# <u>JENWAY</u>

6850 PRISM PC Software

**Operating Manual** 



REV A/06-12

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# **SECTION 1 – Introduction**

## 1.1 PC SOFTWARE DESCRIPTION

The Prism PC software allows the user to fully control the functionality of the Jenway 6850 variable bandwidth, double beam UV/visible spectrophotometer. The software replicates all functions from the instrument interface and adds additional functionality, extensive post-measurement tools, unlimited results storage and allows the easy export of data to other PC software packages. The Prism PC software has measurement modes for photometrics, concentration, multi-wavelength, spectrum scanning, quantitation, kinetics, DNA and protein analysis.

#### 1.2 REQUIRED PC SPECIFICATION

- Pentium processor or above;
- CD-ROM drive;
- USB Port.
- · 32MB Memory minimum (256MB or greater recommended);
- 50MB free hard disc space;
- Microsoft Windows 2000/XP/Vista/7.

## **SECTION 2 – Installation**

#### 2.1 UNPACKING

Remove the 6850 from the packaging and ensure the following items are included:

- 1. PC software CD and USB security dongle (685 035)
- 2. USB Cable

#### 2.2 INSTALLATION

Please disconnect the USB cable connecting the installation PC and the 6850 instrument. Please also ensure that the USB security dongle is not attached to the PC.

- 1. Insert the Prism software disc in the CD-ROM drive of your PC.
- 2. Navigate to the CD-ROM drive directory and double click on the Prism software icon to open the CD-ROM, and then double click **Setup.exe** to start the software installation.



3. Select Next.



4. Enter the requested user information and select Next.

Jser Information			×
	Type your n company yo Name: Company:	ame below. You must also type the name of the u work for. Prism User Bibby Scientific	-
		< Back Next > Cancel	

5. Choose install path, then select Next.



6. Choose a program folder, then select **Next**.



7. Click **Finish** to finish the installation.



8. Connect the PC and Spectrophotometer with the USB Cable.

## 2.3 INITIALISATION

The Prism PC software uses a USB security key to provide a licence to enable the software to run on the installed computer. Please ensure that the USB security key is inserted into a USB port of the computer at all times, when running the application.

Prism		LOX
le Edit View Favorites	Tools Help	
) Back 🔹 🕥 🔹 🏂 🍃	🔎 Search 🜔 Folders 💠 SS Folder Sync	
idress 🛅 C:\Documents and S	settingslAll Users'start MenulPrograms'Prism	💌 🔁 60
File and Folder Tasks	Pism Pism Pism Pism Pism Pism Pism Pism	
Other Places	â	
Programs		
My Documents		
My Computer		
My Network Places		
Details	*	
Prism File Folder		
Date Modified: 23 April 2012, 15:39		

When the Prism software is installed the application shortcut will be displayed in the Start Menu folder. Double click on the Prism icon to start the application.

## 2.4 SETUP COMMUNICATION PORT



Select the Spectrophotometer menu and open the Comm Port Setup option.

Comn	nunication Hub	Setup				×
<b>-</b>	Select one from ir macroeasy.uva	nstalled Driv	ers 32.2002	2.ext.dll		
	R5232 Settings R5232 Port Baud Rate	com6 38400	•		Ок	

In the Communication Hub Setup window select the RS232 port being used to connect to the instrument from the available options and set the Baud Rate to 38400. Select **OK**.

# **SECTION 3 – PRISM SOFTWARE INTERFACE**

## 3.1 MAIN WINDOW

The Main Window is made up of four main areas.

- 1. Menu Bar
- 2. Toolbar
- 3. Data Window
- 4. Status Bar

The information contained in each area is explained further in the following sections.



Figure 3.1 Prism Main Window

# 3.1.1 Menu Bar and Toolbar Options

Menu Bar Option	Sub Menu Option	Toolbar Icon	Function
			New Multi Wavelength Measurement
		X	New Spectrum Scan Measurement
	New	0	New Kinetics Measurement
		Å	New a DNA/Protein Measurement
			New Instrument Validation Measurement
	Open	æ	Open a result file
File	Close		Close the current measurement window
	Save		Save current measurement
	Save As		Save current measurement as a new file name
	Open file from Spectrophotometer	<b>S</b>	Open a file saved on the instrument
	Export		Export data or method
	Print	9	Print test report
	Print Setup		Setup printer options
	Exit		Exit Prism
View	Status Bar		Display/Hide status bar
	Status of Spectrophotometer		Display status of spectrophotometer

