# Running KNOPPIX

computer's operating system usually resides on the hard disk—but it doesn't have to. When a computer boots up, it typically checks first if there is a CD, floppy disk, or DVD in a drive and tries to boot from there (depending on BIOS settings). So, with up to 700MB (CD) or 4.7GB (DVD) of space on those media, why not use them to boot whole operating systems?

Well, that's exactly what bootable Linux distributions (also called live CDs) such as KNOPPIX do. In the case of KNOPPIX, one CD holds up to 2GB of compressed software for you to run that uncompresses on-the-fly. Start it up and you can try out all the features of a well-stocked Linux system, without touching the contents of your hard disk.



KNOPPIX is included on the DVD that comes with this book. In fact, it is the default option. Insert the DVD into your PC's DVD drive and, when you see the boot screen, press Enter. KNOPPIX should just start up, and you can begin using it as described in this chapter.

If you have never used Linux before, KNOPPIX gives you the chance to do so in a very safe way. If you are experienced with Linux, KNOPPIX can be used as a tool to take Linux with you everywhere, troubleshoot a computer, or check if a computer will run Linux. In any case, you can use this chapter to take a little tour of some great Linux features you can try out with KNOPPIX.

# **Understanding KNOPPIX**

If you are impatient, you don't have to read any further. In most cases, you can just insert your DVD into your PC, reboot the computer, and start using KNOPPIX. However, if you have the time, read on a bit more.



### In This Chapter

Understanding KNOPPIX

Starting KNOPPIX

Using KNOPPIX

+ + + +

Created by Klaus Knopper, KNOPPIX is a bootable Linux that includes a nice selection of open source software. Although it can also be delivered on DVD (as we did with this book) or other bootable media, the distribution is made to fit on a single, bootable CD. KNOPPIX is often considered to be the best bootable Linux available.

### **Looking Inside KNOPPIX**

Note

Note

KNOPPIX boots right up to a full-featured desktop system complete with hundreds of desktop applications. It includes some powerful server and power user features. In fact, there are so many features, I won't even try to mention them all here, but just take a look at the following list of some of KNOPPIX's major components:

If you find that you are missing the NVIDIA graphics driver, Flash plug-in, or Quanta HTML editor you need, don't worry. KNOPPIX includes a KNOPPIX-Live Installer that lets you install selected software features from the network and run them live from KNOPPIX. I'll describe the KNOPPIX-Live Installer later in this chapter.

★ KDE — A full-featured KDE desktop (which runs on the X Window System) that includes tools for configuring the desktop and a bunch of applications tailored for the KDE environment. (See Chapter 3 for descriptions of KDE.)

If you prefer the GNOME desktop environment, there are several customized versions of KNOPPIX that include GNOME. Most notable is the Gnoppix (www.gnoppix.org) distribution, which uses GNOME as its default desktop.

- ◆ OpenOffice.org The OpenOffice.org suite of office productivity tools so that you can create documents, graphics, presentations, spreadsheets, and most anything you expect to be able to do with office applications. With KNOPPIX, I can give a presentation created in OpenOffice.org software anywhere that I have access to a PC. (See Chapter 20 for descriptions of OpenOffice.org productivity applications.)
- ◆ Internet tools Web browsers (Mozilla browser, Konqueror, and Lynx), e-mail clients (Kmail, Mozilla mail, and mutt), a chat client (XChat IRC), a news reader (KNode), an instant messaging client (Gaim), and many more applications for using the Internet. (See Chapter 21 for descriptions of popular Web browsers and mail clients.)
- Multimedia software Applications for playing music (xmms and KsCD), editing music (Audacity and Rosegarden), watching TV (xawtv), playing movies (xine), working with graphics (GIMP and xscanimage), using Webcams (gqcam), and displaying images (KView and Kuickshow). (Chapter 19 covers music and video players.)
- ◆ Games A few dozen diverting board games, card games, strategy games, and puzzles to play. Try Potato Guy to keep the young ones busy, and Kasteroids for the older kids. (Chapter 22 talks about KDE and other games that you can run with KNOPPIX.)

- ◆ Administrative tools A nice set of system and network administration tools that enables you to do some pretty advanced setup, monitoring, and debugging of your computer and network. (The Knoppix-STD distribution is configured specifically as a rescue CD to do almost anything you could imagine to check and fix your computer and network.)
- ◆ Servers A few of the powerful server projects available for Linux, many of which don't require a lot of disk space: a Web server (Apache), FTP server (FTPd), file server (NFS), Window file/print server (Samba), proxy server (Squid), DNS server (bind9), login server (sshd), and DHCP server (dhcpd).

Note

Using KNOPPIX (or any other bootable server Linux systems described in Chapter 18) as a server opens some amazing possibilities for serving the data from a Windows or other operating system to a network, while completely bypassing that operating system on the computer's hard disk.

 Programming tools — A good set of tools for developing software across a variety of programming environments.

KNOPPIX is based on Debian Linux, so a Debian user will be particularly comfortable with the selection and organization of features. KNOPPIX software packages are also done in deb package format, so you can use apt, dpkg, and related tools to list and otherwise manage the packages.

Note

Refer to Chapter 9 for information on using apt and dpkg tools for managing software in Debian. Even if you don't install any new software, those tools provide an excellent way to search, list, or even upgrade software packages that are running in KNOPPIX.

