



# THE BLACK ART OF XBOX<sup>®</sup> MODS

Jonathan Harbour

SAMS

**Jonathan S. Harbour**

**THE BLACK ART OF**  
**XBOX<sup>®</sup> MODS**

**SAMS**

800 East 96th Street, Indianapolis, Indiana 46240

## **The Black Art of Xbox Mods**

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# About the Author

**Jonathan S. Harbour** has been an avid gamer and programmer for 17 years, having started with early systems such as the Commodore PET, Apple II, and Tandy 1000. The first console he disassembled and tried to hack was the Atari 2600. He holds a degree in computer information systems and enjoys writing code in several languages. Jonathan has experience with several platforms, including Windows, Linux, Pocket PC, and Game Boy Advance. Jonathan has written nine books on the subjects of game programming, application development, console programming, cross-platform programming, and now console modding. He maintains a website dedicated to these subjects at <http://www.jharbour.com>.

# Dedication

*For My Father,  
Martin Scott Harbour*

# Acknowledgments

This book would not exist without all the incredible amount of diligence by individuals who freely gave their hard-earned knowledge to others. This book is not a unique work by any means, and although everything described herein was performed by me, I do not take credit for figuring out anything on my own. I am just a writer! Yes, I am a hard-core gamer and programmer, but I am by no means a hardware hacker. What I have done here is simply study, build, and explain how it was done. To all of you out there who tinkered, experimented, and figured it all out, then shared your knowledge with the world, this book is dedicated to you.

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To my readers, thank you for buying this book. I am certain that you will enjoy it! Finally, to the open source community—lighten up a little! You are winning, after all.



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**T**he Xbox might be described as a powerful, proprietary *PC* that has been customized exclusively for running games. This book will help you to maximize the potential of your Xbox video game console by showing you how to modify your Xbox in various ways. You will learn how to disassemble your Xbox, right down to the motherboard, and you will learn about each component inside the Xbox case.

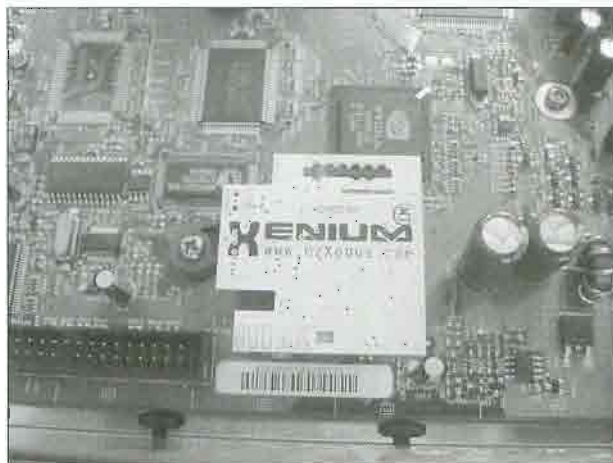
## Introduction



Several chapters are devoted to the most important part of Xbox modding: choosing a mod chip and then learning how to install it in your Xbox. The mod chip allows you to run third-party software on your Xbox that is normally limited exclusively to licensed retail games. By being able to run custom software on your Xbox, you will be able to transform it into a powerful media center capable of playing music files (such as MP3) and video files (such as MPEG2, Divx, WMV, and Xvid). All of the Xbox mod chips currently available work on the same principles, so you will find the coverage of the material applicable to whatever mod chip you use (or plan to install while reading this book). Although this book addresses several of the major mod chips currently available, it focuses primarily on the Xenium mod chip.

I chose this mod chip because it comes with an excellent operating system with features that will assist with upgrading the hard drive and installing your favorite Dashboards and software. All of the mod chips currently on the market are similar, so even if you're using another mod chip (such as SmartXX, Xecuter, X-Bit, X-Chip, or Chameleon), you will find the topics relevant and helpful because the focus is mainly on the Xbox itself, not on any specific model of aftermarket hardware.

Several chapters are devoted to the installation and use of custom Dashboard software—which is somewhat like an operating system for your “modded” Xbox, allowing you to take advantage of software you have installed. For that matter, the new Dashboards provide a way for you to copy software to your Xbox from your PC using a local area network (LAN) connection. Most custom Dashboards come with an FTP server, so you will be able to log on to your Xbox as if it were a computer on the Internet and then transfer files to your Xbox hard drive. Some Dashboards also provide a SAMBA/SMB server that allows you to treat the Xbox hard drive like a shared network drive.



For you to get the most out of your Xbox, this book will also teach you how to upgrade your hard drive. You will be able to install a new hard drive in your Xbox—replacing the original hard drive—with up to 300GB of storage space, which is plenty of room for anything you want to do with your Xbox.

The hundreds of photos in this book will help to guide you through each subject area—from identifying your particular revision of the Xbox (did you know there are seven “unofficial” versions?) to installing a mod chip to upgrading your hard drive. Everything is fully explained, and each subject area includes dozens of photos that illustrate each step of the process of modding your Xbox.

No matter what you plan to do with your Xbox—from turning it into a monster gaming rig or a media center computer to acting as a hub for your big-screen TV and entertainment center—you will find the information you have been looking for in this concise, fully illustrated, thorough, and step-by-step guide to Xbox mods. This book is part hardware and part software, and there is equal treatment of both. You will learn how to fully customize your Xbox from a functional perspective, as well as from a cosmetic perspective. And you will learn how to modify the software to match the exotic changes you have rendered on the physical appearance and functionality of your new “super” Xbox.



So, if you are just browsing at a bookstore, flip through the pages and see for yourself how every subject is completely explored and explained, and every step of the process is completely laid out for you. I'm sure you will find this book an excellent addition to your library and an indispensable reference that you will keep an arm's length away at all times. This book is not just a guide; it is a reference, with all the major features and specifications of each revision of the Xbox, as well as all the major mod chips at your fingertips.

## What You Will Learn

There are 14 chapters in this book, organized by major subject. Here are the main subjects that you will find in this book:

**Part I: The Xbox Demystified.** The first part of the book provides introductory material that will get you heading in the right direction for modding your Xbox, with an overview chapter on the “Xbox scene,” another on disassembling your Xbox, and a chapter on how to identify your Xbox revision.

**Part II: Mod Chips.** The second part of the book explains how to choose the right mod chip for your needs and then how to install a typical mod chip, with illustrated explanations for the major Xbox revisions (an important consideration because mod chip installation is different for some Xbox versions).

**Part III: Software Mods.** The third part of the book gives you an overview of the aftermarket software that is available for your Xbox, including a tutorial on using the Xenium O/S, EvolutionX, Avalaunch, and Xbox Media Center.

**Part IV: Major Hardware Mods.** The fourth part of the book covers hardware mods, or modifications that you can do with your Xbox system components, including how to replace the case, upgrade the hard drive, and how to install lighting and cooling gear.

## Conventions Used in This Book

The following features are used in this book to highlight portions of text that are important. You will find note, tip, and caution boxes here and there throughout the book.

### NOTE

This is what a note looks like. Notes are additional information that is related to the current subject without interrupting the text.

### TIP

This is what a tip looks like. Tips give you helpful pointers related to the current subject being covered that may save you some time.

### CAUTION

This is what a caution looks like. Cautions provide you with guidance about what to do or not do in a given situation.



# PART I

## **The Xbox Demystified**

- CHAPTER 1** Welcome to the Xbox Scene
- CHAPTER 2** Disassembling Your Xbox
- CHAPTER 3** Identifying Your Xbox Revision



# Welcome to the Xbox Scene

In this chapter, you will learn why Xbox is such a popular video game console, and why it has so many uses beyond mere game play. You will learn some of the history leading up to Xbox's development and production, and then I will highlight some of the key modifications you will learn to do with your Xbox in this book.

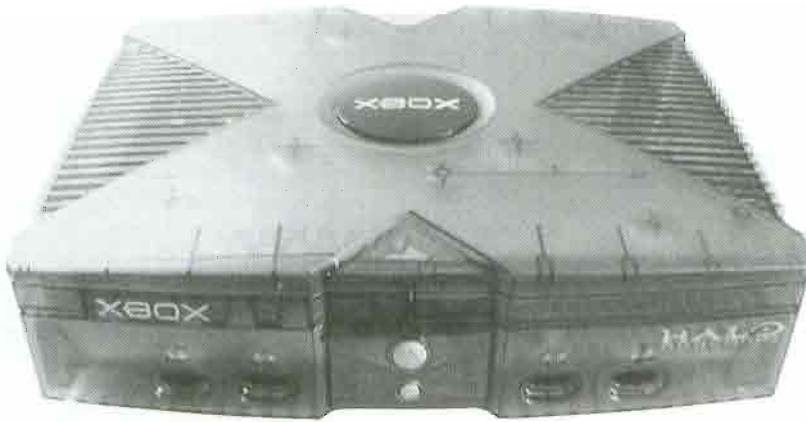
## “Getting” the Xbox

The Xbox is the most powerful video game console ever designed and remains the reigning champ of the specs three years after it was first introduced to the public (see Figure 1.1). I have been an Xbox fan since the day it was released, when I gripped the original thick controller for the first time, guiding Master Chief through the Covenant-infested levels of Halo at a display in a video game store. I was awestruck, mesmerized, and utterly sold on this consumer electronic device, hook, line, and sinker, like I have not been sold on any video game console for many years. If you must know, I believed the Nintendo SNES was the last great console and believed that Sony would rule the video game world. I was happily mistaken on that false prediction!

The following sections chart the development of the Xbox.

Here are the key points covered in this chapter:

- What it means to be a fan
- The history of Xbox's development
- Microsoft's dedication to developers
- What you can do with your Xbox



**FIGURE 1.1** Xbox is a highly customizable video game console with great potential.

## Breaking into an Industry

An oft-repeated theory of Microsoft's success goes something like this: Microsoft *expects* to lose money on the first two versions of a product until it is perfected by the third version, after which Microsoft then dominates that market. This theory does have some weight when you consider the history of Microsoft's main successes. The lesson learned by anyone observing Microsoft is that persistence pays off in the end. Giving up too soon is often a mistake! Here are some examples:

- The Windows O/S was not successful until version 3.0 came out with vast improvements that resulted in widespread acceptance in the PC industry. Windows 3.0 launched Microsoft into the stratosphere of market dominance and profitability.
- Windows CE for portable devices finally achieved a level of market dominance when Windows CE 3.0 came out with the shorthand "Pocket PC" moniker.
- Microsoft Office competed in a formerly thick business productivity software market for many years. Then, Office 95 was released shortly after the launch of Windows 95, taking PC users into the 32-bit realm and leaving many productivity software competitors back in the 16-bit realm. Office 97 and later versions dominated the market.

These are but a few examples, but they represent Microsoft's primary sources of income. Microsoft has been known on occasion to acquire a product that is already mature instead of relying on revision to perfect it. Such was the case with Internet Explorer—based on the infamous NCSA Mosaic web browser.

Entering the "Internet market" late in the game, Microsoft found itself playing catch-up very quickly to adapt to the new wired, online world. NCSA Mosaic allowed Microsoft to skip the usual expensive and time-consuming revision process and produce a web browser to compete with Netscape Navigator.

## Video Game Competition: The Other Side of the Coin

Microsoft faced a similar situation with the video game industry. Microsoft actually entered the game industry back in 1983, surprisingly enough, with a product called MSX. MSX was the result of a collaborative effort between ASCII and Microsoft. The goal of the MSX was to produce a standard computer system that would run the same software regardless of the manufacturer (a familiar theme with Microsoft, wouldn't you agree?). MSX was manufactured by Matsushita and Sony, with O/S and software provided by Microsoft. Because the goal was supposed to be an open-architecture computer system, there were eventually many manufacturers. In addition to the two mentioned, they included Yamaha, Toshiba, Philips, Panasonic, and Daewoo. MSX was a hybrid machine, combining the best of the PC world and the console world at the time with expansion slots, a game cartridge slot, and Microsoft BASIC. But Microsoft's experience with the MSX was too early an example to have any bearing on the modern game market.

In the late 1990s, Microsoft was very eager to tap into the lucrative game industry that was rebounding from a lag period and entering an upswing of innovation. Recall that PlayStation (see Figure 1.2) and Nintendo 64 (see Figure 1.3) were the only serious players at the time. Microsoft tried to market WebTV as a game console, which obviously failed. The market has shown time and again that gamers are not interested in a multifunction device with cable TV, web browsing, email, and games all in one. Isn't that what a PC is for? Apparently, some companies believed that a huge market existed for these devices, but they were just



**FIGURE 1.2** Sony's PlayStation consoles have led the video game market in sales for several years.



**FIGURE 1.3** Nintendo 64 was technically superior to PlayStation but suffered from an antiquated cartridge-based design.

not successful in hindsight. The attempt to use WebTV to compete with Sony and Nintendo failed. Grandma and Grandpa may buy a WebTV device to keep in touch with their grandchildren, but they are not interested in playing games.

## Learning Some Hard Lessons

What was Microsoft's solution after learning some hard lessons from the failure of WebTV? The answer was so obvious that Microsoft seemed to have disregarded the obvious solution. Here are some key points that the Xbox designers had to eventually realize:

- Most PC users are playing games on Windows PCs.
- Console developers of Nintendo 64 and PlayStation games are using Windows PCs.
- DirectX is the standard game library for Windows PCs.

In a nutshell, Microsoft turned to its greatest strength—the Windows O/S and DirectX library—to build a custom video game console. Not just a consumer electronic device; not just a competing device to take on Sony/Nintendo; not just another *console*; Microsoft decided to build a *PC* that developers would *love*. What have developers been putting up with for the past 10–15 years? In a word, inconsistency. The game developer's biggest obstacle is creating a game that will run on as many PCs as possible. But the PC industry is so *crazy* that there are consumers using a wide variety of processors, video cards, and sound cards. Here are some of the processors that were still being used in the late 1990s:

- Intel i486
- Intel Pentium, Pentium II
- AMD K6-2, K6-III
- AMD Athlon

And what about the plethora of video cards and sound cards, each with a different chipset, requiring custom drivers? These problems were greatly reduced when DirectX debuted, but remember that it was not until 1997 that DirectX really became useful when 3.0 came out

(yet *another* example of the “3.0” theory?). There were still MS-DOS games being released in 1997: *Jedi Knight* and *Dungeon Keeper* are two notable examples. But by 1999, DirectX was used by nearly every major game development studio to produce Windows games.

### NOTE

Microsoft has subsidized the costs of Xbox hardware and software development and production for the past three years, taking great losses of annual income (measured in hundreds of millions of dollars) in an effort to solidify its position in the entertainment industry.

And these developers *hated* developing games for PlayStation and Nintendo 64! Many of the same studios producing Windows games were also producing console games, and games were being ported from PC to console and vice versa. A general trend in cross-platform development was brewing in the industry as companies realized that most of the development work in game logic and resources (artwork, 3D models, music, sound, and so on) could be reused when the game is ported to other platforms.

## Xbox Rumors Realized

Rumors began circulating in late 1999 about Microsoft's new console that would be based on an Intel or AMD CPU and Nvidia GeForce 256 GPU, and would be powered by Windows CE. Why use Windows CE, the PDA O/S used in handhelds like the Casio Cassiopeia and HP Jornada? Microsoft believed that it was a suitable O/S for a game console, and used Sega as a testbed.

### NOTE

As you will learn in more detail in the next chapter, Xbox was eventually equipped with an Intel Celeron 733MHz CPU, Nvidia GeForce 3 GPU, and 64MB of memory.

## Xbox Roots

Sega released the Dreamcast (see Figure 1.4) in 1999 to great acclaim as a direct rival to PlayStation and Nintendo 64, and caused an interesting trend in technological leapfrogging. While the Dreamcast secured the demise of the antiquated, cartridge-based Nintendo 64 (which utterly failed to attract developers, a hard lesson for Nintendo, which was used to having developers *beg* for licensing in earlier years), the Dreamcast faced a formidable game lineup for the PlayStation and a solid customer base loyal to Sony. Sega enjoyed being the *quirky* company in this business, having succeeded greatly with the Master System and Genesis, and to a certain degree, competing with Nintendo's Game Boy with the Sega Game Gear.

But Sega suffered from "too little, too soon" syndrome. The Sega Saturn was an underpowered, overpriced console released in 1994 that was overwhelmed by the Sony PlayStation a year later. Sega came back with the Dreamcast in 1999, far too late in the game to make a



**FIGURE 1.4** Sega Dreamcast was a very capable video game console that was powered by Windows CE and DirectX.



serious dent before the PlayStation 2 debuted. The Dreamcast should have come out a year or two earlier to allow time for a strong game base to build up. Instead, PS2 was released just *one year* into Dreamcast's lifetime. Although Dreamcast was a good console with capable hardware specs, it simply could not compete with the superior PS2.

## Timing Is Everything

Microsoft watched this drama unfold for several years before choosing *just the right time* to make an entrance. Those who kept a close eye on the industry might have encouraged Sega to push for a Dreamcast release *at all costs* in 1998, a year sooner. Instead, Sega packed in the features and intended to market Dreamcast as both game machine and WebTV. That Sega worked with Microsoft on Dreamcast is no surprise, given this direction. Microsoft wanted a more powerful piece of hardware to power WebTV, so an agreement was made to include Windows CE in the Dreamcast, along with a limited version of DirectX and even a scaled-down version of Internet Explorer!

Sega would offer developers the option of writing DirectX code, or custom Dreamcast SDK code, depending on need. The Windows aspect of Dreamcast would allow third parties to conceivably produce

### NOTE

The number of exploits discovered for Dreamcast are legendary. Dreamcast might be considered the little brother of the Xbox as far as exploitation and hacking are concerned.

applications for Dreamcast that would be web enabled (Dreamcast featured a 56k modem, and an optional broadband adapter was available in limited quantities), because Sega offered a keyboard and mouse for Dreamcast, making it into a veritable PC! The aspirations of both Sega and Microsoft were great because the capabilities of Dreamcast were great. Unfortunately, the keyboard and mouse were not widely accepted. In an interesting twist, *Unreal Tournament* and *Quake III* would actually foster more keyboard/mouse sales than the intended web browsing and email usage would. PC gamers found it natural (and welcome!) to play first-person shooter games using the keyboard and mouse, whereas most twitch gamers found that to be a peculiar oddity.

## The Game Developer's Dream Machine

What did Microsoft learn from the experience of working with Sega on the Dreamcast? For one thing, that no one wants to browse the Web on his/her TV! Despite the apparent appeal of this feature, most consumers just don't enjoy the eyestrain of trying to read web content on a screen with 320×240 resolution (via a composite TV cable). Another thing that Microsoft learned is that a game console should not be marketed as a cheap PC, like a WebTV. It should do one thing only, and do that one thing well: run games.



Thus, Xbox was designed with the best features of both PCs and consoles. Xbox would take advantage of the latest in off-the-shelf PC hardware, would run a scaled-down version of Windows 2000, and would be based *entirely* on DirectX development. This is the best of both worlds indeed! A standard PC architecture with guaranteed, consistent specifications that developers can rely on, with all hardware device drivers *hard-coded* into the O/S, a DVD-ROM drive, and a hard drive. Xbox would be capable of pushing out composite, S-Video, and High Definition TV signals, as well as Dolby Digital (DTS) for AC5 surround sound with support for digital coax and optical audio cables. In other words, Xbox would be the first console to deliver PC-esque resolutions. The obvious appeal is being able to play PC-quality games on large, widescreen HDTVs with *very high quality* instead of the usual washed-out image on composite big-screen TVs.

## Bridging the PC/Console Gap

Xbox would bridge the gap between the PC and console worlds, and would make it *very easy* to port existing or in-development PC games to a console, with strong marketing and sales implications. Xbox was an easy sell to the American game development industry, although it was a challenge in the saturated Japanese and European markets. The Xbox team would cater to developers, asking their input, making their every wish come true. Xbox would be a dream machine for development. How far would Microsoft go with its dedication to developers? Microsoft would host *all* online multiplayer game servers on the Xbox Live network. If a licensed company wanted to take its game online or provide online content to expand its game, then Live would host it *at no cost to developers*. This central support system differs greatly from Sony and Nintendo's policies that require developers to host their own game servers. How would Xbox handle new content and achieve an updateable core O/S? By including a hard drive *built in* to the console!

Despite these compelling features and PC-like capabilities, along with a high level of stability and performance not usually associated with Windows PCs, Xbox would not feature any consumer electronic add-on devices. Xbox would not be an advanced WebTV, would not include a web browser, and most surprisingly, would *not* have a keyboard or mouse available, *ever*. Microsoft promised developers that Xbox is a *game machine*, wholly and entirely, and would *never* be marketed any other way. And the promise was kept! To this day, no keyboard or mouse has been offered for Xbox. The Xbox Controller S (see Figure 1.5) is the primary input device (having usurped the original, larger Xbox controller).



**FIGURE 1.5** The Xbox Controller S features two analog joysticks, a D-pad, and 12 buttons.

## Promises, Promises...

Even more surprising is the fact that Microsoft promised the development community a longevity on the Xbox regardless of net sales. Microsoft promised to subsidize the Xbox whether it made a profit or not; game companies had an opportunity to make millions on retail game sales, and an extremely low (*unheard-of* in the console industry) licensing system would ensure solid returns for each developer. Microsoft was in this for the long haul. Few companies in the *world* can make such promises, and *no* other company in the world has a cash reserve estimated at around \$20 billion. While Sony and Nintendo are *forced* to draw a net profit, Microsoft can afford to blow large sums on Xbox marketing and manufacturing for a single goal. That goal is not to make money, initially, but rather, to secure Microsoft's position within this lucrative industry. Such long-term thinking is unusual, but part and parcel of Microsoft's phenomenal *long-term* success.

Thus, after the hard lessons learned with WebTV and Dreamcast, Microsoft built a console that developers would *love* and gamers would *love*. Realizing these two necessities, Microsoft forged ahead with the Xbox and, well, now you know the rest of the story.

## Did Xbox Work Too Well?

The very aspects of Xbox that have made it such a success are now under scrutiny by Microsoft as rumors point to a next-generation Xbox *without* a hard drive (see Figure 1.6), utilizing solid-state memory or flash memory technology. Although Xbox has never achieved the sales figures of the PS2, it is a very successful console because it is still widely accepted by developers three years since release, ensuring a healthy line of future games over the next couple of years. Microsoft's dedication to developers extends into a realm that



FIGURE 1.6 The Xbox hard drive.

console manufacturers are particularly sensitive toward: hacking and game piracy. These two issues must be contained within the prime product life of a console, or development support will *wane* or *abandon* a console entirely. It is unfortunate that hackers *hurt* the life cycle of the Dreamcast at such a critical time by pirating games so blatantly.

Pirating games is *bad enough* as a singular problem in the game industry, but once discovered, the exploitation of the Dreamcast continued unchecked. There are many arguments as to why the Dreamcast failed—primarily due to competi-

**NOTE**

It is funny to recall that id Software originally planned on porting *Doom 3* to Dreamcast, if that is any indication on just *how long* the game was in development....

tion with the PS2 first, and then the GameCube and Xbox the following year (after which point, all development shifted to these next-gen consoles). But part of the reason behind the Dreamcast development slowdown was due to the level of piracy occurring *before* the three new consoles debuted, and Sega's inability to stem the tide. Had Dreamcast been allowed to mature during the first two years of its product life cycle (only possible with a strong game library), it might have retained a small but profitable share of the market. I make this claim because some *extraordinary* trend-setting and technically innovative games were developed for Dreamcast. And let's not forget games like *Alien Front Online*, *Quake III*, *Unreal Tournament*, and, of course, the very popular *Phantasy Star Online*.

The features that Microsoft set out to include in Xbox to make it the best console ever designed are the very features that have made it such a *great* computing device for hackers, and this fact is affecting Microsoft's designs for the next Xbox (or is it called Xbox Next?).

## What Can You Do with Your Xbox?

You've been reading thus far about how the Xbox is such a great console and that hackers love to tinker with it because there's so much potential under the "hood" of Xbox. But what can you really do with your Xbox that you aren't already doing (namely, playing games)? It is true that a lot of hardware geeks love to tinker just for the learning experience, but what about the rest of us who really just want to have some fun playing games?

