

ACQ423ELF Product Specification



High Performance Simultaneous Data Acquisition

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1 Product Description

1. **ACQ423ELF** is a minimum cost 32 channel simultaneous analog input module, intended to replace obsolete high channel count digitizers operating in the range 10..200kHz.
2. Standard configuration : 32 channels, 200kSPS/channel, 16 bit, differential, fixed bandwidth 100kHz.
3. Software channel masking for higher sample rate, options:
 1. 32 Channels Enabled, $F_s = 200\text{kSPS}$.
 2. 16 Channels Enabled, $F_s = 350\text{kSPS}$.
4. ELF module with single *FMC* connector and *FMC* front panel with VHDCI connectors, compatible with D-TACQ termination such as BNCPANEL
5. Front end tolerates significant continuous overvoltage. Transient suppression is provided for VHDCI via transition panel eg BNCPANEL
6. ACQ423ELF-32-HR: High CMR version with 36V CMR, 18 bit ADC. Contact factory for details.
7. High impedance input, software switched voltage ranges

1.1 Product Variants

- **ACQ423ELF-32-200-16** : 32 channels, 200kSPS/ch 16 bit resolution.
- **ACQ423BLF-32-200-16** : ditto, D37 front panel (ACQ2106 only).
- **ACQ423ELF-32-200-18-HR** : High CMR version with 18 bit adc.

1.2 Applications

- Instrumentation applications, control and monitoring.

1.3 Overview

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.

Compatible carriers include:

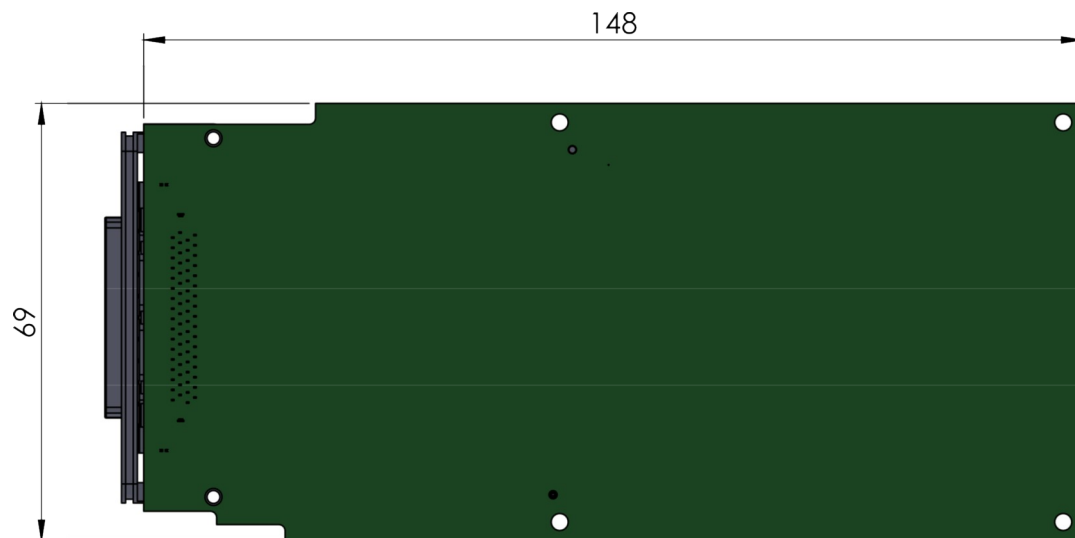
- D-TACQ **ACQ1001** : D-TACQ single slot FMC carrier, Z7020
 - fits single site ACQ1001, up to 32 channels, single VHDCI connector.
- D-TACQ **ACQ1002** : D-TACQ dual slot FMC carrier, Z7020
 - fits dual site ACQ1002, up to 64 channels, 2x VHDCI connectors.
- D-TACQ **ACQ2106** : D-TACQ 6 slot FMC carrier, Z7030
 - Up to 192 channels, 6 x VHDCI connectors;
- D-TACQ **ACQ2106BLF** :
 - Up to 96 channels, 6 x D37 connectors.
 - order code ACQ2106BLF+ 3xACQ423ELF-32-D37
- Korea NFRI **KMCU-Z30 + ACQ400RTM2** : 2 slot ELF carrier, Z7030
 - Up to 64 channels, 2x VHDCI connectors.
- Diamond Light Source **PandABox**, ZYNQ 7030 with single ELF site
 - Up to 32 channels, 1x VHDCI connector.

1.4 Glossary

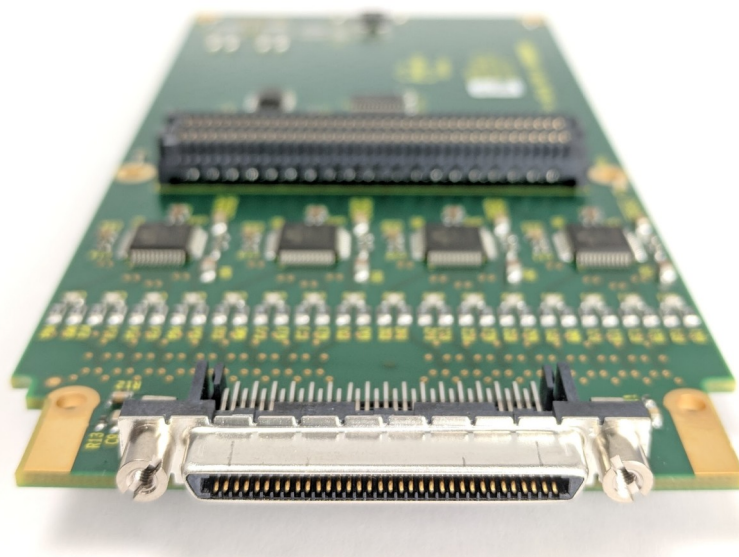
- *FMC*: [VITA57 FPGA Mezzanine Card](#).
- [Xilinx ZYNQ](#) System-on-chip.
- *LPC* : *FMC* Low pin count wiring standard.
- *ULPC*: *FMC* Ultra low pin count (D-TACQ).
- *ELF*: D-TACQ extension to *FMC*, elongated card with provision for dedicated analog power supply rails.

