



OBC-Hyper-Polar

SINGLE BOARD COMPUTER based on PolarFire® SoC

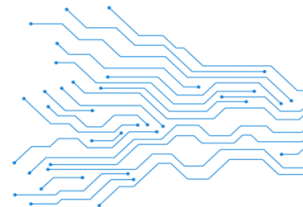
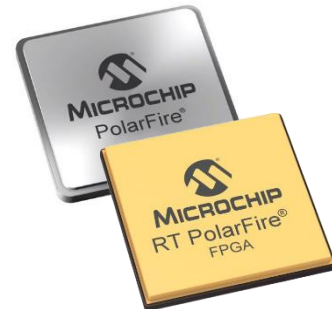


The **OBC-Hyper-Polar** is a compact, high-performance onboard computer based on the **Microchip PolarFire SoC FPGA**. It integrates a multi-core RISC-V processor subsystem with a radiation-tolerant flash-based FPGA fabric in a single device, providing both general-purpose computing and reconfigurable logic resources.

Variations: COTS, Full RT, Partial RT

KEY FEATURES

- **Microchip PolarFire SoC FPGA** — two variants: MPFS250T (254k LE) & MPFS460T (461k LE)
- **RISC-V MSS:** 4× 64-bit U54 application cores + 1× E51 monitor core; >4,000 DMIPS
- **Flash-based FPGA fabric** — ZeroFIT SEU immunity; inherently non-volatile (no external boot PROM required)
- **DDR4 SDRAM (Fabric)** 8 GB 72-bit ECC Enabled
- **LPDDR4 SDRAM (MSS)** 4 GB 32-bit
- **Dual 256 GB eMMC** (one on MSS SDIO, one on fabric SDIO)
- **Dual 512 Mbit QSPI NOR Flash** (primary + redundant boot/config)
- **4 Mbit SPI MRAM** SEU Immune
- **4× RS-422** full-duplex serial
- **4× RS-232** serial
- **4× CAN**
- **4× RS-485**
- **32× buffered GPIO** (GPIOB [1...32]) in 4 banks + 8× buffered bidirectional I/O (IO [1...8]) + 8× Direct-IO
- **1× I2C**
- **2× LVDS** differential pairs (SpaceWire ECSS-E-ST-50-12C compatible)
- **2× Gigabit Ethernet**
- **Up to 4× additional GbE via 6-Ethernet addon card** (total 6× GbE)
- **16-channel, 16-bit ADC** (simultaneous sampling, ±5 V / ±10 V factory-selectable)
- **USB 2.0** (PolarFire SoC native)
- **USB-to-UART debug** (dual channel)
- **JTAG** (FlashPro5/6 compatible)
- **8× SerDes transceivers** (up to 12.7 Gbps each)
- Configurations:** PCIe, CoaXpress, CSI-2, NVMe, USB3.0, Ethernet 10G
- **Input voltage:** 8 V to 28 V DC; OVP and UVLO factory-programmable
- **2-pin power connector** (Glen Air GMPM2-B112R-CBRT-SU)
- **Dual-redundant on-card DC-DC regulators**
- **Hardware watchdog timer**
- **Chassis:** AL7075-T6, Dimensions: 110 × 181 mm, height: 22.5 mm / 35.5 mm
- **Mass:** 600 gr, <1,000 gr (with addon card)
- **All I/O connectors:** **Micro-D** (MIL-DTL-83513 family); **Power connector:** GlenAir GMPM2
- **Software Support:** Linux, FreeRTOS, Bare-Metal, etc.



