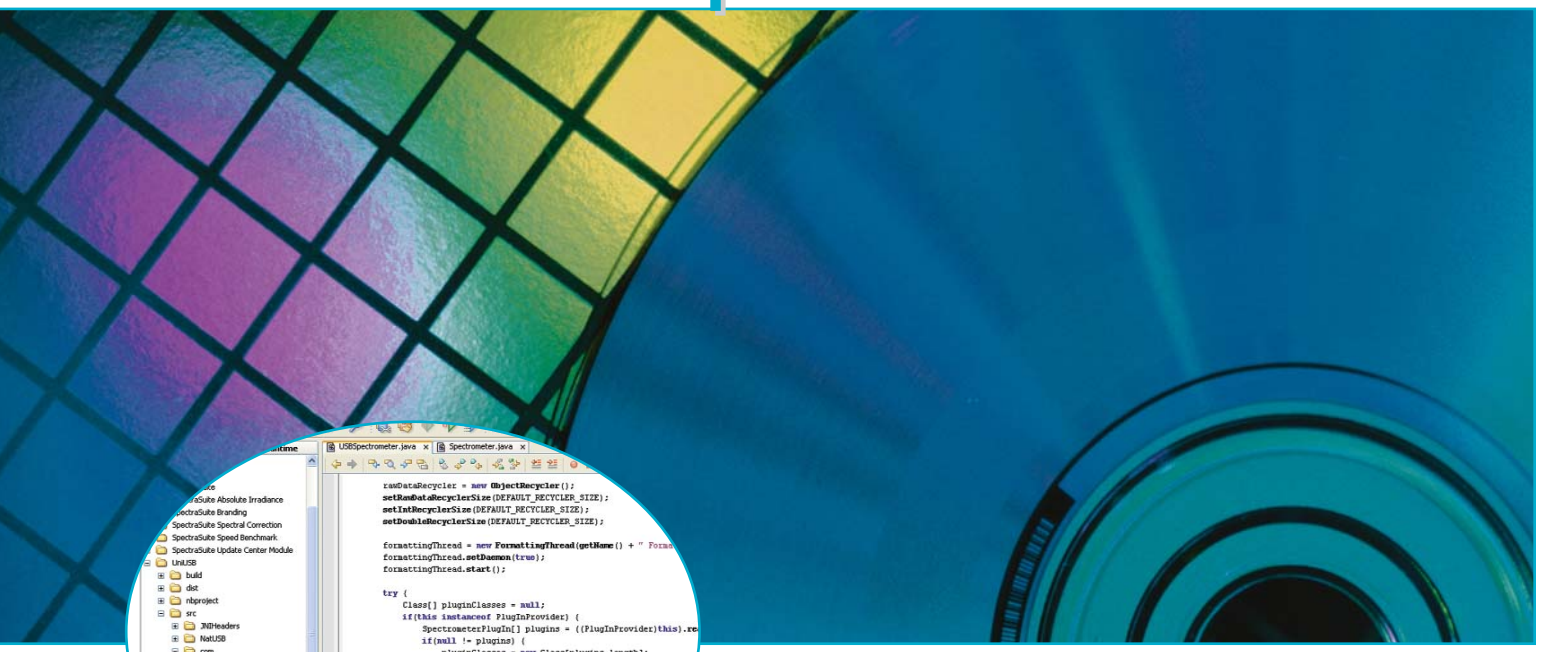
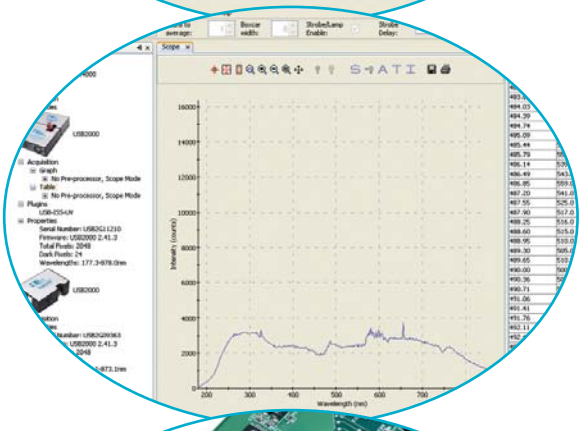
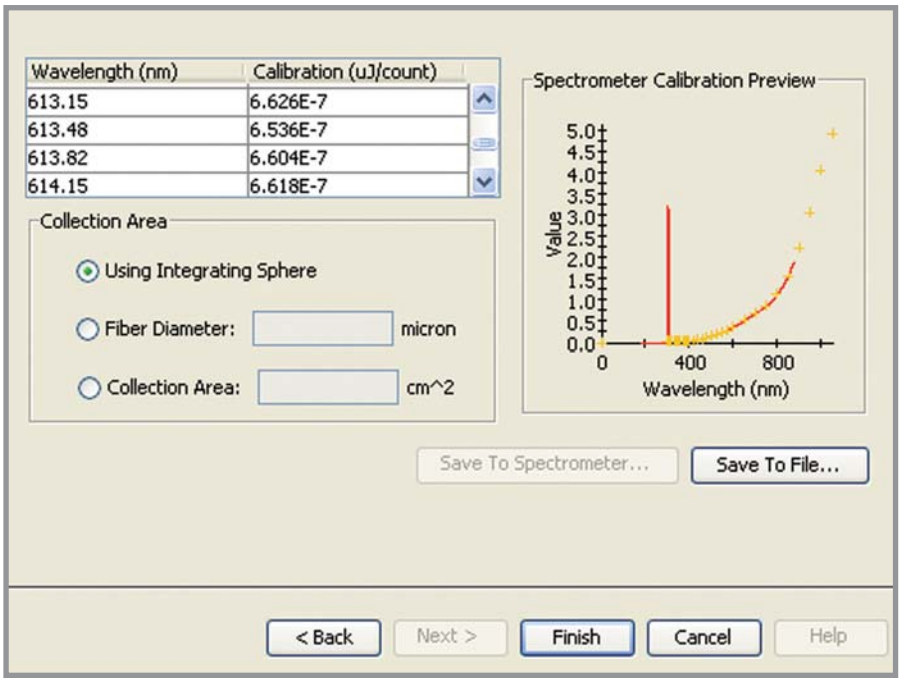
Software & Data Acquisition





