# QuadPro-301
Table of Contents

QuadPro-301

The QuadPro-S301 is designed to be a bench top resistivity test system with sophisticated analysis and graphing capabilities. This manual is a brief introduction to the operation specific to the QuadPro-S301. An on-line help section gives greater detail and explanation of software features.

I. Setting-up the S301 with the QuadPro control system.

The QuadPro-301 comes complete with-
1) S301 probe stand
2) 2 ea SP4 probe heads
3) QuadPro Control box including current source, volt meter and computer.
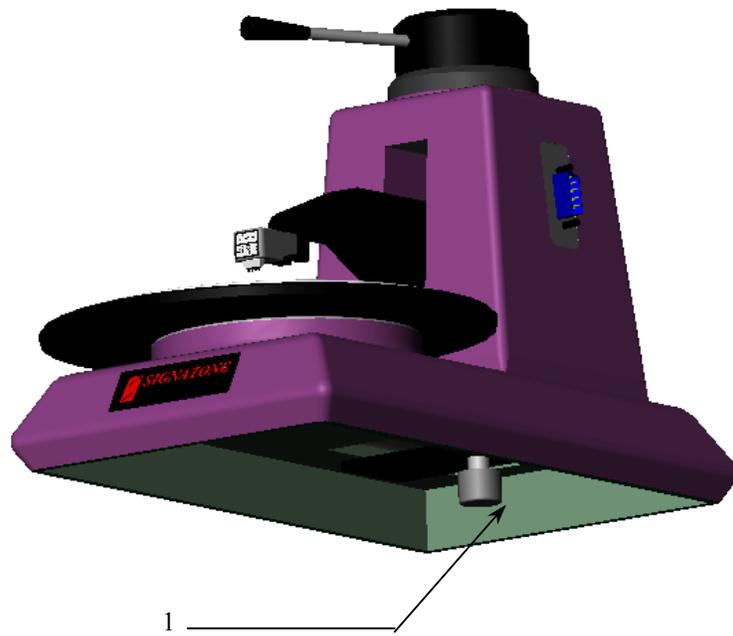4) Flat panel SVGA screen, keyboard and mouse

S301 Prober
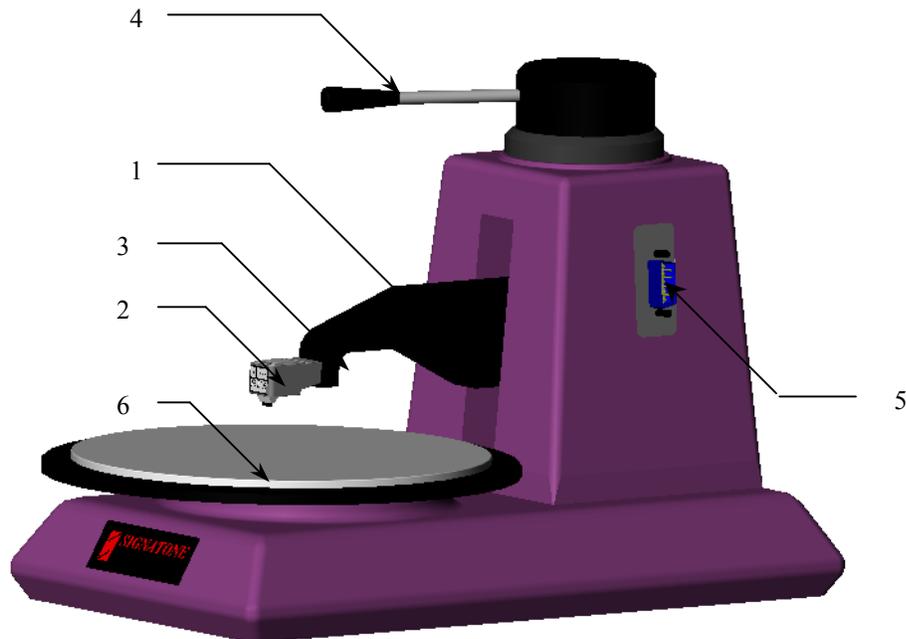
1. Probe Arm
2. Probe Head
3. Probe Head Mount

4. Probe Head Up/Down Lever
5. Test Cable Connection
6. Wafer Stage
See also Back View

Bottom View

1

1. **Probe Head Fine Adjust Knob**

System Installation

1. Arrange the S301 Prober and control rack in your test area.
2. Connect the S301 Prober cable.
   a. Attach the cable at the back of the prober to the PC board mounted to the side at back of the rack.