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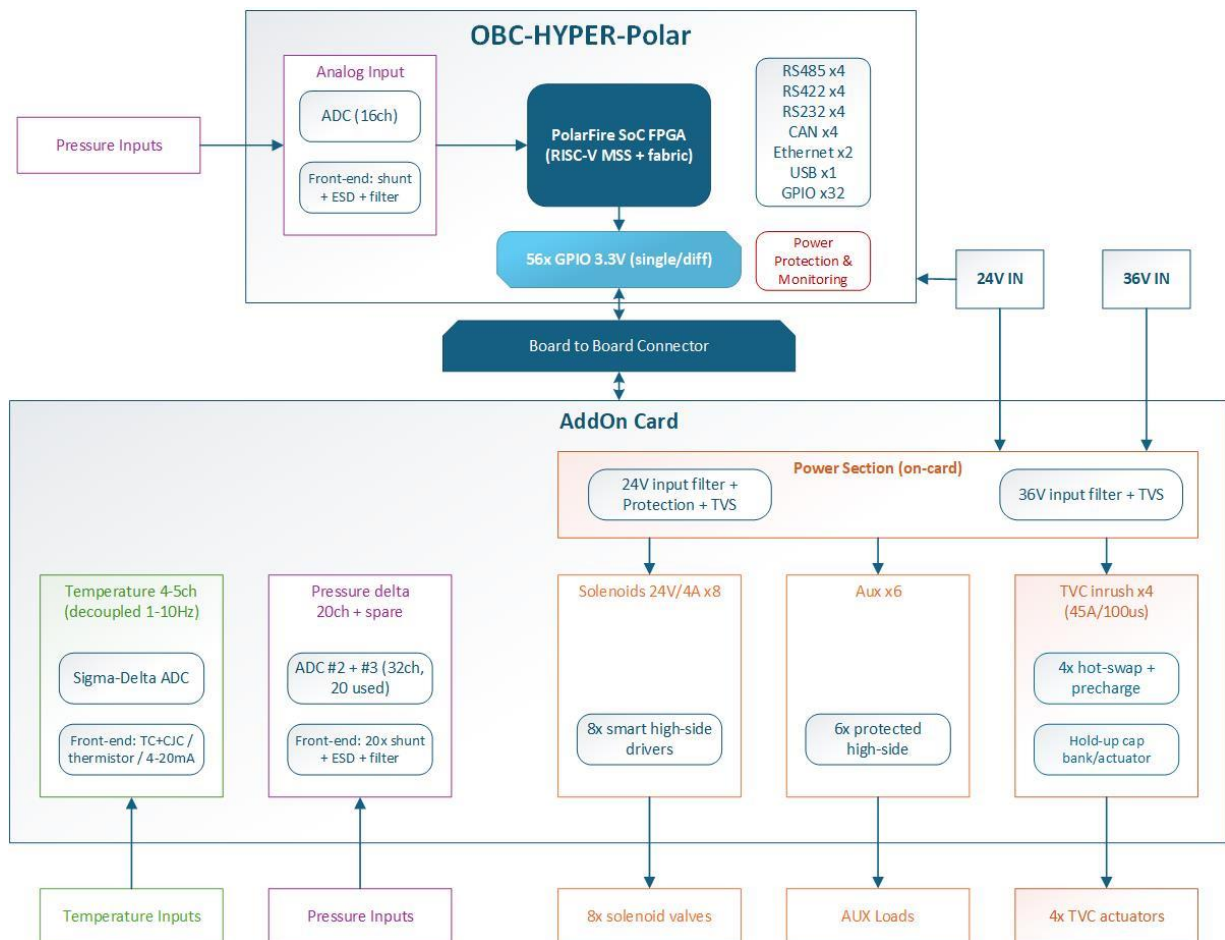
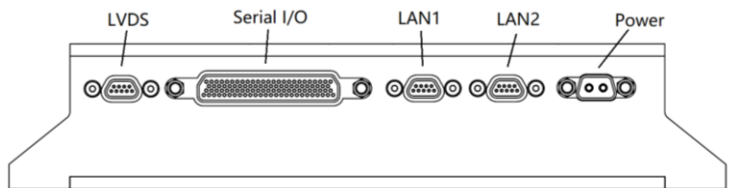
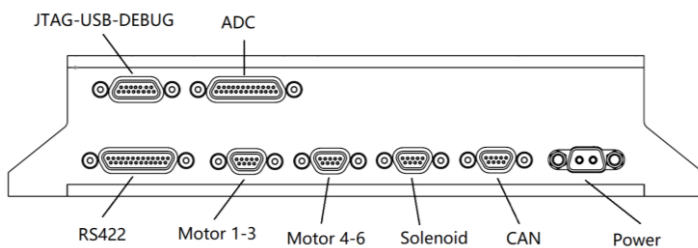
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Add-on Cards

The **OBC-Hyper-Polar** can have several peripheral boards to improve processing, interface capability or extra control.

- Add-on cards can:
- Drive stepper motors,
- Solenoid valve controls,
- Extra serial interfaces like RS-422 or Gb Ethernet,
- Analog signal domain / filtering
- receiving power for improved reliability.



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