Overview: Software & Data Acquisition

Real-time Interface to the PC of Your Choice

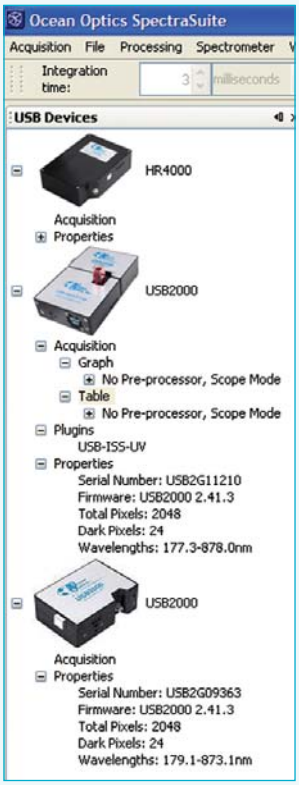


Ocean Optics data acquisition options allow you to interface your spectrometer to any desktop or notebook PC, whether it operates in Mac, Linux or Windows operating systems. Our plug-and-play spectrometers connect directly to the USB port of any desktop or notebook PC. We also offer external analog-to-digital converters, including USB and PCI-bus cards.

Real-time data acquisition for almost any type of application is made possible by our new operating, application and software development packages. We also offer custom software-development services.

The Joys of Java

SpectraSuite and OmniDriver: Multi-platform Marvels



You spoke, we listened. After nearly 15 years and thousands of spectroscopy applications, we've taken the best of your suggestions -- and added a few clever wrinkles of our own -- to create the industry's first modular, operating system-independent spectroscopy software platform and driver. SpectraSuite, a Java-based spectroscopy software that operates on Windows, Macintosh and Linux operating systems, offers a host of robust features for remarkable power and flexibility.

Like SpectraSuite, OmniDriver is cross-platform, Java-based software. It combines the best of our earlier device driver packages -- high-speed data acquisition, customization of acquisition and processing parameters, and so on -- with additional features to make it the only spectroscopy driver you'll ever need.

There's much more on SpectraSuite and OmniDriver in the next few pages -- so prepare to be dazzled.

More About Java

One of the most important decisions in developing SpectraSuite and OmniDriver was the selection of Java as the programming language. Java is an object-oriented programming language, developed in the mid-'90s by Sun Microsystems, Inc., that was designed as a robust, platform-independent programming environment that manages memory on its own. (When it comes to distributed applications, nothing beats Java. For additional information, visit java.sun.com.) We've taken Java a step further by making it platform- and spectrometer-independent -- i.e., the same code works for all of our USB-based spectrometers.

