ACQ426ELF

32 Channel Simultaneous Analog Input Module

Product Description

- 32 Channels of Simultaneous Analog input
- Up to 1 MSPS/channel sample rate
- 16 or 20 bit resolution versions
- High SNR up to 95dB on 20 bit version

Module Key Features

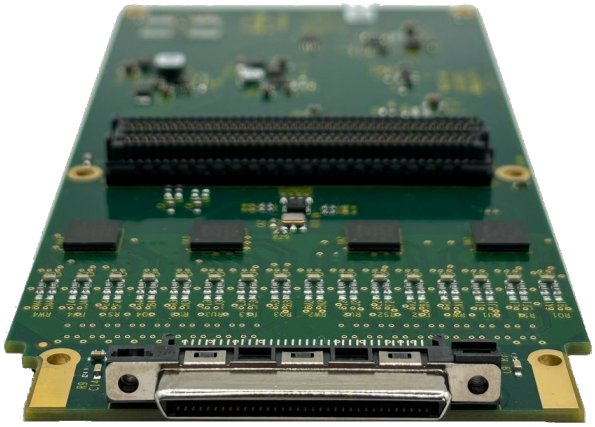
- Ideal for Instrumentation applications, control and monitoring
- Compatible with all D-TACQ Carriers offering up to 192 channels in a 1U 19” system
- Wide range of triggering and capture modes
- Compatible with a range of D-TACQ Breakout Panels and Termination Modules
- Internal FFC connectors for 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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Rev 3 October 2025

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Table Of Contents

1 Product Description **3**
1.1 Product Variants . . . 3
1.2 Applications . . . 3
1.3 Carrier Compatibility . . . 3

2 Physical **4**
2.1 Module Outline . . . 4
2.2 Appearance . . . 4
2.3 Front Panel VHDCI Connector . . . 5
2.4 Flat Flexible Cable - FFC . . . 6
2.4.1 FFC to D37 Front Panel . . . 6

3 Electrical Specification **8**
3.1 Input Voltage Ranges . . . 8
3.2 Electrical Performance . . . 8

4 Mechanical & Environmental Specification **9**

1 Product Description

1. ACQ426ELF 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 programmable input voltage ranges, see Section 3.1.
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.
6. Front panel connector: VHDCI or FFC (for local interconnect).
    - VHDCI compatible with D-TACQ range of termination panels
    - FFC compatible with 2xD37 front panel and facilitates custom transitions. Please contact info@d-tacq.com for details.

1.1 Product Variants

- ACQ426ELF-32-1000-16 : 32 channels, 16 bit resolution, 1 MSPS/channel, Programmable Input Voltage Range.
- ACQ426ELF-32-1000-20-ER : 32 channels, 20 bit resolution, 1 MSPS/channel, Extended Programmable Input Voltage Range.
- ACQ426ELF-32-1000-16-FFC : 32 channels, 16 bit resolution, 1 MSPS/channel, Programmable Input Voltage Range with FFC Connector. This is ordered in conjunction with custom front panel i.e. D37..
- ACQ426ELF-32-1000-20-ER-FFC : 32 channels, 20 bit resolution, 1 MSPS/channel, Extended Programmable Input Voltage Range with FFC Connector. This is ordered in conjunction with custom front panel i.e. D37..

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 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

