

ACQ427ELF Advance Product Specification



High Performance Simultaneous Data Acquisition

Preliminary Product Information

Subject to Change

CONFIDENTIAL

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1 Product Description

1. **ACQ427ELF** is a 8 channel simultaneous Analog Input module, with 4 simultaneous Analog Outputs.
2. Standard configuration :
 - ACQ427ELF-03-10000-16:
 1. 8 AI channels, 1000kSPS/16 bit,
 2. 4 AO channels, 1000kSPS/16 bit.
 - ACQ427ELF-02-1000-16
 1. 4 AI channels, 1000kSPS/16bit.
 2. 4 AO channels, 1000kSPS/16bit
 - ACQ427ELF-01-1000-16
 1. 8 AI channels, 1000kSPS/16 bit.
 2. 0 AO channels.
3. Extended module with *FMC* connector and *FMC* front panel.
4. 2-wire Differential inputs, high quality instrument amplifier front end with switched input voltage ranges.
5. Front panel connector: 4 x Single Pin Lemo, SPL floating shell.
6. Additional channel connectors: 4 x SPL, floating shell, “TOPDECK”

1.1 Product Variants

- **ACQ427ELF-0[123]-1000-16** : AI: 1000kSPS/channel, 16 bit
- **ACQ427ELF-0[123]-2000-16** : AI: 2000kSPS/channel, 16 bit
- **ACQ427ELF-0[123]-1000-18** : AI: 1000kSPS/channel, 18 bit

In all cases, AO is specified as 16 bit, 1000kSPS.

1.2 Applications

- Instrumentation applications, control and monitoring.

1.3 Overview

The *ELF* module standard 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 slot *FMC* carrier, Z7020, up to 12 SPL
- D-TACQ **ACQ2106** : D-TACQ 6 site *ELF* carrier, Z7030 : 8 SPL per site.
- KMCUZ30: Micro TCA, 2 site *ELF* carrier, Z7030: 4 SPL per site
- Panda : 1U x 19” box, Z7030, single TOPDECK: 8 SPL

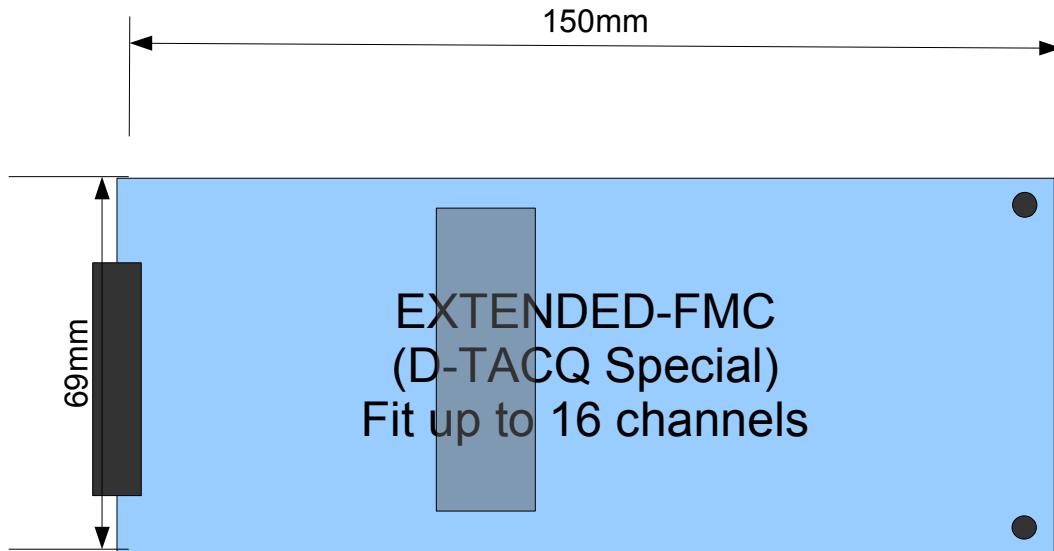
D-TACQ supplies a complete working Intelligent Digitizer appliance including programmable logic and microprocessor system running Linux.