Overview: Software & Data Acquisition

It's long been a goal of ours to create one hardware device driver program that would control all of our hardware as well as other manufacturers' devices, from any type of computer operating system environment and from which all software applications would run. The answer was to use Java as the programming language. Java was designed to be platform-neutral, making it the perfect programming language for our customers around the globe. Aside from the additional power and flexibility our software packages provide, SpectraSuite and OmniDriver will affect customers in two significant ways. First, there is a $199 charge for SpectraSuite, a price that's comparable to what our competitors offer. Second, all existing Ocean Optics software will no longer be upgraded -- supported, yes; upgraded, no. Here's some additional important information about the transition to SpectraSuite and OmniDriver:

Q Did SpectraSuite replace OOIBase32? Is there a charge for SpectraSuite?

A Yes, SpectraSuite replaced OOIBase32, and yes, there is a charge for SpectraSuite -- $199. OOIBase32 is no longer being upgraded and does not work with spectrometers developed after August 2005. If you purchase a spectrometer today, you should include SpectraSuite in your order.

Q Can I upgrade from OOIBase32 to SpectraSuite?

A Absolutely. Upgrade to SpectraSuite for $199. Be sure to check with an Application Sales Engineer to make sure your spectrometer will work with SpectraSuite.

Q Which Ocean Optics software did SpectraSuite and OmniDriver replace?

A OOIBase32 Spectrometer Operating Software, OOIBase32 Platinum Script-writing Software, OOIChem Software for Education and OOIIrrad Irradiance Software; plus the OOIWinIP Windows Interface Package, OOILVD LabVIEW Software Device Driver Package, OOIHSD High-speed Driver Library and OOISPM Spectral Processing Module. Windows CE tools such as OOIPS2000-S Operating Software and OOIHIP Handheld Interface Package have become obsolete.

Q What about existing applications software?

A SpectraSuite is the platform for all future Ocean Optics application software development. At press time, OOISensors and OOILIBS Software are scheduled to migrate to the SpectraSuite platform later in 2007.

Q Will Ocean Optics continue to support earlier versions of its software?

A Yes, we will continue to technically support old versions of all of our software products and, if necessary, post software fixes on our website. In fact, we still occasionally get support questions about SpectraScope -- our original spectrometer operating software, which is older than dirt in software years. What we won't do is upgrade any older software with new features, nor will we upgrade older software to work with Ocean Optics hardware developed after August 2005.

UV-VIS Spectral Database

Ocean Optics has teamed with science-softCon to present the 4th edition of the science-softCon UV-Vis Spectral Database. This is one of the most extensive UV-Vis databases now available, with nearly 3,000 entries (in ASCII format) for some 400 substances. The database includes the following substance groups:

- Alkali Compounds
- Aromatic Compounds
- Dyes
- Halogenated Alkanes, Alkenes
- Halogenated Carbonyl Compounds
- Halogenated Nitrogen Compounds
- Halogens/Halogenoxides
- Hydrocarbons
- Hydrogenhalides/Hypohalides
- Nitrogen Acids
- Nitrogen/Nitrogen Oxides
- Organic Acids/Esters
- Organic Carbonyl Compounds
- Organic Nitrogen Compounds
- Other Oxygenated Organics
- Oxygen Hydrogen Compounds
- Pesticides
- Sulfur Compounds