### What's Cool About KNOPPIX

The features just described are ones that come with many different Linux distributions. What makes them special with KNOPPIX is that you can often be up and using those features within a few minutes — without having to repartition your disk, install software, or do any configuration. For just trying out Linux or using it for some special, quick task you want to do, KNOPPIX is quite awesome.

Some features, however, are specific to KNOPPIX (as compared to a Linux system you would run from a hard disk). Many of those special features are there to help you through issues that relate to the fact that you are not working in a permanent setup. In particular, KNOPPIX includes the following:

◆ Extraordinary hardware detection — The capability to properly detect and configure hardware is one of the best features. During the boot-up procedure, KNOPPIX finds most common PC hardware components and loads the proper modules so it can use them. Its hwsetup tool relies on the Red Hat libkudzu facility to identify hardware, load appropriate modules, and create necessary device files.

For hardware that can't be detected, there are many boot options you can add to properly identify (or skip over) selected hardware devices. Some of them deal with particularly sticky issues related to video cards and running on laptop computers. (See Tables 11-1 through 11-3.)

- ◆ Automatic desktop startup Instead of just dropping you to a command line, KNOPPIX does its best to start up a complete KDE desktop environment. Along the way, it adds some nice features, such as desktop icons giving you access to your computer's hard disk partitions.
- ◆ Configuration tools Some hardware either can't be perfectly detected or requires some extra setup. You can access KNOPPIX-specific configuration tools for configuring your printer, TV card, sound card, network connections, and other features by clicking the desktop icon that looks like a squished penguin.
- ◆ Save setup You don't have to lose the configuration you have done for KNOPPIX every time you reboot. Click the configuration icon to save your configuration — including your personal desktop configuration, files on the desktop, network settings, and graphics setup (X) — to floppy disk.
- Persistent desktop You also can use the configuration icon to create a persistent KNOPPIX home directory on your hard disk or other medium so that you can store and reuse your desktop setup information and any data you save from session to session. (See the "Creating a Persistent Home Directory" section later in this chapter for details on setting up a persistent desktop.)
- Add swap If you are using KNOPPIX from a computer with Linux installed, it automatically uses a swap partition that is set up there. On DOS and Windows systems, KNOPPIX enables you to create an extra swap area if you have space on an available DOS partition. (The mkdosswapfile command is used for this purpose.)
- ♦ Work with Windows files KNOPPIX cannot include Microsoft Windows drivers for using Windows file systems (NTFS), but it provides a utility that enables you to install those drivers (providing you have legal rights to use them). The drivers enable you to safely read and write files from your hard disk if you are booting KNOPPIX from a PC with Windows installed.

For example, say that you have your entire music collection, images downloaded from your digital camera, and personal Web pages on your hard disk on a computer that was set up to be booted by Microsoft Windows XP. You boot KNOPPIX instead (notice that Microsoft Windows is not running at all). Suddenly your hard disk is just a place that holds a lot of files. You can now use applications that come with KNOPPIX to open the files on your hard disk to play the music, view or manipulate images, and display or change Web pages.

A testament to how well KNOPPIX is respected is how many other bootable Linux distributions are based on it. The KNOPPIX project even provides a KNOPPIX-customize package that lets anyone make his own customized KNOPPIX. There are specialized KNOPPIX derivatives that can be used to rescue a broken computer, play a range of multimedia content, or run a specific application.



See Chapter 17 for information on using a bootable Linux as a firewall/router and Chapter 18 for descriptions of many other bootable Linux distributions.

### **Examining Challenges with KNOPPIX**

For most people, KNOPPIX is a special-use Linux system. It's a great way to try Linux or to access a computer that isn't set up the way you like. However, there are a few challenges with using KNOPPIX that you should keep in mind:

- ◆ Reboot clears out KNOPPIX Unless you save your data to some other media (which you can do, as I describe later in this chapter), the entire KNOPPIX system goes away when you reboot. That means files on the desktop, installed software, system configuration, and anything else you do during your KNOPPIX session will be gone unless you explicitly save that information to a hard disk or some removable medium (floppy, CD, and so on).
- ♦ Memory limitations KNOPPIX is made to be able to run without touching your hard disk, so when you save files to KNOPPIX, they are (by default) stored in your computer's memory (RAM). On my desktop system, which has 512MB of RAM, KNOPPIX assigned about 3MB to the root (/) partition and 396MB to ramdisk (to provide space in the /var and /home directories, where data is normally stored). So there is only about 100MB left to hold all the running applications.
- ◆ Performance hits Even with today's faster CD and DVD drives, it's still slower getting data from CDs and DVDs than it is getting them from a local hard disk. Almost every component needed to run KNOPPIX (commands, libraries, and so on) is grabbed from the CD or DVD and decompressed onthe-fly. So it can take a bit longer to run commands with KNOPPIX than it would to run them from hard disk. (Watch the blinking light on your CD or DVD drive to see how often KNOPPIX goes there to get data.)
- ◆ Uses your CD/DVD drive Because KNOPPIX relies so heavily on data from the CD or DVD, you can't remove it while you are using the system. So, if you have only one drive for removable media, you can't use it to access a music CD, install from another software disk, or burn data while you are using KNOPPIX.

Note

Tiny multimedia players such as GeeXboX and MoviX can run totally from memory because they have very limited, specific functions. So you can put in a music CD or video CD or DVD to play content after the bootable Linux is loaded.