1.4 Glossary

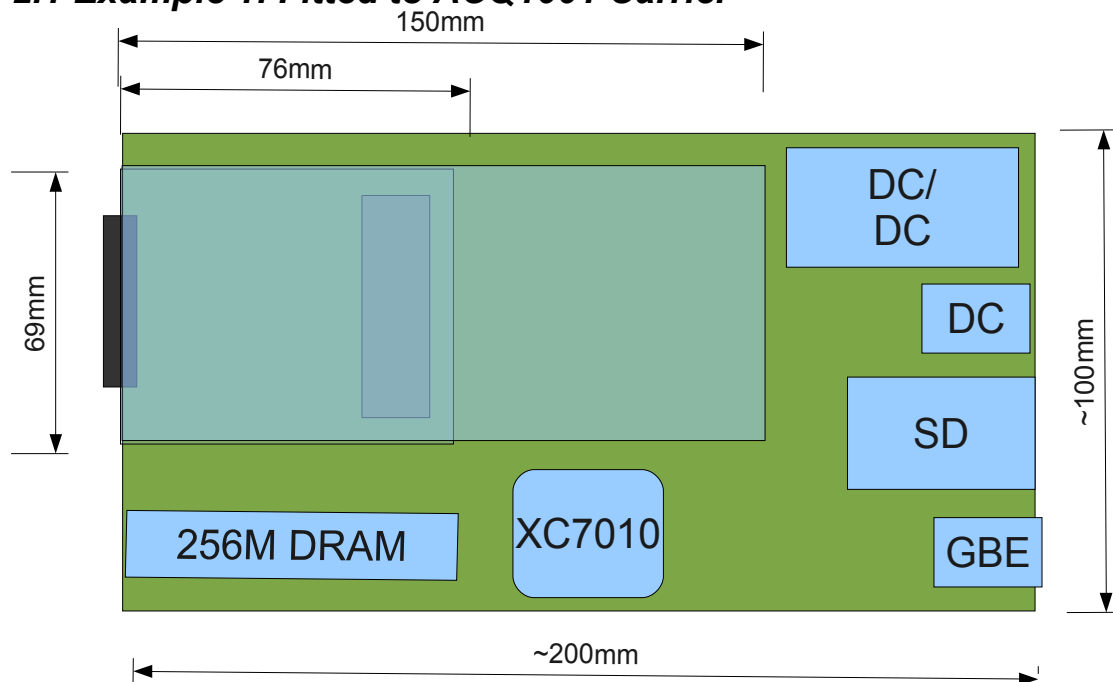
- *FMC*: [VITA57 FPGA Mezzanine Card](#).
- [Xilinx ZYNQ System-on-chip](#).
- *LPC* : *FMC* Low pin count wiring standard.
- *ULPC*: *FMC* Ultra low pin count (D-TACQ).
- Extended, E : *FMC* Extended size module (D-TACQ).

