

Functional Description

The AIO1 board is a peripheral board designed to work with Digilent's family of system boards. The AIO1 contains analog-to-digital and digital-to-analog converters from Analog Devices, two dual op-amps, a variety of analog signal I/O connectors, and a solderless breadboard. All analog components use an on-board 5VDC voltage source. All unused I/O signals are passed through the AIO1 board so that it can be used between a system board and other peripheral boards.

The solderless breadboard and op-amps on the AIO1 can be used to construct filters and amplifiers for the data converters. Gain and frequency-limiting resistor/capacitor networks can be constructed on the breadboard, and connected to the op-amps and data converters using jumper wires inserted into the breadboard connector. The breadboard connector can also be used to route analog I/O signals to any one of eight connectors included on the board (including BNC, RCA, and 1/8 audio jacks).

The AIO1 uses an 8-bit, 1Ms analog-to-digital converter (the AD7823), and an 8-bit, 3Mhz digital-to-analog converter (the AD7303), both from Analog Devices. The AD8534 op-amps (also from Analog Devices) can drive 250mA outputs rail-to-rail with a 3Mhz bandwidth, so many useful devices can be driven directly.

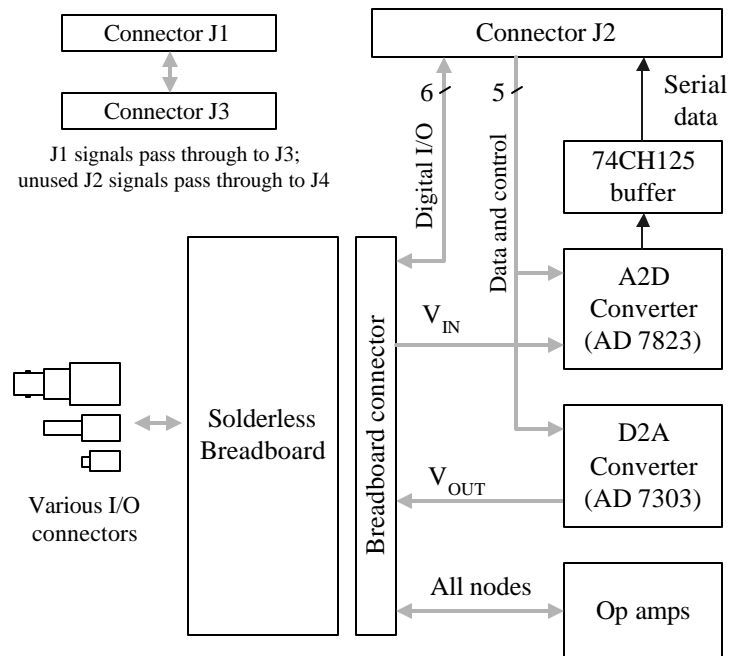


Figure 1: AIO1 block Diagram

The IO1 board uses only twelve signals, all from the J2 connector. Of these, six are provided as uncommitted digital I/Os (three inputs and three outputs), and six are used by the data converters. Both data converters use a serial protocol with data signal, clock, and synchronizing signals. Only one signal is returned to the system board, and it uses a 3.3V buffer so that lower-voltage system boards can be used.

The J2 connector pin definitions are shown below (all J2 signals not shown pass through to J4).

The AOI1 has two voltage selections available. It can be operated with VCC 3.3V (for the Digilent Pegasus Board) or 5Vv for all other Digilent System Boards. To use either voltage selection, place a jumper on JP2 as outlined by the silkscreen on the AIO1.

J2 connector pin definitions		
J2 pin	AIO signal	Description
30	DACIN	AD7303 data input
31	DACLK	AD7303 clock input
29	SYNC	AD7303 Sync signal
34	ADOUT	AD7823 data output
33	ADCLK	AD7823 clock input
32	CONVST	AD7823 convert start signal
38	DINO	Uncommitted digital inputs
35	DIN1	
36	DIN2	
28	DOUT0	Uncommitted digital outputs (use caution – do not drive above 3.3V)
27	DOUT1	
19	DOUT2	

The breadboard connector signals are shown in the following table. The breadboard connector allows various AIO1 signals to be connected to the breadboard using jumper wires. Signals from the BNC connectors (J5 and J8), the RCA connectors (J6 and J9), and the audio connectors (J7 and J10) are available, as well as signals from the op-amps and data converters.

Breadboard Connector (J11) Signal Definitions					
J11 pin	Signal	Definition	J11 pin	Signal	Definition
1	VCC33	Regulated voltage	21	OP2AO	Op-amp 2A output
2	VU	Unregulated voltage	22	OP2BO	Op-amp 2B output
3	DI0	Uncommitted digital input	23	OP2BI+	Op-amp 2B input +
4	DO0	Uncommitted digital output	24	OP2BI-	Op-amp 2B input -
5	DI1	Uncommitted digital input	25	OP1BI+	Op-amp 1B input +
6	DO1	Uncommitted digital output	26	OP1BI-	Op-amp 1B input -
7	DI2	Uncommitted digital input	27	OP1BO	Op-amp 1B output
8	DO2	Uncommitted digital output	28	OP1AO	Op-amp 1A output
9	J8P	BNC post connection	29	OP1AI+	Op-amp 1A input +
10	J8S	BNC shield connection	30	OP1AI-	Op-amp 1A input -
11	J9P	RCA center connection	31	GND	System ground
12	J9S	RCA shield connection	32	ADCREf	ADC reference voltage
13	J10P	Audio tip connection	33	ADCIN+	ADC input +
14	J10S	Audio ring connections	34	ADCIN-	ADC input -
15	DACOUTA	DAC channel A output	35	J7P	Audio tip connection
16	DACOUTB	DAC channel B output	36	J7S	Audio ring connections
17	DACREF	DAC reference voltage	37	J6P	RCA center connection
18	GND	System ground	38	J6S	RCA shield connection
19	OP2AI+	Op-amp 2A input +	39	J5P	BNC post connection
20	OP2AI-	Op-amp 2A input -	40	J5S	BNC shield connection