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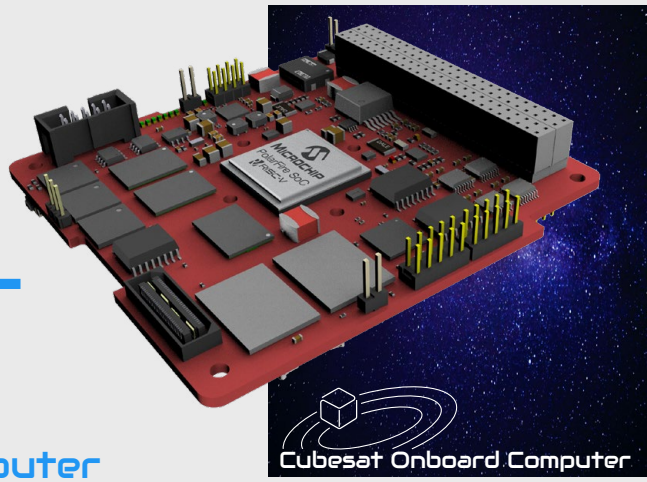
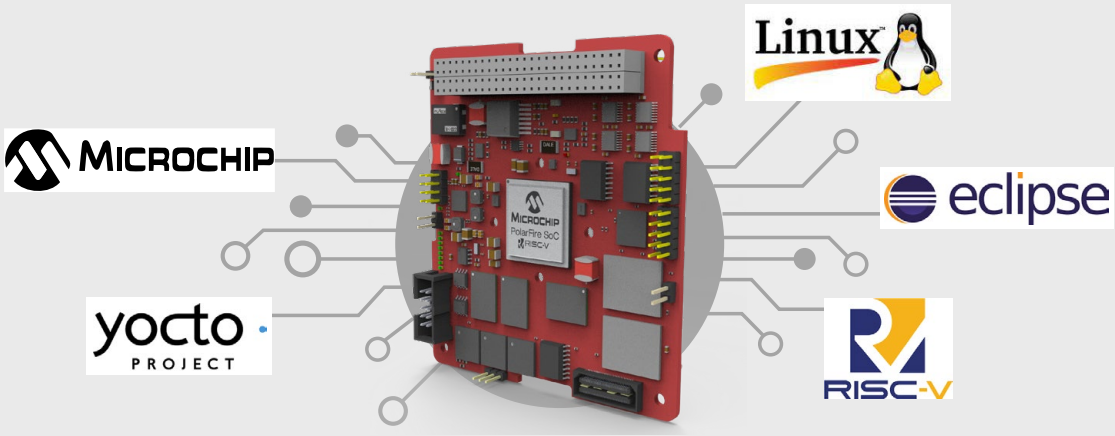
OBC-Cube-Polar



Advanced Cubesat Onboard Computer leveraging PolarFire SoC Technology

The OBC-Cube-Polar Cubesat Onboard Computer utilizes Microchip's PolarFire SoC FPGA, offering reliable and efficient computing for Cubesat missions. With PolarFire SEU immunity, high-speed processing, programming flexibility, and low power consumption, it provides robust error correction and radiation tolerance. Equipped with advanced RISC-V cores, a large choice of memories, and extensive connectivity options, it is ideal for scientific research and commercial satellite deployment, ensuring consistent performance in challenging space conditions.



Key Features

- SEU Immune PolarFire SoC FPGA Platform
- More Than 4000DMIPS Processing Power
- Low Power FPGA Design
- Large RAM with ECC Protection
- Radiation-Immune MRAM/FRAM Memories
- Extensive OS Support: e.g. Linux, INTEGRIRTY, FreeBSD
- Complete Connectivity Solutions

Special Features

- Expected Lifetime: 3 to 5 years in LEO
- On-Board Current & Temperature Monitoring
- On-Board Watchdog
- Double Redundant DC-DC
- TMR and Double Redundant Storage Options
- Custom Daughter Card Connection for SerDes
- NRE-Free Customization

