

ACQ437ELF Product Specification



High Performance Simultaneous Data Acquisition

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1 Product Description

1. *ACQ437ELF* is a 16 channel, 24 bit simultaneous analog input module with variable gain per channel.
2. Standard configuration : 16 channels, 128kSPS/channel.
3. Extended module with *ELF* connector and *ELF* front panel.
4. 2-wire Differential inputs, high quality differential amplifier front end with switched input voltage ranges.

1.1 Product Variants

- *ACQ437ELF* : 24 bit resolution, 128kSPS/channel, 16 channels, 4 ranges $\pm 1V$, $\pm 2V$, $\pm 5V$, $\pm 10V$
x1,x2,x5,x10 Gain Ranges
- *ACQ437ELF-HG* : 24 bit resolution, 128kSPS/channel, High Gain
16 channels, 4 ranges $\pm 0.01V$, $\pm 0.1V$, $\pm 1V$, $\pm 10V$
x1,x10,x100,x1000 Gain Ranges

1.2 Applications

- Instrumentation applications, control and monitoring.
- Wind tunnel turbulence modelling.
- Acoustic and seismic applications.

1.3 Overview

The *ELF* module standard, based on the same front panel and connector footprint at *FMC*, adds user IO to carrier modules fitted with *FPGA* resource. D-TACQ recommends modules based on the *Xilinx ZYNQ* system on chip, combining *FPGA* resource with a dual-core ARM Cortex A9 and gigabit Ethernet. Compatible modules include

- D-TACQ *ACQ1001* : D-TACQ single site *ELF* carrier, Z7020
- D-TACQ *ACQ1002* : D-TACQ dual site *ELF* carrier, Z7020
- D-TACQ *ACQ2106* : D-TACQ 6 site *ELF* carrier, Z7030

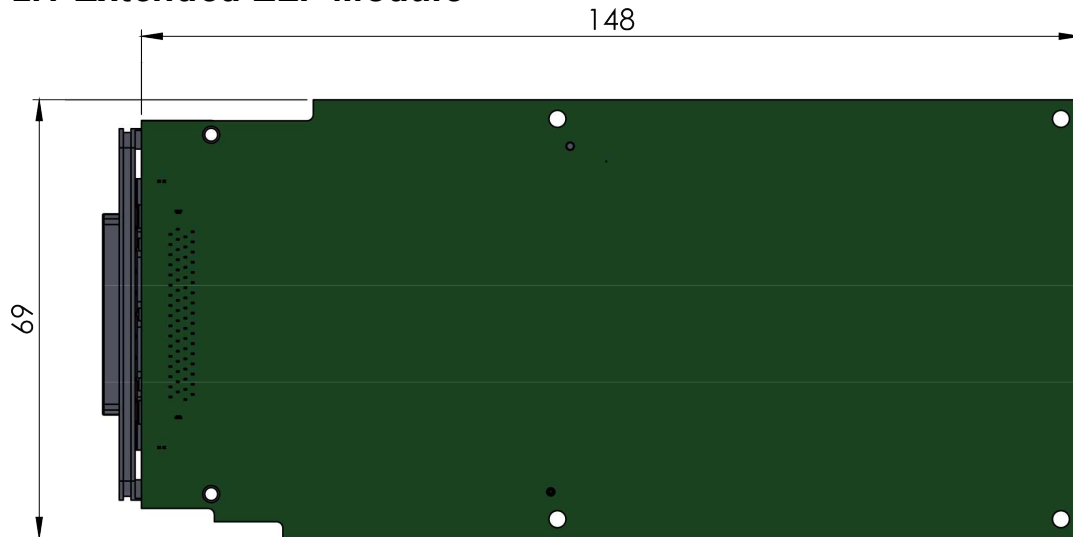
D-TACQ supplies a complete working “DAQ Appliance including programmable logic and microprocessor system running Linux.

1.4 Glossary

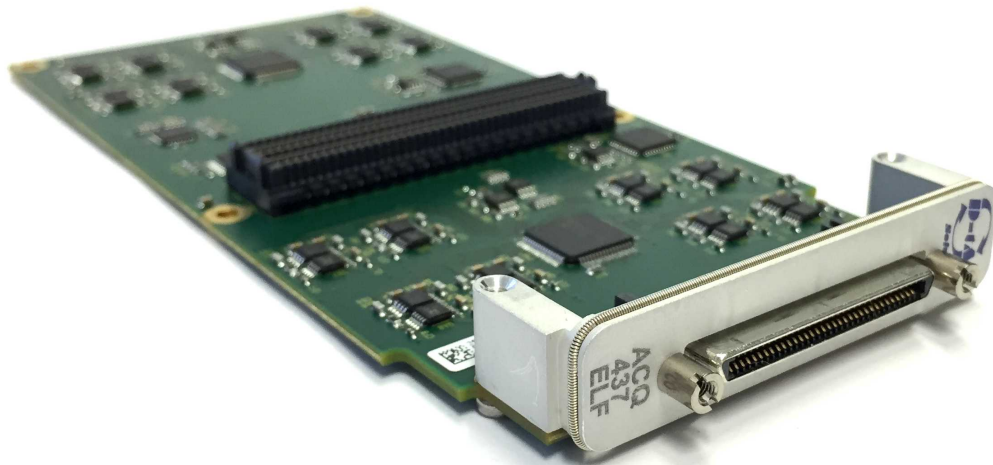
- FMC: [VITA57 FPGA Mezzanine Card](#).
- ELF: D-TACQ extension to FMC, elongated card with provision for dedicated analog power supply rails.
- [Xilinx ZYNQ Soc](#)
- LPC : FMC Low pin count wiring standard.
- ULPC: FMC/ELF Ultra low pin count (D-TACQ).

