

AMC522

MTCA.4 AMC Dual DAC,
16-bit @ 250 MSPS



AMC522

Key Features

- Dual channel DAC 16-bit @ 250 MSPS (MAX5878)
- Compliant to MTCA.4, double module, mid-size (full-size optional) with rear I/O
- Xilinx Kintex-7 FPGA
- Dual PCIe x4 or PCIe x8
- JTAG interface port
- AMC.1, AMC.2, AMC.4 compliant (FPGA programmable)
- IPMI v2.0 compliant

Benefits

- Onboard PLL for buffering/multiplying and Jitter Cleaner
- Design utilizes proven VadaTech subcomponents and engineering techniques
- Full system supply from industry leader
- AS9100 and ISO9001 certified company



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AdvancedMC™



AMC522

The AMC522 provides dual DAC sampling rates of up to 250 MSPS @ 16-bit resolution. It is compliant to MTCA.4 and AMC.1, AMC.2, and AMC.4 specifications. The unit has an onboard, re-configurable Kintex-7 FPGA that directly interfaces with Ports 4-11 and also Port 17 for Trigger I/O.

The AMC522 front panel includes a JTAG header, SMB for Clock input and two Micro USBs for RS-232 management and CPU input. The output from the dual DAC to the RTM is +/- 1V.



