



ADC Pi

Features

- 8 x 17-bit 0 to 5V Single Ended Inputs
- Control via the Raspberry Pi I2C port
- Stack up to 4 ADC Pi boards on a single Raspberry Pi
- Jumper selectable I2C addresses
- Buffered 5V I2C port
- Based on the MCP3424 from Microchip Technologies Inc
- Single Ended full-scale range of 5.0V
- On-board 2.048V reference voltage (Accuracy $\pm 0.05\%$, Drift: 15 ppm/ $^{\circ}\text{C}$)
- On-Board Programmable Gain Amplifier (PGA): Gains of 1, 2, 4 or 8

- Programmable Data Rate Options:
 - 3.75 SPS (17 bits)
 - 15 SPS (15 bits)
 - 60 SPS (13 bits)
 - 240 SPS (11 bits)
- One-Shot or Continuous Conversion Options

The ADC Pi is an 8 channel 17 bit analogue to digital converter designed to work with the Raspberry Pi. The ADC Pi is based on two Microchip MCP3424 A/D converters each containing 4 analogue inputs. The MCP3424 is a delta-sigma A/D converter with low noise differential inputs.

We designed the ADC Pi to work as a single ended A/D converter using the internal 2.048V reference voltage with the -V pins tied to ground. A voltage divider on the ADC Pi board brings the input voltage range to a much more useful 0 – 5.06V. In this configuration the sample size is 17 bits for each channel.

The ADC Pi is powered through the host Raspberry Pi using the GPIO port and extended pins on the GPIO connector allow you to stack the ADC Pi along with other expansion boards. The two MCP3424 A/D converters communicate via i2c to the host Raspberry Pi giving you eight analogue inputs to use. A logic level converter is included on the ADC Pi board giving you a buffered 5V i2c port making it easy to add other I2C devices which operate at 5 volts without damaging the raspberry pi 3.3 volt i2c port. The i2c buffer uses N-channel mosfets with a maximum drain current of 100mA.

The I2C address bits are selectable using the on-board jumpers. The MCP3424 supports up to 8 different I2C addresses so with two A/D converters on each ADC Pi you can stack up to 4 ADC Pi boards on a single Raspberry Pi giving you 32 ADC inputs.

The MCP3424 contains a programmable Gain Amplifier giving the user a selectable gain of x1, x2, x4 or x8 before the analogue to digital conversion takes place.

The data rate for analogue to digital conversions is 3.75 (17 bit), 15 (15 bit), 60 (13 bit) or 240 (11 bit) samples per second. Data rate and resolution can be configured within software using the I2C interface.

