**Description**

The CubeSense module is an integrated sun and nadir sensor for attitude sensing. It makes use of two CMOS cameras and each can be dedicated to sun sensing or horizon detection. The sun sensor has a neutral density filter included in the optics. Both cameras have wide FOV optics. The primary outputs of the sensor are two angles that can be used to calculate the sun and nadir vectors relative to the CubeSense camera boresights.

**Feature List**

**Cameras:**
- 1024 x 1024 pixel CMOS image sensor
- Fisheye lens, 150° effective FOV
- Configurable placement options for each camera

**Onboard:**
- Processing of nadir and sun centroids done onboard
- Dual FPGA/SRAM system for redundancy
- Measurement updates @ 1 Hz
- I2C and UART interfaces available

**Accuracy:**
- Nadir: < 0.2° with full Earth in FOV
- Sun: < 0.2° over entire FOV

**Application**

- For nano-satellites that require accurate attitude determination
- PC104 form factor, compatible with CubeSat standard

**Testing & Heritage**

- Successful vibration and heated vacuum tests
- Radiation test (TID)
- Used on QB50 precursor satellites

**Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>3.3 V, 5 V</td>
</tr>
<tr>
<td>Power consumption</td>
<td>150 (avg), 360 (max) mW</td>
</tr>
<tr>
<td>I2C bus voltage</td>
<td>3.3 V / 5 V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10°C to 70°C</td>
</tr>
<tr>
<td>Mass (including cameras)</td>
<td>80 g</td>
</tr>
<tr>
<td>Dimensions: PC104 board</td>
<td>90 x 96 x 10 mm</td>
</tr>
<tr>
<td>Dimensions: Camera modules</td>
<td>40 x 31 x 19 mm</td>
</tr>
</tbody>
</table>

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