

## High Performance Modular Data Acquisition

**Create cost-effective customized systems to match your IO requirement:**

- Fit anything from 4 to 192 analog channels in one enclosure using ..
- A range of high performance simultaneous IO modules
- A range of networked and standalone carrier appliances to support up to 6 modules
- Appliances feature a low power but powerful ARM system on chip and embedded Linux OS.
- Connectivity is Gigabit Ethernet, USB, PCI-Express, SATA and fiber-optic links.
- Modules based on VITA-57 FMC standard (FMC) and extended (ELF)



### Module Range

Model	Simultaneous Channels			Comment
	No.	Rate	Bits	
AO420FMC	4	1 MSPS	16/18/20	DAC
ACQ420FMC	4	2 MSPS	16/18	4 input ranges, <b>SNR 94dB</b>
ACQ424ELF	32	1 MSPS	16	Fixed range, SAR, Hi Density
ACQ425ELF	16	2 MSPS	16	4 input ranges, <b>SNR 94dB</b>
ACQ430FMC	8	128 kSPS	24	Fixed range Voltage input
ACQ435ELF	32	128 KSPS	24	Fixed range Voltage input
ACQ436ELF	32	128 KSPS	24	Current Mode Input
ACQ437ELF	16	128 KSPS	24	Variable range Voltage Input
ACQ480FMC	8	50MSPS	14	Variable range Voltage Input

### Appliance Range

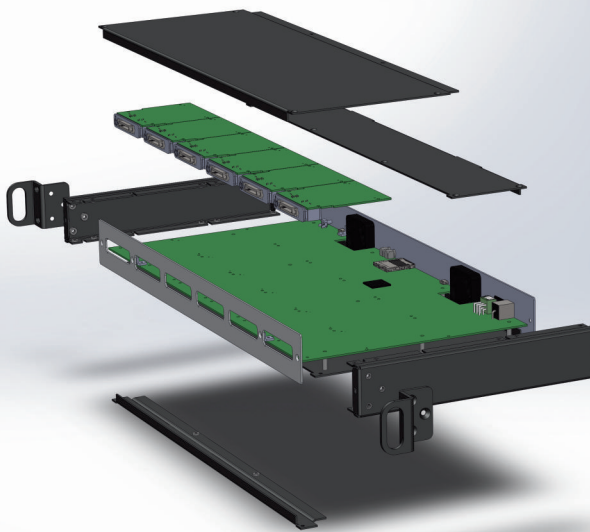
Model	Sites	Size	Comment
ACQ1001	1	70mm x 1U	Minimum Size
ACQ1002R	2	150mm x 1U	Rack mount
ACQ1002S	2	70mm x 1.5U	Stacking: use inTube / Down Hole
ACQ2006	6	19" x 1U	Up to 192 channels in 1U
ACQ2106	6	19" x 1U	SSD, Fiber connectivity
ACQ2206	6	19" x 1U	PCI-Express connectivity, DSP

## Appliance: ACQ2006

*High Density: up to 192 channels in 1U*



- 19", 1U appliance, DC12V power, external PSU
- 6 sites for D-TACQ FMC or ELF modules. *Not recommended for 3rd party FMC modules*
- Xilinx Z7020 SOC running Linux, connectivity on gigabit Ethernet and USB
- PMOD expansion, external CLK and TRG options



## Coming Soon: ACQ2106/AC2206

- As ACQ2006, but upgraded to
- ACQ2106: Xilinx Z7030 connectivity on gigabit Ethernet, USB, SSD and fiber optic.
- ACQ2206: Xilinx Z7045 for DSP intensive applications, PCI-Express cable connectivity.

*Product Planned Q2 2014*

## Appliance: ACQ1001, ACQ1002R/T

*Low cost applications, 4 to 64 channels. Small, Rack and Stack.*



- Minimum size appliance, DC12V power, external PSU
- 1 or 2 sites for D-TACQ FMC or ELF modules.

