Product Specification: RedBullet (RB) Series Spectrometers

Description

The RedBullet (RB) Series spectrometers introduce a concave mirror Czerny-Turner optical design in an extremely compact and lightweight package. Built on an embedded 8-bit microcontroller, the RB Series provides ultra-fast readout, short integration times, precise trigger timing, and low power consumption. Powered via USB with additional external I/O ports, these rugged, miniaturized spectrometers are ideal for portable and OEM applications in the near-infrared region.

Models and Wavelength Ranges

- RB4524: 900–1700 nm
- RB4564: 900–1700 nm

Main Features

- Compact concave mirror Czerny–Turner optical design (f/4.5, NA 0.11)
- InGaAs sensors: 128-pixel (RB4524) or 256-pixel (RB4564)
- High signal-to-noise ratio with selectable high/low gain modes
- Configurable slit widths (25 µm, 50 µm, 100 µm) and multiple grating options
- Integration time 6 µs – 24 s with fast readout performance
- Resolution <15 nm (RB4524, 50 µm slit) / <12 nm (RB4564, 50 µm slit)
- Low stray light < 0.2 % and low dark noise (≤ 10 counts typ.)
- External 8-pin I/O port with six programmable 3.3 V GPIOs, UART TX/RX, trigger input, and lamp control
- Flash ROM storage for wavelength, linearity, and intensity calibration coefficients
- Powered and connected via USB 2.0 (480 Mbps) with Micro USB or 4-pin connector
- Baseline signal intensity of 1,000 counts (adjustable through SpectraSmart software)

- Compact and lightweight housing for portable and OEM integration

Technical Details

- Optical Design: Concave mirror Czerny–Turner, 2nd & 3rd harmonics removed (f/4.5, NA 0.11)
- Sensors: InGaAs array – 128-pixel (RB4524) or 256-pixel (RB4564)
- Slit Width Options: 25 µm / 50 µm / 100 µm (customizable)
- Integration Time: 6 µs – 24 s
- A/D Conversion: 16-bit, 15 MHz
- Fiber Interface: SMA905 (IEC 874-2:1993 standard, ferrule length < 9.812 mm)
- Trigger Modes: Single capture, software trigger, and multiple capture modes
- Data Interface: Micro USB or 4-pin USB connector (USB 2.0 @ 480 Mbps)
- Digital I/O: Six 3.3 V GPIO (VIL ≤ 0.8 V, VIH ≥ 2.0 V), UART TX/RX, external trigger, lamp control
- Baseline Signal Intensity: 1,000 counts (default, adjustable via software)
- Flash ROM Storage: Calibration for wavelength, linearity, and intensity correction
- Environmental: Operating 0 – 50 °C; Storage –30 – 70 °C; Humidity 0 – 90 % non-condensing

Dimensions

- 51.4 (L) × 36.4 (W) × 29 (H) mm

Power Requirements

- USB-powered: 500 mA @ +5 VDC
- Voltage range: 4.75–5.25 V

Specifications

Model	Wavelength Range (nm)	Sensor Type	SNR (Single acquisition)	Dynamic Range	A/D	Stray Light (%)
RB4524	900–1700	128-pixel InGaAs	2000 / 6000	6250 / 7200	16 bits	<0.2%

RB4564	900–1700	256-pixel InGaAs	3000 / 6700	6500 / 9500	16 bits	<0.2%