For connector at end of cable
from back of S301 Prober

3. Probe Head/Arm Assembly
   a. Attach the Probe Head onto the Probe Head Mount.
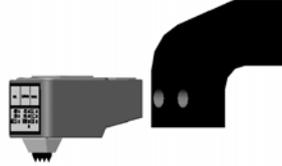
   b. Slide the Probe Head Mount onto the Probe Arm.
   c. Secure Probe Head Mount to Probe Arm with tightening screw.
   d. Attach the connector at the end of the Probe Head cable to the 9pin D-sub connector at the side of the Prober.

For 9pin Female D-sub
connector at end of the
Probe Head cable
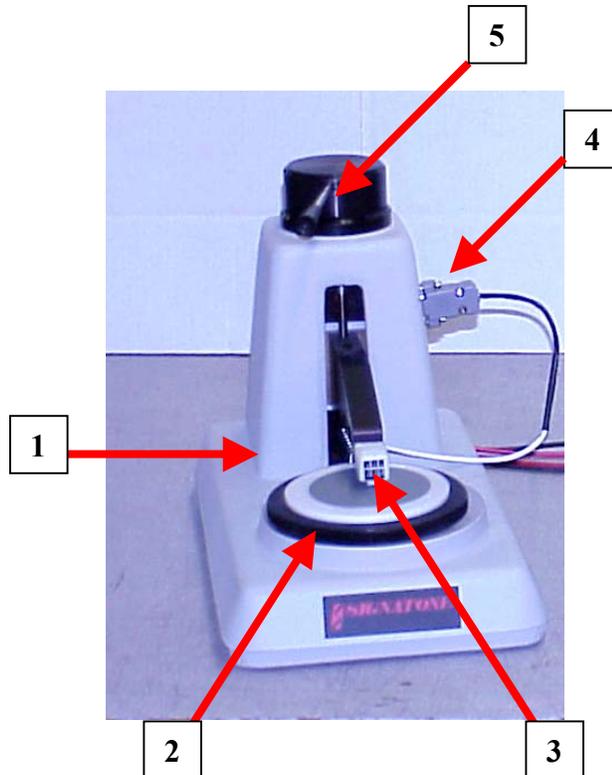
Completed set up should look like this.

The S301 stand (1)
Mounted a four point (3) probe head. The head is held in place by 2 6/32 by 1/2 inch socket cap screws.
Plug in the 9 pin connector (4).
Sample chuck with test sample placed under the probe head (2)
Probe head lowered into contact with sample depressing pins about 50% (5)

B) Electrical Connections

All of the connections go to the QaudPro Control rack. Most of the items are already connected inside the rack and should not be disconnected. There are 5 connections to make:

1) Connect the gray cable from the S301 stand to the white plastic mating connector mounted on the left side rear of the control rack.
2) Connect the mouse to the computer.
3) Connect the keyboard to the computer.
4) Connect the Flat panel monitor to the Video port on the computer. Also connect the power cord to the monitor.
5) Finally, connect the power line from the control box to the proper outlet.

With all of the connections made. We can now power up the system.

C) Starting the System

To power on the control rack, there is a single switch that controls all the power lines to the components on the rear of the control back. Power on this switch. The meters should be powered on as well as the computer and monitor.

