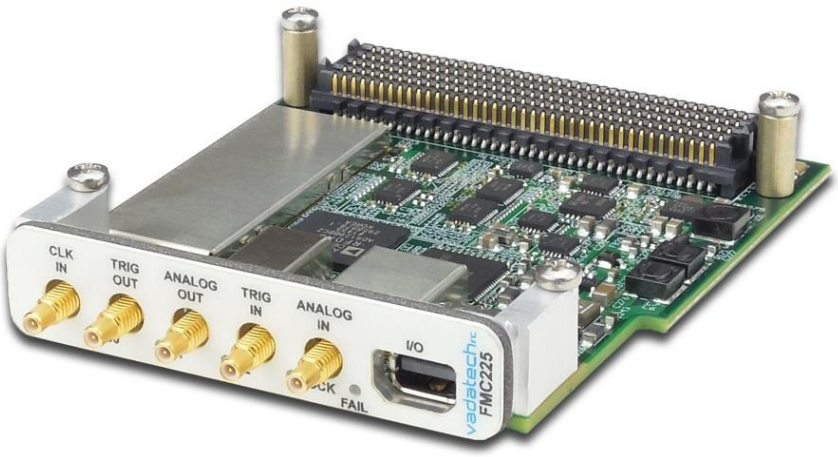
# FMC225 – 12-bit 4.0 GSPS ADC and 14-bit 5.7 GSPS DAC, FMC

FMC, High Speed ADC, DAC




## KEY FEATURES

- FPGA Mezzanine Card (FMC) per VITA 57
- TI ADC12J4000 ADC
  - Usable output bandwidth of 800 MHz at 4x decimation and 4000 MSPS
  - Usable output bandwidth of 100 MHz at 32x decimation and 4000 MSPS
  - Bypass Mode for full Nyquist output bandwidth
- Analog Devices AD9129 DAC
  - DC-to-1.4 GHz in Baseband mode
  - DC-to-1.0 GHz in 2x Interpolation mode
  - 1.4 to 4.2 GHz in Mix-Mode
- Excellent dynamic performance
- Front panel interface includes CLK In, Trig In, Analog In/Out, and GPIO
- Ultra Low-Noise wide-band PLL
- On-chip delay locked loops (DLLs) optimize timing between different clock domains.
- RoHS compliant

## Benefits of Choosing VadaTech

- Array of FMC's and FMC carriers available from VadaTech
- High dynamic range for versatility in video/broadcast requirements
- Ideal for Broadband communications systems, Wireless infrastructure, LTE, ATE, RADAR/Jamming
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from the industry leader
- AS9100 and ISO9001 certified company

The FMC225 is an FPGA Mezzanine Module per VITA 57 specification. The FMC225 has an ADC 12-bit at 4.0 GSPS and a DAC 14-bit at 2.85 GSPS direct RF synthesis.

The FMC225 utilizes TI ADC12J4000 ADC providing 12-bit conversion at rates of up to 4.0 GSPS and an Analog Devices AD9129 DAC providing 14-bit conversion at rates of up to 2.85 GSPS. The DAC core is based on a quad-switch architecture that enables dual-edge clocking operation, effectively increasing the DAC update rate to 5.7 GSPS when configured for Mix-Mode™ or 2x interpolation. The input sampling clock can be via the front panel or the on board wide-band PLL. The FMC225 has a trigger input which is routed to the FMC connector as well as to the ADC.

The analog input/output, clock input and trigger inputs are routed via SSMC connectors.

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## 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 (GUI) which includes 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 customise system behaviour 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.

