

PCI594

PCIe FPGA with quad QSFP28,
VU13P UltraScale+™



PCI594

Key Features

- PCIe x16 or any protocol on the x16 SERDES
- Xilinx UltraScale+™ VU13P FPGA
- Quad QSFP28 ports and an additional GbE
- SyncE Master/Slave
- PLL to lock to an external 1PPS or an external sinewave clock up to 400Mhz
- Dual x8 SERDES lanes for direct connection to neighboring FPGA card(s)
- Single bank of 64-bit wide DDR-4 Memory for total of 16 GB
- Active cooling or passive cooling (utilizing chassis cooling such as VadaTech VT808 chassis)

Benefits

- Based on the widely-used VadaTech PCI596/PCI597
- Strong BSP support and example code to support system bring-up
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company



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PCI594

The PCI594 is based on the Xilinx VU13P UltraScale+™ FPGA, which provides over 12,000 DSP slices, 360 Mb of UltraRAM and 3,780K logic cells. The FPGA interfaces to the quad QSFP28 modules. It also has interface to a single DDR4 memory bank that is 64-bit wide with 16 GB total. This allows for large buffer sizes to be stored during processing as well as for queuing the data to the host.

PCI594 has a PLL that can lock into an external clock such as 1PPS or to a sinewave clock up to 400MHz. The module also has a GbE with SyncE capabilities. The PCI594 could run as SyncE Master and/or Slave. The module provides four clock output which could be connected to adjacent PCI594 modules to allow synchronized between modules.

PCI594 has x16 PCIe edge connector routed to the FPGA PCIe hard IP block. The x16 SERDES going to the edge connector could be configured to run any protocol and integrated, for example, into VadaTech's VT808 chassis. In addition, there are 16 uncommitted SERDES routed to a dual x8 expansion connector, providing direct connectivity to a neighboring FPGA (e.g. via Aurora, 10/40GbE, SRIO, PCIe) without the need to go through the host.

The Quad QSFP28 Cages could take 100GbE as well as 40GbE optical transceiver. The optical modules could be bifurcated to Quad 1/10/25GbE lanes for a total of 16 ports. The optical modules are protocol agnostic and could take a mix of 100G and/or 40G transceiver.

Active cooling of the module and option with passive cooling. The passive cooling requires a chassis that forces air over the PCI594 heat sink, such as VadaTech's VT808 chassis.



Figure 1: PCI594



Figure 2: PCI594 Front View



Figure 3: PCI594 Top View

Reference Design

VadaTech provides a reference design implementation for our FPGAs, complete with VHDL source code and configuration binaries. The reference design focuses on the I/O ring of the FPGA to demonstrate low-level operation of the interconnections between the FPGA and other circuits on the board and/or backplane. It is intended to prove out the hardware for engineering/factory diagnostics and customer acceptance of the hardware, and can be used as a starting point for developing an end application.