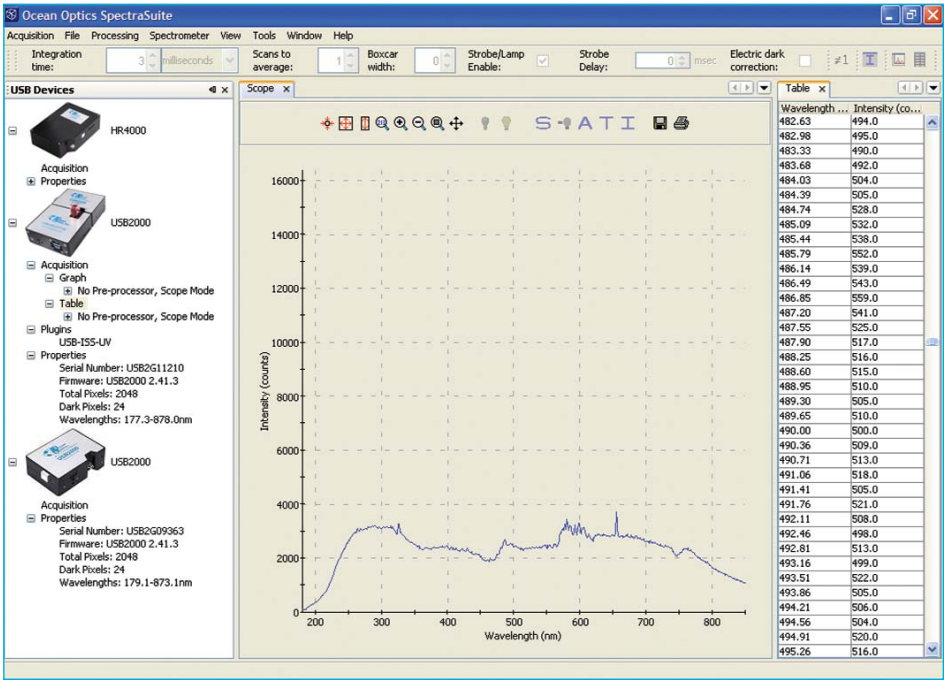
This price of the database includes a CD with science-softCon's UV/Vis Spectral Database and a one year unlimited online free subscription to the most up-to-date and comprehensive spectral data available.

CD-SPECTRA: $195

SpectraSuite Spectroscopy Software

The New Revolution

In 1992, we revolutionized the optical sensing industry when we introduced the first-ever modular, miniature spectrometer. Now, with more than 85,000 spectrometers sold and the experience of thousands of applications, we're kick-starting the market again with SpectraSuite, the first modular, OS-independent spectroscopy software platform.



SpectraSuite is a platform-independent application that provides graphical and numeric representation of spectra in one window.

Spectroscopy on any Operating System

SpectraSuite is a completely modular, Java-based spectroscopy software platform that operates on Windows, Macintosh and Linux operating systems. The software can control any Ocean Optics USB spectrometer and device, as well as any other manufacturer's USB instrumentation (using the appropriate drivers). The SpectraSuite interface looks and feels the same on all operating systems yet retains the familiar appearance of an application native to each OS. Ocean Optics is the first to offer such a flexible, feature-packed application with this level of cross-platform capability.

Our Platform for the Future

SpectraSuite is the platform for all future Ocean Optics application software development. Software applications including OOIChem, OOIColor and OOIIrrad-C have been migrated to the SpectraSuite platform, with applications such as OOISensors and OOILIBS coming in the near future.

Ultimate USB Spectrometer & Device Control

SpectraSuite easily manages multiple USB spectrometers -- each with different acquisition parameters -- in multiple windows or on the same graph in a single window -- and provides graphical and numeric representation of spectra from each spectrometer. Using SpectraSuite, you can combine data from multiple sources for applications that include upwelling/downwelling measurements, dual-beam referencing and process monitoring.

Modular Framework Lets SpectraSuite Work The Way You Work

The SpectraSuite framework is modular, so that every function in it can be altered or replaced. For instance, the data acquisition functions, the scheduling functions, the data processing functions and the rendering functions are all separate modules. You can add or delete modules to create a proprietary user interface or functionality, create modules to perform calculations, automate experiment routines and more. You or your Ocean Optics application developer can easily customize SpectraSuite through Java code.

SpectraSuite

Can be used with these Ocean Optics products when interfacing to a computer via USB port:

Spectrometers

HR2000
HR2000+
HR4000
MMS-Raman
NIR256-2.1
NIR256-2.5
NIR512
QE65000
USB2000
USB2000+
USB2000-FLG
USB4000

Other Devices

ADC1000-USB A/D Converter
SHA-1 Spectral Hyper Adapter

SpectraSuite Spectroscopy Software

Original Equipment Manufacturers

OEMs in particular will find SpectraSuite's modularity most beneficial, as all visual aspects of the program's user interface can be altered to create a fully branded application.

Advanced Data Capture Control

SpectraSuite provides the user with advanced control of episodic data capture attributes. For instance, a user can acquire data for a fixed number of spectra or for a specific interval. Initiation of each spectrum can be externally triggered or event-driven. Captured data is quickly stored into system memory at speeds as fast as one spectrum per millisecond, with speeds limited by hardware performance.

