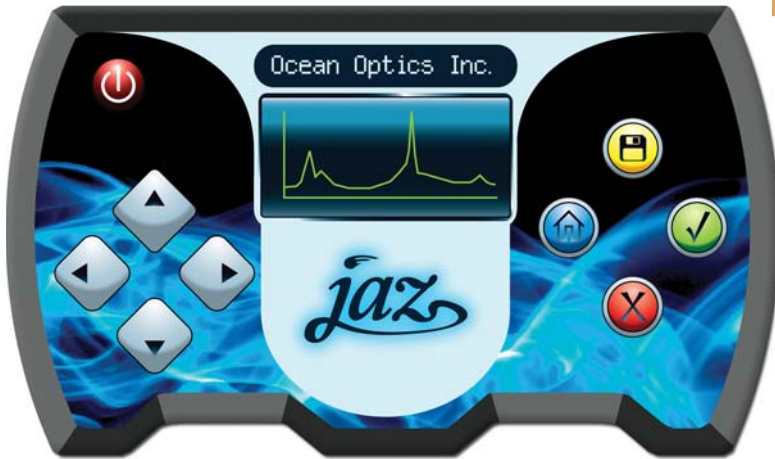


Ocean Optics

Product Information



Jaz

Doesn't That Sound Good?

Introducing the World's Coolest Modular Measuring Suite

Talk about innovation in optical sensing! Jaz is like nothing you've ever seen before -- a community of stackable, modular and autonomous components that combine to create a family of smart sensing instruments. Jaz is unfettered by the limits of traditional optical sensing instrumentation: a powerful microprocessor and onboard display eliminate the need for a PC; stackable, autonomous instrument modules allow you to customize the system to your changing application needs; and Ethernet connectivity plus an SD card for data storage make remote operation a snap!

Those unique features and a platform that expands to include a light source, rechargeable Lithium-Ion battery and up to 8 spectrometer modules make Jaz the first analytical instrument easily adaptable for the field, lab or process environment. And that's the name of that tune!

Jaz Modules & Specifications at a Glance

Jaz Spectrometer Module

Detector:	Sony ILX511B linear CCD array (200-1100 nm)
Grating options:	14 gratings, UV through Shortwave NIR
Slits:	select from 5, 10, 25, 50, 100 or 200 μm widths
Fiber optic connector:	SMA 905

Jaz OLED Display Module

OLED display:	128 x 64 OLED display
Keypad:	push-button functions easy to read from any orientation
Onboard computer:	embedded processor with data processing and storage capability
Additional interfaces:	USB 2.0; GPIO for triggering and other functions

Jaz Ethernet and Memory Module

Ethernet:	100 Mbps, IEEE 802.3-compliant 10/100
Data storage:	via SD card

Jaz Battery and Memory Module

Type:	rechargeable Lithium-Ion
Life:	~4 hours before recharging

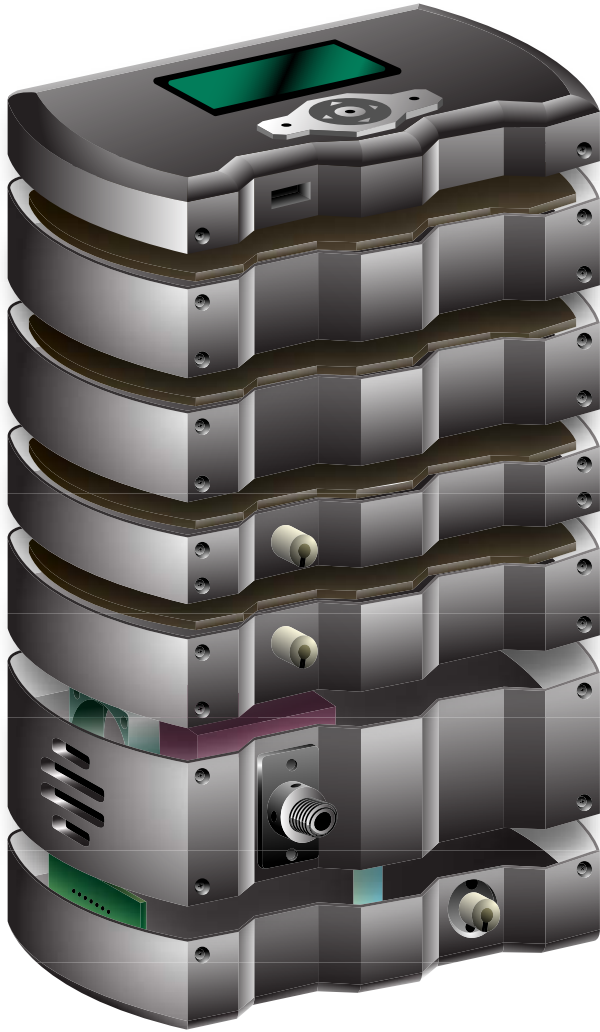
Jaz Light Source Module

Type:	UV-VIS deuterium-tungsten halogen
Bulb life (estimated):	800 hours for deuterium; 2,000 hours for tungsten



Ocean Optics

Product Information



Configure a complete Jaz system by contacting an Ocean Optics Applications Scientist at 727-733-2447 or info@oceanoptics.com.

Jaz Spectrometer Module

- Replaceable slits and gratings take spectrometer design to a new level
- Though the crossed Czerny-Turner optical bench design may be familiar, the rest of the bench is anything but conventional. For maximum flexibility, gratings and external slits are designed to be easily switched out by qualified users.

Jaz OLED Display Module

- Powerful onboard microprocessors eliminate the need for a PC while the OLED display offers clear, vivid viewing.
- The Jaz OLED module is the user interface. Its powerful microprocessor is the "director" harmonizing the interaction among the modules. The Jaz OLED module handles data processing and logging, distributed computing and user interface functions in the display.

Jaz EB Ethernet and Memory Module

- Ethernet supplies system power, makes remote access possible and provides memory and other functions.
- Our 100 Mb/S Ethernet connection is a "single-cable solution" that powers the system and enables remote access by any computer on the network. Communication can take place among modules that are plugged in anywhere on the World Wide Web. The module also includes an SD card slot for data storage.

Jaz MB Battery and External Memory Module

- Rechargeable battery and data storage functions take the hassle of external power supplies and PC handling out of field work.
- Lithium-Ion battery is rechargeable from the main board via Ethernet, USB or external power supply and allows autonomous data collection with power-conserving sleep mode for long-term measurements. This module also has two SD card slots for memory and other functions.

The Round Up

- System power consumption is a modest ~2.5 W
- Use Ethernet to transfer data to PC
- Jaz is RoHS compliant
- Jaz uses IP communications protocol; proprietary interface allows communications with stack and/or the backplane.



727-733-2447 | www.oceanoptics.com | info@oceanoptics.com





Jaz Modular Spectroscopy

Meet Jaz -- the world's coolest modular measuring suite.

Like nothing you've ever seen before, Jaz is a community of stackable, modular and autonomous instruments that combine to create the ultimate in smart sensing for lab, field and anywhere your work takes you.

Jaz is unfettered by the limits of traditional optical sensing instrumentation. Its unique features and expandable platform make it uniquely suited for field applications, remote sensing, process flow, quality assurance and more.

Jaz brings you an unparalleled level of flexibility. With replaceable slits and gratings, choices of modules and more, Jaz is what you make it.



Smarter than the Average Spectrometer

Meet the Jaz Modular Sensing Suite

We designed Jaz to incorporate a number of autonomous modules that share common networking and electronics. Because of its modular design, high-performance spectrometer, Ethernet connectivity, battery operation and PC-free performance, Jaz is nimble in a virtually endless array of applications.

And, since your Jaz can operate independently of your computer, there's no limit to where it can take you.

Customize your Jaz modules to include light sources, multiple channels and more. The choices are only limited by your imagination.

Make Jaz Your Own

Jaz has a home in the lab, the field, the process line and anywhere you need reliable, accurate optical sensing.



In the Lab



Jaz's Ethernet connectivity and battery operation make it a brilliant lab companion – perfect for remote sensing and sharing data across your network. Mix and match Jaz modules to optimize setups for absorbance, reflectance and emission applications.

In the Field



With Jaz's onboard display and microprocessor, you're free to roam! Ideal for field analysis, Jaz does its processing in a convenient, handheld modular stack – storing data to an SD card and processing spectra through its powerful onboard DPU.

Multichannel Sampling



With Jaz, you can add up to eight spectrometer modules for the most simple and convenient multichannel analysis ever. Jaz's spectrometers are incredibly robust for demanding environments and even temperatures of -10°C to $+55^{\circ}\text{C}$.