	Status font		Setup font of status bar
	Customize	۵	Display Setup
	Peaks	$\wedge$	Identify Spectrum Peaks
	Valleys	Y.	Identify Spectrum Valleys
	Zoom	Ð	Activate the Zoom function
		S	Undo Zoom function
	Reset	Q	Return to the default display settings
	Search	Q	Search peak/valley one by one
	Connect to Spectrophotometer	8- <b>8</b>	Connect to the instrument
	Re-Initialise Spectrophotometer		Restart the instrument
	Stop measurement		Stop current measurement
	View dark Current		Refresh and display system dark current
Spectrophotometer	Set Amplifier		Not Applicable
	Locate 656.1nm		Perform wavelength Calibration
	Calibrate System Baseline	B	Re-measure system baseline
	Blank Measurement	Z,	Reset Zero/Blank
	Slit Bandwidth		Set the bandwidth option (0.5, 1.0, 2.0, 4.0, 5.0)

	Set Unit		Select concentration unit
	Turn on/off W lamp	<b>\$</b>	Turn on/off Tungsten lamp
	Turn on/off D2 lamp	<b>*</b>	Turn on/off Deuterium lamp
	D2/W Switch Point		Set switch point of Deuterium and Tungsten lamps
	Comm. Port Setup		Setup communication port
	Change Password		Set/Change login password
	Select Cell Position **	1	Move cell (1-8) into the light path
Auto-sample	Setup Multicell **	<u></u>	Setup Multicell accessory
	Autorun **	₩	Measure multiple samples automatically
	Start		Start a measurement
Scan	Pause	П	Pause a measurement
	Stop		Stop a measurement
	Service		Measure spectrum and scan energy
Settings	Display Range	#	Setup scan display parameters
5	Set Threshold	٨¥	Define peak/valley threshold
	Add	+	Add two spectrum
Analysis	Subtract	-	Subtract one spectrum from another
	Multiply	×	Multiply two spectra

	Divide	÷	Divide one spectrum from another
	Savitzky-Golay	~	Smooth a spectrum with the
	Smoothing Filter	15	Savitzky-Golay method filter
	Derivate	メ	Display the derivative of a spectrum
	Remeasure	R	Remeasure a spectrum
	New Window		Opens a new measurement window the same as currently displayed
	Cascade		Multiple windows are displayed in a cascade on screen
Window	Tile		Multi windows are tiled on screen
	Arrange Icons		Arrange all icons minimized
	Split		Split display area
Help	Help Topics		Displays the Help information for the Prism PC software
	Maintenance and		Displays service information for the
	Replacement		6850 spectrophotometer
	Step by Step Teaching		Displays tutorials on the software measurement modes.
	About Prism		Displays version information

# 3.1.1.1 Toolbar and Measurement Mode Options

P	Setup measurement parameters		Display Instrument CPU information
2	Modify a measurement result	Ē	Delete current Spectrum
8	Delete results selected	Т	Display %T value
<u>G</u> <sub>M</sub>	Goto wavelength	Α	Display Abs value

# **SECTION 4 – PHOTOMETRIC MEASUREMENT**

## 4.1 WAVELENGTH SELECTION

to Lambda —		
		Goto
Wavelength	500	Zero
Readout	-0.0046	
<ul> <li>Abs</li> </ul>	⊂ T%	Class

A single wavelength photometric measurement is made by firstly selecting the **G**, Goto Wavelength icon from the Toolbar.

A window will open that allows the selected wavelength to be entered. Once the wavelength has been entered, select the Goto button.

## 4.2 SAMPLE MEASUREMENT

Goto I amhda —		
Goto Lanoua		Goto
Wavelength	500	Zero
Readout	0.5046	
• <u>A</u> bs	C T%	Close

If required, select the Zero button to reset the Readout value to 0 Abs or 100%T, then insert the blank and sample cuvettes into the sample chamber of the instrument. The sample's photometric reading will be displayed in the Readout field.

# **SECTION 5 – MULTIWAVELENGTH / QUANTITATION**

The multi wavelength and quantitation measurement mode enables measurements of absorbance, % transmittance and concentration to be performed. In this measurement mode it is possible to perform a photometric measurement at up to 20 separate wavelengths. This mode also allows the concentration of an unknown sample to be determined against a calibration curve or a known concentration factor at up to three separate wavelengths.

## 5.1 MENU SCREEN



Select the New Multi Wavelength Measurement

icon on the toolbar. This menu screen enables multi wavelength measurement parameters to be changed and standard and sample information to be entered.

## 5.2 MULTIWAVELENGTH MEASUREMENT METHOD SET UP



The method tab allows the number of wavelengths, wavelength values, quantitation settings and factors to be edited.

## 5.2.1 Number of Wavelengths

The number of wavelengths can be specified by entering the value into the "Number of WL points" field or using the Up and Down arrows in this field to adjust the displayed value.

## 5.2.2 Entering the Measurement Wavelengths

The measurement wavelengths can be specified by entering the values into the available WL 1, WL 2 etc. fields.

