HOME AUTOMATION isn’t what it used to be. A market that once divided between budget-minded do-it-yourself techies who liked to tinker, and wealthy homeowners who wanted a do-it-for-me custom system to control lighting, music, temperature, and more, home automation has evolved into an industry with a range of options for any wallet. Just ask Martin Plaehn, CEO of Control4, a home automation manufacturer that launched 10 years ago with an aim to broaden the market.

“When we started in 2005, we started in the “rich” category,” says Plaehn, recalling the narrow slice of the population that could afford the six-figure investment for a customized control system at the time. Today, the average Control4 starter system costs less than $3,000, Plaehn says, and comes with a smartphone app that allows homeowners “to control everything.” Some 13 percent of Control4 customers have an annual household income of $100,000 and nearly half have household incomes between $100,000 and $250,000.

Control4, along with other companies including Savant Systems and Universal Remote Control (URC), sits in the middle of smart home offerings, between the inexpensive off-the-shelf kits you can buy from Home Depot and Lowe’s, and wired, high-end systems at the top of the pyramid that companies such as Crestron and AMX have long ruled. Wired systems still offer the most customization, since you’re not limited by the reaches of a wireless signal or the number of controllable devices. But Wi-Fi is poised to become the foundation of the next-gen smart home.

Higher-end systems are available, for now, through professional integrators only. “We feel that the customized integrator experience is key to homeowner satisfaction,” says Tim McInerney, director of product marketing at Savant. McInerney noted there are DIY options for installing light switches and other connected home devices, but for many consumers who don’t have the time or inclination to tackle connected device setup, having a professionally installed HVAC or lighting control system “makes a huge difference in user satisfaction.” That user satisfaction comes at the cost of installation. Labor rates vary according to region but generally run from $75-$150 an hour.

So which approach is best: DIY or professionally installed? It depends on what you expect your system to do, how you expect to interact with it, and how much you want to spend. In our Smart Home Systems Buying Guide, we’ll walk you through the options, point you toward the features the matter most, and reveal some of the best smart home systems on the market today. —R.D.
THE ABILITY TO MANAGE your home’s electronic systems from one main control system can make your household run smoother, feel better, and save energy. The trick is to find a system that will meet all the demands of your household, now and in the future. Most systems can be tailored by a home systems integrator to provide all the benefits you desire, but there are some key features to look for in a home automation system that will make his job easier and your interaction with it more enjoyable and useful.

INTEROPERABILITY

The beauty of an automation system is its ability to tie diverse electronic devices together so they can perform as one unified system. Getting these devices to work cohesively can be simple or complex, depending on the “openness” of the automation system. The more open a system is, the easier it will be for the lights, thermostats, audio/video equipment, security devices, motorized window shades, and other electronics to communicate with each other. A good example of interoperability is having the lights turn off and the thermostats set back when you press a “goodbye” button on a keypad or when a motion sensor notices that you have exited a room. To support interoperability between multiple electronic devices, manufacturers of home automation systems often form connectivity partnerships with other manufacturers. For example, Control4 has partnered with more than 60 other companies to ensure its line of automation products can communicate seamlessly with a wide variety of other systems—from architectural lighting and lawn irrigation, to multi-room audio.

Another way automation manufacturers are fostering interoperability is through adherence to technology standards. For example, many manufacturers have embedded Z-Wave wireless control technology into their automation products so those products can network easily with other Z-Wave enabled products. In addition to Z-Wave, other popular communications technologies being embedded into smart home products include ZigBee, Wi-Fi, and Apple HomeKit.

The more connectivity partners a manufacturer has formed and standards it has adopted, the more choices you’ll have as a consumer. More importantly, says home systems integrator Bill Charney of Advanced Home Audio, Shelton, Conn., “it allows installers to select the best suite of products for their clients.”

10 Key Features of a Home Automation System
REMOTE ACCESS
“Automation is all about being able to control things in your home,” says Jay McClellan, president of Leviton Security & Automation, “and part of that is being able to change the settings quickly and easily if your plans change.” More often than not, plans change when you’re not at home, so being able to communicate this remotely to the electronic devices in your home is one of the most revered features of an automation system. Remote access capabilities allow you to monitor your home’s environment and alter the settings of the lights, thermostats, and other gear, all from your smartphone, tablet, or laptop computer. McClellan believes that remote monitoring should be a service that manufacturers and home systems integrators provide free of charge. “Why should you pay $30 a month to access your automation system when you’re already paying for broadband access?” he suggests. Remote access also allows your integrator to tweak your system without having to make a house call, which is always cheaper and more convenient.

EXPANDABILITY
The way you live in your home five years from now will probably be much different than how you live in it today. Moreover, technology will continue to evolve, introducing a completely new generation of products to the marketplace. In the future, you may also want to add new rooms—like a recently finished basement or an addition off the back—to your automation network. Or, you may simply want to start out with just a few features when you first put in your system then add new capabilities later as you have the money. For these reasons, it’s important that a home automation system can be easily expanded vertically, to incorporate additional products, and horizontally to support additional rooms.

Manufacturers can support vertical and horizontal expandability by designing their systems to speak a common network language, like IP (Internet Protocol), and by offering wireless, retrofittable products that can communicate via a home’s existing network.

UPGRADEABILITY
Those in-wall touchpanels and black boxes may look impressive, but it’s what you don’t see that holds the true power of an automation system. Software is the driving force of an automation system, and the more sophisticated that software is, the more the system can do. As technology changes so must the software. Before you buy any system, be sure the manufacturer (or your home systems integrator) will be able to unlock and download software updates automatically.

VARIETY OF USER INTERFACES
There are a number of different ways you can control the electronic systems in your home: by pressing the buttons of a handheld remote or wall-mounted keypad; by touching colorful icons on a portable touchpanel; or by sliding your finger across your iTouch. Depending on your family dynamic, budget, and preferences, you might like to utilize a variety of different controllers (most people do, says McClellan), so make sure the automation manufacturer offers a wide selection of user interfaces.

TIME-TESTED
No one, except for serious early-adopters, likes to be a guinea pig. So choose an automation system with a proven track record. The same goes for the person who installs the system into your home. You should be able to gather some historical background about manufacturers and home systems integrators from their company websites.

STRONG DEALER NETWORK
“You can have great equipment,” says Jeff Singer, of automation system manufacturer Crestron, “but you’ll need a highly trained and certified installer in order to get your money’s worth.” Good home automation manufacturers go above and beyond to create a strong dealer network, by offering continual education and training, and by supporting multiple dealers in a single geographic area. For consumers, having more than one dealer to choose from is important. When more than one dealer carries a particular product in your area, pricing is more competitive. And should one dealer go out of business, there’s someone else you can call to pick up the pieces. To protect yourself from the possibility of your initial dealer closing up shop, demand that he provide access to your project file. You’ll have all the documentation you need should you ever need to hire someone else.

COMMITMENT TO ENERGY SAVINGS
One of the hottest topics in the consumer media is energy conservation. Automation systems can help save energy by turning off electronic devices automatically, and some do this better than others. Be sure to check out the energy-saving features of a system before you buy.

LAYER OF PROTECTION
Everyone always wonders what happens to an automated house when the power goes out. Does the system forget how to operate the lights when power is restored? If an automation system has the appropriate back-up protection, you won’t have to worry about that.

CAN-DO ATTITUDE
This goes both for the installer and the manufacturer. Automation is only beneficial and practical if it fits your lifestyle. Since everyone’s lifestyle is different, the manufacturer should provide its dealers with the tools to customize the system to your specific needs. If there’s something that you want your system to do and your installer says it’s impossible, either he or the manufacturer has failed you. Keep looking.—L.M.
ON ITS OWN, a home automation system has the dexterity to juggle a variety of different tasks. Meticulously engineered and designed by the manufacturer and installed by a home systems integrator, it’s able to dim and brighten light fixtures, adjust the settings of thermostats, provide status reports of household electricity usage, and choreograph the operation of complex home entertainment systems. These, and a wide assortment of other tasks completed by controllable devices, are what the home automation industry refers to as “subsystems.” Without subsystems, a home automation processor’s many talents can go sorely underutilized.

To realize the full benefit of living in an automated home, it’s essential that at least a few subsystems be integrated with a home automation system. Integration usually involves the addition of special hardware and professionally programmed software. But don’t worry. These extra pieces of technology won’t clash with your home’s design or complicate your lifestyle. Their system smarts, which may take the form of a black box or panel that mounts to the wall, or reside alongside the automation processor in a utility room or closet, are able to maintain a low profile. After receiving a signal from a handheld remote, touchpanel, smartphone, tablet, motion sensor, or some other trigger device, an automation system communicates its instructions, like “turn foyer and kitchen lights on at 6 p.m.” to the processor of the subsystem, which in turn carries out the command. In other cases, a light switch, thermostat, and other individual devices may contain the smarts to be controlled directly from the automation system without any help from a subsystem processor. The communication between an automation system and subsystems can happen over cabling or wirelessly via standards like Z-Wave, ZigBee, or Wi-Fi.

Regardless of the signal path or communications protocol, subsystems are an essential component of an automation system. Take the time to consider what types of products and devices you’d like to be able to actively monitor, control, and automate. Maybe you’re interested in automating only the motorized window shades and lights; perhaps you’d like to weave in the control of the swimming pool system and electronic door locks. This will help determine the type of automation system you should use, as they vary in their level of integration capabilities. You’ll want to know which subsystems an automation system has been designed and engineered to handle out of the box, and what upgrade options are available.

It’s also important to understand that, just because an automation system has been crafted to work with heating and cooling systems, for example, it may not be able to control all makes and models of heating and cooling systems. Most home automation systems are very brand-specific when it comes to the types of subsystems they can control.

The following list explains the different types of subsystems commonly integrated with automation systems. If you have any questions or concerns about a system’s integration capabilities, manufacturers are happy to share this information with you and your home systems integrator.

Architectural Lighting Control System

Probably the most popular and practical of all automation subsystems, an architectural lighting control system enables all types of light sources, including incandescent, compact fluorescent, halogen, and LED to be dimmed and brightened to prescribed levels to achieve greater energy savings, provide visual interest, enhance security, and set the mood for certain occasions. When managed by a home automation system, the
operation of a home’s lights can be synchronized with other subsystems. This provides even greater benefits; for instance, the lights can turn on and off according to the settings of a security system or the position of motorized draperies.

**Security System**
Protecting your home and family is well handled by a residential security system, and many now also control lights and thermostats. Still, there are good reasons to integrate security with a home automation system, convenience being one major benefit. From the same device you use to control various other electronic subsystems in your house, you’ll be able to view the status of the security system, arm and disarm sensors, and even view real-time images captured by surveillance cameras. Moreover, the same security sensors that monitor your house can be also used to enact certain automation routines. For example, sensors that are intended to trigger an alarm when they detect motion can also trigger a pathway of lights to turn on.

**Heating and Cooling System**
Manufacturers of thermostats have improved the usability of their products over the years, making them vastly easier to program. As a result, your house temperature can adjust automatically and in sync with your daily routine. It’s even easier to schedule thermostat adjustments, though, by integrating your heating and cooling system with an automation system. This is particularly true for homes that have multiple thermostats. Rather than program each thermostat individually, a home automation system lets you set up them all from the screen of a tablet, touchpanel, or some other user interface. Once they’re programmed, you can monitor the temperature of each heating and cooling zone and adjust as necessary from this single control device. Another perk: The temperature can adjust automatically based on certain conditions like when the garage door opens, the home theater system activates, or the motorized window shades close.