2 Physical

2.1 Single Width Extended FMC Module

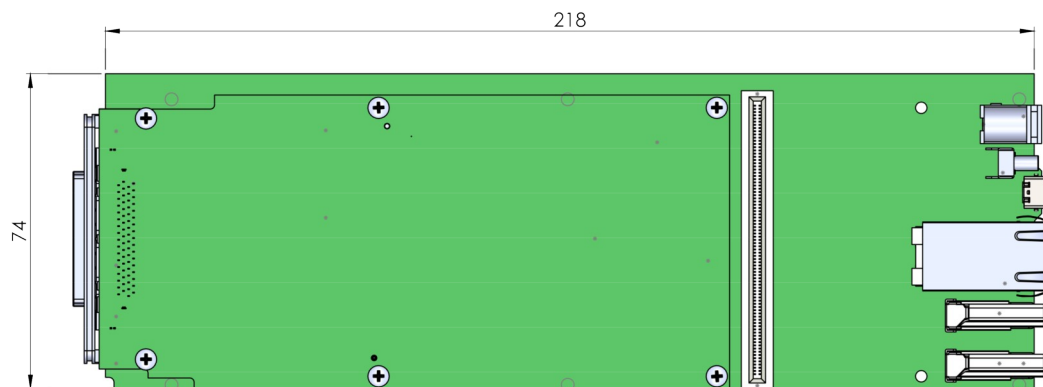


2.2 Appearance



2.3 Example 1 : Fit to ACQ1001Q

- Uses D-TACQ ACQ1001Q-ELF carrier.
- Low cost, small form-factor networked appliance with Gigabit Ethernet
- Stand-alone device with local data storage.
- Carrier fits extended size module e.g. **ACQ423ELF**. Compatible with D-TACQ FMC Modules.



2.4 Example 2: Fitted to ACQ2106 Carrier, 96 channels in 1U

- 1U appliance with 3 x ACQ423ELF modules
- BLF chassis with 6 x D37 front panel



3 Interface Specification.

3.1 Front Panel Connector

- 68 Pin VHDCI, Pinout compatible with D-TACQ BNCPANEL, SMAPANEL.

3.1.1 Pinout.

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-

3.1.2 Alternative – D37 Pinout

<i>Pin</i>	<i>Function</i>	<i>Pin</i>	<i>Function</i>	
1	AI01+	20		AI01-
2	AI02+	21		AI02-
3	AI03+	22		AI03-
4	AI04+	23		AI04-
5	AI05+	24		AI05-
6	AI06+	25		AI06-
7	AI07+	26		AI07-
8	AI08+	27		AI08-
9	AI09+	28		AI09-
10	AI10+	29		AI10-
11	AI11+	30		AI11-
12	AI12+	31		AI12-
13	AI13+	32		AI13-
14	AI14+	33		AI14-
15	AI15+	34		AI15-
16	AI16+	35		AI16-
17	nc	36		nc
18	nc	37		0V
19	0V			

4 ACQ423ELF Electrical Specification.

#	Parameter	Value
1	Number of Channels	32
2	Sample Rate	200 kHz / 32 channels, 350 kHz / 16 channels, per channel simultaneous
3	Resolution	16 bits
4	Coupling	DC, Differential Input
5	Input Impedance	1 M Ω
6	Input Voltage Range	$\pm 10V$, $\pm 5V$, 0-10V, 0-5.12V
7	Input Voltage Withstand	$\pm 100V$
8	Offset Error	0.1% Absolute 0.01% FS with numerical calibration
9	Gain Error	0.01% FS with numerical calibration
10	INL	± 1 LSB
11	DNL	± 1 LSB
12	CMRR	>60dB FS @ 1 kHz
13	THD	-90 dB
14	SINAD	-84 dB*
15	SFDR	100 dBc*
16	SNR Gain 10V	90 dB*
17	Power BW (-3 dB)	130 kHz
18	Small Signal BW	200 kHz
19	Crosstalk	<95 dB @ 1 kHz FS Input
20	Temperature Stability	<25 ppm/C
21	Front Panel Connector	VHDCI, alternate 2 x D-37

* Typical values measured at full scale with a 8.9 kHz input

5 ACQ423ELF Specification

#	Parameter	Value
1	Form Factor	D-TACQ Standard ELF
2	Power source	D-TACQ ELF Module - Please contact us if details are required.
3	Environmental	0°C-50°C Operational -10°C-85°C Non-Operational
4	FMC Socket	Standard ELF D-TACQ Low Pin Count DLPC