

Instrumentation Board Choices

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What is a Personal Instrumentation Board?

ECSE requires knowledge of measurement equipment like:

1. Multimeters
2. Oscilloscopes
3. Source Measure Units
4. Function Generators
5. Spectrum Analyzers
6. Ohmmeters
7. Impedance Meters
8. DC Power Supplies
9. Etc. etc.

These benchtop pieces of equipment are the best possible way to get accurate measurements of a system BUT they are costly, you can't use open source code like C, C++, and Python typically with them, AND you can't carry them around wherever you go.

Thus, the Personal Instrumentation Board was innovated in part by Prof. Don Millard (for RPI professor with a Mobile Studio board in 1999). From this prototype the following new learning/educational boards were inspired. Doug Mercer, [an RPI ECSE Hall-of-Famer](#), founder of the [Mercer Lab](#) (*on the JEC 6th floor that house the BEST of the above benchtop equipment for your use*), and Advisory Board member invented and is still the technical facilitator for the M1K and M2K board. He donated the M1K board to all First-Year students. All Personal Instrumentation Boards have some combination of the equipment above in a small form factor that connects directly to your USB port of your laptop. There are tradeoffs/limitations to each one. Intro to ECSE will start with the ADALM1000 (M1K). You can decide however to use either of the other two. Instructions in Intro to ECSE are currently written for the M1K board but we welcome users of the M2K and Analog Discovery Board.

[ADALM1000 \(M1K\)](#) Free to all First-Year students (Professors will hand these out in class!) Source Measure Unit (SMU) makes it different than all the rest....

[ADALM2000 \(M2K\)](#) (~\$180-\$300 depending on where you buy it. Better than M1K and will be used in future courses)

[Analog Discovery Board 2](#) (~\$400 this price has more than doubled in about 5 years due to high demand and simply being the BEST Personalization Board that covers all needs for our classes....this price is a major limiting factor)

What are we using for Intro to ECSE? M1K! No need to buy others unless....see below

ADALM1000 (M1K) Board IT'S FREE but...buggy

- It's a source measure unit so it functions differently (will explain in labs)
- It requires a daughter board to get -5 volts, we'll hand that out to you too!
- Much cheaper \$40.00 if you had to buy it, but it is free for you!
- Can do some programming with it
- Honestly, it can be buggy...we'll do our best to avoid these bugs and give you options to use other boards to borrow in class if necessary.
- Only +5V DC power source but with daughter board it can get -5V
- Has a current limitation that may prohibit

ADALM2000 (M2K) Board IT'S \$180-\$300 depending on where you buy...better!

- Now being used in ECSE 2010, ECSE 2050, likely other future courses
- Will likely switch Intro to ECSE to this in future semesters with the back up plan of using the M1K
- Has a current limitation that may prohibit circuit that draws a lot of current >50mA
- RPI Bookstore \$300 <https://www.bkstr.com/rpistore/product/adalm2000-board-817836-1>
- Mouser \$180 <https://www.mouser.com/ProductDetail/Analog-Devices/ADALM2000?qs=xbccQsLEe0e03sUxIHWPSw%3D%3D>
- These change every year...no idea why...

Analog Discovery Board 2 \$400...they know they are the BEST one...

- It just works for every class, every time...very little bugs...better current limit 750mA
- Higher frequency limits
- Better GUI for all functions: Scope, Function Generator, Spectrum Analyzer...
- <https://digilent.com/shop/analog-discovery-2-100ms-s-usb-oscilloscope-logic-analyzer-and-variable-power-supply/>