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.

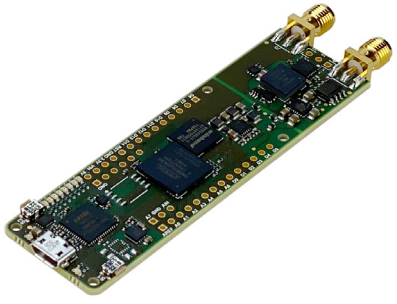
Using System-in-Package (SIP) technology, the ADAQ4020 reduces end system component count by combining multiple common signal processing and conditioning blocks into a single device including a low noise, fully differential ADC driver, a stable reference buffer, and a high resolution 20-bit, 2 MSPS successive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

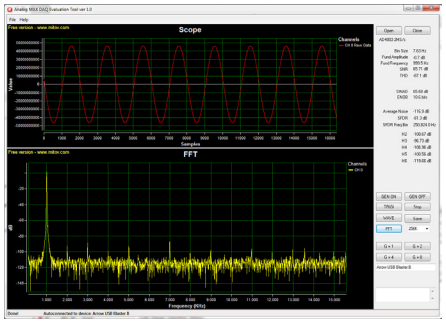
Benefits of the AnalogMAX-DAQ3 Platform

- **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

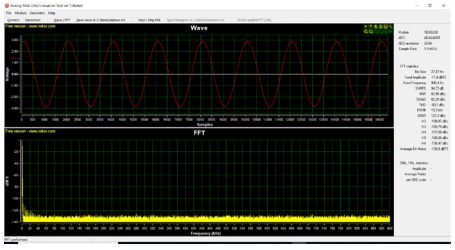
High-Accuracy Data Acquisition Platform



Part #: AnalogMAX-DAQ3

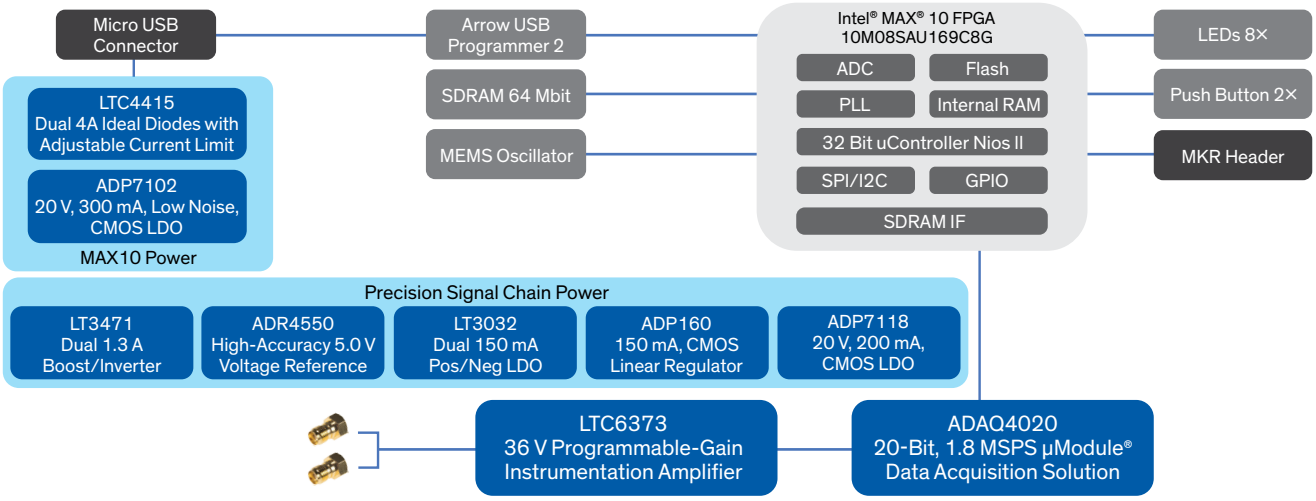


Jupyter notebook with Python code for demos that allow data collection out-of-the-box



DAQCapture Windows Application

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 documentation all available on wiki and GitHub
- User experience includes intuitive demos featuring the Jupyter Notebook software tools or with the standalone Windows application DAQCapture. Jupyter notebook is flexible and extensible. DAQCapture is simple and easy to use. Both can be operated in a loopback mode, and do not require a source waveform

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