SPECIAL REPORT
Planning Guide for Every Budget

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SMART HOME AUTOMATION

Planning Guide for Every Budget

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WHY & HOW to Automate Your Home

Unsure about automation? Here’s a primer to help you get started on your quest for easy living.

AUTOMATION USED TO CONJURE thoughts of a house gone wild, where technology ruled the roost and the decor resembled a science lab. Fortunately, this stereotype has been shattered, thanks to improvements in the technology and consumers’ growing affinity for home electronics. The bottom line is, automation can add real value to your home, and it’s a fairly simple process to have a system installed. Here are 8 helpful bits of information for anyone thinking about or in the process of automating their home.
1. **Automation Boosts Efficiency.** This refers to both efficiency of the systems in your house and the efficiency of your household. Because an automation system is able to control multiple devices, you can, with one touch of a button, set back the thermostats and turn off the lights, for example. You’ll get out of the house faster and save electricity.

2. **Automation is Convenient.** You’ll be able to monitor and manage all types of electronic devices (lights, thermostats, A/V equipment, motorized shades, security system, etc.) from the screen of a smartphone or tablet. The convenience alone is enough to inspire many people to automate.

3. **Automation Delivers Comfort.** Through its ability to actively monitor and manage various electronic elements, an automation system ensures maximum comfort. The entire environment—from the setting of the lights and thermostats to the activation of music—is at your command.

4. **Automation Provides Peace of Mind.** A home automation system helps prevent potentially bad things from happening by enabling you to monitor parts of your house conveniently from tablets, smartphones, and other devices. You can check up on the house even when you’re miles away.

5. **Shop for Gear.** If you’re handy—or just want to window shop—many big-box retailers now offer automation systems designed to be installed by homeowners. A DIY system is the most affordable type of automation system.

6. **Roll it into your Cable, Satellite, Phone, Internet Bill.** From the same company you buy cable, satellite and/or phone and Internet service, you may be also able to bundle in a basic home automation system.

7. **Start with Security.** Many security systems come with basic automation features built in. Home protection is always important. If you can also automate the lights and thermostats, it’s a bonus.

8. **Customization.** It’s a beautiful thing when an automation system can be adapted to fit your lifestyle, not the other way around. A custom electronics (CE) professional is able to tailor a system exactly to your needs.
10 Key Features of a HOME AUTOMATION SYSTEM

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 custom electronics (CE) professional to provide all the benefits you desire, but there are some key features that will make his job easier and your interaction with your system more enjoyable.

1. 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 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 irrigation to multiroom 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.

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 CE pro Bill Charney of Advanced Home Audio, Shelton, Conn. “It allows installers to select the best suite products for their clients.”

Interoperability (see Feature #1) between various subsystems, as pictured here, ensures that all electronic devices can communicate openly with each other; automation systems are the glue that binds all of the devices together. Systems design and installation by Electronics Design Group; Photography by William Psolka

2. 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 those changes to your home automation system remotely 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, if necessary, all from your laptop, smartphone or tablet. McClellan believes that remote monitoring should be a service manufacturers and installers 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 installer to tweak your system without having to make a house call, which is always cheaper and more convenient.
3. Expandability
The way you live in your home five years from now will probably be much different than the way you live in your home 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 of wired products.

4. Upgradeability
Those touchscreens 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. 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 CE pro) will be able to unlock and download software updates automatically.

5. 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 the screen of your phone or tablet. 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.

6. Time-Tested
No one, except for serious early-adopters, likes to be the 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 installers from their company websites.

7. 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, advises Eric Smith of home automation manufacturer Control4. You’ll have all the crucial documentation should you ever need to hire someone else.)

8. 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.

9. 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.

10. 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 installers 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.
It’s possible to install certain home automation systems yourself, but be prepared to make a few sacrifices. THE HOME AUTOMATION MARKET is teeming with automation systems that homeowners can install themselves. It’s a shift that has made automation accessible to people who may not have been able to afford to pay a professional to install a system, and has given tech-savvy consumers fun, doable projects to tackle on the weekends. Still, there are many good reasons to leave the installation of a home automation system to a pro. No matter how handy you are, there are certain features that only a professional is able to unlock. Here’s a look at a system that straddles the DIY and pro marketplace, the iRule system from a company of the same name. The projects featured below compare what’s possible to achieve with a system like iRule when it’s installed by a DIYer versus a professional.

**The DIYer**

Sarasota, Fla., resident Mark Pierson is no stranger to home technology. Together, he and his wife have designed and built a total of three home theaters, their last one a culmination of years of DIY experience. One of the biggest enhancements of this end-all, be-all theater was the inclusion of a more sophisticated control system. The iRule system, Pierson says, was one mentioned frequently on the popular tech-enthusiast online discussion group AVS Forum, so he decided to give it a try, with the hopes of programming a system that would enable him and his family to operate the home theater equipment from the screen of an iPad.
DIY or Professionally Installed?

To help DIYers with this process, iRule lets consumers download from its cloud-based repository IR (infrared) commands for nearly all makes and models of audio and video equipment. Pierson also found the company’s Handset Wizard a handy tool. “The Handset Wizard has a library of pre-configured remote pages with buttons for nearly all types of equipment and is configured through a personal computer by using the iRule Builder,” he explains. “With the codes and the screen design downloaded from the online iRule Builder to your smartphone, you’re ready to operate all of your audio and video equipment.”

Also customizable is the background of your smartphone’s on-screen menu of commands. Ever the curious DIYer, Pierson says he spent a couple of weeks programming the iRule system. “Even after I had it configured, I’d continue to play around with it and if I get bored with the look, I just drag in a photo from the pictures stored on my iPad or iPhone or create new custom buttons for one of the pages.”

Pierson’s post-configuration tinkering usually involves the creation of macros, which was “one of the main reasons I bought iRule,” he says, as was the ability to create separate control menus for each of his home’s seven TVs. “I can use the same iPad to control every TV in my house,” he continues. Macros let Pierson touch one button to signal the many components of his home theater—video projector, A/V receiver, Blu-ray player and room lights—to get ready to play a movie.

All told, Pierson spent a couple hundred dollars for the iRule control system, which includes a subscription to the company’s cloud-based service and the hardware that converts IP commands from tablets and smartphones to the infrared codes that A/V equipment can understand. “Really, the biggest investment for a control system like this is your time,” Pierson says. “I am only limited by my imagination because the options are endless for design and control.”

Professionally Installed

Using iRule as a control platform, the custom electronics (CE) professionals at ChaseSystems, Bethesda, Md., were able to automate more than 200 electronic devices for the owners of a 9,332-square-foot home in Great Falls, Va. The ability for a system to control hundreds of different types of products is what separates a DIY project from a professionally installed project, says Chase Integration’s Matt Collazzo. Off the shelf, a system like iRule is designed to control a certain set of products. To incorporate products outside of its preconfigured realm often requires the handiwork of a CE pro who understands how to write command strings. “As professionals, we are able to develop our own ‘drivers’ to ensure that no matter what brand of product a client has, it can be integrated with iRule,” Collazzo says.
For this project, Chase Integration would develop its own custom software drivers for a Lutron Radio RA lighting control system, Sonos whole-house music system, Jandy swimming pool system, among others. And unlike a DIY project like Pierson’s that focused on controlling components within a particular room—the 500-square-foot home theater—the system set up by Chase Integration is able to control devices throughout every square inch of the almost 10,000-square-foot home. The graphics on the iPad were configured by Collazzo to present a list of rooms; the appropriate commands populate on the screen based on the room that is selected. For example, if the homeowners would like music from their Sonos audio system to stream to the speakers in the family room, they first touch Family Room, followed by Music. From there, they can control the volume, skip to a new song or direct the music to other rooms. Or, they can launch the native Sonos app from within the iRule environment.

