ACQ424ELF

32 Channel Simultaneous Analog Input Module

Product Description

- 32 Channels of Simultaneous Analog input
- Up to 1 MSPS/channel sample rate
- 16 bit resolution
- High SNR typical 88 dB

Module Key Features

- Ideal for Instrumentation applications, control and monitoring
- Compatible with all D-TACQ Carriers offering up to 192 channels in a 1U 19” system
- Wide range of triggering and capture modes
- Compatible with a range of D-TACQ Breakout Panels and Termination Modules

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. ACQ424ELF is a 32 channel simultaneous analog input module.
2. Standard configuration : 32 channels, 1 MSPS/channel.
3. Extended module with FMC connector and FMC front panel.
4. 2-wire Differential inputs, high quality Instrumentation amplifier front end with single factory fixed input voltage range.
5. Front end tolerates significant continuous over voltage. Transient suppression is provided for VHDCI via transition panel eg BNC PANEL, see Termination Panels on the D-TACQ website.

1.1 Product Variants

- ACQ424ELF-32-1000-16 : 32 channels, 16 bit resolution, 1 MSPS/channel ±10V Input Voltage Range.
- ACQ424ELF-32-1000-16-5V : 32 channels, 16 bit resolution, 1 MSPS/channel ±5V Input Voltage Range.
- ACQ424ELF-32-1000-16-2V5 : 32 channels, 16 bit resolution, 1 MSPS/channel ±2.5V Input Voltage Range.
- ACQ424ELF-32-1000-16-1V25 : 32 channels, 16 bit resolution, 1 MSPS/channel ±1.25V Input Voltage Range.

Please contact info@d-tacq.com for ordering information on other input voltage ranges.

1.2 Applications

- Instrumentation applications, control and monitoring.

1.3 Carrier Compatibility

The ELF module standard, based on the same front panel and connector footprint as FMC, 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.
The ELF module standard is a D-TACQ standard and is compatible only with D-TACQ Carriers.

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

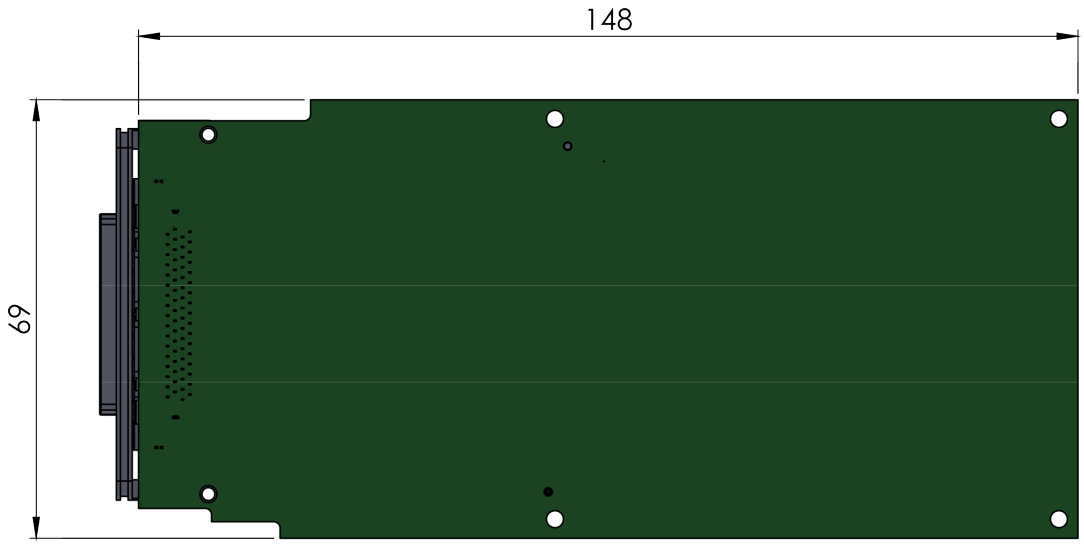

Figure 1: Module Outline

2.2 Appearance

Figure 2: Module Photo

2.3 Front Panel VHDCI Connector

- 68 Pin VHDCI. Pinout compatible with D-TACQ BNCPANEL, SMAPANEL, LEMOPANEL, PTBPANEL.
- For direct external cable to front panel.

Pin	Function	Pin	Function
1	0V	35	0V
2	0V	36	0V
3	AI01+	37	AI01-
4	AI02+	38	AI02-
5	AI03+	39	AI03-
6	AI04+	40	AI04-
7	AI05+	41	AI05-
8	AI06+	42	AI06-
9	AI07+	43	AI07-
10	AI08+	44	AI08-
11	AI09+	45	AI09-
12	AI10+	46	AI10-
13	AI11+	47	AI11-
14	AI12+	48	AI12-
15	AI13+	49	AI13-
16	AI14+	50	AI14-
17	AI15+	51	AI15-
18	AI16+	52	AI16-
19	AI17+	53	AI17-
20	AI18+	54	AI18-
21	AI19+	55	AI19-
22	AI20+	56	AI20-
23	AI21+	57	AI21-
24	AI22+	58	AI22-
25	AI23+	59	AI23-
26	AI24+	60	AI24-
27	AI25+	61	AI25-
28	AI26+	62	AI26-
29	AI27+	63	AI27-
30	AI28+	64	AI28-
31	AI29+	65	AI29-
32	AI30+	66	AI30-
33	AI31+	67	AI31-
34	AI32+	68	AI32-

Table 1: Front Panel VHDCI Connector Pinout

3 Electrical Specification

#	Parameter	Value
1	Number of Channels	32
2	Sample Rate (Max)	1 MHz per channel simultaneous
3	Resolution	16-bit
4	Coupling	DC, Differential Input
5	Input Impedance	1 MΩ
6	Input Voltage Range[1]	±10V
7	Input Voltage Withstand	±30V
8	Offset Error	0.01% FS with numerical calibration
9	Gain Error	0.01% FS with numerical calibration
10	INL	±2.5 LSB
11	DNL	±1 LSB
12	CMRR	>80 dB FS @ 1 kHz
13	THD	-90 dB
14	SINAD [2]	-86 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] Other factory set fixed ranges available – contact D-TACQ for details.
[2] Typical values measured at full scale with an 8 kHz input.

Table 2: ACQ424ELF Electrical Performance

4 Mechanical & Environmental Specification

#	Parameter	Value
1	Form Factor	D-TACQ Standard ELF
2	Power Consumption	D-TACQ ELF Module Please contact info@d-tacq.com for details.
3	Environmental	0 °C - 50 °C Operational −10 °C - 85 °C Non-Operational
4	Mezzanine Socket	D-TACQ ELF Ultra Low Pin Count ULPC

Table 3: Mechanical & Environmental Specification

Revision History

Revision	Date	Author(s)	Description
4	July 2018	JMcL	First Release of Full data sheet
5	February 2025	JMcL	Updated Format

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