

ACQ482ELF Product Specification



High Performance Simultaneous Data Acquisition

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1 Product Description

1. *ACQ482FMC* is an 16 channel simultaneous analog input module.
2. Oversampling ADC to 80MSPS/channel.
3. Differential front end, input voltage range to +/-10V,
4. Input bandwidth to 10MHz, higher for reduced voltage inputs.
5. Compatible with D-TACQ *ELF* sites on ACQ2106.
6. Input connector choices “Flex Front Panel”:
 1. 4 x RJ45, 4 x 4 shielded twisted pairs.
 - (ACQ2106 BLF carrier, BW < 2MHz).
 2. 1 x VHDCI, 16 pairs, alternate grounds:
 - recommend BW < 2MHz.
 3. 16 x SPL. “Single Pin Lemo” (LEMO-00).
 4. 16 x DPL “Dual Pin Lemo” (LEMO-01)
 5. Other input connectors possible: ask D-TACQ for details
7. Module is DOUBLE WIDTH and needs two sites.

1.1 Product Variants

- *ACQ482ELF-16-4V-H* : 14 bit resolution, +/-4V input voltage range.
- *ACQ482ELF-16-2V5-H* : 14 bit resolution, +/-2.5V input voltage range.
- *ACQ482ELF-16-1V-H* : 14 bit resolution, +/-1V input voltage range.
 - H: High Bandwidth.
- Special build due to component obsolescence:
 - *ACQ482ELF-16-10* : 14 bit resolution, +/-10V input voltage range
 - *ACQ482ELF-16-5* : 14 bit resolution, +/-5V input voltage range
- Special build with special component choice at extra cost:
 - *ACQ482ELF-16-2V5-F1* : 14 bit resolution, +/-2.5V input voltage range.
 - F1: High CMRR Version.

1.2 Applications

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

1.3 Replaces

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

1.4 Overview

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

Examples:

#	ISR	OSR	BW	FIR Filter		Comment
	Mhz	Mhz	Mhz	Dec	Taps	
1	80	20	10	/4	24	1 module replaces 1 x ACQ216
2	80	10	5	/8	24	1 module replaces ACQ132
3	80	5	2.5	/4,/4	24,64	2 modules replace 2 x ACQ132
4	80	2		1	/4,/10	24,64

1.5 System Configurations

#	Config	Ch	Max	Max	Duration (s)		Stream
			OSR	Data Rate	Z-DRAM	MGT-DRAM	
			MHz	MB/s			
1	ACQ2106+1xACQ482ELF	16	20	640	1	12.5	2
2	ACQ2106+2xACQ482ELF	32	10	640	1	12.5	2
3	ACQ2106+3xACQ482ELF	48	10	960	0.7	10.0	2