The computer should load Windows and automatically boot into the QuadPro software main screen shown below.
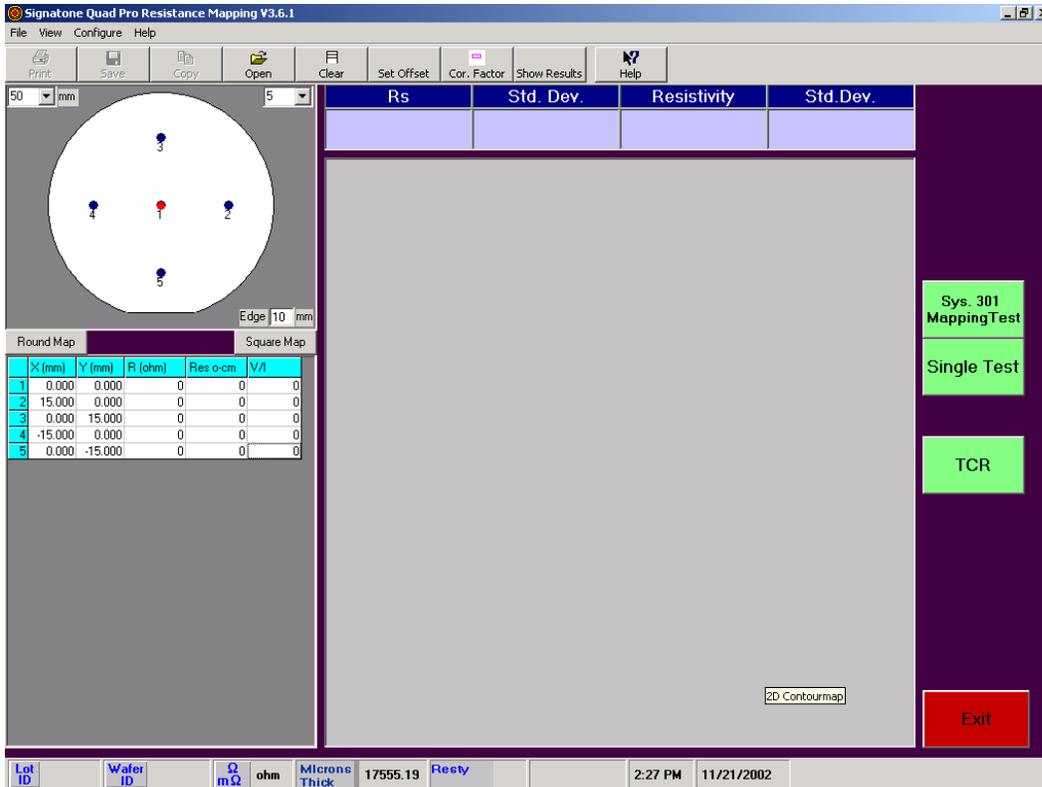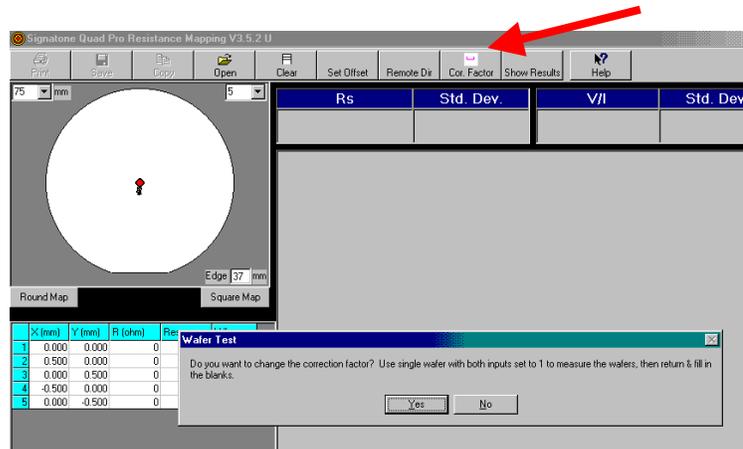

D) Setting the Correction Factor

QuadPro software has implemented a method to calculate the correction factor to adjust for errors in the offset or slope. Following is a step by step procedure for setting your correction factor.

Step 1-
Select the 'Cor Factor' button at the top of the screen. A pop-up box appears asking if you wish to change the correction factor. If you answer yes, the present correction factors in the system

are changed to offset =0, slope =1.

Step 2- If you are entering the correction factor supplied with the probe head, skip to step 3. The correction factor information may be found in the system manual on the configuration sheet.

Otherwise, measure one or two calibrated standards. Most standards are three inch wafers. To measure, on the wafer map select 75mm size, 5 points to measure, Edge of 37mm, round map. This will set-up to make 5 test at the center of the wafer and report the average. Then select the 'S301 Mapping Test' to collect the data. The system will ask you to test all five points within a millimeter of the center of the wafer and give an average Rs. Assuming there are no errors, write down the measured average. Note, wafers with higher resistance (> 250Ω Rs) should be measured in a dark environment. Also, the meters should be powered up for a minimum of 30 minutes before testing.

If you have two calibrated samples with different values, measure the second sample in the same way. Write down the average of the second sample. Also, check the room temperature and compare to the temperature on the 'sample certification sheet.' Adjust the average for temperature error.