I must admit that the challenges described here are more of an explanation of how KNOPPIX works than they are problems with KNOPPIX itself. The idea that you can run a full-blown desktop and server operating system from a single CD (with nearly 2GB of available applications) is an awesome concept for someone who still remembers DOS and character terminals.

### **Seeing Where KNOPPIX Comes From**

KNOPPIX was created by Klaus Knopper in Germany. Knopper follows in the great tradition of naming a distribution using a part of the creator's own name with "ix" or "ux" stuck on the end.

While a groundswell of interest and support has appeared for KNOPPIX in the past year or so, Knopper himself thinks of KNOPPIX more as a collection of tools he needs than as a full Linux distribution. Knopper works to provide only software that can be distributed freely, for both noncommercial and commercial use. So he doesn't even include some free software (such as browser plug-ins) that might restrict free redistribution, although he doesn't object to including non–open source software that can still be freely distributed.

There is no big company behind KNOPPIX, and development efforts continue to be headed up by Knopper himself. There are, however, many people who contribute bug reports and enhancements requests (see www.knoppix.net/bugs), and there are other developers who have helped create software specifically for KNOPPIX (in particular, Fabian Franz who, among other things, has contributed significant work to KNOPPIX installer-related features).

The only official KNOPPIX Web site is Knopper's own personal site: www.knopper. net/knoppix. The closest thing to an official community is a mailing list (mailman. linuxtag.org/mailman/listinfo/debian-knoppix) set up at LinuxTag.org with Knopper's blessing. LinuxTag hosts the LinuxTag Conference and Expo, which is a leading Linux and free software conference in Europe. For the 2004 conference, LinuxTag produced a special edition of KNOPPIX on DVD that held more than 5GB of software.

If you are looking for a way to get information and become involved with others who use and develop the system, the Knoppix.net site offers a very active forum and links to information about other KNOPPIX resources. It's a great place not only to get your questions answered, but also to find a wealth of links to FAQs, HOWTOs, and related projects. There is also an IRC channel (#knoppix on irc.freenode.net) and a Wiki used primarily to gather documentation (www.knoppix.net/docs/).

If you are considering creating your own customized distribution, tools for that purpose are currently under development and may be included with versions of KNOPPIX by the time you read this text. In the meantime, you can check out some remaster tools at http://debian.tu-bs.de/knoppix/remaster/. You can find out about versions that have already been created from the KNOPPIX Customizations page: www.knoppix.net/docs/index.php/KnoppixCustomizations.

### **Exploring Uses for KNOPPIX**

Because there is so much you can do with KNOPPIX, it's hard to narrow my mind enough to give a few specific examples. So, let's start with a few concepts to help think about what you can do with KNOPPIX:

- ◆ Your own, portable operating system You don't have to carry around a laptop or whole PC to make sure you have the software you need. Instead, you can use any PC that is available (with the exception of some unsupported hardware) and boot your whole computing environment with a single CD or floppy. By customizing your own KNOPPIX, you can add your own data and pick and choose applications as well.
- ★ A tool for managing data on any PC You can bypass the operating system and other software on any computer and use the applications on your KNOPPIX disk to manage the data on that computer.

Of course, these concepts are not exclusive to KNOPPIX because you could conceptually do the same thing with any boot floppy since the days of DOS (as well as any other bootable Linux). The difference is that KNOPPIX does those things so well. It lets you take over a computer, not just with a tiny rescue disk capable of running a few obtuse commands, but with at full-scale desktop, server, and administrative tool kit operating system. With that in mind, here are some ways people are using KNOPPIX:

- ◆ Showing off Linux A demo can lack some punch when you have to spend an hour installing before you can make your point. With KNOPPIX, it can take about five minutes from the time you tell your friend about Linux to the time you have a complete desktop system running on his PC. And in the process, you don't have to worry about harming anything on his computer because you don't even need to touch his hard disk.
- ◆ Testing a computer for Linux Instead of getting halfway through an install to see if your PC is capable of running Linux, you can boot KNOPPIX. If it works, you can check to see what drivers were loaded to deal with your hardware (type lsmod from a shell) and then go ahead and install any Linux you like to the hard disk.
- Rescuing a computer or network Many tools for tracking down and fixing problems on both Linux and Windows systems are included in KNOPPIX. There is also a Knoppix-STD edition that includes dozens more tools for rescuing broken systems and tracing network problems (see www.knoppix-std.org).
- ◆ Taking over a broken server If a Web server, file server, or firewall has been hacked or otherwise broken, you might be able to use KNOPPIX to safely server the data from a KNOPPIX boot disk while you fix the problem.
- ◆ Doing anything you want For those of us who have gotten used to using Linux, it's a pain to go somewhere and have to do work or make a presentation on a computer that doesn't have the tools you need. By bringing the whole operating system, all your software tools and sometimes even your data (with a customized CD, separate floppy, or downloaded files), your computing environment can be the same wherever you go.

Now that you have some idea of what to do with KNOPPIX, let's get started.

# **Starting KNOPPIX**

It's supposed to be easy to start KNOPPIX. With KNOPPIX in hand, all you really need is a PC that meets the minimum specifications.

### **Getting a Computer**

If you are ready to start KNOPPIX, there are a few things I recommend.

