ACQ420FMC

4 Channel Simultaneous Analog Input Module

Product Description

- 4 Channels of Simultaneous Analog input
- Up to 2 MSPS/channel sample rate
- 16 bit resolution with 18 bit option
- Programmable Input Voltage Range
- High SNR up to 94 dB

Module Key Features

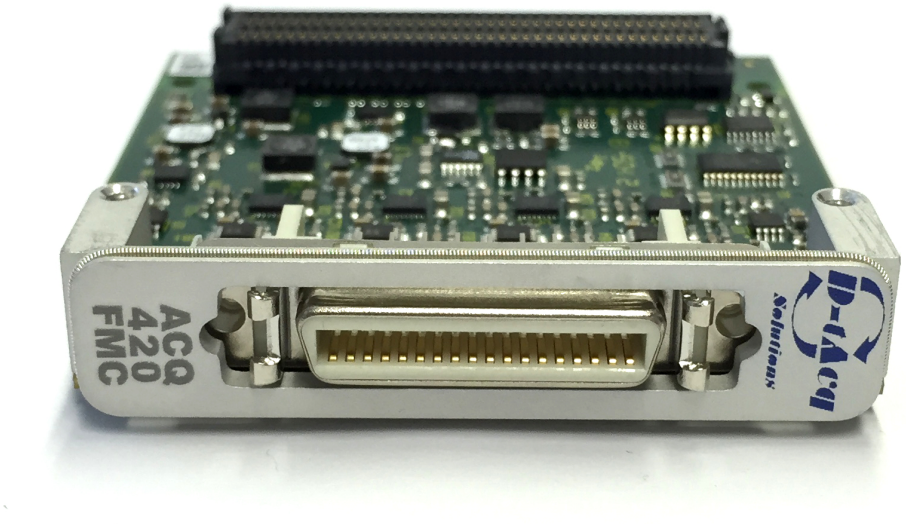
- Ideal for Instrumentation applications, control and monitoring
- Compatible with all D-TACQ Carriers
- Fully compliant with VITA-57, FMC-LPC
- Wide range of triggering and capture modes

Platform Key Features

D-TACQ supplies a complete working Intelligent DAQ Appliance providing:

- FPGA based system with a range of flexible and customisable features
- Microprocessor system running open source Linux
- Comprehensive API provided in Python
- Onboard EPICS IOC for rapid integration

Please contact info@d-tacq.com for details on the above system integration options.



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1 Product Description

1. ACQ420FMC is a 4 channel simultaneous analog input module.
2. Standard configuration : 4 channels, 2 MSPS/channel.
3. FMC module using LPC connector, analog inputs using an MDR36 on a FMC front panel.
4. 2-wire Differential inputs, high quality Instrumentation PGA, see see Section 3 for details.
5. Front end tolerates significant continuous over voltage. Transient suppression is provided via transition module eg TERM-01, see DIN-Rail Termination Modules on the D-TACQ website.

1.1 Product Variants

- ACQ420FMC-4-2000 : 4 channels, 16 bit resolution, 2 MSPS/channel.
- ACQ420FMC-4-1000-18 : 4 channels, 18 bit resolution, 1 MSPS/channel.
- ACQ420FMC-4-1000 : 4 channels, 16 bit resolution, 1 MSPS/channel.

1.2 Applications

- Instrumentation applications, control and monitoring.

1.3 Carrier Compatibility

The FMC module standard, adds user IO to carrier modules fitted with FPGA resource. D-TACQ recommends carriers based on the Xilinx ZYNQ system on chip, combining FPGA resource with a dual-core ARM Cortex A9 and gigabit Ethernet see Module Carriers on the D-TACQ website.

Compatible carriers include:

- D-TACQ ACQ1001 : D-TACQ single site FMC/ELF carrier, ZYNQ Z7020
- D-TACQ ACQ1002 : D-TACQ dual site FMC/ELF carrier, ZYNQ Z7020
- D-TACQ ACQ2106 : D-TACQ 6 site ELF carrier, ZYNQ Z7030
- D-TACQ ACQ2206 : D-TACQ 6 site ELF carrier, ZYNQ Z7030
- D-TACQ ACQ1102 : D-TACQ 2 site FMC/ELF carrier, Z7030
- DAMC-FMC1Z7IO + D-TACQ ACQ400-MTCA-RTM-2 : 2 site ELF + 1 site FMC carrier, ZYNQ Z7030/7035

D-TACQ supplies a complete working Intelligent DAQ Appliance including programmable logic and microprocessor system running Linux.

