Preliminary Product Info

BittWare a molex company

# XUPSVH
PCIe FPGA Board

## Low-profile PCIe with Virtex VU9P

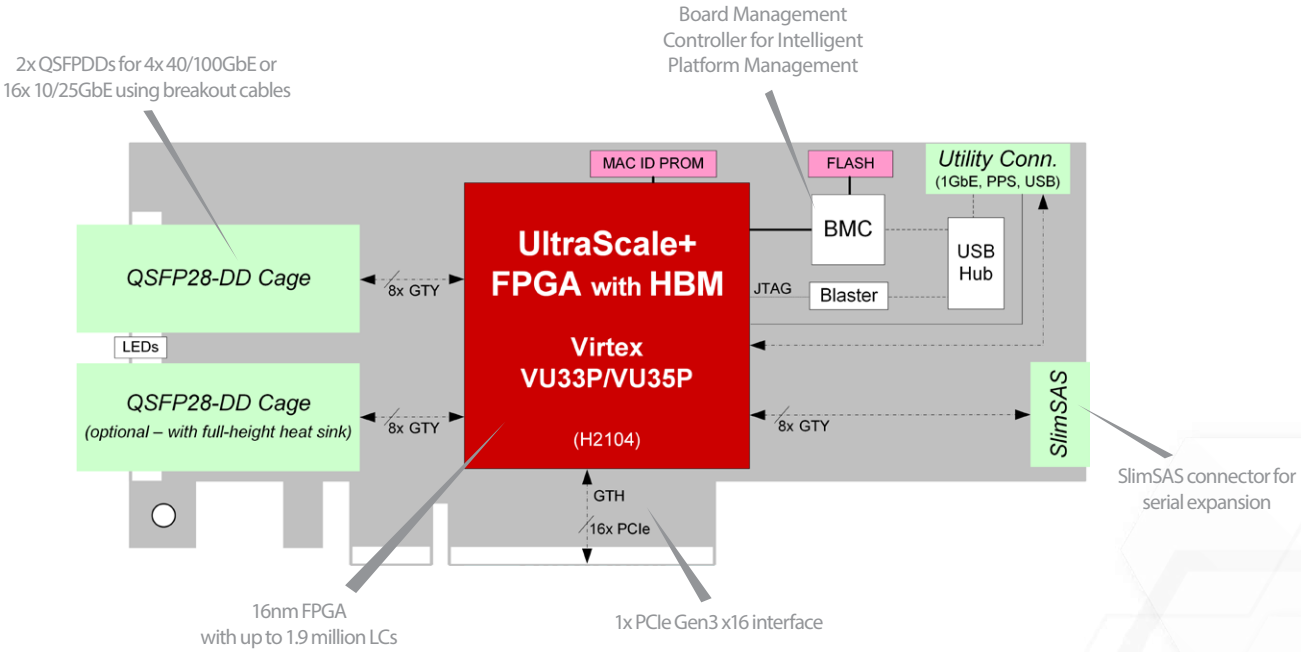
BittWare's XUPSVH is a low-profile PCIe card featuring an UltraScale+ VU33P/35P FPGA with integrated High Bandwidth Memory (HBM2) tiles that support up to 8 GBytes of memory at 460 GBytes/sec. Along with the integrated memory, the UltraScale+ VU35P offers up to 1.9 million logic elements, which gives designers incredible performance potential — yet with a power density that makes thermal management difficult. The XUPSVH meets this challenge with BittWare's Spider platform, supporting large FPGA loads and 2x 100 Gbps Ethernet. Up to 4x 100 GbE is available with a standard-height option.

The XUPSVH is designed with BittWare's Spider platform, which is a low-profile PCIe platform optimized for thermal performance. The Spider platform combines a low-profile PCIe form-factor for high density, the ability to run larger loads, and a robust passive heatsink option designed for servers.


**Spider Platform:** designed for high-performance passive cooling in servers

## key features

- up to **2 QSFPs** for up to **2x 100 GbE or 8x 10/25 GbE**
- Single Slot — Large FPGA on small form-factor
- Up to VU35P FPGA: **1.9 million LCs** **8 GBytes HBM2** FPGA by Xilinx



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## High-Speed Networking and I/O

The XUPSVH is enabled for high-speed networking with up to two front panel QSFP Double Density (QSFP-DD) cages, each supporting two 40/100GbE or eight 10/25GbE channels. Serial expansion is available through an UltraPort SlimSAS connector (8x 24Gbps) that can be connected to a second PCIe interface, another XUPSVH, or other devices, including IBM's POWER9 via OpenCAPI. A utility header provides a PPS input, 10MHz reference clock, 1GbE, USB access to the BMC, USB-to-JTAG, and a USB UART for debug and programming support.

## System Management

For system management, the XUPSVH is equipped with a Board Management Controller (BMC), which accepts IPMI 2.0 commands. Use it along with BittWare's BittWorks II Toolkit to program the FPGA Flash over USB, monitor board power and temperature, re-program the onboard clocks, and adjust FPGA core voltage. The BMC monitors critical temperatures, voltages, and current and will shut the board down to prevent damage. Recovery from shutdown is also supported, without the need to cycle system power.

