V5052
16-Port PCI Express FPGA Card

Benefits

High density FPGA PCIe Card for next generation data distribution, processing, and networking systems

Supports 1/10/25/40/100 Ethernet, 1/2/4/8/16/32G Fibre Channel, sFPDP1/2/2.5/10G, ARINC 818-2

Out-of-the-box ultra low latency and high bandwidth performance

Programmable FPGA with a powerful development framework

Next generation host interface connection bandwidths

Wide range of FPGA sizes and memory configuration options

Features

Four QSFP28 ports accommodate:

- 4x 100G Ethernet
- 4x 40G Ethernet
- 16x 25G Ethernet
- 16x 10G Ethernet
- 16x 1G Ethernet
- 16x 1/2/4/8/16/32G Fibre Channel
- 16x 1/2/2.5/10G sFPDP
- 16x ARINC 818-2

Xilinx Virtex UltraScale+ FPGA (VU9P)

Supports PCIe Gen3 x 16 and Gen4 x 8

PPS time synchronization with nSec resolution

Thermal sensors for monitoring card temperature

Robust FPGA development framework

Advanced APIs that support multi-core and multi-processor architectures

Optimized Linux drivers and libraries

Overview

The V5052 is the next generation of New Wave DV's flagship programmable network products and the industry's highest performance FPGA network card in production today. It is powered by the latest Xilinx Virtex UltraScale+ FPGA technology. Purpose-built for processing network data in real time, the V5052 has been optimized to provide the lowest possible latency and the highest possible performance. This makes it ideal for executing sophisticated algorithms, processing streaming data, and running a wide range of functions as close as possible to the network.

To meet priority deadlines for rolling out new products, the Development Framework provides the standard toolset and debug capabilities required to create applications on the V5052 PCI Express FPGA card quickly.

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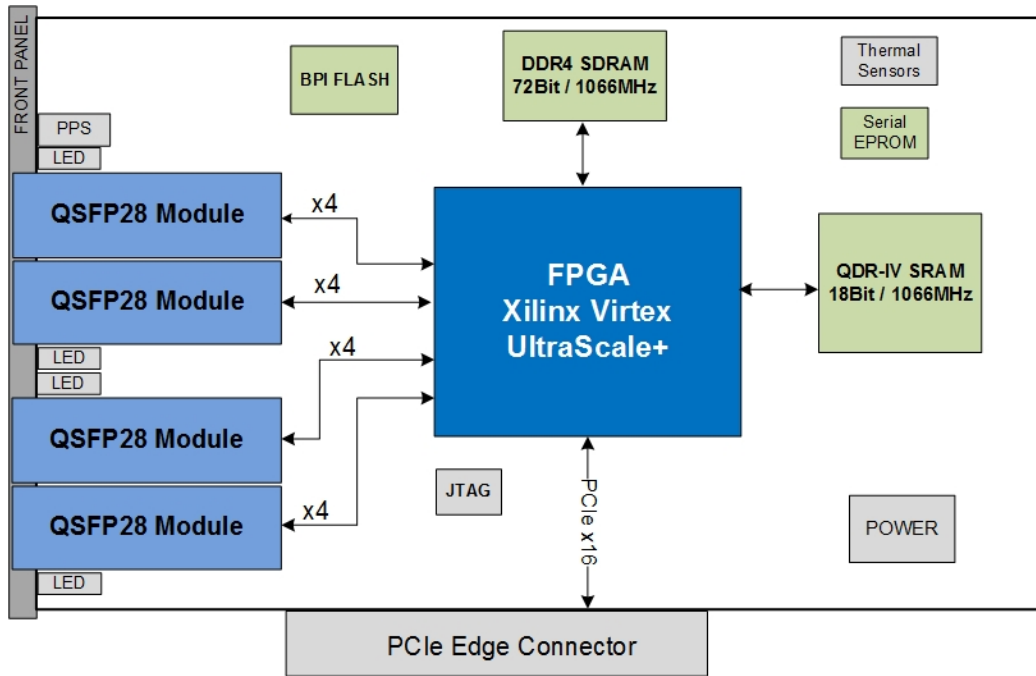
> V5052 Block Diagram

Simplified Programmability Framework

The V5052 can optionally ship with a Development Framework, a fully-integrated and flexible toolset that provides the infrastructure necessary to ensure rapid deployment of custom applications. The framework abstracts the details of the protocol and interfaces, memory controllers and host fabric interfaces, thereby reducing the development effort and schedule for designers to implement custom solutions.

Optional Offload Engines

The V5051 is an extremely flexible FPGA-based interface card. The card features all of the necessary hardware, FPGA IP cores, plus software drivers to support Ethernet, Fibre Channel, sFPDP, and ARINC 818. New Wave also offers options for custom high-speed serial protocols or user-developed IP cores. When used as a gateway, the V5052 supports PCI Express over the edge connector for processor communications.

