Enterpoint
FPGA and ASIC Design

ADC-AD7927 module, (Rev1.0)

This document will give a brief description of our ADC ad-on module (AD7927), this ad-on module has been designed to work on all of our development boards.

FEATURES:

- 2.54mm (0.1 inch) connection headers for breadboards or development board insertion,
- Power Track connections to provide power to lower modules,
- TPS7985 2V5 output regulator for the AD7927 reference voltage,
- 6 Pin 2mm Header for on board or off board reference voltage, implementation,
- On board filtering of reference voltage input,
- 32 Pin 2mm Header for analogue and ground signal input per channel,
- Two AD7927-BRU analogue devices chips,
- Provides 16 channels for input implemented on a rotating sample system,
- Up to 400KHz sample rate.

For lower sample speed rates the ADC board can be powered from the FPGA by setting the power pins as fixed IO in the FPGA.

To initiate the ADC it needs to be inserted in the development board host correctly this is achieved by ensuring that the power pins on the module are inserted in the host systems power structure i.e. at the very top of the socket header.

If the top of the socket is populated with one of our modules that supports the power track system then the power can be connected down to the module through the first one

(***Caution if implemented in this way make sure the FPGA does not drive the relevant pins on the development board host where the power pins are inserted***.)

Once inserted the ADC will power up with the host system, to program the AD7927 chips the remaining pins on the module are connected to the AD7927 SPI communication bus and hence the user should implement the correct SPI protocols in the FPGA, please see the AD7927 Product Sheet for more information.

For the, voltage reference, a 2.5V regulator is supplied, this provides the stable reference required for the ADC chips.

With this reference of 2.5volts the AD7927 devices can measure analogue voltage ranges of 0V to 2.5V or 5V by setting the correct bit in the ADC control registers.

For the analogue voltage range a 6 Pin Header (J3) is provided, this either links the modules 3.3V or Users voltage to the ADC chips, there is room for an external linking of a reference voltage to the chips PIN 4. As a result filtering has been implemented to stabilize any reference voltage to allow greater accuracy of the sample voltage.

PIN1	PIN2	PIN3	PIN4	PIN5	PIN6
3V3	AVDD	ext	ext_in	NC	GND

Figure 1: Pin out of Header J3.
(Pin one is indicated by an extra bump in the silk screen on one side.)

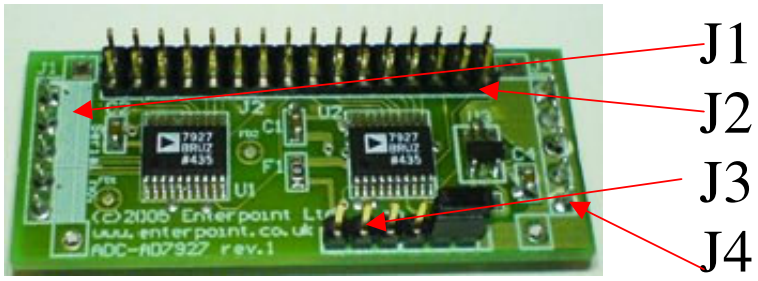
To use this header a jumper is provided to link the 3.3V or user voltage to the AD7927 chips, for the 3.3V the jumper must be over pins 1 and 2 and for the user voltage the jumper must be over pins 2 and 3. This leaves pin 4 for the user to apply the reference voltage and pin 6 to apply the reference voltage ground.

A 2mm header is provided at the top of the module for voltage reference, the pin out is such that each channel has its own ground pin to allow correct voltage sampling.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
1a	2a	3a	4a	5a	6a	7a	8a	1b	2b	3b	4b	5b	6b	7b	8b

Figure 2: Pin out of Header J2.

On the ADC module all information, whether it is control or data, is communicated to both devices individually by two separate SPI interfaces. These interfaces are split so that the left hand side of the module controls the left hand AD7927 and left half of the 32pin header, and the right AD7927 has the right had side of the board.



On each module the headers J1 and J4 contain the power pin and the four communication lines of the separate SPI interfaces, SCLK, CS, DIN and DOUT, the pin out is as follows.

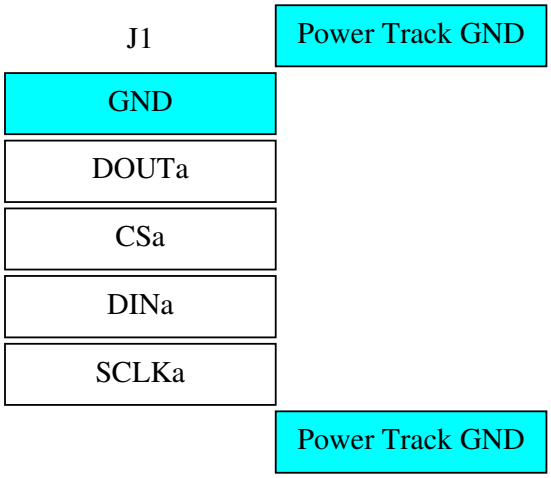


Figure 3: Pin out of Header J1.

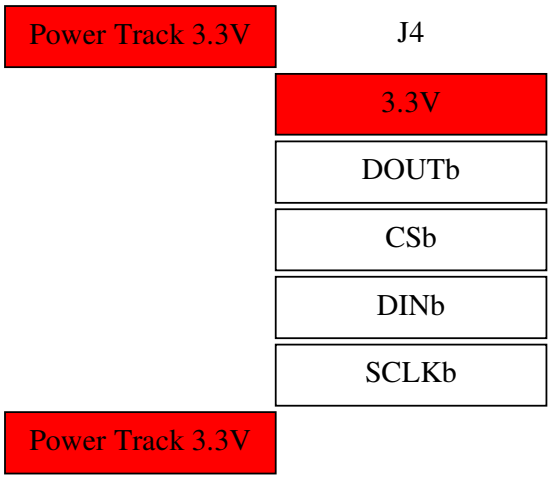


Figure 4: Pin out of Header J4.