AMC593

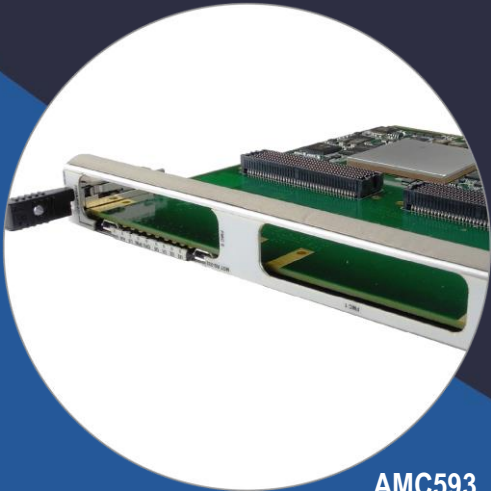## FPGA Carrier with Dual FMC, Kintex UltraScale™ XCKU115 with P2040, AMC

AMC593

Key Features

- Double module, mid-size AMC (full-size optional)
- Xilinx UltraScale™ Kintex XCKU115 QorIQ PPC2040
- AMC Ports 4-11 are routed to FPGA per AMC.1, AMC.2 and AMC.4 (protocols such as PCIe, SRIO, 10GbE, 40GbE, etc. are FPGA programmable)
- AMC Ports 12-15 and 17-20 are routed to the FPGA
- AMC FCLKA, TCLKA, TCLKB, TCLKC and TCLKD are routed
- 8 GB of DDR4 Memory (dual banks)

Benefits

- Xilinx UltraScale™ XCKU115 FPGA provides strong connectivity and processing power
- Dual FMC sites with broad choice of compatible network, A/D, D/A and RF FMCs
- Dual Banks of DDR4 memory allow larger buffer sizes while processing and queuing data to the host
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company

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AMC593

The AMC593 provides a very capable I/O processing engine, with a large UltraScale™ FPGA coupled to two FMC sites and supported by an onboard quad-core processor. With over 5,500 DSP slices and supported by 8 GB of DDR4 (32-bits wide over two banks), the XCKU115 connects to all FMC LA/HA/HB pairs, balancing high-speed I/O with impressive processing power. The AMC593 is compliant to the AMC.1, AMC.2 and/or AMC.4 specification, and supports direct AMC-to-AMC connections over Ports 12-15 and 17-20.

The dual FMC sites accept FMCs from VadaTech's extensive range of data acquisition, networking and RF units, and other 3rd party VITA 57 compliant modules.

The quad core P2040 onboard host has 4x PCIe interface to the FPGA in addition to its local bus, and is supported by DDR3, Boot Flash and a SD Card. The user can select whether to route Ports 0 and 1 of the AMC to the PPC or FPGA.

The AMC593 has Serial Over LAN (SOL) per IPMI specification, with a hardware RNG for secure session.
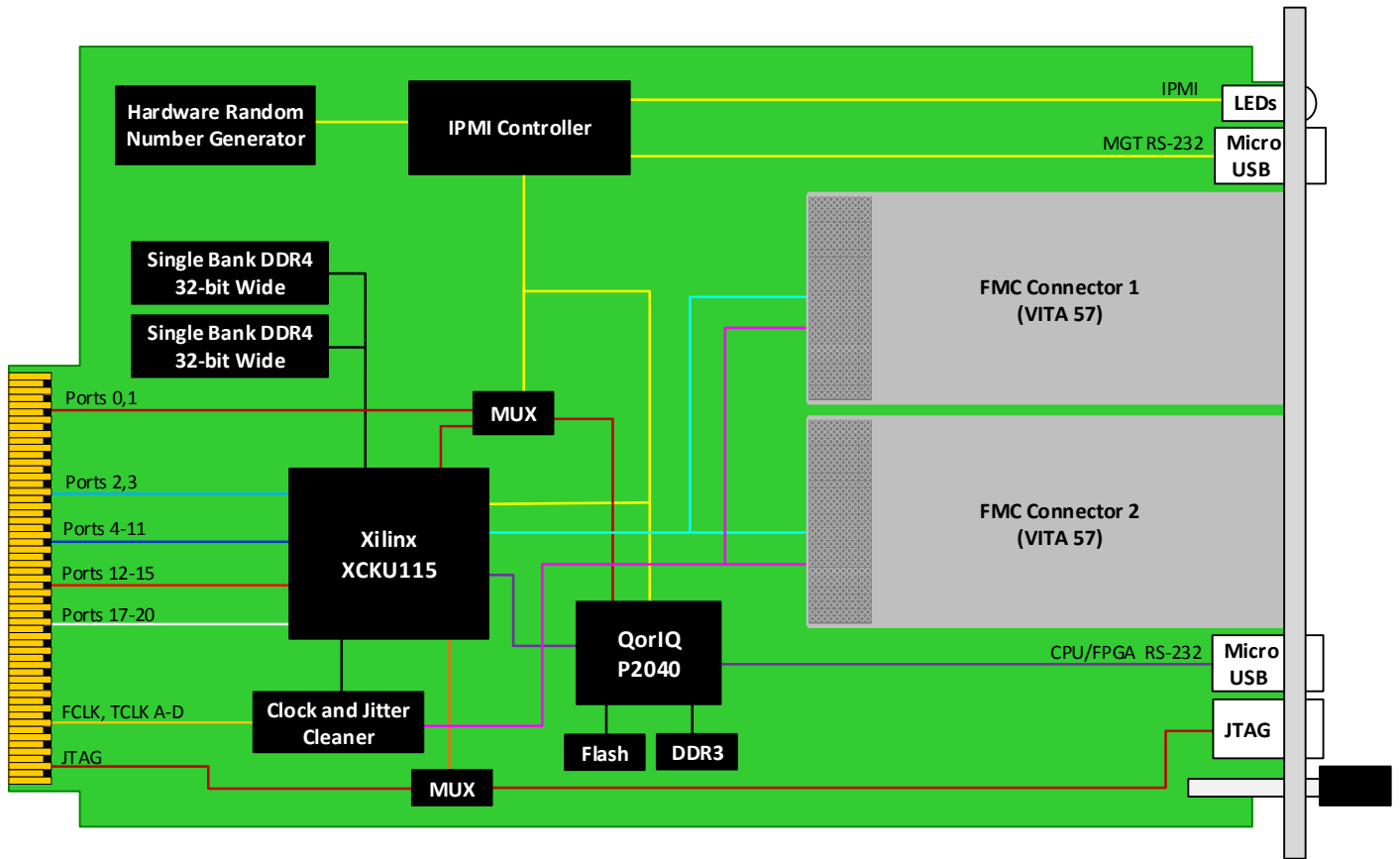

