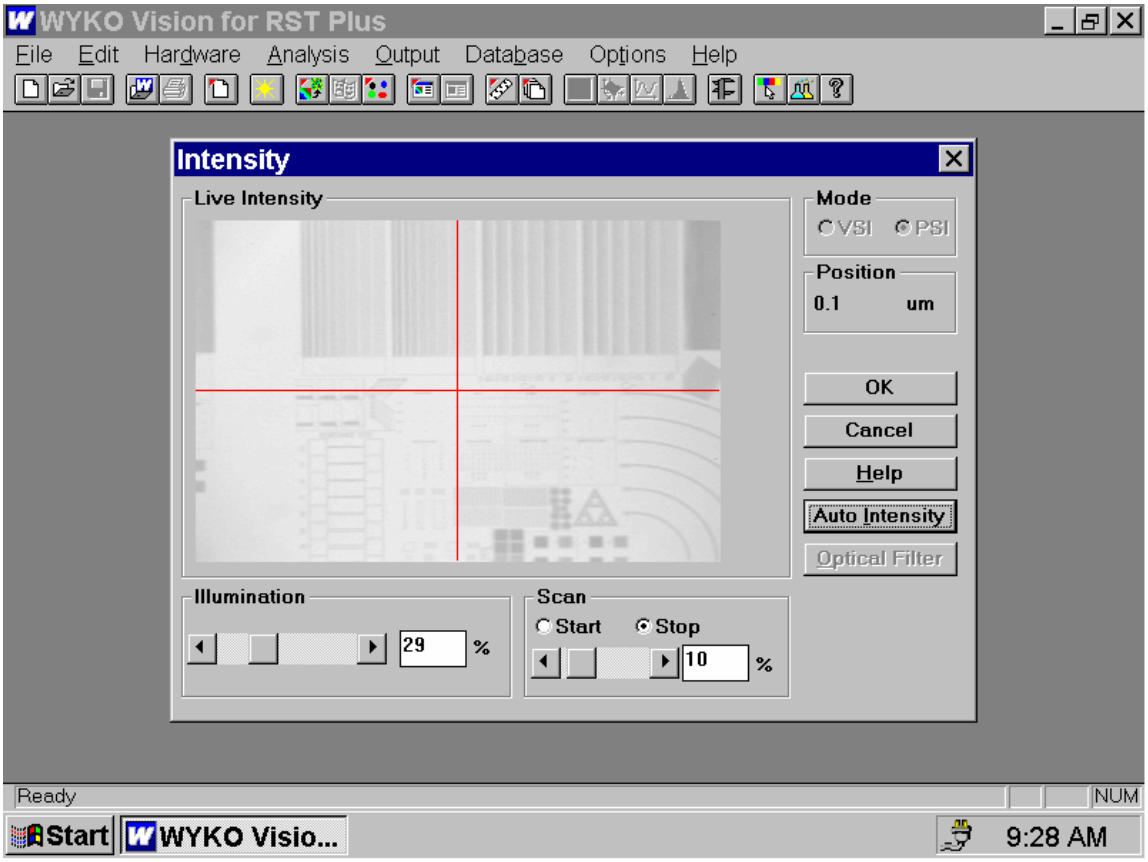
6.2.1 Occasionally the computer will lock up and need to be restarted.
6.2.2 If you ever need to stop a measurement, press the **Escape** key.

6.3 Sample Setup

6.3.1 Start the **Vision for RST Plus** software for the system.
6.3.2 Place the sample on the stage and select the proper magnification lens using care not to run into the sample.
6.3.3 There is a selector ring on the front of the Wyko that may be used to further vary the magnification.
6.3.4 Make sure the filter is in the correct position. VSI mode uses white light and PSI mode uses red light.