**Audio and Video System**
Imagine having your favorite song greet you as you enter the house after work or waking up to see the morning news displayed on your bathroom TV. It’s possible when a home’s audio and video components are managed and controlled by an automation system. On cue from an automation system, music can travel from equipment in a media room to speakers throughout the house. Ditto for video to TVs. And your home’s lights can adjust in concert with the music if they’re programmed via the automation system.

One touch of a button can create the perfect ambiance for a dinner party, a romantic evening at home, or a festive gathering of friends on the back patio. And you’ll have no trouble finding the music or video you want to enjoy when your A/V equipment is managed by a home automation system. You’ll be able to peruse your entire library of media conveniently from the screen of the same tablet, phone, or touchpanel that is used to operate the other electronic subsystems in your house. A few taps of a finger activates the audio or video and instructs it where to play. If there’s a particular room where you often watch movies, an automation system can set up the equipment and the room environment in one fell swoop. On command, the room lights dim, the shades close, and the appropriate equipment revs up. All you need to do is sit back and enjoy.

**Other Subsystems Worth Automating**
The aforementioned subsystems are the most popular to place under the aegis of an automation system, but just about any product or system that derives electrical or battery power can be integrated. When working with a home systems professional to design and install an automation system, also consider these integration-worthy components: swimming pool and spa system, motorized gates, electronic door locks, garage doors, motorized equipment (for drapes, TVs, home theater screens, and video projectors), irrigation system, and decorative fountains.—*L.M.*
TOP 5 DO-IT-YOURSELF SMART HOME SYSTEMS

The surge in broadband households with Wi-Fi has opened up the possibilities for smart homes in ways not possible before. No longer do you need a wiring infrastructure running from a central controller to switches and keypads throughout the house to enjoy a more connected home. Wireless control via Wi-Fi, Z-Wave, and other communications standards makes it possible to start building a DIY system for a couple of hundred dollars. They’re modular, too, so you can expand your system as budget allows.

Staples Connect
Staples bills itself as a “uniter.” Its $79 hub connects to a home’s router and through its Connect app, allowing you to control smart devices from different manufacturers. These could include light switches/dimmers from Lutron and Philips, smart locks from Schlage and Yale, a thermostat from Honeywell, smoke alarms from First Alert, and cameras from D-Link. Motion and window sensors and appliance modules are available to create activities controllable from the app. Kits are available for lighting ($149) and home monitoring ($249). Service fee: None

Belkin WeMo
Belkin wants you to start your connected home journey “wherever you want,” says senior product manager Peter Taylor. That could be lights or even a crockpot or coffee maker. How many times have you wished your cup of morning java was waiting for you when you walked into the kitchen? The Mr. Coffee WeMo-enabled smart coffee maker ($125) can do that with a direction from a smartphone app. With a WeMo-based CrockPot ($129) you can change settings or turn off the cooker from a smartphone app at the office. The company is eyeing 25 WeMo-enabled products within the year. Wi-Fi, but no hub is required. Service fee: None

Lutron Caseta
At Lutron, dimmed lighting scenes once available only through expensive control systems are now sold in stores under the Lutron Caseta Wireless line. At the simplest level, you can control Lutron Serena shades and Pico light switches from a dedicated remote control ($59 for remote and lamp dimmer). Add a Caseta Wireless Bridge ($119) and you can extend that control to an app that works over the Internet. You can create scenes and schedules not only for Caseta dimmer switches but for Lutron’s Serena electronic shades and select Honeywell thermostats. Caseta products can be controlled by third-party control systems from Control4, Savant, URC, Staples, and Wink, too. Service fee: None

Lowe’s IRIS
Lowe’s identified the smart home opportunity early on and now has more than 50 products on its roster of connectable products in its IRIS platform. The IRIS hub speaks several languages and can control products from Schlage, Kwikset, GE, and Honeywell. A basic Lowe’s service plan is free, allowing homeowners to manage home security and energy consumption from a smartphone, tablet, or computer. For $10 per month, users can receive text, email, or phone alerts if an alarm is triggered, along with live streaming and recording of feeds from a connected video camera. Can connect to smart products through various communications languages. Service fee: $10/month for text/email/phone notifications.
TOP 5 PROFESSIONALLY INSTALLED SMART HOME SYSTEMS

Face it, not everyone is cut out for a do-it-yourself project. A professionally installed home automation system—from a service provider or a custom integrator—saves time, brings peace of mind, and provides the kind of reliability that comes from a professional with training and experience. Higher-end installed systems enable a more sophisticated level of customization, including the ability to work with a broader field of products and systems. Most importantly, if something goes wrong, there’s someone to call who knows your system inside and out. For customers who want broader, more customized control options than a DIY smart home system can offer, we’ve compiled a list of some of the best higher-end professionally installed systems on the market.

Control4
Control4 sees itself as the glue that brings connected devices together in an integrated home control system. While more smart devices today can be controlled by an app, Control4 goes a step further, enabling lights to come on and the heat to kick in when the door lock opens, for example. “Our products can listen to products and events that happen in a connected home and tell other things what to do, based on the preferences of the homeowner,” says company CEO Martin Plaehn. You may want your lights to illuminate a path from the hallway to the kitchen after a door unlocks, but only if it’s after dark, and a Control4 integrator can make that happen. The same system could turn off all the lights in a home with a single button while locking all the smart door locks in the process. Customers with second homes can monitor and control their vacation home when they’re not there. Control4 has had customers close the shutters on a beach home in advance of a coming storm.

Elan Home Systems
ELAN Home Systems has been designing innovative, award-winning multi-room audio/video and home control systems since 1989. The ELAN g! Entertainment and Control System puts homeowners in control of entertainment, security, climate, lighting, and more—with elegant keypads and touchpanels or from any location with their favorite Apple or Android mobile device. Automation systems start with the $800 g1 controller and scale up from there. “ELAN has a long history of industry firsts, including the first mobile app for home control, and today we are continuing that tradition and giving our users greater choice and our integrators increased selling power,” said Core Brands director of business development Joe Lautner. “We’ve designed it to be the easiest and most user-friendly control system around, and the easiest to install and configure as well. Your world, made simple.”

Over the past couple of years, service providers (cable/satellite/Internet providers, as well residential security installation firms) have moved into home automation as a way to increase their monthly revenue streams. Systems including AT&T’s Digital Life, ADT Pulse, and Comcast Xfinity are installed by the providers and sold in packages of prescribed products. Users pay up front for the hardware and a monthly service fee for monitoring is billed as part of a service contract.

For example: AT&T’s Digital Life, available in 82 markets, includes packages for door control, video cameras, water detection, and energy management. The video camera package ($99 plus $9.99 per month with a 2-year contract) includes one camera. Subscribers can choose to have the camera capture video or take a snapshot when motion is detected, and then view live feeds or previously recorded video via an app on a smartphone. The energy package ($199, plus $4.99 per month) comes with a light switch, thermostat, and smart plug, allowing you to manage lights and temperature—and set schedules—from a smartphone, tablet, or computer.
Crestron Pyng
Crestron, known for its robust and expensive wired control systems with corporate-grade reliability, has come out with an affordable wireless system that starts at $3,000. “Technology has evolved,” says Delia Hansen, senior residential marketing manager, and “wireless home systems can be much stronger and more reliable than ever before.” A $3,000 Crestron Pyng starter system for one or two rooms comes with four in-wall dimmers, wall-mounted wireless keypad, two battery-powered keypads, a thermostat, and a hub. Crestron offers app control through a smartphone but recommends a dedicated keypad or touchscreen controller for a smart home system because smartphones and tablets tend to “walk away” when family members use the devices for other things. And, Hansen says, when homeowners are talking on the phone or reading an article on a tablet, they have to exit that screen to open the control app, which can be an annoyance when you just want to turn up the temperature. A keypad, on the other hand, is “always connected,” she says. An advanced Pyng system ($6,500) includes eight in-wall dimmers, five lamp dimmers, two in-wall keypads, one thermostat, three battery-powered keypads, a Yale wireless deadbolt lock, an occupancy sensor, and a hub.

Savant Systems
Savant Systems launched 10 years ago using an operating system based on Apple’s Mac mini, and familiarity with the Apple OS makes it a logical starting place for home automation for those with iOS devices. Personalization and simplicity are hallmarks of the Savant experience. Homeowners can add their own photos of people or rooms “or anything they identify with” to customize the app for their own use, says Tim McInerney, director of product marketing. Savant systems tie together modern “smart” devices and legacy “non-smart” devices through a combination of IP- and Wi-Fi-based products and controllers. A Savant installer can design a system that manages products such as a window shade, a gas fireplace, and a universal remote control for a home theater—and make them all controllable from an app. Savant systems start with the $799 Smart Host for control of up to 12 rooms of IP-based or Wi-Fi devices, with control modules for non-IP devices starting at $250 per device. Systems are expandable to include control of video and audio sources, thermostats, lighting, and HVAC systems. The more powerful Savant Pro line ($4,000 and up) controls larger systems, including music for up to 144 rooms or a video tiling system in which nine video feeds can be shown at once on a single large-screen TV.

Universal Remote Control (URC)
URC began in the audio/video world where it consolidated a coffee table full of remotes into one. Now, it owns the largest code database for control of audio and video gear. URC has branched out to offer broader control of other products in the home—its own and those from other companies—that homeowners can control through a keypad or app: lights, shades, security systems, thermostats, door locks, network cameras, and more. All of the systems can be viewed and controlled by URC’s remote controls, keypads, and touchscreens, and via apps on mobile devices. A URC remote paired with a controller starts at $899 in the Total Control line that’s sold through home systems integrators.—L.M.
Now that home automation has hit the mainstream, you can find systems at your local big box electronics store, online at popular sites like Amazon.com, and from a variety of professional installation firms. Given the range of automation providers and the assortment of products available, you'll have no problem finding a place to purchase a system. The question is, from whom or where should you buy? The answer will depend largely on your budget and your expectations. Here are the pros and cons of each shopping option:

Retail and Online Stores
While running errands, you can swing by Staples, Lowe’s, Best Buy, and other superstores and pick up a complete home automation system. You likely won’t spend more than a couple hundred dollars and will be able to take it home with you that day. According to these suppliers, you can have it up and running in your house in a couple of hours. And because most DIY systems are wireless, you won’t need to fish any cabling behind the walls or under the floor.

Automation systems available at retail stores offer DIY consumers a fun, affordable way to implement automation technology into their homes. Most DIY systems are modular, which means you can start with a few basic pieces, like a control “hub” and a couple of light switches, then visit the store or website again to buy additional components. You can tinker with the system to determine what you like and what else you might need, and know that you’ll be able to afford just about anything in the product lineup.

However, rarely is anything as easy as it seems. Although DIY automation systems are touted by retailers and manufacturers as being simple to set up and install, for some, the process could end up being more complicated and confusing than expected. Although most of these systems are wireless, which often simplifies the installation of the components, sometimes, the wireless technology itself presents challenges and issues. In order for the devices in a wireless automation system to function flawlessly, your home needs a rock-solid wireless networking system. Establishing this network can often be as difficult as pulling wire through a wall, not to mention unreliable.