In addition to providing a much larger scope of control, the high level of programming and customization, and the fluidity of operation, the iRule system designed and installed by a professional tallies in at about $150,000.
COMPRISING YOUR HOME ARE many different electronic systems: 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 custom electronics professional) settings, levels and inputs. It’s a much more efficient way to manage your household than by manually manipulating 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 among CE professionals, so consider implementing them as you start to design your own home automation system.

**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.

**Audio and Video Equipment**
An automation system can enhance the performance of your entertainment systems by making them easier to operate and helping them blend in better with the 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 all of the necessary A/V equipment ready to play a movie. This same
command—which CE pros 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; for example, you wake up to the morning news and exercise to Pandora, you can use your automation system to play what you want where you want it automatically at certain times of the day or when you touch a button on your iPhone or some other control device.

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, Vacation are common commands issued by security systems, as well as from automation systems, which make a security and home automation an 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 text 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 turn-
ing 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 system 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 and cleaning people visit 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 a touchpanel, tablet or smartphone.

**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 to save 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.

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 stats 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.
HOME AUTOMATION

Hits the BIG TIME

Monumental shifts in technology are making a huge impact on automation’s mass appeal.

IT’S HIGH TIME THAT HOME automation is celebrated for its amazing high-tech prowess. For too long it’s suffered from a stereotype of being too complicated, too expensive and too unreliable. But now, thanks to a new attitude among key manufacturers and some surprising developments within their product lines, home automation is hitting its stride and hitting it hard by appealing to a huge cross section of consumers. Home automation has evolved and matured to become a mainstream amenity, and here are three reasons it’s changed for the better:

1. It’s Scalable. In other words, you can start with a small, basic automation system and build onto it a month later, a year later, whenever. Although system expansion has always been possible, it wasn’t always as highly encouraged or as practical and affordable as it is today. Systems of a few years ago
were manufactured to be end-all, be-all solutions, meaning they had the muscle to automate everything but the kitchen sink... well, maybe even that, too. Manufacturers wanted homeowners to buy the entire solution; so did CE professionals. This naturally positioned home automation as an expensive home improvement that only a small part of the market could afford.

Over the years, new manufacturers have entered the market with simpler, less expensive systems. More recently, and even more exciting, manufacturers of the big, elaborate, end-all, be-all automation systems have streamlined their products. Rather than focusing solely on high-end clientele, they have broadened their appeal by offering systems that can start out small and basic, but then grow into something much larger and extensive.

One of the leaders in this pack is Savant. Noted as a premier provider of luxury automation systems, the manufacturer has recently developed scalable products that cost a fraction of its legacy automation system. “It’s simply a matter of taking our software and putting it into different form factors,” says Jim Carroll, Savant executive vice president, corporate strategy and business development. The company recently unveiled a $500 Gateway—a Linux box that features the full Savant software and does not require a Mac Mini on the network (although one can be added to enhance the system). The Gateway is packaged with Savant’s new $499 Wi-Fi universal remote, the SUR-0500.

“This is Savant for the masses,” says Carroll. “It can do everything a full-blown million-dollar Savant system can do,” but on a smaller scale. This new scaled-down system serves homes of around 4,000 square feet; Savant’s legacy systems can handle the automation routines of 60,000+ square-foot homes.

And if all a consumer wants is an economical lighting control system, Savant now has that, too. By using Wi-Fi as a communications platform and keypads that can be programmed and controlled from an iPad, it settles in at a comfortable price point.

The more intuitive its controls are, like the menus presented on Vantage’s Equinox touchpad, the more useful an automation system becomes.
2. **Intuitive Controls.** The more devices a system can control, the more important a clean, uncluttered user interface becomes. User interface is industry speak for the device that homeowners use to interact with the subsystems (lighting, audio/video, security, etc.) that are managed by a home automation system. A user interface (UI) can take the form of a dedicated touchpanel, a wall-mounted keypad, your smartphone or tablet. Regardless of its design, a UI can provide a wealth of information about and controls for every system in your house. For example, from the screen of an iPad (that’s running a special home automation app), you can see the status of the thermostat and lights and modify these settings with just a few taps of a finger.

As the dashboard and control hub of an automation system, the UI plays a vital role in the usability and performance of an automation system. When the user interface is poorly designed, it “fails the entire automation system,” says Andrew Wale, vice president of marketing for home automation manufacturer Vantage. “When people don’t understand what the buttons on the user interface will do, they become scared to use their automation system.”

A logical, understandable, uncomplicated user interface is therefore key to a user’s experience with an automation system, and manufacturers like Vantage have started to focus a lot of their R&D energy on UI design. “People understand how to navigate a smartphone, so we created a user interface with the same type of look and feel,” says Wale. Like a smartphone, the Equinox 73 keypad allows users to swipe through pages of controls rather than hunting and pecking for the right buttons. The home screen displays only three “widgets” at a time, which precludes confusion over which button to press. Plus, profiles can be created for each member of the family. Within each profile are only the commands relevant to that particular user. After the UI has been programmed by a CE professional, homeowners are able to reprogram and create some of the settings themselves.

3. **Cleaner, Easier Integration.** Over the past few years so many innovative smart products have been launched. A couple of the most notable are the Nest thermostat and the Sonos wireless whole-house audio system. Although both are great products, when they were first introduced they lacked one very important element—the ability to be integrated with a home automation system. Fortunately, this has changed recently, as manufacturers of disparate systems have decided to work together, enabling a variety of different products to unite under the command of a single home automation system.

Control4 is one manufacturer that’s been particularly welcoming of new products. Through its own internal engineering department and third-party developers, the home automation manufacturer has created a system into which many standalone products—like those from NEST and Sonos—can be easily integrated. A number of manufacturers are doing the same, fostering an industry-wide movement that has simplified the design and installation process for custom electronics (CE) professionals while giving consumers greater choice and flexibility when buying a home automation system.

Surely, home automation will continue to evolve, but for now these three enhancements represent a significant shift in the industry, where automation has become a friendlier, more financially accessible amenity. To find out what’s available, be sure to check out the comprehensive listing of home automation systems on page 34. You’ll be able to find one that’s suits your budget and needs perfectly.
How to SAVE MONEY on AUTOMATION EXPENSES

JUST BECAUSE YOU CAN DO SOMETHING doesn’t mean you should. It’s an old cliche, but it still holds true today, especially if you’re thinking of having an automation system installed into your home.

Automation systems, by nature, are able to perform some pretty amazing and unusual feats. They can regulate the temperature of fish tanks and hot tubs, snap on the lights when you step through the door and open the window shades precisely at 9 a.m. It’s this kind of magic that makes automation so appealing—and expensive.

“Inevitably, home automation will involve a mix of different brands of products,” says CE professional Gordon van Zuiden of cyberManor in Los Gatos, Calif. “Whenever you try to get products from different companies to work well together it can become costly.”

While you still want to cover as many of the key features of an automation system as you can, there are ways to save on costs. For starters, stay away from fancy setups like having a hot tub turn on when a sensor notices that your car has pulled into the driveway. “Any time you add processing intelligence to the system, it drives up the price,” says van Zuiden. “Having a simple off button on a keypad that you push to turn off all the lights in the house will cost significantly less than automating the lights to turn off whenever the security system triggers them, for example.”

You can also tighten the purse strings by limiting the number of products and systems your automation system controls. Any time one system—like security—communicates with another system—like lighting—costs can escalate. Integrate into your automation routines even more systems—like audio/video distribution, motorized window shades and HVAC—and you’ll pay even more. For CE pros like van Zuiden, programming a system to sync the operation of the lights, thermostats and other devices takes time, and for consumers that time equates to labor charges.
CE pros charge a pretty penny for this programming labor, so it’s important to determine whether it’s worth it to have those lights dim and window shades close at a certain time of the day or if you’d be satisfied with just pressing a couple of buttons to make it happen.

Programming isn’t the only expense you’ll incur when you roll in lots of products. The more you automate, the more hardware you’ll likely have to buy. While a programmable thermostat will suffice as a way to have the heating and cooling adjust automatically, you’ll need more processing power (automation software), more equipment (processors, sensors and the like), and a more sophisticated interface (likely a touchpanel)—cha-ching—to make that stat adjust whenever you walk into your home theater, arm the security system or open the draperies.