#### 5.3 SAMPLE INFORMATION

Method 🚵 Info	rmation 🔛 Fitting 🖶 Star	ndard 🕅 🏠 Samp	le 🧕 👧 Display Setting
Information			
Title	Neutral Density Filter MC-50		
Title of Standard	Standard	Title of Sample	Sample
Operator	Prism User	Date and Time	May 01 09:46:36 2012
Footnote	Bibby Scientific		
Sample notes to	+ Enfer to start a new line) be included on the print report		×

The Information tab allows the user to enter sample and standard information. Additional notes can be entered into the Memo field if required.

#### 5.4 SAMPLE MEASUREMENT AND DISPLAY OPTIONS



The Sample tab contains a result window and a Control window. The Control window contain options to Start, Delete, Modify, Recalculate, change the Data Font and Print.

#### 5.4.1 Control Window – Start



Select the Start button to initiate a multiwavelength measurement. A new window will open that displays the measured photometric values. Once complete, select OK to finish. The result window will be updated with the measured values.

#### 5.4.2 Control Window – Delete

Select the Delete button to delete a completed sample measurement.

#### 5.4.3 Control Window - Modify

Select the Modify button to re-measure a sample's photometric values. The updated values will overright any previously recorded data.

## 5.4.4 Control Window – Recalculate

Select the Recalculate button to re-evaluate the concentration result when the Quantitation mode is enabled.

#### 5.4.5 Control Window – Data Font

Select the Data Font button to format the result data.

#### 5.4.6 Control Window – Print

Select the Print button to generate a report of the recorded data. The user will be asked to confirm if the report should include the text entered into the Information tab fields and the data contained in the result window.

## 5.5 QUANTITATION MEASURMENTS



The Quantitation measurement mode is enabled by selecting the Method tab and checking the tick box besides the Calculate Concentration option. If standard solutions are to be used to construct a new calibration curve, check the tick box besides the Use Standard Sample option.

No more than 3 wavelengths can be measured when the Quantitation mode is enabled.

#### 5.5.1 Using a Concentration Factor or Pre-defined Calibration Curve

If the concentration factor or the calibration curve constants are already known, these values can be entered into the method settings to allow an unknown sample to be quantified.



5.5.1.1 Entering a Known Concentration Factor

The Use Standard Samples checkbox should be clear and the Curve Fit option should be set to Linear Fit. The concentration factor should then be entered into the K1 field.

#### 5.5.1.2 Entering Known Calibration Curve Constants

🥬 Method 🍖 Information 🖾 Fittin	ıg 📴 Standard 🖓 San	nple 🧕 👧 Display Setting
	Wavelength	Wavelength
Number of WL points 1	WL 1 260	WL 11 600
Calculate Concentration  Use Standard Samples	WL 2 1050	WL 12 580
Curve Fit	WL 3 1000	WL 13 560
Linear Fit 💌	WL 4 950	WL 14 540
K0 0	WL 5 900	WL 15 520
K1 50	WL 6 850	WL 16 500
K2 0	WL 7 800	WL 17 400
K3 0	WL 8 750	WL 18 480
Ahs	WL 9 700	WL 19 460
$\Delta 4 = 4$	WL 10 650	WL 20 400
221-21		

The Use Standard Samples checkbox should be clear and the Curve Fit option should be set to the appropriate option. The known calibration curve constants should then be entered into the appropriate KO - K3 fields where:-

Concentration =  $(K3^*X^3)$ +  $(K2^*X^2)$ +  $(K1^*X)$  + K0

X = Photometric value of the sample

## 5.5.2 Constructing a New Calibration Curve



To construct a new calibration curve the user must ensure that they check the tick boxes beside the Calculate Concentration and Use Standard Sample options.

## 5.5.2.1 Measuring Standard Samples

Sample name 546.1nm Abs(eff) %	Control
Standard-1	Start
Standard-2	Delete
Standard-3	Moslify
Standard-4	Recalculat
Standard-5	Data For
Standard-6	
Standard-7	Print
Standard-8	Fit Paramete
Standard-9	K0 0
Standard-10	KI 1
Standard-11	K2 0
Standard-12	K3 0
Standard-13	r 1
Standard-14	

Fixed Points Measuri	ng	×
Readout		Sample
Lambda	Abs	Name Standard-1
546.1nm		
		deltaAbs 0
		Cono Ill
		OK
		Cancel
	]	Cancei

Select the Standard tab.

Insert the first standard into the sample position in the sample chamber and the reference into the reference position in the sample chamber.

