AnalogMAX-DAQ2: A Programmable 16-Bit µModule®-Based Data Acquisition Development Platform

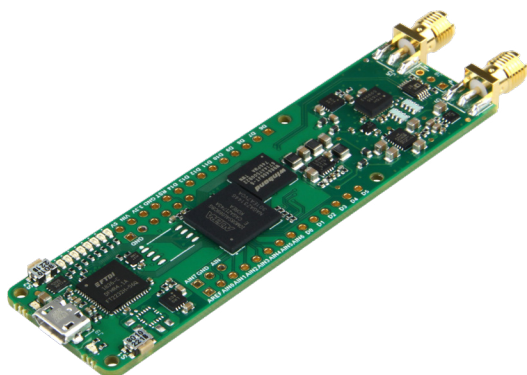## Based on Analog Devices' ADAQ7980 16-Bit 1 MSPS, µModule® Data Acquisition System

AnalogMAX-DAQ2 is a high-accuracy data acquisition platform that meets footprint, power, and reliability requirements of measurement instruments in industrial, medical, and scientific applications. The data acquisition platform is based on the high-impedance, programmable ADC driver stage using AD8251 driving the ADAQ7980, a 16-bit µModule® that integrates several signal chain components into a tiny LGA 4 mm x 5 mm package. This platform is ideal for small form factor systems that require accurate and reliable operation over long periods of time. The non-volatile low-cost Intel® MAX® 10 FPGA offers 8K Logic Elements (LEs) and a flexible environment to customize designs for a variety of use cases.

The ADAQ7980 µModule® solution contains a high accuracy, low power, 16-bit SAR ADC, a low power, high bandwidth, high input impedance ADC driver, a low power, stable reference buffer, and an efficient power management block. The level of system integration in the ADAQ7980 solves many design challenges, while the devices still provide the flexibility of a configurable ADC driver feedback loop to allow gain and/or common-mode adjustments. The µModule® shortens the analog signal chain design time and improves time to market.

Benefits of the AnalogMAX-DAQ2 Platform

> **Simplifies analog signal chain design:** The level of integration in ADAQ7980 simplifies the development of high-accuracy data acquisition systems
> **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 a Jupyter notebook demo with Python code
> **Quick customization services:** Add new functionality, lower BOM cost, or have the complete product designed

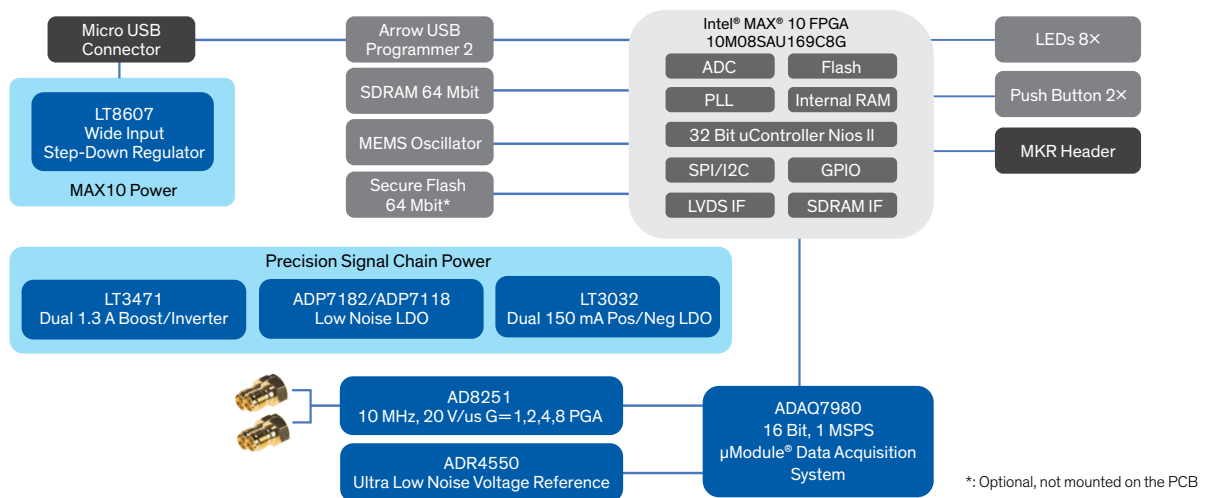## µModule® Data Acquisition Development Platform Based on Intel® MAX®10 FPGA

Part #: AnalogMAX-DAQ2

Signal Spectrum
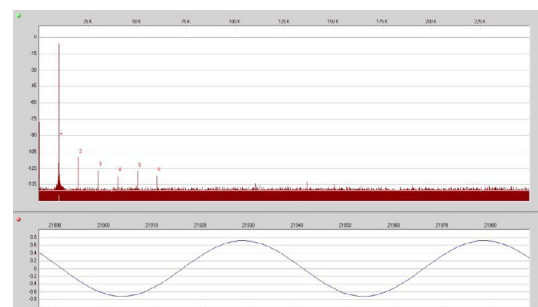
Input signal is a 1 kHz sine wave

Five Years Out

AnalogMAX-DAQ2 Block Diagram

*: Optional, not mounted on the PCB

Hardware Features

> 16-bit, 1MSPS, µModule® data acquisition system (Analog Devices ADAQ7980)
> Power: Small foot-print, low-noise power design
> On-board Intel® MAX® 10 FPGA to combine and process data from multiple sensor inputs
> Memory: SDRAM Memory up to 64 Mb @ 166 MHz, 64 Mb Quad SPI Flash and 4 Kb EEPROM Memory
> Dual high-speed USB to multipurpose UART/FIFO IC
> I/O interface: 23 × GPIO

Software and Demo Features

> 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
> ADAQ7980: 16-bit, 1MSPS, µModule® data acquisition system
> AD8251: 10 MHz, G = 1, 2, 4, 8 iCMOS® programmable gain instrumentation amplifier
> ADR4550: Ultra-low noise, high-accuracy 5.0 V voltage reference

Power
> LT8607: 42 V, 750 mA synchronous step-down regulator with 2.5 µA quiescent current
> LT3471: Dual 1.3 A, 1.2 MHz boost/inverter in 3 mm × 3 mm DFN

Processor
> Intel® MAX® 10 FPGA: Non-volatile low-cost FPGAs (part #:10M08SAU169C8G)

Features of the ADAQ7980 16-Bit 1 MSPS, µModule® Data Acquisition System:

> Low-power data acquisition system with 16-bit, 1MSPS µModule®
> Includes all critical passive parts
> INL: ±8 ppm typ.
> SNR: 91.5 dB typ.
> THD: -105 dB at 10 kHz

Ordering Information

Part #: AnalogMAX-DAQ2

Documentation and Instructions

github.com/ArrowElectronics/AnalogMAX/wiki

Online

www.arrow.com/analogMAX

ARROW
Five Years Out