A2B AD2437 モジュール
AB0331, AB0371
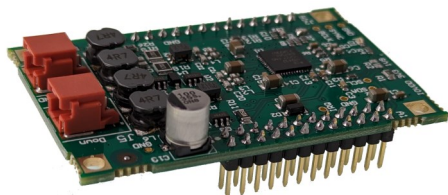
写真はDuraClikコネクタ付きのAB0331

CLOCKWORKS
Signal Processing

A^{2}B - I^{2}S MODULES

ClockworksのA2Bモジュールは、A2B機器の開発や試作、特殊音響向け組込みにご利用ください。AD2437,AD2428, AD2433（限定ユーザ用）搭載モジュールがあります。
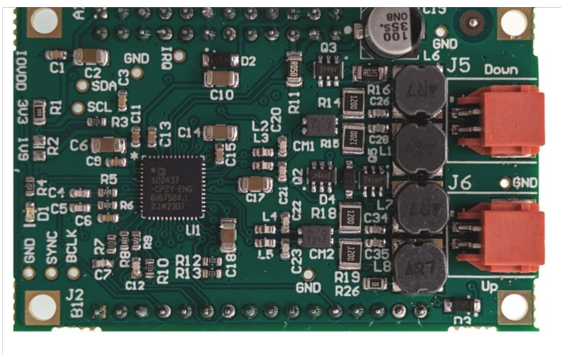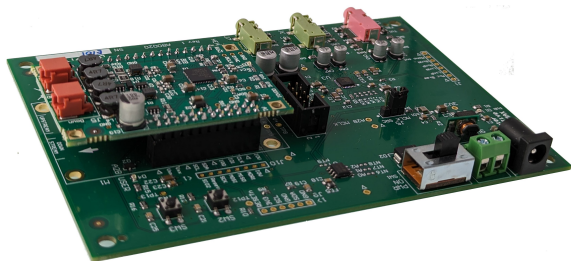
AD2437 A^{2}B - I^{2}S MODULES

SUPPORTS ANALOG DEVICES

写真はAB0331搭載の AB0032 EVM

A2Bノードの試作、評価用にEVMボードがあります。

お問い合わせは、
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Summary

- Off the shelf modules for A^{2}B interfacing to I^{2}S, I^{2}C, and SPI devices
- Evaluation (EVM) board kit with stereo audio in and out to jump start A^{2}B system development
- Based on Analog Devices AD2437 A^{2}B devices
- Fully supported by ADI's Sigma Studio/Plus tool's A^{2}B extensions
- Quick turn custom versions for system developers needing near off-the-shelf solutions for A^{2}B projects
- Modules provide full access to all AD2437 digital I/O pins to allow A^{2}B root node or A^{2}B client mode operation
- Provides CFG4 (24V) phantom power for downstream A^{2}B clients with 2 wire (CFG4) bus power
- Fixed end to end latency regardless of number of nodes in system
- For more complex system design please see Clockworks AB0032 EVM supporting more audio I/O and a wider range of A^{2}B modules.

Introduction

Analog Devices' A^{2}B system allows up to thirty two 48 kHz data (audio) channels to be carried bidirectionally over twisted pair wire be-tween multiple nodes. Supporting up to 30 meters of cable between nodes it provides a low cost way to create dispersed audio processing systems.

Clockwork's A^{2}B modules provide an off the shelf solution to developers and OEMs needing a way to develop and ship products that include A^{2}B but don't want to delay their projects working out their own A^{2}B designs.

Clockworks offers 4 different modules, two based on the AD2428 and two based on the AD2437. They offer a common footprint and set of features consistent with the capabilities of the two different parts.

In addition to the EVM board Clockworks offers a range of breakout and microphone modules to provide fast, low risk A^{2}B system development.

