

HPC2812

Rugged 6U VPX High Performance Computer with Dual Intel® Xeon® D-2700

The HPC2812 Rugged High Performance Computer (HPC) from Abaco Systems features the new high performance, highly integrated Xeon® D-2700 Processor from Intel®.

High performance, high reliability

The new Xeon D-2700 (formerly known as Ice Lake-D) combines up to 20 processing cores with AVX-512 and a rich IO mix, including up to 100Gb integrated Ethernet (100GbE) and PCIe gen 4.0, all with the backing of the Intel Embedded Use Conditions – ideal for long-term, high-reliability applications.

The HPC2812 offers memory resources including 128 GB of high speed DDR4 SDRAM and 480 GB NAND Flash (NVMe) per node, plus a high-throughput Data and Expansion Plane.

Data Plane fabric connectivity, per node, is via two integrated 100GbE capable Ethernet Fat Pipes, with two Gen4 capable PCIe Double Fat Pipes providing the Expansion Plane. Control Plane connectivity on the backplane is via two 1GBase-KX Ultra-Thin Pipes and two 1G Ethernet Thin Pipes.

Available in a range of air- and conduction cooled build levels with extended temperature capability, the HPC2812 is designed to meet the requirements of a wide range of applications from industrial to fully rugged defense and aerospace programs.

Enhanced security features

The HPC2812 incorporates a range of security features designed to assist with user defined Anti-Tamper and Information Assurance strategies. These include an inherently secure FPGA solution (Xilinx™ Zynq® UltraScale+™), and support for Intel's Trusted Execution Technology. The FPGA can be utilized to instantiate a range of Abaco defined security features, or by the customer to embed application specific features.

Rich range of software options

- A variety of Bootloaders are available (UEFI and Slim Bootloader)
- Open Linux® (Fedora) and Red Hat® Enterprise Linux®
- Comprehensive Deployed Test Software: FSP* enabled BIT (PBIT function), and CIBIT (CBIT and IBIT function)
- AXIS environment for app optimization over many node / many channels, and including signal processing / vector math libraries
- Hardware Development Kit (HDK) allows development of unallocated FPGA resources on boards, maximizing flexibility and performance
- The Health Toolkit continuously monitors the health of all components in your system identifying issues with high granularity

Examples and assistance are also available for integrating 'chain of trust' operation (from power-up to application start), into system scenarios. Other Operating System support is available on request.

[*FSP = Intel Firmware Support Package].

FEATURES:

- Single slot 6U VPX High Performance Computer
- Dual Node Intel Xeon D-2796TE with AVX-512
- Four channels of soldered DDR4 SDRAM with ECC, 128 GB in total, per node
- 480 GB NAND Flash (NVMe), per node
- Rear IO:
 - 2 x 40G/100G Data Plane with RDMA per node (RoCEv2 / iWARP)
 - 32 lanes (16 lanes per node) of PCIe Gen4 (Dual Expansion Planes)
 - 1GBase-KX and 1GBase-T Ethernet Control Planes
 - IPMI Management Plane
 - GPIO, Serial, USB and SATA
 - Optional video (via RTM)
- SOSA aligned profiles:
 - SLT6-PAY-4F2Q1H4U1T1S1S1 TU2U2T1H-10.6.4-0
- Convection and conduction cooling variants
- AXIS, Hardware Development Kit, Health Toolkit, and Deployed Test Software
- Windows® and Linux® OS support

HPC2812 Rugged 6U VPX High Performance Computer with Dual Intel® Xeon® D-2700

Specifications

Processor

- 2x Xeon D-2796TE HCC CPU
- 20-cores at 2 GHz with AVX-512
- 112W TDP

SDRAM (per node)

- 128 GB DDR4-2933 SDRAM (dual channel) soldered with ECC

Non-Volatile RAM

- 8 MB for BIT and 8 MB for User, per node
- On-board NVMe Solid State Disk Drive (SSD) (per node)
- 480 GB

Boot Memory (per node)

- 3x 64 MB SPI Flash (Primary, Recovery and FSP Boot devices)

Data Plane (per node)

- 2 x 40 or 1 x 100GBase-KR4 with RDMA (iWARP and RoCEv2) to P1

Expansion Plane (per node)

- Eight lanes of Gen 4 capable PCI-Express to P2
- Eight lanes of Gen 4 capable PCI-Express to P5
- x 8 lanes can be combined to 16 lanes

Control Plane (per node)

- 1 x 1GBase-KX to P4
- 1 x 1GBase-T to P4

Management Plane

- Intelligent Platform Management Controller (IPMC) in accordance with VITA 46.11 Tier 3
- 16MB non-volatile ram

Other (per node)

- 1000Base-X Ethernet (CPU to FPGA) - connects to TAC (test access card)