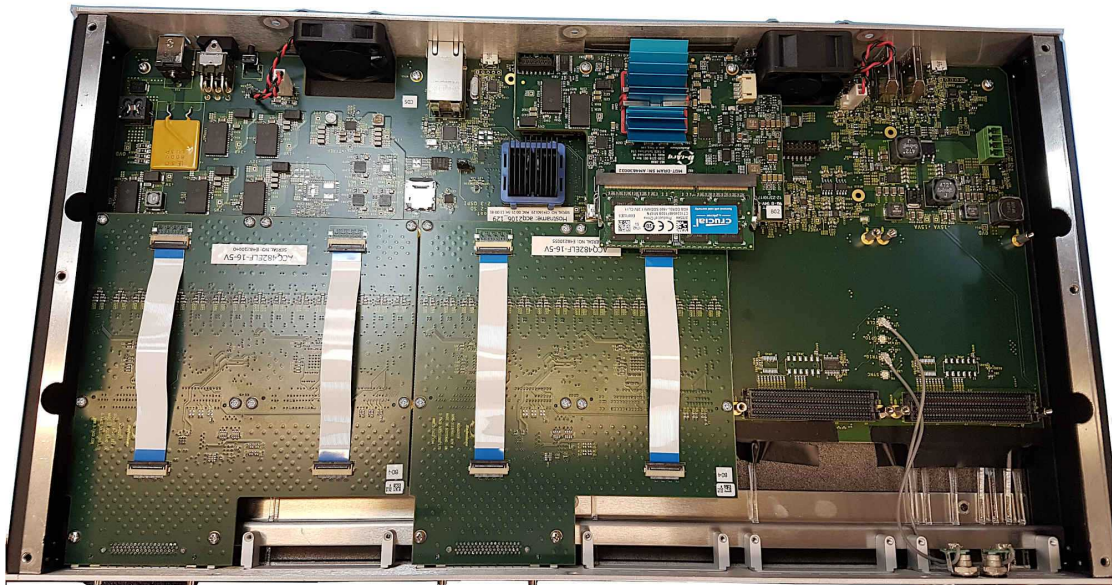
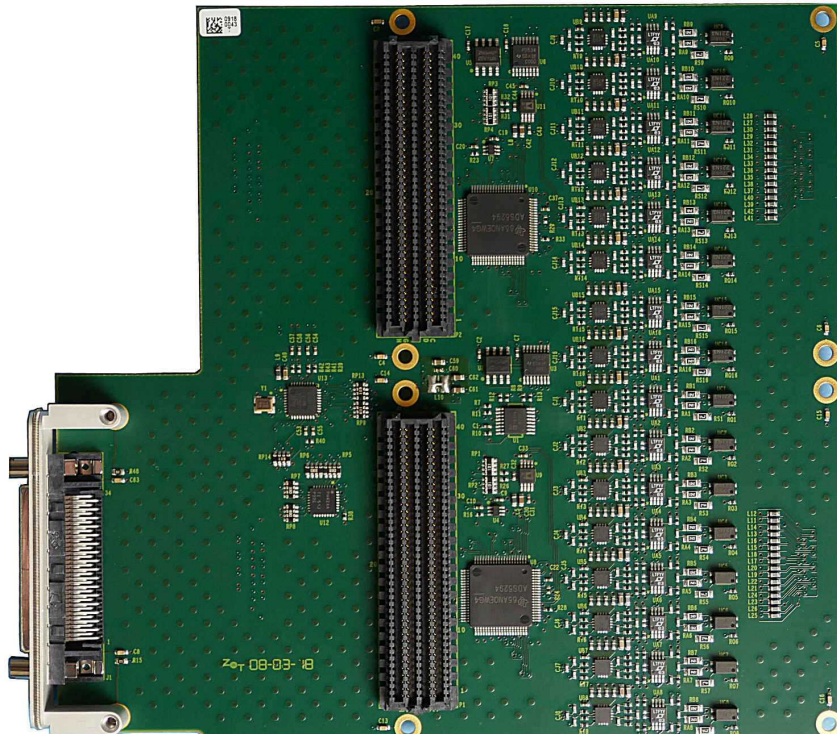
#	Config	Ch	Typ	Typ Data	Duration (s)		Stream
			OSR	Rate	Z-DRAM	MGT-DRAM	
			MHz	MB/s			
1	ACQ2106+1xACQ482ELF	16	10	320	2	25	1
2	ACQ2106+2xACQ482ELF	32	5	320	2	25	1
3	ACQ2106+3xACQ482ELF	48	2	192	3.3	42	1

- Z-DRAM : ZYNQ DRAM, 640MB for data
- MGT-DRAM : MGT-DRAM-8, 8GB for data
- SFP : number of SFP links to stream data.

