Metertech

Provide Accurate Results

Operational Manual

Visible Spectrophotometer

SP-880 Mate

PC Software

Metertech Inc.
Version 1.2.3

Metertech

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Chapter 1
Installation

1. PC system requirements:
   - IBM compatible with CPU Pentium 3 or above, and equipped with CD-ROM drive.
   - Microsoft Windows XP/98SE.
   - 16M RAM and 20Mbytes hard disk space for installing SP880mate program.
   - Display card supporting 800X600 resolution, 16bit high color, or above.
   - Mouse, keyboard, RS-232 serial com port, and a 9-pin connection cable (one male and one female with all pins wired).

2. From the CD ROM that is accompanied with SP880 machine, select **Setup.exe** in SP880mate directory and execute it (skip this step if it has been done before).
3. Follow instructions to go through installation. Usually all files will be installed under directory '**C:\Programfiles\SP880mate**' and the executable file is **SP880_mate.exe**. A database **SP880_mate.mdb** is also created for storing batch files. There are samples in each batch file, and the SP880mate can be operated alone by loading these files without connecting to an instrument.

Chapter 2
Start Connection and Operation

1. Connect com ports between SP880 instrument and PC with RS232 cable(If your PC only has USB ports, please plug in an USB to RS232 converter and follow explanation in Appendix A).
2. Switching a standard alone SP880 machine to PC controlled machine(or vice versa) by pressing ESC key while powering on SP880, then releasing ESC key after hearing two beep sounds. LCD displays '**SP880: pc_mode, off_line...**'. (If LCD shows '**--SP880--, Metertech Inc.**', power off and power on again the machine with ESC pressed). The instrument has completed the initialization procedure and is waiting for connection with PC.
3. In the Program files under '**Start**' menu of PC windows, there is a short-cut named '**SP880mate'** under '**Metertech**'. Click it and SP880mate.exe can be executed.
4. After the program executed, a dialog box '**COM Port Setting**' will show up (picture at next page). The default setting is COM2 and users can select whichever is suitable in real circumstances.

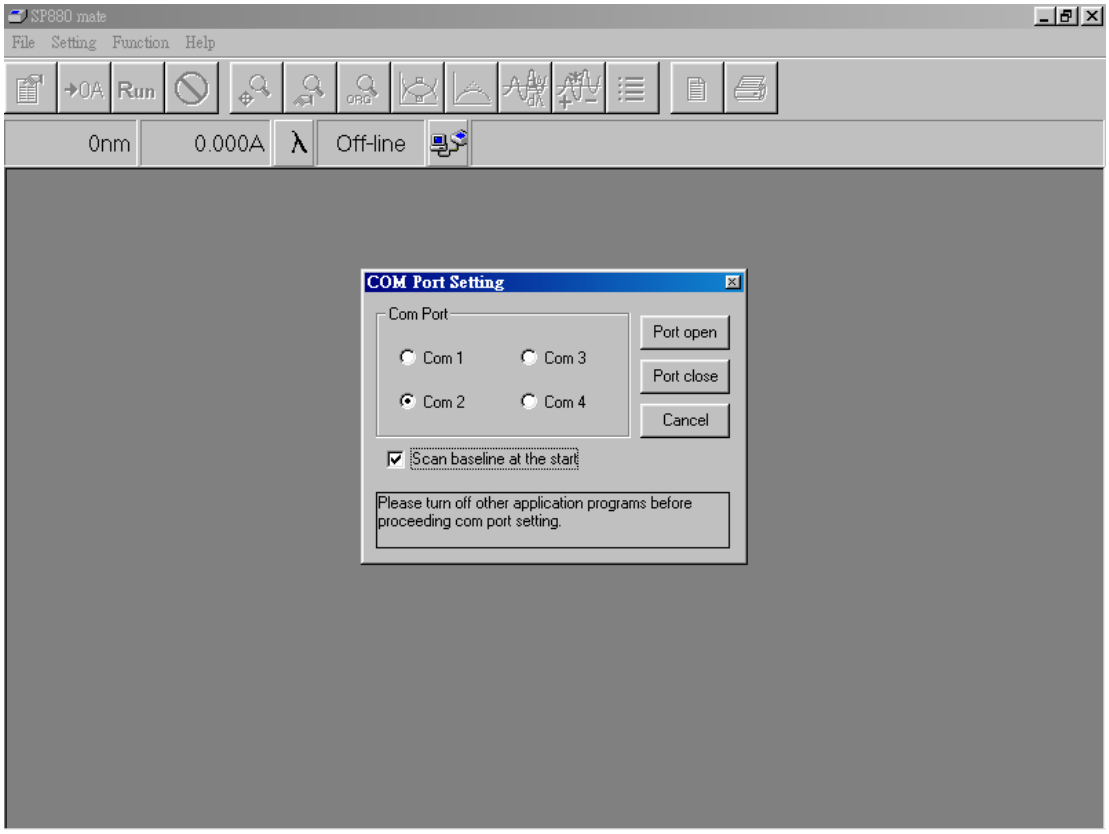
   !!! Reminder !!!

   During execution of SP880mate, please close other application programs those might interrupt the data transfer at PC com port, and cause SP880mate execution error. If the program is halted by this reason, please press keys Ctrl_Alt_Delete to terminate execution of SP880mate and restart it again.

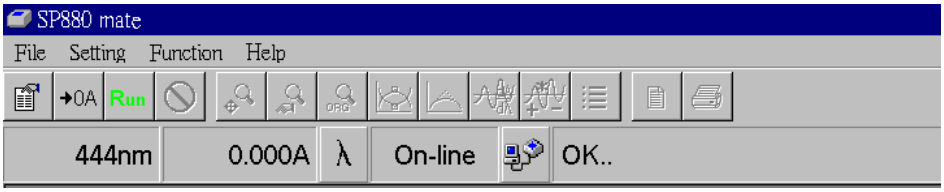
   Note:

   The fixed baud rate settings for COM port are 57600, 8, N, 1.

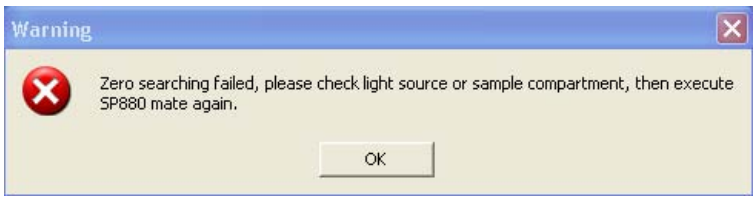
5. Press '**Port Open**' button and the status bar will change '**Off-line**' into '**On-line**'. The SP880 display also changes from '**Off_line**' into '**On_line**'. It represents a successful connection.

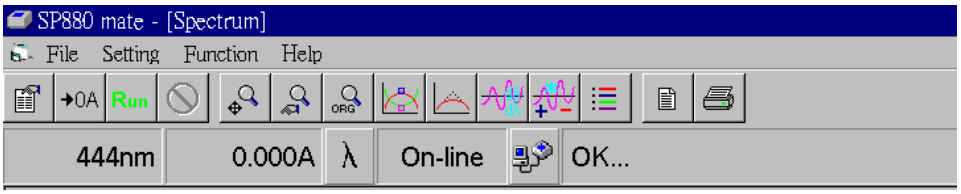


6. After successful connection, The SP880 machine is starting to find optical zero position(it takes 1~2 minutes), reading dark voltages, reading and saving baseline data from 330nm to 1100 nm, and finally back to preset wavelength. The status bar at right hand will show current message at each process. After reaching final position, users can see '**OK**' showing in the status bar and '**....**' will keep cycling for well communication between instrument and PC. Users can start to execute measurement functions as described from chapter 3 to chapter 9.



7. Users may choose not scanning baseline during initialization after the first successful operation.
8. If there is warning message shown below during zero search, please correct the mistake, and execute SP880 mate again.

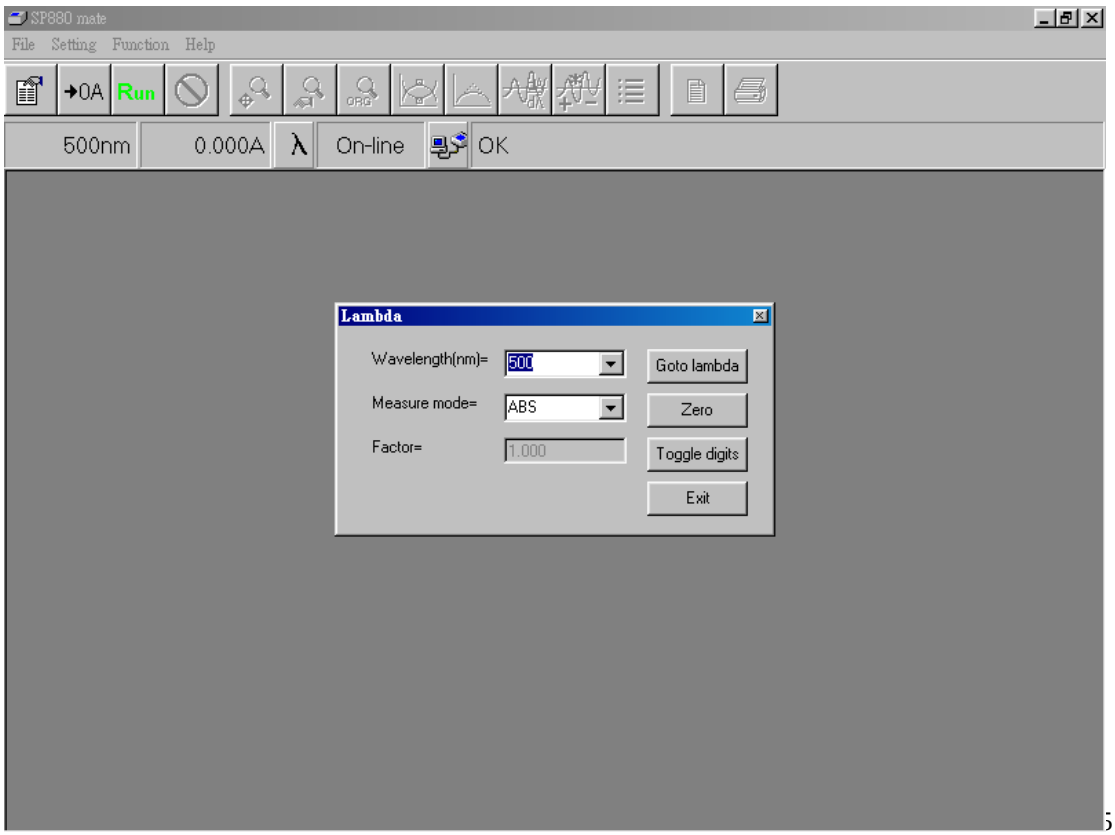




9. The window of SP880mate software shows, from the above, program title, menu bar, toolbar, status bar, and the rest of area for curves and data. Brief explanations are as follows:
   a. '**File**' of menu bar has options for '**Load parameter**', '**Load data**', '**Save parameter**', '**Save data**', '**Data export to Excel**', '**Report preview**', '**Report print**', and '**Exit**'.
   b. '**Setting**' of menu bar has '**Set Com port**' for opening dialog box of communication port.
   c. '**Function**' of menu bar has different functions for selection: Photometry, Spectrum, Time scan, Kinetic, Quantitative, Protein analysis, and System.
      In option '**System**', there are sub functions: '**Property setup**' and '**Verify bandwidth**'.
   d. '**Help**' of menu bar has '**About**' for introduction of this program.
   e. Icons in toolbar, from left to right, are: '**Parameter setup**', '**Zero/Baseline**', '**Data reading**', '**Stop data reading**', '**Auto zoom data**' for auto scaling data, '**Zoom in/out data**', '**Original data**' for restoring original data scale, '**Peak/valley search**', '**Data smoothing**', '**Data derivative**', '**Data manipulation'**, '**Color setup**' for assigning color of different data curve, '**Report preview**', and '**Print**'.
   f. Fields in status bar, from left to right, are '**Present wavelength**', '**Present data**' for current reading, '**Lambda parameter setup**', '**Connecting status**', '**Com port setup**', and '**Present status**' for the instrument.

