



HYPERION TECHNOLOGIES

iADCS100 Attitude Determination And Control System



DESCRIPTION

The iADCS100 is a fully autonomous Attitude Determination and Control System, aimed at small satellites with a 3U-CubeSat form factor or similar. It is a joint development of Hyperion Technologies B.V. and Berlin Space Technologies GmbH. The iADCS100 is based on the ST200 star tracker, complemented with RW210 series reaction wheels, and MTQ200 series magnetorquers.

The iADCS100 features an internal fire-and-forget controller, which frees up the host processor's workload, providing nadir, sun and target-pointing modes, as well as backup de-tumbling and intentional spin modes.

The iADCS100 is delivered with a PC104-compatible footprint, consuming the space of 2 standard CubeSat PCB's, or a total of 0.3 U. The CubeSat connector is fed through, allowing designers to place this system anywhere in the CubeSat stack.

HIGHLIGHTS

- Fully autonomous, highly integrated attitude determination and control system, including built-in ST200 Star Tracker, 3 orthogonal RW210-series reaction wheels, MTQ200-series magnetorquers and built-in IMU
- Total momentum storage per axis: +/-1.5 up to +/- 6.0 mN.m.s.
One reaction wheel per axis
- Maximum torque: 0.1 mN.m
- Three-axis magnetorquer configuration with up to 0.4 A.m² of magnetic dipole moment
- External interface for 6 or more sun-sensors
- Fire-and-forget control
- Standard I²C-compatible interface. RS422, RS485 and UART are optional
- Plug-and-play ready design
- Primary components passed radiation tolerance testing up to 45 krad

Built in pointing modes:

- Target pointing, using latitude/longitude coordinates
 - Nadir pointing
 - Sun-pointing
 - Fast spin mode (max 200°/s using magnetorquers)
 - De-tumble
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- Low mass 400 g
(with RW210.15 reaction wheels)
 - Low power: (nominal) 1.4 W
 - Outer dimensions: 95 x 90 x 32 mm



SPECIFICATIONS

Performance				
Total momentum storage per axis	+/-1.5, +/- 3.0, +/- 6.0 ¹			mN.m.s
Maximum torque	> 0.087			mN.m
Nominal magnetic moment	0.2 (X, Y), 0.1 (Z)			A.m ²
Attitude determination accuracy	30			arcseconds (3σ)
Pointing accuracy	<< 1			°
Slew rate	> 1.5 ²			°/s
Radiation tolerance	> 45 ⁹			krad (Si)
Operating temperature	- 45 / - 20 to + 40 / + 85 ⁷			°C
Dimensions				
Outer dimensions	95 x 90 x 32			mm
Mass ¹	400 / 435 / 470			g
Electrical specifications				
	Min.	Typ.	Max.	
Supply voltage	4.0	5.0 ³	15 ⁴	V
Bus logic level voltage	Referenced to Vsys ⁵			V
Power consumption:				
Idle	-	1150	900 ⁶	mW
Nominal ⁷	-	1400	-	mW
Peak ⁸	-	4000 ¹	4500 ⁶	mW

¹ Depending on the reaction wheel models

² For a 3U CubeSat with the RW210.15 reaction wheel complement, over all axes

³ When using the 5V system power pins on the standard CubeSat header

⁴ When using the VBAT pin on the standard CubeSat header

⁵ Vsys can range from 3.3 to 5.1V for I²C applications.

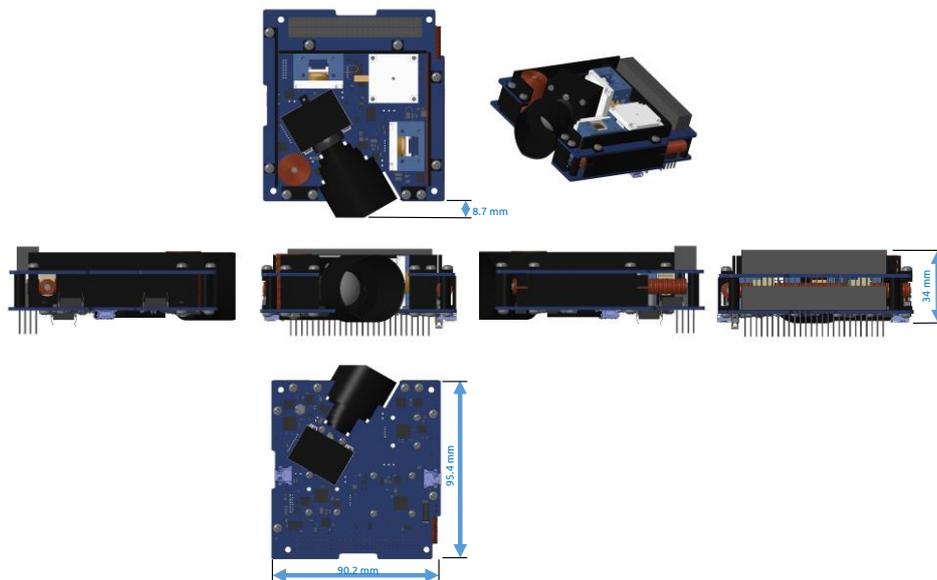
⁶ To be confirmed

⁷ Depends on use case

⁸ Peak values are given to size the power supply. Power consumption can be limited by the iADCS to match supply

⁹ Not accounting for Star Trackers and Reaction Wheels used

MECHANICAL CHARACTERISTICS



For pricing, delivery, configuration and ordering information please contact Hyperion Technologies B.V. at info@hyperiontechnologies.nl, or visit Hyperion Technologies' website at www.hyperiontechnologies.nl.