

Operating Instructions

VersaSpec

Software Version: 5.9.x



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1 PC-Software – Installation under Windows

Execute the following steps on the PC to install the software *VersaSpec*:

- Start Windows 7/ 8/ 10.
- Insert the USB flash drive in an open USB slot on your computer.
- Run 'setup.exe' from the Software ▶ VersaSpec folder of the USB flash drive.

2 Operation of Program

2.1 Starting the Program

- Start Windows and then activate the  Start menu.
- Connect the *JETI* device via USB, LAN or Bluetooth to the computer.
- Select *VersaSpec* under All Programs.

The software will automatically search for all *JETI* devices connected to the PC. If more than one unit is found, a selection list will appear.

By default, the next time the software is started, it will try to establish a connection with the last used device to save time for searching through all ports and interfaces.

There are some command line arguments that can be used to change this default behavior. This will cause a use of fixed ports and interfaces:

COM number (e.g. 'COM 64') – connection through a given COM-port

FTDI address (e.g. 'FTDI A6015FTH') – USB-connection via FTDI driver

BT address (e.g. 'BT 0x0013430FCFEB') – connection via Bluetooth

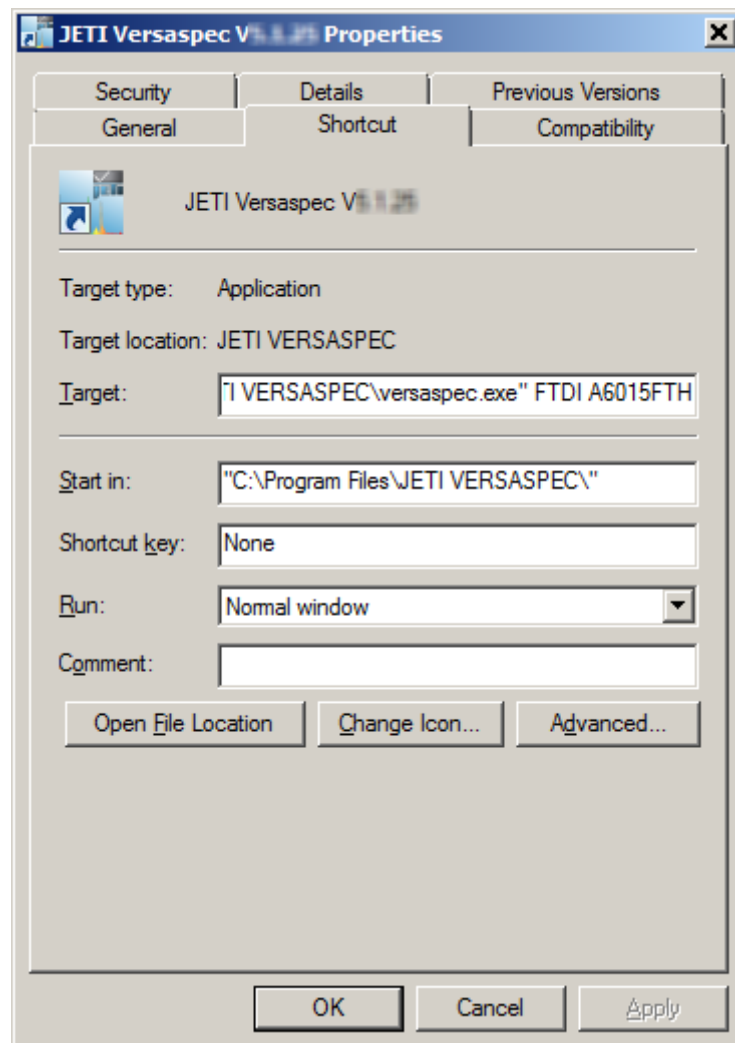
TCP/IP address (e.g. 'TCPIP 192.163.115.163') – connection via TCP/IP (for LAN-devices)

Other arguments:

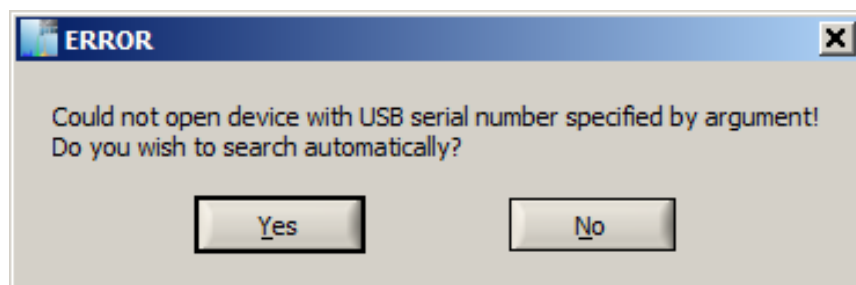
SEARCH – force searching of devices. May be useful if more than one device is connected. In this case, *VersaSpec*'s attempt to open the last connected device is omitted.

OFFLINE – start *VersaSpec* in offline mode.

To insert command line arguments, edit the program's shortcut as follows: right-click the 'JETI VersaSpec' icon on the desktop and select **Properties**. The following dialog appears:



Type in the arguments *after* the last quotation mark in the 'Target' box ('FTDI A6015FTH' in this example). Use a space sign between the quotation mark and the arguments. If no device can be found on the specified port, the software will ask to perform an automatic scan as shown below:



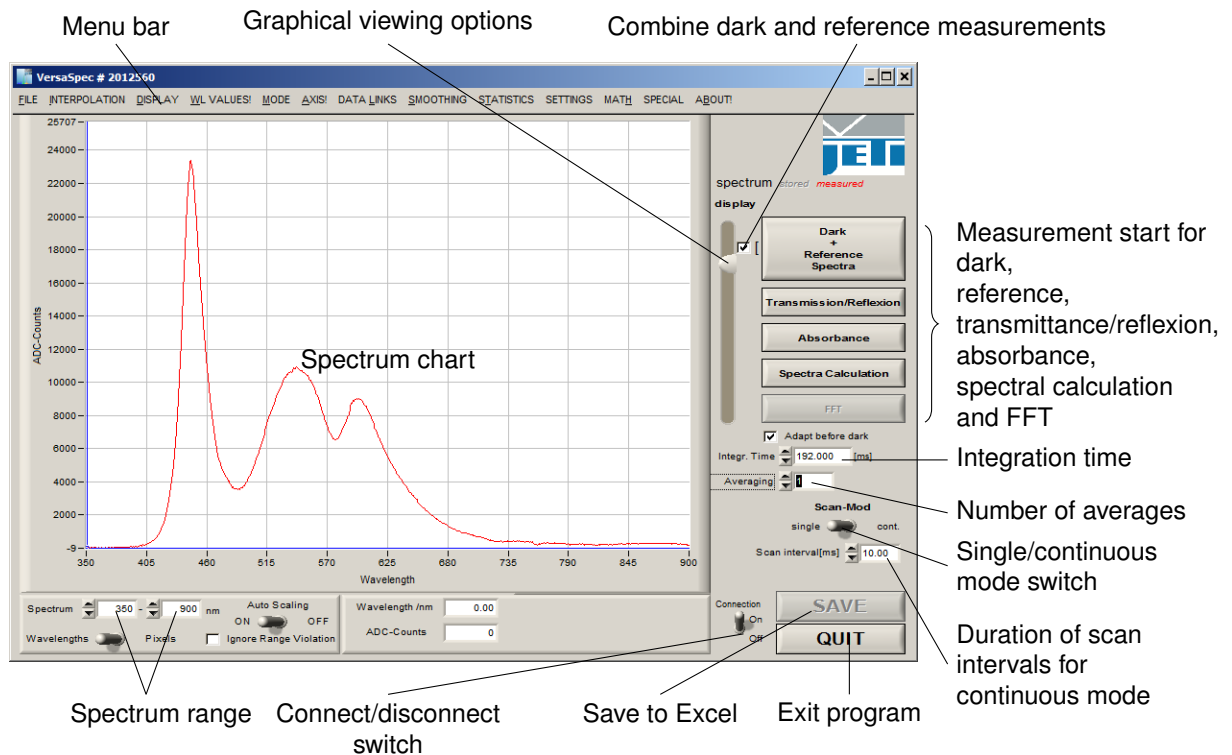
2.2 About

Info/About shows an information window, which contains the software version, serial numbers, connection type (with a COM-port if used) and the firmware version.



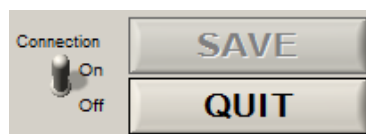
Press  to close the window.

2.3 Main Panel



2.4 Measurement

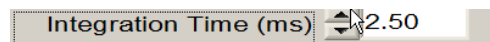
2.4.1 Connect Device



This switch can be used to disconnect the device from the PC to use the connection interface for other tasks. Afterwards it can be reconnected in the same manner.

The switch in the main panel is duplicated with a menu item **File > Connect Device**.

2.4.2 Integration Time

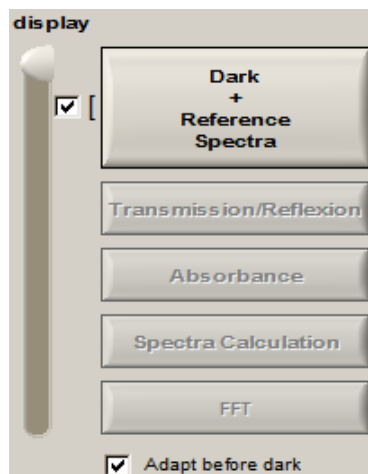


The integration time can be selected between 0.01 ms and 60 000 ms with a step of 0.01 ms, but fractional values have sense only for SDCx3 electronics (or devices on its basis as spectraval or BlueSpecCube). The default value is the time used during the last measurement. It can be also set directly with up/down arrows as well as entered with the keyboard. A new dark scan will be required after a change of the integration time.

