Step-By-Step Tutorial for Measurement & Calculation

1. Check the hardware connection between the Ellipsometer instrument and the computer.
   Turn on the instrument's switch.

2. Run the application.

3. Open the Measure & Calculate Box (Measurement & Calculation Dialog Box) by either the Ellipsometer menu's Measure & Calculate command or the Measure & Calculate button  on tool bar.

   >>The Measurement & Calculation Dialog Box will pop up over the application window with the Odefault.csf file's setting. The Odefault.csf file is used when the user opens the Measurement & Calculation Dialog Box for the first time in each session of the application.

4. Type a string (up to 80 characters) for the Sample field, change some parameters:
   For example, Absorbing Film checked, 4000 for the Thickness1, 1.458 for Nf1, 0.001 for Kf1, etc.
   Click the Save Current Setup to a file button.
   >>The Save As dialog box will pop up. Type test1 into the File name: field and click the Save button, then the current setting will be saved into the file test1.csf, and the file name will be displayed in the Setup File field of the Measurement & Calculation Dialog Box.

5. To make it easier on the user, four shortcut buttons have been added. The user may attach a Calculate Setup File (CSF) to each shortcut button. This is done by the use of the small button to the right of each shortcut button. The name of the Calculate Setup File will be displayed on the shortcut button.
   >>When a shortcut button is clicked, three actions occur:
   a.) Setup parameters are set to those of the setup file linked to the shortcut button.
   b.) The ellipsometric parameters Psi and Delta are measured at the current wavelength.
   c.) A solution is calculated.

   Note: When the user first enters the Measurement & Calculation Dialog Box, the shortcut buttons will have the default settings.

6. Click the Store Setup button.
   >>The current active setup will be displayed on the application screen's document area.
   (Since the application window is behind the Measurement & Calculation Dialog Box, the user may need to move the Measurement & Calculation Dialog Box by dragging it to see part of the application window's document area.)

7. At the bottom-left side of the Measurement & Calculation Dialog Box, click the Measure button.
   >>It will measure the Psi and Delta from the instrument and display it on the screen.

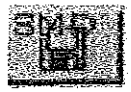
8. Click the Calculate button.

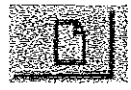
   >>It will do the calculation in the current Calculation Mode with the current parameters settings and display the result to the screen.

9. Click the Store Measured Data button.
   >> The current Psi-Delta and two solutions (Thickness1 and Auto [the 1st and 2nd solutions respectively]) will be displayed on the application window's document area.

10. Now, click the Measure and Calculate button.
    >> Steps 7 and 8 will be performed right after each other.
    Just like step 9, the user can store this result by clicking the Store Measured Data button.
    If the user wants to keep storing the result of every Psi-Delta Calculation, check the box next to the Automatic Storing Data. For practice, click the Measure and Calculate button several times after the Automatic Storing Data has been set (or checked).

11. Close the Measurement & Calculation Dialog Box by clicking the Return button.

12. On the application window, the user can save the contents in the document area into an external file by the Save SMD  button on the toolbar or the File menu's Save command.
    For practice, click the Save SMD button on the toolbar and type test1 in the File name: field of the Save As dialog box and click the Save button. The document will be saved as test1.smd file.
    If the user wants to save the contents in the document area into a TEXT file, click the Save As TXT button  on the toolbar or the File menu's Save As TXT command. For this text file, the user can use any text-editing program to open and modify it.

13. Now create a new document by clicking the New button  on the toolbar or File menu's New command. The document area will be cleared with new a blank document.

