

XCalibur4646

**Not Recommended
for New Designs**

Intel® Xeon® D-1500 Family Processor-Based 6U VPX Module with Dual 10GbE, Dual XMC Sites, and Onboard Security FPGA

Please contact X-ES Sales

- Supports Intel® Xeon® D-1500 family processors (formerly Broadwell-DE)
- Designed with SecureCOTS™ technology to support enhanced security and trusted computing
- Microsemi SmartFusion®2 SoC with 1 GB DDR3 ECC SDRAM and 32 MB SPI flash
- 6U OpenVPX™ (VITA 46) module
- VITA 46.11 Tier 1 and Tier 2 IPMI Controller (IPMC)
- Compatible with multiple OpenVPX™ (VITA 65) profiles
- Ruggedized Enhanced Design Implementation (REDI) per VITA 48
- Supports two XMC modules
- Conduction or air cooling
- Up to 16 Xeon®-class cores in a single, power-efficient SoC package
- 4, 8, or 12 core SKUs available with native extended temperature support
- Up to 32 GB of DDR4 ECC SDRAM in two channels
- Up to 64 GB of onboard SLC SATA NAND flash
- Two 10 Gigabit Ethernet ports and up to three Gigabit Ethernet ports
- Two x4 or one x8 PCI Express Gen3 interface to backplane
- Four SATA ports
- One USB 3.0 port and one USB 2.0 port to the back panel and one USB 3.0 port to the optional front panel
- Four RS-232/422/485 serial ports
- coreboot firmware powered by Intel® FSP
- Wind River VxWorks BSP
- X-ES Enterprise Linux (XEL) BSP
- Contact factory for availability of Green Hills INTEGRITY, QNX Neutrino, and LynuxWorks LynxOS BSPs



XCalibur4646

The XCalibur4646 is a secure, high-performance, 6U OpenVPX™, single board computer based on the Intel® Xeon® D-1500 family processors. The Intel® Xeon® D processor can provide up to 16 Xeon®-class cores for high-bandwidth processing and I/O applications. The integrated SecureCOTS™ technology can protect critical data from being modified or observed and provides an ideal solution where stringent security capabilities are required.

The XCalibur4646 includes a customizable Microsemi SmartFusion®2 security SoC with 1 GB of ECC DDR3 to implement the SecureCOTS™ features. It can host many types of custom functions, such as data encryption, and additionally supports the ability to control, intercept, and monitor the Xeon® D subsystem, implement penalties, and interface to the system through I/O directly connected to the VPX backplane. Circuit board enhancements and optional, optimized Two-Level Maintenance (2LM) metalwork provides added protection to the physical hardware.

The XCalibur4646 optimizes network performance and power efficiency with two 10GBASE-KR Ethernet interfaces direct from the CPU and two 1000BASE-T Ethernet interfaces to the VPX backplane. It accommodates up to 32 GB of DDR4 ECC SDRAM in two channels and up to 64 GB of SLC SATA NAND flash in addition to other I/O ports, including USB, SATA, and four configurable RS-232/422/485 serial ports through the backplane connectors. The XCalibur4646 supports additional expansion from two XMC sites, each of which includes a x8 PCIe connection to the Intel® Xeon® D processor and mezzanine I/O mapped directly to the VPX backplane.

The XCalibur4646 is a powerful, feature-rich solution for the next generation of compute-intensive embedded applications. Wind River VxWorks and X-ES Enterprise Linux (XEL) BSPs are available. The XCalibur4646 uses coreboot, to provide fast boot times and significantly simplify code traceability over legacy BIOS implementations.

X-ES

Extreme Engineering Solutions

*“Fast, Flexible, Customer-Focused
Embedded Solutions”*

Extreme Engineering Solutions

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Processor

- Intel® Xeon® D-1500 family processors (formerly Broadwell-DE)
- Up to 16 Xeon®-class cores in a single, power-efficient SoC package
- 4, 8, or 12 core SKUs available with native extended temperature support

Memory

- Up to 32 GB of DDR4 ECC SDRAM in two channels
- Up to 64 GB of SLC NAND flash
- 32 MB NOR boot flash
- 64 kB EEPROM

OpenVPX™

- VITA 46.11 (System Management on VPX)
- Compatible with multiple OpenVPX™ (VITA 65) profiles
- One x8 PCI Express Gen3-capable port to P2
- Two 10 Gigabit Ethernet ports to P4
- Two 10/100/1000BASE-T Ethernet ports to P4
- XMC I/O to P3, P4, P5, P6, mapping X38s+X12d+X8d or P64s+X12d+X8d

Front Panel I/O (Optional)

- One 10/100/1000BASE-T Ethernet port
- One USB 3.0 port
- One RS-232 serial port
- One RS-232/422/485 serial port
- General-purpose LEDs

Back Panel I/O

- Configurable x8 PCI Express Gen3 interfaces to P2
- Two 10GBASE-KR Ethernet ports to P4
- Two 10/100/1000BASE-T Ethernet ports
- Four SATA ports capable of 6 Gb/s
- One USB 3.0 port and one USB 2.0 port
- Four RS-232/422/485 serial ports
- Eight SmartFusion®2 GPIO

