

CONNECTING TO THE FUTURE

From power line
carrier controls to
integrated structural
wiring systems, home
automation products
meet every need
and budget



Not that long ago “home automation” meant a three-way switch for the hall light, and the “media center” was the TV coax cable drilled up through the living room floor. Those days are long gone. Today an explosion of interest is occurring in all things that make up the “connected home” — security and surveillance systems, automatic lighting, hvac control, household entertainment systems, computer networks with shared broadband Internet access, automated appliances, and home office equipment, to name just a few.

by Joe Stoddard

The connected home market is predicted to grow from \$1.4 billion in 2001 to \$9.2 billion in 2006. NAHB reports that a quarter of new homes are already being built with some kind of “structured wiring,” and the Internet Home Alliance says 42% of single-family homeowners (26 million households) are interested in adopting some type of connected home technology.

More and more manufacturers are getting on board. The recent International Builders’ Show in Atlanta featured over a dozen home technology exhibitors, all trying to convince attendees that their system was the one to use. In fact, there is no single “connected smart-home” system. Today’s installations are usually a combination of technologies with a tangle of overlapping features, leaving it up to you to figure out which one will be best in a given situation.

Hard-Wired Systems

In the “old” (pre-Internet) days, home automation, security, intercom, and lighting control systems required complicated controllers and miles of bell wire running to every possible location where a sensor, speaker, or lighting controller would eventually be installed. Because they’re tough to design and fussy to install, “hard-wired” automation systems have always been the domain of specialized subcontractors.

Common applications for hard-wired systems include security and surveillance, hvac and lighting control, and intercom, but not computer networks or high-quality video distribution. Despite their limitations, hard-wired systems are still regarded as the most bulletproof and reliable systems by many installers. They can also be the most expensive, adding \$5 per square foot or more to the cost of a home.

Master panels, “smart” thermostats, lighting controls, and other devices used in hard-wired systems can be programmed with a personal computer connected by its serial (RS-232) or USB port. Some manufacturers are also starting to offer remote control of their systems from Internet connections or even wireless handheld devices.

Another trend: Manufacturers of hard-wired systems are redesigning their proprietary circuit boards and brand-specific control modules to work with the more standardized structured wiring enclosures. For example, HAI now manufactures its popular Omni security modules to bolt directly into Leviton’s structured wiring enclosures.



The Elk Products ELK Starter Kit includes a Magic Module Controller, power supply, and software for programming through a PC’s serial port. Elk makes a wide variety of security and home/lighting automation components.



CentraLite Elegance is a conventional hard-wired lighting automation package that can also be controlled from a PC via serial port or a new PocketPC wireless interface.



Home Automation, Inc. (HAI) manufactures the popular Omni series of security and automation packages. The system accepts standard sensors for intrusion, fire, and temperature and controls heating and cooling, lights, and appliances. Omni modules will also fit Leviton’s structured wiring enclosures.



Lutron’s original HomeWorks series includes several master control panels and a variety of programmable lighting controllers. The HWIKP10 can set 10 separate lighting scenes from multiple locations.

Power Line Technology

Many of the functions of hard-wired controllers and sensors can also be accomplished by piggybacking control signals across a home's existing wiring system using the X-10 transmission standard. Several manufacturers have been busy bringing X-10 — once the domain of basement tinkerers and cheap DIY devices — into the mainstream of home automation, with the Leviton Decora Home Control line leading the pack.

X-10 systems typically consist of a programmable master controller and a transmitter-receiver for each light, outlet, or other device under control. Because such systems can be installed without touching your fish tape or jab saw (and without calling in specialty subs), they're ideal for remodeling situations.

The range of devices available for X-10 is mind-boggling. A good place to get an overview is www.smarthome.com, an online store that handles hundreds of X-10 products, as well as other home automation products. Like hard-wired systems, X-10 devices often include a PC interface via RS-232 serial port and, more recently, an Internet or home network connection.



Starting at under \$50 per device, Leviton's Decora Home Control series can control lights and appliances using the X-10 protocol over existing house wiring.

Structured Wiring

The fastest-growing category of "connected home" products is the so-called structured cabling systems. These systems bring what were once several separate low-voltage networks into one convenient enclosure. Most manufacturers also supply a variety of cable termination modules that will bolt into their panels as needed — for example, network hubs, telephone patch panels, and audio-video distribution blocks.

Structured wiring enclosures from FutureSmart, GE-Smart, ITT, M&S Systems, OnQ, Ortronics, USTec, West Penn Wire, Greyfox, and others come in a wide variety of sizes, but all have some form of mounting system for individual telephone, network, audio-video, and specialty automation modules. The modules can be combined to create custom enclosures.

