

# FMC-310

V1.15 1/5/21

## FMC Module with 4x 310 MSPS 16-bit A/D with PLL and Timing Controls

### FEATURES

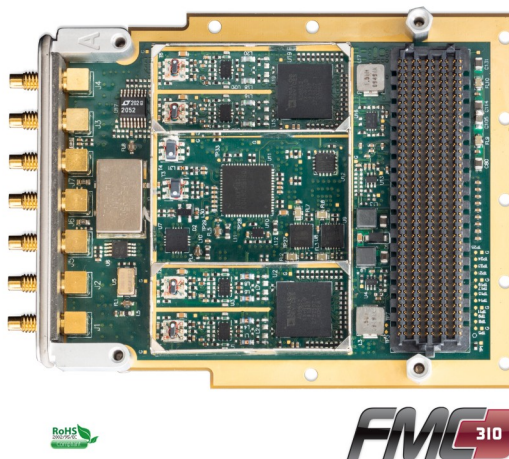
- Four A/D Inputs
  - 310 MSPS, 16-bit
  - AC or DC coupled
- Sample clocks and timing and controls
  - Both Front panel and FMC Ref Clock and Trig/Sync inputs
  - Front panel Clock/Vref output
  - Programmable PLL
  - 20 MHz TCXO Ref
- FMC module, VITA 57.1
  - High Pin Count
    - No SERDES required
    - 2.5V VADJ
  - Power monitor and controls
- 8.8W typical (AC-coupled inputs)
- Conduction Cooling Supported
- Environmental ratings for -40 to 85C  
9g RMS sine, 0.1g<sup>2</sup>/Hz random vibration

### APPLICATIONS

- Wireless Receiver
- LTE, WiMAX Physical Layer
- RADAR
- Medical Imaging
- High Speed Data Recording

### SOFTWARE

- VHDL FrameWork Logic



### DESCRIPTION

The FMC-310 is a high speed digitizing FMC module featuring four 310 MSPS A/D channels supported by sample clock and triggering features. Analog inputs may be either AC or DC coupled. Receiver IF frequencies of up to 300 MHz are supported in the standard model. The sample clock is from either an ultra-low-jitter PLL or external inputs. Multiple cards can be synchronized for sampling.

Typical FMC-310 power consumption is 8.8W for typical AC coupled operation (10.8W typ. DC). The module may be conduction cooled using provided interfaces, which, while electrically isolated from circuit ground consistent with the FMC standard, connect the printed circuit board to thermal interfaces on both sides of the FMC-310 providing better and more thermal interfaces. Also the shielded circuits' shield (top removed in the above image) are thermally connected to the enclosed circuits, grounded, and can be used for heat management. Ruggedization levels for wide-temperature operation from -40 to +85C operation and 0.1 g<sup>2</sup>/Hz vibration. Conformal coating is available.

Support logic in VHDL is available for integration with FPGA carrier cards. Contact [ISISales@Molex.com](mailto:ISISales@Molex.com). Specific support for ISI carrier cards includes integration with Framework Logic tools that support VHDL developers.

Software tools for ISI carrier cards include host development C++ libraries and drivers for Windows and Linux, 64-bit. Application examples demonstrating the module features are provided.

\* Sampling rates in an application depend on carrier and system design

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Interconnect Systems International, LLC, Inc. standard warranty. Production processing does not necessarily include testing of all parameters.

# FMC-310



This electronics assembly can be damaged by ESD. ISI recommends that all electronic assemblies and components circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

## ORDERING INFORMATION

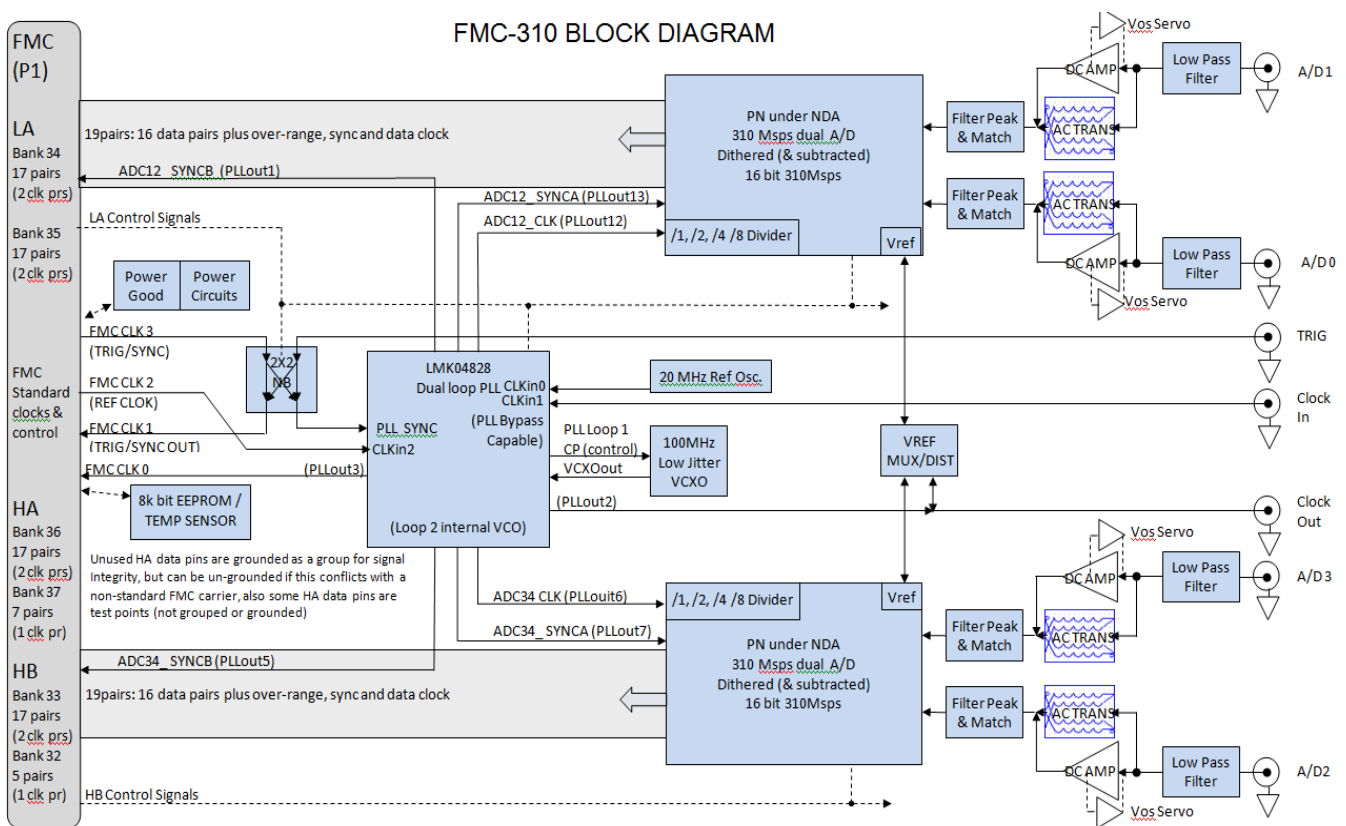
### NOTICE:

***This product is designed to work with an ISI carrier card and is sold separately only under limited conditions.***

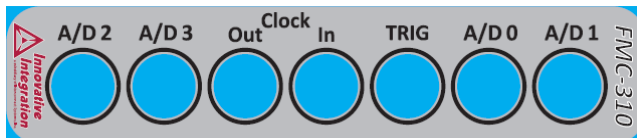
Product	Part No.	Description
FMC-310	80320-1-L0	FMC module with four 310 MSPS 16-bit A/Ds, PLL and timing controls, AC- coupled ADCs
	80320-2-L0	FMC module with four 310 MSPS 16-bit A/Ds, PLL and timing controls, DC- coupled ADCs No VOS SERVO
	80320-3-L0	FMC-310 CH1&2 AC max BW, CH3&4 DC flat freq response
	Ruggedization	Ruggedization options may be available. Contact <a href="mailto:ISISales@molex.com">ISISales@molex.com</a> .
<b>Cables</b>		
SSMC to BNC cable	67156	IO cable with SSMC (male) to BNC (male), 1 meter
<b>Carrier Cards</b>		
PEX7-COP	80382	PEX7-COP, x8 PCIE Lane, Xilinx Kintex 7 K325T-2 or K410T -2, x8 GSPS MGT Lanes, External Clock Input, External Trigger Input support multiboard synchronization , Onboard USB – JTAG Programmer, 1 PPS Input
PEX6-COP	80284	PEX6-COP, Xilinx Virtex 6 LX240T-2, SX315T-2, SX475T-2, x10 6.25 GSPS MTG Lanes, Dual Sample Clock Inputs, External Trigger Input support multiboard synchronization , QDRII+ SRAM
<b>Embedded Computer Hosts</b>		
ePC-K7	90502	ePC-K7 Instrument with Xilinx Kintex 7 K325T2 or K410T-2 FPGA, EXPRESS-SL-I7-6820EQ 32 GB ECC ET, x2 1Gbe Ethernet, x2 USB 3.0 + x1 USB 2.0, x4 SATA III, IEEE-1588 or GPS optional, Clock and Trigger I/O, Conduction or Convection Cooled
Mini-K7	90600	Mini-K7, Atom CPU, Xilinx Kintex 7 K325T2 or K410T-2, Atom Cexpress-BT E3845 CPU 8 GB RAM 1x2 PCIE Lane (FMC Site) x1 Gbe, up to 2 removable 1.8” SSD (SATA III) plus 2 eSATA, IEEE-1588 or GPS optional, Clock and Trigger I/O, Conduction or Convection Cooled, Touchscreen Available

# FMC-310

FMC-310 BLOCK DIAGRAM



Front Panel (Bezel) Detail



# FMC-310

Front Panel Label	Schematic reference	Description
A/D 1	J1	A/D Analog Input 50 Ohm Nominal AC or DC coupled by model
A/D 0	J2	A/D Analog Input 50 Ohm Nominal AC or DC coupled by model
TRIG	J5	DC coupled Logic Input 1.2 +/-0.1 V nominal threshold, 0 to 3.3V, High impedance
Clock In	J6	AC coupled Logic Input 0.3 to 3.3Vpp AC (single to differential transformer to 2 dB attenuator to PLL (LMK04828) clock input ) 1 to 750 MHz
Clock Out	J7	Hardware Configurable IO, Standard configuration; sampling clock monitor 0.4V to 1.65 Vpp into 50 Ohms, with weak DC bias from Vref (1.25V nominal)
A/D 3	J3	A/D Analog Input 50 Ohm Nominal AC or DC coupled by model
A/D 2	J4	A/D Analog Input 50 Ohm Nominal AC or DC coupled by model
ALL	ALL	<b>ENTERTEC 13460334 SSMC JACK RIGHT ANGLE EXTENDED BARREL</b>

# FMC-310

## Block Diagram Optional Feature Notes:

### Optional Vos Servo Circuit:

The standard DC coupled FMC-310 employs digital calibration to remove input offset (Vos) which is the best choice for most applications. The superior analog performance of the DC coupled FMC-310 results from the use of a high performance differential input balanced amplifier. One amplifier input is used and the other is internally terminated to ground with a 50 Ohm resistor. But if there is a DC (or very low frequency) input applied to the FMC-310 input, the differential amplifier will see a DC bias or imbalance, typically reducing analog performance. The optional Vos servo converts an applied DC or low frequency input to differential at the amplifier inputs restoring the DC balance and bias point. This is also useful for reducing the FMC-310 hardware input offset, and accommodating non-50 Ohm inputs.

A trade off when using the optional FMC-310 Vos servo is it changes the DC coupled FMC-310 input impedance from approximately 50 Ohms at 200 Hz down to approximately 15 Ohms at DC, causes smaller (up to +/-8%) variation in the 50 Ohm input impedance between 200Hz and 120kHz, but is well matched to 50 Ohms above 120 kHz to the upper operating frequency limit. The servoed DC coupled FMC-310 will accurately measure a 50 Ohm series terminated input voltage down to DC, but the connected circuit will “see” the FMC-310 input impedance change at low frequencies.

### Optional Voltage Reference Multiplexor/Distribution and J7 Clock/Vref Connector:

The standard configuration buffers the voltage reference from the A/D IC used for channels 1 and 2 to provide a DC level at J7, allowing this to be used as a test point to verify the A/D's Vref setting. The optionally hardware configured Vref distribution circuit allows for either A/Ds' voltage reference, or an external Voltage reference applied to J7, to be scaled and source the other A/D's reference voltage or buffered to source J7's DC Voltage. Allowance is also made for using an internal low noise 1.8V supply as a reference. J7's circuit is configured as a bias tee allowing an AC coupled PLL output (could be sample clock, reference, sync or other PLL generated frequency) to be combined with this DC level.

### Optional Attenuators or Low Pass Filters on FMC-310 Inputs:

On standard product these are populated with 1200 MHz (-1dB BW) low pass filters intended to filter high frequency EMI while not impacting signal bandwidth. Lower frequency options are possible. Attenuators can also be substituted for filters with minimal EMC impact in most applications to attenuate the input, increasing input signal range and improving return loss. These also can be used in conjunction with...

### Optional Filter, Peak and Match circuits at A/D IC Inputs:

A low pass filter and a bandpass filter are allowed for at the A/D IC input. These are designed to incorporate the A/D parasitic circuit in the filters, and reduce the broadband noise bandwidth at the A/D IC input.

Minimum lot sizes, set-up, stocking and NRE charges may apply. Contact sales support for pricing and availability.

# FMC-310

## Standard Features

Analog Inputs	
Nominal Full Scale Range	DC coupled 0 +/- 0.625V (approx. 6 dBm sinusoid in a 50 Ohm system)  AC coupled 1.38Vpp (approx. 6.8 dBm sinusoid in a 50 Ohm system) with +/- 10V DC withstanding  Pre-release data sheet levels and performance can be obtained by programming the A/D IC reference voltage to 1V (new default 1.25V) which changes the Full scale input to 2Vpp (new default 2.5Vpp).
Absolute Maximum Range	DC coupled 0 +/- 0.727 V max  AC coupled 1.6 Vpp max. with +/-10V DC withstanding
Input Type	Single ended; AC or DC coupled
Nom. Input Impedance	50 ohm
A/D Device	Analog Devices AD9652 (16-bit dual A/D IC)
A/D Jitter	40 fs Aperture
A/D Sample Rate	80 Msps to 310 Msps (Maximum 1240 MHz applied clock, A/D IC can divide by 1,2,4 or 8)

FMC Interface	
IO	LA[33:0] pairs, HA[23:0] pairs, HB[21:0] pairs
IO Standards	LA, HA and HB: Differential: LVDS Single Ended: 2.5V LVCMOS FMC Signals: Standard, bidirectional clocks driven by carrier
EEPROM (IPMI Support)	8k bit I2C EEPROM with built in temperature sensor <sup>1</sup>

