

Maya2000 and Maya2000Pro Data Sheet

Description

The Ocean Optics Maya2000 Series Spectrometers (Maya2000 and Maya2000Pro) includes the linear CCD-array optical bench, plus all the circuits necessary for spectrometer operation. The result is a compact, flexible system, with no moving parts, that's easily integrated as an OEM component.



The Maya spectrometers are a unique combination of technologies providing users with high sensitivity for low light-level, UV-sensitive and other scientific applications. The electronics have been designed for considerable flexibility in connecting to various modules as well as external interfaces. The Maya interfaces to PCs, PLCs and other embedded controllers through a USB 2.0 connection. The information included in this data sheet provides detailed instructions on the connection and operation of both of the Maya spectrometers.

The detector used in the Maya spectrometer is a scientific-grade, back-thinned, CCD array from Hamamatsu (product number S9840 for Maya2000 and S10420 for Maya2000Pro). For complete details on these detectors, visit www.Hamamatsu.com.

The Maya operates from power provided through the USB, or from a separate + 5VDC power supply. The Maya is a microcontroller-controlled spectrometer, thus all operating parameters are implemented through software interfacing to the unit.

Features

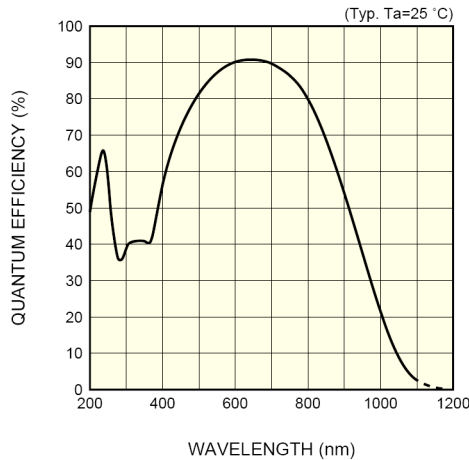
- Hamamatsu high UV-sensitivity detector
 - S9840 Detector for Maya2000 with Peak QE: >90%
 - S10420 Detector for Maya2000Pro with Peak QE: 75%
 - Back-thinned for good UV sensitivity
 - MPP operation for low noise operation, low dark current, wide dynamic range
- Spectrometer Design:
 - Symmetrical Crossed Czerny Turner
 - 101.6 mm focal length
 - 15 gratings including the HC-1 composite grating
 - 6 slit widths
- Electrical Performance:
 - 16 bit, 500kHz A/D Converter
 - Integration time: 6ms – 10s (Maya2000)
6ms – 5s (Maya2000Pro)
- Embedded microcontroller allows programmatic control of all operating parameters and standalone operation:
 - USB 2.0 480Mbps (high-speed) and 12Mbps (full speed)
 - Communication Standards for digital accessories (I2C)
- Onboard Pulse Generator:
 - 2 programmable strobe signals for triggering other devices
 - Software control of nearly all pulse parameters
- Onboard GPIO:
 - 10 user-programmable digital I/O
- EEPROM storage for:
 - Wavelength Calibration Coefficients
 - Linearity Correction Coefficients
 - Absolute Irradiance Calibration (optional)
- Software and Quasi Real-time triggering
- Plug-n-Play Interface for PC applications
- 30-pin connector for interfacing to external products

Specifications

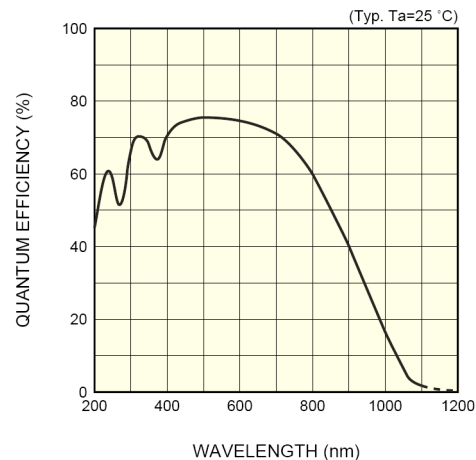
Specifications	Criteria
Physical Specifications: Physical Dimensions (LxWxH) Spectrometer Weight Power Supply Weight	149 mm (5.86 in.) x 109.3 mm (4.30 in.) x 50.4 mm (1.98 in.) 0.96 kg (2.1 lbs.) 0.45 kg (1 lb.)
Power: Power requirement Supply voltage Power-up time	500 mA at +5 VDC 4.5 – 5.5 V ~2s depending on code size
Absolute Maximum Ratings: V _{CC} Voltage on any pin	+ 5.5 VDC V _{CC}
Spectrometer: Design Focal length (input) Input Fiber Connector Gratings Entrance Slit Detector Pixels (active) Pixel size Spectral range Quantum efficiency Well Depth Sensitivity Dark Current Filters	Symmetric crossed Czerny-Turner F/4 101.6 mm SMA 905 to single-strand optical fiber (0.22 NA) 14 different gratings 5, 10, 25, 50, 100, or 200 μm slits. (Slits are optional. In the absence of a slit, the fiber acts as the entrance slit.) Maya2000: Hamamatsu S9840; Maya2000Pro: S10420 Maya2000: 2048 x 14; Maya2000Pro: 2048 x 64 14μm ² 165 – 1100nm Maya2000: >90% peak Maya2000Pro: 75% peak Maya2000: 130 Ke- Maya2000Pro: 200 Ke- Maya2000: ~0.45 counts/e-; Maya2000Pro: ~0.32 counts/e- 4000 e/pixel/sec (typ) @ 25° C; 200 e/pixel/sec (typ) @ 0° C OFLV-MAYA-200 an OFLV-MAYAPRO-200 available with HC-1 grating
Spectroscopic: Integration Time Dynamic Range (Typical) Dynamic Range (Guaranteed) Signal-to-Noise Dark Noise (single dark spectrum) Nonlinearity (uncorrected) Linearity (corrected)	Maya2000: 6 ms – 10s Maya2000Pro: 6ms – 5s Maya2000: 8000:1+; Maya2000Pro: 12000:1+ Maya2000: 5000:1; Maya2000Pro: 8000:1 Maya2000: 350:1; Maya2000Pro: 450:1 Maya2000: 13 RMS counts; Maya2000Pro: 8.2 RMS counts (Guaranteed) Maya2000: ~4%; Maya2000Pro: ~10% >99.7%

Maya Data Sheet

Specifications	Criteria
Environmental Conditions: Temperature Humidity	-30° to +70° C Storage & -0° to +50° C Operation 0% – 90% noncondensing
Interfaces: USB	USB 2.0, 480 Mbps



Quantum Efficiency of Maya2000 S9840 Detector



Quantum Efficiency of Maya2000Pro S10420 Detector

Optical Performance

The following table shows the Maya resolution for various slit sizes.

5 micron Slit	10 micron Slit	25 micron Slit	50 micron Slit	100 micron Slit	100 micron Slit
~1.5 pixels	~2.0 pixels	~2.5 pixels	~4.2 pixels	~8.0 pixels	~15.3 pixels

Electrical Pinout

Listed below is the pin description for the Maya Accessory Connector (J3) located on the front vertical wall of the unit. The connector is a Pak50TM model from 3M Corp. Headed Connector Part# P50-030P1-RR1-TG. Mates with part# P50-030S-TGF (requires two: 1.27mm (50 mil) flat ribbon cable: Recommended 3M 3365 Series)