Remark: Select the integration time to keep the count rate below the detector maximum count rate (approx. < 28000 ... 30000 for 15 bit setting of the ADC and < 55000 ... 60000 for 16 bit setting) to avoid overexposure.

The following sections describe all buttons used for spectral measurements and calculations.

2.4.3 Dark Spectrum



The measurement of the dark spectrum of the spectrograph must be done before the first measurement and **after any change of the integration time**. One has to ensure that no external light can enter the fiber input during the procedure. The acquisition starts with clicking the **DARK SPECTRUM** button.

2.4.4 Reference Measurement

Remark: Target laser can be switched on using **L** or **Ctrl** + **L** shortcuts.

The reference acquisition is done by selecting the button **REFERENCE SPECTRUM**. The displayed spectrum is calculated as the difference between the measured and the dark spectrum.

2.4.5 Combined Dark/ Reference measurement

Remark: Works properly only for devices with shutter.

It is possible to combine each reference measurement with an own dark measurement by clicking the check box left of both buttons. In this case it is also possible to get the integration time automatically by clicking the check box below the measuring buttons.

2.4.6 Transmission / Reflection Measurement

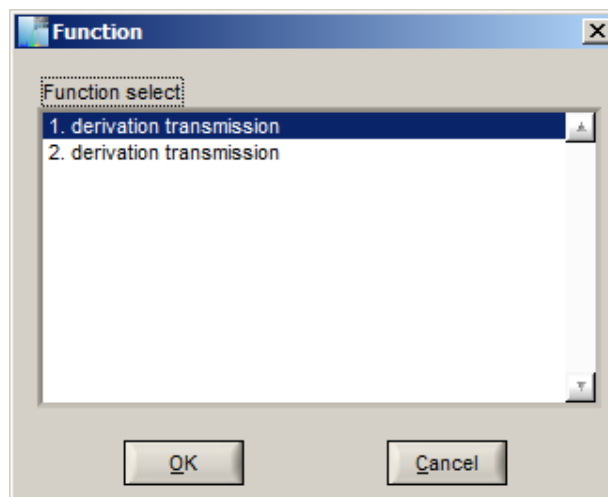
After the reference measurement, it is possible to make transmission/reflection measurements by clicking the correspondent button. The measured spectrum is divided by the reference spectrum. It is possible to measure the spectral transmission or reflection, depending on the measurement set up.

2.4.7 Absorbance Measurement

Absorbance measurements are possible by selecting the **ABSORBANCE** button.

2.4.8 Functions

Several mathematical operations can be applied to the measured spectrum. To select the operation, double click on the **SPECTRA CALCULATION** button. A list of possible operations is displayed. The first and second derivation of the spectra.



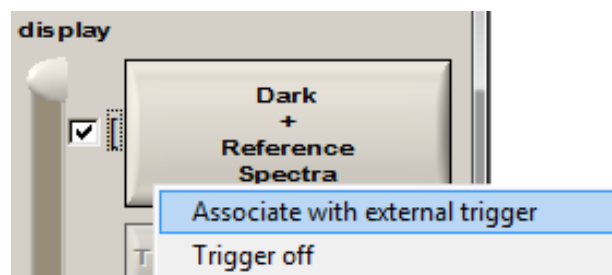
2.4.9 FFT

Switch axis to pixel mode, then select **MATH** > **FFT**. Input the type and number of measurements. When the measurements are done, the **FFT** button becomes active and one can see the FFT diagram by clicking on it.

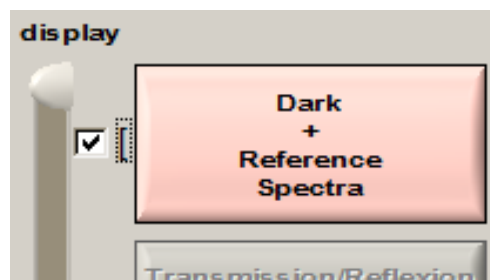
2.4.10 Using of External Trigger

Some of *JETI* devices are equipped with a hardware 'Measure'-button (spectraval, Blue-SpecCube) or with a connector for an external trigger. It can be used to initiate measurements directly with the device, what can be especially useful in combination with BlueTooth.

To make *VersaSpec* react on an external trigger, do the following: right-click on the measuring button you want to associate with the trigger. Then choose 'Associate with external trigger' from the popup-menu.



The button will change its color, and then you can use the trigger to start the corresponding measurement.



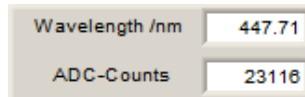
Choosing of 'Trigger off' from the popup-menu ends the triggering mode.

2.5 Display

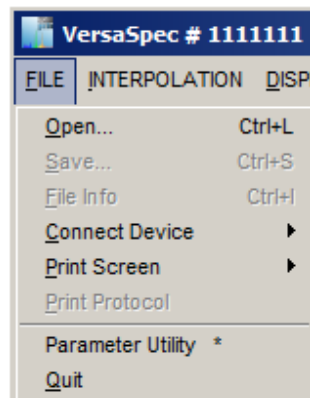
After actuation of a measurement or calculation button the displayed spectrum can be switched back to another previously acquired type of spectrum with the slide control 'DISPLAY'. If a file was loaded, stored spectra can also be viewed by using the slide control (see chapter SET UP). The acquired spectra are displayed in dark colors and the spectra loaded from file are displayed in light colors.

2.5.1 Snap-to-Point Cursor

Single data points of the acquired and/or the stored spectrum can be viewed using the Snap-to-Point Cursor option. The respective wave-length and the intensity value of the selected data point are displayed below the wavelength axis.



2.6 File Operations



2.6.1 Open File

Selecting the sub menu item **FILE** > **Open...** will open the file-select dialog. A file has to be selected which can be loaded to compare with the actually measured spectrum.

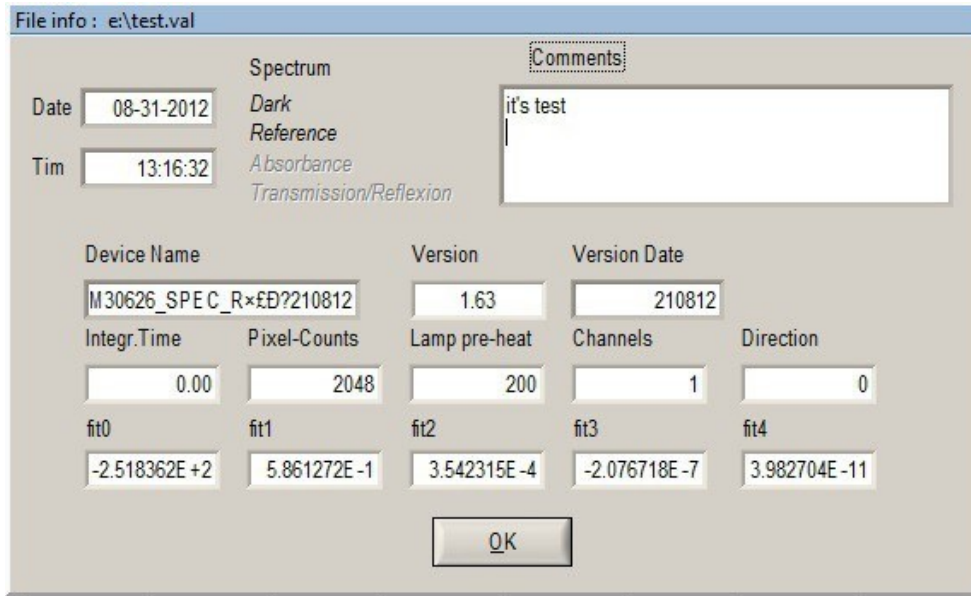
2.6.2 Save File

To save all data of one measurement select **FILE** > **Save...**. A file-save dialog will appear. After a file is selected a short comment can be entered. Click **OK** to save the file.

Remark: The file extension for reference files is '.val'.
--

2.6.3 File Info

By selecting **FILE INFO** or pressing **CTRL** + **I** the following information appears when a reference file was loaded:



File info : e:\test.val

Date	08-31-2012	Spectrum		Comments	
Tim	13:16:32	Dark Reference Absorbance Transmission/Reflexion		it's test	
Device Name		Version	Version Date		
M30626_SPEC_R×ED?210812		1.63	210812		
Integr.Time	Pixel-Counts	Lamp pre-heat	Channels	Direction	
0.00	2048	200	1	0	
fit0	fit1	fit2	fit3	fit4	
-2.518362E +2	5.861272E -1	3.542315E -4	-2.076718E -7	3.982704E -11	
OK					

Date and Time: The date and time when the file was saved.

Spectrum: Shows the spectra which are stored in file.

Comments: A short comment about the file.

Device Name, Version, Version Date: The internal name, firmware version and date of the *VersaSpec*, which was used for measuring.

