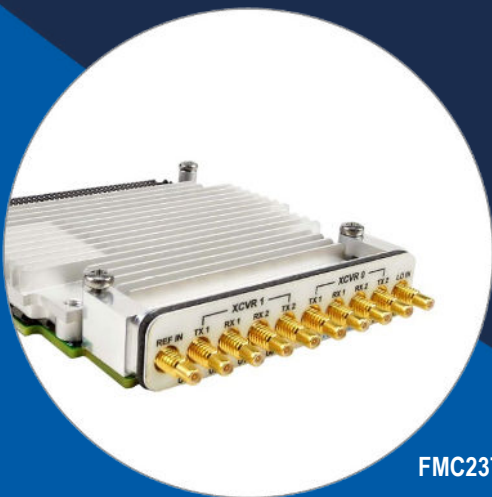


FMC237

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



FMC237

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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FMC237

The FMC237 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 FMC237 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 FMC237 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.

The FMC237 is identical to the FMC239, except the FMC237 has LO input for direct RF clock and does not have the external GPIO.



Figure 1: FMC237

Block Diagram

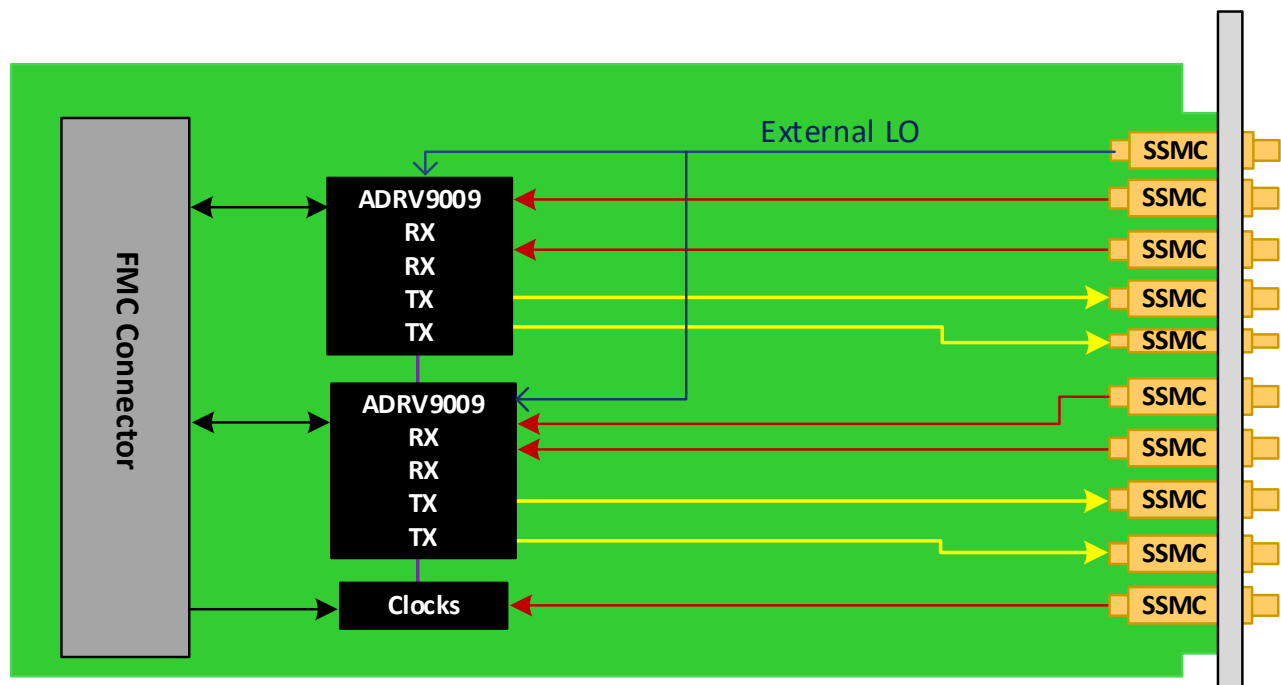


Figure 2: FMC237 Functional Block Diagram

Front Panel

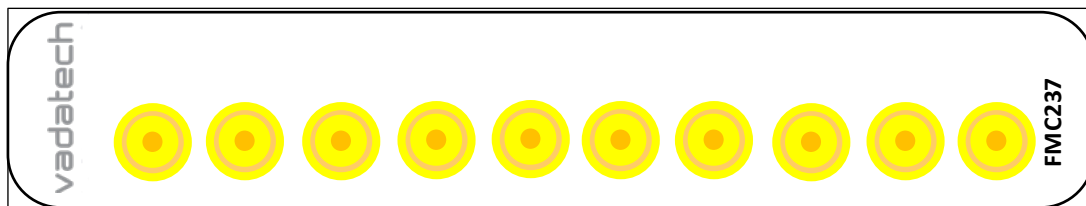


Figure 3: FMC237 Front Panel

Supported Software

The FMC237 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 'Config', 'Iron Python Script', 'ObsRx Data', 'Receive Data', 'Transmit Data', and 'TDD/FDD Switching'. The left sidebar shows a tree view with 'DaughterCard' and 'ADRV9009'. The main window is divided into two sections: a block diagram and a configuration panel.

The block diagram illustrates the internal architecture of the ADRV9009. It shows two receive channels (RX) and two transmit channels (TX). The receive channels consist of an antenna input, a low-pass filter (LPF), a mixer, and an ADC. The transmit channels consist of a DAC, a mixer, and a low-pass filter (LPF). The diagram also shows the digital processing block, which includes decimation, pFIR, AGC, DC-offset, QEC, tuning, LOL, JESD, CIF/RIF, and HSCl. The clock generation block is shown at the bottom right. The diagram is labeled with various pins and signals, including ORX1, ORX2, LOP/N, TX1, TX2, GPIO_3P3, GPIO, AUXADC, AUXDAC, and various digital signals like SYNCINB0_1+/-, SERDOUT[0-1] +/-, SERDIN[0-1] +/-, SYNCOUTB0_1+/-, SERDIN[2-3] +/-, SYNCOUTB2_3+/-, SYSREF +/-, JESD_INTERRUPT, ORX_EN, TX_EN, RESETB, TEST, SCLK, CSB, SD0, SDIO, HSCl, and REF_CLK_IN +/-.

