

## **FMCC371 – FMC Carrier Module**

### **PRODUCT DESCRIPTION**

The Euvis **FMCC371** module is a high-speed FMC carrier designed as a carrier board for Euvis FMC module. The **FMCC371** module is equipped with a Xilinx Virtex 6 FPGA XC6VLX130T and a Cypress CY7C68013A micro-controller. The **FMCC371** carrier accepts divided clocks from the FMC module and generates 96 pairs of LVDS digital data at up to 1 GSPS. The digital data is fed to the FMC modules via two FMC connectors. The maximum memory depth is 512K x 12 bits, corresponding to 64 us of analog waveform at 8 GSPS. The carrier can be controlled by a PC-based GUI via a USB 2.0 interface. Built-in waveforms include sinusoidal, multiple tones, FMCW chirping, and pulses. Coupled with Euvis FMC modules, the **FMCC371** is a versatile compact arbitrary waveform generator (AWG).

### **KEY FEATURES**

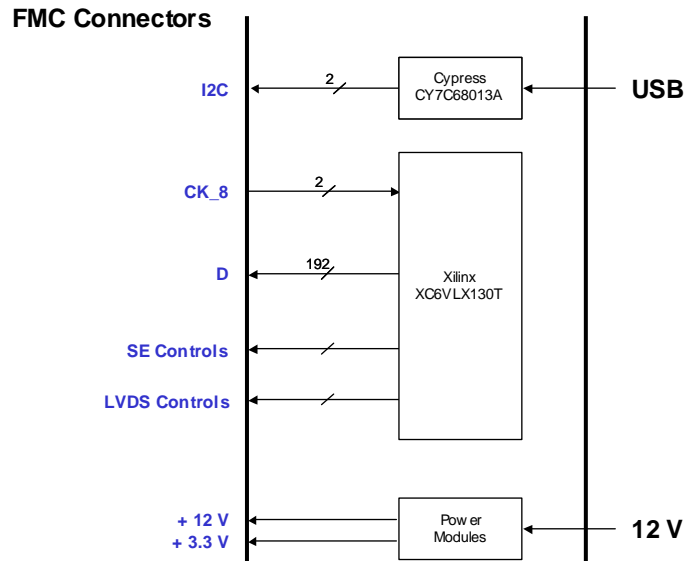
- 96 pairs of LVDS digital data
- I2C controls to FMC module
- Memory depth: 512K x 12-bit
- Two programmable markers
- Continuous, multi-burst, and gate modes
- Accepts external high-speed trigger in burst mode
- Built-in waveforms including sinusoidal, multi-tone, FMCW chirp, and pulse
- USB 2.0 interface
- Companion GUI and API
- Provides +12V and +3.3V power to the module
- +12V with AC adapter included
- Compliant with Vita 57.1 standard

### **APPLICATIONS**

The **FMCC371** module can generate arbitrary high-speed digital for FMC modules.

- Orthogonal Frequency Division Multiplexing (OFDM) transmitter
- Optical OFDM transmitter
- Ultra-wideband transmitter
- Linear Frequency Modulation (LFM) and chirping source
- Electronic warfare
- VSAT satellite communications
- Test and measurement equipment

**BLOCK DIAGRAM**



**ELECTRICAL SPECIFICATIONS**

Parameter	Symbol	Min	Typical	Max	Unit
Operating Temperature	$T_o$		25		°C
Sampling Rate	$f_{data}$	250	1000	1000	MSPS
Clock Frequency	$f_{CK}$	125	500	500	MHz
Clock Input Power	$P_{CK}$	+3	+6	+12	dBm
Power Supply	$V_{33}$		+3.3		V
	$I_{33}$		5		A
	$V_{120}$		+12		V
	$I_{120}$		4		A

**TERMINAL DESCRIPTION**

Name	Function	I/O	Signal
CKI	Input Clock	I	RF
P1	High-Pin-Count (HPC) FMC Connector	O	RF
P2	Low-Pin-Count (LPC) FMC Connector	O	RF
GND	Ground		DC
SMA1-6	Auxiliary SMA Inputs/Outputs	I/O	RF
JTAG	16-pin JTAG Header		