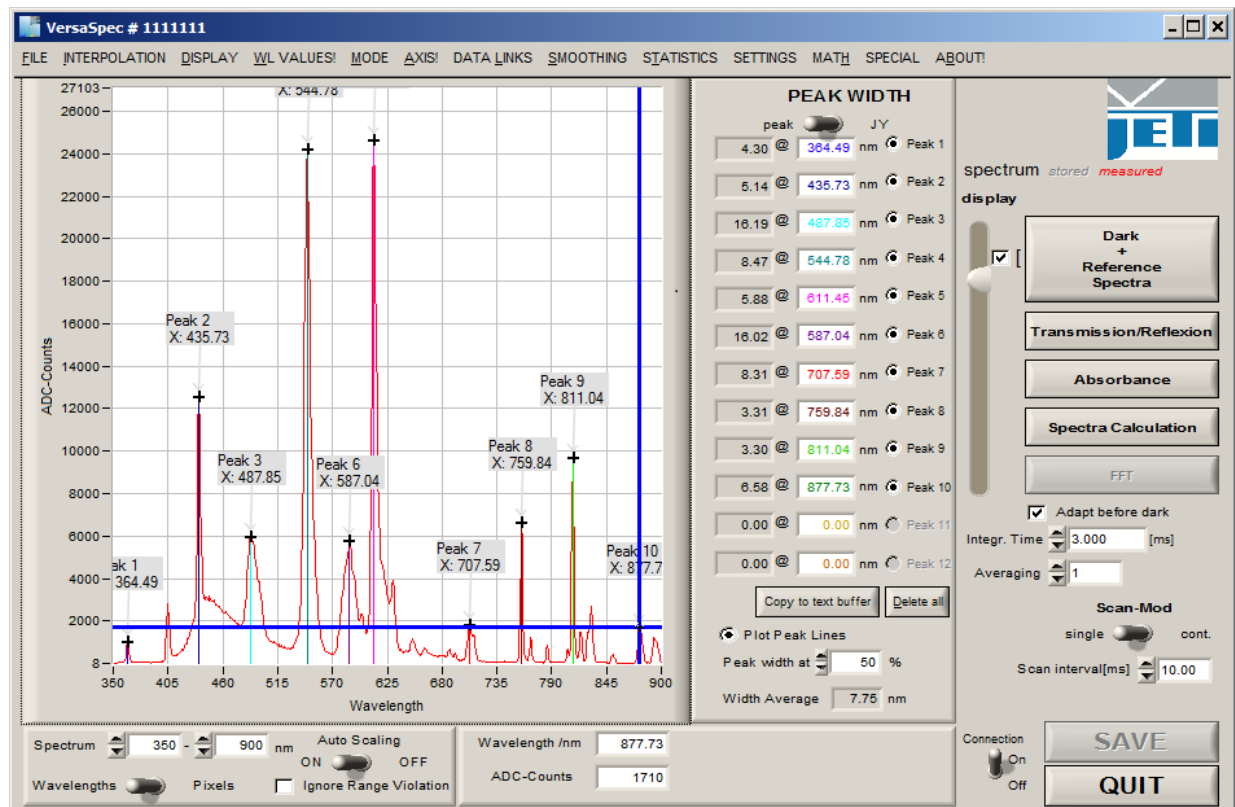
Integr.Time, Pixel-Counts, Lamp pre-heat, Channels, Direction: The settings of the device used for measuring.

fit0 – fit4: The wavelength fit-parameters of the device.

2.7 Operation Modes

2.7.1 Peak Width Mode

Activating the Peak Width Mode (PWM) scales down the diagram and opens the PWM-window. The PWM-window consists of:



- Twelve indicators, each indicator with the peak width, the wavelength(pixel)-value, a radio button ☐ Peak x allowing to delete an inserted peak and a **Delete all**-button;
- Switch between two methods of peak wavelength calculation (see chapter 2.7.3 'Using PWM, VWM and Symmetry', page 16);
- **Copy to text buffer**-button;
- ☒ **Plot Peak Line**-option button;
- Threshold-control **Peak width at** ;
- 'Width Average'-indicator.

2.7.2 Valley Width Mode and Symmetry

Valley Width Mode(VWM) and Symmetry Mode can be called similarly as PWM, but in this case no 'Width Average'-indicator will be shown.

2.7.3 Using PWM, VWM and Symmetry

There are two methods of calculating of peak wavelength implemented in *VersaSpec*, which provide slightly different results. The method to be used can be chosen with a switch between 'peak' and 'JY' options.

The former means that the wavelength corresponding to the highest signal is considered to be a peak.

The latter means that wavelengths corresponding to the left and right points of the peak calculated at 30% threshold are taken, and the mean value of them is considered to be a peak.

A double click into the spectrum adds a peak (valley or symmetry point) to the additional window, displays the width of the peak (valley or symmetry point) at the defined threshold and shows labels with point number and coordinates.

It is possible to monitor up to 12 points simultaneously with wavelength or pixel reference.

Each marked peak gets a colored line to locate it easier in the diagram. This option can be turned off with clicking the  Plot Peak Line -option button.

The  -buttons remove the according peaks out of the list and frees the space for other values. The  -button removes all the chosen peaks/valleys/symmetry points and their labels.

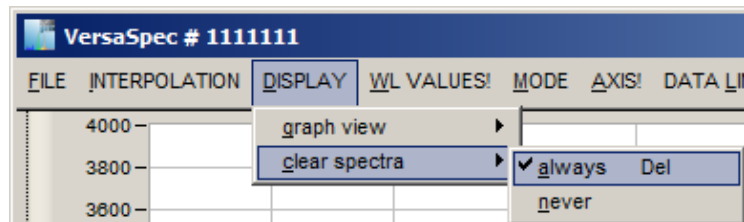
At the bottom of the PWM-window the average peak width of the pitched peaks is displayed to monitor the deviation of all peaks.

Please note, *all* peak widths are calculated depended on the adjusted threshold in the  -control.

2.8 Set Up

2.8.1 Screen Update Mode

There are different spectrum display options which can be selected in the **DISPLAY** menu.

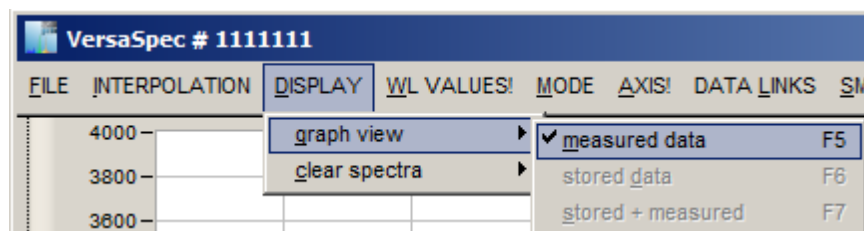


The sub menu **DISPLAY** > **Clear spectra** contains the following items:

Immediate The acquired spectra are deleted at once (actuation of the **DEL** key also deletes the current spectrum display!). The setting under **DISPLAY** > **clear spectra** will remain.

Always The acquired spectra are deleted before a new measurement. Only the most recent acquisition is displayed.

Never The measured spectra will not be deleted. Further measuring curves are displayed one on top of previous ones.



The sub menu **Graph view** contains the items:

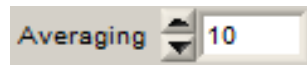
Measured Data Shows only the spectra in diagram, which are just acquired from *VersaSpec* (also selected by pressing **F9**).

Stored Data Shows the spectra, which were loaded from a file (also by pressing **F6**).

Stored+Measurement Displays acquired and stored spectra in one diagram for visual comparison (also by **F7**).

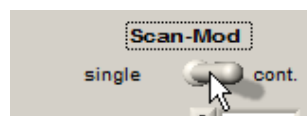
The current graph view option setting is also shown between the diagram and the *JETI* logo.

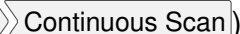
2.8.2 Averaging

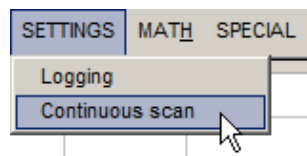


The  Averaging setting can be used to obtain the spectrum as the mean value from up to 10000 successive measurements (though such a huge number of averages can hardly make sense).

2.8.3 Single/ Continuous Measurement

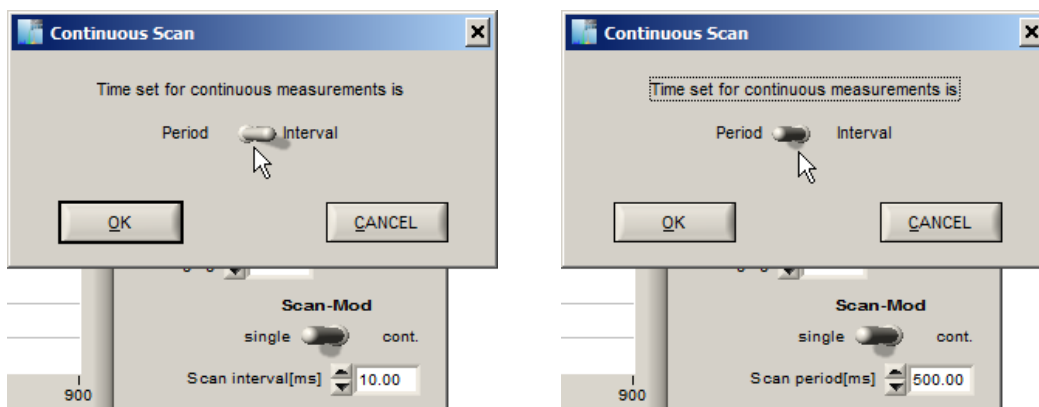


'Scan-Mode' can be used for single or continuous measurement. Repetition rate of the continuous measurement can be set either as a period or as an interval (can be chosen through  ).



'Period' is a time difference between the start of a scan and the start of the successive scan.

'Interval' is a time difference between the end of a scan and the start of the successive scan.



Note: The actual time that one measurement takes depends on too many factors, so that it is impossible to calculate it exactly. That is why the minimal possible period setting is always somewhat larger than actually needed.

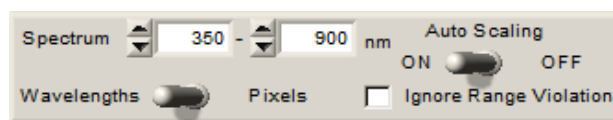
In case of continuous measurements, **Scan period** (**Scan interval**) becomes active. The minimum settable period value depends on integration time. The minimum settable interval value is 0.

