



When the San Jose Mercury News' Jon Healy wrote about smart homes back at the turn of the century, he gave a miserable forecast. Smart homes, he said, would fail because they'd appeal only to couch potatoes. "Don't like to use a measuring cup?" he carped. "The mixer's sensors will tell you when to stop pouring."

Well, Jon, the mixer's turned into a party since then. According to the Monterey-based Internet Home Alliance (a research collaboration between companies like Cisco, Hewlett-Packard, and Microsoft), 61 percent of new single family houses built in the past year were equipped with structured wiring (a home network), 59 percent had high-speed internet access, and 28 percent had monitored security systems. The home automation market is currently a \$1.5 billion business, and experts say that could double by 2008.

Why the sudden boom? Partly, it's because technology has gotten cheaper. Just a few years ago, having a high-tech home meant shelling out upwards of \$50,000 for a system. Today, it costs about \$5,000 to fully automate a house, and there are many products that allow homeowners to add automated lights or remotely controlled entertainment systems for less than the price of a new couch.

Another reason for the renewed interest might be called the "Getting Used to Big Brother" effect. Consumers who walk around plugged into MP3 players, spend the day reading international news on the internet, and press their thumb to a screen to unlock their car have little hesitation in hooking their refrigerator up to a network. TiVo, WiFi, VoIP, and robotic

vacuum cleaners are appliances that some of us have already come to take for granted. It's a small step to remotely accessing one's kitchen from a website at work.

Customers may have been primed to convert to the Jetsons' lifestyle, but companies weren't. Like many technologies, home automation requires leading manufacturers to agree to a compatible industry standard. Currently, there is what one expert has called a "quagmire" of competing standards in the marketplace, but two groups have banded together to agree to make products that work on one network: the Z-Wave Alliance ([www.z-wavealliance.com](http://www.z-wavealliance.com)) and the ZigBee Alliance ([www.zigbee.org](http://www.zigbee.org)). The competing alliances both boast about the same number of participating companies; ZigBee's roster includes big players Mitsubishi Electric, Philips, and Samsung, while local favorite Z-Wave lists Logitech, Levitron, and Panasonic – and is backed financially by Cisco Systems.

			
<p><b>Bowers &amp; Wilkins Mini Theatre</b></p>	<p><b>Ultimate Control's customized home theatre</b></p>	<p><b>TMIO Connect to Intelligent Oven</b></p>	<p><b>Ultimate Control's customized home gym</b></p>

Both the Z-Wave and ZigBee standards are based on wireless mesh networks, which means that if a connection can't be made one way, the system finds a way to reroute it. This allows you to remotely control any device from anywhere in the house – instantly, because the connection is permanently "on" (unlike wireless networks like, say, Bluetooth). Z-Wave, however, is focused solely on the home automation market, while ZigBee also includes companies concerned with industrial applications.

"People have been looking at this automating-of-house technology now for almost 30 years," says Steve Troyer, vice president of marketing at the year-and-a-half-old Z-Wave. "In fact, the original research was done right here at SRI [Stanford Research Institute]; we're actually headquartered right around the corner from it in Menlo Park."

Troyer foresees a kind of quiet revolution in home automation happening in the coming year. "In the past," he says, "there was always this big, huge upfront investment that really made it only interesting to people who were really wealthy. Today you can get started for about \$100."

## THE ULTIMATE

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In Silicon Valley, plenty of companies are jumping on the bandwidth-wagon. One of the most successful, a San Jose company called Ultimate Control ([www.ultimatecontrol.com](http://www.ultimatecontrol.com)), specializes in creating the smart homes' integrated "brain" and gets involved with a home's design at the earliest stages. "We don't just install these systems," explains marketing manager Matt Thomas. "We're engineering-intensive, and collaborate on an equal basis with the architects and builders, working directly with the homeowner in the early stages of the process to incorporate [their] design."

Among the smart houses in Silicon Valley, there is a handful that, based on their sophistication and complexity, could very well be called "genius" homes. A prime example of these new ultra-smart houses is a tri-level structure in Palo Alto designed by Ultimate Control, where nearly every electrical element within the house is part of a centrally controlled network. Touch pad screens located throughout the house show a graphic representation of each level's floor plan, as well as the outside area, and contain control buttons for different functions, such as lights, security, audio, video, even the swimming pool. Different-colored icons provide the status of sub-elements in whatever function is being displayed. For example, a green line-drawing of a light bulb seen in the family room on the main level indicates that the lights in that part of the house are on. The screens are intuitively understandable; no learning curve required.

