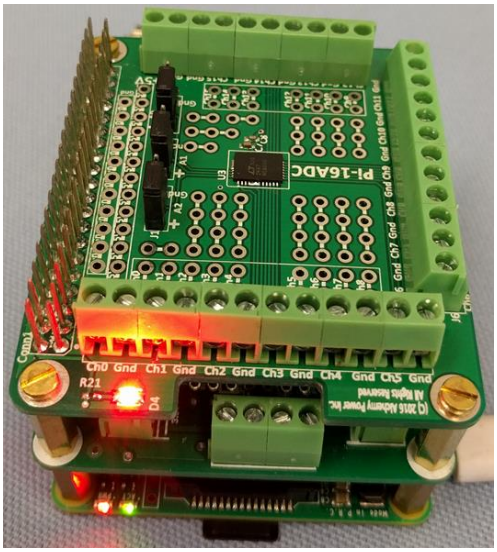
Key Features

- **16 single ended or 8 Differential Analog to Digital Conversion (ADC) ports.**
- **16-bit conversion or 39 μV sensitivity.**
- **50/60 Hz and other noise rejection.**
- **Easy to connect terminal blocks for all ports.**
- **Solder points for each channel.**
- **Sample Python code for ADC use.**
- **Selectable I²C addresses.**
- **Stack boards for additional ADC ports.**
- **Low power consumption.**

Pi-16ADC

for Raspberry Pi™



The Pi-16ADC HAT added to the Raspberry Pi provides 16 analog ports. Analog devices or analog sensors can be added to the Pi-16ADC making the Raspberry Pi (with Pi-16ADC HAT) a powerful hybrid system – allowing analog as well as digital sensors for the Raspberry Pi. This combination – a Raspberry Pi with Pi-16ADC – makes the Raspberry Pi an affordable and a powerful embedded controller.

Analog to Digital Converter (ADC)

ADC processor on the Pi-16ADC provides sixteen single ended analog channels or eight differential channels. The 16-bit conversion provides high accuracy for the data converted. Each channel number is clearly designated on the board. Besides solderless connections, the Pi-16ADC board also provides several solder points for each channel. +5V and ground from the Raspberry Pi and are also provided as solder points on the board.

Each single-ended analog channel can read in a maximum of 2.5V peak-to-peak. Each adjacent channel can be paired to create a differential channel. Differential channels can read in an analog signal from a maximum of -2.5V to +2.5V. Software configuration determines the channel which has the positive voltage. The 16-bit conversion allows an accuracy of 38.1 microvolts. The Sigma-Delta ADC chip on board can perform up to seventeen samples per second across all the channels. 50/60 Hz noise filters prevent spurious readings.

The Pi-16ADC communicates to the Raspberry Pi using an I^2C bus. Other peripherals may coexist on the I^2C bus. To prevent address conflicts, the I^2C address can be set to one of the twenty-seven possible addresses using the address jumpers provided on the Pi-16ADC board. The address jumpers can be connected to Vcc (5V or HIGH) or Ground (0V or LOW) or address jumpers may be removed or left floating (FLOAT). The combination of the HIGH-LOW-FLOAT determines the address of the Pi-16ADC on the I^2C bus.

Sample Python code, along with the User Guide provided shows how the ADC can be used and helps you get started quickly.

Specifications

General Information

Model Number: Pi-16ADC

Raspberry Pi Models supported

The board includes a 40-pin header. Any Raspberry Pi with a 40-pin header is supported. These are Pi 2, Pi 3, Pi Zero etc. Older Raspberry Pi models with a 26-pin header are not supported.

Input

Input Power Source: 5V, sourced from Raspberry Pi header, pin number 2.

ADC

Power: 0.8mW or less. Typical power is 0.5mW.

ADC Chip used: Linear Technologies™ LTC2497™ ADC.

Number of Analog Channels: Sixteen single-ended or eight adjacent differential channels, software selectable.

Maximum analog Voltage: 2.5V p-p. More than 2.5V indicates an over-voltage condition. Differential channels - maximum voltage is from -2.5V to +2.5V.

Maximum DC Voltage: Maximum +5V.

Resolution: 16 bits or appx 39 micro-volts per bit.

Conversion Rate: Maximum 17 samples per second for all channels. Recommended scan rate is 1-2 samples per second per channel.

Calibration: Auto calibration on power reset.

Interface: Interfaces to Raspberry Pi over the I^2C bus at 100 kHz.

I^2C address: Selectable by jumpers labelled A0, A1 and A2. Maximum of 27 addresses.

I^2C Bus Speed: 100kHz (default). Other speeds are also supported.

Other: 50/60 Hz noise rejection.

Stacking: Pi-16ADC boards can be stacked together with other HATs, e.g. Pi-EzConnect.

Terminal Blocks

Capabilities: 3.5 mm spacing. 10A, 300V maximum for each connection. 16-26 AWG wire. Torque (screw) 0.22-0.25 Nm (1.9-2.2 lb-in). M2 screw thread.

Dimensions

Board dimensions: 65mm x 35mm x 10mm (2.5" x 2.2" x 0.4"). Board dimensions follow HAT guidelines.

HAT compatibility: The board follows the HAT guidelines for the board dimensions, mounting holes and connectors.

Weight: Less than 30 grams (1.1 oz.).

Spacers

M2.5x12mm spacers recommended.

Warranty

90-day limited warranty.

Other Information

Recommended peripherals:

Pi-EzConnect for GPIO connections, Amazon Part ID B01FE9EQ88

Spacers – M2.5, 15 mm spacer kit, Amazon Part ID B01M71WKMS

Headers – Adafruit Product ID 85 – 0.1" or 2.54 mm spaced male or female headers.

RoHS Compliant. Electronic components, board etc. are RoHS compliant.

Operating Temperature: 0°C to +70°C.

Operating Humidity: 10% to 80% non-condensing.

Code download: www.alchemypower.com

User Guide download: www.alchemypower.com

Product Video: https://youtu.be/gApMLcfn0A4

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