DIO482FMC

32 Channel Digital Input/Output Module

Product Description

- 32 Channels of Simultaneous Digital I/Os
- Standard configuration: 32 channels with an update rate of up to 30MSPS/channel
- Byte-wide direction control
- TTL Single-ended I/O on VHDCI connector

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
- Fully compliant with VITA-57, FMC-LPC
- Immediate (asynchronous) or Clocked (synchronous) update modes
- Operates as part of a Timing Generator Appliance (TIGA) for complex timing pulses see see D-TACQ TIGA User Guide
- Compatible with a range of D-TACQ Breakout Panels and Termination Modules
- Internal UFL 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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Table Of Contents

1 Product Description

1. The DIO482FMC is a 32 channel simultaneous digital input/output module.
2. Standard configuration: 32 channels with an update rate of up to 30MSPS/channel.
3. Byte-wide direction control for flexible DI/DO allocation.
4. FMC module using LPC connector, Single-ended I/O on VHDCI connector.
5. Immediate (asynchronous) or Clocked (synchronous) update modes including waveform generation.

1.1 Product Variants

- DIO482FMC 32 channels, FMC compliant
- DIO482ELF 32 channels, D-TACQ ELF compliant
- DIO482ELF-PG 6 channels TIGA , D-TACQ ELF compliant
- DIO482FMC-16-FBR 16 channels, FMC Compliant for use with HFBRPANEL-16 see Rackmount Termination Panels

1.2 Applications

- High speed control and diagnostics.
- General Purpose Digital I/O.
- Pulse and clock generation

1.3 Carrier Compatibility

An FMC 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 ARM CPU and Gigabit Ethernet see Module Carriers.

The ELF module standard is a D-TACQ standard and is compatible with only D-TACQ Carriers.

Compatible carriers include:

- D-TACQ ACQ1001 : D-TACQ single site FMC/ELF carrier, ZYNQ Z7020
- D-TACQ ACQ1002 : D-TACQ dual site FMC/ELF carrier, ZYNQ Z7020
- 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
- Quantum Detectors PandABox, ZYNQ 7030 with single ELF site. Please contact info@d-tacq.com for details

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

2 Physical

2.1 Module Outline

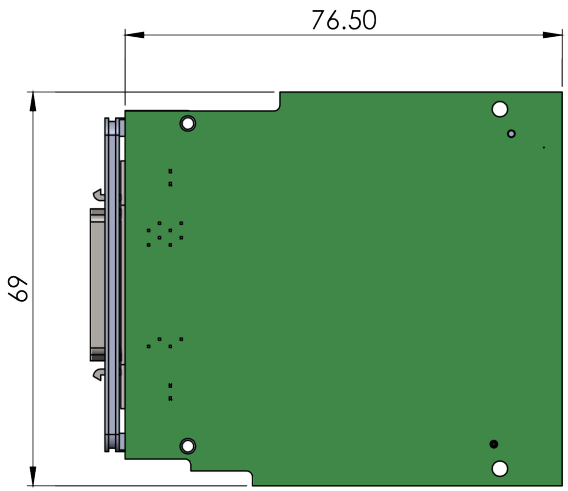

Figure 1: Module Outline

2.2 Appearance

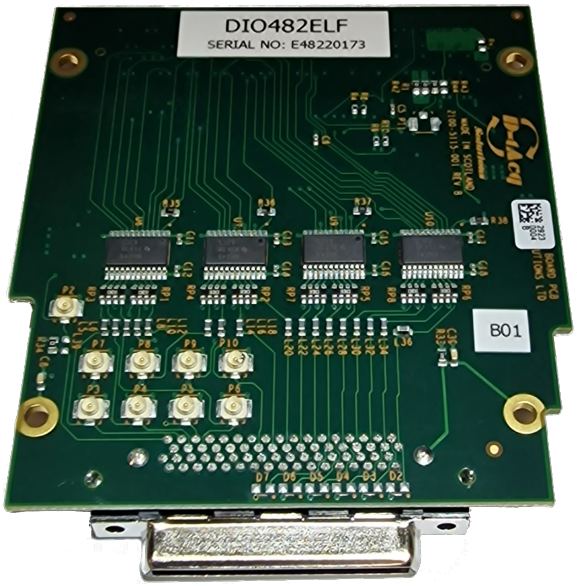

Figure 2: Module Appearance

2.3 Front Panel Connectors

2.3.1 VHDCI

- 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 / Clock Input (build option)*	35	0V
2	0V	36	0V
3	Digital I/O Channel 1	37	0V
4	Digital I/O Channel 2	38	0V
5	Digital I/O Channel 3	39	0V
6	Digital I/O Channel 4	40	0V
7	Digital I/O Channel 5	41	0V
8	Digital I/O Channel 6	42	0V
9	Digital I/O Channel 7	43	0V
10	Digital I/O Channel 8	44	0V
11	Digital I/O Channel 9	45	0V
12	Digital I/O Channel 10	46	0V
13	Digital I/O Channel 11	47	0V
14	Digital I/O Channel 12	48	0V
15	Digital I/O Channel 13	49	0V
16	Digital I/O Channel 14	50	0V
17	Digital I/O Channel 15	51	0V
18	Digital I/O Channel 16	52	0V
19	Digital I/O Channel 17	53	0V
20	Digital I/O Channel 18	54	0V
21	Digital I/O Channel 19	55	0V
22	Digital I/O Channel 20	56	0V
23	Digital I/O Channel 21	57	0V
24	Digital I/O Channel 22	58	0V
25	Digital I/O Channel 23	59	0V
26	Digital I/O Channel 24	60	0V
27	Digital I/O Channel 25	61	0V
28	Digital I/O Channel 26	62	0V
29	Digital I/O Channel 27	63	0V
30	Digital I/O Channel 28	64	0V
31	Digital I/O Channel 29	65	0V
32	Digital I/O Channel 30	66	0V
33	Digital I/O Channel 31	67	0V
34	Digital I/O Channel 32	68	0V

Table 1: Front Panel VHDCI Connector Pinout

* Special Build Option, please contact info@d-tacq.com for details.

3 Electrical Specification

#	Parameter	Value
1	Number of Channels	32
2	Update Rate	32 I/Os up to 30MSPS [1] 16 I/Os up to 50MSPS [1]
3	I/O Voltage Range	5V TTL
4	High-level input voltage	> 3.5V
5	Low-level input voltage	< 1.5V
6	Input Voltage Withstand	-0.5 to 6.5V
7	Output Current High	-32mA, -100mA max per 8 I/Os [2]
8	Output Current Low	32mA, 100mA max per 8 I/Os [2]
9	Output Voltage High	> 3.8V
10	Output Voltage Low	< 0.55V

[1] Recommended maximum update is dependent on number of I/Os used.
[2] I/Os are arranged in banks of 8, the current limitation refers to 8 I/Os on the same device

Table 2: DIO482FMC Electrical Performance

4 Mechanical & Environmental Specification

#	Parameter	Value
1	Form Factor	Standard FMC
2	Power Source	DC 12V, Typical 200 mA DC 3.3V, Typical 100 mA
3	Supported VADJ	Min 1.8V, Max 3.3V
4	Environmental	0 °C - 50 °C Operational −10 °C - 85 °C Non-Operational
5	Mezzanine Socket	Standard FMC or ULPC ELF

Table 3: Mechanical & Environmental Specification

Revision History

Revision	Date	Author(s)	Description
3	September 2021	JMcL	Last Release of Previous Format, Added FMC Design Details
4	February 2025	JMcL	Updated carrier support