Step 3-
Select the 'Cor. Factor' button again. Click 'Yes' again.
You are then asked to enter 1 or 2 measurement methods. Using one indicates that you measured one calibrated wafer to get the correct reading. Entering two indicates that you have measured two different valued wafers.
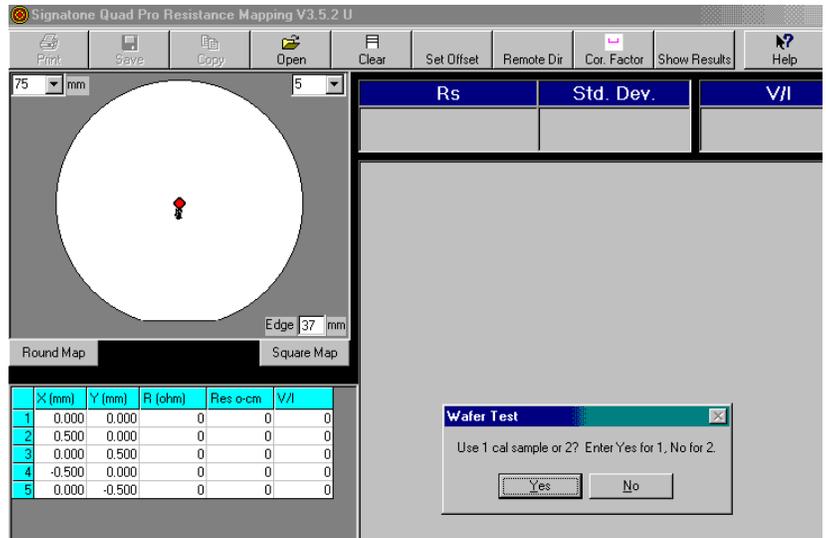
Step 4-
If you answered yes in Step 3, a box with two fill in blanks appear. The measured value is the value you measured on the calibrated sample. The actual Value is the ΩRs value stated on the standard certification sheet. When these values
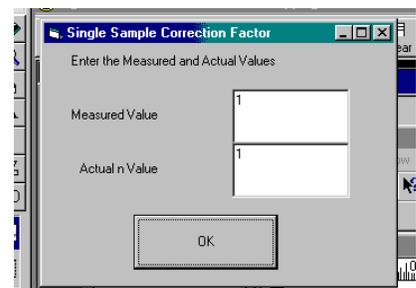
are entered, select OK and the computer automatically calculates the correction factor and stores it in RAM.

If you answered no in Step 3, a box with four fill in blanks appear. The measured values are the values you measured on the calibrated sample. The actual Values are the ΩRs values stated on the standard certification sheets. Enter the larger of the two values in the 1st boxes. When these values are entered, select OK and the computer automatically calculates the correction factor and stores it in RAM.
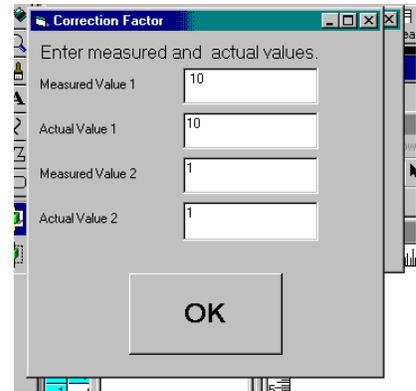
Step 5
This new correction factor is now applied to all measurements. However, the correction factor has not been stored as the permanent correction factor on the computer hard disk. To store this correction factor and make it the default, simply press the 'exit' button on the software. Exiting stores all of the present settings, including the correction factor to the hard disk. Next time the program is run, the correction factor is automatically applied.