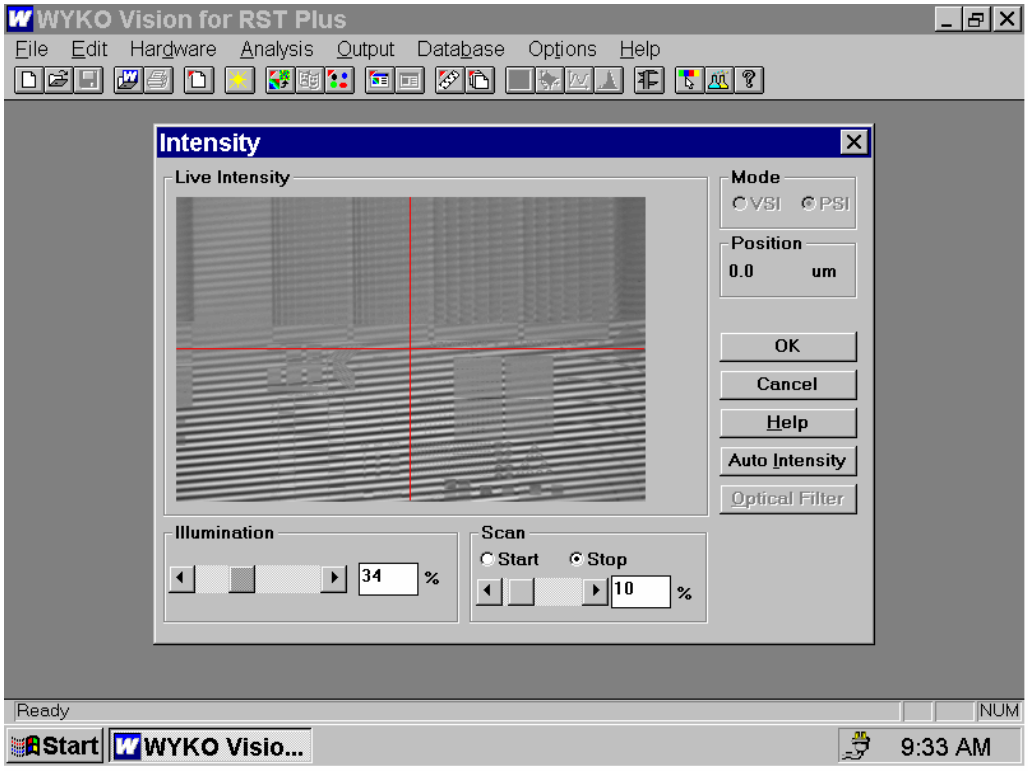
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6.3.5 The sample illumination is controlled through the software. Select **Hardware** and then **Intensity**. Adjust the illumination manually or use the **Auto Intensity** button. The image on the screen should appear bright but not red. If you see red areas, then back off the intensity some.

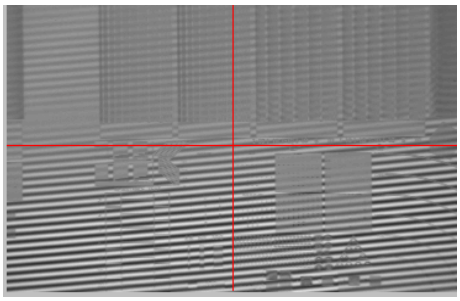
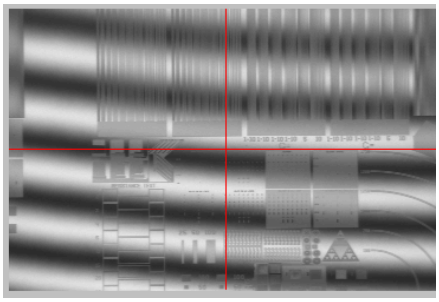
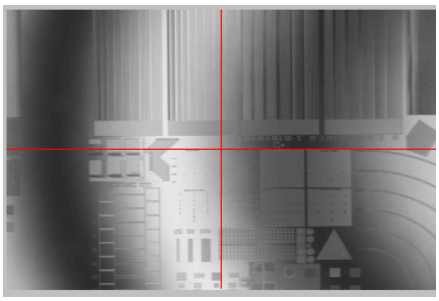


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6.3.6 Adjust the focus using care not to hit the sample which could damage the lens. The sample is in focus when the interference fringes are visible. This can be viewed on the video monitor or the intensity screen on the computer. It may be easier to find the fringes using the red filter. For course focus you may close the field and aperture stops and focus on the resulting polygon. Make sure to open them before taking a measurement.



