Measurements with Analog Discovery

Introduction

The Digilent\textsuperscript{1} 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 anywhere

\textsuperscript{1}http://www.digilentinc.com/analogdiscovery/
• The feature set includes:

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Other functions</th>
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<tbody>
<tr>
<td>Oscilloscope</td>
<td>Voltmeter: DC, AC with True RMS</td>
</tr>
<tr>
<td>2 channels with</td>
<td>Adjustable output voltage</td>
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<tr>
<td>differential inputs</td>
<td>±5 V / 50 mA output voltage</td>
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<tr>
<td>5 MHz analog bandwidth</td>
<td>Spectrum analyzer with many modes</td>
</tr>
<tr>
<td>100 MS/s ADC sampling</td>
<td>Digital I/O with all 16 pins individually controllable</td>
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<tr>
<td>rate</td>
<td>Digital pattern generator – up to 100 MS/s</td>
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<tr>
<td>14 bit DAC resolution</td>
<td>Network analyzer – 1 Hz to 10 MHz</td>
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<tr>
<td>Sine, triangle, square</td>
<td>Data transfer and power via USB 2.0</td>
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<td>wave, etc.</td>
<td>Waveform generator output on 3.5 mm audio jack</td>
</tr>
<tr>
<td>User-defined waveforms</td>
<td>Signal data can be exported</td>
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<td>Sweeps, envelopes, AM</td>
<td>MATLAB support</td>
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<td>and FM modulation</td>
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Logic analyzer
- 16 digital channels
- 100 MS/s sampling rate
- 3.3 V logic level, LVC MOS compatible
- 16 K transitions buffer capacity
- Trigger: pin change, bus pattern, etc.
- Interpreter for SPI, I²C, UART, parallel bus

Function generator
- 2 channels with single-ended outputs
- 5 MHz analog bandwidth
- 100 MS/s DAC sampling rate

• System block diagram:

• The Software: Waveforms™
  - 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

- 
  -
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.