

## Chapter 1

# Exploring the Possibilities of Home Automation

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### *In This Chapter*

- ▶ Exploring X10 and what it can do with Linux software
  - ▶ Watching your Linux MythTV system or a Linux video player on TV
  - ▶ Hearing and controlling your Linux MP3 player remotely
  - ▶ Getting online weather information on your Linux computer
  - ▶ Exploring storm warning alerts for your cell phone, pager, or e-mail
  - ▶ Using a Linux smart phone system for your home or business
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**H**ome automation offers time-saving opportunities that can make your life more organized, more efficient, safer, and more fun. Dozens of free Linux software packages are available for home automation. These programs are often at the cutting edge of the field because Linux is often the platform of choice for programmers around the world in the field of home automation. Many of these programs are published under the GNU General Public License, which means they can be used by anyone freely, and because the source code is available, anyone can add new features to it. That is what programmers everywhere are doing at a fast rate, which makes this field exciting to be a part of. The practical uses for home automation are endless. This chapter covers an overview of how it works and its possibilities, and I get you started automating right away.

## *Functional and Fun: Home Automation Applications*

Every room of your home probably offers plenty of possibilities for home automation. Maybe the most well-known use is turning lights on and off — especially to dissuade any thieves from targeting your place when you aren't

at home. But there are plenty of other uses. Here are some of the most popular and most exciting:

- ✔ **Automate chores** such as watering your lawn, opening and closing drapes, controlling your lights and appliances — even controlling your electric water heater.
- ✔ **Use motion sensors** to turn on floodlights and cameras outside your home. Or turn on lights indoors as you walk from room to room, create an automatic doorbell, and more.
- ✔ **Use water sensors** to inform you of leaking plumbing, both minor or major, while you're at home or away for the day or on vacation. (Why not have your computer call you to let you know?)
- ✔ **Control your lights and appliances remotely** via the Internet or a telephone.
- ✔ **Remotely adjust your thermostat** so you can warm up your home before you get there.
- ✔ **Zone your heat and automatically adjust it** to make your home comfortable in the areas that you're using, and energy efficient in those areas that you aren't.
- ✔ **Wirelessly beam your entertainment around your home.** For instance, be your own DJ and send your MP3 songs playing on your computer to any stereo or TV in your house. Or use the plasma TV in your den to view videos playing on your computer.
- ✔ **Use a smart phone** for your home communications with a digital receptionist, voice mail, call forwarding, call waiting, and more.
- ✔ **Videoconference** with your friends, family, and co-workers by using the Linux Ekiga application; see Chapter 8 for more about Ekiga.
- ✔ **Set up a home surveillance system** by using webcams.
- ✔ **Keep your eye on your home remotely** via webcams and the Internet.
- ✔ **Set up your computer to alert you to storms** in your area or any area you specify by e-mailing you or calling your cell phone or pager.

## *Controlling your environment*

Basically, any appliance or light that you can plug in or wire with a switch can be controlled to turn on (or dim, if applicable) remotely by using a system known as X10.

### *An X10 overview*

X10 signals are sent and received via the powerlines of your home and interpreted by specially made X10 modules. The two basic types of X10 modules are lamp modules for incandescent lights, which can enable your light to dim, and appliance modules, which don't dim. (You don't want to dim your coffee maker.) These modules come in various shapes and sizes. They might look like little white boxes, like the Lamp Module shown in Figure 1-1; they can look like a normal wall outlet; or they can look similar to a lamp socket, like the Socket Rocket.

**Figure 1-1:**  
Use the X10  
Lamp  
Module to  
control a  
light by  
using  
various X10  
controllers.



To use an X10 module, you plug in the lamp (or appliance) or screw a light bulb into it, and then you plug (or wire) the module into the wall or screw it into a lamp socket. These X10 modules interpret the X10 signal and determine whether the signal is meant for it, and if so, it can turn itself on or off or dim the light accordingly, based on the signal.

Using X10 technology, every appliance and every light in your home can be automated and controlled. X10 signals do not interfere with any electrical system because A/C current alternates its phases at 60 times per second, and X10 signals operate during the spare time between the phases!

