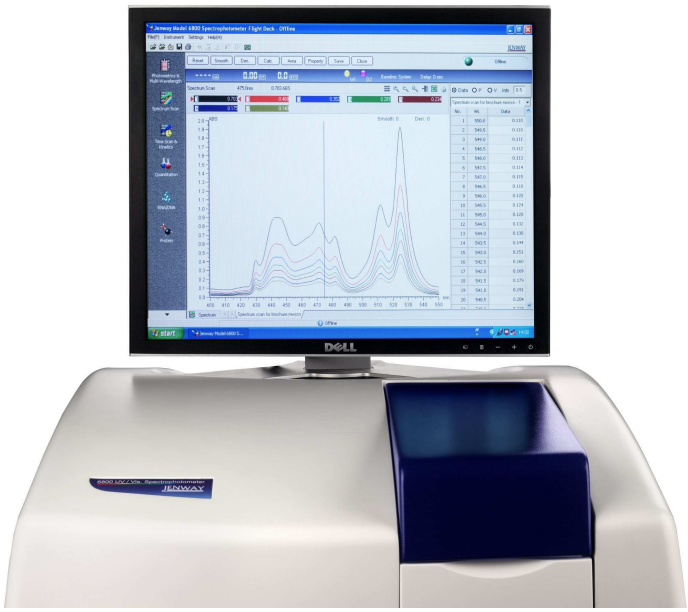
6800
Double Beam
Spectrophotometer
Operating Manual



680 005/REV A/07-08

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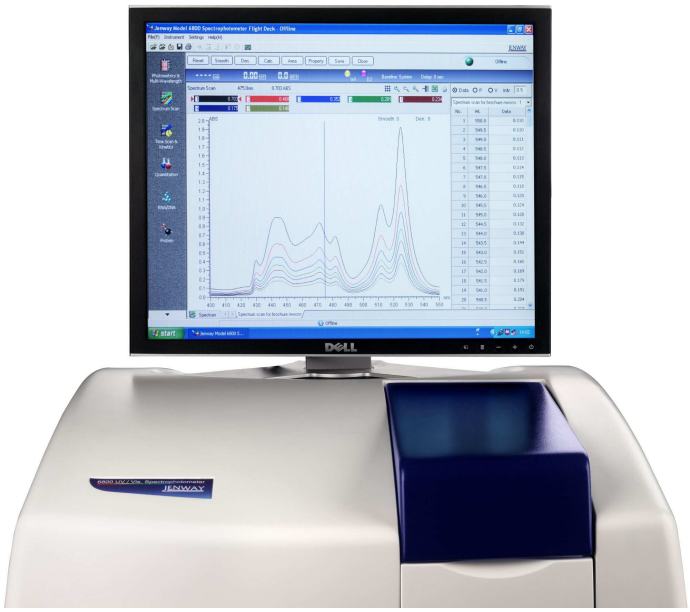

680 005/REV A/07-08

Safety

This is important information; please read carefully before installing or using this instrument.

The Model 6800 Spectrophotometer is designed for operation by **trained personnel** who are aware of the principles and applications involved. For further help and advice please contact your local distributor,

The spectrophotometer is a sensitive electronic and optical instrument designed for use in a laboratory environment. Careful adherence to the installation instructions must be observed. If in doubt contact a **relevant and competent authority** for advice before proceeding.

In addition to observing the instructions detailed in the Operating Manual and Service Manual for this instrument all installation, operating and service personnel must be aware of, and employ, **a safe system of work**.

Voltage levels hazardous to life are present in this instrument, for personal safety only **trained engineers** aware of the risk and avoidance of electric shock should remove protective covers from the instrument.

This instrument is designed for minimal maintenance, which must be carried out carefully following the **procedures detailed in this manual**. All safety instructions in these procedures, as well as those defined locally for the **area or environment** where the work is being carried out must be observed.

Other than for those items defined in the maintenance procedures herein there are **no user serviceable** items in this instrument. Removal of covers and attempted adjustment or service by unqualified personnel will invalidate any warranty and incur additional charges for repair.

Reference should always be made to the **Health and Safety Data** for any chemicals or reagents used. All available information, advice and warnings on the handling, storage, use and disposal of such must be carefully observed. When not available this data must be requested from the supplier before proceeding in any way.

It is important that **good laboratory practice** is observed when handling samples, chemicals, reagents and ancillary equipment in order to carry out measurement and analysis with this instrument. Suitable **safety and personal protective equipment** must be used at all times.

If it is suspected that safety protection has been impaired in any way, the spectrophotometer must be made **inoperative and secured** against any intended operation. The fault condition must be reported to the **appropriate servicing authority**. In all such reports the **model number and serial number** of the spectrophotometer must be quoted.

Guarantee

Please read this important guarantee information:

Notwithstanding the description and specification(s) of the instruments contained in the Operating Manual, Jenway hereby reserves the right to make changes as it sees fit to the instruments or to any components of the instruments.

This Manual has been prepared solely for the convenience of Jenway customers and nothing in this Manual shall be taken as a warranty, condition or representation concerning the description, merchantability, fitness for purpose, or otherwise of the instruments or components.

The Model 6800 spectrophotometer is guaranteed for a period of 12 months from the date of purchase.

Within this period we undertake to supply replacements free of charge for parts that may on examination prove to be defective, provided that the defect is not the result of misuse, accident or negligence.

On all correspondence, please quote the model and serial number in full and/or the sales order number.

Any instrument requiring service under this guarantee should be taken to the supplier through whom it was purchased, or, in the case of difficulty, it should be carefully packed in its original packaging and consigned, carriage paid, to us. Jenway takes no responsibility for returned goods damaged in transit.

Returned goods will not be processed without a Returns Authorisation Number.

Call the Service Administrator +44 (0) 1371 820122 for the relevant documentation.

Please write the Returns Number on the outside of any packaging and ensure that a copy of a Decontamination Certificate is visible.

Please register online (www.jenway.com) or complete and return the Registration Document by fax or mail.

The Guarantee will be rendered invalid if any specified non-serviceable parts within the instrument are tampered with.

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Section 1

Introduction

1.1 Instrument Description

The Model 6800 is a true double beam UV/visible spectrophotometer with highly stable symmetrical optics suited to a wide range of applications in Education, Quality Control, Environmental and Clinical analysis. The Model 6800 offers a wide range of features and functions including:

- Photometric and Multi-Wavelength measurements in Abs, %T and Ratio.
- Spectrum Scanning over the range 190-1100 nm with peak and valley identification, derivation and calculation functions.
- Time Scan and Kinetics over the time range 30-9999 seconds.
- Quantitation using up to 100 standard values and up to 3 wavelengths.
- RNA/DNA measurements using a standard method.
- Protein measurements using Bradford, Lowry, BCA and Direct UV protocols.

The intuitive Jenway Flight-Deck software ensures operation is a simple, straightforward and productive experience. The PC software supplied enables easy transfer of data from the operating PC to spreadsheets (including Excel), and other computer programmes via a USB port.

Photometrics / Multi-Wavelength for simple Absorbance, Transmittance and Energy measurements at 1 to 6 set wavelengths, 2 or 3 wavelengths can be selected for standard calculations of ratio and difference. Results are displayed in a simple tabular format for quick and easy exportation to Excel or other spreadsheets and databases.

Spectrum Scanning, in the range of 190-1100nm, can be completed with resolutions of up to 0.1nm and scan speeds of up to 3600nm/sec. Data is presented in both graphical and tabular formats with automatic peak and valley identification as well as manual selection; multiple overlays, spectrum calculations and derivatives can also be displayed.

Kinetics/Time Scan can be carried out over 30 to 99999 seconds. Concentration or Activity values can be calculated from the display by the free selection of a start and end time, for which a regression curve is displayed and calculations made against an adjustable K factor.

Quantitation enables the accurate measurement of sample concentrations over a wide range against a calibration curve based on one to one hundred standard values and at up to three wavelengths for multi-component analysis.

DNA/RNA mode offers a standard method for measuring DNA or RNA concentrations using the absorbance measurements at 260/280nm. Purity ratios are also displayed. Accessories are available for this precise application.

Protein mode offers pre-set methods for measuring protein concentration using Bradford, Lowry, BCA and Direct UV protocols.

Validation enables a detailed report of the instruments performance to be generated quickly and simply ensuring full compliance with local operating procedures.

To enhance productivity of the Model 6800 a full range of accessories is available including a water heated cell holder, a micro-cell holder for sample volumes down to 50µl, variable path-length cell holders for lengths up to 100mm, glass filter holders and flexible film holders are also available. All these accessories can be easily fitted or changed by the operator.

1.2 Instrument Specifications

Light Source	Tungsten Halogen and Deuterium
Scan Speed	10, 100, 200, 400, 800, 1200, 2400, 3600nm/min
Spectral Bandwidth	1.5nm
Lamp Switchover	325 to 370 selectable
Wavelength Range	190-1100nm
Wavelength Resolution	0.1nm
Wavelength Accuracy	±0.3nm
Wavelength Repeatability	±0.1nm
Transmittance Range	0 to 600%T
Transmittance Resolution	0.01%T
Stray Light	<0.05% at 340nm and <0.05% at 220nm
Absorbance Range	-3.0000 to 3.0000A
Absorbance Resolution	0.0001A
Photometric Accuracy	±0.002A at 0 to 0.5A ±0.004A at 0.5 to 1.0A ±0.008A at 1 to 2.0A ±0.3%T
Photometric Reproducibility	±0.001A at 0 to 0.5A ±0.002A at 0.5 to 1.0A ±0.004A at 1 to 2.0A ±0.15%T
Baseline Stability (Drift)	0.0003A/hour at 500nm after 2 hours operation
Baseline Flatness	±0.002A (200 to 950nm)
Noise	0.0003A
Concentration Range	0.000 to 9999
Communications	RS232, able to communicate with USB port with designated brand RS232-USB adapter
Mains Supply	110 or 230V
Size (w×d×h)	540 × 560 × 235mm
Weight	27kg

1.3 Environmental Operating Conditions

The Model 6800 is designed to work safely under the following conditions:

Operating Temperature	10 to 35℃
Operating Humidity	45 to 85%
Storage Temperature	5 to 40℃, instrument turned off
Atmosphere	Free from acid gas or alkaline gas and other gases that may corrode metals significantly. Free from gases that may dissolve paint such as from organic solvents (particularly benzene thinners or similar).

Other general notes, which should be strictly observed:

< Avoid direct sunlight to avoid deterioration in optical performance.

< To prevent malfunction of the fine adjustment mechanism ensure any strong vibration or shock that can be felt by the human body is not transmitted to the instrument.

< Avoid placing the instrument in the vicinity of a heat generating apparatus such as a gas burner, electric heater or oven to prevent the mainframe cover being heated.

< Avoid placing the instrument close to instruments that generate a strong electric field (such as an electric welding machine, high frequency furnace or pole transformer).

< To prevent the deterioration of optical performance avoid a dusty environment.

< The line voltage must be stable and free from rapid fluctuations.

< Do not frequently turn on and off poorly protected electronic devices (such as stirrers, etc.) that are connected to the same mains circuit as the Model 6800.

1.4 Good Practice Guidelines

1) For optimum performance all spectrophotometers should be sited in a clean, dry, dust free atmosphere. When in use ambient temperature and light levels should remain as constant as possible.

2) Adherence to Standard Operating Procedures (SOP) and Good Laboratory Practice (GLP) should be monitored with regular calibration checks and a suitable Quality Control (QC) programme.

3) The sample chamber lid must be fully closed during measurement and before any readings are recorded or printed.

4) The correct selection of sample containers is imperative for accurate and reproducible results:
   a) Check that the material of the sample container is compatible with the wavelengths to be used for measurement. In general glass can only be used down to 360nm or 320nm depending on quality. Standard plastic cuvettes can be used down to 320nm. Special UV versions can be used down to 260nm. Below this level quartz cuvettes must be used.

   b) Plastic disposable cuvettes should be used ONCE only.

   c) Glass cuvettes should be thoroughly cleaned after use. Discard when scratches become evident in optical surfaces.

   d) Care should be taken when selecting semi-micro or micro cuvettes. The cuvette window on the inner chamber (the area filled with sample) must be wider than the aperture in the sample holder or light will reach the detector without passing through the sample. In this case, semi-micro or micro cuvettes with self-screening black surrounds must be used or alternative holders for these cuvettes fitted.

   e) Glass test tubes and other sample tubes should be used with care. Where possible, matched tubes should be used and any index mark set to the correct position before measurements are made.

   f) Ensure any sample containers used are compatible with the constituents of both the samples and standards they are to hold. Plastic cuvettes are not compatible with organic solvents.

   g) All sample containers must be handled with care; by the top and non-optical surfaces only. Any finger marks evident must be removed using a suitable cleaning process.

   h) Flow-through cuvettes must be selected with care and consideration for the sample type, sample volume, pumping system, rinse, sample and waste handling to be used.

5) Samples and standards should not be stored in open cuvettes or sample containers as evaporation will change the value and lead to staining of the walls which may be irreversible. If stored in stoppered and sealed cuvettes, they should be filled with little or no air space and the values regularly checked against a reference standard or quality control material.

6) Cold samples should be allowed to equilibrate to ambient temperature before measurement (unless a suitable temperature controlled sample holder is in use). Temperature change during measurement may cause air bubbles to form on the walls of the sample holder. This is a common cause of drift during measurement.

7) In the preparation of samples and standards high grade borosilicate glass and AR grade chemicals and reagents must be used. Good quality deionised water or other suitable solvent must be used for dissolving or diluting samples, chemicals and reagents.

8) All measurements require calibration to a blank, for maximum accuracy this should be prepared with care using the same deionised water or solvent used for dissolving or diluting the sample. Where reagents are added to the sample to produce a colour proportional to its concentration a 'sample based' blank should be used. In this case the blank should consist of the sample plus any reagents or chemicals to be used, ***except*** those that produce the colour to be measured.

9) Deviations from the Beer-Lambert Law may occur at high and low concentrations giving non-linear response during sample concentration measurements. For all new methods a linear range should be defined by the preparation of a calibration curve. The quantitation mode may be used to construct such a curve against which sample results are automatically measured.

10) Cuvettes and sample holders must be filled to a minimum level which covers the light path.

Section 2

Getting Started

2.1 Unpacking Instructions

Refer to the label located on the exterior of the packing carton and ensure the instrument type and options/accessories supplied are correct. Refer to your local dealer in the event of any discrepancy.
Remove the package transport securing straps and discard.

Carefully lift off the cardboard carton and remove the two foam packing pieces located on the top of the instrument and place to one side.

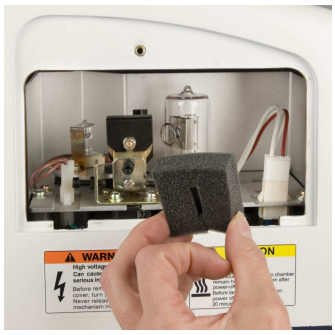
PLEASE TAKE CARE WHEN LIFTING.
It is recommended that, due to the weight (approx. 27Kgs), two people lift the instrument to avoid serious injury. Grasp the instrument (which will be sealed in a plastic bag) firmly at each end, and lift out of the carton to place on an adjacent flat, firm and clean surface.

Check the instrument when it is removed from the packaging to ensure it is correct and undamaged. Refer your local dealer if any item is missing or damaged.

Remove any additional documentation supplied with the instrument. This **MUST** be retained for future reference.

Note: The light source-switching mirror is secured with a sponge rubber material for protection during shipment. This must be removed prior to attempting to use the instrument. Failure to remove this may cause serious damage.

Open the light source cover, and carefully remove the protective material. Keep this material safe with the instrument packaging for possible future long-term storage or transportation. Once removed, carefully close the cover.



Please familiarise yourself with the contents of the Operating Manual prior to using the instrument for the first time.

Refer to the Operating Manual to ensure accessories are installed correctly before using the instrument for the first time.

Disposal of Packaging

It is recommended that the instrument packaging be retained for possible future long-term storage or transportation. Please note that Jenway or the Distributor cannot be held responsible for any damage incurred as a result of transportation of an inadequately packed instrument.

If you wish to dispose of the instrument packaging, please do so in an environmentally responsible manner. Please refer to the following guidelines: -

Cardboard packing items are made from paper sourced from recycled fibres or managed forests and can be 100% recycled where appropriate facilities exist. Ensure cartons are crushed or flattened before disposal.

Foam packing pieces are manufactured with a reprocessed polyethylene content and can be easily recycled with other low-density polyethylene (LDPE) materials. Polyethylene foam is manufactured by a CFC and HCFC free process and contains less than 100ppm heavy metal content. The European Union Packaging Directive confirms that recovery by means of waste-to-energy is a sensible waste management alternative.
The Polyethylene foam burns cleanly and contributes a high calorific value.

2.2 Installation

2.2.1 Location

In ideal circumstances the installation environment will be clean, dry and dust free with the instrument protected from extreme variations in ambient lighting and temperature change. Ensure the unit is positioned so that the mains on/off switch is accessible. If a safety problem should be encountered, switch off at the mains socket and remove the plug from the supply. Where conditions are less than ideal, maintenance and cleaning must be carried out regularly and additional protection offered where possible.

Operating Temperature	10 to 35℃
Operating Humidity	45 to 85%
Atmosphere	Free from acid gas or alkaline gas and other gases that may corrode metals significantly. Free from gases that may dissolve paint such as from organic solvents (particularly benzene thinners or similar).

Other general notes that should be strictly observed:

< Avoid direct sunlight to avoid deterioration in optical performance.
< To prevent malfunction of the fine adjustment mechanism ensure any strong vibration or shock that can be felt by the human body is not transmitted to the instrument.
< Avoid placing the instrument in the vicinity of a heat generating apparatus such as a gas burner, electric heater or oven to prevent the mainframe cover being heated.
< Avoid placing the instrument close to instruments that generate a strong electric field (such as an electric welding machine, high frequency furnace or pole transformer).
< To prevent the deterioration of optical performance avoid a dusty environment.
< The line voltage must be stable and free from rapid fluctuations.
< Do not frequently turn on and off poorly protected electronic devices (such as stirrers, etc.) that are connected to the same mains circuit as the Model 6800.

2.2.2 Supply Voltage

The Model 6800 designed to operate on 110-240Va.c. supplies (-20% +10%) 50/60Hz.
The standard 2-metre mains cable supplied with the instrument is fitted with an IEC type connector, which can be plugged directly into the power in socket on the rear panel.
The mains fuse is housed within the socket. When replacing the fuse the instrument must be disconnected from the mains supply.
In the event of the fuse failing after replacement it is advisable to consult with your local dealer before proceeding further.

Fuse Rating – 3.15A

Note: The instrument should be positioned within 1.5 metres of an earthed mains supply.

2.2.3 Mains Connections

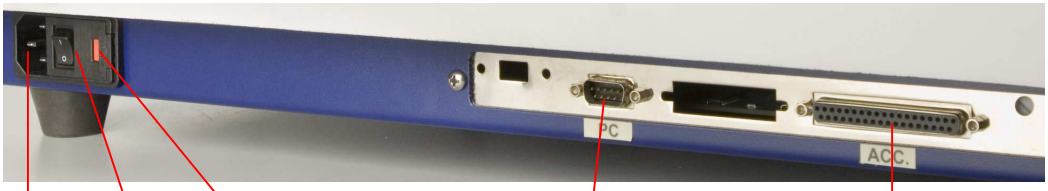
The mains leads supplied with the instrument will have moulded on plugs. However, if this is removed for any reason the wires in the mains lead are colour coded to conform to the internationally recognised standard such that:

UK CONNECTIONS		**US CONNECTIONS**	
BROWN	**LIVE**	**BLACK**	**LIVE**
BLUE	**NEUTRAL**	**WHITE**	**NEUTRAL**
GREEN/YELLOW	**EARTH**	**GREEN**	**EARTH**

Safety
When disposing of any removed plug the connectors must be removed or made incapable of insertion into a mains socket.

2.2.4 Instrument Connections

Connections for the instrument are located on the left hand side of the casework



Power In Socket

On/Off switch

Fuse Holder

9 pin serial port for connection to PC

37 pin connection port for accessories

2.3 Operating System Requirements

Windows 2000®, XP®, Vista®

Minimum system requirements: CPU: 1GHz
Memory: 256Mb
Hard disk: 500Mb

Communications: RS232

Section 3

Jenway Model 6800 Flight Deck Software

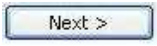
3.1 Installing The Jenway Model 6800 Flight Deck Software

Insert the ***Jenway Model 6800 Spectrophotometer Flight Deck Software*** CD.

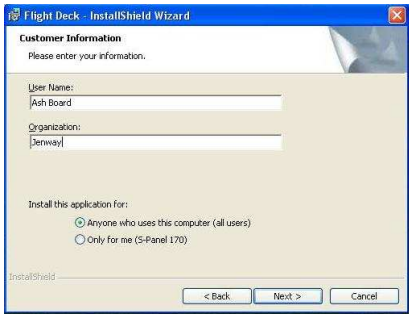
Select the

icon from ***My Computer***. Select the icon

to display the following screen:

To commence the installation select 

To exit the installation at any time select



Input the ***User Name*** and ***Organisation Name*** and select who can use the Flight Deck software.

After all information has been inputted select

to move onto the next screen.

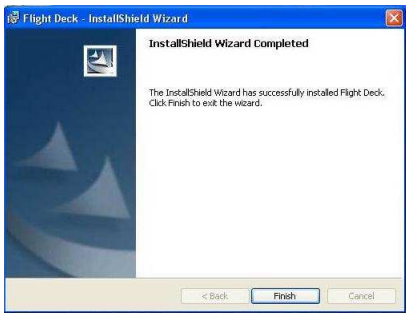
The default installation destination is ***C:\Program Files\FlightDeck***. To select the default destination select

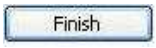
To alter the destination select

After the required ***Destination Folder*** has been chosen select to move onto the next screen.

Select the required set up type and select

To review or change any of the installation settings select



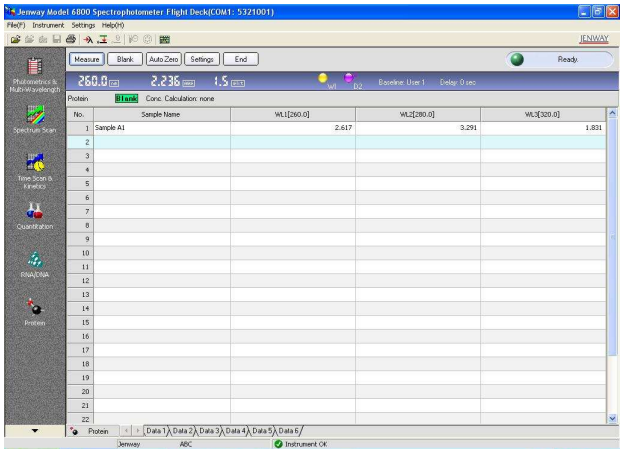
When the installation is complete select 

The Flight Deck Software icon is displayed on the desktop

Section 4

Screens and Icons

4.1 Screen Area



Menu Bar

Tool Bar

Displays shortcuts to common operations

Command Bar

Displays the operations which can be performed in the experimental mode

Status Indicator

Displays the current operating status of the instrument

Live Status Bar

Displays the wavelength, the intensity and the slit width (fixed at 1.5nm)

Lamp Status Display

Displays which lamp is currently in operation

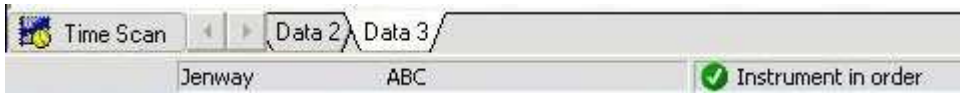
Displays the baseline and delay selected under the ***Instrument Parameters*** tab

Cursor Indicator

Displays the wavelength and intensity of the cursor's position

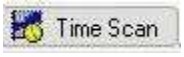
Work Area

Displays operations that can be performed on the spectrum and data



Data Bar

Displays which data set is displayed in the work area.



Mode Indicator - displays the current experimental mode

Page Menu - displays the data tabs

ID - displays the Company and Operator set under the ***General Parameters*** tab

Instrument Status - after power on and self test protocol has been successfully completed

Mode Window - displays the 6 operating modes available

4.2 Icons

Open (available in ***all modes***)

Load combined spectrum from files
(available ***Spectrum Scan*** & ***Timed Scan/Kinetics*** only)

Load combined spectrum from window
(available ***Spectrum Scan*** & ***Timed Scan/Kinetics*** only)

Go to wavelength (available in ***all modes***)

Auto zero (available in ***all modes***)

Save As (available in ***all modes***)

Baseline correction (***Spectrum Scan*** only)

Print screen (available in ***all modes***)

On screen keyboard (available in ***all modes***)

Spectrum grid (***Spectrum Scan, Time Scan & Kinetics, Quantitation***)

Zoom options (***Spectrum Scan, Time Scan & Kinetics***)
(***Quantitation has auto-scale icon only***)

Show / hide window (***Spectrum Scan, Time Scan & Kinetics***)

Export to Excel (available in ***all modes***)

Print report (available in ***all modes***)

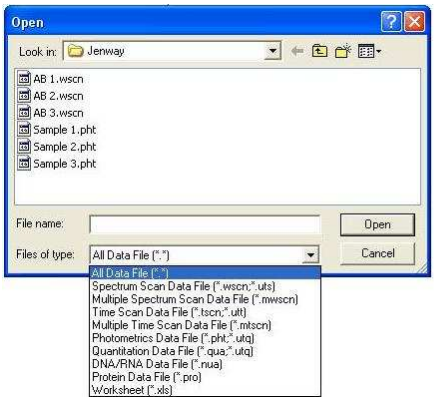
Accessories Icons – only highlighted when accessory is fitted
(available ***all modes***)

Section 5

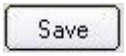
File Management

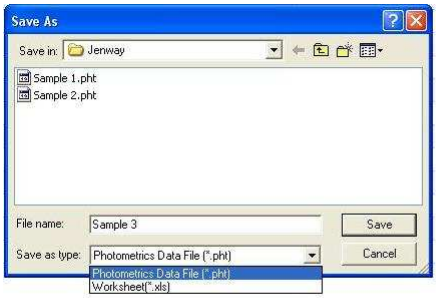
5.1 Opening a File

Previously saved data files can be opened by selecting ***File*** from the ***Menu Bar*** and selecting ***Open***.



5.2 Saving a Data File

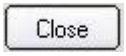
After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting  opens the dialogue box.



Inputting a file name and selecting will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a ***Photometrics*** data file or as an Excel worksheet.

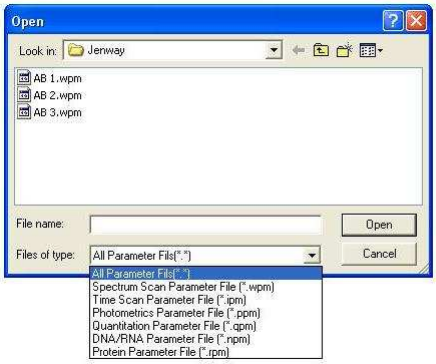
Alternatively, data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting ***Save As***.

To cancel saving the data file select

To exit without saving select  from the ***Command Bar***. The dialogue box will give the options of saving the data, exiting without saving or cancelling.

5.3 Importing Parameters

To import previously saved parameters select Import... from the ***Parameters*** window to open:



The type of parameter file is based on the mode of measurement.

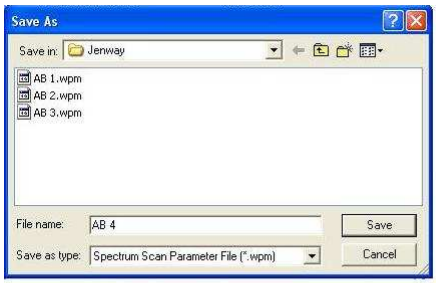
By choosing the required file and selecting Open will import the desired parameters.

Alternatively, parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

Importing the parameters can be cancelled by selecting Cancel

5.4 Exporting Parameters

To export and save parameters select from Export... the ***Parameters*** window to open the ***Save As*** dialogue box.



Inputting a file name and selecting Save will save the parameters in the desired location.

Alternatively, parameters can be exported and saved by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

Exporting and saving the parameters can be cancelled by selecting Cancel

5.5 Zoom Functions

The spectrum can be magnified using the icon.

Alternatively it is possible to zoom in to a specific area by holding down the left mouse button and drawing a rectangle over the desired area, this process can be repeated continuously.