Security and Management

- Microsemi SmartFusion®2 security FPGA with 1 GB DDR3 ECC SDRAM and 32 MB SPI flash
- Designed with SecureCOTS™ technology to support enhanced security and trusted computing
- SmartFusion®2 with embedded memory, random number generator, crypto-cores, PUF, and supports complete zeroization
- System voltage monitor, power-on/reset control, non-volatile write-protection control
- Environmental sensors (see product manual)
- Trusted Platform Module (TPM) 1.2 or 2.0 (optional)

XMC

- x8 PCI Express Gen3-capable port to XMC site 0
- x8 PCI Express Gen3-capable port to XMC site 1
- Six SmartFusion®2 GPIO per site

Additional Features

- Optional VITA 46.11 Tier 1 and Tier 2 IPMI Controller (IPMC)
- IEEE 1588 support

Software Support

- Wind River VxWorks BSP
- X-ES Enterprise Linux (XEL) BSP
- coreboot firmware powered by Intel® FSP
- Contact factory for availability of Green Hills INTEGRITY, QNX Neutrino, and LynxWorks LynxOS BSPs

Physical Characteristics

- 6U VPX-REDI conduction- or air-cooled form factor
- Dimensions: 233 mm x 160 mm
- 0.8 in. pitch
- 1.0 in. pitch is compliant to the VITA 48.2 Type 1, Two-Level Maintenance (2LM) standard (optional)

Environmental Requirements

Contact factory for appropriate board configuration based on environmental requirements.

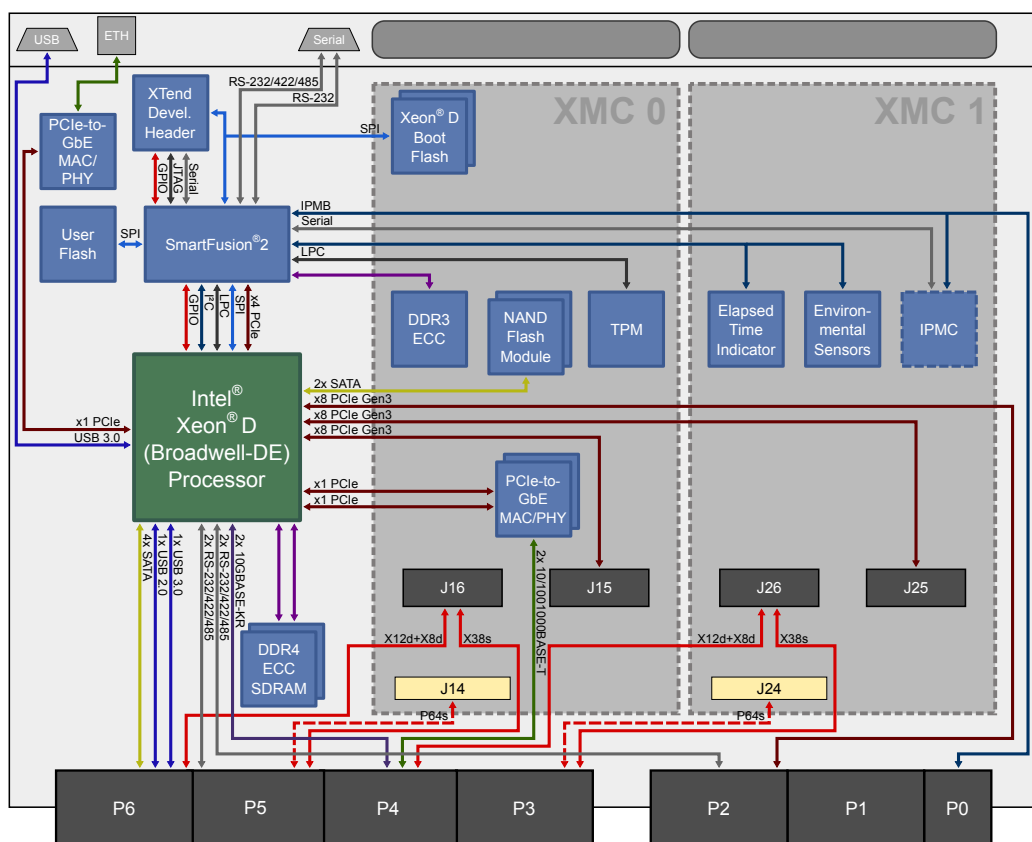
- Supported ruggedization levels (see chart below): 1, 3, 5
- Conformal coating available as an ordering option
- Thermal performance will vary based on CPU frequency and application

Power Requirements

- Power will vary based on configuration and usage. Please consult factory.

Ruggedization Level	Level 1	Level 3	Level 5
Cooling Method	Standard Air-Cooled	Rugged Air-Cooled	Conduction-Cooled
Operating Temperature	0 to +55°C ambient †	-40 to +70°C ambient †	-40 to +85°C (board rail surface)
Storage Temperature	-40 to +85°C ambient	-55 to +105°C ambient	-55 to +105°C (maximum)
Vibration	0.002 g ² /Hz (maximum), 5 to 2000 Hz	0.04 g ² /Hz (maximum), 5 to 2000 Hz	0.1 g ² /Hz (maximum), 5 to 2000 Hz
Shock	20 g, 11 ms sawtooth	30 g, 11 ms sawtooth	40 g, 11 ms sawtooth
Humidity	Up to 95% non-condensing	Up to 95% non-condensing	Up to 95% non-condensing

† Contact factory for airflow rate details.



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