Jaz Modules

Here's How it Breaks Down

Jaz Spectrometer Module

- Benchmarked to the performance standards of the USB2000+ Spectrometer
- 200-1100 nm Sony ILX511B CCD array detector
- 15 gratings available

Jaz DPU Module

- 128 x 64 OLED display
- Choice of two screen/button orientations
- Embedded microprocessor for data processing
- Custom programmable scripting

Jaz Ethernet Module

- 100 Mbps, IEEE 802.3 compliant connectivity
- SD card slot
- Enables remote access via any computer on the same network
- Single-cable solution that provides POE

Jaz Industrial Module

- Communicates with RS-232 and RS-485
- Provides analog and digital inputs/outputs

Jaz Battery Module

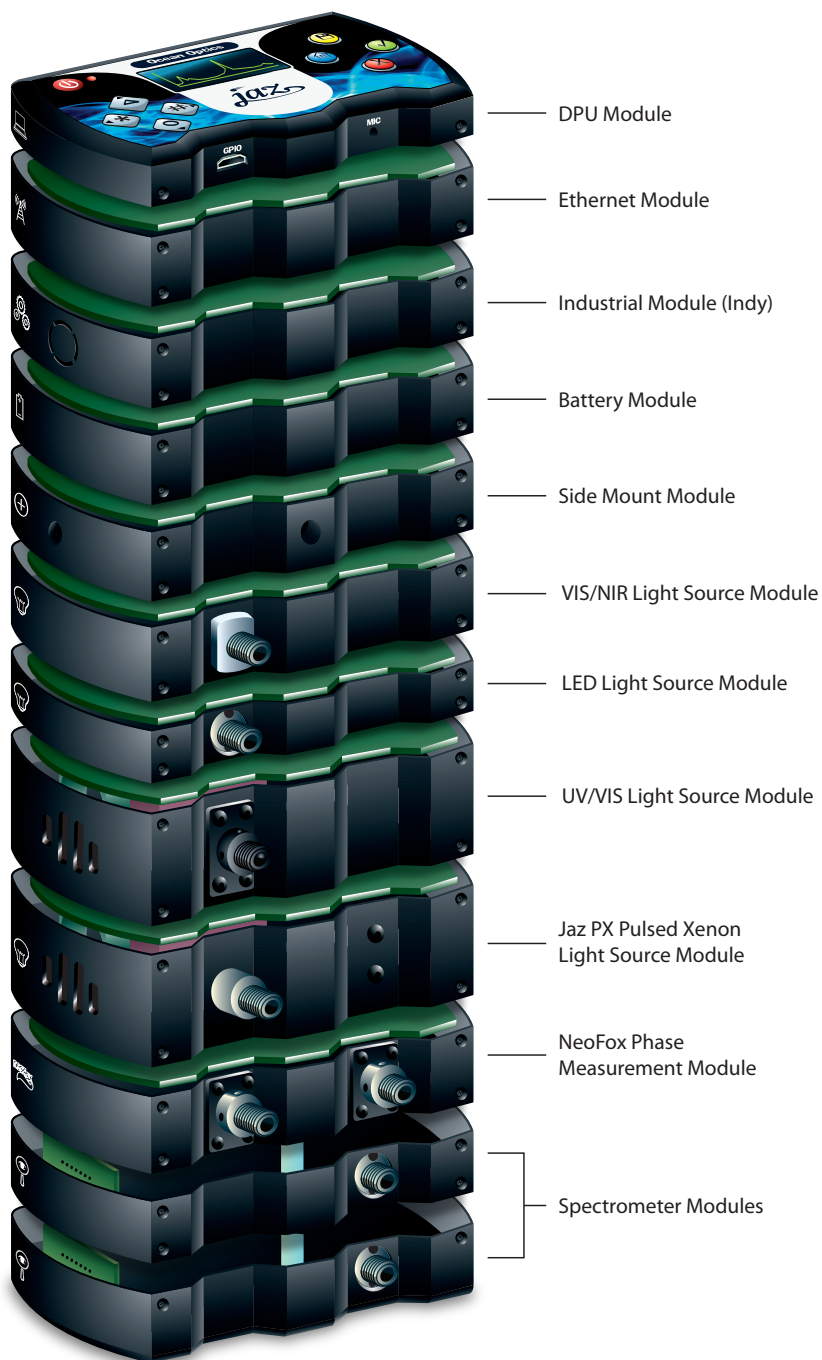
- Lithium-Ion battery for up to 8 hours of use
- Rechargeable from Ethernet, USB or external power supply
- 2 SD card slots for memory and other functions

Jaz Light Source Modules

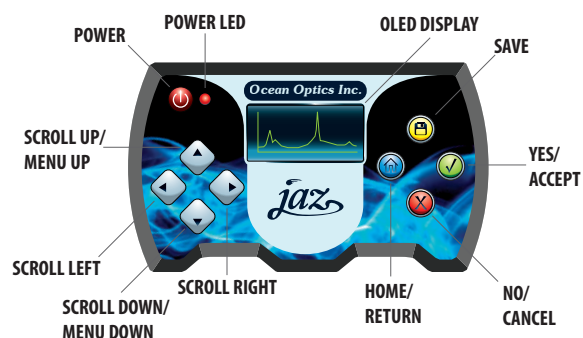
- VIS-NIR Tungsten Halogen
- UV-VIS Deuterium-Tungsten Halogen
- Pulsed Xenon
- LED options

Jaz Side Mount Module

- Lets you affix Jaz to tripod, breadboard and more
- Has 1/4"-20 threaded mounts on three sides of the module



* Illustration only - your configuration may vary.



Have it your way

Imagine having all the gear needed for optical sensing in one, convenient form. That's what we've done with Jaz while blending the functionality of all its parts into a single, seamless instrument. A basic Jaz includes the spectrometer module and onboard DPU. All other modules are optional so you can mix and match for the configuration that best handles your application. For details on the NeoFox option, contact an Application Scientist.

Under the Hood

Mix and match Jaz modules to create a smart, reliable system specifically for your own application.

Not sure which configuration best suits your application? Contact an Ocean Optics Applications Scientist or visit us online at www.oceanoptics.com

Spectrometer	
Physical:	109.2 mm x 63.5 mm x 57 mm LWH; 352 g (JAZ-COMBO only)
Detector:	Sony ILX511B linear silicon CCD array (200-1100 nm)
Wavelength range:	Grating dependent (extended-range grating available for 200-1050 nm coverage)
Optical resolution:	~0.3-10.0 nm FWHM
Signal-to-noise ratio:	250:1 (at full signal)
A/D resolution:	16 bit
Dark noise:	50 RMS counts
Dynamic range:	2 x 10 ⁸ (system); 1300:1 for a single acquisition
Integration time:	870 μ s to 65 seconds (20 s typical maximum)
Stray light:	<0.05% at 600 nm; <0.10% at 435 nm
Sensitivity:	75 photons/count at 400 nm; 41 photons/count at 600 nm
Fiber optic connector:	SMA 905 to 0.22 numerical aperture optical fiber
Electronics connector:	19-pin MHDMI connector
Channels supported:	Up to 8 spectrometers
OEM integration supported:	Yes
Power options:	Wall transformer (+5VDC); Power over Ethernet (Class III PoE provides 12 Watts); USB; integrated battery module (JAZ-B); Solar charger
Inputs/Outputs:	Yes, 4 onboard digital user-programmable GPIOs
Communications & Software	
Computer interface:	Onboard Blackfin [®] microprocessor
Operating systems:	Windows 2000, XP, Vista (32/64 bit), Windows 7 (32/64 bit); Mac OS X and Linux when using the USB interface on PCs
Ethernet Module (optional)	IEEE 802.3-compliant 10/100; includes 2 GB SD card
Industrial Communications Module (optional):	Interfaces (RS-232, RS-485); 4 analog I/O, 8 digital I/O
Trigger modes:	Normal (free-running), Software, Synchronization and External Hardware
Strobe functions:	Continuous, Single, Lamp Enable
Operating software:	Basic Jaz software (included) operates from DPU interface; SpectraSuite (separate purchase) acquires data from USB or Ethernet connection
Applications software:	Irradiance measurement and other options available; application is loaded to an SD card and operates from DPU interface
Development software:	Scripting program and API option for writing your own applications
Battery Options	
JAZ-B Module (optional integrated battery):	Rechargeable Lithium-Ion; lifetime depends on number of modules (~8 hours for JAZ-COMBO only)
Rechargeable battery accessories:	Lithium-Polymer solar battery, ~12 hours lifetime w/JAZ-COMBO; Lithium-Ion external battery, 21 hours lifetime w/JAZ-COMBO
SD card storage:	JAZ-B module includes (2) 2-GB SD cards
Light Source Options	
JAZ-UV-VIS (optional module):	Deuterium-Tungsten Halogen (200-1100 nm); lifetime is ~1,500 hours (recommended for UV absorbance)
JAZ-PX (optional module):	Pulsed Xenon (190-1100 nm); lifetime is 4 x 10 ⁸ flashes to 50% of initial intensity
JAZ-VIS-NIR (optional module):	Tungsten Halogen (400-1100 nm); lifetime is 500-10,000 hours depending on power setting
LEDs (optional module w/replaceable bulbs):	365 nm, 405 nm, 470 nm, 590 nm, 640 nm and White wavelength options
Compliance	
CE mark:	Yes (all modules)
RoHS:	Yes (all modules)