To continuously zoom out use the icon.

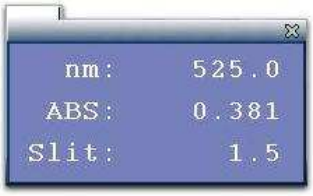
Alternatively, it is possible to zoom out and return directly to the original spectrum at any time by selecting the

button from the Command Bar.

To auto-scale the y-axis select the icon.

5.6 Displaying Real Time Data Window

Selecting ***Real Time Information*** from the ***Settings*** menu displays the ***Real Time Data*** window.



5.7 Go to Wavelength

Selecting the icon from the ***Tool Bar*** opens the ***Set Wavelength*** dialogue box.

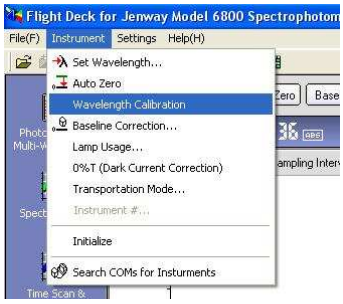
By inputting the required wavelength and selecting

the status indicator will change to display the wavelength and intensity.

Alternatively the ***Set Wavelength*** dialogue box can be displayed by selecting ***Go To Wavelength*** from the ***Operation*** menu.

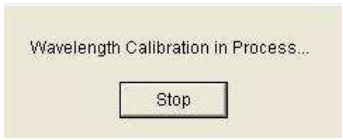
5.8 Wavelength Calibration

If the wavelength position needs to be re-calibrated select ***Wavelength Calibration*** from the ***Instrument*** menu.



During the calibration the status indicator will display

and the calibration dialogue box will appear.

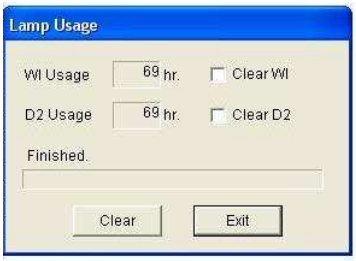


The calibration can be aborted at any time by selecting

Note: During a wavelength calibration no other operations can be performed.

Inquiring Lamp Usage

Selecting ***Lamp Usage*** from the ***Instrument*** menu displays the dialogue box.

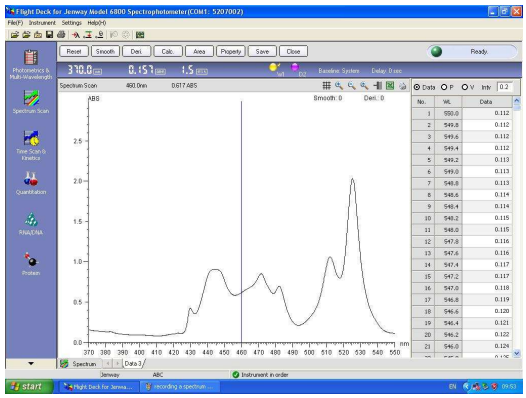


By ticking the appropriate box and selecting

the previous usage time is removed.

5.9 Spectrum Trace

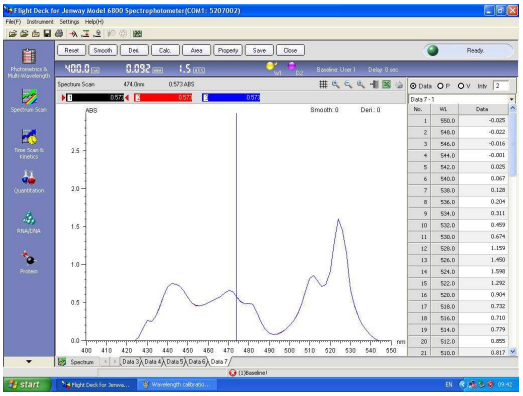
By moving the blue cursor the user can trace to a specific wavelength. The cursor can be moved with the mouse or the keyboard. Selecting a data line in the data table will cause the cursor to jump to this wavelength.



The data at the position of the cursor is displayed on the ***Live Status Bar*** or the ***Work Area***.

5.10 Multi Scan Spectrum Data File

When ***Replicates*** are set greater than 1 and ***Spectrum Display*** is set to ***Overlaid*** or ***Single + Overlaid*** a ***Multi Scan Spectrum Data*** file will be created. All spectra are displayed in the ***Work Area*.**



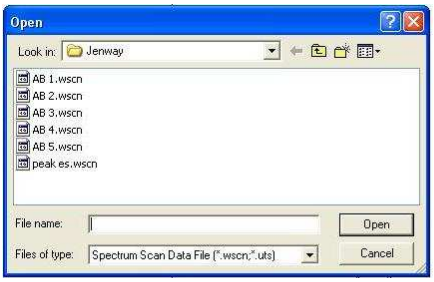
To choose which data is displayed in the ***Data Table***, select the required data bar from the ***Work Area*.**

Note: If choosing to print a ***Multi Scan Data File*** the data that is printed will be the data from the highlighted data bar.

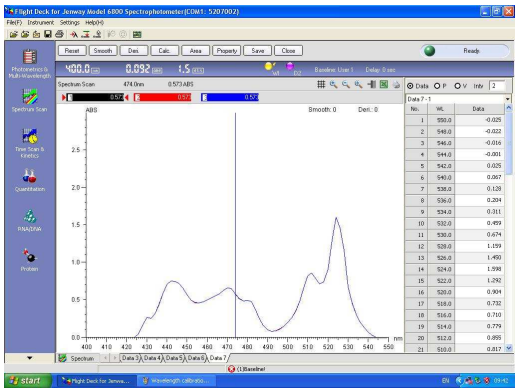
Double clicking the data bar the data will be greyed out and removed from the work area.

5.11 Overlaying Spectra

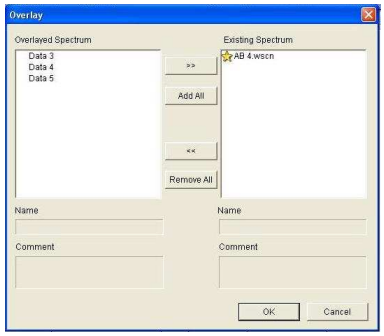
To overlay previously saved data files select from the ***Tool Bar*** to display the ***Open*** dialogue box.



Choosing the required file and selecting ***Open*** will add both the spectrum and data to the ***Work Area***.



To overlay the data files that are displayed on the ***Data Tabs*** select from the ***Tool Bar*** to display the dialogue box.



Selecting the required data from the ***Overlaid Spectrum*** box and choosing will add the spectrum and data to the ***Work Area***.

To deselect any spectra and data select the required data from the ***Existing Spectrum*** and choose

All ***Overlaid Spectrum*** can be added or removed to the ***Existing Spectrum*** box by selecting ***Add All*** or ***Remove All***, respectively.

Note: Only spectra of the same data modes and data types can be overlaid.

To choose which data is displayed in the ***Data Table***, select the required data bar from the ***Work Area***.

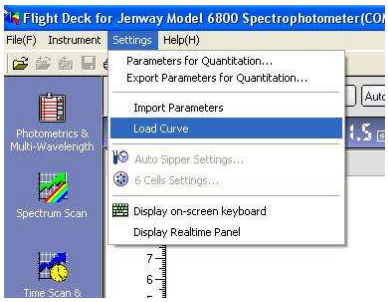
Note: If choosing to print a ***Multi Scan Data File*** the data that is printed will be the data from the highlighted data bar.

Double clicking the data bar the data will be greyed out and removed from the work area.

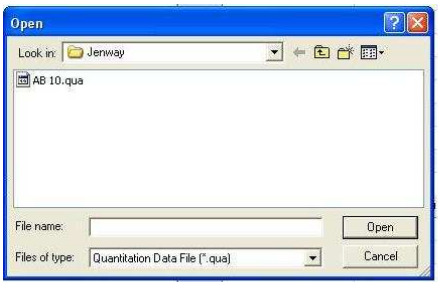
5.12 Importing a Standard Curve

Importing a standard curve allows a sample measurement to be recorded directly, eliminating the need to prepare and measure standard samples on each occasion**.**

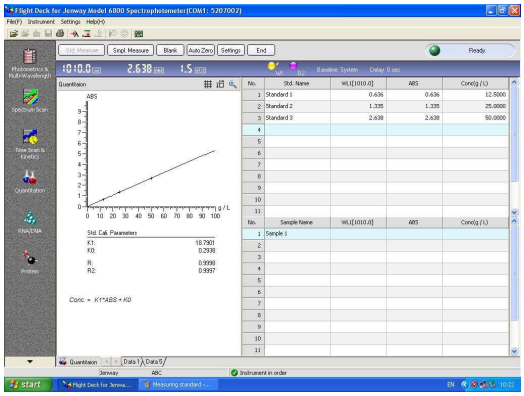
Once a full measurement has been performed and saved the standard curve can be opened by selecting ***Settings*** from the ***Menu Bar*** and selecting ***Load Curve***.



The standard curve can be imported by selecting the required file and



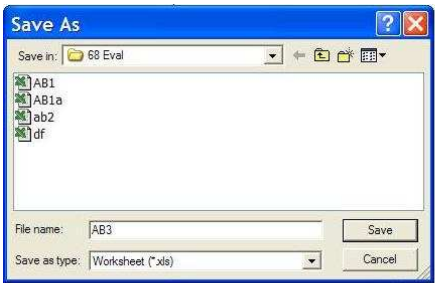
The standard curve is inputted into the ***Work Area*** allowing the sample measurement to be performed directly.



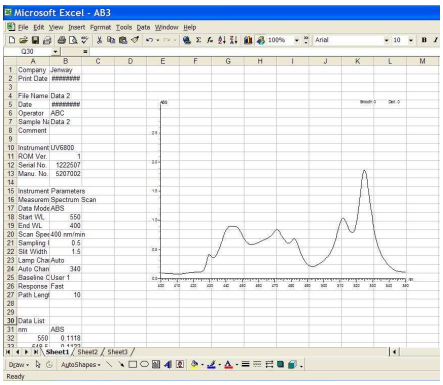
Note: Importing a standard curve will only import the standard curve parameters; the other measurement parameters will not be imported. Therefore the correct system parameters should be entered before importing a standard curve.

5.13 Exporting To Excel

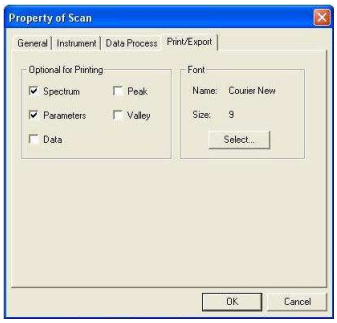
To Export to Excel select from the **Work Area** to open the dialogue box.



Selecting ***Save*** launches Excel and displays the desired data.

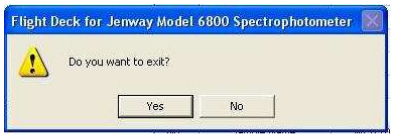


Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.

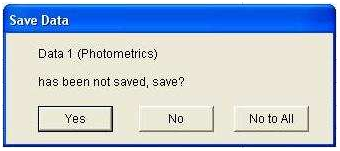


5.14 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box.



If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.



Section 6

Photometrics and Multi-Wavelength Mode

6.1 Principles of Measurement

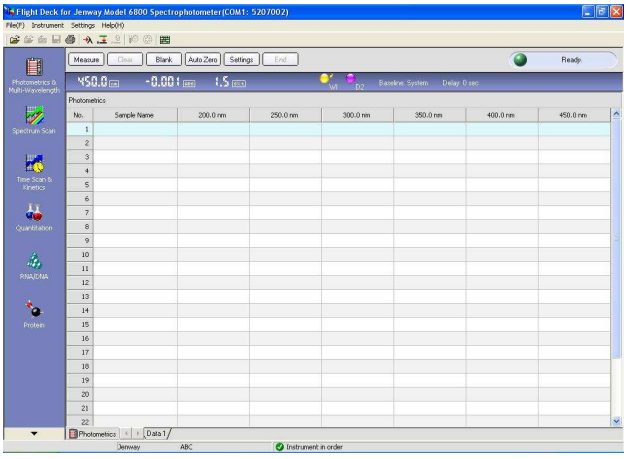
The simplest mode of the spectrophotometer is Photometrics. A measurement is made of either the absorbance or transmittance of a sample. The measurement is at a single wavelength, at one point in time, with no additional calculations. The Multi-Wavelength mode is used to measure absorbance or transmittance at up to six distinct wavelengths. This mode is used for specific tests when one sample is examined and a ratio of absorbance values (or difference between absorbance values) at different wavelengths can reveal the purity or the composition of the sample. The ratio or difference calculations are made automatically by the spectrophotometer. The measurements are made almost simultaneously so the sample must be stable.

6.2 Getting Started

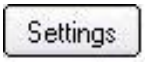
After the Model 6800 has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the work screen.



6.3 Setting Parameters

To input the required parameters select 

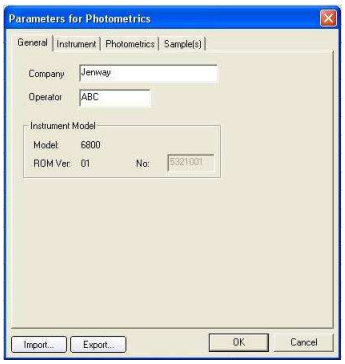
from the ***Command Bar***.

The ***Parameters For Photometrics*** window displays four tabs: ***General***, ***Instrument***, ***Photometrics*** and ***Sample(s)***.

Alternatively, the ***Parameters For Photometrics*** window may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For Photometrics***.

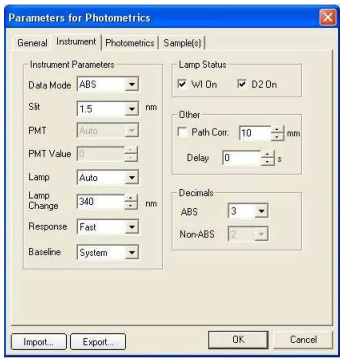
General Tab

Used to input or edit the company name and operator.



Instrument Tab

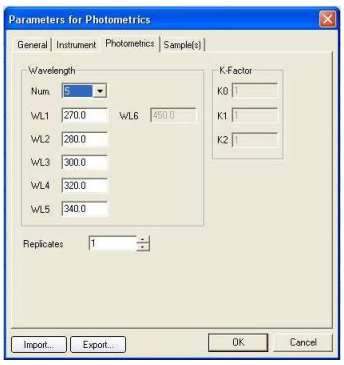
Allows the instrument parameters to be edited.



Data Mode	Photometry has three data modes: ***%T***, ***ABS*** and ***Ratio*** (the default data mode is ***ABS***).
Slit	The slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available.
Lamp	There are 3 options for the light source: ***Auto***, ***D2*** or ***WI***. **Auto** - the light source is switched at the switching wavelength. **D2** - deuterium arc lamp, yields good intensity continuum in the UV region. **WI** - tungsten halogen lamp, yields good intensity over part of the UV spectrum and entire visible range.
Lamp Change	In ***Auto*** mode the light source will be switched automatically at the switching wavelength (Range 325 – 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***System***, ***User 1*** and ***User 2***. There is also an option for no baseline.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 – 100 mm).
Delay	The delay between pressing the ***Measure*** button and the measurement starting (Range 0 – 200 seconds).
Decimals	In ABS mode the intensity can be recorded to 3 or 4 decimal places. For non-ABS modes the intensity can be recorded to 1 or 2 decimal places.

Photometrics Tab

Used to edit the experimental parameters.



Num The number of wavelengths measured (Range 1 - 6). In ***Ratio*** mode only 2 or 3 wavelengths can be inputted.

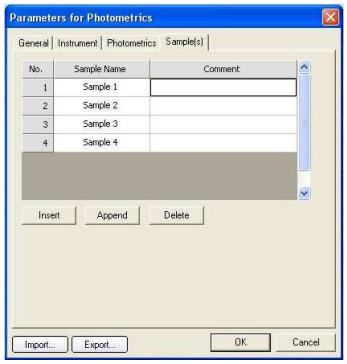
WL The wavelength values that may be inputted are in the range 190 - 1100nm, in increments of 0.1 nm.

Replicates The number of times the sample measurements repeats (Range 1 - 100).

K-Factor These can only be edited in ***Ratio*** mode (the calculation for ratio and difference will be displayed in the ***Work Area*** after a measurement).

Sample(s) Tab

Used to input sample names and add comments. The length limits are 24 and 200 bytes respectively. The number of samples can be edited using:



Note: Any ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for Photometrics*** are saved and the saved data imported.

6.4 Importing Parameters

To access previously saved parameter files select

from the ***Parameters for Photometrics*** window.

Alternatively, ***Importing Photometrics Scan Parameters*** may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

6.5 Exporting Parameters

To save parameters select

from the ***Parameters for Photometrics*** window.

Alternatively, exporting ***Photometrics Scan Parameters*** may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

Whilst saving the updated parameters the ***Status Indicator*** will change from

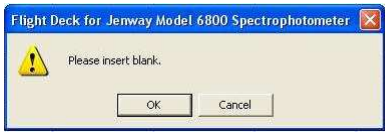
to

6.6 Blank Calibration

Before recording a photometric or multi-wavelength measurement it is necessary to perform a blank calibration for all chosen wavelengths.

To perform a blank calibration select

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed

is shown in the ***Work Area***.

6.7 Auto Zero

To perform a blank calibration to a single wavelength place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select

from the ***Command Bar***.

The Model 6800 will adjust the absorbance to zero for the selected wavelength.

Note: ***Auto Zero*** will only calibrate to zero for a single selected wavelength and therefore should only be used for photometric measurements.

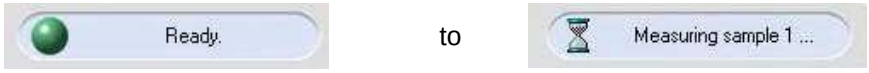
Alternatively, auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the ***Tool Bar***.

6.8 Sample Measurement

To run a sample, replace the blank solvent in the sample cell holder (front) with the sample required for measurement.

Select [Measure] from the ***Command Bar***.

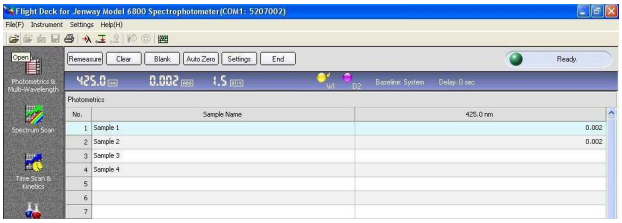
Note: During a measurement the blank solvent must remain in the reference cell holder. During a measurement the ***Status Indicator*** will change from



All recorded data is displayed in the data table.

Note: If the measurement is performed in ***Ratio*** mode the calculations of ***Ratio*** and ***Difference*** are displayed in the ***Work Area***.

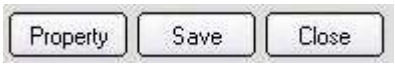
To re-measure a specific sample select the required sample line with the cursor, select [Remeasure] on the ***Command Bar*** and the sample data will be updated.



Individual results can be deleted by right-clicking on the sample line and selecting ***Delete***.

After all samples have been measured select [End] from the ***Command Bar***.

The ***Command Bar*** changes to display:



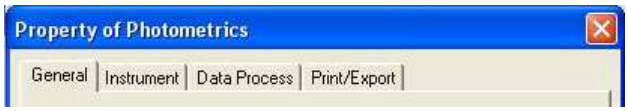
This allows the data to be processed or new measurements to be performed.

Note: Data processing and new measurements cannot be performed until [End] has been selected.

6.9 Data Processing

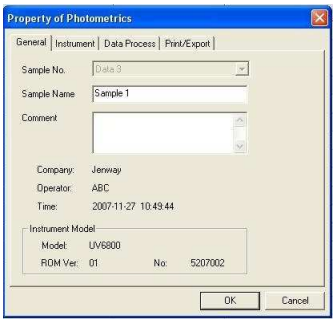
Select [Property] from the ***Command Bar***.

The ***Property of Photometrics*** window displays four tabs: ***General***, ***Instrument***, ***Data Process and Print / Export***.



General Tab

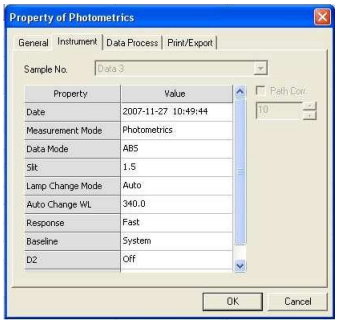
Used to input sample names or comments, the length limits are 24 and 200 bytes respectively.



Note: Any ***Sample Names*** or ***Comments*** inputted will be displayed on the print out.

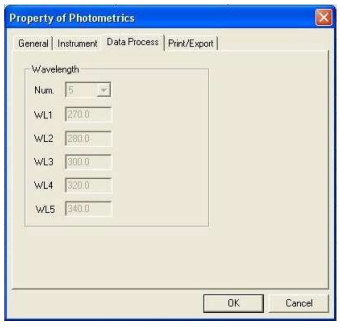
Instrument Tab

Displays both the system parameters and the main parameters of the photometric measurement.



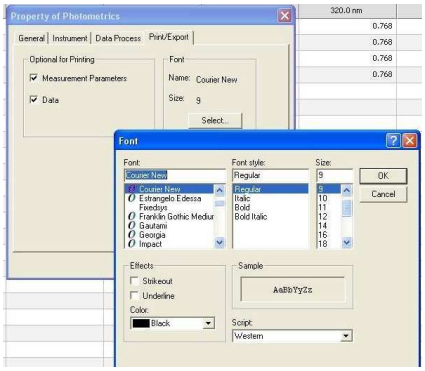
Data Process Tab

Displays the number of wavelengths and wavelength values recorded during the photometric measurement.



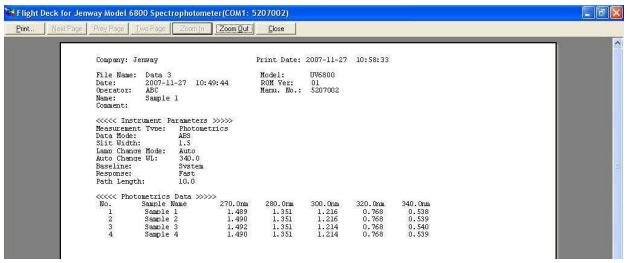
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



6.10 Printing

Select the icon from the work area to display the print preview.

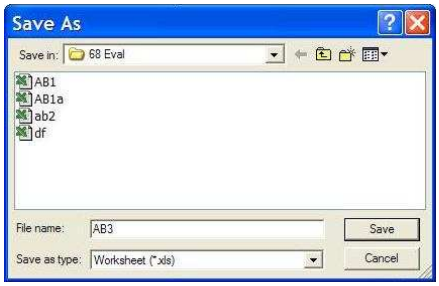


Select to obtain a print out of the report.

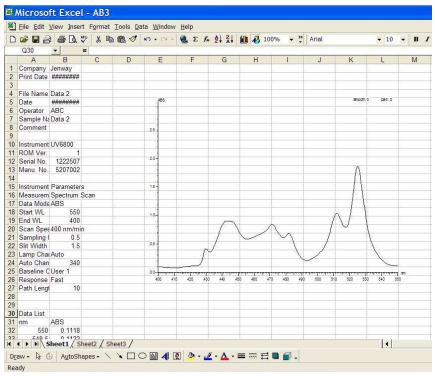
Reselecting the ***Print / Export*** tab in the ***Property of Photometry Measurement*** window allows you to alter any of the print options.

6.11 Exporting To Excel

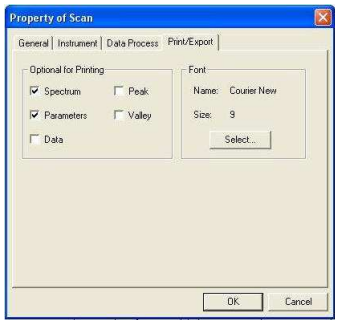
To Export to Excel select from the **Work Area** to open the dialogue box.



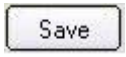
Selecting ***Save*** launches Excel and displays the desired data.

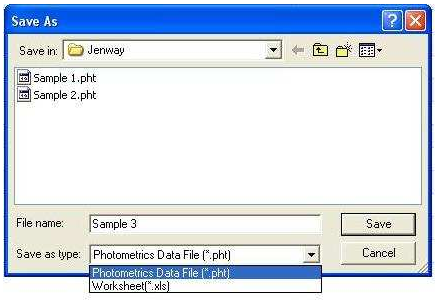


Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



6.12 Saving a Data File

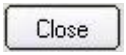
After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting  opens the dialogue box



Inputting a file name and selecting will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a ***Photometrics*** data file or as an Excel worksheet.

Alternatively, data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting ***Save As*** or by selecting the icon from the ***Tool Bar***.

To cancel saving the data file select

To exit without saving select 

from the ***Command Bar***. The dialogue box will give the options of saving the data, exiting without saving or cancelling.

6.13 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box.

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.

Section 7

Spectrum Scan Mode

7.1 Principles of Measurement

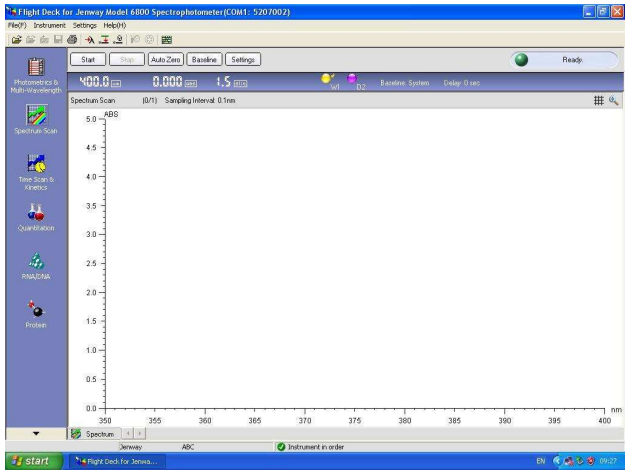
By examining the absorbance, transmittance, E(S) or E(R) of the sample over a wavelength range we can gain important information about the sample. Readings of the sample over a range of wavelengths are performed and the absorbance, transmittance, E(S) or E(R) at each wavelength is plotted and displayed. As well as observing good practice (see Good Practice Guidelines) it must be ensured that the sample is stable for the period of the scan.

7.2 Getting Started

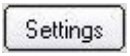
After the Model 6800 has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the work screen.



7.3 Setting Parameters

To input the required parameters select 

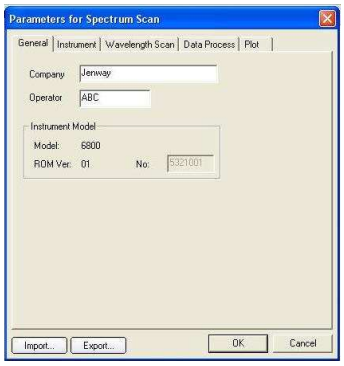
from the ***Command Bar***.

The ***Parameters For Spectrum Scan*** window displays five tabs: ***General***, ***Instrument***, ***Wavelength Scan***, ***Data Process*** and ***Plot***.

Alternatively, the ***Parameters For Spectrum Scan*** window may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For Spectrum Scan***.

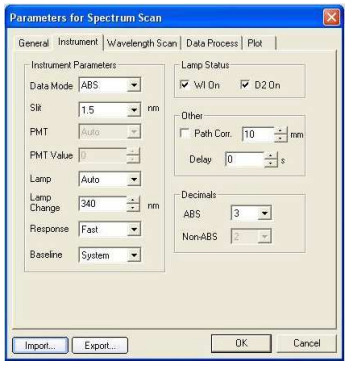
General Tab

Used to input or edit the company name and operator.



Instrument Tab

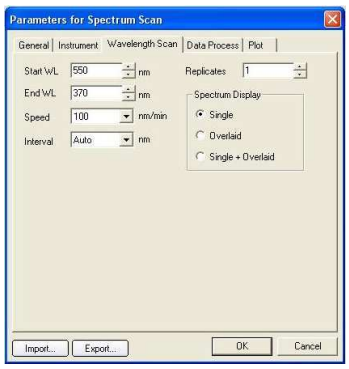
Allows the instrument parameters to be edited.