- ★ A PC—You need a PC that meets the minimal processor and memory requirements I describe a bit later. There are no hard disk space requirements since you don't need to touch the hard disk. However, to get better performance on low-RAM systems, you might want to create a swap partition on hard disk to enable you to run more processes (as described later).
- Permission to reboot KNOPPIX is going to take over operation of the PC, so you need to be sure that it's okay to reboot it. Make sure that nobody else is currently using the computer or relying on it to be accessible over a network.
- Internet connection (optional) It isn't necessary, but if your computer has an Ethernet card and a connection to the Internet, you can immediately start using KNOPPIX to browse the Web and otherwise take advantage of its communications tools. KNOPPIX will try to detect a DHCP server (to get an IP address and other information) and automatically configure itself to use the Internet or other network that is available.

The system requirements for running KNOPPIX are much lower than you need for most of the latest Linux systems. According to Klaus Knopper, you need:

- ♦ CPU—Intel-compatible i486 or better.
- ◆ RAM 20MB (for text mode), 82MB (for graphics mode with KDE), or 128MB (to also run most office applications).
- ◆ Bootable Drive (DVD drive to use the DVD or CD to use a CD) KNOPPIX is able to boot from drives that are IDE/ATAPI, Firewire, USB, or SCSI (provided that your computer can boot from those devices). Otherwise, you can create a boot floppy to start the process of booting KNOPPIX (described later). If you have a DVD drive, you can boot KNOPPIX directly from the DVD that comes with this book.
- ♦ Graphics card Must be SVGA-compatible.
- Mouse Supports any standard serial mouse, PS/2 mouse, or IMPS/ 2-compatible USB mouse.

### **Booting KNOPPIX**

If you have a PC in front of you that meets the requirements, you can get started by following these steps:

- 1. Insert your KNOPPIX DVD or CD into the appropriate drive.
- 2. Reboot the computer. After a few moments, you will see the boot screen.

Note

Although the boot screens look different for the Linux Bible DVD and a regular KNOPPIX CD, you can proceed with the boot process the same way.

**3.** Press Enter. If all goes well, you should see the KNOPPIX desktop, and you can proceed to the "Using KNOPPIX" section. If KNOPPIX doesn't boot up properly or if you want to tune it further before it boots, continue on to the next section.

### **Correcting Boot Problems**

By understanding a bit about the boot process you will, in most cases, be able to overcome any problems you might have installing KNOPPIX. Here are some things you should know:

- ◆ Check boot order Your computer's BIOS has a particular order in which it looks for bootable operating systems. A typical order would be floppy, CD or DVD, and hard disk. If your computer skips over the KNOPPIX boot disk and boots right from hard disk, make sure that the boot order in the BIOS is set to boot from CD or DVD. To change the BIOS, restart the computer and as it first boots the hardware enter Setup (quickly) as instructed (usually by pressing F1, F2, or DEL). Look for a selection to change the boot order so that your CD or DVD boots before the hard disk.
- ◆ Make boot floppies If your computer still can't boot from CD or DVD, you can create two floppy boot disks to start the boot process. To create the floppy boot disks from a running KNOPPIX system, run the mkbootfloppy command that is on the KNOPPIX disk (it automatically finds the floppy images and tells you when to put in the floppy disks). To create KNOPPIX floppy disks on other operating systems, refer to the KNOPPIX Boot Floppy How To (www.knoppix.net/docs/index.php/BootFloppyHowTo).
- ◆ Add boot options—Instead of just letting the boot process autodetect and configure everything about your hardware, you can add options to the boot prompt that will override what KNOPPIX autoconfiguration might do. Press F2 from the boot prompt to see additional boot options.

Some boot options are available with which you can try to overcome different issues at boot time. KNOPPIX refers to these options as *cheat codes*. For a more complete list, refer to the file knoppix-cheatcodes.txt, which you'll find in the KNOPPIX directory when you mount the CD or the DVD that comes with this book on any operating system.

#### Note

Many boot options can be used with different Linux systems. So if you are having trouble installing or booting a different Linux distribution, you can try any of these options to see if they work. Instead of the word "knoppix," you will probably use a different word to launch the install or boot process for other distributions (such as "linux" for Red Hat Linux systems or "morphix" for Morphix Live-CD, depending on the distribution).

When KNOPPIX first begins the boot process, you see the boot screen, with the boot : prompt at the bottom. The following tables provide boot prompt options that can help you get KNOPPIX running the way you like. Table 11-1 shows options to use when you want specific features turned on that may not be turned on by default when you boot.

Table 11-1 Boot Options to Select Features		
Option	Feature	
knoppix lang=??	Choose a specific language/keyboard. Replace ?? with one of the following: cn, de, da, es, fr, it, nl, pl, ru, sk, tr, tw, or us.	
knoppix desktop=??	Instead of using the KDE desktop (kde), replace ?? with one of the following window managers: fluxbox, icewm, larswm, twm, wmaker, or xfce.	
knoppix blind	Start BrailleTerminal (running without X).	
knoppix brltty=type,port,table	Add parameters to use for the Braille device.	
knoppix wheelmouse	For a wheel mouse, enable IMPS/2 protocol.	
knoppix nowheelmouse	For a regular PS/2 mouse, force PS/2 protocol.	
knoppix keyboard=us xkeyboard=us	Assign different keyboard drivers to use with text (shell) and graphical (X).	
knoppix dma	Turn on DMA acceleration for all IDE drives.	
knoppix alsa knoppix alsa=es1938	Select either of these two notations to select to use the ALSA driver (do at your own risk).	

