

StellarNet Single-Channel SpectraWiz for LabVIEW

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Overview

The StellarNet SpectraWiz for LabVIEW spectrometry application provides an easy-to-use graphical user interface for any of up to eight StellarNet USB spectrometers plus logging of process data on local or network storage.

It is designed to work independently of the SpectraWiz software utility. Spectrometer calibration parameters are managed by this application, either automatically in the case of BLUE-Wave and other advanced units with non-volatile onboard parameter storage, or manually when the spectrometers are first connected.

The software utilizes a easy-to-use and space-efficient tabbed-panel design. Data logging and snapshots are supported, and time series may be logged to show changes of three wavelengths of any channel.

The software was entirely coded in LabVIEW 8.2 and interacts with the spectrometers via swdll.dll. In the graphical user interface, spectrometers (channels) are numbered 1-8, consistent with SpectraWiz usage.

Setting up

Note: If you upgrade this application from a previous version or make a significant change to your system such as adding or removing spectrometers, in addition to reconfiguring your system using SpectraWiz, **delete all the .xml files** from c:\Program Files\StellarNet\SpectraWiz. If, when you attempt to run this application, you receive “XML tag describing the type of data does not match” errors, this is an indication that the XML files are of obsolete format and need to be re-created. Delete them and on next run the application will create new ones.

After configuring your spectrometers with SpectraWiz, including creating a calibration file for each spectrometer and setting parameters such as averaging as appropriate for your application, exit SpectraWiz and load the application.

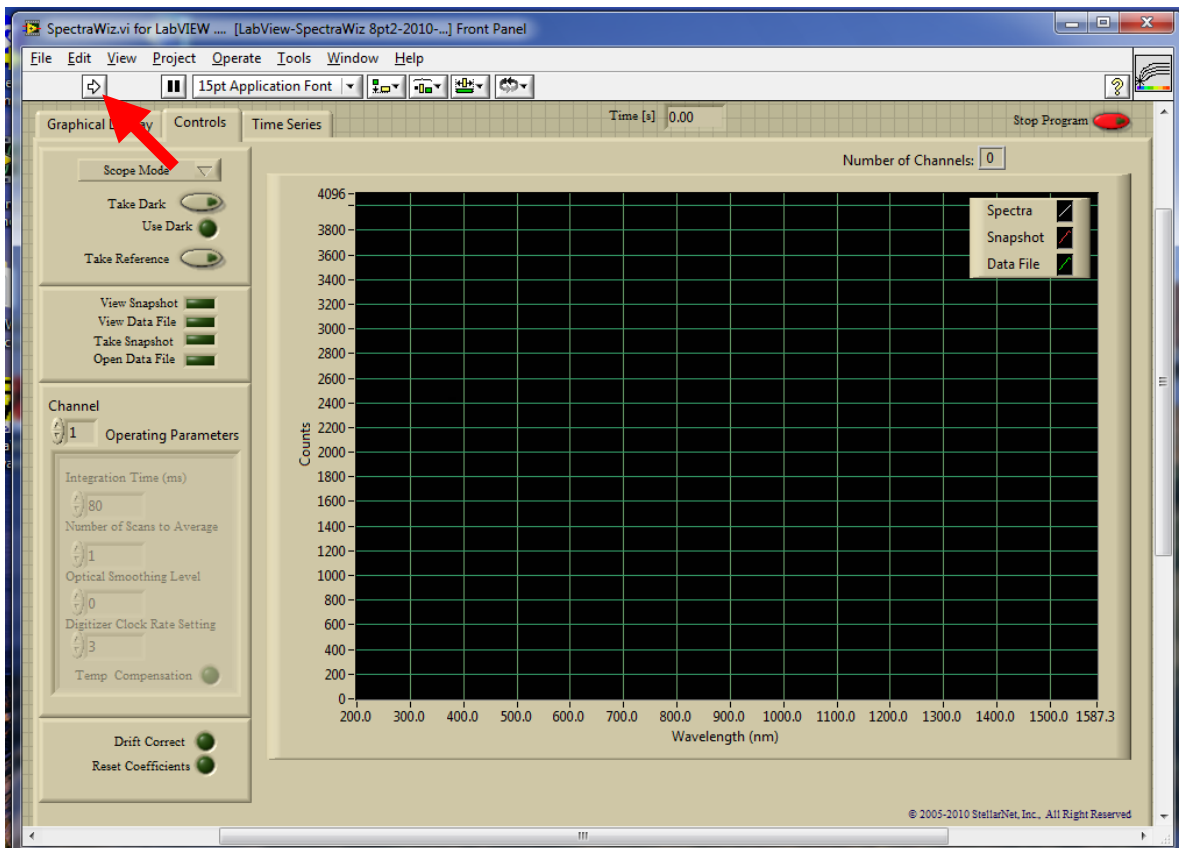


Figure 1. Run the application by single-clicking the LabVIEW “go arrow” until it highlights (indicated). At this time, the most-recent parameters are loaded from disk if available. If necessary, the user will be presented with the opportunity to enter calibration parameters.

