

# VPX519

## FPGA FMC Carrier, Xilinx Artix-7, 3U VPX



VPX519

## Key Features

- 3U FPGA carrier for FPGA Mezzanine Card (FMC) per VITA 46 and VITA 57
- Xilinx Artix-7 FPGA in FBG-676 package
- High-performance clock jitter cleaner
- VHDL reference design with source code
- Protocols such as PCIe and GbE are FPGA programmable
- Compatible with VadaTech and 3rd-party FMCs
- Health Management through dedicated Processor

## Benefits

- Reference design with VHDL source code speeds application development
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company

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# VPX519

The VPX519 is a FPGA Carrier (VITA 46) with an FMC (VITA 57) interface. The unit has an onboard, re-configurable FPGA which interfaces directly to the FMC DP0-9 and all FMC LA/HA/HB pairs.

The FPGA has interfaces to two banks of DDR3 memory (14-bit wide) with a total memory of 512 MB. This allows for large buffer sizes to be stored during processing as well as for queuing the data to the host.

The module supports dual GbE and, dependent on FPGA code loaded, PCIe up to Gen3 (dual x1), or dual SRIO on P1.

Clock crossbar and jitter cleaner can be bypassed by ordering option, providing direct connection from backplane to FMC.

The unit is available in a range of temperature and shock/vib specifications per ANSI/VITA 47, up to V3 and OS2.

Please contact VadaTech for details of Conduction Cooled versions.