Also, no matter how careful and diligent you were during set-up and installation, there may be times when a DIY automation system experiences difficulties, which may make it harder for you to control and enjoy. It’s not that the system is shoddy; it might just need more TLC and patience that you are willing to give to make it perform up to your standards.

Multi-Service Providers
You get your Internet service from them, possibly even your cable or satellite TV programming. It’s quite possible that this same company can bundle a home automation system into your service contract. With a phone call, you can have the automation system delivered to your doorstep and installed by a company technician. It’s quick, convenient, and affordable way to add automation to your home. In a few hours, the system is usually up and running, and its cost is rolled into your monthly bill.

The downside to this model is that little thing called customer service. You’re probably all too familiar with the frustration that ensues when weaving your way through the maze of help line extension numbers to contact your service provider with a question or concern. You’ll likely get this same level of attention should you experience hiccups with your automation system. Although this may not be a deal breaker, the fact that systems sold through these channels are fairly basic in their capabilities might be. Don’t expect a high level of customization or personalization of a home automation system that comes from your service provider. Also, if you’re interested in controlling things beyond a few lights and thermostats, look elsewhere.

Security Companies
Security systems have matured tremendously over the past few years. In addition to providing reliable and robust home protection, manufacturers have engineered their systems to also control lights, thermostats and other electronic devices. In essence, residential security systems have morphed into a respectable contingency of home automation systems. At their core, these security-turned-automation systems still focus most of their smarts on keeping your home and family safe and secure. The automation features are nice perks that can enhance the level of home protection. For example, when the system is armed, not only will the door and window sensors activate, but the lights will turn off. Disarming the system can engage a completely new scene where lights illuminate a pathway from the garage to the front door and from the foyer to the kitchen. And where the partnership between lighting and security can really have an impact is in the event of an emergency. In this situation, lights can lead your family from their bedrooms to the front door and turn off the heating and cooling system to prevent the spread of smoke.
About the only feature missing from these types of systems is the ability to easily integrate audio and video equipment. And unless the security dealer is a superstar, you likely won’t be using this type of system to manage and control motorized window shades, swimming pool pumps, or some other electronic components. Moreover, with a security-based system, it’ll be tough to incorporate elaborate mood settings scenes—the kind that at a touch of the button fills a room with romantic music while the lights dim and the shades close. This level of integration and customization is only possible with home automation systems sold by professional home systems integrators.

**Home Systems Integrators**

Like an architect who coordinates the design and construction of a house, a home systems integrator creates and executes a plan for the installation of various low-voltage systems, including an automation system, in homes. The types of automation systems offered by home systems integrators are typically very sophisticated, can control a wide assortment of products, and can be programmed to do just about anything you want. You’ll pay a premium for the system’s extensive capabilities and the expertise of a professional to design and install the components, but it’s worth it if you want a home automation system that’s reliable, easy to use, and functions as a natural extension of your home.

In addition to offering top-quality automation systems, these professionals are known for offering a high level of customer service. They’ll guide you through the process of integrating a system into your home, will manage the work flow among other trades that might be involved, and ensure that your system functions exactly the way you expected it to. And if it doesn’t, a home systems professional will tweak it until you’re absolutely thrilled. Be advised: Depending on the scope of your system, the size and structure of your house, and the level of customization required, it may take a home systems professional a few weeks, or even months, to engineer, design, program, and install a home automation system, and at a cost that’s usually much higher than systems offered by other channels.—*L.M.*
SMART APPLIANCES are making headway this year, as several leading manufacturers exhibited Internet-connected and app-enabled washers, dryers, dishwashers, and refrigerators at the International Consumer Electronics Show in Las Vegas a few months ago. LG, Whirlpool, Samsung, Bosch, and others demonstrated smartphone-based control over washing and drying cycles, the ability to monitor these cycles remotely, and receive activation cues from other products like the Nest thermostat.

Whirlpool Smart Top Load Washer/Dryer
These concepts have been tossed around for years, and while it's exciting to see them finally come to fruition, Whirlpool has taken Internet-connectivity a step further by enabling owners of its new Smart Top Load Washer and Dryer to opt into the company's new Connect to Care program via a mobile app, which makes a donation to Habitat for Humanity every time they do a load of laundry.

As the washer and dryer give back to the community, they also get increasingly smarter. A host of downloadable cycles are available that have been optimized by Whirlpool engineers for very specific types of laundry: high-performance athletic wear, comforters, baby clothes, and more. A user simply taps the cycle of choice on his or her Whirlpool app-enabled smartphone and the washing and drying duo set-up. In an effort to make laundry time even more interactive and efficient, Whirlpool will be continually adding new cycles to the app throughout the year.

LG TWIN Wash System
Generating the biggest buzz at the LG smart appliances section of its massive CES booth was a TWIN Wash system. As the name suggests, you can do two—yes, two—loads of laundry at the same time. It's akin to a double oven in concept, effectively allowing you to minimize the time you spend doing laundry. The top of the unit is a regular-size top-loading washing machine; the bottom mini washer is ideally suited for delicate items that require special attention or unique wash settings. LG would be remiss not to include some kind of connected technology in this unique washing machine, and this one communicates through both Wi-Fi and NFC (near field communication). Via Wi-Fi, custom cycles can be uploaded to the washer, cycle statuses can be monitored via an LG smartphone app, and alerts can be sent via Wi-Fi when the cycle is complete. Using NFC tagging technology, users can download preprogrammed wash cycles to their smartphones and then activate those cycles by simply touching the smartphone to the washing machine's NFC Tag On symbol.

Whirlpool Magnetic Skins
As appliances continue to get smarter, they are also getting more attractive. And it's not just about stainless steel and compact footprints. Whirlpool, for one, may soon offer magnetized “skins” that can be attached to the front of a washer and dryer. Available in a variety of designs and colors, it will offer consumers a way to instantly alter their style. Considering the average lifespan of a washer and dryer is around 14 years, it's an easy, affordable way to spruce up your laundry room when you redecorate your house.
Bosch Home Connect
Imagine trekking to the grocery store only to realize that you left your list at home. Or, on your way to work you remember that you had left wet towels in the dryer. Bosch envisions a day when all you'll need to do is check your smartphone to inspect the current contents of your refrigerator or to activate the clothes dryer. That day, at least for homeowners in Germany and Austria, is now, as Bosch unveiled a series of smart appliances a few months ago for this market. In addition to the refrigerator and dryer, the Home Connect line includes a smart dishwasher, washing machine, and oven. The most compelling of the group, the refrigerator, is fitted with two small IP cameras, which snap a shot of the inside of the refrigerator every time the door opens. As many as 20 photos can be stored and accessed via a smartphone app. The idea, explains a Bosch spokesperson, is to provide an instant visual status report of the current stock inside so that users can see if they need milk, orange juice, or some other item while running errands. “Or maybe after work you decide to host an impromptu cocktail party at your house,” she offers. You can click on the app and see if you should swing by the store to pick up some beer and wine.”

The app controls for the smart appliances leverage the convenience of having remote access to household appliances by allowing users to select specific cooking and cleaning settings, schedule activation times and be notified when the cycle is complete. Other offerings include recipes and cooking tips, operation instructions and videos, and remote diagnostics.

Making the connection even more convenient is the fact the all of the appliances can be monitored and managed via a single app rather than multiple individual apps.

Home Connect is currently available in Germany and Austria and will be introduced into a growing number of countries, including the United States, over the next several years.—L.M.
Your home is comprised of many different electronic “subsystems”: heating and cooling, lighting, audio and video, security, and more. A home automation system unifies these various systems so that they work as one. One command from an automation system can instruct several of these subsystems to adjust to certain predetermined (as by you and your home systems integrator) settings, levels, and inputs.

It’s a much more efficient way to manage your household than to manually manipulate each dimmer switch, thermostat, and piece of audio and video equipment. The automation system, in essence, becomes your point of contact to, and interaction with, all things electronic in your house. To realize what’s possible from each subsystem when it’s tied to an automation system, we’ve compiled the following ideas. They’ve been tried and tested by home systems integrators, so consider implementing them as you start to design your own home automation system.

1. Lighting

The lights in your home affect almost every aspect of your household: convenience, comfort, efficiency, and safety. Needless to say, they are critical components to integrate with your automation system.

**Pathways.** Lights can be programmed via the automation system to illuminate pathways in and around your house, making travel to the bathroom in the middle of the night, from garage to the house, and up and down stairways a lot safer.

**Efficiency.** You can save money on your utility bills by having an automation system turn off the lights at certain times of the day. If you forget, the system still remembers.

**Convenience.** You can save time and manage your household better by pressing a button on an automation keypad, touchpanel, or mobile device to turn lights on and off.

**Aesthetics.** Your house will look more beautiful when the lights are automated to accentuate the decor, artwork, or architecture.

**Safety.** Lights can be set to switch on and off in a random pattern to make your house look occupied when you’re away.

2. Audio and Video Equipment

An automation system can enhance the performance of your entertainment systems by making them easier to operate and become an important part of the overall home environment.

**Macros.** A macro is a command that’s been programmed into an automation system to launch a series of signals to a variety of different components. So, instead of having to press a button on a remote to turn on the TV, another to activate the surround-sound system, and so on, an automation system can singlehandedly get the A/V equipment ready to play a movie. The same command—which home systems integrators often label Movie Time—can also dim the lights.

**Ambiance.** You’ll likely want some background music playing during a house party; an automation system can tell a whole-house audio system to broadcast a certain playlist to speakers within certain rooms (or throughout the entire house) simultaneously as it arranges the intensity levels of the lights. Instant party atmosphere.

**Routines.** If music and video are part of your everyday routine, you can use your automation system to play what you want where you want it at certain times of the day or when you touch a button on your iPhone or some other control device. So, as part of your morning routine, you can wake up to the morning news and exercise to Pandora.

3. Security System

So much of what an automation system does revolves around the same types of settings you’d typically expect from a security system. Home, Away, Goodnight, and Vacation are common commands issued by security systems, as well as from automation systems, which make security and home automation a natural partnership.

**Lived in Look.** If your house will be empty for an extended period of time, a Vacation command sent from your automation system can arm the security system, plus turn the lights on and off and move the shades up and down.
However, unlike predictable timer-based on and off settings, an automation system can record a household’s random usage patterns over the previous few weeks and mimic those settings to make your house look truly lived in.

**Automated Fix-Its.** When tied to an automation system, the sensors that watch over the conditions of your house can do more than just tell you when there’s a problem. They can signal the automation system to do something about it. For example, should a water sensor detect moisture on the laundry room floor, the automation system could respond by cutting power to the washing machine and turning off the main water line.

**Warnings.** A security system can detect when someone has entered your property or home and sound an alarm. An automation system can add flashing lights and verbal warnings (played over the home’s stereo speakers) to the mix. If this reaction seems too extreme, the automation system can send images captured by surveillance cameras to your smartphone.

**Monitoring.** Sometimes just knowing the status of the systems in your house can provide valuable peace of mind. The user interface (touchpanel or tablet) of a home automation can show you which windows and doors might be open, which room the kids are in, and other helpful information.

**Activity Tracking.** What happened while you were away from home? Again, an automation system can show you by displaying a log of activity in and around your house during your absence. You’ll be able to track who entered the house and when, where they went, and when they left—a great feature for parents of latchkey kids or those who have landscapers, pool maintenance crews, and cleaning people visiting the house.

**Visual Inspection.** Before you leave for work or vacation, your automation system can show you if a window is still open or a TV is still on. You’ll be able to lock up and turn off right from the touchpanel, tablet, or smartphone.