Operation

The Controls tab pane

This pane is presented as soon as the program starts. After initialization (Figure 1) is complete—a very quick process—the user is free to edit various parameters or begin scanning (Figure 2).

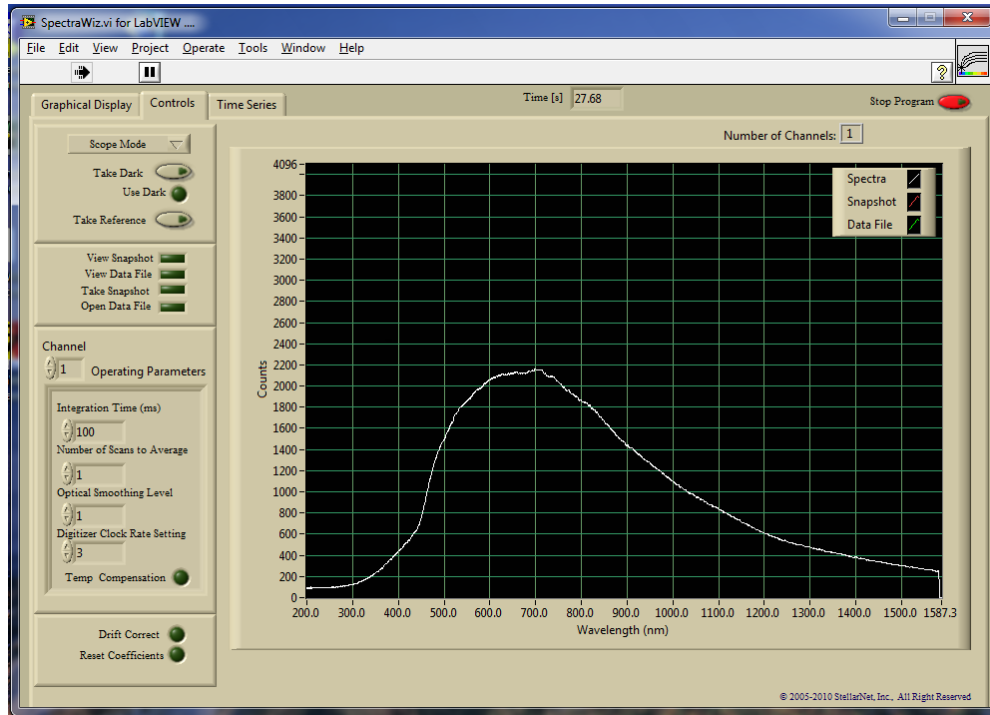


Figure 2. The Controls pane after initialization is complete. Operating parameters such as integration time may now be adjusted by the user. On any change of operating parameter, the most-recently-used parameters are automatically written to disk (crash-proof).

Controls and indicators in the Controls pane include the following. User settable parameters should be changed only when the application is running, else they will be overwritten on start-up by the most-recently-used parameters that were stored to disk.

Name	Type	Comments
Mode	Pull-down list	Allows choice of Scope, Absorbance, Transmission and Radiometer functionality.
Take Dark	Pushbutton	Stores a snapshot of each spectrometer's current data in memory for subsequent dark-signal subtraction. Note: not non-volatile. When pressed, automatically turns the <i>Use Dark</i> button on.
Use Dark	Pushbutton	When active (green), subtracts the previously-memorized Dark spectrum from the current spectrum, and the difference is graphed.
Take Reference	Pushbutton	Stores a snapshot of each spectrometer's current data in memory for subsequent spectroscopic calculations. Note: not non-volatile.
View Snapshot,	Pushbuttons	Store/retrieve multi-channel spectral information to disk.

View Data File, Take Snapshot, Open Data File		
Operating Parameters	Numeric	By first selecting a channel and then adjusting each parameter, the operation of each spectrometer can be customized to your application. Parameters are automatically stored to disk when changed for crash-proofness. Note: application must be running.
Drift Correct	Pushbutton	
Reset Coefficients	Pushbutton	Resets X axis to full-scale (for example, after zooming)
Time [s]	Numeric indicator	Seconds since application was started
Stop Program	Pushbutton	Gracefully stops execution of the application.