To send the signals to control your X10 modules, you can use any one of the following or combinations of the following:

- ✓ **Remote control:** This works in conjunction with a transceiver that is plugged into the wall. Press the proper controls on your remote to tell the transceiver what appliances to turn on or off and what lights to dim or brighten.

- ✓ **Motion sensors:** Motion sensors can signal when motion is detected, and you can set a motion sensor's transceiver to send X10 signals to X10 modules (for instance, to turn on lights) or to an appliance (such as a camera).
- ✓ **Other sensors:** Water sensors can detect leaks and cause a chime to sound, for example, and rain sensors can delay the watering of your lawn. They operate similarly to motion sensors.
- ✓ **Touchtone controller:** This item controls X10 modules through touchtone signals, so you can control your system via your phone.
- ✓ **Desktop controller:** This inexpensive controller plugs into the wall and can control 8 to 16 X10 modules without a transceiver.
- ✓ **Computer:** You can control your X10 modules via your computer software in the following ways:
  - *Send and receive X10 signals over the powerlines from your computer.* For example, the CM11A computer interface, as shown in Figure 1-2, can control your modules by using Linux home automation software. A starter kit is available from [www.x10.com](http://www.x10.com) for \$49.99.
  - *Enable your computer to function as a remote control.* The Firecracker computer interface, also called CM17A, is compatible with Linux home automation software. This is one-way communication only. A starter kit is available from [www.x10.com](http://www.x10.com) for \$39.99.

**Figure 1-2:**  
You can  
use the  
CM11A X10  
computer  
interface  
with free  
Linux  
software  
to control  
your X10  
modules.



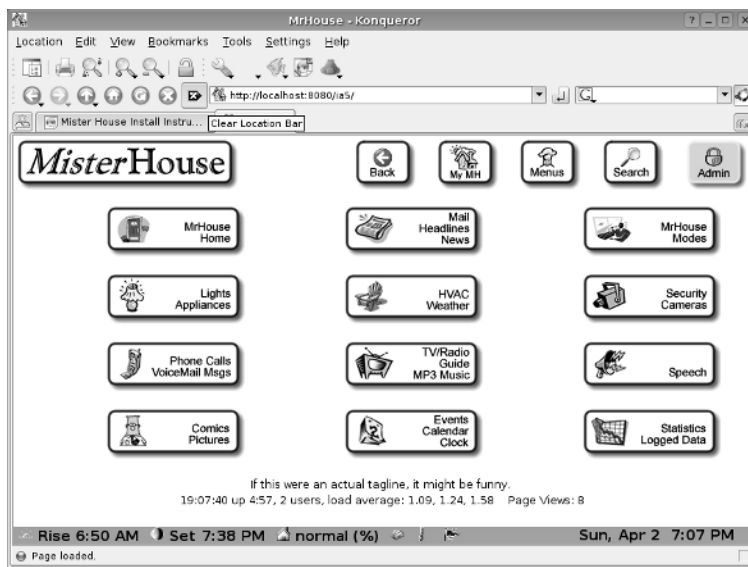
### *Controlling X10 modules with Linux software*

By computerizing your X10 system, you gain the power to create sophisticated macros that can operate based on the input of more than one X10 device, such as opening the garage door if motion is sensed by the hall closet (where you keep your coat) between the time of 8:00 and 8:15 a.m. Or you can connect your system to the Internet so you can operate it from anywhere in the world without having to pay for a phone call.

With your computer controlling your system, you can also use features that might not be available with other controllers, such as using the Internet to control your X10 system from anywhere in the world or using your computer to operate a smart phone system that can call you if, for example, your basement floods.

The CM11A interface can be controlled by several programs, such as MisterHouse, as shown in Figure 1-3, or Heyu. For more information on how to set up your computer to control X10 modules, refer to Chapter 13.

**Figure 1-3:**  
Use  
MisterHouse  
to control  
your X10  
appliances  
remotely,  
even over  
the Internet.



### *Fun and functional ways to use X10*

The uses of X10 are many and limited only by the imagination. For information on how to start building a simple X10 system, check out Chapter 13. After you get to know the basics, filling your home with all kinds of X10 systems is easy.