Data Mode	Spectrum Scan has four data modes: ***%T***, ***ABS***, ***E(S)*** and ***E(R)*** (the default data mode is ***ABS***).
Slit	Slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available
Lamp	There are 3 options for the light source: ***Auto***, ***D2*** or ***WI***. **Auto -** the light source is switched at the switching wavelength. **D2 -** deuterium arc lamp, yields good intensity continuum in the UV region. **WI -** tungsten halogen lamp, yields good intensity over part of the UV spectrum and the entire visible range.
Lamp Change	In ***Auto*** mode the light source will be switched automatically at the switching wavelength (Range 325 – 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***System***, ***User 1*** and ***User 2***. There is also an option for no baseline.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 – 100 mm).
Delay	The delay between pressing the ***Start*** button and the measurement starting (Range 0 – 200 seconds).
Decimals	In ***ABS*** mode the intensity maybe recorded to 3 or 4 decimal places. For ***non-ABS*** modes the intensity maybe recorded to 1 or 2 decimal places.

Wavelength Scan Tab

Used to edit the experimental parameters.



Start WL Start wavelength range is 191 - 1100 nm in increments of 0.1 nm. (The start wavelength must be at least 1 nm longer than the end wavelength)

End WL End wavelength range is 190 - 1099 nm in increments of 0.1 nm.

Speed There are 8 scan speeds: 3600, 2400, 1200, 800, 400, 200, 100 and 10 nm/min.

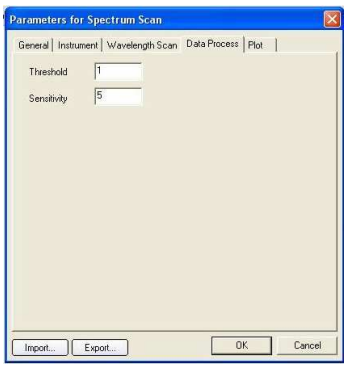
Interval The data interval is set automatically depending on the chosen scan speed

Replicates The number of times the wavelength scan repeats the measurement (Range 1 - 10).

Spectrum Display There are three spectrum display options for when replicates is set greater than 1:
Single - a result file is created after every spectrum scan.
Overlaid - all spectra are displayed but only one result file is created.
Single + Overlaid - Creates a single results file that includes all spectrum scans as well as result files for each individual spectrum scan.

Data Process Tab

Used to input the threshold and sensitivity values.

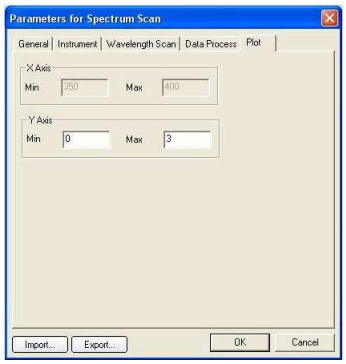


Threshold When the difference between the peaks and valleys are larger than the threshold value their wavelength and intensity are labelled (Range 0.001 to 100, with a default of 1).

Sensitivity The number of data points between a peak and valley that can be judged as a valley (Range 5 to 100, with a default of 5).

Note: If some peaks or valleys have not been highlighted, reduce the threshold value.

Plot Tab



X Axis Displays the maximum and minimum values of the x-axis. This may only be adjusted under the ***Wavelength Scan*** tab.

Y Axis Sets the maximum and minimum values of the y-axis (Range -9999 to 9999).

7.4 Importing Parameters

To access previously saved parameter files select Import... from the ***Parameters for Spectrum Scan*** window.

Alternatively, ***Importing Spectrum Scan Parameters*** may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

7.5 Exporting Parameters

To save parameters select Export... from the ***Parameters for Spectrum Scan*** window.

Alternatively, ***Exporting Spectrum Scan Parameters*** may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

Whilst saving the updated parameters the ***Status Indicator*** will change from

to

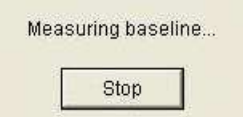
7.6 Baseline Correction

When a sample is being scanned the baseline correction is used for calibration. Before recording a ***Spectrum Scan*** it is necessary to calibrate by performing a ***Baseline Correction***. To perform a baseline correction place the cuvettes containing blank solvent in both the reference cell holder (rear) and the sample cell holder (front).

Select Baseline from the ***Command Bar***.

Baseline Correction modes include ***System***, ***User 1*** and ***User 2***.

Select the required baseline mode and the system will perform the baseline correction. Whilst recording a baseline other operations may not be performed. The measurement may be cancelled at any time by selecting ***Stop***.



The baseline will be saved automatically. Alternatively, a baseline correction can be performed by selecting the icon from the ***Tool Bar***.

Note: The ***Baseline Correction*** mode is selected under the ***Instrument Tab*** in the ***Parameters for Spectrum Scan*** window. By selecting ***System*** the baseline correction is performed over the entire wavelength range (190-1100nm). By selecting ***User 1*** or ***User 2*** the baseline correction is performed over the chosen experimental wavelength values and is automatically saved as ***User 1*** or ***User 2***. This remains saved until overwritten.

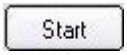
7.7 Auto Zero

Auto Zero is performed by selecting from the ***Command Bar*** or by selecting the icon from the ***Tool Bar***.

Note: In ***Spectrum Scan*** mode if baseline correction is used ***Auto Zero*** is not required, as zero has already been calibrated. ***Auto Zero*** will only calibrate to zero for one wavelength.

7.8 Sample Measurement

To perform a ***Spectrum Scan*** replace the cuvette containing the blank solvent in the sample cell holder (front) with the sample required for measurement.

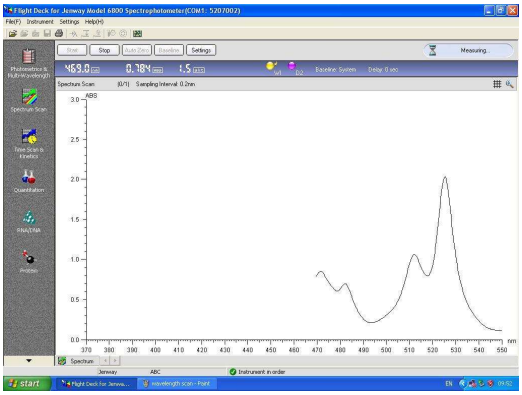
Select  from the ***Command Bar***.

Note: During a spectrum scan measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

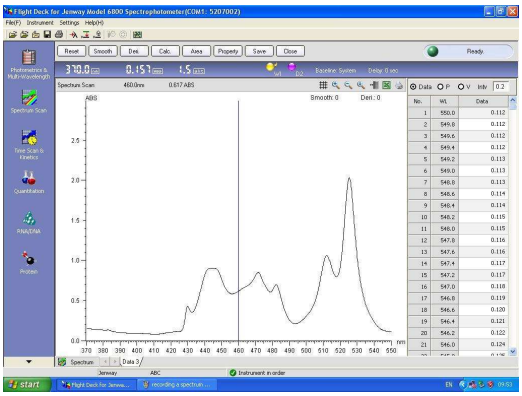
to

During a scan the active spectrum will be displayed in the ***Work Area***.



After the scan has completed a data window appears. Using the icon on the **Command Bar** this data window can be hidden.

The data window can display three possible data modes – **Data**, **Peak (P)** or **Valley (V)**. The data interval can be adjusted; the default value is the same as the scan interval.



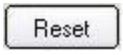
Note: If desired peaks or valleys are not highlighted adjust the ***Threshold*** value in the ***Property of Scan*** box under the ***Data Process*** tab.

The spectrum can be magnified using the icon.

Alternatively, it is possible to zoom in to a specific area by holding down the left mouse button and drawing a rectangle over the desired area, this process can be repeated continuously.

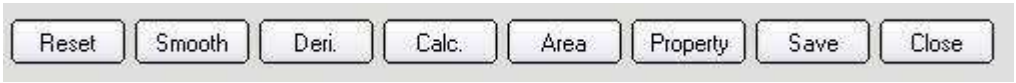
To zoom out use the icon.

All methods of zooming in and out can be repeated continuously.

Alternatively, it is possible to zoom out and return directly to the original spectrum at any time by selecting the  button from the ***Command Bar***.

To auto-scale the y-axis select the icon.

Once a sample measurement is complete the ***Command Bar*** changes to display the buttons – ***Reset***, ***Smooth***, ***Deri***, ***Calc***, ***Area***, ***Property***, ***Save*** and ***Close***.



7.9 Data Processing

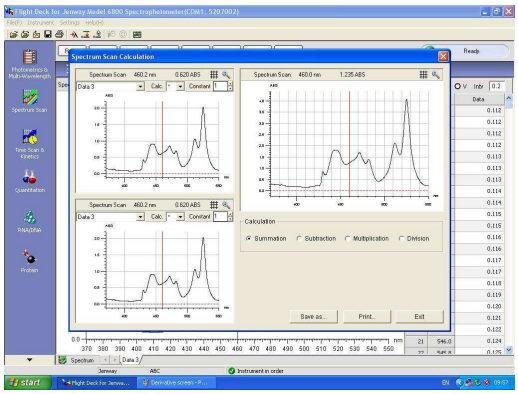
Selecting [Reset] at any time returns the x and y-axis and data to the original parameters.

Selecting [Smooth] the spectrum can be smoothed continuously.

Selecting [Deri.] displays the derivatised spectrum and data. Derivation may be carried out continuously.

Note: If files are saved at this stage the original data will be saved not the smoothed or derived data.

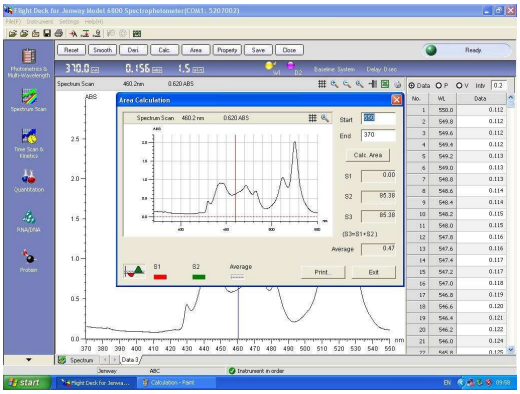
Selecting [Calc.] displays the window.



The left windows display the spectra required for the calculation (only opened spectra can be selected); the right window displays the result spectrum. The calculated result can be saved and printed.

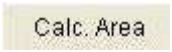
Note: Calculations may only be performed on spectra in the same data mode.

Selecting [Area] displays the ***Area Calculation*** window.



It is possible to zoom in to a specific area by holding down the left mouse button and drawing a rectangle over the desired area, this process can be repeated continuously.

To return to the original spectrum select the icon.

By selecting 

four results will displayed:

S1 - the negative area of the spectrum below the x-axis

S2 - the positive area of the spectrum above the x-axis

S3 - The sum of S1 and S2

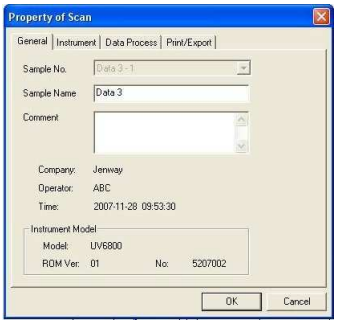
Average - The average value of all of the data points

Selecting

displays the ***Property of Scan*** window. The window displays four tabs: ***General***, ***Instrument***, ***Data Process*** and ***Print / Export***.

General Tab

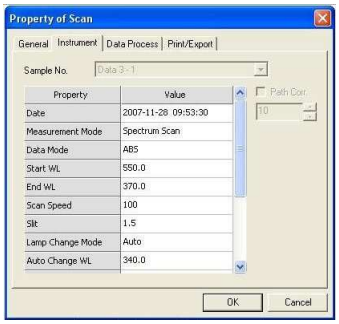
Used to input sample names or comments. The length limits are 24 and 200 bytes respectively.



Note: Any ***Sample Name*** or ***Comments*** inputted will be displayed on the print out.

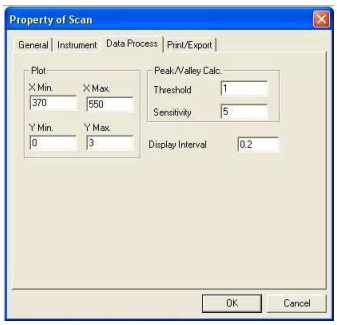
Instrument Tab

Displays both the system parameters and the main parameters of the spectrum scan measurement.



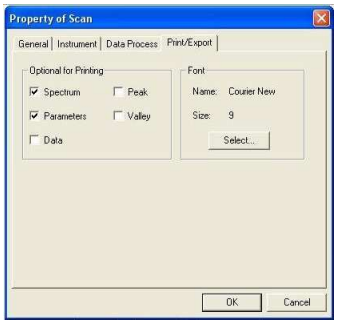
Data Process Tab

Allows the user to set the parameters for printing. The user can set the maximum and minimum values of the x and y-axis, the threshold and sensitivity of the peak/valley calculation and the display interval.



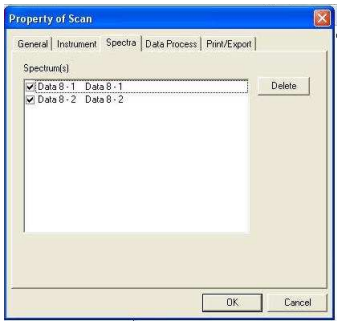
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



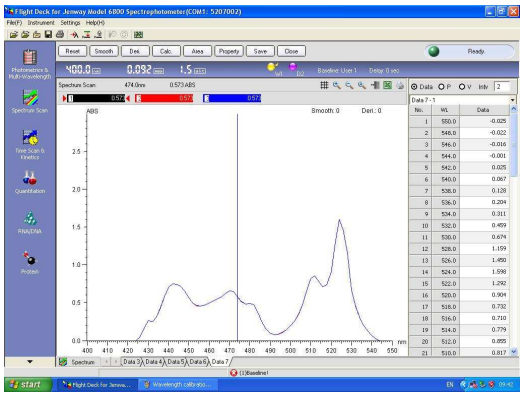
Spectra tab

Note: If the ***Spectrum Display*** (in ***Parameters for Spectrum Scan*** under ***Wavelength Scan***) is set to ***Overlaid*** or ***Single+Overlaid*** and ***Replicates*** are set greater than 1, the ***Property of Scan*** window shows the ***Spectra*** tab for selecting the spectra and data sets that are printed.



7.10 Multi Scan spectrum data file

When ***Replicates*** are set greater than 1 and ***Spectrum Display*** is set to ***Overlaid*** or ***Single + Overlaid*** a ***Multi Scan Spectrum Data*** file will be created. All spectra are displayed in the ***Work Area***.



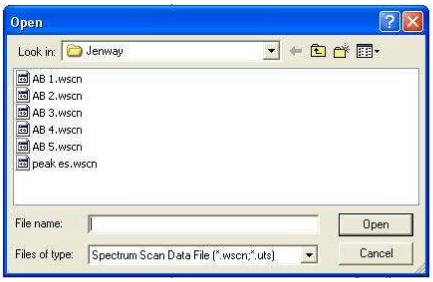
To choose which data is displayed in the ***Data Table***, select the required data bar from the ***Work Area*.**

Note: If choosing to print a ***Multi Scan Data File*** the data that is printed will be the data from the highlighted data bar.

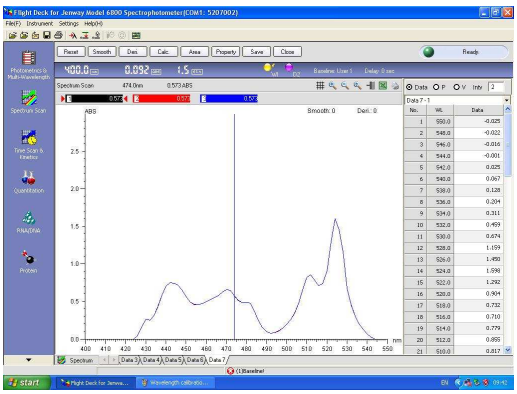
Double clicking the data bar the data will be greyed out and removed from the work area.

7.11 Overlaying Spectra

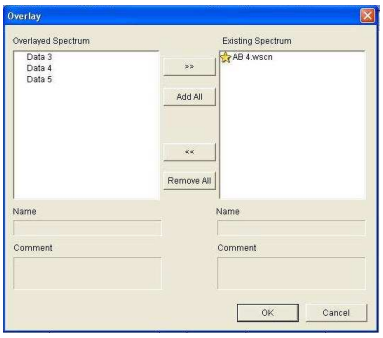
To overlay previously saved data files select from the ***Tool Bar*** to display the ***Open*** dialogue box.



Choosing the required file and selecting ***Open*** will add both the spectrum and data to the ***Work Area***.



To overlay data files that are displayed on the ***Data Tabs*** select from the ***Tool Bar*** to display the dialogue box.



Selecting the required data from the ***Overlaid Spectrum*** box and choosing will add the spectrum and data to the ***Work Area***.

To deselect any spectra and data select the required data from the ***Existing Spectrum*** and choose

All ***Overlaid Spectrum*** can be added or removed to the ***Existing Spectrum*** box by selecting ***Add All*** or ***Remove All***, respectively.

Note: Only spectra of the same data modes and data types can be overlaid.

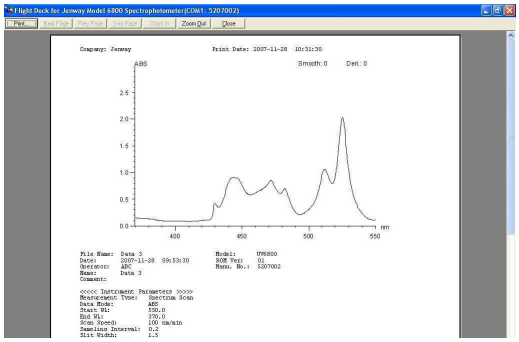
To choose which data is displayed in the ***Data Table***, select the required data bar from the ***Work Area***.

Note: If choosing to print a ***Multi Scan Data File*** the data that is printed will be the data from the highlighted data bar.

Double clicking the data bar the data will be greyed out and removed from the work area.

7.12 Printing

Select the icon from the work area to display the print preview.

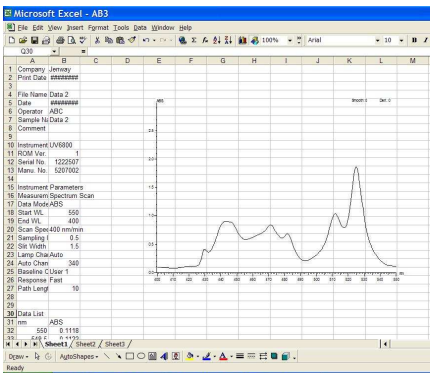


Select to obtain a print out of the report. If you wish to alter any of the print options this can be done by reselecting the ***Print / Export*** tab in the ***Property of Scan*** window.

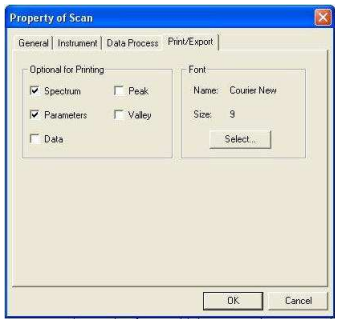
7.13 Exporting To Excel

To Export to Excel select from the **Work Area** to open the dialogue box.

Selecting ***Save*** launches Excel and displays the desired data.

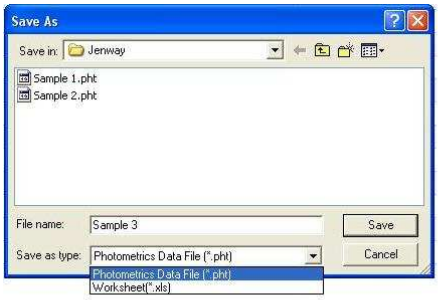


Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



7.14 Saving a Data File

After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting Save opens the dialogue box.



Inputting a file name and selecting Save will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a ***Spectrum Scan*** data file or as an Excel worksheet.

Alternatively data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting ***Save As*** or by selecting the icon from the ***Tool Bar***.

To cancel saving the data file select Cancel

To exit without saving select Close from the ***Command Bar***. The dialogue box will give the options of saving the data, exiting without saving or cancelling.

7.15 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box.

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.

Section 8

Time Scan & Kinetics Mode

8.1 Principles of Measurement

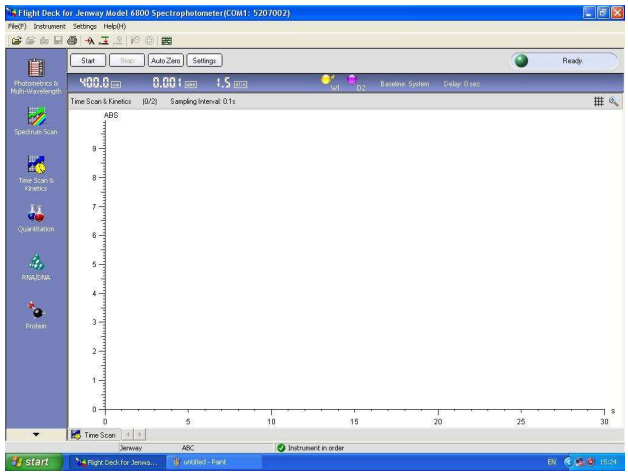
A number of tests run on a spectrophotometer involve the addition of an active ingredient which results in a change of the Abs, %T, E(S) or E(R). The Abs, %T, E(S) or E(T) is recorded at regular intervals and is plotted against time. From this plot it is possible to calculate the concentration of the sample. This mode is ideal for continuous monitoring as well as the calculation of concentration in enzyme activity studies, with calibration possible against a standard or known factor.

8.2 Getting Started

After the Model 6800 has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the ***Work Screen***.

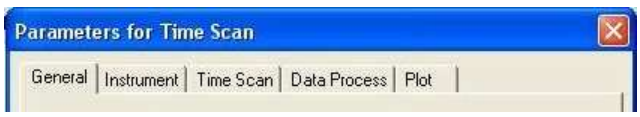


8.3 Setting Parameters

To input the required parameters select

from the ***Command Bar***.

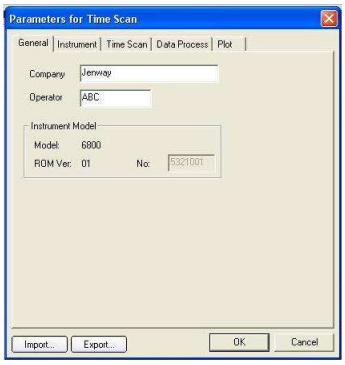
The ***Parameters For Time Scan*** window displays five tabs: ***General***, ***Instrument***, ***Time Scan***, ***Data Process*** and ***Plot***.



Alternatively the ***Parameters For Time Scan*** window can be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For Time Scan***.

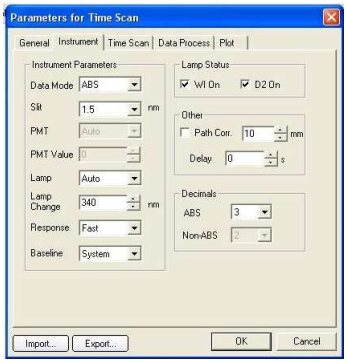
General Tab

Used to input or edit the company name and operator.



Instrument Tab

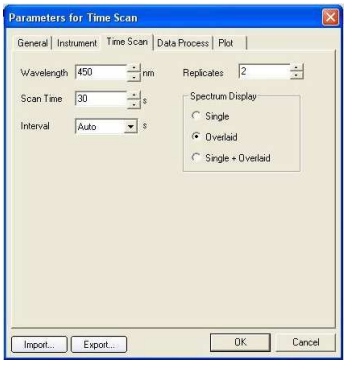
Allows the instrument parameters to be edited.



Data Mode	***Time Scan And Kinetics*** has four data modes: ***%T***, ***ABS***, ***E(S)*** and ***E(R)*** (the default data mode is ***ABS***).
Slit	Slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available
Lamp	There are 3 options for the light source: ***Auto***, ***D2*** or ***WI***. **Auto** - the light source is switched at the switching wavelength. **D2** - deuterium arc lamp, yields good intensity continuum in the UV region. **WI** - tungsten halogen lamp, yields good intensity over part of the UV spectrum and the entire visible range.
Lamp Change	In ***Auto*** mode the light source will be switched automatically at the switching wavelength (Range 325 - 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***System***, ***User 1*** and ***User 2***. There is also an option for no baseline.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 - 100 mm).
Delay	The delay between pressing the ***Measure*** button and the measurement starting (Range 0 - 200 seconds).
Decimals	In ***ABS*** mode the intensity maybe recorded to 3 or 4 decimal places. For ***non-ABS*** modes the intensity maybe recorded to 1 or 2 decimal places.

Time Scan Tab

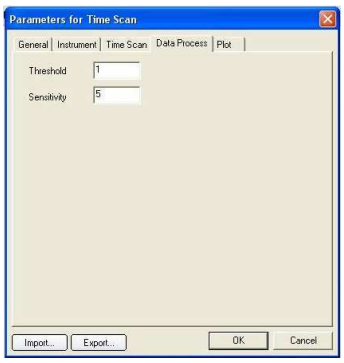
Used to edit the experimental parameters.



Wavelength	The wavelength range is 190 - 1100 nm in increments of 0.1 nm.
Scan Time	The range of scan times is 30 - 99999 seconds.
Speed	There are 8 scan speeds: 3600, 2400, 1200, 800, 400, 200, 100 and 10 nm/min.
Interval	The data interval is set automatically depending on the chosen scan speed
Replicates	The number of times the time scan repeats the measurement (Range 1 - 10).
Spectrum Display	There are three spectrum display options for when replicates is set greater than 1: **Single** - a result file is created after every spectrum scan. **Overlaid** - all spectra are displayed but only one result file is created. **Single + Overlaid** - Creates a single results file that includes all spectrum scans as well as result files for each individual spectrum scan.

Data Process Tab

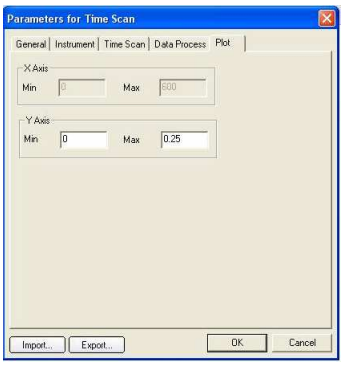
Used to input the threshold and sensitivity values.



Threshold	When the difference between the peaks and valleys are larger than the threshold value their wavelength and intensity are labelled (Range 0.001 to 100, with a default of 1).
Sensitivity	The number of data points between a peak and valley that can be judged as a valley (Range 5 to 100, with a default of 5).

Note: If some peaks or valleys have not been highlighted, reduce the threshold value.

Plot Tab



X Axis Displays the maximum and minimum values of the x-axis. This can only be altered under the ***Time Scan*** tab.

Y Axis Sets the maximum and minimum values of the y-axis (Range -9999 to 9999).

8.4 Importing Parameters

To access previously saved parameter files select Import... from the ***Parameters for Time Scan*** window.

8.5 Exporting Parameters

To save parameters select Export... from the ***Parameters for Time Scan*** window.

Whilst saving the updated parameters the ***Status Indicator*** will change from

to

8.6 Auto Zero

Before performing a measurement it is necessary to adjust the absorbance of the chosen wavelength to zero by performing an ***Auto Zero***.

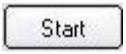
To perform an ***Auto Zero*** place the cuvettes containing the blank reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select Auto Zero from the ***Command Bar***.

The Model 6800 will adjust absorbance to zero for the selected wavelength.

Alternatively, ***Auto Zero*** can be performed by selecting the icon from the ***Tool Bar*** or by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero***.

8.7 Sample Measurement

To run a sample replace the blank solvent in the sample cell holder with the sample required for measurement.

Select 

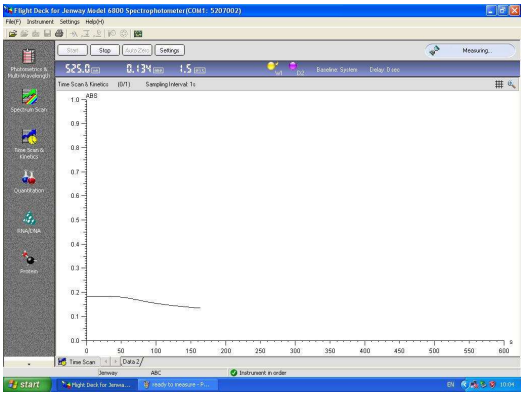
from the ***Command Bar***.