Long after each Ultimate Control project is completed, Thomas maintains, the house will be poised to accept any future upgrades as new technologies emerge. "Our systems are CAT5e and CAT6, which in layman's terms means that the houses are equipped and wired to accept Ethernet attached equipment, which should keep them very adaptable for many years to come."

Tying everything together, like refrigerators, stoves, audio/video systems, lights, heating and air conditioning, telephones, and security (just to name a few), is no easy task. Such integrated smart homes require an imposing stack of servers, each sprouting tree-limb thick bunches of wiring, to be humming mightily somewhere – hopefully hidden away – in the house. The real trick is to get all these banks of electronic brains in sync and make the network push-button easy to use. And even more importantly, have it work without fail.

"Our clients' needs are really very simple," says Matt Thomas, marketing manager of Ultimate Control. "They want the system to be straightforward and simple to use, with all the technology virtually invisible, so that even young kids can operate it. And they want it to be what we call 'telco-grade' reliable – in other words, never not working, never 'down.'" He admits that's a tall order, but to Ultimate Control, it's more like figuring out an extremely interesting engineering problem, as opposed to some impossible obstacle that can't be overcome.

## **DEBUGGING THE HOME**

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For all their brainpower, some smart homes are not completely immune to a few bugs now and then. It's not exactly Murphy's Law, but once in a while things can go awry.

Steve Kirsch is the founder and former chairman of Infoseek, the Internet navigation service that was acquired by Disney in 1999, and is now the head of Propel, a San Jose company that makes spam-filtering products. A longtime resident of Silicon Valley, he is proud of his new high-tech house... most of the time, anyway. With a Masters in Electrical Engineering from MIT, Kirsch knows a few things about high tech and has more than a little experience debugging new products. Even so, he's a bit bemused by a few of his new home's features, some of which, he feels, weren't quite thought out as completely as they could have been. To warn others, Kirsch has posted a video describing some of his smart home's dumber features (to view it, see [www.skirsch.com/videos](http://www.skirsch.com/videos)).

"Sometimes," he says with an ironic smile, "not everything works the way you expect it to work." His entryway, for example, uses a motion detector that unlocks the front door when someone from the inside is close enough to be detected. One problem, according to Kirsch, is that "...sometimes other motion within the house will unlock the door and the wind will unexpectedly blow the doors open. The other problem is that I [may] see people I don't want to let in, [but] if I get too close to the door by mistake, they're in."

Even more problematic can be the sometimes-finicky link between his audio/video system and its components. Kirsch's universal remote sends a signal to the a/v system, which then sends the appropriate code to the individual device, each of which has its own infrared sensors. "The problem here," he notes, "is if you were to manually turn one of the components off, the system doesn't know that it's turned off. If you then try to adjust something on one of the devices manually, it throws things all out of sync and nothing works in the entire house. The technology is great, but it's harder than you think to implement a system that makes all your audio and video devices work together in a seamless fashion. It took a couple of years to debug my system, but now it works reasonably well."

It may be a while before the majority of our homes are outfitted with smart systems of their own, but it also took a few decades to make electric appliances commonplace. Eventually, we – and our integrated networks – will likely all be on the same grid. Just make sure the one that runs your house isn't named HAL.

## **SMART CAN BE SMALL. TOO.**

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If the idea of an entire wired house still gives you flashbacks to 2001, check out these high-tech appliances. They offer a range of dandy features like internet connectivity, remote control, and even computerized voices!

### **Electrolux Communication Washing Machine**

[www.electrolux.com](http://www.electrolux.com)

Doing your laundry can get so boring that sometimes you imagine the washing machine is talking to you. Well, this one actually does –guiding users through wash cycles, explaining what functions mean, indicating if the door has been left open, even greeting the user with a little beep upon arrival. The only thing it can't do is tell you where your missing socks went. (Price not yet available)

### **TMIO Connect Io Intelligent Oven**

[www.tmio.com](http://www.tmio.com)

This stainless steel professional-grade wall oven converts from a refrigerator to an oven remotely via the internet or cell phone, or using the mounted touch screen. Dinner stays cool until you want it to cook. The flat panel also integrates through Microsoft's Media Center for access to the television or internet. (\$2,500 single, \$4,000 double)

### **Bowers & Wilkins Mini Theater MT-30**

[www.bwspeakers.com](http://www.bwspeakers.com)

A compact, high-performance home cinema system that looks as good as it sounds, the MT-30 includes five M-1 satellite speakers and a PV-1 subwoofer. In aluminum or black. (\$2,500)

### **Lutron Maestro IR Light Dimmer**

[www.lutron.com](http://www.lutron.com)

Adjust your lights from anywhere in the room (up to 30 feet). A silver button on the remote recalls your favorite light setting. And as you leave the room, lights fade slowly so you're not left in the dark. (\$90)