**Some tips to help keep costs down:**

- **Be Realistic.** Do you really need a sensor by the driveway to trigger on the lights at the front porch? Probably not. Focus on what you need, rather than what you want, and a good place to start is with security. Many security systems can not only protect your home, but can also control your home’s thermostats and lights.

- **Think ROI.** Choose features that offer a good return on investment—like heating and cooling control. “Automating the HVAC system is one of the last things homeowners often think about doing, but it has the highest payback of all systems, especially in parts of the country where energy costs are high,” says Robert Ridenour, brand manager for home control manufacturer Elan Home Systems and formerly a CE pro with Connected Technologies in Colorado Springs, Colo. Automating the lights and shades can also greatly curb your energy use.

- **Common Interface.** Use a system that’ll let you control devices with something you already own—like a smartphone or tablet.

- **Don’t be Oversold.** Project prices might be driven up by how encompassing or how high-performance the subsystems are. For example, one brand of distributed audio system might play at 15 watts per channel and cost $200 per room, while another plays at 150 watts and costs $2,000 per room. Be sure to understand what you’re getting for your money before choosing your subsystems.

- **Ask for Less.** There is more than one way to skin a cat in the world of home automation. Always ask your CE pro if there’s a different, more economical way to get the features you want.

- **Go Lite.** In an effort to make their systems more marketable, many home automation companies offer “lite” versions of their flagship automation systems. Usually, they offer the same basic features as the expensive version, but on a smaller scale and without the bells and whistles.

- **Line It Up.** Ask your installer to break down everything you want to do and show you line by line what each item will cost. An automation system can accomplish virtually anything, but projects can also go on for years, so have your installer specify the estimated time, labor and expenses for each aspect.

- **Expand Later.** You don’t have to have everything done at the same time. You can start with a small number of rooms and then expand the system later. Most automation and control systems are expandable, so if you have your media room and master bedroom integrated now, you can call the installer back next year to add the kitchen, dining room and rear deck, for example.
Common Automation Challenges

Preparation is the best defense against challenges that can occur when having a home automation system installed.

LIKE ANY IMPROVEMENT YOU MAKE to your home, you’re bound to run into a few obstacles. In the case of a kitchen remodel, maybe the countertops aren’t plumb or the new refrigerator won’t fit the allotted space. Often, you can avoid problems like these, or at least be ready to work around them, by planning carefully before you delve into the actual installation. It’s no different when you decide to add an automation system to your house. You’ll want to know what you might be up against so you can prepare accordingly. This goes for both DIYers and for those who prefer to hire a custom electronics (CE) professional to install their automation system.

Believe it or not, sometimes it can be what you’re doing, rather than not doing, that can cause issues. One of the biggest mistakes consumers make, according to CE pro John Goldenne, Digital Home Technologies, Palatine, Ill., is buying their own equipment. That TV on sale at Costco might be a bargain, but what people don’t realize is that bargain products are usually more difficult to integrate with a home automation system. And the longer it takes to link a product to an automation system, the more you can expect to pay for labor. “The cost for us to integrate certain products with an automation system can be quadruple that of what it would have cost to buy a more expensive, but integration-friendly product,” adds CE pro Troy Bolotnick, Interior Technologies, El Segundo, Calif. The best course of action: Consult with your CE pro before you buy anything, or simply let him do all the buying for you.

Even innovative new products that have automation capabilities built in, like programmable thermostats, electronic door locks, and IP (Internet protocol) surveillance cameras, don’t always work well with automation systems. Yes, you can use a separate, dedicated smartphone app to control an IP surveillance camera, but if you want that camera to be a part of a complete automation system, where one command could control the lights, camera and other components, “be prepared to pay for integration,” Bolotnick says.
Another trend that seems great but can ultimately cause headaches is wireless home automation. You’d think it would be easy to install a system that requires no wiring, but in most homes that’s far from the case. Well… maybe it’s easy to install, but the system’s performance may be under par. Wireless systems are so much more reliable and robust than they were a few years ago; what people don’t realize is that homes need good wireless networks to support them. “With the addition of a home automation system, the number of devices on the network can jump from 5 to 75 in the blink of an eye,” Bolotnick says. “Don’t expect that inexpensive cable router your Internet Service Provider gave you to handle the extra traffic.” It’s such a problem that many CE pros insist on performing a complete overhaul of a home’s wireless network before installing an automation system.

Finally—and this has nothing to do with products or technology—there’s the pitfall of poor communication between you, your CE pro and other subcontractors on the job (builder, architect, electrician, interior designer). For your part, communicate openly and often with your CE pro so that he understands clearly your desires and expectations. “You’re going to be investing a lot of time and money to have your house automated, so ask a lot of questions and do your research,” Bolotnick advises. Keep constant tabs on the project, too. Automation evolves quickly, so if yours is a lengthy project, products that were relevant during your first meetings with your CE pro may be old hat a few months later. “Certain things are unchangeable after the plans have been finalized,” says Bolotnick, “but if there’s a new model of iPad or a newer, better music system that just hit the market, let your CE pro know that you’d like to incorporate these instead … before he buys the equipment for the project.”

By knowing what to expect and being prepared to deal with certain obstacles, you can ensure that the design and installation of your automation system proceed smoothly. You’ll be able to take things in stride, which will make the entire experience more pleasant, and allow your CE pro to provide a system that’s perfectly suited for your home and family.
MAKING A SCENE

Automation systems can be programmed to set the scene for common—and not so common—household activities.

THINK ABOUT THE STEPS YOU TAKE every day to get the house ready for bedtime. You lock the doors, turn off the lights, adjust the thermostat and close the window shades. The same sort of scenario unfolds when you prepare the house for your departure for work, a family vacation or an evening entertaining friends. It's not that the tasks are all that difficult. They're just tedious and can, depending on the size and layout of your house, take a long time to accomplish.

When programmed appropriately by a custom electronics (CE) professional, a home automation system can do in seconds what it may have taken you several minutes to handle manually. And all you do is touch a button. The system responds by launching a sequence of commands, referred to as a scene, to various electronic devices located throughout your house. An automation scene can impact the entire house or one particular room. It can serve a practical purpose or just do something totally amazing that you'd love to show off to your friends and family.

Scene setting is one of an automation system's most appealing features. By saving time, it helps your household run more efficiently. It also ensures that your home environment suits the occasion or activity that's taking place and establishes a unique personality for your house. Finally, scene setting...
Making a Scene

offers the opportunity to mold your automation system around each family member’s habits, personal preferences and daily routines. A CE pro can suggest scenes to incorporate into your automation system; the list below of common and not-so-common automation scenes offers some inspiration, as well. And remember, you can call your scenes whatever you want. A button on a keypad by your nightstand, for instance, could be labeled GOOD NIGHT, BEDTIME, SLEEP or something entirely different. Likewise, you might personalize buttons to say DAD’S HOME instead of a generic WELCOME. In addition to being issued by buttons on keypads, scene commands can be engaged via touchpanels, smartphones and tablets. Or, if you are a serious creature of habit, some scenes can be designed to activate automatically at a preset time of day.

GOOD NIGHT. Turns off the lights, but leaves some dimly lit so you can see your way to the bathroom. Also arms the security system, closes the motorized window shades and sets back the thermostats to a comfortable sleeping temperature.

GOOD MORNING. Gradually brightens the lights in the bedrooms and bathrooms, opens the shades and readjusts the thermostats. Can also turn on the kitchen lights, activate the coffee pot and turn on any and all TVs to the morning news.

MIDNIGHT SNACK. Illuminates a pathway to the kitchen. The lights are kept at a low intensity level—enough light to see your way down the hall, but still gentle on sleepy eyes.