When running in continuous scan mode be certain that the ASCII link and Excel link are in the desired state.

Usually continuous mode is used with **Clear spectra**-option set to **Always**. A continuous measurement can be stopped by setting the 'Scan mode'-switch back to 'single'.

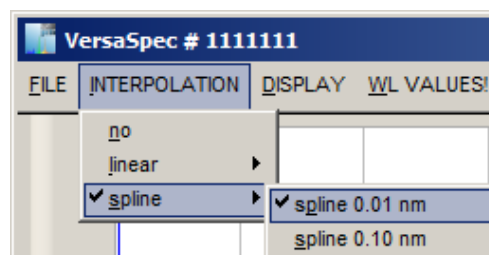
If the export to Excel was activated (see below), then the **Save continuously** toggle button appears in the main menu and can be used to export every measured spectrum automatically.

2.8.4 Zooming of Wavelength



The start and end of the displayed spectrum can be adjusted at the screen edge below the diagram with **Start of Spectrum** and **End of Spectrum**. Use the up and down arrows, or keyboard to select the displayed spectral limits. The largest possible interval is determined by the calibration parameters of the instrument. If a file was loaded the largest values are used. If a file was loaded the larger values are used. For measurements always the full spectral range of the connected spectrometer device is used.

2.8.5 Interpolation



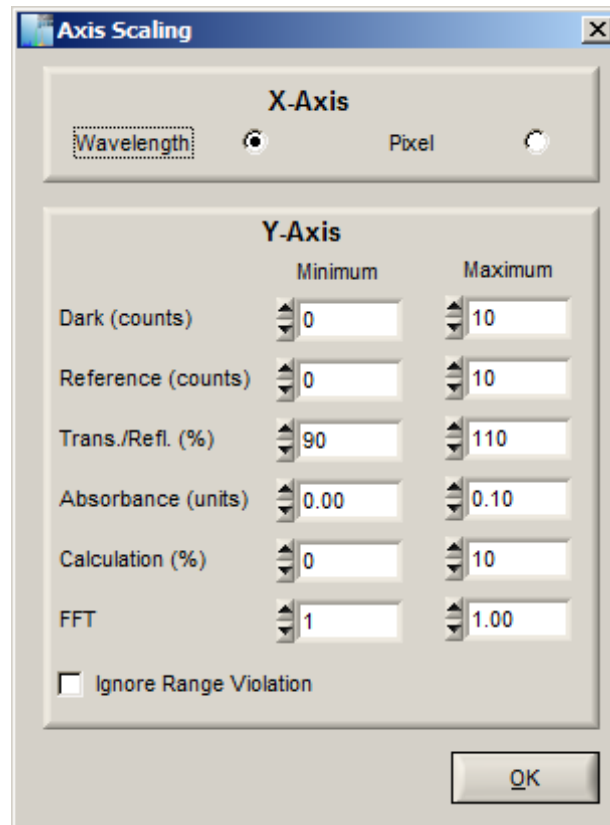
Different options for the interpolation of spectra can be selected under the menu item **INTERPOLATION**. Besides the display of the raw data without interpolation (**no**), **linear** and **spline** (partial cubical interpolation) can be selected.

For linear interpolation, step widths of 1 nm, 2 nm, 5 nm or 10 nm are available.

For spline, step widths of 0.1 nm or 0.01 nm are available.

2.8.6 Axis

Selection of **AXIS!** in the menu bar opens the following window:



Following settings are available:

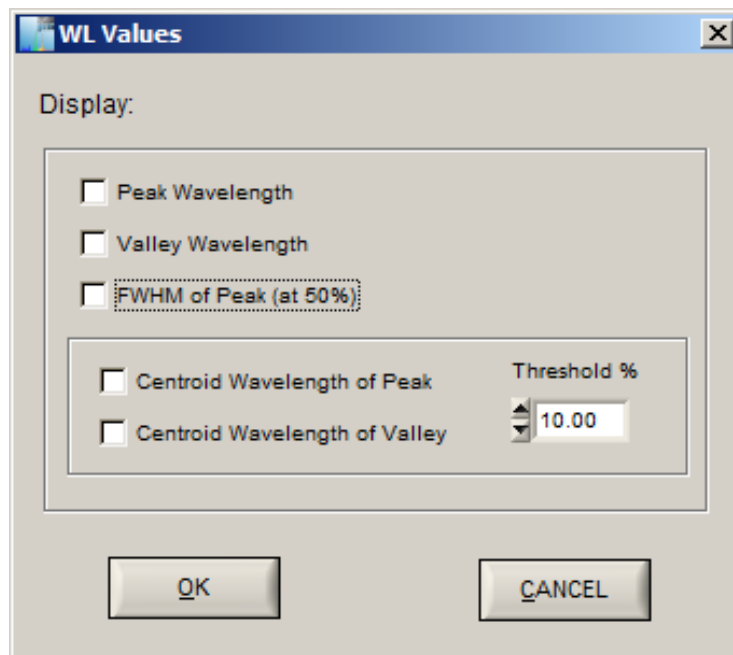
X-axis:

- Scaling in WAVELENGTH or PIXEL

Y-axis:

- For each type of measurement the displayed axis-range can be defined. If Ignore Range Violation is switched off, the program will generate a warning in every case the measured data exceeds the manual adjusted range.
- If Ignore Range Violation is activated, every violation of the manually adjusted range is ignored by the program and the graph is displayed with clipping values outside the diagram area.
- Scaling in Counts or Percent of maximum (in this case a selection of minimum (min) and maximum (max) value is possible). In addition to using the up/down arrows, the Y axis values can be input use the keyboard number pad.

2.8.7 WL Values (Cursor Behavior and Peak/Valley Settings)



2.8.7.1 FWHM

The cursor jumps to the nearest peak by clicking into the spectra and the full width half maximum value of this peak is displayed in the indicator-box below the graph.

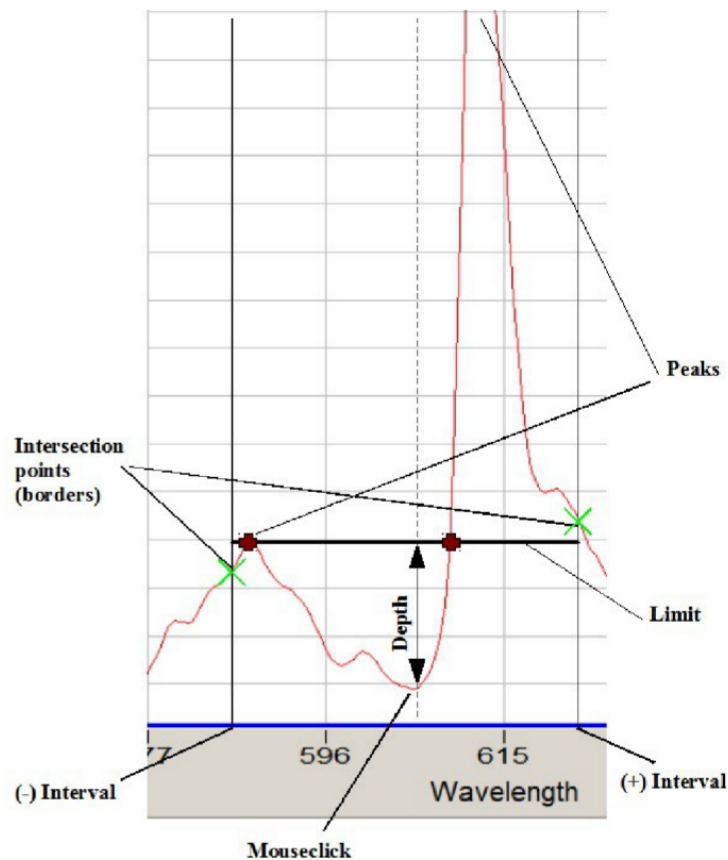
2.8.7.2 Peak/Valley

Wavelength at Cursor Function displays the wavelength of the nearest peak(valley) from a pitched position in the peak(valley) indicator box.

2.8.7.3 Centroid Wavelength

Displays the centroid wavelength of a fixed position in the graph with the adjusted threshold. A vertical line is plotted to the position of the dominant wavelength.

2.8.7.4 Centroid Wavelength for Valley



For the COG Valley calculation it is necessary to give the interval value (it is symmetrical), threshold (in %) and mouse position. The program searches the nearest valley to the mouse click position and a limit at the top. The limit is defined as the smallest (y – coordinate) and the nearest point from two greatest peaks on the left and on the right to mouse click between borders of the given interval and the spectrum. Depth is defined as a distance between the mouse click point and selected intersection point. Then, the real threshold is defined as a product of the depth and the given threshold, and finally COG Valley value is calculated.

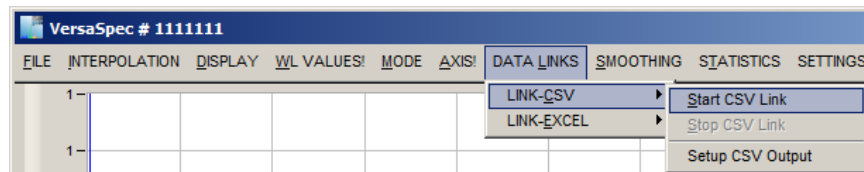
2.9 Print Screen

The print out of the actual screen on the connected printer is possible by **FILE** **Print Screen**. If no printer is connected the action is ignored without an error message.

2.10 Data Links

There are three possibilities to store spectra: as ASCII file, Excel or CSV file. The desired format can be selected in the menu item **DATA LINKS**.

