



Outlook for Home Management Systems

A Parks Associates White Paper

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1.0 Present State of the Market

“Are we there yet?” asks the child in the back seat on a long trip. The same question can be asked of Home Automation. The answer is, “No!” After 30 years of development, the home controls market (a.k.a. home automation) is still stuck in a market niche of high-end, new homes representing less than 1% of the total opportunity (See **Figure 1**). To date, even with relatively inexpensive, do-it-yourself products, the industry has failed to convince the mass market of the value of home control systems. Now, at the beginning of 2006, significant market drivers are poised to propel the industry, but challenges remain.

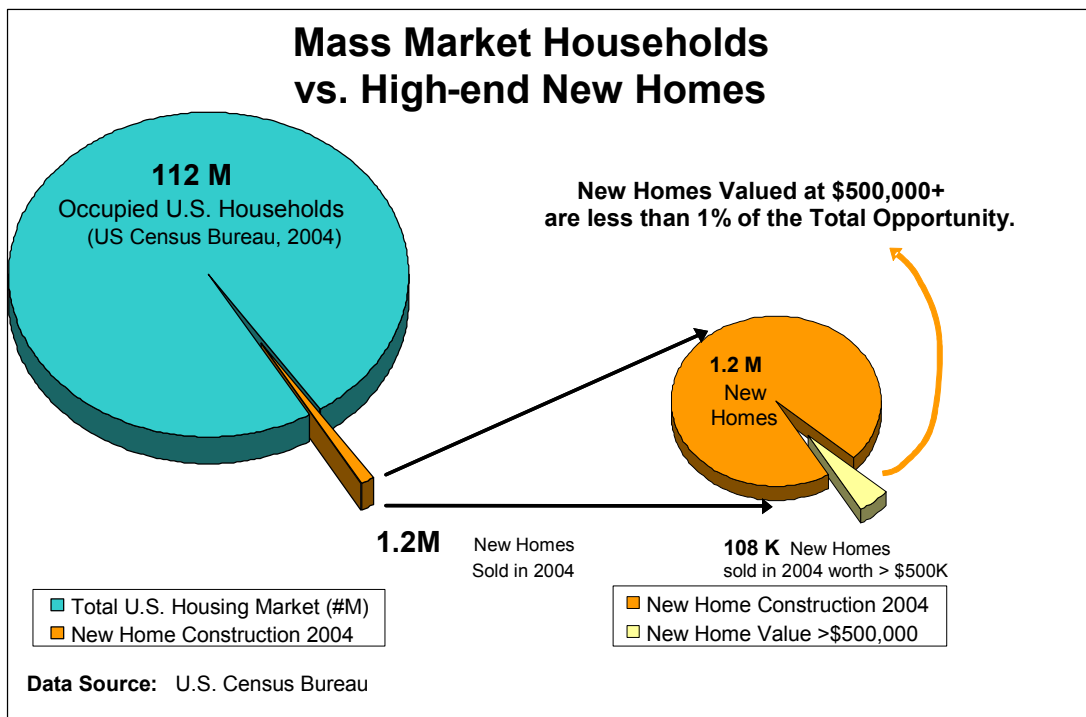


Figure 1 Mass Market Households vs. High-end New Homes

The two most significant drivers are widespread broadband Internet access and the convergence of traditional consumer electronics (CE) with personal computer-based (PC) technology. CE-PC convergence is not a new trend but one whose time may have finally arrived, and with it the means to provide control applications as a by-product of other activities. Consumers can access audio and video content via their broadband Internet connections and route this content to the desired room, and they can also turn down the heat in a room not being used and make sure the outside lights are off. The operative

word here is “can.” They can set up these types of control applications, but few have done so. Why? Generally, a lack of awareness and the hassle (or expense) of installing the controls are the two biggest inhibitors to broad adoption of control systems in the home.

This environment is changing. Companies such as Dell, H-P, Intel, and Microsoft are investing in marketing and product development to bring converged systems to market and educate consumers about the benefits of these new systems. Traditional consumer electronics firms, such as LG Electronics, Mitsubishi, Panasonic, Samsung, Sanyo, Sharp, and Sony are embracing digital convergence and, together with their PC counterparts, helping to create an ecosystem conducive to nurturing innovative, start-up firms. As these supply-side forces drive the market forward, recent rises in energy costs are driving one component of the demand side of the equation: cost savings.