HOME. Readies the house for your return home by activating select lights—like the fixtures that lead from the garage to the kitchen. The security system disarms and your favorite Internet music
Making a Scene

station streams to the speakers in the main living areas (assuming you have an audio system that supports this function). Unique Home settings can be created for every member of the family. For example, Kids Home could send you a text when they open the door, then keep the security system on (exterior sensors only). Dad’s Home, meanwhile, could completely disarm the security system, activate the gas fireplace in the family room and turn on the TV in the home office, set to the evening news.

**AWAY.** Prepares the house for your family’s routine departure for work and school by turning off all lights and A/V equipment, closing the window shades and arming the security system.

**VACATION.** This scene is often similar to Away but puts the house into a serious energy-saving and home protection mode through the adjustment of thermostats, closing of all window shades and, of course, turning off of all A/V devices and lights. All security sensors are active and surveillance cameras begin recording to a DVR. The setting can also be designed to make your house look (and sound) occupied while you’re away by randomly opening and closing the shades, and turning on and off lights and the stereo system. The system is on high alert at this time and will send you a text if it notices someone at the front door, water on the basement floor or activity in the backyard.

**MOVIE TIME.** Make movie night an event by having your automation system dim the lights, close the shades and activate the essential A/V equipment. Incorporate a pause button that illuminates a path to the powder room and/or the kitchen.

**ROMANCE.** Set the stage for a night of romance by having your system activate the gas fireplace, play some sexy music over the family room or bedroom speakers, lock the doors and close the drapes. Oh, and of course you’ll want the system to dim the lights.

**PARTY.** While you worry about the food and the decorations, your automation system can prepare the electronic systems in your house for a party. If the gathering will take place in the evening, a Party command can illuminate a pathway from the driveway to the front door for your guests, disarm the security system, play music throughout the house and backyard, set the lights to show off your home’s artwork and architecture and set the thermostats so that everyone is comfortable.

You can have your CE pro create a variety of party buttons—elegant, casual, Superbowl Sunday, Christmas/holiday.

**DINNER** Like various party scenes, an automation system can set the lights, music and other electronic devices for a family dinner or an elegant dinner, as well as arrange the kitchen for preparation and clean up.
Savant automation system sets a new standard of living for family of four.

FOR EIGHT YEARS, THE FAMILY who lived in this elegant Boston brownstone had dealt with an inconsistent indoor climate, troublesome light switches and poor communication between six floors. Finally, after deciding to update the decor, they turned to the custom electronics (CE) pros at Advanced Communication Technologies (ACT), Rockland, Mass., to integrate modern electronic systems into a home that was in bad need of a technology overhaul.

“Even though the owner had a fair amount of knowledge about technology, he hadn’t really implemented it in his home yet,” says ACT senior project manager Bill Gerber. “It was very minimal as far as infrastructure and products.” After lengthy discussions with Gerber about the high-tech possibilities, though, the homeowners fully embraced the notion of having a system that would afford their family the convenience of being able to operate the lights, security devices and several thermostats, as well
Boston Brownstone Goes from Barebones to Brimming with Technology

as distribute video and music throughout the house—all from their current stash of iPhones, iPads, iPod touches and Mac computers. The Savant automation system chosen for the project ties everything together; a companion mobile app puts the controls on the family’s mobile devices.

Now that the design and installation of the system is complete, the family can turn off lights and adjust thermostats via the touch of a few buttons instead of having to scale six flights of stairs as they had done for years. It’s a huge time-saver for a family that maintains an irregular schedule where they’re in and out of the house at all times of the day,” says Gerber.

In addition to saving time—and aching leg muscles—the successful union of the home’s existing heating and cooling system and the Savant system had a huge impact on the renovated brownstone’s new, more modern, aesthetic. Instead of almost two dozen individual thermostats peppering the walls, there are now half as many. The thermostats that monitor a high-efficiency Mitsubishi AC system were relocated to a central equipment closet where no one sees them (sensors within the AC ductwork monitor the temperature). The other thermostats, which are responsible for heat, were replaced with stylish Lutron thermostats. (The brownstone was heated and cooled by two separate systems.)

The same iDevices that are used to operate the home’s internal electronic systems also orchestrate the delivery of music and video to built-in KEF speakers and Samsung flat-panel TVs throughout the residence. Viewing the screen of an iPad or other mobile device, the family can select content from their iTunes library and Squeezebox Internet Radio, plus cable boxes and a Blu-ray player. No matter where the family happens to be—the first floor or the sixth—audio, video, lights, thermostats and other electronic devices are within easy reach.
Legrand/Vantage inFusion system gets put through the paces through clever integration of dozens of different devices.

**THERE’S A LOT OF RESEARCH**, engineering and design work that goes behind the production of a home automation system. Sometimes it takes years before it has been perfected to the point of being a viable, marketable product.

In the case of Legrand/Vantage, the testing of its systems is extensive, involving exhaustive case studies in the homes of company employees, as well as non-techy homeowners. “We follow the users over a period of time and record how the operation of the system fits their lifestyle,” says Vantage president Doug Fikse. Based on these findings, Legrand/Vantage may go back to the drawing board to work out any bugs or to revamp a particular design element. It was through four years of testing, says Fikse, that the company developed its Adorne line of wiring products.

More recently, Fikse had the opportunity to give Vantage’s inFusion automation system, with its new Equinox touchpads, a whirl in his own house. Fikse and his wife had already been using a home automation system in their 6,000-square-foot residence; the switch to the inFusion/Equinox system was a “complete overhaul.” Some of the existing electronic subsystems were upgraded and several of Vantage’s new Equinox touchpads and Italian-designed Axolute keypads were mounted to the walls.
Extensive Automation
throughout the house.

With installation help from the custom electronics professionals at Roanoke, Va.-based Sound Decision, Fikse programmed the system to operate lights, thermostats, whole-house audio and video, security, swimming pool and spa, window shades, sprinklers, fountains and a wine cellar. “We wanted to prove that the system would be able to simplify the operation of so many different types of products in a residence of this size,” says Fikse.

After living with the inFusion system and Equinox keypads for several months, the verdict was in: Ordinary, daily routines like shutting down the house for the night were significantly more convenient and efficient for the Fikse family to handle. The system also enabled the homeowners, through a menu of commands called Profiles, to easily control only those items within a particular room. “I can walk through the house with my iPhone, and when I approach a room, the Vantage app presents only the controls that are applicable for that room,” Fikse explains. This design, he says, precludes the challenge of having to scroll through a long list of options to find the commands that matter.

The real testament to the system’s simplicity, though, says Fikse, came from his wife. “With the design of this system, we were able to remove commands that didn’t matter to her and present only the ones that did, like being able to control the TV and audio in the kitchen,” Fikse explains. His profile, on the other hand, shows additional commands for the lights and security system. “This ability to streamline what you see as command options is particularly handy when you have houseguests. You can set up Profiles specially for them.”

If in fact, Doug and his wife encourage their guests to use the system as a way to gauge its usability. “We entertain a lot and it’s a fascinating test to have guests put their iPod in a docking station and see how easy it is for them to control the lights, A/V, etc., without knowing anything about the system.” So far, everything at the Fikse house has worked like a charm, but as with any new system, Vantage will continue to refine it as it receives feedback from users like Fikse, as well as from the custom electronics professionals who are installing it. Updating it will be a simple matter of downloading the software and the latest app, says Fikse.
A LOVE OF MUSIC IS WHAT INSPIRED NASCAR driver Mark Martin to initially outfit his Batesville, Ark., home with technology, but it was his hectic racing schedule that ultimately led to the recent introduction of a more complete control system—one that would let him manage his entire home environment, not just the audio and video equipment. “What I wanted more than anything was a system that was bulletproof,” says Martin, after having struggled for years with a finicky A/V distribution system.

After connecting with custom electronics (CE) professional Ryan Heringer, Sound Concepts, Jonesboro, Ark., Martin agreed to a complete tech overhaul of his 6,000-square-foot residence. “The A/V distribution system that was already in the house was old and difficult to operate, and just to get it to work, it had to be rebooted once a week,” Heringer says.