2 Physical

Extended FMC Module



2.1 Example 1: Fitted to ACQ1001 Carrier



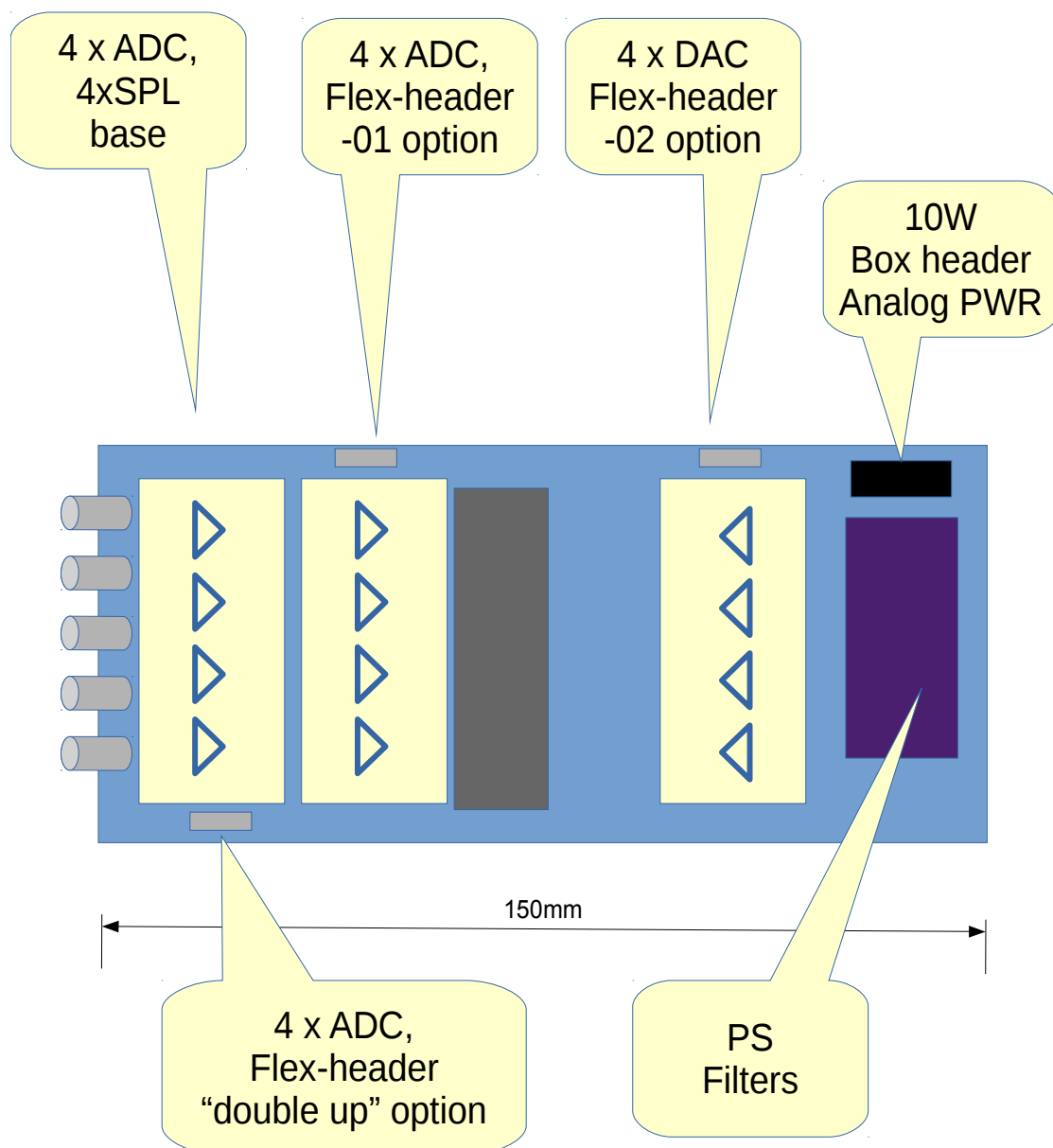
Carrier fits 1 x standard FMC eg *ACQ420FMC* or or an extended size module eg *ACQ427ELF*

3 ACQ427ELF Interface Specification.

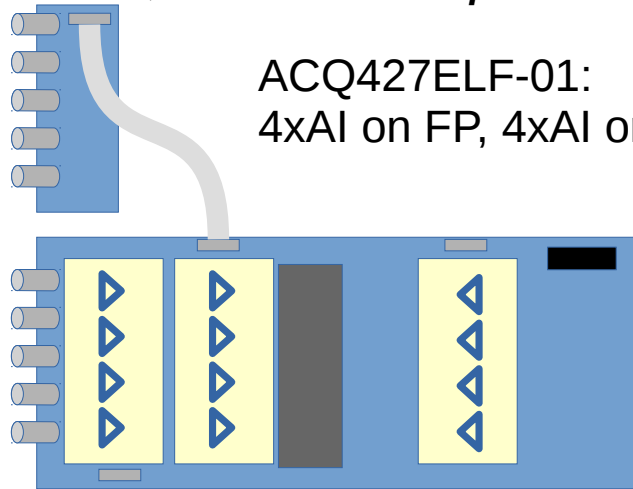
3.1 Front Panel Connector

- 4 x SPL
- Additional 4 x SPL on TOPDECK
- Channels 9..12 may accommodated on a second TOPDECK, where available (ACQ1001, ACQ2106)