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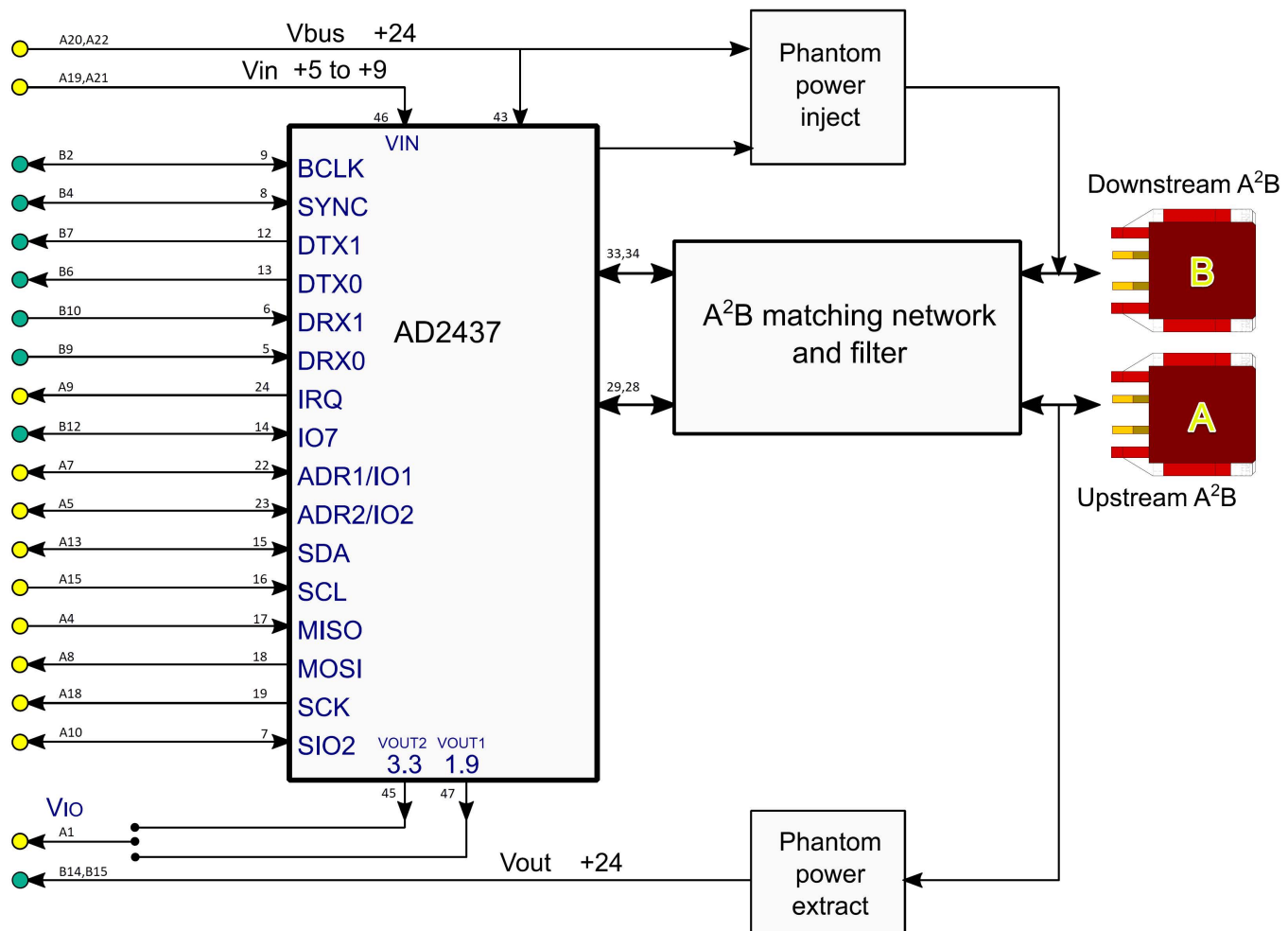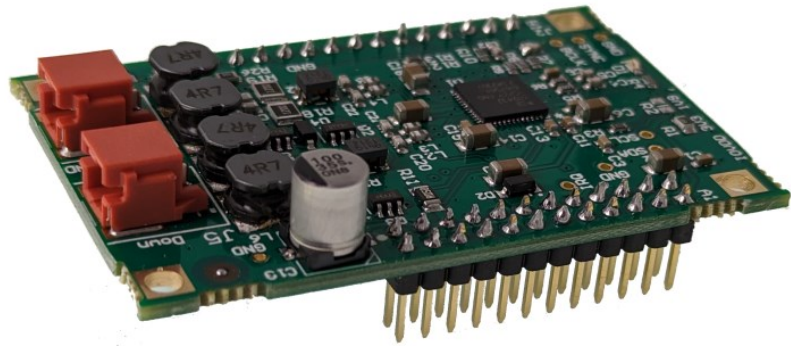
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AD2437搭載 MODULE (AB0331はDuraClikコネクタ仕様。AB0371は各種コネクタ向けにヘッダピン仕様）

