

## Kits for Kids



The people at SparkFun Electronics have several new microcontroller products for young minds to explore. The ProtoSnap Pro Mini board, for example, combines an Arduino Pro Mini section with I/O devices – a buzzer, red-green-blue LED, a light sensor, and a pushbutton – in separate sections of a ProtoSnap board. The six sections come connected to the Arduino Pro MCU so students and experimenters can get started right away. The many Arduino programs, called sketches, and free software make it a "snap" to get started. [www.sparkfun.com](http://www.sparkfun.com) [1].

If they choose, people simply snap off the "outboards" and retain the Arduino Pro along with the USB section for programming and add their own LEDs, buzzers, and other components as needed for a project. The ProtoSnap Pro Mini boards cost \$US 45 each.

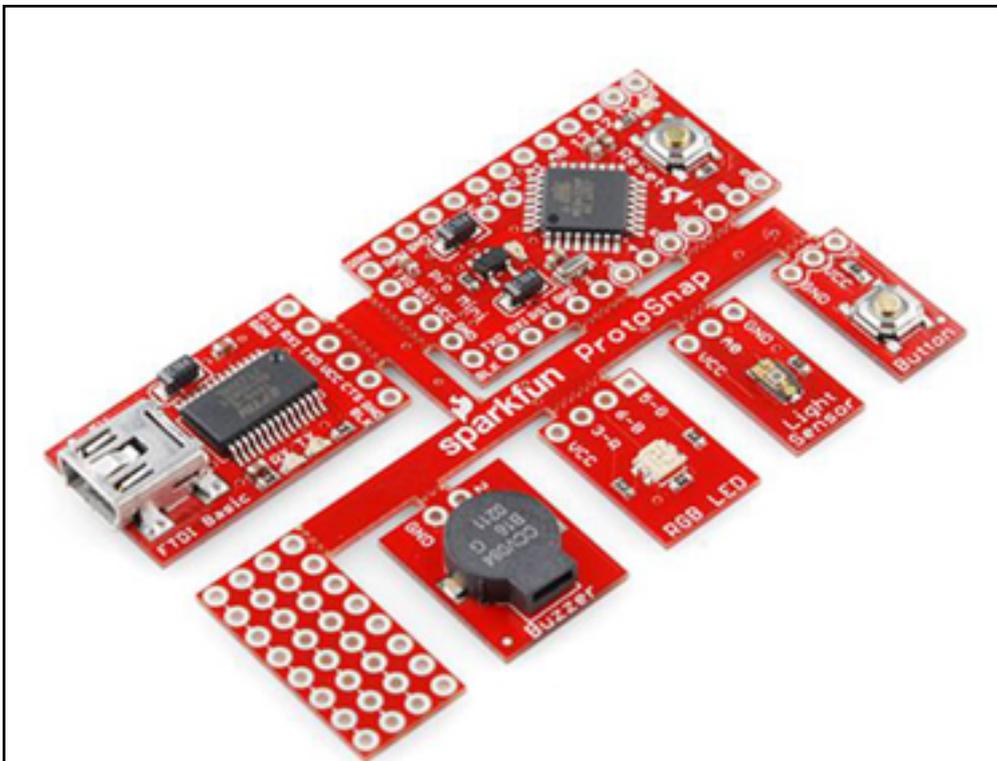


Figure 1. This ProtoSnap Pro Mini board from SparkFun gives kids a way to learn about microcontrollers and then snap off components or add others.

Experimenters can

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get quite creative with the SparkFun ProtoSnap LillyPad board kits that include an MCU module and break-away LEDs, pushbuttons, switches, and sensors. Pete Lewis at SparkFun explained that adventurous experimenter can sew the LEDs and sensors onto a sweater or sweatshirt and connect them to the MCU module with thin wires. The ProtoSnap LilyPad Development Boards cost \$US 60 each. The ProtoSnap LilyPad E-Sewing Kits cost \$US 20 each.

SparkFun also has an "Inventor's Kit," that includes an Arduino Uno board, a breadboard and many components such as LEDs, DC motor, servo motor, photocell, and so on. An accompanying manual--also available online--describes what the components do, the basic structure of C-language programs, and instructions for set up of software on either a Windows XP or Mac OS-X computer. Fourteen hands-on experiments include explanations, C-language code with comments, breadboard-wiring instructions and diagrams, troubleshooting information, and an optional "Making it Better" section that enhances the results. For \$US 99, the kit seems like a bargain. A set of kit overlays, sold separately (\$US 1.50), simplifies component placement and breadboard wiring.

If a young person has some electronics experience and wants more details about how to use an Arduino Uno module, I recommend the book, "Arduino Cookbook," by Michael Margolis, published by O'Reilly media. This 600-page book tells experimenters just about everything they need to know about the Arduino and how to use its free software and connect hardware devices and boards, called "shields" to it. But as one reviewer on Amazon noted, "Be ready to buy some more parts." ISBN: 978-0596802479, \$US 45, available for \$US 30 on Amazon.

For experimenters who need more computing power and I/O capabilities, consider the chipKIT Uno32 from Digilent and Microchip Technology. The new board maintains compatibility with code and hardware used for the original Arduino Uno boards, but provides a 32-bit MCU and many extra peripherals. Online software documentation for the Arduino Uno also applies to the Uno32 board. Price: \$US 27. [www.digilentinc.com](http://www.digilentinc.com) [2]. Digilent also has many other MCU boards, including the Arduino compatible Max32.