Chapter 3
Lambda

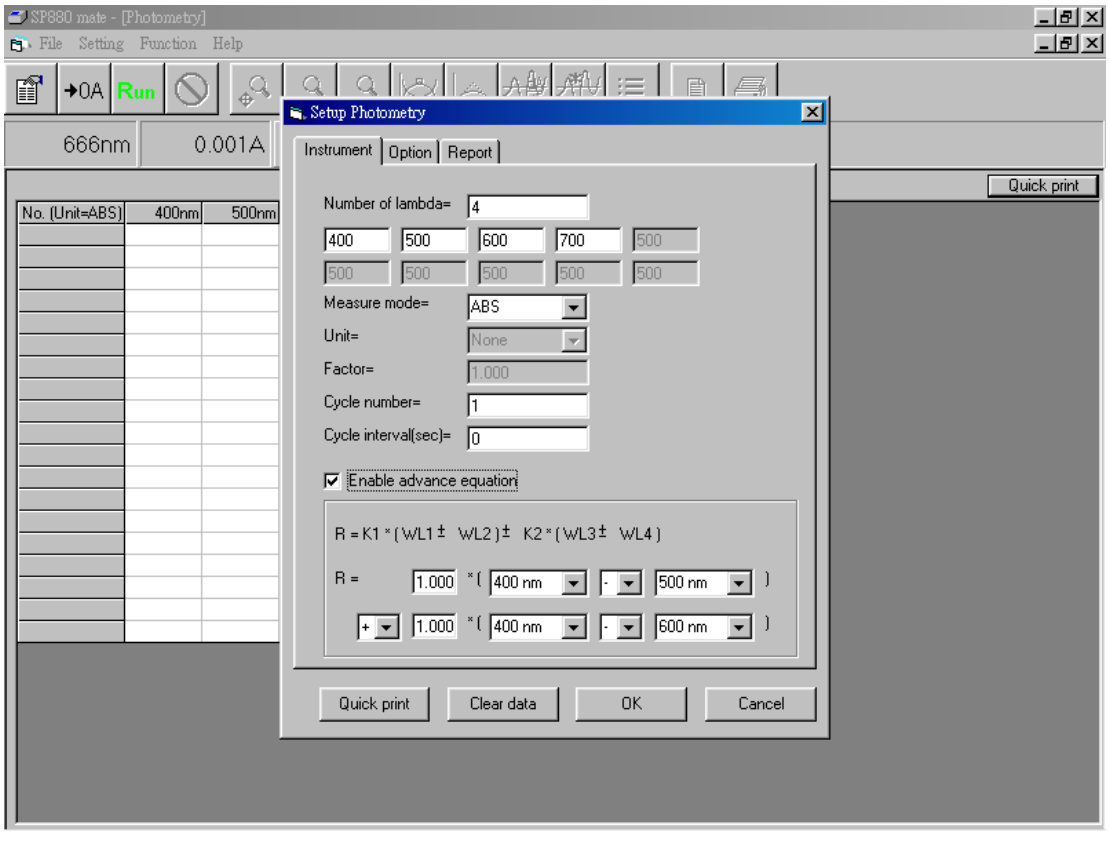
1. Press the icon '**λ**' in the status bar, a window for function Lambda will show in the screen. Explanations of this function are as follows.
2. Field '**Wavelength(nm)=**' is used for keying in the desired value of wavelength. The input value of wavelength will be recorded in the current wavelength field in order to pick up rapidly by using mouse.
3. Field '**Measure mode=**' is for selecting the proper unit during measurement and this field can not accept input from keyboard.
4. Field '**Factor=**' will be enabled (turning into white) for accepting key-in value when '**Factor*ABS**' is chosen in '**Measure mode**' field.
5. The '**Goto lambda**' button will accept the key-in value in '**Wavelength**' field and will run the instrument to the desired wavelength.
6. The '**Zero**' button will force the instrument to perform the blanking function.
7. The '**Toggle digits**' button will switch digit numbers from the current measurement; for example, 0.012A→0.0124A.
8. The '**Exit**' button will close the Lambda function.
9. After close the Lambda function, the status bar will still show the current wavelength and the corresponding reading in a real-time manner.



Chapter 4
Photometry

1. Choose '**Photometry**' from '**Function**' of menu bar and a screen for function Photometry will show up. A dialog box of '**Setup Photometry**' also shows up. Press '**OK**' after setting to execute the program according to new parameters.
   Press '**Quick print**' to print out current parameter setting. Press '**Cancel**' to cancel settings and the program runs according to old parameters, or press '**Clear data**' to clear last measured data. There are three tabs for setting in this window: Instrument, Option and Report.

   a. Tab '**Instrument**' refers to basic parameters of this function. More details are described below:
      - '**Number of lambda**' represents the desired number of wavelength for measurement.
      - Input the desired wavelength according to '**Number of lambda**'.
      - In '**Measure mode**', there are three choices: ABS, %T, or Factor*ABS.
      - In '**Unit**', users can select the unit only when Measure mode= Factor*ABS.



   - In '**Factor**', users can key in the value of factor. It is functional only when

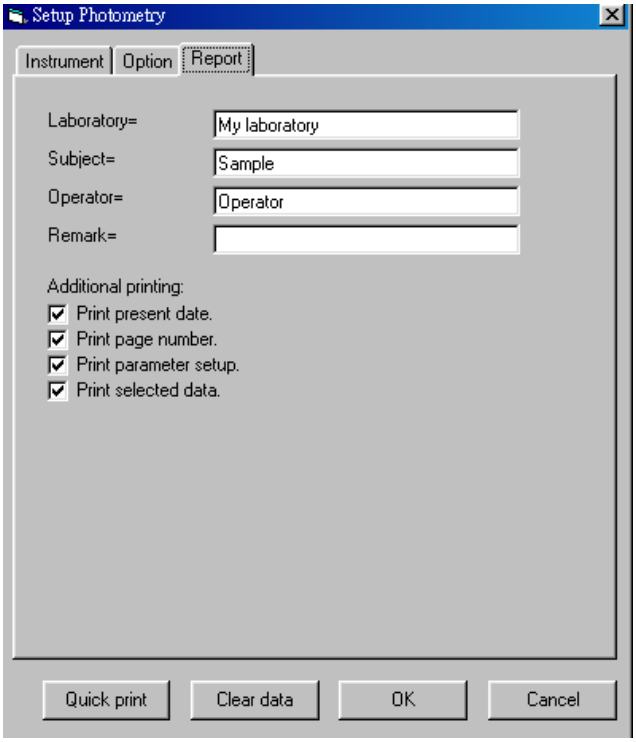
Measure mode= Factor*ABS.

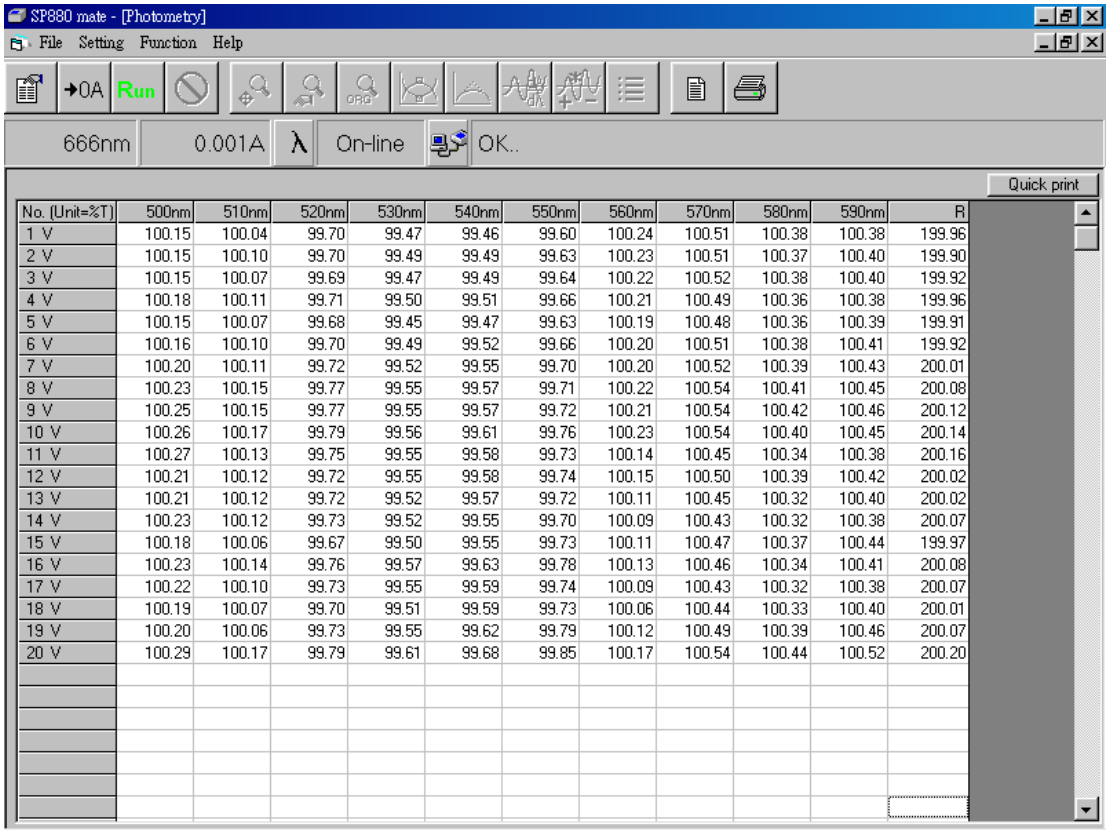
- '**Cycle number**' sets up total number of cycle for measurement.
- '**Cycle interval (sec)**' defines the holding time between each cycle.
- Selecting '**Enable advance equation**', a mathematical formula will show up. User can key in parameter K1 and K2, and fill in selected wavelength at WL1, WL2, WL3, and WL4. The calculated value R is displayed in data table.

b. Tab '**Option**' is not available for this function.

c. Tab '**Report**' is to set up options for printing reports in this function.

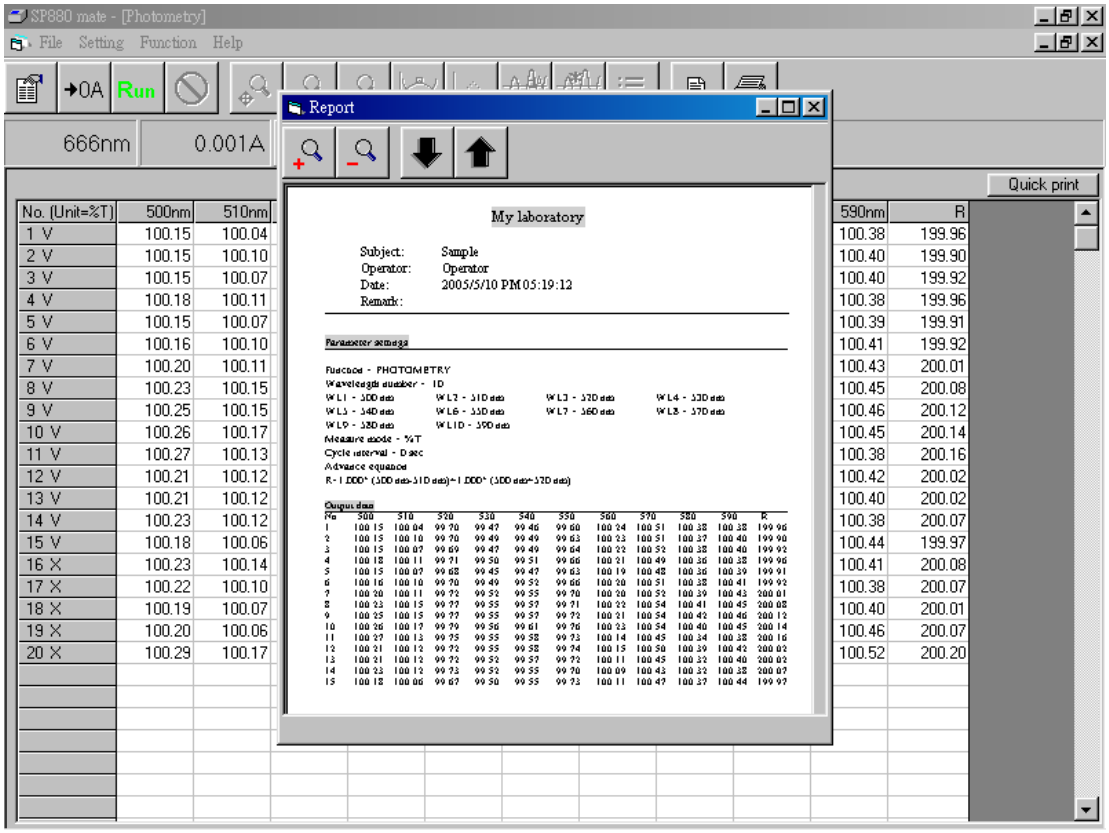
- '**Laboratory**' is for input of user's company or name of laboratory.
- '**Subject**' is for input of the subject of this experiment.
- '**Operator**' is for input of user's name or comprehensive code.
- '**Remark**' is for input of information or notes of the experiment.
- '**Print present date**' will print the current date in computer.
- '**Print page number**' will print the page number of each page.
- '**Print parameter setup**' will print all settings of parameters.
- '**Print selected data**' will print selected data of readings (marked with '**V**'). All measured data is default as '**V**'.





No. (Unit=%T)	500nm	510nm	520nm	530nm	540nm	550nm	560nm	570nm	580nm	590nm	R
1 V	100.15	100.04	99.70	99.47	99.46	99.60	100.24	100.51	100.38	100.38	199.96
2 V	100.15	100.10	99.70	99.49	99.49	99.63	100.23	100.51	100.37	100.40	199.90
3 V	100.15	100.07	99.69	99.47	99.49	99.64	100.22	100.52	100.38	100.40	199.92
4 V	100.18	100.11	99.71	99.50	99.51	99.66	100.21	100.49	100.36	100.38	199.96
5 V	100.15	100.07	99.68	99.45	99.47	99.63	100.19	100.48	100.36	100.39	199.91
6 V	100.16	100.10	99.70	99.49	99.52	99.66	100.20	100.51	100.38	100.41	199.92
7 V	100.20	100.11	99.72	99.52	99.55	99.70	100.20	100.52	100.39	100.43	200.01
8 V	100.23	100.15	99.77	99.55	99.57	99.71	100.22	100.54	100.41	100.45	200.08
9 V	100.25	100.15	99.77	99.55	99.57	99.72	100.21	100.54	100.42	100.46	200.12
10 V	100.26	100.17	99.79	99.56	99.61	99.76	100.23	100.54	100.40	100.45	200.14
11 V	100.27	100.13	99.75	99.55	99.58	99.73	100.14	100.45	100.34	100.38	200.16
12 V	100.21	100.12	99.72	99.55	99.58	99.74	100.15	100.50	100.39	100.42	200.02
13 V	100.21	100.12	99.72	99.52	99.57	99.72	100.11	100.45	100.32	100.40	200.02
14 V	100.23	100.12	99.73	99.52	99.55	99.70	100.09	100.43	100.32	100.38	200.07
15 V	100.18	100.06	99.67	99.50	99.55	99.73	100.11	100.47	100.37	100.44	199.97
16 V	100.23	100.14	99.76	99.57	99.63	99.78	100.13	100.46	100.34	100.41	200.08
17 V	100.22	100.10	99.73	99.55	99.59	99.74	100.09	100.43	100.32	100.38	200.07
18 V	100.19	100.07	99.70	99.51	99.59	99.73	100.06	100.44	100.33	100.40	200.01
19 V	100.20	100.06	99.73	99.55	99.62	99.79	100.12	100.49	100.39	100.46	200.07
20 V	100.29	100.17	99.79	99.61	99.68	99.85	100.17	100.54	100.44	100.52	200.20

2. After setting up parameters for function Photometry, press icon →0A in toolbar for blanking, then put sample in cell holder and press icon Run. Program will start to read and record data accordingly. Symbol '**V**' after serial numbers in table means that the data will be printed in report. If users don't want the data in the report, please click left button of mouse in that field and the symbol will change into '**X**'. Current measured data can be printed out by pressing '**Quick print**' at upper right corner of the screen.