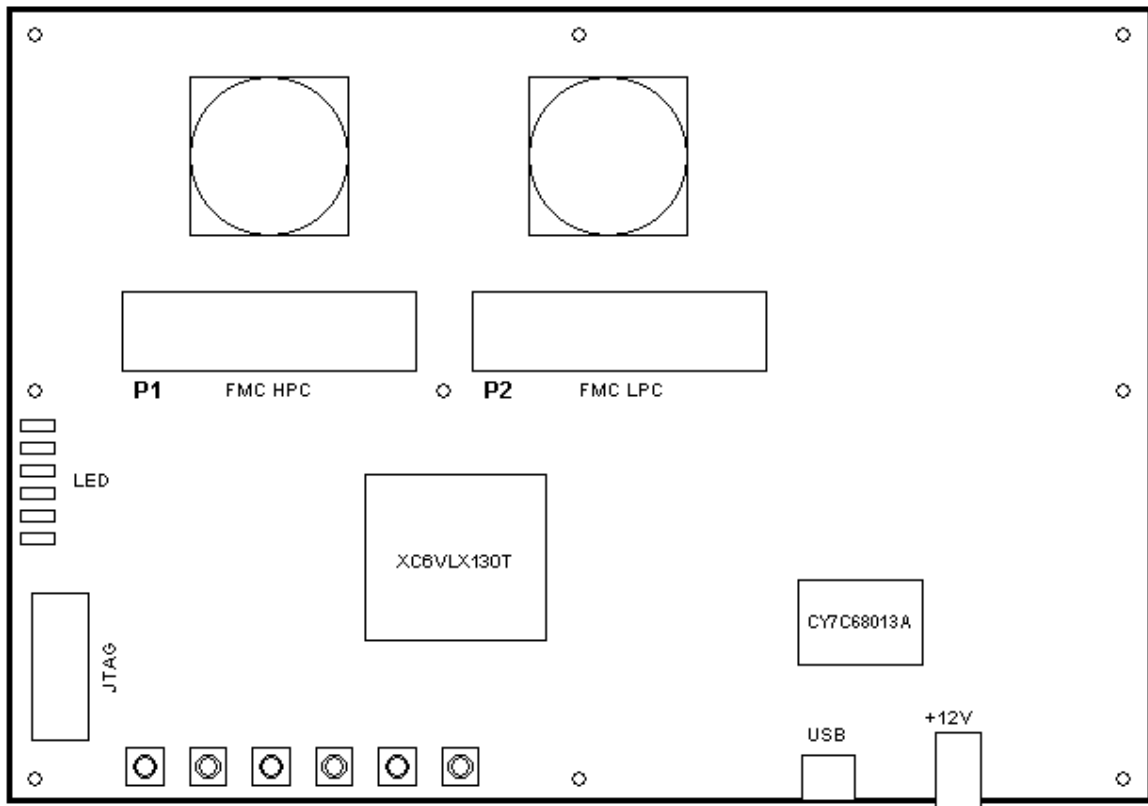


**SWITCHING CHARACTERISTICS**

Parameter	Description	Min	Typ	Max	Units
<b>Data, Reset, CK_8: LVDS Logic</b>					
V <sub>IH</sub>	Input Voltage High		1.4		V
V <sub>IL</sub>	Input Voltage Low		1		V
I	Input driving current		2		mA
T <sub>s</sub>	Setup time	0.2			ns
T <sub>h</sub>	Hold time	0.2			ns
<b>SEL and RZ: LVCOMS25 Logic</b>					
V <sub>IH</sub>	Input Voltage High	1.7	2.5	2.8	V
V <sub>IL</sub>	Input Voltage Low	-0.3	0	0.7	V
I	Input driving current		250		uA
<b>I2C SDA, SCK: LVTTTL33 Logic</b>					
Speed	Standard		100		KHz
	Fast		400		KHz
	High-Speed		3400		KHz
V <sub>IH</sub>	Input Voltage High	2	3.3		V
V <sub>IL</sub>	Input Voltage Low		0	1	V
I	Input driving current			±1	uA
C <sub>in</sub>	Input Capacitance			2	pF
V <sub>Hys</sub>	Input Hysteresis	0.3			V

**BOARD OUTLINE AND DIMENSIONS:**

*TOP VIEW*



All dimensions use the bottom left corner of the board as the origin. All dimensions are in millimeters (mm). Board thickness is 1.62 mm.