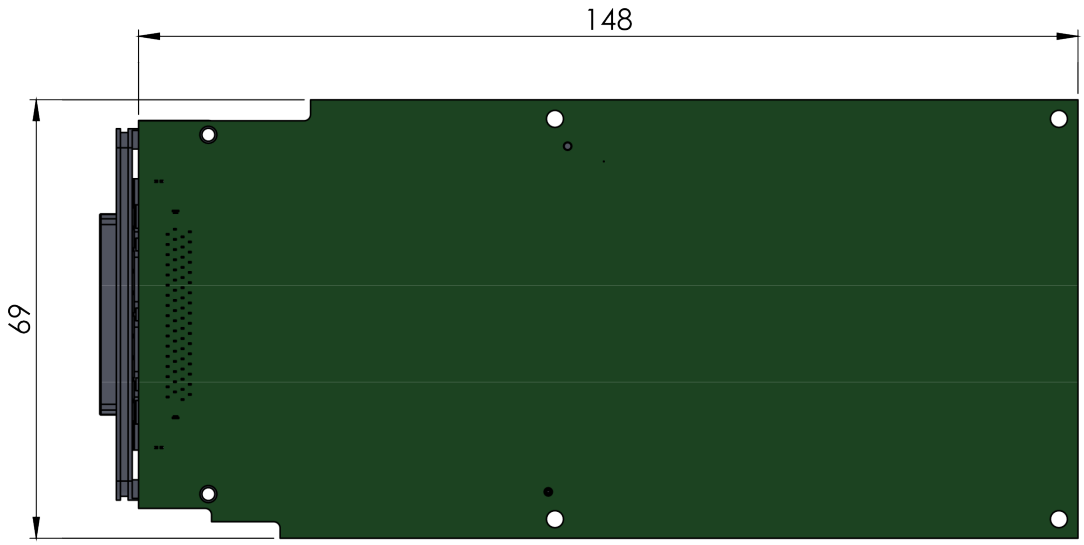

Figure 1: Module Outline

2.2 Appearance

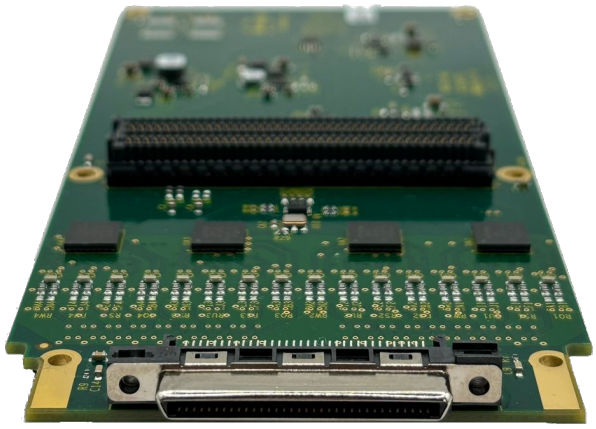

Figure 2: Module Photo

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

2.4 Flat Flexible Cable - FFC

- For custom front panel, see below for an example. Please contact info@d-tacq.com for details.

2.4.1 FFC to D37 Front Panel

The example below shows the FFC version fitted with a custom D37 Front panel. Note; there are two D37 connectors per mezzanine site.

Figure 3: Example Fitted to ACQ2106 Carrier, 96 channels in 1U

Figure 4: Front View of ACQ2106 Carrier, 96 channels in 1U

The pinout of the connectors on the D37 panel is given in the tables below:

Pin	Function	Pin	Function
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		

Table 2: D37 Front Panel 1-16 Connector Pinout

Pin	Function	Pin	Function
1	AI17+	20	AI17-
2	AI18+	21	AI18-
3	AI19+	22	AI19-
4	AI20+	23	AI20-
5	AI21+	24	AI21-
6	AI22+	25	AI22-
7	AI23+	26	AI23-
8	AI24+	27	AI24-
9	AI25+	28	AI25-
10	AI26+	29	AI26-
11	AI27+	30	AI27-
12	AI28+	31	AI28-
13	AI29+	32	AI29-
14	AI30+	33	AI30-
15	AI31+	34	AI31-
16	AI32+	35	AI32-
17	nc	36	nc
18	nc	37	0V
19	0V		

Table 3: D37 Front Panel 17-32 Connector Pinout

3 Electrical Specification

3.1 Input Voltage Ranges

The ACQ426ELF offers a per channel input voltage range as follows

Input Signal	Available Ranges
ACQ426ELF-32-1000-1[1]	±10V, ±5V, ±2.5V
ACQ426ELF-32-1000-20-ER[1]	±40V[2], ±20V, ±10V, ±5V, ±2.5V

[1] Unipolar Ranges available, please contact info@d-tacq.com for details
[2] Differential inputs only ±20V maximum DC input

Table 4: ACQ426ELF Input Ranges

3.2 Electrical Performance

The following performance characteristics are typical for an input range of ±10V contact D-TACQ for details of other ranges.

#	Parameter	Value
1	Number of Channels	32
2	Sample Rate (Max)	1 MHz per channel simultaneous
3	Resolution	-16 = 16 bit -20 = 20 bit
4	Coupling	DC, Differential Input
5	Input Impedance	>1 GΩ
6	Input Voltage Withstand[1]	±30 V
7	Offset Error	0.01% FS calibrated
8	Gain Error	0.01% FS calibrated
9	INL	±0.0003% FS
10	DNL	±0.0007% FS
11	CMRR	>100 dB FS @ 1 kHz
12	THD	-103 dB
13	SNR [2,3] -16 -20	 92 dB 95 dB
14	SFDR [2,3]	116 dBc
15	Power BW (-3dB)	550 kHz
16	Small Signal BW	11 MHz
17	Crosstalk	<100 dB @ 1 kHz FS Input
18	Temperature Stability	<25 ppm/°C

[1] Maximum Continuous, note functional behaviour and data integrity may be impacted above this limit.
[2] Typical values measured at full scale with an 8 kHz input.
[3] Performance characteristic using High Dynamic Range Mode.

Table 5: ACQ426ELF 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	FMC Mezzanine Socket	D-TACQ ELF Ultra Low Pin Count ULPC

Table 6: Mechanical & Environmental Specification

Revision History

Revision	Date	Author(s)	Description
1	June 2025	JMcL/EM	Initial Version
2	September 2025	JMcL	Addition of FFC Version and example D37 Front Panel
3	October 2025	JMcL	Finalised Input Ranges

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Rev 3 October 2025