- AB0331: Standard 2 pin DuraClik connectors for A^{2}B (red indicates CFG4 power)
  AB0371: header pins

- Local or bus power

- AD2437 supports CFG4 power system (24V, 50W)

- Up to 30m node spacing, 300m overall, 16 nodes

- AB0331 can be used with Clockworks AB0032 EVM or user's circuit

Block diagram

Pin	Net		AD2437 signal
A20,A22	Vbus +24	43	VIN
A19,A21	Vin +5 to +9	46	VIN
B2	9		BCLK
B4	8		SYNC
B7	12		DTX1
B6	13		DTX0
B10	6		DRX1
B9	5		DRX0
A9	24		IRQ
B12	14		IO7
A7	22		ADR1/IO1
A5	23		ADR2/IO2
A13	15		SDA
A15	16		SCL
A4	17		MISO
A8	18		MOSI
A18	19		SCK
A10	7		SIO2

AD2437

VOUT2 45 3.3
VOUT1 47 1.9

V$_{IO}$
A1
B14,B15   Vout +24

Phantom power inject

A^{2}B matching network and filter   33,34   29,28

Downstream A^{2}B   B

Upstream A^{2}B   A

Phantom power extract

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AB0331 , AD0371 (AD2437) modules

Pinout – A Connector J1 on PCB label. 2x12 pins

Notes	Name	Pin	Pin	Name	Notes
Connected to EVM reset line	/RESET	2	1	IOVDD	1.8V or 3.3V. Jumper selects between AD2437 internal regulator voltages, defaults to 3.3V
SPI Master in/Slave Out Data	MISO	4	3	GND	
	GND	6	5	ADR2	AD2437 ADR2/IO2 line with 10K pulldown
SPI Master out/Slave In Data	MOSI	8	7	ADR1	AD2437 ADR1/IO1 line with 10K pulldown (on EVM connects to LED)
AD2437 SIO2 pin. Use as SPI select.	SIO2	10	9	IRQ	AD2437 IRQ/IO0 line (on EVM can connect to pushbutton or GPIO9 of the RP2040 board)
	GND	12	11	GND	
Reserved	-	14	13	SDA	I2C data
	GND	16	15	SCL	I2C clock
SPI data clock	SCK	18	17	GND	
A2B bus power (24V 2 amp max)	VBus	20	19	Vxx	Power 5-9V suggested range, 4V min, 9.2V max.
	VBus	22	21	Vxx	Note: Vxx not used with all configurations
	GND	24	23	GND	