2.10.1 CSV



CSV are database files, which can be opened with database programs (*EXCEL*, *ACCESS*...). Start the automatic transfer with **DATA LINKS** » **LINK-CSV** » **Start CSV Link**. The file name, operator name and file destination has to be selected. Afterwards every measured spectrum will automatically be stored linewise into this file. The x-axis is stored in pixel related wavelength steps.

CSV file, opened with Excel:

	A	B	C	D	E	F	G	H
1	Date:	14.12.2016	14.12.2016	14.12.2016	14.12.2016	14.12.2016		
2								
3	Time:	14:59:51	15:00:03	15:00:11	15:00:23	15:00:36		
4								
5	wavelength	dark:	reference:	transmission	absorbance:	1.derivation:		
6	350.72	2.05E+03	2.35E+01	8.58E+01	1.64E-01	-9.69E+01		
7	351.58	2.04E+03	2.34E+01	8.22E+01	1.78E-01	-9.69E+01		
8	352.44	2.06E+03	2.33E+01	7.85E+01	1.92E-01	-9.67E+01		
9	353.3	2.04E+03	2.32E+01	7.47E+01	2.06E-01	-9.65E+01		
10	354.16	2.07E+03	2.30E+01	7.08E+01	2.21E-01	-9.63E+01		
11	355.02	2.06E+03	2.29E+01	6.69E+01	2.35E-01	-9.60E+01		
12	355.88	2.02E+03	2.28E+01	6.29E+01	2.50E-01	-9.56E+01		
13	356.74	2.07E+03	2.26E+01	5.88E+01	2.65E-01	-9.51E+01		
14	357.61	2.07E+03	2.25E+01	5.47E+01	2.80E-01	-9.47E+01		
15	358.47	2.18E+03	2.23E+01	5.05E+01	2.95E-01	-9.41E+01		
16	359.33	2.11E+03	2.21E+01	4.63E+01	3.10E-01	-9.35E+01		
17	360.19	2.01E+03	2.19E+01	4.20E+01	3.26E-01	-9.29E+01		
18	361.05	2.12E+03	2.18E+01	3.77E+01	3.41E-01	-9.21E+01		
19	361.91	2.06E+03	2.16E+01	3.33E+01	3.56E-01	-9.14E+01		
20	362.77	2.13E+03	2.14E+01	2.89E+01	3.72E-01	-9.06E+01		
21	363.63	2.02E+03	2.12E+01	2.44E+01	3.88E-01	-8.97E+01		
22	364.49	2.03E+03	2.10E+01	2.00E+01	4.03E-01	-8.88E+01		
23	365.35	2.06E+03	2.08E+01	1.55E+01	4.19E-01	-8.79E+01		

CSV file, opened with an editor program:

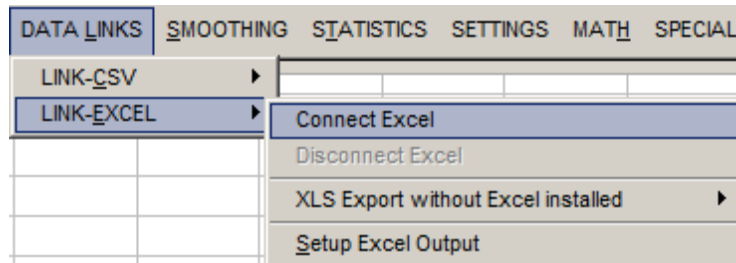
```

1.csv - Editor
Datei Bearbeiten Format Ansicht ?
Date:;;14.12.2016;14.12.2016;14.12.2016;14.12.2016;
Time:;;14:59:51;15:0:3;15:0:11;15:0:23;15:0:36;
wavelength;dark;;reference;;transmission;;absorbance;;1.derivation;;
350.72;2.046000E+03;2.351873E+01;8.579903E+01;1.640405E-01;-9.692166E+01;
351.58;2.041000E+03;2.341319E+01;8.218360E+01;1.778798E-01;-9.685642E+01;
352.44;2.058000E+03;2.329939E+01;7.848313E+01;1.919243E-01;-9.672615E+01;
353.30;2.044000E+03;2.317756E+01;7.470158E+01;2.061617E-01;-9.653221E+01;
354.16;2.065000E+03;2.304794E+01;7.084293E+01;2.205798E-01;-9.627599E+01;
355.02;2.055000E+03;2.291077E+01;6.691112E+01;2.351664E-01;-9.595883E+01;
355.88;2.024000E+03;2.276628E+01;6.291012E+01;2.499092E-01;-9.558211E+01;
356.74;2.066000E+03;2.261472E+01;5.884388E+01;2.647960E-01;-9.514719E+01;
357.61;2.065000E+03;2.245632E+01;5.471638E+01;2.798144E-01;-9.465544E+01;
358.47;2.182000E+03;2.229132E+01;5.053157E+01;2.949524E-01;-9.410823E+01;
359.33;2.114000E+03;2.211997E+01;4.629342E+01;3.101976E-01;-9.350693E+01;
360.19;2.007000E+03;2.194249E+01;4.200588E+01;3.255378E-01;-9.285289E+01;
361.05;2.117000E+03;2.175914E+01;3.767292E+01;3.409607E-01;-9.214748E+01;
361.91;2.062000E+03;2.157014E+01;3.329849E+01;3.564541E-01;-9.139208E+01;
362.77;2.134000E+03;2.137573E+01;2.888656E+01;3.720058E-01;-9.058805E+01;
363.63;2.021000E+03;2.117616E+01;2.444110E+01;3.876035E-01;-8.973676E+01;
364.49;2.031000E+03;2.097166E+01;2.096605E+01;4.032349E-01;-8.883956E+01;
365.35;2.056000E+03;2.076247E+01;1.546539E+01;4.188879E-01;-8.789783E+01;
366.21;2.070000E+03;2.054884E+01;1.094307E+01;4.345502E-01;-8.691294E+01;
367.07;2.067000E+03;2.033099E+01;6.403055E+00;4.502095E-01;-8.588624E+01;
367.93;2.044000E+03;2.010916E+01;1.849308E+00;4.658537E-01;-8.481912E+01;
368.79;2.072000E+03;1.988361E+01;-2.714211E+00;4.814703E-01;-8.371292E+01;
369.65;2.073000E+03;1.965455E+01;-7.283540E+00;4.970473E-01;-8.256903E+01;
370.51;2.078000E+03;1.942225E+01;-1.185472E+01;5.125723E-01;-8.138880E+01;
371.37;2.062000E+03;1.918692E+01;-1.642379E+01;5.280332E-01;-8.017361E+01;
372.23;2.067000E+03;1.894881E+01;-2.098678E+01;5.434176E-01;-7.892481E+01;
373.09;2.067000E+03;1.870816E+01;-2.553974E+01;5.587134E-01;-7.764378E+01;
373.95;2.075000E+03;1.846521E+01;-3.007870E+01;5.739082E-01;-7.633188E+01;

```

2.10.2 Excel

It is possible to store the measured values in Excel files in two ways: if Excel is installed on the computer or if it is not installed.



If it is installed, Excel starts as a background application and the measured data are saved linewise into spread sheets.

First one has to open **DATA LINKS** >> **LINK EXCEL** >> **Setup EXCEL Output**. A window appears, where one has to select, if the spectra and/ or the PWM-mode values have to be stored.

Afterwards the Excel link is started with **DATA LINKS** >> **LINK EXCEL** >> **Connect Excel**.

Every desired measurement can be stored by pressing the **SAVE** button. The serial number and the used integration times will always be stored automatically.

If the displayed wavelength range has changed between two data savings, two columns will be written to the Excel-spread sheet (wavelength and intensity values), whereas without changes in the spectral range only one column with the intensity values is written.

If one spread sheet is almost completely filled, the next sheet is opened automatically.

The connection to MS Excel is finished and the data are stored (*.xls') by selection of the sub menu item **DATA LINKS** >> **LINK EXCEL** >> **Disconnect Excel**.

If Excel was not installed select **DATA LINKS** >> **LINK EXCEL** >> **XLS Export without Excel installed** item. Choose **Start XLS link** and type in the desired file name. Stop the export by pressing **End XLS link** under the same menu.

To store a measurement press the **SAVE** button in the same way as above.

Attention: Please ensure that the Excel worksheet has enough rows to store all data. This could be critical if the interpolation is set to a fine value, e.g. 0.01.

2.11 Smoothing

Under the menu item **SMOOTHING** are two types of smoothing — Savitzky-Golay smoothing and Boxcar, on default nothing is chosen, i.e. 'no'.

2.12 Statistics

Select Menu **STATISTICS** > **Start Statistics**. Input the type and number of measurements. When the measurements are done, the table with statistics is shown and average values of intensity and standard deviation are calculated.

2.13 Abort a measurement

The **ESC** button can be used to abort a measurement.

2.14 Finishing the Program

The program can be closed by clicking on the **Quit** button or by pressing of **Alt** + **Q** on the keyboard.

Remark:	Do not disconnect the instrument until the program is not finished yet. This is also valid if the device is used with its firmware commands.
----------------	---

2.15 Session Logging

VersaSpec can generate a log-file for each session (*VersaSpec* overwrites it at every program start), which is normally located under C: > Users > [username] > AppData > Roaming > JETI > VersaSpec > versaspec_session.log. The file contains important information about internal calls of system functions which are responsible for communication with the device.

If you notice any reproducible error, you can backup this file before you restart *VersaSpec* and send it to *JETI* with an explanation of what exactly has happened. This can help us to make *VersaSpec* better in the future.

Because file operations rather slow down the software and reduce the precision of time periods of continuous measurements, logging is switched off per default. You can it on in the menu **Settings** > **Logging**.

2.16 Parameters

VersaSpec allows to display and to change all parameters, which are stored in the connected instrument.