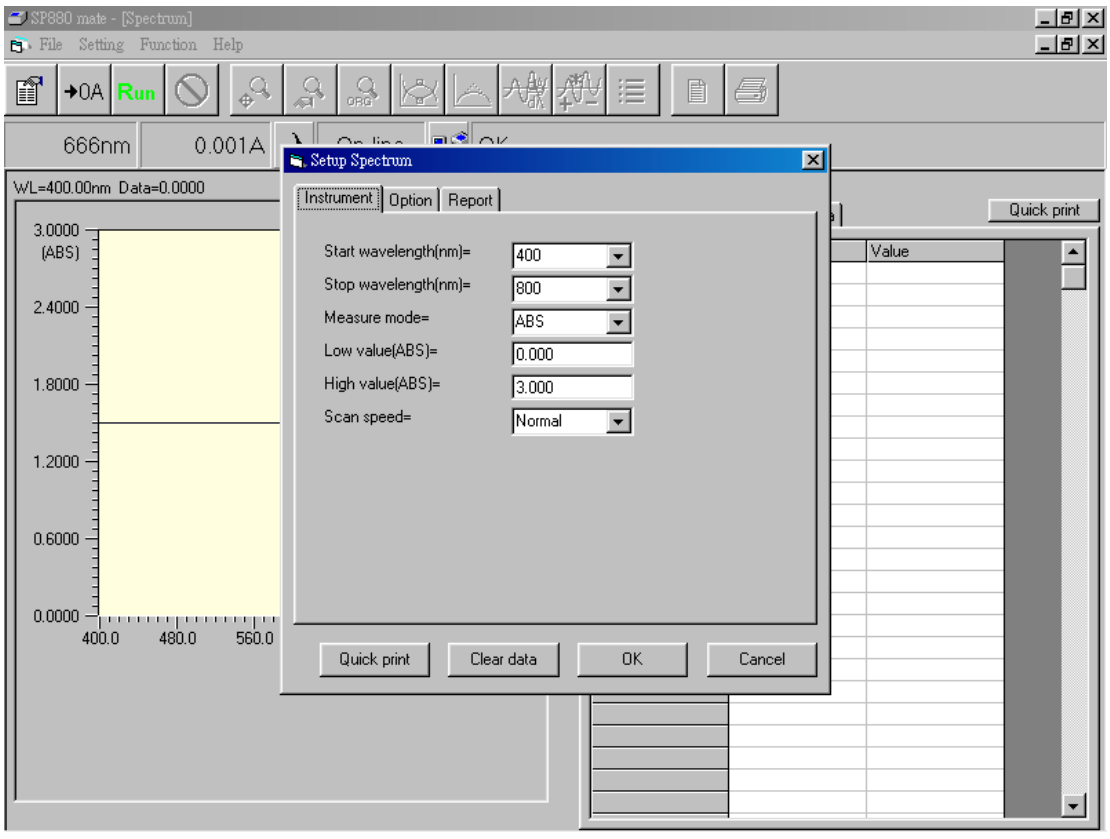


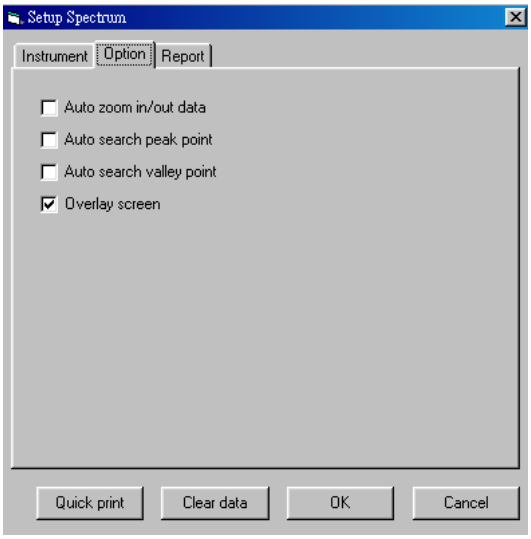
3. Press icon in the toolbar and users can preview the report for printing. In this screen, icon an zoom in the report and icon can zoom out the report. If there is more than one page of report contents, press icon to view next pages and press icon to return to previous pages.
4. In the toolbar, press icon to execute function of printing the report. During the printing process, the default printer will be selected by system. If there is no printer in the system, an error message will show up.
5. The contents of report for Photometry include report headers, settings of parameters, and selected measurements.

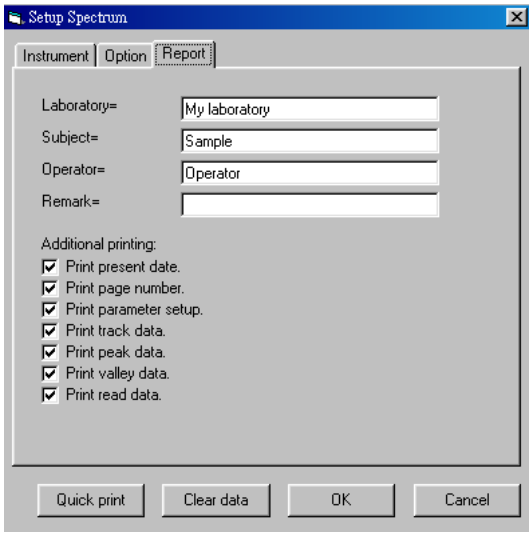
Chapter 5
Spectrum

1. Choose '**Spectrum**' from '**Function**' of menu bar and a screen for function Spectrum will show up. A dialog box of '**Setup Spectrum**' also shows up. Press '**OK**' after setting to execute the program according to new parameters. Press '**Quick print**' to print out current parameter setting. Press '**Cancel**' to cancel settings and the program runs according to old parameters, or press '**Clear data**' to remove the last measured data. There are three tabs for setting in this screen: Instrument, Option, and Report.

   a. Tab '**Instrument**' refers to basic parameters of this function. More details are described below:
      - '**Start wavelength**' represents the start wavelength for measurement. Input range from 330 ~1098 nm.
      - '**Stop wavelength**' represents the stop wavelength for measurement. Input range from 332 ~1100 nm.
      - In '**Measure mode**', there are two choices: ABS, and %T.
      - In '**Low value**', users can set up the low value in scale of graph and the unit will change depending on measure mode.







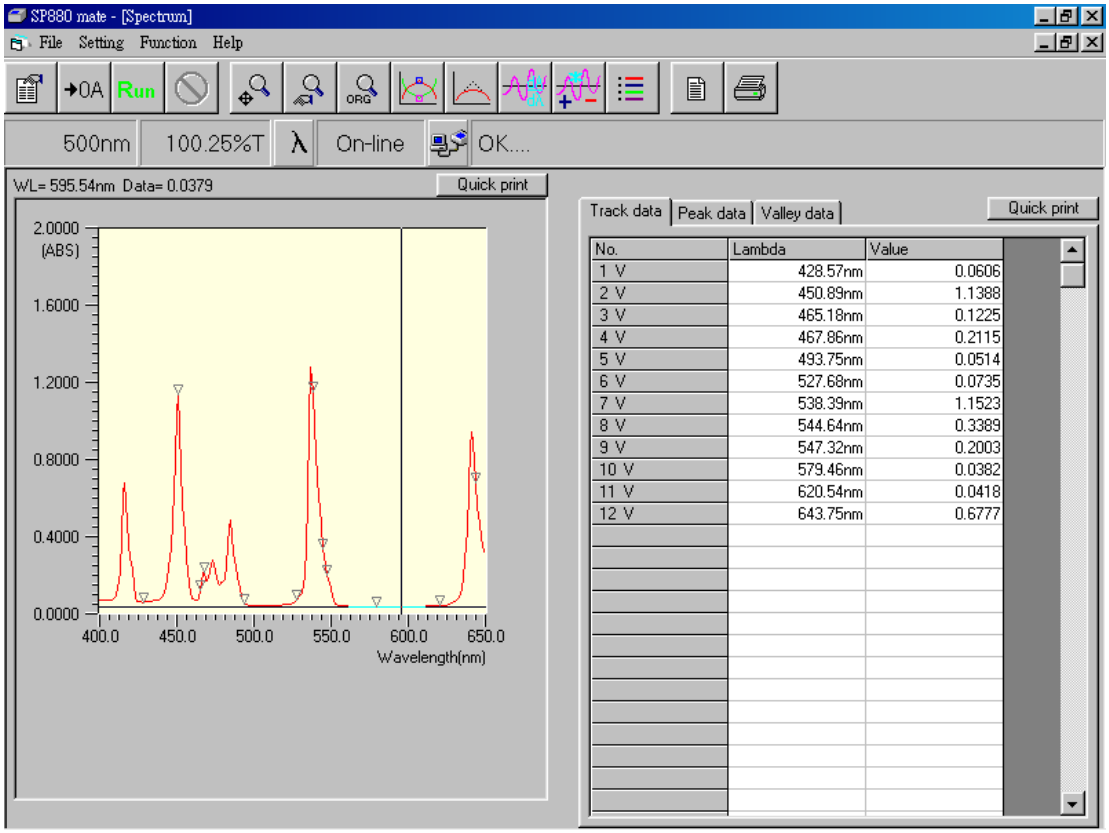
- In '**High value**', users can set up the high value in scale of graph and the unit will change depending on measure mode.
- In '**Scan speed**', users can select low(300nm/min), normal (600nm/min) or high speed(1200nm/min) for grating motion. The default speed is normal.

b. Tab '**Option**' refers to special options. Details are described below.

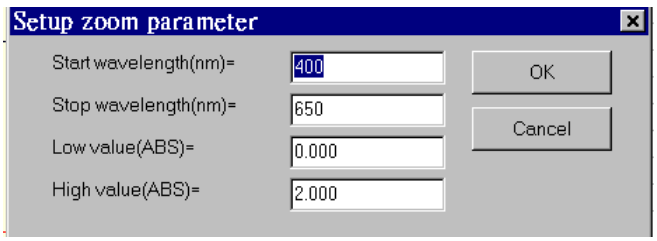
- '**Auto zoom in/out data**' will zoom data curve to fit in the optimal scale automatically after reading data.
- '**Auto search peak point**' will search for local maximum automatically after reading data, and display their values
- '**Auto search valley point**' will search for local minimum automatically after reading data, and display their values.
- '**Overlay screen**' will not clear previous read curves when doing multiple scans.

c. Tab '**Report**' is to set up options for printing reports in this function. Most options are described in chapter 4 except following items.

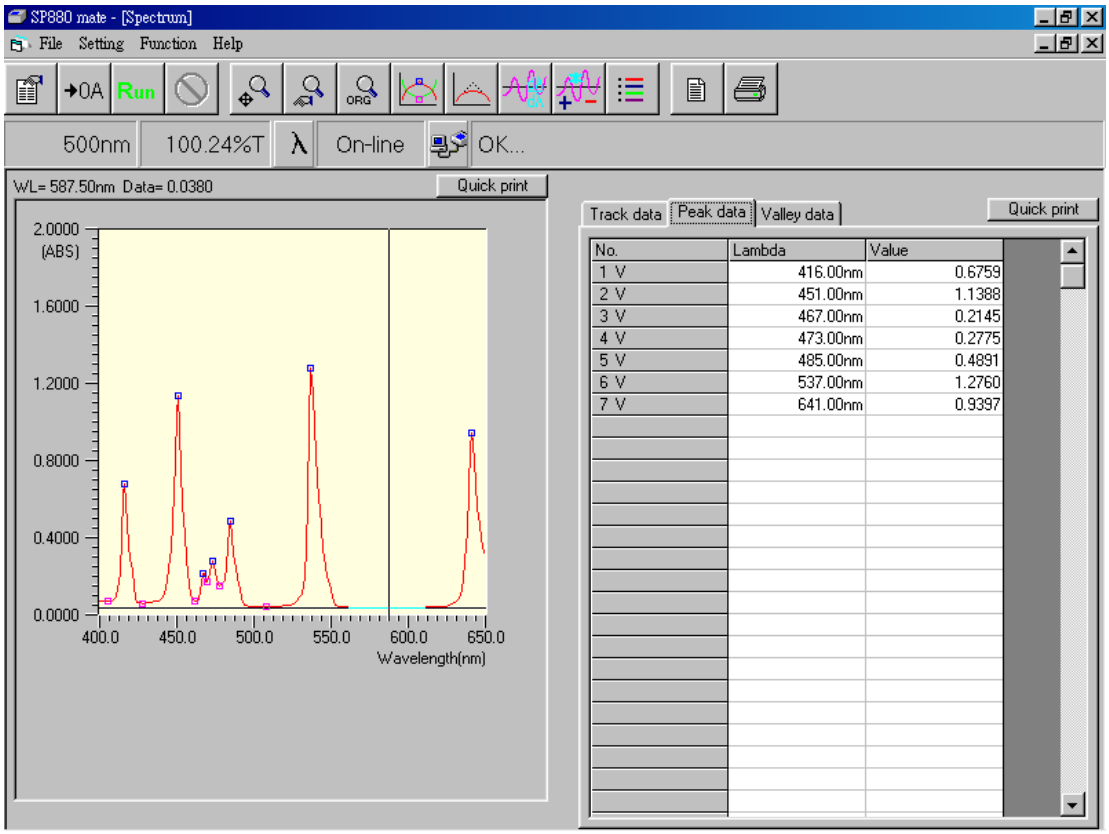
- '**Print track data**' will print selected data in track (marked with '**V**').
- '**Print peak data**' will print selected data of peaks (marked with '**V**').
- '**Print valley data**' will print selected data of valleys (marked with '**V**').
- '**Print read data**' will print original data of the latest scanned curve (marked with '**V**').



2. After completing above parameter setup, press icon →0A in the toolbar for baseline scanning. Then put in sample and press icon Run for sample scanning. Program will start reading data and show those in a graph.
3. After readings, users can select desired area in graph by holding down left button of mouse, moving the mouse in right and down directions, and then releasing the left button. The selected area of graph will be zoomed in automatically.
4. Moving mouse to any position in the graph and then hitting right button of the mouse, this can record data of that point of active curve to the right field '**Track data**'. Every record will be numbered accordingly.



