

# FMC239

## 75 MHz to 6 GHz Quad Versatile Wideband Transceiver (MIMO), FMC



FMC239

## Key Features

- Complete transceiver signal chain solution using Dual Analog Devices (ADRV9009) on a single-wide FMC
- Frequency range 75 MHz to 6 GHz, receiver BW up to 200 MHz and transmitter synthesis BW up to 450 MHz
- Onboard clocking with multi-card synchronization capability. BSP sync's dual ADRV9009 as standard
- Compatible with Analog Devices design tools for ADRV9009
- MIMO transceiver is Time Domain Duplex (TDD) for 3G/4G/5G
- FPGA Mezzanine Card (FMC) per VITA 57

## Benefits

- Ideal for 3G/4G/5G SDR applications with wideband range versatility
- Transmit channels and receive channels sync'd across both ADRV9009 as standard
- High modulation accuracy with ultralow noise
- Array of FMC's and FMC carriers available from VadaTech
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company



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# FMC239

The FMC239 is a FPGA Mezzanine Card (FMC) per VITA 57.1 standard. This low powered unit boasts a small footprint and utilizes two ADRV9009 highly integrated, wideband RF transceivers. VadaTech BSP supports TX sync and RX sync across the transceivers.

The ADRV9009 features dual channel Transmitters (TX) and Receivers (RX) with integrated synthesizer and digital signal processing functions. Each complete RX and TX subsystem includes DC offset correction, Quadrature Error Correction (QEC), and programmable digital filters. The transceivers also provide Automatic Gain Control (AGC) and flexible external gain control modes, allowing significant flexibility in setting system level gain dynamically.

The FMC239 operates within the 75 MHz to 6.0 GHz frequency range, covering most licensed and unlicensed bands. The clocking is via the front panel or an internal clock. This makes the FMC239 an ideal choice for the development and/or deployment of advanced RF solutions.

The VadaTech family of Multiple Input Multiple Output (MIMO) modules are the most versatile FMCs of this type on the market.



Figure 1: FMC239

## Block Diagram

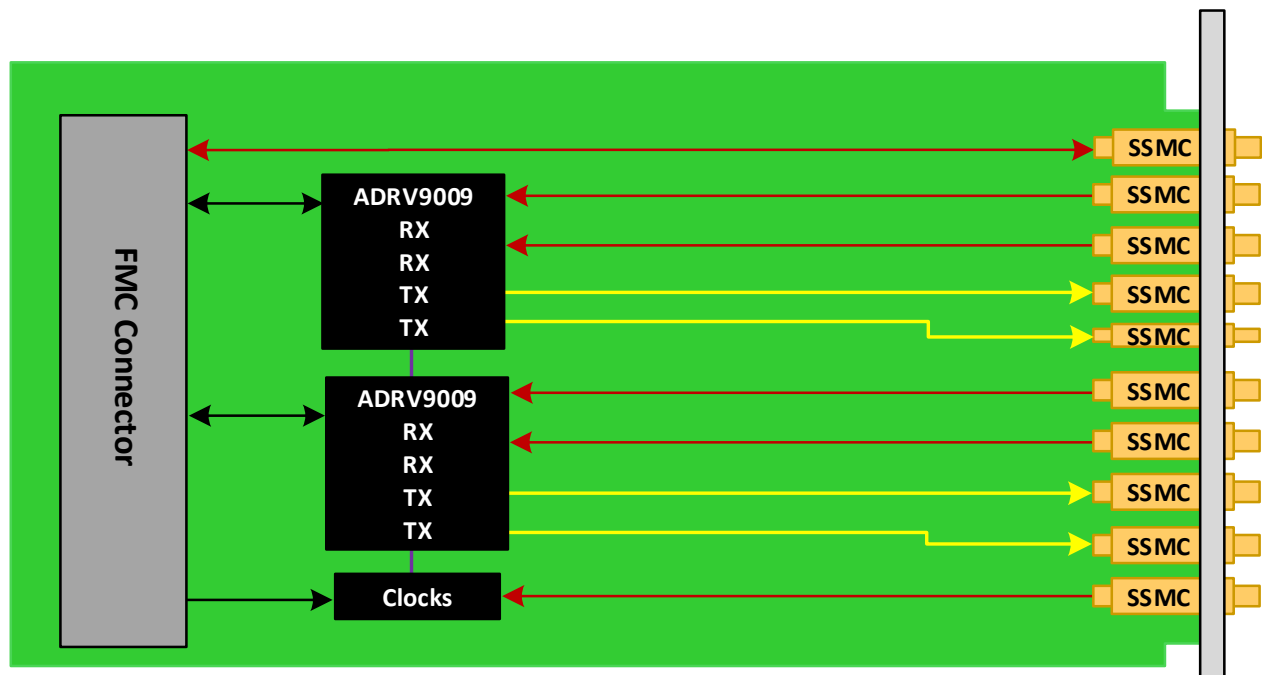


Figure 2: FMC239 Functional Block Diagram

## Front Panel

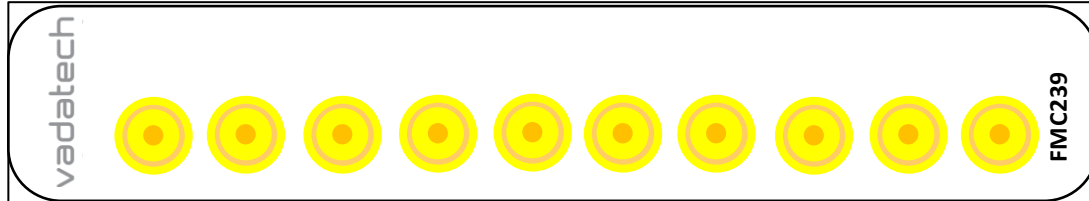


Figure 3: FMC239 Front Panel

# Supported Software

The FMC239 is compatible with Analog Devices design tools for ADRV9009.