Heringer’s advice to Martin: Rip it out and start fresh with an Elan g! automation system. Gun-shy about introducing another system to his house, Martin agreed, but only to a minimal amount of automation. Sound Concepts started by setting up 12 zones of distributed audio (with all new speakers) and eight zones of video. A Crestron HDMI switcher was integrated into the Elan g! platform to ensure transmission of the highest audio and video quality.

It’s a full-throttle approach to automation, when two homes and two airplane hangars get smart.
As good as the system would be at pumping music and video throughout the house, it would be the ability to manage his music and video library and easily direct content to specific entertainment zones from the screen of an iPad that would forever change Martin's mind about home technology.

Over the course of the next few weeks, as Martin and his family became increasingly enamored with Elan g!, Sound Concepts visited the residence several times to expand the system. Seven surveillance cameras and three exterior intercom stations were added and can be accessed from the mobile g! app on any iPad or iPhone, as well as from an Elan g! wall-mounted touchpanel in the kitchen. More recently, lights and thermostats were integrated and commands were created to enable Martin to prepare the house for his arrival and departure by simply touching a Home or Away button. These two macro commands, which synchronously adjust the lights, electronic door locks, alarm system, thermostats and A/V, have proven a valuable tool for a frequently traveling Martin when racing season swings into high gear.

In fact, the Elan g! system “was so awesome that I decided to have it installed in my lake home in North Carolina that we were in the process of remodeling,” Martin says. Naturally, Sound Concepts was hired for the job, and flown to the house via airplane, piloted by Martin himself. For this home, Sound Concepts did the works—automated LED lights, thermostats, irrigation, motorized shades, garage doors, security, a dedicated theater (featuring an 84-inch 4K LG TV and 7.2 surround-sound system), and whole-house audio and video distribution. Although more extensive in the scope of products it manages and controls, the Elan g! system functions no differently here than it does in Martin's original automated house in Batesville. The control menus presented on the iPad and iPhone are organized and laid out identically, and Home and Away commands produce similar results. Plus, Martin is able to use the Elan g! mobile app to remotely access either home; for instance, view the surveillance cameras or regulate the heating and cooling system of the Batesville residence from North Carolina, and vice versa. Even better, Martin can monitor both homes (requires logging in to each home separately) while en route, or while preparing for the trip from either of two airplane hangars. Yes, an Elan g! system was installed by Sound Concepts at each hangar, primarily as a convenient way to operate the A/V equipment. In less than a year, Sound Concepts had automated a total of four places for Martin.

Although Martin has relied solely on Sound Concepts to tweak the settings of his multiple Elan g! systems, he's eager to try it himself. “I could probably reprogram settings for the whole house in less than 10 minutes,” he says. And for a guy like Martin, speed is everything.
"FEEL" THE MUSIC

in this NY Brownstone

Audio enthusiast goes beyond hi-fi to incorporate a complete automation system into his downtown digs.

LIKE MANY AUTOMATION PROJECTS, the plan for this New York City brownstone started with one specific and fairly simple request: hi-fi audio throughout the entire five-story, 3,500-square-foot residence. “Music is what inspires him, it’s what he listens to when watching his downhill skiing videos,” says Todd Anthony Puma of The Source Home Theater, New York, N.Y. “So installing a high-quality whole-house audio system was our initial plan of attack.”

He and his team, which included system programmer Rich Fregosa, ensured that music from components, including a Mirage media server and AppleTV, would sound crisp, clean and inspiring by combining high-end matrix switchers from Crestron with in-ceiling speakers from Paradigm’s audiophile collection and a pair of invisible in-ceiling dining room speakers from Amina. With audio traveling to so many places (18 independent zones), having a way to easily access and direct the music to chosen destinations was another key factor in the homeowner’s enjoyment of music. This could have been accomplished with a basic audio distribution system, but as Puma relates, after conversations with the homeowner, the project
“Feel” the Music in This NY Brownstone

went quickly from simple to “haywire.” “He ended up wanting so much technology that we had to modify our original plan and go with something with heavy processing power and speed.” For the homeowner, this would mean a full-blown Crestron automation system, complete with iPads and touchpanels for on-the-spot control of numerous electronic components, that would extend way beyond audio.

Perfectly capable of also handing the distribution of high-def video, the Crestron switchers took charge of Blu-ray players, cable boxes, Nintendo Wii and Mac Minis. Video from these components can be fed, per commands issued via a touchpanel or iPad, to any or all of five TVs (four Samsung plasmas and one SunBrite outdoor TV)—located in the media room, living room, gym, master bedroom sitting area, and roof deck.

Pushing the capabilities of the Crestron automation system even further, Puma integrated a Crestron lighting system (which replaced the home’s traditional lighting scheme), several Crestron motorized window shades, and Siedle electronic door locks, which feature built-in surveillance cameras. Just as the homeowner pulls up a Crestron iPad app to orchestrate the delivery of music and video, he can do the same to operate these additional pieces of technology.

Through the Crestron mobile app on his iPad or an identical screen layout on one of two 7-inch wall-mounted Crestron touchpanels, the homeowner can control lights, thermostats and shades individually, in groups or by area, view real-time images captured by the Siedle surveillance cameras, and lock and unlock the doors. And while Puma could have programmed into the Crestron system preset macro commands (one touch of a button launches a string of commands to several different devices), he designed the screen-based interfaces so that the homeowner could create his own dynamic settings.

Puma explains: “If the homeowner wants to create a Party macro, for example, he uses his finger to drag icons of certain lights and shades to an area on the page labeled Party.” The next time he hosts a party, he can choose an entirely different set of lights and shades to react to the macro command.

From a basic request for whole-house music to being able to program some of the settings of his home’s automation system himself, the owner of this renovated brownstone has the power of technology right at his fingertips. It’s an evolution that introduced him to new ways of looking at automation, where the technology adapts to the needs of its users, not the other way around.
To make it easy to find a system that will best fit your needs and budget, we've divided this list of home automation systems into 6 different categories:

Highly Customizable, High-End Systems Installed Only by Professionals ................................................. 34
Customizable, Mid-Priced Systems Installed Only by Professionals .........................................................36
Security-Centric Systems Installed Only by Professionals .........................................................................42
Affordable Systems Installed by Tech-Savvy DIYers and Professionals ....................................................44
Basic, Affordable Systems Intended for DIY Installation.............................................................................48
Systems Available Through Mass Market Service Providers ......................................................................50

HIGHLY CUSTOMIZABLE, HIGH-END, PROFESSIONALLY INSTALLED

AMX  amx.com
Years in business: 32
System: AMX
Specialty: enterprise-grade automation systems
Subsystems supported: lighting, HVAC, motorized shades, surveillance, pools/spas, etc.
User interfaces: panoramic touchpanels, apps for iOS and Android devices, Windows 8 and Windows RT tablets, Windows 8 PCs, keypads, handheld remotes
Typical cost (equipment only; no labor): $25,000
Features:
- Professionally installed
- Wired and wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, ZigBee
Complementary products offered: digital video matrix switchers, audio switchers, amplifiers
Noteworthy: systems offer virtually unlimited customization capabilities
Crestron Electronics crestron.com
Years in business: 30+
System: 3-Series
Specialty: video distribution and scaling
Subsystems supported: whole-house audio and video, entertainment systems, home theater, lighting, motorized shades, security, pool/spa, electronic door locks, HVAC, etc.
User interfaces: touchpanels, handheld remotes, smartphones, tablets, Smart TVs
Typical cost (equipment only; no labor): starts at $3,500
Features:
- Professionally installed
- Wired and wireless
- For both new construction and retrofit
Compatible communications protocols: inﬁNET EX, Cresnet, Wi-Fi
Complementary products offered: various digital audio and video products
Noteworthy: system can be configured to distribute 4K high-deﬁnition video and audio throughout the house