Select the Start button to initiate the measurement

A new window will open allowing the Standard name, final photometric reading and concentration to be edited. The actual photometric reading of the standard will be displayed in the Readout window and this value will default to the deltaAbs field.

ixed Points Measuring				
Readout		Sample		
Lambda	Abs	Name Standard-1		
546.1nm	0.0952			
		deltaAbs 0.0952		
		Conc. 10		
		OK		
Cancel				
<u> </u>		]		

Once the standard measurement is complete and the name and concentration information has been entered, select OK to transfer the information to the main standard tab.

Repeat this procedure for each standard sample.

 Method
 Information
 Fitting
 Standard
 Sample
 Obsplay Setting

 Standard-1
 Abs (eff) %
 Standard-1
 Standard-12
 Standard-12
 Standard-13
 Standard-14
 Sta

5.5.2.2 Calibration Curve Settings and Display

🔎 Method 🍖	nformatio	on 🛛 🚟 Fitting	🛉 🖶 Sta	ndard 🕅 🗞	Sample	<u>Ω</u> Displ	ay Setting
Display Ran	ge		Scale	es			
Xr	nin 0			Automat	tic Setting	$\overline{\mathbf{v}}$	
Xr	nax 10	0		X Interv	ral 0.1		
Yr	nin 0			Y Interv	ral 0.1		Font
Yr	nax 1.	15		Unit of Co	nc. ppm	•	
Display Cont	Display Content						
🔽 X-Axis	Concentra	tion		Font	🔽 Standa	ırd	
🔽 Y-Axis	Abs			Font	🔽 Sampl	e	
🔽 Title	Fit Curve			Font	🔽 Fit Par	ameters	Font

The calibration curve display settings are edited by selecting the Display Setting tab.

The calibration curve's labels, axis range and interval values and concentration units can be edited in this tab.



The calibration curve is displayed by selecting the Fitting tab.

## 5.5.3 Sample Measurement

Sample name	546.1nm	Abs(eff)	ppm		-	Control
Sample-1						Start
Sample-2						Delete
Sample-3						Modify
Sample-4						Recalculate
Sample-5				1		Data Font
Sample-6						
Sample-7						Print
Sample-8						Fit Parameter
Sample-9						K0 0.0800527
Sample-10						K1 98.5746
Sample-11						K2 0
Sample-12						K30
Sample-13						r 0.999818
ht-olower				1		

To quantify an unknown sample select the Sample tab and select the Start button.

Fixed Points Measuring	X
Readout	Sample
Lambda Abs 546.1nm 0.5166	Name Sample-1
	deltaAbs 0.5166
	Conc. \$0.9999
	ОК
	Cancel

A new window will open allowing the sample name and final reported photometric reading to be edited. The actual photometric reading of the standard will be displayed in the Readout window and this value will default to the deltaAbs field.

Select OK to transfer the data to the sample result table.

Sample name	546.1nm	Abs(eff)	ppm		Control
Sample-1	0.5166	0.5166	50.9999	2	Start
Sample-2	1				Delete
Sample-3					Modify
Sample-4					Recalculate
Sample-5					Data Font
Sample-6					
Sample-7					Print
Sample-8					Fit Parameters
Sample-9					K0 0.0800527
Sample-10					K1 98.5746
Sample-11					K2 0
Sample-12					K3 0
Sample-13					r 0.999818
Sample-14				2	

The sample result table will display the measured absorbance value, the final reported absorbance value and the calculated concentration value.

## **SECTION 6 – SPECTRUM**

The spectrum measurement mode enables measurements of absorbance or % transmittance over a range of wavelengths to be performed. The absorbance or % transmittance at each wavelength is plotted graphically. Post measurement tools such as peaks/valleys, derivatives and spectral points analysis can be performed. This operating mode can be used to partially characterise a sample.

## 6.1 SPECTRUM MODE SCREEN



Select the Spectrum Measurement icon 💹 on the toolbar. The Spectrum measurement window will open.

## 6.2 METHOD SETUP

5can Setup	×
Scan Range	OK
From 700	Cancel
To 200	
Scan Step	
Step 0.1nm 💌	
Precision 5	fast

The spectrum scan settings can be edited by selecting the settings icon *p* in the toolbar. The options that can be changed are:-

- 1. Scan from (Highest Wavelength)
- 2. Scan to (Lowest Wavelength)
- 3. Scan Step (0.5, 1.0, 2.0, 4.0, 5.0nm)
- 4. Scan Precision (5, 10, 30, 50)

The required options can be entered directly or selected from the available options via the drop down lists. Select OK to confirm.

## 6.3 SELECTING THE MEASUREMENT MODE

The required measurement mode can be selected from the available options of Abs and %T by selecting the T or A icons on the toolbar.