The screenshot displays the ADRV9009 Transceiver Evaluation Software interface. The top menu bar includes Connect, Program, Device, File, Tools, and Help. Below the menu is a toolbar with buttons for Config, Iron Python Script, ObsRx Data, Receive Data, Transmit Data, and TDD/FDD Switching. The main window is divided into a left sidebar and a central area. The sidebar shows a tree view with 'DaughterCard' and 'ADRV9009'. The central area features a block diagram of the ADRV9009 transceiver, showing the flow from RX and TX inputs through various processing blocks (MUX, LPF, ADC, DAC, Digital Processing, Clock Generation) to the output pins. Below the diagram is a configuration table with various settings.

| Device              | ADRV9008-2                     | LO PLL | Freq(MHz) | 1800 | Ext. LO | NO | RFPLL Phase Sync | Disable |
|---------------------|--------------------------------|--------|-----------|------|---------|----|------------------|---------|
| Device Clock        | 122.88MHz                      |        |           |      |         |    |                  |         |
| Tx Channel          | TX1 and TX2 Enabled            |        |           |      |         |    |                  |         |
| Tx Profile          | Tx 200/450MHz, IRate 491.52MHz |        |           |      |         |    |                  |         |
| Observation Channel | Observation Rx1                |        |           |      |         |    |                  |         |
| Obs Profile         | ORX 450MHz, IRate 491.52MHz    |        |           |      |         |    |                  |         |
| Load Custom Stream  | <input type="checkbox"/>       |        |           |      |         |    |                  |         |

At the bottom left, the status bar shows 'Zynq Platform: Disconnected'. At the bottom right, the Analog Devices logo is visible.

Figure 4: FMC239 Compatible Design Tools for ADRV9009

# Specifications

|                  |  |   |
|------------------|--|---|
| Architecture     |  |   |
| Physical         | Dimensions   | Single Module   |
|                  |  | Width 2.71" (69 mm)   |
|                  |  | Depth 3.01" (76.5 mm)   |
| Type             | FMC  | Quad wideband transceiver (dual ADRV9009)   |
|                  |  | FMC connector   |
| Standards        |  |   |
| FMC              | VITA 57  | ANSI/VITA 57.1-2008   |
| Configuration    |  |   |
| Power            | FMC239   | 11W   |
| Performance      | Broadband transmitter  | Tuneable range from 75 MHz to 6 GHz, maximum synthesis bandwidth 450 MHz<br>Transmitter attenuation power control range: 0 to 32 dB |
|                  | Broadband receiver   | Tuneable range from 75 MHz to 6 GHz, maximum receiver bandwidth 200 MHz<br>Receiver gain range: 30 dB                               |
|                  | Integrated synthesizers  | 2.3 Hz typical LO step size   |
| Environmental    | Temperature  | See <a href="#">Ordering Options</a> (air flow requirements >400 LFM)   |
|                  |  | 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   | 10x SSMC Front Panel Connector  |
|                  | LEDs   | Status  |
| Software Support | Operating System   | Agnostic  |
| 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 ISO9001:2015 and AS9100D standards |   |
| Warranty         | 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

## FMC239 – 0B0-000-0HJ

|   |  |   |
|---|--|---|
|   |  |   |
| <b>B = VCXO</b><br>0 = 100 MHz<br>1 = 122.88 MHz<br>2 = 153.6 MHz<br>3 = Reserved<br>4 = Reserved |  | <b>H = Operating Temperature</b><br>0 = Commercial (–5° to +55°C)<br>1 = Industrial (–20° to +70°C)<br>2 = Extended (–40° to +80°C) |
|   |  | <b>J = Conformal Coating</b><br>0 = No coating<br>1 = Humiseal 1A33 Polyurethane<br>2 = Humiseal 1B31 Acrylic                       |

## Related Products

AMC515



- AMC FPGA carrier for FMC per VITA 57
- AMC Ports 4-11 are routed to FPGA (protocols such as PCIe, SRIO, XAUI, etc. are FPGA programmable)
- Xilinx Virtex-7 XC7V2000T in 1925 package

FMC108



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

FMC223



- Single module AD9739 DAC 14-bit @ 2.5 GSPS
- 2 Vpp differential Analog output swing
- Programmable DSP clock

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- Open systems expertise

## We commit to our customers

- Partnerships power innovation
- Collaborative approach
- Mutual success

## We deliver complexity

- Complete signal chain
- System management
- Configurable solutions

## We manufacture in-house

- Agile production
- Accelerated deployment
- AS9100 accredited



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