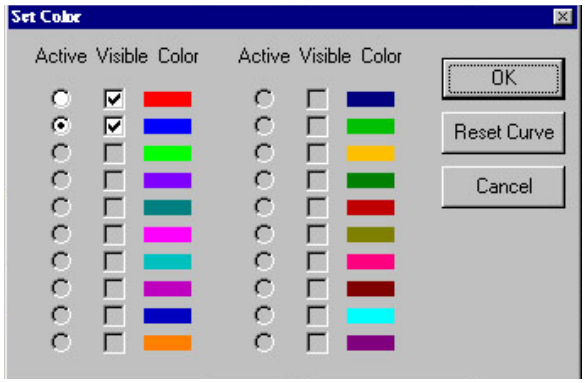
5. Press icon in the toolbar and users can manually zoom in or out data of active curve according to parameter setting. This function can perform precise work in zoom.



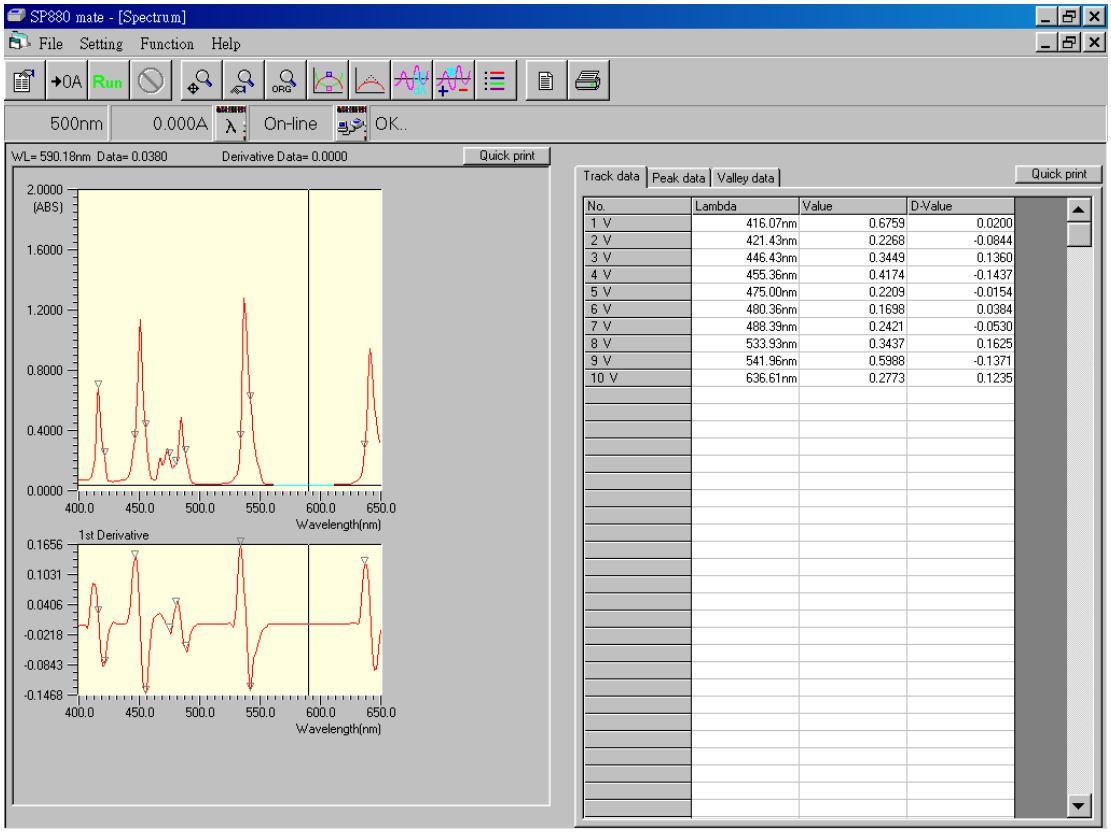
6. Press icon in the toolbar and users can restore all data to the original scale.
7. In the toolbar, press icon to execute function for searching Peaks and Valleys of active curve automatically. All details of searching results will be recorded in the data area to the right.
8. In the toolbar, press icon to execute function for smoothing data of active curve. There are two ways for smoothing data – '**Smooth low**' and '**Smooth high**'. The difference between these two methods is the total number of data points used for smoothing calculation.
9. Press '**Quick print**' at top of graphic or data area to print out current displayed information.

10. Press icon in the toolbar and a dialog box of '**Set Color**' will show up. In the box, all scanned data segments will be shown. For those to be shown in the graph, mark '**v**' in the '**Visible**' option for each segment. If special treatment is needed for specific data segment, mark '●' in the '**Active**' option field. Such that, when performing functions like Zoom, Peak/Valley, or Track and so on, it will only take the '**Active**' segment as the base. If there are too many data segments, press '**Reset curve**' button to reset the numbering system.

    Data Curves marked with '**v**' can be saved in data file or exported as Excel file.



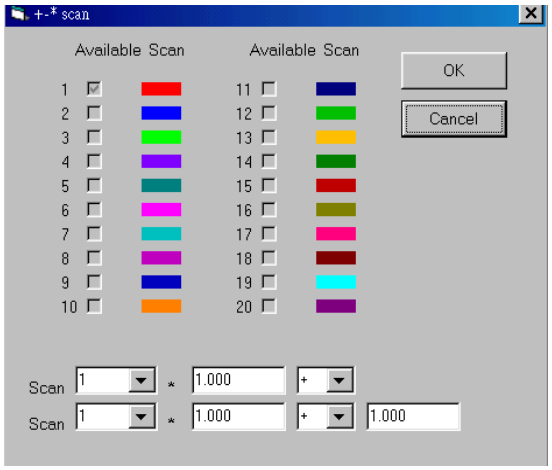
11. In the toolbar, press icon to execute function for taking derivative for active curve. First to fourth derivative can be calculated and the derived spectrum will be displayed in a separate figure right beneath the original figure. Tracking data by hitting right button of mouse will display original data and derivative data on the right table.

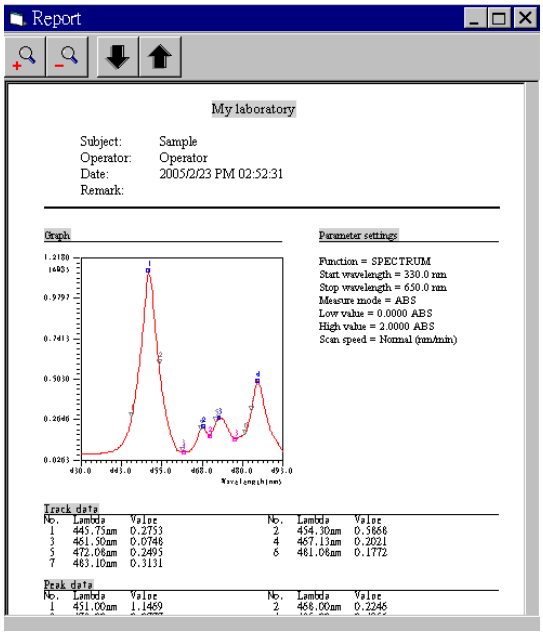


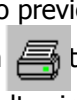
12. Press icon in the toolbar and a dialog box for spectrum manipulation will show up. Users can manipulate existing spectra to get a new spectrum. In the box, all spectra will be identified by pre-determined colors (up to 20 spectra). Those spectra can be added, subtracted, or multiplied through the equation:

New scan = (Scan I × C1) +/-/× (Scan J × C2) +/-/× C3

Where Scan I and Scan J are known spectrum data, C1 and C2 are coefficients for Scan I and Scan J, separately. And C3 is an additional factor for the new spectrum.



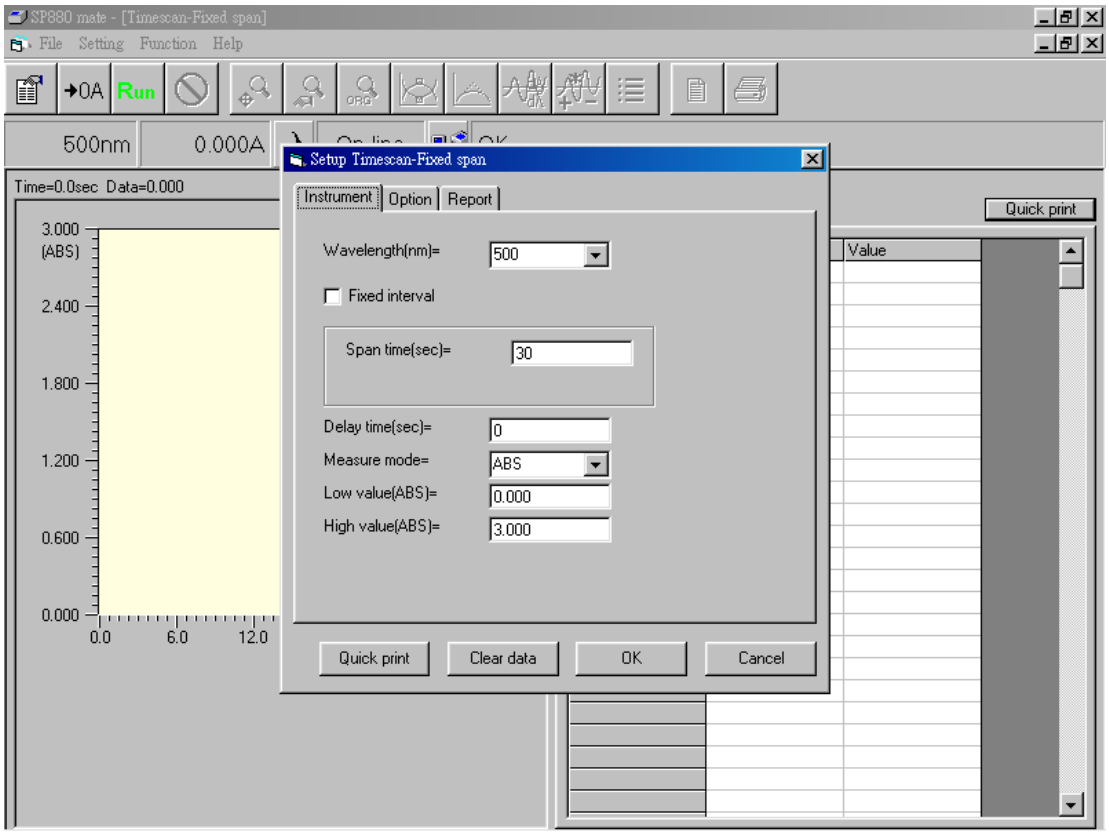


13. Press icon in the toolbar and users can preview the report for printing. In the screen, icon can zoom in the report and icon can zoom out the report. If there is more than one page of the report content, press icon to view next pages and press icon to return to previous pages.
14. In the toolbar, press icon  to execute function of printing the report. During the printing process, the default printer will be selected by system. If there is no printer in the system, an error message will show up.
15. The contents of report for Spectrum include report headers, graphs, settings of parameters, and tables for Track data, Peak data, Valley data and scanned data of active curve.
16. All scanned curves shown in the graph can be saved in database. It takes a while for data storage and exporting. For file saving, loading and export, please go to chapter 12 for explanation.

Chapter 6
Time Scan

1. Choose '**Time scan**' from '**Function**' of menu bar and a screen for function Spectrum will show up. A dialog box of '**Setup Timescan-Fixed span**' also shows up. The setup procedure is almost the same as that in previous chapters.

   a. Tab '**Instrument**' refers to basic parameters of this function. More details are described below:
      - '**Wavelength**' represents the wavelength for measurement.
      - Two kinds of data sampling are featured: fixed span and fixed interval.
      - '**Span Time**' represents the total time needed for measurement. The sampling interval of data is proportional to span time.
      - Select '**Fixed interval**' to set up '**Sampling interval**' and '**Stop time**'. '**Sampling interval**' represents the sampling time for each measurement. '**Stop time**' defines the time to quit constant sampling.
      - '**Delay time**' represents the delay time before taking readings.
      - In '**Measure mode**', there are two choices: ABS, and %T.

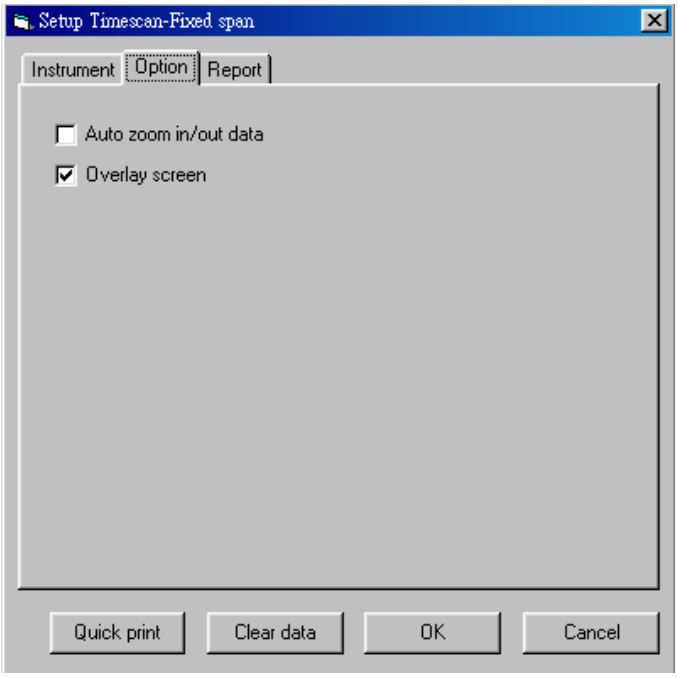


- In '**Low value**', users can set up the low value in scale of graph and the unit will change depending on Measure mode.
- In '**High value**', users can set up the high value in scale of graph and the unit will change depending on Measure mode.