## Clocks and Triggering

Clock Sources	Internal LMK04828 dual PLL standard 1 <sup>st</sup> loop 100 MHz TCVCXO standard 2 <sup>nd</sup> loop 2 VCOs on chip VCO0 from 2370 to 2630 MHz VCO1 from 2920 to 3080 MHz 300 MHz Jitter (VCO2 at 3GHz with Output Divider = 10 (1-32 allowed)) < 100 fs (10 kHz to 20 MHz) < 140 fs (100 Hz to 150 MHz)  External FMC and Front Panel Inputs; FMC interfaces do not support ultra low jitter clock distribution. So the FMC-310 jitter cleans the FMC clock input (treats it as a PLL reference source). The front panel clock input can be optionally configured for direct clocking (no jitter cleaning) however an ultra low jitter clock/input is typically required.
PLL Reference Sources	Internal 20MHz TCXO standard; accuracy is +/- 15 ppm, can vary up to +/-500ppb over -40 to +85C and is used for FMC-310 test and specification  External FMC and Front Panel Inputs; The FMC-310 PLL frequency locks to and cleans (reduces jitter) from an externally applied reference, the frequency locking range is +/-13.9 ppm
PLL Resolution	<12 kHz Typical Tuning Resolution (system tuning resolution can depend on PLL, system and hardware configuration(s), the standard product is configured for low jitter operation with the 20 MHz TCXO using 20 MHz [also supporting 10 MHz] steps)
Triggering	Software: Continuous or acquire N frames External: DC coupled Logic Input
Channel Clocking	All channels can be synchronous
Multi-card Synchronization	External triggering and clock inputs may be used to synchronize multiple boards <sup>2</sup> , also sync signals can be set through the FMC PLL SPI control interface.

Physicals	
Form Factor	FMC VITA 57.1 single-width
Size	94.2 mm [ x 69 mm 10 mm mounting height
Weight	180g (approximate with conformal coat, contact factory if critical to application).

# FMC-310

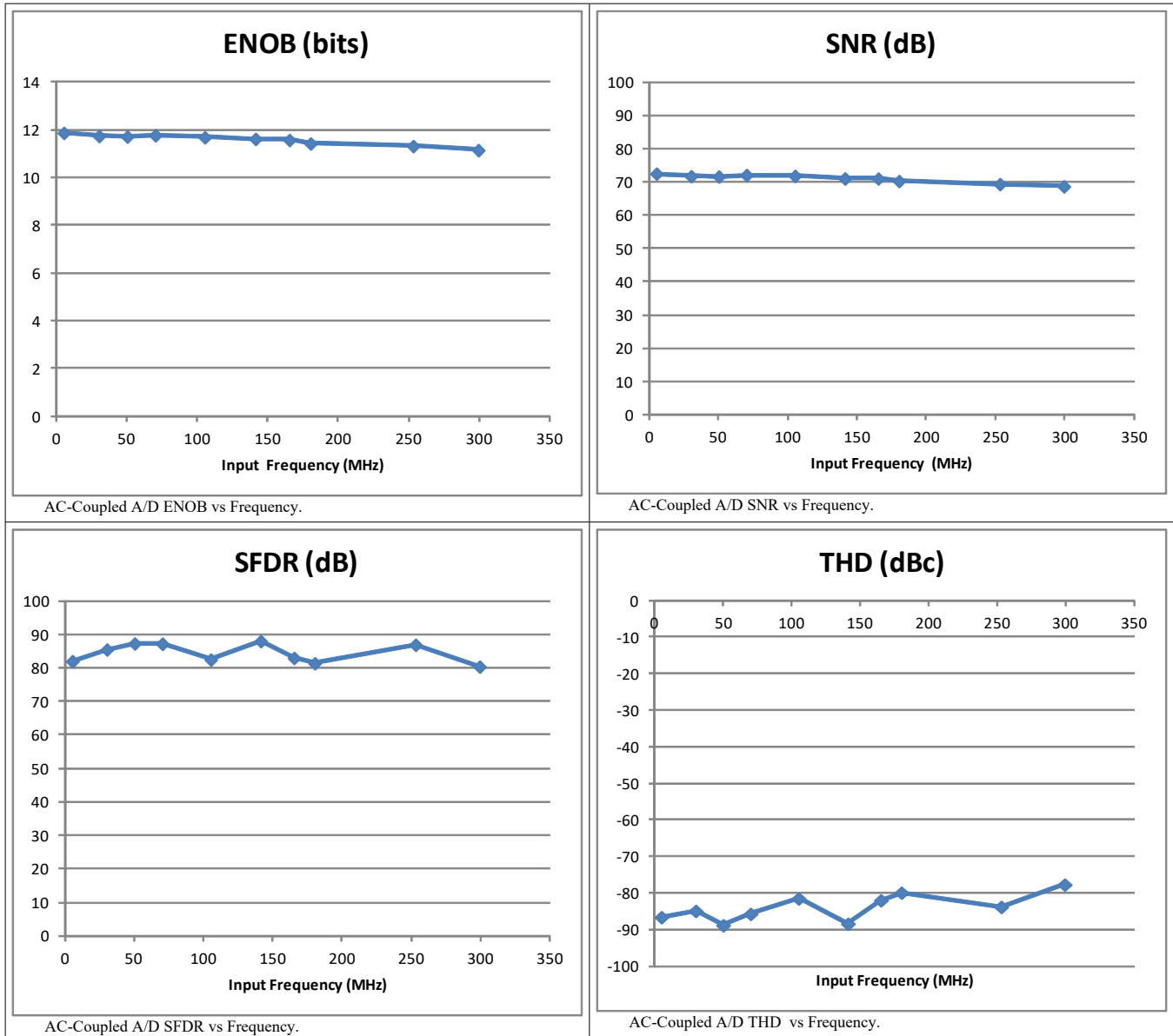
<b>ELECTRICAL CHARACTERISTICS</b>			
Over recommended operating free-air temperature range at 0C to +50C, unless otherwise noted.			
Parameter	Typ	Units	Notes
<b>A/D Channels</b>			
Analog Input Bandwidth	400	MHz	-3dB, DC coupled inputs
	0.2 to 300	MHz	-3dB, AC coupled inputs
Analog Input Passband Flatness (all same coupling type (AC or DC) channels including channel gain matching between channels)	+/-0.4	dB	0 to 275 MHz, DC Coupled
	+/-0.4	dB	2 to 240 MHz, AC Coupled
Broadband SFDR <sup>2</sup>	82, 86	dB	Fin = 5.1 MHz, 91% FS, sine sampled at 310 MSPS; (AC, DC) Coupled
	87, 78	dB	Fin = 70.1 MHz, 91% FS, sine sampled at 310 MSPS; (AC, DC) Coupled
THD	-81, -89	dBc	Fin = 5.1 MHz, 91% FS, sine sampled at 300 MSPS; (AC, DC) Coupled
	-85, -78	dB	Fin = 70.1 MHz, 91% FS, sine sampled at 300 MSPS; (AC, DC) Coupled
ENOB	11.9, 11.1	bits	Fin = 5.1 MHz, 91% FS, sine sampled at 300 MSPS; (AC, DC) Coupled
	11.8, 11.0	bits	Fin = 70.1 MHz, 91% FS, sine sampled at 300 MSPS; (AC, DC) Coupled
SNR	72.3, 67.8	dB	Fin = 5.1 MHz, 91% FS, sine sampled at 300 MSPS; (AC, DC) Coupled
	72, 67.5	dB	Fin = 70.1 MHz, 91% FS, sine sampled at 300 MSPS; (AC, DC) Coupled
Adjacent Channel Crosstalk	-78, -85	dB Max.	Measured channel 50 Ohm terminated with a 70.1 MHz, 91% FS sine on aggressor channel, measured channels (0 to/from 1) or (2 to/from 3) (AC, DC)
Opposite Channel Crosstalk	-95, -95	dB Max.	Measured channel 50 Ohm terminated with a 70.1 MHz, 91% FS sine input on aggressor channel, measured channels (0 or 1 to/from 2 or 3) (AC, DC) SFDR limits measurement, believed to be more than 30 dB below Adjacent Channel Crosstalk
DC Offset Error	+/- 1	mV	With digital calibration, average of 64K samples after warm up. Worst case un-calibrated hardware offset error is +/- 25mV Optional DC Coupled Vos servo un-calibrated hardware offset error is +/- 1mV typical (+/-7mV worst case) after warm-up which may also be effectively reduced with digital calibration
Gain Error	<0.2	%	With digital calibration, after warmup