The configuration panel below the diagram contains several settings:

- Device: ADRV9008-2
- 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: ☐

On the right side of the configuration panel, there are additional settings:

- LO PLL: RF PLL
- Freq(MHz): 1800
- Ext. LO: NO
- RFPLL Phase Sync: Disable

Below these settings is a table for Tx Channel and Attenuation:

Tx Channel	Attenuation
Tx1	0.00
Tx2	0.00

At the bottom of the configuration panel, there is a section for DAC Enabled:

- ☐ Higher Power Faster Tx Switching Time
- ☒ Lower Power Slower Tx Switching Time

The bottom status bar shows 'Zynq Platform: Disconnected' and the Analog Devices logo.

Figure 4: FMC237 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	FMC237	11W
Performance	Broadband transmitter	Tuneable range from 75 MHz to 6 GHz, maximum synthesis bandwidth 450 MHz Transmitter attenuation power control range: 0 to 32 dB
	Broadband receiver	Tuneable range from 75 MHz to 6 GHz, maximum receiver bandwidth 200 MHz Receiver gain range: 30 dB
	Integrated synthesizers	2.3 Hz typical LO step size
Environmental	Temperature	See Ordering Options (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 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

FMC237 – 0B0-000-0HJ

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

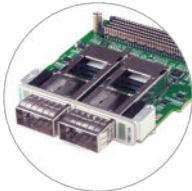
Related Products

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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DOC NO. 4FM737-12 REV 01 | VERSION 1.2 – JAN/22