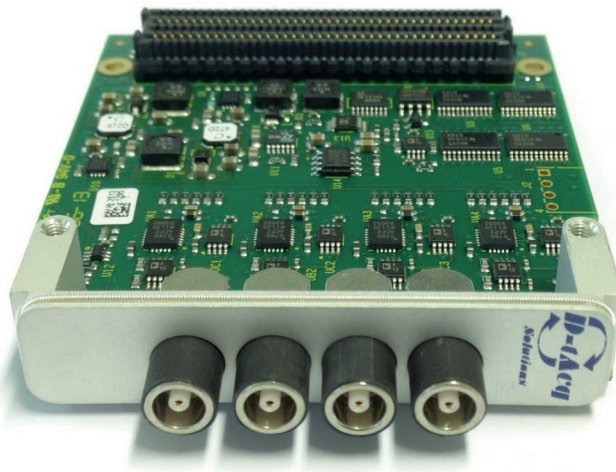
*ELF Site not recommended for 3rd party FMC modules.*

- Shape optimised smallest single (Q), dual Rack mount (R) or dual Stack (S) to fit in a tube.
- Xilinx Z7020 SOC for one full VITA-57 compliant FMC LPC site.
- PMOD expansion, external CLK and TRG options.
- Synchronized between units using HDMI cable bus.
- Rackmount options allow for very high density if required.



## Module: AO420FMC

- 4 channels simultaneous Analog Output.
- 16 bit resolution, 1MSPS update rate. -18, -20 bit options available.
- DC, repetitive and continuous AWG functions.
- VITA-57 Compliant FMC module
- AO423-ELF 32 channels output in ELF formfactor. *Product Planned Q2 2014*

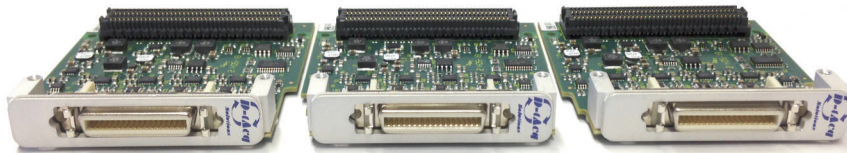


## Specifications

Parameter	Value	Comment
Output Type	DC, 20mA max current	
Sample Rate	1MSPS	per channel, simultaneous
Output Voltage Range	±10V	
Output Impedance	10 Ω	
Offset Error	0.01% FS	
Gain Error	0.1% FS	
INL	±2 LSB	
DNL	±1 LSB	
CMR		FS, at 1kHz
THD	> 80dB	
SINAD	-74 dB	
SFDR	85 dBc	
SNR	72 dB	
Full Power BW	1 MHz	
Small Signal BW	2 MHz	
Crosstalk	< 80 dB	@ 1kHz FS Input
Temperature Stability	< 25 ppm / C	
Front panel connectors	4 x "LEMO" NIM 00	

## Module: ACQ420FMC

- 4 channels Simultaneous Analog Input.
- Extremely high quality.
- 16, 18 bit resolution, 500k to 2MSPS sample rate
- High impedance differential input, PGA with 4 switched ranges
- Internal and External Clock
- VITA-57 Compliant FMC module



## Module Range

Model	Channels		
	No.	Bits	Sample Rate
ACQ420-FMC-4-500	4	16	500 kSPS
ACQ420FMC-4-1000	4	16	1 MSPS
ACQ420FMC-4-2000	4	16	2 MSPS
ACQ420FMC-4-1000-18	4	18	1 MSPS
ACQ420-TERM01	DIN Rail accessory, 4 x Signal, CLK, TRG		

## Specifications

Parameter	Value	Comment
Input Type	DC, Differential Input	High Impedance
Input Impedance	100K	
Input Voltage Range	$\pm 10, \pm 5, \pm 2.5 \pm 1.25V$ $+0, +20, +40, +60$ dB	Software Selectable, per channel High Gain option
Input Voltage Withstand	$\pm 30V$	
Offset Error	0.01% FS	
Gain Error	0.01% FS	
INL	$\pm 0.5$ LSB	
DNL	$\pm 0.5$ LSB	
CMRR	>80dB	FS, at 1kHz
THD	-100dB	
SINAD	-93 dB	
SFDR	100 dBc	
SNR	<b>94 dB</b>	Exceptional SNR

## Module: ACQ424ELF

- 32 channels simultaneous Analog Input
- High Quality, but low cost. Very high channel counts possible.
- 16 bit resolution, 500kSPS or 1MSPS maximum sample rate
- High impedance differential input, factory fixed input range
- Internal and External Clock
- Extended module, fits D-TACQ Appliances only.