### 4. Motorized Window Treatments

Like a lighting control subsystem, motorized window shades are operated by wall switches and handheld remotes. This approach is basic, simple, and convenient, but you’ll realize more benefits when the motorized shades are tied to an automation system.

**Daylight Harvesting.** Why turn on all the lamps when you can use some of the natural sunlight to illuminate a space? Through the intelligence of an automation system, motorized shades can roll up when it’s sunny to supplement your home’s artificial lighting. The automation system can keep some of the lights off and at a lower intensity level, saving electricity.

**Temperature Control.** Just as you can use the sunlight for supplemental illumination, you can use it to warm parts of your house. When the conditions are right, the automation system can lift the shades and set back the thermostats.

**UV Protection.** On the other hand, the sun can be very damaging to upholstery, artwork, and other decorative elements. An automation system can instruct the shades to lower to protect your investments.

**Cut the Glare.** As part of a Movie macro the shades can lower as the lights dim and the A/V equipment revs up for a night of movie watching.

**Privacy.** The same Good Night command that shuts off the lights and arms the security system can tell the bedroom shades to lower.

### 5. Heating and Cooling System

Of all the electronic devices in your home, the most difficult to program is probably the thermostat. It’s also a device that’s often skipped over when you prep the house for bedtime and your departure. An automation system can both simplify the programming process and adjust the settings of the thermostats automatically, based on certain predefined conditions.

**Smoke Signals.** In the event of a fire (signaled by the smoke detector of a security system) your home’s heating, cooling, and ventilation system can shut down to prevent smoke from spreading.

**Comfort Keeper.** During parties, movie nights, and other activities that involve a lot of people, body heat will naturally cause certain rooms to feel too warm. A Party command issued by an automation system can adjust the appropriate thermostats to a cooler setting, as it alters the intensity of the lights and activates certain audio and video components.

**Quick Settings.** If your home has multiple thermostats, a home automation system allows you to adjust them all from one user interface, like the screen of a touchpanel, iPhone, or iPad.
Great Home Automation Ideas for Beginners

SMART HOME SYSTEMS, or home automation systems, once were expensive luxuries (and professionally installed and custom programmed systems still can be), but today many DIY (do-it-yourself) products are very practical and reasonably affordable. If you’re ready to add some smarts to your home, here are five simple projects that can provide big benefits. Most require little-to-no experience with smart home products, can be completed in a couple hours or less, and cost under $300.

Smart Light Bulbs
Lighting is one of the easiest smart home projects to tackle, and will allow you to operate your home’s lights from an app on your smartphone. In addition to downloading the app, it involves replacing your old light bulbs with wireless LED bulbs (and then following the setup instructions). Some systems will require the addition of a main smart home hub or gateway that connects to your home network, while other smart light bulbs can be operated via Bluetooth from your phone or tablet. More advanced lighting control can be achieved by replacing traditional switches and dimmers with smart dimmers and wireless switches that you can control with your phone’s smart home app. Try the Philips Hue, Lutron Caseta Wireless, or Quirky Wink (with GE smart bulbs) systems.

Energy Saving Devices
The Nest (shown) smart wireless thermostat inspired many people to start saving energy by adding a smart wireless thermostat to their home (although there are plenty of others on the market). You can minimize your household energy consumption even more by installing wireless motorized blinds to some of the windows as a way to regulate heat gain and loss. Also easy to install are motion sensors that can turn lights on and off automatically. And if you’re in the market for a ceiling fan, why not use one from Big Ass Fan (yes, that’s really what it’s called) that can adjust itself based on the current temperature and occupancy of a room.

Mood Setting
A home automation system can create instant ambiance in a home. Smart dimmable LED bulbs (especially color-adjustable bulbs like the Philips Hue and others) can create completely new looks in any room with simple commands issued from a smartphone app. You can integrate music with your smart home system as well. Create custom scenes that automatically adjust the lights and turn on music to suit your mood. The SmartThings system (see sidebar) is compatible with Sonos wireless speakers, making this kind of mood integration easy.

Monitoring Devices
One of the most appealing features of a home automation system is its ability to notify you with a text message when something “unusual” happens at home. This might be the opening of the front door while you’re in the backyard or a water leak in the basement while you’re on vacation. Various types of wireless security sensors are available that can monitor the conditions of your home, and most are very easy to install and link to a do-it-yourself home automation system. In fact, many do-it-yourself systems come with at least a few sensors.

Want more peace of mind? A wireless security camera, like the Piper from iControl, can provide visual assurance that all is well at home. You can access the camera remotely from your smartphone to see if the kids made it home from school okay and check out the weather conditions before your plane lands after a long business trip. Some cameras feature built-in sensors, so they can push an alert to your phone should they notice motion, and follow up by sending a snapshot of the activity.
Media Center/Entertainment Control
Home entertainment and home automation often overlap. Most custom designed home theater systems are almost always integrated with a professional home automation system. But on a smaller and less expensive level, even moderate media room systems and home entertainment systems can benefit from some integration. DIY smart home systems of the sort discussed above, don’t usually integrate with your TV, A/V receiver, or Blu-ray player (the Logitech systems of the sort discussed above, don’t usually integrate). But on a smaller and less expensive level, even moderate media room systems and home entertainment systems can benefit from some integration. DIY smart home systems of the sort discussed above, don’t usually integrate with your TV, A/V receiver, or Blu-ray player (the Logitech Harmony Smart Control is one exception, among others), but there are several affordable DIY systems designed specifically for home theater gear. iRule’s app-based system, for example, allows you to put the control of all your media room components into one app that can control multiple devices at one time. For things that can't be controlled via an IP connection, bridge devices are available to control components wirelessly. Instead of picking up the TV remote, turning it to input 1, turning on the Blu-ray player, and using another remote to turn that on the receiver and switch inputs, you could simply press “watch movie.” DIY systems such as this can take some time to program, but they’re surprisingly affordable.

DIY Home Automation Under $400
Getting started in smart home automation is easier and cheaper than ever, especially if you’re looking for a DIY home automation system. Today, many smart home communications systems begin with a gateway or hub, which includes all the smart home technology such as Z-Wave, ZigBee, and Wi-Fi radios for communicating to the various devices around your house. A good smart home system usually includes more than one kind of wireless communications protocol, and most of the home automation software for configuring your smart home system lives in the app downloaded to your mobile device (a smartphone or tablet), so the process of integrating devices and linking systems is easier than ever.

Check out these smart home starter kits and hubs designed to get you on your way to a more integrated home.

SMARTTHINGS
This Smart Home Starter Kit from SmartThings includes a SmartThings hub, which communicates via Z-Wave, Zigbee, and IP (for networked systems like Sonos). There are tons of devices you can add to the system, and lots of creative ways to integrate them. In addition to the hub, this kit includes two door/window sensors, one wall outlet adaptor, one motion sensor, and one presence sensor. With these devices you can monitor doors or windows, be alerted if motion is detected, and turn on a lamp. $299.

WINK
Wink is a new smart home system from the IoT company, Quirky. Wink is sold at Home Depot and other places, including online. This A19 GE Lighting Kit includes a wall or table mounted Wink Relay hub ($300 when purchased by itself) with a color touchscreen display. Also in the kit are four standard A19 style LED light bulbs (around $15 each when purchased individually) that communicate wirelessly to the Wink hub. The kit is $288, so it looks like a pretty decent deal. If this package is still too expensive, you can get the standard Wink Hub (about $50) and buy the GE Link bulbs separately.

LUTRON SMART BRIDGE
The new $150 Lutron Smart Bridge and companion smartphone app connects to a home’s existing Wi-Fi router and sets up in less than 30 minutes. The mobile app turns your smartphone into a control device, from which you can operate a variety of Lutron products and systems, including Caseta Wireless dimmers, Pico remote controls, Serena motorized window shades, as well as other third-party products like some Honeywell Wi-Fi thermostats.

ICONTROL PIPER
The Piper is a pretty cool device because, on the surface, it’s a very good DIY security camera. Also built into the Piper is a Z-Wave radio, making it a Z-Wave controller for your smart home system. You can then add other Z-Wave devices, such as window and door sensors or light controllers to turn the security camera into the foundation of a whole-house automation system. The app is pretty easy to use, too. The Piper+Z-Wave pack includes the camera plus your choice of three Z-Wave accessories for $339.

INSTEON HUB
The Insteon smart home system has been around longer than any of the other companies listed here, but this HomeKit-enabled Insteon Hub (and the Insteon iPhone app) is new. This single hub brings Insteon switches, outlets, thermostats, and light bulbs into the HomeKit ecosystem. Plus, the app will work with all HomeKit-enabled products from various manufacturers and protocols, providing a simple, singular method for consumers to control connected devices. The Insteon Hub is also compatible with some of the hottest technologies on the market, like the Nest thermostat. You can use the Hub’s companion smartphone app to create automation routines, schedules, and scenes for connected devices—and even issue commands via Apple’s Siri personal voice assistant. Commands travel from the Hub to accessory devices over a combination of Wi-Fi and your home’s electrical power lines. The HomeKit-enabled hub retails for $149.
Home Automation Systems and Mobile Apps

NEW CONTROL APPS PUT THE POWER OF PERSONALIZATION INTO THE HANDS OF HOMEOWNERS

MOBILE APPS HAVE TAKEN THE home automation market by storm, offering consumers a more convenient way to interact with the electronic systems in their homes. They've also afforded home systems integrators an easier and faster way to program the operation of those systems. Goodbye laptop computers as the primary means of monitoring, managing, and programming control systems; hello app-enabled smartphones and tablets as the main user interfaces of our home systems.

As mobile apps have taken hold, manufacturers have continued to refine their offerings. One of the most notable trends among app-enabled systems: the ability for homeowners to easily create their own automation routines for their electronic devices to follow. In the past, this has been a task only to be handled by a professional home systems integrator, but thanks to an industry-wide shift in thinking, manufacturers are now putting the power of programming into the hands of the consumer. Home systems integrators, meanwhile, reap the benefit of having to make fewer visits to clients' homes for system modifications.

The Crestron Pyng is a great example of an app that facilitates configuration of a home control system by the consumer. This app proves that just because the components of a home control system may be sophisticated, the interface used to set up, monitor, and manage them can be extremely simple. The Pyng app and companion hub pair with Crestron's reputable line of accessories, including wireless lighting controls, security systems, motorized shading, thermostats, and electronic door locks. By contrast, many other home control apps focus on one type of component and offer limited functionality. “With Pyng, you're not adding an app to an automation system; the app IS your automation system,” says Crestron technology manager, Evan Ackmann. Configuration involves a five-step process that, during a demonstration, took only a few minutes to complete.

After initial setup of the Pyng by a home systems integrator, a homeowner is free to modify the settings and create new scenes by themselves, directly from the Pyng app. For example, if a user decides to add lights or adjust their intensity levels for a Good Night scene, the Pyng app guides him or her through the process. Adding new iPhones and iPads to the system is easy, too, and all this functionality precludes the need for homeowners to pay a home systems integrator for minor system modifications. All settings are stored in the Cloud, so in the event of mistakes, the initial settings of the system can be restored.