# FMC-310

## ELECTRICAL CHARACTERISTICS

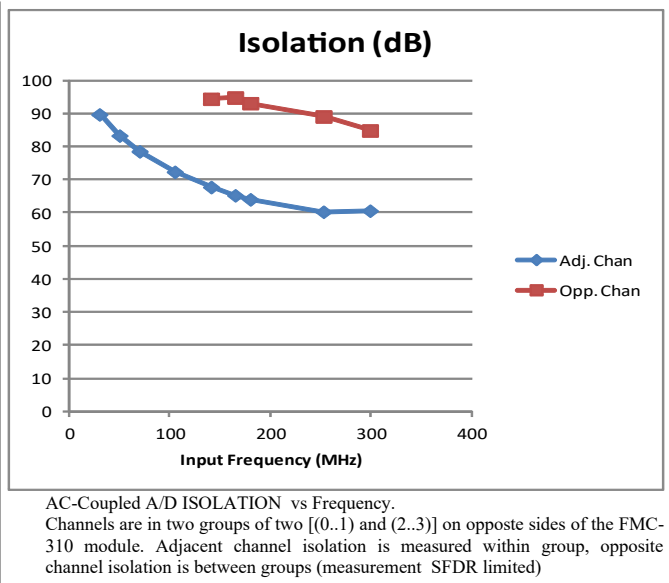
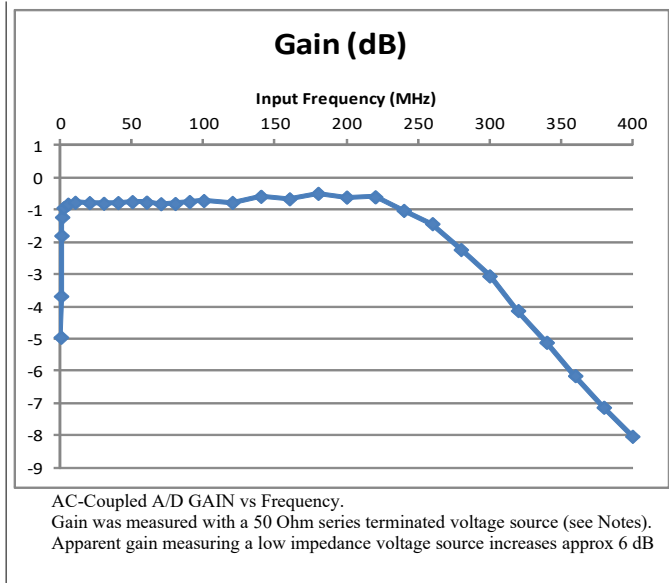
Measurements taken with prototypes, better performance has been measured in production....

### AC Coupled Typical A/D Performance (SN B102 ch 0)

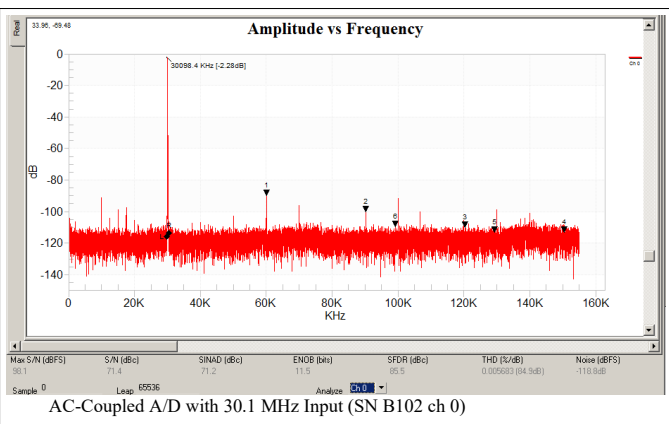
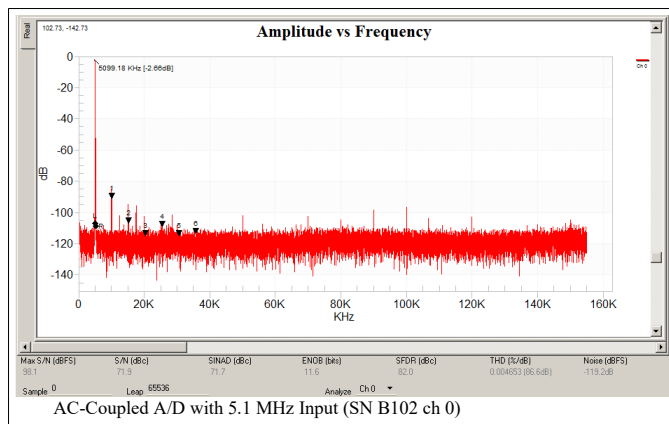




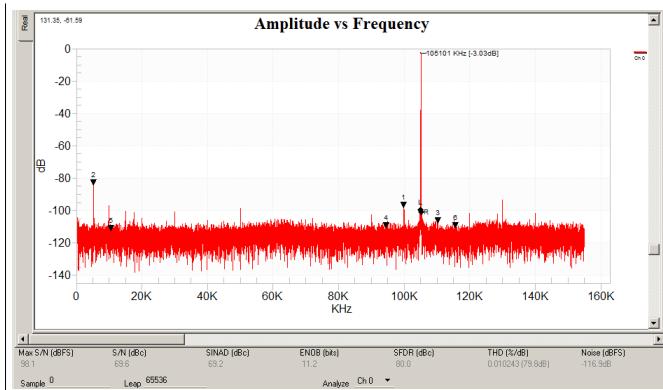
# FMC-310



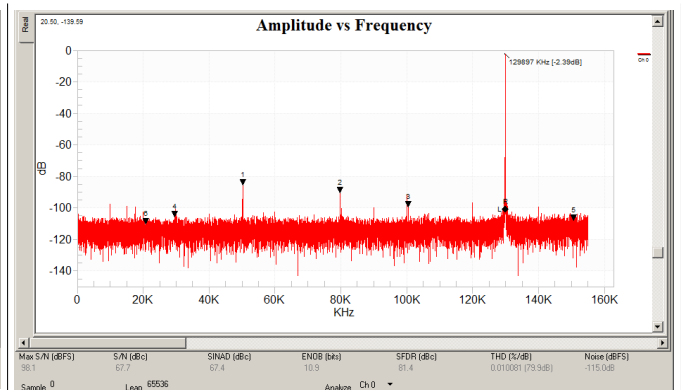
## Uncorrected AC Coupled A/D FFT Plots



# FMC-310

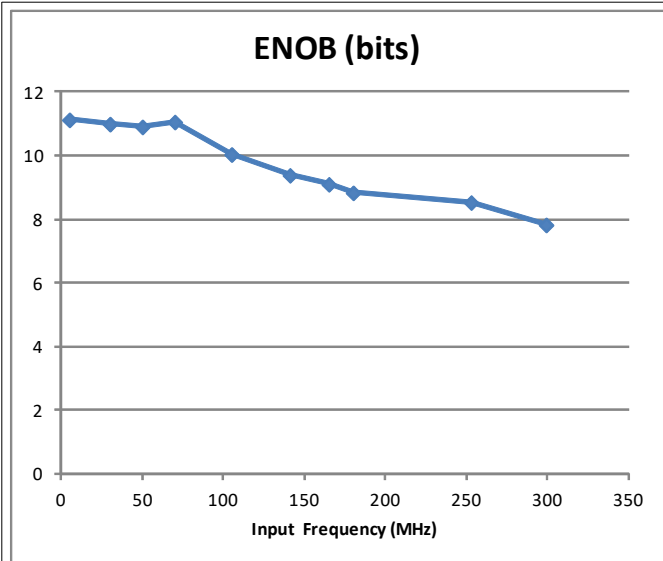


AC-Coupled A/D with 105.1 MHz Input (SN B102 ch 0)

