



NanoPower  
SADA-50  
Part no. 108215  
Datasheet

Product name: NanoPower SADA-50

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## 2 Overview

The GomSpace NanoPower SADA-50 is a compact and highly durable mechanism for sun tracking of solar arrays about 1 axis, and is qualified for 5 years in low earth orbit.



Figure 2-1 SADA-50

The SADA-50 is intended as the sun tracking unit for the deployable solar array NanoPower-TSP 45W deploy but can also be purchased as a standalone unit. The SADA-50 is integrable on the GomSpace 6U structure on either of the Z faces (see Figure 7-1).

### 2.1 Highlighted Features

- 5-years lifetime in LEO.
- Nominal torque of 50Nmm.
- Maximum torque up to 75Nmm.
- Range of Motion:  $\pm 117.5^\circ$ .
- Backlash:  $<3^\circ$ .
- Internal encoder and end stop contacts of position verification and run-time calibration.
- Memory of position recall in case of power failure and adjustable drive settings.
- Highly parameterized firmware.
- Positioned by external device such as an ADCS unit.
- Four built in modes: *Normal* (suntracking), *Homing* (calibration), *Eclipse*, and *Safe*.
- Power interface 5V normal operation. Functional range 4.75-5.5V.
- CAN and I2C control interface. GOSH (UART) interface for test and debug.
- Sensor interface (GSSB compatible).
- Temperature sensors for motor unit and MCU.
- Current sensors on external interfaces.
- Externally back drivable within range of motion when unpowered.
- PCB material: ARLON 85N.
- IPC-A-610 Class 3 assembly.

## 2.2 Qualification

The product has undergone the following qualification tests:

Structural tests:

- Sine vibration: 5-100Hz @ 4.5g
- Quasi-static by sine burst: 15g at 30Hz (7 full load cycles)
- Random vibration: Nasa GEVS qualification level (14.1g<sub>rms</sub>)
- Mechanical shock: 1500g until 10kHz

Radiation:

- TID: 18kRad

Thermal Vacuum:

- 8 cycles, [-55°C,90°C]
  - First cycle non-operational [-55,90].
  - Rest of cycles operational [-40;90]

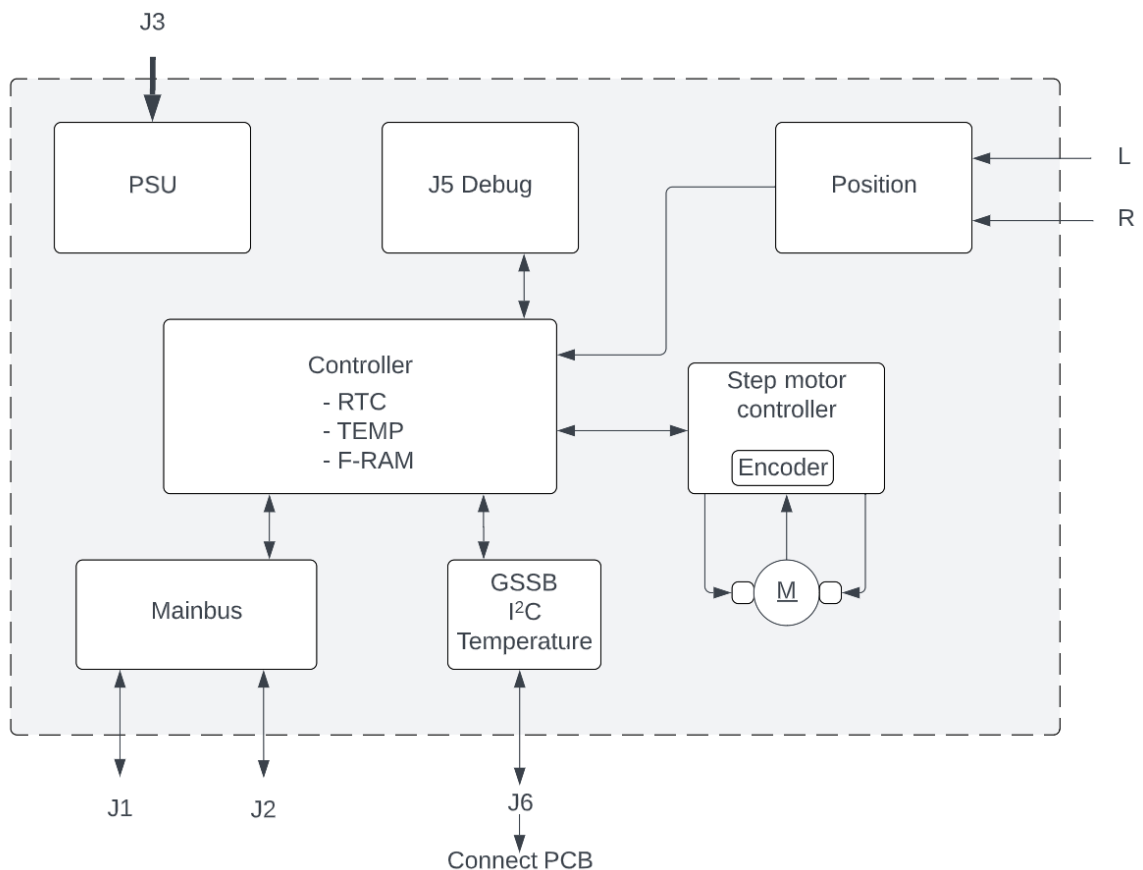
Thermal stress:

- 500 cycles, [-55°C,90°C]

Lifetime testing:

- Qualified for >58000cycles (approximately 10 years in LEO) – Using qualification factors from ECSS-E-ST-33-01C Rev. 2.

## 2.3 Block Diagram



### 3 Connector Pinout

The connector placement on the SADA-50 is as shown.

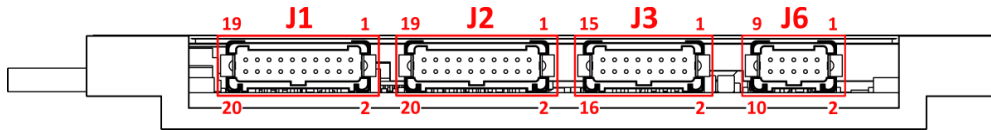


Table 1: Connector type

Designator	Connector type
J1	G125-MH12005L1R
J2	(same as J1)
J3	G125-MH11605L1R
J6	G125-MH11005L1R

Table 2: Pinout of J1

Connector J1 (MainBus)		
Pin	Description	Comments
1	I2C_DATA	3V3 Communication
3	GND	
5	I2C_CLK	3V3 Communication
7	GND	
9	PPS_H	Connected to J2
11	PPS_L	Connected to J2
13	Reserved	Connected to J2
15	GND	
17	Reserved	Connected to J2
19	GND	
2	CAN_H	3V3 CAN bus communication
4	CAN_L	3V3 CAN bus communication
6	Reserved	Connected to J2
8	Reserved	Connected to J2
10	Reserved	Connected to J2
12	Reserved	Connected to J2
14	Reserved	Connected to J2
16	Reserved	Connected to J2
18	Reserved	Connected to J2
20	Reserved	Connected to J2

**Table 3: Pinout of J2.**

<b>Connector J2 (MainBus backup)</b>		
Pin	Description	Comments
1	I2C_DATA	3V3 Communication
3	GND	
5	I2C_CLK	3V3 Communication
7	GND	
9	Reserved	Connected to J1
11	Reserved	Connected to J1
13	Reserved	Connected to J1
15	GND	
17	Reserved	Connected to J1
19	GND	
2	CAN_H	3V3 CAN bus communication
4	CAN_L	3V3 CAN bus communication
6	Reserved	Connected to J1
8	Reserved	Connected to J1
10	Reserved	Connected to J1
12	Reserved	Connected to J1
14	Reserved	Connected to J1
16	Reserved	Connected to J1
18	Reserved	Connected to J1
20	Reserved	Connected to J1

**Table 4: Pinout of J3.**

<b>Connector J3 (Power)</b>		
Pin	Description	Comments
1	RAIL_VCC	5V
3	RAIL_VCC	5V
2 - 16	GND	Even numbers.
5 - 15	No connections	ODD numbers.