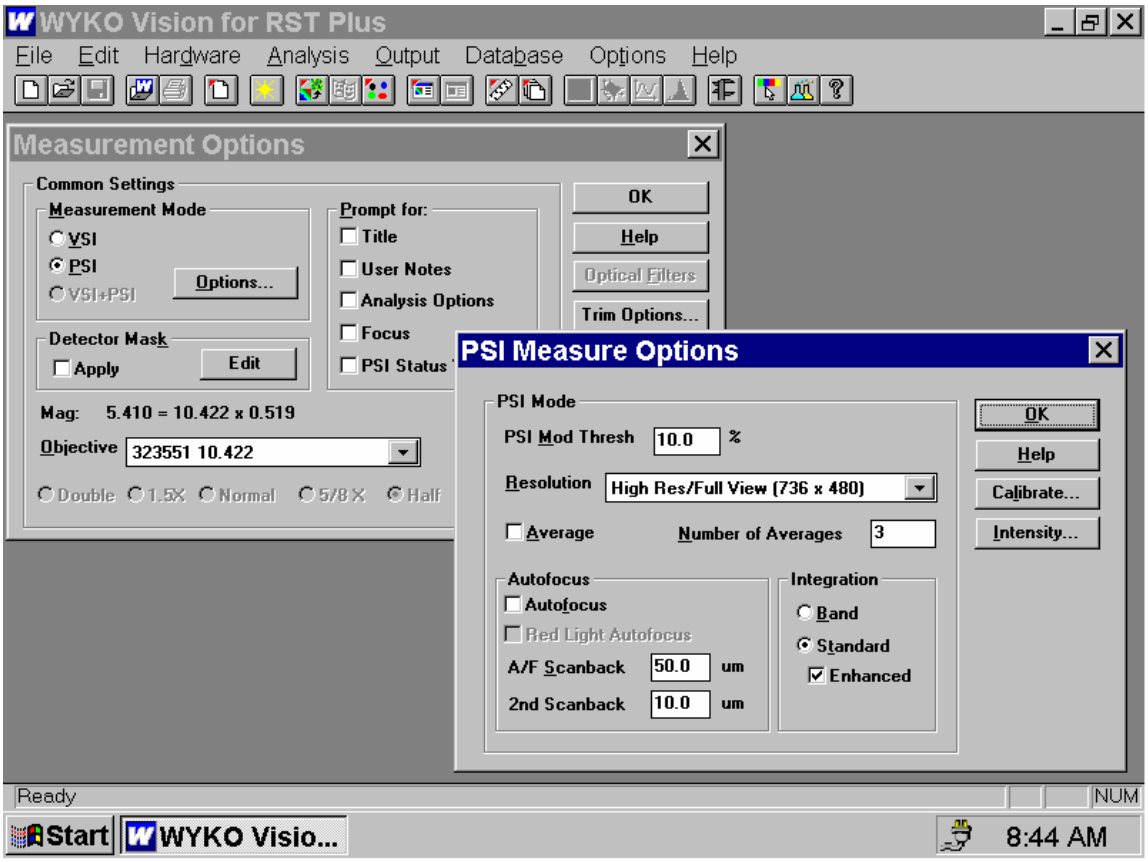
6.3.7 Adjust the tilt using the tilt knobs on the front and left side of the stage. If there is too much tilt there will be many small fringes. As the tilt is reduced, the fringes will broaden and rotate. The fringes should be as broad as possible with the darkest fringe centered. It may also be necessary to adjust the fine focus while you are adjusting the tilt. If the intensity still looks good, you can close the window by selecting **OK**. Make sure that the fringes are on the upper surface of the steps.

