

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

Based on Analog Devices ADAQ4003 18-bit, 2 MSPS,  $\mu$ Module<sup>®</sup> Data Acquisition Solution

AnalogMAX-DAQ3 is a low-cost, programmable, high-accuracy 18-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 2 MSPS, 18-bit ADAQ4003  $\mu$ Module<sup>®</sup> 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 the designer to the device.

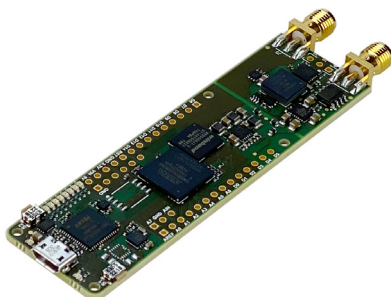
Using System-in-Package (SIP) technology, the ADAQ4003 reduces end system component count by combining multiple common signal processing and conditioning blocks into a single device along with the critical precision passive components. These blocks include a low noise, fully differential ADC driver, a stable reference buffer, and a high resolution 18-bit, 2 MSPS successive approximation register (SAR) ADC.

The small footprint, 7 mm  $\times$  7 mm, 0.80 mm pitch, BGA package enables compact form factor designs without sacrificing performance and simplifies end system bill of materials management. This level of system integration makes the ADAQ4003 much less sensitive to printed circuit board (PCB) layout while still providing flexibility to adapt to a wide range of signal levels.

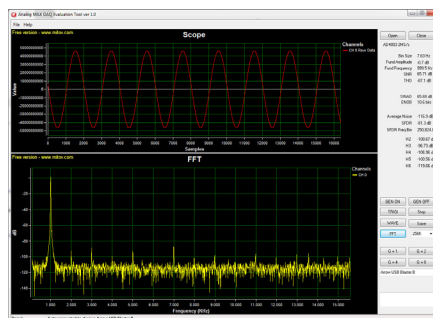
## Benefits of the AnalogMAX-DAQ3 Platform

- > **High-accuracy analog front-end** – Ideal for applications requiring accurate data capture at high throughputs
- > **Flexible platform** – Based on the programmable Intel<sup>®</sup> MAX<sup>®</sup> 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

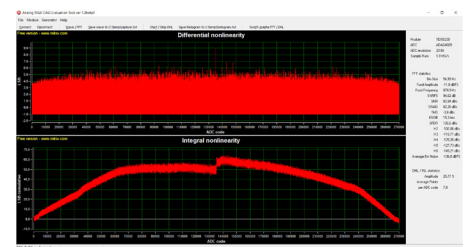
## High-Accuracy Data Acquisition Platform



Part #: [AnalogMAX-DAQ3](#)

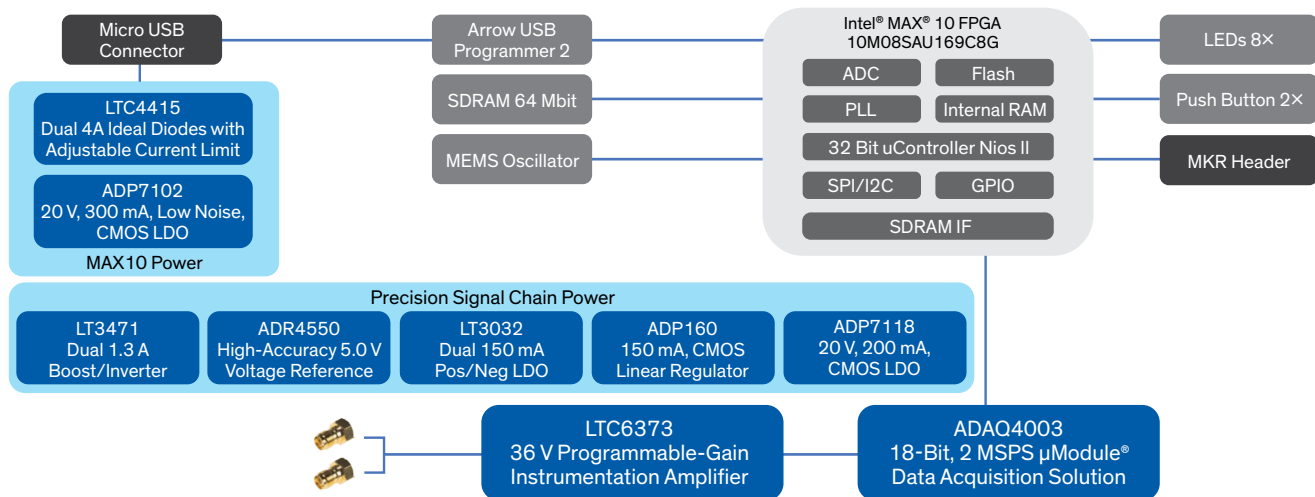


Jupyter notebook with Python code for demos that allow data collection out-of-the-box



DAQCapture Windows Application

## AnalogMAX-DAQ3 Block Diagram



## Hardware Features

- > High-accuracy, 18-bit, 2 MSPS  $\mu$ Module® (Analog Devices ADAQ4003)
- > 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

Precision data acquisition system 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

- > [ADAQ4003](#): 18-bit, 2MSPS  $\mu$ Module® 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  $\times$  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 ADAQ4003 18-Bit, 2 MSPS $\mu$ Module® Data Acquisition Solution

- > Low-power solution with guaranteed 18-bit no missing codes
- > Throughput: 2 MSPS
- > INL:  $\pm 0.8$  LSB typical
- > SINAD: 99.5 dB typical at 1 kHz (Gain = 0.454)
- > 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](https://github.com/ArrowElectronics/AnalogMAX/wiki)

## Online

[www.arrow.com/analogMAX](http://www.arrow.com/analogMAX)

