



Zerocube - Technical specifications



Description:

ZeroCube is a CubeSat Onboard Computer (OBC) powered by Raspberry Pi and integrated with NASA's cFS framework. It provides efficient and versatile computing for CubeSats, allowing easy extension of both software and hardware capabilities. With its modular software design, users can add mission-specific apps without compromising OBC performance, and it supports multiple I2C sensors. The built-in hardware watchdog ensures reliability during long-duration missions.



Specifications:

	Parameter	Value
Compute	Processor Type	Quad-core 64-bit Arm Cortex-A53 CPU
	Processor Clock Speed	1GHz
	RAM Size	512MB SDRAM
	Non-volatile Memory	4GB Delkin industrial microSD
	Real-Time Clock (RTC)	TCXO based RTC with Battery Backup
	Data Retention	10 Years with < 10% of Rated P/E Cycles
	Rated P/E Cycle	60,000 Cycles
	Clock Synchronization	RTC and External GPS Synchronisation
	Fault Tolerance	External Watchdog Timer(configurable)
Power	Power Consumption (Idle)	1.6W
	Power Consumption (Nominal)	2W
	Power Consumption (Peak)	3.5W
	Processor Voltage Range	4.75V - 5.25V
	Peripheral Voltage Range	3.18V - 3.45V
Interfaces	Interfaces Supported	2 X Multiplexed UART, 6 X Multiplexed I2C, 2 X HS-CAN, 1 X RS-485, 1 X MicroUSB(Data), 1 X USB-C(Power Only), 1 X MIPI-CSI Camera Connector
	GPIO Pins	4 X GPIO (3 X PWM Enabled)
	External Watchdog Timer	Can be configured as option
Mechanical	Dimensions	90.1mm x 95.6mm x 20.2mm
	Weight	250g*
	Form factor	PC104 compliant with stackable connector
	Material	Hard anodised Al 6061 T6
	Temperature Range	-40 C to 85 C
	Storage Temperature	-55C to + 85C
	Connectors	1 USB-C, 5 6-pin Harwin Gecko Latch, 6 4-pin Molex picolock, 1 PC104, 1 microUSB, 1 22-pin CSI
Software	Software Development Kit (SDK)	OrbitOS , a fork of NASA cFS , implemented on 32 Bit raspbian bullseye
	Supported Languages for SDK	C - Language
	Firmware Update Mechanism	SD Card
	CCSDS Compliance	Compliant with ground stations following ccscs



		v2 protocol
	Boot Time	75 Seconds
	Debug Interface	MicroUSB
Testing & compliance	ETL: TVAC, EMI/EMC, Vibration and Shock Tolerance	ETL complete for ISRO PSLV profile. Individual modules can be tested based on customer requirements.
		Tested for 13g (vibration), 1500g (shock) ISRO PSLV profile
	Mission Life Expectancy	5 Years
	Radiation Tolerance	Radshield protection with proprietary Ta-tape for upto 10x reduction in TID for LEO