Preconfigured Jaz Systems

Portable Setups for Field and Beyond

Thanks to its small footprint, built-in computing power and onboard display, Jaz is an excellent option for field applications of all types. Build your own Jaz setup – hundreds of configurations are possible – or select from one of these fully integrated, application-ready options:

Jaz-EL Spectrometers

We offer three preconfigured versions of a lightweight, portable spectrometer system complete with integrated Lithium-Ion battery, SD card storage of your spectra and SpectraSuite software for post-processing of data back in the lab. Choose JAZ-EL200 for UV-VIS measurements from 200-850 nm or JAZ-EL350 for VIS-NIR measurements from 350-1000 nm. And for extended-range coverage, the JAZ-EL200-XR1 is responsive from 200-1050 nm. Each option is available with our standard line of Jaz accessories.

Jaz SpectroClip

If you're investigating plants and other living organisms, consider the Jaz SpectroClip. Conceived for characterization of wavelength-dependent absorption of leaves and other diffuse biological materials, the system consists of a Jaz spectrometer configured for 400-850 nm, plus built-in tungsten halogen light source and battery. The system comes with a fiber optic probe optimized for determining the absorption properties of diffuse materials. The Jaz SpectroClip is an especially useful tool for plant researchers and growers seeking to improve crop yields by monitoring plant health and stress properties. The Jaz SpectroClip also is available for purchase separately.



About the Applications

When configured for field applications, Jaz is a practical tool for applications such as solar irradiance measurements, fluorescence and reflectance of plants and marine organisms, and chlorophyll analysis of leaves and other agricultural samples.

With its extended-life battery and PC-free operation, Jaz is brilliantly suited for a host of agricultural, ecological and environmental applications. And that's just the tip of the iceberg with Jaz in the field.

Jaz Field Accessories

Don't head out without these Jaz accessories that are guaranteed to make your field work more simple and convenient.

Jaz Pack

Our Jaz Pack is the rough and tumble Jaz accessory made from lightweight, water-resistant fabric that stretches to hug your Jaz safely and securely. Its unique flip-top helps you see your OLED display in the brightest of sunshine and its adjustable fit easily accommodates your configuration.

Jaz Pack Shoulder Strap Item Code - JAZ-PACK-S

Jaz Pack Waist-belt Item Code - JAZ-PACK



Jaz Solar Pack

Harness the power of the sun when you're in the field! The Jaz Solar Pack is the handy accessory that powers and recharges your Jaz battery module via its mini-USB cable. The Jaz Solar Pack recharges itself through the sun or electrical socket and can independently power your Jaz for up to 4 hours.

Item Code - JAZ-SOLAR



Jaz External Battery

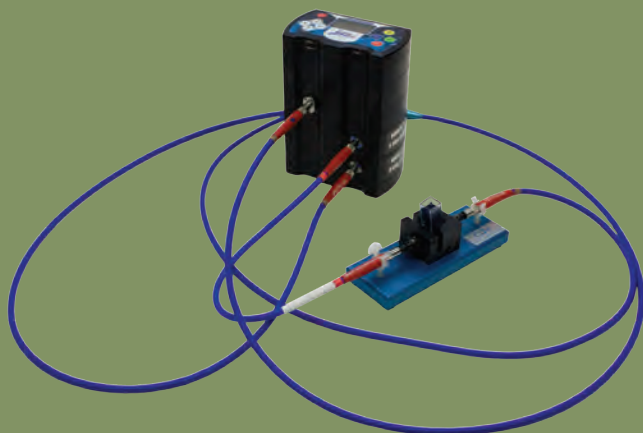
The Jaz External Battery Pack is a multipurpose, rechargeable Lithium-Ion battery that connects directly to the 5V power connection on the DPU module of your Jaz. This powerful accessory is ideal for remote sensing and field applications and can triple the operating lifetime of your Jaz unit.

Item Code - JAZ-EXT-BP-50WH



Preconfigured Jaz Systems

Jaz-RM Series for Multichannel Monitoring



We built the Jaz-RM200 and Jaz-RM350 as preconfigured two-channel systems that are ideal for reference monitoring. The first channel measures your sample and the second channel monitors variations in spectral intensity based on light source and system drift.

The Jaz-RM Series is the perfect match for extended experiments in which taking frequent reference spectra is not possible. You can direct the system's software to correct for any type of drift that may occur – whether it's spectrally uniform or hectic. This helps to ensure normalized results in experimentation.

JAZ-RMs

- Two-channel systems ideal for reference monitoring
- UV-VIS and VIS-NIR options
- Built-in Ethernet module for power and network accessibility



About the Applications

In addition to reference monitoring, the Jaz-RM Series is useful for other applications where two spectrometer channels add measurement muscle. For example, with two spectrometer channels, monitoring two locations in a process stream is simple. The additional data allows you to adjust your process more easily and produce better results.

Preconfigured Jaz Systems

Jaz-FL-365 and Jaz-FL-450 for Fluorescence Measurements

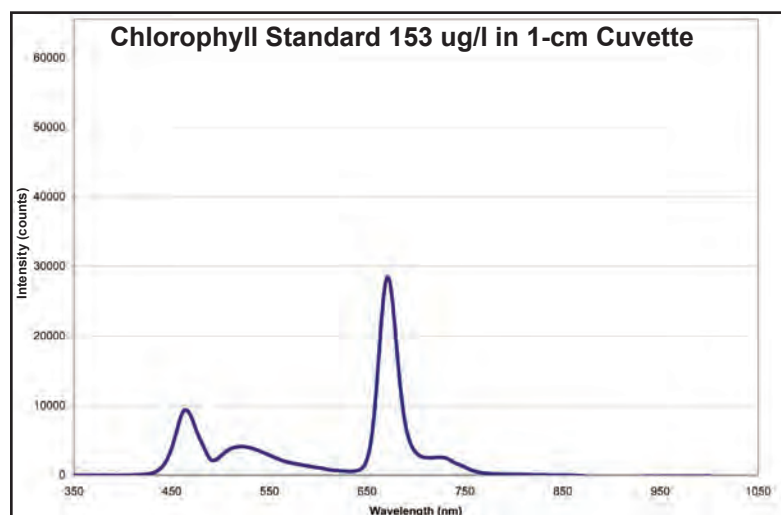


The Jaz-FL-365 and Jaz-FL-450 are preconfigured to deliver outstanding fluorescence capabilities at a lower cost than traditional fluorescence spectrometers. Our unique silver-coated mirrors increase reflectance and reduce the effects of excitation scattering – ensuring accurate, reliable measurements.

The Jaz-FL series are available with 365 nm and 470 nm LEDs for excitation and can be used for cuvette-based or probe-based fluorescence.

JAZ-FLs

- Fluorescence setups with integrated 365 nm or 470 nm LEDs for excitation
- Great for cuvette- or probe-based fluorescence
- Applications such as chlorophyll analysis and tissue fluorescence
- Built-in battery and Ethernet modules for portability, power and remote operation



About the Applications

The Jaz-FL Series fits in a number of applications from life sciences to chemical analysis. Use either of these portable spectrometer suites for biochemical analysis, chemical research, analyzing organic compounds and ensuring water quality.

