

# Liquid-Cooled with 300A Power Supply



## CVP-13

## PCIe UltraScale+ VU13P FPGA Board Power Edition for Cryptocurrency Mining

BittWare's CVP-13 is an UltraScale+ VU13P FPGA-based PCIe card designed for ultra high power applications. The Xilinx UltraScale+ VU13P FPGA gives designers incredible performance potential, with 3.8M logic elements —yet with a power density that makes power and thermal management difficult. The CVP-13 meets this challenge with BittWare's Viper platform, supporting monster FPGA loads, up to 256 GBytes DDR4 or 1152 Mbits of QDR-II+, and up to 800Gbps board-to-board bandwidth.

The CVP-13 supports liquid cooling and a 300A FPGA core power supply. While the board is available in an air-cooled version, the liquid cooling option unleashes the full potential of the CVP-13. Two external 8-pin power connectors provide all necessary power.

The CVP-13's Board Management Controller (BMC) provides full system monitoring and control, including core voltage adjustment, automatic shut-down to avoid board damage, and recovery from shut-down.



Xilinx VU13P FPGA: lidless package is used by BittWare's Viper thermal management for enhanced cooling performance

### key features

**300A**

FPGA core power supply

Viper platform  
**Liquid Cooling**  
option for extreme FPGA loads

Virtex UltraScale+  
**VU13P FPGA**  
3.8 million LCs  
360Mb UltraRAM

4x QSFP28s for 400Gbps board-to-board bandwidth

300A FPGA core power supply supports large FPGA loads

Board Management Controller for Intelligent Platform Management

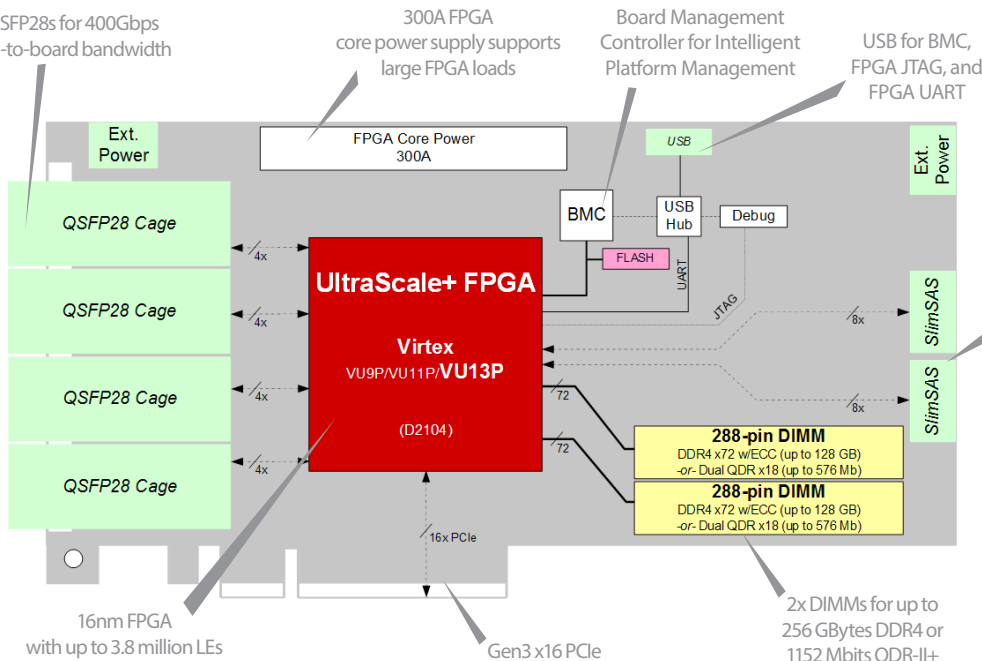
USB for BMC, FPGA JTAG, and FPGA UART

#### Board Size

standard height, 3/4 length, dual width

x16 slot

2x UltraPort SlimSAS for additional 400Gbps board-to-board bandwidth



# CVP-13

## High-Speed Connectivity

The CVP-13 is enabled for high-speed connectivity with four front panel QSFP28 cages, supporting 400Gbps. Two UltraPort SlimSAS connectors provide another 400Gbps.

## USB Interface

A USB interface is provided for debug and programming support. It allows access to the BMC for system monitoring and control, FPGA UART for bitstream connectivity, and FPGA JTAG for Vivado programming and debug.

## System Management

For system management, the CVP-13 is equipped with a Board Management

Controller (BMC), which accepts IPMI 2.0 commands. Use it along with BittWare's BittWorks II Toolkit Lite 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.

## Bitstreams

The CVP-13 is supported by popular bitstream developers. It can be ordered with encryption fuses burned to allow protected bitstreams to be used.

## BWMonitor

Name	Value	Status
Board Management Controller	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 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

<b>FPGA</b>	<ul style="list-style-type: none"> <li>• Virtex UltraScale+ VU13P</li> <li>• 48x GTY transceivers at 32.75 Gbps</li> <li>• 3.8 million logic elements</li> <li>• Over 400 Mb of embedded memory</li> <li>• Integrated PCIe core</li> <li>• 11,904 DSP slices with 27x18 multipliers</li> </ul>
<b>On-board Flash</b>	2Gbit Flash memory for storing FPGA bitstreams
<b>Optional DIMM memory</b>	2 DIMM sites, each supporting: <ul style="list-style-type: none"> <li>• Up to 128 GBytes DDR4 x72 with ECC</li> <li>• Up to 576 Mbits dual QDR-II+ x18 (2 independent 288 Mbit banks)</li> </ul>
<b>PCIe interface</b>	x16 Gen1, Gen2, Gen3 interface direct to FPGA (optional; no power used from PCIe connector)
<b>USB interface</b>	Provides access to <ul style="list-style-type: none"> <li>• BMC</li> <li>• FPGA UART</li> <li>• FPGA JTAG (for Vivado)</li> </ul>
<b>QSFP cages</b>	<ul style="list-style-type: none"> <li>• 4 QSFP28 cages on front panel connected directly to FPGA via 16 GTY transceivers</li> <li>• Provides 400 Gbps board-to-board bandwidth</li> </ul>
<b>UltraPort SlimSAS</b>	<ul style="list-style-type: none"> <li>• 2 UltraPort SlimSAS on rear edge connected to FPGA via 16x GTY transceivers</li> <li>• Provides additional 400Gbps board-to-board bandwidth</li> </ul>

## Board Management Controller

- Voltage, current, temperature monitoring
- Power sequencing and reset
- Field upgrades
- FPGA configuration and control
- Clock configuration
- I<sup>2</sup>C bus access
- USB 2.0
- Voltage overrides

## Power & cooling

- Liquid-cooled or air-cooled
- Dual external 8-pin power connectors (both must be connected)
- 300A FPGA core power supply

## Size

- ¾-length, standard-height PCIe dual-slot card
- 254mm x 111.15mm
- Max. component height: 34.79mm dual slot

## Optional Development Tools (for Bitstream Developers)

<b>System development</b>	BittWorks II Toolkit - host, command, and debug tools for BittWare hardware
<b>FPGA development</b>	<ul style="list-style-type: none"> <li>• <a href="#">FPGA Examples</a> - example Vivado projects</li> <li>• <a href="#">Xilinx Tools</a> - Vivado® Design Suite</li> </ul>



To learn more, visit [www.BittWare.com](http://www.BittWare.com)

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