Multi-processor Multi-core Support

The V5052 is uniquely suited to system architectures involving multiple processing cards on a common switched data plane. Specifically, the V5052 supports shared access from multiple host processors, enabling it to function as a cost effective, high- performance gateway. This feature enables a single high-speed pipe to carry multiple virtual channels in systems that need to spread or load balance sensor data across processor farms.

Operation Customization

The V5052 is an FPGA-based network card that can be customized to fit your requirements. New Wave provides access to the FPGA for customers to customize, however New Wave can also modify existing cores or develop new cores for your applications. If you have specific networking requirements, New Wave DV can help you accomplish your goals.

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Complete Product Support Program

New Wave DV prides itself on its excellent customer support, a fact that is echoed by our customers. New Wave DV provides industry standard warranty on its products, but it is the human factor that makes our support so valuable to our customers. Our team takes the time and effort to ensure that the customer experience with our products is a positive one.

Our Commitment

New Wave DV is committed to providing the latest innovations in technology, architectures, and techniques to keep our customers one step ahead of the rest. Our products, complete with the Development Framework, are intended to offer our customers an entirely unique out-of-the-box experience.

Technical Specifications

NETWORK INTERFACE
Four QSFP28 optical ports

ETHERNET PROTOCOLS
TCP, UDP, ARP, ICMP, Multicast, Broadcast

FIBRE CHANNEL PROTOCOLS
RDMA, AV, ASM

ADDITIONAL PROTOCOLS
sFPDP, ARINC 818-2

FPGA DEVICE
Xilinx Virtex UltraScale+ (VU9P)
Xilinx Kintex UltraScale (KU115)

MEMORY
One bank of 4GB to18GB 72-bit up to 1066MHz DDR4 SDRAM
One bank of 36Mbit to 144Mbit 18-bit 1066MHz QDR-IV SRAM

FLASH
One 32MB memory for storing a default configuration image

HOST INTERFACE
PCI Express Gen4 x8
PCI Express Gen3 x16

EXTERNAL INTERFACE
32 differential pairs (user configurable)
PPS Interface for time synchronization with μsecond resolution
RS-232 serial interface for debug

THERMAL SENSORS
2 digital temperature sensors

COMPLIANCE
PCI Express Card Electromechanical Specification, Rev 2.0
IEEE 802.3ae 2002
IEEE 802.3ba 2010
FC-FS-3 INCITS 470-2011
FCC 47 CFR Part 15, Subpart B, Class A (USA)
IEC 60950-1 (International)
RoHS Directive 2002/95EC

FORM FACTOR
Full-length[1], standard-height PCIe tri-width board
Dual-width option[2]
234 x 111.15mm (9.22 x 4.38 inches)

POWER REQUIREMENTS
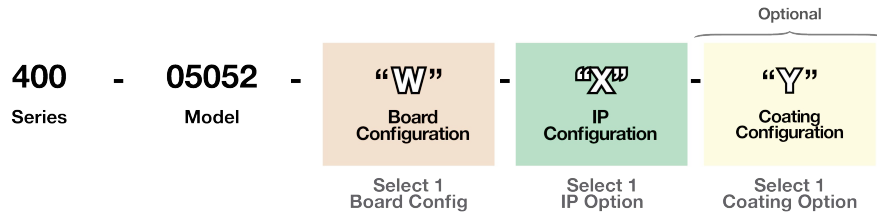Maximum 65W (preliminary)

TEMPERATURE
Operating: 0 to 45°C
Storage: -55˚ C to 105˚C

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[1]Minimum length. Designs that exceed backplane-specific PCIe power specifications and require a mating connector to external power will be longer.

[2]Available on boards for designs that require smaller and/or no additional cooling devices.

V5052 Hardware Part Number Configuration

Optional

400	-	05052	-	"W"	-	"X"	-	"Y"
Series		Model		Board Configuration		IP Configuration		Coating Configuration
				Select 1 Board Config		Select 1 IP Option		Select 1 Coating Option

W

Config #	Configuration Option Details			
Select One	FPGA	DDR4	Ports	Rate
20	VU9P	DNP	16	1-25G
50	KU115	DNP	16	1-10G
#70 - #87	Reserved		Reserved	

*P = Populate; DNP = Do Not Populate

400-05052-__ __ __   (W X Y)
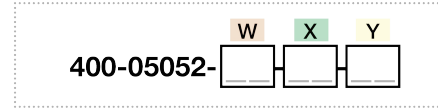
X

Config #	Description
02	Fibre Channel ASM IP Core
17	sFPDP IP Core
21	Fibre Channel ULP IP Core
22	ARINC-818 IP Core
00	No IP

Y

Config #	Description
AR	Acrylic conformal coat
UR	Urethane conformal coat
ER	Epoxy conformal coat
SR	Silicone conformal coat
XY	Parylene conformal coat
BLANK	No conformal coat