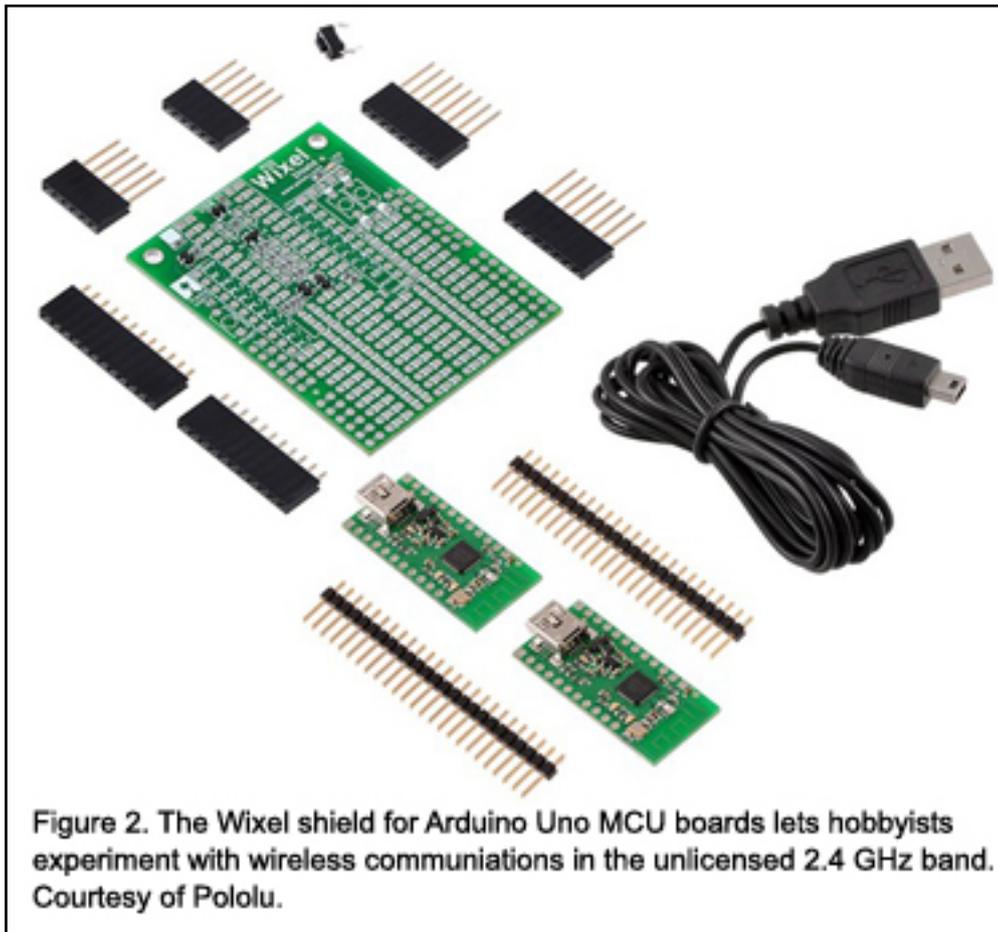


Figure 2. The Wixel shield for Arduino Uno MCU boards lets hobbyists experiment with wireless communications in the unlicensed 2.4 GHz band. Courtesy of Pololu.

For hobbyists and experimenters who want to learn about and use wireless devices, Pololu has created Wixel shields for Arduino boards that, "... duplicate the functionality of the Arduino's USB interface, allowing you to program and communicate with your Arduino wirelessly using the standard Arduino software and existing Arduino sketches." Each Wixel module provides a Texas Instruments CC2511F32 MCU and a built-in 2.4 GHz transceiver. You can write your own software or load precompiled, open-source apps onto the TI MCU. Pololu provides many software resources and code for the Wixel wireless modules and CC2511F32 MCU. Purchase individual Wixel modules for \$20 each or a complete Wixel kit that includes one Arduino shield board, two Wixel modules, pins, and a USB cable for \$US 50. [www.pololu.com](http://www.pololu.com) [3]. Parents or relatives with electrical-engineering experience might find the TI CC2511F data sheet helpful. Visit: [www.ti.com/product/cc2511f32](http://www.ti.com/product/cc2511f32) [4].

Remember to check out the latest Arduino information at the group's Web site: [www.arduino.cc](http://www.arduino.cc). You'll find a free compiler, code examples, reference information, comments from experimenters and professionals, and information for newcomers.

Not all young people want to program MCUs, but they can still learn more about the world of science by visiting the "Science News for Kids" Web site and signing up for a weekly email that provides science-news updates. The Society for Science and the Public sponsors the site: [www.societyforscience.org/sciencenewsforkids](http://www.societyforscience.org/sciencenewsforkids) and aims the news at young people between about nine and 14. The SSP also hosts the Intel International Science and Engineering Fair that involves budding scientists worldwide and awards more than \$4 million annually.

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If you have a favorite kit or Web site for young engineers or scientists, or know of one you think we should mention, let me know: [jontitus@comcast.net](mailto:jontitus@comcast.net) [5].

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### **Links:**

[1] <http://www.sparkfun.com>

[2] <http://www.digilentinc.com>

[3] <http://www.pololu.com>

[4] <http://www.ti.com/product/cc2511f32>

[5] <mailto:jontitus@comcast.net>