

# THE NEW **Qmini**

MINIATURE SPECTROMETER  
WITH ON-BOARD PROCESSING AND EVALUATION  
FOR INTEGRATED MOBILE APPLICATIONS

### KEY FEATURES:

- Spectral resolution from 0.3 nm
- Miniature size
- Customizable wavelength range, sensitivity and resolution
- Powerful on-board processing and evaluation



Within an amazingly small design, the Qmini delivers technical specifications that are unprecedented at this size. Its compact design enables tight integration in applications where space is limited, like mobile analysis devices.

The new version of the Qmini includes a powerful new electronics board that enables:

- Full processing of spectra in the device (offset, nonlinearity, dark spectrum, spectral sensitivity)
- Averaging and smoothing
- Binning and buffering of spectra
- Complex application-specific evaluation algorithms
- A large choice of available communication interfaces
- A new I/O connector for analog and digital signals

The new Qmini also features a replaceable entrance slit, reduced stray light and lower power consumption.

### Configurations

The Qmini is available in 6 standard configurations:

- Qmini UV: 220 - 400 nm
- Qmini VIS: 370 - 750 nm
- Qmini NIR: 730 - 1080 nm
- Qmini Wide UV (optimized for 300 nm): 225 - 1000 nm
- Qmini Wide VIS (optimized for 500 nm): 225 - 1000 nm
- Qmini VIS/NIR: 480 - 1100 nm

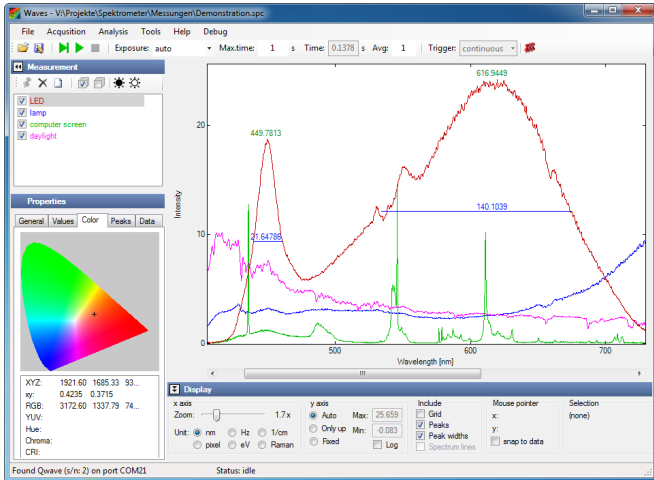
### Options

- Custom wavelength ranges between 190 and 1100 nm
- Custom entrance slits (resolution and sensitivity)
- CMOS image sensor
- Custom optical connectors
- Ethernet, WLAN, Bluetooth and CAN interfaces
- Detector collection lens
- Custom optical filters

Specifications	
Focal length	50 mm
Grating	300 or 600 lines/mm
Entrance slit	20 $\mu$ m (can be changed by user)
Spectral resolution (FWHM)	UV: 0.3 nm VIS: 0.7 nm NIR: 0.7 nm Wide UV: 1.5 nm Wide VIS: 1.5 nm VIS/NIR: 1.5 nm
Dynamic range	500 : 1
Numerical aperture	0.1
Stray light	< 0.1 %
Exposure time range	3 $\mu$ s to 600 s
Detector	2500 pixel linear CCD sensor
A/D converter	16 bit
Calibration	Wavelength, sensitivity, nonlinearity and multiple dark spectra stored in device
Transfer speed to PC	USB 2.0 High-Speed
Optical interface	SMA connector
Digital Interfaces	USB 2.0 with Type-C connector On request: UART (serial), SPI, I <sup>2</sup> C Ethernet, WLAN, Bluetooth, CAN
Dimensions	64.0 x 42.0 x 14.5 mm (technical drawing available on our website)
Weight	60 g
Operating temperature	-15 °C to 60 °C (non-condensing)
Storage temperature	-25 °C to 70 °C
Power consumption	5 V DC, up to 130 mA (low-power mode on request)
PC operating system	Windows 10, 8, 7, Vista, XP

## PC Software

Every Qmini spectrometer includes Waves, the smartest general-purpose spectroscopy software on the planet. Waves not only includes unique sophisticated algorithms for data acquisition 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)
- 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.

Waves is available as a free download from our website.

## Software library

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 language that can use .NET DLLs, including C#, Visual Basic .NET, C++, Delphi, LabVIEW, Matlab and Mathematica.

## Communication protocol

The spectrometer can also be directly controlled from an embedded microcontroller or other operating systems using the device communication protocol. Just like our application software, the protocol is designed to be both powerful and easy to use for software developers.

Please contact us if your requirements are not matched by these specifications. Custom modifications are available for any quantities. All specifications are subject to change without notice. The latest versions can be found on our website.

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## I/O Port



The Qmini includes a new auxiliary connector for analog and digital I/O, communication interfaces and power supply (if USB is not used). The 8 digital channels can be configured as trigger input, shutter or flash lamp control, process control or general purpose I/O pins.

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.

## Optional accessories

### Cosine Correcting Probe

The cosine corrector COCOS-SMA-F collects light over an angle of 180 degrees and can be used to measure irradiance or illuminance as optical power per area. It can be attached to an optical fiber or directly to the spectrometer.



### SMA Collimator

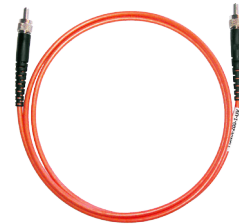
The collimator can be used to couple collimated light into a multi-mode optical fiber or to collimate the divergent light emitted from a fiber.



### Optical Fiber with SMA Connectors

Optical fiber patch cables are fabricated to customer's requirements regarding:

- Length
- Core diameter
- Tubing (PVC or stainless steel)
- Spectral range (UV/VIS or VIS/NIR)
- Optical connectors



More specialized accessories are available on request.

## Applications

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

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