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6.4 Measurement setup for PSI mode

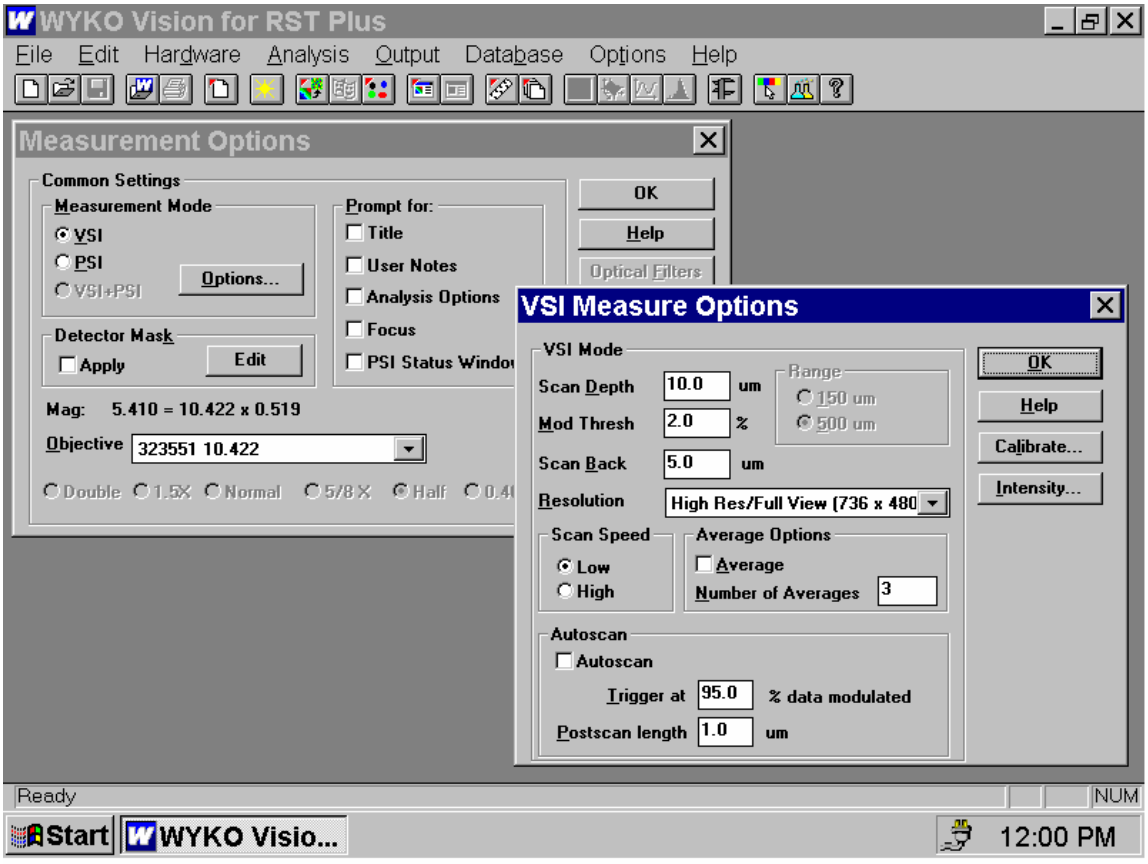
6.4.1 Verify that the red filter is in place.
6.4.2 Select **Hardware** and then **Measurement Options.**
6.4.3 Select **PSI Mode**.
6.4.4 Select **Options**.
6.4.5 Enter a **Modulation Threshold**. This is used to eliminate data that is outside an acceptable signal to noise ratio. PSI is typically 7-10%
6.4.6 Select a **Resolution** in pixels. Higher resolutions will increase the measurement time.
6.4.7 Select a data average number to calculate results. The default is 2.
6.4.8 Select an A/F Scanback and a 2nd Scanback.
6.4.9 To make a measurement select **File** and then **New Measurement**.



