

The MMS OEM Spectrometer Unit offers a compact solution for reliable UV-NIR acquisition. The unit contains a Zeiss MMS optical engine with the Hamamatsu S3904 detector chip and the tec5 USB electronics, all packed into a robust OEM-style aluminum housing. With high signal-to-noise in a small footprint, the MMS offers the best compromise between performance and cost.

## Main Features

- Wide spectral range
- High reliability
- High signal-to-noise
- Compact
- Temperature stable

## Spectrometer Module

The Carl Zeiss Monolithic Miniature spectrometer (MMS) module series offers a compact design for detection between 190 to 1110 nm in a variety of wavelengths ranges. It combines a high-quality silicon photodiode array, S3904-256Q or S8381-256Q from Hamamatsu, with a high-efficiency, imaging-corrected grating. The SMA fiber bundle input acts as a cross-section converter, which increases the sensitivity nearly ten-fold for a standard 600  $\mu\text{m}$  monofiber input.



## Electronics

The tec5 COE-USB11 /NMOS-1 board is a compact electronics solution that converts the signals from the array into useable data. The combination of the Analog-to-Digital (A/D) conversion and the interface electronics onto a single board simplifies the setup and eliminates the need for cables. The 16-bit A/D conversion provides a large dynamic range and a trigger input/output connector allows a synchronization to external hardware, such as a mechanical stage. A non-volatile memory (EEPROM) allows a user to save spectrometer or customer specific data in the electronics.

## Software Support

- MultiSpec Pro II – application with add-on features for color analysis, chemometrics, data preprocessing, etc.
- Software Development Kit (C++, Visual Basic, Delphi, Labview) – versatile tools for the creation of complex applications

# Systems

## MMS OEM Spectrometer Unit

This unit is designed as an OEM spectrometer for integration into a larger system.

### Technical Data

#### Optics:

- Dispersive element: imaging grating, flat-field corrected, 366 lines/mm at center
- Optical interface: SMA, up to 600  $\mu\text{m}$  effective diameter
- Numerical Aperture: 0.22

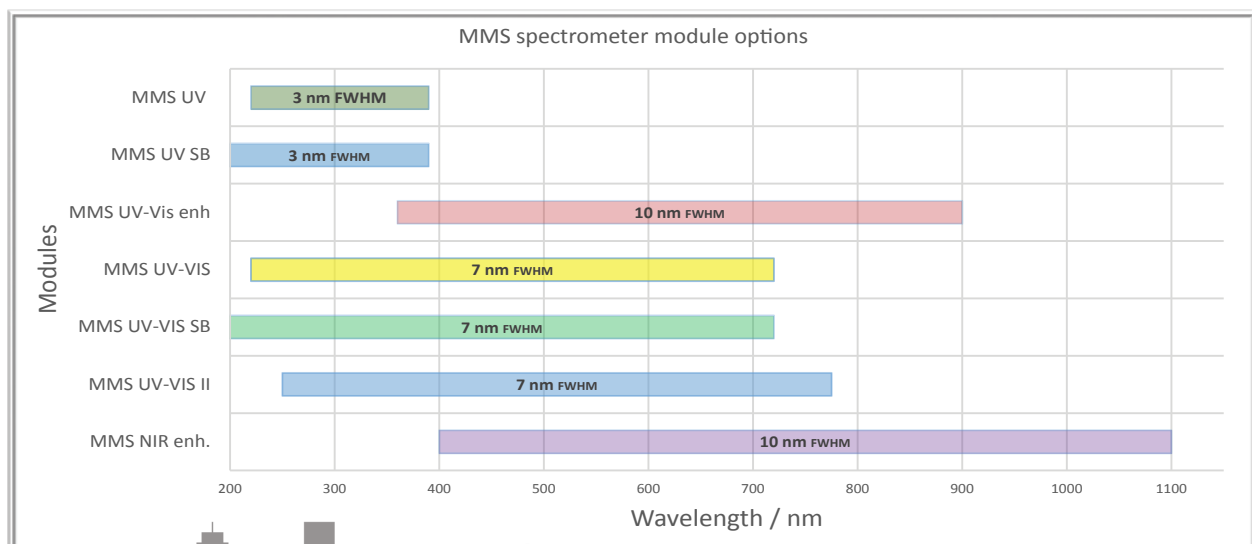
#### Electronics:

- Chip: Hammamatsu S3904-256Q (S8381-256Q for MMS 1 NIR enhanced version)
- Readout frequency: 1 MHz
- Readout time: 0.3 ms
- Integration time range: 0.3 ms to 6.5 seconds
- A/D Conversion: 16 bit
- Readout noise: < 2 counts rms at 16 bit A/D conversion
- Interface: High-speed or full-speed USB V2.0
- Power requirements: +5 DC, < 0.450 A
- External power supply included

Weight: approx. 0.5 kg

Standard Dimensions (H x W x D): 85 x 105 x 124 mm<sup>3</sup>

Customization possible



Graph above shows the wavelength ranges and resolutions of the available MMS modules