Some practical or just plain fun uses for X10 automation include these:

- ✓ Use a motion detector to switch on Robo-Dog, an X10 dog barking device to scare intruders, or hook up your motion detector to floodlights.
- ✓ Create an automatic doorbell with a motion detector and chime. Place the motion detector at your front door, front gate, or sidewalk to alert you of guests.
- ✓ Dim all the lights with the touch of a single button in your living room for a home-theater effect.
- ✓ Set up a motion detector to work in a bedroom during the night to turn on the bathroom lights as well as a lighted hallway path when your child needs to go to the potty.
- ✓ Automate your security by aiming X10 cameras outside your home so that they will turn on when tripped by motion detectors. If you want to get fancy, have your computer call you to alert you and watch your cameras from the Internet.
- ✓ Use sprinklers attached to motion detectors to scare off neighborhood dogs or deer. (However, this might be a magnet to every child in town!)
- ✓ Use X10 to start your coffee in the morning and open your window shades.
- ✓ Turn off all your lights with one click of a remote.
- ✓ Water your lawn automatically on schedule.
- ✓ Check the state of your car's muffler and exhaust system with an automated pan-and-tilt camera base.
- ✓ Decorate with X10-controlled Christmas lights that turn on and off to the beat of your music or other cues.

### ***Best places to find X10 products***

X10 products are generally inexpensive. For example, you can buy a CM11A computer interface, a two-way transceiver module, a remote, a lamp module, and a credit card controller all bundled into one package for \$49.99 at [www.x10.com](http://www.x10.com) — plus free shipping!

X10.com is a great place to shop for home automation devices. Their prices are generally low and their sales are often incredible. (No, I don't get a commission.) However, don't get excited by their Sale Ending Soon banners or Buy Now — Only 4 Left! Don't feel like you need to rush. New sales start every day.



Smarthome ([www.smarthome.com](http://www.smarthome.com)) and Radio Shack ([www.radioshack.com](http://www.radioshack.com)) are two other suppliers of X10 products. And don't forget eBay for good deals.

Here's an interesting statistic: Roughly 95 percent of all X10 products are sold online. Maybe this will change as X10 rises in popularity — or maybe not.

## *Taking your entertainment wherever you go*

Here's the problem. Your favorite music is on your computer and you want to play it on your stereo in the den. Or you have MythTV (a Linux-based TiVo knock-off I describe in detail in Chapter 6) on your computer, but you want to watch it from your couch — not your swivel chair. Or, another problem: You set up your MP3 files on your computer to play in your den, but you want to control them with a remote — and your computer is 50 feet away on the other side of the house. This section covers a wide variety of incredibly easy (and cheap) entertainment solutions. And if you want information on streaming your music through the Internet, check out Chapter 7.

### *Wirelessly sending TV and stereo signals from any TV, stereo, or CD player*

For about \$50, you can get an X10 wireless video sender from [www.x10.com](http://www.x10.com). The entire package consists of a video sender and video receiver, both of which look like small boxes with regular antennas and tiny dish-like antennas protruding from them, which can communicate with each other wirelessly throughout your home. The video sender also sends and receives stereo sound from your TV, CD player, or stereo — whatever takes standard RCA Audio In and Audio Out jacks — or coaxial cable.

The following steps show you how to hook up your wireless video sender to your DVD, VCR, stereo, TiVo, satellite receiver, or cable box to play on a TV or stereo:

- 1. Connect the RCA jacks to the Audio and Video inputs and outputs of your video sender and video receiver, and connect them to the Video Out and/or Audio Out of your DVD player, VCR, TiVo, satellite receiver, CD player, stereo, or cable box and the Video In and/or Audio In of your stereo or TV.**

If RCA connections are not available, coaxial cable inputs and outputs will do as well.

- 2. Set the channel on the wireless video sender to either three or four, whatever channel the TV that is normally connected to the DVD player, VCR, or other device uses to receive the signal.**
- 3. Set the channel on the wireless video receiver to the same channel on the wireless video sender.**

4. **Angle the flat antennas of the wireless video sender and receiver so they are facing each other.**

It's okay if there are walls between them. Just pretend the walls are not there.

5. **Turn on whatever your wireless video sender and receiver are connected to and enjoy!**

If the signal isn't as strong as you like, try adjusting the angles of the antennas or changing the channel numbers on both the sender and receiver. They need to be the same numbers.