Figure 1: VPX519

# Block Diagram

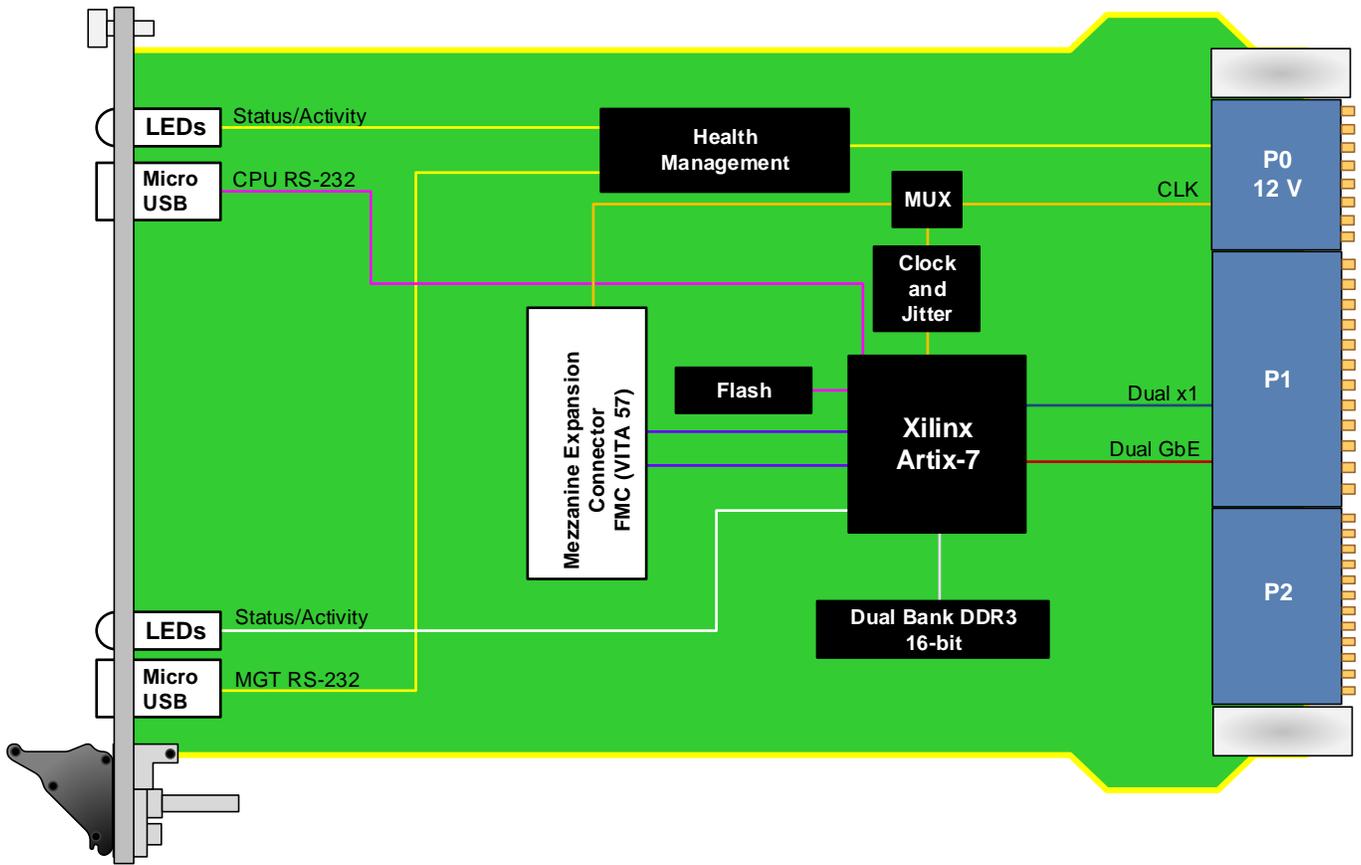


Figure 2: VPX519 Functional Block Diagram

# Front panel

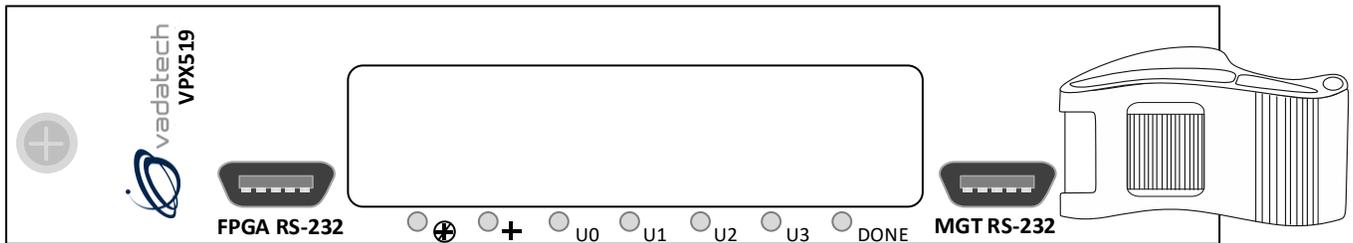


Figure 3: VPX519 Front Panel

# Backplane Pinout

P2	1	N/C
	2	
	3	
	4	
	5	N/C
	6	
	7	
	8	
	9	N/C
	10	
	11	
	12	
	13	N/C
	14	
	15	
	16	
Row G	Management	

P1	1	PCIe Gen3
	2	N/C
	3	
	4	PCIe Gen3
	5	
	6	
	7	
	8	N/C
	9	
	10	N/C
	11	
	12	
	13	
	14	GbE x2
	15	
	16	Management
Row G		

Figure 4: VPX519 Backplane Pinout

# Reference Design

VadaTech provides an extensive range of Xilinx based FPGA products. The FPGA products are in two categories; FPGA boards with FMC carriers and FPGA products with high speed ADC and DACs. The FPGA products are designed in various architectures such as AMC modules, PCIe cards and Open VPX.

VadaTech provides a reference design implementation for our FPGAs complete with VHDL source code, documentation 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 designed to prove out the hardware for early prototyping, engineering/factory diagnostics and customer acceptance of the hardware, but it does not strive to implement a particular end application. The reference VHDL reduces customer time to develop custom applications, as the code can be easily adapted to meet customer's application requirements.

The reference design allows you to test and validate the following functionality (where supported by the hardware):

- Base and Fabric channels
- Clocks
- Data transfers
- Memory
- User defined LEDs

Xilinx provides Vivado Design Suite for developing applications on Xilinx based FPGAs. VadaTech provides reference VHDL developed using the Vivado Design Suite for testing basic hardware functionality. The reference VHDL is provided royalty free to use and modify on VadaTech products, so can be used within applications at no additional cost. However, customers are restricted from redistributing the reference code and from use of this code for any other purpose (e.g. it should not be used on non-VadaTech hardware).

The reference VHDL is shipped in one or more files based on a number of ordering options. Not all ordering options have an impact on the FPGA and a new FPGA image is created for those options that have direct impact on the FPGA. Use the correct reference image to test your hardware. For more information, refer to the FPGA reference design manual for your device which can be accessed from the customer support site along with the reference images.