Savant Systems, LLC savantsystems.com
Years in business: 8
System: Pro Series
Specialty: Apple integration
Subsystems supported: more than 6,000 devices, including A/V receivers, TVs, security, surveillance cameras, pool/spa, electronic locks, energy management, gates, elevators, motorized shading, etc.
User interfaces: iOS, Android, on-screen (TV) display, handheld remotes, keypads
Typical cost (equipment only; no labor): $1,500-$1 million
Features:
- Professionally installed
- Wired and wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, ZigBee, Z-Wave, IP
Complementary products offered: A/V switchers, controllers and ampliﬁers; lighting control systems; music server; video tiling system; telephony system; climate control systems
Noteworthy: the ﬁrst to introduce an Apple-based home automation system; video tiling system enables multiple video streams to be displayed simultaneously on one screen
**Vantage vantagecontrols.com**

**Years in business:** 26  
**System:** InFusion System  
**Specialty:** lighting control and user interfaces  
**Subsystems supported:** lighting, HVAC, whole-house audio and video, home theater, surveillance cameras, security, motorized shades, pool/spa controls  
**User interfaces:** apps for iOS and Android devices, keypads, touchpanels  
**Typical cost (equipment only; no labor):** $125 per lighting load  
**Features:**  
- Professionally installed  
- Wired and wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, 3G, 4G, LTE, IP  
**Complementary products offered:** NuVo audio system, thermostats and temperature sensors  
**Noteworthy:** stylish Equinox touchpanels can be personalized by homeowners

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**Clare Controls clarecontrols.com**

**Years in business:** 4  
**System:** Clare Automation Solution  
**Specialty:** intuitive, engaging multiroom audio control  
**Subsystems supported:** security, electronic door locks, whole-house audio and video, HVAC, lighting, motorized shades, surveillance cameras, pool/spa systems, etc.  
**User interfaces:** apps for iOS and Android devices  
**Typical cost (equipment only; no labor):** starts at $4,060  
**Features:**  
- Professionally installed  
- Wired and wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, Z-Wave  
**Complementary products offered:** amplifiers, video surveillance systems, A/V distribution equipment  
**Noteworthy:** cloud-based platform enables updates to be sent to the system remotely and automatically, so that there are no hassles
Control4 control4.com

Years in business: 10
System: Control4 Home Automation System, HC-800
Specialty: lighting control, A/V distribution, security monitoring and surveillance, climate control, remote monitoring
Subsystems supported: whole-house A/V, lighting, security, HVAC
User interfaces: TV screen, tablets, smartphones (iOS and Android), touchpanels
Typical cost (equipment only; no labor): $1,000-$1,500
Features:
- Professionally installed and savvy DIYers
- Wired
- New construction and retrofit
Compatible communications protocols: Wi-Fi, ZigBee, Z-Wave
Complementary products offered: music distribution products, amplifiers, matrix switchers, wireless thermostat, fan speed control, etc.
Noteworthy: Control4 is a leader in system interoperability, with drivers and the ability to integrate with more than 7,500 devices from more than 60 consumer electronics manufacturers. System can be operated via voice recognition and control technology

Elan Home Systems elanhomesystems.com

Years in business: 25
System: Elan g!
Specialty: A/V distribution
Subsystems supported: HVAC, lighting, whole-house audio and video, security, surveillance cameras, electronic door locks, motorized window shades, pool/spa controls, irrigation, garage doors, intercoms
User interfaces: touchpanels, handheld remotes, apps for iOS and Android devices, TV screen
Typical cost (equipment only): starts at $2,000
Features:
- Professionally installed
- Wired
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, ZigBee, Z-Wave
Complementary products offered: thermostats
Noteworthy: most homeowners master how to use the system in only a day or two
**Key Digital**  [keydigital.com](http://keydigital.com)

**Years in business:** 15  
**System:** Compass Control System  
**Specialty:** A/V distribution  
**Subsystems supported:** HVAC, lighting, whole-house audio, security, video  
**User interfaces:** iOS devices  
**Typical cost (equipment only; no labor):** $1,500-$150,000  
**Features:**  
- Professionally installed  
- Wired and wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, ZigBee  
**Complementary products offered:** video extenders and switchers, distribution amplifiers, cabling  
**Noteworthy:** system supports full integration of video switcher

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**Leviton Security & Automation**  [leviton.com/Automation](http://leviton.com/Automation)

**Years in business:** 29  
**System:** Omni Security & Automation Controller  
**Specialty:** security, automation and control of lighting, thermostats and entertainment equipment  
**Subsystems supported:** HVAC, irrigation, lighting, whole-house audio, burglary and fire protection, access control, video surveillance, remote access, A/V control, smart grid, heavy-duty load control  
**User interfaces:** apps for iOS, Android and Kindle Fire devices; high-def touchpanels, keyfobs, outdoor keypads, handheld remotes, Decora wall keypads  
**Typical cost (equipment only; no labor):** $2,500-$5,000  
**Features:**  
- Professionally installed  
- Wired and wireless  
- For new construction and retrofit  
**Compatible communications protocols:** ZigBee, Z-Wave, Bluetooth, UPB, others  
**Complementary products offered:** speakers, networking devices, USB outlets, surveillance cameras, thermostats, light switches, access control card readers, etc.  
**Noteworthy:** has developed its eighth-generation controller and seventh-generation touchpanel. Has received more than 100 industry awards for exceptional home automation products and services
**Pro Control procontrol.com**

**Years in business:** 2 (parent company RTI has been in business for 22 years)

**System:** Pro Control

**Specialty:** home control via iPad and iPhone

**Subsystems supported:** all types of electronic systems

**User interfaces:** handheld remotes, app for iOS devices

**Typical cost (equipment only; no labor):** $250-$900

**Features:**
- Professionally installed
- For new construction and retrofit

**Compatible communications protocols:** ZigBee

**Complementary products offered:** RF processors

**Noteworthy:** offers a line of sleek, touchscreen-based handheld remote controls

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**Remote Technologies Inc. (RTI) rticorp.com**

**Years in business:** 22

**System:** APEX Control Platform

**Specialty:** control, automation, audio distribution

**Subsystems supported:** all types of electronic systems

**User interfaces:** apps for iOS and Android devices and PCs, handheld remotes

**Typical cost (equipment only; no labor):** a few hundred to several thousand dollars

**Features:**
- Professionally installed
- Wired and wireless
- For new construction and retrofit

**Compatible communications protocols:** Wi-Fi, ZigBee, IP

**Complementary products offered:** matrix switchers, amplifiers

**Noteworthy:** award-winning programming software allows custom electronics professionals to provide homeowners with a custom, yet uniform, control experience across all types of interfaces
Schneider Electric  wiserenergy.com
Years in business: 3
System: Wiser
Specialty: energy management; smart grid; utility connectivity where applicable
Subsystems supported: HVAC, AC control
User interfaces: browser-based, apps for iOS and Android devices
Typical cost (equipment only; no labor): $320-$495
Features:
- Professionally installed and DIY installed
- Wireless
- For new construction and retrofit
Compatible communications protocols: ZigBee
Complementary products offered:
Noteworthy: system offers a simpler way to program thermostats and can be integrated with Alarm.com security system

Somfy Systems  somfythahoma.com
Years in business: 3
System: TaHomA
Specialty: manufacture and control of motorized window treatments, HVAC, lighting, motorized window treatments
User interfaces: browser, and app for iOS devices
Typical cost (equipment only; no labor): $2,500
Features:
- Professionally installed
- Wireless
- For new construction and retrofit
Compatible communication protocols: Z-Wave
Complementary products offered: motors for draperies, window coverings, rolling shutters, awnings and projection screens
Noteworthy: system focuses on the management and control of a home’s “energy triangle,” the balance between natural lighting, artificial lighting and heating and cooling
TiO Home Automation & Control  tiohome.com

Years in business: 1
System: The TiO Ecosystem
Specialty: control over third-party subsystems
Subsystems supported: audio, lighting, climate
User interfaces: app for Android devices, touchpanels
Typical cost (equipment only; no labor): $2,000-$7,000
Features:
- Professionally installed
- Wired and wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi
Complementary products offered: thermostat, wireless power outlets
Noteworthy: you can start with the company’s 50-watt Streaming Music Player then expand it to include automation features