The Graphical Display tab pane

This pane shows the data from each selected spectrometer (that is, each spectrometer which is check-marked in the legend at the upper right) plus three cursors. The cursors may be moved by click-dragging with your mouse to select a wavelength to monitor. Choose the spectrometer with the Channel To Monitor control above the graph. The wavelengths are shown in the middle column of the cursor legend at the upper right; the intensity at those wavelengths is displayed in the rightmost column. These values are used by the Time Series tab pane.

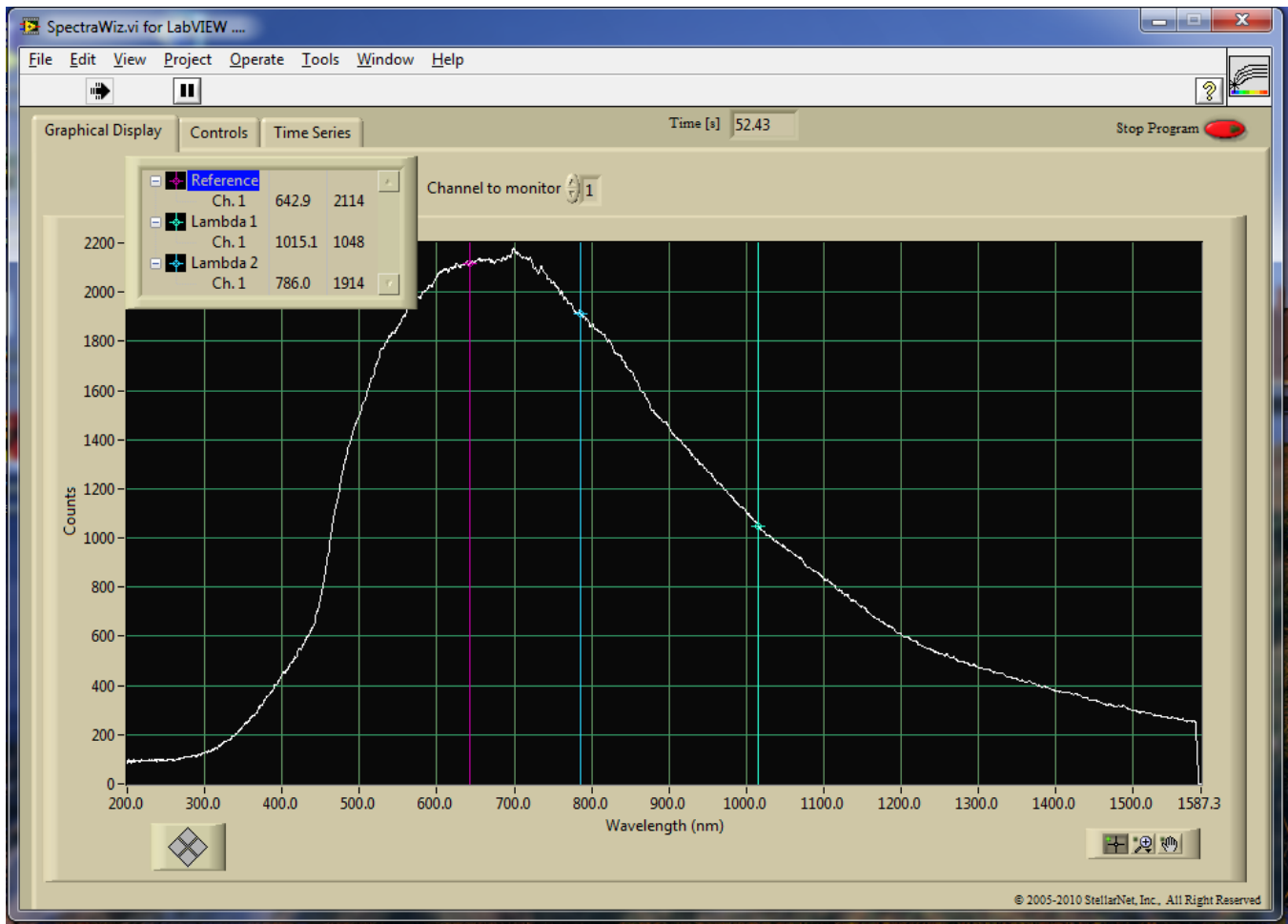


Figure 3. The Graphical Display tab pane allows you to select three wavelengths for a given channel to monitor. You may hide or display each channel; the wavelength and the intensity at each cursor-selected wavelength is displayed in the legend. This information is also used in the Time Series tab pane.