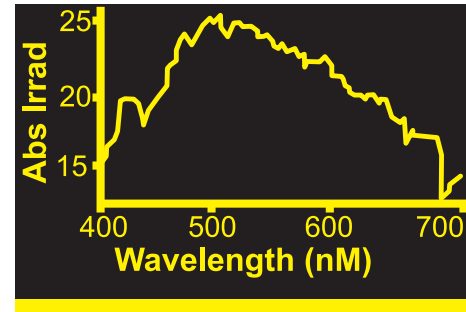
Preconfigured Jaz Systems

Jaz-ULM Light Meter

Jaz



At the heart of the Jaz-ULM-200 is a spectroradiometrically calibrated spectrometer with built-in microprocessor and display. Also in the instrument stack is an Ethernet module for remote measurements, a battery module for handheld or field operation and a mounting fixture for orienting the system in different positions. Additional components include SD cards for data storage, a direct-attach cosine corrector for collecting radiation within a 180° Field of View, and both soft-sided and Pelican-brand carrying cases.



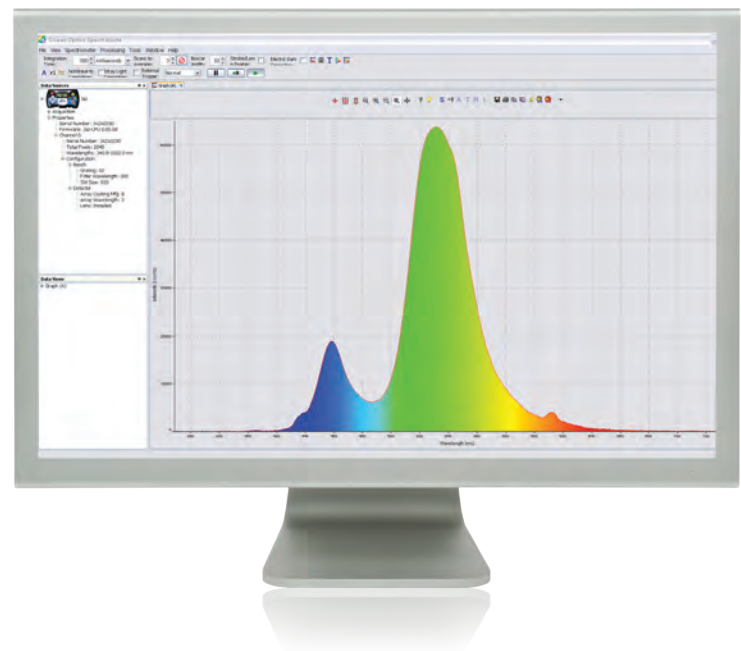
Lumens: 0.1102
Lux : 9230.9
PAR: 163.42
Watts: 0.0005

Special Software for Calculating Irradiance Values

With its Jaz-A-IRRAD irradiance software, the Jaz-ULM-200 allows users to capture, process and store full spectra without a PC. Jaz-A-IRRAD is stored on an SD card and loaded to the system. In just three simple clicks, the software collects spectral irradiance information from the selected light source. This data can be processed to give the intensity parameter of choice, including W/cm², lumens, lux or any other light intensity parameter. The system's three-button wizard simplifies operation so that even non-spectroscopy experts are able to perform fast and accurate measurements. More detailed analysis can be performed using SpectraSuite software on a PC.

Advantages of the Jaz-ULM-200

- All-in-one system with everything you need for irradiance measurements
- Simple calculation of key irradiance parameters in a single device
- Capture and storage of spectral characteristics right on the unit
- Lightweight, portable system convenient for lab, process or field
- Remote access and networking capability with built-in Ethernet



About the Applications

The Jaz-ULM-200 setup is an ideal solution for spectral irradiance applications such as process control in LED sorting systems, monitoring of LED output in greenhouse and other operations and quality control analysis of UV curing sources. The system is also conveniently appointed for solar irradiance measurements.

The Jaz Spectrometer

Smart Design Makes all the Difference

We took a page from our USB2000+ miniature spectrometer and built the Jaz spectrometer module to be just as powerful and just as accurate. The 2048-pixel, Sony ILX511B linear silicon CCD array detector delivers outstanding performance and – though Jaz’s Czerny-Turner optical bench may be familiar – the rest of the Jaz spectrometer module is anything but ordinary.

L2 Detector Collection Lens

Jaz’s cylindrical lens ensures aberration-free performance and is fixed to the detector’s window to focus light onto the shorter detector elements. It increases light-collection efficiency by 5x and reduces stray light.

Replaceable Slits

Unlike the fixed slits in most spectrometers, Jaz allows you to change your entrance aperture to suit your application. Most Jaz slits are 1 mm tall and come in various widths from 5 to 200 μm .

Slit	Description	Pixel Resolution
INTSMA-005	5 μm wide x 1 mm high	~3.0 pixels
INTSMA-010	10 μm wide x 1 mm high	~3.2 pixels
INTSMA-010S	10 μm wide x 50 μm high	~3.2 pixels
INTSMA-025	25 μm wide X 1 mm high	~4.2 pixels
INTSMA-050	50 μm wide x 1 mm high	~6.5 pixels
INTSMA-100	100 μm wide x 1 mm high	~12.0 pixels
INTSMA-200	200 μm wide x 1 mm high	~24.0 pixels

Grating and Wavelength Range

Choose from 14 different gratings for each Jaz spectrometer channel. Your choice of grating groove density helps to determine optical resolution, spectral range and blaze wavelength.

Grating Number	Intended Use	Groove Density	Spectral Range	Blaze Wavelength	Best Efficiency (>30%)
1	UV	600	650 nm	300 nm	200-575 nm
2	UV-VIS	600	650 nm	400 nm	250-800 nm
3	VIS-Color	600	650 nm	500 nm	350-850 nm
4	NIR	600	625 nm	750 nm	530-1100 nm
5	UV-VIS	1200	300 nm	Holographic UV	200-400 nm
6	NIR	1200	200-270 nm	750 nm	500-1100 nm
7	UV-VIS	2400	100-140 nm	Holographic UV	200-500 nm
8	UV	3600	50-75 nm	Holographic UV	290-340 nm
9	VIS-NIR	1200	200-270 nm	Holographic VIS	400-800 nm
10	UV-VIS	1800	100-190 nm	Holographic UV	200-635 nm
11	UV-VIS	1800	120-160 nm	Holographic VIS	320-720 nm
12	UV-VIS	2400	50-120 nm	Holographic VIS	260-780 nm
14	NIR	600	625 nm	1000 nm	650-1100 nm
31	UV-NIR	500	200	200-1050 nm	250-<500 nm

Longpass Absorbing Filter

We offer longpass absorbing or blocking filters – each with a transmission band and a blocking band to restrict radiation to a certain wavelength region. This helps to eliminate second- and third-order effects. These filters are installed permanently between the slit and the clad mode aperture in the bulkhead of the SMA 905 connector.

Item	Description
OF1-WG305	Transmits light >305 nm
OF1-GG375	Transmits light >375 nm
OF1-GG475	Transmits light >475 nm
OF1-OG515	Transmits light >515 nm
OF1-OG550	Transmits light >550 nm
OF1-OG590	Transmits light >590 nm

Collimating and Focusing Mirrors

You can replace standard aluminum-coated reflective mirrors with our proprietary, UV-absorbing SAG+ Mirrors. These special mirrors increase reflectance in the VIS-NIR and increase the sensitivity of your Jaz. SAG+ Mirrors can be specified for fluorescence. These mirrors also absorb nearly all UV light to reduce the effects of excitation scattering in fluorescence measurements.