This "mix-and-match" approach makes structured wiring enclosures more versatile than their one-function hard-wired cousins. Unfortunately, a module made by one manufacturer won't necessarily bolt into an enclosure made by another. Some third-party manufacturers are bridging the gap by producing their networking modules to fit a variety of popular panel formats.

Also watch for established hvac or lighting control manufacturers to partner with a structured system outfitter to create a line of co-branded products, as in the

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FutureSmart manufactures and distributes structured wiring systems for home automation, entertainment, security, and home office connectivity. The SuperPro 16 is meant to be surface mounted and can service up to 16 "zones" with a variety of interchangeable modules. Built-in wire management loops keep cabling organized.

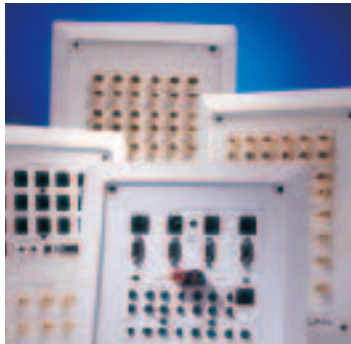
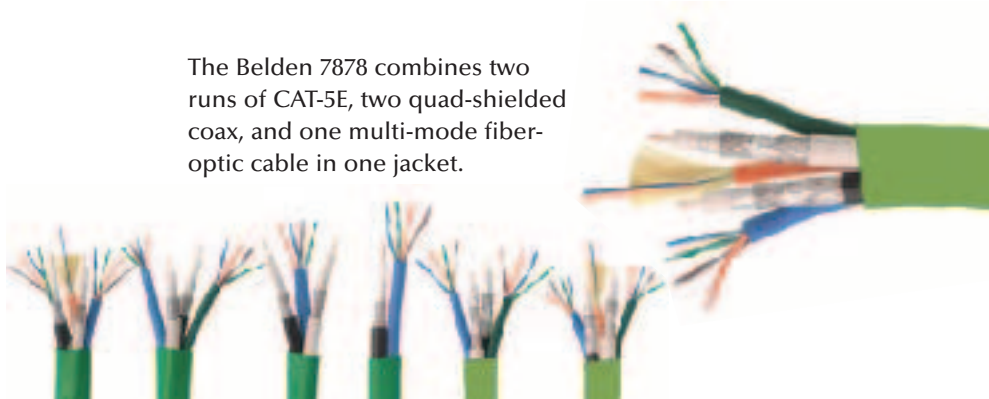


The \$369 Gold enclosure from M&S Systems provides built-in termination for 10 phone, 6 video, 4 data, and 5 audio runs, as well as all the associated incoming cabling from the street. Other features include a locking cover and the choice of surface or stud mounting. Basic models start at \$149, and additional modules can be added as necessary.



The Greyfox Trio surface mount panel is a low-cost alternative for smaller projects. The \$100 enclosure houses three of the company's structured cabling modules. Up to three Trio panels can be patched together for larger projects. Two are shown here.

The Belden 7878 combines two runs of CAT-5E, two quad-shielded coax, and one multi-mode fiber-optic cable in one jacket.



Elan specializes in zoned audio-video components for structured wiring systems. The Precision series of panels and controllers allows precise termination of components and control from multiple locations. Pricing starts at around \$250.

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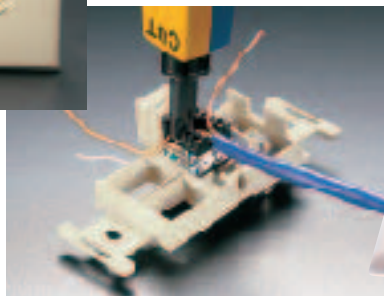
Honeywell-OnQ alliance.

Structured cabling systems involve several types of low-voltage wiring, including UTP (uniform twisted pair) network-phone wire, video coax, fiber-optic cable, and even speaker wire. In addition to individual cables, Belden, CommScope, West Penn Wire, and other cable manufacturers have created bundled products that combine several different cables in one jacket, including CAT-5E, coax, speaker wire, and multi-mode fiber-optic.

At the other end of the cabling, you'll find modular jacks and faceplates that can be customized for each location to connect multi-media systems, computer networks, phone and fax, security devices, and more. Many systems also provide computer interfaces for programming and control functions — either by RS-232 serial connections or through the CAT-5 network.



Modular jack and faceplate systems from OnQ, Seimon, Leviton, and USTec let the installer custom-configure structured cabling terminations for the situation at hand, and make them easy to reconfigure in the future.



Combination Systems

Even more cutting edge are systems that combine hard-wire, structured cabling, power line, and even radio frequency (RF) technology with a computer interface and Internet connectivity. Just about every manufacturer of home automation equipment is dabbling with a combination product or two, but perhaps the most familiar example is the Home Director system (formerly from IBM).