If there is hardware being improperly detected or configured, you can have KNOP-PIX skip over that hardware. Table 11-2 contains options for skipping or turning off various hardware features:

Table 11-2 Boot Options to Turn Off Hardware		
Option	Result	
knoppix atapicd	No SCSI-Emulation for IDE CD-ROMs.	
knoppix noagp	No detection of AGP graphics card.	
knoppix noapic	Disable Advanced Programmable Interrupt Controller (can overcome some problems on SMP computers).	
knoppix acpi=off	Disable Advanced Configuration and Power Interface (ACPI).	
knoppix noapm	No Advanced Power Management support. (With a working acpi, apm will be off by default. Only one can be active at a time.)	
knoppix noaudio	No sound support.	
knoppix nodhcp	Don't try to start your network connection automatically via DHCP.	
knoppix fstab	Don't read the fstab file to find file systems to mount or check.	
knoppix firewire	No detection of Firewire devices.	
knoppix nopcmcia	No detection of PCMCIA card slots.	
knoppix noscsi	No detection of SCSI devices.	
knoppix noswap	No detection of swap partitions.	
knoppix nousb	No detection of USB devices.	
knoppix pnpbios=off	Don't initialize plug-and-play (PnP) in the BIOS.	
knoppix failsafe	Do almost no hardware detection.	

Table 11-3 lists options that may help if you are having trouble with your video card. Several of these options are particularly useful if you are having trouble with X on a laptop.

Table 11-3 Boot Options to Fix Video Problems		
Option	Result	
knoppix noddc	No Display Data Channel (DDC) detection of monitor.	
knoppix screen=??	Pick X screen resolution. Replace ?? with 640×480, 800×600, 1024×768, 1280×1024, or any other resolution supported by your video card.	
knoppix xvrefresh=60	Set vertical refresh rate to 60 Hz for X (or other value as specified by monitor's manual).	
knoppix xhrefresh=80	Set horizontal refresh rate to 80 Hz for X (or other value as specified by monitor's manual).	
knoppix xserver=??	Replace ?? with X-Server: XFree86 or XF86_SVGA.	
<pre>knoppix xmodule=??</pre>	Select the specific driver to use for your video card. Replace ?? with one of the following: ati, fbdev, i810, mga, nv, radeon, savage, s3radeon, svga, or i810.	
knoppix 2	Runlevel 2, Textmode only.	
knoppix vga=normal	No-framebuffer mode, but X.	
knoppix fb1280x1024	Use fixed framebuffer graphics (1).	
knoppix fb1024x768	Use fixed framebuffer graphics (2).	
knoppix fb800x600	Use fixed framebuffer graphics (3).	

#### **Customize KNOPPIX**

Several boot options exist that tell KNOPPIX to look for a customized home directory or configuration information on hard disk or floppy. See the "Customize KNOPPIX" section later in this chapter for information on how to both customize KNOPPIX and tell KNOPPIX where to look for customized information at boot time. (Unless they were created from KNOPPIX, most other Linux distributions will not use these boot options.)

#### **Special Features and Workarounds**

Other boot options are described in the knoppix-cheatcodes.txt file mentioned earlier. Things you can do with boot options include changing the splash screen when KNOPPIX boots, running in expert mode so you can load your own drivers, selecting to run either a 2.4 or 2.6 kernel, testing your computer's RAM, and trying to overcome special problems with laptop computers.

#### **Testing the CD**

If you suspect that you have a bad KNOPPIX CD, I recommend you run this from the boot prompt:

knoppix testcd

If you are still not able to boot KNOPPIX at this point, it might be that your hardware is either not supported or is broken in some way. To further pursue the problem, I recommend that you check out an appropriate forum at www.knoppix.net.

#### **Running KNOPPIX from RAM**

To improve performance, KNOPPIX offers a way to run the entire KNOPPIX distribution from RAM (provided you have enough available) or install it on hard disk and run it from there. Provided that you have more than 1GB of RAM, you can run KNOPPIX entirely from RAM (so you can remove the KNOPPIX DVD or CD and use that drive while you run KNOPPIX) by typing the following from the boot prompt:

knoppix toram

#### Installing KNOPPIX to Hard Disk

You can run KNOPPIX entirely from hard disk if your hard disk is either a FAT or EXT2 file system type and contains at least 800MB of space. To do this, you must know the name of the hard disk partition you are installing on. For example, to use the first partition on the first IDE drive you would use /dev/hda1. In that case, to copy KNOPPIX to that disk partition you would type this at the boot prompt:

knoppix tohd=/dev/hda1

You can watch as KNOPPIX is copied to your hard disk partition, and then boots automatically from there. The next time you want to boot KNOPPIX, you can boot it from hard disk again by inserting the KNOPPIX medium and typing the following:

```
knoppix fromhd=/dev/hda1
```

With KNOPPIX running from your hard disk, you can safely eject your CD or DVD and use it for other things (type eject /dev/cdrom). Refer to the knoppix-cheatcodes.txt file for information on other things you can do from the KNOPPIX boot prompt.