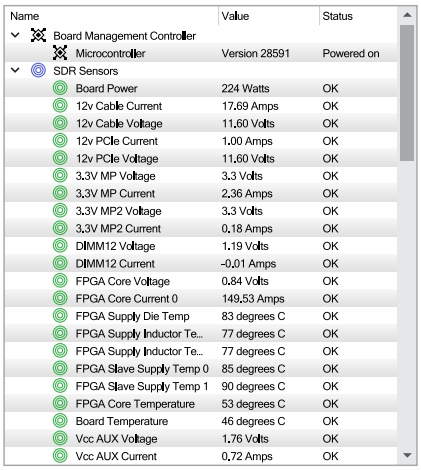
## BittWorks II Toolkit

BittWare offers complete software support for the XUPSVH with its BittWorks II software tools. The BittWorks II Toolkit is a suite of development tools that serves as the main interface between the BittWare board and the host system. The Toolkit includes drivers, libraries, utilities, and example projects for accessing, integrating, and developing applications for the BittWare board.

## FPGA Examples

BittWare provides FPGA board support IP to simplify integration and development. These example projects illustrate how to move data between the board's different interfaces and are designed to integrate easily with the Xilinx Vivado tools. All examples are available for download on BittWare's developer website. they flow through and then any number of Actions are applied based on those labels.

## BwMonitor



| Name | Value | Status |
|---|---|---|
| Board Management Controller | | |
| Microcontroller | Version 28591 | Powered on |
| SDR Sensors | | |
| Board Power | 224 Watts | OK |
| 12v Cable Current | 17.69 Amps | OK |
| 12v Cable Voltage | 11.60 Volts | OK |
| 12v PCIe Current | 1.00 Amps | OK |
| 12v PCIe Voltage | 11.60 Volts | OK |
| 3.3V MP Voltage | 3.3 Volts | OK |
| 3.3V MP Current | 2.36 Amps | OK |
| 3.3V MP2 Voltage | 3.3 Volts | OK |
| 3.3V MP2 Current | 0.18 Amps | OK |
| DIMM12 Voltage | 1.19 Volts | OK |
| DIMM12 Current | -0.01 Amps | OK |
| FPGA Core Voltage | 0.84 Volts | OK |
| FPGA Core Current 0 | 149.53 Amps | OK |
| FPGA Supply Die Temp | 83 degrees C | OK |
| FPGA Supply Inductor Te.. | 77 degrees C | OK |
| FPGA Supply Inductor Te.. | 77 degrees C | OK |
| FPGA Slave Supply Temp 0 | 85 degrees C | OK |
| FPGA Slave Supply Temp 1 | 90 degrees C | OK |
| FPGA Core Temperature | 53 degrees C | OK |
| Board Temperature | 46 degrees C | OK |
| Vcc AUX Voltage | 1.76 Volts | OK |
| Vcc AUX Current | 0.72 Amps | OK |

Live board power/temperature display is included as part of Toolkit Lite

## Board Specifications

| | |
|---|---|
| **FPGA** | • Virtex UltraScale+ VU33P/VU35P<br>• 40x GTY transceivers at 32.75 Gbps<br>• Up to 1.9 million logic elements<br>• 8 GBytes of HBM2 high-bandwidth DRAM<br>• Up to 5 integrated PCIe cores<br>• Up to 5,952 DSP slices with 27x18 multipliers |
| **On-board memory** | • Flash memory for booting FPGA |
| **PCIe interface** | x16 Gen1, Gen2, Gen3 interface direct to FPGA |
| **Utility header** | • 1 PPS and 10MHz ref clk<br>• 1GbE<br>• USB access to BMC, USB-JTAG, USB-UART |
| **UltraPort SlimSAS** | • Standard high-speed connector for storage devices<br>• Connected to FPGA via 8x transceivers<br>• OpenCAPI compatible |
| **QSFP cages** | • 2 QSFP-DD cages (one is optional*) on front panel connected directly to FPGA via 16 transceivers<br>• Each supports 2x 40/100GbE and 8x 10/25GbE |
| **Board Management Controller** | • Voltage, current, temperature monitoring<br>• Power sequencing and reset<br>• Field upgrades<br>• FPGA configuration and control<br>• Clock configuration<br>• I²C bus access<br>• USB 2.0<br>• Voltage overrides |
| **Cooling** | Air-cooled Spider platform, passive or active |
| **Size** | • Low profile (Half-height, half-length) PCIe slot card; x16 mechanical<br>• 168mm x 68.9mm |

## Development Tools

| | |
|---|---|
| **System development** | BittWorks II Toolkit - host, command, and debug tools for BittWare hardware |
| **FPGA development** | • FPGA Examples - example Vivado projects<br>• Xilinx Tools - Vivado® Design Suite |

** Second QSFP-DD option requires a standard-height heat sink.*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