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# *Spacemag-Lite*

## *Three-Axis*

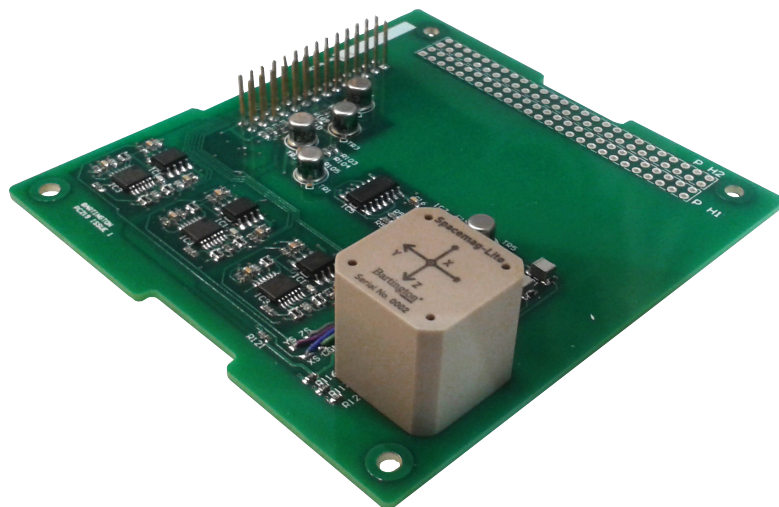
## *Magnetometer*

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Spacemag-Lite is a low-cost, unpackaged fluxgate sensor which has been specifically designed to fit into the chassis of a CubeSat.

It is available either as a fluxgate probe mounted directly onto electronics, or in two parts, with the probe connected to the electronics by cables up to 2m in length. The latter allows the probe to be deployed at the end of a boom.

The sensor utilises COTS components.



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## *Features*

- Compact dimensions (<100mm x 100mm)
- Available as a single unit or with probe connected to electronics by PTFE cables
- Noise level <150pTrms/√Hz at 1Hz
- Able to withstand up to 25krad
- Measuring range  $\pm 60\mu\text{T}$

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## *Typical Applications*

- Spacecraft attitude sensing
- Geomagnetic field mapping
- Spacecraft magnetic signature measurement

## Spacemag-Lite Specifications

Performance	
Number of axes	Three (right hand XYZ co-ordinate system)
Polarity	+ve non-inverting output when pointing North
Measuring range	$\pm 60\mu\text{T}$
Bandwidth	>1kHz [-3dB]
Measurement noise floor	>10pT to <150pTrms/Hz at 1Hz at 25°C
Scaling	50mV/ $\mu\text{T}$
Scaling temperature coefficient	<100ppm / °C
Start-up / settling time	99% of final value in 0.5s
Zero field offset	$\pm 100\text{nT}$ max. at 25°C
Scaling error	$\pm 0.5\%$ at 25°C
Orthogonality error between axes	<0.5°
Frequency response	<5% amplitude error DC to 15Hz
Hysteresis	<0.1 % range for exposure to 10 x range when unpowered
Excitation breakthrough	<10mV pk-pk at 16kHz

Environmental	
Operating temperature range	-40°C to +65°C TBC
Storage temperature range	-40°C to +85°C TBC
Environmental protection	None: unpackaged electronics
Radiation dose	Up to 25krad



Mechanical: fluxgate element*	
Dimensions excl. cable	20 x 20 x 20mm ( $\pm 0.1$ mm)
Integral cable length	2m when probe mounted remotely
Weight (approximate)	50g incl 2m cable 15g without cable
Material	Sensor head enclosure: PEEK
Mounting arrangements	4 off mounting holes M3 tapped

\* Option to mount on PCB or remotely.

Mechanical: electronics	
Dimensions	Conforms to Pumpkin® CubeSat Kit PCB specification 810-00253 rev A5 (90.2 x 95.9 mm)
Weight	12g approx
Output connector	2 x Samtec ESQ-126-39-G-D or Samtec ESQ-114-39-G-D TBC
Fluxgate element connector	Solder pads
Mounting arrangements	Conforms to Pumpkin® CubeSat Kit PCB specification 810-00253 rev A5

Electrical	
Supply voltage	+5V and +3.3V
Current consumption (max. mA)	+5V: 33.5mA zero field; 35mA in specified full range field +3.3V: 8.5mA
Analogue output	$\pm 3$ V (balanced differential output, each output 0.15V to 3.15V, 1.65V zero-field)