The access to the Parameter Utility is via the menu File or by pressing the  button. It opens a window with several slides, where the parameters are grouped in different topics. It is also possible to access to a special parameter by clicking on the related firmware command in the list on the left side of the Parameter Utility. Clicking on a parameter command highlights the related argument in the sliders.

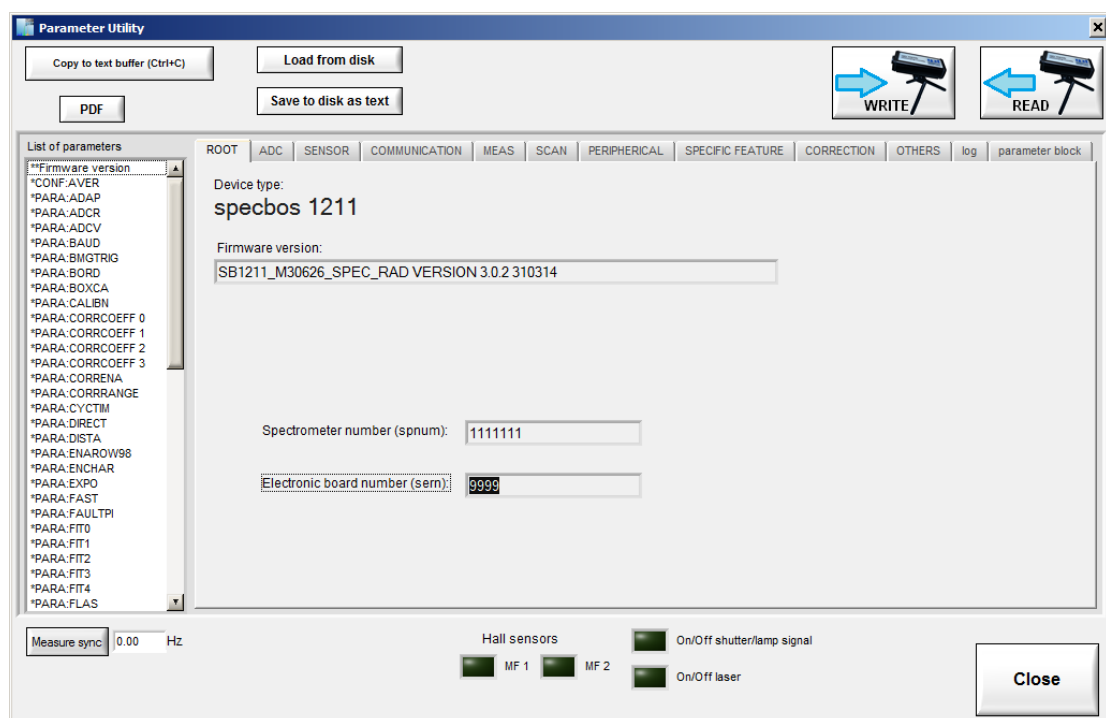
The display of the different parameters depends on the type of connected instrument or spectrograph. The meaning and range of each parameter can be found in the related firmware description of the attached instrument.

Every parameter change is saved temporarily immediately after pressing of **ENTER** or leaving of the input field. It is possible to save changes permanently by clicking on the **WRITE** button. This change is password protected for security reasons. Please ask at *JETI* if you need it.

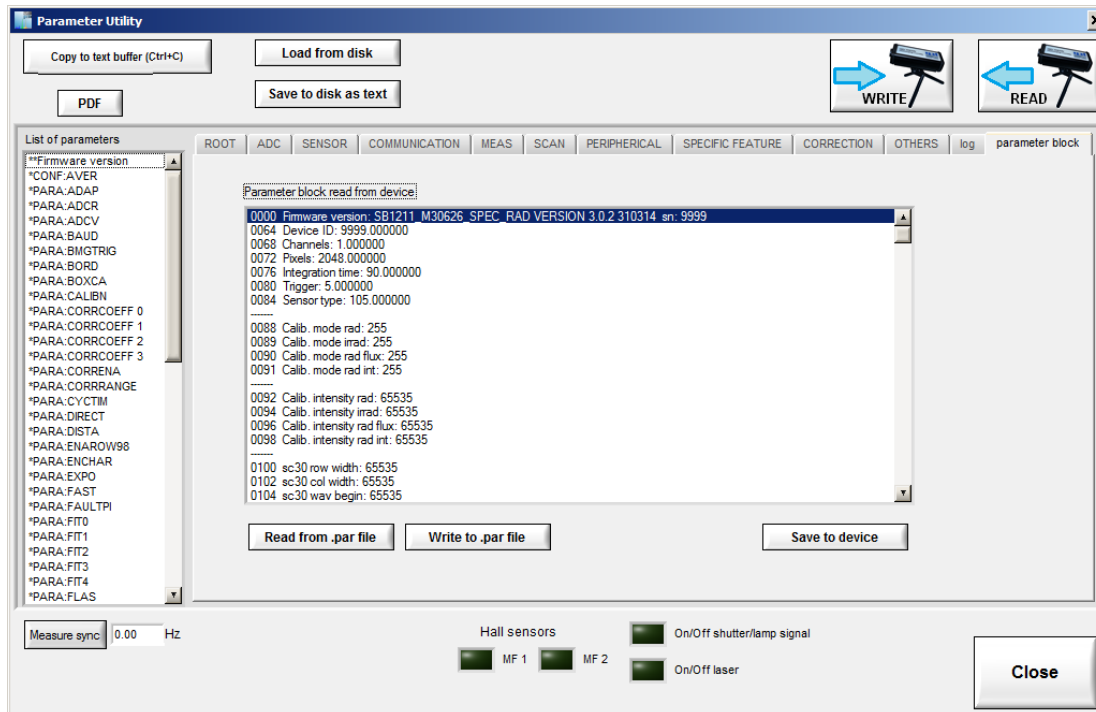
The **READ** button causes a transfer of parameters from the attached device to the PC. This is always done during start of *VersaSpec*, so the actual purpose of this button is restoring of parameter values after they were temporarily changed.

Additionally it is possible to load parameter sets with the **Load from disk** button and to store them as text or to copy them to the text buffer for further use.

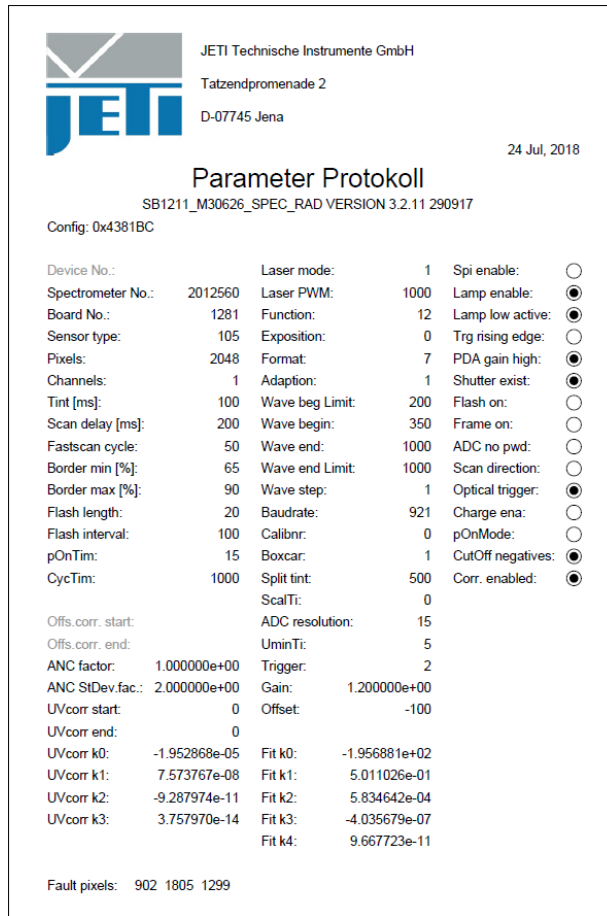
The buttons on the bottom of the window are valid only for the *JETI* spectroradiometers (operation of shutter, target laser, measurement of repetition rate of a source and check of Hall sensors).



The **Parameter block**-tab allows to store the parameters of all devices except those based on SDCx3 to '.par' files.



The  button lets to export most important parameters as a 1-page PDF document.



JETI Technische Instrumente GmbH
 Tatzendpromenade 2
 D-07745 Jena

24 Jul, 2018

Parameter Protokoll

SB1211_M30626_SPEC_RAD VERSION 3.2.11 290917

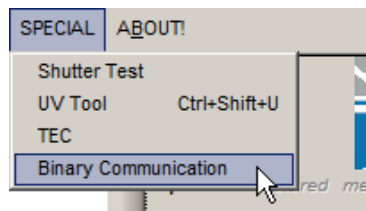
Config: 0x4381BC

Device No.:	Laser mode:	1	Spi enable:	☐
Spectrometer No.: 2012560	Laser PWM:	1000	Lamp enable:	☒
Board No.: 1281	Function:	12	Lamp low active:	☒
Sensor type: 105	Exposition:	0	Trg rising edge:	☐
Pixels: 2048	Format:	7	PDA gain high:	☐
Channels: 1	Adaption:	1	Shutter exist:	☒
Tint [ms]: 100	Wave beg Limit:	200	Flash on:	☐
Scan delay [ms]: 200	Wave begin:	350	Frame on:	☐
Fastscan cycle: 50	Wave end:	1000	ADC no pwd:	☐
Border min [%]: 65	Wave end Limit:	1000	Scan direction:	☐
Border max [%]: 90	Wave step:	1	Optical trigger:	☒
Flash length: 20	Baudrate:	921	Charge ena:	☐
Flash interval: 100	Calibnr:	0	pOnMode:	☐
pOnTim: 15	Boxcar:	1	CutOff negatives:	☒
CycTim: 1000	Split tint:	500	Corr. enabled:	☒
	ScalTi:	0		
Offs.corr. start:	ADC resolution:	15		
Offs.corr. end:	UminTi:	5		
ANC factor: 1.000000e+00	Trigger:	2		
ANC StDev.fac.: 2.000000e+00	Gain:	1.200000e+00		
UVcorr start: 0	Offset:	-100		
UVcorr end: 0				
UVcorr k0: -1.952868e-05	Fit k0:	-1.956881e+02		
UVcorr k1: 7.573767e-08	Fit k1:	5.011026e-01		
UVcorr k2: -9.287974e-11	Fit k2:	5.834642e-04		
UVcorr k3: 3.757970e-14	Fit k3:	-4.035679e-07		
	Fit k4:	9.667723e-11		