Building off the success of its Clare Controls App, Clare Controls has added new administration features and capabilities to the app, giving consumers even greater control over their home automation experiences. The new app, called MyClareHome, invites users to create schedules for lights, window shades, thermostats, security devices, and A/V equipment to follow. They can modify these routines at any time and add new products to them. The MyClareHome app is also helpful to end-users, thanks to its ability to synch new mobile devices to the system, such as a houseguest's iPhone. After the houseguest leaves, the iPhone access can be omitted. “Homeowners want luxury performance with some DIY features, like the ability to make simple system changes without a service call,” says Clare Controls vice president of marketing Brigitte McCarthy.

Another company branching out by offering a do-it-yourself or pro-installed system is Lutron Electronics. A few months ago the company launched its DIY-installable Caseta Wireless lighting system; it now follows up with technology to enable users to program the operation of Caseta dimmers, as well as Lutron Serena battery-operated motorized shades, Honeywell Wi-Fi thermostats, and GE LED light bulbs.

Lutron’s new Smart Bridge product and its companion mobile app, which can be installed and set up in less than 30 minutes by a homeowner, provides on-the-spot control of the aforementioned devices from any iOS or Android-based smartphone or tablet. A user can also automate the operation of the devices by using the app to program scenes and schedules. The price of both the Caseta system and the Smart Bridge are DIY-friendly, too, at $80 and $150, respectively.
Smart Home on a Budget

A NEW BREED OF HOME AUTOMATION SYSTEMS CATERS TO FRUGAL CONSUMERS

NO MATTER HOW YOU SLICE IT, a professionally installed home automation system rarely comes cheaply. But that's all about to change, thanks to new scaled-down systems introduced by companies including Savant, Elan, Clare Controls, and Crestron. And if they're not paring down the capabilities of their systems to the basics, they've refined their programming software to make it faster for integrators to get automation systems up and running. All of this results in technology that's priced attractively for mainstream consumers. But don't worry. These entry-level systems offer plenty of practical features that'll add greater convenience, comfort, and value to your home; plus, they can be easily expanded to incorporate additional functionality.

Here are some of the forerunners offering solid, reliable, automation systems that can be professionally installed for less than $2,000.

When Savant hit the automation scene nearly a decade ago with its sophisticated Apple-based home automation system, the company catered exclusively to the owners of mansions. And if they're not paring down the capabilities of their systems to the basics, they've refined their programming software to make it faster for integrators to get automation systems up and running. All of this results in technology that's priced attractively for mainstream consumers. But don't worry. These entry-level systems offer plenty of practical features that'll add greater convenience, comfort, and value to your home; plus, they can be easily expanded to incorporate additional functionality.

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When Savant hit the automation scene nearly a decade ago with its sophisticated Apple-based home automation system, the company catered exclusively to the owners of mansions. The system was robust and intuitive, and way out of the reach of the vast majority of homeowners. But times have changed, and software that used to require a powerful piece of processing hardware to run it can now be handled by more affordable processors. “This has afforded us the opportunity to take our software that's proven to work well in big homes and put it in a piece of hardware that's much less expensive,” says Savant director of product marketing Tim McInerney. The result is a system that starts at around $1,599 (plus installation labor). The new Smart Series System maxes out at about 12 rooms of control, which is usually plenty for most consumers, McInerney states. With support for more than 5,000 different devices, including a variety of thermostats, A/V equipment, security products, lighting controls, and more, it's a system that can be expanded over time—and with more efficiency than before, thanks to the system's ability to communicate wirelessly with devices as well as a new app, Single App Home, that enables homeowners to set up some of their own automation routines.

Embraced by production homebuilders, the CLIQ.express from Clare Controls costs about 70 percent less than the company's flagship host product (Clare requested no MSRP be published). The CLIQ.express puts Clare in the unique position of catering to both the luxury and production home markets. As the most stripped-down product in its lineup, the CLIQ.express is able to handle the automation needs of smaller homes where, for instance, owners may need to control only a couple of thermostats and 10 circuits of lights (among a few other things). By comparison, Clare's full-featured system offers unlimited control over an unlimited number of devices. Missing, too, from the CLIQ.express, are ports for the control of A/V equipment. Like many other manufacturers who've morphed their big, upscale systems into modest starter automation packages, Clare's entry-level systems (which also includes CLIQ.lite) can be upgraded and expanded by home systems integrators by “unlocking”—at an additional charge—the system's internal software restrictions.

Also reaching into the mass market is Elan, a company known for its robust professionally installed g1 home automation system. With its new g1 system, the company plants itself firmly as a provider of automation that “average” homeowners can afford. Priced at $799 MSRP, the g1 remarkably still boasts an impressive roster of features, and
it still requires installation by a home systems professional. Integrated can be up to 16 zones of security; two door locks; the control of up to 32 displays; up to 24 lighting devices; three thermostats; three surveillance cameras; and an irrigation system. It also comes with a handheld remote that can be used to access and navigate an onscreen display of the g1 user interface. Like Clare, Elan is targeting production builders and owners of smaller homes with this scaled-down offering.

Savant, Clare, Elan, and others are following a path initially blazed several years ago by Control4. This company’s HC-250 controller ($750 MSRP) is designed for the control of devices within a single room, and has been one of Control4’s best sellers. To cut costs even further, Control4 has launched a configuration tool that promises to dramatically simplify and accelerate the set-up process of its line of home automation systems. With the Composer Express app, a home systems integrator can set up a system—even a very complex one—in just a few hours by using a Wi-Fi-enabled tablet or smartphone. In the past, the process may have taken an integrator several days to complete, so consumers should realize a reduction in labor charges.

The real muscle behind Composer Express is its embedded Simple Device Discovery Protocol (SDDP), which enables the programming app to automatically discover all SDDP-enabled devices in a home and allows professionals to integrate them into the Control4 platform with just a touch of a button. Companies including Crestron and Clare also offer streamlined programming tools, a sign that the home automation industry is committed to providing consumers with more affordable solutions on both the hardware and software side of an installation.

Add these attractively priced, professionally installed automation systems to the scads of DIY systems currently on the market, and consumers can find a system to fit into even the tightest of budgets. And when you’re ready to incorporate new features, the systems can be expanded quickly and easily — and without breaking the bank.
Networking Protocols:
HELPING SMART DEVICES PLAY WELL TOGETHER IN AN AUTOMATED HOME

IF YOU HAVE A ROUTER in your house, you're familiar with Wi-Fi, the communications protocol that enables your smartphone to stream music from the backyard, and your laptop to access email from the living room couch—or wherever you happen to be in your house. This wireless networking standard has untethered us from cabling for our communications needs, and has become so pervasive in American homes that manufacturers have implemented the technology into all kinds of devices. With a Wi-Fi chip embedded in it, a light switch can be controlled from an app on your smartphone, for example. But as most people have likely experienced, Wi-Fi can be finicky. Connections can drop unexpectedly, products located far away from the router might lose signal, and as more and more devices join a Wi-Fi network, the communications highway becomes increasingly congested and slow.

While Wi-Fi works, and is still a favored communications protocol of many manufacturers due to its low cost (your existing router does the job of traffic cop instead of a completely new hub), several other wireless “mesh” networking protocols have been developed over the past few years to work around some of the inherent limitations of Wi-Fi. “Try communicating with a smart washing machine that’s in the basement from a smartphone in the upstairs bedroom,” offers Insteon’s Joe Gerber as an example. “Distance combined with the metal of the washing machine can kill the signal.”

Adds Ryan Maley, director of strategic marketing, ZigBee Alliance: “Wi-Fi connects point-to-point, so when an access point fails, your laptop must be manually switched to some other access point. In a mesh network, every device automatically connects to every other device near it. Single points of failure are therefore eliminated. Even if one connection goes down, the device can automatically use the other connection and the network still works. The mesh also extends range since messages can be passed along bucket brigade-style throughout the network.”

Insteon is just one of many manufacturers of smart home devices incorporating networking chipsets into their products as a way to establish simple, reliable, affordable, and easy-to-install home automation solutions for consumers.

It’s an industry that’s booming. According to analysts at Research and Markets, the IoT, where devices talk to each other via the Internet and/or short-range wireless networking, will represent a $7 billion market by 2020. If IoT devices and wireless networking isn’t on your radar, it should be. Here’s a look at some of the protocols poised to change the way we interact with our home’s lights, thermostats, A/V equipment, and more—and in some very positive ways.

Arguably two of the most popular and mature networking standards are Z-Wave and ZigBee. However, newcomers like the Thread Group, Apple HomeKit, and the AllSeen Alliance (AllJoyn) are bringing additional choices to the table. Although Z-Wave, ZigBee, Thread, HomeKit, and AllJoyn differ in their technological design and approach to the smart home market, the goal among all is to enable devices that share a like networking protocol to communicate seamlessly with each other and with minimal configuration, which means a complete system can be pieced together by a homeowner affordably and easily.

The basic concept is this: A network-enabled home automation hub will be able to instantly recognize, sync up with, and monitor and control other products that communicate via the same protocol, such as light switches, thermostats, and electronic door locks. These devices will be able to send messages to each other with ease, creating a networking backbone to support a complete home automation system.

So if all of the networking protocols are positioned to offer similar benefits, which one should you choose? Is there a right or wrong way to connect the devices in your home?

If you asked these questions a year ago, you’d likely hear each networking organization championing its own respective solution. Today, it’s a different story. While each protocol is designed to address a certain need or solve a particular problem, “there is no clear-cut winner,” says Gerber. “Basically, there’s a lot of uncertainty over which protocol will reign supreme. The result: confusion among consumers,” adds Mark Walters, chairman of the Z-Wave Alliance.

But at least for a while, you may not have to commit to one particular protocol. To ensure that their devices will work with the broadest range of products—regardless of protocol — manufacturers have begun to embed their products with multiple types of chipsets. “We try to be protocol agonist and work with any radio frequency technology,” says Kevin Kraus, director of product development at Yale. “Our electronic door locks have a combination of both Z-Wave and ZigBee radios.” Ostensibly, this means that this lock can
talk with both a Z-Wave and a ZigBee home control hub and link with both Z-Wave and ZigBee light switches, thermostats, and more.

Where you'll see the widest adoption of multiple communications standards is with manufacturers of home automation hubs, such as the Iris from Lowe's and the Connect from Staples. “Companies like these want their hubs to be able to talk to as many products as possible and most importantly hot products like the Nest thermostat and the Philips Hue light bulb,” says Walters. “While this approach makes sense now, the more chips you put into a product the more expensive that product becomes. As the market matures, we'll see manufacturers begin to remove some of the chips from their product to opt for one standard or another.”

**Zigbee**

There are currently more than 1,100 products that talk via ZigBee, and although it was adopted initially by utilities to smarten up their meters, it's finding a foothold in the smart home sector. ZigBee chips are developed by a variety of semiconductor companies. This gives manufacturers of smart devices more choice, and therefore keeps costs competitive. The result is that ZigBee comes in many different flavors to support specific applications, like lighting, energy management, etc. Combine two different types of ZigBee chips and you might need extra bridging hardware or software to establish communication. (Note: The ZigBee Alliance recently announced ZigBee 3.0, which will unify diverse standards to eliminate the need for different flavors to support different applications.)

