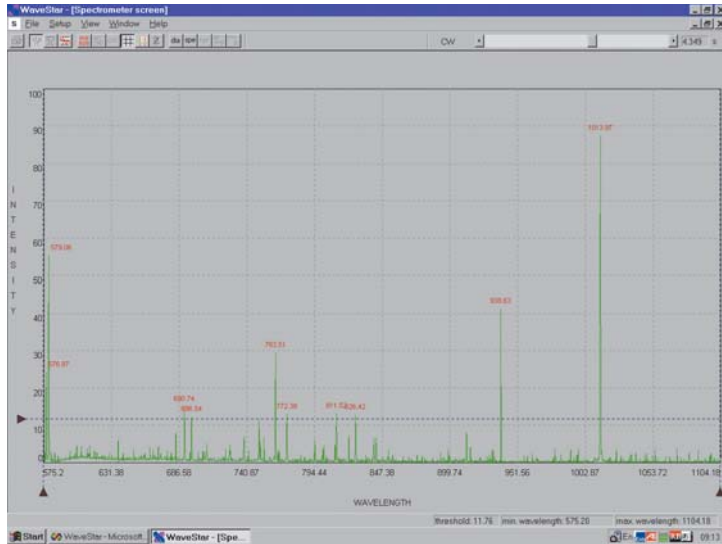


WaveStar

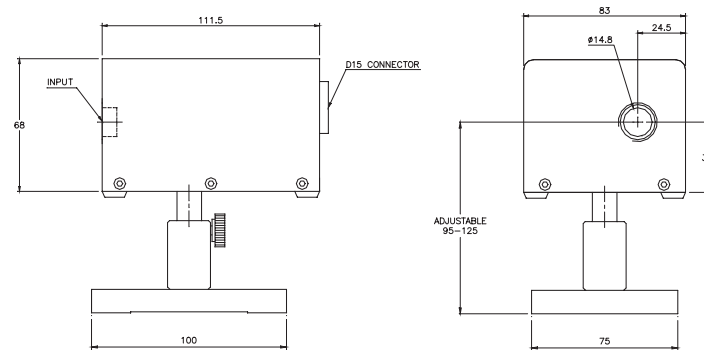
CCD Laser Spectrum Analyzer



- Unprecedented resolution for a CCD spectrometer - 0.5nm FWHM
- Automatically finds and tags peak wavelengths to 0.1nm accuracy
- Self-contained - plugs into parallel port - no PC card necessary
- WaveStar V 570 -1070nm, WaveStar U 360 -625nm
- Photodiode trigger to capture single shot events
- Complete set of fiber adapters and attenuators available
- True NIST traceable intensity vs. wavelength display
- Active X software included for controlling WaveStar from your software



WaveStar with SMA fiber input



The Ophir WaveStar introduces a new level of accuracy and ease in spectral measurements. Just plug into your PC parallel port, install the software and easily and accurately measure spectra from a wide variety of sources including continuous and pulsed sources from microwatts to watts in intensity. The WaveStar program automatically tags the peaks with the wavelength so the result is readily available.

The WaveStar is available with interchangeable filters which together with the variable shutter speed allow you to easily and accurately measure any type of source from fractions of a microwatt to watts in intensity. Fiber adapters are available to connect to fiber sources. The WaveStar has up to four times higher resolution than similar competing instruments due to its innovative optical design (patent applied for). Its sophisticated peak interpolation algorithms allow you to find the peak wavelengths of lines at up to 10 times the accuracy of competing instruments and with greater ease. The built-in intensity calibration insures that the relative intensity vs. wavelength gives an accurate relative curve. This is especially important when measuring broadband sources such as lamps.