Note: During a measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

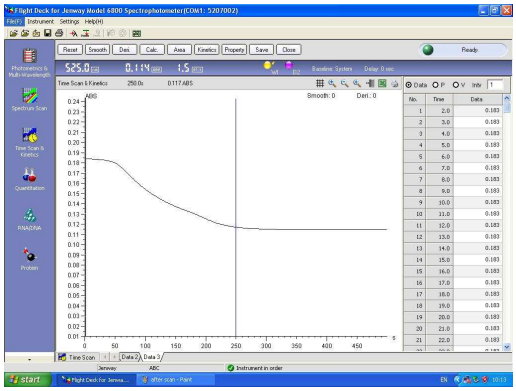
to

During a scan the active spectrum will be displayed in the ***Work Area***.



After the scan has finished a data window appears. Using the icon on the ***Command Bar*** the data window can be hidden.

The data window can display 3 possible data modes – ***Data***, ***Peak (P)*** or ***Valley (V)***. The data interval can be adjusted; the default value is the same as the scan interval.



Note: If desired peaks or valleys are not highlighted adjust the ***Threshold*** value in the ***Property of Time Scan*** box under the ***Data Process*** tab.

The spectrum can be magnified using the icon.

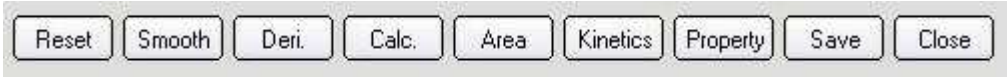
Alternatively, it is possible to zoom in to a specific area by holding down the left mouse button and drawing a rectangle over the desired area, this process can be repeated continuously.

To continuously zoom out use the icon.

Alternatively, it is possible to zoom out and return directly to the original spectrum at any time by selecting the Reset button from the ***Command Bar***.

To auto-scale the y-axis select the icon.

Once a sample measurement is complete the ***Command Bar*** changes to display the buttons – ***Reset***, ***Smooth***, ***Deri***, ***Calc***, ***Area***, ***Kinetics***, ***Property***, ***Save*** and ***Close***.



8.8 Data Processing

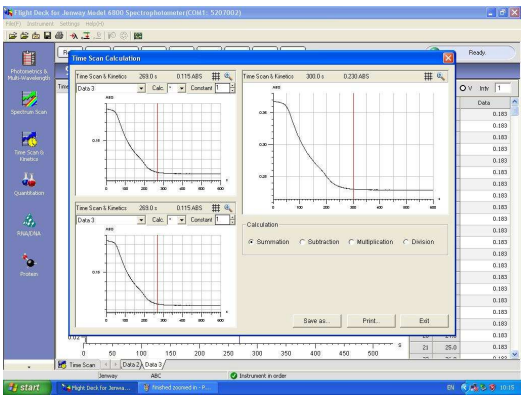
Selecting Reset at any time returns the x and y-axis and data to the original parameters.

Selecting Smooth the spectrum can be smoothed continuously.

Selecting Deri. displays the derivatised spectrum and data. Derivation may be carried out continuously.

Note: If files are saved at this stage the original data will be saved not the smoothed or derivatised data.

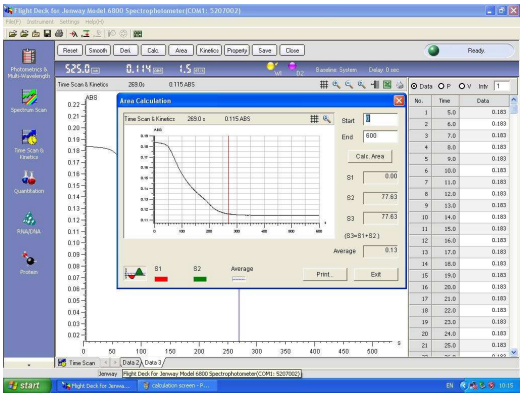
Selecting Calc. displays the ***Calculation*** window.



The left windows display the spectra required for the calculation (only opened spectra can be selected); the right window displays the result spectrum. The calculated result can be saved and printed.

Note: Calculations may only be performed on spectra in the same data mode.

Selecting Area displays the ***Area Calculation*** window.



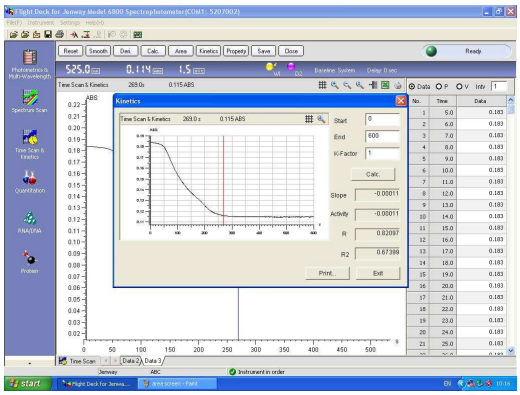
It is possible to zoom in to a specific area by holding down the left mouse button and drawing a rectangle over the desired area, this process can be repeated continuously.

To return to the original spectrum select the icon.

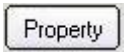
By selecting Calc. Area four results will displayed:

S1 - the negative area of the spectrum below the x-axis
S2 - the positive area of the spectrum above the x-axis
S3 - The sum of S1 and S2
Average - The average value of all of the data points

Selecting Kinetics displays the ***Kinetics*** window.



The kinetics window calculates the slope, activity, R and R^2 factors by inputting the start and end time values and K-factor. The regression curve is displayed on the spectrum. The results can be printed out from this screen.

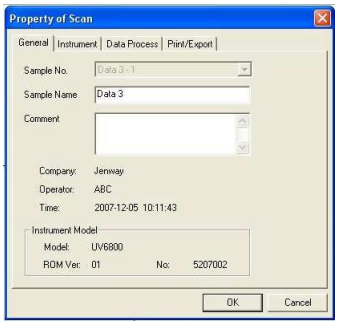
Selecting 

displays the ***Property of Scan*** window. The window displays four tabs

-***General***, ***Instrument***, ***Data Process*** *and* ***Print / Export***.

General Tab

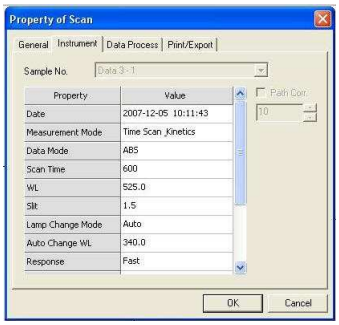
Used to input sample names or comments, the length limits are 24 and 200 bytes respectively.



Note: Any ***Sample Names*** or ***Comments*** inputted will be displayed on the print out.

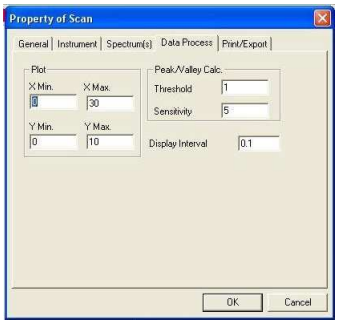
Instrument Tab

Displays both the system parameters and the main parameters of the ***Time Scan*** measurement.



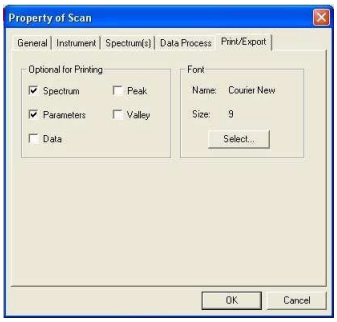
Data Process Tab

Allows the user to set the parameters for printing. The user can set the maximum and minimum values of the x and y-axis, the threshold and sensitivity of the peak/valley calculation and the display interval.



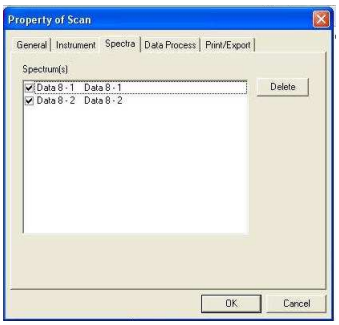
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



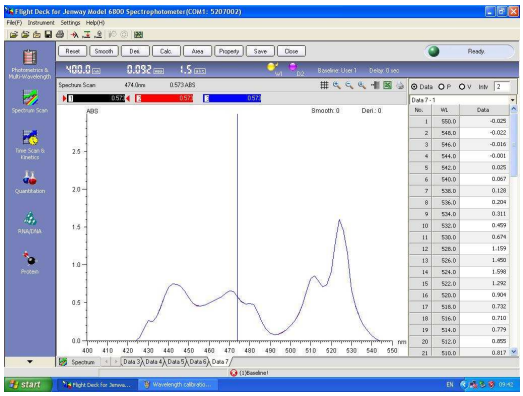
Spectra Tab

Note: If the spectrum display (in ***Parameters for Time Scan*** under ***Time Scan***) is set to ***Overlaid*** or ***Single+Overlaid*** and ***Replicates*** are set greater than 1, the ***Property of Scan*** window shows the ***Spectra*** tab for selecting the spectra and data sets that are printed.



8.9 Multi Scan Spectrum Data File

When ***Replicates*** are set greater than 1 and ***Spectrum Display*** is set to ***Overlaid*** or ***Single + Overlaid*** a ***Multi Scan Spectrum Data*** file will be created. All spectra are displayed in the ***Work Area***.



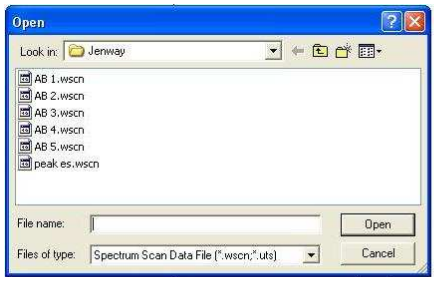
To choose which data is displayed in the ***Data Table***, select the required data bar from the ***Work Area.***

Note: If choosing to print a ***Multi Scan Data File*** the data that is printed will be the data from the highlighted data bar.

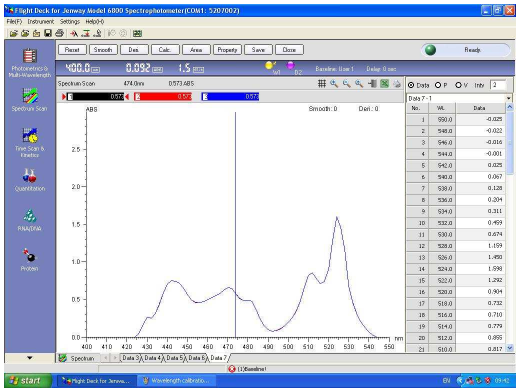
Double clicking the data bar the data will be greyed out and removed from the work area.

8.10 Overlaying Spectra

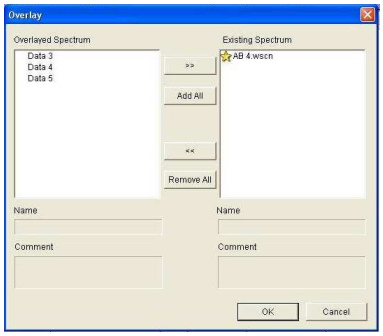
To overlay previously saved data files select from the ***Tool Bar*** to display the ***Open*** dialogue box.



Choosing the required file and selecting ***Open*** will add both the spectrum and data to the ***Work Area***.



To overlay data files that are displayed on the ***Data Tabs*** select from the ***Tool Bar*** to display the dialogue box.



Selecting the required data from the ***Overlaid Spectrum*** box and choosing will add the spectrum and data to the ***Work Area***.

To deselect any spectra and data select the required data from the ***Existing Spectrum*** and choose

All ***Overlaid Spectrum*** can be added or removed to the ***Existing Spectrum*** box by selecting ***Add All*** or ***Remove All***, respectively.

Note: Only spectra of the same data modes and data types can be overlaid.

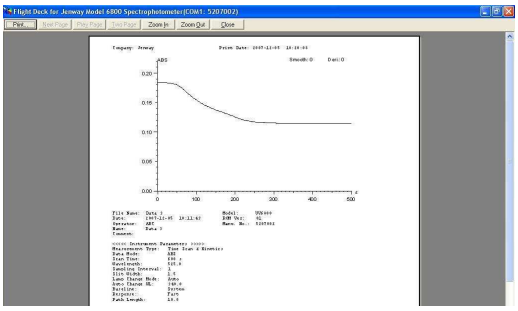
To choose which data is displayed in the ***Data Table***, select the required data bar from the ***Work Area***.

Note: If choosing to print a ***Multi Scan Data File*** the data that is printed will be the data from the highlighted data bar.

Double clicking the data bar the data will be greyed out and removed from the work area.

8.11 Printing

Select the icon from the work area to display the print preview.

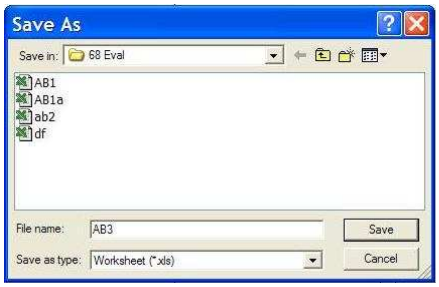


Select

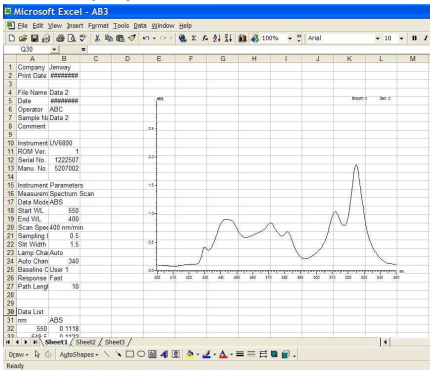
to obtain a print out of the report. Reselecting the ***Print / Export*** tab in ***Property of Scan*** window allows you to alter any of the print options..

8.12 Exporting To Excel

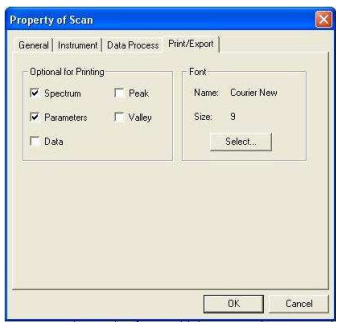
To Export to Excel select from the **Work Area** to open the dialogue box.



Selecting ***Save*** launches Excel and displays the desired data.

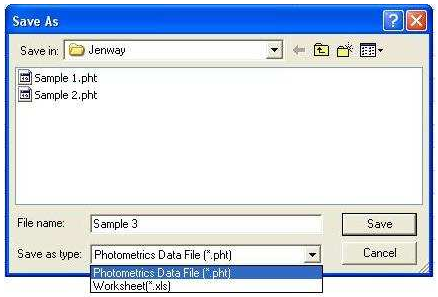


Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



8.13 Saving a Data File

After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting Save opens the dialogue box.



Inputting a file name and selecting Save will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a ***Time Scan & Kinetics*** data file or as an Excel worksheet.

Alternatively, data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting ***Save As*** or by selecting the icon from the ***Tool Bar***.

To cancel saving the data file select Cancel

To exit without saving select Close from the ***Command Bar***. The dialogue box will give the options of saving the data, exiting without saving or cancelling.

8.14 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box.

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.

Section 9

Quantitation Mode

9.1 Principles of Measurement

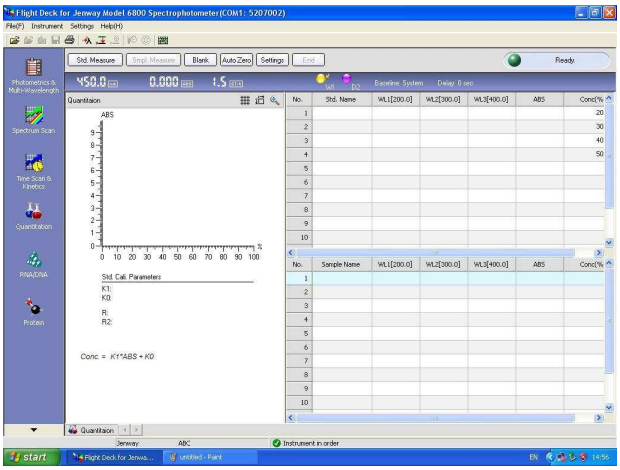
The concentration of a known substance in a sample can be determined through comparison to standardised solutions of that substance. The absorbances of carefully prepared standard solutions at set wavelengths over a range of concentrations are measured by the spectrophotometer and a calibration curve calculated. Through recording the absorbances of the samples at these set wavelengths the concentration of the known substance in the sample can be determined by comparison to the calibration curve.

9.2 Getting Started

After the Model 6800 has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the work screen.



9.3 Setting Parameters

To input the required parameters select

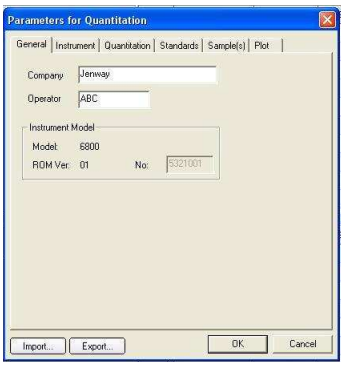
from the ***Command Bar***.

The ***Parameters For Quantitation*** window displays six tabs: ***General***, ***Instrument***, ***Quantitation***, ***Standards, Sample(s)*** and ***Plot***.

Alternatively, the ***Parameters For Quantitation*** window may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For Quantitation***.

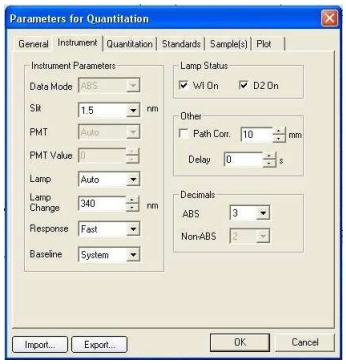
General Tab

Used to input or edit the company name and operator.



Instrument Tab

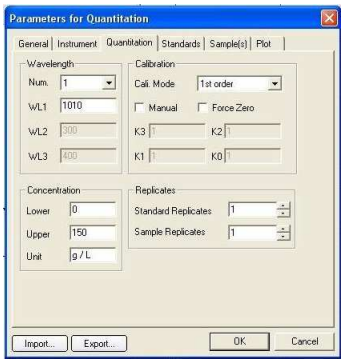
Allows the instrument parameters to be edited.



Data Mode	The data mode for Quantitation is fixed as ***ABS*** only.
Slit	The slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available.
Lamp	There are 3 options for the light source: ***Auto***, ***D2*** or ***WI***. **Auto** - the light source is switched at the switching wavelength. **D2** - deuterium arc lamp, yields good intensity continuum in the UV region. **W1** - tungsten halogen lamp, yields good intensity over part of the UV spectrum and the entire visible range.
Lamp Change	In ***Auto*** mode the light source will be switched automatically at the switching wavelength (Range 325 - 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***System***, ***User 1*** and ***User 2***.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 - 100 mm).
Delay	The delay between pressing the ***Measure*** button and the measurement starting (Range 0 - 200 seconds).
Decimals	In ***Quantitation*** mode ***ABS*** can be recorded to 3 or 4 decimal places.

Quantitation Tab

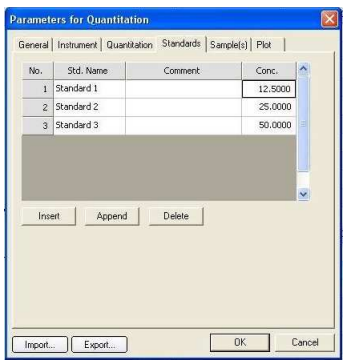
Used to edit the experimental parameters.



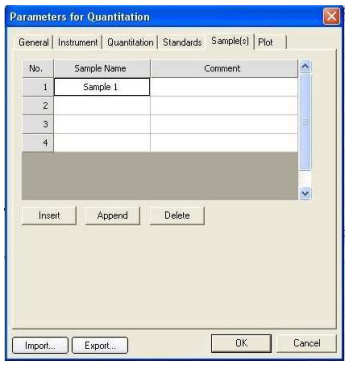
Num	The number of wavelengths measured (Range 1 - 3).
WL	The wavelength values that may be inputted are in the range 190 - 1100 nm in increments of 0.1 nm.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.
Concentration Units	Text to a limit of 7 bytes can be inputted.
Calibration Mode	The calibration modes are 1st, 2nd, 3rd order or segment. By selecting the manual box the curve parameters can be inputted manually (Range -99999 to 99999). Selecting ***Force Zero*** forces the line of best fit to intercept the y-axis at zero. The calibration mode and ***Force Zero*** can be altered after a measurement has been performed.
Standard Replicates	The number of times the sample measurements repeats (Range 1 - 100). The result after each measurement is used for the calibration curve.
Sample Replicates	If sample replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

Standards Tab

Used to input the concentrations of the standard samples (Range -9999.0 to 9999.0), standard names and to add comments. Length limits are 24 to 200 bytes. The number of standard samples can be edited using:



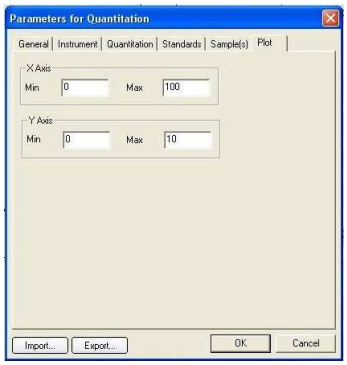
Sample(s) Tab
Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of samples can be edited using



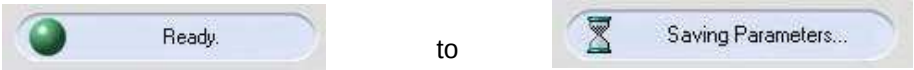
Note: Any ***Standard Names***, ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for Quantitation*** are saved and the saved data imported.

Plot Tab

Used to set the maximum and minimum values of the x and y-axis (Range –9999 to 9999).



Whilst saving the updated parameters the ***Status Indicator*** will change from



9.4 Importing Parameters

To access previously saved parameter files select

from the ***Parameters for Quantitation*** window.

Alternatively, ***Importing Quantitation Parameters*** may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

9.5 Exporting Parameters

To save parameters select

from the ***Parameters for Quantitation*** window.

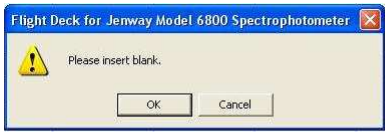
Alternatively, ***Exporting Quantitation Parameters*** may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

9.6 Blank Calibration

Before recording a quantitation measurement it is necessary to perform a blank calibration for all chosen wavelengths.

To perform a blank calibration select

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed

is shown in the ***Work Area***.

9.7 Auto Zero

To perform a blank calibration to a single wavelength, place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select

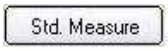
from the ***Command Bar***.

The Model 6800 will adjust the absorbance to zero for the selected wavelength.

Note: Auto Zero will only calibrate to zero for a single selected wavelength and therefore should only be used for quantitation measurements using a single wavelength.

Alternatively ***Auto Zero*** may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the ***Tool Bar***.

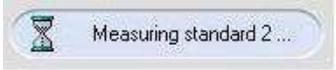
9.8 Standard Measurements

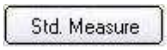
To run a standard replace the blank solvent in the sample cell holder (front) with the standard required for measurement and select 

from the ***Command Bar***.

Note: During a measurement the blank must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

to


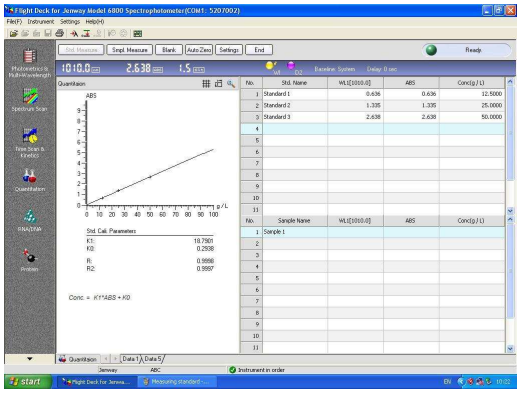
When a standard measurement has been recorded insert the next standard sample and reselect 

from the ***Command Bar***.

When all standards have been recorded the ***Work Area*** displays the calibration curve, the standard calibration parameters and the completed standard sample data table.

To re-measure a specific standard select the required sample line with the cursor, by selecting

on the ***Command Bar*** the standard sample data will be updated.



The maximum and minimum values of the x and y-axis of the calibration curve can be edited at any time by selecting to display the dialogue box.

To auto-scale the calibration curve select

If more than one wavelength is recorded then ABS is calculated as follows:

1. Two wavelengths

ABS = ABS(1) – ABS(2)

2. Three wavelengths

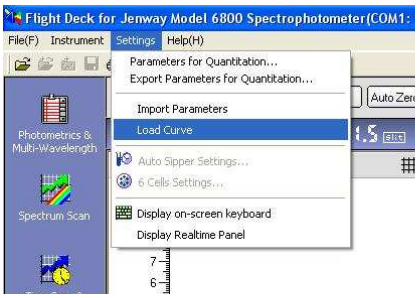
$$ABS = ABS(2) - \frac{[(WL(1) - WL(2)) \times ABS(3)] + [(WL(2) - WL(3)) \times ABS(1)]}{(WL(1) - WL(3))}$$

Where ABS(1), ABS(2), ABS(3) are absorbance values for WL(1), WL(2) and WL(3), respectively.

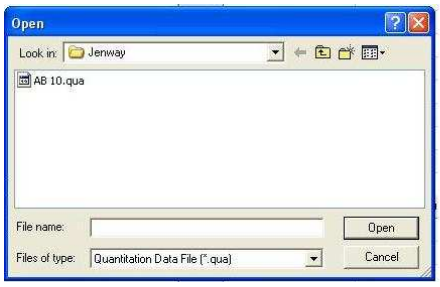
9.9 Importing a Standard Curve

Importing a standard curve allows a sample measurement to be recorded directly, eliminating the need to prepare and measure standard samples on each occasion**.**

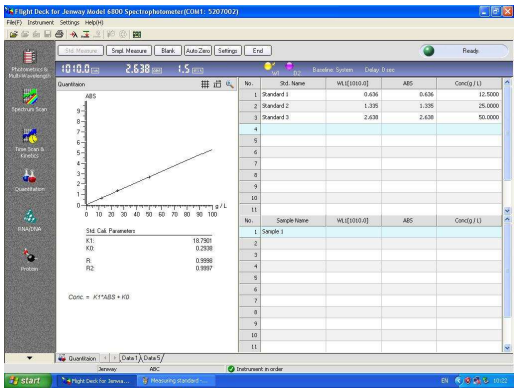
Once a full measurement has been performed and saved the standard curve can be opened by selecting ***Settings*** from the ***Menu Bar*** and selecting ***Load Curve***.



The standard curve can be imported by selecting the required file and



The standard curve is inputted into the ***Work Area*** allowing the sample measurement to be performed directly.



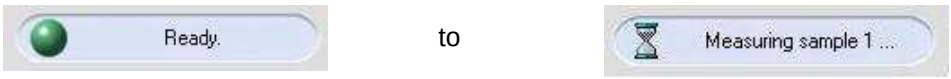
Note: Importing a standard curve will only import the standard curve parameters the other measurement parameters will not be imported. Therefore the correct ***Settings*** should be entered before importing a standard curve.

9.10 Sample Measurement

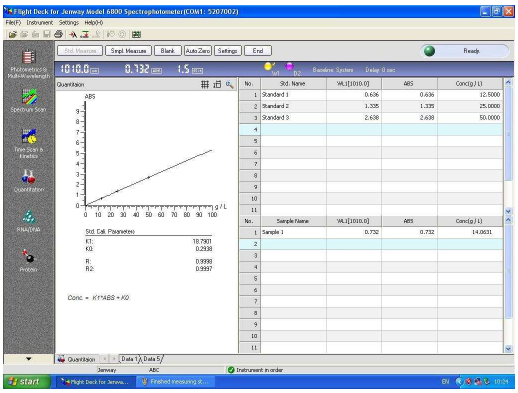
To run a sample measurement, replace the blank solvent in the sample cell holder with the sample required for measurement and select Smpl. Measure from the ***Command Bar***.

Note: During a sample measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from



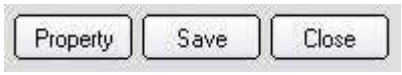
When a sample measurement has been performed the absorbances and the calculated concentrations are displayed in the ***Work Area***.



To re-measure a specific sample select the required sample line with the cursor, by selecting Smpl. Remeasure on the ***Command Bar*** the standard sample data will be updated.

After all samples have been measured select End from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.

