MicroDAQ E2000

Multifunction DAQ Device with Real-Time Processing Capabilities

Embedded Solutions

Features

- Fixed/floating point DSP core
- Ethernet and Wi-Fi
- Analog inputs
- Analog outputs
- Digital input and outputs
- UART, PWM, Quadrature encoder inputs

Supported Operating Systems

Windows/Linux/MacOS

Supported Software

Scilab, MATLAB/Simulink, LabVIew, C/C++, Python

Overview

The E2000 series is dedicated to data acquisition and real-time processing applications. Thanks to dedicated DSP core user can execute code on an independent processing unit. The E2000 series is perfect for control and signal processing applications. The device can be configured with all available analog input and output options. The E2000 series is equipped with six PWM channels, two Encoder modules, up to 32 digital input/output channels. The E2000 software allows using the device with Scilab, Matlab/Simulink, LabView and C/C++ and Python programming languages.

DSP Core

MicroDAQ E2000 features DSP processing unit. The 300 or 456-MHz TMS320C674x floating/fixed point DSP can be used to execute signal processing and control applications.

The MicroDAQ software allows DSP utilization by automatic code generation from Matlab/Simulink or Scilab/Xcos.
Generated DSP application can be loaded with Ethernet or Wi-Fi on MicroDAQ DSP. The software allows live application data access during DSP execution.

Analog Input

MicroDAQ E2000 analog inputs can be selected from ten available options. User configure MicroDAQ with cost-effective, simultaneously sampling and muxed analog inputs with sampling rate up to 2000ksps. All available analog input options can be used for data acquisition and real-time processing.

Analog Output

The device can be configured with different analog output options. From basic 100ksps with 0-5V output range to advanced 16 channel, 16bit, 800ksps, ±10V, ±5V, ±2.5V, 0-10V, 0-5V multi-range option. All available analog output options can be used for data acquisition and real-time processing

Digital I/O

The 32/16 digital I/O lines are configured as 16/8 inputs and 16/8 outputs. Digital I/O lines are shared with PWM, Encoder inputs, and UART port. Digital I/O can be used for data acquisition or real-time processing when executing accessing from DSP application.

Storage

The MicroDAQ E2000 provides up to 32Gb total storage memory. This memory can be used to store user data. The User can use Simulink or Xcos ‘To File’ block to save data from DSP application. The memory can be accessed via web browser or USB.

Ethernet and Wi-Fi

The MicroDAQ E2000 series provides Ethernet and Wi-Fi. Both interfaces can be used for device control and data exchange with host PC. Unique software features allow loading and live application data access during DSP execution via Ethernet or Wi-Fi.

MicroDAQ E2000 specification

Processing unit	300 or 456MHz TI C674x fixed/floating point DSP core
Memory	up to 32GB of storage
Connectivity	Ethernet 100Base-TX WIFI, IEEE 802.11n, RP-SMA connector, 9dBi antenna USB2.0 480MBit (mass storage device)
Digital I/O	16 or 32 5-Volt TTL/CMOS DIO with configurable functions: ▪ 6 PWM ▪ 1 UART ▪ 2 Quadrature encoder module
Power	5V DC power supply, USB powered - storage access only
Operating temperature	0 °C to +70 °C (operational), -40 °C to +90 °C (storage only)
Dimensions	53.5x131x172mm, 53.5x131x132mm (ADC01-DAC01 configuration)
Software support	**Scilab/Xcos** MicroDAQ toolbox for Scilab - data acquisition - automatic code generation for DSP - legacy C code integration - Evidence E4Coder support **LabVIEW** Real-time processing with MicroDAQ DSP VIs for: analog input/output, DIO, Encoder, PWM, UART **Matlab/Simulink:** Automatic build and download to target over Ethernet or WiFi Standalone, PIL andn External mode supported PIL mode profiling support Simulink block library

MicroDAQ E2000 Analog Output

Analog output	DAC01	DAC02	DAC03	DAC04	DAC05	DAC06	DAC07
Number of channels	8	8	8	16	16	4	4
Resolution	12-Bit	12-Bit	16-Bit	12-Bit	16-Bit	12-Bit	16-Bit
Output range range	0-5V	±10V ±5V ±2.5V 0-10V 0-5V	±10V ±5V ±2.5V 0-10V 0-5V	±10V ±5V ±2.5V 0-10V 0-5V	±10V ±5V ±2.5V 0-10V 0-5V	±10V ±5V ±2.5V 0-10V 0-5V	±10V ±5V ±2.5V 0-10V 0-5V
Multi-range selection(1)	No	Yes	Yes	Yes	Yes	Yes	Yes
Sampling rate	100ksps	800ksps	800ksps	800ksps	800ksps	800ksps	800ksps
Current drive	±10mA	±10mA	±10mA	±10/5mA(2)	±10/5mA(2)	±10mA	±10mA
Slew rate	0.75V/µs	5V/µs	5V/µs	5V/µs	5V/µs	5V/µs	5V/µs
Capacitive load (max)	1000pF	1000pF	1000pF	1000pF	1000pF	1000pF	1000pF
INL	±0.5 LSB max	±0.5 LSB max	±1 LSB max	±0.5 LSB max	±1 LSB max	±0.5 LSB max	±1 LSB max