#### 6.4 SAMPLE MEASUREMENTS



Insert a cuvette containing the blank solution into the reference position in the sample chamber and insert the cuvette containing the sample solution into the sample position. Close the instrument lid and select the Start а measurement icon **b** on the toolbar. Once the measurement is complete the measured spectrum scan will be displayed on the screen. The scan can be cancelled by selecting the Stop a measurement icon

## 6.5 POST MEASUREMENT TOOLS

## 6.5.1 Adjusting the Displayed Scan Range



Select the Setup display spectrum icon # from the toolbar. Enter the required display settings and select OK to confirm.

#### 6.5.2 Spectrum Peaks and Valleys



Select the Peak/Valley Threshold icon  $\bigwedge$  from the toolbar. Enter the required absorbance (peak height) threshold and select OK to confirm.

Select the identify spectrum peaks icon  $\bigwedge$  from the toolbar to list the peaks information and select the identify spectrum valleys icon  $\bigvee$  to list the valley information.

#### 6.5.3 Spectrum Zoom Function

Select the Zoom function icon from the toolbar. Position the cursor in the upper-left corner of the area you want to select. Hold the left mouse button to drag the cursor to outline the spectrum area you want to enlarge. Release the mouse button. The part of the spectrum which is displayed within the

outlined area will be enlarged. Select the undo zoom icon **end** to restore the previous view settings. Select the Zoom function icon again to exit the zoom function.

Click

#### 6.5.4 Spectral Points Analysis



Select the Scan spectrum icon  $\swarrow$  from the toolbar. Move the cursor over the spectrum display to trace the scan and display the scan data. Select the Scan spectrum icon again to exit the spectral points analysis mode.

#### 6.5.5 Spectrum Derivative

Derivative		×
Derivative -		OK
Class		Cancel
Name	Sample-2-d	

#### 6.5.6 Spectrum Smooting

Smooth the spe	ectrum	×
Smooth		ок
Range	2	Cancel
Name	Sample-2-s	Calcer

appears allowing the user to select the derivative function required (1-10) and enter a name for the calculated derivative spectrum. Select OK to confirm. The derivative spectrum will be displayed as an overlay on the original.

on the toolbar. A dialogue box

Click on the toolbar. A dialogue box appears allowing the user to select the range of the smoothing function (2-100) and enter a name for the smoothed spectrum. Select OK to confirm. The smoothed spectrum will be displayed as an overlay on the original.

#### 6.5.7 Remeasure (Re-plot) Spectrum



Click on the toolbar. A dialogue box appears asking the user to specify the frequency of the data points in the re-plotted spectrum. Select OK to confirm. The re-plotted spectrum will be displayed.

## 6.6 OVERLAY SPECTRA



The Prism Pc software can display multiple spectrum scans simultaneously on the screen by either measuring additional samples or loading stored data. The active spectrum is selected from the drop down menu on the toolbar. The colours of the selected spectrum's background and photometric trace can be selected using the palette options on the toolbar.

#### 6.6.1 Spectrum Addition, Subtraction, Multiplication and Division

Spectra Addition	)/Subtraction	×
File 1	holmium scan against system basel	OK Cancel
File 2	holmium scan after measurement b	
Result	ResultName	



A dialogue box will appear asking the user to specify the files to be used in the calculation and enter a name for the calculated spectrum. Select OK to confirm. The calculated spectrum will be displayed.

## 6.6.2 Delete Displayed Spectrum

Select the spectrum to be deleted in the active spectrum drop down box (see 6.6). Click on the toolbar to remove the spectrum from the display.

## 6.7 SPECTRUM DISPLAY AND PRINT OPTIONS

Settings to display and print the spectra
View Peak and Valley Legend Special Scaler Print Memo
X-Axis Wavelength(nm) Font
Y-Axis Absorbance( Abs Transmittanc T Font
Title Sample-1
OK Cancel Apply Help
Settings to display and print the spectra
View Peak and Valley Legend Special Scaler Print Memo
🔽 Spectrum 🗖 Grid data 🗖 Operator 🛛 David
✓ Scan Range     [200.0,1000.0      ✓ Scan Step     [0.1nm     □     Filters     [49
✓ Print Time March 01 15:50:39 2012
Foot notes Bibby Scientific

The display and print options for the selected

spectrum can be accessed by selecting the icon on the toolbar. The display range, peak and valley labels, axis legends, spectrum title, display colours, print information options and printout notes can be edited in the dialogue box that appears.

# **SECTION 7 – KINETICS**

The kinetics measurement mode enables the absorbance or % transmittance of an active molecule to be measured over a period of time; for example enzyme analysis of horseradish peroxidase. The absorbance or % transmittance is measured at regular time intervals at a set wavelength over a period of time. The results are plotted on a graph to show the change in absorbance or % transmittance over time. Following sample measurement statistical analysis of all or part of the experiment can be performed.

