ZKit-51 Analog I/O Board

User Manual

1.0, June 2009

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Chapter 1. ZKit-51 Analog I/O Board

1. Overview

The ZKit-51 Analog I/O Board provides A-to-D and D-to-A capabilities to the main board. The board is based on NXP PCF8591 8-bit A/D and D/A converter, with four analog inputs, one analog output and a serial I2C interface.

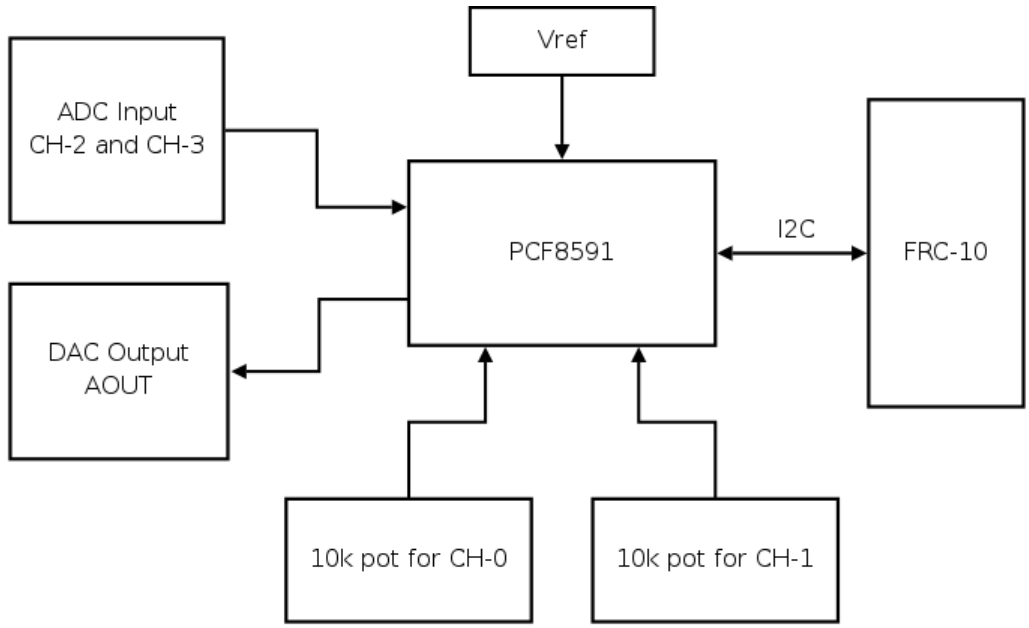
2. Board Features

- PCF8591 with ADC and DAC functionality
- I2C interface to communicate with ZKit-51 motherboard
- ADC with four channel, 8-bit, maximum 11kHz sampling rate
- Two channel inputs are connected 10K pot
- Two channel inputs are terminated to a phonix connector
- DAC with single channel, 8-bit, maximum 11KHz coversion rate
- DAC output terminated to phonix connector

3. Block Diagram

A block diagram representation of the board is shown below.