SpectraSuite in the Future

SpectraSuite is constantly evolving. Be sure to check for updates via SpectraSuite's Update Center. With the purchase of SpectraSuite, you are entitled to one year of free, web-based automatic upgrades. Future enhancements include:

- SpectraSuite will soon be 21 CFR Part 11 compliant with an encoded binary file. This binary data format will track the complete history of all processing steps that are performed on your data.
- SpectraSuite will allow users "process do-overs." A user will be able to change the values of various parameters in a process and apply those changes to data without having to recreate an entire process.
- SpectraSuite will store and provide data in new formats, such as JCAMP.
- SpectraSuite will offer a database module where arbitrary data can be stored in any user-selectable format.
- SpectraSuite will be fully "internationalized." All of the software's menus, dialog boxes, prompts, messages and files will be able to reflect a native language by simply changing a single file.

SpectraSuite Pricing

Item	Description	Price
SPECTRASUITE	One copy of SpectraSuite	$199
SPECTRASUITE-U	Annual upgrade subscription fee	$99
SPECTRASUITE-20	Site license for SpectraSuite allows up to 20 copies	$1,499
SPECTRASUITE-E	Site license for SpectraSuite allows up to 40 copies for educational institutions only	$2,499
SPECTRASUITE-S	Site license for SpectraSuite allows unlimited copies	$4,999

All-In-One SpectraSuite

Check out our long list of new SpectraSuite features. Note that most of the features from our other Application Software Packages, such as OOIIrrad Software for Color & Irradiance and OOIChem Software for the Teaching Lab, have migrated to SpectraSuite.

General Features

- Allows users to annotate graphs and to specify format and precision of displayed values
- Displays a color spectrum behind graphs
- Corrects for non-unity for reflection measurements
- Performs reference monitoring
- Displays x-axis in GHz, microns, pixel number, Raman shifts, wavenumbers or nanometers
- Provides an Experiment Wizard that guides users on configuring common experiments
- Acquires data from one spectrometer using different parameters to run multiple experiments
- Stores data in other formats such as tab-delimited ASCII (for Excel or other analysis packages) and GRAMS SPC

Features for Reflective & Emissive Color & Absolute Irradiance

- Provides dominant wavelength and wavelength purity
- Provides radiometric and color analysis
- Analyzes peak wavelength, full width at half max, centroid and central wavelength
- Measures absolute spectral intensity of light and other emission sources
- Calculates integrated intensity between user-specified wavelengths
- Obtains photopic or scotopic data calculated in lumen, lux and candela based on CIE standards
- Provides microjoules, microwatts, number of photons and much more
- Calculates reflective or emissive color
- Provides chromaticity diagram of color-space values
- Offers CIE standard illuminants for reflective color (A, B, C, D50, D55, D65, D75, E, F1-F12, etc.)
- Calculates L*a*b*, XYZ, xyz, u'v'w', hue, chroma, CCT (correlated color temperature), saturation, and more

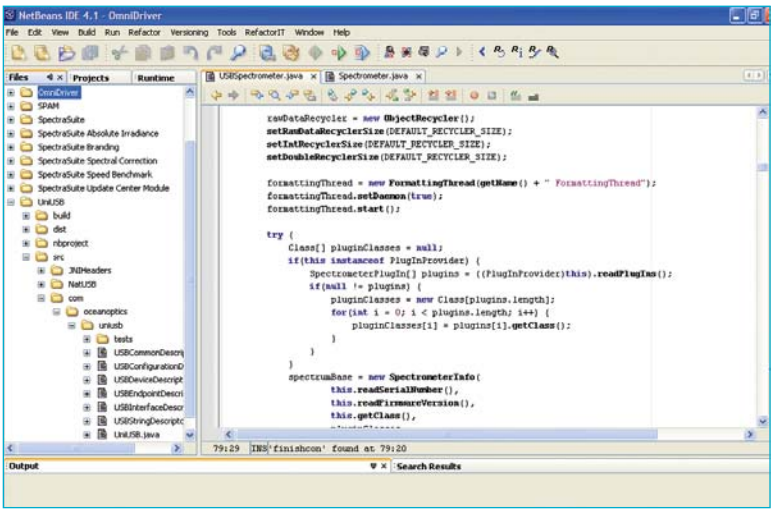
Features for Chemistry Teaching Labs

- Provides an easy-to-follow format ideal for undergraduate-level students and beginning spectroscopists
- Contains five modes of operation: Scope, Absorbance, Transmission, Relative Irradiance and Concentration
- Includes a Beer's Law spreadsheet for performing calibrations from standard solutions
- Adds into the spectral window previously saved overlay spectra
- Performs kinetics experiments
- Saves data as ASCII files and stores and retrieves sample spectra