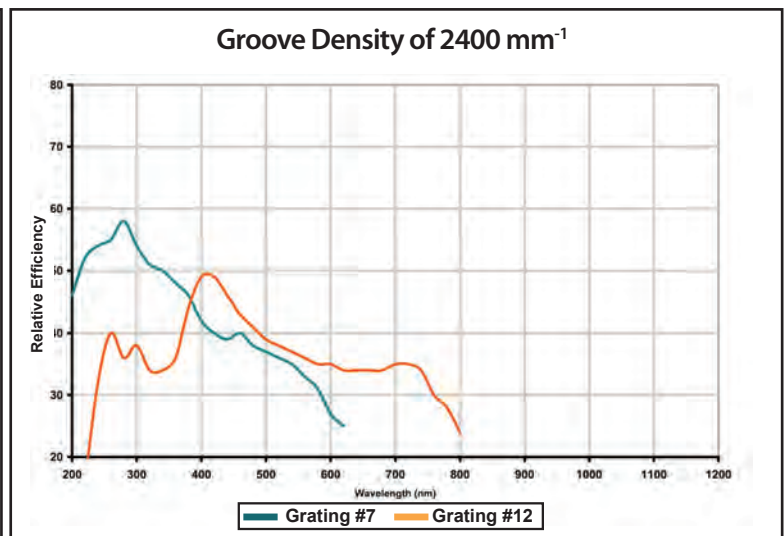
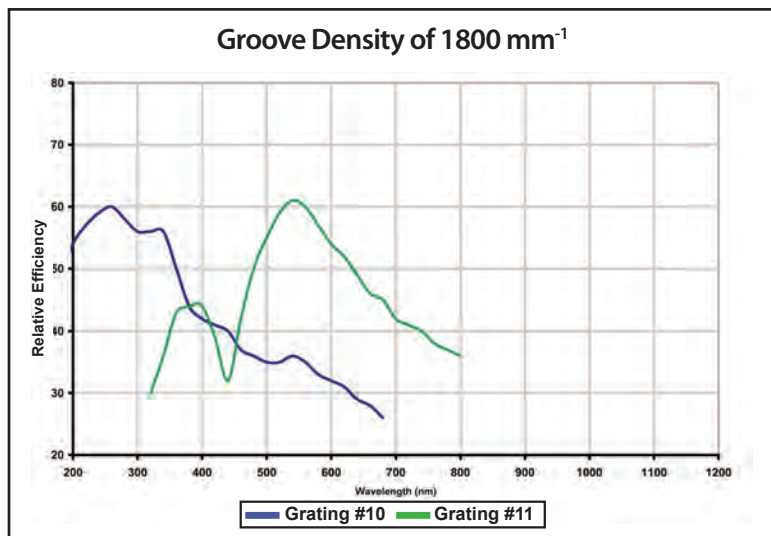
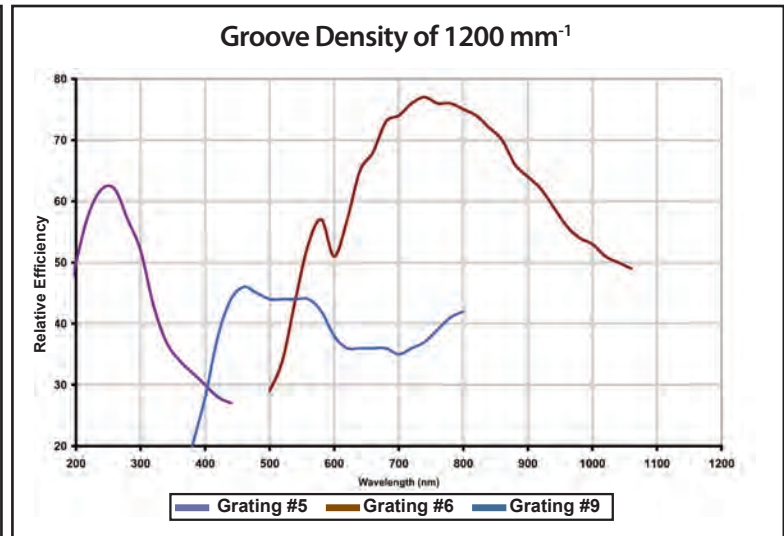
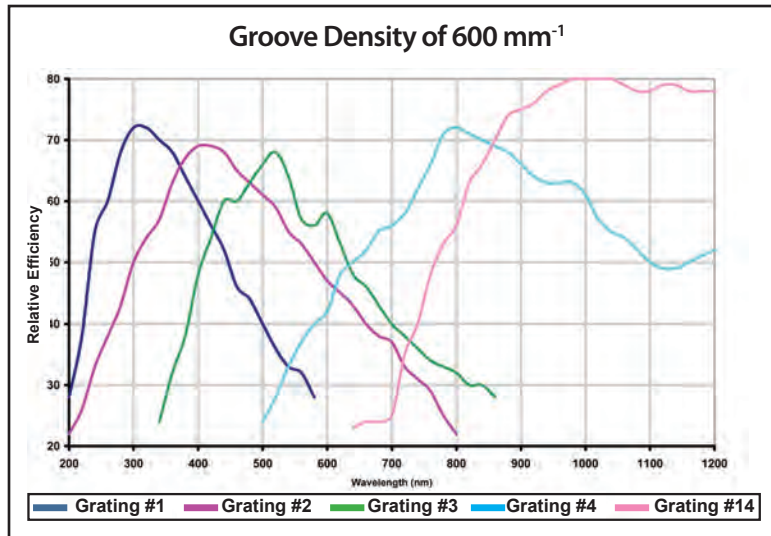
Detector Accessory Options

Detector	Description
DET2B-200-850	Sony ILX511B detector, installed, w/200-850 nm variable longpass filter & UV2 quartz window; best for UV-VIS systems configured with Grating #1 or #2
DET2B-350-1000	Sony ILX511B detector, installed, with 350-1000 nm variable longpass filter; best for VIS system configured with Grating #2 or #3
DET2B-UV	Sony ILX511B detector, installed, with UV2 quartz window; best for systems configured for <360 nm
DET2B-VIS	Sony ILX511B detector, installed, with VIS BK7 window; best for systems configured for >400 nm
DET2B-200-1100	Sony ILX511B detector, installed, w/200-850 nm variable longpass filter & UV2 quartz window; best for XR grating

The Jaz Spectrometer

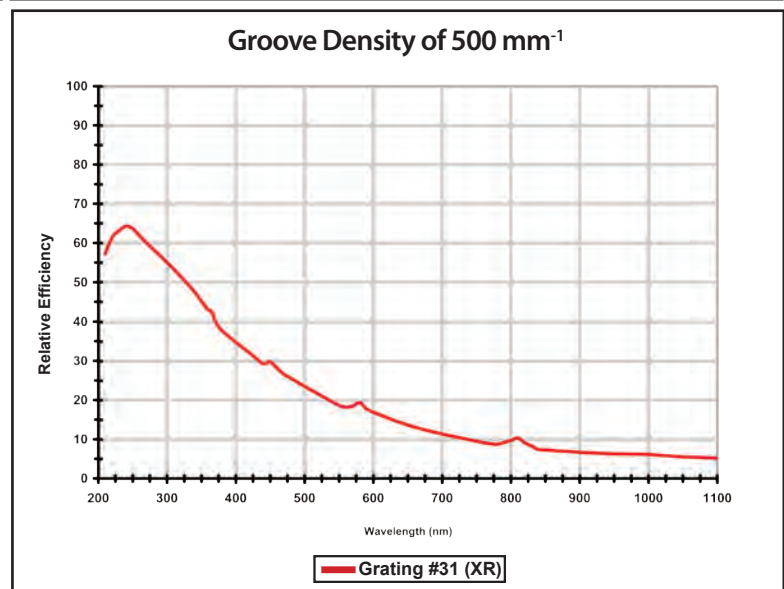
Optical Bench Options: Gratings

The graphs below are grating efficiency curves for gratings with groove densities of 500, 600, 1200, 1800 and 2400 mm^{-1} . Additional information is available at www.oceanoptics.com/Products/bench_grating_usb.asp.



Grating Selection Tips:

- You must specify a grating for each Jaz spectrometer channel.
- These efficiency curves relate only to the grating. System response is affected by a number of variables, including detector response.
- Grating selection often involves trade-offs. For example, gratings with very high groove density (mm^{-1}) allow greater optical resolution but at the expense of a truncated spectral range. If the user is characterizing two or three closely aligned laser wavelengths, such a trade-off of resolution for range might be acceptable. For other applications, a wider range with good resolution would make better sense.
- The XR grating (#31) is a good option for broad spectral coverage (200-1050 nm) without sacrificing optical resolution (~ 2.0 nm FWHM with a 25 μm slit).



Jaz DPU and Microprocessor Module

The Brains of the Operation

Jaz DPU Module

The Jaz DPU module combines a powerful onboard microprocessor and 128 x 64 OLED display that delivers clear and vivid viewing of spectra in real time. This clever user interface features an intuitive menu-driven system and touch-pad and is available in two orientations to ensure convenient operation. Its embedded microprocessor provides quick and reliable data processing and easily orchestrates up to 8 spectrometer modules for multipoint sampling.