**Table 5: Pinout of J6.**

<b>Connector J6 (GSSB)</b>		
Pin	Description	Comments
1	GND	
2	GND	
3	GSSB I2C_CLK	3V3 I2C communication
4	GSSB I2C_CLK	3V3 I2C communication
5	VCC_PWR	3V3
6	VCC_PWR	3V3
7	GSSB I2C_DATA	3V3 I2C communication
8	GSSB I2C_DATA	3V3 I2C communication
9	GND	
10	GND	





## 4 Absolute Maximum Ratings

Stresses above those listed under Absolute Maximum Rating may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect the reliability.

Symbol	Description	Min.	Max.	Unit
$M_{Nom}$	Nominal Torque	50		Nmm
$M_{Unp}$	Unpowered Hold Torque	49		Nmm
$M_{Max}$	Maximum Achievable Torque		75	Nmm
$T_{operational}$	Minimum and maximum operational ambient temperature	-40	80	°C
$V_{max}$	Maximum possible rotational speed		15	Deg/s
$\Delta_{min}$	Minimum possible step size	0.1		Degree
$b$	Backlash		3	Degree
$\alpha$	Angular accuracy (defined by backlash)		3	Degree

## 5 Electrical Characteristics

Symbol	Description	Min.	Max.	Unit
Supply voltage	Nominal 5V	4.75	5.5	V
Supply current		65	225	mA

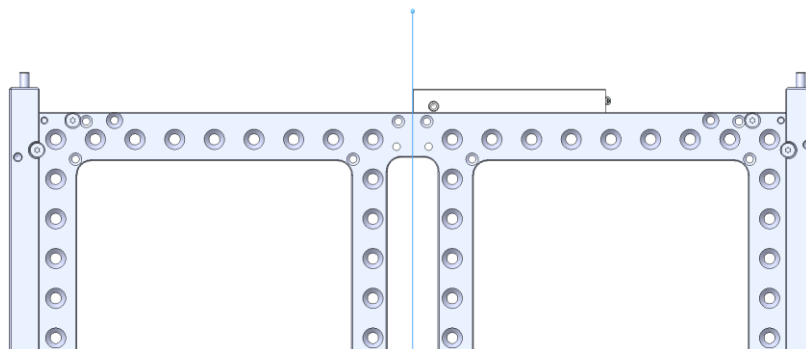
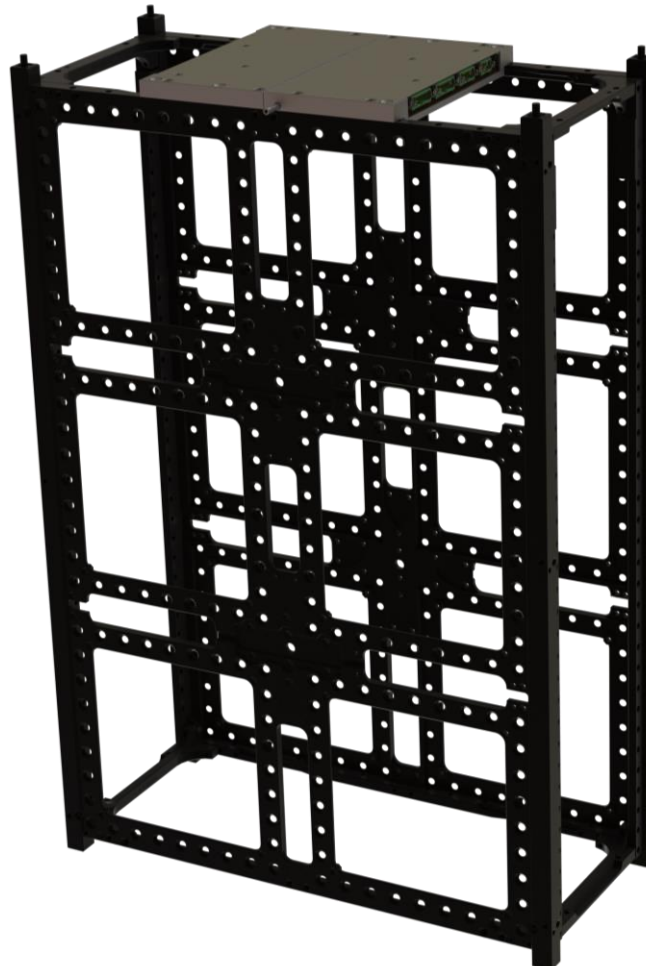
## 6 Physical Characteristics

Description	Value	Unit
Mass	80	g
Size	98 x 54.1 x 10	mm

## 7 The SADA-50 on the GomSpace 6U structure

The SADA-50 may be accommodated on the exterior Z faces of the GomSpace, which fits two opposite facing SADA-50 to operate two solar arrays individually. The output shaft of the SADA-50 is placed only 5.9mm off the structure center plane. The SADA-50 will also fit on other larger GomSpace structures.