URC  universalremote.com

Years in business: 23
System: Total Control
Specialty: A/V and home theater control
Subsystems supported: A/V, home theater, whole-house audio, lighting, surveillance, security, HVAC, remote monitoring
User interfaces: handheld remotes, apps for iOS devices, keypads, touchpanels
Typical cost: $1,100
Features:
- Professionally installed
- Wired and wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, Z-Wave, URC form of ZigBee
Complementary products offered: streaming music player, home theater processor, amplifiers, iPod dock, surveillance cameras, thermostats, lighting system, sensors
Noteworthy: systems support the display of full-motion, live video on handheld remotes; remotes enabled with gyroscopic controls
SECURITY-CENTRIC WITH HOME AUTOMATION CAPABILITIES, PROFESSIONALLY INSTALLED

**Alarm.com**  
*alarm.com*

**Years in business:** 10+

**System:** partners with providers of security panels (including Interlogix, 2GIGF and Qolsys) to integrate its Interactive Security Services software

**Specialty:** interactive security

**Subsystems supported:** HVAC, garage door openers, solar panels

**User interfaces:** browser-based devices, apps for iOS, Windows and Android devices

**Typical cost (equipment only; no labor):** N/A

**Features:**
- Professionally and DIY installed
- Wired and wireless
- For new construction and retrofit

**Compatible communications protocols:** cellular, Wi-Fi, Z-Wave

**Complementary products offered:** Image Sensor motion sensors, HD video surveillance cameras

**Noteworthy:** software incorporates Geo-Services feature, which uses your location to trigger predefined settings of your security system

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**Elk Products, Inc.**  
*elkproducts.com*

**Years in business:** 14

**System:** M1 Cross-Platform Control

**Specialty:** integrated control

**Subsystems supported:** HVAC, access control, lighting, water shut-off, sprinklers and pumps, whole-house audio

**User interfaces:** keypads, apps for iOS and Android devices, PC

**Typical cost (equipment only; no labor):** N/A

**Features:**
- Professionally installed
- Wired
- For new construction and retrofit

**Compatible communications protocols:** Z-Wave

**Complementary products offered:** speakers, sirens, power products, surge suppressors, structured wiring

**Noteworthy:** system supports the integration of products from more than 50 other manufacturers
**Honeywell**  
*honeywell.com*

**Years in business:** 25  
**System:** Tuxedo Touch Home and Business Controller  
**Specialty:** security, video and Z-Wave integration  
**Subsystems supported:** HVAC, lighting, surveillance camera and video recording  
**User interfaces:** apps for iOS and Android devices, touchpanel  
**Typical cost (equipment only; no labor):** starts at $500  
**Features:**  
- Professionally installed  
- Wired and wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, Z-Wave  
**Complementary products offered:** surveillance cameras, sensors, HVAC, remote monitoring services  
**Noteworthy:** system incorporates voice recognition technology

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**Linear LLC**  
*linearcorp.com*

**Years in business:** 52  
**System:** 2GIG by Linear Go!Control System  
**Specialty:** Advanced security management and monitoring  
**Subsystems supported:** HVAC, lighting, security/surveillance, access control, garage door openers, energy sensors, appliances  
**User interfaces:** security control panels, smartphone/tablet/PC, touchpads, keyfobs  
**Typical cost (equipment only; no labor):** for a basic system, hardware and installation can be free; monthly monitoring fees start at about $30  
**Features:**  
- Professionally installed and savvy DIYers  
- Wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Z-Wave  
**Complementary products offered:** Z-Wave lighting control products, image sensors, wireless doorbells, surveillance cameras, door and window contacts, panic button remotes, motion detectors, glass-break detectors, thermostats, carbon monoxide detectors, etc.  
**Noteworthy:** new Go!Control panel features cell radio, Wi-Fi, broadband, and Bluetooth connectivity
Qolsys (Quality of Life Systems)  qolsys.com
Years in business: 4
System: IQ Panel
Specialty: security via integration with Alarm.com
Subsystems supported: energy, automation, lighting, security
User interfaces: 7-inch touchpanel
Typical cost (equipment only; no labor): N/A
Features:
- Professional installation and DIY installation
- Wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, Cellular, Z-Wave, ZigBee, Bluetooth
Complementary products offered: sensors, thermostats, electronic door locks
Noteworthy: touchpanel features 6 built-in wireless radios and is Android based

BitWise Controls, LLC  bitwisecontrols.com
Years in business: 5
System: BitWise Controls BC Series
Specialty: integrated controls
Subsystems supported: A/V, HVAC, lighting, security, whole-house audio, IP surveillance cameras, electronic door locks, motorized shades, pool/spa systems
User interfaces: apps for iOS and Android devices, handheld remote
Typical cost (equipment only; no labor): $549-$1,549
Features:
- Professionally installed primarily
- Wired and wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, Z-Wave
Complementary products offered: N/A
Noteworthy: system incorporates voice recognition technology
**Fibar Group** fibaro.com

**Years in business:** 3  
**System:** FIBARO System  
**Specialty:** smart home  
**Subsystems supported:** HVAC, lighting, sensors, whole-house audio, security, access control, IP surveillance cameras  
**User interfaces:** web-based devices, iOS and Android devices  
**Typical cost (equipment only; no labor):** $1,200-$2,000  
**Features:**  
- Professionally installed and DIY installed  
- Wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Z-Wave  
**Complementary products offered:** wireless sensors  
**Noteworthy:** voice control technology is built into the control app; various sensors feature sophisticated detection technology

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**Homeseer** homeseer.com

**Years in business:** 15  
**System:** HomeTroller  
**Specialty:** whole-house control via Android or Apple mobile devices  
**User interfaces:** Android Tabletop Touchscreens  
**Typical cost (equipment only; no labor):** starts at $199.95  
**Features:**  
- Professionally installed and DIY installed  
- Wired and wireless  
- For new construction and retrofit  
**Compatible communications protocols:** WiFi, Z-Wave, UPB, Insteon, X10  
**Complementary products offered:** Z-Wave system interface, Z-Wave multi sensors  
**Noteworthy:** the ability to program the system via voice commands
**Insteon** insteon.com

**Years in business:** 9

**System:** Insteon

**Specialty:** lighting control

**Subsystems supported:** lighting, HVAC, low-voltage, irrigation, motorized shades, projection screens, pool pumps, A/V, sensors and security

**User interfaces:** apps for iOS and Android devices, desktop software, browser-based controls

**Typical cost (equipment only; no labor):** $100-$200

**Features:**
- DIYer installed primarily
- Wireless
- For new construction and retrofit

**Compatible communications protocols:** Insteon

**Complementary products offered:** IP surveillance cameras

**Noteworthy:** installation friendly

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**iRule LLC** iruleathome.com

**Years in business:** 4

**System:** iRule

**Specialty:** affordable customizable control

**Subsystems supported:** A/V, motorized shades, HVAC, security, lighting, garage door openers, surveillance cameras, electronic door locks

**User interfaces:** iOS and Android devices

**Typical cost (equipment only; no labor):** $250 for one room

**Features:**
- Professionally installed and DIY installed
- Wired and wireless
- For new construction and retrofit

**Compatible communications protocols:** IP, Z-Wave, Insteon

**Complementary products offered:** modules to support integration with a variety of different products

**Noteworthy:** cloud-based Builder allows full customization and personalization of a user interface; can be easily expanded from one room to multiple rooms over time
**JDS Technologies**  *jdstechnologies.com*

Years in business: 26  
System: HomeRunner RBI  
**Specialty:** control and automation of lighting, A/V and HVAC  
**Subsystems supported:** HVAC, lighting, whole-house audio, security, irrigation, etc.  
**User interfaces:** smartphone, tablet, computer or web-enabled device  
**Typical cost (equipment only; no labor):** under $1,000  
Features:  
- DIY installed  
- Wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, Insteon, X10  
**Complementary products offered:** powerline modem  
**Noteworthy:** any photo or drawing can be turned into a user interface in minutes

