# Home Automation Today – Not quite like X-10

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Home Automation refers to automating the control of certain house activities, like lighting, temperature, entertainment, and even appliances. A Home Automation system typically connects the controlled devices to a central hub. The system is then controlled from a wall-mounted terminal, a desktop computer, or a mobile device like a smartphone. The addition of a home automation system to a home creates a "smart home." Modern smart homes are beginning to take advantage of Wi-Fi to connect the various parts of the home automation system.

Wi-Fi is becoming an essential part of the modern home. Whereas the basic utilities are necessary to sustain your modern life, Wi-Fi is necessary to sustain your modern digital life. Maybe not as important as water or electricity, but Wi-Fi provides the basic wireless interconnection capability for all the devices that, working together, support your modern lifestyle and make up the "smart home." Before wireless, devices could only be connected by wires. Many techniques and devices were developed to use the internal house wiring for this interconnection. Some systems used the telephone wires like HomePNA, and some systems used power wires, like X-10. There even were some early attempts at wireless systems like Z-Wave and Zig Bee. X-10, setting its roots back in 1975, is probably the oldest system and probably had the largest market share in the past. And although it was very inexpensive, it was deficient in many areas, especially in the data rate that it could support. X-10 could support only up to 200 bits per second, whereas Wi-Fi supports hundreds of megabits per second. The data rate determines the type of data that can be transmitted. Video data could never be transmitted on an X-10 control network.

The X-10 system and its devices use the 120-volt wiring in the house to carry control signals from place to place, wherever the wiring was accessible. The wiring is accessible in switch boxes and outlet boxes, so most X-10 devices replaced either a switch or a receptacle. Using these devices, you could control lights from the X-10 switches or automatically from a timer also connected to the wiring. The interface to the wiring system was relatively inexpensive and straightforward, so the X-10 devices were pretty affordable. Switches were in the $10 to $20 range, and controllers were around $50. As the X-10 system evolved, there was an interface to a computer, so all the devices could be controlled from the computer. There was even a form of wireless connection provided by an RF multi-channel transmitter/receiver. These forms of home automation are still available, but Wi-Fi seems to be the direction home automation is taking.

Home automation systems that used to use the house wiring to connect devices now use Wi-Fi to connect devices together and to the internet. Devices like smart bulbs and smart sockets, smart plugs, smart thermostats, smart security systems, smart front door locks, and smart doorbells with cameras connect via the Wi-Fi router. Google, Ring, and Yale make smart locks that allow you to remotely lock or unlock your door, which means you can let someone into the house even if you're not home or unlock your door if you forget your keys. And, of course, the bonus is that you can control and monitor the activities of these devices with your smartphone, which is hopefully always with you. These devices can be controlled from inside the house, outside the house, or halfway around the world; anywhere you can get an internet connection. But, on the downside, a Wi-Fi network connected to the internet can possibly be vulnerable to hacking. (Personally, I'm not ready to turn over the locking of the house to a lock that could possibly be hacked, but I know a few people who have installed these locks, and they are very happy.)  So, extreme security should be used with any of these systems. Make sure you definitely use WPA2 when you set up your Wi-Fi router and use a very strong password for router access (I know strong passwords are difficult to memorize, but the enhanced security will be worth it).

The Wi-Fi router is the device that provides the wireless connection between the internet and the myriad of devices that are used in the home, such as a laptop computer, tablet, smartphone, smart TV, and possibly appliances like a refrigerator or washing machine. (We're starting to see the Internet of Things (IoT) appear right before our eyes. Wikipedia says, "IoT is the network of physical devices, vehicles, home applications, and other items embedded with electronics, software, and sensors which enable these objects to connect and exchange data."  It is how all of our devices and appliances will be networked together to provide us with control over many aspects of our homes.

And, now there are new ways of controlling a Home Automation system. These new control systems are called Intelligent Assistants and take the form of Amazon's Echo (Alexa), Google's Home (OK Google), and Microsoft's Cortana (Hey Cortana), all of which connect the home automation devices together and to the internet via the Wi-Fi router. Amazon's Echo and Google's Home can control various smart home devices. Once set up, the Assistants can control the devices by your voice commands or an App on your smartphone. For example, they can turn lights on or off, open or lock doors, open or close garage doors, and even adjust the temperature in your home. In addition, schedules for the control of your devices can be set up on the App. For example, lights can come on or go off on a timed schedule, or they can even come on at dawn and go off at dusk, and the time will be adjusted with the seasonal changes. So, today the modern smart home can operate on its own, be controlled remotely, or be controlled by the owner's voice; we've come a long way from simple X-10 style home automation.

Home Automation – Using Cloud Computing