



SPACE QUALIFIED

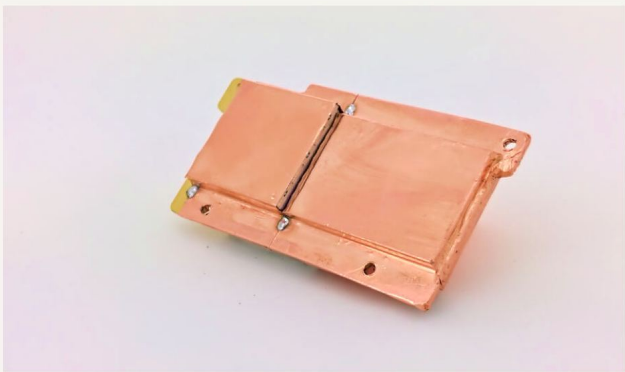
FLIGHT HERITAGE

CUBESAT READY

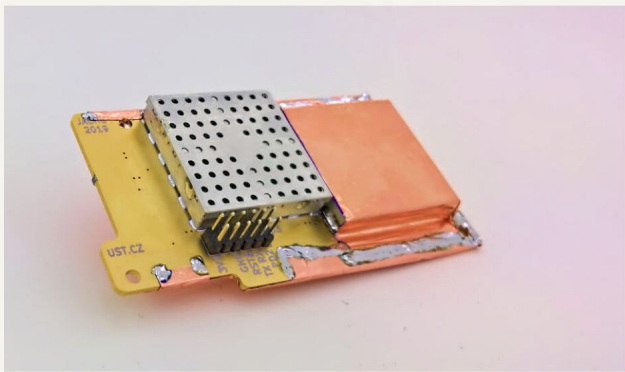
SPACEDOS01B

Flight Model — Cosmic-Ray Spectrometer & Dosimeter

SPACEDOS01B is a silicon PIN-diode radiation spectrometer and dosimeter built for long-duration unmanned space missions. Flight-proven, low-power, and minimal in interface, it reports an energy-resolved spectrum of ionizing radiation directly to the spacecraft’s flight computer or telemetry link.



TOP VIEW



BOTTOM VIEW — RF SHIELDING CAN

Flight heritage: SPACEDOS01B was in orbit on board the Sokrat-R satellite (NORAD ID 44404), approximately 500 km above Earth, monitoring cosmic-ray spectral data since launch.

100 keV to 9 MeV Deposited energy range	8.6 mW Typical @ 3.3 V	33 g Mass	15 mm Envelope height (H)
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Applications

SPACE DOSIMETRY & SPECTROMETRY

- Radiation dosimetry for unmanned missions
- Real-time absorbed dose in silicon and dose equivalent
- Shielding material effectiveness studies

SPACE RADIATION RESEARCH

- LET energy spectrum of cosmic particles
- Time evolution of the radiation flux
- Operation on board a CubeSat

Main technical parameters

Sensor	Si PIN diode, 10 × 20 × 0.5 mm
Detection volume	44 mm ³ (default configuration)
Deposited energy range	100 keV – 9 MeV
Energy resolution	< 50 keV / channel
Particle types	Electrons, protons, heavy ions
Integration time	15 s
Power supply	3.3 V – typ. 2.6 mA, max 3 mA
Communication interface	UART / RS232, TTL levels, 2400 baud
Measurement environment	Vacuum < 3.2 × 10 ⁻² Pa
Temperature stability	-50 °C to +50 °C (within ±50 keV)
EMC compliance	ECSS-E-ST-20-07C Rev.2
Dimensions (H × W × L)	15 × 41 × 94 mm
Weight	33 g