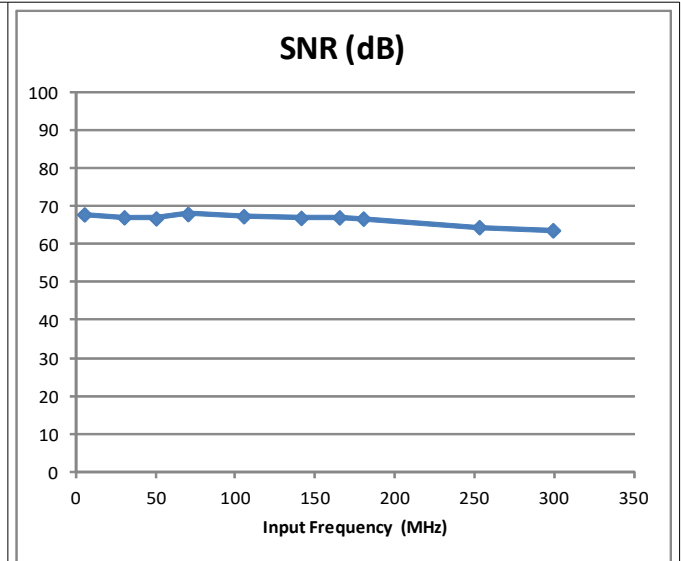


AC-Coupled A/D with 180.1 MHz Input (SN B102 ch 0)

## DC Coupled Typical A/D Performance (SN B103 ch 0)

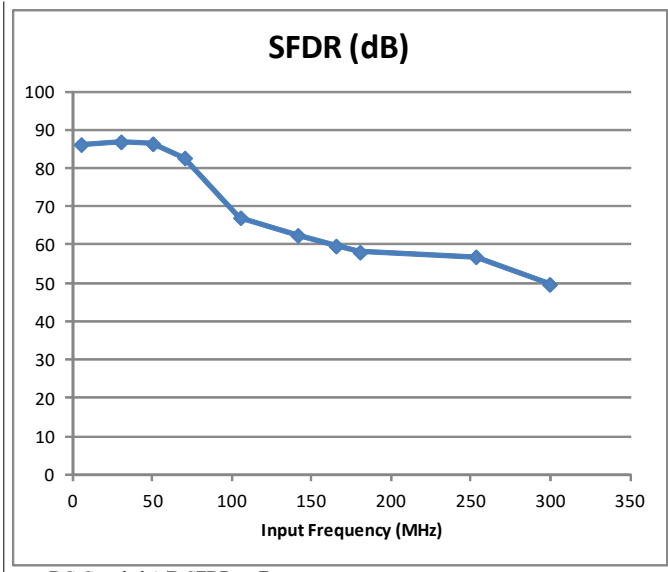


DC-Coupled A/D ENOB vs Frequency.

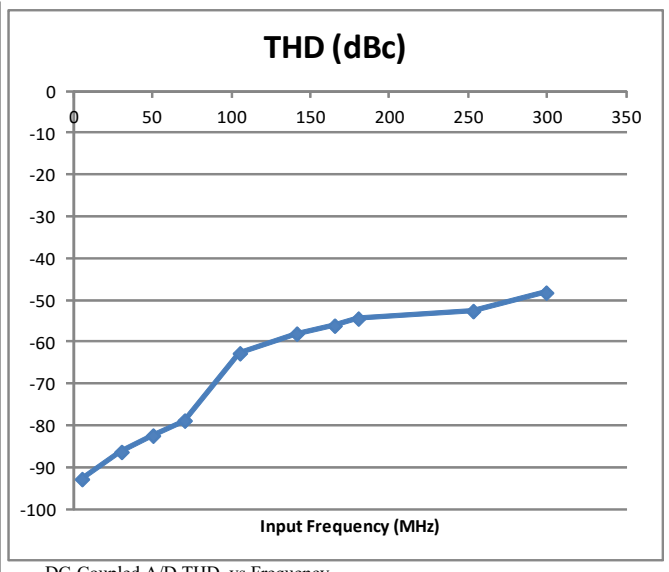


DC-Coupled A/D SNR vs Frequency.

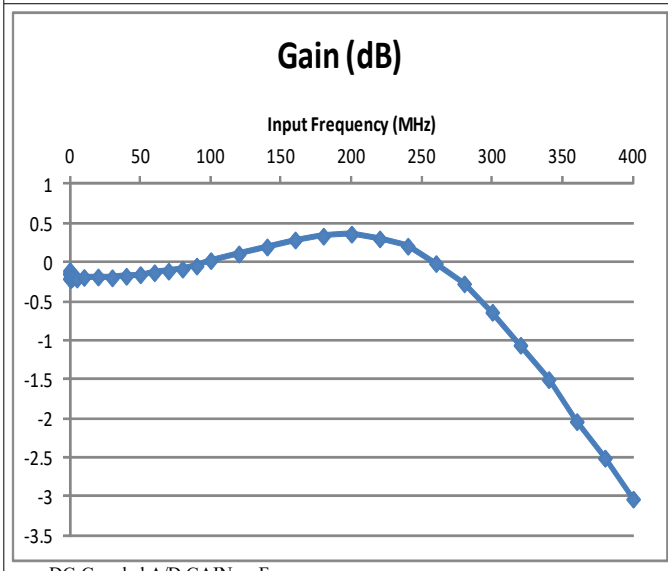
# FMC-310



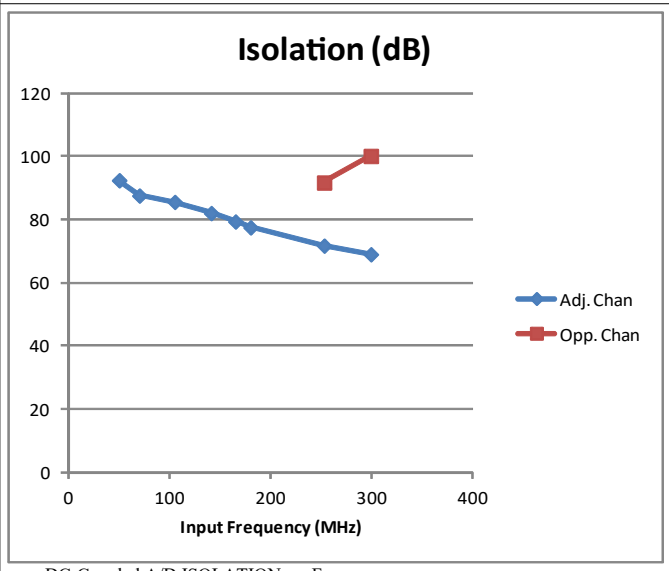
DC-Coupled A/D SFDR vs Frequency.



DC-Coupled A/D THD vs Frequency.