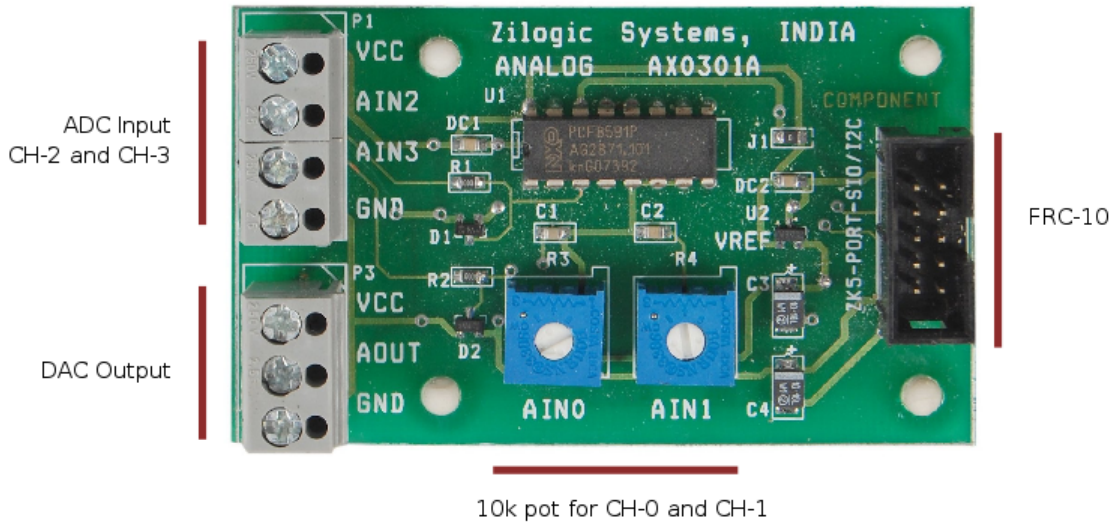
Figure 1.1. Block Diagram



4. Locating Components

The location of the components on the board are indicated in the following diagrams.

Figure 1.2. Front View



5. Power Supply

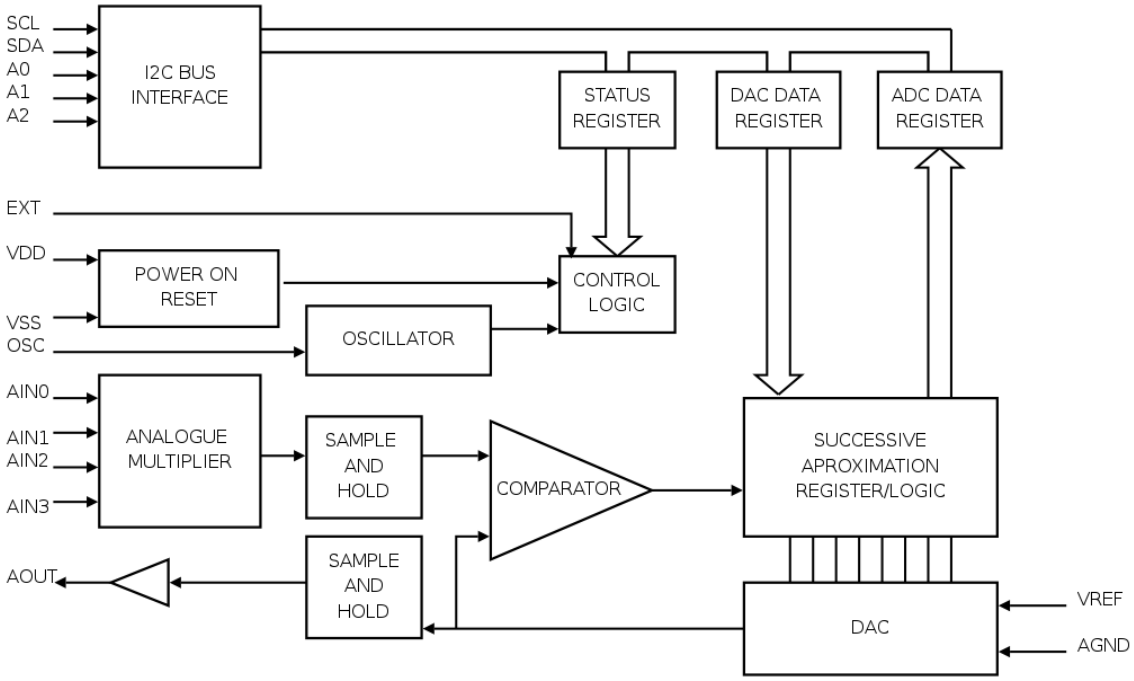
The Analog I/O Board is powered from the motherboard using FRC-10. In FRC-10 connector the first and tenth pins are used for VCC and GND respectively.

6. PCF8591

6.1. Features

- Single power supply
- Operating supply voltage 2.5 V to 6
- Four anlog input channels
- 8-bit successive approximation A/D conversion
- Multiplying DAC with one analog output
- Low standby Serial input/output via I2C
- Address by 3 hardware address pins
- Sampling rate given by I2C-bus speed
- Auto incremented channel selection

Figure 1.3. PCF-8591 Block Diagram



7. Connectivity

Analog I/O Board can be interfaced to the Motherboard through SIO/I2C header using FRC-10 connector. The signal connection details are given below.