### *Wirelessly transmitting MP3 files*

Using the wireless video sender, you can easily transmit your MP3 tunes wirelessly from your computer to any stereo or TV in your home — or by the poolside. The wireless video sender is also an audio sender. To hook up your computer to play your audio from your computer remotely on any TV or stereo, follow these steps:

1. **Plug the white and red RCA connectors of the video receiver into the RCA Audio In jacks of any stereo or TV equipped with them.**

You can use coaxial cable if you need to.

2. **If your computer has RCA jacks for Audio Out, plug your red and white RCA cables into them; if it has a Video Out card with a place to screw on a coaxial cable, hook up a coaxial cable to it. Then skip to Step 5.**
3. **If your computer has no Audio Out jack that is compatible with RCA plugs or coaxial cable, find or buy a stereo tuner with Audio In and Audio Out RCA jacks on it and place it near your computer.**
4. **Buy a cable that has an earphone jack on one end and two RCA jacks on the other end and plug the headphone jack into your computer and the two RCA jacks into the Audio In jack on the back of the stereo.**
5. **Plug the white and red RCA cables into Audio Out jacks in the back of the stereo and plug the other end of the white and red RCA cables into the wireless video sender.**
6. **Set the channel number on your video sender and receiver to the same number — whatever number you want — or whatever works best.**
7. **Follow Steps 4 to 5 in the preceding section “Wirelessly sending TV and stereo signals from any TV, stereo, or CD player.”**

Lots of good MP3 players with easy-to-use interfaces are available for use on the Linux desktop. XMMS, MPlayer, or Zinf Audio Player are a few. Any of these players will work with this system.



### *Controlling your Linux MP3 player with an X10 remote control*

It is possible to control your XMMS MP3 player running on your computer from a handheld remote up to 50–100 feet away (and through walls). This remote, called the Anywhere Remote, can control the following:

- ✓ Song selection
- ✓ Play/stop/fast forward/pause
- ✓ Volume/mute
- ✓ Balance

The Anywhere Remote is a universal remote that can do the following:

- ✓ Control your TV, CD player, DVD, cable box, and satellite receiver.
- ✓ Control your X10 modules up to 50–100 feet away and through walls (if you use it with a TM751 or RR501 transceiver, which is available at [www.x10.com](http://www.x10.com) for about \$13).
- ✓ Control your MP3 player on your computer remotely up to 50–100 feet away and through walls if you have the following:
  - A TM751 or RR501 transceiver, which costs about \$13 from [www.x10.com](http://www.x10.com).
  - XMMS audio software comes with most Linux desktop distributions, as shown in Figure 1-4.
  - A computer capable of sending and receiving X10 signals. Refer to the “Controlling X10 modules with Linux software” section.
  - A program called `x10mp3`.

`x10mp3` is free software that runs in Linux and is available for download at <http://x10mp3.sourceforge.net>. This software is the Linux version of the Windows program, Boom 2000, which controls the Anywhere Remote.

When you use the Anywhere Remote along with a video sender, you can send your MP3 music to any stereo or CD player in the house from your computer and control it remotely from up to 50–100 feet away. You can find the Anywhere Remote on [www.ebay.com](http://www.ebay.com) for about \$10.



If you want to beam your music to a stereo directly from your iPod, special iPod transmitters are available for about \$50. The sender attaches directly to the iPod and the receiver attaches to a stereo by using standard RCA connectors. This has nothing to do with Linux, however.



**Figure 1-4:**  
Your  
Anywhere  
Remote  
interfaces  
with the  
MP3 player  
software  
package,  
XMMS.

### *Wirelessly viewing Linux applications and videos on any TV*

If you like to download videos to your computer (from Google Video, or MythTV, for example) and want to see them on a TV elsewhere in your house, you can easily do it. After all, your computer lives in your home office, and your plasma TV is in your living room (you wish). Your home office is crowded, and your living room can seat more people. Your desk chair is hard, and your couch is soft (or maybe not). So, if you have video on your computer that you want to enjoy in more comfort, you can hook up your computer to the wireless video sender. The only requirement to using the wireless video sender with your Linux computer is that you need to have a *Video Out card* — that means you need to have a coaxial cable connection or RCA Audio and Video outputs.