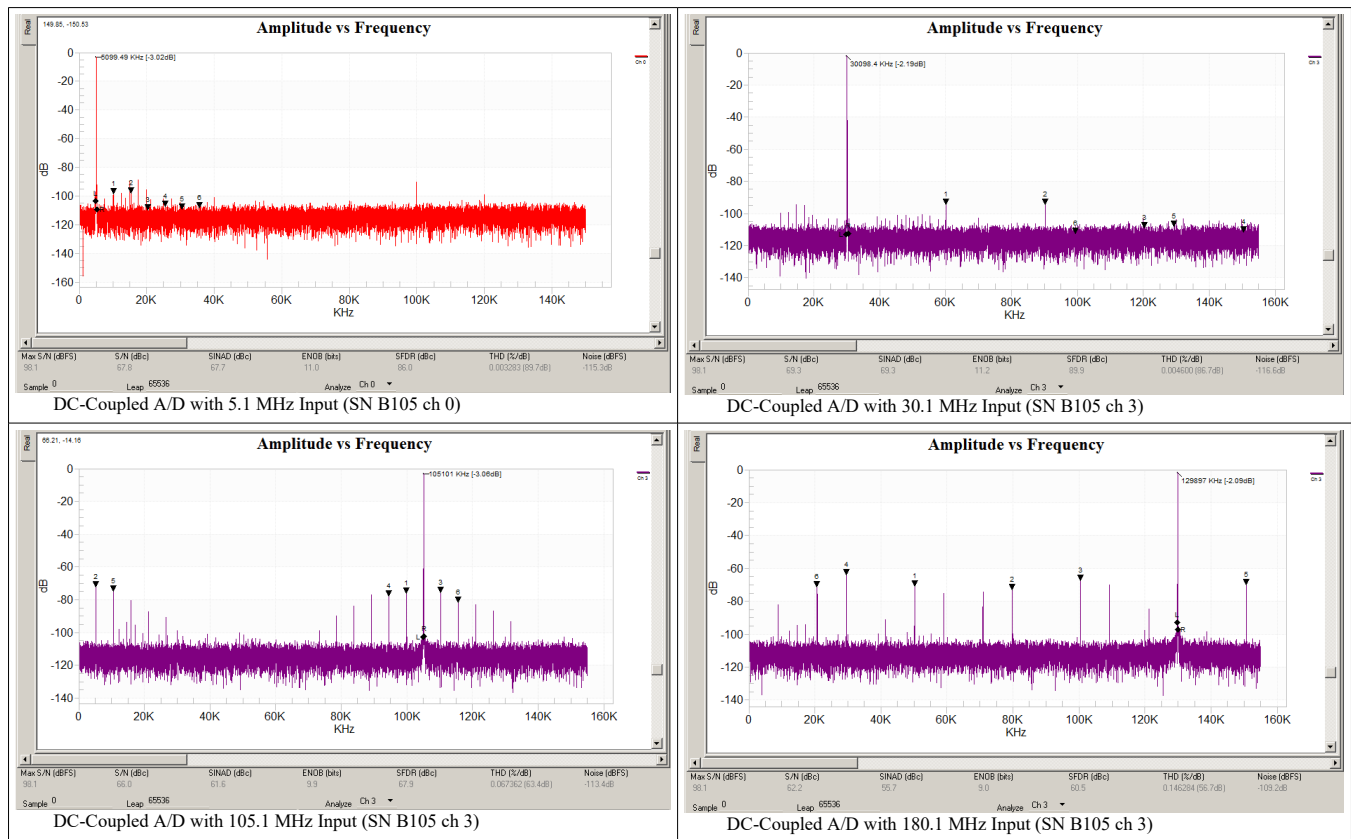
DC-Coupled A/D GAIN vs Frequency.  
Gain was measured with a 50 Ohm series terminated voltage source (see Notes).  
Gain with a zero impedance voltage source will increase approximately 6 dB



DC-Coupled A/D ISOLATION vs Frequency.  
Channels are in two groups of two [(0..1) and (2..3)] on opposite sides of the FMC-310 module. Adjacent channel isolation is measured within group, opposite channel isolation is between groups (measurement SFDR limited)

## Uncorrected DC Coupled A/D FFT Plots

# FMC-310



## Gain Definition

FMC-310 is specified and tested with a 50 Ohm source impedance (unless otherwise noted). The FMC-310 nominal gain is approximately 1X or 0dB when calibrated, the voltage at the FMC-310 input equals the digital reading output. Internally the A/D IC sees about twice the voltage applied at the FMC-310 input but the FMC-310 is calibrated to its input in typical use.

Practically the 50 Ohm terminations in a RF system are rarely physical resistors (they are the Thévenin equivalent of the circuit). At lower input frequencies 50 Ohm source terminations are not common but are needed for continuity with RF 50 Ohm measurements. This source 50 Ohm series termination forms a voltage divider with the FMC-310 input impedance reducing the source voltage by approximately  $\frac{1}{2}$  at the FMC-310 input. A series 0 Ohm source resistance will change the circuit gain by about 2X in Voltage or 6 dB. Variations in source impedance will change the system gain.

## Digital Calibration Note

The FMC-310 can be digitally calibrated for offset and gain. However if the signal is clipped (outside the A/D range) the information is lost, so the raw gain is typically designed for a signal level at the A/D that is slightly less than A/D Full Scale in the bandwidth of interest to allow the nominal input range to be measured accurately without clipping when digitally calibrated.

# FMC-310

## Bandwidth Notes

The standard DC coupled version targets maximum flatness and slightly less than 0 dB gain from DC to 90 MHz.

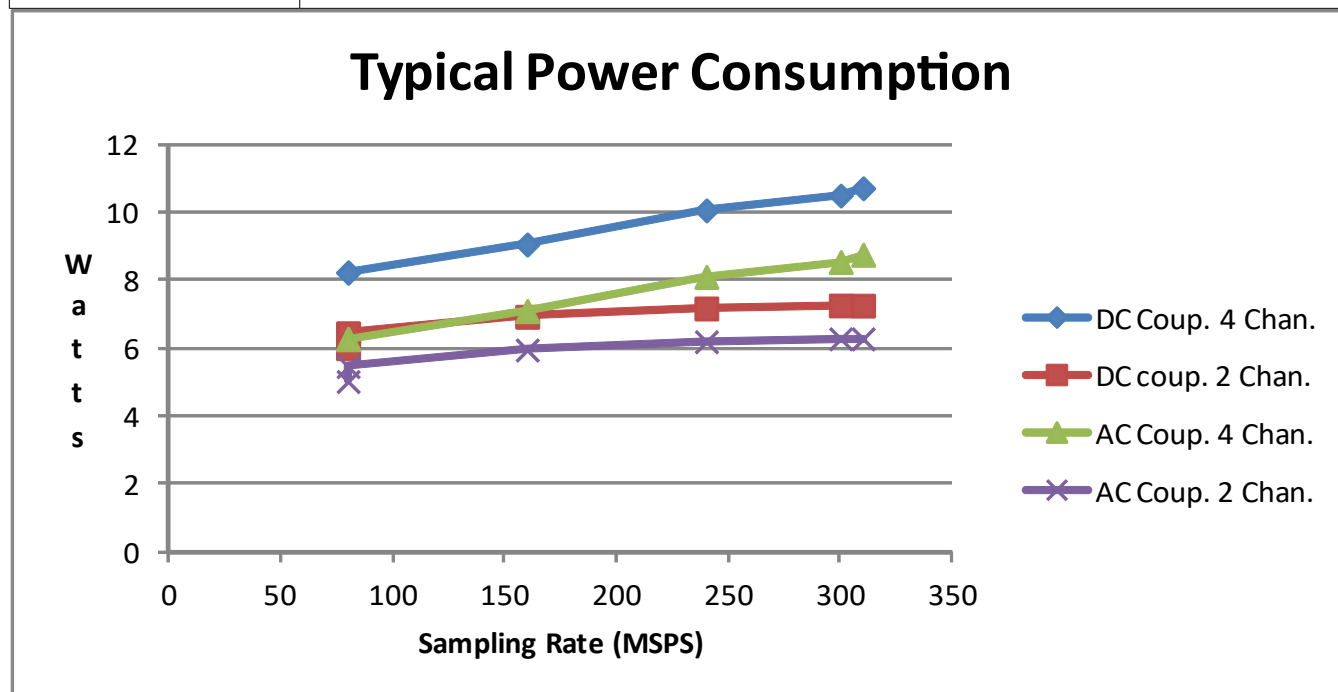
The standard AC coupled version targets broader band use, and a slightly lower gain in this band as the system gain will typically be more variable due source impedance and level variation over frequency

Also slight gain peaking is present at high frequency to maximize BW and help compensate for likely cabling and filter roll-off in typical use.