*Product Planned Q3 2014*



## Specifications

Parameter	Value	Comment
Input Type	DC, Differential Input	High Impedance
Input Impedance	100K	
Input Voltage Range	$\pm 10, \pm 5, \pm 2.5 \pm 1.25V$	Factory set.
Input Voltage Withstand	$\pm 30V$	
Offset Error	0.01% FS	
Gain Error	0.01% FS	
INL	$\pm 3$ LSB	
DNL	$\pm 1$ LSB	
CMRR	>60dB	FS, at 1kHz
THD	-85dB	
SINAD	-84 dB	
SFDR	100 dBc	
SNR	86 dB	Typical measured at FS with 9.76 kHz input
Full Power BW	500 kHz	
Cross Talk	<90 dB	Typical 1 kHz FS input
Front panel connector	VHDCI	Pinout compatible with ACQ200 series panels

## Module: ACQ425ELF

- 16 channels simultaneous Analog Input
- Extremely high quality. High channel counts possible.
- 16 bit resolution, 2MSPS sample rate, 18 bit 1MSPS
- High impedance differential input, PGA with 4 switched ranges
- Internal and External Clock
- Extended module, fits D-TACQ Appliances only. Scaled up ACQ420FMC.  
*Product Planned Q2 2014*



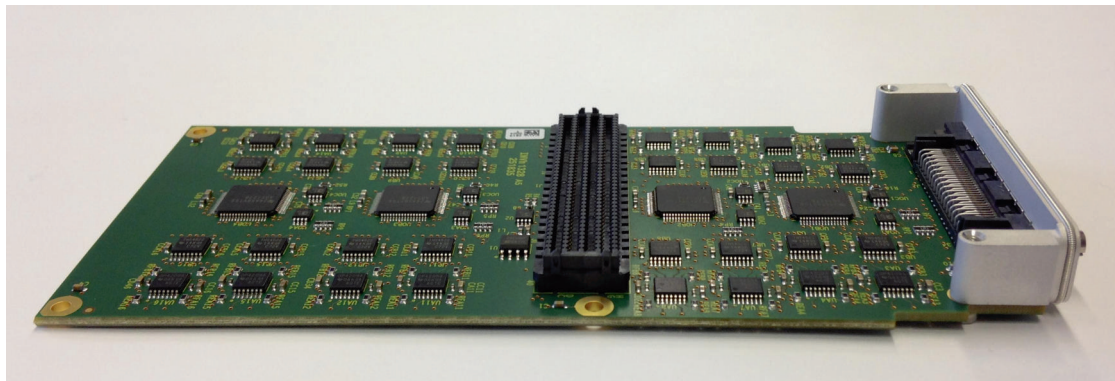
## Specifications

Parameter	Value	Comment
Input Type	DC, Differential Input	High Impedance
Input Impedance	100K	
Input Voltage Range	$\pm 10, \pm 5, \pm 2.5 \pm 1.25V$ $+0, +20, +40, +60$ dB	Software Selectable, per channel High Gain option
Input Voltage Withstand	$\pm 30V$	
Offset Error	0.01% FS	
Gain Error	0.01% FS	
INL	$\pm 0.5$ LSB	
DNL	$\pm 0.5$ LSB	
CMRR	$> 80$ dB	FS, at 1kHz
THD	-100dB	
SINAD	-93 dB	
SFDR	100 dBc	
SNR	94 dB	Exceptional SNR
Full Power BW	1Mhz	
Cross Talk	$< 90$ dB	Typical 1 kHz FS input
Front panel connector	VHDCI	Pinout compatible with ACQ200 series panels

## Module: ACQ430FMC, ACQ435/6/7 ELF

- Up to 32 channels simultaneous Analog Input
- Delta Sigma converter with high order LP filter.
- 24 bit resolution, 128kSPS sample rate
- Internal and External Clock

Model	Channels			Characteristics
	No.	Bits	SR	
ACQ430-FMC	4	24	128k	Factory Fixed Voltage Input
ACQ435ELF-32	32	24	128k	Factory Fixed Voltage Input
ACQ436ELF-32	32	24	128k	Factory Fixed Current Input
ACQ437ELF-16	16	24	128k	Programmable Input Voltage
ACQ435ELF-32-16	32	16	50k	Low Cost