Fault pixels: 902 1805 1299

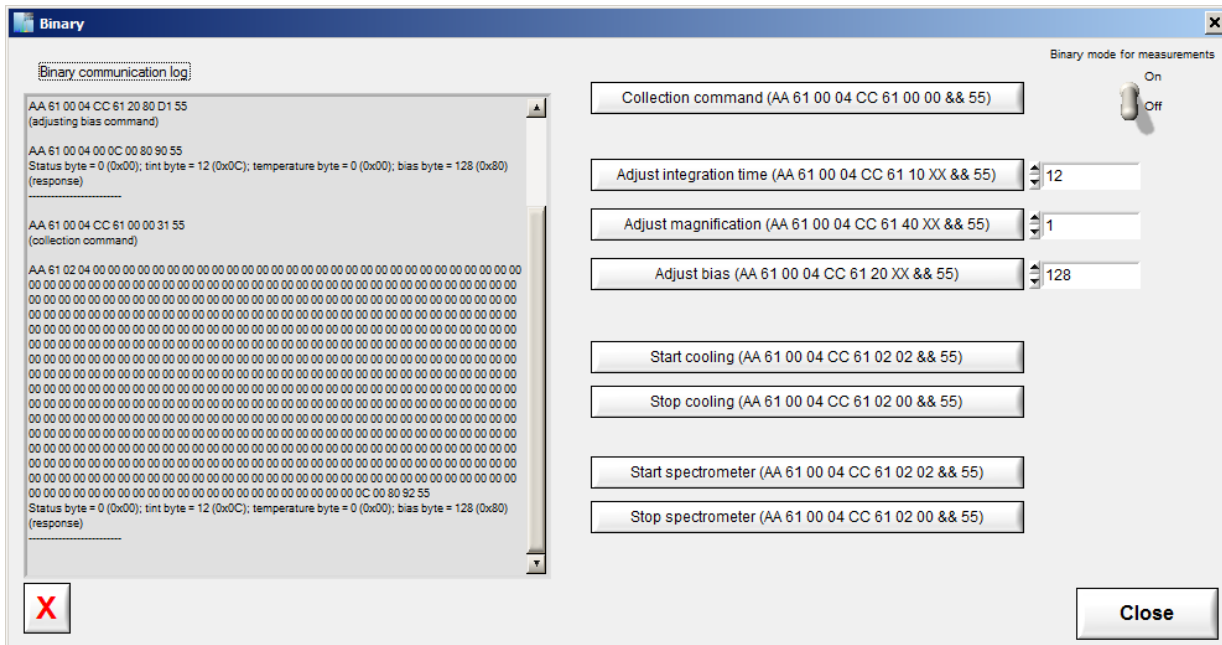
2.17 Binary Communication (Special)

Binary communication feature can be found under menu .



It allows to send 10-byte commands to the firmware, wait for 10-byte response and analyze it. If the switch 'Binary mode for measurements' in the upper right corner is turned on, the measurements fired from the main window of *VersaSpec* are also performed using binary commands: before every measurement an integration time is set,

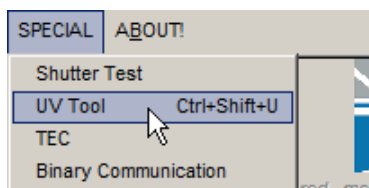
then 'collection' command is called to start the measurement. Temperature value is extracted from every response on the 'collection' command and is shown in the log as well as in *VersaSpec's* main panel



All binary commands and their responses (also fired from the *VersaSpec's* main panel) are logged. The text control with the log can be cleared with the -button.

2.18 UV Tool (Special)

The UV-Tool can be found under **SPECIAL**.



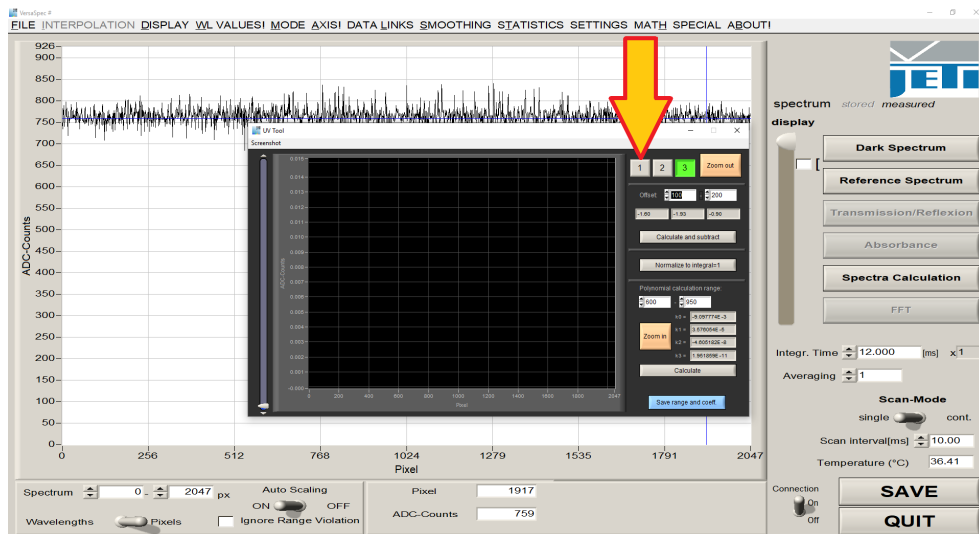
This tool is specially designed to check the level of stray light which is registered by spectrometers in the spectral range that corresponds to short wavelengths (approx. 450 nm and below).

The observation is that the level of the stray light is proportional to the integral signal measured by the spectrometer. That means that the effect we deal with is white light which is diffracted in a false way by the diffraction grating (i.e. *not* some ghost paths which can exist in a spectrometer for some certain spectral ranges).

UV-Tool contains 3 slots for storing of measured spectra. Its window floats over other windows, so it is possible to use the whole *VersaSpec* interface in the background. Every time a 'reference' measurement is done, its resulting spectrum is copied to the currently active slot of UV-Tool.

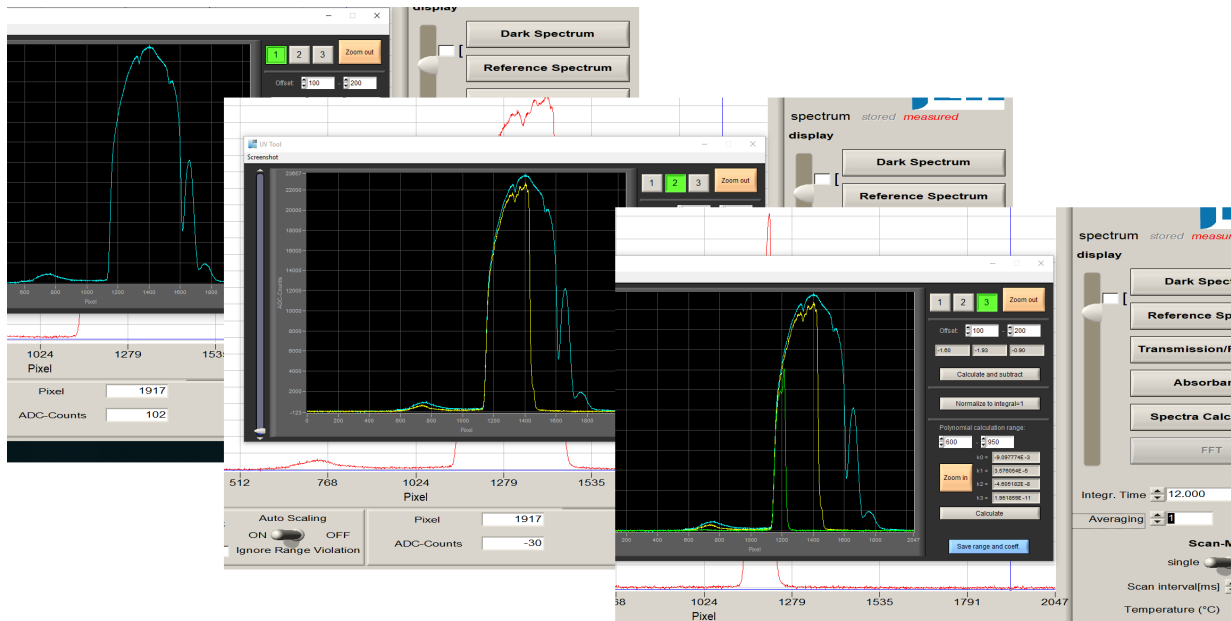
The idea of usage is following:

- Switch the x-axis in the main window of *VersaSpec* to 'Pixels'.
- Make a dark measurement.
- Open UV-Tool.