# FMC-310

## Powering

<b>Power (does not include power supplied by and returned to carrier through FMC VIO_B)</b>	
Maximum Consumption	10.1W all channels AC Coupled (Transformer coupled inputs, DC coupled input amplifiers and their supply disabled) 12.1W all channels DC coupled Maximums based on worst case consumption and recommended / expected usage.
Heat Sinking	Conduction cooling supported (FMC-310 does not include thermal interface near FMC region 1 RF connectors)



Note: The power consumption change with sampling rate is dominated by the change in 2.5V VADJ current.

FMC Interface Voltages				Maximum DC Current (mA)		NOTES: Power circuits' capacitance within FMC standard, inrush current not otherwise limited.
Voltage	Min	Nom	Max	AC Coup.	DC Coup.	
VADJ	2.38	2.5	2.62	3500	3500	All channels Input (includes possible VIO_B_M2C current load)
3P3V	3.14	3.3	3.46	1650	2300	Input
3P3VAUX	3.14	3.3	3.46	2	2	Input
12P0V	11.4	12	12.6	0	0	Input Not used
VIO_B_M2C	2.35	2.5	2.62	1150	1150	Output (sourced from VADJ not included in FMC-310 power consumption)
VREF_A_M2C	0	0	0	0	0	Optional Output Not Connected
VREF_B_M2C	0	0	0	0	0	Optional Output Not Connected

# FMC-310

## Typical Measurement Notes:

Measurements were made with an approximately 91% FS (-0.82 dBFS) sinusoidal input, sampled at 310 MSPS, using the on-board PLL (Phase Locked Loop).

Measurements (except gain) used a narrow band pass filter (order 3 to 7, bandwidth 0.5 to 25 MHz) from the signal generator (HP 8663A or R&S SMA100A) to the FMC-310 input.

Gain measurements are made in a 50 Ohm system, in this context the 50 Ohm series output termination of the test source forms a voltage divider with the FMC-310 input impedance. Alternately when using a voltage source without a series termination, the Voltage gain will be approximately twice as big, and the above gain plot values are increased 6 dB for this. An un-terminated source is not practical at RF frequencies but is common at DC. For continuity a series 50 Ohm source termination was used for low (and high) frequency gain measurements.

AC Gain measured with a 50 Ohm 10 dB attenuator (to improve signal generator return loss) and calibrated with an Agilent U2004A power sensor.

DC Gain measured with a 50 Ohm series resistor from a low noise Voltage source measured with a Fluke 179 multimeter, opposite polarity measurements were made and subtracted to remove offset.

A 65536 point FFT (Fast Fourier Transform) with Blackman window was used. Signal level in raw FFT plots is not corrected to dBFS (deciBel full scale). Input signal dBFS was set using the amplitude (from A/D counts).

SNR (and therefore ENOB calculated from SNR) measurements were corrected for filter bandwidth and bleed through. SNR measurements were corrected when the input noise contributed to the raw FFT SNR.

Harmonics were not corrected for filter bleed through (finite attenuation of test source harmonics in the filter stop bands), some of the above results are believed to be a few dB worse compared to double filtered measurements.

Isolation was measured with the victim channels' ports connected to a 50 Ohm termination through a cable.

The above test corrections were applied consistent with guidance from the A/D IC manufacturer for test equipment limitations. Some formulas for above test corrections taken from Analog Devices Tutorial MT-003 "Understand SINAD, SNR, THD, THD + N, and SFDR so You Don't Get Lost in the Noise Floor" by Walt Kester.

# FMC-310

FMC Connector



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**Manufacturer:** SAMTEC  
**Newark Part No.:** 79X1313  
**Manufacturer Part No** ASP-134488-01



# FMC-310

	K	J	H	G	F	E	D	C	B	A
1	NC	GND	NC	GND	PG_M2C	GND	PG_C2M	GND	FMC_CLK_DI R	GND
2	GND	FMC_CLK3_P	GND	FMC_CLK1_P	GND	FMC_HA01_P _CC	GND	NC	GND	NC
3	GND	FMC_CLK3_N	GND	FMC_CLK1_N	GND	FMC_HA01_N _CC	GND	NC	GND	NC
4	FMC_CLK2_P	GND	FMC_CLK0_P	GND	FMC_HA00_P _CC	GND	NC	GND	NC	GND
5	FMC_CLK2_N	GND	FMC_CLK0_N	GND	FMC_HA00_N _CC	GND	NC	GND	NC	GND
6	GND	FMC_HA03_P	GND	FMC_LA00_P _CC ADC12_SYNB _P	GND	FMC_HA05_P	GND	NC	GND	NC
7	FMC_HA02_P	FMC_HA03_N	FMC_LA02_P ADC12_DAT A_0_P	FMC_LA00_N _CC ADC12_SYNB _N	FMC_HA04_P	FMC_HA05_N	GND	NC	GND	NC
8	FMC_HA02_N	GND	FMC_LA02_N ADC12_DAT A_0_N	GND	FMC_HA04_N	GND	FMC_LA01_P _CC ADC12_DAT A_CO_P	GND	NC	GND
9	GND	FMC_HA07_P	GND	FMC_LA03_P ADC12_DAT A_1_P	GND	FMC_HA09P GND	FMC_LA01_N _CC ADC12_DAT A_CO_N	GND	NC	GND
10	FMC_HA06_P	FMC_HA07_N	FMC_LA04_P ADC12_DAT A_2_P	FMC_LA03_N ADC12_DAT A_1_N	FMC_HA08P GND	FMC_HA09N GND	GND	FMC_LA06_P ADC12_DAT A_4_P	GND	NC
11	FMC_HA06_N	GND	FMC_LA04_N ADC12_DAT A_2_N	GND	FMC_HA08N GND	GND	FMC_LA05_P ADC12_DAT A_3_P	FMC_LA07_N ADC12_DAT A_4_N	GND	NC
12	GND	FMC_HA11P GND	GND	FMC_LA08_P ADC12_DAT A_6_P	GND	FMC_HA13P GND	MC_LA05_N ADC12_DAT A_3_N	GND	NC	GND
13	FMC_HA10_P GND	FMC_HA11N GND	FMC_LA07_P ADC12_DAT A_5_P	FMC_LA08_N ADC12_DAT A_6_N	FMC_HA12P GND	FMC_HA13N GND	GND	GND	NC	GND
14	FMC_HA10_N GND	GND	FMC_LA07_N ADC12_DAT A_5_N	GND	FMC_HA12N GND	GND	FMC_LA09_P ADC12_DAT A_7_P	FMC_LA10_P ADC12_DAT A_8_P	GND	NC
15	GND	FMC_HA14P GND	GND	FMC_LA12_P ADC12_DAT A_10_P	GND	FMC_HA16P GND	FMC_LA09_N ADC12_DAT A_7_N	FMC_LA10_N ADC12_DAT A_8_N	GND	NC
16	FMC_HA17P_ CC GND	FMC_HA14N GND	FMC_LA11_P ADC12_DAT A_9_P	FMC_LA12_N ADC12_DAT A_10N	FMC_HA15P GND	FMC_HA16N GND	GND	GND	NC	GND
17	FMC_HA17N_ CC GND	GND	FMC_LA11_N ADC12_DAT A_9_N	GND	FMC_HA15N GND	GND	FMC_LA13_P ADC12_DAT A_11_P	GND	NC	GND
18	GND	FMC_HA18P GND	GND	FMC_LA16_P ADC12_DAT A_14_P	GND	FMC_HA20P GND	FMC_LA713_ N ADC_DATA_ 11_N	FMC_LA14_P ADC12_DAT A_12_P	GND	NC
19	FMC_HA21_P GND	FMC_HA18N GND	FMC_LA15_P ADC12_DAT A_13_P	FMC_LA16_N ADC12_DAT A_14_N	FMC_HA19P GND	FMC_HA20N GND	GND	FMC_LA14_N ADC12_DAT A_12_N	GND	NC
20	FMC_HA21_N GND	GND	FMC_LA15_N ADC12_DAT A_13N	GND	FMC_HA19N GND	GND	FMC_LA17_P _CC ADC12_DAT A_15_P	GND	NC	GND