To be blunt, if you feel this way, then you are the target audience for Xbox and need not be concerned with what additional things you can do with your Xbox; instead, just have fun using it. But if you are craving more, want to see just what the Xbox can *really do*, then you've come to the right place!

I've been involved in the game industry as a developer and as a consumer for more than 15 years. In that time, I've seen a lot of trends, a lot of gaming platforms come and go. But one thing that remains consistent over the years is the amount of software piracy that is going on.

**WAREZ ARE FOR PATHETIC LOSERS**

If your desire with this book is to learn how to pirate games, you'll be disappointed because I am absolutely opposed to this illegal activity! People who traffic in warez do much to harm the game industry. If you find yourself making *excuses* to pirate games, at least you have a conscience; many don't even have that much concern, believing that the entire world owes them a favor. It's all about making excuses for bad behavior. The ironic thing about software pirates is that they really don't enjoy playing games at all. It's all about inventory, not about having fun! The warez groups on IRC, the Web, and in newsgroups are made up primarily of adolescents, still living at home off Mom and Dad's bill, with far too much free time on their hands. If software pirates cared more about playing games than their pathetic *geekfest* warez listings, they would find that they are *entirely* missing the point.

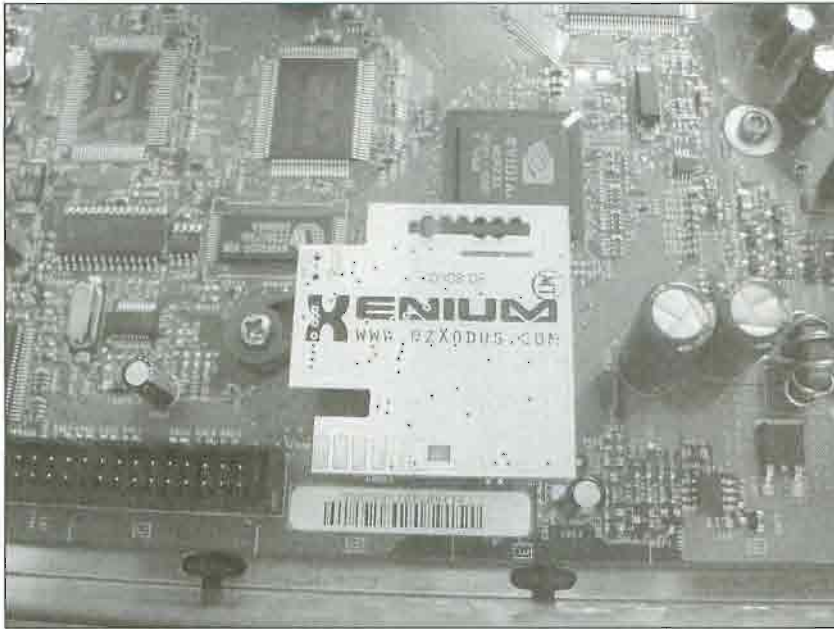
Pirated games ("warez") are almost always of *very poor quality* because games are torn apart, resampled, reduced in size, and reassembled before distribution among warez circles. I have a suggestion for you, if you have trafficked in warez: Buy used games. There is a very strong and vibrant used video game market now thriving in the retail channels, with many games not even *a month old* going for half the retail price or less. Why waste all of your time going through the whole process of tracking down warez and downloading them when you can buy a game for 10 to 15 bucks? What is 10 bucks, anyway? When I was younger, that was an average day at the arcade, back when console games retailed for 70 to 75 bucks.

Stop wasting your time (and bandwidth) on warez! It's dumb. It hurts the very thing that supposedly brings you *enjoyment*. It is stealing. It takes away from developers who are working their butts off for *you* to come up with innovative and creative new games. They won't keep doing that kind of work forever; many give up and go into IT, which *pays* better and offers *better* benefits. You will find that buying a new or used game once a week is far more rewarding and enjoyable, and you will *appreciate* the game more.

## So What's the Spiel?

Here is a list of significant things that you will learn to do with your Xbox in this book:

1. Install a mod chip. This is, first and foremost, the most significant step you will take toward modding your Xbox. All others are irrelevant (adding LEDs to the case, and so on). The mod chip is perfectly legal to purchase and install in your Xbox, and is analogous to buying and installing a turbo for your car. A mod chip unlocks the potential of the Xbox, boosting its capabilities. Figure 1.7 shows the Xenium mod chip installed in an Xbox motherboard. With a mod chip, you will be able to install a larger hard drive and load custom software. Figure 1.8 shows the Xenium OS, which allows you to run custom software on the Xbox. Because Xbox is so well equipped, it would make a perfect media center for your living room, able to play music and home movies just for starters.



**FIGURE 1.7** The Xenium mod chip has been installed on the Xbox motherboard.



**FIGURE 1.8** The Xenium O/S 2.0 (built into the mod chip's BIOS) is used to run custom Xbox software.

2. Install a new hard drive (see Figure 1.9). The Xbox hard drive varies from 8GB to 10GB, depending on the assembly line and date of manufacture. A few years ago that would have been unprecedented, but today, a few gigs are nothing. So it is very helpful to swap out the original Xbox hard drive for a larger one. This will allow you to store more

soundtracks, saved games, and custom software. My Xbox has 250 gigs, and I will show you how you can expand yours too.



**FIGURE 1.9** You can replace the stock Xbox hard drive with a new model with 30 times the capacity.

3. Install custom Xbox software. This is the whole purpose of the mod chip and new hard drive, to allow you to use the Xbox more like a small, powerful, portable PC. Using the mod chip's built-in O/S or using a custom dashboard, you can host web and FTP servers on your Xbox, connected to your LAN. How about a storage backup where you can send files from your PC for safekeeping? The Xbox is a great little server for hosting file backups or for running your entire website! Since the Xbox already has a LAN port, it's ready for action.

## Summary

This chapter presented a high-level overview of the Xbox and its place in the consumer electronic and video game industries. You learned how Xbox compares to other modern consoles, and a little about what you can and can't do with Xbox. After a little history to put the Xbox's life cycle into perspective, you learned about some of the key issues that make Xbox such a great piece of hardware for hackers and what Xbox mods you'll be able to perform in the coming chapters.



# Disassembling Your Xbox

**T**his chapter is an introduction to and overview of the Xbox hardware. You will learn how to completely disassemble your Xbox down to the last component so you will be familiar with the various parts inside your Xbox. You shouldn't feel nervous about opening your Xbox because it's very much like a simple PC, and I'm sure you've opened your PC's case before. The Xbox comes with a 90-day warranty, so be aware that opening your Xbox will void the warranty (negligible that it is). You will be opening your Xbox many, many times over the course of reading this book, so here is your chance to become acquainted with it.

By learning about the inner configuration of your Xbox, you will be better prepared before you purchase a mod chip. (Chapter 4, "Introduction to Xbox Modding," talks in detail about choosing the best mod chip for your needs.) This chapter will show you how to perform the very important task of identifying the version of your Xbox because it has been changed significantly since November 2001.

## Getting to Know the Xbox Hardware

The Xbox is simple in design, really, mimicking a PC in many ways. There is a motherboard (of course, all video

Here are the key points covered in this chapter:

- Getting to know the Xbox hardware
- Removing the cover
- Removing the hard drive
- Removing the DVD-ROM drive
- Removing the motherboard

game consoles have that!), a DVD-ROM drive, a hard drive, a familiar Intel processor, an equally familiar Nvidia graphics chip, and even a standard IDE cable. Let's look at these components before you actually start disassembling your Xbox so that you'll know what to expect.

Did you know there are currently seven versions of the Xbox out in the gaming public? That's right, I said seven! Microsoft did not stop working on Xbox design when the first version was released in late 2001. As is always the case in mass-produced consumer electronic devices, the manufacturing process is streamlined, improved, and made more efficient, so the products are cheaper to manufacture. Xbox is no exception, and there is evidence that the most recent versions of Xbox have been produced simply to thwart the use of mod chips! As you will learn in Chapter 4, some Xbox versions are more difficult to modify (with a mod chip). But I'll reserve that discussion for later.

At the retail level, four versions of Xbox were actually available at one time or another. Figure 2.1 shows the basic, stock Xbox packaging as it appeared in 2001, followed by Figure 2.2, showing the original console (which has basically not changed).



**FIGURE 2.1** Original packaging for the first version of Xbox at launch.

Then the Halo Special Edition Xbox came out in late 2003 and soon became a collectible among die-hard Xbox fans. Figure 2.3 shows this special edition Xbox.

The aftermarket for Xbox is truly amazing, considering that this is just a video game console. Gamers grow quite fond of their little boxes of joy, swapping cases, applying skin kits, adding lighting kits, and performing other tasks that are at the forefront of content coverage in this book.

In addition to these models, a special edition Mountain Dew case that was painted in Dew green was offered as a promotional item.



**FIGURE 2.2** The standard Xbox console at the time of launch has changed only internally, not externally.

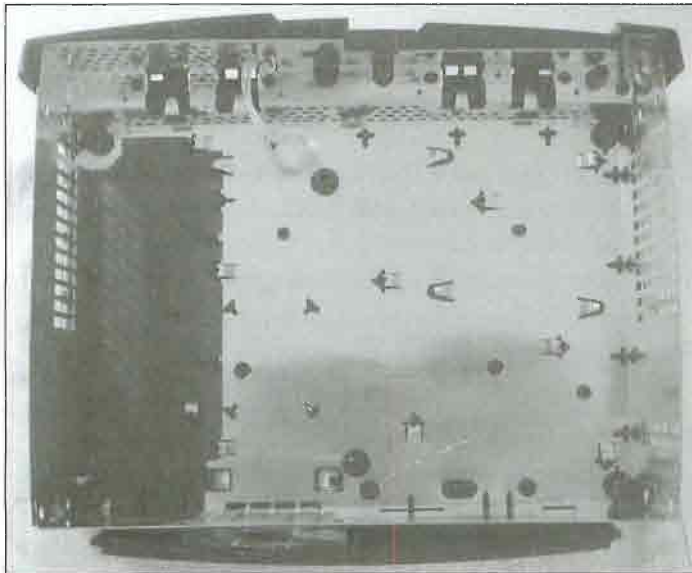




**FIGURE 2.3** The clear, green Halo case is unique and attractive.

## The Case

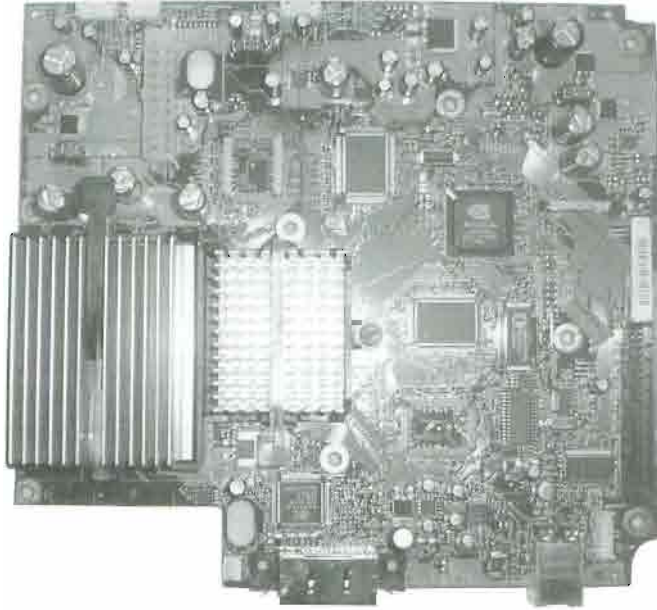
The Xbox case is similar to the many small “Micro ATX” cases that you might use as a media center PC, and it betrays the roots of Xbox as much as any other component (see Figure 2.4).



**FIGURE 2.4** The Xbox case.

## The Motherboard

The Xbox motherboard is what defines the version of the console that you own. Figure 2.5 shows the revision 1.3 motherboard. Although all of the motherboards have the same basic shape, there are differences in the electronics from one revision to the next.



**FIGURE 2.5** The Xbox motherboard.

## The Power Supply

The Xbox power supply is exposed within the case and is therefore a considerable hazard if you operate your Xbox with the cover removed. You can very easily brush the components of the power supply if you tinker with your Xbox with the cover off, so be extremely cautious because you could ruin your Xbox at best or—worst-case scenario—electrocute yourself. In addition to the danger of exposing you to electric shock, the power supply components get very hot while in operation. Figure 2.6 shows the power supply.

## The DVD-ROM Drive

The Xbox DVD-ROM drive is a standard DVD-ROM drive that you might find in any standard PC, except that it has a slightly different type of power connector. Figure 2.7 shows a typical DVD-ROM drive for an Xbox. (Some revisions used different DVD-ROM models; the one shown here is a revision 1.3.)



**FIGURE 2.6** The Xbox power supply.



**FIGURE 2.7** The Xbox DVD-ROM drive allows you to play games as well as DVD movies.

## The Hard Drive

The Xbox hard drive has a capacity of 8GB, although there are reports that some Xboxes were equipped with 10GB drives. Figure 2.8 shows a typical Seagate 3.5" hard drive used in the Xbox.

## The Central Processing Unit (CPU)

At the heart of the Xbox are two processors that work in tandem to produce the stunning visuals in modern games that you enjoy. The central processor is an Intel Celeron 733MHz, based on the Pentium 3 core. If this seems like a meager processor to power a next-generation console, remember that a console is a custom-built machine with hardware specifically tuned for games, utilizing a hard-coded set of hardware drivers and a highly optimized software development kit. For the most part, the graphics processor handles all of the rendering, so the CPU need not be extraordinarily fast. Remember that recent revisions to the Xbox no longer have an active cooling system, just a passive heatsink; a faster processor (such as the typical 2GHz chip available at the time of the Xbox launch) would require active cooling.

Note that the thermal compound is still present in the photo shown in Figure 2.9. Because this is a working motherboard, I did not want to remove the material just for the photo opportunity.



FIGURE 2.8 The Xbox hard drive (typically 8GB).



FIGURE 2.9 The Xbox central processor.

## The Graphics Processing Unit (GPU)

The Xbox graphics processor is a custom-built Nvidia GeForce 3 chip. As a matter of fact, Xbox was ahead of the game in 2001 by incorporating the very first programmable shader technology, available before the consumer version of the GeForce 3 became available. The graphics processor (shown in Figure 2.10) handles all of the graphics (2D and 3D) in an Xbox game, while the video processing (which sends output to your television) is handled by the chipset integrated in the motherboard. This XGPU, also known as the NV2X, has a clock speed of 250MHz, giving Xbox the rendering horsepower to draw about 125 million polygons per second.

Figure 2.10 shows the thermal compound still present on the chip. A dash of Artic Silver thermal compound will be applied before the heatsink is reattached, and this motherboard will continue to be used.



FIGURE 2.10 The Xbox graphics processor.

## Front-Side Bus (FSB)

The Xbox motherboard contains a front-side bus as well as a back-side bus, just like a PC motherboard. The front-side bus (FSB, also called the North Bridge) connects the CPU to the system and includes the Advanced Graphics Port (AGP), which is built into the motherboard on the Xbox. As a single incorporated motherboard, the XGPU (Nvidia GeForce 3) chip is mounted directly on the bus, although this is equivalent to including an AGP card slot and plugging in a video card. Obviously, the Xbox doesn't need to be upgraded, although that would be intriguing.... The FSB also includes the memory controller that provides Xbox with access to the 64MB of double-data rate (DDR) memory. The FSB chip runs at 133MHz, providing a bus transfer rate of about 1GB per second.

## Media Control Processor (MCPX)

The media control processor (MCP) is the second half of the motherboard chipset that handles device I/O, handling the IDE port (for the DVD-ROM and hard drive) as well as the controller ports (which are oddly shaped USB ports). This chip, custom-designed for Xbox by Nvidia, runs at 200MHz and handles the 100Mb LAN port as well as the sound electronics (see Figure 2.11), and is equivalent to the South Bridge on a PC.



**FIGURE 2.11** The Xbox MCP chip.

## Removing the Cover

If you are at all intimidated by the thought of getting to know the insides of your Xbox, you will soon overcome that phobia (it's irrational anyway!). Not only is the Xbox easy to disassemble, it is made up of all-too-familiar components (which cannot be said of GameCube or PS2). If you have ever taken apart a Game Boy Advance, you'll be surprised to learn that Xbox is simpler than the GBA. For starters, let's see what you'll need to crack open the case.

### Removing the Rubber Feet

Take your Xbox, unplug everything (obviously), and turn it over. Remove the four rubber feet on the corners to reveal the four main screws, as shown in Figure 2.12.

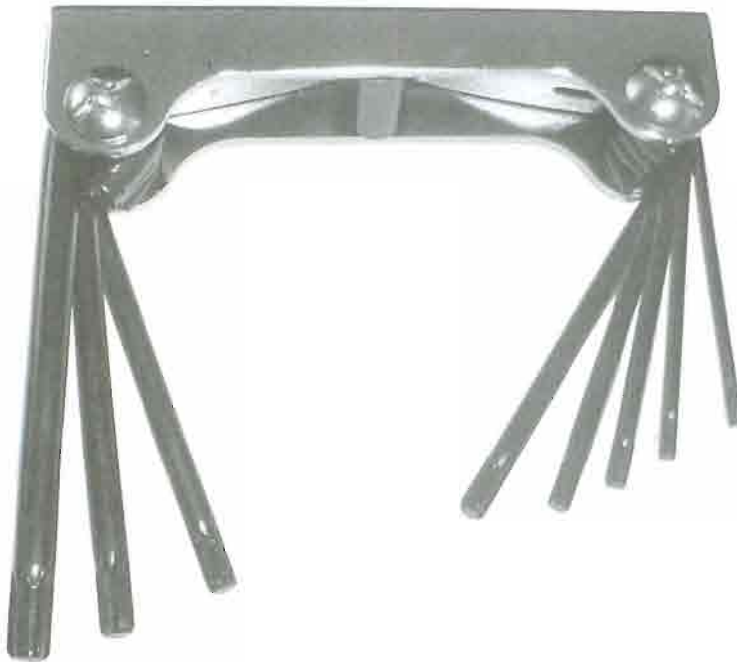
You will need to use a Torx (star-shaped) wrench, not to be confused with a hex wrench. Torx wrenches have five-point heads (see Figure 2.13).

### Removing the Six Case Screws

Using the appropriate Torx wrench (Xbox screws are typically Torx-10 or Torx-20), remove the four screws. You will also find two screws beneath labels on the bottom of your Xbox. You don't need to remove the entire label; just use your fingernail or a small Torx to scrape around the screw head to punch a hole over the screw. Figure 2.14 shows one of the screws you will find behind a label.



**FIGURE 2.12** The bottom of the Xbox.



**FIGURE 2.13** A typical Torx wrench tool.





**FIGURE 2.14** Two screws are hidden behind labels.

See Figure 2.15 for help locating all of the screws.



**FIGURE 2.15** Only six Torx screws protect your Xbox from the machinations of a curious mind.



After you have removed all six screws, keep them in a safe place because they are *all* required to keep the components within the Xbox from moving around during transport (see Figure 2.16).

## Lifting the Case

Now that the screws have been removed, you can lift off the top of the case. Lifting the case can be a bit tricky because it isn't obvious where the top part of the case separates from the bottom part. Take a look at Figures 2.17, 2.18, and 2.19, which show the front, side, and back of the Xbox, respectively.

### NOTE

For some reason, many folks are concerned about voiding the Xbox warranty. Given that it's only a 90-day period, I don't consider that to be a good enough reason to keep my Xbox inviolate, so neither should you. However, if you do have a new Xbox, you will encounter some difficulties with installing a mod chip because the newest Xbox revisions have been adjusted to thwart the efforts of the mod chip makers (or perhaps just to reduce costs using new manufacturing methods or cheaper components). After you have examined the inner sanctum of your Xbox in this chapter, you will learn how to identify which Xbox revision you own in the next chapter.



**FIGURE 2.16** The six Torx-head screws that keep the Xbox together.



FIGURE 2.17 The front of the Xbox.



FIGURE 2.18 The side of the Xbox.



FIGURE 2.19 The back of the Xbox.

## Examining the Main Deck

Finally, Figure 2.20 shows the case after it has been lifted up and off the main deck of the Xbox. You will immediately see the huge DVD-ROM drive mounted beside the standard 3.5" hard

drive, and both are enclosed in plastic frames that prevent movement inside the case (a very good thing!).



**FIGURE 2.20** The top portion of the Xbox case has been removed.

Figure 2.21 shows the components up close. Note the standard IDE drive cable connecting the DVD-ROM and hard drive to the motherboard. This example is an Xbox revision 1.4 (see the “MAY 2003” on the DVD-ROM bar code sticker in the lower right?). Revision 1.5 was manufactured in the fall of 2003, while revision 1.6 came out in the spring of 2004.

The parts almost look like they belong together, all tight and snug inside the case like that (when, in fact, they are just PC components). Too bad we’re going to tear the thing completely apart and ruin the nice consistent—perhaps even aesthetic?—packaging of components! The first rule of hacking: Know everything. So, let’s carefully disassemble this bad boy and see what it’s made of. You will follow through with a complete Xbox identification and mod chip installation in the next few chapters, so this isn’t all just for educational purposes.



**FIGURE 2.21** The drives are connected to the motherboard with a standard IDE cable!

## Removing the Hard Drive

The hard drive tray sits atop the DVD-ROM tray stands, so it must be removed first. Take a close look at the IDE cable shown in Figure 2.22. You will find three Torx screws that need to be removed before the hard drive and DVD-ROM drive will come out. Let's get the IDE cable out of the way first. Lift up the cable so you can get to the connectors as well as a screw hidden beneath the IDE cable, as shown in Figure 2.23.



**FIGURE 2.22** The IDE cable is routed carefully underneath the cover.



**FIGURE 2.23** Lifting up the IDE cable reveals a screw that must be removed.

## Removing the Hard Drive Tray Screw

Figure 2.24 shows how to remove the screw. This typical Torx screw is the same type and size of screw you will find in other areas of the Xbox case.



**FIGURE 2.24** Removing the single screw holding down the hard drive frame.

## Removing the Cables

After you have removed this single screw from the hard drive frame, you will then need to disengage the IDE and power connectors from the hard drive. The hard drive uses a standard power connector that is compatible with PC power connectors, meaning that you can use a Y-splitter to add standard PC accessories to your case (such as lights and other cosmetic items). If you have a hard time removing the power connector, try using a screwdriver on either side of it to lightly pry it loose, as shown in Figure 2.25. It doesn't take much effort.

The power connector is fed along the top left edge of the hard drive frame (or tray), so you will need to disconnect the wire from the two hooks built into the hard drive frame to loosen it (see Figure 2.26).

Removing the IDE cable is a cinch, using either your fingers or a screwdriver to gently pry the ends of the cable out of the IDE connector on the hard drive using a side-to-side motion (see Figure 2.27).



**FIGURE 2.25** Removing the power connector from the hard drive.



**FIGURE 2.26** Freeing the power connector from the hard drive frame.



**FIGURE 2.27** Unplugging the IDE cable from the hard drive.

## Lifting the Hard Drive Tray

You will then be able to lift the hard drive frame out of the Xbox case. If you have difficulty lifting it, first make sure you have removed the bolt. You can use a screwdriver to pry up the edge of the tray, as shown in Figure 2.28.

After you have managed to raise the hard drive tray, you can easily lift it out of the Xbox case, as shown in Figure 2.29.

You can remove the hard drive from the tray by removing four small Torx screws on either side of the hard drive tray (see Figures 2.30 and 2.31). You may want to do this if you plan to replace the hard drive with a higher capacity drive (which is featured in Chapter 12, “Upgrading the Xbox Hard Drive”).

See Figure 2.32 for the final result.





