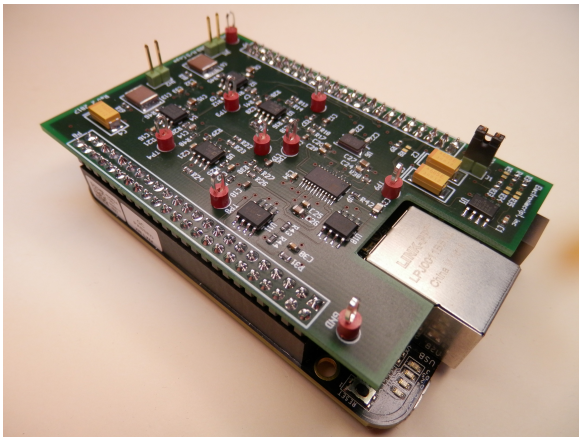
ADC-001 – Audio Experimenter's Platform for Beaglebone Black

The ADC-001 is an analog-to-digital converter designed as a cape for the Beaglebone Black (BBB). The converter is envisioned as an experimenter's platform for audio signal processing. It is designed for use with electret microphones. Ready-to-use microphones are available from Electroniscript under part no MIC-001. Features of the ADC-001 include:

- High quality Analog Devices A/D converter: AD7172.
- Configurable sample rate; sampling up to 31ksps. Determined by AD7172 settings.
- 24 bit A/D. ENOB depends upon system bandwidth, sample rate, and filtering in AD7172. At 31ksps with default filtering, ENOB = 13bits.
- Two AC-coupled input channels.
- Inputs for two electret mics, -44dB sensitivity, 2.2K impedance, 2V. Suggested mics: POM-2246L-C33-LW100-R from PUI Audio.
- Audio frequency range: 50Hz – 15kHz.
- Open-source driver and data-acquisition software to run the board is available for free download at GitHub under https://github.com/brorson/ADC-001_basic_code. The code is written in C. All support files are also included.



ADC-001 shown mounted on Beaglebone Black.

Example applications

The Beaglebone Black is a widely known single-board computer ideal for embedded computing applications. Its CPU is a powerful 32-bit ARM microprocessor manufactured by TI, the AM3559. The AM3559 supports hardware floating point operations. The ADC-001 interfaces with the Beaglebone Black via SPI link over the expansion headers. The wide frequency range of the ADC-001 and the processing power of the AM3559 make the combination a powerful system for signal processing applications in the audio range. Target applications for the ADC-001 include:

- Sound capture and analysis.
- Audio signal processing.
- Audio-frequency data acquisition.
- Embedded sensors and controllers.
- DSP algorithm prototyping and development.
- Education, research, and development.

Open-source flexibility

A full schematic diagram of the ADC-001 is available at the GitHub site to facilitate circuit modifications. All code required to build and use the cape is also available on GitHub. Therefore, both the circuit and the software may be tailored to fit your individual application.

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