## 7.1 KINETICS MODE SCREEN



Select the Kinetics Measurement icon on the toolbar. The Kinetics measurement window will open.

## 7.2 METHOD SETUP



The kinetics scan settings can be edited by selecting the settings icon *p* in the toolbar. The options that can be changed are:-

- 1. Scan wavelength
- 2. Scan time (max 100000s)
- Scan Step (0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0, 30.0, 60.0s)

The required options can be entered directly or selected from the available options via the drop down lists. Select OK to confirm.

## 7.3 SELECTING THE MEASUREMENT MODE

The required measurement mode can be selected from the available options of Abs and %T by selecting the T or A icons on the toolbar.

#### 7.4 SAMPLE MEASUREMENTS



Insert a cuvette containing the blank solution into the reference position in the sample chamber and insert the cuvette containing the sample solution into the sample position. Close the instrument lid and select Start the а measurement icon **b** on the toolbar. Once the is complete the measurement measured spectrum scan will be displayed on the screen. The scan can be cancelled by selecting the Stop a measurement icon

## 7.5 POST MEASUREMENT TOOLS

## 7.5.1 Adjusting the Displayed Scan Range



Select the Setup display spectrum icon # from the toolbar. Enter the required display settings and select OK to confirm.

#### 7.5.2 Kinetics Zoom Function

Select the Zoom function icon icon from the toolbar. Position the cursor in the upper-left corner of the area you want to select. Hold the left mouse button to drag the cursor to outline the scan area you want to enlarge. Release the mouse button. The part of the scan which is displayed within the outlined

area will be enlarged. Select the undo zoom icon **end** to restore the previous view settings. Select the Zoom function icon again to exit the zoom function.

#### 7.5.3 Spectral Points Analysis



Select the Scan spectrum icon from the toolbar. Move the cursor over the kinetics spectrum to trace the scan and display the scan data. Select the Scan spectrum icon again to exit the spectral points analysis mode.

#### 7.5.4 Kinetics Derivative

Derivative		x
Derivative		OK
Class	1	Cancel
Name	Sample-2-d	

#### 7.5.5 Remeasure (Re-plot) Kinetics Scan



#### 7.6 OVERLAY SCANS

KINETICS2.kin	
KINETICS2.kin	
KINETICS.kin	

Click on the toolbar. A dialogue box appears allowing the user to select the derivative function required (1-10) and enter a name for the calculated derivative spectrum. Select OK to confirm. The derivative spectrum will be displayed as an overlay on the original.

Click in the toolbar. A dialogue box appears asking the user to specify the frequency of the data points in the re-plotted kinetics scan. Select OK to confirm. The re-plotted kinetics scan will be displayed.

The Prism Pc software can display multiple kinetics scans simultaneously on the screen by either measuring additional samples or loading stored data. The active kinetics scan is selected from the drop down menu on the toolbar. The colours of the selected scan's background and photometric data can be selected using the palette options on the toolbar.

## 7.6.1 Kinetics Display and Print Options

Settings to display and print the spectra										
F	Print	Me	mo	Dynamic Analysis						
View	Peak	and Valley	Legend	Special		Scaler	- į			
X-Axis	Time(s)			Font	:					
Y-Axis	Y-Axis Absorbance( Abs =Transmittan T Font									
🔽 Title	KINETICS.kir	1		Font	t					
	[	OK	Cancel		Apply	Help				

The display and print options for the selected

scan can be accessed by selecting the icon on the toolbar. The display range, peak and valley labels, axis legends, spectrum title, display colours, print information options and printout notes can be edited in the dialogue box that appears.

#### 7.6.2 Calculate Rate of Change

5e	ttings to disp	lay and print	the spec	tra 🛛				×
	View	Peak and V	'alley	Legend		Special	Scaler	
	Print		Merr	10		Dynamic Ar	nalysis	
Print Result         Result           Time Begin 10         IU         1.91883         R         -0.988567           Time End         20         III         -1.91883         R         -0.988567								
	K Factor	6.5		Calc	ulate			
-			OK	Cance		Apply	Help	

The rate of change for the selected kinetics scan is calculated by selecting the Display and Print

settings icon and valley labels, axis legends, spectrum title, display colours, print information options and printout notes can be edited in the dialogue box that appears.

# **SECTION 8 – DNA/PROTEIN**

The DNA/Protein measurement mode allows the user to measure multi-wavelength absorbance ratios, such as 260nm/280nm and 260nm/230nm, which are commonly used to estimate a protein or nucleic acid sample's purity. The mode also includes calculations that can be used to estimate the concentration of the protein or nucleic acid sample.

Four commonly used protein assay methods are pre-loaded in this measurement mode. The available protein assay methods are Direct UV, Lowry, Bradford, Biuret and BCA.