**FIGURE 2.28** Removing the hard drive tray may require the help of a screwdriver to pry it up.

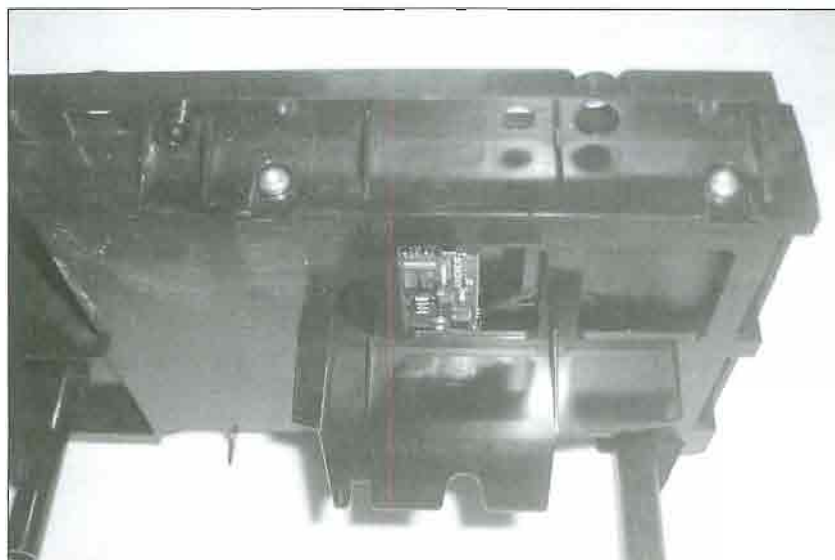


**FIGURE 2.29** Lifting the hard drive tray out of the Xbox case.





**FIGURE 2.30** The hard drive screws on the left side of the tray.



**FIGURE 2.31** The hard drive screws on the right side of the tray.



**FIGURE 2.32** Removing the hard drive from the tray.

## Removing the DVD-ROM Drive

The DVD-ROM drive is mounted to the case with two Torx screws. Figure 2.33 shows where those screws are located (in the DVD-ROM frame).

### The DVD-ROM Screws

For a closer look at the DVD-ROM screws, take a look at Figures 2.34 and 2.35.

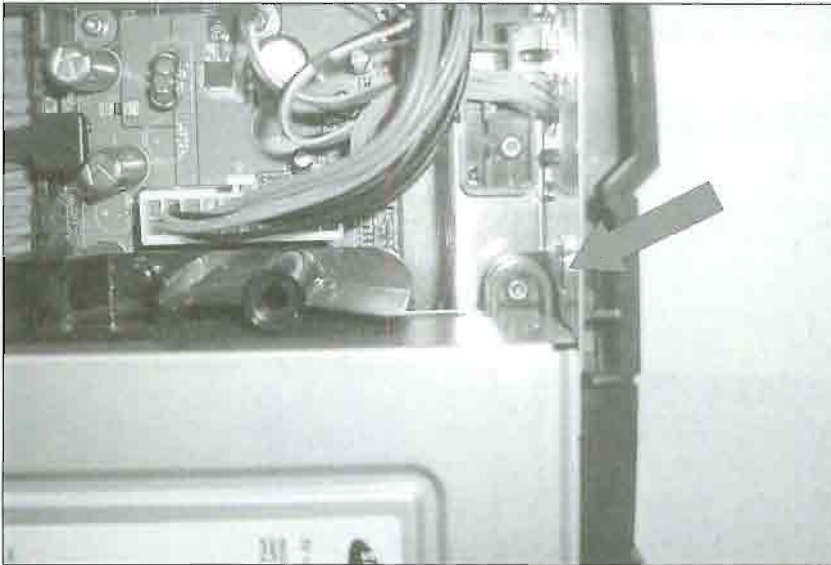
## Removing the IDE and Power Cables

Before you lift out the hard drive, it's a good idea to first remove the IDE and power connectors. You can just as easily remove them after lifting out the DVD frame, so it's up to you. Figure 2.36 shows the rear of the DVD-ROM drive with the IDE cable disconnected.

Figure 2.37 shows the power connector on the back of the DVD-ROM drive. Loosening it can be a bit tricky, so you may want to carefully pry each side of the connector with a screwdriver. This technique is better than yanking on it with your fingers in such a narrow space. After you have disconnected both cables, put them aside so they won't get in the way of the tray as you lift it out (see Figure 2.38).



**FIGURE 2.33** The two screws holding down the DVD-ROM frame.

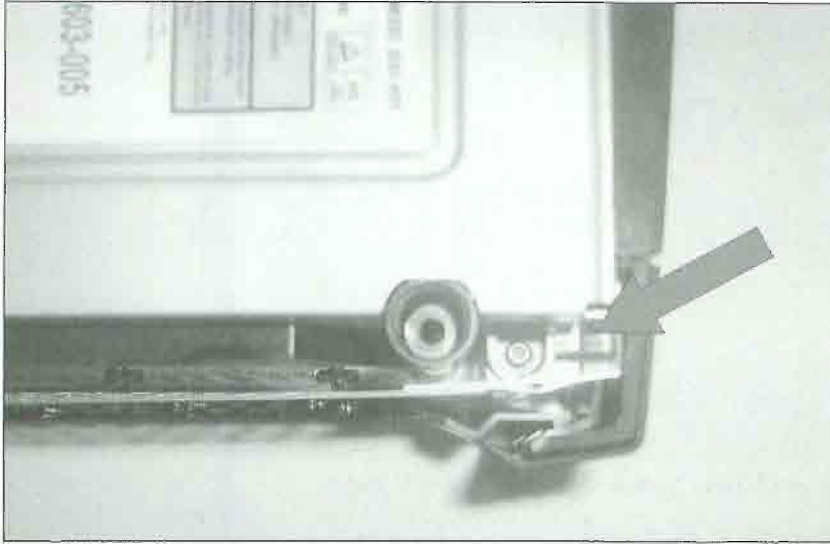


**FIGURE 2.34** The left screw holding down the DVD-ROM drive.

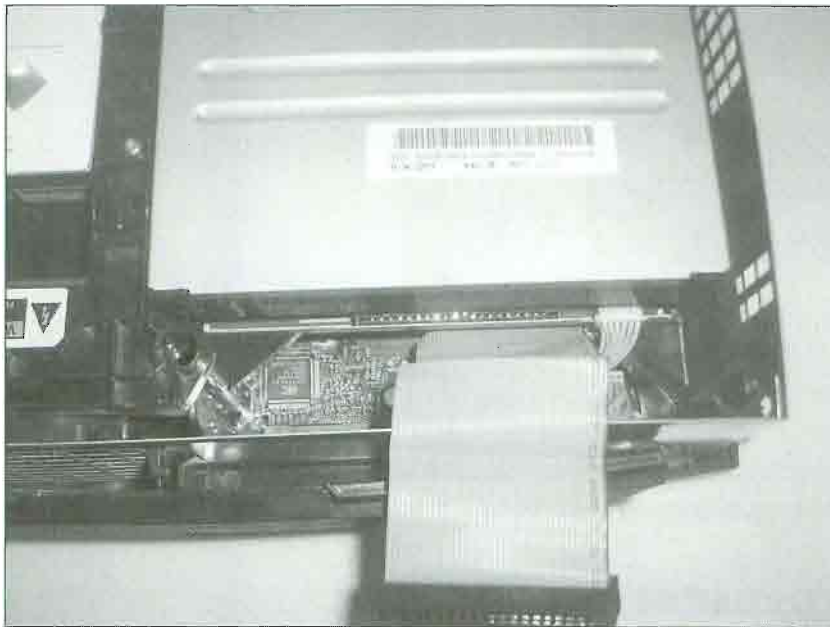
## Pulling the DVD-ROM Drive

You can now lift the DVD-ROM drive and tray out of the Xbox case. It should just lift right out, no prying required. Don't be hesitant to handle the equipment, but at the same time, if something

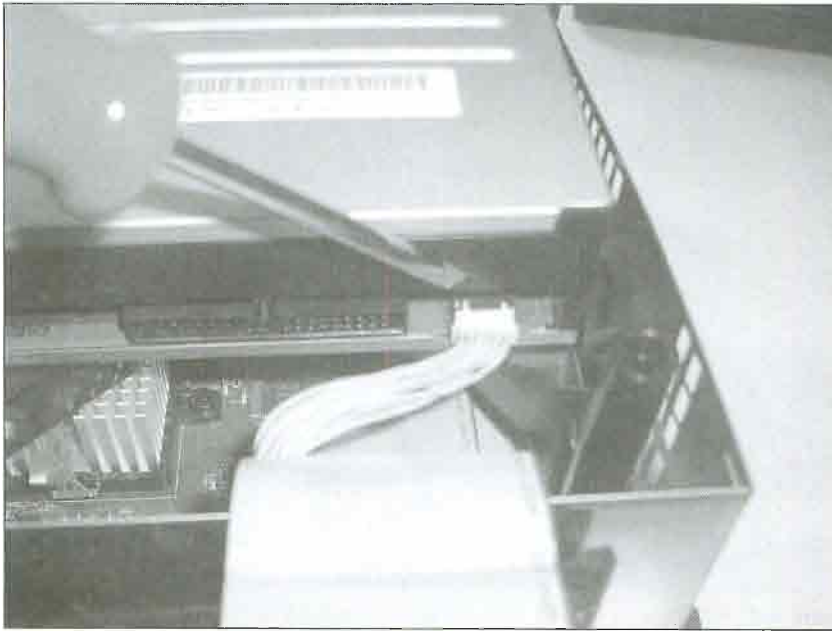
doesn't come loose easily, don't force it because it is easy to forget to loosen a screw here and there (see Figure 2.39).



**FIGURE 2.35**    The right screw holding down the DVD-ROM drive.



**FIGURE 2.36**    The back of the DVD-ROM drive, showing the IDE and power cables.



**FIGURE 2.37** Removing the DVD-ROM drive power connector.



**FIGURE 2.38** Moving the cables out of the way.



**FIGURE 2.39** Lifting the DVD-ROM drive and tray out of the Xbox case.

The DVD-ROM drive is actually attached to the frame/tray with two small tabs (see Figure 2.40).

By gently pulling the DVD-ROM unit out while prying the sides of the tray outward, you can disengage the drive from the tray, as shown in Figure 2.41. You probably will not need to separate the drive from the tray for any practical purpose, unless perhaps your DVD-ROM drive has broken and you are replacing it with a unit from another Xbox.



**FIGURE 2.40** The complete DVD-ROM drive and tray unit.



**FIGURE 2.41** Disengaging the DVD-ROM drive from the tray.

## Removing the Motherboard

The Xbox motherboard is the key component of the console and will be of the most interest to you, primarily as you learn to install a mod chip. First, why would you want to remove the motherboard? If you have a revision 1.5 or 1.6 Xbox, you will need to do some soldering to install a mod chip, and that is accomplished with the motherboard removed (the mod chip is soldered

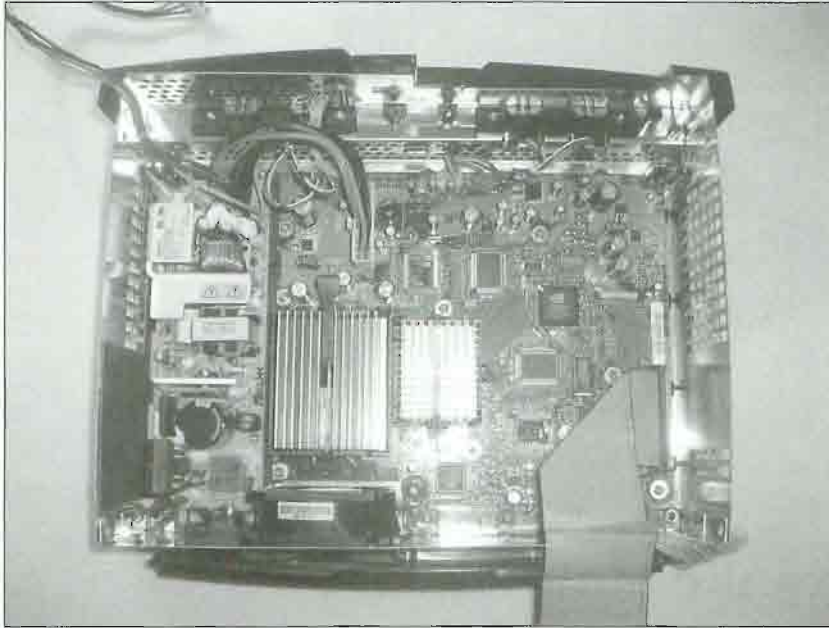
on the reverse side). There is also the possibility that your Xbox motherboard has been destroyed and must be replaced. This could happen in a thunderstorm, for instance, due to a lightning strike or other form of power surge. For this reason, I strongly suggest using a high-amperage surge protector with 3,500 amps or more of blocking protection (which is enough to stop anything short of an Electro-Magnetic Pulse (EMP), relatively speaking).

### CAUTION

Remember, voltage won't kill you; amperage will. You can withstand direct contact with a 20,000 volt power line if it has only a few milliamps of juice flowing through it! Think of water flowing through a pipe. Voltage is the depth of water, while current (amperage) is the speed the water is flowing. You can float in a lot of water, but unless it's flowing quickly, you won't be swept away.



Figure 2.42 shows an Xbox with a revision 1.4 motherboard. This is a very solid revision because it has a few refinements from the original Xbox (1.0 or 1.1), in addition to some manufacturing improvements introduced in 1.2 and 1.3. Note that 1.4 is the last revision that will accept a solderless mod chip (at the time of this writing).



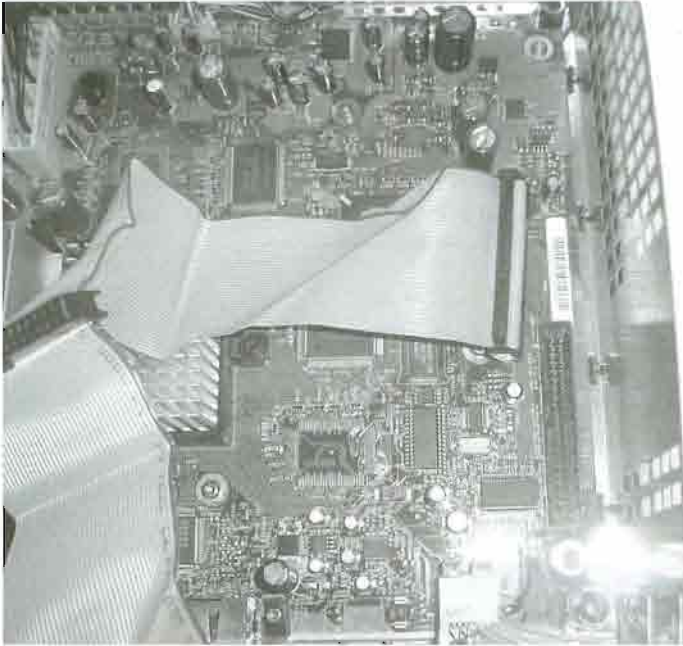
**FIGURE 2.42** A revision 1.3 Xbox motherboard, still in the case.

If you have a 1.5 or later revision, I honestly recommend that you buy a used Xbox motherboard with an earlier revision. In Chapter 11, “Replacing the Xbox Case,” I will show you how to completely swap out your old case for a new case, so you will have all the instructions you need in this book to do a motherboard replacement if necessary. However, if that is not an option, don’t worry; I still cover a full soldered mod chip install in Chapter 6, “Installing a Soldered Mod Chip.”

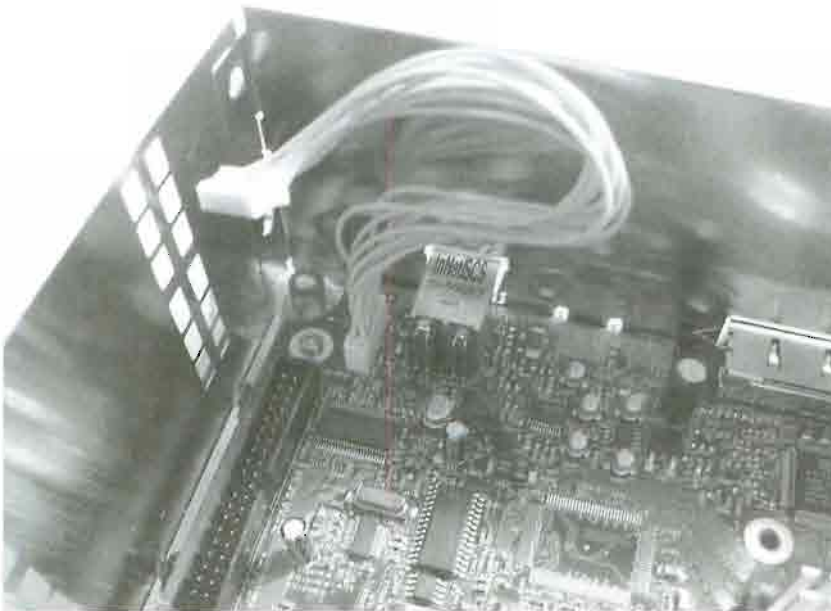
## Removing the IDE Cable and DVD-ROM Power Connectors

Now, let’s remove the IDE and DVD-ROM power connectors (the hard drive power connector is soldered to the power supply, so you will just have to move it aside). Both cables simply pull out of their slots on the motherboard. Just be cautious and don’t pry too hard. Small, easy, gentle (usually back-and-forth) motion will free the cable and power connector (see Figures 2.43 and 2.44).





**FIGURE 2.43** Removing the IDE cable from the motherboard.



**FIGURE 2.44** Removing the DVD-ROM power connector from the motherboard.

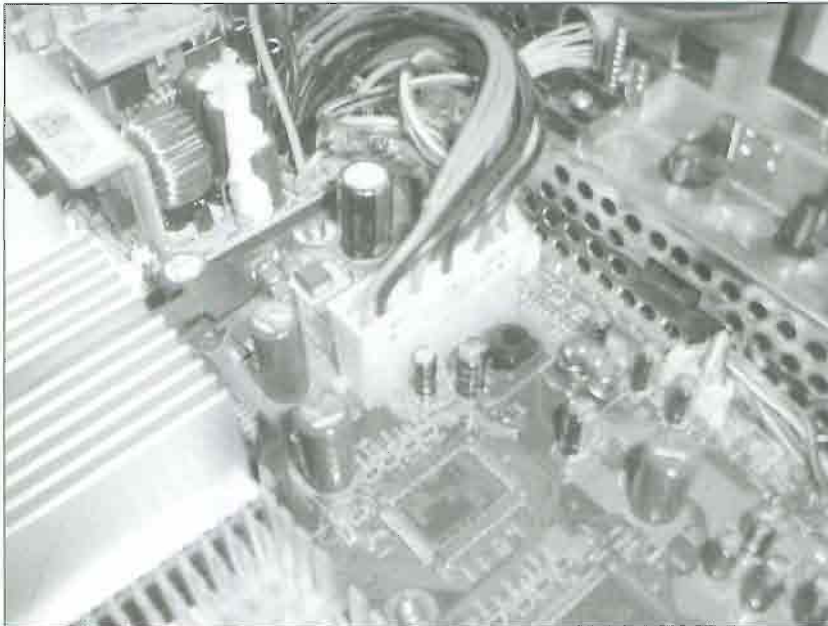
## Removing the Motherboard Power Supply Connector

Next, let's focus our attention on the power supply connector for the motherboard. This connector comes from the power supply, which is located on the right side of the motherboard, screwed into the case. I will explain how to remove the power supply in Chapter 11 (on replacing the case).

### TIP

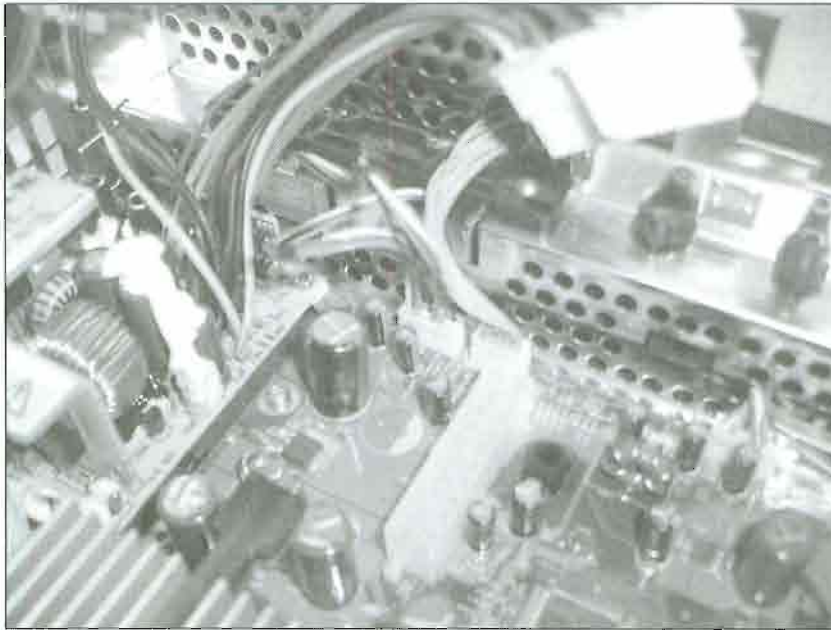
Be very careful around the power supply supply (as well as the CPU and GPU heatsinks) if you have recently operated your Xbox because the power supply components will be extremely hot!

Locate the power supply connector by referring to Figure 2.45. You remove the power supply connector by pressing the clip tab with your finger while pulling upward on the connector that is mounted to the motherboard fitting. This is identical to an ATX motherboard power connector in a PC (see Figure 2.46).

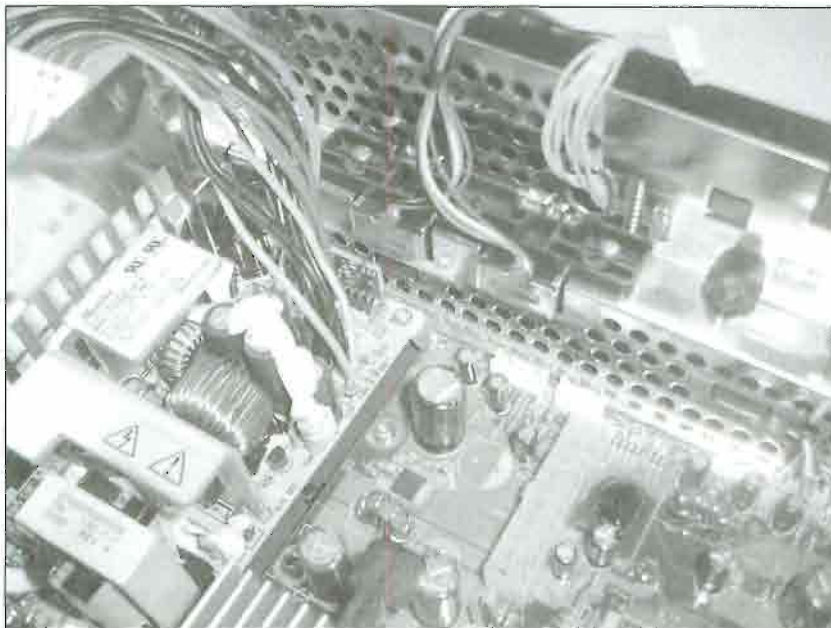


**FIGURE 2.45** Locating the power supply connector on the motherboard.

After you have disengaged the motherboard power supply connector, lay it aside so the motherboard can be removed, as shown in Figure 2.47.



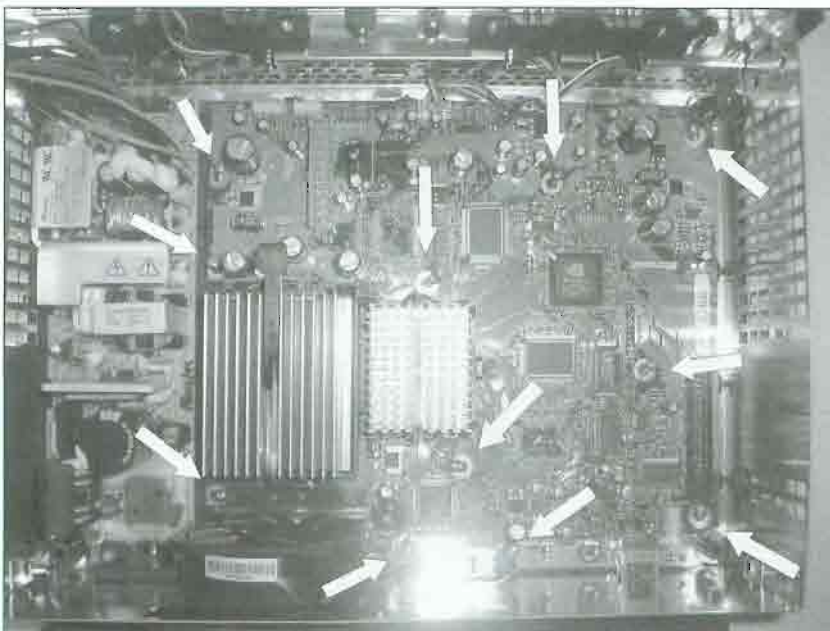
**FIGURE 2.46** Removing the motherboard power supply connector.



