



## Hardware Installation Guide

### ACQ2006

### 6-Site D-TACQ ELF/FMC Carrier

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## 1 Overview

ACQ2006 is a 1U, 19" rack-mountable carrier designed to accommodate up to six D-TACQ ELF<sup>1</sup> or FMC<sup>2</sup> modules, allowing up to 192 simultaneous analogue data acquisition channels in one enclosure. The system uses a Xilinx Zynq-7000 All Programmable SoC Z-7020 running Linux. Connectivity is provided by gigabit Ethernet or USB 2.0, with expansion options through a PMOD connector. External Clock and Trigger inputs are also provided.

Please note the ACQ2006 is not recommended for use with third-party FMC modules.

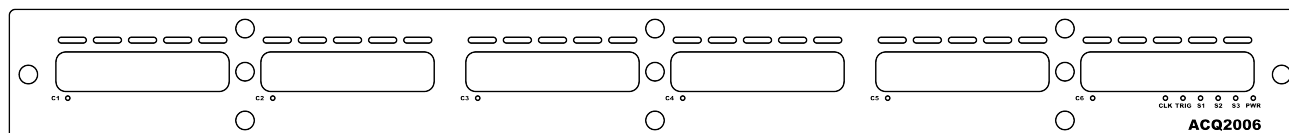
## 2 Variations

ACQ2006 comes in two standard configurations.

<b>Product Name</b>	<b>Description</b>
ACQ2006-EU	Connectivity via a single gigabit Ethernet port and USB 2.0.
ACQ2006-EE	Connectivity via dual gigabit Ethernet ports.

Analogue voltage is set to  $\pm 15V$  as standard, but please contact D-TACQ for alternatives.

## 3 Front Panel



Drawing 1: ACQ2006 Front Panel

### 3.1 D-TACQ ELF/FMC Sites

ACQ2006 has space for six D-TACQ ELF/FMC modules. Please note the sites are not recommended for third-party FMC modules. Please contact D-TACQ for details on our range of modular data acquisition cards, and see section 5 for details on field replacement.

### 3.2 LEDs

Upon power-up, the PWR LED should light, followed 20s later by S3 to indicate loading of the FPGA. When Linux boots, an LED test sequence will be shown, showing red and green on each LED.

<b>LED</b>	<b>Description</b>	
C1-C6	Red	Card present, invalid configuration. Analogue Power disabled if any card is invalid.
	Green	Card present, valid configuration. Analogue power enabled if all cards are valid.
CLK	Red	Unused at present.
	Green	Lit when a valid clock signal is in use.
TRIG	Red	Unused at present.
	Green	Lit when a valid trigger signal is being received on the rear panel connector.

1 ELF – D-TACQ Mechanical Superset of FMC Standard

2 FMC – FPGA Mezzanine Card, ANSI/VITA 57.1

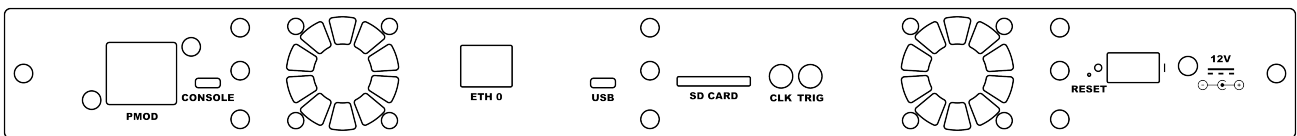
<b>LED</b>	<b>Description</b>	
S1	Red	Unused at present. Available for user use.
	Green	Unused at present. Available for user use.
S2	Green	Heartbeat – flashes to indicate Linux activity.
S3	Green	Lights approximately 20s after power-up to indicate FPGA loaded. If unlit after this, check the validity of the SD card image or check the Console for error messages.
PWR	Green	Lit when digital power supplies are all valid.

### 3.3 Air Inlets

The row of slots above the module front panel sites allow air to enter ACQ2006, drawn across the cards by the rear fans. Do not cover the air inlets.

## 4 Rear Panel

From left to right, the ACQ2006 rear panel is shown below.



Drawing 2: ACQ2006 Rear Panel

### 4.1 PMOD

A removable cover is given to allow custom PMOD boards to be used to extend the functionality of ACQ2006. For example, customers use a GPS module to provide a synchronisation signal.

### 4.2 Console

ACQ2006 uses an FTDI FT232 USB-Serial converter for console access via a Micro USB port. Please see the FTDI website for drivers. Serial Console settings are as follows.