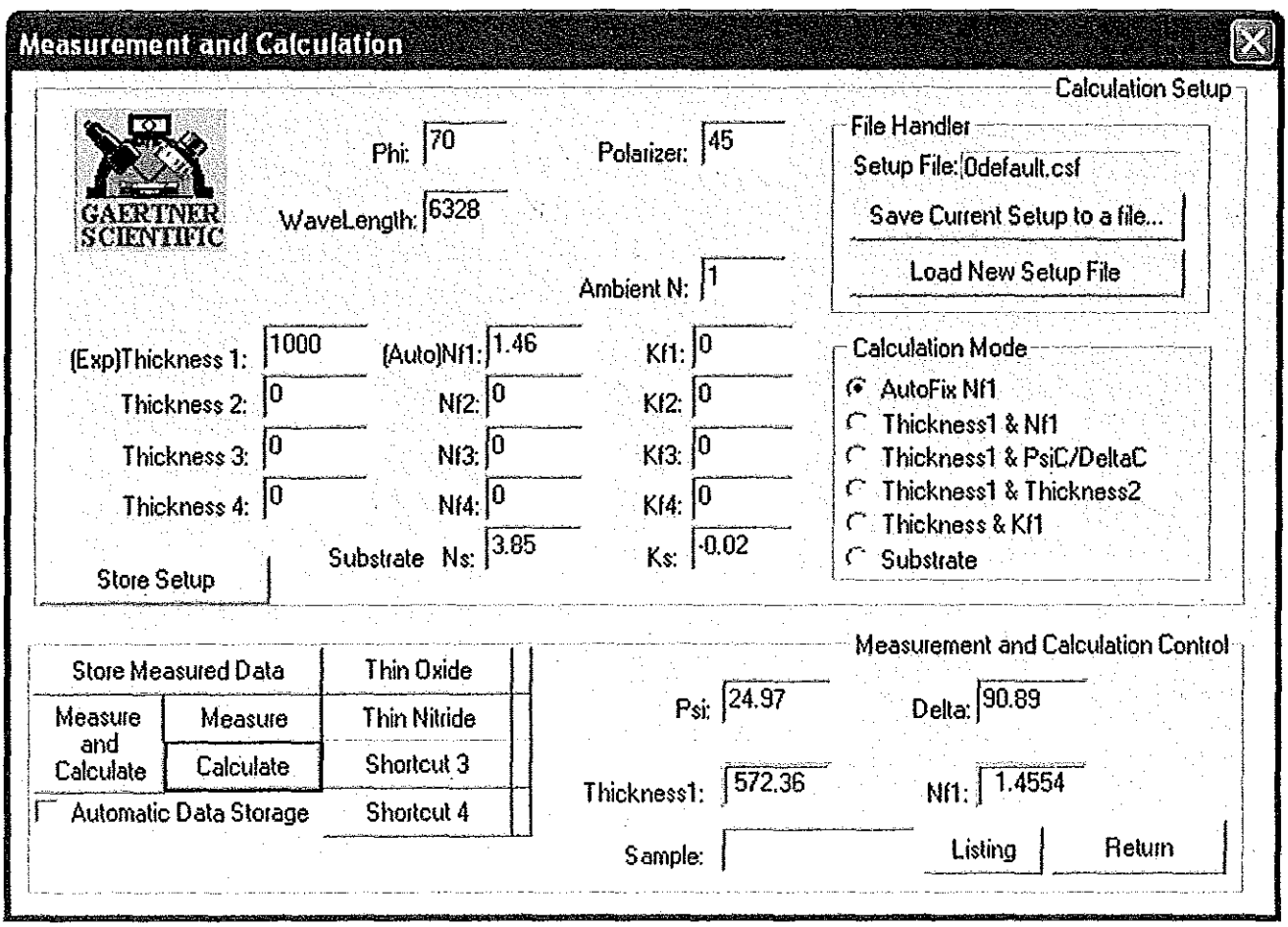
14. Open the Measurement & Calculation Dialog Box again (see step 3).
    >> This time, the Measurement & Calculation Dialog Box will pop up over the application window with the test1.csf file's settings, which the user has used recently, rather than the Odefault.csf. The user may try to change the parameters and save it as a different parameter file as many times as the user wants (see step 4).

15. Click the Load a Setting from a file button.
    >> The Open Dialog Box will pop up and display all the CSF files. Select a file and click the Open button. Then the Measurement & Calculation Dialog Box will be re-displayed with the parameter settings of the file the user has selected.