**FIGURE 2.47** Moving the motherboard power supply connector aside.

## Removing the Motherboard Screws

Eleven Torx screws are used to mount the motherboard to the case. Refer to Figure 2.48 for the location of all the screws and then remove all 11 screws using your Torx tool. Figure 2.49 shows a close-up image of the motherboard with the screws already removed.



**FIGURE 2.48** The location of the 11 screws holding down the Xbox motherboard.

## Unplugging the Controller Port Cables

Two connectors each handle two of the controller ports on the front of the Xbox, as shown in Figure 2.50. The controller ports are connected to the motherboard using two small plugs at the inside front side of the Xbox.

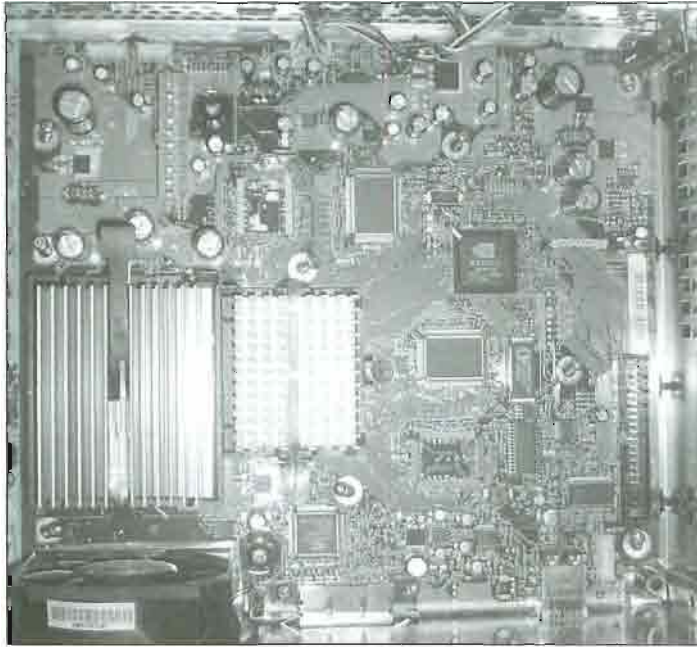
The four controller ports.

First, locate the controller port connectors on the motherboard, as shown in Figure 2.51, and gently pry them free with your fingers, as shown in Figure 2.52.

The final result is shown in Figure 2.53. Note the screws are loosened but not yet removed. Be careful when removing the screws by hand because you do not want to damage the motherboard



with an electrostatic discharge, which can occur especially if you are standing on carpet or other static-inducing material.

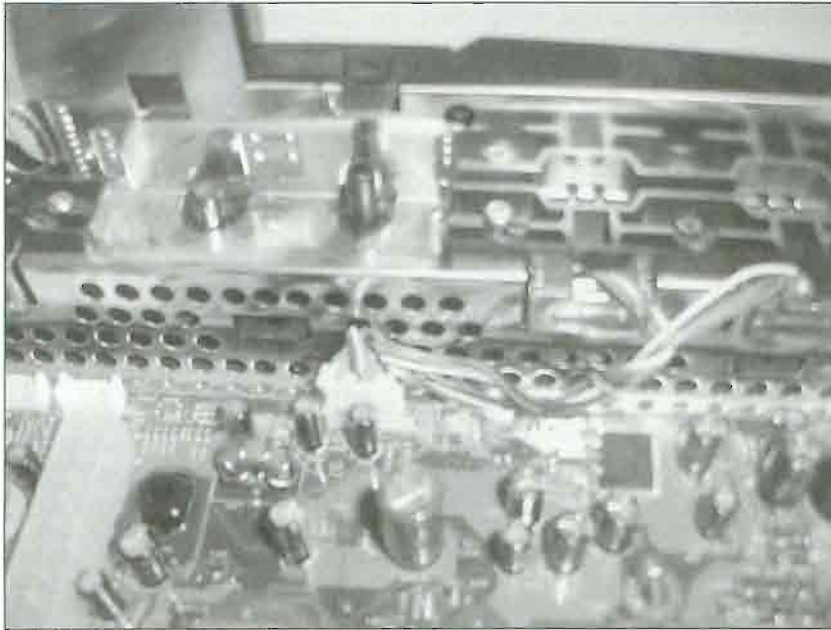


**FIGURE 2.49** Close-up of the Xbox motherboard, showing the screws that have been removed.

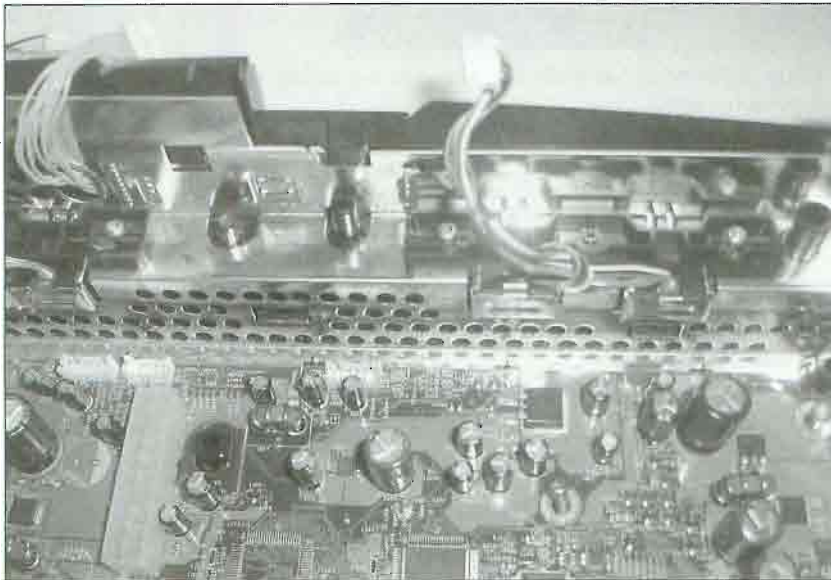


**FIGURE 2.50** The four controller ports.

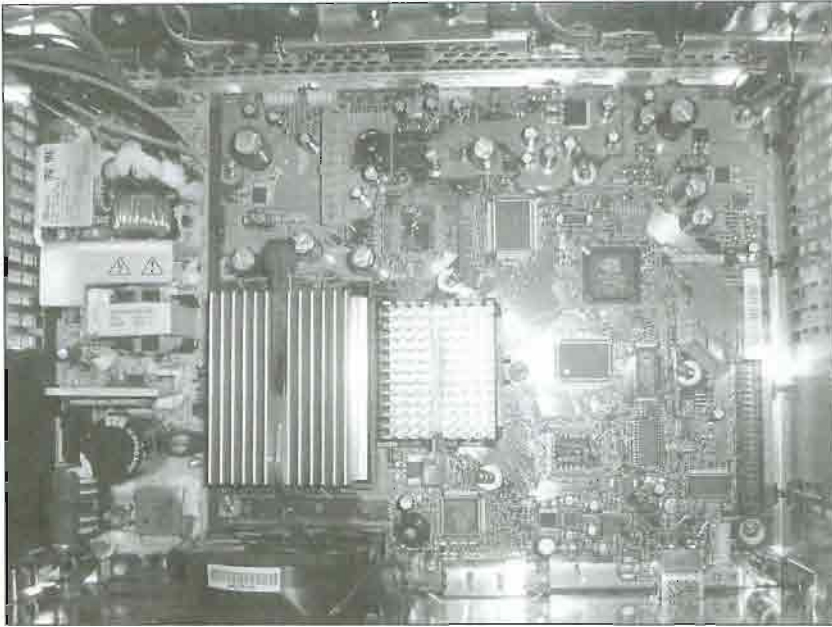
You should wear an antistatic wrist strap or ground yourself repeatedly while working with any electronics. You can ground yourself by touching a large (preferably unpainted) metal object, although just using an antistatic wrist strap is safer. Be sure to store the screws in a safe place so that they won't get lost! See Figure 2.54.



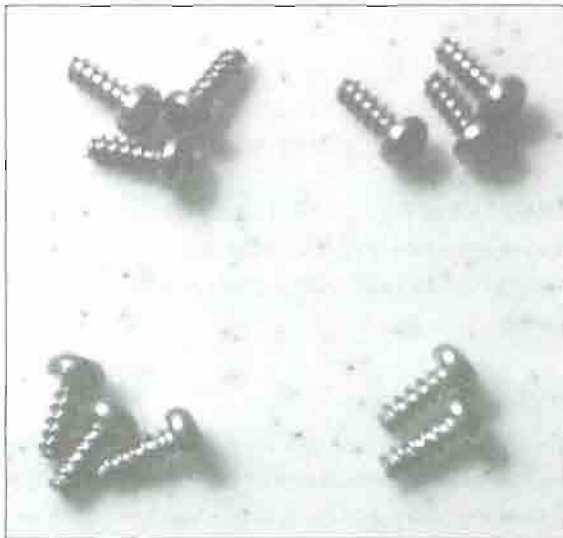
**FIGURE 2.51** The controller port plugs on the motherboard.



**FIGURE 2.52** Removing a controller plug from the motherboard.



**FIGURE 2.53** The Xbox motherboard is mostly stripped and almost ready to be removed.

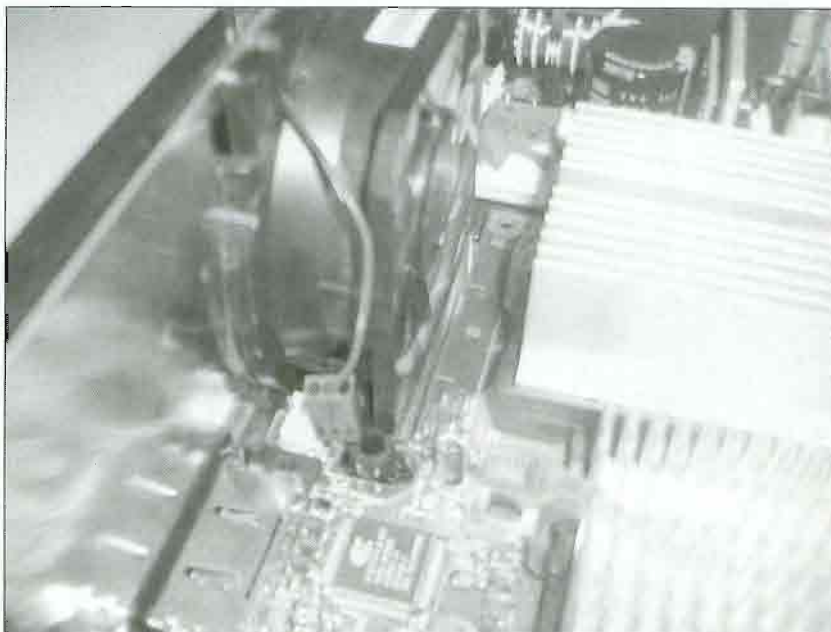


**FIGURE 2.54** The 11 motherboard screws should be stored in a safe place.



## Removing the Case Fan

The Xbox case fan is powered by a small power cable that attaches to the motherboard, as shown in Figure 2.55. Simply pull up on the fan power wires to remove the connector from the motherboard.

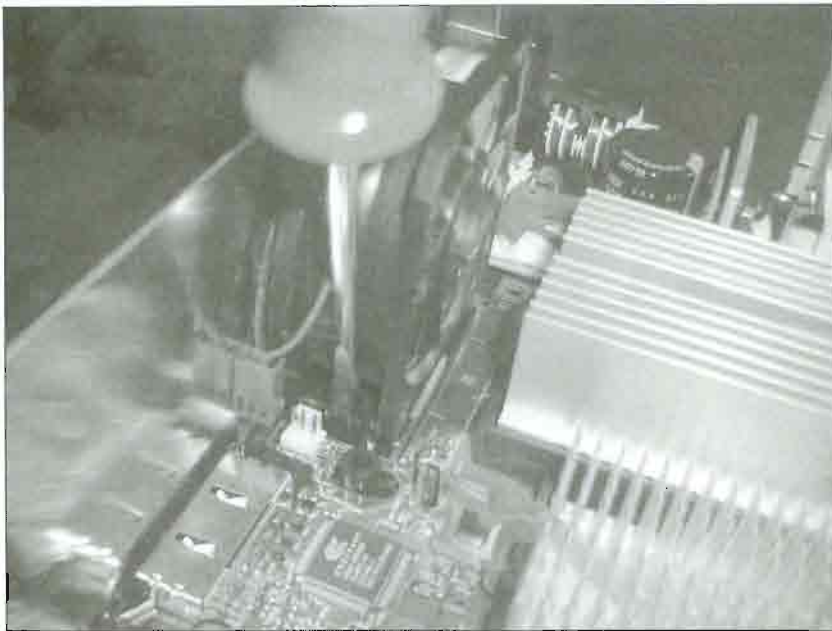


**FIGURE 2.55** The Xbox case fan must be removed prior to removing the motherboard.

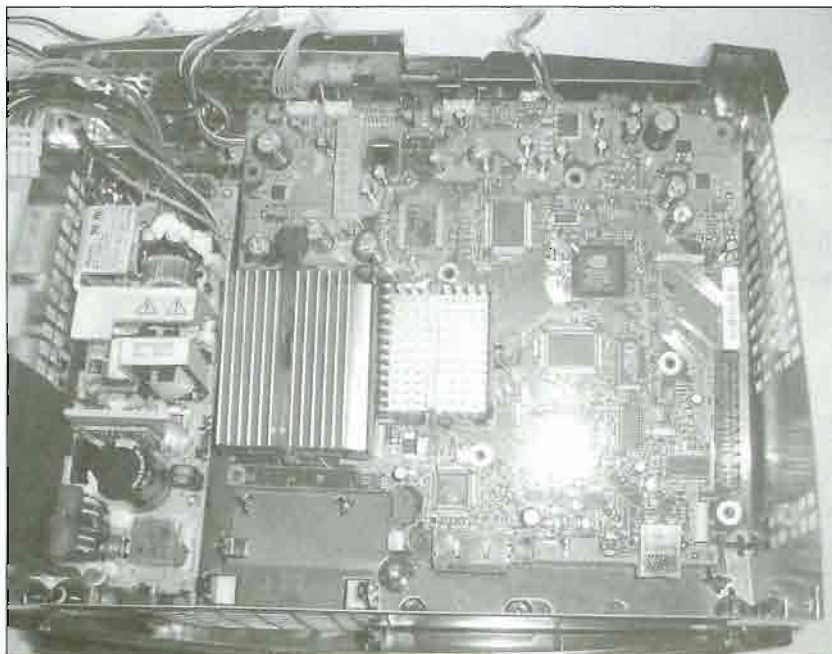
Removing the fan itself is a bit more tricky. Take a look at Figure 2.56. The easiest way to get the fan out is to use a screwdriver to pry the fan mounting tabs away from the fan and then gently remove it using a back-and-forth motion. You will have to switch the screwdriver from one side of the fan to the other to free the fan of both tabs.

## Removing the Motherboard

You are now (finally!) ready to lift the motherboard out of the case. Simply grab hold of the CPU heatsink and lift the motherboard. I advise against using a screwdriver or any other tool on the motherboard itself because a simple twitch of the hand can cause the tool to scratch the leads on the motherboard, rendering it unusable. So, be careful at this point! See Figure 2.57.

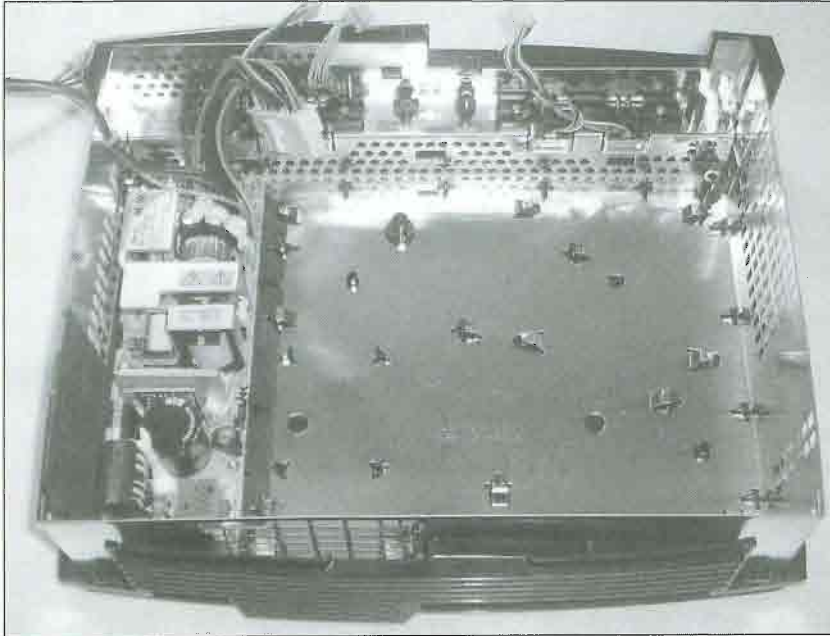


**FIGURE 2.56** Pry the fan mounting tabs away from the fan to lift it out of the case.



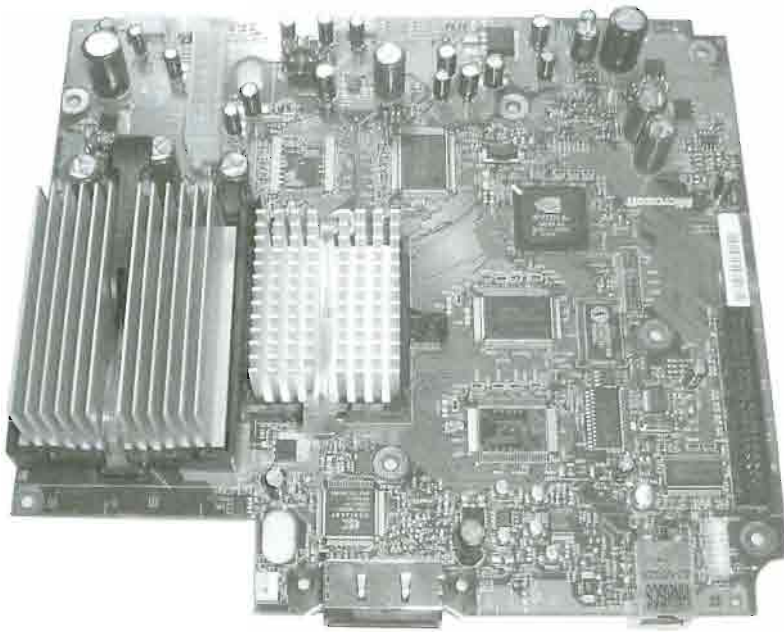
**FIGURE 2.57** Lifting the motherboard out of the Xbox case.

You will quickly notice that the motherboard needs to be pulled toward the front of the Xbox to clear the video and network ports on the back of the Xbox. Simply lift the motherboard while pulling it toward the front of the Xbox. If all goes well, your Xbox should look like the one shown in Figure 2.58.

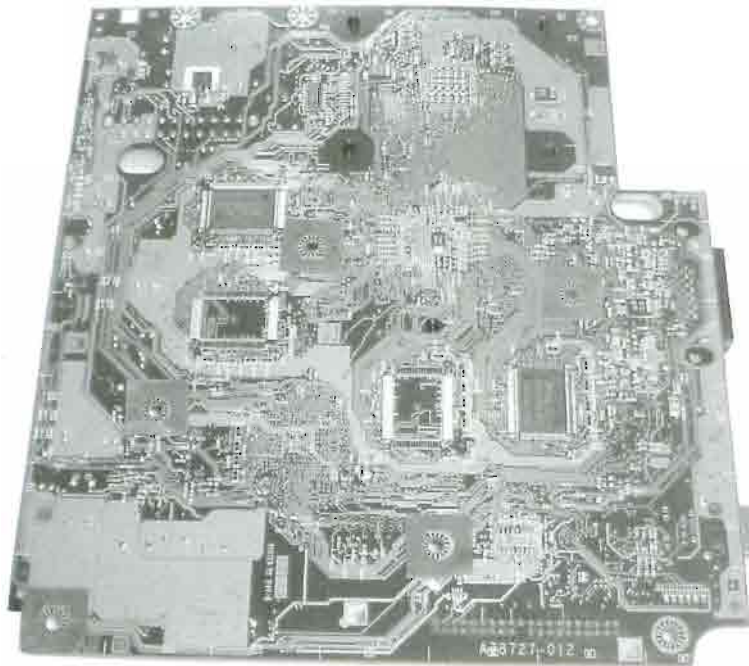


**FIGURE 2.58** The motherboard has been removed from the Xbox case.

Figure 2.59 shows the Xbox motherboard after it has been removed from the case, and Figure 2.60 shows the bottom side of the motherboard. You will get to know the motherboard layout more personally if you have a late-model Xbox (which requires a soldered mod chip—more on that in Chapter 6).



**FIGURE 2.59** The Xbox motherboard is dominated by the CPU/GPU heatsinks.



**FIGURE 2.60** The bottom side of the Xbox motherboard.

## Summary

If you are planning on installing a mod chip (which is probably a good bet if you are reading this book!), you should leave your Xbox disassembled at this point because you will need it open for the next few chapters.

# Identifying Your Xbox Revision

Here are the key points covered in this chapter:

- Revision notes
- Methods of identification
- Special/limited edition exceptions

**T**his chapter will help you to perform the all-important step of identifying which version of the Xbox you own. This step is critical in determining what type of mod chip you will need for your Xbox and what you must do to install a mod chip (covered in the next two chapters).

## Revision Notes

Before I explain how to identify your Xbox, let's discuss each of the seven revisions that have been produced at the time of this writing.

### 1.0

The first Xbox, 1.0, was produced in Hungary and Mexico in early to mid-2001. This version was unique in that it featured an active cooling unit (heatsink plus fan) on the GPU. The DVD-ROM was made by Thomson (see Figure 3.1), and the hard drive by Seagate (see Figure 3.2). This first version used the Conexant video chip, which was carried through revision 1.3.

### 1.1

The first *revision* to the Xbox, 1.1, did away with the GPU fan, leaving only a heatsink. This revision was manufactured in Mexico and China. This version also used the Conexant video chip.



## 1.2

The second revision to the Xbox, 1.2, was an incremental update with some different hardware used in some factories. The Philips DVD-ROM drive (see Figure 3.3) replaced the Thomson in most of the 1.2 units. Some units featured a Western Digital hard drive (see Figure 3.4) more often than the Seagate. This version also used the Conexant video chip.



FIGURE 3.1 Thomson DVD-ROM unit.

## 1.3

The third revision, 1.3, along with 1.4, seems to be the most common, so it may have been produced in the greatest quantities. This version saw the introduction of the Samsung DVD-ROM drive (see Figure 3.5), although Thomson and Philips models were still used throughout the production life of the Xbox in lesser quantities. This version also introduced a second Seagate drive (10GB) in some units (see Figure 3.6). This version also used the Conexant video chip.



FIGURE 3.2 First Seagate hard drive used in the Xbox.

## 1.4

The fourth revision, 1.4, was also produced in great quantities and was perhaps the most produced version of all. Manufactured exclusively in China, 1.4 saw the introduction of yet another Western Digital hard drive (see Figure 3.7), and featured the Samsung DVD-ROM in most cases (though not all). This version



FIGURE 3.3 The Philips DVD-ROM drive.



is identifiable by the use of a Focus video chip, the first change in the video chip since the Xbox was first introduced.