Item Code: JAZ-DPU



JAZ-DPU	
Module dimensions:	109.2 mm x 63.2 mm x 14.2 mm
Module weight:	90.72 g
Display:	OLED
Area:	128 x 64 pixels; orientation can be rotated 180°
Display lifetime:	55,000 hours
Keypad:	Push-button function
	Available in 180° orientation versions (standard and reversed)
	Power and charging indicator
	Contact switches lifetime of 200,000 contacts (minimum)
	Anti-glare ethyl-butyl-acrylate overlay material
	RoHS compliant
	Temperature range: -40 °C - +70 °C (storage) and 0 °C - + 50 °C (operating)
Microprocessor	Blackfin® embedded microprocessor with data processing and storage capability
SDRAM:	64 MB
Power consumption:	~1-2 Watts

Jaz Ethernet Module

Connectivity and More for Your Jaz

The Jaz Ethernet Module turns your Jaz spectrometer system into a powerful network appliance. Use it to power your Jaz over Ethernet connectivity, access Jaz remotely or share data with others on your network. The 100 Mb/S Ethernet connection is a single-cable solution that powers the system and enables remote access by any node on your network or via the Internet. The Jaz Ethernet Module also includes a 2 GB SD card slot for instant data storage.

A Jaz stack with an Ethernet Module has both USB and Ethernet port connectors, to connect the spectrometer to a computer via a USB port or to a network via a connection from the Ethernet port. This port connects

to a Power over Ethernet (PoE) bridge or a switch to the network (e.g., a network hub). Your Jaz stack receives power from either connection, and both connections enable Jaz to be recognized by SpectraSuite software. Spectral acquisition time in a Jaz system with an Ethernet Module – 100 scans per second – is identical to the acquisition time using USB.

The Ethernet Module is a Class III PoE device that provides 12 watts of power and can recharge a JAZ-B Battery Module in approximately four hours (longer if the Jaz is in operation). The latter is particularly handy for a Jaz setup that’s used as a handheld device in the lab or in the field.

Item Code: JAZ-E

JAZ-E Ethernet Module	
Dimensions:	109.2 mm x 63.2 mm x 20.8 mm
Weight:	90.72 g
Data transfer rate:	100 Mbps
Power over Ethernet (PoE) standard:	IEEE 802.3-compliant 10/100
Data storage:	2 GB SD card (stores up to 100,000 spectra)
Ethernet cable:	14 ft. length, ferrite bead included for electronic noise suppression
PoE adapter (not included):	Recommended D-Link DWL-P50 or equivalent



Jaz Battery and Memory Modules

Because You Need to Stay Mobile



JAZ-B Battery Module

The Jaz Battery and External Memory Module* is built on a rechargeable Lithium-Ion battery that provides up to 8 hours . It allows autonomous data collection with power-conserving sleep mode for long-term measurements. The Jaz Battery Module also includes two SD card slots for memory, applications and data storage.

Item Code: JAZ-SOLAR

Jaz Solar Battery Supply

The Jaz Solar Pack is a handy accessory that powers and recharges your Jaz unit via its mini-USB cable. Jaz Solar Pack recharges itself through sun or socket and can independently power your Jaz for up to four hours.

Item Code: JAZ-SOLAR



JAZ-EXT-BP-50WH External Battery

This external battery pack connects to the 5V power connection of the Jaz DPU module and extends the charge of your Jaz by up to 3x. The JAZ-EXT-BP-50WH is a multipurpose, rechargeable Li-Ion battery rated at 50 watt-hours. It comes with an AC wall charger, a car charger and its own holster and belt clip.

Item Code: JAZ-EXT-BP-50WH

Jaz Battery Options			
	JAZ-B Battery Module*	JAZ-SOLAR Solar Charger	JAZ-EXT-BP-50WH External Battery
Battery type:	Lithium-Ion	Lithium Polymer	Lithium-Ion
Rechargeable:	Yes (via wall power or PoE)	Yes (service lifetime minimum 500 full charges)	Yes (includes Quick AC charger and car kit charger)
Charging time:	When Jaz is off, 8 hours via USB and 4 hours via wall power and PoE	4 hours via USB; 2-3 hours via PoE; 2-3 hours via 12 VDC wall power	3 hours (from fully discharged) via PoE; 3 hours via 12 VDC wall power
Charging current:	~4A @ 5V maximum w/wall plug adapter or 0.5A @ 5V through the USB port	360 mA	2000 mA
Capacity:	14.8 Watt hours	~7-10 Watt hours	50 Watt hours
Lifetime when combined w/JAZ-COM-BO (DPU + single-channel spectrometer):	~8-10 hours	3-5 hours standard; ~12 hours w/JAZ-B battery module	21 hours standard; 28 hours w/JAZ-B battery module
Lifetime when combined w/JAZ-COM-BO and Light Source:	2 hours	~3 hours w/JAZ-B battery module	8.5 hours standard; 10.5 hours w/JAZ-B battery module
Data storage via (2) SD card slots:	Yes	No	No
SD cards included:	Yes (2)	No	No

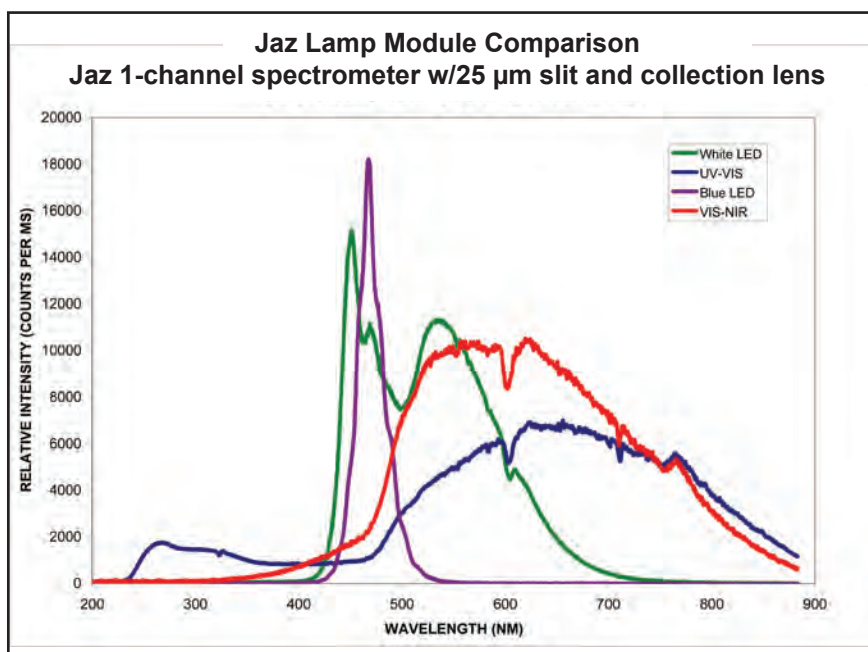
* Battery module is incompatible with any SDHC (high-capacity) card or SD card >2 GB.

Jaz Light Sources

An Illuminating Difference

Whether your work takes you to the lab, the field or the process line, you can make the most of your Jaz modular sensing suite with the addition of an optional light source, optimized for your application needs.

These compact, low-cost, modular light sources fit directly into the Jaz stack of appliances and feature outstanding bulb life as well as lower power consumption than comparable sources.



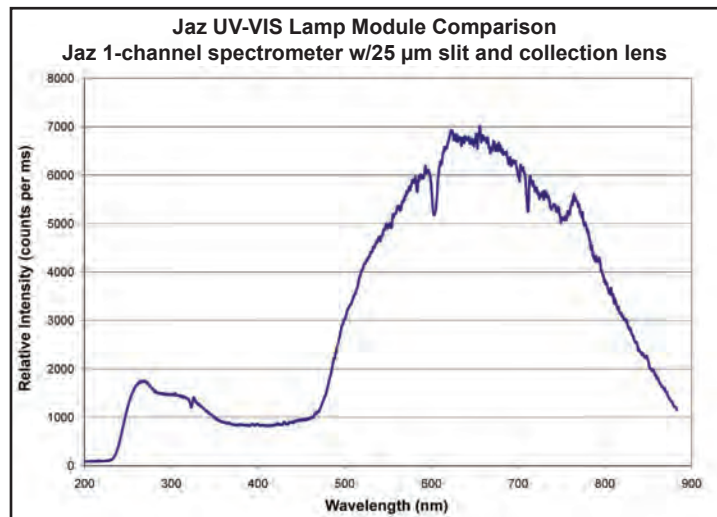
For spectral output of Jaz PX, see page 73.