# **Using KNOPPIX**

Rather than go over how to use the features in KNOPPIX that are common to many Linux systems (KDE, Internet tools, word processors, and so on), I'll give you a quick tour of the special features in KNOPPIX. If your computer booted KNOPPIX properly, you should see a screen that is similar to the one shown in Figure 11-1.



Figure 11-1: KNOPPIX boots to a full KDE desktop that is ready to run.

I've opened a couple of applications to illustrate some things, and the following sections explore what you typically get when KNOPPIX comes.

### Using the KDE Desktop in KNOPPIX

KDE is the default desktop environment that comes with KNOPPIX. You can change that at the boot prompt to use one of several window managers instead, or get a Gnoppix disk instead to use the GNOME environments. But, as delivered, the desktop looks similar to what you see in Figure 11-1.

The KNOPPIX version of KDE matches pretty closely the descriptions in Chapter 3, although there are a few items related to the KNOPPIX KDE desktop that are worth noting:

- ◆ Desktop icons To get information about KNOPPIX, click the KNOPPIX icon (choose a language, and then find links to FAQs, Knopper.Net, and general KNOPPIX information) or the LinuxTag icon (to read the licenses). There is also the requisite Trash icon.
- ◆ Disk icons Any CD, DVD, floppy, or other removable medium drive is displayed as an icon on the desktop. Of course, this includes the drive holding the KNOPPIX disk, which you can get to directly to do such things as find boot images or KNOPPIX documentation.

Hard disk partitions are also represented by icons on your KNOPPIX desktop. Click one of those icons and you can access (read-only) the files on that hard disk partition. This is a great feature for getting the information you need without, by default, letting you change or otherwise damage the data on the computer. To make a disk writable, right-click on the disk icon and select Actions r Change read/write mode. If you are not able to write to the disk, refer to the section on making disks writable later in this chapter.

- ★ KDE Panel KNOPPIX loads the KDE Panel with applets and launchers for a few useful applications. Click the K button to display the menu containing most KDE applications for you to select. The Web Browser icon launches the Konqueror browser, which is the KDE file manager as well.
- ★ KNOPPIX configuration Click the squished penguin icon in the KDE Panel to see a menu of configuration tools specific to KNOPPIX. This is where you can tune up your TV card, configure printers, get your network connection going, and even start a few servers. I describe some of these subjects — in particular, how to save data and configuration information across sessions with this otherwise ethereal operating system — later in this chapter.
- ◆ Launching games, players, and other stuff From the KDE menu, you can launch applications as you would from any desktop operating system. Just to illustrate that, I launched a simple game (Penguin Mastermind) and a music player (XMMS) for Figure 11-1.

Running KNOPPIX, at this point, is just like running any other Linux system with a KDE desktop, with one major exception. By default, you can't save any data permanently. There are a few ways around this issue, especially if you expect to use KNOPPIX on a regular basis. Refer to sections on creating persistent desktops and opening disks for writing later in this chapter.

### **Getting on the Network**

If you have an Ethernet card and a connection to a network that has a DHCP server, your KNOPPIX system should just start up and offer immediate access to that network (and possibly the Internet if it offers such a connection). If not, KNOPPIX offers several tools for configuring your network connection, including:

- ◆ Dial-up modem From the squished penguin, select Network/Internet /dev/modem connection setup. The menus that appear help you create a dialup connection to the Internet, or other TCP/IP network, using a serial modem, USB modem, IRDA cellphone/PDA, or Bluetooth cellphone/PDA.
- ◆ ADSL router From the squished penguin, select Network/Internet->ADSL /PPPOE configuration. It will help you connect your broadband ADSL router to connect to the Internet.
- ◆ GPRS connection From the squished penguin, select Network/Internet=> GPRS connection to set up a connection via your cellphone provider.

- ◆ Network card From the squished penguin, select Network/Internet ⇒ Network card to configure your Ethernet card (assuming you don't just want to use DHCP to get your network address).
- ◆ ISDN—From the squished penguin, select Network/Internet⇔ISDN to use ISDN to connect to the network.
- ♦ Wireless Card From the squished penguin, select Network/Internet → Wavelan to use a wireless Ethernet card to connect to the network.

In addition to the interfaces available here, you can use the wvdialconf command to create your dial-out connection as described in Chapter 5.

### Installing Software in KNOPPIX

Despite the fact that KNOPPIX includes a wide range of software applications, there may be some special software package you want to use with it that isn't included. KNOPPIX has a feature for installing software while you are running from the CD that is called the KNOPPIX-Live Installer.

To use the KNOPPIX-Live Installer, click the squished penguin on the KNOPPIX panel and select Utilities r Install software. After being warned that this is still experimental software, a list of software that you can install with KNOPPIX-Live Installer appears. The list includes software that can't be freely distributed, such as Flash plug-ins for your browser or NVIDIA drivers for your video cards.

Select the software package you want to install. KNOPPIX will try to use the Debian installer to download the selected packages and install them on your computer. Remember that the software is being installed in the version of KNOPPIX that is running in RAM. So, the software will disappear the next time you reboot, unless you do something to preserve your data (such as creating a persistent desktop before you install the software you want to keep).

### **Saving Files in KNOPPIX**

When you reboot your computer with KNOPPIX, you not only lose KNOPPIX itself, but you lose any data and configuration information you may have created along the way. That's because, by default, KNOPPIX runs from your system's RAM and a nonwritable CD or DVD. Using tools and procedures that come with KNOPPIX, there are ways in which you can keep that information going forward.