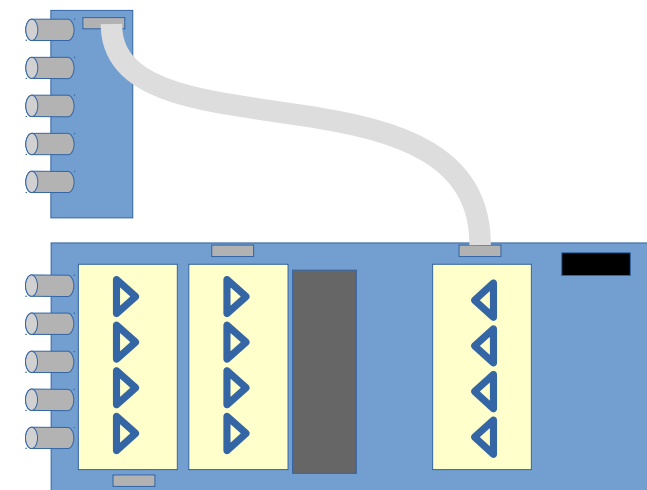
3.2 Component Placement



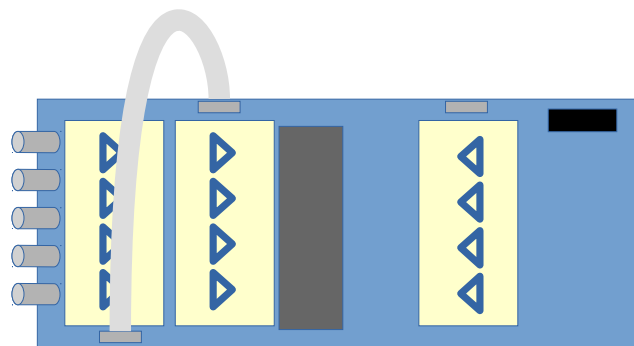
3.3 ACQ427 Front Panel Options



ACQ427ELF-01:
4xAI on FP, 4xAI on TOPDECK



ACQ427ELF-02:
4xAI on FP, 4xAO
on TOPDECK



ACQ427ELF
4xAI on FP, double up for
higher resolution.

Assume 2MSPS, 16 bit
ADC

* 2x oversampling in time:
1MSPS + 0.5 bit

* Average on 2 channels:
+0.5bit

=> Get the performance of
the -18 bit ADC using with
the standard 8 x 2MSPS
configuration.

4 ACQ427ELF AI Electrical Specification.

#	Parameter	Value
1	Number of Channels	16
2	Sample Rate	up to 2000 kHz, per channel simultaneous
3	Resolution	16 [18] bits
4	Coupling	DC, Differential Input
5	Input Impedance	100K
6	Input Voltage Range	±10, ±5, ±2.5, ±1.25 V software selectable ranges. High Gain Option, 4 ranges: 0, 20, 40, 60 dB
7	Input Voltage Withstand	±30V
8	Offset Error	0.01% FS
9	Gain Error	0.01% FS
10	INL	±2 LSB
11	DNL	±1 LSB
12	CMRR	>80dB FS @ 1 kHz
13	THD	-95 dB
14	SINAD	-88 dB*
15	SFDR	100 dBc*
16	SNR	90 dB* * Typical values measured at full scale with a 9.76kHz input
17	Full Power BW	1 MHz
18	Small Signal BW	2 MHz
	Crosstalk	<90 dB @ 1 kHz FS Input
	Temperature Stability	<25 ppm/C

5 ACQ427ELF AO Electrical Specification

#	Parameter	Value
1	Number of Channels	4
2	Sample Rate	Up to 1000 kHz, per channel simultaneous
3	Resolution	16 bits
4	Coupling	DC, Differential Input
5	Maximum output current	20mA
6	Output Voltage Range	±10 V
7	Output Impedance	10Ω
8	Offset Error	0.01% FS
9	Gain Error	0.1% FS
10	INL	±2 LSB
11	DNL	±1 LSB
12	CMR	TBD
13	THD	Better than 80dB
14	SINAD	74 dBc
15	SFDR	85 dBc
16	SNR	72 dB
17	Full Power BW	1 MHz
18	Small Signal BW	2 MHz
	Crosstalk	<80 dB @ 1 kHz FS Input
	Temperature Stability	<25 ppm/C