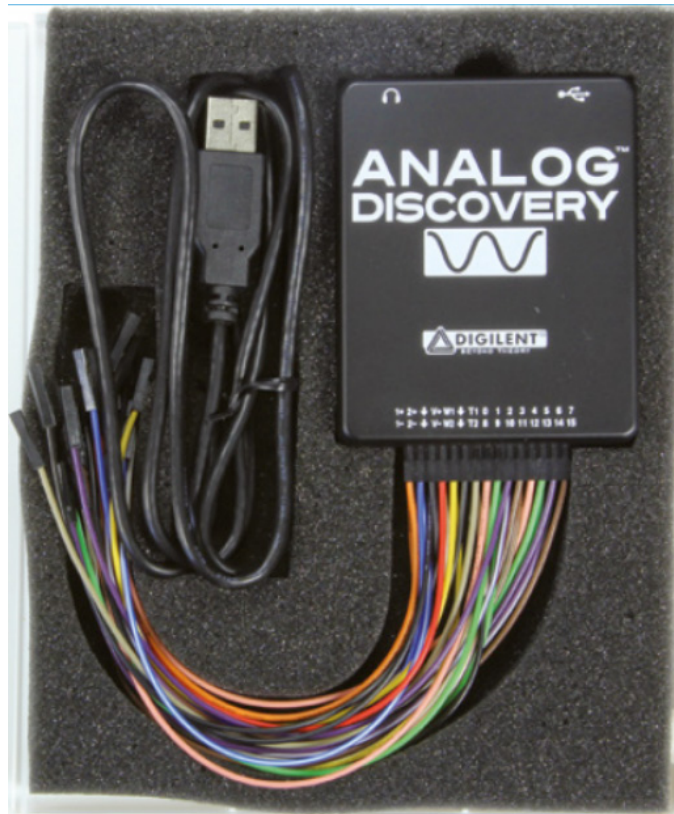


Measurements with Analog Discovery

Introduction

The Digilent¹ *Analog Discovery* is a very powerful test and measurement toolbox, that can be used while you are debugging real-time code. The cost for students is \$99!



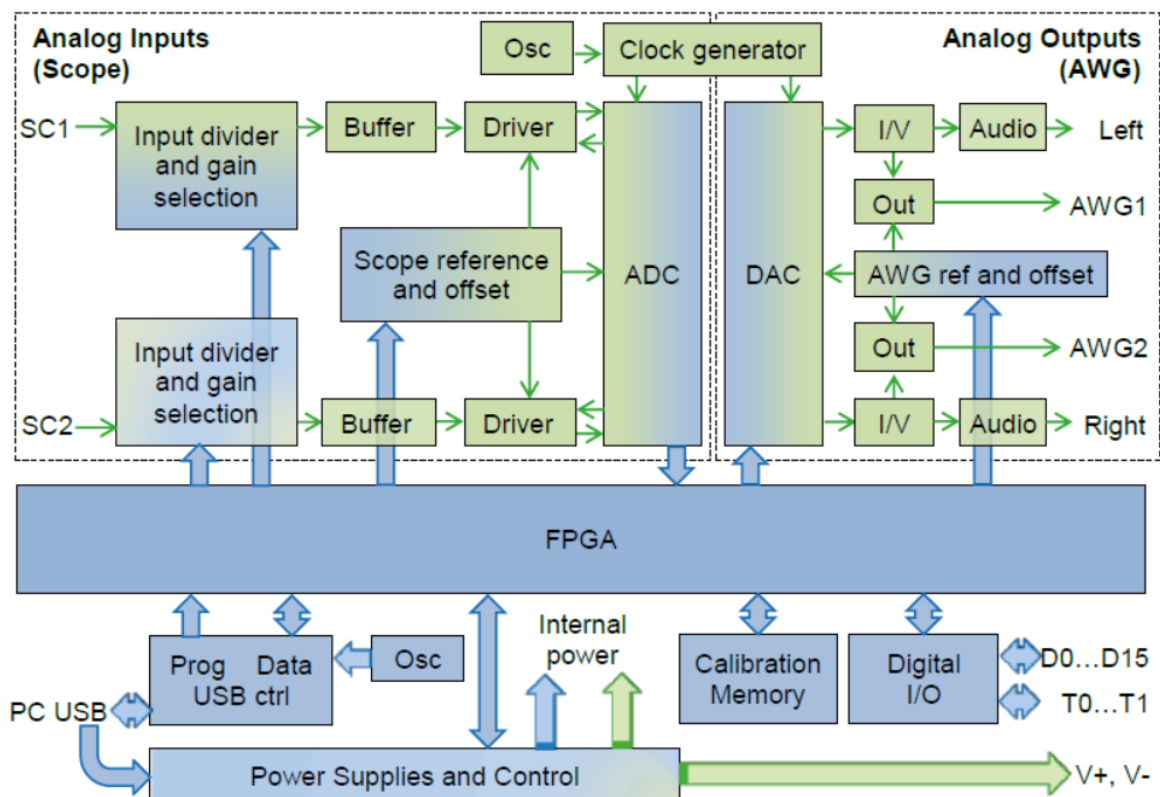
- With this small device and laptop PC, you can perform laboratory type measurements almost most anywhere

1. <http://www.digilentinc.com/analogdiscovery/>

- The feature set includes:

Technical Data		
Oscilloscope <ul style="list-style-type: none"> • 2 channels with differential inputs • 5 MHz analog bandwidth • 100 MS/s ADC sampling rate • 14 bit ADC resolution • 1 MΩ / 20 pF input impedance • Vertical: 0.5 mV – 5 V per division, max. \pm25 V • 16 KS buffer • Cross-triggering with other functions 	<ul style="list-style-type: none"> • 14 bit DAC resolution • Sine, triangle, square wave, etc. • User-defined waveforms • Sweeps, envelopes, AM and FM modulation 	Other functions <ul style="list-style-type: none"> • Voltmeter: DC, AC with True RMS • Adjustable output voltage • \pm5 V / 50 mA output voltage • Spectrum analyzer with many modes • Digital I/O with all 16 pins individually controllable • Digital pattern generator – up to 100 MS/s • Network analyzer – 1 Hz to 10 MHz • Data transfer and power via USB 2.0 • Waveform generator output on 3.5 mm audio jack • Signal data can be exported • MATLAB support
Function generator <ul style="list-style-type: none"> • 2 channels with single-ended outputs • 5 MHz analog bandwidth • 100 MS/s DAC sampling rate 	Logic analyzer <ul style="list-style-type: none"> • 16 digital channels • 100 MS/s sampling rate • 3.3 V logic level, LVCMOS compatible • 16 K transitions buffer capacity • Trigger: pin change, bus pattern, etc. • Interpreter for SPI, I²C, UART, parallel bus 	

- System block diagram:



- The Software: *Waveforms*TM
 - What is really astounding is the capability of the software that comes with the Analog Discovery

- Version 2.x of the software supports just Windows, but version 3, under development, will additionally support Mac OS and Linux
- The remainder of this appendix provides examples of using the Analog Discovery to take measurements in the context of the real-time DSP course
 - Don't stop here if you are interested in general electronic circuit design test and measurement
 - There is much more capability of this device that remains to be explored for other types of course/lab work

Audio Loop Through

Function Generator Input to Scope Output Measurement

- What
-

Spectrum Analysis

-
-

ISR Timing Analysis

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-

Analog I/O Frequency Response

- A very useful real-time DSP capability of the analog discovery is in making frequency response measurements of the audio in and out of the codec