KNOPPIX happily gives you a login name (knoppix) and a home directory (/home/ knoppix), each time you boot from KNOPPIX. You can save files to that directory, as well as change your desktop and system configuration information (which is stored in that directory and in /etc files). The problem is that those directories are in RAM, so they disappear when you reboot. The following sections give you some ideas about how to save what you do in your KNOPPIX session to use in future sessions.

#### Writing to Hard Disk

Although hard disk partitions are mounted read-only by default, you can make them read/write if you like. Then you can store any data you want to save on those partitions. (You can simply drag and drop files to those partitions.)

If your hard disk partitions are Linux partitions, it's pretty easy to do this. With older Windows systems that use VFAT partitions, it's not too hard either. With NTFS partitions, things get a bit trickier:

#### Caution

Up to this point, there's not much risk of damaging any data on your hard disk. Once you make your disks writable, you have the potential for deleting or changing that data. Keep that in mind if the computer doesn't belong to you of if you are not used to using Linux. Regardless of which user you are logged in as, KNOPPIX does not prevent you from changing any file in a writable hard disk partition.

#### **Mounting Linux Partitions for Writing**

KNOPPIX usually identifies all hard disk partitions and adds entries for each one in your /etc/fstab file. If you click the icon representing that partition, the partition is automatically mounted and a folder opens to the root of that directory.

The name of each partition (hda1, hda2, and so forth for IDE partitions; sda1, sda2, and so on for SCSI disk partitions) is shown on the desktop icon. With that information, here is how you can make any of those partitions writable:

- **1.** Click the hard disk partition you want to write to on the KNOPPIX desktop. A folder opens, displaying the top directory in that partition.
- **2.** When you know which partition you want to write to, close all folders or shells that have that partition open. (With the partition open, you can't remount it.)
- 3. Open a Terminal from the panel and become root user by typing

```
$ cd
$ su -
∦
```

**4.** Make sure that the partition you want to mount as writable is unmounted. For example, to unmount the second IDE hard disk partition (hda2), type

```
# umount /dev/hda2
```

If the command completes quietly or if it says "not mounted," you are fine. If it says "device is busy," there is still a shell or folder window that is holding that partition open. Before you can continue, you must close whatever is holding the partition open and make sure the umount completes.

- 5. Next, you need to mount the partition so it is writable. Here's how:
  - # mount -orw /dev/hda2

At this point you can open the folder to the partition (hda2 in our example) or open a shell and write to that directory (/mnt/hda2 and any subdirectories). To make that change permanent (in the KNOPPIX sense), you need to change the /etc/fstab to add rw to the entry for the partition so it is mounted read/write by default. Again, with the example of /dev/hda2, an entry in /etc/fstab to mount that partition read/write could look as follows:

```
/dev/hda2 /mnt/hda2 ext3 noauto,users,exec,rw 0 0
```

With that change, simply typing **mount /dev/hda2** mounts the directory with read/write permissions. You can save that change permanently, as described in the "Keeping Your KNOPPIX Configuration" section later in this chapter.

#### **Mounting Windows Partitions for Writing**

Getting your Windows partitions mounted for writing is a bit tougher. Although using FAT and VFAT file systems works pretty much the same as described for Linux partitions (provided they are properly detected and configured in /etc/fstab), the drivers for using NTFS file systems (the current default for Windows) are unreliable for writing.

If you have legal Windows drivers on your hard disk (which you should if you are booting KNOPPIX from an otherwise-Windows machine), KNOPPIX provides a reliable way to set up your NTFS partitions to be read/write accessible from KNOPPIX. Here's how:

#### Caution

You must make sure that you have the legal right to use Microsoft NTFS-related drivers to use this procedure.

- 1. Click the squished penguin logo in the panel, and then select Utilities ⇔ Captive NTFS. The Captive Microsoft Windows Drivers Acquire window appears.
- **2.** Click Forward. The Local Disks Drivers Scan window appears, ready to look for the drivers KNOPPIX needs to access the NTFS partitions for writing.
- **3.** Click Forward to look for the drivers. If the drivers are found, you can continue. If not, it asks for a location on the network where it can get the drivers. If that is not available, it offers the opportunity to get the Microsoft Windows XP Service Pack, if you are legally allowed to get that.
- **4.** Once the necessary drivers are installed, you can mount the NTFS partition using the mount command with the captive-ntfs file system type. For example, if your NTFS partition is on hda1, you could type the following (as root user):

```
# umount /dev/hda1
```

```
# mkdir /mnt/captive-LABEL_C
```

# mount -t captive-ntfs /dev/hda1 /mnt/captive-Label\_C

Now you should be able to access the NTFS partition from the <code>/mnt/captive-LABEL\_C</code> directory.

#### **Creating a Persistent Home Directory**

If you are going to use the computer more than once with KNOPPIX (or if you just want more storage space for files than your computer has available in RAM) you can assign your KNOPPIX home directory (/home/knoppix) to use some of the available space on your hard drive. That can be done by either:

- ◆ Assigning an entire partition to be used for your home directory.
- Assigning a part of that partition for your home directory, in the form of an image file.

