

CMOS Digital Sun Sensor (DSS-2)



Short technical specification

Number of pixels:	2 x 1024 (CMOS)
Field of view (FOV):	typically 80° ($\pm 40^\circ$), maximum ($\pm 45^\circ$)
Accuracy:	$\sim 0.1^\circ$
Resolution:	$\sim 0.1^\circ$ (optionally, a narrower FOV can be chosen to get better accuracy)
Exposure Time:	30-3840 ms, (15ms steps); can be set by the command, the default - power on reset value is 30ms, which is recommended for the flight (real Sun).
Electric interface:	RS485, (RS422). Integrated circuit MAX 489 or equivalent is used; terminal resistor 470 Ohm, (3900 Ohm is tied to power supply 5V and to ground), 9-pin micro-D connector RS232 interface can be used if required.
Baud rate:	115200 bit/s
Mass:	0.15 kg
Sizes:	75 x 72 x 33.5 mm
Power consumption:	< 250mW
Digital Output:	computed Sun vector or signal from all pixels, temperature, delay between the exposure and data send
Supply Voltage:	5V \pm 0.25V, other voltage or internal DC/DC converter can be used if required.

After having successfully received the first reading command, the sensor performs continuously the following operation in a cycle:

- 1) Takes the picture - measures the signal from the linear CMOS sensors,
- 2) Calculates two perpendicular angles α , β - finds the most illuminated pixels $p_{i\alpha}$, ($p_{i\beta}$) respectively,
- 3) Measures the processor temperature, the data are given out only on request.

The sensor mainly consists from COTS and industrial components. The sensor was tested on radiation by exposure to 30MeV protons with the beam flux $\sim 1.5 \cdot 10^9$ particles per cm^2/s for 200s. No change in function was observed. The sensor should fly on the SPECTR-R satellite of RADIOASTRON project, scheduled for launch in 2008.

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