E)- Adjust Probe Head into contact

Probe Head Z adjust knob
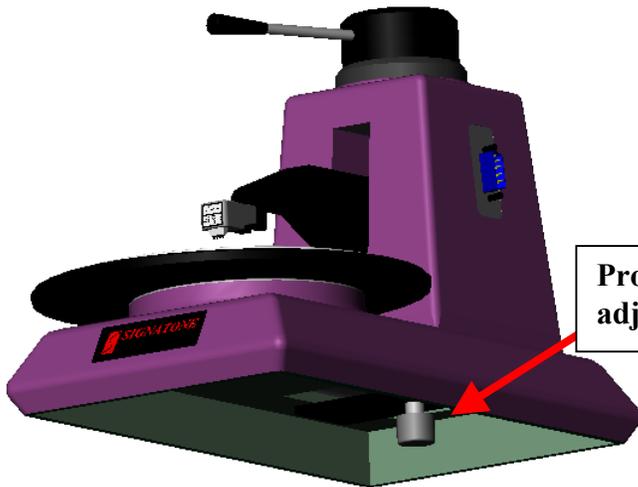
The Z adjust for the probe head is located on the bottom side of the S301 stand. Slide the stand over the edge of the table, reach up underneath the stand and turn the knob. Adjust the probe head up or down as needed. Watch the probe head carefully. With the lever in the forward position, the probe head in low position; lower the probe head into contact with the test sample. The pins on the probe head should be compressed into the probe head 50-70% to assure good contact.

Moving the lever to the right should lift the probe tips out of contact with the test sample.
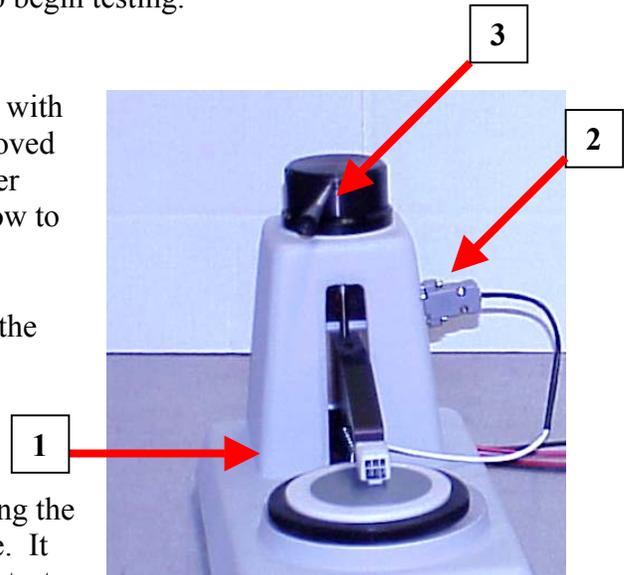
Running a Test

With the set-up complete, we are now ready to begin testing.
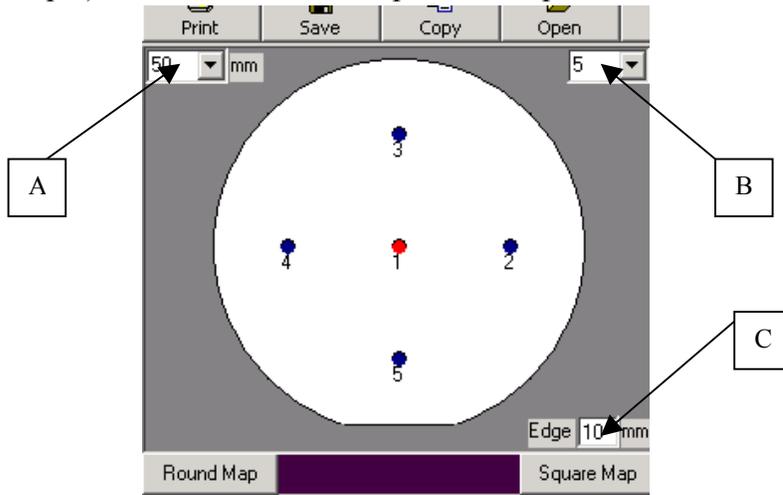
A) Run a single test.

Step 1. Lower the probe head into contact with the test sample. Be sure the lever (3) is moved clockwise all the way to the stop. The lever activates a switch that allows current to flow to the sample.

Step 2. Select the 'Single Test' button on the software screen. The test will start and a message will pop up saying 'AUTORANGING'. This means the software is communicating to the meters through a variety of settings before choosing the best setting for measuring your test sample. It may take up to 30 seconds to complete the test.

B) Running several tests and plotting a map.

Step 1) Create the Test Points position map.


    a.   Select the correct wafer size by clicking on the Wafer Size pull down button.

    b.   Select the desired number of test points.

    c.   Enter the Edge Exclusion. (The distance a test position is from the edge.)

    d.   Click the either the Round Map button. `Round Map`, or Square Map button, `Square Map`. The map is updated.