Figure 1: AMC593

Block Diagram

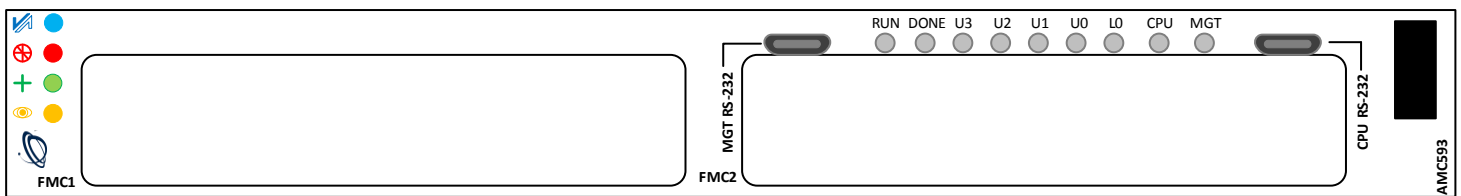*Figure 2: AMC593 Functional Block Diagram*

Front panel

Figure 3: AMC593 Front Panel

AMC593 – FPGA Carrier with Dual FMC, Kintex UltraScale™ XCKU115 with P2040, AMC

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 accessed from 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		
Physical	**Dimensions**	Double module, mid-size (full-size optional)
		Width: 5.85" (148.5 mm)
		Depth 7.11" (180.6 mm)
Type	**AMC FPGA**	Xilinx UltraScale™ XCKU115 FPGA with PPC2040
		Dual bank of DDR4

Standards		
AMC	**Type**	AMC.0, AMC.1, AMC.2 and AMC.4 (FPGA programmable)
Module Management	**IPMI**	IPMI v2.0
PCIe	**Lanes**	Dual x4 via FPGA to AMC
SRIO/Aurora	**Lanes**	Dual x4 via FPGA to AMC
Ethernet	**10/40GbE and GbE**	Dual 10/40GbE via FPGA and Dual 1000-BaseBX from PPC

Configuration		
Power	**AMC593**	~50W (without mezzanine) application specific
Environmental	**Temperature**	See Ordering Options and Environmental Spec Sheet
		Storage Temperature: –40° to +85°C
	Vibration	Operating 9.8 m/s^2 (1G), 5 to 500Hz on each axis
	Shock	Operating 30Gs on each axis
	Relative Humidity	5 to 95% non-condensing
Front Panel	**Interface Connectors**	Dual FMC VITA 57
		Micro USB for MGT RS-232 and CPU RS-232
	LEDs	IPMI management control
		4 user defined LEDs
	Mechanical	Hot swap ejector handle
Software Support	**Operating System**	Linux

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

AMC593 – A0C-DEF-G0J

A = FPGA DDR4 Memory	D = Ports 12-15 and 17-20	G = Clock Holdover Stability
0 = Reserved 1 = 8 GB 2 = Reserved	0 = Not routed to FPGA 1 = Routed to FPGA	0 = Standard (XO) 1 = Stratum-3 (TCXO)
	E = FPGA Speed	
	1 = Reserved 2 = High 3 = Highest	
C = Front Panel	**F = PCIe Option**	**J = Temperature Range and Coating**
1 = Reserved 2 = Mid-size 3 = Full-size 4 = Reserved 5 = Mid-size, MTCA.1 (captive screw) 6 = Full-size, MTCA.1 (captive screw)	0 = No PCIe 1 = PCIe on Ports 4-7 2 = PCIe on Ports 8-11 3 = PCIe on Ports 4-11	0 = Commercial (–5° to +55°C), No coating 1 = Commercial (–5° to +55°C), Humiseal 1A33 Polyurethane 2 = Commercial (–5° to +55°C),Humiseal 1B31 Acrylic 3 = Industrial (–20° to +70°C), No coating 4 = Industrial (–20° to +70°C), Humiseal 1A33 Polyurethane 5 = Industrial (–20° to +70°C), Humiseal 1B31 Acrylic 6 = Extended (–40° to +85°C), Humiseal 1A33 Polyurethane* 7 = Extended (–40° to +85°C), Humiseal 1B31 Acrylic*

Notes: *Edge of module for conduction cooled boards

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

FMC223

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

UTC020

- Single module, full-size per AMC.0
- Dual -36V DC to -75V DC input, 936W (available in 468W)
- Hot swappable with support for power module redundancy

VT899

- MTCA System Platform 5" x 7U x 9" deep. (with handles 10" deep)
- Up to six AMCs: 6 full-size single-width or 3 full-size double width
- Redundant Cooling Units

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