1.6 Glossary

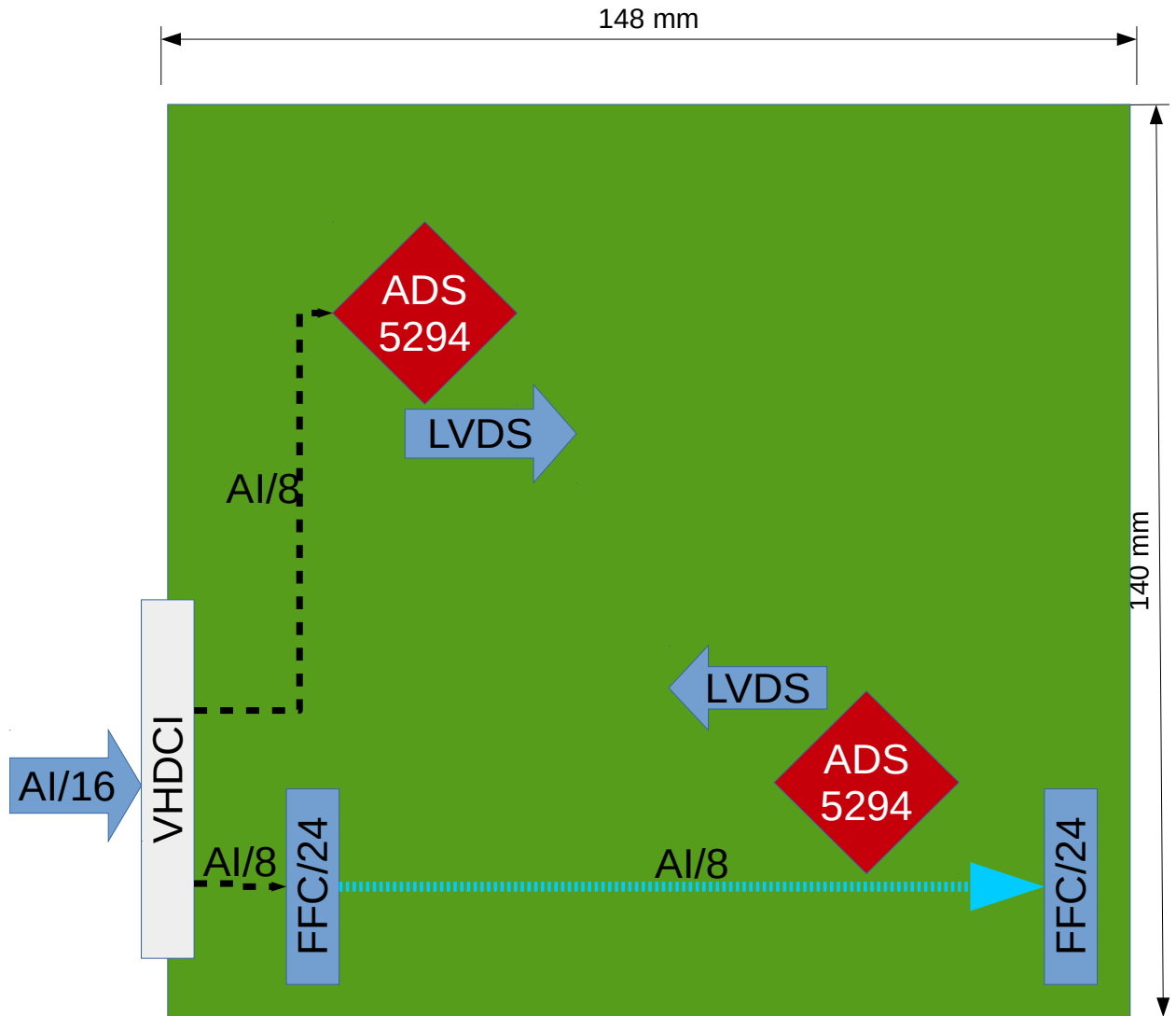
- *FMC*: [VITA57 FPGA Mezzanine Card](#).
- *ELF*: Extended D-TACQ module based on FMC
- [Xilinx ZYNQ Soc](#)
- *FPGA* : Field Programmable Gate Array.
- *FIR*: Finite Impulse Response digital filter.
- *ISR*: Input Sample Rate.
- *OSR*: Output Sample Rate.
- *BW*: input bandwidth.