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**Roomie Remote, Inc.**  *roomieremote.com*

Years in business: 3  
System: Roomie Remote  
**Specialty:** home theater control  
**Subsystems supported:** home theater, lighting, whole-house audio  
**User interfaces:** app for iOS and iOS 7 devices  
**Typical cost (equipment only; no labor):** $200  
Features:  
- Professional and DIY installation  
- Wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, ZigBee, Z-Wave  
**Complementary products offered:** adapters for serial and infrared control  
**Noteworthy:** recently introduced technology to support gesture-based control of a home theater
DIY BEGINNER SYSTEMS

Blacksumac getpiper.com

Years in business: 2
System: Piper
Specialty: remote video monitoring of your home
Subsystems supported: lighting, small appliances, wireless door and window sensors
User interfaces: apps for iOS and Android devices
Typical cost (equipment only; no labor): $239
Features:
- DIY installed
- Wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, Z-Wave, Bluetooth
Complementary products offered: Z-Wave smart switches, door/window sensors, etc.
Noteworthy: system features a fisheye surveillance camera that has a 180-degree field of view and electronic pan, tilt and zoom

Lowe's lowes.com/iris

Years in business: 2
System: Iris from Lowe's
Specialty: unifies the control of products from a variety of manufacturers
Subsystems supported: HVAC, lighting, water monitoring, energy consumption, security
User interfaces: apps for iOS and Android devices
Typical cost (equipment only; no labor): $299
Features:
- DIY installed
- Wireless
- For new construction and retrofit
Compatible communications protocols: Wi-Fi, ZigBee, Z-Wave
Complementary products offered: thermostats, electronic locks, motion sensors, surveillance cameras, pet doors, light switches, water leak sensors, keypads, etc.
Noteworthy: integrated into the Iris system is the ability to shut off the main water line automatically should a problem, like a water leak, be detected; voice control capabilities will also be offered.
**Revolv**  revolv.com

**Years in business:** 2

**System:** Revolv

**Specialty:** unifies the control of off-the-shelf devices through one simple app

**Subsystems supported:** lighting, electronic door locks, thermostats, audio

**User interfaces:** smartphone app

**Typical cost (equipment only; no labor):** $299

**Features:**
- DIY installed
- Wireless
- For new construction and retrofit

**Compatible communication protocols:** Wi-Fi, Z-Wave, Insteon

**Complementary products offered:** N/A

**Noteworthy:** system comes with a lifetime cloud-connectivity service plan for remote GeoSense automation; GeoSense is a technology that enables the Revolv system to activate devices when you—and your smartphone—are within a certain geographical distance from your home

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**Webee**  webeeuniverse.com

**Years in business:** 1

**System:** Webee

**Specialty:** cloud-based, the system employs algorithms to learn user’s behaviors and offers suggestions on how to operate devices in the home more efficiently

**Subsystems supported:** from irrigation systems to alarms, sensors and HVAC, video systems, lighting, appliances, etc.

**User interfaces:** apps for smartphones and tablets, customized Web interfaces, touchpanels, air mouse, handheld remote, keypads

**Typical cost (equipment only; no labor):** $129-$599

**Features:**
- DIY installed
- Wireless
- For new construction and retrofit

**Compatible communications protocols:** Wi-Fi, ZigBee, Z-Wave

**Complementary products offered:** Presence Tags (to attach to anything from keychains to kid’s backpacks), Smart Station (for air quality detection, accelerometer, temperature, humidity, etc.), Skipper (to detect and control anything that reads an infrared signal), Smart Plugs, Smart Lamp Holder, and various sensors

**Noteworthy:** the system Hub can be used as a Smart TV to run multimedia applications while also controlling your home
**Zonoff** zonoff.com

*Years in business:* 3  
*System:* Staples Connect  
*Specialty:* integrated home control  
*Subsystems supported:* HVAC, lighting, surveillance cameras, sensors, electronic door locks, garage door openers, water shut-off valves, etc.  
*User interfaces:* apps for iOS and Android devices, Web browser  
*Typical cost (equipment only; no labor):* starts at $99  
*Features:*  
- DIY installed  
- Wired and wireless  
- For new construction and retrofit  

*Compatible communications protocols:* Wi-Fi, Z-Wave, Lutron Clear Connect, ZigBee, Bluetooth, Insteon  
*Complementary products offered:* electronic door locks, IP surveillance cameras, thermostats, voice activation systems, dimmers, motorized blinds and shades, etc.  
*Noteworthy:* features to be rolled out include voice control, health monitoring via devices like the Jawbone UP bracelet, and integration with Web services like Twitter

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**MASS MARKET SERVICE PROVIDERS**

**ADT Security Services** adt.com

*Years in business:* 40  
*System:* ADT Pulse  
*Specialty:* control of small appliances (lamps, coffee makers, etc. and ceiling fan control)  
*Subsystems supported:* HVAC, lighting, electronic door locks, surveillance cameras, garage door openers, high-power appliances (water heaters, pool pumps)  
*User interfaces:* apps for iOS and Android devices, touchpanel, Web portal, mobile WAP client  
*Typical cost (equipment only; no labor):* starts at $99 (after typical promotions)  
*Features:*  
- Professionally installed  
- Wired and wireless  
- For new construction and retrofit  

*Compatible communications protocols:* Wi-Fi, Z-Wave  
*Complementary products offered:* surveillance cameras, lighting/small appliance modules, thermostats, garage door controls, ceiling fan controls, etc.  
*Noteworthy:* introducing Voice app, which enables users to operate the Pulse system via voice commands; also new is a completely wireless version of the system
**AT&T** [att.com/digitallife](http://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  
**Subsystems supported:** HVAC, lighting, water shutoff  
**User interfaces:** Web browser; compatible with iOS, Android, Windows Phone and Blackberry  
**Typical cost (equipment only; no labor):** starts at $149.99 plus $29.99 a month  
**Features:**  
- Professionally installed  
- Wireless  
- For new construction and retrofit  
**Compatible communications protocols:** Wi-Fi, Z-Wave  
**Complementary products offered:** surveillance cameras, sensors, water detectors  
**Noteworthy:** all-IP and all-wireless

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**Comcast** [xfinity.com/home](http://xfinity.com/home)

**Years in business:** 4  
**System:** Xfinity Home  
**Specialty:** energy savings  
**Subsystems supported:** HVAC, lighting, water detection  
**User interfaces:** apps for iOS and Android devices, touchpanel  
**Typical cost (equipment only; no labor):** starts at $99  
**Features:**  
- Professionally installed and DIY installed  
- Wireless  
- For new construction and retrofit  
**Compatible communications protocols:** ZigBee  
**Complementary products offered:** surveillance cameras, battery backup  
**Noteworthy:** system operates on a network that facilitates cross-platform convergence, so if a customer has phone service through Comcast, he/she will have the option of accessing voicemail through the Xfinity Home system as well as through email
Vivint, Inc.  vivint.com  
Years in business: 4  
System: Vivint Home Automation  
Specialty: security, automation and energy management  
Subsystems supported: HVAC, video surveillance, remote access, electronic door locks, alarms, lights, sensors and detectors  
User interfaces: Web-enabled devices, security panel  
Typical cost (equipment only; no labor): $199 activation fee; $68.99 monthly monitoring fee  
Features:  
- Professionally installed  
- Wireless  
- For new construction and retrofit  
Compatible communications protocols: Z-Wave  
Complementary products offered: various packages  
Noteworthy: customers can choose from one of four preconfigured packages: home security, energy monitoring, advanced security and home automation
If you’re interested in learning more about home electronic systems check out these useful resources

**Find an Installer**: Locate a professional in your area who can set you up with your dream system.

**EH Daily**: Helpful articles on a variety of home tech topics.

**EH Library**: The most complete resource for smart home technology research.

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