Specifications of WaveStar U and WaveStar V

Detector	3000 element CCD
Optics	Proprietary optical design
Spectral response	WaveStar-V 570 -1070nm WaveStar-U 360 -625nm
Wavelength resolution	FWHM 0.5nm
Wavelength peak detection	Proprietary algorithm interpolates pixels and tags peaks with the wavelength value to an accuracy of 0.1nm. The FWHM of each peak is also shown if desired.
Mounting thread	¼" threaded mounting hole
Intensity vs.wavelength	The intensity display is corrected for variations in system sensitivity with wavelength to give a relative intensity accuracy of ±10% over spectral region
Dimensions	80mm x 70mm x 100mm
Optional accessories	SMA fiber adapter, diffusers, ND filters
Connections to PC	Connects to standard parallel port via 3 meter cable. No hardware installation in PC necessary.
Trigger	Photodiode trigger allows capture of single shot events.
Minimum host system requirements	Pentium 200 32MB RAM 10MB HD free, Windows 2000, XP, 2MB 16bit color VGA card one free parallel port.
Performance with pulsed sources	Operates with continuous or pulsed sources at pulse rates from <1Hz up. Special trigger photodiode allows measurement of single pulse events.
Temperature dependence	0.025nm/degC

Laser Power & Energy

Heads

Examples of Software Features

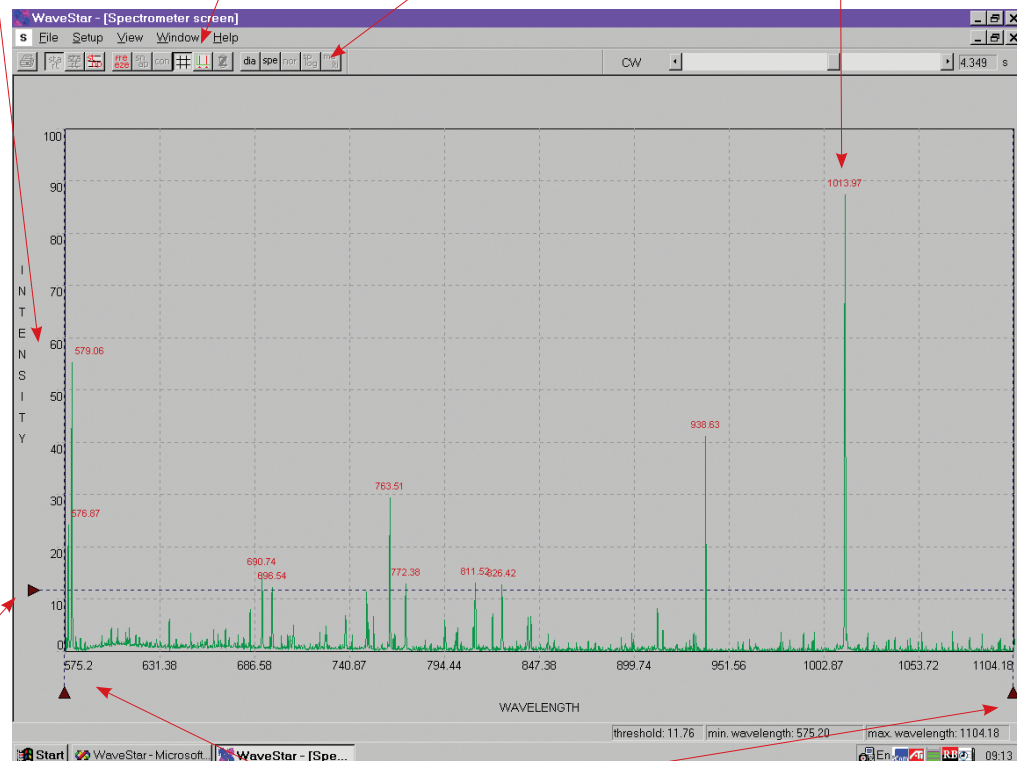
Intensity is corrected for variations in detector sensitivity so spectral curve intensity is proportionally correct

Zoom button blows up wavelength range selected with vertical bars below

Data log with time of peak wavelengths and FWHM

Continuously variable shutter speed from 28µs to 7.3s – a dynamic range of >100,000:1

Automatically tags all peaks with the center wavelength to an accuracy of ±0.1nm. Will show FWHM as well if desired



Horizontal bar determines threshold for displaying peak wavelength and FWHM so as not to clutter screen with unwanted data