**Core applications:** Home control and security

**Major supporters:** ADT, AT&T, Verizon, Honeywell, LG

**Thread**

Established in July 2014, the Thread Group is working on a networking standard that's IP (Internet Protocol)-based and designed to work with Wi-Fi, but with some significant improvements. One of the most notable, according to Chris Boross, president of the Thread Group and technical product marketing manager at Nest Labs, is “extremely low power consumption,” which means a battery that powers a wireless product could last for several years.” When batteries last longer, concerns about the network going down are mitigated, and for security-based products like electronic door locks, maintaining constant, and reliable communications is critical. “With a lock, you want no latency in operation,” Yale's Kevin explains. (Yale is a member company of the Thread alliance.) “And, if the network is ever jeopardized, the lock has to keep trying to establish network connectivity, which sucks the battery life, and nobody wants a dead door lock.”

Currently under the certification process, Thread has been incorporated into few products other than Nest thermostats, but has support from Yale, Tyco, and Somfy, among others. Boross expects 2015 to be a banner year of product announcements, due to Thread's ability to be easily augmented into a home's current Wi-Fi network.

**Core applications:** To be determined

**Major supporters:** Tyco, NEST Labs, Samsung Electronics, Yale

**Apple HomeKit**

Thread, Z-Wave, Zigbee ... Apple doesn't care. It's recently released HomeKit “platform” was designed not as a communications standard, but as a way to tie all products, regardless of protocol, together in one cohesive unit. Naturally, these devices must go through Apple certification, which is currently in its infancy with limited availability of Home-
Smart Home Systems

Kit products. However (and this is the really good part), a HomeKit-enabled hub, such as a new hub offered by Insteon, is able to act as a bridge so that any device that’s tied to it can be part of HomeKit ecosystem.

All that’s left for the consumer to do is download the appropriate apps from the Apple App Store; iOS 8 framework allows the user to control HomeKit chip-enabled devices via a smartphone, through Bluetooth or Wi-Fi. Unlike most app-based control today, in which each product is controlled via is own individual app, HomeKit enables users to operate multiple devices with a single app, regardless of the native networking protocol.

Core applications: To be determined
Major supporters: Insteon, Schlage, Chamberlain

AllJoyn

AllJoyn, like Apple HomeKit, is a technology designed to link smart home devices together, regardless of communicating platform. But unlike HomeKit, which is more of a “closed community of products, AllJoyn is an open source software framework, like Linux, that offers manufacturers unlimited choice in terms of communication transport and platform, which leads to brand-agnostic interoperable products that are able to communicate and interact with each other freely,” explains AllSeen Alliance senior director of IoT, Philip DesAutels. “Manufacturers can use whichever networking protocol they want, be it Wi-Fi, Thread, or something else; AllJoyn creates a network on top of the networks that are already in place.” Security is a big focus of the AllSeen Alliance, too. Homeowners communicate with AllJoyn products not through the Cloud, but directly, which minimizes their home network’s exposure to hackers. There are currently about 100 different types of AllJoyn-enabled products on the market, most of which are available at retail stores.

Core applications: open source code freely available to product developers; secure communications, protocol-agnostic

Major supporters: Electrolux, LG, Microsoft (All-Joyn is expected to be in every Windows 10 product), Panasonic
New Automation Systems: TEEMING WITH INNOVATIVE FEATURES

HOME AUTOMATION SYSTEMS are entering the marketplace from all avenues, and from places that you might not expect. Traditional channels made up of manufacturers that focus solely on developing home automation solutions are being joined by door and window manufacturers, TV manufacturers, and home improvement retailers. For homeowners, this means you can now buy home automation from the same company from which you bought your new home’s windows, for example. Or you might be able to roll in automation when you buy your satellite dish.

When new, diverse companies join the bandwagon, it’s also a fairly good indication that automation is becoming an increasingly important element of the home and is here to stay. It’s become an amenity that’s well supported by all types of industries, even those with no history in the electronics industry. In the following product descriptions and reviews by the editors at Electronic House, you’ll see how untraditional automation providers are staking a claim in the marketplace with solutions that are solid and broaden your options.

Insynctive System
Pella Windows and Doors, the name recognized since 1966 as a leading provider of quality windows and doors for new construction, remodeling and replacement applications, has branched off into totally new territory: home automation. It’s a big move for a company with strong roots in the construction industry, but one that it’s entering with gusto by fully embracing the natural synergy between technology and architecture with its new Pella Insynctive product line.

As one of the first manufacturers in its category to develop smart home products for windows and doors, Pella’s wireless Z-Wave-based line of products includes window and door sensors, garage door sensors, deadbolt entry door sensor, status indicator, bridge and motorized blinds and shades.

Unlike many of the DIY home automation systems available today, Pella’s system is intended to be integrated into professionally installed home automation systems. Pella currently has partnerships with Wink, Nexia Home Intelligence, Crestron and Savant—with additional partnerships coming in 2015. An Insynctive hub connects the various door and window sensors, and motorized window treatments to a homeowner’s choice of automation system, enabling products to be included in various scenes and modes that a professional installer creates.

Using Insynctive technology, homeowners can know at a glance if windows, doors and garage doors are opened or closed and if the entry door is locked or unlocked. Insynctive also allows homeowners to control motorized blinds and window shades. The integrated system of sensors and motorized blinds and shades can be controlled while at home simply by using the status indicator or remote control, or while away by integrating with a compatible home automation system.

Insynctive products are sold separately and give homeowners the ability to choose the products they need to get the level of home management they want, whether a single sensor on the front door or outfitting the entire home with sensors and Insynctive blinds and shades.

Products available include:

**WINDOW, DOOR AND GARAGE DOOR SENSORS**
- Insynctive Window, Door and Garage Door Sensors wirelessly relay information via the Bridge to the Insynctive Status Indicator so, while at home, users know at a glance whether windows and doors are opened or closed.
- Insynctive Window and Door Sensors mount easily to most any brand of window or door—no tools required.

**ENTRY DOOR DEADBOLT SENSOR**
- Insynctive Entry Door Deadbolt Sensor can be installed with a new Pella entry door and will indicate if the door is closed and locked.

**PELLA BLINDS AND SHADES WITH REMOTE CONTROL AND INSYNCTIVE TECHNOLOGY**
- Pella’s Designer Series snap-in between-the-glass blinds and shades and Pella room-side blinds and shades are available with motorized Insynctive technology. While at home, homeowners can control all the blinds and shades in a room using the remote control.
- Additionally, Pella blinds and shades with Insynctive technology can be programmed to a compatible home automation system via the Insynctive bridge and operated from a smart device.
- Homeowners can choose between cellular shades, roller shades, wood blinds and between-the-glass blinds or shades with Insynctive technology.
Iris System  By Grant Clauser

If you believe installing your own home security system is too difficult, there's a good chance that newer systems on the market will prove you wrong. I've been using the Iris system by Lowe's for a few weeks for a new home automation review, and above all what strikes me about this package is how easy it was to install and how easy it is to customize the programing. If you can set up a Facebook page you can do this.

What exactly is this? The Iris system offers basic home security and automation products that all work together with a smartphone/tablet app that integrates any of the various smart modules. Most people will begin with one of the Iris starter kits. The Safe and Secure kit includes door and motion sensors plus a keypad. The Comfort and Control kit includes a thermostat and smart plug, and the Smart Kit is a combination of the other two. All of them include the Iris hub which is necessary for any Iris system installation.

Iris works with both wireless Z-Wave and Wi-Fi devices (the hub also supports Zigbee), and while these are fairly universal protocols, not all wireless devices are made alike. That's why Iris has its own line of products (only sold at Lowe's and Lowes.com), which cover most devices a basic security or control system buyer would need. There are door and window contact sensors, motion detectors, surveillance cameras (indoor and outdoor), smoke and carbon monoxide detectors, door locks, water leak detector, garage door openers, light switches... you get it.

I started with the Smart Kit ($299), which combines temperature control and basic home security. In the box is the Iris hub, a smart thermostat, two door/window contact sensors, one motion sensor, a Z-Wave extender and a smart outlet plug. If you start with this kit, you'll probably want to pick up a few more contact sensors right away for $20 each.

The first thing you set up is the hub. It gets connected directly to your network Wi-Fi router. It sends and receives Wi-Fi commands through your router and receives Z-Wave commands directly. The hub also has a speaker that plays announcements and alarms. Setting up the hub took just a few minutes, which involves calling in a pin number to Lowe's to activate it. You'll also need a credit card. While basic operation of the system requires no monthly fee, a Premium service costs $10 a month (free for your first month).

Part of the setup process involves selecting a user name and password to access and configure different aspects of your system from a computer. The easiest thing to do is to keep a laptop with you as you're setting everything up.

The hub's volume is adjustable, but not adjustable enough. Alerts and simple message are all the same volume. I'd want the alarm beeps at full volume when an intruder alert is triggered, but much quieter when the system is simply confirming that I've armed it for the night.

The next most important part of the Iris system is the home control app, which works both on iOS and Android smartphones and tablets. With the app you can adjust, set, arm, and monitor most features of the system, though some of the more involved automation features (Iris calls this Magic) can only be done at a computer.

After connecting the hub, I installed the thermostat. That went in about as easy as any other thermostat, which is to say that there are a lot of little colored wires, so make sure you get the right ones pointed to the right place. Setup of the thermostat will vary depending on the kind of heating and cooling system you have.

The Iris touchscreen thermostat allows temperature controls both at the device itself or through the app or web interface on a computer. The thermostat isn't as cool to look at as something like the Nest, but it's fairly thin (thinner than the old Honeywell I replaced) and doesn't look bad. You can schedule Home, Away, Night and Vacation modes, and other standard temperature adjustments. I set mine up with very basic day and night modes. If my family gets too warm or too cold, we just pull up the app and make the change.

Adding the additional devices (contact sensors, motion detector and smart plug) all was completed in just a few minutes. The Z-Wave extender didn't want to connect at first, but was fine after a second try. It wasn't really necessary in my setup anyway since all the devices were installed on the same floor and close enough that they connected directly to the hub without a problem (you can check signal strength on your Iris home page).

Since this system was primarily about security, the keypad was, well, key. That product requires you to select a personal pin number for disarming the system. You can also arm and disarm it with your smartphone without the pin—that's a nice feature in case you forgot to arm it when you left the house or want to disarm it remotely so someone can enter without triggering the system.

In addition to the numerical keypad, there's a panic button, which sends alerts to everyone on your alert list. Placement of the keypad is important. You'll want it next to the door you enter and exit most frequently. For many people that's the front door, but in my house we come in through the garage most of the time, so I put the keypad next to the door leading to the garage. Ideally I'd have two keypads, one for that garage entrance and one for the front door.

Arming and disarming the system requires you to key in your pin number and then press On, Off or Partial. Partial only arms the door/window contact sensors but not the motion detectors.
sensors. You'd likely want to use this setting at night so people can still walk around the house without setting off the system. When you arm the system it makes an announcement and then gives you 15 seconds to get out of the house and close the door before all the sensors are active.

In the weeks I've been using it the system has been pretty reliable. I never received a false alarm, and all my test alarms were triggered properly. If anything, the motion detector is too sensitive, so place where it's not looking out a window. When an activity is detected, alerts are sent to the contacts you entered during the setup process (you can add or delete contacts later). If you add a camera (the Smart Kit doesn't come with one, but you can add a camera for $130), you can program it to start recording as soon as motion is detected or another sensor is triggered. If you get an alert that something's going on you can either rush home to see what's up or view the video on your phone to look for yourself (I didn't install a camera so I can't say how good the image is).

Unlike some professionally monitored systems, Iris does not alert the police or fire department when triggered. It's not actually monitored by live people—the phone and text messages are all automated. If you think an alert is due to an actual crime it's up to you to get in touch with the authorities.