MEMORY

- **RAM:** 2GB or 4GB with ECC Protection
- **ROM:** Tripple 16Mb or 32Mb MRAM (Total 48Mb or 96Mb)
- **Nonvolatile Storage:** 64GB Flash via Dual 32GB eMMC
- **QSPI Flash:** Double 512Mb (Total 1Gb)
- **EEPROM:** I2C/SPI FRAM & MRAM
- **MicroSD Card Slot:** For Development and Debug

PROCESSOR

- **Microchip PolarFire SoC Flash Based FPGA SoC**
- **Quad 64-bit RISC-V on FPGA + 1 RISC-V Monitoring Core**
- **660MHz per Core, More Than Total 4000DMIPS**
- **Optional 32-bit RISC-V Soft Cores**

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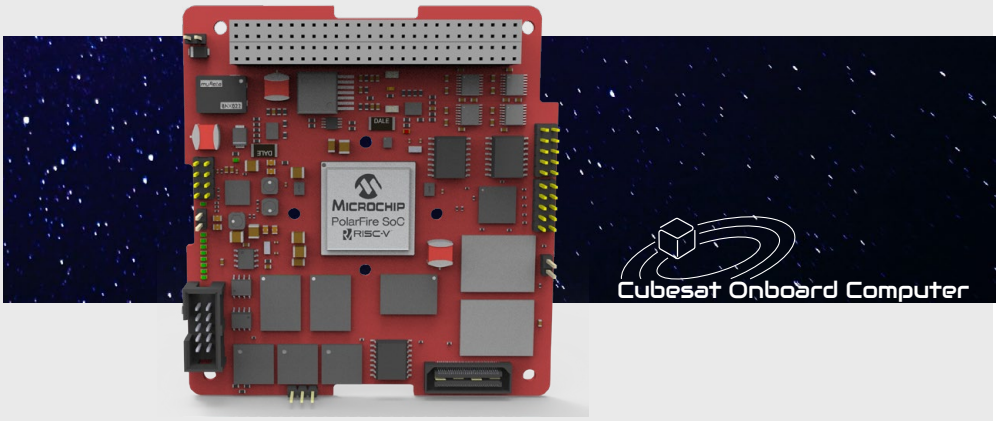
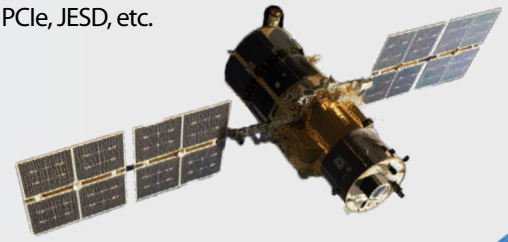


Specifications

Interfaces

DIGITAL/ANALOG:	**Digital I/O:**	20~60
	ADC:	8/16CH with 12-bit or 16-bit resolution
High Speed Interfaces:	**Space Wire:**	1 or 2
	1G Ethernet:	1 or 2
	SerDes:	Via QSH Connector for PCIe, JESD, etc.
Serial Interfaces:	**CAN2.0:**	4
	RS422 and RS485:	2 to 8
	RS232:	2 to 4
	I2C:	2 to 4
	SPI:	2 to 4



Environment

- **Radiation Tolerance:**
  - ZeroFIT SEU neutron-immune FPGA
  - Total Ionizing Dose: More than 30Krad
  - Internal Block RAM ECC Protected
  - Latch-up Immune
- **Temperature & Pressure:** -40°C to +85°C @ 10^{-8} bar
- **Shocks & Vibrations:** Compatible with ISS CubeSat Deployer
- **QML-V & QML-Q Options Available**

Software Support

- **Design Tools:**
  - Free Eclipse-based SoftConsole Programming IDE and Debug via JTAG for the rapid development of bare metal- and RTOS-based C/C++ software.
  - IAR Embedded Workbench
  - MATLAB Embedded Coder Support
- **Multiple Operating Systems:** Linux, FreeRTOS, GNOME, INTEGRITY, FreeBSD, Azure, Ubuntu, VxWorks, SAFWRTOS, etc.
- **Extensive Community and Mi-V Ecosystem Support**
- **Implementing Custom FPGA Processing Design**

Budget

Dimensions:	Cubesat Standard: 90.17x95.89mm
Mass:	80gr
Power Supply:	5V ±5% or 8V~36V
Power Consumption:	3W ~ 5W

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