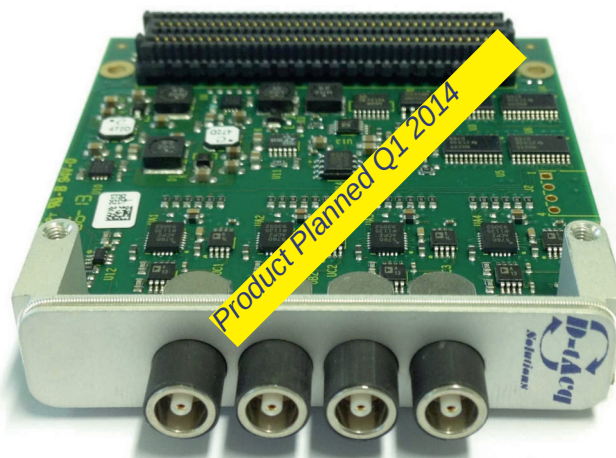
## Specifications

Parameter	Value	Comment
Input Type	DC, Differential Input	High Impedance
Input Impedance	100K	
Input Voltage Range	$\pm 10V$ (options: $\pm 5V$ $\pm 2.5V$ $\pm 1mA$ $\pm 0.5, 1, 2, 5V$ )	ACQ430/ACQ435 Voltage Input ACQ436 Current Input, Transimpedance amp. ACQ437 Voltage input with PGA
Input Voltage Withstand	$\pm 30V$	
Offset Error	0.01% FS	
Gain Error	0.01% FS	
INL	$\pm 0.002\%$ FS	
CMRR	$> 60dB$	FS @ 1kHz
THD	-100dB	
SINAD	102 dB	
SFDR	-107 dBc	
SNR	104 dB	
Analog Input BW	80 kHz	Digital Filter passband $0.453 F_s$
Crosstalk	$< 90dB$	1kHz FS Input
Front Panel Connector	MDR36 / VHDCI	



## Module: ACQ480FMC

- 8 channels simultaneous Analog Input
- 14 bit resolution, 50MSPS sample rate
- Compatible with ACQ1001/ACQ2106/ACQ2206.
- Internal and External Clock available from carrier.
- VITA-57 Compliant FMC module.



## Specifications

Parameter	Value	Comment
Input Type	DC, Single Ended Input	High Impedance
Sample Rate	50 MSPS	Compatible ACQ1001, ACQ2106, ACQ2206
Resolution	14 bit	
Input Impedance	5K	50 R factory option
Input Voltage Range	$\pm 5, \pm 2.5V, \pm 1V$	Factory set, x2 gain option in 6 steps
Input Voltage Withstand	$\pm 30V$	
Offset Error	$\pm 3$ mV	
Gain Error	$\pm 2$ mV	
INL	$\pm 1$ LSB	
DNL	$\pm 0.5$ LSB	
CMRR	$> 80$ dB	FS, at 1kHz
THD	TBD	
SINAD	-71 dB	typical
SFDR	85 dBc	typical
SNR	72 dB	typical
Full Power Bandwidth	20 MHz	
Front panel connector	SSMC x 10	Floating inputs, CLK, TRG

## Common Product Features

### **FMC Module Compatibility**

The VITA 57 FMC standard combines a robust front panel design with an interface designed for FPGA's. D-TACQ FMC modules achieve very high analog performance in part by providing local clean power. D-TACQ ELF modules make use of the same interface connector but extend the module size to increase payload; D-TACQ appliance motherboards provide clean analog power rails for the ELF modules.

### **Xilinx ZYNQ System on Chip**

The ZYNQ SOC allows improvement on the successful ACQ200 series; it not only replaces 3 devices (cpu, FPGA and Ethernet) with one chip, it also provides a higher performance cpu (dual-core ARM Cortex A9 at 800MHz) and a higher performance FPGA fabric. Z7020 is fitted to ACQ1001/ACQ2006 series carriers, Z7030 is specified as standard on ACQ2106 to provide fast serial connectivity - SATA, SFP fiber optic - while Z7045 is available as an option on ACQ2106 to provide huge DSP resource and quad-lane PCI-Express cable transport. D-TACQ welcomes opportunities to implement new generic and custom DSP solutions. Examples of previous projects include: FIR filter, Digital Downconverter, Ratiometric fault monitor.

### **1U Appliance formfactor**

Both ACQ2x06 and ACQ100x are available in 1U formfactor, for maximum rackmount simplicity with minimum space. The enclosure is a black painted aluminium finish. ACQ100x may also be deployed in non-rack situations, and it's easy to mount anywhere thanks to a full set of tapped fixing holes. Both units require an external 12V supply (provided).

### **Embedded Linux on board**

Appliances boot Linux. This provides for maximum connectivity, and flexibility and ease of programming. The cards feature a comprehensive web interface, easy scriptable socket interface, and an EPICS IOC is provided as standard. All D-TACQ software is released under GPL and the full source code is provided to end-users.

### **Turnkey Systems, ready to work**

Intelligent units make for extremely simple integration. Power up and point a web browser at it to view data. Make use of the comprehensive EPICS controller, with client GUI applications provided. Easy to extend with a network-scriptable interface, and data transfer using standard networking. Stream to disk and plot live data. No device driver required!

This document provides preliminary product information and is subject to change without notice. Please contact D-TACQ for details and confirmation prior to commitment. All trademarks acknowledged.

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