You can also put your persistent home directory on rewritable, removable media, such as a memory stick. Once you create that area to use as your home directory, you can tell KNOPPIX to use it every time you restart KNOPPIX. Here's what you do:

- 1. Click the squished penguin in the panel, and then select Configure +> Create a Persistent KNOPPIX Home Directory. A window appears, asking if you are ready to create a persistent home directory.
- **2.** Click Yes to continue. You are asked which partition you want to use for your persistent home directory.
- **3.** Select the partition you want from the list and click OK. You are asked if you want to use the entire partition and format it as a Linux file system or just create an image.
- **4.** Don't click Yes unless you are prepared to erase an entire partition! Click No (the safer route) to just add an image file on a directory where you have space. If you are creating the image file, you are asked how big to make it.
- **5.** Type the number of megabytes to assign to your home directory. Be sure that that much space is available on the partition. (When the partition is mounted later, you can type df -h to see how much space is available on it.) You are asked if you want to save the home directory in an encrypted format.
- **6.** Select No, to not have the directory selected as encrypted (if you choose Yes, you'll have to specify a long password that you will need to access the persistent home directory at boot time). The partition or image file should be created now.

When I ran this procedure to create a 100MB image on the hda5 partition, it created the file /mnt/hda5/knoppix.img, which had 97MB of available space. To see how to use that directory, see the "Restarting KNOPPIX" section later in this chapter.

### **Keeping Your KNOPPIX Configuration**

After you have gone through all the work to configure your desktop, printer, network, disks, and other preferences for your KNOPPIX setup, it's a shame to lose all that on your next reboot. Well, KNOPPIX offers a way that you can save your configuration information and reuse if for your next session. That saved information can be stored on a floppy disk or any other medium that is accessible (such as your hard disk) the next time you reboot KNOPPIX. Here's how:

- 1. From the squished penguin icon on the panel, click Configure ⇔ Save KNOPPIX configuration.
- 2. Choose the configuration files to save. You can choose to save your personal configuration (from /home/knoppix .kde and .mozilla directories), files on the desktop, your network configuration, X configuration, and other system configuration files (from /etc).
- **3.** Choose to save your configuration files to your floppy disk or to any available disk partition that is writable. Choosing floppy can make the configuration portable, whereas using the hard disk makes the configuration easily reusable on the same machine.
- **4.** If you are saving to floppy, insert the floppy and click OK. The data will be saved to floppy disk.

The results from this action are that the knoppix.sh and configs.tbz files are created on floppy disk. The configs.tbz file contains all the saved configuration files from your /home and /etc directories. The knoppix.sh file is a script that tells KNOPPIX how to install those files when KNOPPIX boots up. The next time you start KNOPPIX, you can use the configuration files, as described in the next section.

Note

Those who create their own customized KNOPPIX boot disks can simply add their knoppix.sh and config.tbz files to the top-level directory of the CD, so KNOPPIX will just boot to their personalized configuration without worrying about an extra floppy or other medium.

### **Restarting KNOPPIX**

You can start KNOPPIX anytime by just inserting your KNOPPIX CD or DVD and restarting your computer. However, if you want to take advantage of the persistent desktop you set up or the saved configuration information, you need to add some options to the KNOPPIX boot prompt. Here's how:

- **1.** Insert your KNOPPIX CD or DVD into the computer and reboot. You should see the KNOPPIX boot prompt.
- **2.** Press F3 (before KNOPPIX boots) to see if there are any additional boot options that are required.
- **3.** If you have a configuration floppy boot disk (or other removable media created in an earlier procedure), insert that disk now.

**4.** At the boot prompt, type one of the following command lines, which are different ways to load your configuration files:

boot: knoppix floppyconfig boot: knoppix myconf=/dev/hda1 boot: knoppix myconf=/dev/sda1 boot: knoppix myconf=scan

These KNOPPIX boot commands, respectively, get configuration information from the floppy disk, look for that information on the first IDE drive partition (/dev/hda1), look for it on the first SCSI drive partition (/dev/sda1), or scan all available drives to find the information. To boot to a persistent desktop (assuming you set one up earlier), you could instead type:

```
boot: knoppix home=/dev/hda1/knoppix.img
boot: knoppix home=/dev/sda1/knoppix.img
boot: knoppix home=scan
```

The previous boot commands, respectively, assign the KNOPPIX home directory (/home/knoppix) to the /dev/hda1/knoppix.img file, to the /dev/sda1/knoppix.img file, or to the image file found by scanning all available directories for that file. You could also combine one from each of the two preceding command sets to both read your configuration files and assign a persistent desktop, as follows:

boot: knoppix floppyconfig home=/dev/hda1/knoppix.img

Now you are ready to continue your KNOPPIX session where you left off last time, with the same configuration and data files available.

# **Summary**

KNOPPIX offers what many feel is the best bootable Linux today. It gives you a fully configured Linux desktop system available virtually anywhere you can find a bootable PC.

Besides its desktop features, KNOPPIX contains software needed to use many server, programming, and troubleshooting features of Linux as well. Despite the fact that KNOPPIX runs as a bootable system in RAM, by default, there are ways to configure it to save data and configuration information across multiple boot sessions.

KNOPPIX is particularly valuable as a tool for accessing a damaged computer so that you can troubleshoot it. With a KNOPPIX disk booted on a computer that was installed to use Microsoft Windows or other operating system, you can use KNOPPIX to access and work with data on that computer's hard disk.

+ + +