Pinout – B Connector J2 on PCB label. 1x16pins

Pin	Name	Notes
1	GND	
2	BCLK	AD2437 bit clock (output as slave)
3	GND	
4	SYNC	AD2437 frame sync (output as slave)
5	GND	
6	DTX0	AD2437 DTX0 with 10K pulldown (output)
7	DTX1	AD2437 DTX1 with 10K pulldown (output)
8	GND	
9	DRX0	AD2437 DRX0
10	DRX1	AD2437 DRX1
11	GND	
12	IO7	AD2437 IO7
13	GND	
14 15	Vbout	CFG4 phantom power out (24V typical)
16	GND	
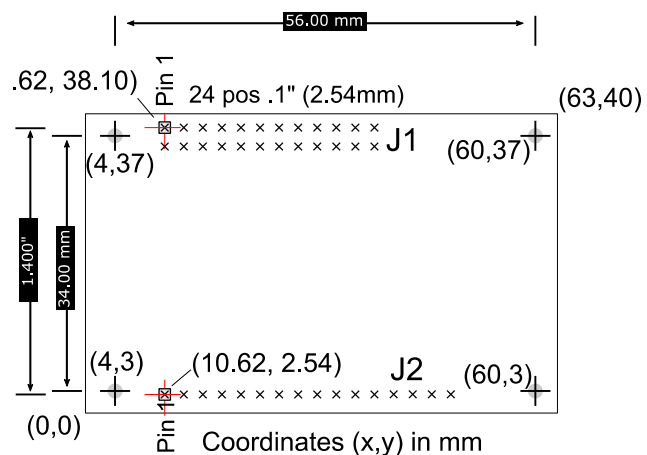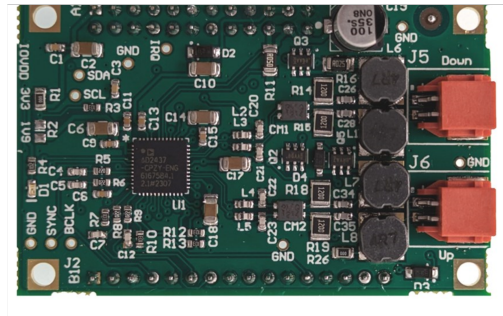
A^{2}B module dimensions and pin locations. Note this EVM just supports the AB0001 (AD2428) and AB0331 (AD2437) models of modules. STEP files of all modules are available for download from the Clockworks website.

For mounting to a carrier board 11mm standoffs can be used when using standard height mating (female) sockets.

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AB0331/AB0371

AB0331/71 modules (AD2437 based) have one 12 pin single row .1" (2.54 mm) connector (male pins) and one 24 pin (2 row x 12) on the bottom side of the module. They mate with standard single and dual row header sockets such as Samtec's SSW-112-01-F-S and SSW-112-01-F-D. The AB0371 has one 4 pin header (upstream) and one 8 pin header (downstream) for the A^{2}B bus and bus power connections.

The AB0331/71 modules are 4 layer dual sided boards, but like the AB0001/3 are built with 0603 and larger components to allow experimentation with optimizing the A^{2}B interface for a specific application.

Both boards need 5-9V and 24V power to be supplied. This can either be from a local supply or with the appropriate external circuitry, A^{2}B bus powered. For the AB0331 module with the 2 pin Dura-clik connectors all that is needed is a 9V regulator. For the AB0371 the design depends on how power will be carried between nodes. For an example see the AB0032 EVM; that board implements the RJ-45 scheme defined by ADI.

General

Four 3mm mounting holes are provided, please see the last page for detailed dimensions.

Module I^{2}S output lines are series terminated on the module. A buffer should be added at the connector on the mating board if the trace length for the BLCK and SYNC lines will exceed around 2" (5 cm). Long I^{2}S lines may also create EMI and proper high speed digital design techniques must be followed for all I^{2}S lines.

When used as the root node the bit clock and frame clock must be supplied to the module. When used as a client node those two signals are outputs from the module.

For peripherals needing a higher speed clock—like 128x Fs and typically referred to as MCLK, one of the multiuse pins can be used. By convention that pin as the ADR2 line. For high performance audio applications please review the materials on the Clockworks website about A^{2}B clock jitter.

Users of AD243x devices should also review the ADI chip errata for MCLK output enable conflicts when SPI is enabled in certain modes

All of the Clockworks modules provide a method for supplying power to downstream nodes; the de-tails are a function of the A^{2}B power type (CFG0 or CFG4, see ADI documentation) and if CFG4: does the implementation use phantom power (2 or 3 wire schemes) or separate lines via RJ45 or other higher wire count solutions? The AD2437 provides fault detection and diagnostics for both CFG0 and CFG4 power schemes. The CFG4 system has several design considerations that are application de-pendent; the Clockworks AB0331/71 module designs reflects this fact that there's not a one size fits all solution across the entire application space.

Module schematics are available from the Clockworks website, along with a .STEP file for the A^{2}B module to facilitate design of your own carrier board.

Software and documentation for the AD2428 or AD2437 A^{2}B transceiver can be obtained directly from Analog Devices' website.

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