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6.5 Measurement setup for VSI mode

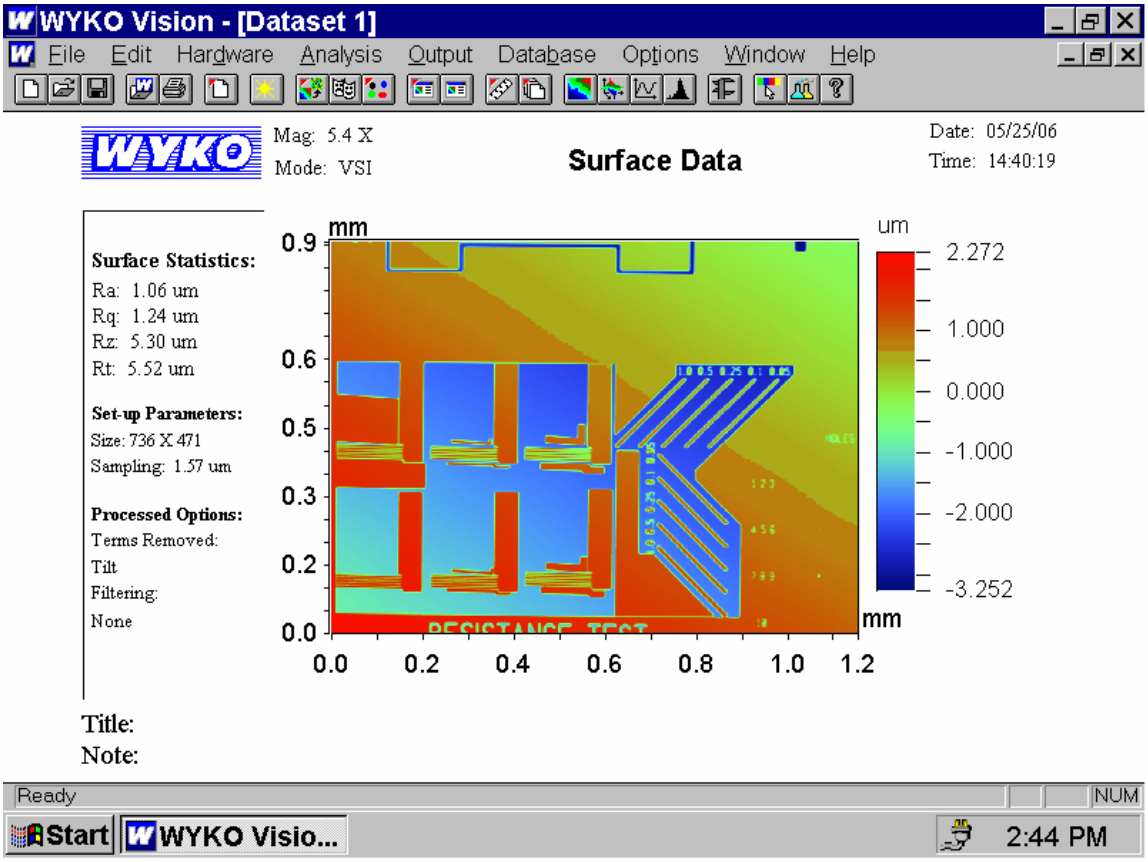
6.5.1 Verify that the filter is positioned to provide white light.
6.5.2 Select **Hardware** and then **Measurement Options.**
6.5.3 Select **VSI Mode**.
6.5.4 Select **Options**.
6.5.5 Enter a **Scan Depth**. Use an approximate peak to valley range.
6.5.6 Enter a **Modulation Threshold**. This is used to eliminate data that is outside an acceptable signal to noise ratio. VSI is typically 2%.
6.5.7 Enter a **Scan Back** to move the objective up before starting a measurement.
6.5.8 Select a **Resolution** in pixels. Higher resolutions will increase the measurement time.
6.5.9 Choose a scan speed. High speed is the default.
6.5.10 Select a data average number to calculate results. The default is 2.
6.5.11 To make a measurement select **File** and then **New Measurement**.