16. Now close the Measurement & Calculation Dialog Box and exit the application.
    >> If the current document area has been changed but it has not been saved yet, the user will be prompted to save it or not. Then the application will close the application window.

To see detailed descriptions about menu commands and buttons, go through the Menu Commands on the Help Main Page.

Click here to go to **Help Main Page**


Measurement and Calculation
GAERTNER SCIENTIFIC
Calculation Setup
Phi: 70
Polarizer: 45
WaveLength: 6328
Ambient N: 1
File Handler
Setup File: 0default.csf
Save Current Setup to a file...
Load New Setup File
(Exp)Thickness 1: 1000
(Auto)Nf1: 1.46
Kf1: 0
Thickness 2: 0
Nf2: 0
Kf2: 0
Thickness 3: 0
Nf3: 0
Kf3: 0
Thickness 4: 0
Nf4: 0
Kf4: 0
Substrate Ns: 3.85
Ks: -0.02
Calculation Mode
AutoFix Nf1
Thickness1 & Nf1
Thickness1 & PsiC/DeltaC
Thickness1 & Thickness2
Thickness & Kf1
Substrate
Store Setup
Measurement and Calculation Control
Store Measured Data
Thin Oxide
Measure and Calculate
Measure
Thin Nitride
Calculate
Shortcut 3
Automatic Data Storage
Shortcut 4
Psi: 24.97
Delta: 90.89
Thickness1: 572.36
Nf1: 1.4554
Sample:
Listing
Return

New Two Angle LGEMP Program

The new Two Angle LGEMP program includes 3 additional refractive index calculation modes: **Auto Nf**, **Measure Nf**, and **Fix Nf**.

Auto Nf --- permits the calculation of film thicknesses with computer determined film refractive indexes. The computer determines whether to base the thickness calculation on a measured value of index or on a fixed (estimated) value of film index. If the computer determines it can measure indexes at both angles then each measured index is used for the film thickness calculation. If the index can be measured at only one angle of incidence then the index is calculated for the other angle based on a dispersion formula. If the computer determines that the indexes cannot be measured at either angle then the thickness calculation is based on the user entered estimated values in the Setup.

Measure Nf --- forces the measurement of both indexes regardless of their accuracy. The film thicknesses are then calculated based on these values. Unrealistic values of thickness often can result since the underlying index values are not correct.

Fix Nf --- forces the calculation of film thicknesses based on fixed values of refractive index as entered by the user in the Setup.

Step-By-Step Tutorial for 2 Angle Measurement & Calculation

1. Check the hardware connection between the Ellipsometer instrument and the computer. Turn on the instrument's switch.
2. Run the application.
3. Open the 2 Angle Measurement Calculation Dialog Box by either the Ellipsometer menu's 2 Angle Measurement & Calculation command or the 2 Angle 2Φ button on the tool bar.
   >>The 2 Angle Measurement & Calculation Dialog Box will pop up over the application window with the Odefault.csf file's setting. The Odefault.csf file is used when the user opens the 2 Angle Measurement & Calculation Dialog Box for the first time in each session of the application.
4. Type a string (up to 80 characters) for the Sample field, change some parameters: **for example**, 4000 for the Thickness1, 1.458 for Nf1, 0.001 for Kf1, etc.
   Click the Save Current Setup to a file button.
   >>The Save As Dialog Box will pop up. Type test1 into the File name: field and click the Save button, then the current setting will be saved into the file test1.csf, and the file name will be displayed in the Setup File field of the 2 Angle Measurement & Calculation Dialog Box.
5. To make it easier on the user, four shortcut buttons have been added. The user may attach a Calculate Setup File (CSF) to each shortcut button. This is done by the use of the small button to the right of each shortcut button. The name of the Calculate Setup File will be displayed on the shortcut button.
   >>When a shortcut button is clicked, three actions occur:

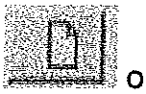
   a.) Setup parameters are set to those of the setup file linked to the shortcut button.
   b.) The ellipsometric parameters Psi and Delta, for Phi and Phi2, are measured at the wavelength.
   c.) A solution is calculated.

