

ACQ482ELF

16 Channel Simultaneous Analog Input Module



Product Description

- 16 Channels of Simultaneous Analog input
- Up to 80 MSPS/channel sample rate
- 14-bit resolution
- D-TACQ ELF Double Width Module (occupies 2 sites)
- Available with a Range of Input Voltages and Bandwidth Options
- Programmable High Impedance or 50 Ω termination
- High SNR typical 72 dB

Module Key Features

- Ideal for high speed Instrumentation applications including Radar, Radio Reflectometry, and High Speed Ultrasound
- Compatible with all D-TACQ Carriers offering up to 48 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.

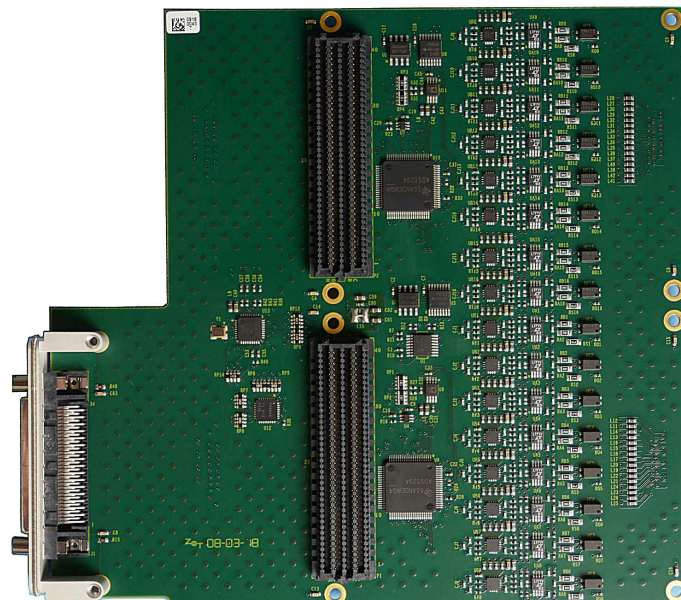


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1 Product Description

1. ACQ482ELF is a 16 channel simultaneous analog input module.
2. Standard configuration 16 channels, max ADC sample rate of 80 MSPS/channel, 14-bit resolution.
3. Differential front end, input voltage range to $\pm 10V$.
4. Input bandwidth to 5 MHz, higher for reduced voltage inputs.
5. Compatible with D-TACQ ELF sites.
6. Input connector choices "Flex Front Panel":
 - 1 x VHDCI, 16 pairs, alternate grounds:
 - Recommended Max Bandwidth 2MHz.
 - VHDCI compatible with D-TACQ range of termination panels.
 - 16 x SPL. "Single Pin Lemo" (LEMO-00).
 - 16 x DPL. "Dual Pin Lemo" (LEMO-01).
 - Other input connectors possible: Please contact info@d-tacq.com.
7. Module is DOUBLE WIDTH and needs two sites.

1.1 Product Variants

- ACQ482ELF-16-4V-H: $\pm 4V$ input voltage range, High Bandwidth.
- ACQ482ELF-16-2V5-H: $\pm 2.5V$ input voltage range, High Bandwidth.
- ACQ482ELF-16-1V-H: $\pm 1V$ input voltage range, High Bandwidth.
- Special build due to component obsolescence:
 - ACQ482ELF-16-10V: $\pm 10V$ input voltage range, Standard Bandwidth.
 - ACQ482ELF-16-5V: $\pm 5V$ input voltage range, Standard Bandwidth.
- Special build with special component choice:
 - ACQ482ELF-16-2V5-F1: $\pm 2.5V$ input voltage range, Standard Bandwidth. High Common Mode Rejection Ratio (CMRR).

1.2 Product Overview

ACQ482ELF uses the same octal ADC subsystem used on the successful ACQ480FMC product, but provides a wider voltage range and differential input.

The product is intended to be used as an oversampling digitizer. Single, or 2 cascaded FIR digital filters provide tight control of bandwidth with strong anti-aliasing. Filtering includes both ADC based filters and FPGA based filtering in D-TACQ Carriers and covers many combinations. Please contact info@d-tacq.com for more information on this.

1.3 Applications

- Radar, Radio Reflectometry.
- High speed ultrasound and diagnostics.

1.4 Replaces

- ACQ216CPCI : 16 channels x 10MSPS, replaced by 1 modules.
- ACQ132CPCI : 32 channels x 2MSPS, replaced by 2 modules.

1.5 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.