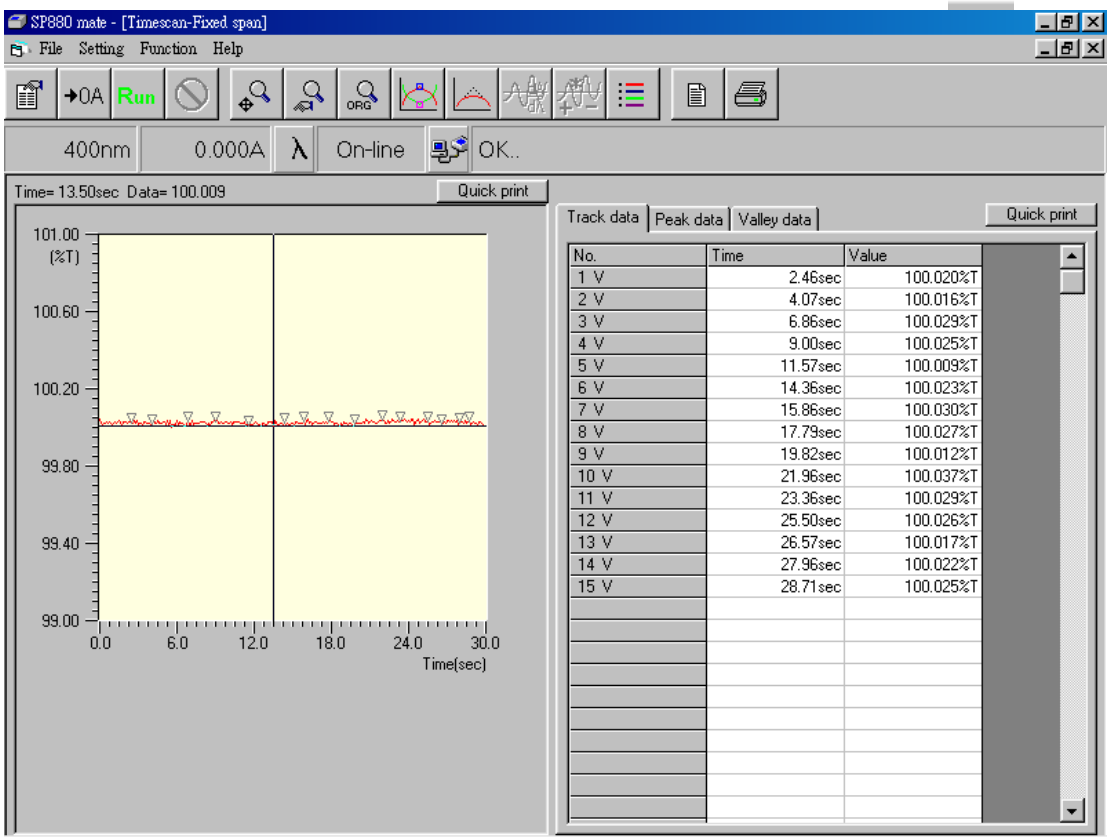
b. Tab '**Option**' refers to special options. Details are described below.

- '**Auto zoom in/out data**' will zoom datum to fit in the optimal scale automatically after reading data.
- '**Overlay screen**' will not clear previous readings when doing multiple scans.

c. Tab '**Report**' is to set up options for printing reports in this function. Please refer to chapter 4 for explanation.



2. After setting up parameters of Time scan by fixed span, press icon Run in the toolbar to start reading data and drawing curve in a graph. Users can press icon to stop scanning process. After readings, users can zoom in/out curve either by pressing mouse, or icon , or icon ORG with the same methods as described in function Spectrum.
3. Moving mouse to any position in the graph and then hitting right button of the mouse, this can record data of that point to field '**Track data**'. Every record will be numbered accordingly.
4. In this function, operations for '**Zoom**', '**Smooth**', and '**Set color**' are the same of those in function Spectrum.
5. For data saving, loading and export, please go to chapter 11 for explanation.

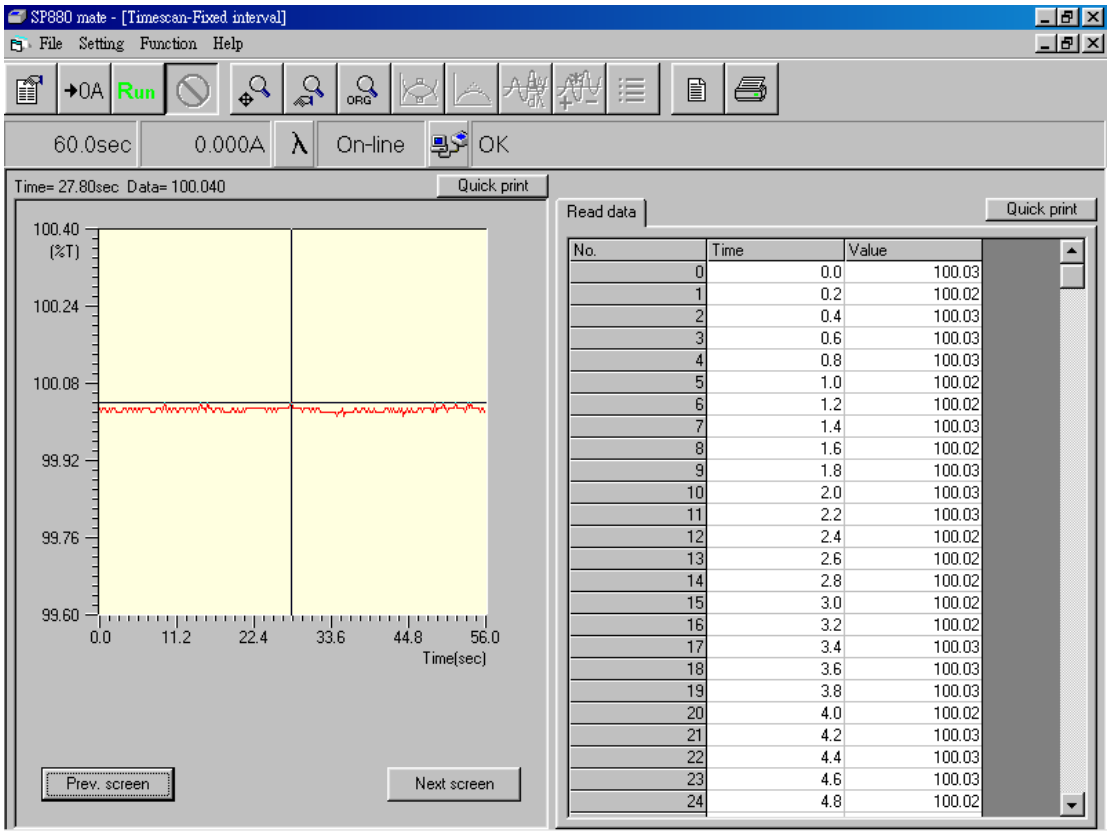


(Time scan by fixed span)

6. For fixed interval operation of Time scan (shown below), press icon in the toolbar to start reading data and drawing curve in a graph. Users can stop scanning process by pressing icon , or it will continue drawing until reach stop time. Each sampled data is also recorded in the right table simultaneously.
7. If the data number is more than one page (280 points per drawing screen), press icon '**Prev screen**' under graph to review previous curves or press icon '**Next screen**' to back to current curve. Users can only zoom in/out curve in Y direction with methods described in previous chapters.
8. The entire recorded data can be printed out, or saved in file, or exported to Excel.

Note:

Before loading stored parameter/data files at fixed interval operation, please select '**Fixed interval**' at instrument setup window first. Unselect '**Fixed interval**' will allow loading stored parameter/data files at fixed span operation.



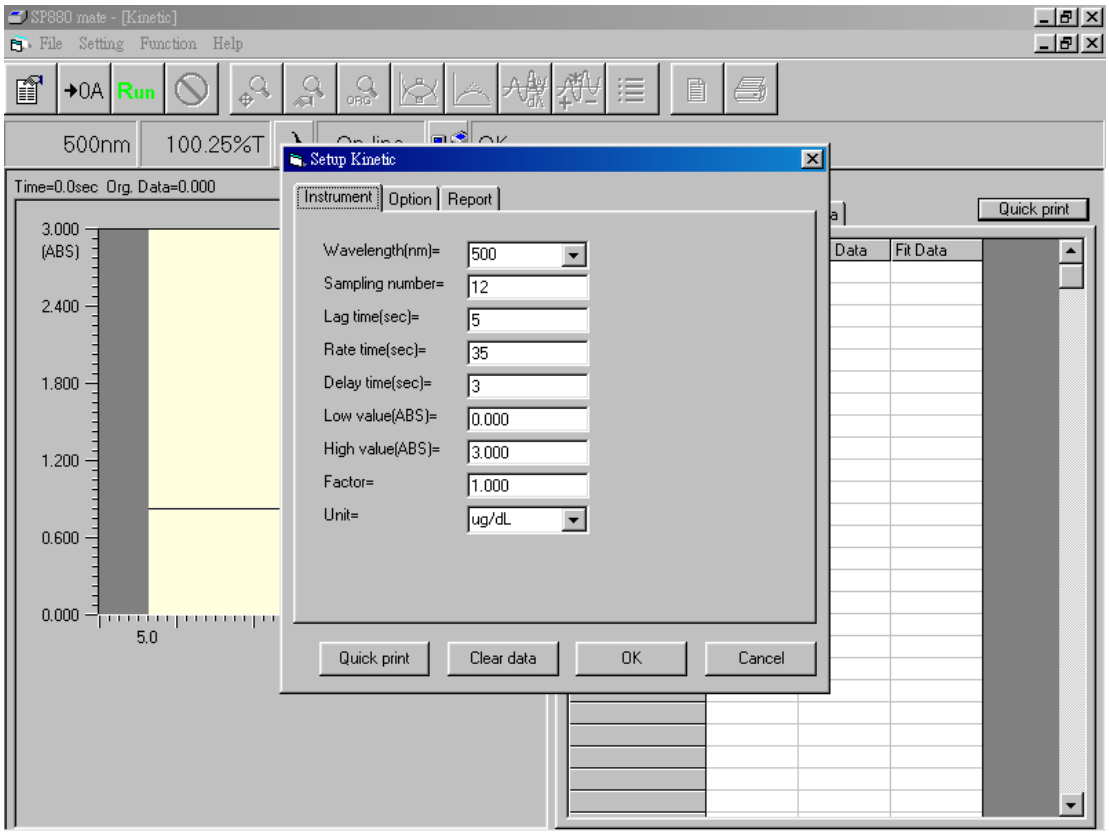
(Time scan by fixed interval)

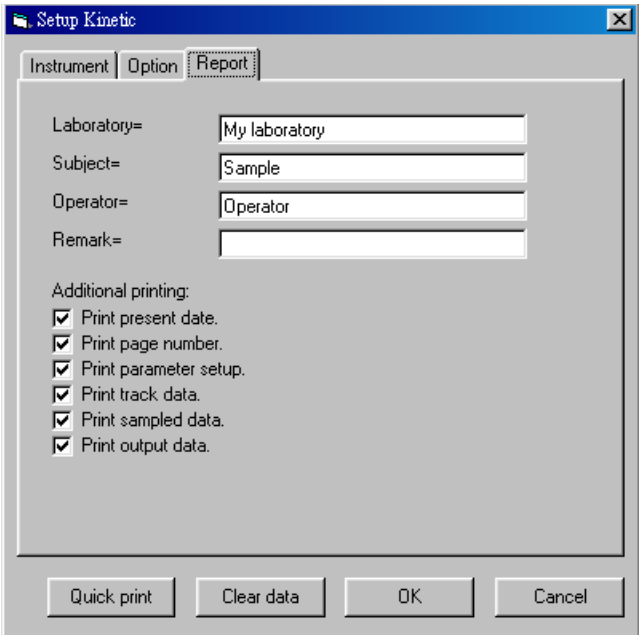
Chapter 7
Kinetic

1. Choose '**Kinetic**' from '**Function**' of menu bar and a screen for function Kinetic will show up. A dialog box of '**Setup Kinetic**' also shows up. The setup procedure is similar to that in previous chapters.

   a. Tab '**Instrument**' refers to basic parameters of this function. More details are described below:

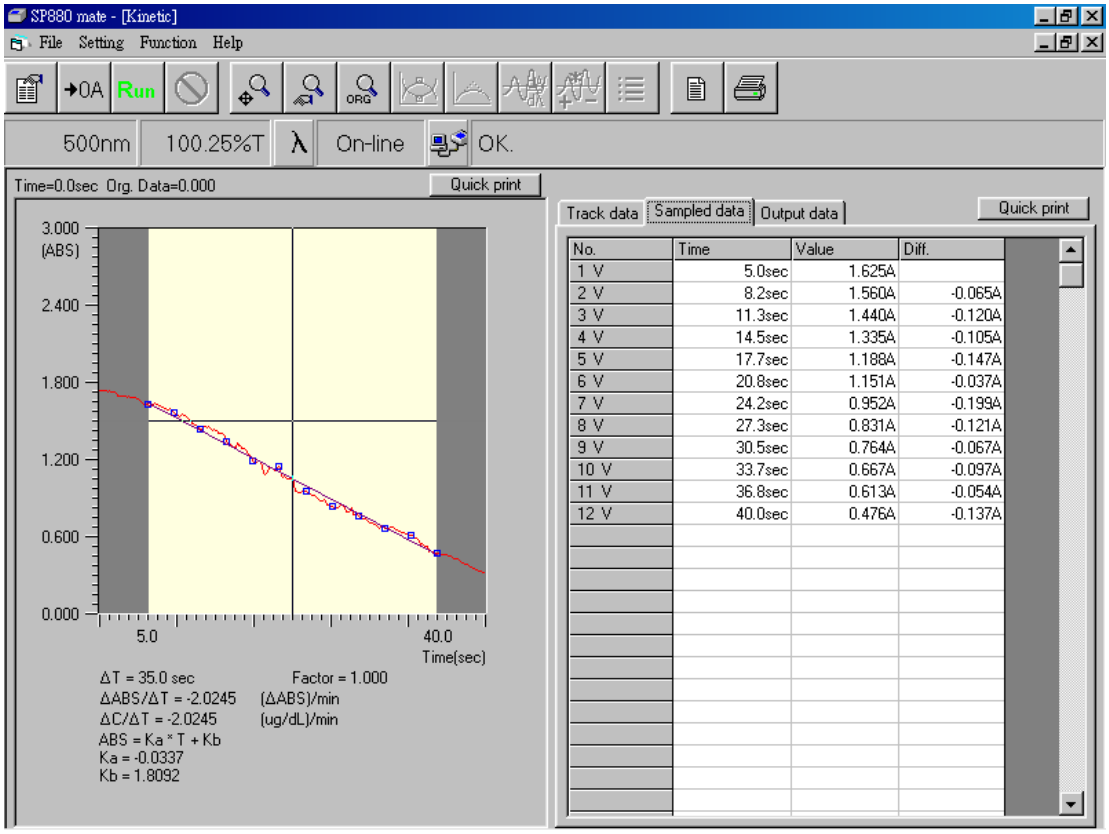
   - '**Wavelength**' represents the wavelength for measurement.
   - '**Sampling number**' represents the number of samples.
   - '**Lag time**' represents the lag time needed in measurement.
   - '**Rate time**' represents the rate time needed in measurement.
   - '**Delay time**' represents the delay time before taking readings.
   - In '**Low value**', users can set up the low value in scale of graph and the unit is ABS.
   - In '**High value**', users can set up the high value in scale of graph and the unit is ABS.
   - In '**Factor**', users can set up value for factor.
   - In '**Unit**', users can select different unit as necessary.





b. Tab '**Option**' refers to special options. Details are described below.
   - '**Auto zoom in/out data**' will zoom data to fit in the optimal scale automatically after reading data.

c. Tab '**Report**' is to set up options for printing reports in this function. Most options have same definitions as previous chapters except for following items.
   - '**Print track data**' will print selected data in track of current test(marked with '**V**').
   - '**Print sampled data**' will print sampled data in constant time interval of current test(marked with '**V**').
   - '**Print output data**' will print activities for total tests(marked with '**V**').