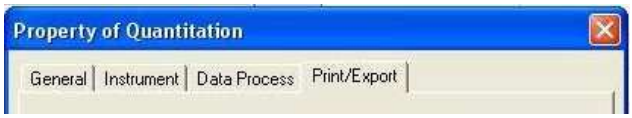


Note: Data processing and new measurements cannot be performed until End has been selected.

9.11 Data Processing

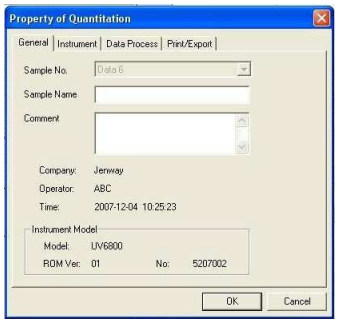
Select Property from the ***Command Bar***.

The ***Property of Quantitation*** window displays four tabs: ***General***, ***Instrument***, ***Data Process*** and ***Print / Export***.



General Tab

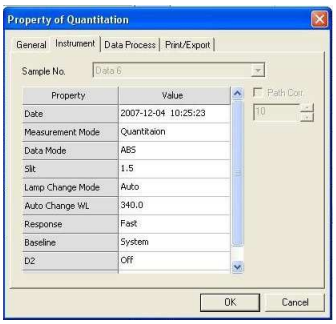
Used to input sample names or comments, the length limits are 24 and 200 bytes, respectively.



Note: Any ***Sample Names*** or ***Comments*** inputted will be displayed on the print out.

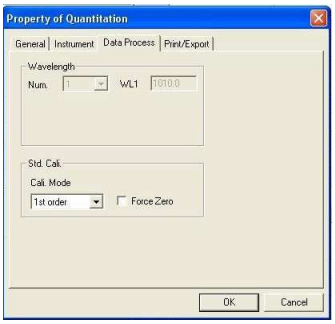
Instrument Tab

Displays both the system parameters and the main parameters of the quantitation measurement.



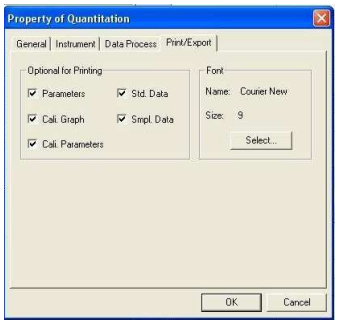
Data Process Tab

Displays the number of wavelengths and wavelength values recorded during the quantitation measurement. It is possible to change the calibration mode and select ***Force Zero***, if required. Any changes to the calibration mode will be displayed in ***Work Area***.



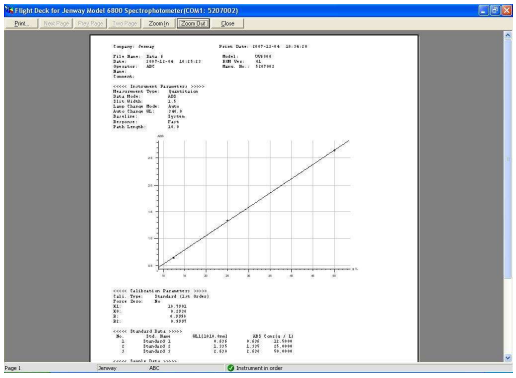
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



9.12 Printing

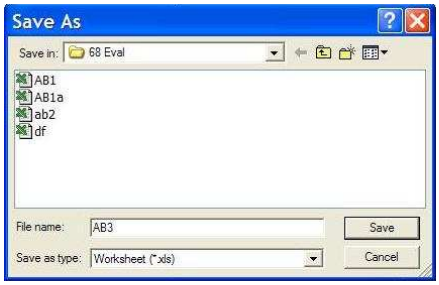
Select the icon from the work area to display the print preview.



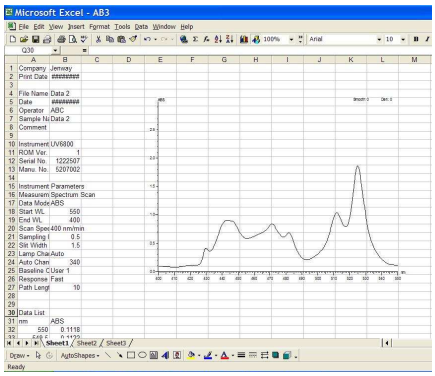
Select to obtain a print out of the report. Reselecting the ***Print / Export*** tab in the ***Property of Quantitation*** window allows you to alter any of the print options.

9.13 Exporting To Excel

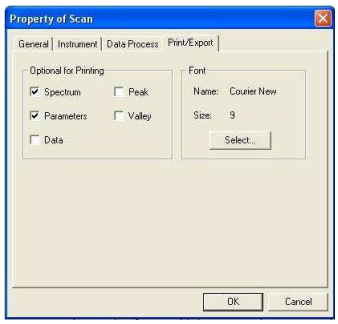
To Export to Excel select from the **Work Area** to open the dialogue box.



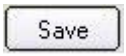
Selecting ***Save*** launches Excel and displays the desired data.

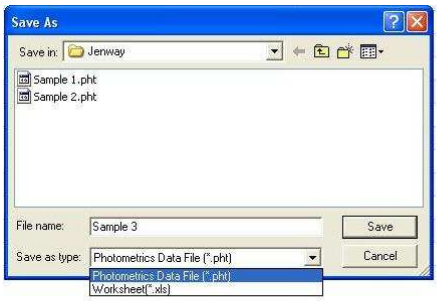


Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



9.14 Saving a Data File

After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting  opens the dialogue box

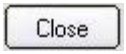


Inputting a file name and selecting will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a ***Quantitation*** data file or as an Excel worksheet.

Alternatively data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting

Save As or by selecting the icon from the ***Tool Bar***.

To cancel saving the data file select

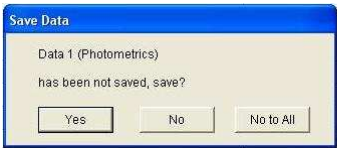
To exit without saving select 

from the ***Command Bar***. The dialogue box will give the options of saving the data, exiting without saving or cancelling.

9.15 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box.

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.



Section 10

RNA/DNA Measurements

10.1 Principles of Measurement

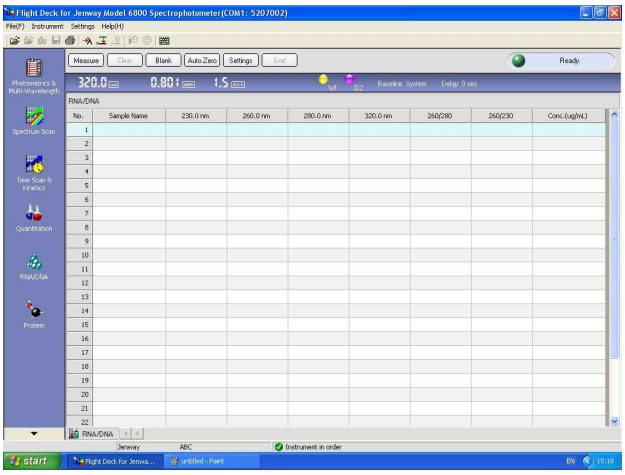
The concentration of double or single stranded DNA, RNA or oligonucleotides can be determined by recording the absorbances at 230, 260, 280 and 320nm.

10.2 Getting Started

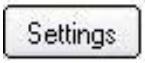
After the Model 6800 has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the ***Work Screen***.



10.3 Setting Parameters

To input the required parameters select 

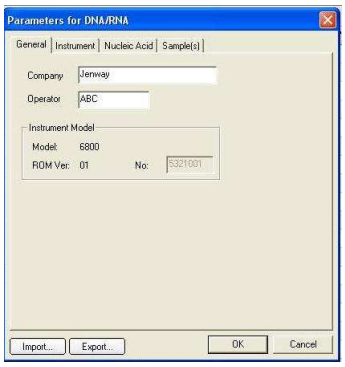
from the ***Command Bar***.

The ***Parameters For DNA/RNA*** window displays four tabs: ***General***, ***Instrument***, ***Nucleic Acid*** and ***Sample(s)***.

Alternatively, the ***Parameters DNA/RNA*** window can be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For DNA/RNA***.

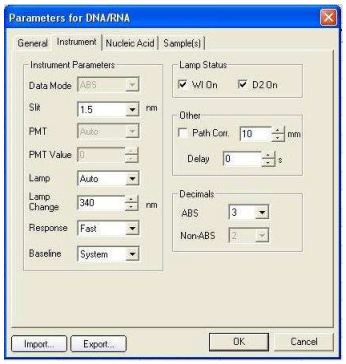
General Tab

Used to input or edit the company name and operator.



Instrument Tab

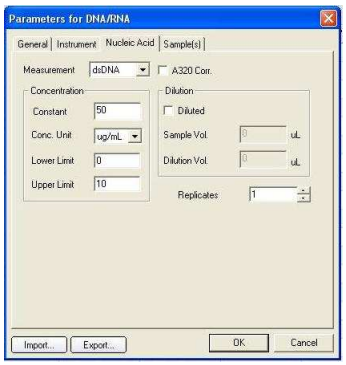
Allows the instrument parameters to be edited.



Data Mode	The data mode for RNA/DNA is fixed as ***ABS*** only.
Slit	Slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available
Lamp	There are 3 options for the light source: ***Auto***, ***D2*** or ***WI***. **Auto** - the light source is switched at the switching wavelength. **D2** - deuterium arc lamp, yields good intensity continuum in the UV region. **WI** -tungsten halogen lamp, yields good intensity over part of the UV spectrum and entire visible range
Lamp Change	In ***Auto*** mode the light source will be switched automatically at the switching wavelength (Range 325 - 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***System***, ***User 1*** and ***User 2***. There is also an option for no baseline.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 - 100 mm).
Delay	The delay between pressing the ***Measure*** button and the measurement starting (Range 0 - 200 seconds).
Decimals	In ***RNA/DNA*** mode ***ABS*** can be recorded to 3 or 4 decimal places.

Nucleic Acid Tab

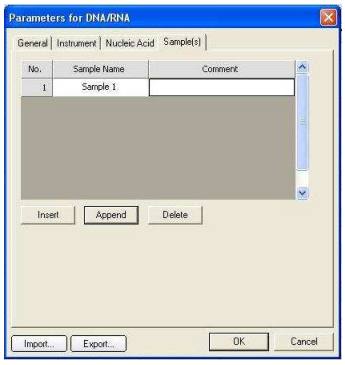
Used to edit the experimental parameters.



Measurement	The measurement methods are double-stranded DNA (***dsDNA***), double-stranded DNA (***ssDNA***), ***RNA*** and oligonucleotides (***Oligo***).
A320 Correction	If selected, the ABS values at 230, 260 and 280 nm will subtract the 320 nm ABS value.
Conversion Constant	Each method has a different default value for the concentration constant these are 50, 37, 40 and 30 for ***dsDNA***, ***ssDNA***, ***RNA*** and ***Oligo***, respectively. These can be edited before or after the sample measurement.
Concentration Unit	The concentration units are ***µg*** / ***mL*** and ***µg / µL***, each unit will have a different conversion constant.
Upper and Lower Limits	The range of concentration is 0 to 9999
Dilution	Dilution can be selected or unselected by ticking or cancelling the ***Diluted*** box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.
Replicates	If sample replicates is set greater than 1 (Range 1-100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

Sample(s) Tab

Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard sample can be edited using



Note: Any ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for DNA/RNA*** are saved and the saved data imported.

Whilst saving the updated parameters the Status Indicator will change from

to

10.4 Importing parameters

To access previously saved parameter files select

from the ***Parameters for DNA/RNA*** window.

Alternatively, select ***Settings*** from the ***Menu Bar*** and choose ***Import Parameters***.

10.5 Exporting parameters

To save parameters select

from the ***Parameters for DNA/RNA*** window.

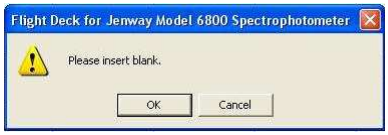
Alternatively, select ***Settings*** from the ***Menu Bar*** and choose ***Export Parameters***.

10.6 Blank Calibration

Before recording a DNA/RNA measurement it is necessary to perform a blank calibration for all chosen wavelengths.

To perform a blank calibration select

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed

is shown in the ***Work Area***.

10.7 Auto Zero

By performing ***Auto Zero*** the Model 6800 will adjust the absorbance to zero.

Ensure the reference cell holder (rear) and sample cell holder (front) are empty and select

from the ***Command Bar***.

Alternatively auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the
icon from the Tool Bar.

Note: ***Auto Zero*** will only calibrate to zero for a single wavelength and therefore any results obtained after performing an ***Auto Zero*** will not have a blank calibration.

10.8 Sample Measurement

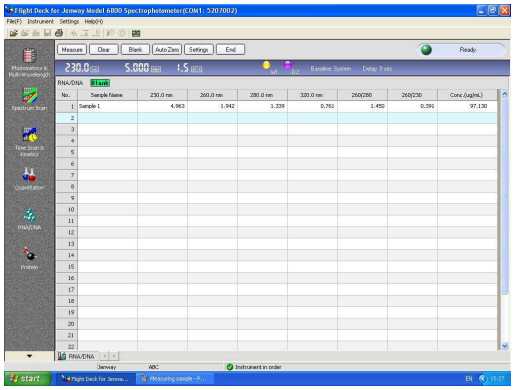
To run a sample replace the blank solvent in the sample cell holder with the sample required for measurement.

Select [Measure] from the ***Command Bar***.

Note: During a sample measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from:

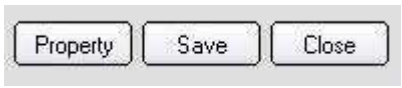
to



The absorbance values recorded at 230, 260, 280 and 320 nm are displayed in the ***Work Area*** alongside the ratios ABS260/ABS280, ABS260/ABS230 and the sample concentration (Sample concentration = ABS260 × Concentration Constant).

After all samples have been measured select from [End] the ***Command Bar*.**

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.



Note: Data processing and new measurements cannot be performed until [End] has been selected.

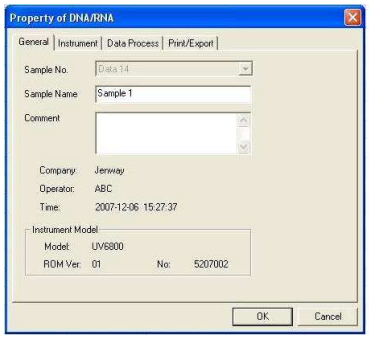
10.9 Data Processing

Select Property from the ***Command Bar***.

The ***Property of DNA/RNA*** window displays four tabs: ***General***, ***Instrument***, ***Data Process*** and ***Print / Export***.

General Tab

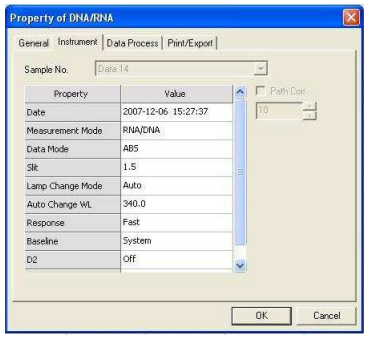
Used to input sample names or comments, the length limits are 24 and 200 bytes respectively.



Note: Any ***Sample Names*** or ***Comments*** inputted will be displayed on the print out.

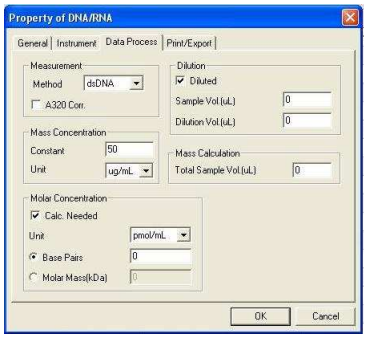
Instrument Tab

Displays both the system parameters and the main parameters of the ***DNA/RNA*** measurement.



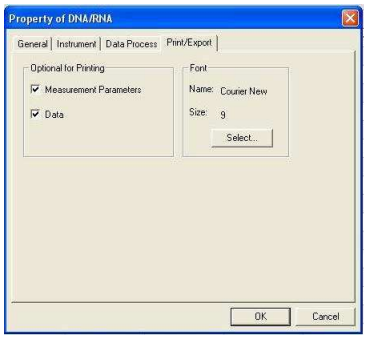
Data Process Tab

Displays the main parameters of the measurement. By selecting or editing these parameters the result will be recalculated and displayed on the sample line in the ***Work Area***. Selecting molar concentration and inputting number of base pairs or the molar mass the molar concentration and number of moles will be added in the result.



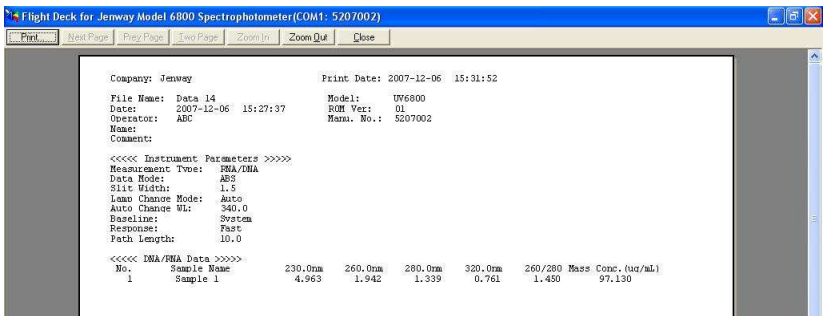
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



10.10 Printing

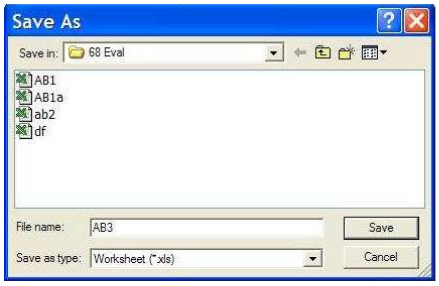
Select the icon from the work area to display the print preview.



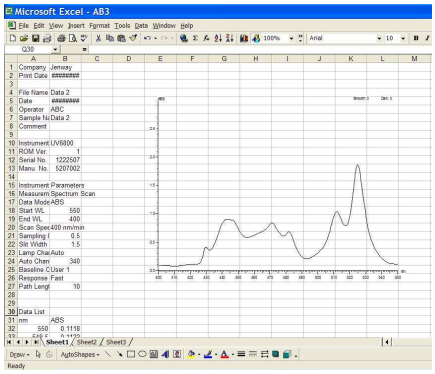
Select to obtain a print out of the report. Reselecting the ***Print / Export*** tab in the ***Property of DNA/RNA*** window will allow you to alter any of the print settings.

10.11 Exporting To Excel

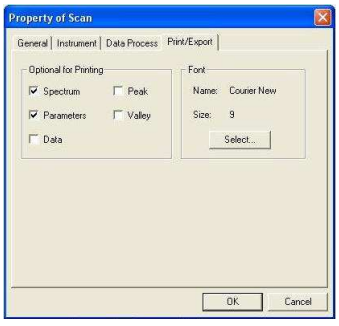
To Export to Excel select from the ***Work Area*** to open the dialogue box.



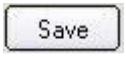
Selecting ***Save*** launches Excel and displays the desired data.

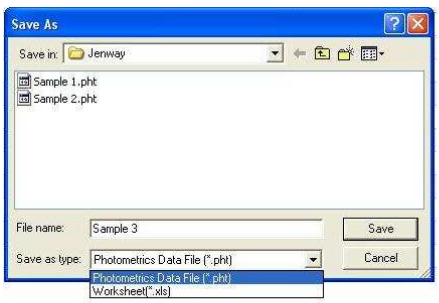


Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



10.12 Saving a Data File

After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting  opens the dialogue box



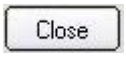
Inputting a file name and selecting

will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a ***Quantitation*** data file or as an Excel worksheet.

Alternatively data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting

Save As or by selecting the icon from the ***Tool Bar***.

To cancel saving the data file select

To exit without saving select 

from the ***Command Bar***. The dialogue box will give the options of saving the data, exiting without saving or cancelling.

10.13 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box.

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.

Section 11

Protein Measurement – Direct UV Mode

11.1 Principles of Measurement

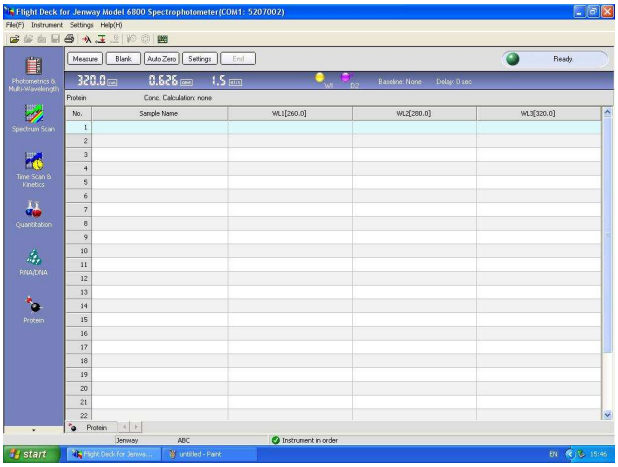
The concentration of proteins can be determined by pre-set methods using Bradford, Lowry, BCA and Direct UV protocols. Through recording the absorbances of the samples at set wavelengths the concentration of the protein in the sample can be determined.

11.2 Getting Started

After the Model 6800 spectrophotometer has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the work screen.



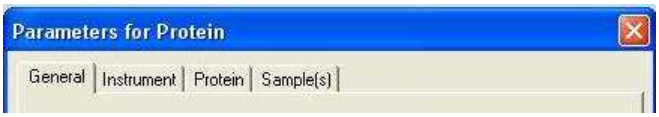
Note: Protein measurement has seven measurement modes ***Direct UV***, ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro***.

11.3 Setting Parameters

To input the required parameters select

from the ***Command Bar***.

The ***Parameters For Protein*** window displays four tabs: ***General***, ***Instrument***, ***Protein*** and ***Sample(s)***.

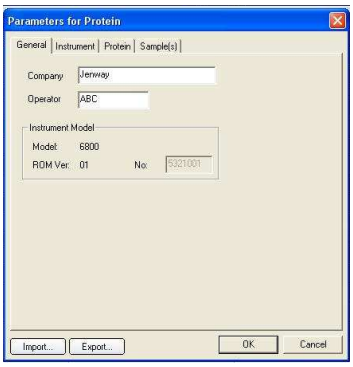


Note: The options displayed under the ***General*** and ***Instrument*** tabs are the same for all ***Calculation Methods*** in ***Direct UV*** measurements.

Alternatively, the ***Parameters For Protein*** window may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For Protein***.

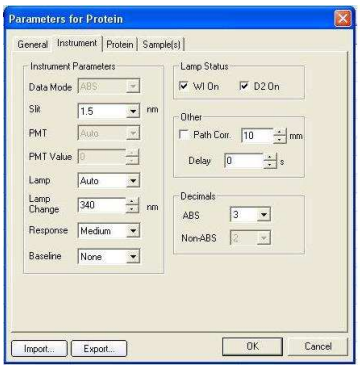
General Tab

Used to input or edit the company name and operator.



Instrument Tab

Allows the instrument parameters to be edited.

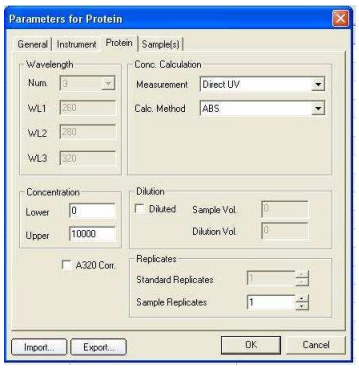


Data Mode	The data mode for ***Protein*** measurement is fixed as ***ABS*** only.
Slit	The slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available
Lamp	There are 3 options for the light source: Auto, D2 or WI. **Auto** - the light source is switched at the switching wavelength **D2** - deuterium arc lamp, yields good intensity continuum in the UV region **WI** - tungsten halogen lamp, yields good intensity over part of the UV spectrum and the entire visible range.
Lamp Change	In Auto mode the light source will be switched automatically at the switching wavelength (Range 325 - 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***System***, ***User 1*** and ***User 2***. There is also an option for no baseline.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 – 100 mm).
Delay	The delay between pressing the Measure button and the measurement starting (Range 0 – 200 seconds).
Decimals	In ***Protein*** measurement ***ABS*** can be recorded to 3 or 4 decimal places.

11.4 ABS Calculation Method

Protein Tab – ABS Calculation Method

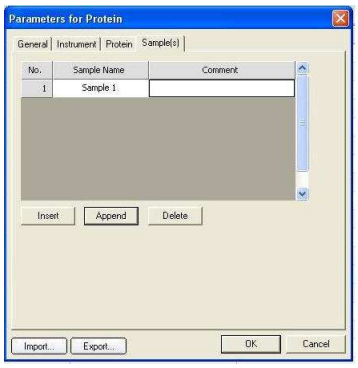
Used to edit the experimental parameters.



Measurement	There are seven options for measuring modes: ***Direct UV***, ***Bradford***, ***Bradford micro***, ***Lowry***, ***Lowry micro***, ***BCA*** and ***BCA micro***.
Calc. Method	In ***Direct UV*** mode there are four different calculation methods: ***ABS***, ***Constant***, ***Single Standard First Order*** and ***Warburg*** formula.
Num	The number of wavelengths measured, this cannot be altered and is set to 3 in ***Direct UV*** mode.
WL	The wavelength values that are measured, this cannot be altered and is set at 260, 280 and 320 nm in ***Direct UV*** mode.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.
Dilution	Dilution can be selected or unselected by ticking or cancelling the ***Diluted*** box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.
A320 Correction	If selected, the ABS values at 260 and 280 nm will subtract the ABS value recorded at 320 nm.
Sample Replicates	If sample replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition, Standard Deviation and Coefficient of Variation are calculated.

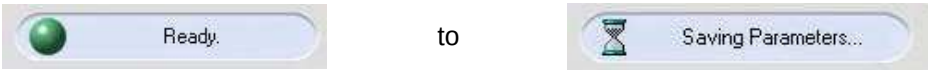
Sample(s) Tab - ABS Calculation Method

Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard sample can be edited using

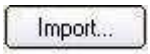


Note: Any ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for Protein*** are saved and the saved data imported.

Whilst saving the updated parameters the ***Status Indicator*** will change from



11.4.1 Importing parameters

To access previously saved parameter files select 

from the ***Parameters for Protein*** window.

Alternatively, parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

11.4.2 Exporting parameters

To save parameters select

from the ***Parameters for Protein*** window.

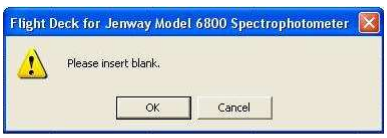
Alternatively, parameters can be exported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

11.4.3 Blank Calibration

Before recording a protein measurement it is necessary to perform a blank calibration for all chosen wavelengths.

To perform a blank calibration select

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed

is shown in the ***Work Area***.

11.4.4 Auto Zero

By performing ***Auto Zero*** the Model 6800 will adjust the absorbance to zero.

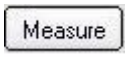
Ensure the reference cell holder (rear) and sample cell holder (front) are empty and select

from the ***Command Bar***.

Alternatively auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the Tool Bar.

Note: ***Auto Zero*** will only calibrate to zero for a single wavelength and therefore any results obtained after performing an ***Auto Zero*** will not have a blank calibration.

11.4.5 Sample Measurement – ABS Calculation Method

To run a sample replace the blank solvent in the sample cell holder with the sample required for measurement. Select 

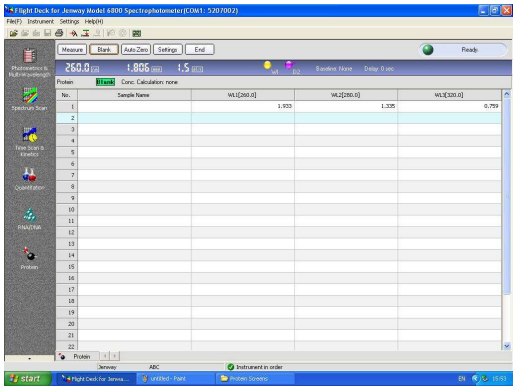
from the ***Command Bar***.

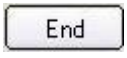
Note: During a sample measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

to

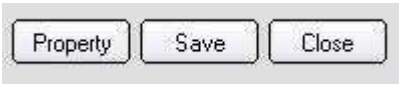
The ***Work Area*** displays the absorbances measured at 260, 280 and 320nm.