Vertical bars select wavelength region of interest for displaying wavelength and FWHM values and zooming with zoom button

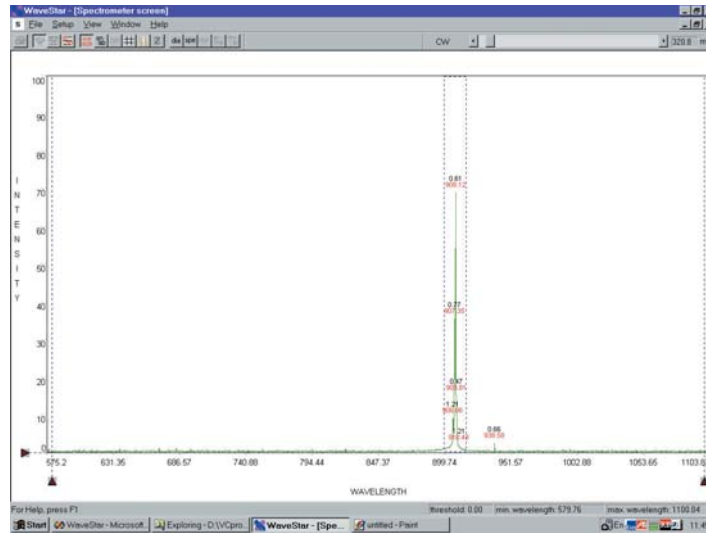
Displays

Beam Profile Wavelength

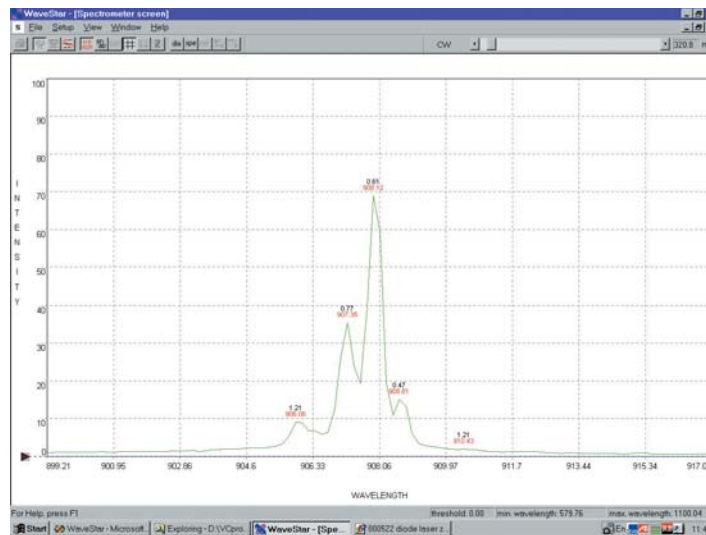
OEM Products

Example of Expanded Wavelength Scale

The first screen shows the spectrum of a pulsed diode laser where the user has selected the region to zoom with the mouse. The second screen shows the zoomed picture from the selected region.



The screen below shows the zoomed region selected in the first screen. Note the resolution of the spectrometer, where the laser longitudinal modes spaced at 1nm intervals are clearly shown. In this view, the FWHM as well as the wavelength is displayed above each peak.

