

Abstract Submitted  
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**The trials and tribulations of building a phase-sensitive detector with an Arduino microcontroller** KEVIN SCHULTZ, Hartwick Coll — In the last few years we have seen a proliferation of relatively inexpensive devices that can be used for data acquisition. In addition to having high resolution and multiple channels, these devices require nothing more than a USB port to communicate with a computer. All of these attributes make these devices perfect for an undergraduate laboratory. Despite their simplicity, they have some costly aspects. Most of these devices, including the popular Arduino series of microcontrollers, do not function easily as signal sources. In this talk, I will describe the challenges I faced making a self-contained, phase-sensitive detector (PSD) using the Arduino/Processing device and language families. The goal of the project was to create a phase-sensitive detector that was cheap, easy to program, and used no external components beyond a few passive components like resistors and capacitors. The pedagogical hope was to use this popular platform, or others like it, to teach undergraduates the important technique of PSD. A two-phase PSD was successfully implemented, but to overcome the technical difficulties inherent in the goals will require the use of advanced programming techniques like “bit-banging,” hardware/software interrupts, and careful memory management.

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