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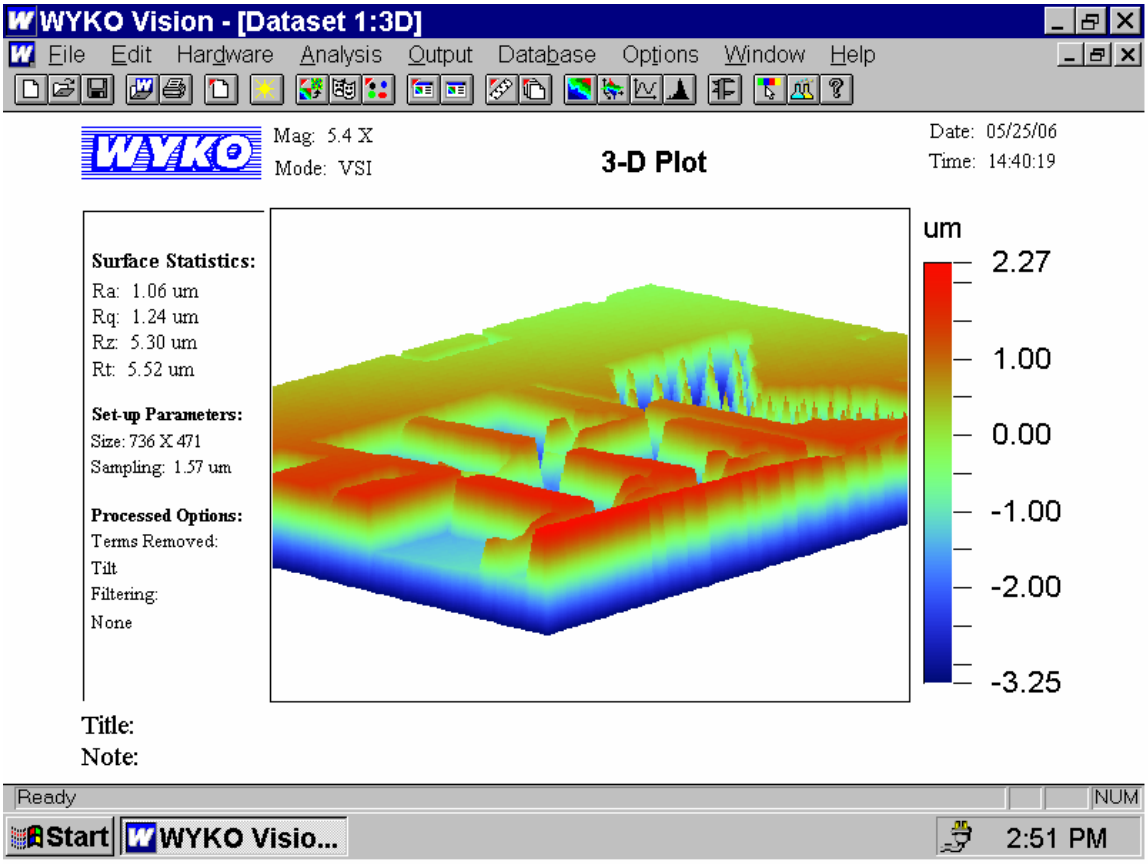
6.6 Data Analysis

