CheapStat open source DIY potentiostat

By the machinegeek
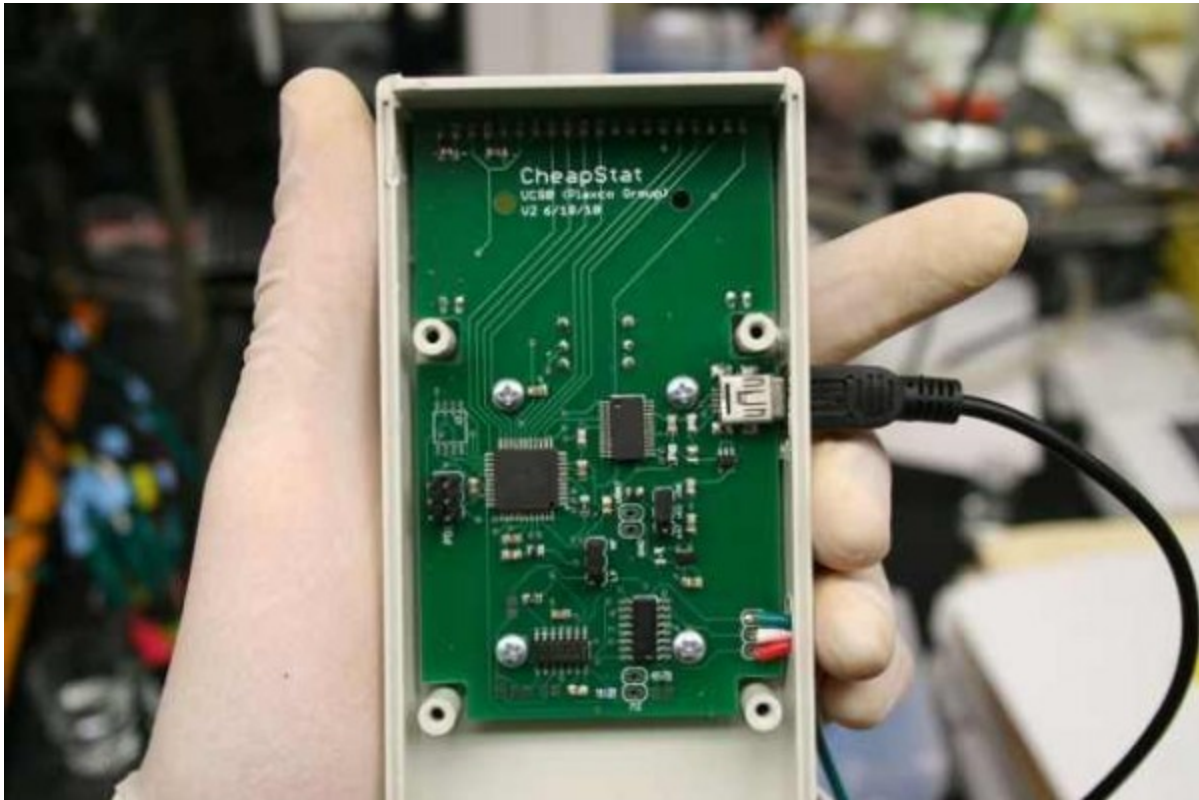
A potentiostat is an electronic instrument that controls the voltage difference between a Working Electrode and a Reference Electrode contained in an electrochemical cell. Control is achieved by injecting current into the cell through an Auxiliary, or Counter, electrode.

Commercial units sell for up to $10,000, but the researchers at University of California (Santa Barbara) were able to design one costing less than $100.

> In response to the apparent need for a truly inexpensive, fully programmable potentiostat we present here the CheapStat, an open-source potentiostat easily constructed by anyone proficient at assembling circuits. We believe this device may prove of value in undergraduate chemistry labs, the developing world and other environments where resources are limited. In support of this, we have demonstrated the device's utility in applications including food and drug testing, environmental monitoring, education, and biosensing.
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> The device supports cyclic, square wave, linear sweep and stripping voltammetry over the potential range −990 to +990 mV and over frequencies from 1 to 1000 Hz. The device supports a range of environmental, food and drug quality control, and educational applications. The reverse of the circuit board supports a three-line LCD display and a joystick, which is used to select an experiment protocol, change its parameters (frequency, starting voltage, end voltage, scan rate), and initiate the experiment.

PLosONE, a site covering peer-reviewed scientific publications, has published this research paper detailing the development and usage of the CheapStat. While the science is rather deep, and this isn't the type of project many hobbyists would build, it nevertheless serves to illustrate how open source hardware and software benefit society in ways we wouldn't otherwise think of.

The schematic diagrams are available from the PLosONE site as well as the complete build instructions in DOCX format, the MS Word/Office format. (Yes, we see the irony too.)

Via Citizen Science Quarterly.