As the ACQ482ELF is a dual site module this restricts the carrier compatibility, these 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

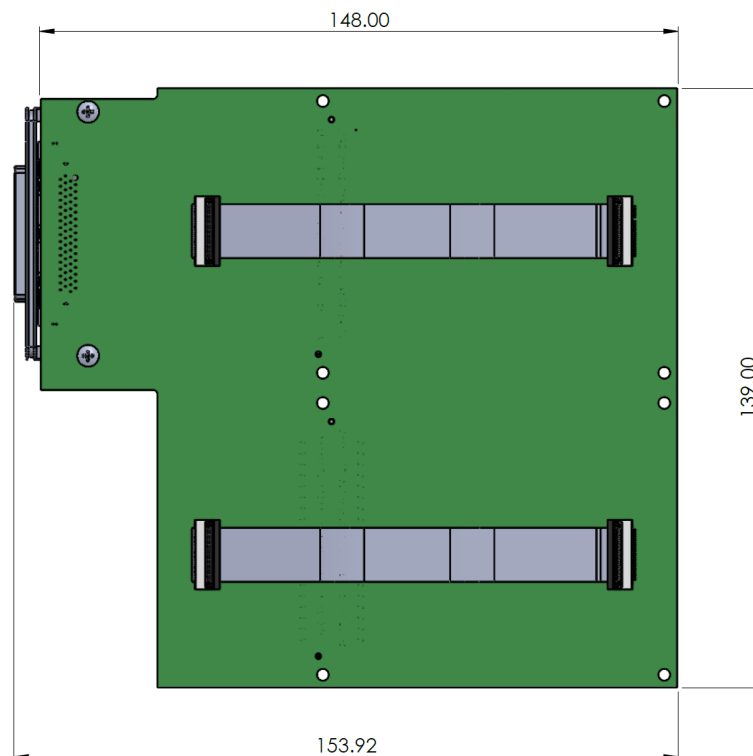


Figure 1: Module Outline

2.2 Appearance with VHDCI Connector

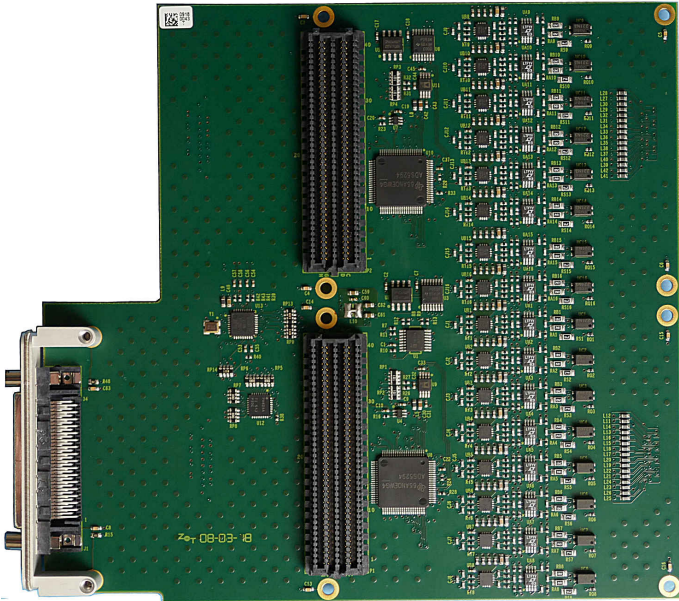


Figure 2: Module Photo

2.3 Front Panel Connectors

2.3.1 VHDCI

- 68 Pin VHDCI. Pinout compatible with D-TACQ BNCPANEL-S2, SMAPANEL-S2, BNCPANEL-16.
- For direct external cable to front panel.

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

Table 1: 16 Channel Voltage Input VHDCI Pinout

2.4 Single Pin LEMO Front Panel

The front panel configuration below shows a 48 channel configuration of 3 x ACQ482ELF configured for an ACQ2106 system in a 1U configuration.

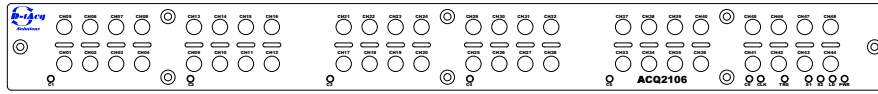


Figure 3: 48 channel Single Pin LEMO configuration

The Single Pin LEMO connectors have a standard centre +ve, shield -ve configuration.

2.5 Dual Pin LEMO Front Panel

The front panel configuration below shows a 48 channel configuration of 3 x ACQ482ELF configured for an ACQ2206 system in a 2U configuration.