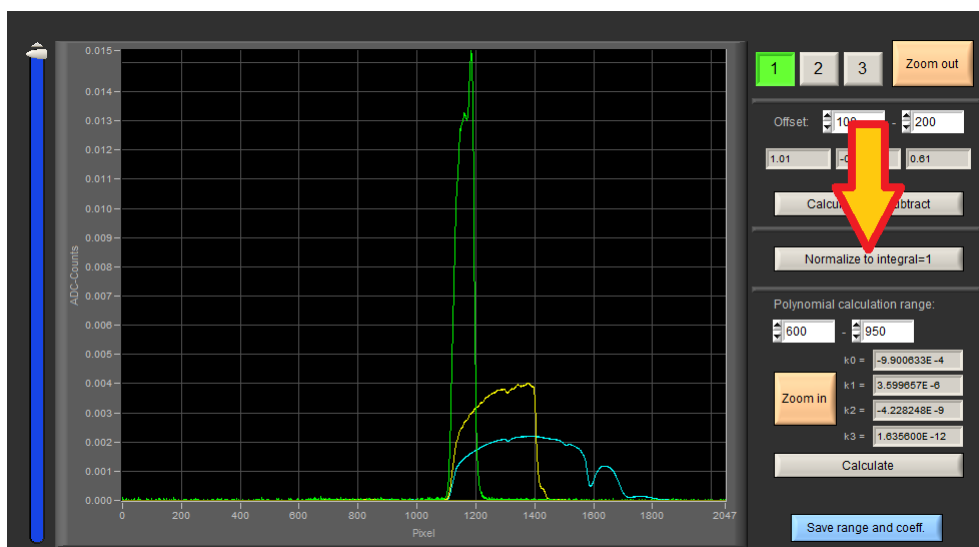


- Activate the 1st slot by clicking of the button 1.
- Make 3 measurements of some light source with 3 different combinations of optical filters. Switch before every next measurement to the next slot. For exam-

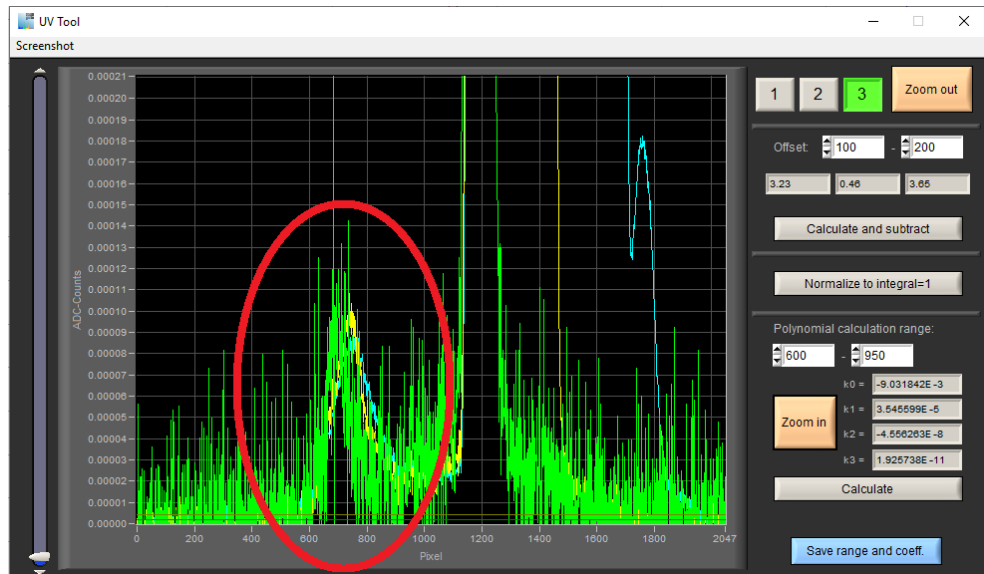
ple, the light source can be a halogen lamp, and filter combinations – LP560, LP560+SP800, LP560+SP800+SP625.



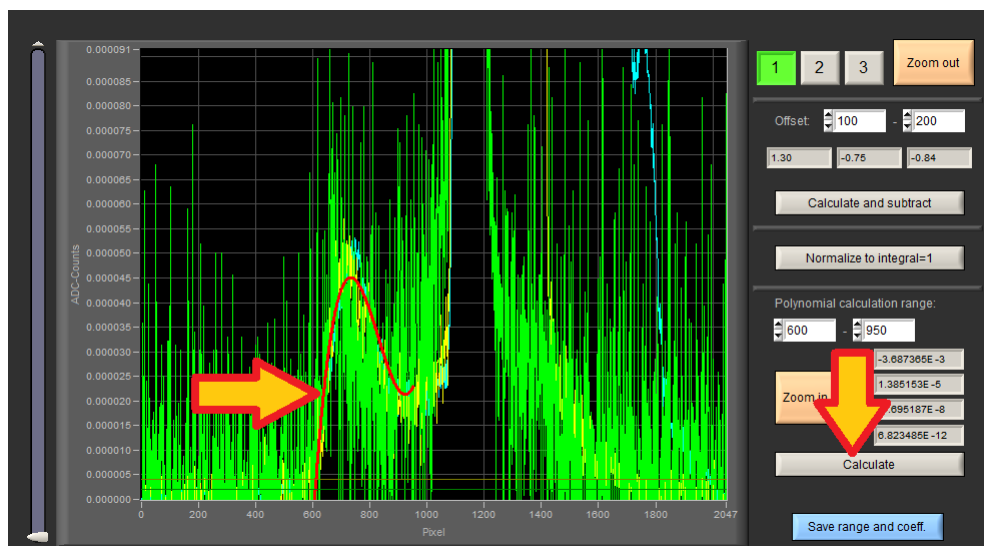
- Zoom the result with the slider on the left side of the UV-Tool to the limit. If the detector in the spectrometer has some 'dark area' – some pixels that are always in the dark – and it has the effect of some offset (the whole spectrum is shifted up or down, even noise around the zero in that dark area), use the button **Calculate and subtract** to compensate this offset. Two settable numeric fields are start and end pixels for offset calculation; it is calculated as the average spectral value over this range and then is subtracted from the *whole* spectrum.
- Normalize all spectra with their integrals by clicking on **Normalize to integral=1**.



- Zoom the result with the slider on the left side again and watch the picture of the stray light.



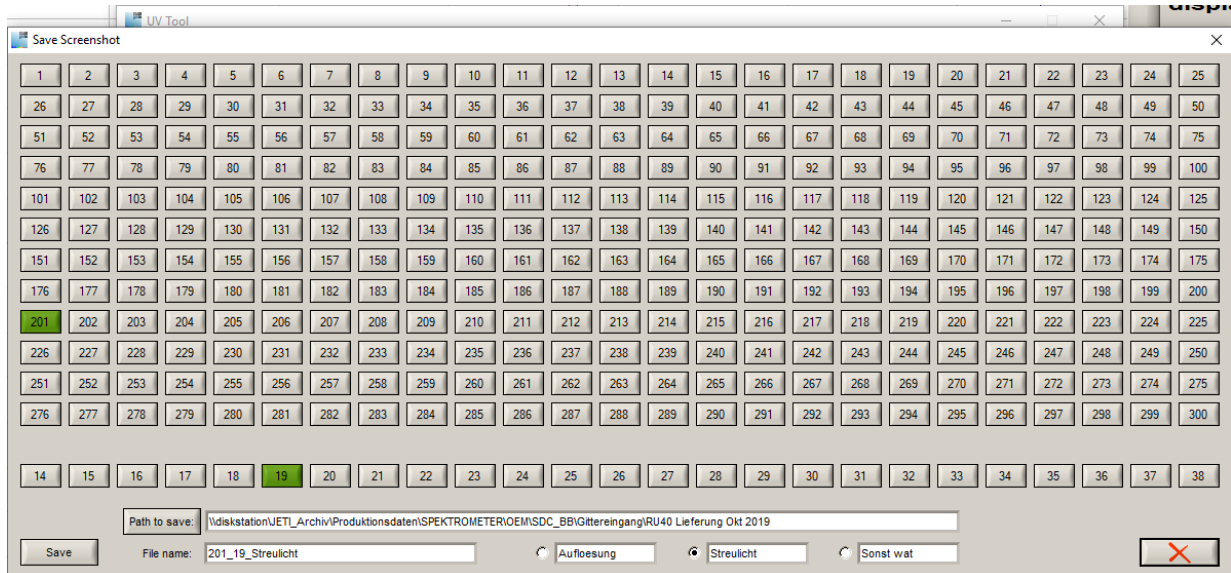
- Most devices of *JETI* support a correction for this stray light. It is approximated with a polynomial of the 3rd order and its coefficients together with the range where this polynomial is defined can be saved as parameters to device for subsequent usage. The area in the lower-right corner of the UV-Tool window is designed for automatic calculation of this correction. **Calculate** button makes calculations and visualize the result as a thick red curve on the diagram. The button **Save range and coeff.** lets to save obtained correction parameters to device.



- Measuring results can be saved with **Screenshot!** menu item. The feature is designed for internal usage by *JETI*: numbers from 1 to 300 are numbers of diffraction gratings in a given charge, numbers from 14 to 38 are 20xx years and 3 options to

the right from the 'File name:'-field are additional editable designations. If switching between numbers or between those additional designations, the file name is created as a combination of them.

For general usage, any arbitrary file name can be still input manually.



3 Error Messages

Error message	Reason	Removal
No device found! Switched to offline-mode.	Device not connected or USB driver not installed correctly.	Connect the device to the PC or check the installation of the device driver (see 'install.txt' on the setup-USB).
Could not read parameter.	The software cannot read the necessary parameters from the instrument.	Contact your supplier.
Could not read file!	It was not possible to read a selected reference file.	Check the readability of the file.
Could not write file!	It was not possible to write a measured file as reference.	Start again.
Error on USB-Transfer	It was not possible to read or write data via USB.	Check the USB-connection and restart the software.

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5 Service

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May 7, 2020