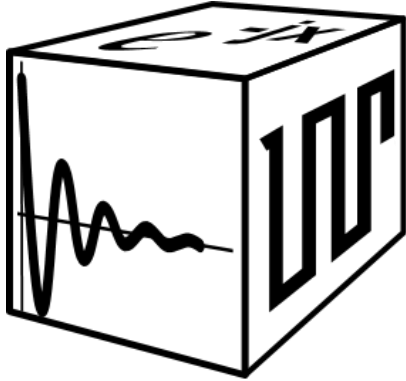# SIGNALBLOX®

DigitalBlox®

CLOCKWORKS
Signal Processing

8 CHANNEL ADC & DAC FOR ADI A^{2}B

DigitalBlox system for 8 ADC and 8 DAC channels for use with Analog Devices A^{2}B systems

- Convenient package of boards to provide additional audio I/O for developing Analog Device's A2B applications.
- Simplest way to create high channel count A^{2}B systems, just plug it on and start development.
- Can be expanded with a range of modules for even more off-the-shelf capability
- Reliable and full featured design for development and OEM use
- Input uses ADI's ADAU1979 ADC and AKM AK4438 DAC for output
- Analog functionality (buffers, volume control, switching) can be enhanced with AnalogBlox modules and carriers
- Uses Clockworks A^{2}B module for future upgrades
- A^{2}B I^{2}C and GPIO used to control carrier provide system design flexibility

PWR017

NA0105
Balanced in

12V supply

A2B
Module
on
DD3100
adapter

AD2100
ADC

DA1100
DAC
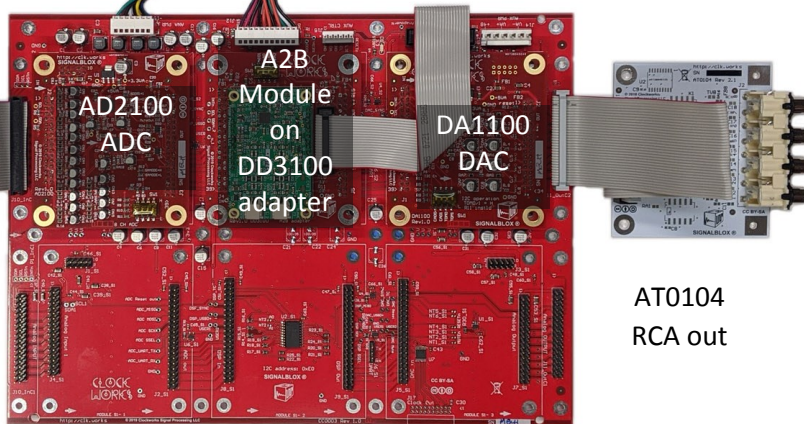
AT0104
RCA out

A2B Cable

CC003

SYSTEM COMPONENTS

V1r200311   http://clk.works

Introduction

This package provides an off the shelf solution for multichannel system development with A^{2}B. It can be used with Analog Device's A^{2}B development tools, including their graphical SigmaStudio tool. All development tools are available directly from ADI. This system acts as an A^{2}B slave and therefor an A^{2}B master must be present elsewhere in the overall system.

All SignalBlox module design information is released under the Creative Commons CC-BY-SA 4.0 license, making it easy to modify and adapt the designs to specific use cases.

Using the kit

Using the ADI tools for A^{2}B development the Clockworks system can be used for either the primary system audio I/O, or as part of a diagnostic setup for testing by modifying the default signal streams in SigmaStudio to send copies of data to the DACs or use the ADCs as an alternate input.

A second set of modules can be added to the carrier to increase the channel count to 16 in and 16 out. 32 channels at 48 kHz sample rate (24 bit) is the limit of the data capacity of A^{2}B.

Kit contents

All kit contents can be purchased separately. Different connector boards are available: RCA, balanced (25 pin Tascam), and terminal blocks.

Part number	Kit Quantity	Description	
PWR017	1	12V in, 3.3V 1A standby, 3.3 and 5V digital (5A), and analog +/-15V 330 mA, +/-5V 1A supply with power fail detect and analog enable. Includes a 60W AC universal input supply.	
CC0003	1	Six module (2 wide by 3 deep) DigitalBlox carrier	
NA0105	1	8 channel balanced input (Tascam 25 pin)	
AT0104	1	8 channel RCA output with mute relay module	
DD3100	1	A^{2}B module adapter board	
A2B01-S	1	A^{2}B module (mated to DD3100 board)	
AD2100	1	8 channel ADC	
DA1100	1	8 channel DAC	
CK005	1	Cable kit: (2) 34 pin 15 cm IDC (analog in and out connection) (1) 20 pin 30 cm IDC (control connection) (1) 12 pin MTA-100 digital power/control cable (1) 8 pin MTA-100 analog power/control cable	

Not included:

• Hardware for mounting carrier to chassis. M3 hardware suggested.

• Hardware for mounting connector board (NA0105, AT0104)

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Sigma Studio, SHARC, and A^{2}B are trademarks of Analog Devices.

System control

The Clockworks A^{2}B module adapter board (DD3100) has a 20 pin control connector on it that is used to connect to the DigitalBlox carrier board. This provides the needed GPIO and I^{2}C signal used to control the rest of the system peripherals. It is also possible to use a separate control processor for the system but the A^{2}B module by default is configured to act as an A^{2}B slave device, so it will be an I^{2}C bus master on the local (carrier board) side. It is possible to configure the A^{2}B adapter and module to act as A^{2}B bus master, in which case a host processor is required to establish the A^{2}B network.

The I^{2}C bus on the carrier board uses I^{2}C addressable muxes to allow the A^{2}B master or a local host processor unique access to each I^{2}C module position and therefor avoid I^{2}C address conflicts that would otherwise happen from using multiple devices of the same type.

Performance

The ADC and DAC used in this configuration offer middle of the road performance in terms of DR and THD+N. For details please review the ADI ADAU1979 and AKM AK4438 datasheet. In-system performance numbers are typically within 1 dB of the datasheet values for those parts. For analog in to analog out applications the end to end performance numbers add.

The analog 34 pin connectors used for the DigtialBlox carrier board in and out can be connected to an AnalogBlox carrier board and the two boards stacked to provide additional features like volume control or balanced output, etc.

Custom "flattened" designs for OEM use

SignalBlox modules are a fast and simple way to prototype and build a small number of systems without incurring NRE charges. Builders of a larger number of systems may want to consider Clockworks' custom engineering services to quickly, and for a fixed price, convert a pre-defined module configuration in to an optimized design for the specific feature set needed. When produced in larger quantities (> 50 typical) this can reduce the per system cost by 50%.

KIT CONFIGURATION
BLOCK DIAGRAM

Shown with RCA input option.