	Jaz-PX	Jaz-VIS-NIR	Jaz-UV-VIS	Jaz-LED
Dimensions:	109.2 mm x 63.5 mm x 31.8 mm	109.2mm x 63.5mm x 29.5mm	109.2 mm x 63.5 mm x 26.7 mm	109.2 mm x 63.5 mm x 28.58 mm
Type:	Pulsed Xenon	Tungsten Halogen	Deuterium Tungsten Halogen	LED
Wavelength range:	190-1100 nm	400-1100 nm	200-400 nm (deuterium); 400-1100 nm (tungsten)	365 nm - White
Best for:	Absorbance, transmission, fluorescence and UV-VIS bioreflectance	Absorbance, transmission and reflection	Absorbance and transmission only	Excitation source for fluorescence, luminescence
Stability:	<1% flash to flash	decay rate is ~0.01%/hour @ power setting of 1024 and 0.1%/hour at setting of 4095	after 30-minute warm-up, 0.3% peak to peak over 4 hours	+/-0.5% (typical short-term) after warm-up
Time to stable output:	10 flashes	~20 minutes	10 minutes (deuterium); 1 minute (tungsten halogen)	~30 minutes (~5 minutes for <3% drift for 470 nm LED)
Lamp life:	4 x 10 ⁸ flashes to 50% of initial intensity	>10,000 hours @ 1024 power setting; 500 hours @ 4095 power setting	~1500 hours (deuterium); 1500 hours (tungsten halogen)	>25,000 hours to 70% of initial intensity
Operating life in typical field setup:	~3 hours w/JAZ-COMBO and battery module	~6 hours w/JAZ-COMBO and battery module	~2 hours w/JAZ-COMBO and battery module	~25,000 hours to 70% of initial intensity (battery has negligible effect on LED life)
Power consumption:	4.5W	1W	7W	<0.2W
Operating temperature:	0 °C-+55 °C	0 °C-+55 °C	0 °C-+55 °C	-10 °C-+55 °C
Storage temperature:	-20 °C-+60 °C	-20 °C-+60 °C	-20 °C-+60 °C	-20 °C-+60 °C
Connector:	SMA 905	SMA 905	SMA 905 (recommended for use with 200 µm-600 µm fibers)	SMA 905
Certification:	CE Mark/RoHS	CE Mark/RoHS	CE Mark/RoHS	CE Mark/RoHS

Jaz UV-VIS Light Source

Useful for UV Absorbance

The Jaz-UV-VIS is a unique deuterium-tungsten halogen source with combined output from 200-1100 nm. The Jaz-UV-VIS is a continuous light source that is most effective for absorbance measurements in the deep UV and is not recommended for reflection measurements. For reflection and fluorescence



measurements, the Jaz-PX (see below) is a far superior option.

Item code: JAZ-UV-VIS

Jaz-UV-VIS	
Dimensions:	109.2 mm x 63.5 mm x 26.7 mm
Type:	Deuterium Tungsten Halogen
Wavelength range:	200-400 nm (deuterium); 400-110 nm (tungsten)
Best for:	Absorbance and transmission
Stability:	after 30-minute warm-up, 0.3% peak to peak over 4 hours
Time to stable output:	10 minutes (deuterium); 1 minute (tungsten halogen)
Lamp life:	~1500 hours (deuterium); 1500 hours (tungsten halogen)
Operating life in typical field setup:	~2 hours w/JAZ-COMBO and battery module
Power consumption:	7W
Operating temperature:	0 °C - +55 °C
Storage temperature:	-20 °C - +60 °C
Connector:	SMA 905 (recommended for use with 200 μ m-600 μ m fibers)
Certification:	CE Mark/RoHS

Pulsed Xenon Light Source for Jaz

High Intensity, Low Power, Versatility

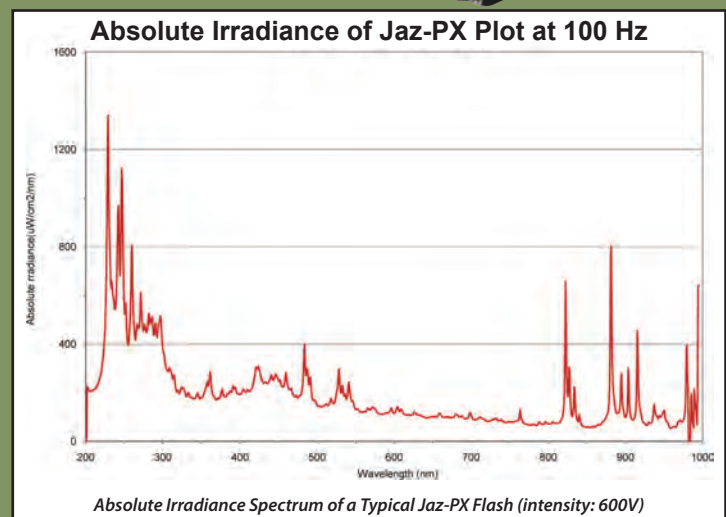
The Jaz-PX is a pulsed xenon light source for your Jaz modular sensing system. It features a pulsed, short-arc xenon lamp that is especially useful for UV-VIS applications such as absorbance, bioreflectance, fluorescence and phosphorescence. The Jaz-PX's lamp has a specified pulse frequency of 200 Hz (maximum 500 Hz) and spectral response from 190-1100 nm.

Jaz-PX operates in both free-running and triggered modes, which allows its pulses to be coordinated with other devices in your Jaz stack.

The Jaz-PX has an SMA 905 connector that couples to other Ocean Optics accessories, including optical fibers, cuvette holders, probes and other sampling optics.

Because of its pulsed signal, the Jaz-PX is less likely to cause solarization in optical fiber assemblies which can occur when fibers are illuminated with signals <260 nm.

Item Code: JAZ-PX

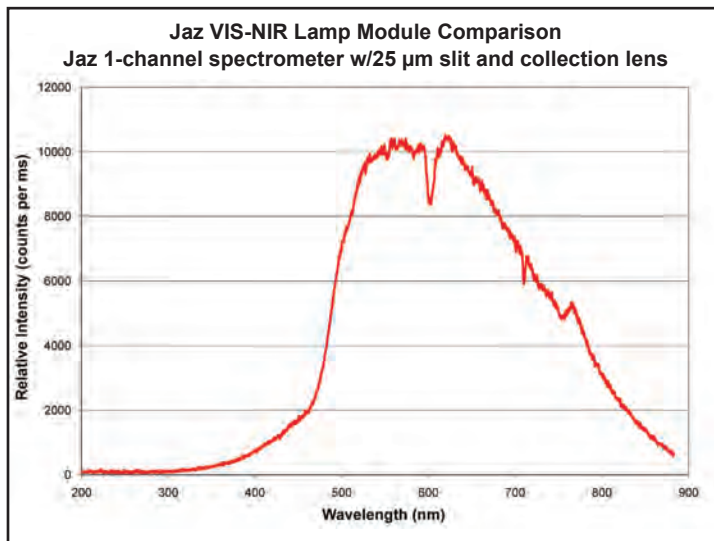


Jaz VIS-NIR Light Source

Strong Output from 400-1100 nm

The Jaz VIS-NIR Light Source is a Tungsten Halogen source that provides reliable coverage of 400-1100 nm and requires little power to operate. This small, lightweight source is perfect for absorbance, transmission and reflection. Additionally, it provides up to 10,000 hours of lamp life.

Item code: JAZ-VIS-NIR



Jaz-VIS-NIR	
Dimensions:	109.2 mm x 63.5 mm x 29.5 mm
Type:	Tungsten Halogen
Wavelength range:	400-1100 nm
Best for:	Absorbance, transmission and reflection
Stability:	decay rate is ~0.01%/hour @ power setting of 1024 and 0.1%/hour at setting of 4095
Time to stable output:	~20 minutes
Lamp life:	>10,000 hours @ 1024 power setting; 500 hours @ 4095 power setting
Operating life in typical field setup:	~6 hours w/JAZ-COMBO and battery module
Power consumption:	1W
Operating temperature:	0 °C-+55 °C
Storage temperature:	-20 °C-+60 °C
Connector:	SMA 905
Certification:	CE Mark/RoHS

Questions? If you're not sure which Jaz Light Source is the best for your application, contact an Ocean Optics Applications Scientist at info@oceanoptics.com. We'll help you find the source that's the perfect match.

Jaz LED Modules

Convenient and Simple

LED Modules

Wavelength range options:	365 nm, 405 nm, 470 nm, 590 nm, 640 nm and White
Power consumption:	<0.2W
Power requirements:	5V @ 50 mA (maximum)
Stability:	+/-0.5% (typical short-term) after warm-up
Drift:	Typically <0.1% drift/hour after 30-minute warm-up (at constant temperature)
Time to stable output:	~30 minutes (~5 minutes for <3% drift for 470 nm LED)
Bulb life:	>25,000 hours to 70% of initial intensity
Bulb aperture (typical):	5 mm diameter with 12-20° viewing angle
Replaceable bulb assembly*:	Yes
Operating temperature:	-10 °C-+55 °C
Humidity:	0-95% non-condensing
Connector:	SMA 905
Certification:	CE Mark/RoHS

The Jaz LED modules allow you to switch out LED bulbs more quickly and easily. Instead of having to replace the entire module, simply replace the LED assembly – a small fixture with only three screws to manage. Your Application Scientist can provide all the details.

