AnalogMAX-DAQ3: A Programmable High-Accuracy Data Acquisition Development Platform

Based on Analog Devices ADAQ4020 20-Bit, 1.8 MSPS, µModule® Data Acquisition Solution

AnalogMAX-DAQ3 is a low-cost, programmable, high-accuracy 20-bit data acquisition rapid prototyping platform that meets power, footprint, and reliability requirements of measurement instruments in ATE, medical equipment, precision DAQ systems, and battery-powered equipment applications.

The data acquisition system is based on the 1.8 MSPS, 20-bit ADAQ4020 µModule® Data Acquisition Solution that reduces the development cycle of a precision measurement system by transferring the signal chain design challenge of component selection, optimization, and layout from designer to device.

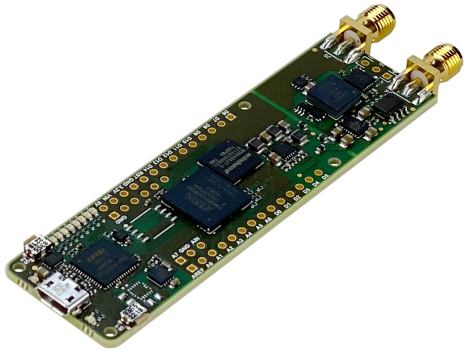
Using System-in-Package (SIP) technology, the ADAQ4020 reduces end system component count by combining multiple common signal processing and conditioning blocks into a single device including a low noise, fully differential ADC driver, a stable reference buffer, and a high resolution 20-bit, 2 MSPS successive approximation register (SAR) ADC.

The small footprint 7×7 mm BGA package increases solution density without sacrificing any performance. This combination of signal chain blocks into one component solves many design challenges.

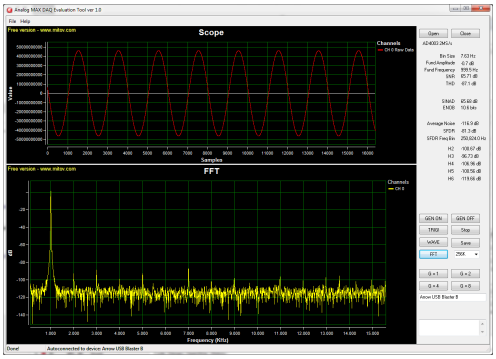
Benefits of the AnalogMAX-DAQ3 Platform

- **High-accuracy analog front-end** – Ideal for applications requiring accurate data capture at high throughputs
- **Flexible platform** – Based on the programmable Intel® MAX® 10 FPGA, easily adjusts to a wide range of use cases and production needs
- **Rapid prototyping and product development** – Rapid development and testing with an out-of-the-box experience that includes the Jupyter notebook with Python code
- **Quick customization services** – Add new functionality, lower BOM cost, or have the complete product designed

High-Accuracy Data Acquisition Platform

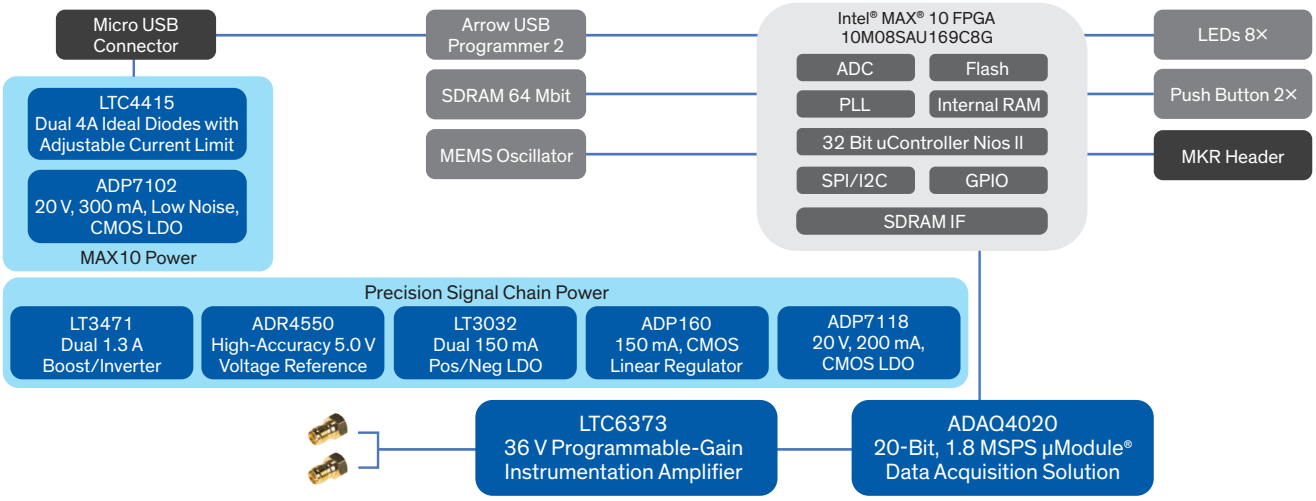


Part #: AnalogMAX-DAQ3



Jupyter notebook with Python code for demos that allow data collection out-of-the-box

AnalogMAX-DAQ3 Block Diagram



Hardware Features

- High-accuracy, 20-bit 1.8 MSPS ADC module (Analog Devices ADAQ4020)
- Power: Small foot-print, low-noise power design
- Memory: 64 Mb SDRAM memory and 64 Mb Secure Flash
- Dual high-speed USB to multipurpose UART/FIFO IC
- On-board Intel® MAX® 10 FPGA to combine and process data from multiple sensor inputs

Software and Demo Features

ADC performance evaluation demo

- Works out-of-the-box with the latest code and wiki documentation on GitHub
- Signal processing and data visualization demo
- Uses the Jupyter Notebook, Python code available to change gain and capture corresponding data
- Time domain and FFT plots available

Key Components

Analog Signal Chain

- ADAQ4020: 20-bit 1.8 MSPS µModule® data acquisition solution
- LTC6373: 36V fully-differential programmable-gain instrumentation amplifier with 20pA input bias current

Processor

- Intel® MAX® 10 FPGA: Non-volatile low-cost FPGAs

Power

- LT3471: Dual 1.3A, 1.2 MHz boost/inverter in 3 mm × 3 mm DFN
- LT3032: Dual 150 mA positive/negative low noise low dropout linear regulator
- ADP160: Ultra-low quiescent current 150 mA, CMOS linear regulator
- ADR4550: High-accuracy 5.0 V voltage reference
- LTC4415: Dual 4A ideal diodes with adjustable current limit

Features of the ADAQ4020 20-Bit 1.8 MSPS µModule® Data Acquisition Solution

- Low-power solution with guaranteed 20-bit no missing codes
- Throughput: 1.8 MSPS/1000+ kSPS options
- INL: ±0.5 LSB typical
- SINAD: 99.5 dB typical at 1 kHz (Gain=0.9)
- THD: −120 dB typical at 1 kHz, -100 dB at 100 kHz

Ordering Information

Part #: AnalogMAX-DAQ3

Documentation and Instructions

github.com/ArrowElectronics/AnalogMAX/wiki

Online

www.arrow.com/analogMAX

Five Years Out