### *Watching the weather*

Whether or not you or someone in your family is a budding meteorologist, it is still handy to know what the weather conditions are — without having to get frozen or fried checking it out. A wide variety of home weather stations are available on the market, and they can give you accurate information concerning weather conditions. Some of these weather stations can interface with Linux software, so you can gather and store your information on your computer. Or you can create your own weather station by using information from the Internet. Having weather information right on your desktop or browser or being alerted by a text message on your cell phone can be handy.

### *Getting weather reports from your own weather station*

Weather stations come in all sizes and price ranges. For about \$25, you can get a display that tells the temperature indoors and out and tells time. For about \$50 to \$100, you can get a display that tells temperature and gives you the local forecast via a wireless connection. These weather stations come with their own displays that are updated wirelessly every couple of minutes from the sensors outside your home. A good place to find a large variety of weather stations for sale is [www.weatherbarn.com](http://www.weatherbarn.com).

If you want to read the weather conditions outside your home on your PC by means of sensors for temperature, wind speed, wind direction, humidity, barometric pressure, rainfall, wind chill, and more, you can get this kind of weather station for around \$200 to \$500. Connecting your weather station with your computer can also enable you to share and manipulate your weather data. For more information on installing your own weather station, see Chapter 10.

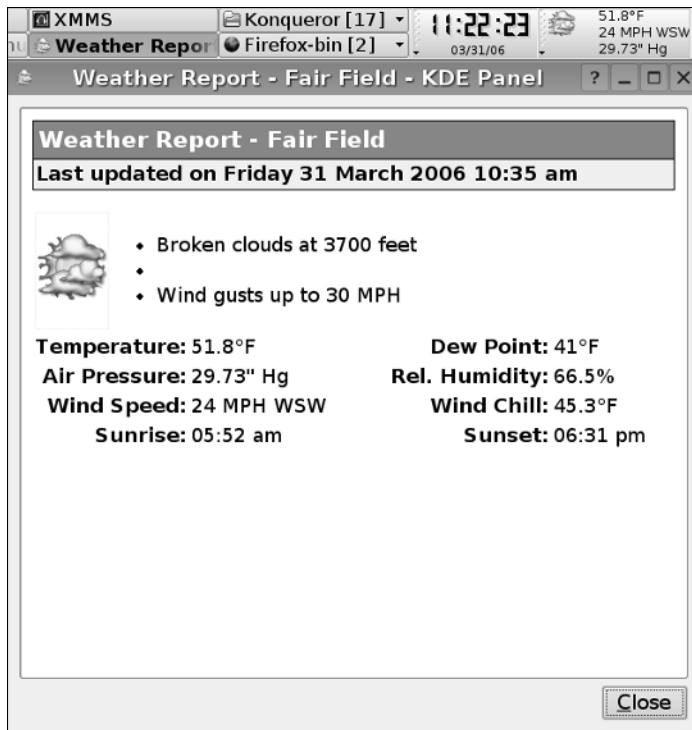
### *Getting weather reports from the Internet*

Another way to get weather information is to have your computer automatically gather the information from the Internet. This allows you to have instant access to the following:

- ✓ The current weather conditions for your area
- ✓ The current weather conditions for any other area you designate, which might be useful if you want to keep track of your family around the country or around the world.
- ✓ The weather report for the next few days
- ✓ Severe storm warnings

Four popular means of having access to up-to-date and continuous weather information are as follows:

- ✓ **Installing and using a weather applet with your Linux desktop:** This is a tiny application that lives on your desktop and tells you the temperature, wind speed, and direction and uses an icon representing general weather conditions. If you double-click the applet, it brings up a window with more information, as shown in Figure 1-5.
- ✓ **Installing an extension for the Firefox Web browser that automatically gives you up-to-date and future weather information:** If you're a regular Web surfer, having weather reports on the browser can be useful. You can see icons representing current and future weather as well as a pop-up screen of the Doppler radar for your area and severe storm icons. Knowing when severe storms are expected can be an extremely handy feature — especially if you live in a mobile home.