<b>Name</b>	<b>Setting</b>
Baud Rate	115200
Data Bits	8
Parity	No
Stop Bits	1
Flow Control	None

### 4.3 Ethernet

Single (ACQ2006-EU) or dual (ACQ2006-EE configuration only) gigabit Ethernet ports accept standard RJ45 connectors.

#### **4.4 USB**

ACQ2006-EU contains a USB 2.0 OTG port capable of being a host or a standard device, allowing use of external storage, for example. To allow both configurations, ACQ2006 contains a USB port of type micro-AB, accepting either micro-A or micro-B connectors.

#### **4.5 SD Card**

This contains the Linux boot image for the onboard Xilinx Zynq-7000 All Programmable SoC Z-7020. Please contact D-TACQ if more information is required.

#### **4.6 Clock**

ACQ2006 accepts a clock signal via a centre-positive single-pin LEMO 00 Series Mini Coax connector (part EPL.00.250.NTN). Mating plugs should be compatible with this part.

It is common practice for customers to manufacture their own cables to fit in with their own requirements.

#### **4.7 Trigger**

ACQ2006 accepts a trigger signal via a centre-positive single-pin LEMO 00 Series Mini Coax connector (part EPL.00.250.NTN). Mating plugs should be compatible with this part.

It is common practice for customers to manufacture their own cables to fit in with their own requirements.

#### **4.8 Reset**

Use a paper clip or pin to push the reset button if required.

#### **4.9 Power**

Power is provided to ACQ2006 by an external 12V regulated DC supply capable of outputting approximately 80W. A rocker switch allows ACQ2006 to be powered on or off.

The socket accepts a standard DC barrel connector, centre-positive, 2.5mm internal diameter, 5.5mm external diameter, with length a minimum of 10.5mm.

The power supply's input Earth should be connected to the output 0VD.

#### **4.10 Fans**

Fan outlets help keep ACQ2006 cool, drawing air across the modules from front to back. Do not cover the fan outlets.

### **5 D-TACQ ELF/FMC Card Replacement**

The modular ELF or FMC cards may be replaced by the user. Contact D-TACQ for more detailed instructions.

#### **Warning!**

Third-party cards may not be compatible with the D-TACQ mechanical superset of the FMC specification and undesired effects may occur. ACQ2006 includes power rails on the mezzanine connectors for D-TACQ ELF cards and therefore only uses certain pins for FPGA connections.

Please contact D-TACQ to check compatibility if you wish to use third-party FMC cards with ACQ2006. A better option may be to use ACQ1001Q-FMC (single-site carrier), ACQ1002R-FMC or ACQ1002S-FMC (both dual-site: 1x FMC, 1x ELF) which are all fully compliant with the FMC standard.

ACQ2006 is a complex electronic assembly. Special care should be taken in handling. The cards are susceptible to damage by ESD and improper power connections or FPGA configurations.

1. Ensure ESD precautions (chassis and body grounding) are taken before and during the opening of the case.
2. Please be extremely careful to ensure correct card alignment when plugging in the cards to avoid mezzanine card pin damage.

### 5.1 Case Opening

1. Remove the 12 screws which hold on the lid.
2. Turn the case over and remove the 7 screws which hold on the bottom screw cover.
3. On Rev 1 cases, loosen the 5 remaining screws which hold on the front panel.

### 5.2 Mezzanine Card Removal

1. Remove the 2 screws on the underside at the front. The two on the top at the front may be left attached.
2. Remove the 2 screws on top at the rear of the card. Remove the 2 screws in the centre of D-TACQ Extended Length cards.
3. Carefully lift the card away from the mezzanine connector. Note that not a lot of force is required to do this and the card should not bend.
4. Jog the card out from the front panel.