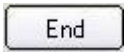


After all samples have been measured select 

from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.



Note: Data processing and new measurements cannot be performed until 

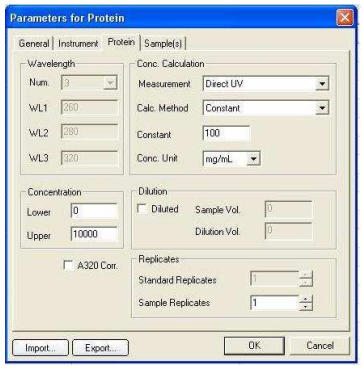
has been selected.

Note: Data processing for ***ABS Mode*** is described in ***11.7 Data Processing for Direct UV Measurements***.

11.5 Constant and Warburg Formula Calculation Methods

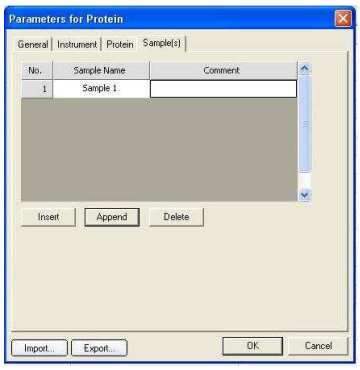
Selecting ***Constant*** and ***Warburg Formula Calculation Methods*** allows a constant and concentration unit to be inputted.

Protein Tab - Constant and Warburg Formula Calculation Methods



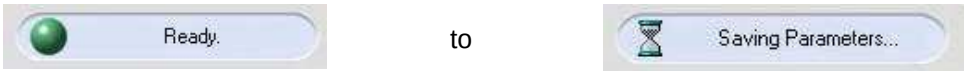
Measurement	There are seven options for measuring modes: ***Direct UV***, ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro***.
Calc. Method	In ***Direct UV*** mode there are four different calculation methods: ***ABS***, ***Constant***, ***Single Standard First Order*** and ***Warburg*** formula.
Constant	The constant used in the concentration calculation (Range 0 - 99999.9).
Conc Unit	There are two choices for the units of concentration: ***mg/mL*** and ***µg/mL.***
Num	The number of wavelengths measured, this cannot be altered and is set to 3 in ***Direct UV*** mode.
WL	The wavelength values that are measured, this cannot be altered and is set at 260, 280 and 320 nm in ***Direct UV*** mode.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.
Dilution	Dilution can be selected or unselected by ticking or cancelling the Diluted box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.
A320 Correction	If selected, the ABS values at 260 and 280 nm will subtract the 320nm ABS value.
Sample Replicates	If sample replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

Sample(s) Tab - Constant and Warburg Formula Calculation Methods
Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard sample can be edited using



Note: Any ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for Protein*** are saved and the saved data imported.

Whilst saving the updated parameters the ***Status Indicator*** will change from



11.5.1 Importing parameters

To access previously saved parameter files select

from the ***Parameters for Protein*** window.

Alternatively, parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

11.5.2 Exporting parameters

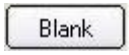
To save parameters select

from the ***Parameters for Protein*** window.

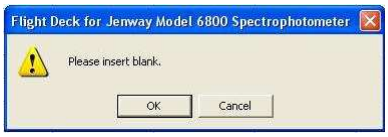
Alternatively, parameters can be exported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

11.5.3 Blank Calibration

Before recording a protein measurement it is necessary to perform a blank calibration for all chosen wavelengths.

To perform a blank calibration select 

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed

is shown in the ***Work Area***.

11.5.4 Auto Zero

By performing ***Auto Zero*** the Model 6800 will adjust the absorbance to zero.

Ensure the reference cell holder (rear) and sample cell holder (front) are empty and select

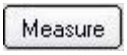
from the ***Command Bar***.

Alternatively, auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the
icon from the Tool Bar.

Note: Auto Zero will only calibrate to zero for a single wavelength and therefore any results obtained after performing an ***Auto Zero*** will not have a blank calibration.

11.5.5 Sample Measurement – Constant & Warburg Formula Calculation Method

To run a sample replace the blank solvent in the sample cell holder with the sample required for measurement.

Select 

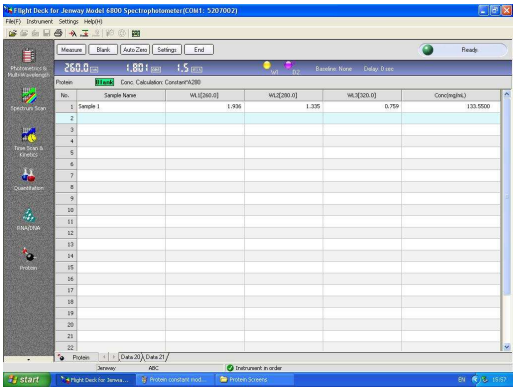
from the ***Command Bar***.

Note: During a sample measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

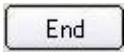
to

The ***Work Area*** displays the absorbances measured at 260, 280 and 320nm and the calculated concentrations.



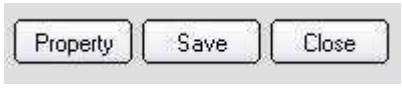
Note: **Constant Mode:** Concentration = Constant × *ABS280*.

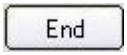
Warburg Formula Mode: Concentration = (1.55 × *ABS280*) – (0.76 × *ABS260*).

After all samples have been measured select 

from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.



Note: Data processing and new measurements cannot be performed until 

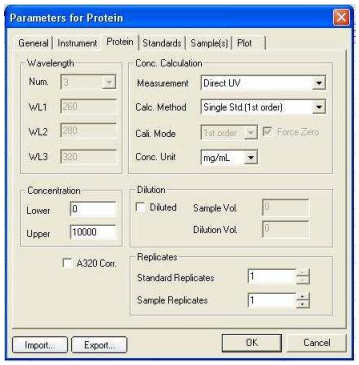
has been selected.

Note: Data processing for ***Direct UV - Constant*** and ***Warburg Formula Calculation Methods*** is described in ***11.7 Data Processing for Direct UV Measurements***.

11.6 Single Standard First Order Calculation Method

Selecting ***Single Standard First Order Calculation Method*** the ***Parameters For Protein*** will change to display six tabs ***General***, ***Instrument***, ***Protein***, ***Standards***, ***Sample(s)*** and ***Plot***:

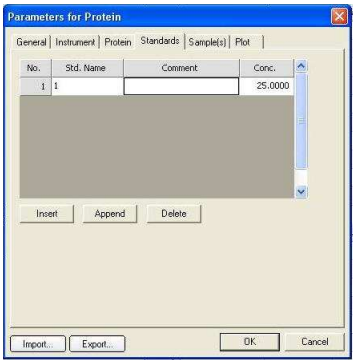
Protein Tab - Single Standard First Order Calculation Method



Measurement	There are seven options for measuring modes: ***Direct UV***, ***Bradford, Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro***.
Calc. Method	In ***Direct UV*** mode there are four different calculation methods: ***ABS***, ***Constant***, ***Single Standard First Order*** and ***Warburg formula***.
Cali Mode	The calibration mode is fixed as ***First Order***.
Force Zero	The line of best fit is fixed to intercept the y-axis at zero.
Conc Unit	There are two choices for the units of concentration: ***mg/mL*** and ***µg/mL.***
Num	The number of wavelengths measured, this cannot be altered and is set to 3 in ***Direct UV*** mode.
WL	The wavelength values that are measured, this cannot be altered and is set at 260, 280 and 320nm in ***Direct UV*** mode.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.
Dilution	Dilution can be selected or unselected by ticking or cancelling the ***Diluted*** box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.
A320 Correction	If selected, the ABS values at 260 and 280 nm will subtract the 320nm ABS value.
Standard Replicates	If standard replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated
Sample Replicates	If sample replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

Standard Tab - Single Standard First Order Calculation Method

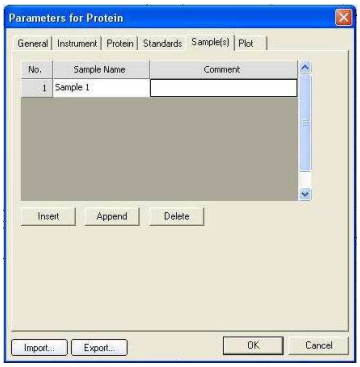
Used to input the concentrations of the standard sample (Range - 9999.0 to 9999.0), standard names and to add comments. The number of standard sample can be edited using



Note: Only the ***Standard Sample*** in ***Position 1*** will be used for the measurement.

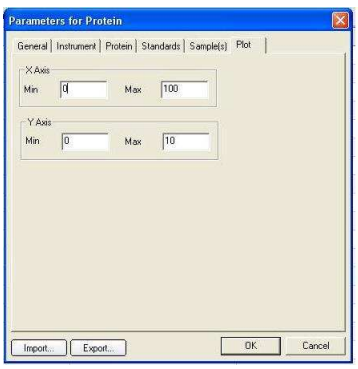
Sample(s) Tab - Single Standard First Order Calculation Method

Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard sample can be edited using



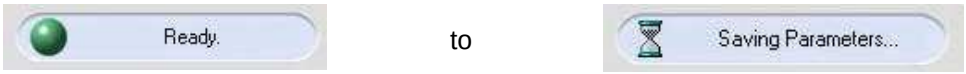
Plot Tab - Sample(s) Tab - Single Standard First Order Calculation Method

Used to set the maximum and minimum values of the x and y-axis (Range -9999 to 9999).



Note: Any ***Standard Names***, ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for Protein*** are saved and the saved data imported.

Whilst saving the updated parameters the ***Status Indicator*** will change from



11.6.1 Importing parameters

To access previously saved parameter files select Import... from the ***Parameters for Protein*** window.

Alternatively parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

11.6.2 Exporting parameters

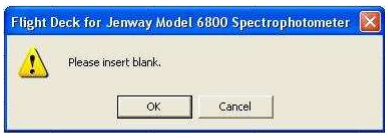
To save parameters select Export... from the ***Parameters for Protein*** window.

Alternatively, parameters can be exported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

11.6.3 Blank Calibration - Single Standard First Order Calculation Method

Before recording a protein measurement it is necessary to perform a blank calibration for all chosen wavelengths.

To perform a blank calibration select Blank from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed Blank is shown in the ***Work Area***.

11.6.4 Auto Zero

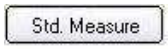
By performing ***Auto Zero*** the Model 6800 will adjust the absorbance to zero.

Ensure the reference cell holder (rear) and sample cell holder (front) are empty and select Auto Zero from the ***Command Bar***.

Alternatively auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the Tool Bar.

Note: Auto Zero will only calibrate to zero for a single wavelength and therefore any results obtained after performing an ***Auto Zero*** will not have a blank calibration.

11.6.5 Standard Measurements - Single Standard First Order Calculation Method

To run a standard sample replace the blank solvent in the sample cell holder with the standard sample required. Select 

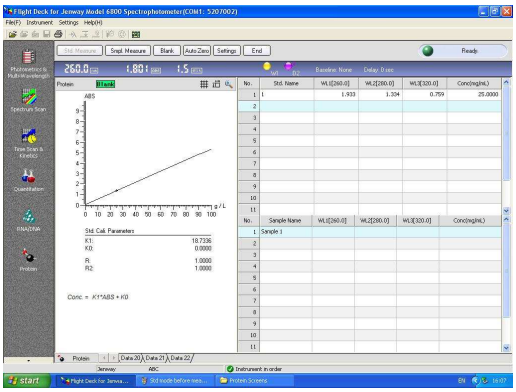
from the ***Command Bar***.

Note: During a measurement the blank solvent must remain in the reference cell holder.

During a measurement the Status Indicator will change from

to

When the standard has been recorded the ***Work Area*** displays the calibration curve, the standard calibration parameters and the completed standard sample data table.



To re-measure a specific standard select the required sample line with the cursor, by selecting

on the ***Command Bar*** the standard sample data will be updated.

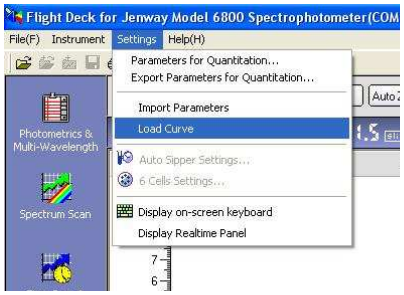
The maximum and minimum values of the x and y-axis of the calibration curve can be edited at any time by selecting to display the dialogue box

To auto-scale the calibration curve select

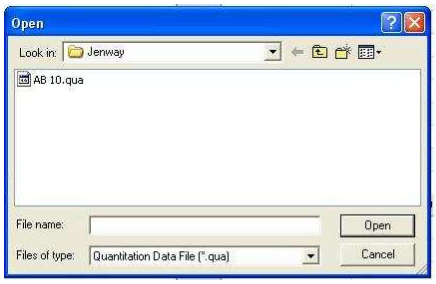
11.6.6 Importing a Standard Curve

By importing a standard curve into the ***Protein*** mode this allows a sample measurement to be recorded directly, eliminating the need to prepare and measure standard samples on each occasion.

Once a Protein standard measurement has been performed and saved, the standard curve can be opened by selecting ***Settings*** from the ***Menu Bar*** and selecting ***Load Curve***.

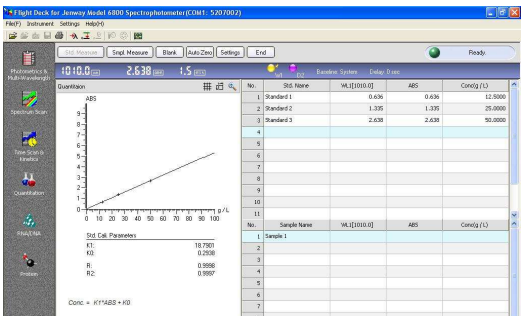


The standard curve can be imported by selecting the required file and



The standard curve is inputted into the ***Work Area*** allowing the sample measurement to be performed directly.

Note: Importing a standard curve will only import the standard curve parameters; the other measurement parameters will not be imported. Therefore the correct system parameters should be entered before importing a standard curve.



11.6.7 Sample Measurement - Single Standard First Order Calculation Method

To run a sample measurement, replace the blank solvent in the sample cell holder with the sample required for measurement.

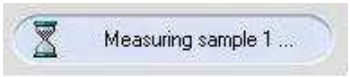
Select [Smpl. Measure] from the ***Command Bar***.

Note: During a sample measurement the blank solvent must remain in the reference cell holder.

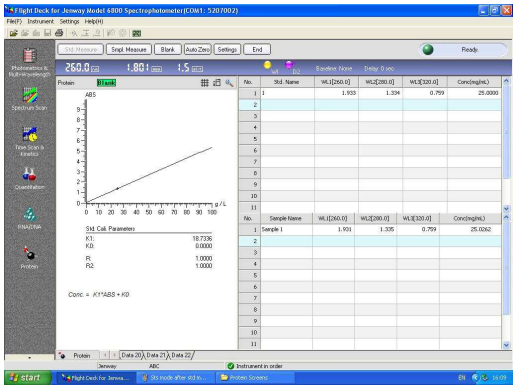
After the standard sample has been measured is [Smpl. Measure] highlighted.

During a measurement the ***Status Indicator*** will change from

to



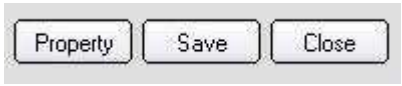
When a sample measurement has been performed the calculated concentrations and absorbances are displayed in the ***Work Area***.



To re-measure a specific sample select the required sample line with the cursor, by selecting [Smpl. Remeasure] on the ***Command Bar*** the standard sample data will be updated.

After all samples have been measured select [End] from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.



Note: Data processing and new measurements cannot be performed until [End] has been selected.

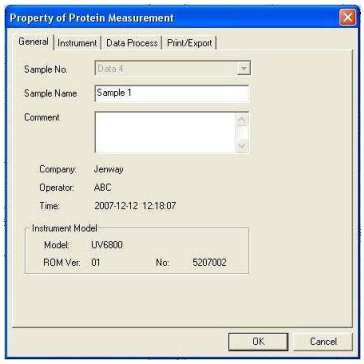
11.7 Data Processing for all Direct UV Calculation Methods

Select Property from the ***Command Bar***.

The ***Property of Protein*** window displays four tabs: ***General***, ***Instrument***, ***Data Process*** and ***Print / Export***.

General Tab

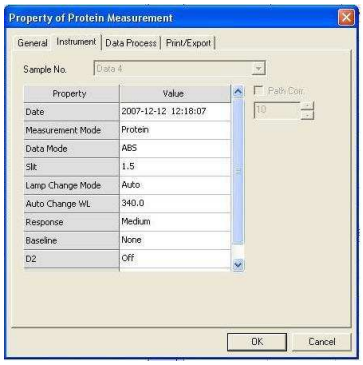
Used to input sample names or comments, the length limits are 24 and 200 bytes, respectively.



Note: Any ***Sample Names*** or ***Comments*** inputted will be displayed on the print out.

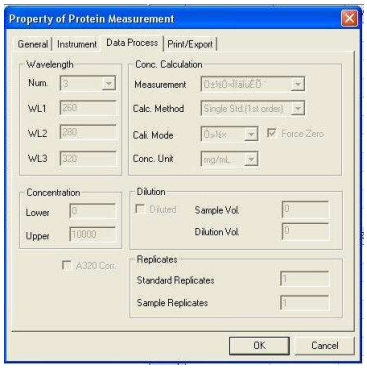
Instrument Tab

Displays both the system parameters and the main parameters of the protein measurement.



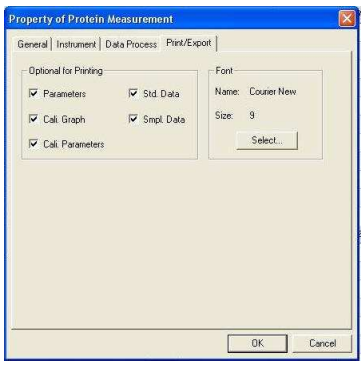
Data Process Tab

Displays the experimental parameters of the protein measurement.



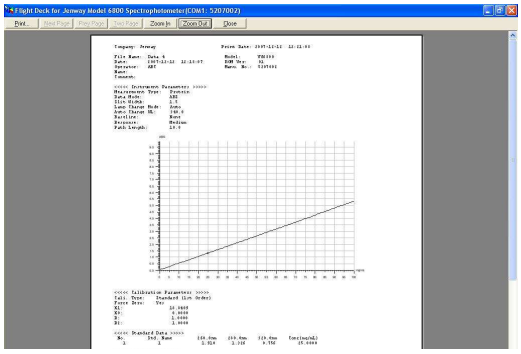
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



11.8 Printing

Select the icon from the work area to display the print preview.

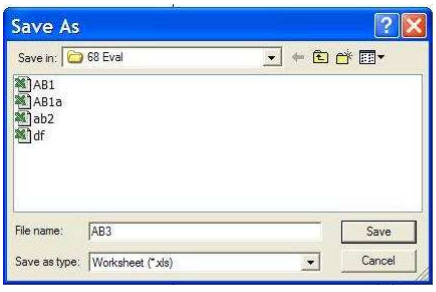


Select to obtain a print out of the report.

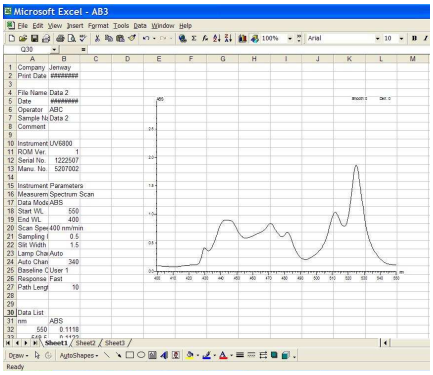
If you wish to alter any of the print options this can be done by reselecting the ***Print / Export*** tab in the ***Property of Protein*** window.

11.9 Exporting To Excel

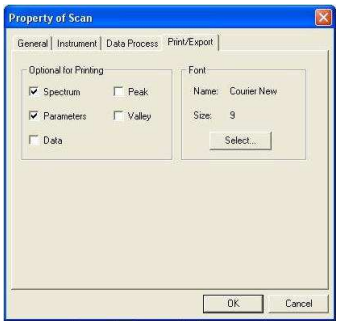
To Export to Excel select from the ***Work Area*** to open the dialogue box.



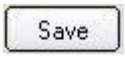
Selecting ***Save*** launches Excel and displays the desired data.



Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



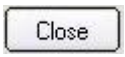
11.10 Saving Data a Data File

After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02***, etc. Selecting  opens the dialogue box.

Inputting a file name and selecting will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a Photometrics data file or as an Excel worksheet.

Alternatively, data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting ***Save As*** or by selecting the icon from the ***Tool Bar***.

To cancel saving the data file select

Select  from the ***Command Bar*** to exit the current protein measurement.

If exiting a measurement without having saved the data the following dialogue box will appear:

11.11 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.

Section 12

Protein Measurement

Bradford, Bradford Micro, Lowry, Lowry Micro, BCA and BCA Micro Modes

12.1 Principles of Measurement

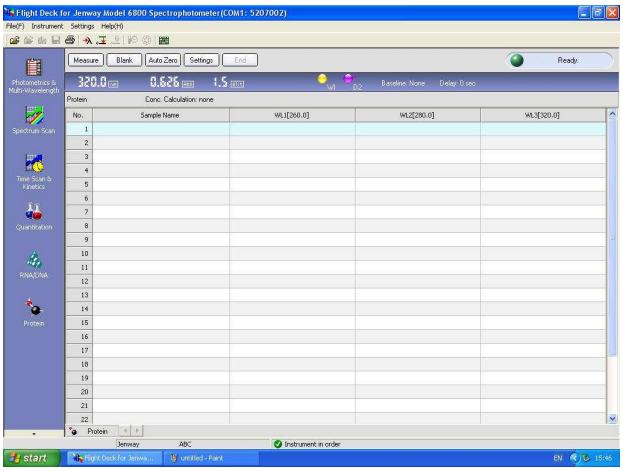
The concentration of proteins can be determined by pre-set methods using Bradford, Lowry, BCA and Direct UV protocols. Through recording the absorbances of the samples at set wavelengths the concentration of the protein in the sample can be determined.

12.2 Getting Started

After the Model 6800 spectrophotometer has finished initialising the ***Status Indicator*** will display the status.

Select

from the left hand mode window to display the work screen.



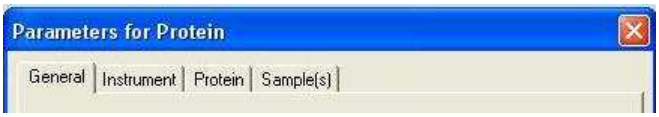
Note: Protein measurement has seven measurement modes ***Direct UV***, ***Bradford***, ***Bradford micro***, ***Lowry***, ***Lowry micro***, ***BCA*** and ***BCA*** micro.

12.3 Setting Parameters

To input the required parameters select

from the ***Command Bar***.

The ***Parameters For Protein*** window displays four tabs: ***General***, ***Instrument***, ***Protein*** and ***Sample(s)***.

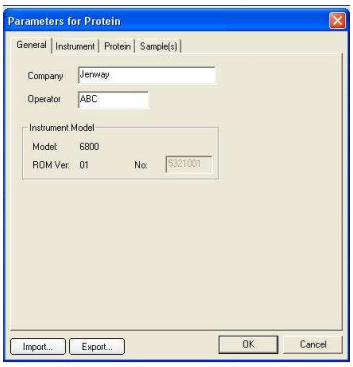


The options displayed under the ***General*** and ***Instrument*** tabs are the same for all ***Calculation Methods*** in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and **BCA Micro** Modes measurements**.**

Alternatively, the ***Parameters For Protein*** window may be opened by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Parameters For Protein*.**

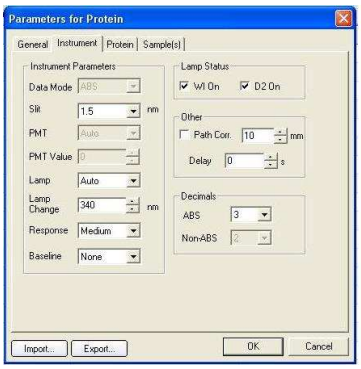
General Tab

Used to input or edit the company name and operator.



Instrument Tab

Allows the instrument parameters to be edited.

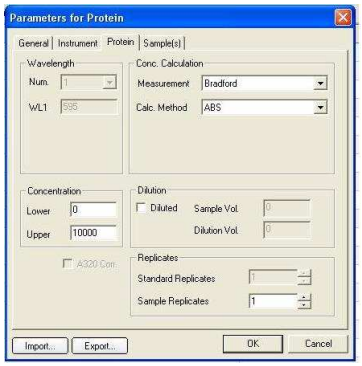


Data Mode	The data mode for ***Protein*** Measurement is fixed as ***ABS*** only.
Slit	The slit width is fixed at 1.5 nm.
PMT and PMT Value	Not available
Lamp	There are 3 options for the light source: ***Auto***, ***D2*** or ***WI***. **Auto** - the light source is switched at the switching wavelength **D2** - deuterium arc lamp, yields good intensity continuum in the UV region **WI** - tungsten halogen lamp, yields good intensity over part of the UV spectrum and the entire visible range.
Lamp Change	In ***Auto*** mode the light source will be switched automatically at the switching wavelength (Range 325 - 370 nm).
Response	There are three options for the response time: ***Fast***, ***Medium*** or ***Slow***.
Baseline	Up to three baselines may be stored at any one time: ***None***, ***System***, ***User 1*** and ***User 2***. There is also an option for no baseline.
Lamp Status	The ***D2*** or ***WI*** lamps may be turned on or off by ticking or cancelling the appropriate box.
Path Corr.	ABS is measured based on a 10 mm light path. Path correction calibrates ABS based on inputted path length (Range 0.1 - 100 mm).
Delay	The delay between pressing the ***Measure*** button and the measurement starting (Range 0 - 200 seconds).
Decimals	In ***Protein*** measurement ***ABS*** can be recorded to 3 or 4 decimal places.

12.4 ABS Calculation Method

Protein Tab – ABS Calculation Method

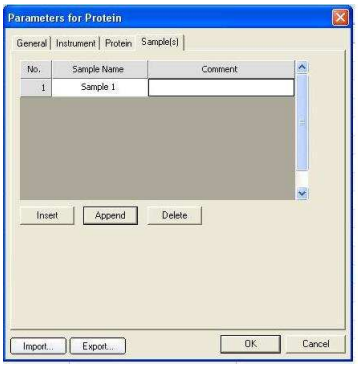
Used to edit the experimental parameters.



Measurement	There are seven options for measuring modes: ***Direct UV***, ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro***.
Calc. Method	In ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro*** modes there are four different calculation methods: ***ABS***, ***Constant***, ***Single Standard First Order*** and ***Multi Standard Calibration***.
Num	The number of wavelengths measured, this cannot be altered and is set to 1 in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro*** modes.
WL	The wavelength value that is measured, this cannot be altered and is set at 595 nm in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro*** modes and 562 nm in ***BCA*** and ***BCA Micro*** modes.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.
Dilution	Dilution can be selected or unselected by ticking or cancelling the ***Diluted*** box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.
Sample Replicates	If sample replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

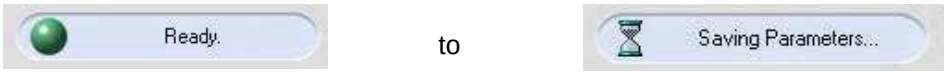
Sample(s) Tab – ABS Calculation Method

Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard samples can be edited using



Note: Any Standard Names, Sample Names or Comments are recalled if the ***Parameters for Protein*** are saved and the saved data imported.

Whilst saving the updated parameters the ***Status Indicator*** will change from



12.4.1 Importing parameters

To access previously saved parameter files select

from the ***Parameters for Protein*** window.

Alternatively, parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

12.4.2 Exporting parameters

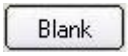
To save parameters select

from the ***Parameters for Protein*** window.

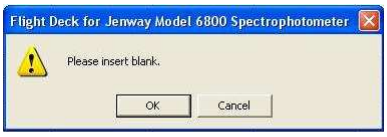
Alternatively, parameters can be exported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

12.4.3 Blank Calibration

Before recording a protein measurement it is necessary to perform a blank calibration for the chosen wavelength.