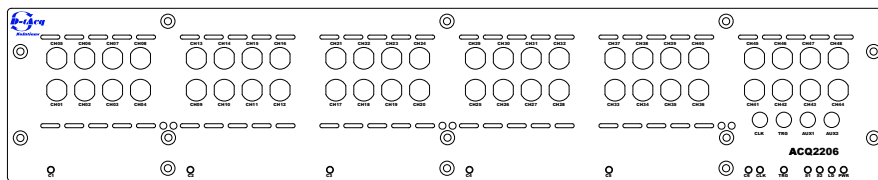


Figure 4: 48 channel Dual Pin LEMO configuration

The Dual Pin LEMO connectors have the pinout shown below:

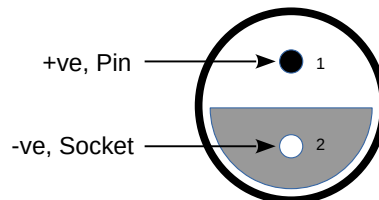


Figure 5: Dual Pin LEMO Pinout

Shell can be source grounded or ACQ2206 grounded, please contact info@d-tacq.com for details.

Other Front Panel Configurations are possible. For custom front panel, please contact info@d-tacq.com for details.

2.6 Example Configuration in Carrier

The example below shows the VHDCI version fitted to a ACQ2106 Carrier:

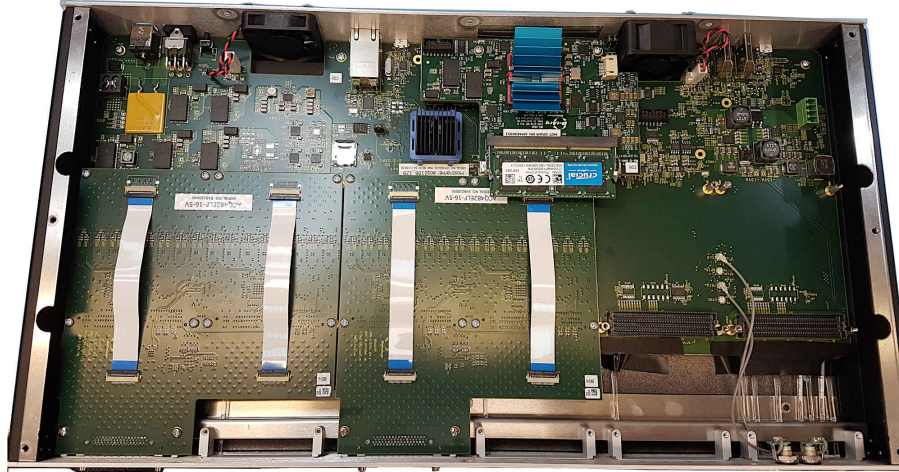


Figure 6: Example Fitted to ACQ2106 Carrier, 32 channels in 1U

3 Electrical Specification

#	Parameter	Value
1	Number of Channels	16
2	Sample Rate ¹	Up to 80 MHz, per channel simultaneous
3	Resolution	14-bit
4	Coupling	DC, Differential Input
5	Input Impedance	100 k Ω , 50 Ω - Software selectable
6	Input Voltage Range	± 10 V ± 5 V ± 2.5 V ± 1 V
7	Input Voltage Withstand	Up to ± 30 V on ± 10 V version
8	Offset Error	± 3 mV
9	Gain Error	± 2 mV
10	INL	± 2.2 LSB
11	DNL	± 0.5 LSB
12	THD	80 dBc
13	SINAD	71 dBc
14	SFDR	85 dBc
15	SNR	72 dB
16	CMRR ²	60 dB (80 dB)
17	Power BW	5 MHz @ 5 Vpp (± 10 V variant) 10 MHz @ 2 Vpp (± 5 V variant) 20 MHz @ 1 Vpp (-H variants)
18	Small Signal BW	20 MHz >20 MHz (-H variants)
19	Crosstalk	< 90 dB @ 100 kHz FS Input
20	Temperature Stability	< 25 ppm/ $^{\circ}$ C

¹ Max ADC Sampler Rate, decimating FIR filter reduces stored data rate. Please contact info@d-tacq.com for details

² On high CMRR version -F1

Table 2: ACQ482ELF Electrical Performance

4 Mechanical & Environmental Specification

#	Parameter	Value
1	Form Factor	Double width, double socket ELF
2	Power Consumption	D-TACQ ELF Module Please contact info@d-tacq.com for details.
3	Environmental	0 $^{\circ}$ C - 50 $^{\circ}$ C Operational -10 $^{\circ}$ C - 85 $^{\circ}$ C Non-Operational
4	Mezzanine Socket	ELF (ULPC)

Table 3: Mechanical & Environmental Specification

Revision History

Revision	Date	Author(s)	Description
6	February 2020	JMcL	Product Release Version
7	February 2025	JMcL	Updates for latest product variants



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