Despite these drivers, widespread use of any types of control systems beyond the toggle switch or thermostat remains sparse. Even if consumer awareness grows and, together with rising energy costs, fosters demand for home controls, who will install them? Some firms tout the fact that their systems are designed for the do-it-yourself market, and perhaps this is true, but it has been well-documented elsewhere that people have less leisure time now than they had a decade ago. Will they spend their precious free time installing light, curtain, or environmental controls instead of gardening, golfing, or sitting on the couch? We think a new form of home installation service is needed.

Firms such as Best Buy, Inc. (Geek Squad®), Circuit City Stores (IQ Crew®), and CompUSA (TechknowledgistSM) have entered the market for in-home customer support, installation, and repair services for PCs and consumer electronic equipment. And Tweeter Home Entertainment, Inc. provides a range of installation services for consumers purchasing home theater systems in their stores. These firms are precursors of the types of organizations likely to evolve for serving the needs of those too busy to do their own “digital plumbing.”

The opportunity to serve the 99% of homes without automation is massive, and this is the carrot that will drive companies to invest, innovate, and educate the market.

2.0 State of Central Home Control Systems

The market for central home control systems is one of extremes. Players such as AMX, Crestron, and HAI serve a luxury systems market for integrated control systems, along with companies offering proprietary control solutions for specific applications, e.g. Lutron and Vantage Controls for lighting and Aprilaire and RCS for energy. Custom central control systems cost, on average, between \$25,000 and \$30,000 and can easily exceed \$100,000 when security, lighting, and environmental controls are combined centrally.

Crestron and AMX, leaders in these luxury systems, are not new companies. Both were founded in the mid-1980s. Both began installing systems for commercial enterprises and then migrated to the residential market based on requests from the CEOs of companies for which commercial controls were installed. Often, those installations included automating the A/V in board rooms so that executives were able to manage their multimedia presentations with fool-proof, single-button controllers. Corporate customers turned to these same installation firms for their personal needs because in the 1980s and through the mid-90s, there were few other satisfactory methods to acquire superior, flexible entertainment systems.

The other extreme in general controllers are X-10¹-based devices. Today, there exist an increasing number of general controllers based on new technologies seeking to substitute X-10 with improved powerline, radio frequency (RF), and hybrid technologies. Examples include companies initiating offerings based on Z-Wave™, a proprietary RF technology from Zensys, and ZigBee, a consortium approach to RF serving home control applications with low speed and low bandwidth. In addition, Smarthome, a distributor and reseller of many automation devices from multiple manufacturers, has developed a line of single-function controllers based on INSTEON™, a proprietary approach to data transmission offering both RF and power line protocols. But to date, most of the above innovations merely provide substitutes for basic X-10 functions available since the early 1980s.

¹ X-10 – home automation protocol that uses existing home wiring to broadcast control signals.

These basic controllers are affordable. With inexpensive pricing of approximately \$10 for a controller and \$12 or so for most modules, a homeowner can equip his or her home with simple automation for a few hundred dollars at most. However, no strong mass market has appeared because typically, these basic products are acquired by hobbyists or “techie types” who enjoy (or at least tolerate) the act of do-it-yourself (DIY) for the benefit of some automation.

Mid-market general systems that cost between \$750 and \$2000 are missing in action. Many companies have tried to crack this segment, but none have succeeded to date. A couple of years ago, Shell Oil Company in Houston, Texas, introduced Shell Genie™, an IP-based controller allowing remote controls for basic home functions. Priced at \$599 for a basic package, this system could be expanded via additional modules aimed at the “middle” market. However, the product did not achieve the hoped-for success and was discontinued, becoming yet another in a series of disappointments for the home controls marketplace. Many companies, both entrepreneurial and established, have entered the home controls marketplace only to withdraw within a few years. Some offered good ideas with functional, useful products. Examples include IBM’s Home Director, GE Smart, and Honeywell’s Total Home, to name just a few.

