

XUPVVH

Xilinx UltraScale+ 3/4-Length PCIe Board

VU37P with Integrated HBM2, Quad QSFP, and 256 GBytes DDR4 on BittWare Viper Platform

Ultra high-speed network interface

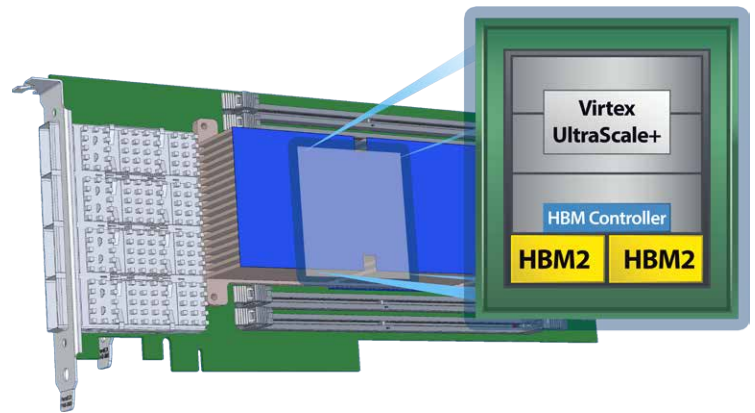
4x 100GbE and timestamping support

Latest generation 16nm FPGA

UltraScale+ FPGA with integrated HBM2

Optimized for thermal performance

BittWare Viper platform with passive heatsink supports large FPGA loads



BittWare's XUPVVH is an UltraScale+ VU35P/37P FPGA-based PCIe card ideal for high-density datacenter applications that demand high memory bandwidth. The UltraScale+ FPGA helps these demanding applications avoid I/O bottlenecks with integrated High Bandwidth Memory (HBM2) tiles on the FPGA that support up to 8 GBytes of memory at 460 GBytes/sec.

Along with the integrated memory, the UltraScale+ VU37P offers up to 2.8 million logic elements, which gives designers incredible performance potential – yet with a power density that makes thermal management difficult. The XUPVVH meets this challenge with BittWare's Viper platform, supporting large FPGA loads, up to 256 GBytes DDR4, and 4x 100 Gbps Ethernet.

Viper Platform and Lidless Package

BittWare's Viper platform uses advanced computer flow simulation to drive the physical board design in a thermals first approach, including the use of heat pipes, airflow channels, and arranging components to maximize the limited available airflow in a server. Viper boards are passive by default, with active cooling as an option.

Key Features

- Xilinx Virtex UltraScale+ VU35P/VU37P
- 8 GB Integrated High Bandwidth Memory @ 460 GBps
- PCIe x16 interface supporting Gen1, Gen2, or Gen3
- Four QSFP cages for 4x 40/100GbE or 16x 10/25GbE
- Up to 256 GBytes DDR4
- UltraPort SlimSAS™ for serial expansion
- Board Management Controller for Intelligent Platform Management
- FPGA examples and complete software support

High-Speed Networking and I/O

The XUPVVH is enabled for high-speed networking with four front panel QSFP+ cages, each supporting 40/100GbE or four 10/25GbE channels. Serial expansion is available through two UltraPort SlimSAS connectors (16x 24Gbps) that can be connected to a second PCIe interface, another XUPVVH, or other devices, including IBM's POWER9 via OpenCAPI. A utility header provides a 1GbE interface, a PPS input, and a USB interface for debug and programming support.

Memory

The board's flexible memory configuration includes two DIMM sites that support DDR4 SDRAM and QDR. Memory card options include up to 128 GBytes of DDR4 with optional error-correcting codes (ECC) or up 576 Mbits QDR-II+ (2x 288Mbit banks x18). The board also features flash memory for FPGA images.

Board Management Controller

The XUPVVH features an advanced system monitoring subsystem, similar to those typically found on today's server platforms. At the heart of the board's monitoring system lies a Board Management Controller (BMC), which accepts Intelligent Platform Management Interface (IPMI) messaging protocol commands. The BMC provides a wealth of features, including control of power and resets, monitoring of board sensors, FPGA boot loader, voltage overrides, configuration of programmable clocks, access to I²C bus components, field upgrades, and IPMI messaging. Access to the BMC is via PCIe or USB. BittWare's BittWorks II Toolkit also provides utilities and libraries for communicating with the BMC components at a higher, more abstract level, allowing developers to remotely monitor the health of the board.

Development Tools

BittWorks II Toolkit

BittWare offers complete software support for the XUPVVH 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 Example Projects

BittWare offers FPGA example projects to provide FPGA board support IP and integration for its UltraScale+ boards. The example projects easily integrate with the Xilinx Vivado tools and illustrate how to move data between the board's different interfaces. All examples are available for download on BittWare's developer website.