2 Physical

2.1 Extended ELF Module



2.2 Appearance



3 Interface Specification.

3.1 Front Panel Connector

- 68 Pin VHDCI
- Pinout compatible with D-TACQ BNCPANEL-S2, SMAPANEL-S2, LEMOPANEL-S2, PTBPANEL-S2, BNCPANEL-16.

3.2 16 Channel Pinout

| Pin No. | Signal | Pin No. | Signal |
|---------|---------------|---------|---------------|
| 1 | 0V | 35 | 0V |
| 2 | 0V | 36 | 0V |
| 3 | Analog In 1+ | 37 | Analog In 1- |
| 4 | 0V | 38 | 0V |
| 5 | Analog In 2+ | 39 | Analog In 2- |
| 6 | 0V | 40 | 0V |
| 7 | Analog In 3+ | 41 | Analog In 3- |
| 8 | 0V | 42 | 0V |
| 9 | Analog In 4+ | 43 | Analog In 4- |
| 10 | 0V | 44 | 0V |
| 11 | Analog In 5+ | 45 | Analog In 5- |
| 12 | 0V | 46 | 0V |
| 13 | Analog In 6+ | 47 | Analog In 6- |
| 14 | 0V | 48 | 0V |
| 15 | Analog In 7+ | 49 | Analog In 7- |
| 16 | 0V | 50 | 0V |
| 17 | Analog In 8+ | 51 | Analog In 8- |
| 18 | 0V | 52 | 0V |
| 19 | Analog In 9+ | 53 | Analog In 9- |
| 20 | 0V | 54 | 0V |
| 21 | Analog In 10+ | 55 | Analog In 10- |
| 22 | 0V | 56 | 0V |
| 23 | Analog In 11+ | 57 | Analog In 11- |
| 24 | 0V | 58 | 0V |
| 25 | Analog In 12+ | 59 | Analog In 12- |
| 26 | 0V | 60 | 0V |
| 27 | Analog In 13+ | 61 | Analog In 13- |
| 28 | 0V | 62 | 0V |
| 29 | Analog In 14+ | 63 | Analog In 14- |
| 30 | 0V | 64 | 0V |
| 31 | Analog In 15+ | 65 | Analog In 15- |
| 32 | 0V | 66 | 0V |
| 33 | Analog In 16+ | 67 | Analog In 16- |
| 34 | 0V | 68 | 0V |

4 ACQ437ELF Electrical Specification.

| # | Parameter | Value |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Number of Channels | 16 |
| 2 | Sample Rate High Speed Mode High Resolution Mode | Per channel simultaneous 128 kHz 52 kHz |
| 3 | Resolution | 24 bits |
| 4 | Coupling | DC, Differential Input |
| 5 | Input Impedance | 1M Ω |
| 6 | Standard Input Voltage Range High Gain Input Voltage Range | $\pm 1V, \pm 2V, \pm 5V, \pm 10V$ $\pm 0.01V, \pm 0.1V, \pm 1V, \pm 10V$ |
| 7 | Input Voltage Withstand | $\pm 30V$ Standard Version $\pm 20V$ HG Version |
| 8 | Offset Error | 0.01% FS with numerical calibration |
| 9 | Gain Error | 0.01% FS with numerical calibration |
| 10 | INL | $\pm 0.002\%$ FS |
| 11 | CMRR Standard Version HG Version $\pm 10V$ Range HG Version $\pm 0.01V$ Range | $>100dB$ FS @ 60 Hz (Typical) $>80dB$ FS @ 50 kHz $>100dB$ FS @ 60 Hz (Typical) $>80dB$ FS @ 20 kHz $>120dB$ FS @ 60 Hz (Typical) $>100dB$ FS @ 20 kHz |
| 12 | THD | -106 dB ¹ |
| 13 | SFDR | 107 dBc ¹ |
| 14 | SNR Standard Version Gain 1 $\pm 10V$ Gain 2 $\pm 5V$ Gain 5 $\pm 2V$ Gain 10 $\pm 1V$ HG Version Gain 1 $\pm 10V$ Gain 10 $\pm 1V$ Gain 100 $\pm 0.1V$ Gain 1000 $\pm 0.01V$ | 108 dB ¹ 107 dB ² 105 dB ² 102 dB ² 108 dB ¹ 106 dB ² 98 dB ² 79 dB ² |
| 15 | Analog Input BW full | 80kHz all ranges on standard |

| | | |
|----|--------------------------|----------------------------------------------------------------------------|
| | scale | input range Limited to 30 kHz on x1000 (±0.01V) range on -HG version |
| 16 | Crosstalk | <90dB @ 1kHz FS Input |
| 17 | Digital Filter:Pass Band | 0.453 Fsample |
| | Digital Filter:3dB | 0.490 Fsample |
| | Digital Filter:Stop Band | 0.547 Fsample |
| | Digital Filter:Attenuate | 95 dB |
| 19 | Gain range control | Per channel, software control |

¹ Typical values measured at full scale on ±10V range with a 9.76kHz input

² Projected Typical values with measured gain noise increase

5 ACQ437ELF 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 | ELF Socket | Standard ELF D-TACQ Ultra Low Pin Count ULPC |