Item Codes:

JAZ-L365	365 nm LED
JAZ-L405	405 nm LED
JAZ-L450	470 nm LED
LAZ-L590	590 nm LED
JAZ-L640	640 nm LED
JAZ-LWHITE	White LED

* Available by request

Jaz Industrial Communications Module

Multipoint Sampling for Process and Lab



NEW FOR 2011

- Experiments connect directly to Indy module for analog and digital I/O (8 I/Os available)
- Enables Jaz to communicate with other devices via RS-232/RS-485 interfaces
- Provides measurement and control for portable, laboratory and "light-industrial" setups
- Installs in Jaz stack and can be mounted to DIN rail or a wall (with special accessories) or anywhere with ¼-20 mount

The Jaz Indy is a multifunction module that allows the Jaz system to interface to industrial applications – in particular, RS-232 and RS-485 – and provides both analog and digital inputs/outputs. When combined with triggering capabilities and multichannel capacity, the Indy module makes Jaz an attractive optical-sensing option for multipoint sampling, reference monitoring and other applications in process and lab environments.

Item Code: JAZ-INDY

RS-232 connectivity:	300-115K Baud, +/-5V
RS-485 connectivity:	300-8M Baud
Analog inputs:	4 single-ended or 2 differential pairs +/-5V (single-ended) or 10V (differential pairs)
Analog outputs:	4 +/- 5V (software configurable to 0-5V) 16-bit (0.15mV/bit)
Digital I/O:	8 Source 5V, 5 mA; Sink 20 mA (TTL compatible input levels)
Current loop:	1 x 4-20 mA current loop, 2-wire Transmit 1 x 4-20 mA current loop, 2-wire Receive
4-20 mA A/D resolution:	14 bit (A/D and D/A); 4-20 mA receive is limited to ~20V and 4-20 mA transmit is compliant to ~35V (w/external voltage source)
Enclosure:	Integrated into Jaz stack; optional DIN 3 rail mount available
Environment (use):	-10°C - +55°C, 0-95% humidity (non-condensing)
Environment (storage):	-40°C - +55°C, 0-95% humidity (non-condensing)
Certification:	CE Mark
Certification:	RoHS
Certification:	FCC Part 15, Class A

Jaz Fixtures for Industrial Applications and More

Convenient Tools for Mounting Your Jaz

Jaz Side Mount

The aptly named Jaz Side Mount is precisely that – an integrated Jaz module with ¼"-20 threaded mounts on three sides of the module. This lets you attach your Jaz stack to a breadboard, tripod or other fixture. Also, you can use the in-the-stack Jaz Side Mount with the external mounting accessories to expand your range of positioning options.

Item Code: JAZ-MOUNT



Jaz Rail Mount

Conceived for use with standardized 35 mm DIN rails, this clever adapter for your Jaz securely holds up to three Jaz modules (excluding the DPU and end modules) for incredible convenience.

JAZ-MNT-DIN3

Wall Mount

With this easy-to-install bracket, mount your Jaz setup to any solid or hollow wall.

Item Code: JAZ-MNT-WALL

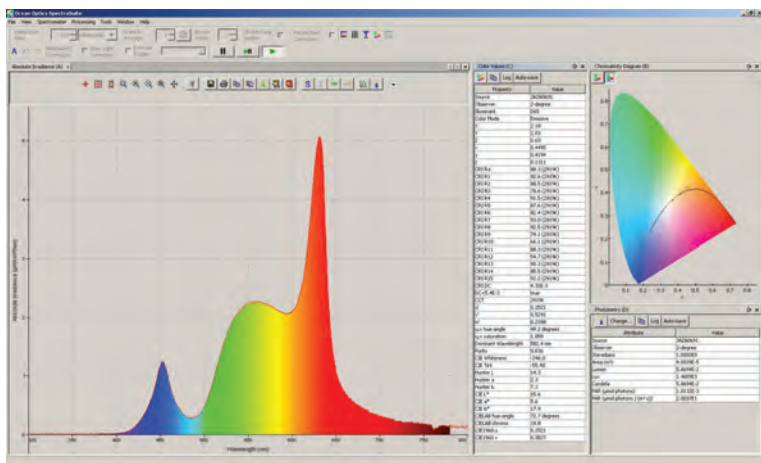


Jaz Software Options

Get the Most out of Your Data

Although Jaz comes with its own basic software, additional processing power and functionality are available via several options:

- **SpectraSuite Spectrometer Software.** Our standard spectrometer operating software is ideal for post-acquisition processing of spectral data. For example, the user can capture data in Jaz software and save it to an SD card in the field, and then transfer the data to a PC in the lab for post-processing with SpectraSuite. This allows for more detailed analysis of your results.
- **Applications Software.** Jaz applications are pre-loaded on an SD card and let you perform application-specific calculations on the Jaz display itself. The JAZ-A-IRRAD irradiance measurement application is a good example. Its post-processing mode can be manipulated to display parameters such as lumens, lux, PAR (Photosynthetically Active Radiation) and watts.
- **Development Software.** Much like our other spectrometers, Jaz can be used with software that you develop. Development tools range from a relatively simple but useful scripting tool conceived for non-programmers to a powerful application programming interface (API) recommended only for experienced C developers with a background in spectroscopy or who attend a Jaz API training session.



- **Jaz Scripting Language.** The Jaz Scriptor provides both programmers and non-programmers with an accessible, intuitive interface to Jaz spectroscopy functions. A script is simply a text file containing a sequence of operations to be performed; some relate to controlling data acquisition from Jaz, while others provide for analysis, transformation and presentation of spectroscopy data. With the Scriptor, you can automate basic tasks such as obtaining a spectrum, controlling a light source and spectrometer in the Jaz stack, manipulating spectral data and saving spectral data to a file for further analysis.
- **Jaz API.** The API is a sophisticated developer's tool conceived for use by experienced C programmers seeking to develop customized Jaz software for OEM and other applications. The API makes available a large number of commands for each device in the stack and enables interaction among those devices. A sample application is included. Consultation with an Applications Scientist prior to purchase is strongly recommended.

Type	Description	How Delivered?	Operation
Standard operating:	Handles basic spectroscopic functions	Preloaded to your Jaz unit	From DPU interface onboard the Jaz
SpectraSuite:	Spectrometer operating software for more sophisticated data processing and analysis; add-on product	Separate program you install to a PC that is connected to the Jaz unit	Acquires data from the Jaz via the USB connection on the DPU or an optional Ethernet module
Application programs:	Application-specific programs for irradiance (JAZ-A-IRRAD) and other measurements	Application is loaded to an SD card	From DPU interface onboard the Jaz; requires an SD card slot (Ethernet or Battery module)
Scripting program:	Jaz-specific tool (JAZ-SPL) for writing your own applications	Scriptor is loaded to an SD card	From DPU interface onboard the Jaz; I.C.; requires an SD card slot (Ethernet or Battery module)
API:	Jaz-specific Application Programming Interface (JAZ-API) for writing your own applications	API is loaded to an SD card	From DPU interface onboard the Jaz; requires an SD card slot (Ethernet or Battery module)



Outfit your Jaz with accessories like discrete light sources, optical fibers and sampling optics.

We also offer LED bulbs, entrance slit accessories and assorted external cabling and power supplies.



Item	Description
JAZ-CBL-DB15	Jaz DB15 Accessory Cable This 1-foot-length MHDML cable runs from the 19-pin connector on the JAZ-DPU to any external device with a DB-15 electrical connector. With the JAZ-CBL-DB15 in place, you can integrate Jaz functions with operation of external devices such as light sources.
INTERNET-CBL	14' Ethernet cable with a ferrite bead to suppress noise
JAZ-PS-ETHERNET	Jaz Power Over Ethernet Adapter 802.3af compliant power over Ethernet with adjustable output power
USB-CBL-PS-JAZ-STACK	5V Universal 30 Watt Power Supply

Everything You Need for a Day in the Field*

*Honeybee Not Included

Whether your work is in the field, laboratory or on a process line, you'll love Jaz from Ocean Optics – the new sensation in optical measurement.

Jaz is the handheld marvel that delivers remarkable accuracy in color, irradiance and remote sensing.

No matter where life takes you, Jaz makes the perfect companion!