2 Physical



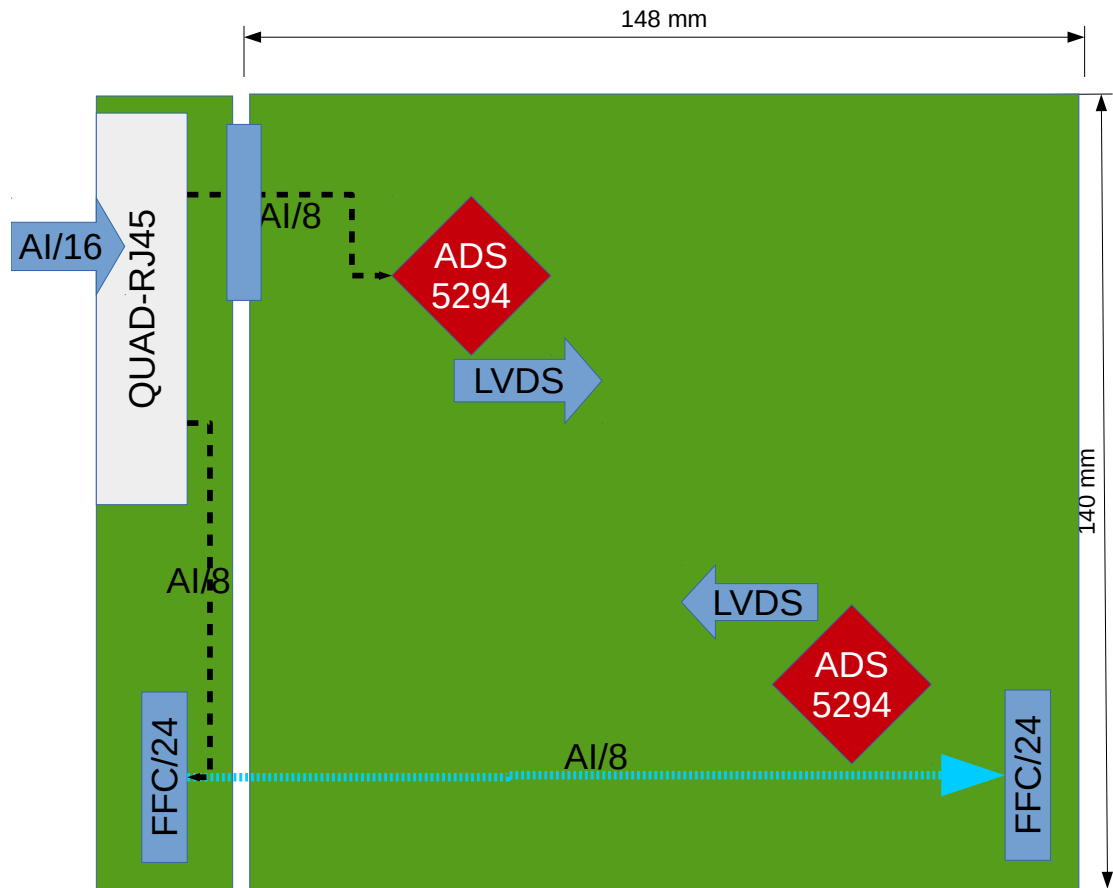
2.1 VHDCI

Fits Standard ACQ2106 enclosure, max 3 units, 48 channels.



2.2 Quad RJ45

Fits ACQ2106-BLF enclosure. Suitable for signal b/w < 2MHz ONLY.



3 Interface Specification

3.1 Frontpanels

3.1.1 RJ45 Pinout

Quad RJ45 connector

Pinout matches ACQ425BLF.

Compatible with Ethernet RJ45 cables, Cat6 STP recommended.

Pin	Ethernet Function	ACQ482ELF Function			
		P1	P2	P3	P4
1	Bi-directional pair A +	CH01P	CH05P	CH09P	CH13P
2	Bi-directional pair A -	CH01N	CH05N	CH09N	CH13N
3	Bi-directional pair B +	CH02P	CH06P	CH10P	CH14P
4	Bi-directional pair C +	CH03P	CH07P	CH11P	CH15P
5	Bi-directional pair C -	CH03N	CH07N	CH11N	CH15N
6	Bi-directional pair B -	CH02N	CH06N	CH10N	CH14N
7	Bi-directional pair D +	CH04P	CH08P	CH12P	CH16P
8	Bi-directional pair D -	CH04N	CH08N	CH12N	CH16N

3.1.2 VHDCI

Double-space pinout matches ACQ425ELF, ACQ132CPCI

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

3.1.3 Lemo-00

One floating LEMO connector per channel, IN- connected to shell. Recommend twisted pair cabling on the LEMO cable.

4 ACQ482ELF Electrical Specification.

#	Parameter	Value
1	Number of Channels	16
2	Sample Rate	80 MSPS per channel simultaneous †1
3	Resolution	14 bits
4	Coupling	DC, Differential Input
5	Input Impedance	100k Ω , [50 Ω option]
6	Input Voltage Range	$\pm 10V$, $\pm 5V$, $\pm 2.5V$, $\pm 1V$
7	Input Voltage Withstand	$\pm 30V$
8	Offset Error	± 3 mV
9	Gain Error	± 2 mV
10	INL	± 2.2 LSB typical
11	DNL	± 0.5 LSB typical
12	THD	TBD
13	SINAD	71 dB typical
14	SFDR	85 dBc typical
15	SNR	72 dB typical
16	CMRR	60 dB (80dB †2)
17	Full Power BW	5 MHz @ 5Vpp ($\pm 10V$ variant) 10 MHz @ 2Vpp ($\pm 5V$ variant) > 30MHz @ 1Vpp (1V-H variant †3) > 10MHz @ 2.5Vpp (2V5-H variant †3)
18	Small Signal BW	20 MHz > 20MHz @ 1Vpp (-H variant †3)
19	Crosstalk	<90 dB @ 100 kHz FS Input 1 MHz 5 MHz
20	Temperature Stability	<25 ppm/C
21	Formfactor	Double width, double socket ELF

- †1 : With ADC decimating FIR filter engaged.
- †2: -F1 variant.
- †3: Carrier analog rails set +/-5V.