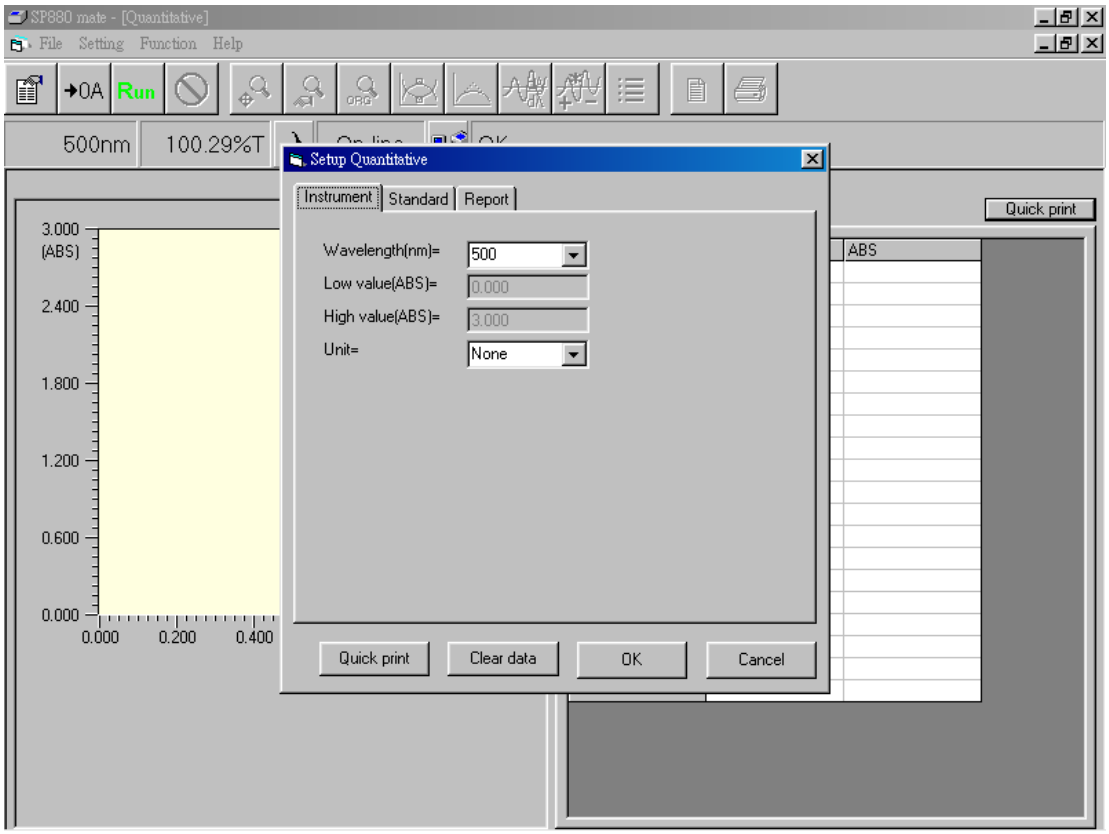


2. After setting up parameters for function Kinetic, press icon Run in the toolbar and program will start reading data and will show those in a graph. After measurement, program will find data for sampling point and record in the right field '**Sampled data**' automatically. Note that data in this area are always marked with '**V**' and can not be altered partially for printing by users.
3. For every measurement, program will store data like activity, Lambda, ABS0, … … etc. in the field of '**Output data**'.
4. Moving mouse to any position in the graph and then hitting right button of the mouse, this can record data of that point to field '**Track data**'. Every record will be numbered accordingly.

Chapter 8
Quantitative

1. Choose '**Quantitative**' from '**Function**' of menu bar and a screen for function Quantitative will show up. A dialog box of '**Setup Quantitative**' also shows up.

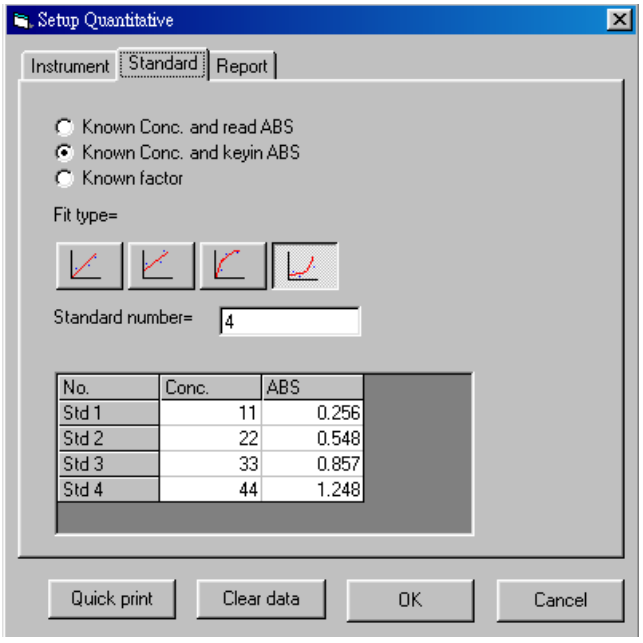
   a. Tab '**Instrument**' refers to basic parameters of this function. More details are described below:
      - '**Wavelength(nm)**' represents the wavelength for measurement.
      - In '**Low value**', users are not allowed to set up the low value in scale of graph and the unit is ABS.
      - In '**High value**', users are not allowed to set up the high value in scale of graph and the unit is ABS.
      - In '**Unit**', users can select different unit as necessary.

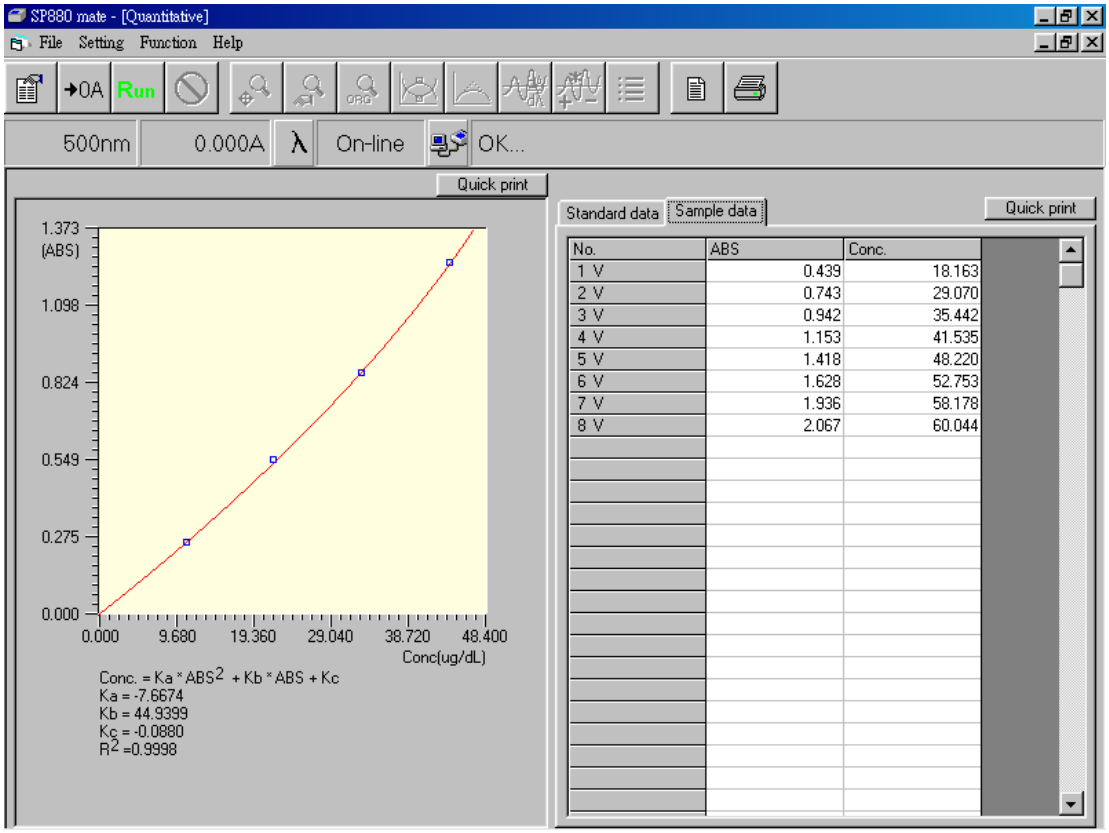


b. Tab '**Standard**' refers to options for setting up standard. Details are described below.

- Three standard types for user to choose: '**Known Conc. and read ABS**' for known concentrations with unknown ABS for measurement, '**Known Conc. and keyin ABS**' for known concentrations with user-decided ABS to key in, and '**Known factor**' for known factor.
- Four fit types for users to choose; from left to right, 1st order equation passing origin, 1st order equation without passing origin, 2nd order equation passing origin, and 2nd order equation without passing origin.
- '**Standard number**' is for users to input number of standards.
- Followed by the above three selections, users will key in proper values for standards.

c. Tab '**Report**' is to set up options for printing reports in this function. Please follow explanations in chapter 4.





2. After setting up parameters for function Quantitative, press icon Run in the toolbar to run the function. If standard type **'Known conc. and read ABS'** is selected, it will start to measure standards and set up the standard table. Otherwise, it can start to measure samples.
3. Data of standards will be in field '**Standard data**'. Note that those data in this area are always marked with '**V**' and can not be altered partially for printing by users.
4. For every measurement, program will store data in field '**Sample data**'.
5. If users completed a standard curve by standard type '**Known conc. and read ABS**', then leave this measurement function. The standard type will become **'Known conc. and keyin ABS'** next time users return to this function, and can start sample measurement.

Chapter 9
Protein Analysis

1. Select '**Protein Analysis**' from '**Function**' of menu bar and a function screen '**Protein Analysis**' will show up. A dialog box of '**Setup Protein Analysis**' also shows up.

   a. Tab '**Instrument**' refers to basic parameters in this application. More details are described below:

      - In '**Assay type**', there are seven choices:

        Bradford Protein Analysis

        Lowry Protein Analysis-High Sensitivity

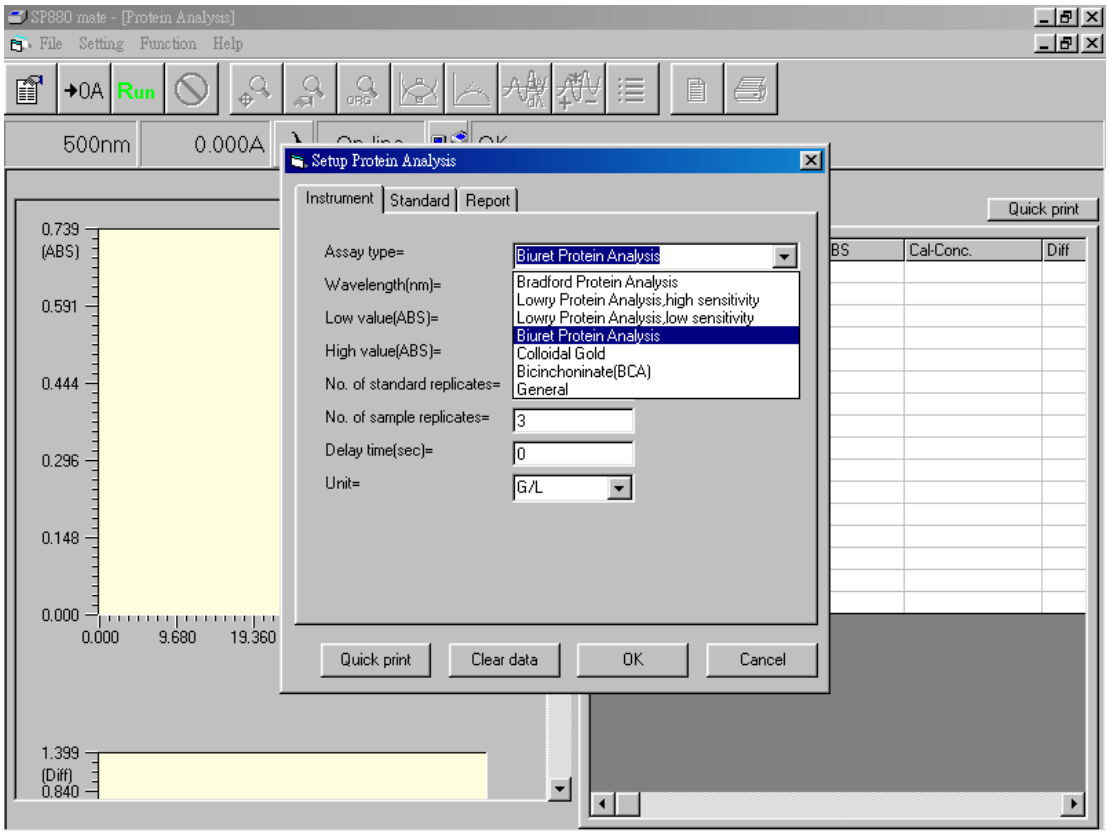
        Lowry Protein Analysis-Low Sensitivity

