2NDSpace

MASTER II OBC

MISSION CRITICAL PAYLOAD AND PLATFORM OBC

MASTER II is 2NDSPACE's next-generation On-Board Computer (OBC), designed for nanosatellite and small satellite platforms requiring high reliability, flexible integration, and advanced onboard processing capabilities.

Built around two nearly identical and electrically independent sections, each integrating a PolarFire SoC, dedicated FPGA-based supervision, memory resources, and an independent power chain, MASTER II combines cold-redundant operation with advanced computing capabilities, onboard AI acceleration, and mission-configurable high-speed connectivity through the BRIDGE expansion interface.

- Payload-centric OBC for demanding small satellite missions
- Dual-section A/B redundant architecture
- Independent FPGA Monitor for supervision and recovery
- PolarFire SoC with RISC-V processing and FPGA acceleration
- Embedded Linux with support for modular mission applications
- Container-oriented software architecture for flexible payload integration
- Coral Edge TPU for onboard AI inference
- BRIDGE interface for mission-specific expansion
- Modular, resilient and power-aware by design



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PRODUCT **FEATURES**

Architecture	2x electrically independent sections (A / B), cold redundancy, telecommandable master/slave swap
Processor (per section)	Microchip PolarFire SoC (application cores + FPGA fabric)
Supervision (per section)	Independent FPGA Monitor on always-on rails: power sequencing, reset & boot-mode control, watchdog, image recovery
Redundancy Management	FPGA Monitor cross-strap: command/status, heartbeat, master/slave arbitration
AI Acceleration	1x Coral Edge TPU per section, PCIe Gen2 x1, on-demand
RAM	DDR4 for execution and onboard processing
Flash Memory	QSPI NOR (boot + secondary image) + PFSoC FRAM + Supervisor FRAM
Storage	eMMC mass storage
Operating System	Linux-class environment on PolarFire SoC
Interfaces	CAN, I2C, USB, RS-422/485
High-Speed Expansion	BRIDGE piggy-back: SERDES, SGMII Ethernet, HSIO, secondary rails (SpaceWire, Ethernet, optical, LVDS, backplane, PCIe)
AIT & Debug	PFSoC / ProASIC3 JTAG, image loading over USB, fabric live probing
Mechanical & Power	Dimensions, mass, operating voltage and peak power: TBC
Operating Temp.	-40°C to +85°C (TBC)

QUALIFICATION AND **ACCEPTANCE TEST**

	Functional/AIT	Electrical control	Vibration test	Mechanical Shock	TVAC Test
Qualification Test	✓	✓	NASA GEVS: GSFC-STD-7000A ESA ECSS-E-ST-10-03C	NASA GEVS: GSFC-STD-7000A ESA ECSS-E-ST-10-03C	NASA GEVS: GSFC-STD-7000A ESA ECSS-E-ST-10-03C
Acceptance Test	✓	✓			

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MASTER II is a next-generation On-Board Computer for nanosatellite and small satellite missions, combining high-performance computing, reliability, and flexible payload integration. Its dual-section architecture integrates PolarFire SoC processing, independent hardware supervision, onboard AI acceleration, and modular high-speed connectivity.

- Redundant Architecture: Two electrically independent processing sections supporting cold redundancy and configurable master/slave roles.
- Autonomous Supervision: Independent FPGA Monitors managing power sequencing, watchdog functions, boot control, and recovery.
- Advanced Computing: PolarFire SoC processing with DDR4 memory, eMMC storage, and FPGA-based processing resources.
- Modular Connectivity: BRIDGE expansion interface enabling mission-specific high-speed payload connections.
- Onboard AI: Dedicated AI accelerator per section, supporting on-demand activation and onboard AI/ML inference.

ARCHITECTURE HIGHLIGHTS

- Hardware-Level Redundancy: Cross-strap communication between independent FPGA Monitors enables heartbeat monitoring, status exchange, and master/slave arbitration.
- Independent Fault Recovery: Always-on supervision, dedicated FRAM, and boot recovery mechanisms maintain critical control capabilities independently of the main processor.
- Mission-Adaptable Architecture: Modular BRIDGE interface enables mission-specific high-speed payload connectivity, while integrated AI accelerators support advanced onboard processing.

Scan to discover product features and specs

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