Figure 1: AMC522

Block Diagram

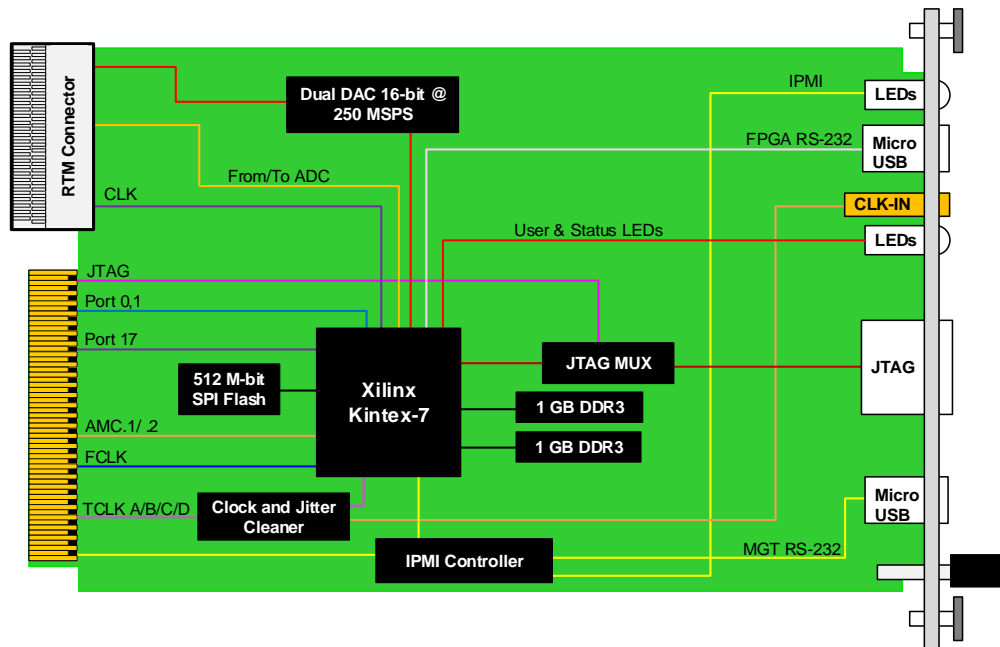


Figure 2: AMC522 Functional Block Diagram

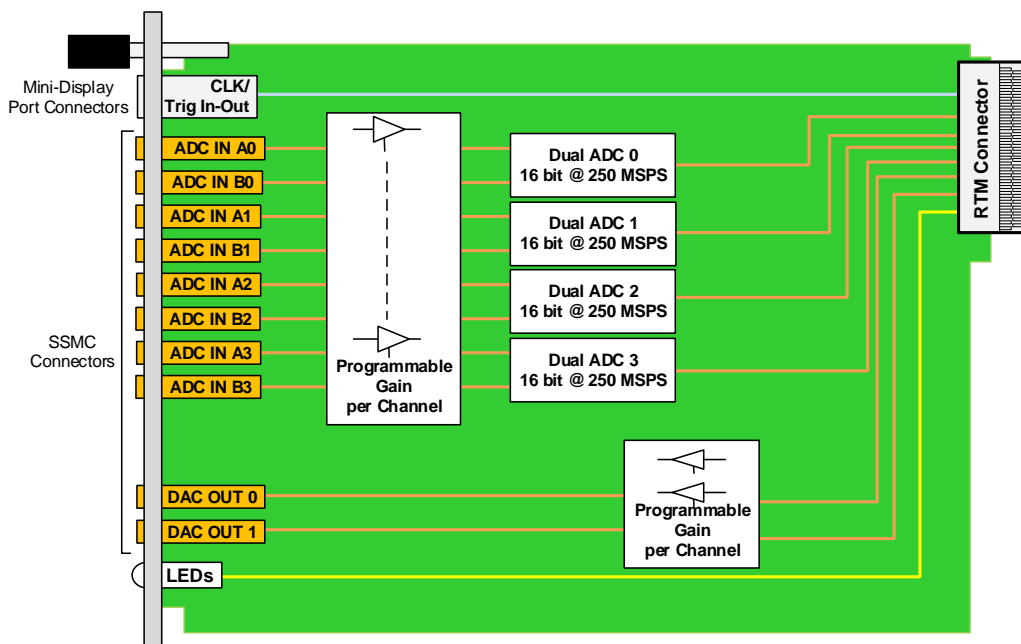


Figure 3: MRT522 Functional Block Diagram (Sold Separately)

Front Panel

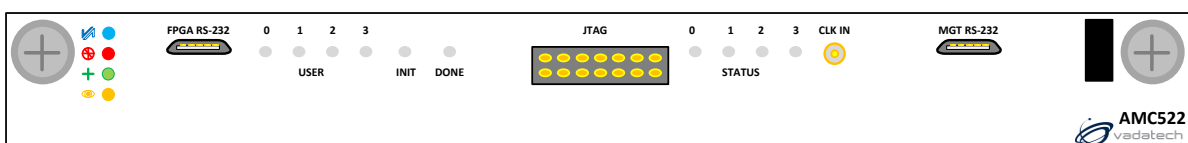


Figure 4: AMC522 Front Panel

Data Acquisition

VadaTech offers a wide range of FPGA AMCs, RTMs, FMC Carriers and FMCs that can be combined to build a Data Acquisition (DAQ) sub-system. The DAQ Series software, when used with a supported hardware configuration, provides all that is needed to configure the system, acquire data and transfer it to a host processor. It also includes a user-configurable Graphical User Interface (Figure 5), which incorporates real-time display of acquired data. The host can be within the MTCA system or, via PCI113 or PCI123, in a separate PC. Full documentation is provided to allow users to customize system behavior or develop their own application on the AMC/FMC hardware.

The DAQ includes data acquisition software that allows users to get up and running quickly and easily, while providing a high level of performance and allowing the user to extend functionality by adding their own FPGA code. Please contact VadaTech sales for the latest information on supported combinations of VadaTech hardware. (Note that the DAQ Series software is not currently supported for 3rd party hardware).

Components provided in the DAQ software include:

- System libraries to configure clocking and triggers
- Sequencer to configure the acquisition (duration, start, stop)
- High-performance DMA firmware for acquiring ADC outputs and transferring to host processor
- Linux driver for host processor (e.g. AMC72x)
- EPICS channel access client API
- Pre-configured GUI (based on Qt Creator)

This software set allows the user to acquire, transfer and display data without the need for any user programming of the hardware. Status information is included in the GUI display, to ease integration and debugging activity.