Reaching the middle market with a product that can be easily integrated and installed remains an elusive goal, but advancements in standards, sensors, and form factors are occurring to enable high performance with mass market pricing. Major manufacturers of electrical devices and components for both the residential and commercial construction market, such as Eaton and Intermatic, are developing systems based on new RF and powerline communication technologies aimed at the mass market. The credibility that firms like these brings to the market, coupled with their existing relationships with home builders and retailers like Lowes and Home Depot, could help spark consumer adoption of home controllers.

3.0 Overview of Home Control Applications

A simple three-way light switch allows users to control a light from two locations, but by adding communications, they can control that light from anywhere in the home. Include a security system, and the light can go on and off as scheduled or randomly for a “lived in” look while in “away” mode. Add an outdoor light sensor, and when the security system is armed and motion is detected, the light will turn on. Additional lights can be turned on and off in sequence to make it look like the house is occupied when someone enters the yard. Add a Web camera and link it to a VCR or PC, and the system can record the visitor. With an always-on broadband connection, the system can send an e-mail attachment and respond to remote commands.

The above scenario is not only possible, but available today for less than the cost of a good home theater-in-a-box. Yet few homes have such systems. Why? The average consumer is not aware that such a system is available and affordable. In addition, an installation professional is required for the consumers who are not ready to invest the time to learn how to set up such systems.

3.1 Lighting Controls – Advanced and Basic

Lighting is the simplest and most self-explanatory home control application, and it is where home control began. Lighting controllers typically utilize powerline technologies, and lighting remains the most common use of the X-10 standard today. However, any home controls standard can be used, and sophisticated high-end systems from companies such as Lutron and Vantage Controls use low-voltage wiring and proprietary control signals. Lighting controllers can either be used alone in or integrated with security systems and other home control systems.

Lighting control offers homeowners a variety of lighting functions that have expanded over the years from basic on/off and dimming to more sophisticated lighting applications such as creating lighting scenes via keypads, touch screens, wireless remote controls, and Internet-enabled devices, as well as integration with other home control applications. Lighting control adds the benefits of convenience (with one-button access), aesthetics

(scenes for multiple lights at different brightness), security (lived-in look while away), safety (lighted pathways), and energy savings (turn off when not needed).