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	K	J	H	G	F	E	D	C	B	A
21	GND	FMC_HA22P GND	GND	FMC_LA20P ADC12_CSB	GND	FMC_HB03_P ADC34_DAT A_2_P	FMC_LA17_N _CC ADC12_DAT A_15_N	GND	NC	GND
22	FMC_HA23_P 50_Ohm_Termination	FMC_HA22N GND	FMC_LA19P ADC12_SDI_ CLK	FMC_LA20N 50 Ohm Termination	FMC_HB02_P ADC34_DAT A_1_P	FMC_HB03_N ADC34_DAT A_2_N	GND	FMC_LA18_P _CC ADC12_OVE R-RANGE_P	GND	NC
23	FMC_HA23_N 50_Ohm_Termination	GND	FMC_LA19N 50_Ohm Termination	GND	FMC_HB02_N ADC34_DAT A_1_N	GND	FMC_LA23P ADC1_FE_A MP_EN	FMC_LA18_N _CC ADC12_OVE R-RANGE_N	GND	NC
24	GND	FMC_HB01_P ADC34_DAT A_0_P	GND	FMC_LA22P ADC12_PWD N	GND	FMC_HB05_P ADC34_DAT A_4_P	FMC_LA23N ADC2_FE_A MP_EN	GND	NC	GND
25	FMC_HB00_P ADC34_SYNBN_P	FMC_HB01_N ADC34_DAT A_0_N	FMC_LA21P ADC12_SDI_ OUT	FMC_LA22N ADC12_FE_A MP_PWR_EN	FMC_HB04_P ADC34_DAT A_3_P	FMC_HB05_N ADC34_DAT A_4_N	GND	GND	NC	GND
26	FMC_HB00_N ADC34_SYNBN_N	GND	FMC_LA21N ADC12_SDI_ N	GND	FMC_HB04_ N ADC34_DAT A_3_N	GND	FMC_LA26P FMC_TRIG/ SYNC_OUT_S EL	FMC_LA27P PLL_STATUS _1	GND	NC
27	GND	FMC_HB07_P ADC34_DAT A_5_P	GND	FMC_LA25P FMC_TEMP_ ALERT	GND	FMC_HB09_P ADC34_DAT A_7_P	FMC_LA26N FMC_TRIG/ SYNC_OUT_E N	FMC_LA27N PLLSTATUS_ 2	GND	NC
28	FMC_HB06_P ADC34_DAT A_CO_P	FMC_HB07_P ADC34_DAT A_5_N	FMC_LA24P ADC3_FE_A MP_EN	FMC_LA25N 50_Ohm_Termination	FMC_HBB08_ P ADC34_DAT A_6_P	FMC_HB09_N ADC34_DAT A_7_N	GND	GND	NC	GND
29	FMC_HB06_N ADC34_DAT A_CO_N	GND	FMC_LA24N ADC4_FE_A MP_EN	GND	FMC_HB08_N ADC34_DAT A_6_N	GND	NC	GND	NC	GND
30	GND	FMC_HB11_P ADC34_DAT A_9_P	GND	FMC_LA29P PLL_STAT_3_ C2M/M2C	GND	FMC_HB13_P ADC34_DAT A_11_P	FMC_TDO	FMC_SCL	GND	NC
31	FMC_HB10_P ADC34_DAT A_8_P	FMC_HB11_N ADC34_DAT A_9_N	FMC_LA28P PLL_STATUS _3	FMC_LA29N_ PLL_STAT_4_ C2M/M2C	FMC_HB12_P ADC34_DAT A_10_P	FMC_HB13_N ADC34_DAT A_11_N	FMC_TDO	FMC_SDA	GND	NC
32	FMC_HB10_N ADC34_DAT A_8_N	GND	FMC_LA28N PLL_STATUS _4	GND	FMC_HB12_N ADC34_DAT A_10_N	GND	3P3VAUX	GND	NC	GND
33	GND	FMC_HB15_P ADC34_DAT A_13_P	GND	FMC_LA31P PLL_CS_N	GND	FMC_HB19P ADC34_SDI_ CLK	NC	GND	NC	GND
34	FMC_HB14_P ADC34_DAT A_12_P	FMC_HB15_N ADC34_DAT A_13_N	FMC_LA30P PLL_RESET	FMC_LA31N PLL_TRIG/ SYNC_IN_SE L	FMC_HB16_P ADC34_DAT A_14_P	FMC_HB19P ADC34_PWD N	NC	GA0	GND	NC
35	FMC_HB14_N ADC34_DAT A_12_N	GND	FMC_LA30N PLL_GPO	GND	FMC_HB16_N ADC34_DAT A_14_N	GND	GA1	I2P0V	GND	NC
36	GND	FMC_HB18_P ADC34_OVE R-RANGE_P	GND	FMC_LA33P PLL_SDI	GND	FMC_HB21P ADC34_SDI_ OUT	3.3V	GND	NC	GND
37	FMC_HB17_P ADC34_DAT A_15_P	FMC_HB18_N ADC34_OVE R-RANGE_N	FMC_LA32P PLL_SCK	FMC_LA33N PLL_SDO	FMC_HB20P ADC34_CSB	FMC_HB21N ADC34_SDI_ N	GND	I2P0V	NC	GND
38	FMC_HB17_N ADC34_DAT A_15_N	GND	FMC_LA32N PLL_TRIG/ SYNC_IN_SE L	GND	FMC_HB20N 50_Ohm_Termination	GND	3.3V	GND	GND	NC

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	<b>K</b>	<b>J</b>	<b>H</b>	<b>G</b>	<b>F</b>	<b>E</b>	<b>D</b>	<b>C</b>	<b>B</b>	<b>A</b>
<b>39</b>	GND	VIO_B_M2C	GND	FMC_VADJ	GND	FMC_VADJ	GND	3.3V	GND	NC
<b>40</b>	VIO_B_M2C	GND	FMC_VADJ	GND	FMC_VADJ	GND	3.3V	GND	NC	GND

**FMC Connector Pin Map Table**

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