PEMBROKE INSTRUMENTS
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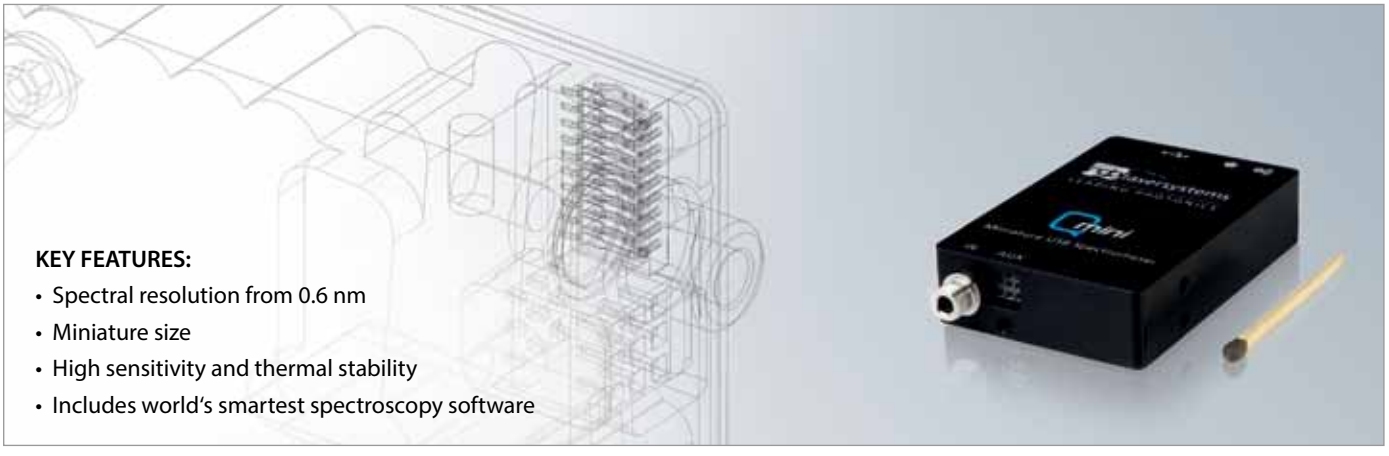
Qmini

MINIATURE SPECTROMETER
FOR HIGHLY INTEGRATED APPLICATIONS



KEY FEATURES:

- Spectral resolution from 0.6 nm
- Miniature size
- High sensitivity and thermal stability
- Includes world's smartest spectroscopy software

The new Qmini pushes the limits of miniaturization further: Within an amazingly small design, it delivers technical specifications that are unprecedented at this size. Its compact design enables tight integration in applications where space is limited, like hand-held analysis devices.

Applications

- Color measurement
- Chemical analysis
- Quality control
- System integration
- Counterfeit detection
- Environmental analysis

Configurations

The Qmini is available in 6 standard configurations:

- Qmini UV: 220 - 560 nm
- Qmini VIS: 370 - 750 nm
- Qmini NIR: 730 - 1100 nm

- Qmini VIS/NIR: 480 - 1100 nm
- Qmini WIDE-U (UV sensitivity optimized): 225 - 1000 nm
- Qmini WIDE-V (VIS sensitivity optimized): 225 - 1000 nm

Options

- Custom wavelength ranges and gratings
- Custom entrance slits (determine resolution vs. sensitivity)
- RS-232 serial interface
- Custom optical connectors
- I/O port adapter
- IllumiCell sample holder with light source

	Specifications
Focal length	50 mm
Grating	300 or 600 lines/mm
Entrance slit	20 µm (default)
Spectral resolution	UV: 0.6 nm VIS: 0.7 nm NIR: 0.7 nm VIS/NIR: 1.3 nm WIDE (UV opt.): 1.3 nm WIDE (VIS opt.): 1.3 nm
Dynamic range	> 500 : 1 (full scale, t_{exp} = 1 s)
Numerical aperture	0.1
Stray light	< 0.3 %
Exposure time range	100 µs to 600 s
Detector	2500 pixel linear CCD detector
A/D converter	16 bit 15 MHz
Calibration	Wavelength, sensitivity and multiple dark spectra stored within device
Transfer speed to PC	30 ms per spectrum
Optical interface	SMA connector
Digital Interface	USB 2.0
Dimensions	62.0 × 42.0 × 14.8 mm (technical drawing available on our website)
Weight	57.5 g
Operating temperature	-15 °C to 60 °C (non-condensing)
Storage temperature	-25 °C to 70 °C
Power consumption	5 V DC, 250 mA (supplied via USB, no power adapter required)
PC operating system	Windows 7, Vista, XP

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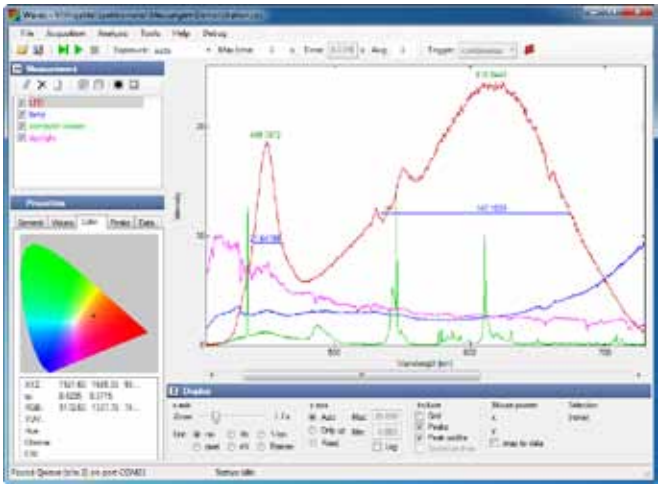
Waves

Every Qmini spectrometer includes Waves, the smartest general-purpose spectroscopy software on the planet. Waves not only includes unique sophisticated algorithms for data aquisition and evaluation, it also provides these features through a clear and straightforward user interface that's designed to make things easy.