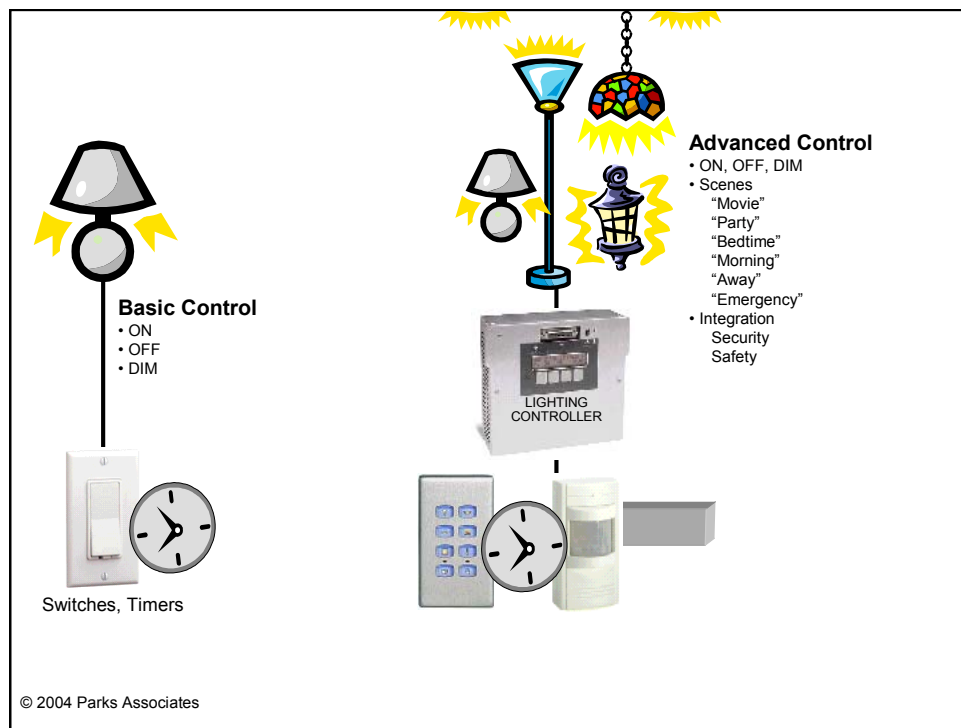


Figure 2 Basic Control & Advanced Control

Besides being more expensive for consumers, the lighting applications found in commercial office buildings and high-end custom homes that necessitate special wiring, complex control systems, and professional installation have little chance of moving into mass-market consumer households since neither home builders nor consumers have the necessary skills to install them. It is for this reason that companies like Lutron and Vantage Controls have introduced their own wireless technologies. They seek to reduce installation complexity, earn higher margins for the labor fees that do exist, and expand their markets through lower pricing.

High functionality can also be achieved with low-end solutions that many consumers can install themselves including timers, dimmers, sensors (photocell and motion detectors), and remote controllers that operate individually or in a network based on standards such as X-10, Z-Wave, ZigBee, or INSTEON™. While high-end products have advantages for very large and complex installations, DIY solutions require no special wiring or skills so builders, electricians, and end consumers can perform the installation themselves. They

can also duplicate the function of far more expensive high-end systems, and DIY systems do not have to be installed all at once, which means homeowners can start small and grow with additional function and sophistication over time.

By choosing lighting control products that conform to industry standards, consumers can tie their lighting controls into security systems and other control applications or access these controls from Web browsers – including accessing them remotely from phones and office PCs. Compared to high-end lighting controls, the low-end DIY solutions should continue to move up-market and broaden their market opportunity as manufacturers add features, reduce costs, and make their products easier to understand and install.

3.2 HVAC & Climate Control

The basic device used for HVAC control is the programmable thermostat. Although they are typically unable to integrate with other home control applications, programmable thermostats are home control systems all by themselves. They can automate HVAC operation for days, weeks, and months at a time and can be programmed to perform a range of functions from simply turning off and on the heater or air conditioner to adjusting the temperature during different times of day or with different activities.

Programmable thermostats are available from all of the major HVAC suppliers including Carrier, Honeywell, and Trane. Approximately one-third of U.S. households have at least one programmable thermostat. Now, *communicating* thermostats are arriving on the market.

Communicating thermostats differ from programmable thermostats in that they can communicate with other home control applications as part of an integrated system and communicate with the outside world. Communication with the outside world gives homeowners and energy utilities the ability to monitor and remotely control the thermostat via the Internet. For example, the homeowner can tell the communicating thermostat and home control system to optimize operation by automatically adjusting the temperature and the air conditioning or heat modes as energy prices dynamically rise and fall above/below a predetermined point. The actual control logic can be embedded in the thermostat itself, or it can reside in some other home controller or in a remote service

such as with an energy utility. Some envision the possibility of homeowners eventually programming their control systems to shop for the best energy rates.

Combining several thermostats and HVAC systems in a single house creates a basic zoned HVAC system, which allows the homeowner to set and adjust temperatures in different parts of the home independently of one another. A more complex zoned HVAC system might include multiple thermostats, a zone control panel, motorized or air-operated dampers, and other equipment so each room can be adjusted differently. These systems are only in large, expensive homes at this point in time.

3.3 Integrating Controls with Security & Safety

As described earlier, lighting systems have more value when integrated with security so they can provide a “lived-in” look when away, illuminate an exit path in emergencies, and flash to alert first responders. The same goes for HVAC when the temperature is adjusted automatically while no one is at home and readjusted when they return. And always-on Internet connections facilitate the remote monitoring, alerts, access and control of the lights, temperature, medical devices, and cameras that zoom, pan, tilt, record and send images through the Web.

As security, home control, and entertainment applications converge into integrated systems that add comfort and convenience while improving safety and security, it will be difficult to sell a security-only system. Established security brands such as GE-Security are seeking ways to get into medical monitoring, which can make it easier for the growing elderly population to remain in their homes instead of being forced into extended care facilities. At the same time, utility, telephone, and cable companies may expand their offerings to provide services similar to those of security providers.