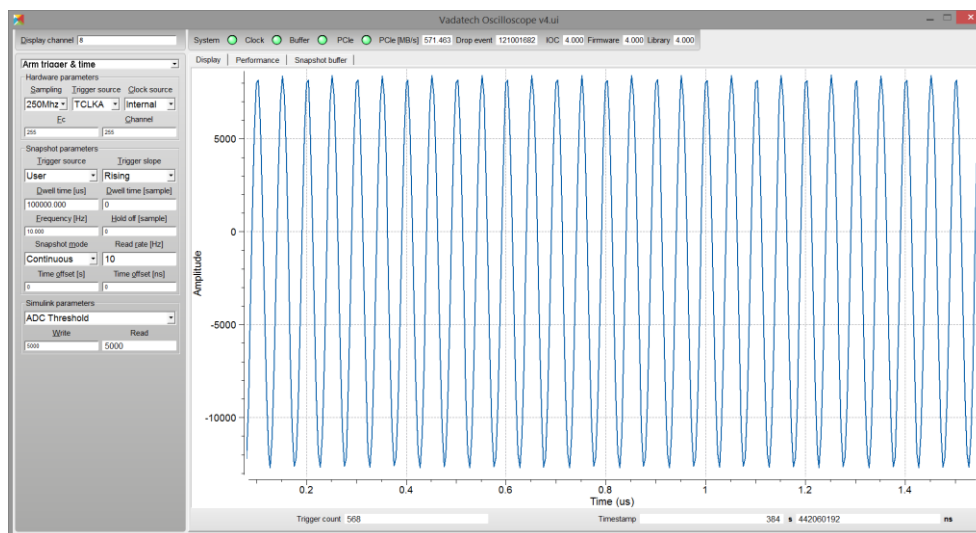


Figure 5: Typical Graphic User Interface Display

The data acquisition software provided as part of the DAQ can be used as-delivered without the user needing to develop any FPGA code.

Full source code is provided for the libraries, sequencer, DMA, Linux driver and GUI, allowing users to easily customize or brand to their own requirements at the exception of a low level PCIe IP from Xilinx provided only as Netlist (this low level block doesn't require modification/customization from integrators or end-users).

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 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 with full-size option Width: 5.85" (148.5 mm) Depth: 7.11" (180.6 mm) |
| Type | AMC DAC | Dual DAC 16-bit resolution per port DAC |
| Standards | | |
| MTCA | Type | MTCA.4 has RTM with two differential bi-directional LVDS lines from FPGA |
| AMC | Type | AMC.0, AMC.1, AMC.2 and AMC.4 |
| Module Management | IPMI | IPMI v2.0 |
| PCIe | Lanes | Dual x4 or x8 |
| Aurora/SRIO/10GbE | Lanes | x4 (if the x8 PCIe is not utilized) |
| Ethernet | GbE | 1000-BaseBX |
| Configuration | | |
| Power | AMC522 | ~25W, application specific (up to 40W) |
| Environmental | Temperature | See Ordering Options and Environmental Spec Sheet Storage Temperature: -40° to +85°C |
| | Vibration | 1G, 5 to 500 Hz on each axis |
| | Shock | 30Gs each axis |
| | Relative Humidity | 5 to 95% non-condensing |
| Front Panel | Interface Connectors | FPGA JTAG port SMB Trig in/out, clock |
| | Micro USB | RS-232 management port and RS-232 CPU |
| | LEDs | IPMI Management Control (Blue, Red, Amber, and Green LEDs) Quad user defined LEDs |
| | Mechanical | Hot-swap ejector handle |
| Software Support | Operating System | Linux (consult VadaTech for other options) |
| 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

AMC522 – 00C-DEF-00J

| | | |
|--|--|---|
| | D = FPGA 0 = Reserved 1 = Reserved 2 = XC7K420T | |
| | E = FPGA Speed 0 = Reserved 1 = High 2 = Highest | |
| C = Front Panel Size 1 = Reserved 2 = Reserved 3 = Reserved 4 = Reserved 5 = Mid-size, MTCA.4 (captive screws) 6 = Full-size, MTCA.4 (captive screws) | F = PCIe Option 0 = No PCIe 1 = PCIe on Ports 4-7 2 = PCIe on Ports 8-11 3 = PCIe on Ports 4-11 | 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* |

Notes: *Edge of module for conduction cooled boards, consult factory for availability

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

VT814



- MTCA rack mount or desktop chassis
- Compliant to MTCA.4 specifications with rear IO for High-Energy Physics and other applications
- Supports up to six MTCA.4 mid-size, double module AMCs and RTMs

VT811



- MTCA System Platform (with handles)
- Full redundancy with dual MTCA Carrier Hub (MCH), dual Cooling Units and quad Power Modules
- Up to twelve AMCs. 12 front mid-size double module slots and RTM slots

AMC725



- Double module, mid-size per AMC.0 and MTCA.4
- Intel® Xeon E3 processor options with PCH
- DVI graphics (SM750 w/ 16 MB DDR), up to 1920x1440 resolution

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