The Time Series tab pane

After selecting the wavelengths to monitor on the Graphical Display tab pane, you may switch to the Time Series tab pane to view a rolling graph showing the behavior of the selected channel at those wavelengths over a period of time. For convenience, a real-time view of the full spectrometer data is presented in an inset graph at the upper left. You may clear the history of the rolling graph at any time by clicking the Clear History button at the upper left.

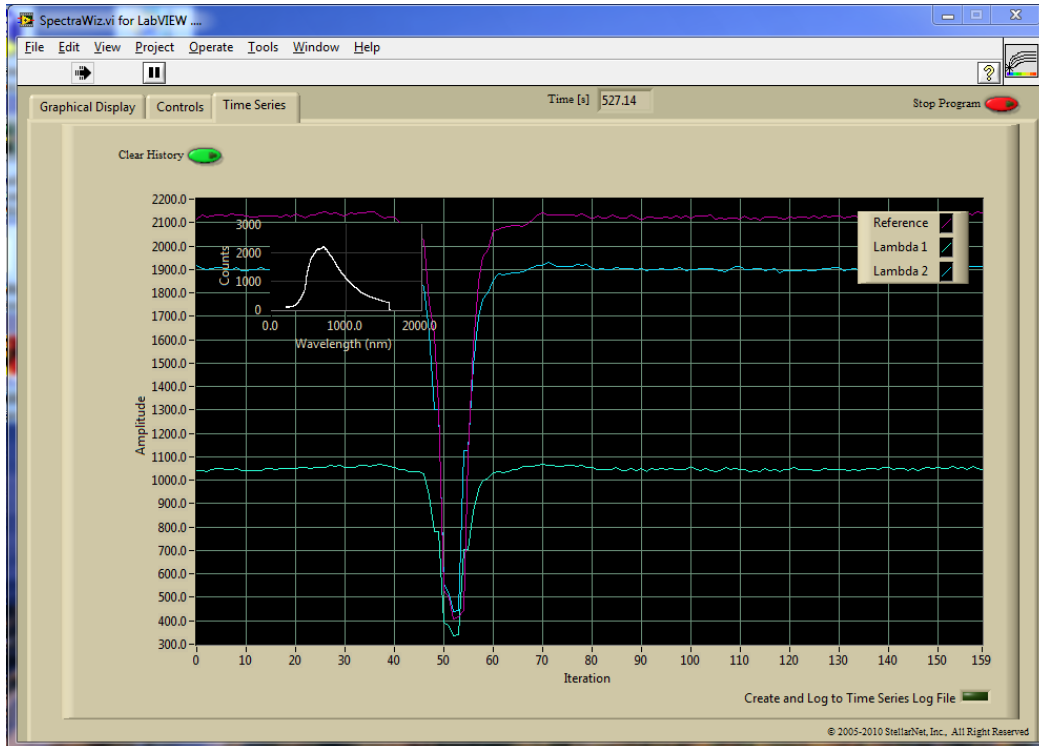


Figure 4. The Time Series tab pane shows a rolling graph of the intensities at the wavelengths you previously selected in the Graphical Display tab.

Parameter Files

Parameters for this application are stored in .xml files in the SpectraWiz directory. They may be viewed using any text editor. If, on entry, any parameter file is not found, it is automatically created using defaults.

The files created by this application in the SpectraWiz directory and used to store its parameters are shown in Figure 5.

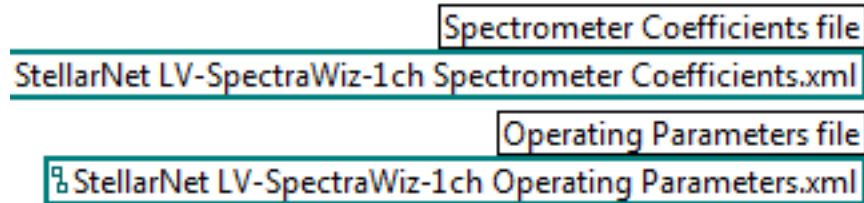


Figure 5. The application creates and uses these files (in the SpectraWiz directory) to keep track of user settings and other parameters. The application also utilizes the settings from SpectraWiz.

Note: This application has been tested for compatibility with Windows XP and Windows Vista/7. The User Access Control security feature of Windows Vista & 7 ordinarily prevents programmatic writes to any system folder, which includes subfolders of c:\program files. Accordingly, for operation in Windows Vista & 7, both SpectraWiz and LabVIEW will need to be granted permission to write to c:/program files/StellarNet/SpectraWiz. Refer to the SpectraWiz documentation for the procedure; repeat for the LabVIEW executable.