2 Physical

2.1 Module Outline

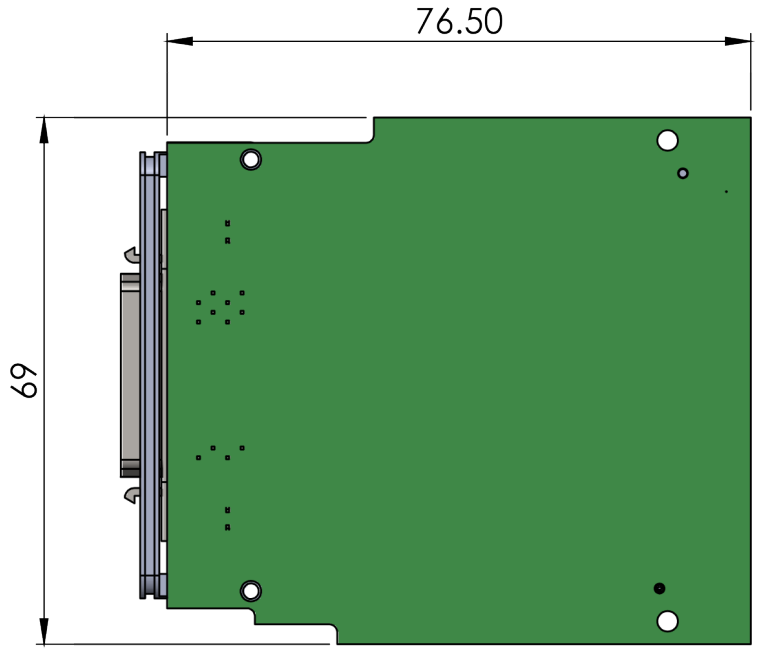

Figure 1: Module Outline

2.2 Appearance

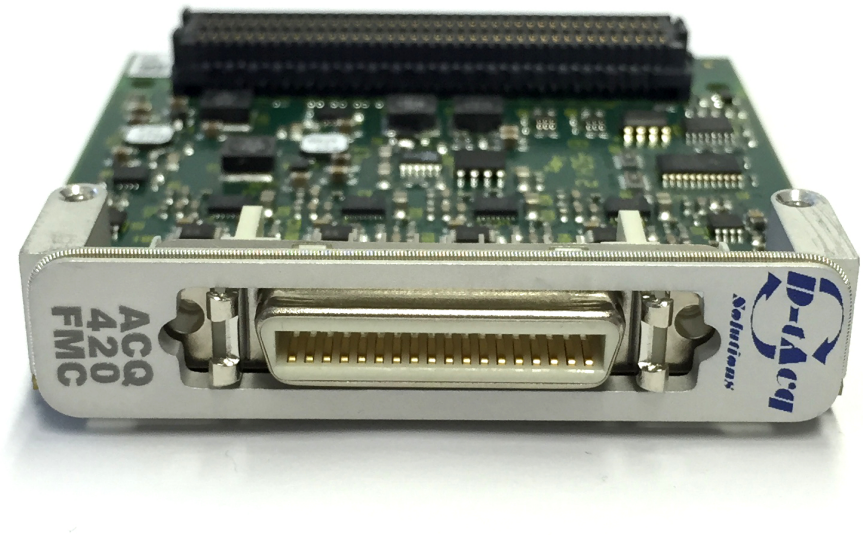

Figure 2: Module Photo

2.3 Front Panel MDR 36 Connector

- 36 Pin MDR. Pinout compatible with D-TACQ DIN RAIL ACQ420-TERM01 Panel For direct external cable to front panel See ACQ420-TERM01.

Pin	Function	Pin	Function
1	EXT_CLK	19	ACCESSORY PRESENT
2	0VD	20	0VD
3	EXT_TRIG	21	0VD
4	0VD	22	0VD
5	+12V	23	+5V
6	+12V	24	+5V
7	0VA	25	0VA
8	Reserved	26	AI4 GND
9	AI4+	27	AI4-
10	0VA	28	0VA
11	Reserved	29	AI3 GND
12	AI3+	30	AI3-
13	0VA	31	0VA
14	Reserved	32	AI2 GND
15	AI2+	33	AI2-
16	0VA	34	0VA
17	Reserved	35	AI1 GND
18	AI1+	36	AI1-

Table 1: Front Panel MDR 36 Connector Pinout

3 Electrical Specification

#	Parameter	Value
1	Number of Channels	4
2	Sample Rate (Max)	-1000: 1 MHz -2000: 2 MHz per channel simultaneous
3	Resolution	Standard 16 bit -18: 18 bit
4	Coupling	DC, Differential Input
5	Input Impedance	1 MΩ
6	Input Voltage Range Standard (1,2,4,8)	Software selectable ranges ±10 V, ±5 V, ±2.5 V, ±1.25 V
7	Input Voltage Withstand[1]	±30 V
8	Offset Error	0.01% FS with numerical calibration
9	Gain Error	0.01% FS with numerical calibration
10	INL	16 bit ±0.2 LSB 18 bit ±0.5 LSB
11	DNL	16 bit ±0.1 LSB 18 bit ±0.1 LSB
12	CMRR	>80dB FS @ 1 kHz
13	THD [2]	-98 dB
14	SINAD[2]	-93 dB
15	SFDR [2]	100 dBc
16	SNR [2]	88 dB
17	Power BW (-3dB)	580 kHz
18	Small Signal BW	1 MHz
19	Crosstalk	<100 dB @ 1 kHz FS Input
20	Temperature Stability	<25ppm/°C

[1] Withstand voltage for damage protection however functional behavior may be impacted above input range.
[2] Typical values measured at full scale with an 8 kHz input.

Table 2: ACQ420FMC Electrical Performance

4 Mechanical, Environmental & Digital Input Specification

#	Parameter	Value
1	Form Factor	Standard FMC
2	Power Consumption	12V, 150mA 3.3V, 75mA
3	Supported VADJ	Min 1.8V, Max 3.3V
4	Environmental	0 °C - 50 °C Operational −10 °C - 85 °C Non-Operational
5	Mezzanine Socket	Standard FMC, Low Pin Count LPC
6	Digital Signal I/O	CLK, TRG inputs 5V TTL

Table 3: Mechanical & Environmental Specification

Revision History

Revision	Date	Author(s)	Description
10	July 2021	JMcL	Last Release of Previous Format
11	June 2024	JMcL	Updated Format
12	February 2025	JMcL	Added VADJ detail format updates