**Board Edge Lengths**

Edge	Length	Edge	Length
<b>Width</b>	233.4	<b>Height</b>	160

⊗ **Mount Hole Locations (x, y)**

6.35, 153.7	104.7, 153.7	226.9, 153.7
6.35, 80	81.8, 80	226.9, 80
6.35, 6.35	104.7, 6.35	226.9, 6.35

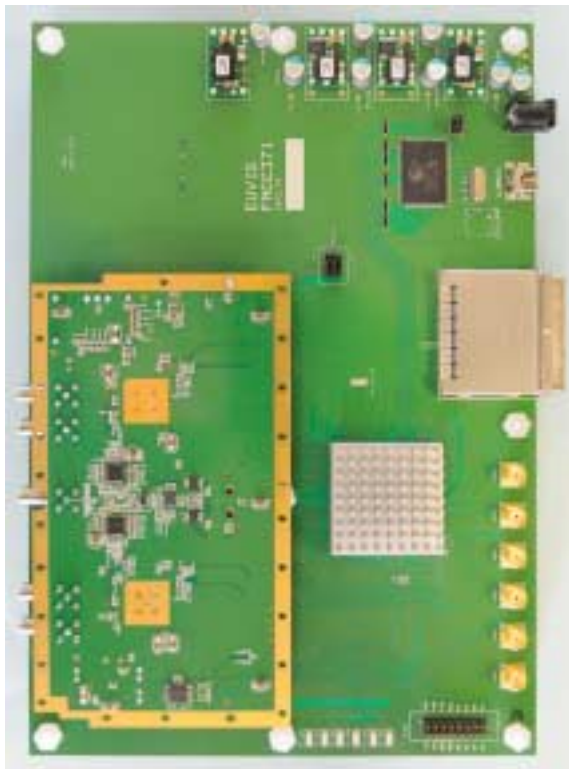
**SMA Locations (x, y)**

<b>SMA1</b>	118.6, 69.3	<b>SMA4</b>	118.6, 69.3
<b>SMA2</b>	61.7, 69.3	<b>SMA5</b>	61.7, 69.3
<b>SMA3</b>	92.1, 69.3	<b>SMA6</b>	92.1, 69.3

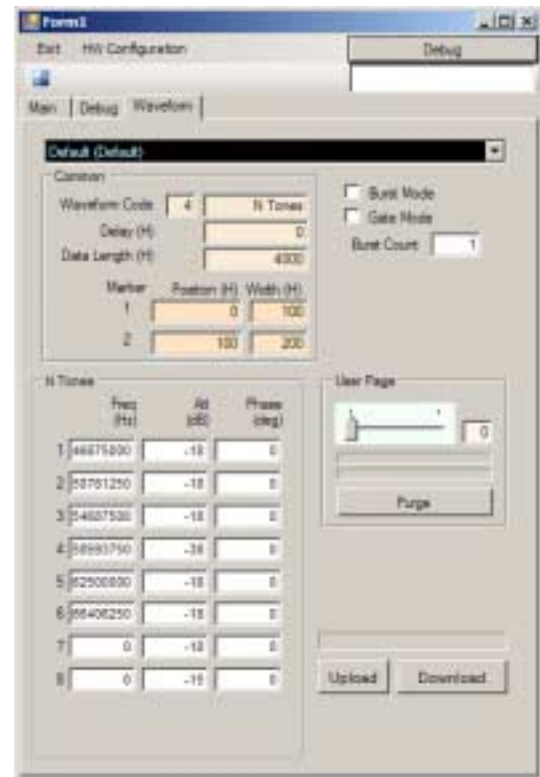
## TEST SETUP

In applications, **FMCC371** provides a VITA 57.1-compliant double-width module board: digital data, DAC controls, I2C signals, and DC power via FMC connectors. The carrier is capable to provide both +12V and +3.3V power with current capacities of 2A and 500mA respectively. Digital data and DAC resets are in LVDS pairs. The DAC sampling window selects and return-to-zero mode select are single-ended LVCMOS25.

The following photo shows a Euvis **FMC2653** module plugged into the **FMCC371**. In the test setup, the carrier is controlled by a PC host via the USB interface. The carrier can store up to 512K words of data in memory. The maximum data length is 64  $\mu$ s at 8 GSPS or 64  $\mu$ s for two channels at 4 GSPS. Several built-in waveforms are available within the FMC GUI. Waveform generation and download is performed using the GUI.



USB  
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