## 1.5

Revision 1.5 has an interesting story associated with it, though none of this information is official. Apparently, this version was produced only for a short period of time at the factory in China before it was pulled from production, and manufacturing reverted back to revision 1.4. One might assume that there was some sort of mistake in the initial production runs for 1.5 that was not detected right away. For whatever reason, both factories in China and Taiwan switched back to producing 1.4. Revision 1.5 might have seen only limited production afterward because the development of revision 1.6 came soon after. Therefore, the manufacturing date alone is not a reliable factor for determining the revision. Revision 1.5 also used the Focus video chip, and was otherwise similar to 1.4. Many mod chip makers doubt even the existence of the 1.5, believing it to be a refurbished version of 1.4 motherboards with changes made to the LPC to prevent modding. This revision is exceedingly rare, if it exists at all.

## 1.6

The sixth revision, 1.6, was a radical departure from prior versions with



**FIGURE 3.4** The first Western Digital hard drive used in Xbox.



**FIGURE 3.5** The Samsung DVD-ROM drive.



**FIGURE 3.6** The second Seagate hard drive.

major changes in the Xbox motherboard. The TSOP chip containing the Xbox BIOS is no longer *flashable* (that is, updateable), meaning the usual soft hacks/exploits are not possible, and the BIOS cannot be flashed. Microsoft also removed power *and* data lines from the LPC expansion port utilized by mod chips, requiring extra effort to install a mod chip in this version. A new video chip, known as Xcalibur (with an Xbox logo), was also used in this revision. The apparent changes were meant to make the 1.6 motherboard more compact.



**FIGURE 3.7** The second Western Digital hard drive (10GB).

## Methods of Identification

There is no single method of identifying your Xbox revision with 100% accuracy, but by using three well-tested methods together, you will be able to determine the version of your Xbox with certainty. The methods are as follows. It is best to perform all of these tests because Microsoft doesn't print the revision number on the Xbox (that would make it too easy for modders!).

The goal of revision identification is ultimately to determine which type of mod chip you can use, so after you have determined the revision by a single test, it's a pretty safe bet that you have your revision. But just to be cautious, I recommend performing other checks of the revision to be certain.

## Manufacturing Date

The manufacturing date of an Xbox is just a "suggestion" for the revision. The manufacturing date is printed on the serial number label on the bottom of the Xbox. You can see this label through a hole in the retail box (used for scanning the serial number at the cash register), so you can try to identify the revision without even removing an Xbox from the box (although a used Xbox is probably lacking a retail box in the first place).

### NOTE

The Xbox BIOS is stored on an EEPROM (electrically erasable programmable read-only memory) chip so that the binary BIOS image can be updated. Xbox 1.6 BIOS chips are only EPROM, meaning they can be burned once, and after that, these chips are permanently fixed with a BIOS.

The serial number/bar code label on the bottom of the Xbox includes a “MFG. DATE” value in the format *YYYY-MM-DD*, representing year, month, and day. Table 3.1 will help you to identify your Xbox revision using the manufacturing date (although assembly line and factory appear to be more relevant factors).

**TABLE 3.1** Revision by Manufacturing Date

Date Range	Revision	Location
01/2001–10/2002	1.0	Hungary
11/2002–04/2003	1.1	Hungary, Mexico
05/2003–03/2004	1.2–1.5	China
04/2004–?	1.6	China, Taiwan

## Hardware Serial Number

If you are browsing the used Xboxes at your local video game store in the hope that you can buy an older Xbox that will work with your solderless mod chip of choice, you will need to use the serial number version test. But what happens if the manufacturing label has been removed? This is a fairly common occurrence that might have something to do with Xbox owners not wanting to change their Xbox Live accounts (which makes one wonder why they sold the Xbox in the first place). Here is how you can decode the hardware serial number if it is available:

LNNNNNN YWWFF

where

- L is the number of the production line within the factory.
- NNNNNN is the number of the Xbox produced during the workweek.
- Y is the last digit of the production year.
- WW is the number of the week of the production year.
- FF is the code of the factory where the Xbox was manufactured, according to Table 3.2.

**TABLE 3.2** Factory Codes

Factory	Location	Revision
02	Mexico	1.0 or 1.1
03	Hungary	1.0
05	China	1.2 (or later)
06	Taiwan	1.2 (or later)

Because the factory code method is not very reliable (because there may be some codes missing from this list), let's try another method of identifying your Xbox to narrow things down a bit. See Table 3.3 for a serial number check that is accurate but not very specific. If your code is not shown, I would recommend using the closest code to yours, leaning toward the previous one if there is a value above and below your code.

**TABLE 3.3** Serial Number Check

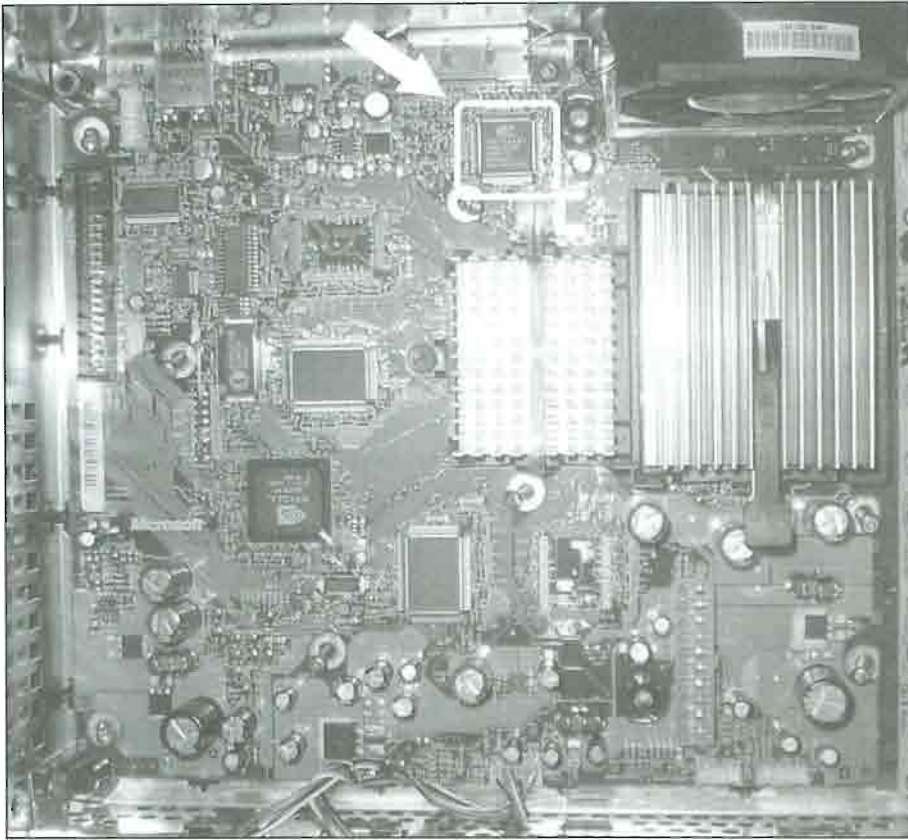
Serial Number	Revision
LNNNNNN <b>20WFF</b>	1.0
LNNNNNN <b>21WFF</b>	1.0
LNNNNNN <b>23WFF</b>	1.0, 1.1
LNNNNNN <b>24WFF</b>	1.1
LNNNNNN <b>25WFF</b>	1.1
LNNNNNN <b>30WFF</b>	1.2
LNNNNNN <b>31WFF</b>	1.3
LNNNNNN <b>32WFF</b>	1.3
LNNNNNN <b>33WFF</b>	1.4, 1.5
LNNNNNN <b>42WFF</b>	1.6

## Video Chip Verification

If you have used the preceding two checks to narrow down what you think your Xbox revision is, the next two steps will really give you a concrete answer to the question. Assuming you have already opened your Xbox per Chapter 2, “Disassembling Your Xbox,” you should look for the video chip. It is located on the motherboard, directly below the video output port on the back of the Xbox (see Figure 3.8). This is another excellent verification of the revision, as Table 3.4 illustrates, and may be considered foolproof.

**TABLE 3.4** Video Chip Identification

Video Chip	Revision
Conexant	1.0, 1.1, 1.2, 1.3
Focus	1.4, 1.5
Xcalibur	1.6



**FIGURE 3.8** The location of the video chip on the Xbox motherboard.

## Xbox BIOS Version Number

You can use one final check to verify the Xbox revision that you own (or are considering buying): Look at the BIOS kernel version and dashboard version numbers. To view these numbers, boot the Xbox in dashboard mode (by powering up without a disc in the DVD-ROM drive). Go to Settings and then System Info. A disclaimer will scroll down and will eventually show you two version numbers: a K: value for the kernel and a D: value for the dashboard. You can perform an unscientific check of the revision using Table 3.5.

If you are at a video store, this may be your only way of double-checking the revision. Note that revision 1.0 of the Xbox did not provide these numbers, so if you can't find them, it is *definitely* a 1.0. Nevertheless, I will include the 1.0 kernel version in Table 3.5. Some kernel versions may not be shown in this list; if yours is not shown, you can base it on the nearest version to yours. Along with the other noninvasive tests, this should give you a *clear* idea about the revision for a particular Xbox.

**TABLE 3.5** BIOS Kernel Versions

<b>Xbox Revision</b>	<b>Kernel Version</b>
1.0	3944,4034,4036,4627
1.1	4817,4972
1.2–1.5	5101,5713
1.6	5838

## Special/Limited Edition Exceptions

Microsoft has released several special versions of the Xbox that you should know about because they may (or may not) conform to the guidelines presented in the preceding sections. More than likely they do, but if you own a special or limited edition Xbox, you will be able to quickly and easily identify the revision. The special/limited editions were produced at a single plant for a short time, so they are all identical in hardware.

### Halo Special Edition

If you own the Halo Special Edition Xbox with a translucent green case (see Figure 3.9), your Xbox is a revision **1.2**. If you want to verify the revision, you can check the production numbers. This Halo SE Xbox was manufactured *only* in China, during weeks 8 and 9 of 2003, on the manufacturing lines 2, 5, and 6! (How's that for detail?). In other words, if you have a Halo SE Xbox, the serial number should look like one of the following:

2NNNNNN 3WW05

5NNNNNN 3WW05

6NNNNNN 3WW05

And WW should be 08 or 09. I would like to advise you that it is possible for this version to be manufactured again, in which case you might find a newer Halo SE Xbox.

### Limited Edition Crystal Pack

The Limited Edition Crystal Pack (shown in Figure 3.10) was a unique and collectible Xbox, released only in Europe to improve sales. If you own this edition, you may be certain that it is revision **1.4**. This edition was manufactured in China, in week 6 of 2004, on production line 4. In other words, the serial number should look like this:

4NNNNNN 30605





**FIGURE 3.9** The Halo Special Edition Xbox.

There are rumors that a more recent manufacture of the Crystal Xbox has taken place, and if this is true, then it's possible there might be some of these units with a 1.6 revision motherboard.



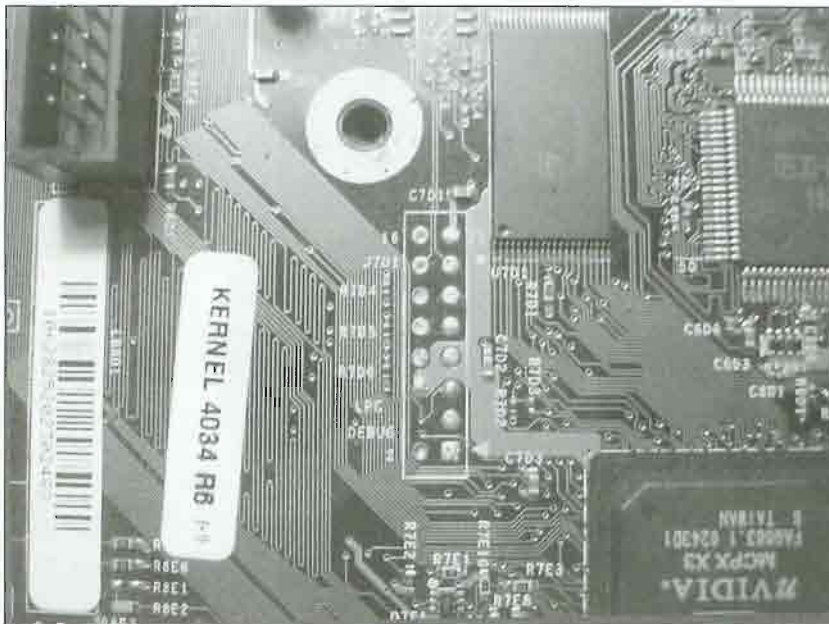
**FIGURE 3.10** The Limited Edition Crystal Xbox.

## Additional Exceptions

I have encountered some very strange exceptions to the guidelines presented in this chapter, where a motherboard has the telltale signs of two different revisions at the same time. Take Figure 3.11, for example. This Xbox was purchased from a retail store in late 2003, but it has signs of being a 1.0 as well as a 1.1 at the same time. The heatsinks are not shown in this figure, but take my word for it, there was no heatsink fan on the GPU, indicating that this is a 1.1 or later.

However, look at the filled-in LPC holes in this figure, along with that very strange sticker on the motherboard, spelling out clearly that this Xbox has a 4034 kernel. That kernel, according to Table 3.5, should be in a 1.0. But here we have what appears to be a 1.0 with no heatsink fan. This is very strange, indeed! Expect to find exceptions to the rule like this case, which is not a problem at all because any 1.0 to 1.4 Xbox will accept a solderless mod chip adapter (which is all that matters).





**FIGURE 3.11** This unusual 1.0 has no fan on the GPU heatsink (not shown).

## Summary

This chapter should help you to identify your Xbox while browsing serial numbers of used Xbox consoles at a store or via eBay or other online sites. If you already own an Xbox, the additional tables and figures will help you to determine exactly which Xbox revision you own.

Much of the information in this chapter was found online at [www.xbox-linux.org](http://www.xbox-linux.org) and [www.xbox-scene.com](http://www.xbox-scene.com). I would like to thank the owners and users of these sites for the valuable information they provided.

# PART II

## Mod Chips

- CHAPTER 4** Introduction to Xbox Modding
- CHAPTER 5** Installing a Solderless Mod Chip
- CHAPTER 6** Installing a Soldered Mod Chip



# Introduction to Xbox Modding

Here are the key points covered in this chapter:

- What is a mod chip?
- What can you do with a mod chip?
- Overview of available mod chips
- Before you install a mod chip

**T**his chapter is an introduction to Xbox modding, revealing all the information you need to know about mod chips so that you can choose a mod chip that is suitable for your needs. You will learn what a mod chip is and what it can do; plus, you will get an overview of the major Xbox mod chips that are available.

## What Is a Mod Chip?

Mod chips are small electronic devices that are incorporated into the electronics of a video game console, thus “modifying” the basic functionality of the console. The most common reason for installing a mod chip is to make it possible to boot up CDs or DVDs that are encoded for other regions. For example, if you purchase imported DVD movies that are encoded for a different region and video format, a mod chip will allow you to play these movies (where a standard DVD player will not). Obviously, this new functionality will allow you to purchase import games as well (for instance, Xbox games released only in Japan, if you live in the United States or Europe). There is also an NTSC-J format in Japan.

The internal Xbox architecture is the same for all regions, but an internal configuration setting specifies the support for region-encoded games and DVD movies (NTSC in the United States) as well as for the PAL format (Europe and

Japan). A mod chip will cause the Xbox to ignore the region and video format and play any game or movie. Table 4.1 shows the region code for each region.

**TABLE 4.1** DVD Regions

Number	Region Name
0	No region coding
1	United States and Canada
2	Europe, Greece, Turkey, Egypt, Arabia, Japan, and South Africa
3	Korea, Thailand, Vietnam, Borneo, and Indonesia
4	Australia, New Zealand, Mexico, the Caribbean, and South America
5	India, Africa, Russia, and eastern European nations
6	People's Republic of China
7	Unused
8	Airlines and cruise ships

## How Does a Mod Chip Work?

When you power up your Xbox with a game in the DVD-ROM drive, the Xbox boots up and then performs a validation check on the game disc to ensure it is a licensed game, produced by an official Microsoft licensee. Before the game starts running, the Xbox authenticates the disc by searching for the correct boot information. If a region-specific code is not found, the Xbox will refuse to play the disc (either a game or movie) because the correct information is not available.

The mod chip kicks into action at this point. A mod chip such as Xenium will cause the Xbox to ignore the boot information and just start running whatever is on the disc. The mod chip will boot either a game or DVD movie import.

An interesting side effect of the change effected by the mod chip is that Xbox will run anything, not just standard or import discs. A mod chip will allow you to run custom software written for Xbox.

## Are Mod Chips Legal?

As soon as the term “mod chip” is brought up, the obvious question arises like the proverbial elephant in the room: Are mod chips legal?

The simple answer to this question is this: Yes, mod chips are legal, at least in the United States. Those who understand copyright law will immediately realize that a mod chip containing custom

electronics and code is legal. A mod chip may not be legal if it uses a proprietary BIOS (such as the one built into the Xbox). Mod chips must include their own custom BIOSes. To drive the point home (future pun intended), allow me to provide you with an analogy.

Are you interested in cars? Chances are good that you are, so you are probably familiar with automobile performance and modification. You have heard about turbochargers, superchargers, and intercoolers, right?

A turbo is basically a device that you add to your car that makes your car *capable* of being used illegally. A turbo modifies the stock behavior of a car's engine, causing the exhaust to spin a turbine that feeds compressed air into the fuel injectors (or carburetor), greatly increasing torque and horsepower. A supercharger is similar but is powered by the engine's crankshaft with a pulley, which turns the turbine that compresses air and forces it into the intake system. These modifications allow you to drive your car faster, which may lead to speeding violations. In other words, these modifications make it possible for you to break the law. (Of course, a stock car can also break the speed limit, but the intended purpose of a turbo or blower is to speed!). Turbos and blowers are legal as long as your car passes emissions' standards, and as such, many manufacturers will market their aftermarket performance parts as "race-only" or "strip-only" parts, meaning that the manufacturer does not condone the use of such parts on the "street" (that is, on roads that require emissions-legal cars).

## Mod Chip Usage Issues

Like turbos and blowers are legal for cars, a mod chip is legal for a video game console such as Xbox. Why, then, is there so much confusion on the matter? Video game manufacturers don't want you to install a mod chip because it undermines their control of product sales in each region. The bottom line here is that once you have purchased a product, you *own it*. You did not buy a *license* to use an Xbox; you did not *lease* your Xbox. It becomes your *property* at the time when you purchase it, and you are free to do with it as you wish. That is the fact that confuses many consumers, who somehow believe a video game console is like an album or movie. These products are the intellectual/creative property of the manufacturers or artists who create them; when you purchase a CD or DVD, you are buying the rights to use a copy of that product.

Since you do not *own it*, you may *not* make copies to give away or sell because all you have purchased is a *right*, not a *product*. That *right* is called a license. The DVD or CD is just a *container* for the digital content that you have a *license* to use. When you buy a game, you have acquired a license to use that game for its intended purpose (to play). Likewise, when you buy a DVD, you own a license that gives you the right to use that product for personal use, but not for a public performance. In other words, the license for a DVD grants you the right to watch it as often as you want, but you may not charge a fee to allow others to watch it. Likewise, you may loan or sell your copy of the license (in the form of the DVD) to others. That distinction is very important and is a serious source of confusion that surrounds the whole issue of intellectual property rights.

## The Difference Between Ownership and License

The key to this whole issue of ownership is not whether someone owns a *copyright* on a product, but whether someone owns a *license* to use a product. The physical product is not the license; it is the physical container of the licensed product (digital content in one form or another). When you purchase a DVD movie, you are not buying the “DVD” itself. You are buying a license! When you rent a movie or game from a rental store, that store temporarily assigns ownership of the product to *you*, for a limited fee. You must *return* ownership of the product back to the store, by the terms of the rental agreement. If you decide to keep (or lose or damage) the movie or game that you rented, then you must purchase the license *outright* from the rental store. The store cannot simply make a copy to replace the one that was lost because *you* were granted ownership of the license for a short period of time. Failure to return it incurred the cost of purchasing the product.

That is the reason it is illegal for a store to rent a *copy* of a DVD to you; doing so results in *two* copies of the licensed product: the original and the copy. The store might archive the movie away in a storage room and claim that it is not being *used* at the same time as the copy; however, that is not how copyright law works. The licensed product may be held by only a single entity (individual or company) at a time. When you rent that DVD movie or video game, the store actually *loses* that product and relies on your returning it in order to rent it again. Loss of the product requires the store to purchase a new copy.

Now, terminology is a very important issue because much of the confusion in copyright law is due to improper use of the terminology related to this issue. When you say that you own a “copy” of a movie, that is incorrect. If you purchase a new DVD movie, you own a *license* of that digital product. For instance, I just “bought” *Aladdin* on DVD. It’s one of my favorite animated films. I often *incorrectly* tell friends, “I bought *Aladdin*. Want to come over and watch it with me?” Disney still owns *Aladdin*. I just bought a license that gives me the right to watch this film whenever I want. But the tendency is to use incorrect grammar to describe the situation. Not that this is a big deal, but it does tend to affect one’s perception of the bigger issue.

## What Can You Do with a License?

Here is the critical issue at hand: When you own a license, you may transfer the digital product from one medium to another if you wish. You may even copy the medium and destroy the original if you wish. Why? Because you own a license of that product, not a license of the physical media on which it is stored. Unfortunately, without the original medium, proving that you are *still* the original licensee is impossible. Therefore, you must keep the original medium even if it is damaged, as proof that you own the license. If your favorite DVD is scratched beyond use, you are within your rights to use your backup copy, as long as you keep the original.



Let's discuss a scenario that may happen. Suppose you purchase a music CD. You really love this band, so you listen to the CD every day in your car as well as at home. Over time, the CD becomes scratched and begins to affect the quality of playback; eventually, the CD is no longer playable due to scratches on the surface (maybe you are careless with it?). Your only recourse is to purchase a new copy of the CD. By doing so, you have discarded your old license and acquired a new one. But there is a better solution. Instead of using the original CD that your *licensed product* is stored on, you can make a copy of that CD and then store the original in the retail case, kept in like-new condition in your music collection. Doing this is legal as long as only *one* copy is used at a time by *you* and *you alone*.

Therefore, you may not make two copies of the CD (for instance, one copy for your car, another for your home CD player) because that would involve the use of two licensed products. You will need to use the same copy in your car and home CD players, but not *two* copies. *That* is illegal! Further, because you are getting twice the enjoyment out of the product, you are ripping off the artists who created the music in the first place by paying them for a single license, while using two licenses.

Now let's see how copyright law affects your use of video games. It is illegal to download and play emulated arcade games with an emulator program such as MAME (Multiple Arcade Machine Emulator), unless you own a license for those games. Do you have the original arcade cabinets? If not, it is illegal to play emulated games! Of course, how practical is this argument? Practicality is of no concern to copyright law; unless you own a license, you may not use a product. If you own an old NES console with a huge game collection, it is perfectly legal for you to run an emulator on your PC or Xbox to be able to play those games. Where you acquire the ROMs is irrelevant because intended use follows the copyright law: You own the cartridges; therefore, you may legally play those games on any hardware device you wish (just as you may watch a DVD on any television set, using any DVD player). Not every license is the same, though, as there are some cases where the license specifically states that you may run one copy on the *intended* hardware.

## The Modded Xbox

An Xbox mod chip makes the Xbox behave more like a PC than a limited-use video game console. PC games are installed to the hard drive to speed up load times (while most PC games require you to at least *insert* the retail CD into the CD-ROM drive to verify *ownership* of the game). Likewise, you can install your Xbox games onto the Xbox hard drive and play them legally from that location, with or without verification. A mod chip allows you to do this, and it is legal to do so. In the same vein, you may load your music CDs and movie DVDs to your Xbox hard drive and play them using custom Xbox software, and these practices are also legal.