OmniDriver Development Platform

More Than a Device Driver

OmniDriver is the culmination of our best software driver packages. It allows you to harness the power of high-speed data acquisition, spectral processing, data analysis, visual data representation and data flow in a single cross-platform driver. Integrate OmniDriver into your own software application for complete control over USB spectrometers and devices in virtually any environment.



Developed in Java

It's long been a goal of ours to create one hardware device driver program that would control all of our hardware as well as other manufacturers' devices, from any type of computer operating system environment and from which all software applications would run. The answer was to use Java as the programming language. Java was designed to be platform-neutral, making it the perfect programming language for our customers around the globe. OmniDriver was created in the Java environment and includes native libraries for select Windows, Macintosh and Linux operating systems. Using OmniDriver, you can develop robust applications to control multiple Ocean Optics USB spectrometers and direct-attach devices across these different operating systems. Ocean Optics is the first and only provider in the optical sensing industry to offer this level of cross-platform compatibility.

Complete Platform & Device Independence

Applications written in Java are environment-independent; they can work across all operating systems. This is an advantageous feature for product developers and OEMs wanting to expand their product offering with systems that work on multiple operating platforms. In developing OmniDriver, we took the Java philosophy a step further to create a device driver that is not only platform-independent, but also spectrometer-independent; the same Java code works with all Ocean Optics USB spectrometers and direct-attach devices. Plus, OmniDriver can control any manufacturer's USB spectrometer and supports any USB device.

"I don't know how to program in Java"

Chances are you know how to program in C, C++, Pascal, Visual Basic, Delphi, C++ Builder or one of many Microsoft Office Applications. You don't need to know Java to use OmniDriver. Our wrapper libraries take care of the Java code; we provide Framework (Mac), Dynamic Link Library (Windows), Shared Object (Linux), .NET object (Windows) and LabVIEW 7.0.

OmniDriver

Can be used with these Operating Systems

Windows	**Windows 2000 or later**
Macintosh	**OSX 10.2 or later**
Linux*	**RedHat 9 or later**
	Fedora Core, any version
	Debian 3.1 (Sarge)
	Suse, 9.0 or later

** OmniDriver will work with any Linux OS with a kernel 2.4.27 or later and libstdc ++ version 5.*

OmniDriver Components

OmniDriver is a fully functional cross-platform USB device driver library. It allows software to communicate with any USB device on any Windows, Macintosh or Linux operating system. What does it take to make such a robust driver? OmniDriver offers these components:

- **HighResTiming:** Time stamping that is accurate to sub-microsecond performance; great for chemical kinetics and other applications that require complex time accountability.
- **SPAM:** You'll want this SPAM. Spectral Processing and Manipulation performs all spectral processing math from subtracting dark to radiometric color analysis. SPAM provides you with the ability to harness spectral processing commands for your own applications but does not require you to use Ocean Optics spectrometers or hardware. SPAM is available as a stand-alone module or as part of the OmniDriver package (OMNI+SPAM).

OMNIDRIVER:	$399
SPAM:	$199
OMNI+SPAM:	$499

SpecLine Software for Compound ID

Identifies Elements & Compounds

SpecLine Software is a powerful new tool designed for identifying atomic emission lines and molecular bands in spectral data. SpecLine's advanced evaluation, search, compare and identify functions -- and its extensive library of over 100 elements and over 400 compounds -- enable you to quickly identify unknown lines, peaks and bands. SpecLine was designed for scientists, engineers and researchers using emission spectroscopy in fields such as astrophysics, the plasma sciences, and plasma processing.

Searching and Comparing Data

In the Line Identification window, you can define all the parameters for your search in a Periodic Table screen (top right), and begin the process with just a single click. SpecLine can analyze even the most complex spectral data, including spectra with double lines, line shoulders and complex band structures. Up to 12 separate spectra, even if they are in different file formats, can be combined for comparative purposes.