        Biuret protein Analysis

        Colloidal Gold

        Bicinchoninate(BCA)

        General

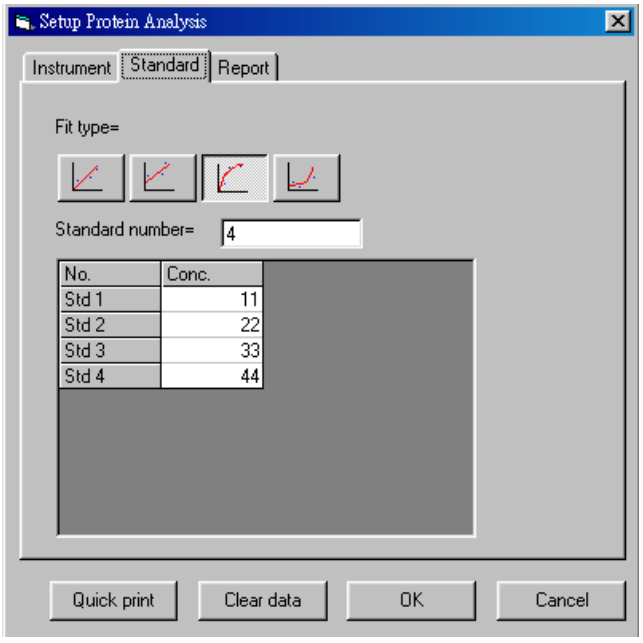


- '**No of standard replicates**' represents the standard solution number for known concentration.
- '**No of sample replicates**' represents the sample solution number for unknown concentration.
- '**Delay time(sec)**' represents the delay time before taking readings.
- '**Unit**' represents concentration unit applied, totally there are 15 units available.

b. Tab '**Standard**' is for setting up standard solution. Details are described below.

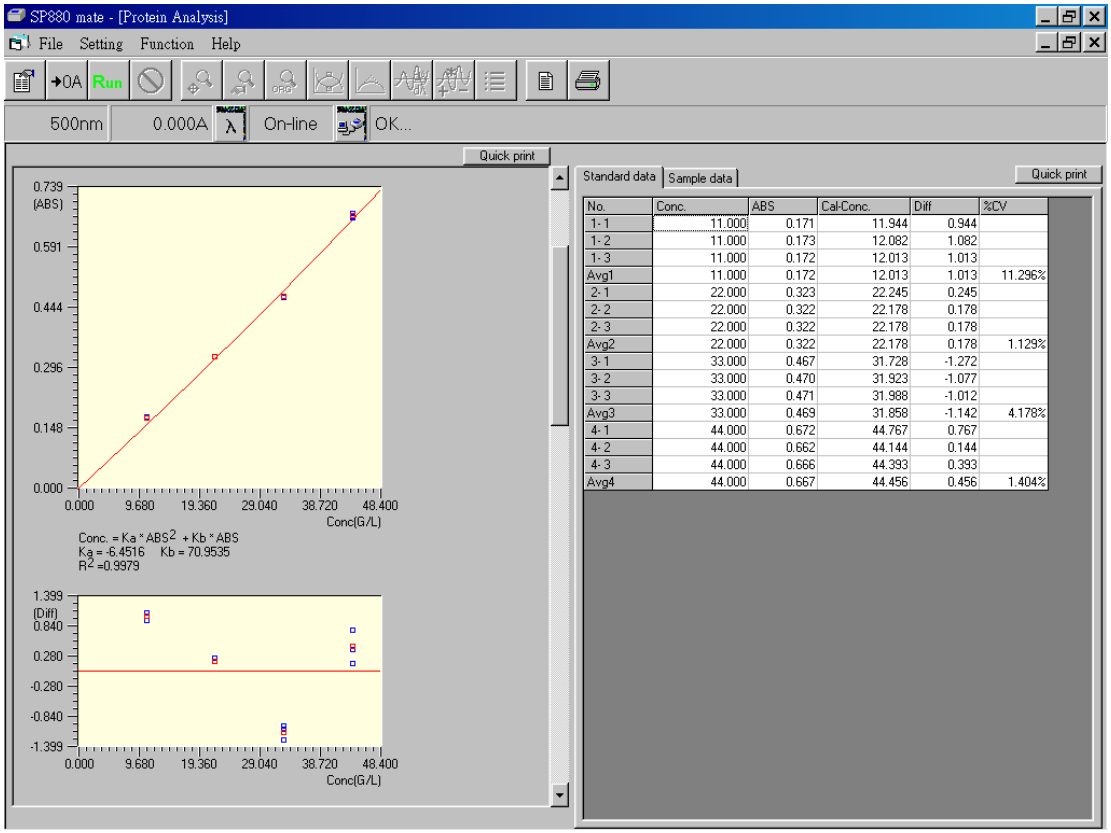
- Four fit types for users to choose; from left to right, 1st order equation passing origin, 1st order equation without passing origin, 2nd order equation passing origin, and 2nd order equation without passing origin.
- '**Standard number**' is for users to input number of standards.
- Followed by above selections, users will key in proper values for standards.

c. Tab '**Report**' is to set up options for printing reports in this application. Please follow explanations in chapter 4.



2. After setting up parameters for protein analysis, press icon Run in the toolbar and program will start reading standard. In the standard table, readings and results of calculation will show up accordingly.

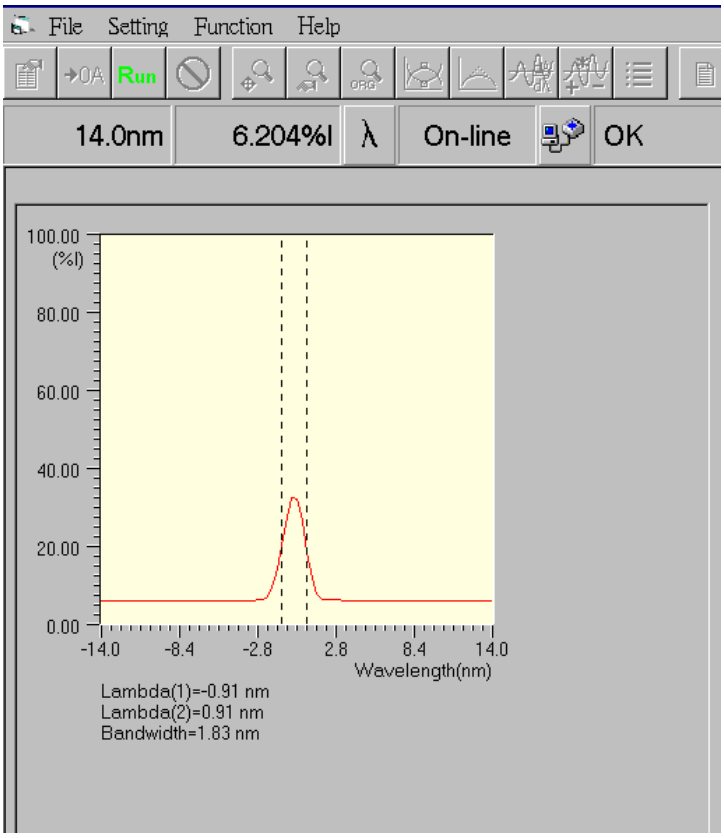
3. Three types of calculations are done. They are concentration obtained from fitted equation(Cal-Conc), difference between Cal-Conc and input concentration(Diff), and coefficient of variance from Cal-Conc(CV) for standard replicates greater than 2.
4. Two colors in the drawings distinguish between individual data(blue) and average data(red).

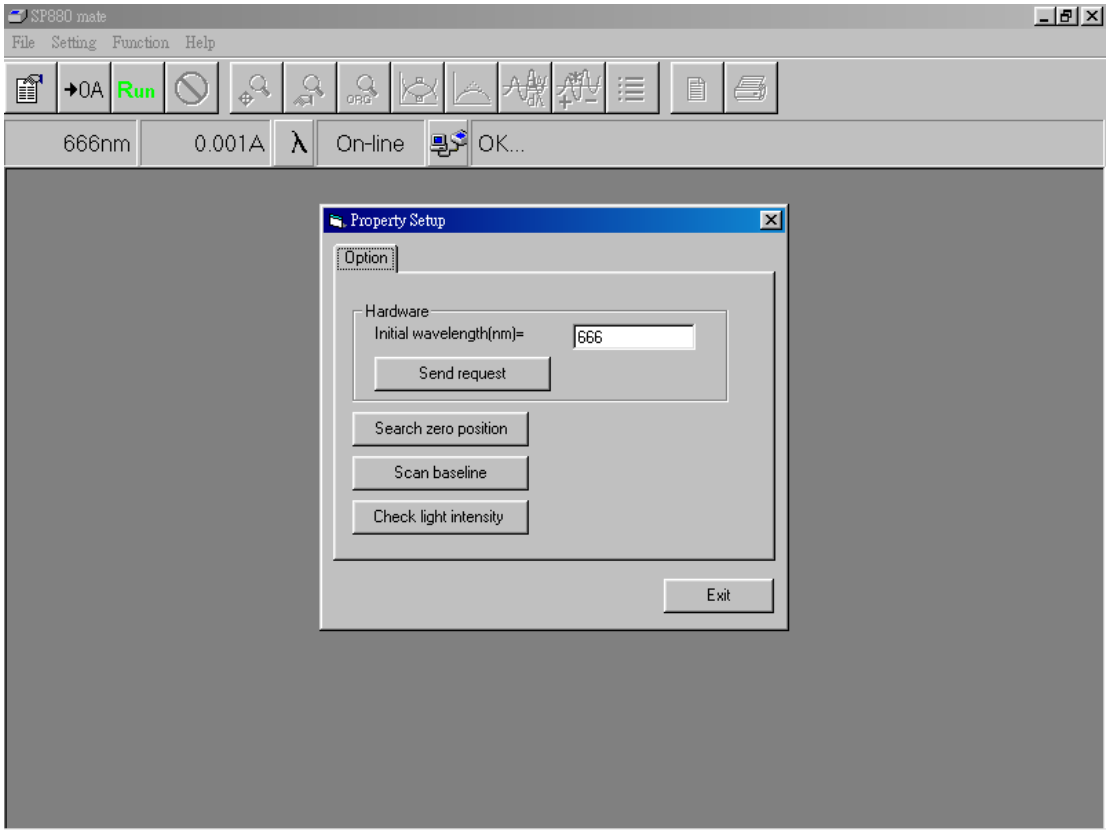


No.	Conc.	ABS	Cal-Conc.	Diff	%CV
1- 1	11.000	0.171	11.944	0.944	
1- 2	11.000	0.173	12.082	1.082	
1- 3	11.000	0.172	12.013	1.013	
Avg1	11.000	0.172	12.013	1.013	11.296%
2- 1	22.000	0.323	22.245	0.245	
2- 2	22.000	0.322	22.178	0.178	
2- 3	22.000	0.322	22.178	0.178	
Avg2	22.000	0.322	22.178	0.178	1.129%
3- 1	33.000	0.467	31.728	-1.272	
3- 2	33.000	0.470	31.923	-1.077	
3- 3	33.000	0.471	31.988	-1.012	
Avg3	33.000	0.469	31.858	-1.142	4.178%
4- 1	44.000	0.672	44.767	0.767	
4- 2	44.000	0.662	44.144	0.144	
4- 3	44.000	0.666	44.393	0.393	
Avg4	44.000	0.667	44.456	0.456	1.404%

Chapter 10
System Setup

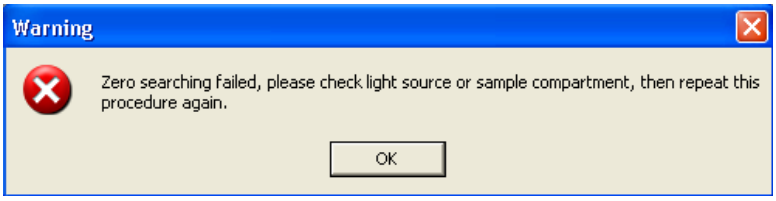
1. Under '**System Setup**' from '**Function**' of menu bar, select '**Verify bandwidth**' and a function screen '**Verify Bandwidth**' will show up.
2. In this screen, press icon Run in the toolbar and this function will be executed. The machine will approach optical zero position, read light intensity (%I) from –14.0nm to +14.0nm, and calculate optical bandwidth at zero position with result shown in the graph. Lambda(1) and Lambda(2) are wavelength at half of maximum light intensity. In normal situation, the bandwidth is to be 2.0nm





3. Under '**System Setup**' from '**Function**' of menu bar, select '**Property Setup**' and a function screen '**Property Setup**' will show up. Explanations of this function are described below:

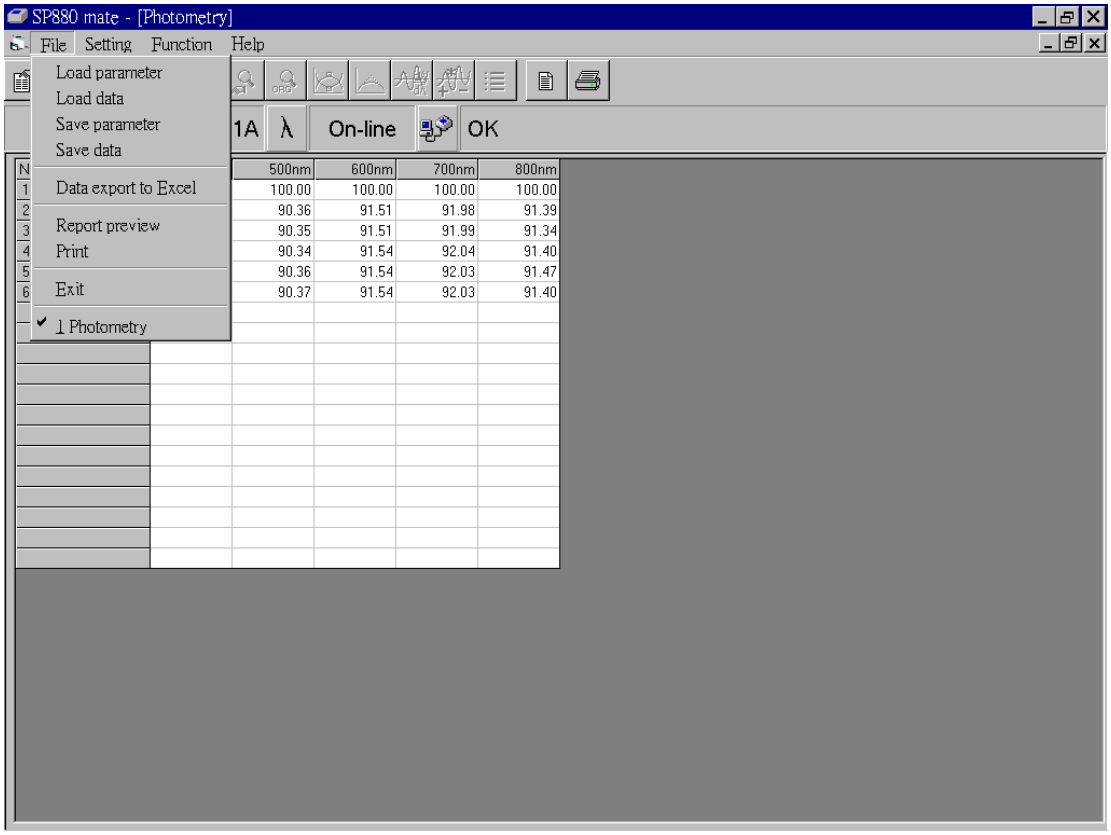
- In the blank area of '**Initial wavelength**', users can key in desired wavelength so that it will go to this position every time powering-up the instrument. Press '**Send request**' after key in value to confirm data saving.
- Press '**Search zero position**' button and the instrument will run into the optical zero position. Users can inspect a rectangular light spot in the space of cell holder. If the lamp is malfunctioned or the cell compartment has sample inside, the zero position can not be found. There will be a warning message shown below and '**Error-1**' at instrument LCD. Please do proper correction and repeat searching until both messages disappear. Users are not allowed to execute other function if the warning is still there.



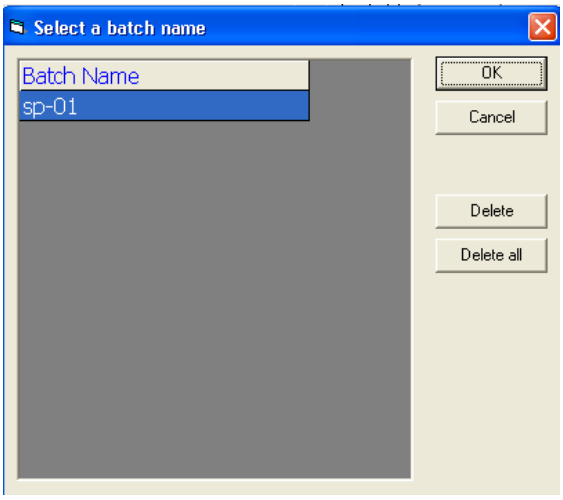
- Press '**Scan baseline**' button and the instrument will perform measurement for baseline, then save data in data base file. In order to get stable readings, turn on the instrument half an hour before doing this measurement.
- Press '**Check light intensity**' button, the instrument will go to 500nm position, measure the light intensity and compare with reference voltage (0.1V). There will be a warning message if the intensity is too low.

Chapter 11
File Management

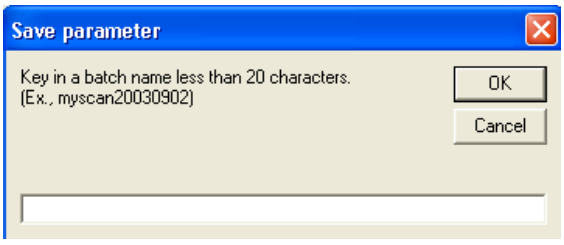
1. At each measurement function, users can save/load parameters/data by following procedures. The file management can not be activated under system function.
2. Choose '**Load parameter**' from '**File**' of menu bar and a dialog box of '**Select a batch name**' shows up. Users can select a parameter file in this batch. The file includes all setting values for a function in a specific experiment. Users can also delete saved batch files here.(figure 11-1)
3. Choose '**Load data**' from '**File**' of menu bar, and a dialog box of '**Select a batch name**' shows up. Users can select the needed data file in this batch. The file includes all setting values for a function and data obtained in a specific experiment. Users can also delete saved batch files here. (figure 11-1)
4. Choose '**Save parameter**' from '**File**' of menu bar, and a dialog box of '**Save parameter**' shows up. Users can key in desired name and press OK to save all setting values in a file of a selected function. (figure 11-2)
5. Choose '**Save data**' from '**File**' of menu bar, and a dialog box of '**Save data**' shows up. Users can key in desired name and press OK to save parameter settings and measured data in a file. (figure 11-3)



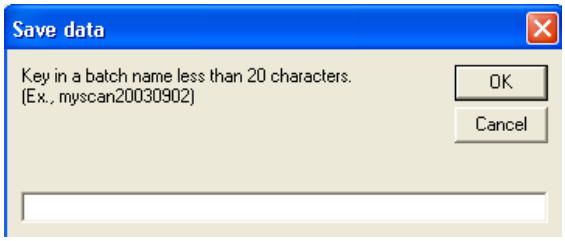
6. Choose '**Data export to Excel**' from '**File**' of menu bar, and a dialog box of '**Export data**' shows up. Users can key in desired name and press OK to save measured data in an Excel file.(figure 11-4) Several sheets will be generated in this file to separate different types of data obtained in the measurement.



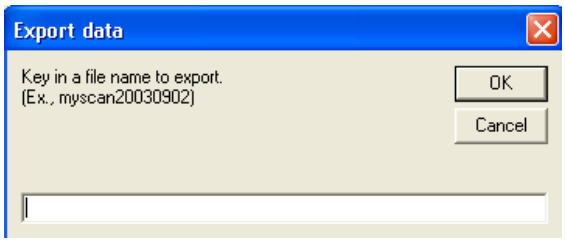
(Figure 11-1)



(Figure 11-2)



(Figure 11-3)



(Figure 11-4)

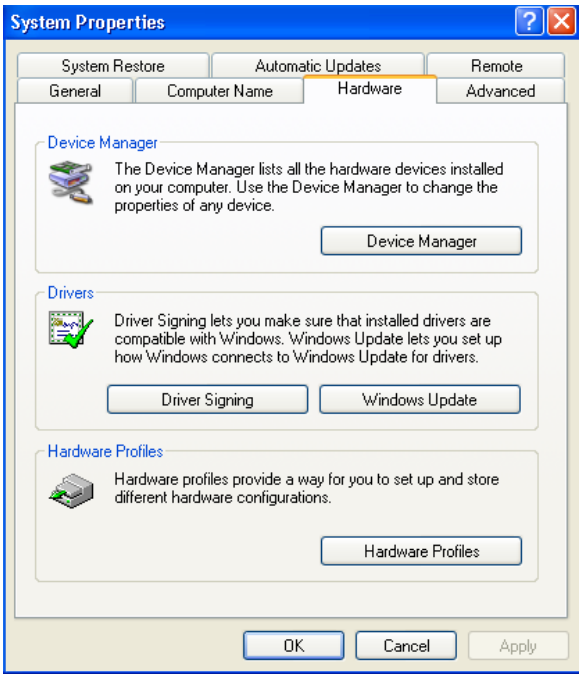
Appendix A
Setting of USB Serial Port

If your Windows(XP/98SE) PC does not support RS232 com ports, and only has USB ports. An USB to RS232 converter is required to connect between RS232 output of spectrophotometer and USB input of PC. After successfully installing this converter and its driver to PC, and before connecting its RS232 connector to spectrophotometer, please set up your Windows(XP) computer as follow.

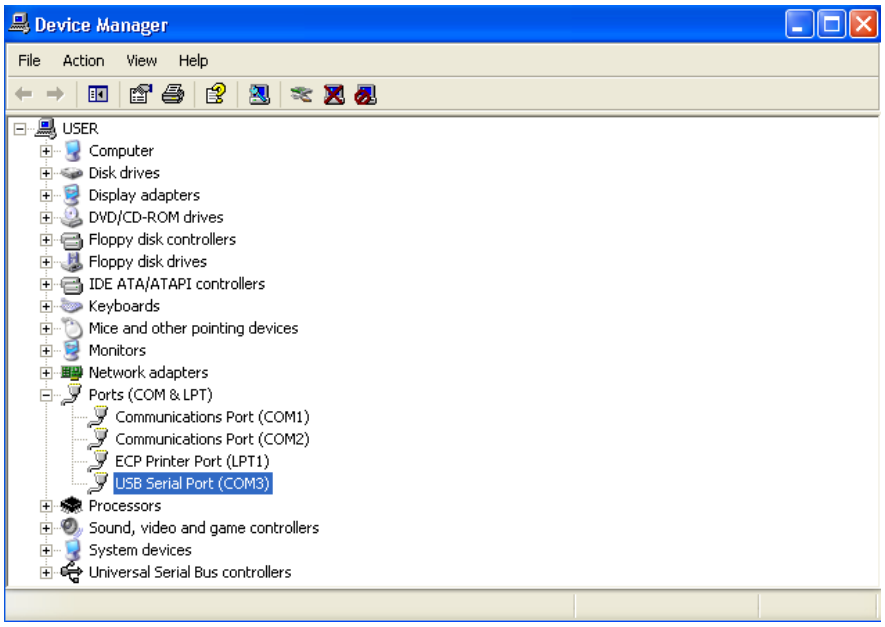
Under '**Systems Tasks**' of '**My Computer**' screen, press '**View system information**'. In System Properties, select icon '**Hardware**' and press button '**Device Manager**'(figure A-1).

In Device Manager, double click '**USB Serial Port**'(figure A-2) to enter port setting(figure A-3). Fill in '**57600,8,None,1,None**' in those blanks. Press button '**Advanced..**' to enter advanced COM setting(figure A-4). USB transfer size is to be selected as max number(4096). Latency timer is to be smallest number(1)

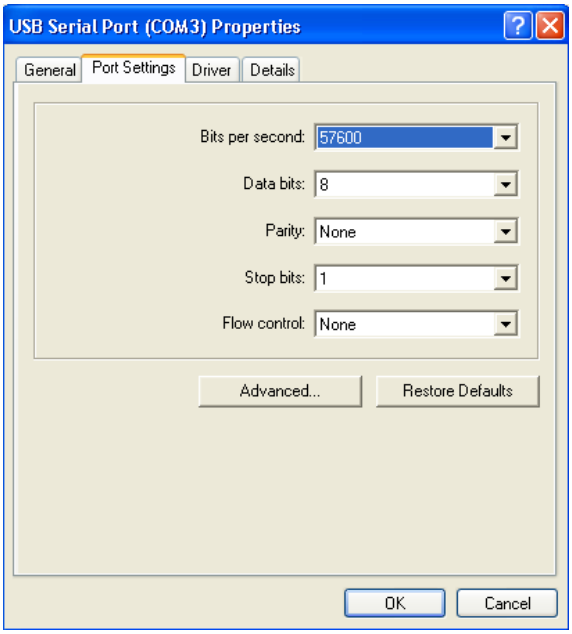
Upon finishing above procedure, user can start connecting the converter to machine for further operation.



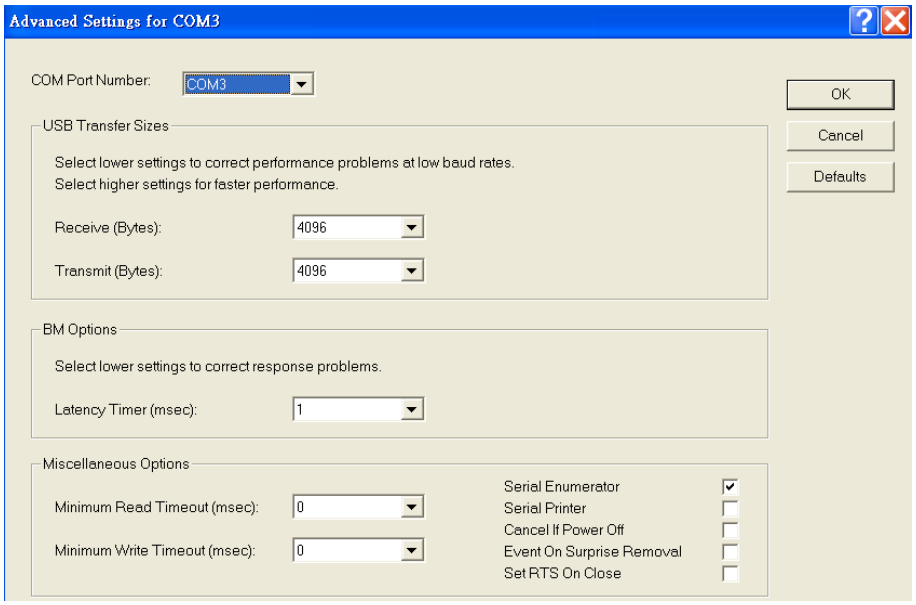
(Figure A-1)



(Figure A-2)



(Figure A-3)


Advanced Settings for COM3
COM Port Number:
COM3
OK
Cancel
Defaults
USB Transfer Sizes
Select lower settings to correct performance problems at low baud rates.
Select higher settings for faster performance.
Receive (Bytes):
4096
Transmit (Bytes):
4096
BM Options
Select lower settings to correct response problems.
Latency Timer (msec):
1
Miscellaneous Options
Minimum Read Timeout (msec):
0
Minimum Write Timeout (msec):
0
Serial Enumerator
Serial Printer
Cancel If Power Off
Event On Surprise Removal
Set RTS On Close

(Figure A-4)