## Supported Software

- Default FPGA image stored in flash memory
- Linux BSP
- Build Scripts
- Device Driver
- Reference application projects for other ordering options

The user may need to develop their own FPGA code or adapt VadaTech reference code to meet their application requirements. The supplied pre-compiled images may make use of hardware evaluation licenses, where necessary, instead of full licenses. This is because VadaTech does not provide licenses for the Vivado tool or Xilinx IP cores, so please contact Xilinx where these are required.

Xilinx also provides System Generator tools for developing Digital Signal Processing (DSP) applications.

See the following links:

[Xilinx Vivado Design Suite](#), [Xilinx System Generator for DSP](#).

# Specifications

Architecture		
<b>Physical</b>	<b>Dimensions</b>	3U, 1" pitch
Configuration		
<b>Power</b>	<b>VPX519</b>	~21 W (dependent on FPGA load and FMC)
<b>Memory</b>		Two banks of DDR3 (16-bit)
<b>Front Panel</b>	<b>FMC</b>	Single FMC slot
	<b>Micro USB</b>	RS-232 from FPGA and RS-232 from Health Management
	<b>LEDs</b>	User defined by the FPGA and Health Management
<b>VPX Interfaces</b>	<b>Slot Profiles</b>	See Ordering Options
	<b>Rear IO</b>	PCIe on Ports 4 and 8 on P1
		Dual GbE on P1
	<b>Power Supplies</b>	On P0: VS1 = 12V
Other		
<b>MTBF</b>		MIL Hand book 217-F@ TBD hrs
<b>Certifications</b>		Designed to meet FCC, CE and UL certifications, where applicable
<b>Standards</b>		VadaTech is certified to both the ISO9001:2015 and AS9100D standards
<b>Warranty</b>		Two (2) years, see <a href="#">VadaTech Terms and Conditions</a>

## 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

## VPX519 – ABC-DEF-GHJ

<b>A = Clock routing</b> 0 = Standard routing 1 = Bypass crossbar	<b>D = FPGA Speed</b> 1 = Reserved 2 = High 3 = Highest	<b>G = Applicable Slot Profiles</b> 0 = H5P, IEEE 1101.10 1 = 5HP, VITA 48.1
<b>B = VPX Connector Type</b> 0 = Standard 50u Gold Rugged 1 = KVPX Connectors	<b>E = Clock Holdover Stability</b> 0 = Standard (XO) 1 = Stratum-3 (TCXO)	<b>H = Environmental</b> See Environmental Specification
<b>C = FPGA</b> 0 = Reserved 1 = XC7A200T	<b>F = PCIe Option (P1) for Data Port 1/2</b> 0 = No PCIe 1 = PCIe/None 2 = None/PCIe 3 = PCIe/PCIe	<b>J = Conformal Coating</b> 0 = No coating 1 = Humiseal 1A33 Polyurethane 2 = Humiseal 1B31 Acrylic

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.

## Environmental Specification

Option H	Air Cooled			Conduction Cooled	
	H = 0	H = 1	H = 2	H = 3	H = 4
<b>Operating Temperature</b>	AC1* (0°C to +55°C)	AC3* (-40°C to +70°C)	CC1* (0°C to +55°C)	CC3* (-40°C to +70°C)	CC4* (-40°C to +85°C)
<b>Storage Temperature</b>	C1* (-40°C to +85°C)	C3* (-50°C to +100°C)	C1* (-40°C to +85°C)	C3* (-50°C to +100°C)	C3* (-50°C to +100°C)
<b>Operating Vibration</b>	V2* (0.04 g2/Hz max)	V2* (0.04 g2/Hz max)	V3* (0.1 g2/Hz max)	V3* (0.1 g2/Hz max)	V3 (0.1 g2/Hz max)
<b>Storage Vibration</b>	OS1* (20g)	OS1* (20g)	OS2* (40g)	OS2* (40g)	OS2* (40g)
<b>Humidity</b>	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing

Notes: \*Nomenclature per ANSI/VITA 47. Contact local sales office for conduction cooled (H = 2, 3, 4).

## Related Products

FMC108



- FMC per VITA 57
- Two QSPF+ cages for 10GbE/SRIO/PCIE and Aurora
- Re-driver on both ports for a better signal quality

FMC211



- FMC per VITA 57
- ADC @ 2.6 GSPS (EV10AS150B)
- 5 GHz Full Power Input Bandwidth (-3dB)

FMC224



- FMC per VITA 57
- Quad port DAC39J84
- Onboard-Wideband PLL

# Contact

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