Identification

SpecLine applies a variety of sophisticated filter functions such as Wiener-Fourier and polynomial noise removal to identify the elements and compounds in your spectra. After SpecLine applies comparative searches to its extensive atomic, ionic and molecular database of over 100 elements in several ionization states and over 400 elemental compounds, it provides detailed data on each identified peak and line, such as the name of the element, the peak's wavelength, the electron voltage and its transition state and quantum number.

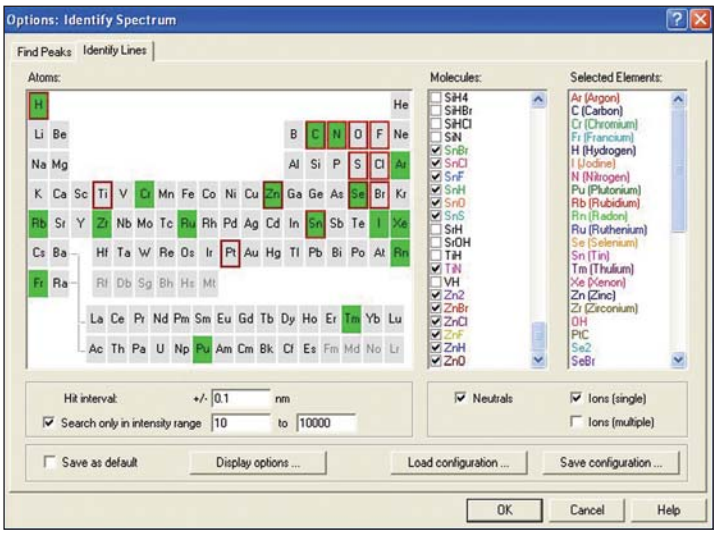
Opening Spectra & Saving Data

SpecLine can analyze spectral data from various spectroscopy software applications; it also can open all Ocean Optics software file formats as well as SPC and ASCII file formats. In addition, you can save all of SpecLine's identification data in its native file format or export it into various applications, such as Excel.

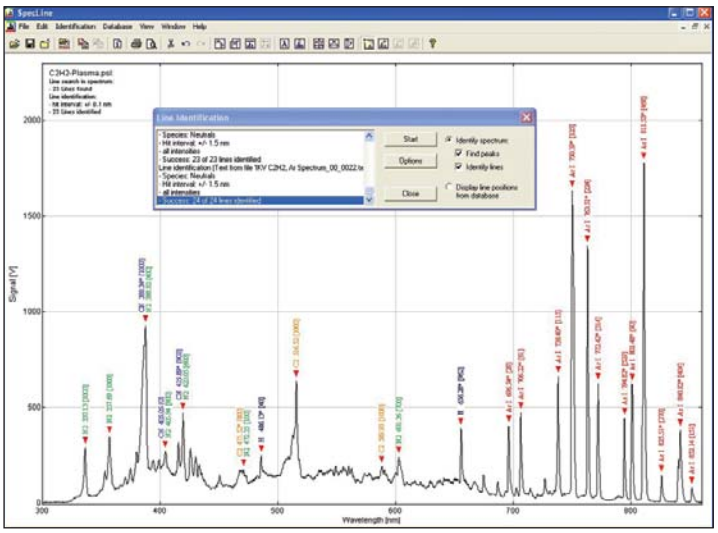
Hardware Keys

SpecLine Software comes with a USB or parallel-port (printer port) hardware key. The key is a security device to protect against unlicensed copies. It connects to an input/output port on your computer and must be used to run the software. SpecLine-U comes with a USB hardware key for use with Windows 98/2000/ME/XP operating systems (but not Windows 95 or NT). SpecLine-P comes with a feed-through parallel port hardware key.

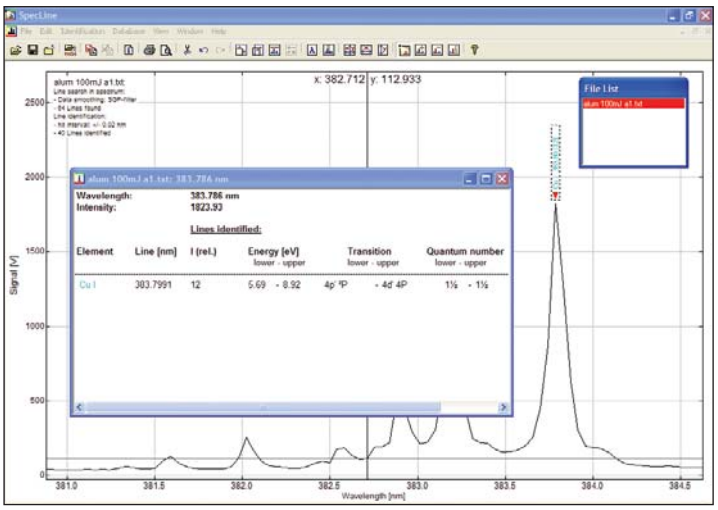
OOISPECLINE-P: $3,510
OOISPECLINE-U: $3,510