Step 2. The test sample should be centered under the probe head. Lower the probe head into contact with the test sample. Be sure the lever (3 previous page) is moved

clockwise all the way to the stop. The lever activates a switch that allows current to flow to the sample.

Step 3. Select the "Sys-301 Mapping Test" button. The screen shown below appears. Select "OK" (2 below). The test will start and a message will pop up saying 'AUTORANGING'. This means the software is communicating to the meters through a variety of settings before choosing the best setting for measuring your test sample. It may take up to 30 seconds to complete the test.

Step 4. After the first test site is completed, the message window appears again. Raise the probe head using the lever. Slide the test sample to the position indicated by a red dot (5 below) on the wafer graph (1 below). Lower the probe head all the way to the stop and select the "OK" (2 below) button. The test time shortens considerably because auto ranging is not necessary. The settings found in the first measurement are used. Continue repeating this step until all of the points have been tested.
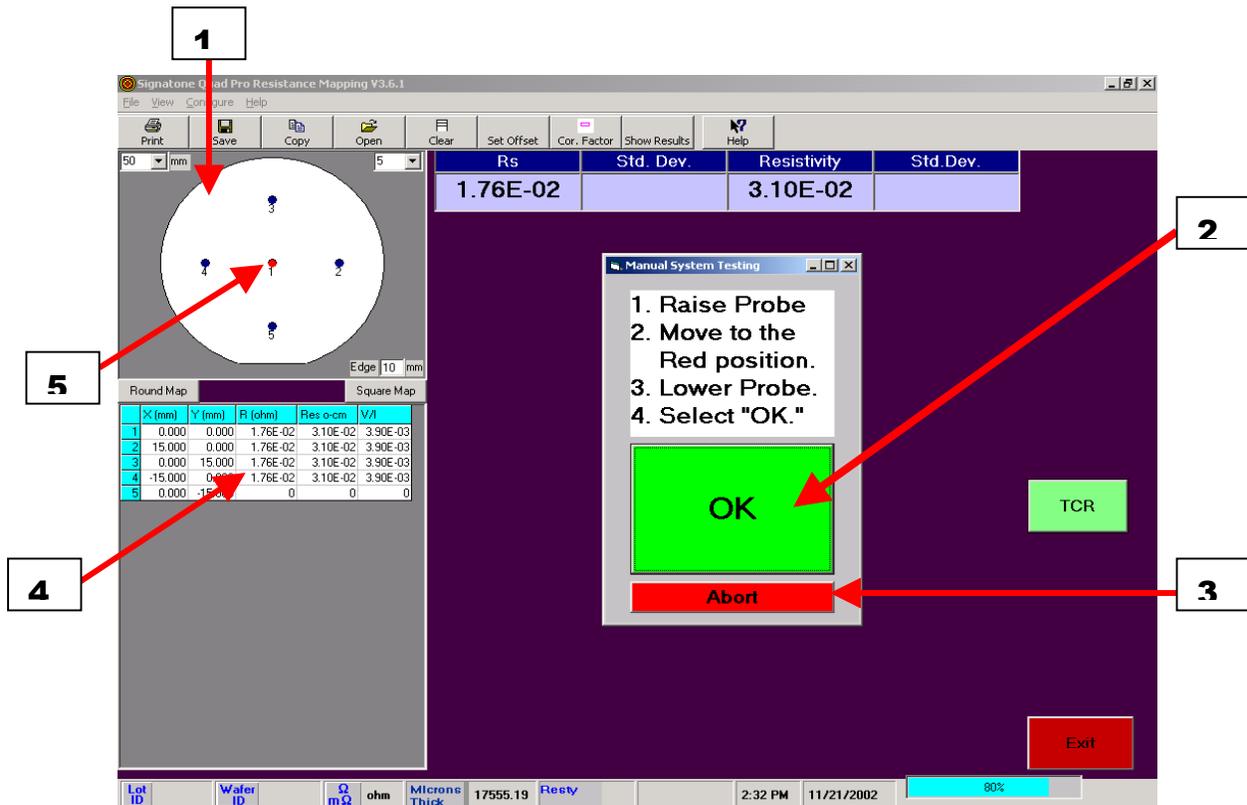
Step 5: After all the points have been tested, the save data screen automatically appears. Select a name and store the data in the desired directory. Upon completeion of storing the data, the data is processed for drawing the graph.
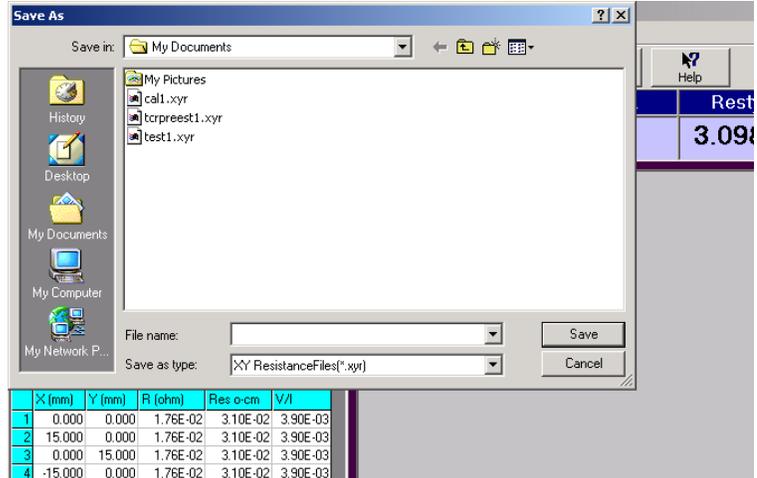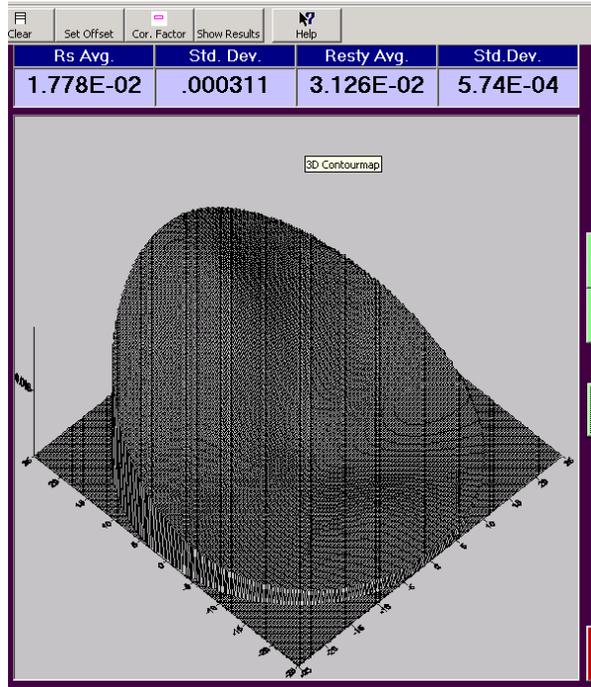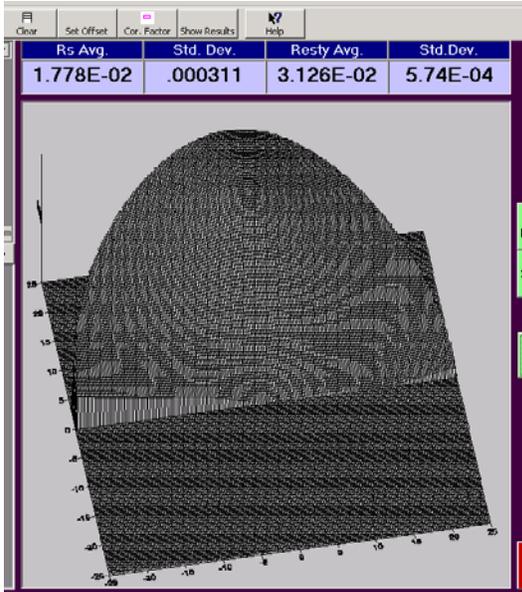