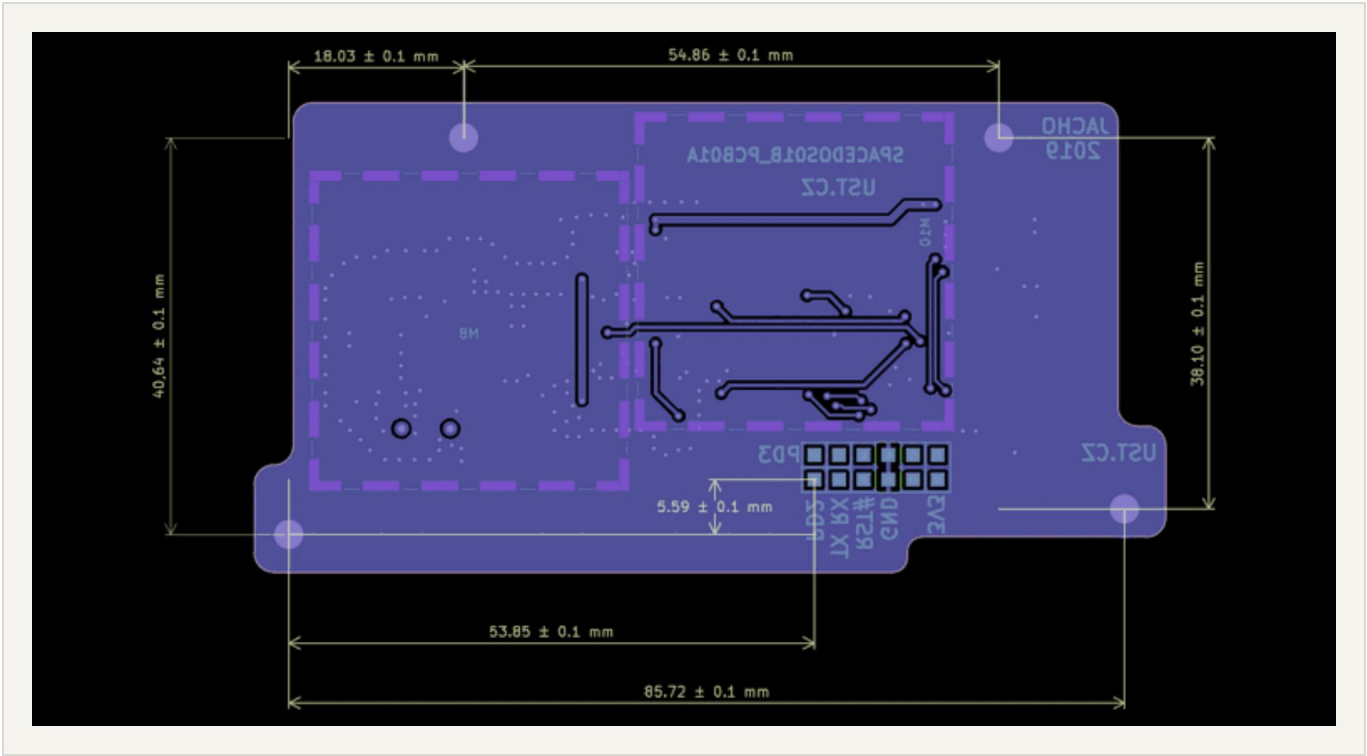
Meaning of measured data

SPACEDOS01B measures ionizing radiation with a silicon semiconductor sensor and outputs energy-resolved spectral data of deposited energy — the instrument’s primary data product.

Derived quantities such as dose rate and total ionizing dose (TID) are calculated from the spectrum by integrating deposited energy over the detector mass and over time. Dose rate reflects instantaneous radiation intensity; TID is the time-integrated accumulated dose.

Spectral resolution enables separation of radiation components by deposited energy, supporting analysis of temporal and spatial variation in the radiation environment. All derived quantities depend on integration geometry, calibration, shielding, and mission-specific configuration.

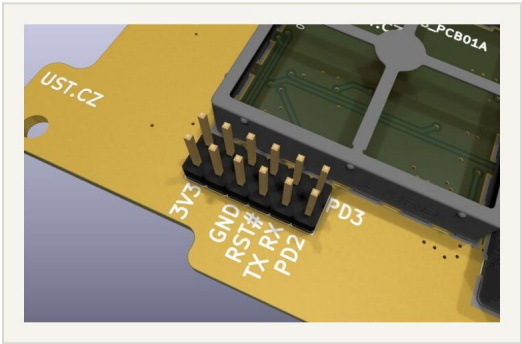
Physical dimensions



PCB DIMENSIONS IN MM, TOLERANCE ±0.1 MM

Electrical interface

Dual-row 2.54 mm pitch pin header



CONNECTOR DETAIL

PIN	DESCRIPTION
3V3	Power supply, +3.3 V
GND	Ground
RST#	Reset (through capacitor)
TX0	RS232 transmit, 3.3 V
RX0	RS232 receive, 3.3 V
PD2	Universal input pin
PD3	Universal output pin

Communication protocol

ASCII, comma-separated NMEA-style sentences at 2400 baud. Minimal data payload is 18 B / 15 s — approximately 103,680 B per day.

MESSAGE	PERIOD	CONTENT
\$POSD	At power-on	Power-on handshake, git commit hash of onboard firmware
\$ICSD	Once, ≤ 1 s after power-on	Initialization complete
\$DPSD	Every 15 s	Data payload — 8-channel energy spectrum + ADC offset, for ground archival
\$HKSD	Every 15 s	Housekeeping — per-channel event histogram, filter statistics
\$BESD	Every 15 s (reset by \$ADSD)	Cumulative beacon counters, 8 energy thresholds
\$ADSD	~Once/day (5760 beacons)	Two-day almanac summary for beacon transmission

Ordering information: SPACEDOS01 is available from Universal Scientific Technologies s.r.o. Custom shielding, calibration ranges, and interface modifications can be discussed for mission-specific integration — including HiRel radiation alarm variants for satellite protection. Contact sale@ust.cz for a commercial quotation.

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