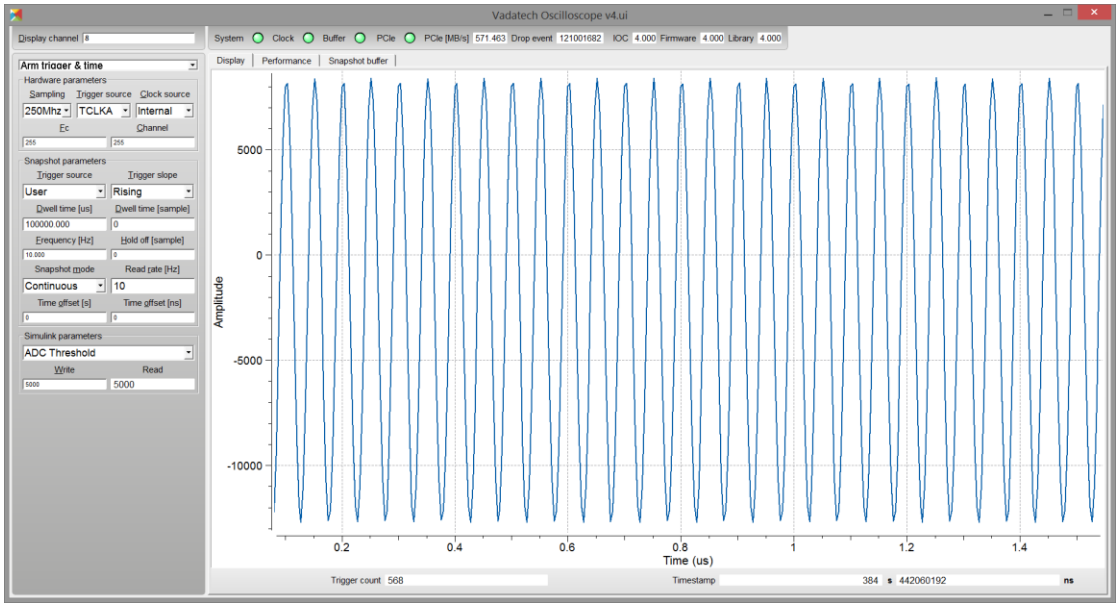


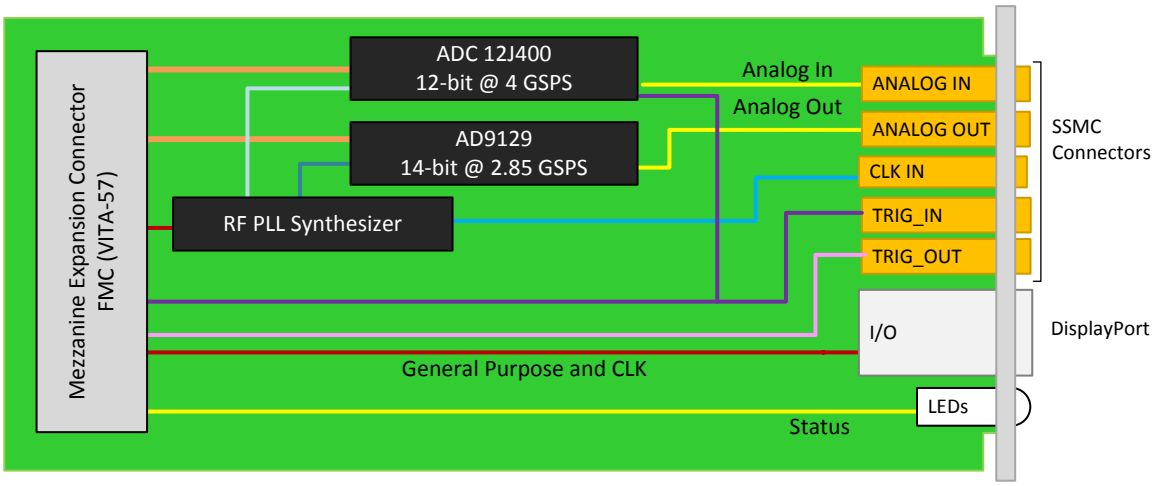

Figure 1: Typical User Interface Display

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

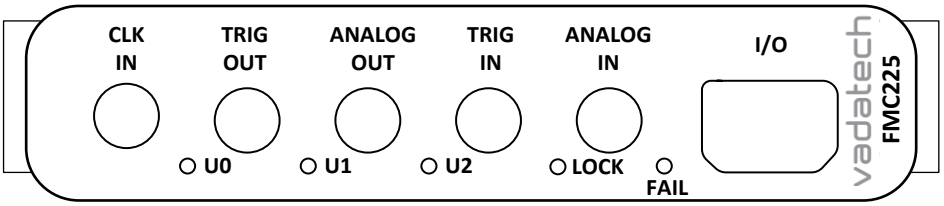
*Note that VHDL source code is not provided for the DMA engine and memory block (provided as Netlists).*

Full source code is provided for the libraries, sequencer, Linux driver and GUI, allowing users to easily customize or brand to their own requirements.

## BLOCK DIAGRAM




## FRONT PANEL



## SPECIFICATIONS

| | | |
|---|---|---|
| **Architecture** | | |
| **Physical** | Dimensions | Single module |
| | | Width 2.71" (69 mm) |
| | | Depth 3.01" (76.5 mm) |
| **Type** | FMC | Single port ADC and single port DAC |
| | | Single FMC slot |
| **Standards** | | |
| **FMC** | VITA-57 | ANSI/VITA 57.1-2008 |
| **Configuration** | | |
| **Power** | FMC225 | 6 W |
| **Environmental** | Temperature | Operating Temperature: -5° to 55° C (air flow requirements >400 LFM) industrial and extended versions available |
| | | Storage Temperature: –40° to +85° C |
| | Vibration | 1G, 5 to 500 Hz on each axis |
| | Shock | 30Gs each axis |
| | Relative Humidity | 5 to 95 percent, non-condensing |
| **Front Panel** | Interface Connectors | SSMC and DisplayPort |
| | LEDs | Status |
| **Conformal Coating** | | Humiseal 1A33 Polyurethane (Optional) |
| | | Humiseal 1B31 Acrylic (Optional) |
| **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

### FMC225 – A00 – 000 – G0J

**A = Front Panel Clock/Sync Input**
0 = Square wave for sync or clock input
1 = Sinewave for clock input only

**G = FMC Board Spacing**
0 = 10 mm (per VITA-57 specification)
1 = 17.5 mm *

**J = Conformal 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**

* For use with carriers that require higher mating clearance, such as VadaTech AMC595. Requires full size AMC.
** Edge of module for conduction cooled boards

## RELATED PRODUCTS

**AMC516 Virtex-7 FPGA**

**AMC530 Altera FPGA**

**FMC210 ADC FMC**

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