To perform a blank calibration select 

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed

is shown in the ***Work Area***.

12.4.4 Auto Zero

Selecting

from the ***Command Bar*** will calibrate to zero for a single wavelength. Therefore as the ***Bradford, Lowry*** and ***BCA*** modes only use a single wavelength recording ***Auto Zero*** whilst cuvettes containing the blank/reaction solvent are placed in both the reference cell holder (rear) and sample cell holder (front) will perform the necessary blank calibration.

Alternatively, auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the Tool Bar.

12.4.5 Sample Measurement – ABS Calculation Method

To run a sample replace the blank solvent in the sample cell holder (front) with the sample required for measurement.

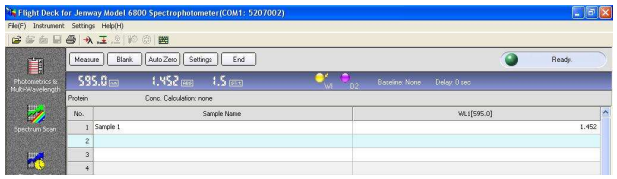
Select

from the ***Command Bar***.

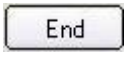
Note: During a sample measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

to

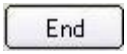


The ***Work Area*** displays the absorbance measured at 595 or 562nm.

After all samples have been measured select 

from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.

Note: Data processing and new measurements cannot be performed until 

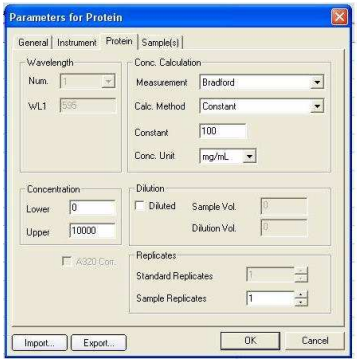
has been selected.

Note: Data processing for ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro*** is described in ***12.7 Data Processing for Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro Calculation Methods***.

12.5 Constant Calculation Method

Selecting ***Constant Calculation Method*** allows a constant and concentration unit to be inputted.

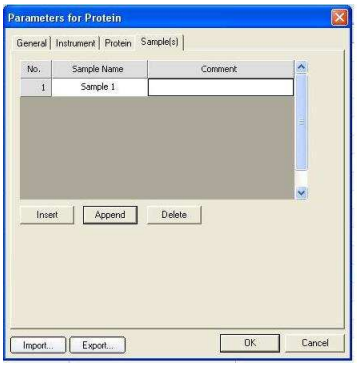
Protein Tab - Constant Calculation Method



Measurement	There are seven options for measuring modes: ***Direct UV***, ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro***.
Calc. Method	In ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro Calculation Methods*** there are four different calculation methods: ***ABS***, ***Constant***, ***Single Standard First Order*** and ***Multi Standard Calibration***.
Constant	Range is 0 – 99999.9
Conc Unit	There are two options for the units of concentration: ***mg/mL*** and ***µg/mL***.
Num	The number of wavelengths measured, this cannot be altered and is set to 1 in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro Calculation Methods*** mode.
WL	The wavelength value that is measured, this cannot be altered and is set at 595 nm in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro*** modes and 562 nm in ***BCA*** and ***BCA Micro*** modes.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.
Dilution	Dilution can be selected or unselected by ticking or cancelling the ***Diluted*** box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.
Sample Replicates	If sample replicates is set greater than 1 (Range 1 – 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

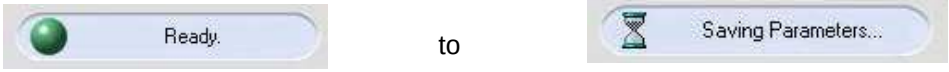
Sample(s) Tab - Constant Calculation Method

Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard sample can be edited using



Note: Any Sample Names or Comments are recalled if the ***Parameters for Protein*** is saved and the saved data imported.

Whilst saving the updated parameters the ***Status Indicator*** will change from



12.5.1 Importing parameters

To access previously saved parameter files select

from the ***Parameters for Protein*** window.

Alternatively parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

12.5.2 Exporting parameters

To save parameters select

from the ***Parameters for Protein*** window.

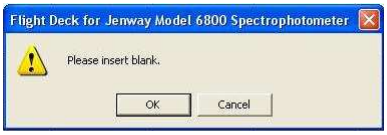
Alternatively parameters can be exported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

12.5.3 Blank Calibration

Before recording a protein measurement it is necessary to perform a blank calibration for the chosen wavelength.

To perform a blank calibration select

from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.

The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed Blank is shown in the ***Work Area***.

12.5.4 Auto Zero

Selecting Auto Zero from the ***Command Bar*** will calibrate to zero for a single wavelength. Therefore as the ***Bradford, Lowry*** and ***BCA*** modes only use a single wavelength recording ***Auto Zero*** whilst cuvettes containing the blank/reaction solvent are placed in both the reference cell holder (rear) and sample cell holder (front) will perform a blank calibration.

Alternatively, auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the Tool Bar.

12.5.5 Sample Measurement - Constant Calculation Method

To run a standard sample replace the blank solvent in the sample cell holder with the standard sample required.

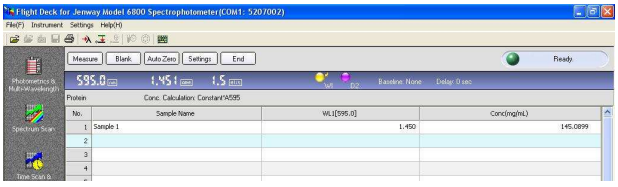
Select Measure from the ***Command Bar*.**

Note: During a measurement the blank solvent must remain in the reference cell holder.

During a measurement the ***Status Indicator*** will change from

to

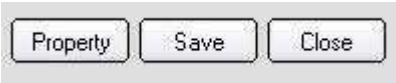
The ***Work Area*** displays the absorbance measured at 595 or 562nm and the calculated concentration.



Note: **Constant Mode**: Concentration = Constant × *ABS595* (or Constant × *ABS562*)

After all samples have been measured select End from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.



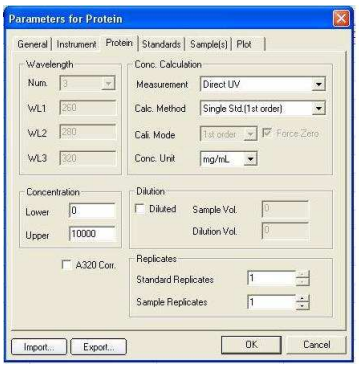
Note: Data processing and new measurements cannot be performed until [End] has been selected.

Note: Data processing for ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro Calculation Methods*** - ***Constant Calculation Method*** is described in ***12.7 Data Processing*** for ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro Calculation Methods***.

12.6 Single Standard First Order Calculation and Multi Standard Calibration Methods

Selecting ***Single Standard First Order*** or ***Multi Standard Calibration Calculation Method*** the ***Parameters For Protein*** will change to display six tabs ***General***, ***Instrument***, ***Protein***, ***Standards***, ***Sample(s)*** and ***Plot***:

Protein Tab - Single Standard First Order Calculation and Multi Standard Calibration Methods



Measurement	There are seven options for measuring modes: ***Direct UV***, ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro***.
Calc. Method	In ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro*** modes there are four different calculation methods: ***ABS***, ***Constant***, ***Single Standard First Order*** and ***Multi Standard Calibration***.
Cali Mode	The calibration mode is fixed as ***First Order*** for ***Single Standard 1st Order***. For ***Multi Standard Calibration*** the calibration mode can be 1st, 2nd or 3rd order.
Force Zero	For ***Single Standard First Order*** the line of best fit is fixed to intercept the y-axis at zero. For ***Multi Standard Calibration***, ***Force Zero*** can be chosen by ticking or cancelling the box.
Conc Unit	There are two options for the units of concentration: ***mg/mL*** and ***µg/mL.***
Num	The number of wavelengths measured, this cannot be altered and is set to 1 in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro***, ***BCA*** and ***BCA Micro*** modes.
WL	The wavelength value that is measured, this cannot be altered and is set at 595 nm in ***Bradford***, ***Bradford Micro***, ***Lowry***, ***Lowry Micro*** modes and 562 nm in ***BCA*** and ***BCA Micro*** modes.
Concentration	The lower and upper limits of concentration are 0 and 99999, respectively.

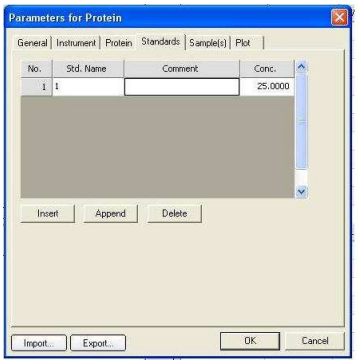
Dilution Dilution can be selected or unselected by ticking or cancelling the ***Diluted*** box. When the sample concentration is too high the sample can be diluted before the measurement. By inputting the sample and dilution volumes the concentration result that is calculated is the sample concentration before dilution.

Standard Replicates If standard replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated

Sample Replicates If sample replicates is set greater than 1 (Range 1 - 100) the average value will be used as the final result. In addition Standard Deviation and Coefficient of Variation are calculated.

Standards Tab - Single Standard First Order Calculation and Multi Standard Calibration Methods

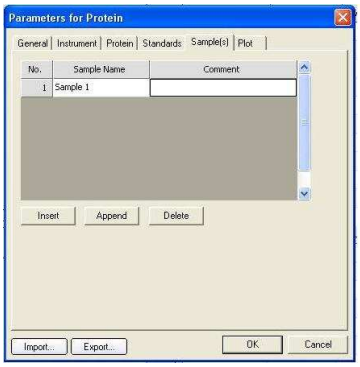
Used to input the concentrations of the standard sample (Range -9999.0 to 9999.0), standard names and to add comments. The number of standard samples can be edited using



Note: For ***Single Standard First Order Calculation*** only the ***Standard Sample*** in ***Position 1*** will be used for the measurement.

Sample(s) Tab - Single Standard First Order Calculation and Multi Standard Calibration Methods

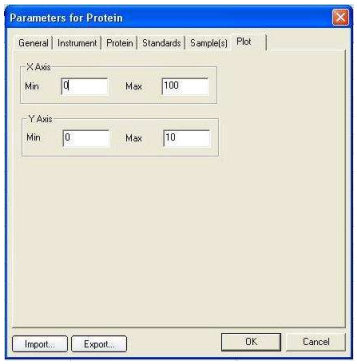
Used to input the sample names and comments, the length limits are 24 and 200 bytes, respectively. The number of standard samples can be edited using



Note: Any ***Standard Names***, ***Sample Names*** or ***Comments*** are recalled if the ***Parameters for Protein*** is saved and the saved data imported.

Plot Tab - Single Standard First Order Calculation and Multi Standard Calibration Method

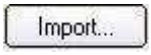
Used to set the maximum and minimum values of the x and y-axis (Range -9999 to 9999).



Whilst saving the updated parameters the ***Status Indicator*** will change from

to

12.6.1 Importing parameters

To access previously saved parameter files select  from the ***Parameters for Protein*** window.

Alternatively, parameters can be imported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Import Parameters***.

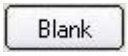
12.6.2 Exporting parameters

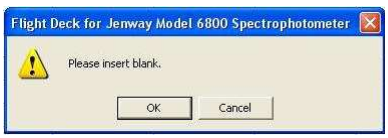
To save parameters select from the ***Parameters for Protein*** window.

Alternatively, parameters can be exported by selecting ***Settings*** from the ***Menu Bar*** and choosing ***Export Parameters***.

12.6.3 Blank Calibration - Single Standard First Order Calculation and Multi Standard Calibration Methods

Before recording a protein measurement it is necessary to perform a blank calibration for the chosen wavelength.

To perform a blank calibration select  from the ***Command Bar*** to open the dialogue box.



Place cuvettes containing the blank/reaction solvent in both the reference cell holder (rear) and sample cell holder (front) and select ***OK***.
The Model 6800 will adjust the absorbance to zero for each chosen wavelength.

After a blank calibration has been performed Blank is shown in the ***Work Area***.

12.6.4 Auto Zero

Selecting Auto Zero from the ***Command Bar*** will calibrate to zero for a single wavelength. Therefore as the ***Bradford, Lowry*** and ***BCA*** modes only use a single wavelength recording ***Auto Zero*** whilst cuvettes containing the blank/reaction solvent are placed in both the reference cell holder (rear) and sample cell holder (front) will perform a blank calibration.

Alternatively, auto zero may be recorded by selecting ***Instrument*** from the ***Menu Bar*** and choosing ***Auto Zero*** or by selecting the icon from the Tool Bar.

12.6.5 Standard Measurements - Single Standard First Order Calculation and Multi Standard Calibration Methods

To run a standard sample, replace the blank solvent in the sample cell holder with the standard sample required.

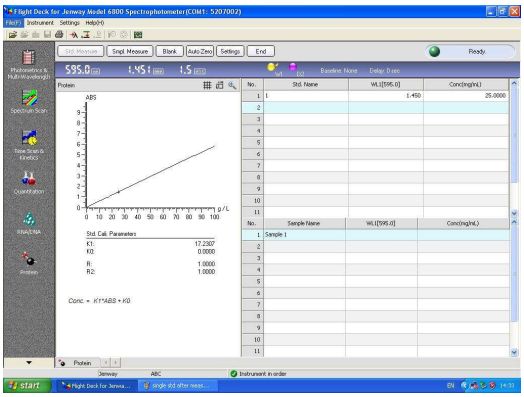
Select Std. Measure from the ***Command Bar***.

During a measurement the ***Status Indicator*** will change from

to

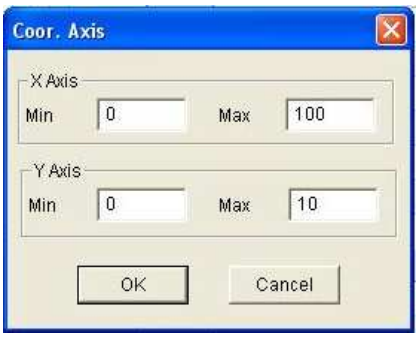
When all of the standards have been recorded the ***Work Area*** displays the calibration curve, the standard calibration parameters and the completed standard sample data table. If a Blank Calibration has been recorded the data displayed will be the difference between the sample measurement data and the blank data.

To re-measure a specific standard select the required sample line with the cursor, by selecting Std. Remeasure on the ***Command Bar*** the standard sample data will be updated.



The maximum and minimum values of the x and y-axis of the calibration curve can be edited

at any time by selecting to display the dialogue box

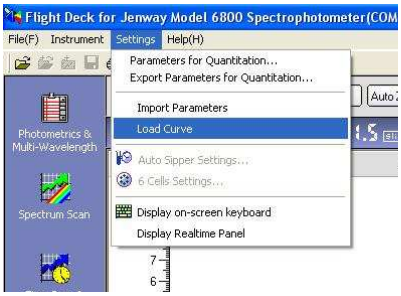


To auto-scale the calibration curve select

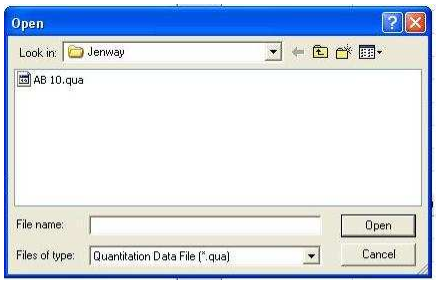
12.6.6 Importing a Standard Curve

By importing a standard curve into the Protein mode this allows a sample measurement to be recorded directly, eliminating the need to prepare and measure standard samples on each occasion.

Once a Protein standard measurement has been performed and saved, the standard curve can be opened by selecting ***Settings*** from the ***Menu Bar*** and selecting ***Load Curve***.



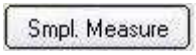
The standard curve can be imported by selecting the required file



The standard curve is inputted into the ***Work Area*** allowing the sample measurement to be performed directly.

Note: Importing a standard curve will only import the standard curve parameters; the other measurement parameters will not be imported. Therefore the correct system parameters should be entered before importing a standard curve.

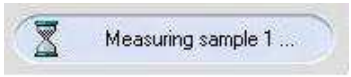
12.6.7 Sample Measurement - Single Standard First Order Calculation and Multi Standard Calibration Methods

After the standard sample has been measured is 

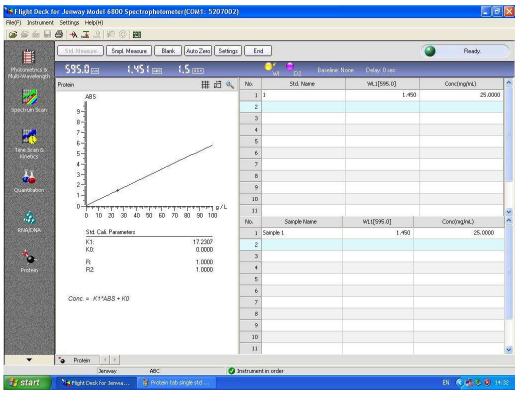
highlighted.

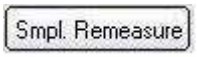
During a measurement the ***Status Indicator*** will change from

to

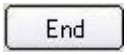


When a sample measurement has been performed the calculated concentrations and absorbances are displayed in the ***Work Area***.



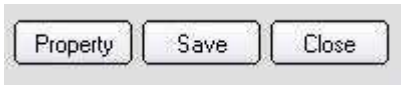
To re-measure a specific sample select the required sample line with the cursor, by selecting 

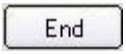
on the ***Command Bar*** the standard sample data will be updated.

After all samples have been measured select 

from the ***Command Bar***.

The ***Command Bar*** is updated and will now allow the data to be processed or new measurements to be performed.



Note: Data processing and new measurements cannot be performed until 

has been selected.

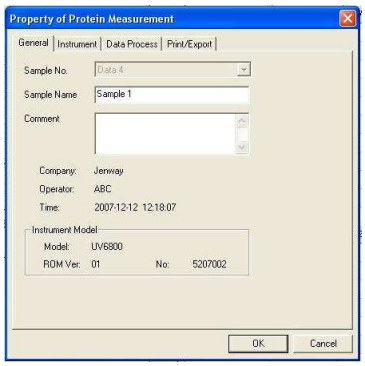
12.7 Data Processing for all Bradford, Bradford Micro, Lowry, Lowry Micro, BCA and BCA Micro Calculation Methods

Select Property from the ***Command Bar***.

The ***Property of Protein*** window displays four tabs: ***General***, ***Instrument***, ***Data Process*** and ***Print / Export***.

General Tab

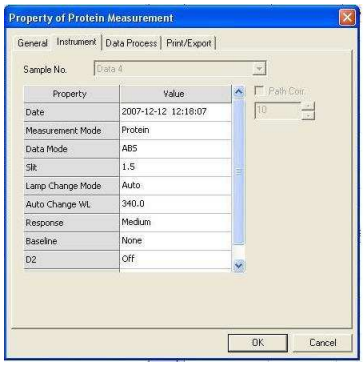
Used to input sample names or comments, the length limits are 24 and 200 bytes, respectively.



Note: Any ***Sample Names*** or ***Comments*** inputted will be displayed on the print out.

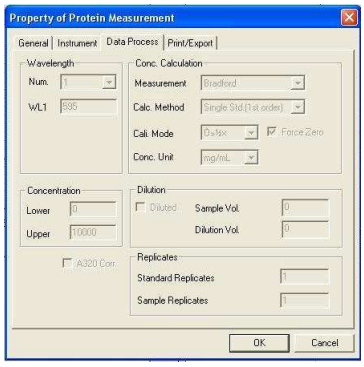
Instrument Tab

Displays both the system parameters and the main parameters of the protein measurement.



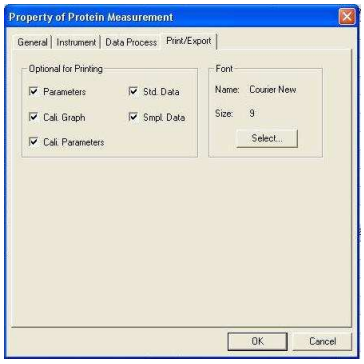
Data Process Tab

Displays the experimental parameters of the protein measurement.



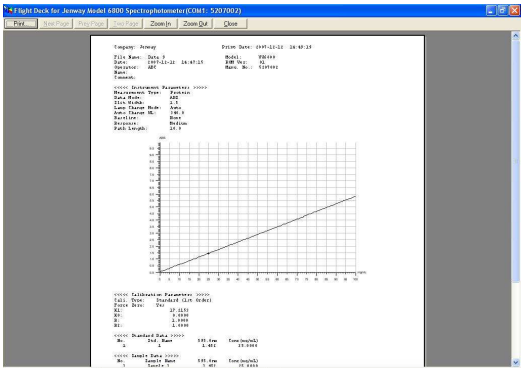
Print / Export Tab

Allows the user to choose what is printed on the report along with the font and size. The default font and size are Courier New size 9; generally these do not need to be altered.



12.8 Printing

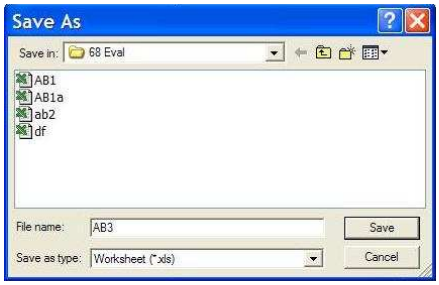
Select the icon from the work area to display the print preview.



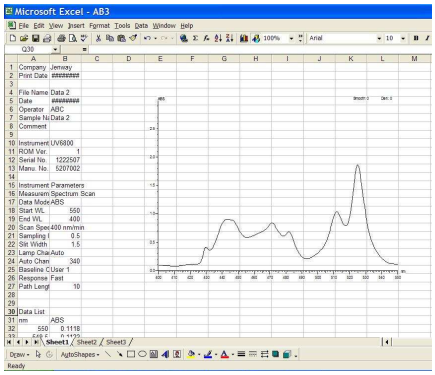
Select to obtain a print out of the report. If you wish to alter any of the print options this can be done by reselecting the ***Print / Export*** tab in the ***Property of Protein*** window.

12.9 Exporting To Excel

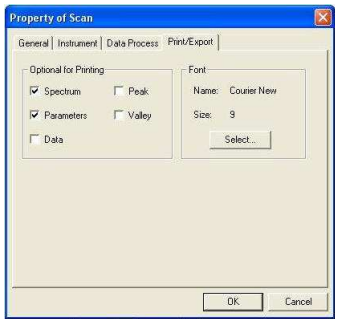
To Export to Excel select from the **Work Area** to open the dialogue box.



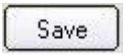
Selecting ***Save*** launches Excel and displays the desired data.



Note: Ticking or cancelling the appropriate boxes under the ***Print/Export*** tab in the ***Property*** window selects the data that is exported to Excel.



12.10 Saving Data a Data File

After a measurement has been recorded a data file is created this will have the default name of ***data01***, ***data02*** etc. Selecting  opens the dialogue box

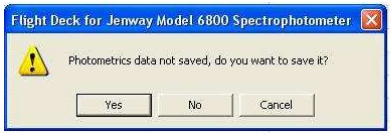
Inputting a file name and selecting will save the data file in the desired location. Each file can be saved as the specific measurement mode file e.g. a Photometrics data file or as an Excel worksheet.

Alternatively, data files can be saved by selecting ***File*** from the ***Menu Bar*** and selecting ***Save As*** or selecting the icon from the ***Tool Bar***.

To cancel saving the data file select

Select Close from the ***Command Bar*** to exit the current protein measurement.

If exiting a measurement without having saved the data the following dialogue box will appear:



12.11 Exiting the Flight Deck

Selecting ***File*** from the ***Menu Bar*** followed by ***Exit*** will open the dialogue box

If exiting without having saved all of the data the user will be given the option to save before closing the Flight Deck.

Section 13

Installation and Operation of Accessories

13.1 Glass Filter Holder

The Glass Filter Holder allows measuring mainly glass samples or the like having parallel surfaces. The result may involve some errors when the sample has a curved or irregular surface that refracts the light beam.

Specification

Sample Dimensions:
Thickness: 0.5 to 5mm
Size: 12 x 25mm minimum
55 x 100mm maximum

Unpacking

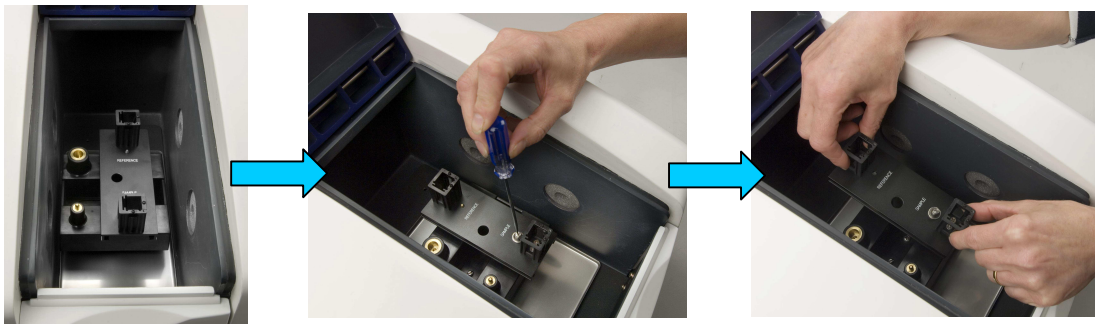
Remove the Glass Filter Holder from the box and place gently on the bench. Check the contents of the box against the packing list. If any part is damaged or missing contact your dealer.

Installation

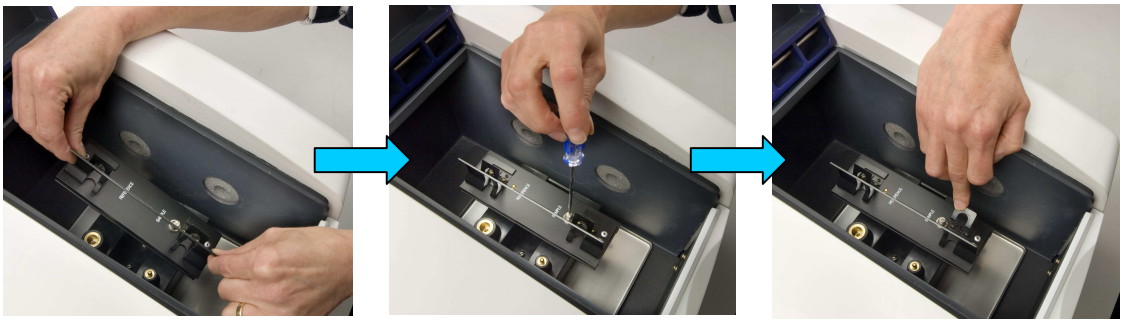
The Glass Filter Holder is used in the sample compartment of the Jenway Model 6800 Spectrophotometer. The installation procedure is highlighted below:

Note: Before commencing the installation procedure ensure that the spectrophotometer is switched off and disconnected from the mains supply.

Open the lid of the Model 6800 spectrophotometer and using the supplied screwdriver loosen the fixing screw. Remove the standard 10x10mm cell holder and store in a safe place.



Carefully lower the Glass Filter Holder into the sample compartment, ensuring that the locator spigots fit into the locator holes of the accessory. Once in place secure the accessory by gently tightening the fixing screw with the supplied screwdriver.



Note: Do not over tighten the fixing screw as this may damage both the spectrophotometer and the accessory.

Re-connect the power supply to the instrument and switch on.

Usage

Select the ***Flight Deck*** desktop icon and allow the instrument time to perform the self-test protocol (approximately 1 min).

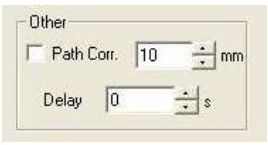
Select the required operating mode.

The fundamental usage of the Glass Filter Holder is the same as the standard 10mm cell holder.

To insert a glass filter, gently pull back the sprung holder, insert the glass filter and carefully position the holder against the filter.

Note: Exercise care when securing the glass filter sample, as the sprung holder could damage the sample if released quickly.

All measurements are based on a 10mm light path length. Using the path correction option the Flight Deck software calibrates the measurement based on the inputted path length. Path correction can be edited by selecting ***Path Corr.*** under the ***Instrument*** tab and inputting the desired path length.



Note: If the initial reading, before path correction, is out of the measuring range of the spectrophotometer then the results displayed after path correction will show these limits.