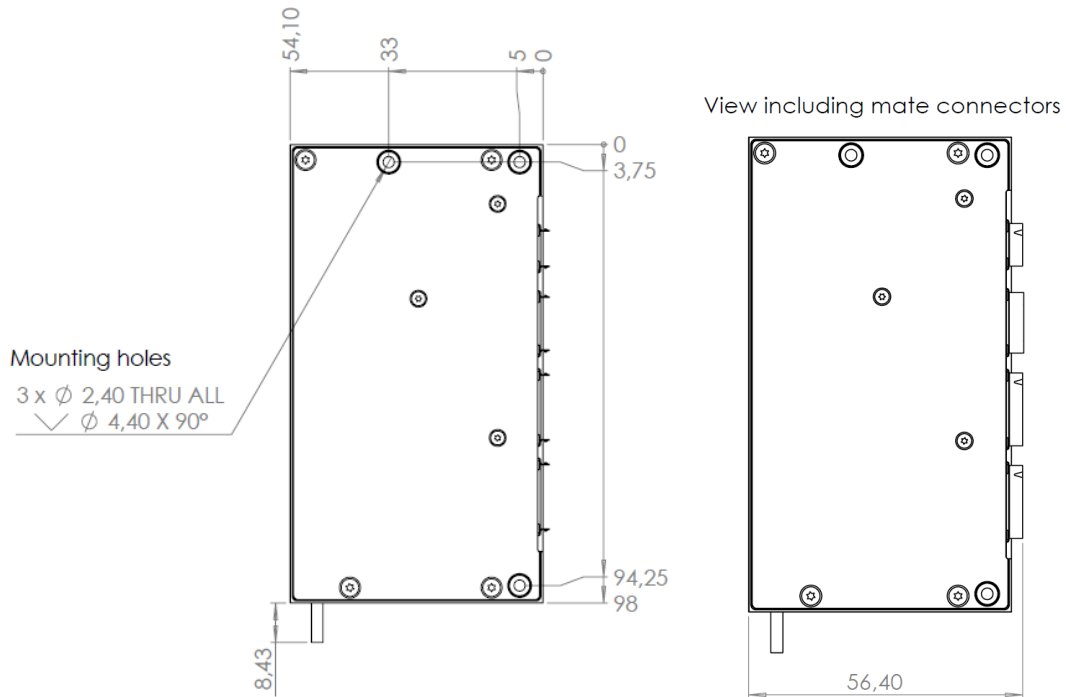
Below is shown two SADA-50's mounted on the GomSpace 6U structure.



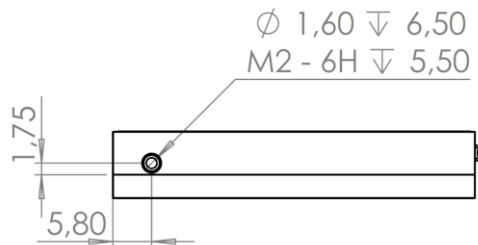
## 8 Mechanical Drawing

All dimensions in mm.

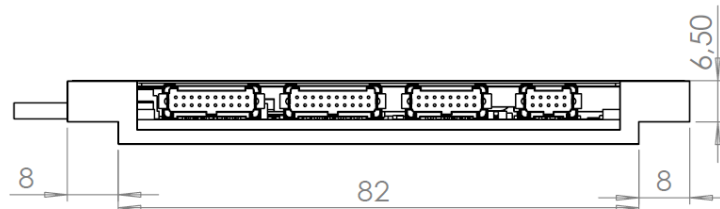
Seen from top/lid



Seen from front



Seen from connector side



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