6.6.1 After completion of a measurement the following plot will be displayed.



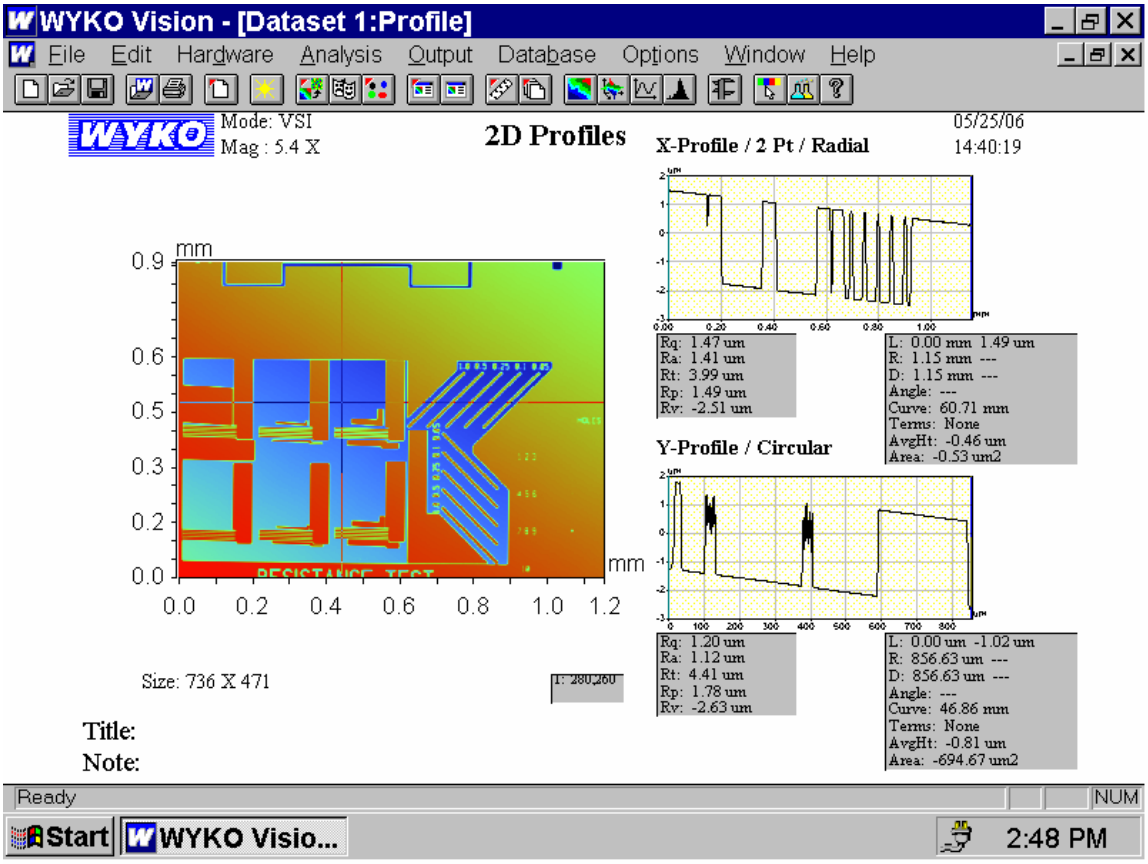
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6.6.2 If a **3D plot** is needed, go to **Analysis**, **Processed** and select **3D**. Right click on the resulting plot to change the view or to zoom in.



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6.6.3 If a **2D profile** is needed, go to **Analysis** and select **2D Profile**. Use the mouse to move the vertical and horizontal lines to obtain different profiles. Right click for additional options.



6.6.4 Some other options that are available under Analysis include Filtered Histogram, Multiple Region, Step Measurement and Fourier.

6.7 Data Export to another Computer

6.7.1 Press the **Print Screen** button
6.7.2 From the **Start** Menu select **Programs**, **Accessories** and **Paint**.
6.7.3 From **Paint** select **Edit** and then **Paste**.
6.7.4 Save your file to 3 ½ Floppy (A:)
6.7.5 Alternately you may right click on a plot and choose to save just the plot to a tiff file. This may result in a higher resolution image.

6.8 System Shutdown

6.8.1 When finished using the system turn down the intensity. Select **Hardware**, **Intensity** and then minimize the intensity using the slider bar.
6.4.2 Turn off the video monitor.

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6.9 Errors during Run

6.9.1 A measurement may be stopped at any time using the **Escape** key.

6.6.2 If the system locks up try restarting the computer.

7 APPROPRIATE USES OF THE TOOL

8 ATTACHMENTS

REVISION RECORD

Summary of Changes	Originator	Rev/Date
Original Issue	Sean O'Brien	A-05/23/06

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