Why, if these activities are legal, do so many companies object to these practices? Because obeying the law is a voluntary matter, many companies in the movie and video game industries

prefer to enforce the law by limiting your use of their products in the first place, rather than relying on your personal choice to obey the law. This is akin to automobile manufacturers limiting the speed of your car based on the posted speed limits on the highway. Obviously, this is impossible by today's technology (although, perhaps in the future, roads will "tell" your car how fast it should travel and limit your car accordingly).

Manufacturers of digital media would prefer to physically limit your use of their products rather than rely on your personal choices to obey the law. This is a form of commercial control that consumers should discourage whenever possible. Such requirements to obey the law neither foster competition in the marketplace nor encourage innovation. Almost all innovation in the consumer electronics industry is due to consumer demand and utilization, not due to a decision by manufacturers to innovate. As long as consumers continue to purchase a product in large quantities, that manufacturer is under no obligation to innovate. Only by threat of competition will a company innovate (although new features may be introduced to foster even more sales). But when the entire industry agrees to force behavior on consumers, that leads to the centralized control of the marketplace, which is called a *cartel*.

No company has the right to disable a music CD or MP3 file after you have encoded it for digital playback from your PC's hard drive. This is a criminal act on the part of the company that created the playback software (and continues to operate only due to a lack of opposition). *You* have every right to encode a music CD onto your hard drive and listen to it however you wish. It is not up to manufacturers to enforce the law, just as it is not up to automobile manufacturers to enforce the posted speed limits.

You must understand what your rights are so that you will be able to enjoy the products you have purchased without breaking the law. Microsoft has every right to modify the architecture of the Xbox to thwart the activities of mod chip makers, which, in turn, have every right to modify their mod chips to suit. An automobile manufacturer has the same right to modify an engine to thwart the aftermarket car performance industry (although manufacturers usually support the aftermarket).

## Why the DMCA Does More Harm Than Good

What about the Digital Millennium Copyright Act? The DMCA has been chosen as a defense by many digital content providers to thwart legal utilization of licensed digital products. The CSS encryption algorithm used in DVD movies is one such example. Cracking CSS was not an illegal act, but the DMCA was used to prosecute the individual(s) who cracked CSS—and the algorithm is now widely shared on the Internet. The DMCA was created through lobbying of lawmakers in the United States and should be feared by consumers because it has been repeatedly abused in violation of individual rights and has thwarted innovation and competition in the marketplace.

If a company has millions of dollars available for an extended legal battle, can any individual afford to defend himself/herself, even if the plaintiff is in the wrong? Of course not! That is the travesty of the DMCA: It was invented by companies involved in the production of digital products, who know full well that no individual has the ability to defend himself/herself legally (unless class action can be brought to bear, which is almost impossible on the defending side of a case).

I am a consumer with as varied a level of interests as anyone else. I enjoy the digital products that are created by talented and creative people; however, I disagree with the methods imposed by the manufacturers and publishers of the digital content that I otherwise enjoy. I respect the artists and filmmakers but dislike the predatory behavior of their publishers. Therefore, my desire is to purchase and use licensed products in a legal manner so that the DMCA and other laws cannot be used against me.

I *love* to play games, listen to music, and watch movies. This is a serious pastime that I enjoy on a daily basis. Therefore, I support the talented people who create these products by purchasing their products (or rather, licenses thereof). The legalities of hardware devices go away when you are the legal owner of every licensed digital product that you use. If you do own every game that you play, no argument will *ever* be made against you on proper use of those digital resources. I understand that some consumers use digital products illegally; however, their numbers are not as extensive as reported by agencies such as Recording Industry Association of America (RIAA). Laws and hardware/software schemes are putting unnecessary limits on the majority of legal consumers due to the illegal acts of a minority.

## What Can You Do with a Mod Chip?

One of the coolest things you can do with your modded Xbox is run homebrew software such as Xbox Media Center or a custom version of Linux. Some homebrew software was supposedly compiled with official Microsoft tools outside the realm of the official development process. There is also an open source Xbox Development Kit (OpenXDK) in the works (meaning it is not completely functional and fully featured yet) that has been used by homebrew developers to come up with some fantastic applications and games for Xbox.

### Xbox Media Center (XBMC)

Xbox Media Center is an open source project at [www.xboxmediacenter.de](http://www.xboxmediacenter.de) and hosted on SourceForge.net. XBMC turns your Xbox into a media center PC and looks similar to the Media Center edition of Windows (see Figure 4.1). With XBMC, you can view digital photos, play video files (such as AVI and MPEG2), play audio files (such as MP3 and WMA), and even launch games.

Xbox Media Center is my absolute favorite Xbox application because it really allows me to do what I've always wanted to do: bridge the gap between my entertainment center and my PC. I have never liked the “multimedia PCs” and “media center PCs” available at retail because these hybrid devices are too much PC and not enough media center, by trying to satisfy both camps at the same time. Xbox Media Center completely nails the solution by being easy to use; able to link to the PC LAN; and able to connect to the Internet for updates, skins, and application downloads. It is *totally* awesome. Truth be told, I have two Xboxes, each equipped with 250GB hard drives. One sits on a shelf in my entertainment center, controlled with the Xbox DVD remote control, running XBMC. My other modded Xbox is used just for playing games.



FIGURE 4.1 Xbox Media Center.

## Homebrew Games

One of the most interesting things you can do with a modded Xbox is run homebrew games created by an enthusiastic and creative Xbox development community that functions outside the normal “licensed” retail realm. Many games already available for Xbox will probably never see a retail shelf, but that doesn’t mean they will go unappreciated. Thanks to a mod chip, you can enjoy these homebrew games. Figure 4.2 shows a game called xBomberbox2, a homebrew game inspired by Bomberman. This is just one example of the many scores of homebrew Xbox games available on the Web.



**FIGURE 4.2** xBomberbox2 is a homebrew Xbox game.

## Overview of Available Mod Chips

Many mod chips available for Xbox date back to early 2002. The earliest mod chips (such as Enigmah and LPC) work with only the first few Xbox revisions, which is fine if you own an early Xbox (usually 1.0, 1.1, or 1.2), but will not work with later revisions. The war, it seems, between Microsoft and the mod chip manufacturers achieved something of a stalemate when Xbox 1.6 was released, which pretty much wiped out the mod chip community with its significant architectural changes. However, the persistent mod chip makers soon found ways to adapt their most recent mod chips to support 1.6. The only drawback to owning a revision 1.6 is that even the solderless mod chips require some soldering because Microsoft removed the power source and some of the data lines from the usual connections relied upon by the mod chips. So, if you have a late-model Xbox, you can still use a “solderless” mod chip, but you will have to solder a couple of wires to reattach the power source to the LPC (an expansion port on the motherboard that mod chips are connected to).

The obvious question arises as you are reading this section: Where can I buy a mod chip? I will not give you any links in this book because the Web is so dynamic. You will not find a mod chip in a retail electronics or video game store. Instead, I recom-

### CAUTION

I recommend against sending your Xbox to a modder for mod chip installation. Many are honest and reliable, but some are not; you may never see your Xbox again. It is best to learn how to install your own mod chip!

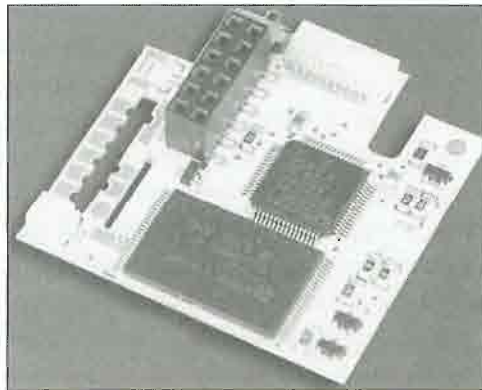
mend that you perform a simple Web search for any of the mod chips listed in the following sections of this chapter using Google, Yahoo, or another search engine. My only recommendation is

that you do a little research before you slap down the cash, to be sure you don't place an order with a disreputable fly-by-night online store. It is best to browse a site for historical news items or an online forum to see how long the site has been around. Chances are, if a **mod chip supplier** has been around for at least a year, the store is probably reputable. If you are at all concerned, contact the store owner and ask a few questions (such as which mod chip he/she recommends) to determine the person's knowledge of Xbox modding before sending any money. You may also want to search a mod chip manufacturer's own recommended list of suppliers, usually available from the manufacturer's website.

## Xenium

Xenium, shown in Figure 4.3, is a very nice mod chip with a lot of built-in features and attractive and fully featured O/S. One such feature is an 8-bank flash memory chip for storing multiple BIOS images inside the Xenium (allowing you to boot many different dashboards and BIOS revisions that you need). Like Xecuter and SmartXX, Xenium can clone the stock hard drive onto a new hard drive, with full hard drive lock code transfer. Xenium has a built-in LED that you can customize to show in several different colors based on the BIOS bank that is running (with an included external LED for attaching to the front of your Xbox). Xenium also supports an LCD display panel.

Xenium is extremely easy to configure due to a built-in FTP server. Using your PC, you can connect to Xenium and transfer a new BIOS and dashboard to the Xbox directly via LAN. An optional USB flash stick is also available for installing new BIOSes and dashboards without using a LAN connection. The Xenium is easy to install via solderless adapter or soldered pin header. Xenium has many more features built into the Xenium O/S.



**FIGURE 4.3** Xenium mod chip created by Team Xodus, [www.teamxodus.com](http://www.teamxodus.com).

## Xecuter

The Xecuter3 mod chip, shown in Figure 4.4, is produced by TeamXecuter; you can find details about this mod chip at [www.teamxecuter.com](http://www.teamxecuter.com).



Xecuter3 is one of the most feature-rich mod chips available, which includes an LCD display that you can affix to the front of your Xbox for use with XBMC to display the current media file being played. X3 includes a hard drive activity LED, network activity LED, and in the opinion of one Xbox modder, “is more complex than the Xbox itself.” The only drawback to this feature-rich mod chip is that it does not work with a solderless adapter and must therefore be soldered (via a pin header). (However, an Xecuter Lite chip with solderless adapter is available.) This is an advanced mod chip for experienced modders and is a good choice for an Xbox that will be used mainly as a media center or for homebrew development. Like Xenium and SmartXX, Xecuter3 can clone the stock hard drive onto a new hard drive, with full hard drive lock code transfer. Xecuter has many additional features built into the O/S.

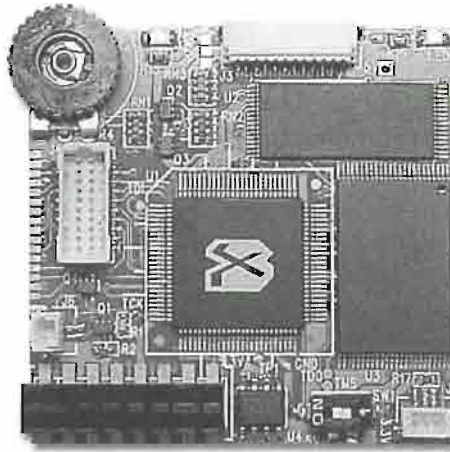
## SmartXX

SmartXX, shown in Figure 4.5, is another excellent mod chip for experienced modders who want loads of functionality in a small package. SmartXX has an optional LCD and is pin-compatible with the Xecuter on LCD support.

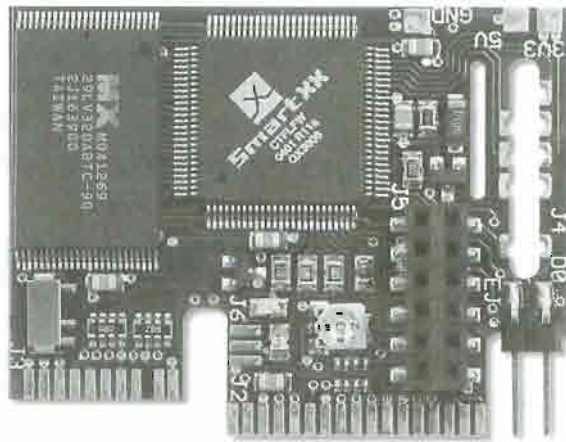
SmartXX can clone the stock Xbox hard drive partitions to a new (larger) hard drive, like the Xecuter and Xenium. SmartXX also supports networking, with the ability to install BIOSes and dashboards via FTP using your PC, and it has many additional features built into the O/S.

## XBIT

The XBIT mod chip, shown in Figure 4.6, supports Xbox revisions 1.0 to 1.5 (but does not support 1.6). This older mod chip works well with older Xboxes and is easy to install because the mod chip has built-in



**FIGURE 4.4** Xecuter3 mod chip created by TeamXecuter, [www.teamxecuter.com](http://www.teamxecuter.com).



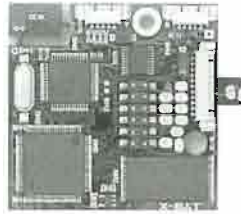
**FIGURE 4.5** SmartXX mod chip is created by the SmartXX team, [www.smartxx.com](http://www.smartxx.com).



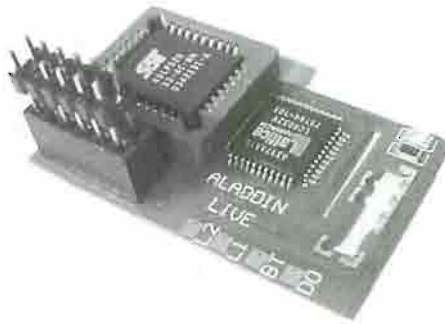
spring-loaded pins and screw holes allowing you to screw the mod chip directly onto the motherboard without a solderless adapter.

## Aladdin

The Aladdin mod chip, shown in Figure 4.7, is a solder-only solution that comes with an optional flash programmer (for upgrading the mod chip BIOS) and is a low-cost mod chip that may appeal to those wanting a no-nonsense modification to their Xbox. Aladdin has all the built-in support of the more expensive mod chips but lacks the bells and whistles that raise the cost of other mod chips.



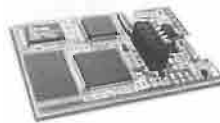
**FIGURE 4.6** XBIT mod chip is created by DMS Technologies, [www.dms3.com](http://www.dms3.com).



**FIGURE 4.7** Aladdin mod chip.

## X-Chip

The X-Chip mod chip, shown in Figure 4.8, is another late-generation mod chip that supports Xbox revisions 1.0 to 1.6 and includes a solderless adapter (although Xbox 1.6



**FIGURE 4.8** X-Chip mod chip.

requires a minor wire soldering to bring a power source back to the LPC). X-Chip is simple in design and lacks some of the features of other recent mod chips. X-Chip comes with 4MB of flash memory with plenty of room for storing up to 16 BIOS images, including the Cromwell BIOS (which is Linux-based) that can be upgraded using the included USB programmer.

## Before You Install a Mod Chip...

The fact of the matter is, you can install any type of mod chip that you want and achieve the same basic result of being able to run homebrew games and region-free media on your Xbox. Many different mod chips are available, as you saw in the preceding sections; choosing one over the other entirely depends on which features matter most to you.

I have chosen to go with Xenium because it is a modern mod chip that supports both the latest revision of the Xbox (1.6 at the time of this writing) and the solderless adapter. Some mod chips

have more features, such as the LCD display, but usually require soldering. In my opinion, solderless is a strong feature that is more important. (I go into this issue in more detail in a moment.) As far as features go, you should choose a mod chip that will satisfy your goals for using your Xbox. If you just need basic functionality, choose a less expensive chip; but if you want features galore, choose a “better” mod chip. Also keep in mind that you will want to identify your Xbox revision before choosing a mod chip because not all of them support the latest revision.

**NOTE**

A note on revisions: At the time of this writing, there have been seven (7) revisions to the Xbox, from 1.0 to 1.6. I fully acknowledge that a 1.7 might come out after this book has been published, rendering some discussions in this book out-of-date. The best option is to buy a used Xbox and then use a known mod chip with the feature set you desire. But if you own a late-model Xbox of revision 1.7 or later (which is not confirmed at this time), just refer to the features offered by the most recent mod chips to see whether they support a new Xbox revision. So, to future-proof this book, I recommend you look up any minor changes required to support new revisions, after which the information in this book is otherwise the same.

You can do two basic types of installation:

- Solderless: Simple installation
- Soldered: Complex installation

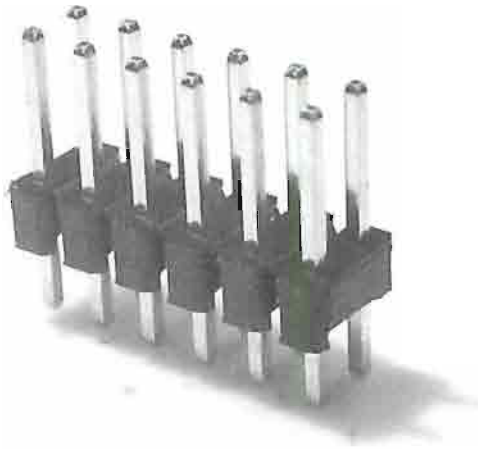
The advantage to a solderless mod chip installation kit is that it is relatively easy to install and is not permanent. So, if you buy a new Xbox, you can transfer the mod chip to the new unit. The main drawback to a solderless mod chip is that it can come loose if the Xbox is jarred or dropped (usually a bad thing in any event!), or may come loose from simple vibration while the Xbox is being moved (when you take it to a LAN party, for example). Also, the latest Xbox revisions (1.5 and 1.6) will not work with a solderless adapter due to changes in the motherboard that require some soldering.

The advantage of a soldered mod chip is that it is solid and sturdy, will not come loose, and is more reliable because the electronic leads are fused rather than simply touching. The soldering work is more difficult than a solderless adapter, but is more professional and longer lasting. If you are serious about Xbox gaming, I recommend soldering a pin header to your Xbox motherboard (covered in the next chapter). Figure 4.9 shows a typical pin header. A pin header will allow you to easily install or remove the mod chip, but the leads will be soldered, so you have convenience and stability. Pin headers are cheap, whereas the mod chip is not, so you can transplant the mod chip if the motherboard ever fails by simply soldering in a new pin header to the new Xbox.

If you have never installed a mod chip before, I recommend performing a solderless install just to get started. You can solder in a pin header later if you really like the mod chip and want to make it pseudo-permanent.

## Summary

This chapter provided an overview of the mod chips available for Xbox, with descriptions of each mod chip, its capabilities, compatibility, and features. I hope you have gleaned enough information about the available mod chips from this chapter that you will be able to decide which one you would like to purchase for your Xbox. If you already have a mod chip, you will find the next two chapters of interest, as they explain in detail how to install a solderless as well as soldered mod chip.



**FIGURE 4.9** A typical pin header that is soldered to the Xbox motherboard.

# Installing a Solderless Mod Chip

Here are the key points covered in this chapter:

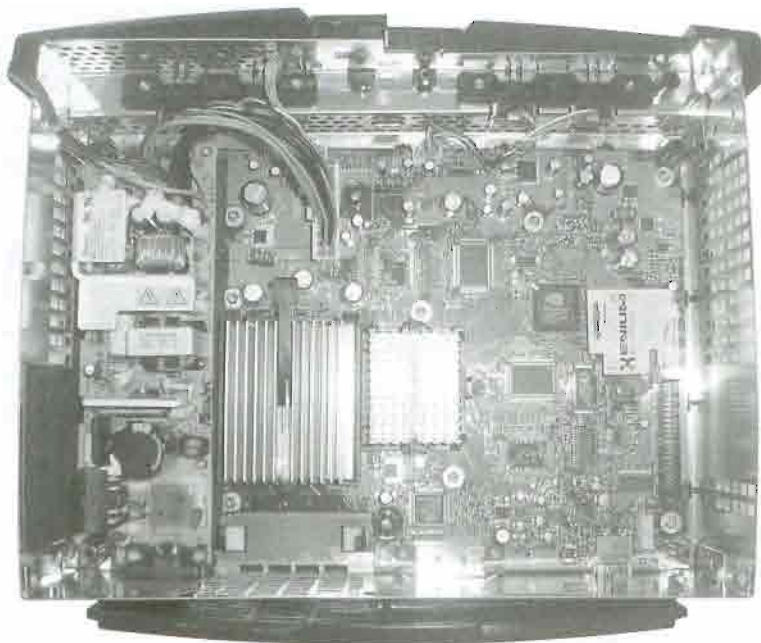
- Locating the LPC port
- Locating the D0 point
- Fixing a pre-soldered LPC
- Installing the solderless adapter
- Installing the mod chip

**T**his chapter explains how to install a mod chip into an Xbox using a solderless adapter. The Xenium chip is used as an example, but most other mod chips are installed in the same exact way that is covered in this chapter. By the time you have completed this chapter, you will know how to install a mod chip for any but the newest revisions of the Xbox (which are covered in the next chapter).

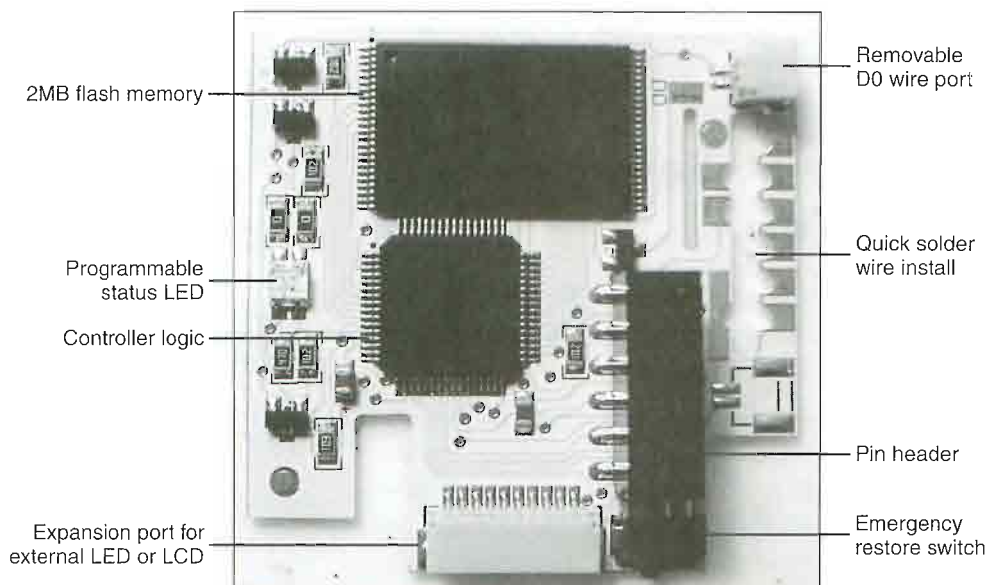
## Solderless Xenium Installation

For the sake of brevity, I have chosen to feature the Xenium chip in this chapter on installing a mod chip (shown already installed in Figure 5.1).

Because all of the mod chips now basically use the same pin header and solderless adapter, the instructions in this section are conveniently applicable to other mod chips. In other words, the main difference is between the solderless pin header and the soldered pin header. I will cover the installation of a solderless pin header along with the Xenium mod chip in this chapter, and the soldered pin header in the next chapter. Figure 5.2 shows the Xenium chip with key components labeled.



**FIGURE 5.1** The Xenium installation is similar for all mod chips.



**FIGURE 5.2** Key components of the Xenium mod chip.

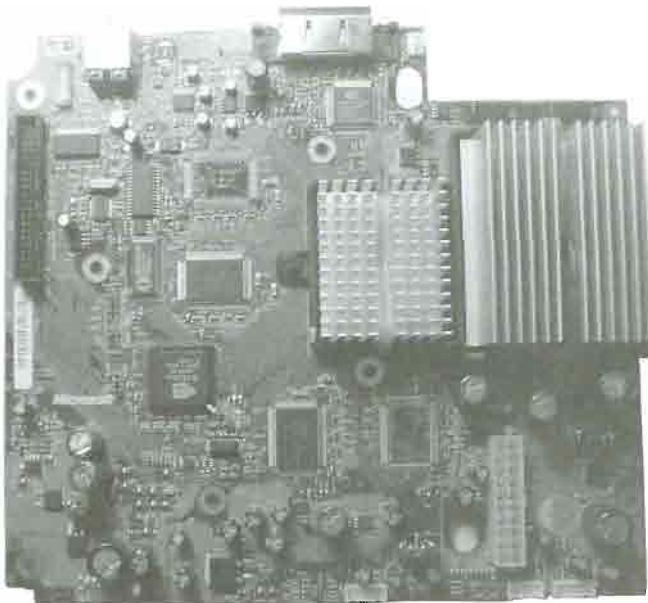
The first step to install a mod chip is to disassemble your Xbox, which I presume you have done already, per Chapter 2, “Disassembling Your Xbox.” The next step is to identify the version of your

Xbox, per Chapter 3, “Identifying Your Xbox Revision.” If you have not read these chapters yet, you will be at a disadvantage as you read on because a lot of vitally important information that you will not want to miss is covered in those two chapters.