Specifications

BOARD SPECIFICATIONS

FPGA

- Virtex UltraScale+ VU35P or VU37P
- 48x GTY transceivers at 32.75 Gbps
- Up to 2.8 million logic elements
- 8 GBytes of HBM2 high-bandwidth DRAM
- Up to 6 integrated PCIe cores
- Up to 9,024 DSP slices with 27x18 multipliers

On-Board Memory

- Flash memory for booting FPGA

Optional DIMM Memory

- 2 DIMM sites, each supporting:
 - Up to 128 GBytes DDR4 x72 with ECC
 - Up to 576 Mbits dual QDR-II+ x18 (2 independent 288 Mbit banks)

PCIe Interface

- x16 Gen1, Gen2, Gen3 interface direct to FPGA

Utility Header

- USB, 1 PPS input, 1GbE

UltraPort SlimSAS

- Standard high-speed connector for storage devices
- Connected to FPGA via 8x transceivers
- OpenCAPI compatible
- Can support an additional x16 or x8 PCIe interface (requires second slot)

QSFP Cages

- 4 QSFP28 (zQSFP) cages on front panel connected directly to FPGA via 16 transceivers
- Each supports 100GbE, 40GbE, 4x 25GbE, or 4x 10GbE and can be combined for 400GbE

Board Management Controller

- Voltage, current, temperature monitoring
- Power sequencing and reset
- Field upgrades
- FPGA configuration and control
- Clock configuration
- I²C bus access
- USB 2.0 and JTAG access
- Voltage overrides

Size

- 3/4-length, standard-height PCIe dual-slot card
- 241mm x 111.15mm
- Max. component height: 34.79mm dual slot

DEVELOPMENT TOOLS

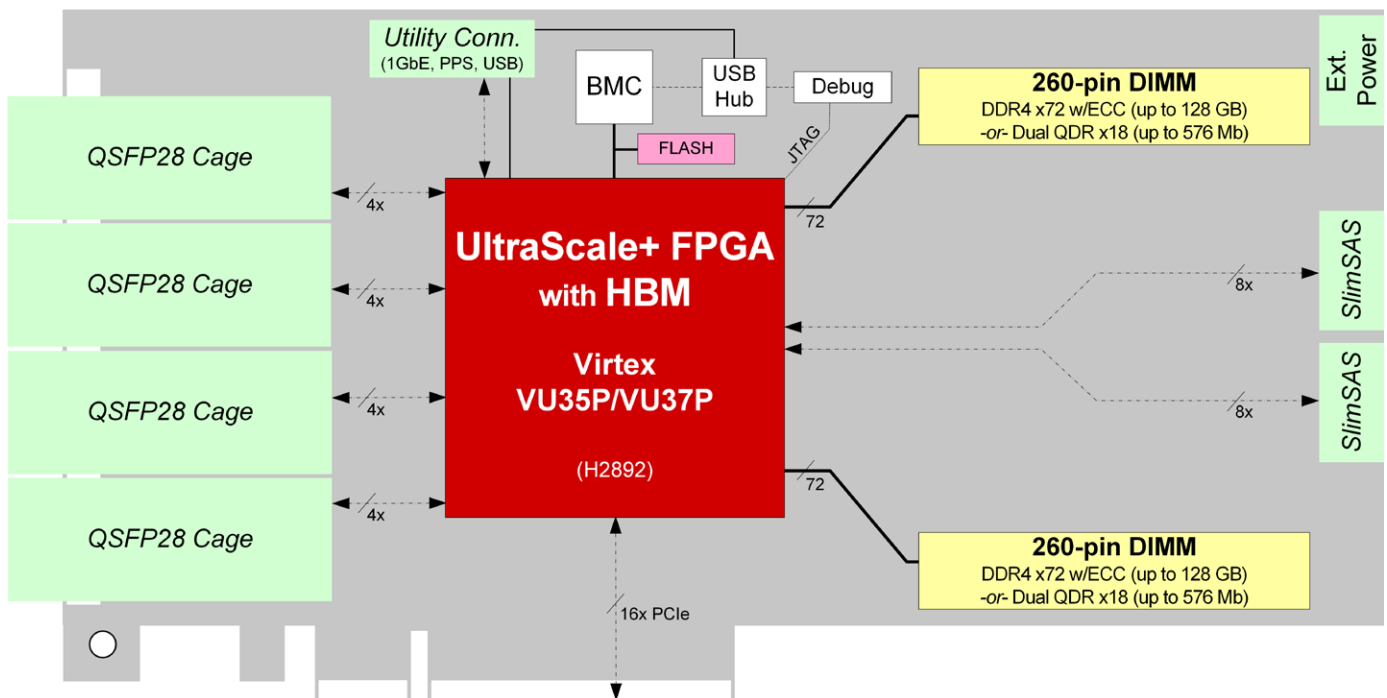
System Development

- [BittWorks II Toolkit](#) - host, command, and debug tools for BittWare hardware

FPGA Development

- [FPGA Examples](#) - example Vivado projects
- [Xilinx Tools](#) - Vivado® Design Suite

Figure 2: XUPVVH System Block Diagram



XUPVVH Ordering Options

XUPVVH - [TBD*]

* Contact BittWare for availability

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