Software features include:

- Take and display series of spectra
- Automatic exposure control with dark spectrum interpolation
- Import most ASCII-based file formats
- Export as ASCII table to almost any numerical analysis software
- Comprehensive tools for displaying and analyzing spectra
- "Strip charts" for comparing characteristic values between multiple spectra including peak follower in real time
- Graph printing and export to PDF
- Dynamic peak finder (no need to set a threshold level)
- Automated wavelength calibration
- Dark spectrum interpolation
- Transmission, absorption and reflection measurements
- Colorimetry

All spectrum evaluation options are available with as little mouse clicks as possible. To zoom in, just move the zoom slider. To move around, just move the scrollbar. To change the x axis unit, just click the corresponding button. There is no step two. For some features, there is not even a step one: values such as peaks or colorimetry are instantly calculated as soon as you take a spectrum.

There is just one version of Waves that includes all features, and it's free. No license fees, no need to buy additional packages, no hassle with copy protection. Waves is available for download from our website.

A software development kit (SDK) is also included to control the spectrometer and take spectra from your own software. It consists of a Windows DLL library for the .NET framework, documentation and sample code. The SDK can be used with any programming languange that can connect to .NET DLLs, including C#, Visual Basic .NET, C++/CLI, Delphi, LabVIEW, Matlab and Mathematica.

I/O Port

The Qmini includes 4 I/O channels that can be configured as trigger input, shutter and light source control or general purpose I/O pins. The optional I/O adapter provides easy access via a screw terminal block.

The Qmini supports three trigger modes: software trigger, interval trigger and external trigger. It can be set to trigger on the start or the end of the exposure period. For synchronizing the Qmini precisely to external events, a special low-jitter mode is available.

IllumiCell

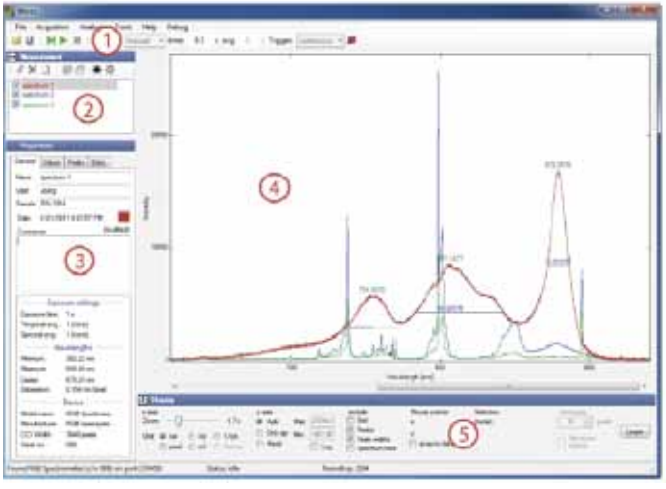
With the optional IllumiCell sample holder attached directly to the optical input, the Qmini can be extended to a complete measurement system for transmission, absorption and fluorescence spectroscopy.

The IllumiCell includes:

- a compartment for standard 1-cm square cuvettes
- a tungsten halogen light source (built-in along optical axis)
- an SMA fiber connector for custom light sources (at a 90° angle)
- four passive holders to store cuvettes between measurements
- a trigger button for spectrum acquisition
- a light shield cover to block ambient light

Need more performance or an even smaller design? Check out the Qwave and Qstick spectrometers.

Waves was designed from the ground up to provide a clean and straightforward user interface that does not stand in your way, without compromising advanced features or precision. Waves not only includes unique sophisticated algorithms for data aquisition and evaluation. It provides these features through a clear and straightforward user interface that's designed to make things easy.



The main window consists of several panels:

1. The Exposure Toolbar, where you can start and stop taking spectra and set the acquisition parameters.
2. The Spectrum List shows all spectra that are currently in memory.
3. The Properties Panel consists of four tab pages and displays many parameters and values of the spectrum currently selected in the Spectrum List.
4. The Main Diagram Panel shows all spectra marked with a check mark in the list.
5. The Display Parameters Panel determines how the spectra are displayed.

Pre Calibrated

The calibration for wavelengths, dark spectra and spectral sensitivity has been done during the production of the spectrometer and is stored on the device. It will be loaded automatically during device initialization. So in contrast to almost any other spectroscopy software, you don't need to worry about taking dark spectra and other calibration parameters, it's all done automatically. Nevertheless you can recalibrate all those values on purpose.

Intelligent Workflow

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Ease of use

Taking Spectra is an easy process. You can use automatic or manual modes, with or without sensitivity, dark spectra or background noise correction. You can capture and/or display multiple spectra at once with automatic peak determination or display single wavelengths for statistical data. Display parameters can be changed to turn the focus to important areas of the spectrum, without changing any spectrum value.

Before measuring absorption, reflection or transmission spectra, you can take all kinds of reference spectra (light, background, refection) and use them to improve your measurement.

Import/Export

Spectrum data will be exported in a simple ASCII table file format. This allows the spectrum files saved by Waves to be read by almost any numerical analysis software like Origin, Excel or Matlab. In Waves, you can also open spectrum data files written by other applications, if they are saved as ASCII tables or .csv files. Waves tries its best to automatically determine the file structure and is able to open many different file formats.

Specification

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Sophisticated and Free

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