Home Director uses various software packages to combine a typical structured cabling-enclosure system with other wired and wireless "networked" devices. For example, Home Director AudioPoint allows existing stereo equipment to play streaming Internet radio stations.



Want to check on the babysitter or turn down the thermostat? Starting at \$1,900, the BeAtHome system connects a wide variety of wired and wireless sensors and surveillance equipment with an always-on Internet appliance that feeds a customized BeAtHome website. Homeowners can keep track of the systems in their homes 24-7, from any computer with a web browser.



Lutron is supplementing its original HomeWorks line of hard-wired products with RadioRA, a series of RF devices that can control high- and low-voltage lighting from multiple locations just by replacing existing dimmers or switches with the RadioRA modules.

Tabletop repeaters serve as master controllers. Like the hard-wired versions, RadioRA modules can interface with a PC for programming or control.



Honeywell's Your Home Expert series combines structured cabling with special thermostats and equipment sensors. Like BeAtHome, Honeywell maintains private websites for its users, who can manage their system from a web browser or dial in to TAMs (telephone access modules) directly from any telephone.



DiLAN, a partnership between ITT and Home Director, does away with confusing multi-cable and uses CAT-5E only to distribute all types of home automation, including high-quality audio and video. According to ITT, simpler cabling translates to substantial savings in materials and labor and fewer installation errors.



The Future

If you're thinking all these different kinds of cables and jacks are still too complicated and might be obsolete before you get them off the spool, you're not alone. That's why ITT and Home Director have partnered to develop and promote DiLAN (Domestic Integrated Local Area Network — pronounced Dylan). DiLAN, which was formally unveiled at the NAHB show in Atlanta last month, uses a single type of cable — CAT-5E — to provide networking, telephone, security, lighting, and hvac automation, as well as high-quality video and audio distribution. The single-cable approach effectively eliminates bulky and expensive structured cabling and truly "future-proofs" the job because outlets can be reformatted as requirements change over time. With DiLAN, today's baby monitor could be tomorrow's digital media center.



Joe Stoddard is a technology consultant to the construction industry and a contributing editor at The Journal of Light Construction.

For More Information

Organizations

Home Automation & Networking Association
Washington, D.C.
202/712-9050
www.hanaonline.org

Hard-Wired Systems

Centralite Systems, Inc.
Mobile, Ala.
877/466-5483
www.centralite.com

Elan

Lexington, Ky.
859/269-7760
www.elanhomesystems.com
Distributed audio-video systems

Elk Products, Inc.

Hildebran, N.C.
800/797-9355
www.elkproducts.com
Hard-wired panels, accessories, security devices, universal enclosures

Home Automation, Inc.

New Orleans, La.
800/229-7256
www.homeauto.com

Lutron Electronics Co., Inc.

HomeWorks Interactive
Coopersburg, Pa.
610/282-3800
www.lutron.com

Power Line Products

Leviton Decora Home Control
Leviton Voice & Data Division
Bothell, Wash.
800/722-2082
www.leviton.com

Structured Wiring Systems

Belden Electronics Division
Richmond, Ind.
800/235-3361
www.belden.com
HomeChoice structured cabling

CommScope

Hickory, N.C.
800/982-1708
www.commscope.com

FutureSmart

Draper, Utah
800/903-4237
www.futuresmart.com

GE-Smart

Las Cruces, N.M.
505/521-6000
www.ge-smart.com

Greyfox Systems

Pittsburgh, Pa.
412/920-6100
www.greyfox.com

M&S Systems

Dallas, Texas
800/877-6631
www.mssystems.com

OnQ Technologies, Inc.

Middletown, Pa.
800/321-2343
www.onqtech.com

Ortronics

New London, Conn.
800/934-5432
www.ortronics.com
Enclosures, jacks, faceplates

The Siemon Company

Watertown, Conn.
860/274-2523
www.homecabling.com

USTec

Victor, N.Y.
800/836-2312
www.ustecnet.com

West Penn Wire/Cable Design Technologies

Washington, Pa.
800/245-4964
www.westpenn-cdt.com

Combination Systems

BeAtHome
Fargo, N.D.
888/547-9381
www.beathome.com

Home Director (formerly IBM Home Director)

Durham, N.C.
800/426-7144
www.homedirector.com

ITT Industries

Network Systems & Services
New York, N.Y.
212/785-6660
www.itnss.com

Suppliers

Home Controls, Inc.
San Diego, Calif.
800/266-8765
www.homecontrols.com

Smarthome, Inc.

Irvine, Calif.
800/762-7846
www.smarthome.com