[1] Multi-range selection allows selecting different ranges for used channel e.g. ±10V and ±5V for channel 1 and 2 respectively, if not supported only one range can be selected for used channels.
[2] ±10mA for up to 8 channels in use, 5mA for up to 16 channels in use

MicroDAQ E2000 Analog Input

Analog input	ADC01	ADC02	ADC03	ADC04	ADC05
Number of channels	8	8	16	8	16
Sampling rate	100ksps	600ksps(2)	600ksps(3)	500ksps(4)	500ksps(5)
Resolution	12-Bit	12-Bit	12-Bit	16-Bit	16-Bit
Input range	±10V ±5V 0-10V 0-5V	±10V ±5V ±2V ±1V	±10V ±5V ±2V ±1V	±10V ±5V ±2V ±1V	±10V ±5V ±2V ±1V
Multi-range selection(1)	Yes	No	No	No	No
Over-voltage protection	±25V	±20V	±20V	±20V	±20V
Type of ADC	SAR	SAR	SAR	SAR	SAR
Type	Multiplexed	Simultaneous	Simultaneous	Simultaneous	Simultaneous
Differential	Yes	No	No	No	No
Input impedance	42kΩ/31kΩ(6)	>1GΩ	>1GΩ	>1GΩ	>1GΩ
INL	±1 LSB max	±1 LSB max	±1 LSB max	±4 LSB max	±4 LSB max

[1] Multi-range selection allows selecting different ranges for used channel e.g. ±10V and ±5V for channel 1 and 2 respectively, if not supported only one range can be selected for used channels.

[2] 600/500/400ksps for 2/4/8 channels in use respectively (300MHz DSP)
600/600/500ksps for 2/4/8 channels in use respectively (456MHz DSP)

[3] 600/500/400/200ksps for 2/4/8/16 channels in use respectively (300MHz DSP)
600/600/500/350ksps for 2/4/8/16 channels in use respectively (456MHz DSP)

[4] 500/400/300ksps for 2/4/8 channels in use respectively (300MHz DSP)
500/500/400ksps for 2/4/8 channels in use respectively (456MHz DSP)

[5] 500/400/300/200ksps for 2/4/8/16 channels in use respectively (300MHz DSP)
500/500/400/300ksps for 2/4/8/16 channels in use respectively (456MHz DSP)

[6] 42kΩ - unipolar (ranges 0-10V, 0-5V), 31kΩ - bipolar (ranges ±10V, ±5V)

Analog input	ADC06	ADC07	ADC08	ADC09	ADC10
Number of channels	8	8	16	16	8
Sampling rate	500ksps	1000ksps	500ksps	1000ksps	2000ksps
Resolution	16-Bit	16-Bit	16-Bit	16-Bit	16-Bit
Input range	±10.24V ±5.12V ±2.56V ±1.24V ±0.64V	±10.24V ±5.12V ±2.56V ±1.24V ±0.64V	±10.24V ±5.12V ±2.56V ±1.24V ±0.64V	±10.24V ±5.12V ±2.56V ±1.24V ±0.64V	±10.24V ±5.12V ±2.56V ±1.24V ±0.64V
Multi-range selection(1)	Yes	Yes	Yes	Yes	Yes
Over-voltage protection	±20V	±20V	±20V	±20V	±20V
Type of ADC	SAR	SAR	SAR	SAR	SAR
Type	Multiplexed	Multiplexed	Multiplexed	Multiplexed	Multiplexed
Differential	Yes	Yes	Yes	Yes	Yes
Input impedance	>100GΩ	>100GΩ	>100GΩ	>100GΩ	>100GΩ
INL	±3 LSB max	±3 LSB max	±3 LSB max	±3 LSB max	±3 LSB max

[1] Multi-range selection allows selecting different ranges for used channel e.g. ±10V and ±5V for channel 1 and 2 respectively, if not supported only one range can be selected for used channels.