Block Diagram

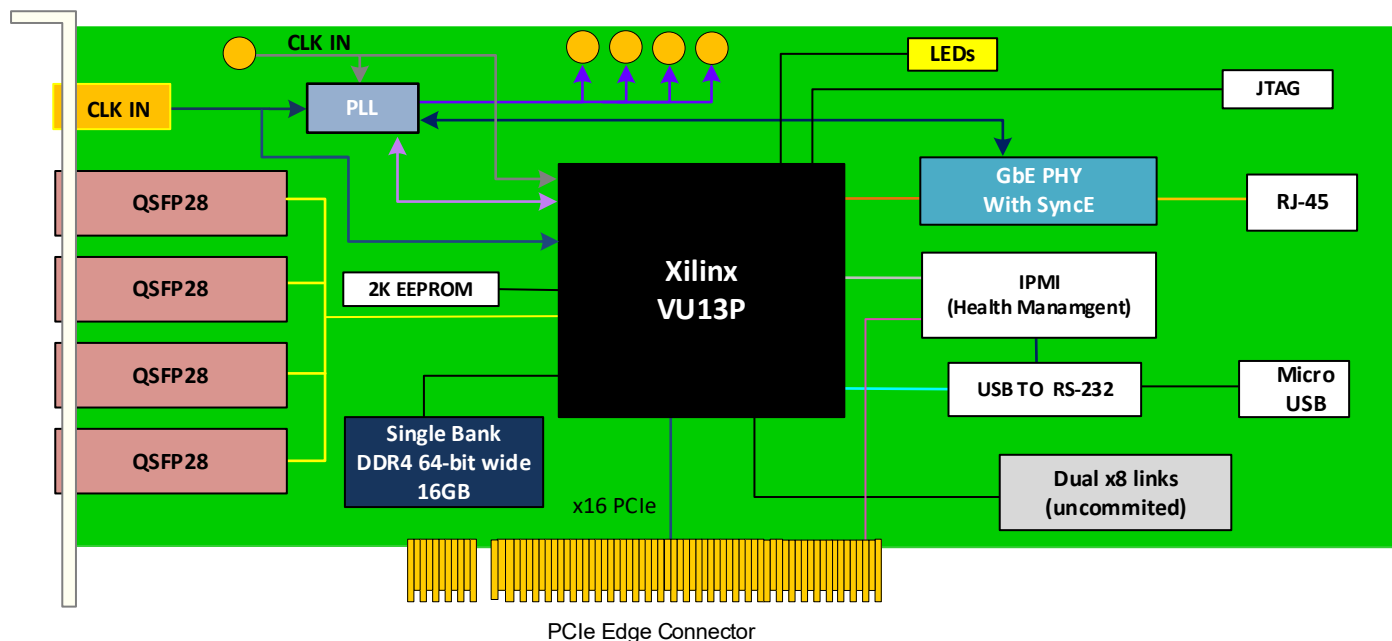


Figure 4: PCI594 Functional Block Diagram

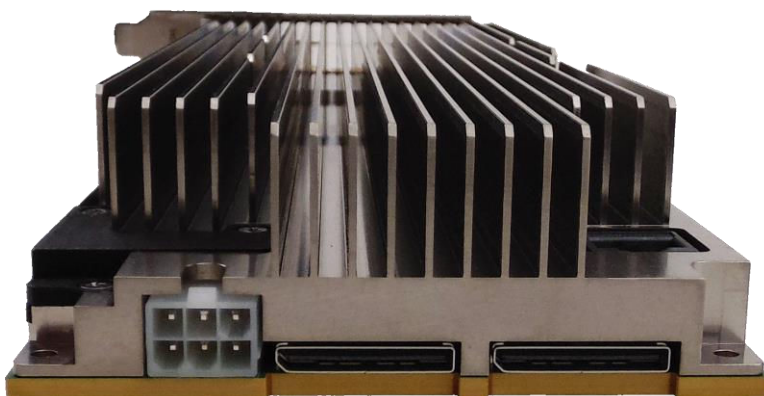


Figure 5: PCI594 Rear View

Specifications

Architecture		
Physical	Dimensions	Double Module
		Width: 4.36" (110.74 mm)
		Depth: 11.34" (288 mm)
Type	PCIe Network	PCIe FPGA with Quad QSFP28 and GbE
Standards		
PCIe	Lanes	X16 or any protocol
Configuration		
Power	PCI594	90W (FPGA load dependent and number of optical modules)
Environmental	Temperature	See Ordering Options
		Storage Temperature: -40° to +85°C
	Vibration	Operating 9.8 m/s ² (1G), 5 to 500 Hz
	Shock	30Gs on each axis
	Relative Humidity	5 to 95% non-condensing
Front Panel	Interface Connectors	SMPM for External clock input via panel
		Quad QSFP28
		FPGA RS-232 and IPMI Health management thru the Micro USB
		RJ-45, Dual OCuLink x8 in the rear, Five U.FL-R connector as output clock and single input clock
	LEDs	Status LED
Software Support	Operating System	N/A
Other		
MTBF	MIL Hand book 217-F@ TBD hrs	
Certifications	Designed to meet FCC, CE and UL certifications, where applicable	
Standards	VadaTech is certified to both the ISO9001:2000 and AS9100B:2004 standards	
Warranty	Two (2) years, see VadaTech Terms and Conditions	

INTEGRATION SERVICES AND APPLICATION-READY PLATFORMS

VadaTech has a full ecosystem of OpenVPX, ATCA and MTCA products including chassis platforms, shelf managers, AMC modules, Switch and Payload Boards, Rear Transition Modules (RTMs), Power Modules, and more. The company also offers integration services as well as pre-configured Application-Ready Platforms. Please contact VadaTech Sales for more information.

Ordering Options

PCI594 – A00-DE0-0HJ

A = Optical modules*	D = Cooling Method	
0 = None 1 = 100G MTP/MPO SR 2 = 100G MTP/MPO LR (1km) 3 = 100G MTP/MPO LR (10km) 4 = 40G MTP/MPO (SR) 5 = 40G WDM (SR) 6 = Reserved	0 = Passive cooling (chassis provides cooling) 1 = Active cooling	
	E = FPGA Speed	H = Temperature Range
	1 = High (-2)** 2 = High (-2LE) 3 = Highest (-3E)**	0 = Commercial (-5° to +50°C) 1 = Industrial (-20° to +65°C)
		J = Conformal Coating
		0 = No coating 1 = Humiseal 1A33 Polyurethane 2 = Humiseal 1B31 Acrylic

Notes: *Qty four is shipped with the module, if a mix of modules are needed, please contact VadaTech Sales Team member

**Minimum order quantity applies for these FPGA SKU's and/or memory option

For operational reasons VadaTech reserves the right to supply a higher speed FPGA device than specified on any particular order/delivery at no additional cost, unless the customer has entered into a Revision Lock agreement with respect to this product.

Related Products

AMC592



- AMC FPGA carrier for FMC per VITA 57
- Xilinx UltraScale™ XCKU115 FPGA
- Supported by DAQ Series™ data acquisition software

FMC223



- FPGA Mezzanine Card (FMC) per VITA 57
- Single module DAC 14-bit @ 2.5 GSPS (AD9739)
- 2 Vpp differential Analog output swing

FMC229



- FMC per VITA 57
- Quad DAC based on DAC39J84
- On-board dual Wideband Quadrature Modulator

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