## 8.1 DNA/PROTEIN MODE SCREEN



Select the DNA/Protein Measurement icon so not the toolbar. The DNA/Protein measurement window will open.

#### 8.2 METHOD SETUP



#### 8.2.1 Adjusting the Method Parameters

🏸 Method 🍖 Information 🖶 St	andard 🖏 Sample
Method	Concentration of DNA
260/280 -	C( DNA ) = f1*(A1-Aref) - f2*(A2- Aref)
	Coef. fl= 62.9 Coef. f2= 36
Wavelength	Concentration of Protein
WL 1 260	C(Protein) = f3*(A2-Aref) - f4*(A1- Aref)
WL 2 280	Coef. f3=  1000 Coef. f4=  700
With Reference	Ratio Unit Unit
WL 3 320	Ratio= Al-Aref ug/mL •

The DNA/Protein method options are selected from the Method drop down box. The methods that are available are:-

- 1. 260/280
- 2. 260/230
- 3. UV Method
- 4. Lowry
- 5. BCA
- 6. Bradford
- 7. Biuret

Select the DNA/Protein Measurement field to edit and enter the required wavelength or concentration factor. The displayed concentration unit is selected from the Unit drop down menu.

## 8.3 DETERMINATION OF NUCLEIC ACID CONCENTRATION

Select the required method parameters as in 8.2.

#### 8.3.1 Sample Measurements

ample-1	LOO. OIM	12.00.01101104	CONTRACTOR DURING	C-DHA	Protein	Patio			
ampre 1			52.0 . 011m	S. Dan	riocom	ACAT LO		Start	
(amp.La=2		6						Delete	
ample-3								Mostly.	
ample-4								Recalc	1
ample-5								Font	-
ample-6								1.000	-
ample-7								Prud	_
ample-8							č	Parameters	
ample-9								n 🗆	
ample-10								62	-
ample-11								20 E	1
ample-12									
ample-13								9 I	
ample-14									

DNA/Protein Measure	ement	×
Result		Sample
Lambda	Abs	
260.0nm	0.9862	Name Sample-1
280.0nm	0.5778	C-DNA 39.994595
320.0nm	0.0460	
C-DNA	39.9945	5
Protein	109.801	1 ОК
Ratio	1.76783	3 Cancel

Sample name	260	0nm	280	0nm	320.	0nm	C-DNA	Protein	Ratio	-	St	ort.
Sample-1	0.	9862	0.	5778	0.	0460	39.9946	109.8016	1.7678	-		
Sample-2											Del	ete
Sample-3											Mo	lify
Sample-4											Rec	alc
Sample-5											Fo	nt
Sample-6											De	
Sample-7										1		
Sample-8											Paramete	rs
Sample-9											fl 🗌	
Sample-10											12	-
Sample-11												_
ample-12											D	
Sample-13	1										54	
Sample-14	1											

To quantify an unknown sample select the Sample tab. Insert the sample cuvette into the sample cuvette holder and the blank solution into the reference sample holder.

Select the Start button.

A new window will open allowing the sample name to be edited. The actual photometric readings of the sample will be displayed in the Readout window along with the results of the calculations specified in the method settings.

Select OK to transfer the data to the sample result table.

The sample result table will display the measured absorbance values and the final calculated concentration and ratio values.

#### 8.4 DETERMINATION OF PROTEIN CONCENTRATION

Select the required method parameters as in 8.2.

#### 8.4.1 Using a Concentration Factor or Pre-defined Calibration Curve

#### 8.4.1.1 Entering Known Calibration Curve Constants

🥬 Method 👆 Information 🕂 🕂 St	tandard   🏠 Sample
Method	Concentration of DNA
Lowry	C(DNA)=K2*A^2 + K1*A + K0
	K0= 0
Wavelength	K1= 1
WL 1 750	K2= 0
WL 2 260	K3= 0
With Reference	Standard Unit
WL 3 260	Use Standard ug/mL

The known calibration curve constants can be entered into the appropriate K0 – K2 fields where:-

Concentration =  $(K2^*X^2)$ +  $(K1^*X)$  + K0

X = Photometric value of the sample

#### 8.4.2 Constructing a New Calibration Curve

#### 8.4.2.1 Measuring Standard Samples

🕅 Mathad 🔈 Jafara	notion du	Standard S	Pemple ]	
meanoù   🖓 miori		Standard 18	Samhie	- Central Densi
Sample name7	50.0nm	C-DNA		Start
Standard-1				
Standard-2				Delete
Standard-3				Modify
Standard-4				Recalc
Standard-5				Font
Standard-6				Duint
Standard-7				Print
Standard-8				Parameters
Standard-9				f1 0
Standard-10				f2 1
Standard-11				
Standard-12				0
Standard-13				f4 U

