AMC523 – Dual DAC 16-bit @ 250 MSPS, Kintex-7, MTCA.4

MTCA.4 Dual DAC, Kintex-7

KEY FEATURES

- Dual DAC 16-bit @ 250 MSPS utilizing MAX5878 device (user programmable for lower sampling rate)
- Xilinx Kintex-7 FPGA XC7K410T in FFG900 package
- 2 GB of DDR3 memory
- Double module, mid-size (full-size optional) compliant to µTCA.4
- Internal clock or precision external clock from RTM/backplane/front panel clocks
- Trig in/out configurable by software (external trigger via front or port 17)
- x8 PCIe (or dual x4)
- AMC FCLKA, TCLKA, TCLKB, TCLKC and TCLKD are routed
- Quad SFP+ (up to 6.6 Gbps)
- JTAG selectable front and backplane
- AMC.1 and AMC.2 (FPGA programmable)
- DC Coupled

Benefits of Choosing VadaTech

- High performance dual channel DAC with Kintex-7 FPGA
- Design utilizes proven VadaTech subcomponents and engineering techniques
- Comprehensive driver support
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company

The AMC523 is a dual DAC (Digital to Analog Converter) module compliant to the MicroTCA.4 specification. The unit has an on-board, re-configurable FPGA which interfaces directly to the GbE and PCIe bus. It also has 12 channels ADC digital LVDS routed to the FPGA from the MRT523 RTM (sold separately).

The FPGA has an interface to the DDR3 memory. This allows for large buffer sizes to be stored during processing as well as for queuing the data to the host.

The AMC523 allows for flexible external clocking as well as internal clocking. The module has a Trig In/Out signal that is sourced from the front panel or port 17. Each input/output goes to the Rear Transition Module (RTM) connector that complies with µTCA.4. Each of the ADC/DAC single ended inputs are converted to differential signals. Dual GbE is available across ports 0 and 1.

The FPGA interfaces to the front panel via quad SFP+, I/O headers, JTAG, CLK In/Trig In/Out, and LEDs. An RS-232 port is also available from the FPGA if the customer desires to implement a soft-processor in the FPGA and utilize a serial console.

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BLOCK DIAGRAMS

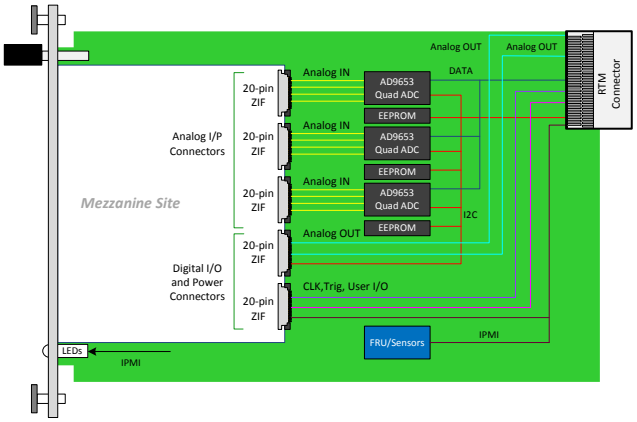

Figure 1: MRT523 Block Diagram (Sold Seperately)

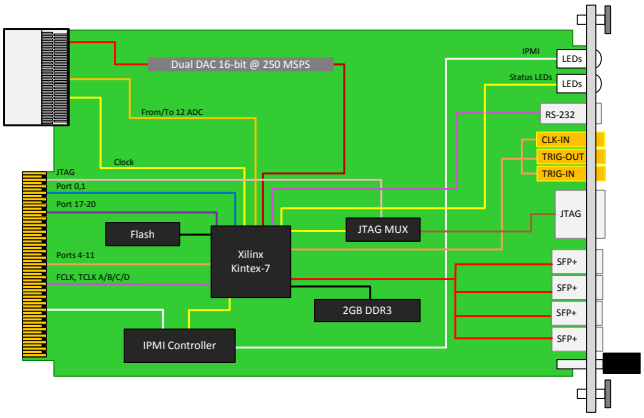

Figure 2: AMC523 Block Diagram

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 tool for developing Digital Signal Processing (DSP) applications.

Xilinx Vivado Design Suite, Xilinx System Generator for DSP

SPECIFICATIONS

Architecture		
Physical	Dimensions	Double module, mid-size (full-size optional)
Type	AMC DAC	Dual DAC
	Resolution	16-bit resolution per port
	CLK/TRIG	Internal/External clock with TRIG IN/OUT
	Memory	2GB of DDR3, Flash
Standards		
µTCA	Type	µTCA.4 with RTM support
AMC	Type	AMC.1 and AMC.2
Module Management	IPMI	IPMI Version 2.0
PCIe	Lanes	Dual x4 or single x8 via FPGA to AMC
Ethernet	GbE	1000-BaseBX
Configuration		
Power	AMC523	~15 W, application specific (up to 40 W)
Environmental	Temperature	Operating temperature: -5° to 45°C (55°C for limited time, performance restrictions may apply), (See environmental spec sheet)
		Storage Temperature: –40° to +85° C
	Vibration	1G, 5 to 500 Hz on each axis
	Shock	30 Gs each axis
	Relative Humidity	5 to 95 percent, non-condensing
Front Panel	Interface Connectors	FPGA JTAG port; MMCX TRIG In/Out, Clock In; IPMI RS-232, FPGA RS-232; 4 SFP+
	LEDs	IPMI Management Control, FPGA 8 user defined LEDs, 16 Status, 16 PCIe signal detect
	Mechanical	Hot Swap Ejector Handle
Software Support	Operating Systems	Independent
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	

INTEGRATION SERVICES AND APPLICATION-READY PLATFORMS

VadaTech has a full ecosystem of ATCA and µTCA products including chassis platforms, shelf managers, AMC modules, Switch and Payload Boards, Rear Transition Modules (RTM), 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

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ORDERING OPTIONS

AMC523 – 00C – DEF – G0J

C = Front Panel
1 = Reserved
2 = Reserved
3 = Reserved
4 = Reserved
5 = Mid-size, MTCA.4 (captive screws)
6 = Full-size, MTCA.4 (captive screws)

D = FPGA
1 = Reserved
2 = Reserved
3 = Reserved
4 = XC7K410T
5 = Reserved

E = FPGA Speed
1 = Reserved (low speed grade is not available)
2 = High
3 = Highest

F = PCIe Option
0 = None
1 = PCIe on Ports 4-7
2 = PCIe on Ports 8-11
3 = PCIe on Ports 4-11

G = SFP+ Transceivers
0 = None
1 = GbE LC/SX (850 nm)
2 = GbE LC/LX (1310 nm)
3 = Copper 1000 Mbit (Ethernet only)
4 = 10 GbE/SX
5 = 10 GbE/LR

J = Temperature Range and Coating
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*

* Edge of module for conduction cooled boards

RELATED PRODUCTS

MRT523 12-ch ADC RTM for AMC523

VT811 MTCA.4 Chassis

AMC725 MTCA.4 Processor AMC

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