There are so many discrepancies and oddities in the manufacture of the Xbox that I have had problems with mod chip installations that should have been straightforward and simple. The most common problem arises when you have a late-model Xbox with architectural changes that have changed the install points of the mod chip or when you have an early motherboard with filled-in LPC points.

## Locating the LPC

The LPC is a port on the Xbox motherboard that is used to update the Xbox BIOS at the factory (see Figure 5.3). The LPC also seems to be used for debugging, which would mean that the same motherboards are used in retail consumer Xboxes as are used in Xbox Development Kits (XDKs). In this case, the LPC has an interface soldered onto it for connecting the “development” version of an Xbox to a PC with the Xbox development tools installed (which would allow a game developer to compile code and run it directly on the Xbox).



**FIGURE 5.3** The Xbox motherboard—revision 1.3.

Motherboards are mass-produced by the hundreds of thousands, so this inventory stock of motherboards cannot simply be thrown out when a new BIOS upgrade is developed. At least, that was the theory until 1.6 was developed with a static (not flashable) BIOS, which put the hobby modders out of business.



Although you can use an aftermarket mod chip on a 1.6 Xbox, the built-in BIOS on the Xbox motherboard itself can no longer be flashed. In “the old days,” modders would actually just flash the Xbox BIOS itself rather than use a mod chip! Pretty crazy, isn’t it? Microsoft killed that practice by making many changes to the 1.6 motherboard, by modifying the LPC and using a read-only BIOS. The good news is that 1.6 (and later) owners can still mod their Xboxes, but a little extra work is required (as noted later in this chapter).

### LPC Port on 1.0–1.1 Motherboard

The LPC port is shown in Figure 5.4 for Xbox revisions 1.0 and 1.1. As you can see, the LPC points are pre-soldered! This is fairly common for revision 1.1 but doesn’t seem to have been done on any other revisions. I think it’s possible that this was Microsoft’s first attempt to block mod chips that used the LPC, by filling the LPC holes. However, the modders then started using the filled holes as tinning for soldering wires directly to the LPC—which was actually easier!—so the change was not done in 1.2 or later versions. It appears that some 1.0 motherboards also featured the pre-soldered LPC holes. In either case, you will have to remove the solder from the LPC holes before you can install a mod chip (solderless or otherwise). The alternative is to do a wired installation, but this is just as difficult as removing the solder from the LPC points, so I recommend the latter solution. See the section “Fixing a Pre-Soldered LPC” later in this chapter for details.

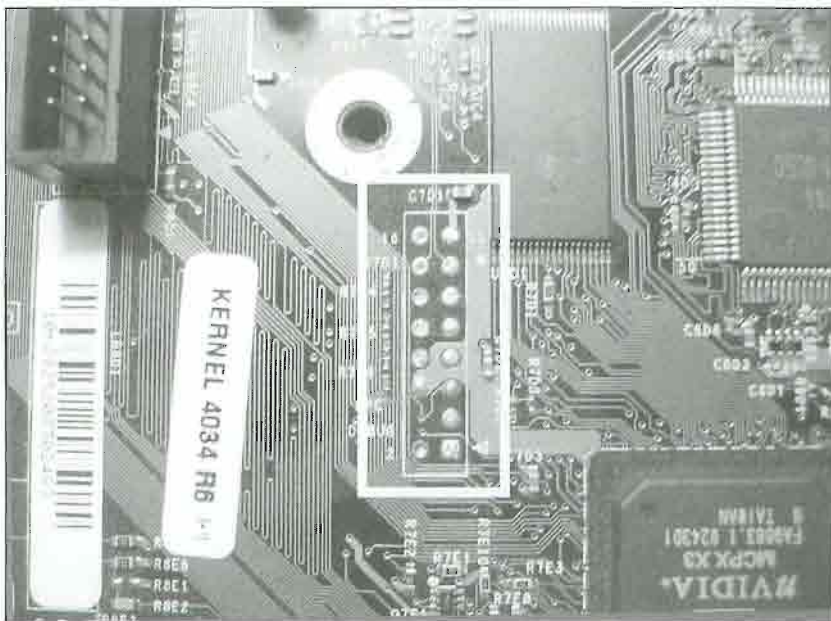


FIGURE 5.4 The LPC port on an Xbox 1.0–1.1.



## LPC Port on 1.2–1.6 Motherboard

The LPC port is in the same location on an Xbox revision 1.2 or later as it is for 1.0 and 1.1, but the layout of the motherboard is somewhat different, so a photo of each is helpful here. Figure 5.5 shows a close-up of the LPC on an Xbox revision 1.3 motherboard, which should look the same on 1.2 and 1.4.

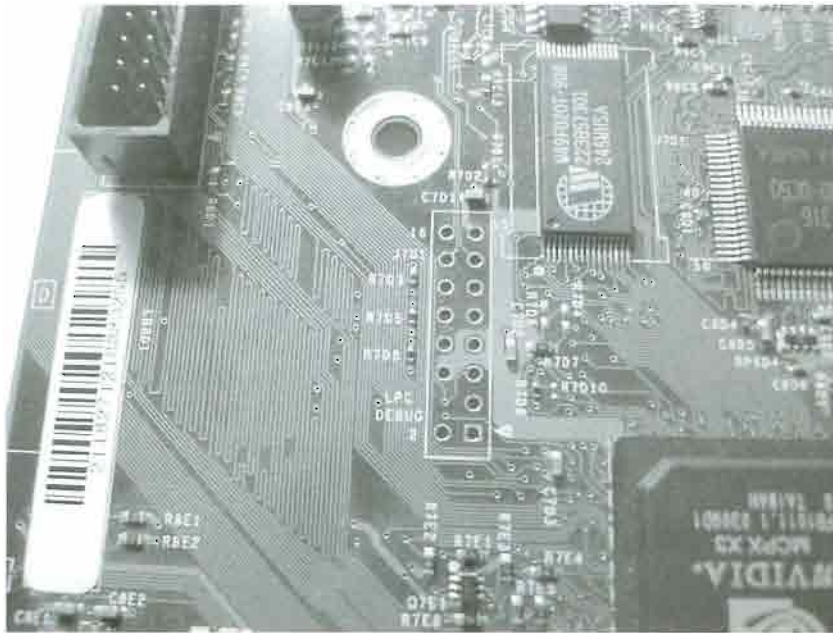


FIGURE 5.5 The LPC port on an Xbox 1.3.

## Fixing a Pre-Soldered LPC

If you are unlucky enough to have a pre-soldered LPC (as you saw in Figure 5.4), you'll need to remove the tin from the LPC to open the holes to allow a pin header (solderless or not) to be installed for a mod chip.

If you find that you will have to take this step, I strongly recommend removing the entire motherboard from the Xbox case; setting it on an antistatic mat; and working on the LPC without the Xbox case, cables, and accessories getting in the way. It is much easier to work when you

### CAUTION

When you reinstall the motherboard, be sure to replace *all* 11 screws (or just 10 screws on a 1.6), because the screws keep the motherboard from rubbing against the pegs that could scrape leads off the motherboard if the Xbox is moved around a lot without a fully mounted motherboard.

can get up close to the LPC with your soldering iron. And, if you read Chapter 2, you know that it's not difficult to remove the motherboard, and there's no harm in doing so. You can easily screw it back in after you are done installing the mod chip.

Here is a quick explanation of how to clear the LPC points from pre-solder. You will need a firm, small wire, such as wire braid or a pin from a mod chip pin header. You will need a soldering iron to heat up the pin, so you will need to buy a soldering iron even if you want to install a solderless adapter. Sorry, but it's just one of the exceptions for owners of early Xbox revisions (at least, those with a pre-soldered LPC) that cannot be avoided. Hold the small wire/pin with needle-nose pliers and heat the top of the wire with your soldering iron while touching each point on the LPC that must be opened.

At this point, take care because *not every point needs to be opened!* Points 4 and 6 are not needed. Look at Figure 5.6 for an illustration of which LPC holes you should open.

Figure 5.7 shows the solderless pin header for your reference. Note that the pin header image is inverted from the image of the LPC. To compensate, visualize the pin header (in Figure 5.7) tilting down toward you until the pins are facing down, and that is the orientation of the pin header onto the LPC.

Using the heated wire/pin, touch each of the LPC points that you need to open, and the solder should melt and attach to the wire/pin. I recommend that you do not use a suction desolderer because that may damage the leads on the motherboard. Take your time and be precise and meticulous in your work, and try not to be in a hurry.

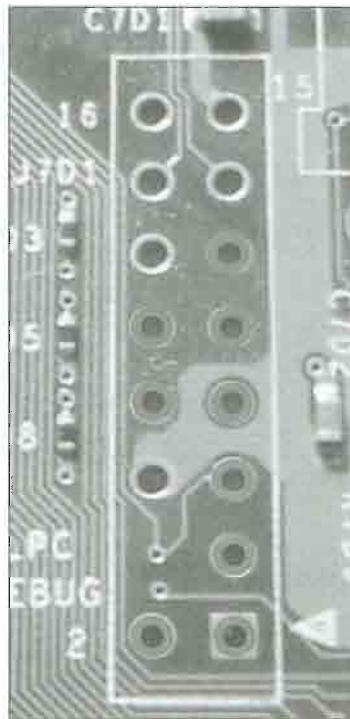


FIGURE 5.6 The LPC points with labels.

## Locating the D0

The “D0” (dee-zero) is a point on the motherboard near the LPC that must be connected to the mod chip to provide a complete interface to the Xbox system bus. There are basically two

different positions for the D0 based on the Xbox revision.

### **D0 Point on 1.0–1.1 Motherboard**

The early Xbox revisions (1.0 and 1.1) have the D0 point shown in Figure 5.8. If you are indeed installing a Xenium, you may want to use the D0 wire included in the Xenium kit and solder it to the D0 point on the motherboard, especially if you can't make the spring-pin stay in position. That is why the D0 wire was included with the Xenium kit. I have found that I am able to keep the D0 spring-pin (attached to the solderless adapter) on the D0 point by carefully pushing it into the D0 hole and then gently positioning the solderless adapter leads onto the LPC and screwing it down. As far as I know, the D0 point is at the same location for both 1.0 and 1.1.



**FIGURE 5.7** The solderless header showing the pins.

### **D0/LFRAME Point on 1.2–1.6 Motherboard**

The D0 point (called LFRAME on 1.6) is in a different location on more recent Xbox revisions (1.2 to 1.6), as shown in Figure 5.9. As far as I know, the D0 is the same for revisions 1.2 to 1.4, but you should just scrutinize your motherboard carefully because some cases may have unusual differences (as has already been noted).

## **Installing the Solderless Adapter**

If you have cleared out the pre-soldered LPC points or if you have an Xbox that already had open LPC points (which is the most common case), you are ready to install the solderless adapter, which is what I'll go over next. First, let's get our bearings. Take the solderless adapter in your hand and examine it (see Figure 5.10). Take note of how the D0 wire points down and the pins below are springy. This is the orientation (with pins facing down) of the adapter as it will be placed on the motherboard.

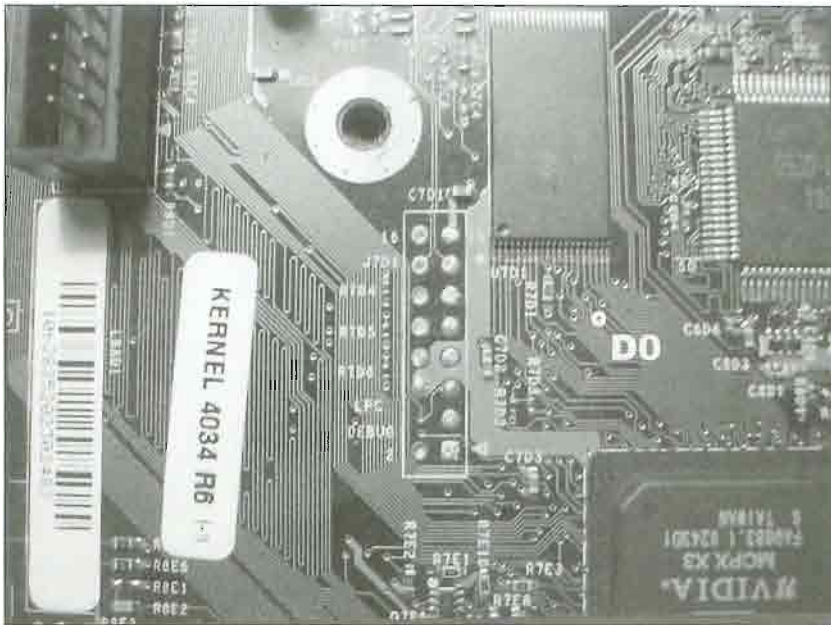


FIGURE 5.8 The LPC port on an Xbox 1.0-1.1.

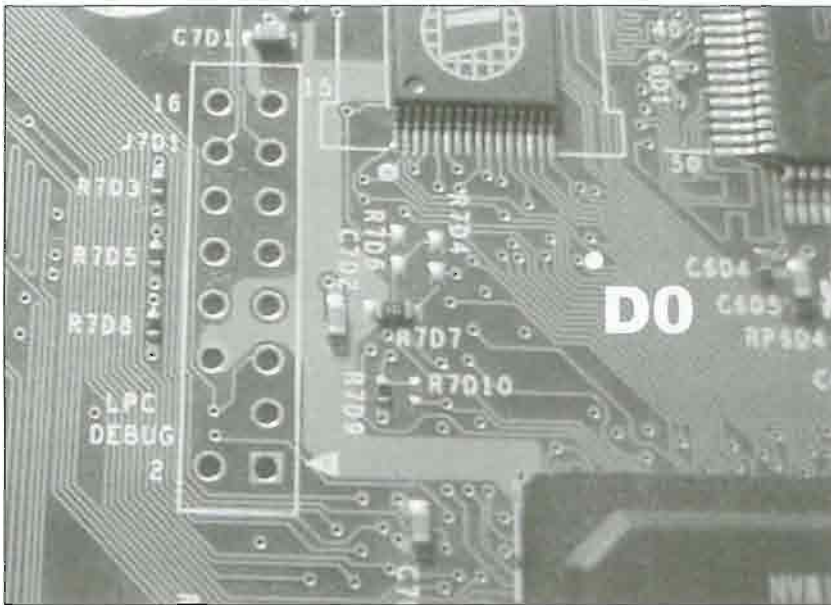
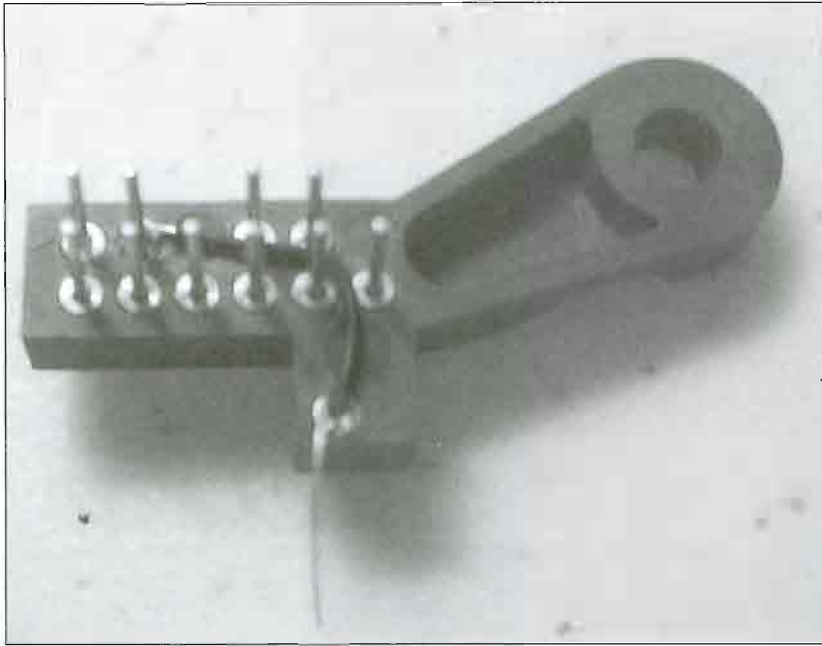


FIGURE 5.9 The LPC port on an Xbox 1.2-1.6.

Figure 5.11 shows the solderless adapter next to the LPC in the correct spot. Note the position of the adapter's screw hole near the motherboard screw hole. There is really only one way that the

adapter can be affixed to the motherboard, so I don't expect any confusion on the matter. The D0 wire must point down, and the springy leads on the bottom of the solderless adapter are meant for the LPC points.



**FIGURE 5.10** The solderless header is installed over the LPC port.

Now you will need to determine where the D0 point is located, based on the information presented in the preceding section. I am basing this install on a 1.3 motherboard, which should look similar to any other motherboard in the 1.2–1.6 revision group. If you have a 1.0, 1.1, or some as-yet-unknown *new* revision, just be sure you check with the mod chip manufacturer for information on installing the mod chip, including how to locate the D0 point. In any event, it is always located near the LPC.

After you have positively located the D0 point on your motherboard, you should then *gently* insert the D0 spring-wire on the solderless adapter into the D0 hole (see Figure 5.12).

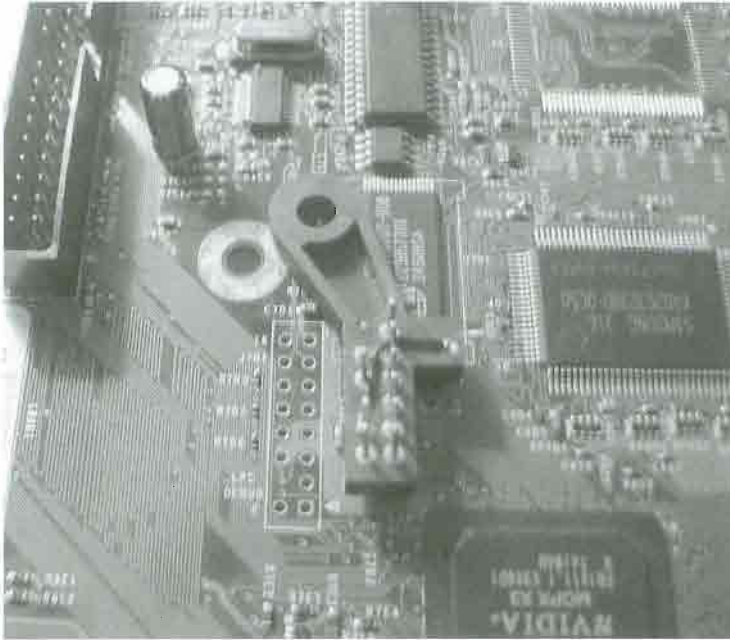
After you have the D0 pin positioned, you can *gently* position the solderless adapter over the LPC points while keeping the D0 pin still inserted into the D0 point on the motherboard, as shown in Figure 5.13. If you are careful, you should

#### CAUTION

I can't stress enough how careful you must be to avoid breaking the D0 pin. The D0 is as critical as any pin on the header, and the adapter is useless if the D0 breaks off.



be able to screw the solderless adapter onto the motherboard using the provided screw—which is the same as a regular Xbox motherboard screw, except that it is slightly longer to account for the centimeter or so height of the solderless adapter.



**FIGURE 5.11** Positioning the solderless adapter near the LPC.

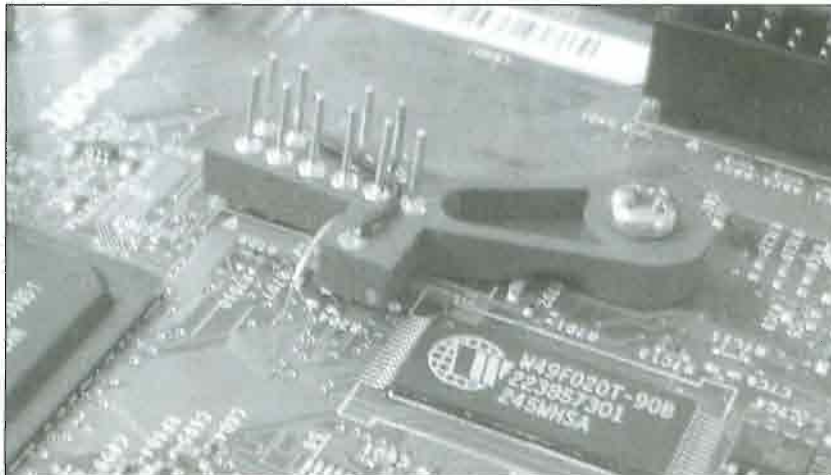


**FIGURE 5.12** Seating the D0 pin into the D0 point on the motherboard.



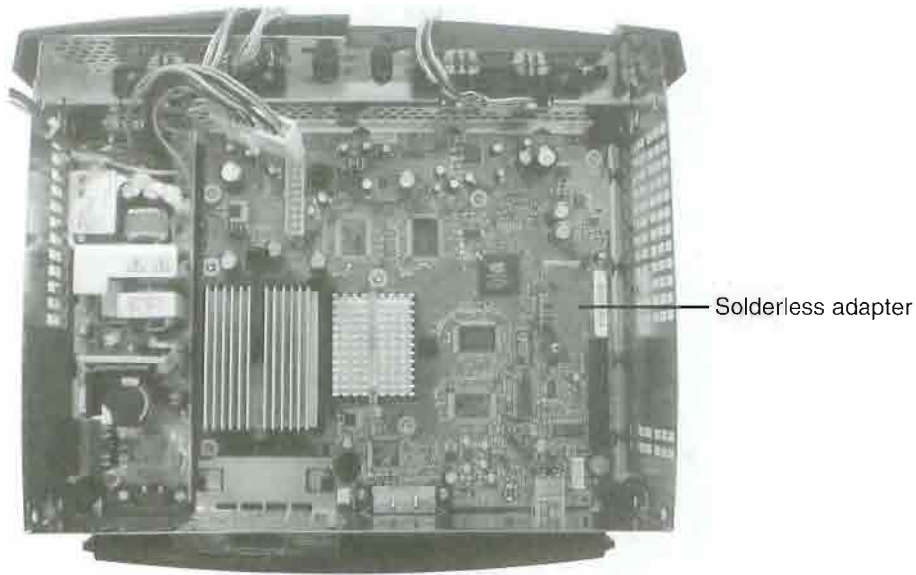
**FIGURE 5.13** The solderless adapter has been screwed down to the motherboard.

Figure 5.14 shows a close-up view of the solderless adapter after it has been successfully installed. For your reference, I have also provided you with Figure 5.15 to show the entire Xbox with the solderless adapter in position.



**FIGURE 5.14** Close-up view of the installed solderless adapter.



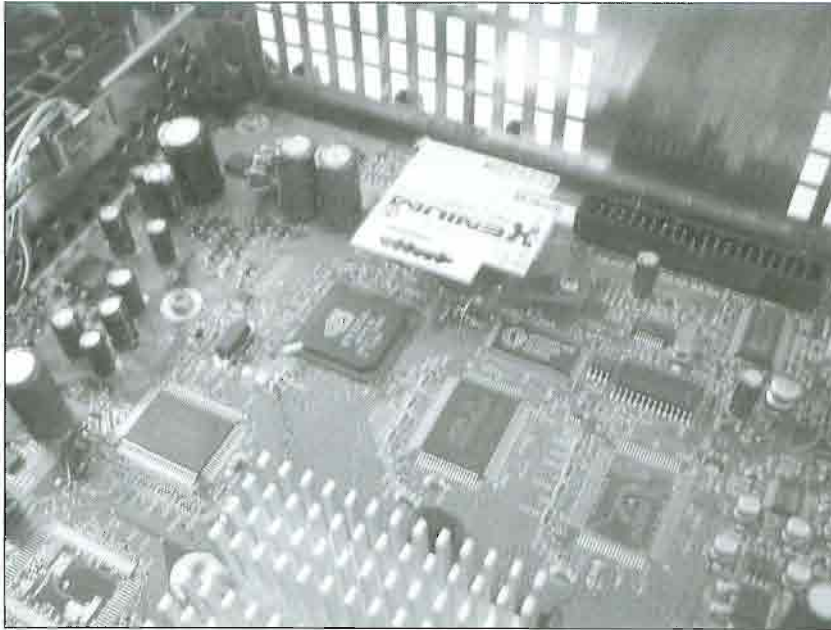


**FIGURE 5.15** Bird's-eye view of the solderless adapter.

## Installing the Mod Chip

Now that the solderless adapter is installed, attaching the mod chip itself to the “new” pin header on the solderless adapter is a simple matter. The mod chip is attached to the solderless adapter using the pin header on the mod chip. It should be affixed to the adapter in only one direction, as shown in Figure 5.16.