Serial Ports

- Four external 16C550 compatible async serial ports (2 on P4, 1 on P1, 1 on P5)
- COM1 can be configured as a 2-wire RS-232 port or LVCMOS. COM1 is the Maintenance port (MP01) on P1
- COM2 can be configured as a 2-wire RS-232 port or LVCMOS. COM2 is the Maintenance port (MP02) on P5
- COM7 supports 2-wire RS232 and 4-wire RS422 modes of operation (P4)
- COM8 supports 2-wire RS232(P4)

SATA (per node)

- 2 x SATA Gen3 to P4

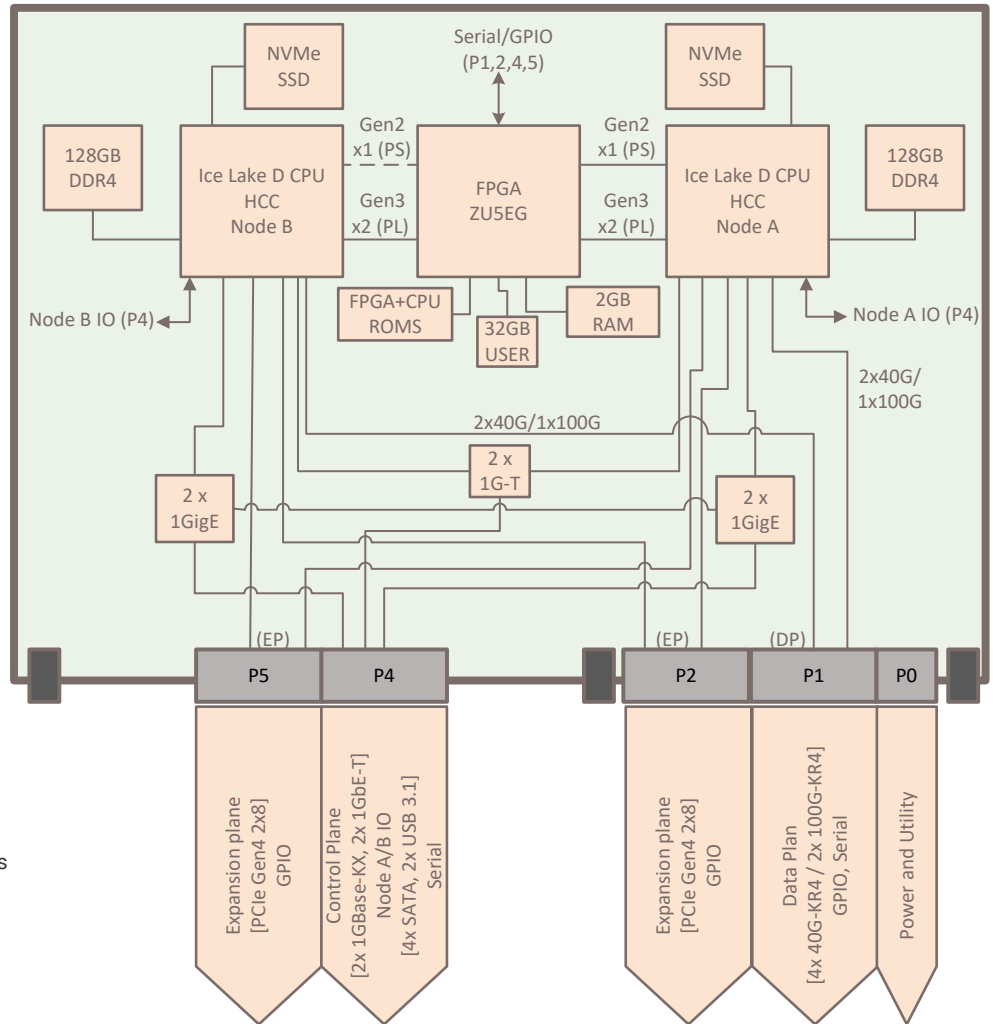
USB (per node)

- 1 x USB3.1 to P4

SOSA aligned/OpenVPX Profiles

- SLT6-PAY-4F2Q1H4U1T1S1S1TU2U2T 1H-10.6.4-0

Block diagram



GPIO

- 10 x single ended, 3.3V signaling
- 3 x differential, LVDS

FPGA

- Xilinx Zynq UltraScale+ FPGA with advanced security features
 - Enhanced Anti-Tamper features
 - Encryption
 - Physically unclonable functions (PUF)
 - Zeroization
 - 32GB user flash attached to the FPGA for general user/OS storage

Other HW Features

- Hardware Write Protection
- Two accelerometers which can be mastered by either of the CPU nodes, or the FPGA

processing system/logic

- 10G node to node Ethernet connection

Power Requirements

- +12V (Vs1)
- +3.3V for P3V3_AUX is required

Watchdog/ Timers/ TPM/ ETI

- Software programmable watchdog in FPGA
- Timers in FPGA (SW programmable)
- TPM 2.0 (Trusted Platform Module)
- ETI (Elapsed Time Indicator)

Temperature Sensor

- PCB and FPGA temperature sensors



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Abaco Systems is a subsidiary of AMETEK, Inc., a leading global manufacturer of electronic instruments and electromechanical devices with 2020 sales of more than \$4.5 billion.

