ACQ430FMC

8 Channel Simultaneous Analog Input Module

Product Description

- 8 Channels of Simultaneous Analog input
- Up to 125kSPS/channel
- 24-bit resolution
- High SNR up to 108dB

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
- Compatible with a range of Termination Modules
- Internal FFC connectors for possible OEM Termination or Signal Conditioning

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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Table Of Contents

1 Product Description

1. ACQ430FMC is an 8 channel, 24 bit simultaneous analog input module.
2. Standard configuration : 8 channels, 125 kSPS/channel.
3. 2-wire Differential inputs, high quality differential amplifier front end.

1.1 Product Variants

- ACQ430FMC : 8 channels, FMC compliant, 36 way MDR (Mini-Centronics) Connector.
- ACQ430ELF : 8 channels, D-TACQ ELF compliant, 36 way MDR (Mini-Centronics) Connector.
- ACQ430FMC-4-LFP : 4 channels, FMC compliant , 4 single Pin LEMO connectors.
- ACQ430FMC-8-LFP : 8 channels, D-TACQ ELF compliant, 4 single Pin LEMO. connectors on Front Panel, 4 single Pin LEMO connectors on Top Deck.

Please contact info@d-tacq.com for other Front Panel connection options.

1.2 Applications

- Instrumentation applications, control and monitoring.
- Acoustic and seismic applications.

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
- Quantum Detectors PandABox, ZYNQ 7030 with single ELF site. Please contact info@d-tacq.com for details

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

2 Physical

2.1 Module Outline

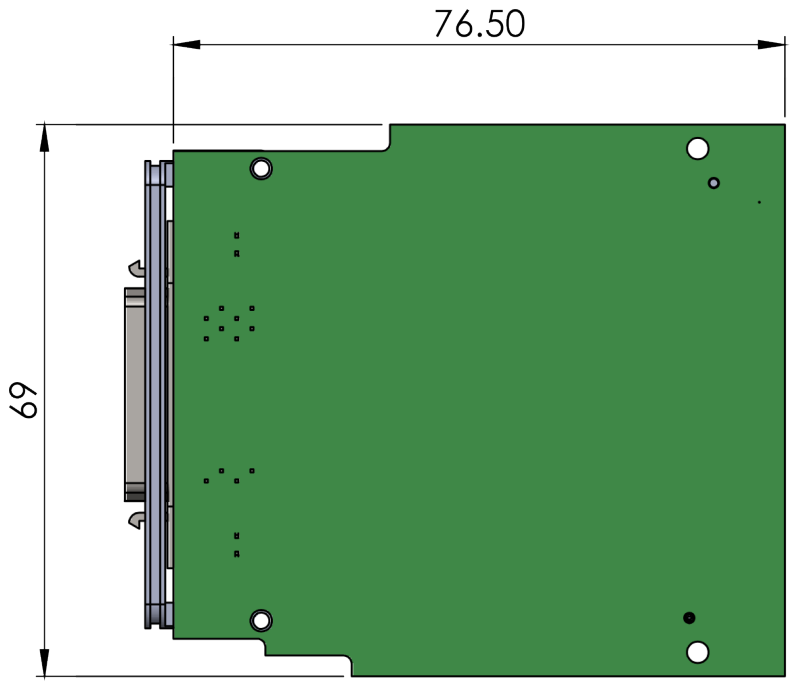

Figure 1: Module Outline

2.2 Appearance

The picture below shows the ACQ430FMC module with the 36 way MDR (Mini-Centronics) Connector:

Figure 2: ACQ430FMC Module Appearance

The picture below shows the ACQ430FMC-8-LFP module with dual stacked 4 pin LEMO top Deck:

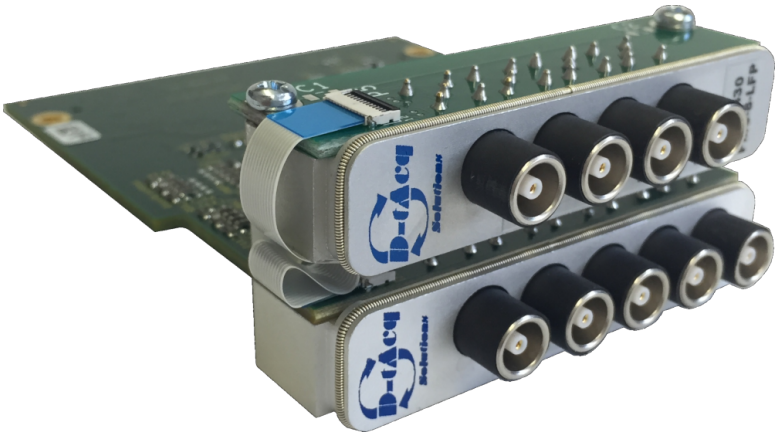

Figure 3: ACQ430FMC-8-LFP Module Appearance

2.3 Front Panel Connector & Pinout

2.3.1 36 Pin MDR (Mini-Centronics)

- 36 Pin MDR (Mini-Centronics) 3M 10236-55G3PL.
- Mating Part 3M 10136-6000EL.
- Compatible cables include: Videk 1082-2.
- Pinout compatible with D-TACQ DIN RAIL ACQ430-TERM03 Panel For direct external cable to front panel.

Pin	Function	Pin	Function
1	0V	19	0V
2	CH_08+	20	CH_08-
3	0V	21	0V
4	CH_07+	22	CH_07+
5	+12V	23	+5V
6	TRIG	24	CLK
7	0V	25	0V
8	CH_06+	26	CH_06-
9	0V	27	0V
10	CH_05+	28	CH_05-
11	0V	29	0V
12	CH_04+	30	CH_04-
13	0V	31	0V
14	CH_03+	32	CH_03-
15	0V	33	0V
16	CH_02+	34	CH_02-
17	0V	35	0V
18	CH_01+	36	CH_01-

Table 1: Front Panel 36 Pin MDR Pinout

2.3.2 Single Pin LEMO

- Single-pin LEMO 00 Series Mini Coax connector (part EPL.00.250.NTN).
- Mating Part FFA.00.250.NTAC29.

Pin	Function	Pin	Function
Centre	CHANNEL +ve	Shell	CHANNEL -ve

Table 2: Front Panel LEMO Connectors Pinout

3 Electrical Specification

The table below is for the 32 Input signals:

#	Parameter	Value
1	Number of Channels	8
2	Sample Rate High Speed Mode High Resolution Mode	Per channel simultaneous 125 kHz 52 kHz
3	Resolution	24 bits
4	Coupling	DC, Differential Input
5	Input Impedance	1 MΩ
6	Input Voltage Range[1]	±10 V
7	Input Voltage Withstand[2]	±30 V
8	Offset Error	0.01% FS with numerical calibration
9	Gain Error	0.01% FS with numerical calibration
10	INL	±0.002% FS
11	Analog Input BW	80 kHz
12	CMRR	> 60 dB FS @ 1 kHz
13	Crosstalk	< 90 dB @ 1 kHz FS Input
14	THD[3]	-106 dB
15	SFDR[3]	107 dBc
16	SNR[3] High Speed Mode High Resolution Mode	 104 dB 108 dB
17	Digital Filter:Pass Band Digital Filter:3dB Digital Filter:Stop Band Digital Filter:Attenuate	0.453 Fsample 0.490 Fsample 0.547 Fsample 95 dB

[1] Custom Input Voltages available please contact info@d-tacq.com for details.
[2] Withstand voltage for damage protection however functional behavior may be impacted above input range.
[3] Typical values measured at full scale with an 8kHz input.

Table 3: ACQ430FMC Electrical Performance

4 Mechanical, Environmental & Digital Input Specification

#	Parameter	Value
1	Form Factor	Standard FMC
2	Power Consumption	12V, 200 mA 3.3V, 100 mA
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 4: Mechanical & Environmental Specification

Revision History

Revision	Date	Author(s)	Description
3	January 2015	JMcL	Last Release of Previous Format
4	February 2025	JMcL	Updated carrier support, added LFP versions, added FMC Design Details