4.0 Market Drivers

Several developments over the last few years are having a profound effect on the Home Controls market. These developments include embedded technologies, digital convergence, and always-on broadband.

The Internet is becoming more pervasive as system-on-a-chip designs can put the power of a PC at your fingertip and into numerous devices in your home – from the light switch to the thermostat to the garage door opener. The average American household already has nearly 100 embedded microprocessors and microcontrollers, and even the throwaway musical birthday card has nearly the same computing power as an early 1970s mainframe. Advancements in electronic systems technology will continue to put more intelligence and communication capability into sensors (measuring thermal, optical, chemical, mechanical, and magnetic activity) and actuators (controlling movement, positioning, pumping, and filtering) throughout a house.

Home control signals, computer programs, newspapers, radio broadcasts, television programs, and phone calls can all be broken down into bits that are cheap, easy to combine on one network or storage device, and easy to share. The convergence of these bits means that control signals that once ran on low-speed networks like X-10 can now run on the same high-speed networks that carry data, voice, and entertainment content or connect with Internet services. This capability is already having a deep effect on home controls as we know them.

For home control applications needing very little bandwidth, the “always-on” characteristic of broadband is important because it gives homeowners and service providers the ability to access and monitor homes remotely, opening all sorts of new business opportunities and attracting increased investment.

Because digital convergence enables broadband networks to carry many services, we could see a separation of network operators and service providers for services like telephone (and specifically voice-over-IP, or VoIP services), digital television, digital music, security monitoring, telemedicine, energy management, and much more.

Digital entertainment has become a driver of home networking and control and has attracted large, influential PC and consumer electronics companies that are driving the development of standards with side benefits for the controls side of the home networking market.

5.0 Challenges and Next Steps

Increasing market growth begins by understanding home dwellers, their desires, and the need to eliminate complexity and confusion. Mass-market adoption requires affordable and integrated, whole-product solutions because consumers will not buy individual components and do the systems integration work *en masse*. This means the entire value chain must be complete.

A key link in this value chain is an installation service designed to serve the average home owner, just as an electrical or plumbing service can be called upon for installation services. Currently available installation services, e.g. security dealers, electricians, or the new services provided by the Geek Squad®, IQ Crew®, and the like are not trained to install home control solutions. High-end system installation firms are accustomed to handling large projects for a few customers, not rolling trucks to thousands of homes each year. Will electricians, security dealers, and others adapt to serve the middle market? Will some other type of service organization evolve? Will utility companies see the opportunity and step into the gap? It is likely that there will be some combination of all of the above.

One of the biggest challenges to faster uptake of more advanced home management solutions is the natural lag between technology innovation and consumer adoption caused, in part, by the long useful life of legacy devices. The manual light switch works and works well. Control systems that seek to automate a single function without the ability to integrate with other applications will not be widely adopted because they seek to replace standalone devices that work well. Robert Metcalfe, inventor of Ethernet, observed that the value of a network increases exponentially with the number of devices connected to it. It is this phenomenon that will move consumers to see the value of home control systems. The networked TV, audio system, refrigerator, and thermostat provide more value than just a better picture, sound or increased energy efficiency – together they can provide convenience and a better living experience. And together they represent a much larger opportunity for manufacturers and installation services than any of the individual opportunities standing alone.

The total market for home control systems of all types reached approximately \$2.3 billion in 2005. Parks Associates projects that revenues will grow 8% to 9% per year over the next four years, reaching more than \$3 billion by 2009.

