



UltraScale+ PCIe board with integrated HBM2 memory

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.

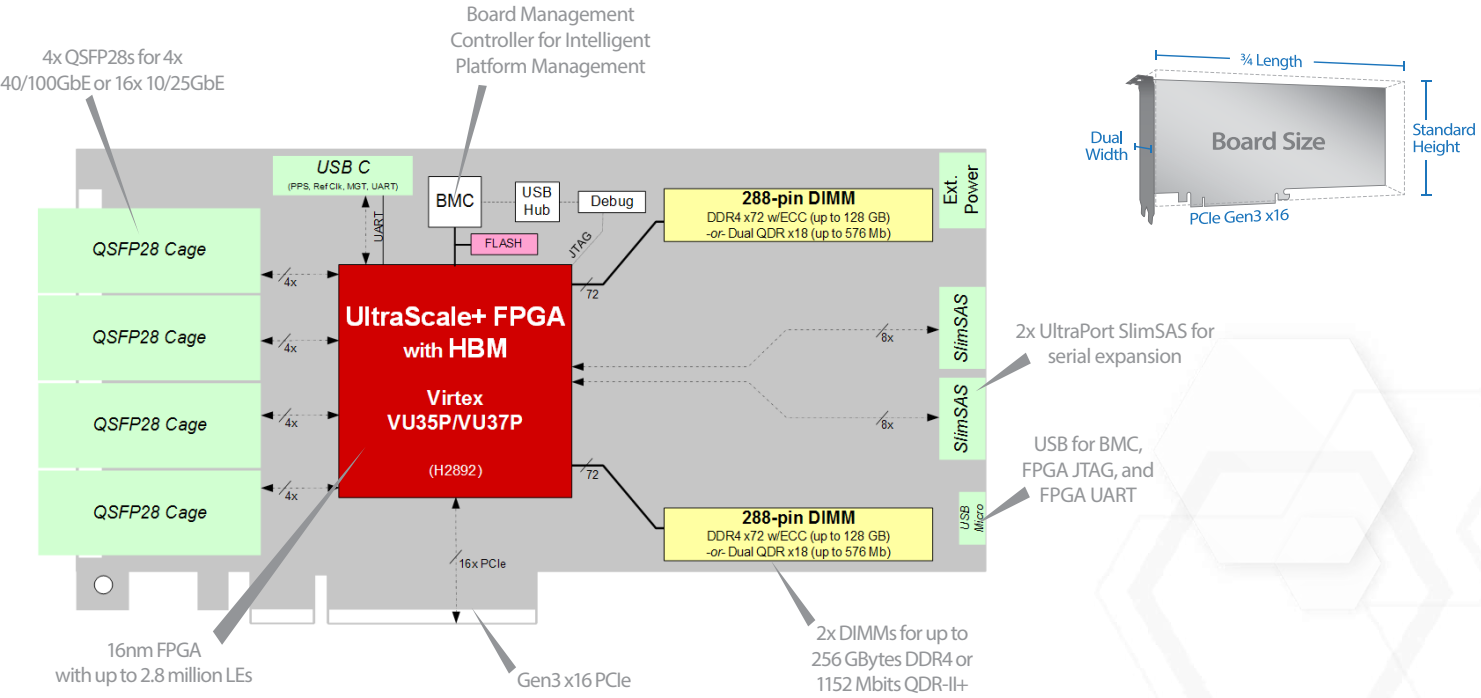
BittWare's Viper platform uses advanced computer flow simulation to drive the physical board design in a thermals first approach, including the use of heat pipes, airflow channels, and arranging components to maximize the limited available airflow in a server. Viper boards are passive by default, with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



Xilinx VU37P FPGA: lidless package is used by BittWare's Viper thermal management for enhanced cooling performance

key features

- 4x 100GbE** via 4 QSFP28
- Up to 256 GBytes DDR4**
- Up to VU37P FPGA: 2.8 million LCs 8GBytes HBM2** FPGA by Xilinx



XUPVVH

PCIe FPGA Board

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 25Gbps) 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 PPS input, 10MHz reference clock, two management ports, and a USB interface for debug and programming support.

System Management

For system management, the XUPVVH 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 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 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.

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

XUPVVH

PCIe FPGA Board

Board Specifications

FPGA	<ul style="list-style-type: none">• 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• 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 [†] : <ul style="list-style-type: none">• 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 (optional; no power used from PCIe connector)
USB ports	<ul style="list-style-type: none">• USB C: connects to a breakout board for USB UART, 1 PPS input, 10MHz clock input, 2x management ports• Micro USB: connects to USB-JTAG and BMC
UltraPort SlimSAS	<ul style="list-style-type: none">• 2 UltraPort SlimSAS on rear edge connected to FPGA via 16x GTY transceivers• Can support an additional x16 or x8 PCIe interface (requires soft IP core and additional slot)
QSFP cages	<ul style="list-style-type: none">• 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
- Voltage overrides

Power & cooling

- Air-cooled
- 150A power supply

Size

- $\frac{3}{4}$ -length, standard-height PCIe dual-slot card
- 254mm 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



Ordering Options

XUPVVH - RW-ABBBBCD-EEFF-GHI-JKLMN-OPQ-R

RW	Ruggedization 0U = Commercial (0°C to 50°C)	FF	DIMM 2‡ 00 = None* R4 = DDR4 16GB RDIMM R5 = DDR4 32GB RDIMM R7 = DDR4 128GB RDIMM L5 = DDR4 32GB LRDIMM L6 = DDR4 64GB LRDIMM L7 = DDR4 128GB LRDIMM Q4 = QDRII+ x18 288Mb (dual 144Mb) Q5 = QDRII+ x18 576 Mb (dual 288Mb)	L	SlimSAS 0 = Installed*
A	UltraScale Printed Wiring Board H = Optimized for VU37P*			M	Factory JTAG Header 0 = Not Installed* 1 = Installed
BBBB	FPGA Type and Size 37VP = Virtex VU37P*			N	USB-to-JTAG 1 = Installed*
C	FPGA Core Speed Grade 1 = Slower 2 = Standard* 3 = Faster	G	Oscillator S = Standard*	O	Heatsink 2 = Passive *
D	FPGA Temperature Range E = Extended (Tj = 0 to +100C)*	H	Clock Generator A 0 = 322.265625 MHz*	P	Mechanical Options 0 = Default*
EE	DIMM 1‡ 00 = None* R4 = DDR4 16GB RDIMM R5 = DDR4 32GB RDIMM R7 = DDR4 128GB RDIMM L5 = DDR4 32GB LRDIMM L6 = DDR4 64GB LRDIMM L7 = DDR4 128GB LRDIMM Q4 = QDRII+ x18 288Mb (dual 144Mb) Q5 = QDRII+ x18 576 Mb (dual 288Mb)	I	Clock Generator B 0 = 322.265625 MHz*	Q	Misc. Configuration 0 = Default
		J	Timing 0 = None*	R	Assembly 6 = RoHS 6/6
		K	QSFP Configuration 4 = 4 QSFP cages		

* Default

† Contact Sky Blue or Zerif for availability

‡ DIMM sites 1/2 and sites 3/4 must have the same memory type, or be empty.

Contact



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