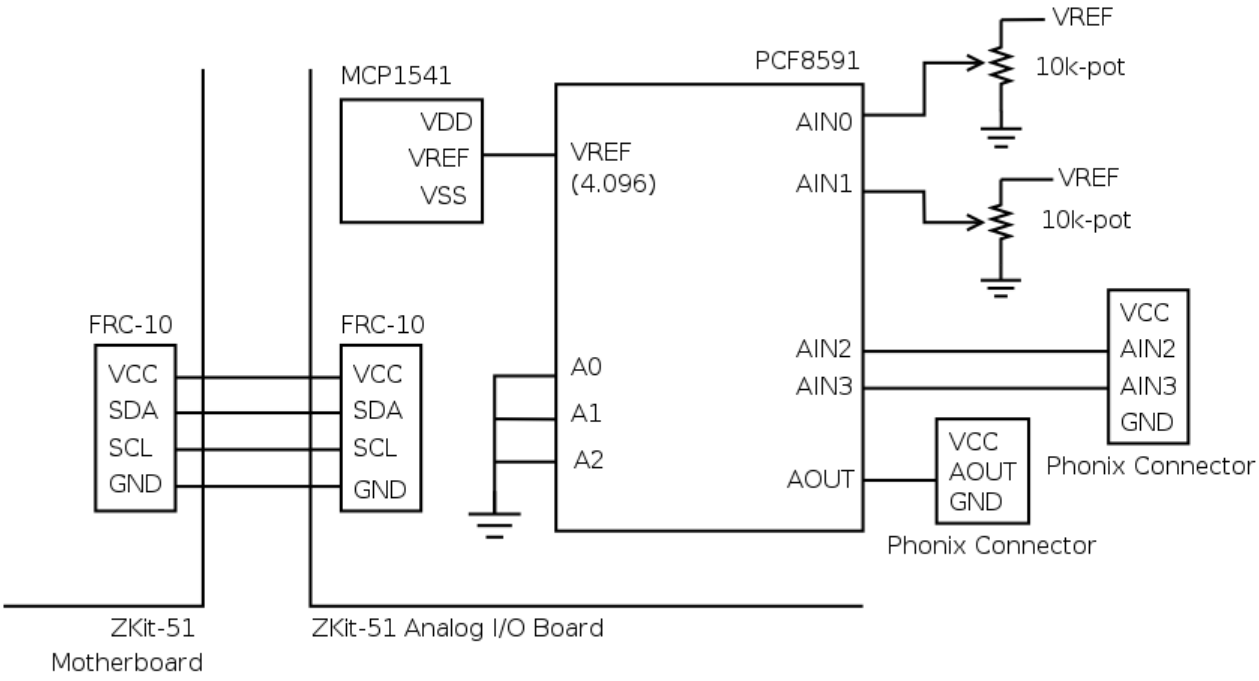
Table 1.1. Signal connection table

Pin #	Motherboard	Analog I/O Board
1	VCC	VCC
2	P3.0/RXD	-
3	P3.1/TXD	-
4	P1.6/SCL	SCL
5	P1.7SDA	SDA
6	P1.0/T2	-
7	P1.1/T2EX	-
8	P1.3/CEX0	-
9	P3.2/INTR0	-
10	GND	GND

8. Programming Details

The Analog I/O Board has four channels, out of which two are connected to 10k pots and the other two are connected to Phonix connector. The channel which is connected to 10k pot can be used for testing the ADC functionality. The input range is 0 to VREF. The VREF is fixed to 4.096. The DAC output range is 0 to VREF.

Figure 1.4. Signal connection diagram



9. Hardware Address

In PCF8591, three address pins A0, A1 and A2 are used for programming hardware address. In the Analog I/O Board, the address pins A0, A1 and A2 are connected to ground.

Table 1.2. I2C Device Address

Operation	Address
Write	0x90
Read	0x91