DNA/Protein Measure	ment	X
Result		Sample
Lambda	Abs	Nome Ctondord 1
750.0nm	0.0836	C DNA 10
		C-DIA III
		OK
		Cancel

🔎 Method 🛛 🗞 Info	rmation 🚏	Standard 🍖	Sample	
Cample name	750.000	C DNA		Control Panel
sampre name	750.0111	C-DIA	-	Start
Standard-1	0.0836	10.0000	-	
Standard-2	0.5072	50.0000		Delete
Standard-3	1.0180	100.0000		Modify
Standard-4				Recalc
Standard-5				Font
Standard-6				Drint
Standard-7				
Standard-8				Parameters
Standard-9				fl 2.26264
Standard-10				f2 92.2434
Standard-11				£2 3 6995
Standard-12				1. 2.26000+ 02
Standard-13				f4 2.550998-05
Chandend 14				

#### 8.4.3 Sample Measurement

🖉 Method 😽 Info	rmation   🖶	Standard 🔊	Sample	
Sample name	750.0nm	C-DNA		Control Panel
Sample-1			]	Diat
Sample-2				Delete
Sample-3				Modify
Sample-4				Recalc
Sample-5				Font
Sample-6				Print
Sample-7				
Sample-8				Parameters
Sample-9				f1 0
Sample-10				f2 1
Sample-11				
Sample-12				1.5 0
Sample-13				f4 0

Select the Standard tab.

Insert the first standard into the sample position in the sample chamber and the reference into the reference position in the sample chamber.

Select the Start button to initiate the measurement

A new window will open allowing the Standard name and concentration to be edited. The actual photometric reading of the standard will be displayed in the Readout window. Select OK to transfer the information to the main standard tab.

Repeat this procedure for each standard sample.

To quantify an unknown sample select the Sample tab and select the Start button.

DNA/Protein Measur	ement	×
Result		Sample
Lambda 750.0nm	Abs 1.0181	Name Sample-1
C-DNA	99.9957	C-DNA 99.995750
		OK
		Cancel
		Cancel

A new window will open allowing the sample name to be edited. The actual photometric reading of the standard will be displayed in the Readout window and this value will default to the C-DNA field.

Select OK to transfer the data to the sample result table.

The sample result table will display the measured absorbance value and the calculated concentration value.

Sample name	750 0pm	C-DNA	 Co	ntrol Panel
Sample-1	1 0191	00 0059		Start
Sampie-i	1.0101	33.3330		Delete
sampie-z	-			Modify
sampie-3				mouly
Sample-4				Recalc
Sample-5				Font
Sample-6				Deint
Sample-7				Fint
Sample-8			_ Par	ameters
Sample-9			f1	2.2208
Sample-10			f2	92.3009
Sample-11			£2	3 67366
Sample-12			15	5.07500
Sample-13			f4	2.35099e-03

# **SECTION 9 – APPENDIX**

The multicell accessory measurement mode allows the user to measure a sample's photometric absorbance or %transmittance at up to 10 wavelengths. Following sample measurement, the photometric readings are displayed on the multi-wavelength mode screen.

## 9.1 CALCULATIONS IN QUANTITATION MODE

Single Wavelength Method	: Abs.=A <sub>1</sub>
Double Wavelengths Method	: Abs.=m*A <sub>1</sub> -n*A <sub>2</sub>
Three Wavelengths Method	: Abs.=A <sub>1</sub> -(WL1-WL2)*(A <sub>2</sub> -A <sub>3</sub> )/(WL2-WL3)-A <sub>3</sub>

#### 9.2 CALCULATIONS IN DNA/PROTEIN MODE

260/280:	CDNA CProtein Ratio	=(A1-Aref)*f1-(A2-Aref)*f2 =(A2-Aref)*f3-(A1-Aref)*f4 =(A1-Aref)/(A2-Aref)	
	A1=A260nm, <i>A</i> f1=62.9, f2=36	A2=A280nm, Aref=A320nm (Optional) .0, f3=1550, f4=760.0	
260/230:	CDNA CProtein Ratio	=(A1-Aref)*f1-(A2-Aref)*f2 =(A2-Aref)*f3-(A1-Aref)*f4 =(A1-Aref)/(A2-Aref)	
	A1=A260nm, A2=A230nm, Aref=A320nm (Optional) f1=49.1, f2=3.48, f3=183, f4=75.8		

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# **SECTION 10 – TECHNICAL SUPPORT**

## 10.1 TECHNICAL SUPPORT

Jenway have a dedicated Technical Support team made up of experienced scientists who are on hand to help with any applications advice and questions you may have about our products and how to use them. If you require any technical or application assistance please contact the team at:

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