**Figure 1-5:**  
Get up-to-date weather information automatically on your Linux desktop.

- ✓ **Getting weather updates from MythWeather:** A primary function of MythTV is to fulfill your need for a personal video recorder (PVR), but MythTV also has a program called MythWeather that you can use to get your current weather conditions and extended forecast. Access MythWeather by choosing the Weather option from the MythTV main menu; see Chapters 6 and 11 for more information.
- ✓ **Using StormSiren to alert you of storms by e-mail or text messages to your cell phone or pager:** This program automatically checks the National Weather Service for information on storms in the county or counties that you specify. If a severe weather alert exists, it e-mails you and sends instant messages to your cell phone or pager. For more information on StormSiren, see its homepage at <http://stormsiren.sourceforge.net>.

## *Creating a sophisticated phone system*

Sophisticated phone systems, like the kind large stores have that can direct calls automatically, can now be used in the home! These systems usually cost about \$40,000 to install, but an enterprising businessman/programmer who needed one and did not have the cash to buy one just programmed one

himself. He offered it to others as an open source program, named Asterisk, and since then over 300 programmers have contributed to it.

Asterisk is one of the best phone systems for businesses around, and it's free! Because Asterisk needs someone savvy with Linux to install it, another system based on Asterisk was created for home use: Asterisk@Home.

Asterisk@Home has the following features:

- ✓ Digital receptionist to direct calls automatically. For example, the call can be directed to your phone, your spouse's phone, or the kids' phones.
- ✓ Queue calls on hold and play music.
- ✓ Forward calls.
- ✓ E-mail voice mail messages.
- ✓ Send voice mail with Web access or phone access and more.

Running Asterisk at home requires the following items to work:

- ✓ Dedicated computer. (Old hardware is fine for this.)
- ✓ Broadband connection — the faster the better.
- ✓ VoIP (Voice over IP) phone lines, which are phones that work over the Internet, such as VoicePulse or BroadVoice. This costs about \$10 a month per phone.
- ✓ Phones that are compatible with VoIP, which you can buy for as little as \$60, but most cost from \$100 to \$150.

Asterisk can also be used in conjunction with MisterHouse, a free software application that controls X10 modules and more. For more information about running Asterisk, see Chapter 9.

## *Using Linux to Your Advantage*

Linux is on the cutting edge of home automation. Using Linux home automation enables you to

- ✓ **Save money:** Most Linux software is free to use, free to give away, free to modify, and even free to sell.
- ✓ **Access the cutting edge of home automation:** Asterisk, for example, is one of the top phone systems available for businesses today. And MisterHouse offers features that aren't available in any proprietary home automation software and is exploring the frontiers of voice activation for X10 devices. Plus MythTV lets you set up a free and feature-full TiVo-like system.

- ✓ **Explore lots of possibilities:** Lots of home automation software exists, but you can't usually try out the proprietary software without paying money — so that limits your exploration of it. With Linux, you can explore and try whatever you want without feeling a financial pinch. You are not locked into a single program.
- ✓ **Contribute to the growth of free software:** You can contribute to improving the home automation field by programming new features (if you are a programmer), by helping newbies on the forums, by suggesting new features, and more.



Linux home automation software published under popular licenses such as the GNU General Public License has the source code available for everyone to improve and add features to. This way, it can be advanced by professionals and amateurs alike. And the new features, which are added by programmers around the world, cause the software to grow, sometimes as effectively as if it were designed by a business plan and paid programmers spent every day working on it — maybe even more effectively. And its setup and maintenance costs are a fraction of what similar proprietary software costs.

To some people, Linux is a hobby, but it can be a career as well. Money-making opportunities are available for savvy entrepreneurs. Here are just a few possibilities:

- ✓ Setting up Asterisk phone systems for clients
- ✓ Creating Internet-accessible, home-surveillance systems
- ✓ Offering clients high-performance video streaming

Linux software offers a large range of home automation possibilities, which are fast becoming very powerful and have lots of mainstream applications.

Because the source code is freely available, bugs in the program are swiftly fixed by programmers all around the world. This factor often makes free software more robust than proprietary software. Also, it is much less vulnerable to viral attacks and other malicious software because Linux is inspired by the UNIX operating system, which had security built into it since ancient times — not added on after the system was already established.

Using Linux for home automation might require a bit more knowledge on your part, but in the long run, can be much more satisfying and rewarding.