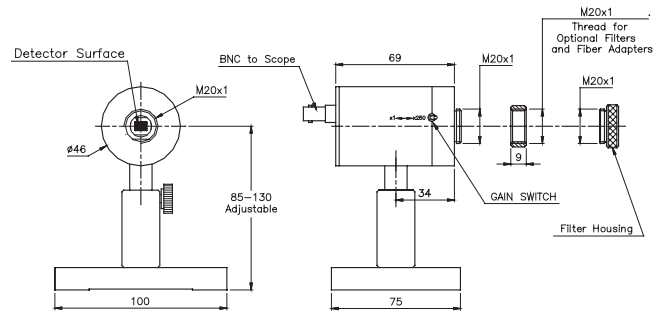


Ordering Information		
Item	Description	Ophir P/N
WaveStar V unit for 570-1070nm	Complete ready to install system including head, stand, cables, power supply and software. Not RoHS	1Z02550
WaveStar U unit for 360-625nm	Complete ready to install system including head, stand, cables, power supply and software. Not RoHS	1Z02551
Adapter for SMA fiber input to WaveStar	Adapter for SMA fiber input to WaveStar. For other adapters see page 166	1G01236
Lens assembly for focusing fiber input onto WaveStar slit	For weak signals (below ~100nW for narrow band source, more for broadband source) lens assembly to focus output onto slit. To be purchased together with SMA fiber adapter	1Z08205
Screw-on 50:1 filter for WaveStar	Screw-on filter for WaveStar with attenuation of between 50:1 and 200:1 depending on spectral range	1Z08201
Screw-on 10:1 filter for WaveStar	Screw-on filter for WaveStar with attenuation of between 10:1 and 20:1 depending on spectral range	1Z08200

Complete ready to install system including head, stand, cables, power supply and software. not RoHS.

Fast Photodetector Model FPS-10

- 2 operation modes – fast and amplified
- Fast mode – 10ns response time, x1 gain
- Amplified mode – 300ns response time, x250 gain
- Spectral range 193nm to 1100nm
- Rechargeable battery inside power supply unit
- Comes with stackable filters to accommodate various laser intensities
- Can be used with fiber input



Description

The FPS-10 fast photodetector is designed to measure the temporal behavior of pulsed lasers. The sophisticated high speed circuitry in the FPS-10 has two modes of operation:

1. x1 gain with 10ns response time for very short pulses with high peak power
2. x250 gain for longer lower peak power pulses.

The FPS-10 comes with additional filters to adjust the sensitivity to the power level of the source. It also comes with a stand and base.

Fiber adapters for the head are also available.



Specifications of the FPS-10 Fast Photodetector

Detector:	Silicon photodiode	
Spectral range:	0.19 - 1.1 μ m	
Detector aperture:	4mm	
Performance specifications:	x1 gain	x250 gain
Risetime/fall time to 50%:	3ns	300ns
Output sensitivity approx (630nm):	20mV/mW Into 50 ohm	10V/mW into 1M ohm
Noise level:	10nW	0.2 μ W
Input connections:	Direct from laser or from fiber optic cable	
Input adapters:	Accepts standard Ophir SMA and FC adapters and neutral density attenuators.	
Attenuation:	Accepts standard Ophir x10 and x50 ND attenuators. Attenuators may be stacked. One attenuator of each type is included with FPS-10.	
Output connection:	Output: BNC	
Power supply unit:	Power unit is connected to head by telephone cable and runs from rechargeable batteries. Operates 13 hours from batteries before recharge. Wall cube charger is supplied with system.	
Supplied accessories:	Rod and stand, 1-x50 attenuator and 1-x10 attenuator.	
Dimensions:	Head dimensions 46mm dia x 90mm deep	

Ordering Information		
Item	Description	Ophir P/N
FPS-10 Fast Photodetector system	FPS-10 head with power supply and connecting cables. Comes with 1 each of the filters below	78024
Extra x10 filter	ND filter. Attenuation from x10 to x20 from 400-1100nm	1Z08200
Extra x50 filter	ND filter. Attenuation from x50 to x200 from 450-1100nm	1Z08201

Ordering Information for Fiber Adapters							
Instrument	Instrument P/N	Bracket P/N	SMA fiber Adapter	FC Fiber Adapter	LC Fiber Adapter	ST Fiber Adapter	SC Fiber Adapter
WaveStar-V	1Z02550	N.A.	1G01236	1Z08229	1Z08228	1Z08226	1Z08227
WaveStar-U	1Z02551	N.A.	1G01236	1Z08229	1Z08228	1Z08226	1Z08227
4X beam expander	1Z17022	1G01649	1G01236	1Z08229	1Z08228	1Z08226	1Z08227
FPS-10	78024	N.A.	1G01236	1Z08229	1Z08228	1Z08226	1Z08227