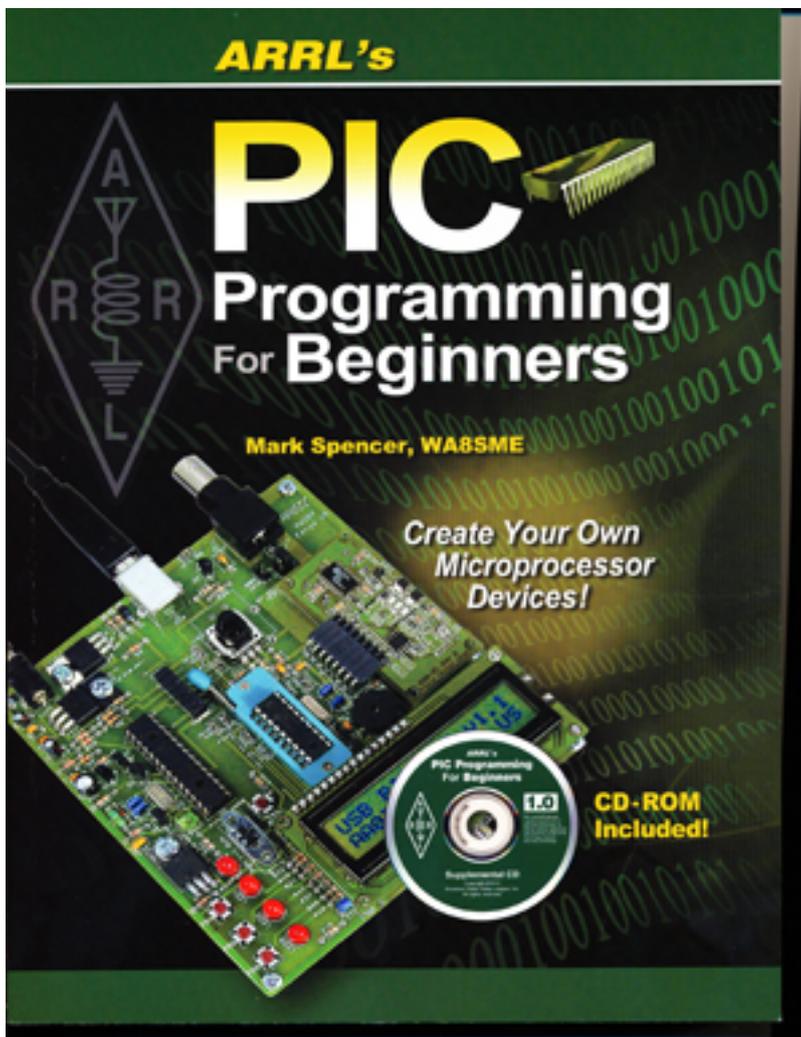


Kits for Kids

Jon Titus, Senior Technical Editor



The Microchip Technology PIC processors have appealed to electronics experimenters and hobbyists for some time, and many companies sell a variety of device programmers and development boards. Young people, though, can start with a less elaborate setup: a solderless breadboard, a PIC microcontroller, and a few components along with an inexpensive PIC MCU programmer. That's the approach Mark Spencer takes in "PIC Programming for Beginners." Spencer selected the PIC16F676 microcontroller and he uses the free Microchip MPLAB integrated development environment (IDE) along with a PICKit 2 Starter Kit (\$US 49, part no. DV164120).



To learn the most from this book,

Kits for Kids

Published on Electronic Component News (<http://www.ecnmag.com>)

readers should peruse the chapters sequentially and run the exercises. Spencer notes that Chapter 6, which covers PIC registers, ranks highest in importance. Understanding MCU operations depends on knowing how to properly use internal registers that save information and perform special functions. Unlike some books that include complicated examples, the author uses a "brute force programming method" that emphasizes understanding rather than code efficiency. I bet a lot of nascent programmers will like this book.

The experiments all use assembly-language code, which might seem like a throwback when so many programmers now use C. I've found, though, beginners who start with assembly language and understand MCU organization become good problem solvers because they understand the underlying resources their code can use.

The book, published by the American Radio Relay League, comes with a CD-ROM that contains the programs used in the text, reference materials, and some short videos. An appendix provides answers for questions at the end of most chapters. The book doesn't include a bill of materials, but experiments don't require much additional hardware.

A Low Cost MSP430 Kit

If you want to get deeper into programming, buy the LaunchPad kit for Texas Instruments MSP430 Value Line MCUs sells for \$US 4.30. The kit includes a board that handles 14- or 20-pin MSP430 Value Line MCUs, two MCU chips, and a USB cable. You can solder included pins to the board and drop it onto a pair of solderless breadboards. TI offers a free "lite" version of its Code Composer Studio (CCS) tools for the MSP430 Value Line MCUs that anyone can download. The tools might intimidate new users, but information on TI's CCS Wiki pages will help them get off to a good start. Prepared to put in some mentoring time with new users, though.

Simulate Digital Circuits

If you want to introduce youngsters to digital logic without buying hardware, try a digital-simulation program such as EasySim (\$US 14.95). It lets you draw simple schematic diagrams that use drag-and-drop logic gates and functions, and connect them with "wires." Output devices such as "LEDs" and "displays" show the results. "Switches" and oscillators drive the circuits. The wires change color to indicate their logic state, a nice aid for people who haven't worked with digital logic.

Make It Easy

If you haven't yet seen Make: magazine, you should take a look at this quarterly publication from O'Reilly Media (\$US 34.95/year). Make: covers do-it-yourself science kits, tutorials, projects, discussions, articles, and news. Issue 23--176 pages--included articles about smelting copper, an anti-mosquito beam weapon, a magic mirror, a mystery-switch box, an audio amplifier, and a gyroscopic model car that rides a rail on one wheel. Those projects just scratch the surface of this issue's contents. I just signed up for a subscription.

Kit Update

In previous columns I have mentioned Jaycar, an electronics supplier in Australia.

Kits for Kids

Published on Electronic Component News (<http://www.ecnmag.com>)

Recently I purchased two audio-mixer kits from the company and they arrived promptly. I discovered a cracked front panel, which the company replaced after an exchange of emails and after I sent a photo of the panel. When I opened packages of components I discovered two damaged potentiometers that the company also replaced, although they took a while to arrive. For the most part, the kit went together smoothly and the legends on the circuit board made it easy to choose and orient the proper components. The blue coating on the small resistors made the color codes impossible to read, so I kept a DMM handy to determine resistances. The knobs caused another problem. Their manufacturer didn't properly align the flat side of the insert for a control's shaft with the mark on the knob. So I oriented the knobs in my drill press and drilled a small crater that I filled with white paint. I "wiped out" the original cock-eyed lines with a black marker.

References:

EasySim: <http://www.research-systems.com/easysim/easysim.htm> [1].

Jaycar: www.jaycar.com [2].

Spencer, Mark, "PIC Programming for Beginners," ARRL, 2010. ISBN: 987-0-87259-089-2. \$US 39.95.

Texas Instruments Code Composer Studio Wiki:
<http://processors.wiki.ti.com/index.php/CCSv4> [3].

Texas Instruments LaunchPad: www.ti.com/launchpad and
www.ti.com/launchpadwiki [4].

Source URL (retrieved on 04/19/2015 - 7:44pm):
<http://www.ecnmag.com/articles/2010/10/kits-kids>

Links:

[1] <http://www.research-systems.com/easysim/easysim.htm>

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

[3] <http://processors.wiki.ti.com/index.php/CCSv4>

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