

Fine (Digital) Sun-Sensor



The Sun-Sensor determines the spacecraft body angles with respect to the Sun.

It accepts configuration commands and outputs digital angles and telemetry over a serial interface to the on-board computer. The unit is powered from unregulated DC power from the spacecraft.

The front surface of the sensor is a mirror with slits cut in the reflective metal. Sunlight passes through these slits and then through an optical filter. Below this is an array of photo-sensors interfaced to a micro-controller.

The charge on the photo-sensors are read by the microcontroller, which processes the image and computes the sun vector.

The vector and other telemetry is returned to the spacecraft through the serial interface.

Features

- ◆ Digital architecture
- ◆ High accuracy
- ◆ Wide Field of View
- ◆ Small size and low mass
- ◆ Low power
- ◆ Simple to interface

Applications

- ◆ Accurate determination of sun-angle
- ◆ Four sensors can achieve full sky coverage
- ◆ Can be used as safe-mode sensors on gyro or star-mapper controlled systems
- ◆ Used in conjunction with a magnetometer for simple attitude control

Qualification

The qualification of the Fine Sun-Sensor comes from 14 on-orbit sensors on 4 LEO satellites.

Specifications

Functional Characteristics
Field of View: 140°
Update rate: 5 Hz
Accuracy: +/- 0.1° (2 sigma)
Physical Characteristics
Size: 34mm x 32mm x 21mm
Mass: 35 grams
Power: 7.5mA average, 26mA peak
Environmental Characteristics
Operating temperature: -25°C to +50°C
15g rms random, vibration, 1000g shock (qualification levels)
10krad total dose (component level)
Interfaces
Power Supply: 5V DC nominal (5V to 50V)
Digital I/F: UART RS-485/422

Contact information

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