Note: When the user first enters the 2 Angle Measurement & Calculation Dialog Box, the shortcut buttons will have the default settings.

6. Click the Store Setup button.
   >>The current active setup will be displayed on the application screen's document area. (Since the application window is behind the 2 Angle Measurement & Calculation Dialog Box, the user may need to move the 2 Angle Measurement & Calculation Dialog Box by dragging it to see part of the application window's document area.)

7. On the right side of the 2 Angle Measurement & Calculation Dialog Box, click the Measure button.
   >>The user will be prompted to set the angle to either Phi or Phi2, depending on which angle is checked off as the starting angle. The measured Psi and Delta for that angle will be displayed on the screen, in the appropriate columns. This same procedure will be repeated for the second angle.
8. Click the Calculate button.
   >>It will calculate the matched thicknesses and indexes, for Phi and Phi2, using the current parameters settings and display the result to the screen for each angle.
9. Click the Store Measured Data button.
   >>The current Psi-Delta, matched Thickness and Index, for Phi and Phi2, will be displayed on the application window's document area.
10. Now, click the Measure and Calculate button.
    >>Steps 7 and 8 will be performed right after each other.

    Note: Just like step 9, the user can store the results by clicking the Store Measured Data button. If the user wants to keep storing the result of every Psi-Delta and Calculation, check the box next to the Automatic Storing Data. For practice, click the Measure and Calculate button several times after the Automatic Storing Data has been set (or checked).
11. Close the 2 Angle Measurement & Calculation Dialog Box by clicking the Return button.
12. On the application window, the user can save the contents in the document area into an external file by the Save SMD button  on the toolbar or the File menu's Save command.
    For practice, click the Save SMD button on the toolbar and type test1 in the File name: field of the Save As dialog box and click the Save button. The document will be saved as test1.smd file.
    If the user wants to save the contents in the document area into a TEXT file, click the Save As TXT button  on the toolbar or the File menu's Save As TXT command. For this text file, the user can use any text-editing program to open and modify it.

13. Now create a new document by clicking the New button  on the toolbar or File menu's New command.
    The document area will be cleared with new a blank document.
14. Open the 2 Angle Measurement & Calculation Dialog Box again (see step 3).
    >>This time, the 2 Angle Measurement & Calculation Dialog Box will pop up over the application window with the test1.csf file's settings, which the user has used recently, rather than the Odefault.csf. The user may try to change the parameters and save it as a different parameter file as many times as the user wants (see step 4).
15. Click the Load a Setting from a file button.
    >>The Open Dialog Box will pop up and display all the CSF files. Select a file and click the Open button. Then the Measurement & Calculation Dialog Box will be re-displayed with the parameter settings of the file the user has selected.
16. Now close the 2 Angle Measurement & Calculation Dialog Box and exit the application.
    >>If the current document area has been changed but it has not been saved yet, the user will be prompted to save it or not. Then the application will close the-application window.

To see detailed descriptions about menu commands and buttons, go through the Menu Commands on the Help Main Page