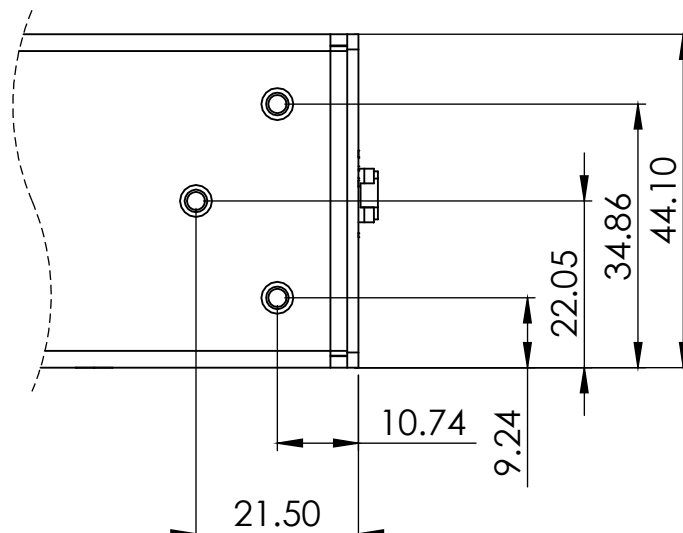
### 5.3 Card replacement and Case Closing

1. Follow the above instructions in reverse order.
2. Ensure the correct FPGA and Software images are installed prior to powering up.

## 6 Mounting Options

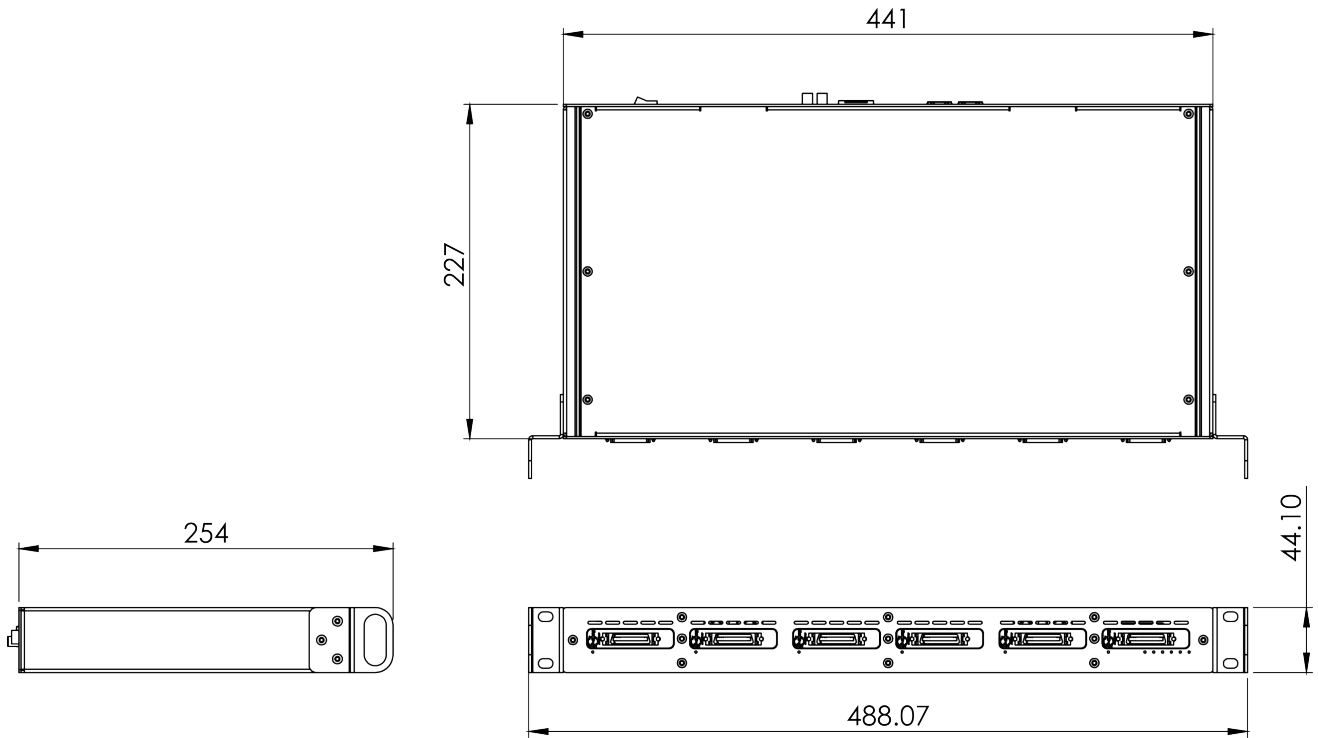
ACQ2006 mounts in a 19" rack. Alternatively, the custom-built case allows standalone use with optional tilting feet. Please contact D-TACQ for options.

Mounting points for the 19" lugs are in the following locations, on both the left and right of the case.



Drawing 3: ACQ2006 Mounting Point Locations

## 7 Dimensions



*Drawing 4: ACQ2006 Case Dimensions*