In the Identify Lines window, you can search atoms from a Periodic Table, molecules from an extensive list, and elements in single or multiple ionization states.



In this window, a search on the peaks and lines in a spectrum has been completed and identified successfully.



This window demonstrates SpecLine's ability to provide detailed data on just one emission line.

Analog-to-Digital Converters

ADC2000-PCI+ for PCI-bus

- This A/D card has 2 MHz sampling frequency for data acquisition within 2 milliseconds
- Channel rotator function acquires data from up to eight spectrometer channels simultaneously
- Has standard modes for free-running operation and external trigger modes for synchronizing external events
- Processes full spectrum into memory every 5 milliseconds
- Half-length, 12-bit A/D card fits easily into a PCI-bus slot in a PC and connects to the spectrometer via a 1-meter CBL-2 cable (included)
- Additional PC slot protector provides eight digital inputs/outputs and eight analog outputs (analog outputs incur additional fees)
- Provides advanced features such as pixel rotation with no loss of resolution

ADC2000-PCI+: $699
CBL-2 Cable: $50 (included)

ADC1000-USB for External USB

- Easily connects to PCs via USB port or serial port
- 1 MHz sampling frequency enables acquisition of data in 3 ms
- Plugs directly into back of your existing spectrometer (as in the main picture at right), or can be stacked or rack-mounted with the spectrometer in the same housing (see insets, one with housing and one without)
- Channel rotator function enables simultaneous acquisition of data from up to eight spectrometer channels
- Has standard modes for free-running operation and external trigger modes for synchronization of external events
- Provides D-Sub-15 pass-through for triggering the spectrometer and other accessories

ADC1000-USB: $599
USB-CBL-1 USB Cable: $25 (included)
ADC-USB-SER Serial Cable: $49 (not included)

Specifications

	ADC2000-PCI+	ADC1000-USB
Dimensions:	168.8 mm x 127.9 mm x 18.3 mm	105.83 mm x 104.9 mm x 40.9 mm
Weight:	90 g	230 g
Power consumption:	250 mA @ 5 VDC	150 mA @ 5 VDC
Sampling frequency:	2 MHz (maximum)	1 MHz (maximum)
Integration time:	2 milliseconds to 60 seconds	3 milliseconds to 60 seconds
Data transfer rate:	Full spectrum into memory every 4 milliseconds; software time acquisition ~25 ms	Via USB port, full spectrum into memory every 14 milliseconds; via RS-232, full spectrum into memory every 300 milliseconds
Programmable flash delay:	0-65 seconds	0-255 milliseconds
Inputs/Outputs:	8 digital I/Os	8 analog outputs, requires ADC-1000-DAC
Shutdown S2000 power:	Yes	No
Spectrometer compatibility:	Supports S2000 Spectrometers	Supports S2000 and S1024DW Spectrometers
Board architecture/design:	32 bit/PCI bus	USB and RS-232 interface external A/D board
Operating systems:	Any 32-bit Windows operating system	Via USB port, Windows 98/Me/2000/XP, Mac OS X and Linux Via RS-232, any 32-bit Windows operating system
Interface cable:	Comes with a 25-pin, 1-meter cable for connecting the ADC2000-PCI+ to the spectrometer	Via USB port, comes with 1-meter cable (USB-CBL-1) to connect ADC1000-USB to PC Via RS-232, requires serial cable (not included, order ADC-USB-SER)
Software compatibility:	All 32-bit Ocean Optics software, except SpectraSuite and OmniDriver	All 32-bit Ocean Optics Software
Multiple-channel capability:	Up to eight spectrometer channels	
A/D resolution/channels:	12 bit/up to 8 spectrometer channels	
Rotator capability:	yes	
Trigger modes:	3	