One of the fun bits about Iris is voice control. Using your smartphone you can deliver simple voice commands (“set alarm to on,” “turn porch light on,” “set thermostat to 70”). Are voice commands really easier or faster than tapping the phone? No, but it looks cool when showing off to your neighbor. Note, you can pin protect the Iris app so someone can't steal your phone and turn off your alarm.

As a basic security system Iris seems competent and will add peace of mind when you leave the house. You can turn it into more of an automation system by adding Z-Wave light switches and other devices. Iris makes managing and linking devices simple in the Magic part of the home page. For instance, you can have certain lights programmed to turn on when an alarm is triggered. There you'll see a number of scenarios for connecting devices in a sort of if-this-then-that process, but it's not nearly as customizable as a professional automation system. The devices it can control are also limited compared to some other systems, but the list of Iris-compatible products is growing.

Remote operation with the app can sometimes be slow, very slow. There were more than a few times when I was trying to adjust the temperature remotely and the app eventually gave up after several minutes. This could be due to my cellphone's connection. I really don't have any way of knowing, but it would be frustrating if I was trying to do something more important than turning the temp down (like unlocking the front door for a guest.)

The Iris system also isn't as attractive or invisible as professionally installed systems. The keypad is bulky and the contact sensors are also fairly large, but that's what you get for a system this inexpensive. You also can't program personalized scenes, such as lighting scenes, which professional systems offer. Also it isn't compatible with any audio/video equipment.

Back to that $10 a month I mentioned earlier. There are several control or security products that require no monthly fee, and many others that charge a lot more than $10 a month. With the free plan from Iris you get basic on/off arming and individual control of all the devices you installed. You also get email, text and voice alerts to only one contact name whenever an alarm is triggered. When you add the premium service you get access to the Magic—the automation part of the package where multiple devices are linked together. You also can add up to 20 contacts for alarm alerts (very useful when you're out of town), plus extended video storage for your security cameras. While some control systems (such as the Staples Connect) don't charge for similar functionality, Lowe's does. Is it worth it? If you buy the Iris system, then yes, it absolutely is.

The Iris Smart Kit or Safe and Secure Kit ($179) would be good systems for apartment dwellers who want a little security but don't want to make a big investment. Owners of single-family homes or people with more complex needs will need to budget for add-on devices or opt for a professionally installed system.

**Samsung SmartThings** By Grant Clauser

There are a lot of smart things in this review. Unfortunately, I'm not one of them. In the case of this review I was probably the dumbest thing in the room.

I've set up a number of smart home hubs, programmed my own Control4 system (somewhat), and confused countless universal learning remotes, so I decided to give myself a challenge with this review of a SmartThings system—I wanted to see how fast I could get it setup and running.

SmartThings, which was recently acquired by Samsung, is one of several recent entries into the do-it-yourself home automation market. Similar to many other DIY solutions, the SmartThings system begins with a hub product that connects to your network router. The hub then connects wirelessly via ZigBee and Z-Wave to other devices to create a mesh network of connected smart things such as motion sensors, door sensors, smart locks, etc. and which you then access and operate all through an iOS or Android app.

SmartThings offers its own line of accessories or you can use compatible third-party devices like Kwikset smart locks, Philips Hue lights or Sonos wireless speakers (Note: use of third-party devices like Hue still requires the original device's hub or gateway, so make sure you have plenty of ports on your router.) Recently the company added several more device makers to the list of products it works with, and that list is likely to keep growing.

So, back to my setup. Hooking up the SmartThings hub started off smoothly. I plugged it into my router, launched the app, entered the unique ID number that came with the system and filled in a little more user information. Then I got cocky. In a rush to get it done, I didn't write down the password I'd just made up (Rule #1: don't forget your home automation password). This little oversight came back to haunt me when I wanted to add the app to my Android tablet.

Next, I neglected to properly look at the very clear directions—the directions that were actually so simple I really didn't need to look at them at all. Unfortunately, I must have had one eye closed, so I skipped Step 1 and went straight to Step 2. The result is that I spent 10 wasted minutes opening up the back of a motion sensor and repeatedly pressed a pairing button for a product that had already automatically
I had ghosts. Setting up a wireless camera in the garage re-

Having seen all the Paranormal movies I instantly assumed

for three nights in a row I’d get motion alerts around 3 a.m.

have headphones on and can’t hear the garage door). Then

alerts when it detected motion. For a while this was useful

configure a camera to snap a picture of an intruder. I set up

ous sensors are triggered, add an ear-piercing alarm and

security features. You can add notifications for when vari

devices like this, and SmartThings can be set up for basic

a lot fancier than that. Some are more for fun than anything else, such as the “Undead Early Warning” app (SmartThings
does not offer a sensor which tells the difference between a

zombie and an ordinary boring person).

Home security is one of the main areas of interest for
devices like this, and SmartThings can be set up for basic
security features. You can add notifications for when vari-
sors are triggered, add an ear-piercing alarm and
configure a camera to snap a picture of an intruder. I set up
a motion sensor in the garage and programmed it to send
alerts when it detected motion. For a while this was useful
in letting me know that my wife had come home (I often
have headphones on and can’t hear the garage door). Then
for three nights in a row I’d get motion alerts around 3 a.m.
Having seen all the Paranormal movies I instantly assumed
I had ghosts. Setting up a wireless camera in the garage re-

revealed that the ghost was just a curtain being blown by wind
because I had left a window open (maybe I should have put
a contact sensor on that window).

Anyway, all the devices I connected worked as planned.
The real trick to a system like this is in the app, specifically in
how easy it is to configure activities and activate devices. The
main screen, called the Dashboard, gives you an at-a-glance
view of everything in your system. It will tell you if the doors
are locked, the windows open, the lights on, or ghosts (or
curtains) moving in your garage. The Things view shows you
all the devices. Depending on the device, some can be acti-
vated (like a light switch) or configured (like a motion sensor)
by pressing the button of that particular device.

The app is comprehensive, in that it allows a wide variety
of activities to be configured. If this is your first experience
with a smart home system, navigating the interface will take
some getting used to. The system doesn’t come with particu-
larly thorough printed instructions, so it’s pretty easy to forget
how you set up an action or mode if you want to go back
and change it. On the other hand, there’s actually a support
feature built into the app that includes very good instructions
(you get to this section from the Dashboard). Within the Sup-
port section you’ll find several “How to” entries and even a
live text chat area to connect with a support person.

So how does SmartThings compare with similar devices?
Pretty well. The large variety of “Smart Apps” makes it pos-
sible to deeply personalize your system. The large variety can
also seem a little overwhelming if you’re new to the whole
process. The Lowe’s Iris system, for example, makes program-
ming (or personalizing) a little easier; however some of the
Iris’ programming options require a monthly fee of $10. With
SmartThings you only pay for the devices. There’s no service
charge. In fact, it’s the depth that these Smart Apps go that
really gives SmartThings its strength. There’s a wealth of cre-
ativity in these options, and they’ll most likely give you some
ideas on how to use your system that you would never have
thought of on your own.

The library of devices that SmartThings works with also
makes it attractive. There are door locks, thermostats, leak
detectors, a variety of light switches (including WeMo) and
lights (including Hue) and even the Sonos wireless music
system.

So back to my challenge–how long did it take me to set up
SmartThings? Not counting my errors, the entire hardware
setup for the hub and seven devices was about 25 minutes.
Setting up the activities, likewise, is a process of a couple
minutes each, but realistically it may take you several days or
longer as you learn the potential of the system and modify
it to fit your lifestyle. Someone who is into tweaking gadgets
may never finish this process.

As with any DIY home control system, there will be some
trial and error involved in the process, but if you’re a curious
and tech-savvy person, SmartThings can not only add a high
level of functionality to your home, it can also be a lot of fun.
We expect that with the help of Samsung’s deep pockets, this
platform will continue to expand.
**GE Z-Wave Remote Control**  
*By Grant Clauser*

Home automation systems using the wireless mesh network protocol Z-Wave to control and communicate with smart devices and sensors are proliferating at a dizzying rate. The majority of Z-Wave products are controllable via tablet or smartphone apps, and that’s great for people who never let their iPhone or Android devices leave their side, but what if you don’t have your smartphone attached to you at all times? That’s where the GE Z-Wave remote comes in.

Jasco’s GE Z-Wave remote is a remote control for your home. Think of it as a secondary control interface for your smart home system, and it’s one you don’t have to wake up or enter an unlock code to use first—there are physical buttons for controlling your devices or automation scenes. Sure, a remote seems old-school, but look at it this way—a remote that sits on the coffee table is easier to access when you want to turn off the lights or adjust the temperature, than a tablet or cellphone (which needs to be recharged every night). It also makes a lot of sense as a nightstand remote next to your bed so you can easily activate a Goodnight scene to turn off all the home’s Z-Wave lights.

The $99 GE Z-Wave remote can control up to 18 individual lights or 18 groups of lights, and 18 different lighting scenes (based on your preprogrammed lighting scenes). Not only will it turn on and off (and dim) lights, it will control up to four Z-Wave smart thermostats and six Z-Wave smart locks for your doors. You can create scenes in your home smart system to link those devices together, so you can adjust lighting, heat and door locks all with one button. The remote includes an LCD screen so you know what mode you’re in and what you’re controlling.

With any smart home system, the control app will give you the most flexibility and deep control, but often it’s not convenient on a day-to-day basis. We always recommend supplementing the app control with connected keypads, wall switches and dimmers. This is especially important if you have family members who don’t use smartphones or if you have guests who don’t have access to your smart home app. The Z-Wave remote would be another smart addition to a Z-Wave home automation system.

**Sage Home Automation System**  
*By Rachel Cericola and Julie Jacobson*

We’ve seen a lot of service providers deliver options for home automation. Comcast has XFINITY Home, AT&T has Digital Life, and even Time Warner has its own system. Now EchoStar, the company known for spawning and spinning off DISH Network, offers its subscribers (and everyone else) Sage.

Sage is EchoStar’s newly announced security and home automation solution. However, it’s not exclusive to DISH Network subscribers. The company plans to make this system for the masses, with access to everything from cameras and locks to lights, thermostats, sensors and more. EchoStar says that since Sage is completely wireless, it’s very easy for anyone to install—and even easier to use. In fact, the system is accessible right on your TV, as well as through your favorite iOS and Android portables.

The Sage home automation system makes good use of the TV as a graphic user interface and could be a serious contender in the increasingly crowded smart-home space.

The system starts with a box that includes ZigBee, Z-Wave, Wi-Fi and Bluetooth (and can support Thread through a download). It has one HDMI and two USB ports, plus a remote control for quick access to functions like rules, cameras and temperature.

What sets it apart is a slick TV interface, with graphic overlays and/or a picture-in-picture function that lets users continue to watch the on-screen action even during automation events.

Here is an automation routine that’s commonly set up by home systems integrators: The doorbell rings and an image from the front-door camera pops up as a picture-in-picture on the TV screen.

“Yeah, but I can get this on my cellphone,” you say? Sure, if you want to take your eyes off the Big Game while you search for the phone and pull up the image.

A more useful scenario is to keep your eye on the kids at all times while you’re watching TV. Easy, just arrange the video images on one side of the screen. Or open your Sage control dashboard in full-screen mode while your TV show plays in the corner.