13.2 Rectangular Long Path Cell Holder

For applications requiring additional sensitivity longer path length cuvettes may be required. These can be accommodated in the Jenway Model 6800 Rectangular Long Path Cell Holder, which can accept cell lengths of 10, 20, 30, 40, 50 and 100mm.

Specification

Rectangular Cell Usable Width:	12.5mm
Optical Path Length	10, 20, 30, 40, 50, 100mm

Error in Reproducibility due to Cell Loading/Unloading: ±0.5%T or less.

Unpacking

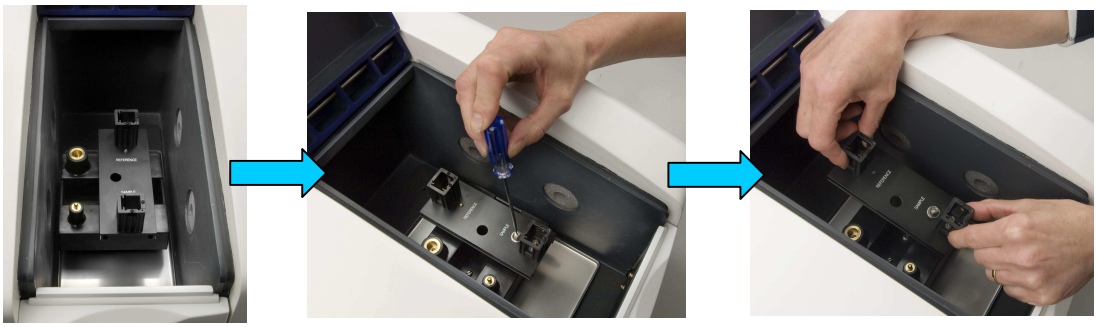
Remove the Rectangular Long Path Cell Holder from the box and place gently on the bench. Check the contents of the box against the packing list. If any part is damaged or missing contact your dealer. Before use ensure that you remove the elastic band.

Installation

The Rectangular Long Path cell holder is used in the sample compartment of the Jenway Model 6800 Spectrophotometer. The installation procedure is highlighted below:

Note: Before commencing the installation procedure ensure that the spectrophotometer is switched off and disconnected from the mains supply.

Open the lid of the Model 6800 spectrophotometer and using the supplied screwdriver loosen the fixing screw. Remove the standard 10x10mm cell holder and store in a safe place.



Carefully lower the Rectangular Long Path cell holder into the sample compartment, ensuring that the locator spigots fit into the locator holes of the accessory. Once in place secure the accessory by gently tightening the fixing screw with the supplied screwdriver.

Note: Do not over tighten the fixing screw as this may damage both the spectrophotometer and the accessory.

Re-connect the power supply to the instrument and switch on.

Usage

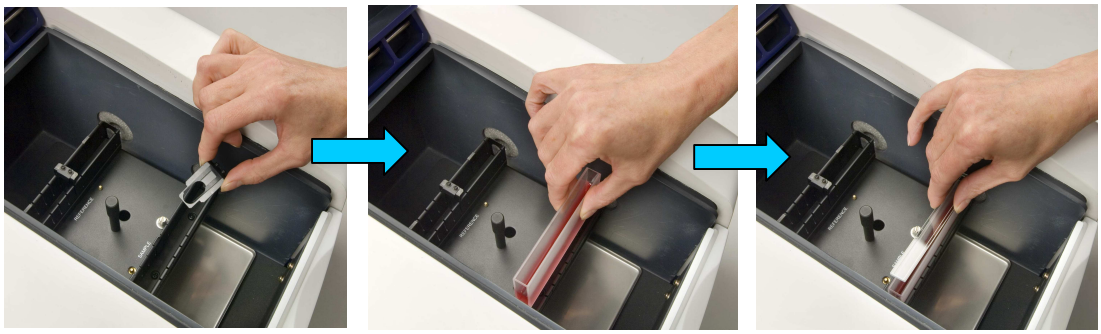
Select the ***Flight Deck*** desktop icon and allow the instrument time to perform the self-test protocol (approximately 1 min).

Select the required operating mode.

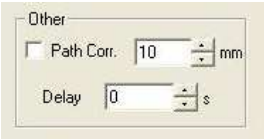
The fundamental usage of the Rectangular Long Path Cell Holder is the same as the standard 10mm cell holder.

To insert a long path cuvette, move the leaf spring to the appropriate position and insert the cuvette.

Note: Due to the increased volumes of liquids when using long path cuvettes it is advisable to always use a cell lid to prevent spillages.



All measurements are based on a 10mm light path length. Using the path correction option the Flight Deck software calibrates the measurement based on the inputted path length. Path correction can be edited by selecting ***Path Corr.*** under the ***Instrument*** tab and inputting the desired path length.



Note: If the initial reading, before path correction, is out of the measuring range of the spectrophotometer then the results displayed after path correction will show these limits.

13.3 Film Holder

The Film Holder allows the measurement of thin films and filters.

Specification

Film frame: Width 25mm, height 30 to 50mm
Beam aperture: Width 10mm x 20mm

Unpacking

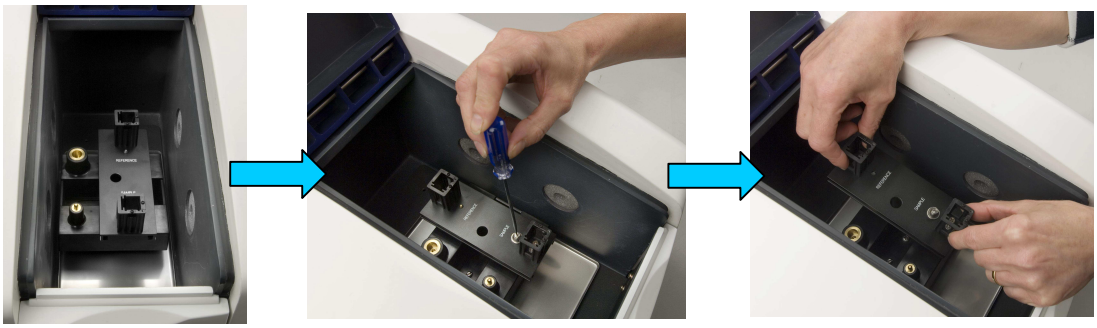
Remove the Film Holder from the box and place gently on the bench; the individual paper film holders are supplied in a separate polythene bag. Check the contents of the box against the packing list. If any part is of the film holder accessory or paper film holders are missing or damaged contact your dealer.

Installation

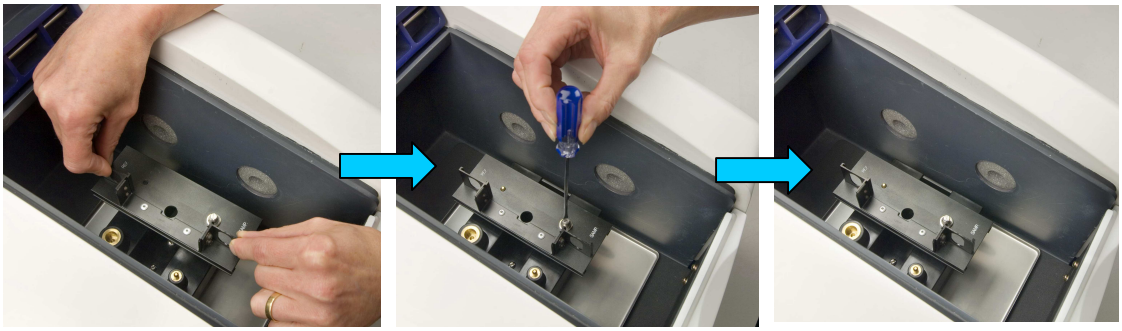
The Film Holder is used in the sample compartment of the Jenway Model 6800 Spectrophotometer. The installation procedure is highlighted below:

Note: Before commencing the installation procedure ensure that the spectrophotometer is switched off and disconnected from the mains supply.

Open the lid of the Model 6800 spectrophotometer and using the supplied screwdriver loosen the fixing screw. Remove the standard 10x10mm cell holder and store in a safe place.



Carefully lower the Film Holder into the sample compartment, ensuring that the locator spigots fit into the locator holes of the accessory. Once in place secure the accessory by gently tightening the fixing screw with the supplied screwdriver.



Note: Do not over tighten the fixing screw as this may damage both the spectrophotometer and the accessory.

Re-connect the power supply to the instrument and switch on.

Usage

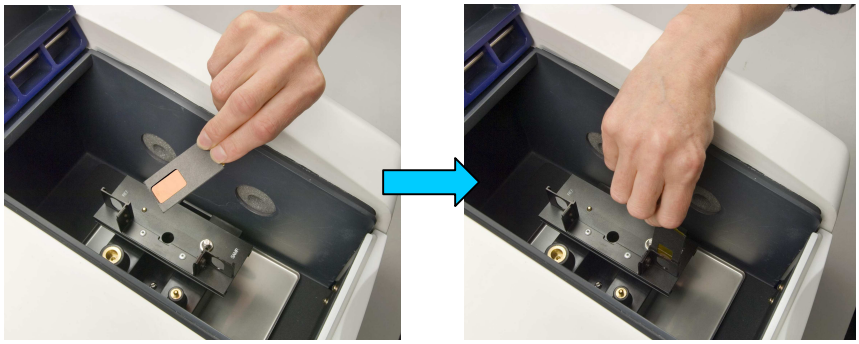
Select the ***Flight Deck*** desktop icon and allow the instrument time to perform the self-test protocol (approximately 1 min).

Select the required operating mode.

The fundamental usage of the Film Holder is the same as the standard 10mm cell holder.

To insert a film carefully place it into the paper film holder and slide into the Film Holder.

Note: Exercise care when inserting a paper film holder into the film holder accessory to avoid any tearing or unnecessary damage.



All measurements recorded are based on a 10mm light path length, by using the path correction option the Flight Deck software calibrates the recorded measurement based on the inputted path length. Path correction can be edited by selecting ***Path Corr.*** under the ***Instrument*** tab and inputting the desired path length.

Note: If the initial reading, before path correction, is out of the measuring range of the spectrophotometer then the results displayed after path correction will show these limits.

13.4 Micro Cell Holder

The Micro Cell Holder is designed for biochemical and medical applications where sample volumes are strictly limited and allows measurement of sample volumes down to 50µL using the micro cell (035 124).

Specification

Wavelength range:	220 to 950nm
Cell mounting/demounting repeatability:	±0.3%T
Baseline flatness:	±0.005A (50µL micro cell)

Unpacking

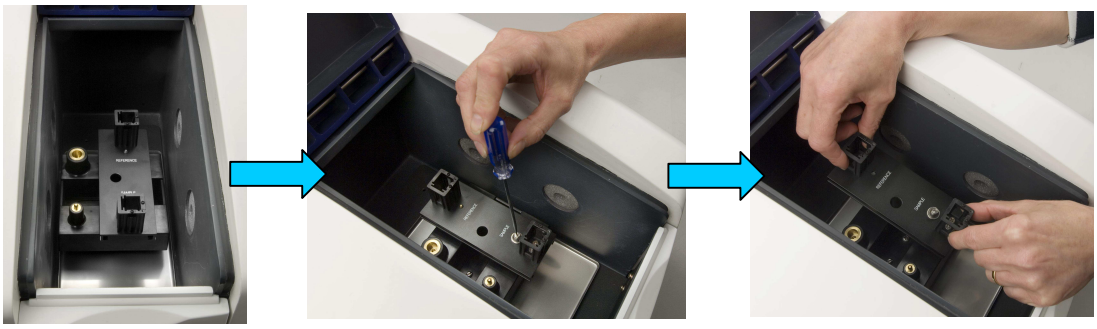
Remove the Micro Cell Holder from the box and place gently on the bench. Check the contents of the box against the packing list. If any part is damaged or missing contact your dealer.

Installation

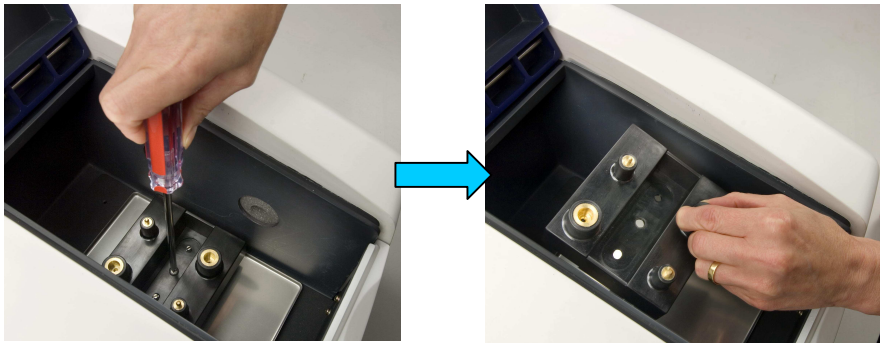
The Micro Cell Holder is used in the sample compartment of the Jenway Model 6800 Spectrophotometer. The installation procedure is highlighted below:

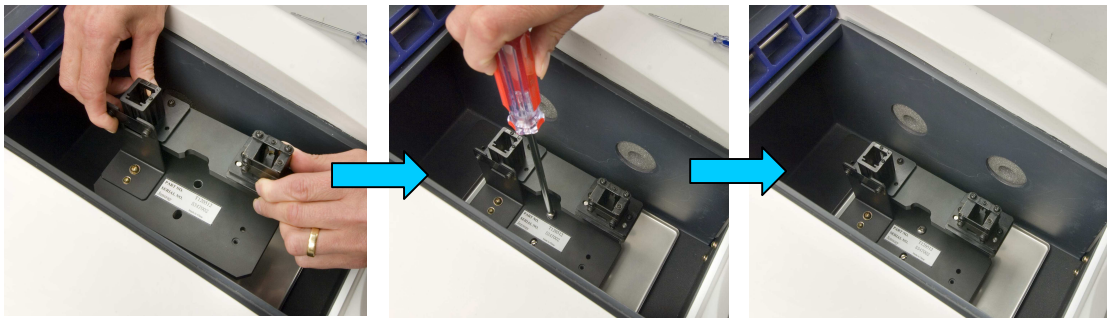
Note: Before commencing the installation procedure ensure that the spectrophotometer is switched off and disconnected from the mains supply.

Open the lid of the Model 6800 spectrophotometer and, using the supplied screwdriver, loosen the fixing screw. Remove the standard 10x10mm cell holder and store in a safe place.



After removing the standard 10x10mm cell holder, using the screwdriver provided, unscrew the spigot block from the base plate. Carefully lower the Micro Cell Holder into the sample compartment and secure the accessory by gently tightening the screw to the base plate with the supplied screwdriver.





Note: Do not over tighten the screws as this may damage both the spectrophotometer and the accessory.

Re-connect the power supply to the instrument and switch on.

Usage

Select the ***Flight Deck*** desktop icon and allow the instrument time to perform the self-test protocol (approximately 1 min).

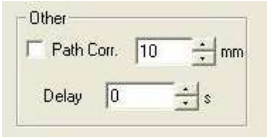
The fundamental usage of the Micro Cell Holder is the same as the standard 10mm cell holder.

Select the required operating mode.

Micro Cells are inserted into the Micro Cell Holder in the same way as standard 10x10 cells are inserted into the standard 10mm cell holder.

Note: Exercise care when filling a micro cell to ensure that no bubbles are present in the light path prior to recording a measurement.

If you wish to calibrate the recorded measurement to a 10mm light path length select ***Path Corr.*** under the ***Instrument*** tab and input the light path length that will be recorded. The Flight Deck software uses Beer-Lambert law to automatically recalculate the result to display the result for a 10mm light path length.



Note: If the initial reading, before path correction, is out of the measuring range of the spectrophotometer then the results displayed after path correction will show these limits.

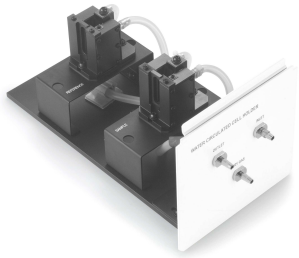
13.5 Water Circulated Cell Holder

The Water Heated Cell Holder is designed for applications where sample temperature is critical, allowing temperature control from ambient temperature up to 40℃.

Specification

Temperature range:	Ambient to 40℃
Temperature stability:	±0.3°C

Unpacking



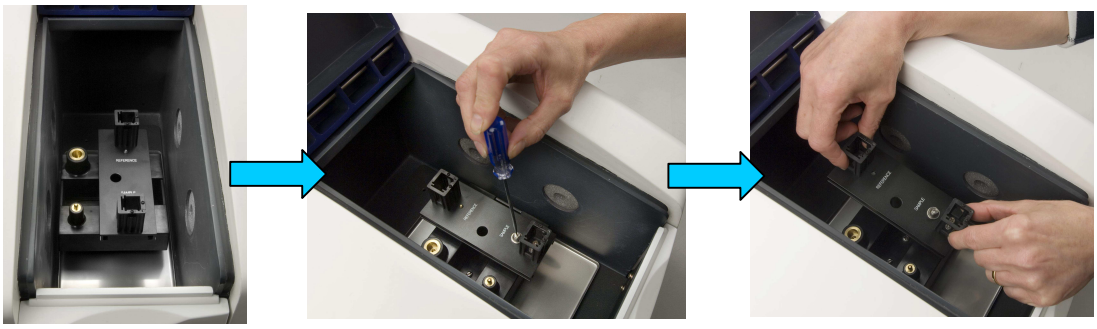
Remove the Water Circulated Cell Holder from the box and place gently on the bench. Check the contents of the box against the packing list. If any part is damaged or missing contact your dealer.

Installation

The Water Circulated Cell Holder is used in the sample compartment of the Jenway Model 6800 Spectrophotometer. The installation procedure is highlighted below:

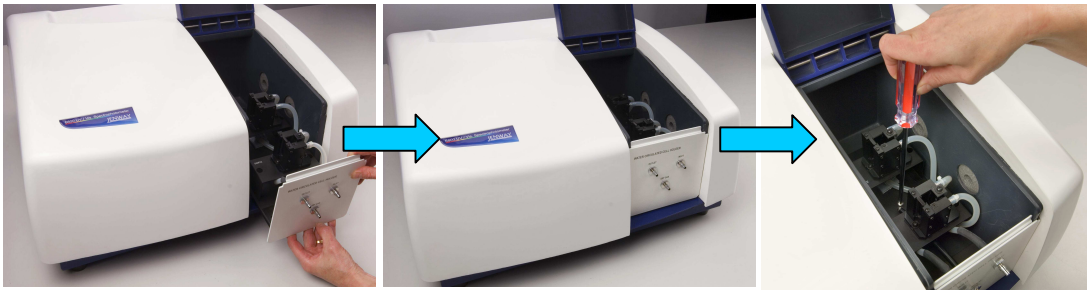
Note: Before commencing the installation procedure ensure that the spectrophotometer is switched off and disconnected from the mains supply.

Open the lid of the Model 6800 spectrophotometer and, using the supplied screwdriver, loosen the fixing screw. Remove the standard 10mm cell holder and store in a safe place.



After removing the standard 10mm cell holder, using the screwdriver provided, unscrew the spigot block from the base plate. Carefully remove the base plate from the unit by lifting the front panel and gently pulling forward (see below).

Gently slide the Water Circulated Cell Holder into the Model 6800 and ensure that the locator holes of the accessory align with the locator spigots in the unit. Secure the accessory by gently tightening the screw to the unit using the supplied screwdriver.



Note: Do not over tighten any of the screws as this may damage both the spectrophotometer and the accessory.

Connect the circulated water inlet to a thermostatic water bath and the outlet to a suitable receptacle, to allow the water to drain or re-circulate safely. If required, a dry gas can be connected to the dry gas inlet to prevent fogging of the surface of the cells that may occur at low temperatures.

After the unit has been connected to the water circulator, before re-connecting the power supply, check for any leaks by switching on the thermostatic water bath. If there are no leaks, re-connect the power supply to the instrument and switch on the instrument.

Usage

Select the ***Flight Deck*** desktop icon and allow the instrument time to perform the self-test protocol (approximately 1 min).

The fundamental usage of the Water Heated Circulated Cell Holder is the same as the standard 10mm cell holder.

Select the required operating mode.

Note: The sample time should always be allowed to equilibrate to the desired temperature.

Section 14

Maintenance and Troubleshooting

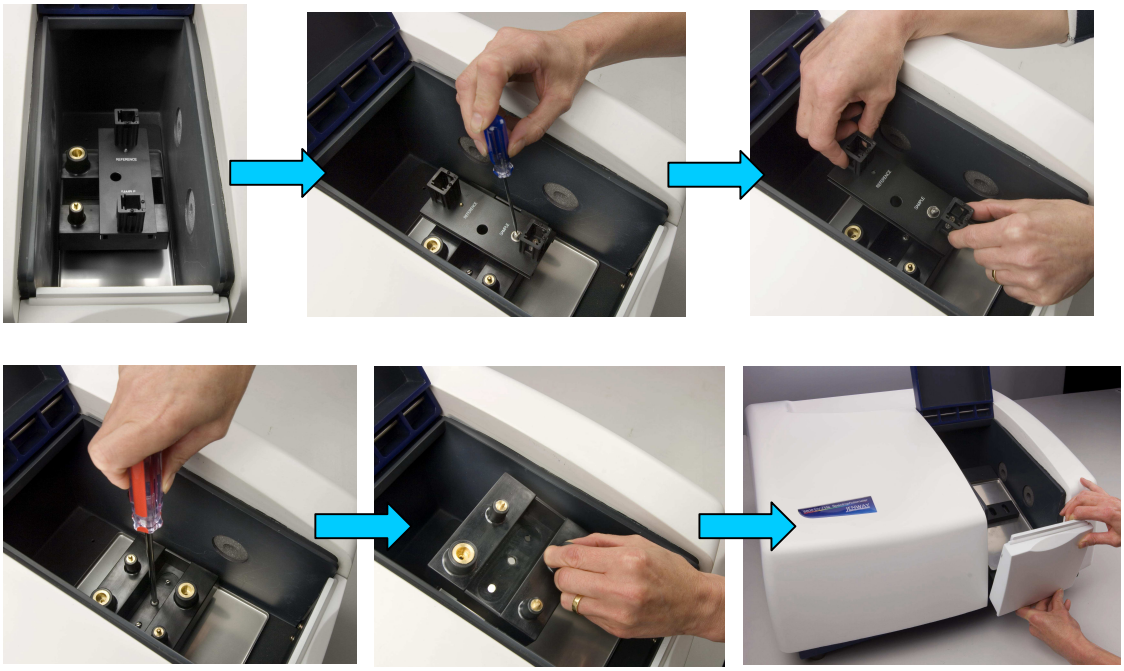
14.1 General

The Model 6800 is designed to give optimum performance with minimum maintenance. It is only necessary to keep the external surfaces clean and free from dust. For general cleaning the use of a damp cloth should be sufficient. For more thorough cleaning it is possible to use a mild detergent solution, iso-propyl alcohol (a small amount on a cloth) or a dilute solution of Decon 90®. The sample area should always be kept clean and any accidental spillage should be wiped away immediately.
For long-term storage or re-shipment it is recommended that the instrument should be returned to the original packing case.

14.2 Cleaning the Sample Compartment

The sample compartment is susceptible to contamination. The sample compartment should be cleaned if spillage occurs.

Remove the sample base as shown in the diagrams below:



Open the sample compartment door, remove and place carefully to one side.

Loosen the fastening screw with a posi-head screwdriver and remove the sample compartment base.

Clean the sample area and carefully re-install.

14.3 Cleaning the Sample Compartment Window

Note: Ensure your hands are washed prior to attempting to clean the sample compartment windows.

Pinch both ends of the window plate with your fingers to set it back in the sample compartment. Do not leave fingerprints on the window plate.

Wipe the contaminant off the windows using a soft cloth or paper soaked with alcohol and ether solution (mixed in a ratio of 1:1).

14.4 Light Source Replacement

Replacement of the light source may be required during the lifetime of the instrument. Lamp failure will be detected the system test at power up of the instrument.

Caution

< Do not replace the lamp with the power switch on. Note that high voltage is applied to the lamp. High voltage is discharged when the power is switched off.

< Care should be taken when removing the lamp from the holder.

< Wear clean gloves when fitting the new lamp. Do not leave fingerprints on the lamp tube wall. Care should be taken to avoid leaving fingerprints on the protruded sections when fitting the deuterium lamp.

14.4.1 Replacing the Tungsten Lamp

Turn the power switch to the off position and disconnect the instrument from the mains supply. Allow a minimum of 20 minutes for the lamp to cool down before attempting to remove it from the holder.

Remove the posi-head securing screw from the front of the light source cover (located to the rear right hand side of the casework). Gently withdraw the cover and place to one side with the securing screw.

Loosen the retaining spring and remove the lamp. The lamp is a plug-in fit and should be removed by gently easing it from the holder.

Carefully remove the replacement lamp from the packaging, ensuring the glass portion of the lamp is not touched. Should accidental damage with finger marks occur, the surface of the lamp can be cleaned using iso-propyl alcohol.

Push in the new lamp to the extreme end of the lamp holder ensuring it is fully pushed home.

Slide the light source cover back into place and fit the posi-head securing screw.

After replacement of the lamp the lamp usage time should be reset.

In the unlikely event of further failure on power up self-test, please consult your local dealer.

14.4.2 Replacing the Deuterium Lamp

Warning: Safety glasses must be worn when UV emissions are present.

Turn the power switch to the off position and disconnect the instrument from the mains supply. Allow a minimum of 20 minutes for the lamp to cool down before attempting to remove it from the holder.

Remove the securing screw from the front of the light source cover (located to the rear right hand side of the casework). Gently withdraw the cover and place to one side with the securing screw.

Locate and carefully remove the deuterium lamp connector from the socket.

Hold the base of the lamp and gently turn it counter clockwise until it is separated from the holder.

Fit the new deuterium lamp into place by holding the base of the lamp and gently turn it clockwise until it fully locates into the holder, taking care not to touch the glass portion of the lamp. Should accidental damage with finger marks occur, the surface of the lamp can be cleaned using iso-propyl alcohol.

Plug in the connector.

Slide the light source cover back into place and fit the posi-head securing screw.

After replacement of the lamp the lamp usage time should be reset.

In the unlikely event of further failure on power up self-test, please consult your local dealer.

Section 15

Accessories & Spares

Accessories

680 081	Single Cuvette holder for standard 10mm cuvettes sample and reference
680 031	Micro cuvette holder for sample volumes down to 50microlitres
680 061	Glass filter holder for slides, lenses and filters
680 101	Film holder, for thin, flexible sheet materials, plastic, acrylic, gelatine, etc
680 111	Long Path Length cuvette holder for use with 10, 20, 50 or 100mm path length cuvettes
680 131	Water Thermostated cuvette holder for use with a temperature controlled water circulator and 10mm cuvettes

Glass & Quartz Cuvettes

035 027	Visible (glass) 10mm path length cuvette
035 086	Visible (glass) 20mm path length cuvette
035 029	Visible (glass) 40mm path length cuvette
035 087	Visible (glass) 50mm path length cuvette
035 079	Visible (glass) 100mm path length cuvette
035 123	Visible (glass) micro (500µl) cuvette
035 126	Visible (glass) semi-micro (1ml) cuvette
035 028	UV (quartz) 10mm path length cuvette
035 124	UV (quartz) ultra-micro (50µl) cuvette
035 125	UV (quartz) micro (500µl) cuvette
035 127	UV (quartz) semi-micro (1ml) cuvette

Spares

068 020	Tungsten Lamp
068 021	Deuterium Lamp

Glossary of Icons

Icons

Open (available ***all modes***)

Load combined spectrum from files
(available ***Spectrum Scan*** & ***Timed Scan/Kinetics*** only)

Load combined spectrum from window
(available ***Spectrum Scan*** & ***Timed Scan/Kinetics*** only)

Go to wavelength (available ***all modes***)

Auto zero (available ***all modes***)

Save As (available ***all modes except Protein***)

Baseline correction (***Spectrum Scan*** only)

Print screen (available ***all modes***)

On screen keyboard (available ***all modes***)

Spectrum grid (***Spectrum Scan, Time Scan & Kinetics, Quantitation***)

Zoom options (**Spectrum Scan, Time Scan & Kinetics, *Quantitation has auto-scale icon only***)

Show / hide window (**Spectrum Scan, Time Scan & Kinetics**)

Export to Excel (available ***all modes***)

Print report (available ***all modes***)

Accessories Icons – only highlighted when active accessory is fitted
(available all modes)

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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Email: sales@keison.co.uk

Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.