High-tech tinkerers on the rise

A growing demand for openness drives the trend

By Carolyn Y. Johnson
Globe Staff / February 11, 2008

For years, hackers and garage hobbyists have pried the covers off their gadgets, cobbled together computers out of components, or built other electronics from scratch. But today, even people who can’t tell a resistor from a capacitor are finding new opportunities to tinker as the do-it-yourself spirit of the Web branches into the physical world.

Not long ago, people who wanted to set up a Web page, blog, or upload video needed to know a little about programming; today, just about anyone can be up and running in an hour. Now, start-up companies and electronics kit makers are trying to bring the same kind of easy tinkering to the physical world amid calls for more openness.

Last summer, when the Apple iPhone was unlocked so that it would work on networks other than AT&T’s, a spotlight shined on the hacker who did it. A block of electromagnetic spectrum that will be used to carry wireless calls and data now being auctioned by the Federal Communications Commission will be required to have open access to devices and applications.

Verizon Wireless, the second-largest wireless carrier, said it will open its network to devices and applications not offered by the company, and is next month holding a developers’ conference to explain its technical standards.

"People just feel so hemmed in . . . Customers and users prefer open, and what’s happening is that the barriers of expertise required are getting lower and lower," said Eric von Hippel, a professor at the Massachusetts Institute of Technology’s Sloan School of Management. "The reason you’re going to see more and more people doing it is because they’ve always wanted to be able to fiddle - but the technology was daunting."

That’s changing, as do-it-yourself gadgetry becomes more accessible to people who have never even held a soldering iron.

Paul Badger, an instructor at the Rhode Island School of Design who runs Modern Device Co. out of his house, creates cheap microcontroller boards, called "Bare Bones Boards," that take off from a popular microcontroller called Arduino.

Badger’s art students work on things like a wig that can flip up and down and back and forth, or experiment with lighting; the Arduino microcontroller is often used in other artistic products, such as clothing melded with computing,
or basic robotics for artists.

"It gets by some of the tedious stuff and allows you to do high-level things quickly, without getting involved in lots of chips - the nuts and bolts and low-level stuff," Badger said.

At this year's Consumer Electronics Show, Bug Labs, a New York start-up, presented its gadget modules, meant to be the equivalent of consumer electronics Legos.

Bug Labs, which has named a module after von Hippel, starts with its BUGbase, a small Linux-based computer that can be linked to modules that include a GPS unit, an LCD screen, a camera module, and a motion detector.

Peter Semmelhack, Bug Labs' chief executive, said the inspiration came shortly after 9/11, when he wished he had a way to know where his loved ones were at all times - a simple gadget that would upload GPS information and let him know where they were.

"How hard could it be to make a hardware mash-up?" said Semmelhack.

"I found out pretty quickly it was impossible, and I was constantly being reminded there were devices I would love to have that just weren't available."

Semmelhack now uses his BUG to set up a motion-sensitive camera that automatically sends photos to his computer, letting him know when the deer are munching on his rose bushes. Bug Labs is hoping that people who see their lives filled with distinct devices - cellphones, computers, cameras, GPS receivers, and music players - will find fun ways to mash together devices, experimenting with ideas that big companies looking for mass appeal may never adopt.

The Chumby, a squeezable WiFi-connected device that pipes Internet content onto a small screen, also makes its debut this year. But the company isn't just selling the gadget, it's also giving away the design - from circuits down to the pattern for the leather panels on the outside.

"You might as well share the plans so everyone can benefit from it, and we don't believe that it hampers our ability to be competitive. To have it open - we think it helps," said bunnie Huang, the company's vice president of hardware engineering and a hacker who as an MIT student gained notoriety for hacking the Xbox. "When we share the plans, we invite the users to participate in the process of defining the product."

Von Hippel, who has studied innovation in various industries, said much of the innovation people take for granted comes from users.

"This is about what is called lead users. When we study where innovations come from, we find out that historically it has been argued that it's manufacturers who sort of look into your eyes" and divine what you want, he said.

"But actually when we trace back these things - whether they are consumer goods like skateboards, or things like heart-lung machines, users develop them because they need them."

But much of the innovation is also just fun.

Brian Jepson of Kingston, R.I., turned his Nokia N95 cellphone into a remote

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http://www.boston.com/business/technology/articles/2008/02/11/high_tech_tinkerers_on_the_rise/?page=full
control for his Christmas tree, setting it up so that every time he shook his cellphone, the lights blinked randomly, as if he were shaking a snow globe.

"There's a whole world waiting for people who have just gotten a taste of modifying a consumer device," said Jepson, who is executive editor of books for Make magazine, dedicated to do-it-yourself technology.

"We're looking to this future where the physical world is as programmable as the digital world."

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