Step 6: Test Sample Graphs
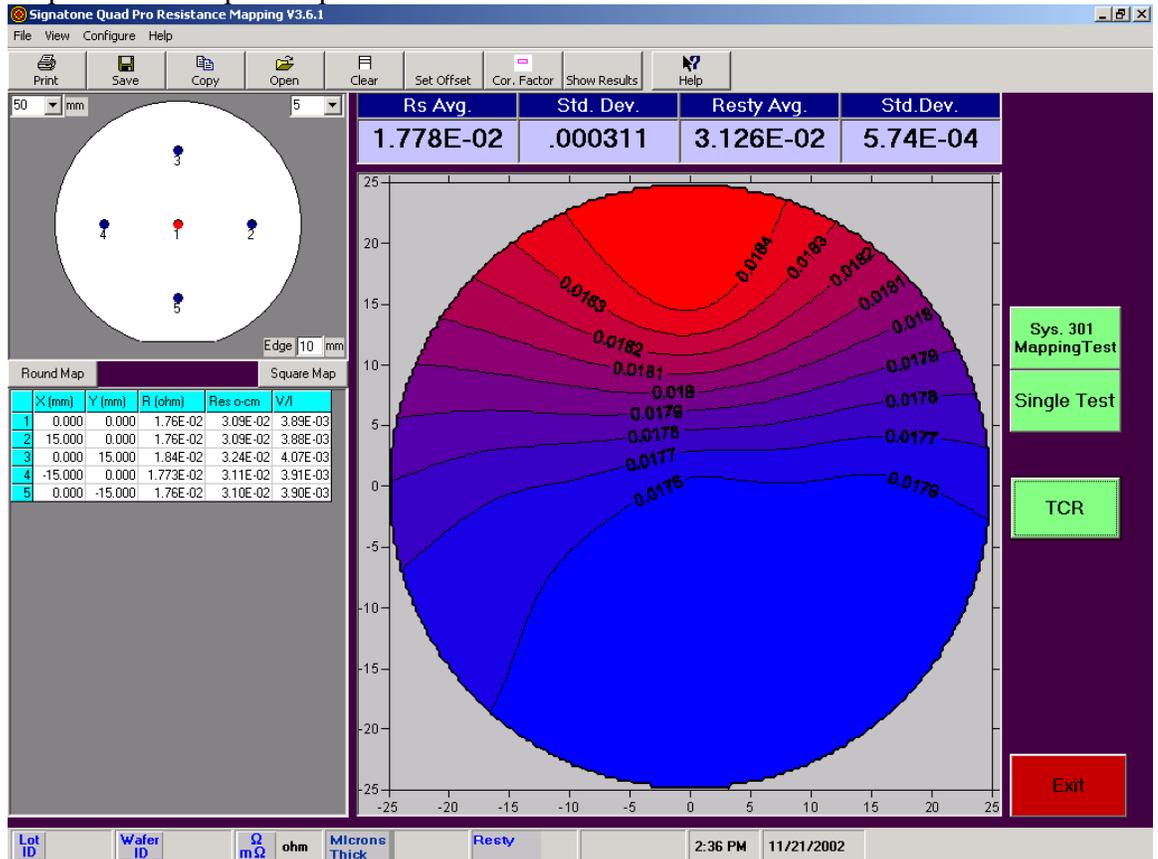
With the data collected and stored a graph of the sample is shown on the screen. There are four available graphic formats that may be plotted. The most common is the 2 dimensional topographical map as shown above. To select a different view, select the desired format from the view menu.
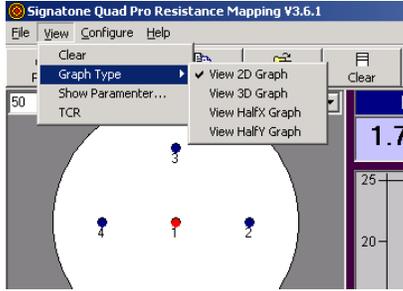
Select the graphic view that you desire from the "View" pull down menu. Shown below are samples of the same data shown in the different graphic formats.

Four Point Probe
Part Numbers

SP4-

Y = 15" wire, 9 pin D sub, for SYS-301 &
QuadPro-301.

R = 1.6 mil radius tip
F = 5 mil radius tip
B = 10 mil radius tip

T = Tungsten Carbide
O = Osmium

045 = 45 gram spring pressure
085 = 85 gram spring pressure
180 = 180 gram spring pressure

40 = 40 mil spacing between tips
50 = 50 mil spacing between tips
62 = 62.5 mil spacing between tips

HT4 - **1 8 0**

Y = 15" wire, 9 pin D sub termination
for SYS-301 & QuadPro-301.

R = 1.6 mil radius tip
F = 5 mil radius tip
B = 10 mil radius tip

T = Tungsten Carbide
O = Osmium

180 = 180 gram spring pressure

50 = 50 mil spacing between tips
62 = 62.5 mil spacing between tips