But back to the doorbell scenario. Even products that integrate doorbells with home automation systems have an issue. The existing doorbell must be replaced by something more expensive, possibly trickier to install, and certainly more attractive to vandals.

EchoStar wasn’t content with that, so they built a clever product that lets users keep their existing but tons intact. The doorbell module connects between the doorbell and chime, passing signals along from there to the Sage system.

And that’s not the only pesky-product issue that EchoStar has solved. It also has an answer to outdoor cameras. So here’s the problem: Unless you have a very strong Wi-Fi signal and your camera has very big batteries, you’re going to have to run wire outside for power and/or signal.

Total drag for the do-it-yourselfer.

EchoStar’s answer is a camera that connects with a cable so flat you can shove it through the side of your window. The cable, which carries data and power, runs to a module that plugs into an A/C outlet inside. The module delivers video signals wirelessly to the Sage system.

This camera (plus other cameras) are leveraged by Echostar’s Local 911 app, which enables remote monitoring of the cameras, and with the touch of one button, call 911 to personally provide details of the nature of the emergency.

Pricing has yet to be disclosed, but EchoStar will offer a certain amount of video storage for free, as well as a premium service.
Start with Security

HOME MONITORING CAN BE THE GATEWAY TO HOME AUTOMATION

As prices of home automation systems continue to decline and become easier to install and use, they’re becoming an increasingly popular amenity. However, some homeowners may not be ready to bite off such a large chunk of technology. For them, a solid security system can serve as a nice springboard into home automation, providing a chance to get the feet wet without completely diving in. In fact, the main processor or hub for a security system usually can be upgraded easily to also automate a home’s lights, thermostats, and other devices. Other common parts of residential security system pave the way to complete home automation, as well:

**Sensors That Multitask**
Security systems always include sensors—contact sensors for windows and doors, motion sensors, gyroscopic sensors, heat sensors, noise sensors. In a security system, these sensors help detect activity when there should be no activity, and then alert you when there's a problem. In a home automation setup, many of these same sensors can be configured to trigger other devices, such as lights and smart thermostats or even your home music system. For example, a motion sensor in the kitchen can be programmed to tune in your favorite Pandora station when it knows you're home from work.

**Locks That Cue Other Devices**
Electronic door locks and garage door openers can complement a security system by prohibiting access into your home and reporting to you whenever someone unlocks and opens the door. As the main access points of your house, they can also function as terrific signaling devices. For example, whenever the door is unlocked or a garage door lifts, it can signal certain lights to turn on. These conditions could cue other devices, too, such as thermostats, ceiling fans, and motorized window shades.

**Settings Revolve Around Your Lifestyle**
One of the biggest learning curves in any home automation system is getting adjusted to using the interface, whether that's a touchpanel, keypad or app on your smartphone. When you start with a security system, you'll have to interact with it a couple of times a day to arm and disarm it, which serves as an easy way to get comfortable with the look and feel of the onscreen features, especially if you're new to this kind of technology.

Security Provides A Solid Backbone
The devices that make up a security system are not very expensive; nor are the systems themselves. When you're ready to implement automation features, you can add one device or one room at a time. Add a room's worth of lighting control for the cost of a couple of wireless dimmers—the security system can act as your control device. Add your front porch light to the system by installing a wireless LED light bulb. If you're handling the project yourself, you can slowly work your way up to an entire home system. If you're working with a professional, set a budget and work with your installer to upgrade your system at your pace.
SMART HOME SYSTEMS DIRECTORY

To simplify your search for a home automation system, we’ve created a comprehensive directory of solutions available today. Each system in the directory has been placed into its most appropriate category, so whether you want something that’s professionally installed or would like to tackle the project yourself, you’ll be able to find the right automation solution. Be sure to visit the company websites for more detailed information.

HIGHLY CUSTOMIZABLE, HIGH-END, PROFESSIONALLY INSTALLED

**AMX**
Amx.com
Years in business: 32
Specialty: enterprise-grade automation systems
Typical cost (equipment only; no labor): $25,000

**Crestron Electronics**
Crestron.com
Years in business: 30+ years
Specialty: video distribution and scaling
Typical cost (equipment only; no labor): Starts at $3,500

**Savant Systems, LLC**
Savantsystems.com
Years in business: 8
Specialty: Apple integration
Typical cost (equipment only; no labor): $1,500 - $1 million

**Vantage**
Vantagecontrols.com
Years in business: 26
Specialty: Lighting control and user interfaces
Typical cost (equipment only; no labor): $125 per lighting load
**MID-PRICED, CUSTOMIZABLE, PROFESSIONALLY INSTALLED**

**Clare Controls**
Clarecontrols.com
Years in business: 4
Specialty: intuitive, engaging multi-room audio control
Typical cost (equipment only; no labor): $4,000

**Control4**
Control4.com
Years in business: 10
Specialty: lighting control, A/V distribution, security monitoring and surveillance, climate control, remote monitoring
Typical cost (equipment only; no labor): $1,000-$1,500

**Elan Home Systems**
Elanhomesystems.com
Years in business: 25
Specialty: A/V distribution
Typical cost (equipment only): starts at $2,000

**Key Digital**
Keydigital.com
Years in business: 15
System: Compass Control System
Specialty: A/V distribution
Typical cost (equipment only; no labor): $1,500-$150,000

**Leviton Security & Automation**
Leviton.com/Automation
Years in business: 29
Specialty: security, automation and control of lighting, thermostats and entertainment equipment
Typical cost (equipment only; no labor): $2,500-$5,000

**On Controls**
Oncontrols.com
Years in business: 6
Specialty: cloud-based for easy updates and programming modifications
Typical cost (equipment only; no labor): starts at $475 for a single-room

**Pro Control**
Procontrol.com
Years in business: 2 (parent company RTI has been in business for 22 years)
Specialty: home control via iPad and iPhone
Typical cost (equipment only; no labor): $250-$900

**Remote Technologies Inc. (RTI)**
Rticorp.com
Years in business: 22
Specialty: control, automation, audio distribution
Typical cost (equipment only; no labor): a few hundred to several thousand

**Schneider Electric**
Wiserenergy.com
Years in business: 3
System: Wiser
Specialty: energy management; smart grid; utility connectivity where applicable
Typical cost (equipment only; no labor): $320-$495

**Somfy Systems**
Somfytahoma.com
Years in business: 3
Specialty: manufacture and control of motorized window treatments
Typical cost (equipment only; no labor): $2,500

**TiO Home Automation & Control**
tiohome.com
Years in business: 1
Specialty: control over third-party subsystems
Typical cost (equipment only; no labor): $2,000-$7,000

**URC**
Universalremote.com
Years in business: 23
Specialty: A/V and home theater control
Typical cost (equipment only; no labor): $1,100
Smart Home Systems

SECURITY CENTRIC WITH HOME AUTOMATION CAPABILITIES, PROFESSIONALLY INSTALLED

Alarm.com
Alarm.com
Years in business: 10+
Specialty: interactive security
Typical cost (equipment only; no labor): N/A

Elk Products, Inc.
Elkproducts.com
Years in business: 14
Specialty: integrated control
Typical cost (equipment only; no labor): N/A

Honeywell
honeywell.com
Years in business: 25
Specialty: security, video and Z-Wave integration
Typical cost (equipment only; no labor): starts at $500

Fibar Group
Fibaro.com
Years in business: 3
System: FIBARO System
Specialty: smart home
Typical cost (equipment only; no labor): $1,200-$2,000

Homeseer
Homeseer.com
Years in business: 15
Specialty: whole-house control via Android or Apple devices
Typical cost (equipment only; no labor): starts at $199.95

Insteon
Insteon.com
Years in business: 9
Specialty: lighting control
Typical cost (equipment only; no labor): $100-$200

iRule LLC
iruleathome.com
Years in business: 4
Specialty: affordable customizable control
Typical cost (equipment only; no labor): $250 for one room

JDS Technologies
Jdstechnologies.com
Years in business: 26
Specialty: control and automation of lighting, A/V and HVAC
Typical cost (equipment only; no labor): under $1,000

Roomie Remote, Inc.
Roomieremote.com
Years in business: 3
Specialty: Home theater control
Typical cost (equipment only; no labor): $200

AFFORDABLE, DIY OR PRO INSTALLED (BUT NOT FOR BEGINNERS)

BitWise Controls, LLC
Bitwisecontrols.com
Years in business: 5
Specialty: integrated controls
Typical cost (equipment only; no labor): $549-$1,549

Linear LLC
Linerarcorp.com
Years in business: 52
Typical cost (equipment only; no labor): For a basic system, hardware and installation can be free; monthly monitoring fees start at about $30

Qolsys (Quality of Life Systems)
Qolsys.com
Years in business: 4
Specialty: security via integration with Alarm.com
Typical cost (equipment only; no labor): N/A

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Roomieremote.com
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Typical cost (equipment only; no labor): $200
**DIY BEGINNER SYSTEMS**

**Belkin WeMo**
WEMOthat.com  
Years in business: 3  
Specialty: automation of everyday devices  
Typical cost (equipment only; no labor): starts at $29.99 for single WeMo LED bulb

**Icontrol Networks**
Getpiper.com  
Years in business: 2  
Specialty: remote video monitoring of your home  
Typical cost (equipment only; no labor): $239

**EchoStar SAGE**
www.sagebyhughes.com  
Specialty: security  
Typical cost (equipment only; no labor): to be determined

**Lowe’s**
Lowes.com/iris  
Years in business: 2 years  
Specialty: unifies the control of products from a variety of manufacturers  
Typical cost (equipment only; no labor): $299

**Neurona ConnectedLife**
Myneurona.com  
Years in business: 1  
Specialty: robust networking on products  
Typical cost (equipment only; no labor): starts at $199.99

**Nexia**
Nexiahome.com  
Years in business: 6  
Specialty: app-based home control; thermostat monitoring  
Typical cost (equipment only; no labor): starts at $67 plus $9.99 monthly subscription

**Webee**
Webeeuniverse.com  
Years in business: 1  
Specialty: cloud-based, the system employs algorithms to learn user's behaviors and offer suggestions on how to operate devices in the home more efficiently.  
Typical cost (equipment only; no labor): $129-$599

**Wink**
Wink.com  
Years on business: 2  
Specialty: good starter system for lighting control  
Typical cost (equipment only; no labor): starts at about $50

**Zonoff**
Zonoff.com  
Years in business: 3  
System: Staples Connect  
Specialty: integrated home control  
Typical cost (equipment only; no labor): starts at $99

**MASS MARKET SECURITY PROVIDERS**

**ADT Security Services**
Adt.com  
Years in business: 140 years  
System: ADT Pulse  
Typical cost (equipment only; no labor): starts at $99 (after typical promotions)

**AT&T**
Att.com/digitallife  
Years in business: 1  
System: AT&T Digital Life  
Specialty: all-digital, fully integrated wireless management of surveillance cameras, door locks, lights, thermostats, small appliances and more  
Typical cost (equipment only; no labor): starts at $149.99 plus $29.99 a month
**Comcast**  
Xfinity.com/home  
Years in business: 4  
System: Xfinity Home  
Specialty: energy savings  
Typical cost (equipment only; no labor): starts at $99

**Vivint, Inc.**  
Vivint.com  
Years in business: 4  
System: Vivint Home Automation  
Specialty: security, automation and energy management  
Typical cost (equipment only; no labor): $199 activation fee; $68.99 monthly monitoring fee