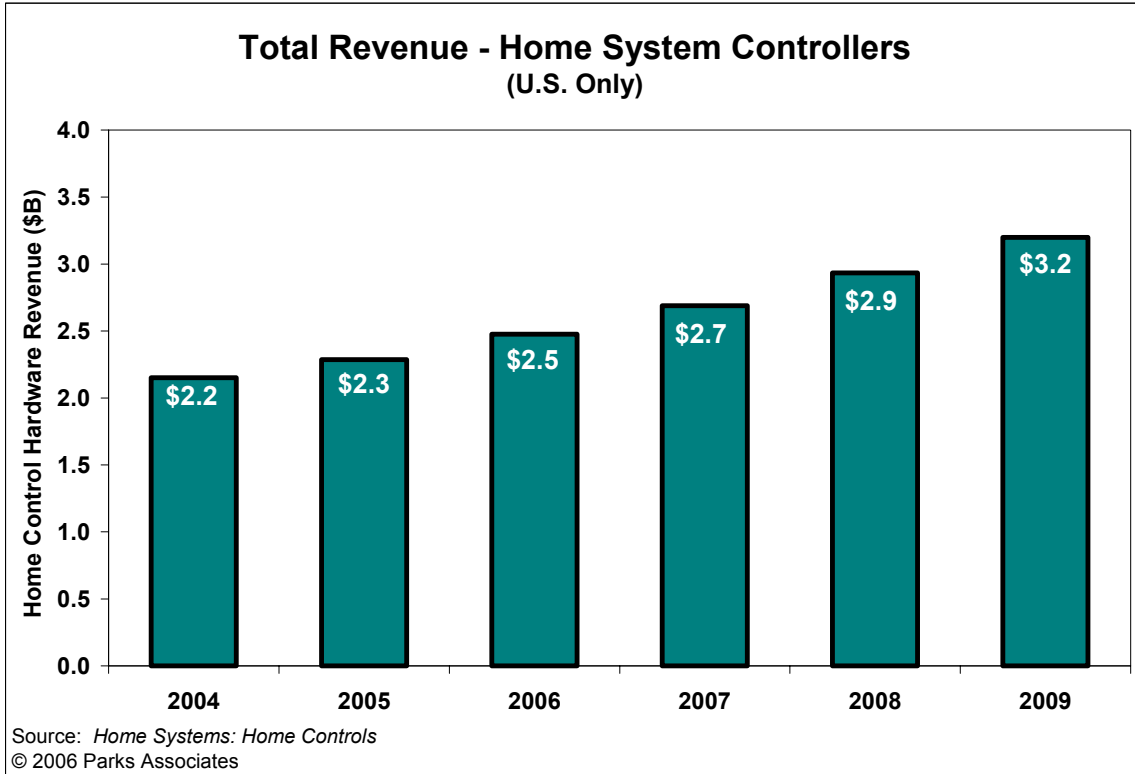


Figure 3 Home Control System Revenues (U.S. Only)

About the Author: Bill Ablondi is an information technology market analyst with 25 years of experience advising computer and related peripheral manufacturers, software publishers, communication service, and Internet providers. He has directed syndicated advisory services and related custom consulting activities for several leading research firms in addition to Parks Associates.

Bill directs Parks Associates' *Installing Dealer ePanel* research program, designed to monitor the adoption of innovative products into upscale America. Recent research has focused on the changing market environment that dealers are encountering, end-user adoption of new technologies, and dealers' changing business models.

Mr. Ablondi also directs Parks Associates' *Builder Insights* research of residential home builders in the U.S. This research is designed to help manufacturers and service providers size the market for their products into the new home market and understand how to do business with builders. The 2006 Builder Insights will include case studies of builders profitably integrating technology into their offerings and forecasts for key product categories.

Bill began his information technology career as an engineer and business development manager at Texas Instruments. He holds a BS in Chemical Engineering from Rensselaer Polytechnic Institute and an MBA from Columbia University with a concentration in management science, emphasizing operations research and finance.

About Parks Associates: Parks Associates is a market research and consulting firm focused on all product and service segments that are “digital” or provide connectivity within the home. The company’s expertise includes home networks, digital entertainment, consumer electronics, broadband and Internet services, and home systems.

Founded in 1986, Parks Associates creates research capital for companies ranging from Fortune 500 to small start-ups through market reports, multiclient studies, consumer research, workshops, and custom-tailored client solutions. Parks Associates also hosts two executive seminars, both part of the Fall Focus series, and co-hosts CONNECTIONS™ (in partnership with the Consumer Electronics Association) each year. www.parksassociates.com.