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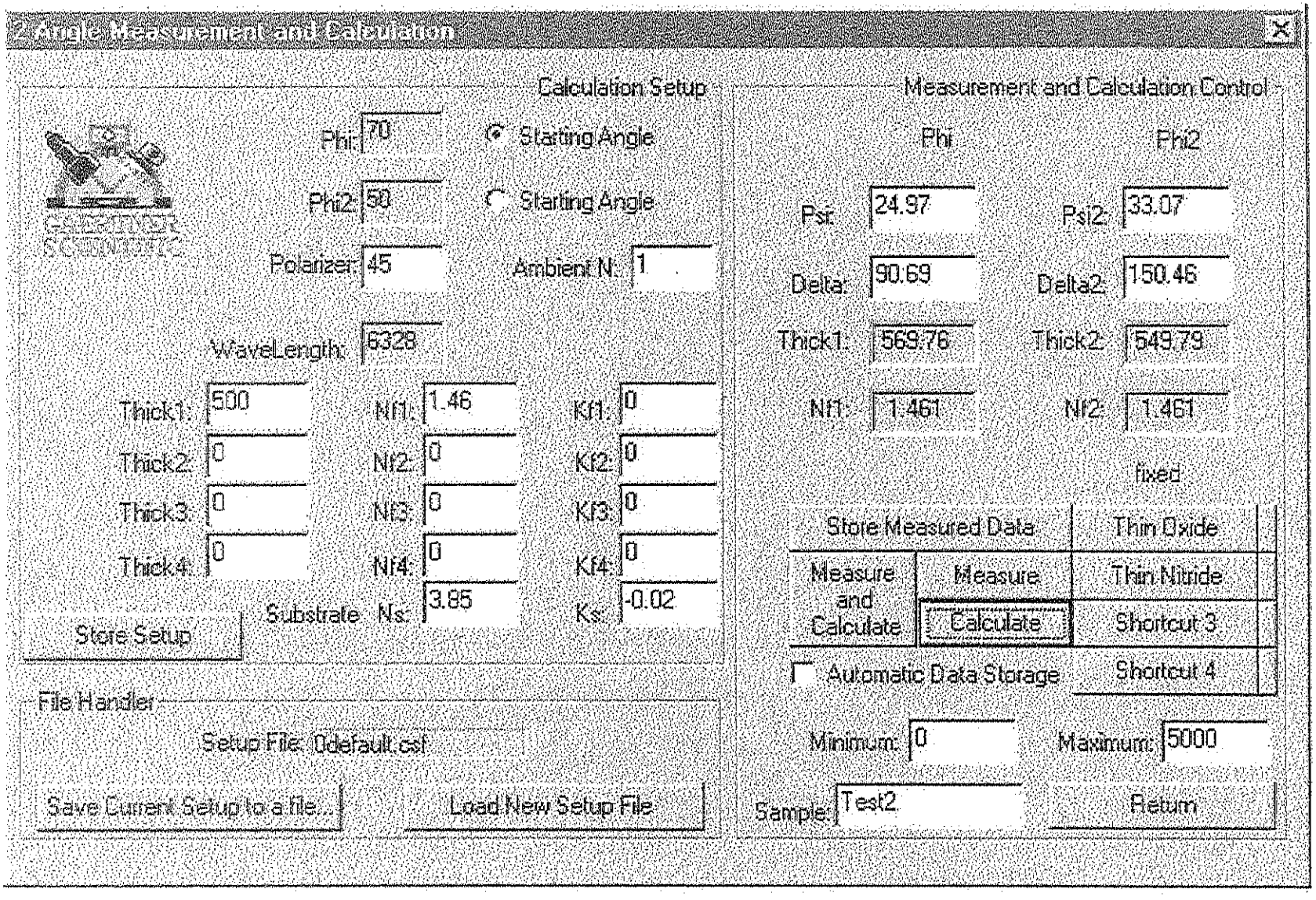
2 Angle Measurement and Calculation
Calculation Setup
Phi: 70
Starting Angle
Phi2: 50
Starting Angle
Polarizer: 45
Ambient N: 1
WaveLength: 6328
Thick1: 500
Nf1: 1.46
Kf1: 0
Thick2: 0
Nf2: 0
Kf2: 0
Thick3: 0
Nf3: 0
Kf3: 0
Thick4: 0
Nf4: 0
Kf4: 0
Substrate Ns: 3.85
Ks: -0.02
Store Setup
File Handler
Setup File: 0default.csf
Save Current Setup to a file...
Load New Setup File
Measurement and Calculation Control
Phi
Phi2
Psi: 24.97
Psi2: 33.07
Delta: 90.69
Delta2: 150.46
Thick1: 569.76
Thick2: 549.79
Nf1: 1.461
Nf2: 1.461
fixed
Store Measured Data
Thin Oxide
Measure and Calculate
Measure
Calculate
Thin Nitride
Shortcut 3
Automatic Data Storage
Shortcut 4
Minimum: 0
Maximum: 5000
Sample: Test2
Return