The mod chip fits nicely over the adapter, leaving plenty of room for the DVD-ROM drive that is fit snugly over the motherboard on that side of the Xbox. Figure 5.17 shows the final result.



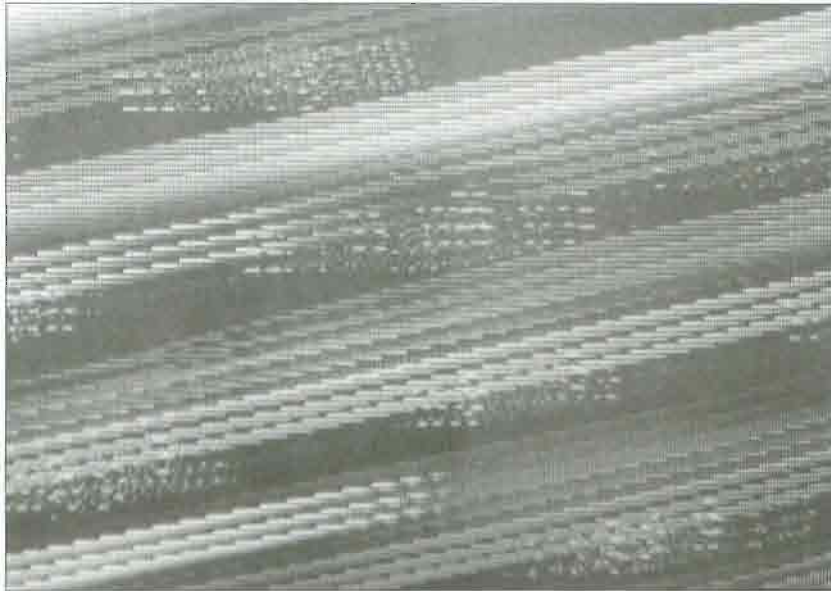
**FIGURE 5.16** Attaching the mod chip to the solderless adapter.



**FIGURE 5.17** The mod chip has been successfully installed.

## Booting Up the Mod Chip

Before you eagerly reassemble your Xbox, make sure the mod chip is working properly by booting up your Xbox with the components still removed (yes, you can power it up with the hard drive and DVD-ROM drive removed). If your Xbox displays output that looks like Figure 5.18, don't worry; that's a problem with the high definition video kit. You will need to use the standard video cable that comes with the Xbox rather than an enhanced video cable because the mod chip doesn't like HDTV (at least on first boot up!).



**FIGURE 5.18** The mod chip doesn't like HDTV at first boot.

If you have the standard video cable installed, you can power up your Xbox. If all goes well, you should be rewarded with a screen that looks like Figure 5.19.

If you don't get any video, there is probably a problem with the installation of your mod chip, and you will probably notice red flashing on the eject button LED to indicate a problem. If you do have a problem, my first suggestion is to remove the mod chip from the adapter and then try to boot up again. If your Xbox fails to boot with just the solderless adapter (and no mod chip), you have crossed a wire, you have mounted it incorrectly, or there is a problem with the D0/LFRAME connection. Carefully review your installation of the solderless adapter and start over if necessary. If you have carefully seated the adapter, the Xbox should boot up normally with the mod chip *not installed*. That is a good sign that the solderless adapter is good to go, and you should be able to plug in the mod chip.



**FIGURE 5.19** The mod chip is working!

## Summary

This chapter explained how to install a mod chip into an Xbox using a standard solderless adapter. I focused on the Xenium mod chip because installation for this chip is very easy, it supports a solderless adapter, and it is a good chip for beginners. If you have a different mod chip, chances are that the installation procedures discussed in this chapter will be the same, or at least similar.



# Installing a Soldered Mod Chip

Here are the key points covered in this chapter:

- Removing the motherboard
- Installing a pin header
- Installing the D0 wire
- Xbox revision 1.6
- Rebuilding the LPC
- Installing the LFRAME wire
- Troubleshooting

**T**his chapter explains how to install a mod chip into your Xbox by soldering a pin header to the Xbox motherboard. The pin header allows you to remove the mod chip any time you want, and even switch to another Xbox if necessary without buying a new mod chip. A pin header also makes it possible to remove a mod chip for a BIOS flash update, to replace a damaged mod chip, or even use a different mod chip if a newer model comes out. If you are using a mod chip other than Xenium, refer to the installation manual that came with your mod chip (or refer to the manufacturer's website for documentation). Installation for any mod chip should be similar to the instructions in this chapter.

## Removing the Motherboard

You absolutely must remove the Xbox motherboard to solder in a pin header, but don't worry, because removing the motherboard is even easier than opening the case and removing the drives. There are 11 Torx screws holding down the motherboard prior to 1.6, and 10 screws holding down a 1.6 motherboard. If you skipped over Chapter 2,

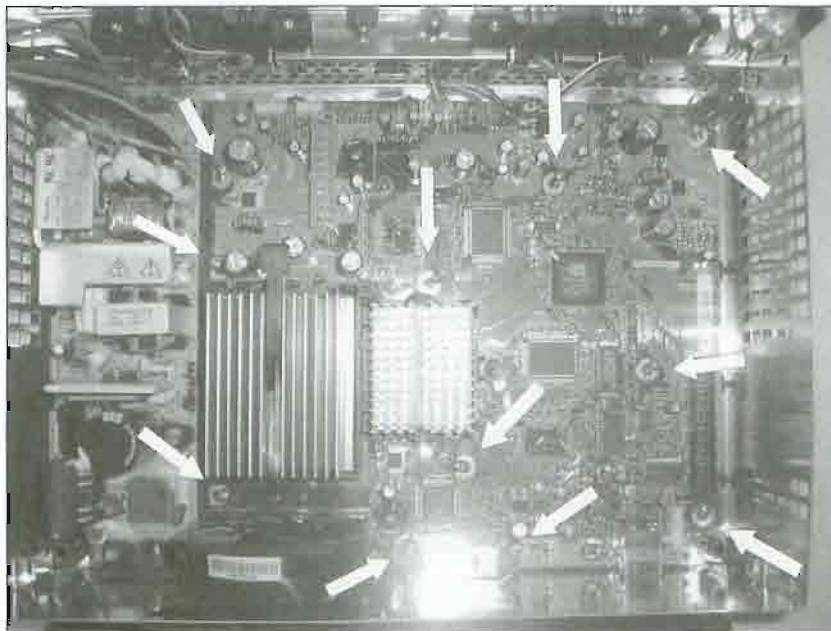


“Disassembling Your Xbox,” you may want to refer back to that chapter for instructions on how to take apart your Xbox. When you have your Xbox down to the case and motherboard, you can refer to

Figure 6.1 for an illustration showing the 11 screws that must be removed on pre-1.6 motherboards. The 10 screws in 1.6 motherboards are located in similar locations, so you will have no problem finding them all.

**NOTE**

If this is the first time you are attempting to install a soldered mod chip, I recommend you read these instructions through completely at least once before attempting to start the install



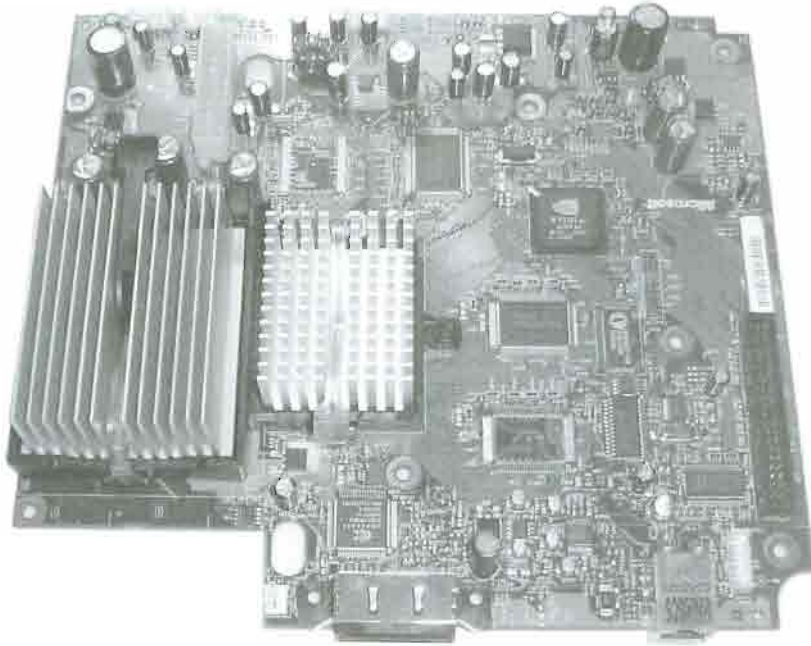
**FIGURE 6.1** Eleven screws hold down the pre-1.6 motherboard.

Figure 6.2 shows the top of a 1.3 motherboard, and Figure 6.3 shows the bottom of the same. Note the position of the various chips and locate the LPC. The LPC is located where you might have installed a solderless adapter and is the same place where a pin header will be installed (via soldering) in this chapter.

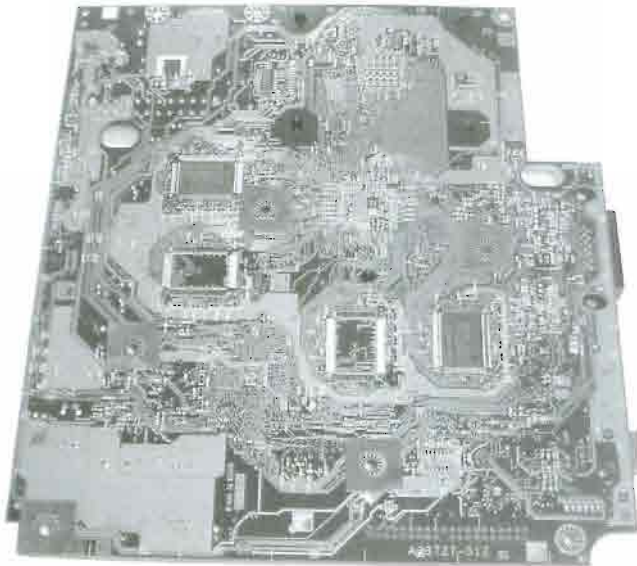
**NOTE**

If you own a revision 1.5 Xbox, refer to the install manual for the specific changes to the LPC required for 1.5, which may be found in your mod chip installation manual. Revision 1.5 is quite rare. Because I do not have access to a 1.5 and am not basing my work on any online tutorials, I will have to forgo coverage of 1.5. I apologize for the inconvenience if you do indeed own a 1.5, and I encourage you to look up the specific diagrams from your mod chip maker's website.





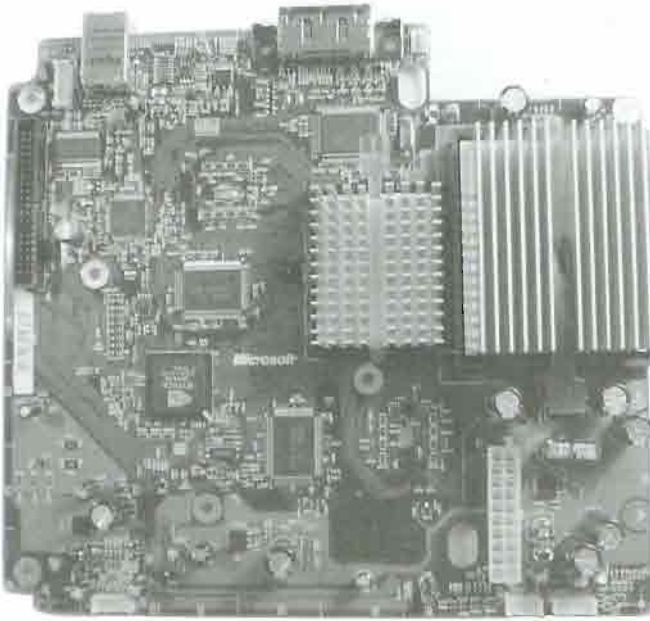
**FIGURE 6.2** Top of the Xbox motherboard (revision 1.3 shown).



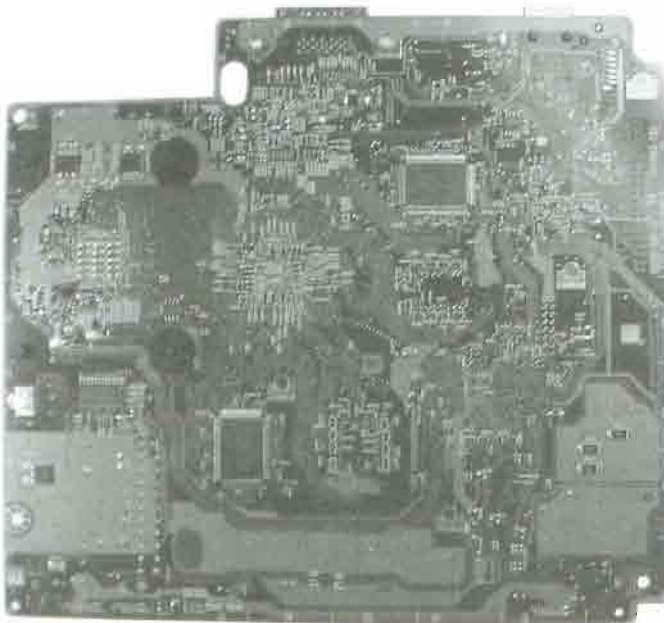
**FIGURE 6.3** Bottom of the Xbox motherboard (revision 1.3 shown).

The next few figures show the 1.6 motherboard for your reference. The top of the 1.6 shown in Figure 6.4 and the bottom shown in Figure 6.5 give you an overall picture of the components on the board. Because this motherboard was redesigned, it is laid out quite differently than pre-1.6 boards. In case you haven't noticed, the 1.6 is also *smaller* than previous boards! You will notice

immediately when you remove the board from the Xbox case, as it comes out easily (whereas pre-1.6 boards are a little tighter fit).



**FIGURE 6.4** Top of the Xbox motherboard (revision 1.6 shown).

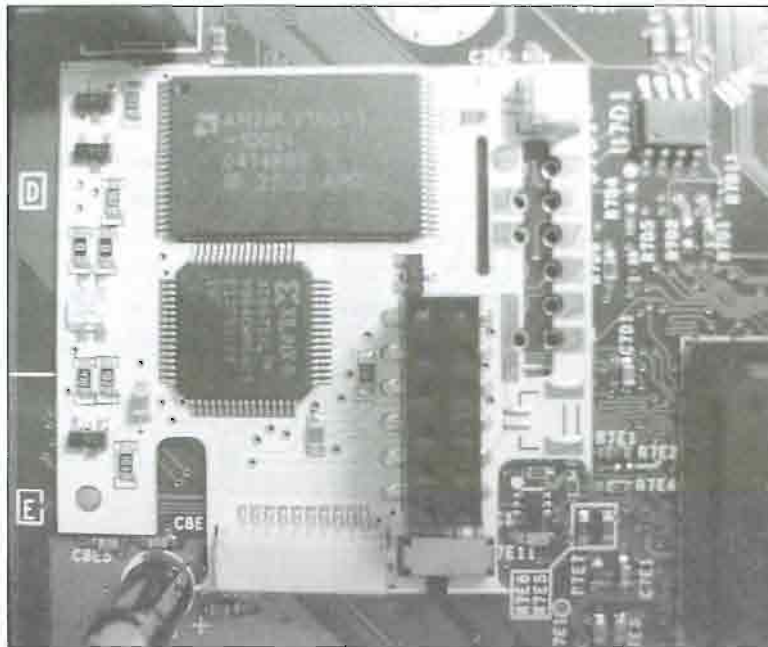


**FIGURE 6.5** Bottom of the Xbox motherboard (revision 1.6 shown).

## Installing a Pin Header (All Revisions)

This section is applicable to all Xbox revisions because the pin header is soldered in the same way in all cases.

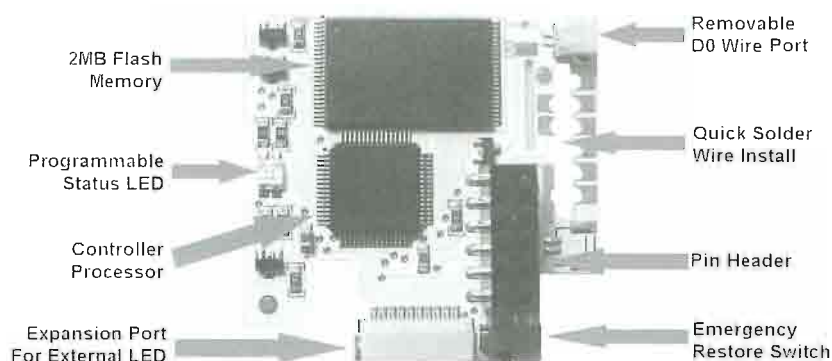
You can solder a mod chip to the Xbox motherboard in two ways: by either soldering a pin header to the LPC or by using the quicksolder method. The quicksolder method doesn't make much sense because it is permanent, whereas the pin header method allows you to swap the mod chip or just remove it entirely. Look at Figure 6.6, which shows a Xenium in position for soldering via the quicksolder method.



**FIGURE 6.6** Xenium chip in place for a “quicksolder.”

Although an experienced solderer will have no trouble correcting mistakes, an amateur with the soldering iron will want to avoid this method because it is “permanent” (inasmuch as it cannot be *easily* removed, as is the case with a pin header). Refer to Figure 6.7 and note the location of the quicksolder points on the Xenium. When you're soldering the Xenium directly to the motherboard with this technique, note that the mod chip is placed flat on the motherboard with the pin header facing upward (it is not needed when you quicksolder the points).

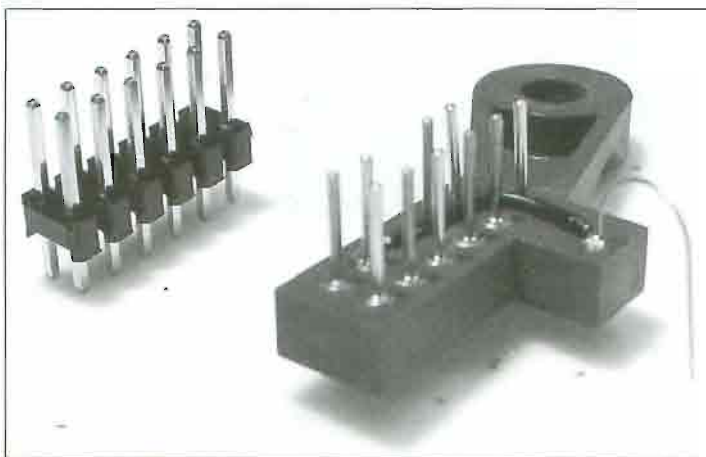
If you want to permanently solder a mod chip to your Xbox motherboard using the quicksolder method, you will need to refer to the install manual **that came with your mod chip** (and usually available from the manufacturer's website).



**FIGURE 6.7** Note the location of the quicksolder points on the Xenium.

## Preparing to Solder

If you are like most Xbox fans, you may have little or no skill with a soldering iron. However, there are just as many Xbox fans, hobbyists, and modders who *have* done a lot of tinkering with electronics and already have some good experience with a soldering iron. I am not concerned with your level of skill at this point because you'll see in this chapter just how incredibly easy it is to solder a pin header to your Xbox motherboard. If you own a newer Xbox 1.6, you will find the information in this chapter to install a mod chip on that revision as well. Figure 6.8 shows the pin header and solderless adapter side by side for comparison.



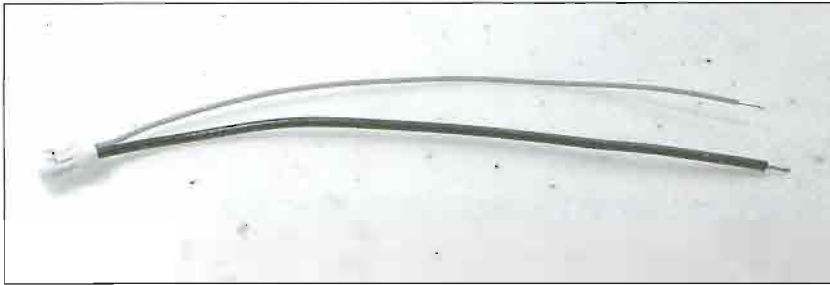
**FIGURE 6.8** A pin header and a solderless adapter.

If you are an inexperienced solderer, I can't think of any good reason why you would not use a solderless adapter, unless you own a 1.5 or 1.6—that is the *only* bulletproof argument for

soldering (because there is no other option!). If you are worried about the D0 (dee-zero) pin attached to the solderless adapter becoming dislodged from the D0 point on the motherboard (which is the most common cause of mod chip “failure”), you can just solder in the D0 wire that comes with the Xenium (shown in Figure 6.9) and otherwise use the solderless adapter with it.

**TIP**

Older solderless adapters had rigid pins beneath that are meant to make contact with the LPC points. These pins should be springy and should move in and out easily. If you have an older solderless adapter with rigid pins underneath, I recommend you buy a new one because the rigid pins tend to cause system instability and boot failure due to the poor quality of the pin springs.



**FIGURE 6.9** The D0 wire adapter plugs into the Xenium.

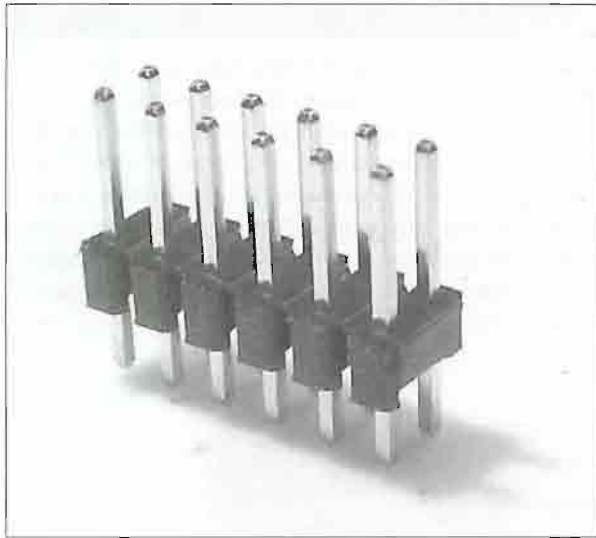
Be very careful and patient, noting that you might not succeed on the first try. You should also weigh the possibility of losing your Xbox due to a poor soldering job. Crossed lines may very well destroy your mod chip and/or your Xbox. If your soldering skill is suspect, and you have an older Xbox, it's a no brainer: Use the solderless adapter. But if you have a 1.6 and you have no other choice, just be extremely careful, patient, and meticulous. You *can* install the pin header and rebuild the LPC with amateur soldering skill if you are patient and careful about what you are doing. As soon as you become impatient, stand up and walk away for a while because stress and impatience might lead to a damaged Xbox.

Take your time and do a good job. The first time I tried to install a mod chip on a 1.6, it didn't work. I narrowed down the problem to an imperfect LFRAME solder point and was able to fix it by carefully diagnosing the **symptoms** (see the “Troubleshooting” section later in this chapter if your 1.6 install doesn't seem to work, for some pointers on how to diagnose the problem).

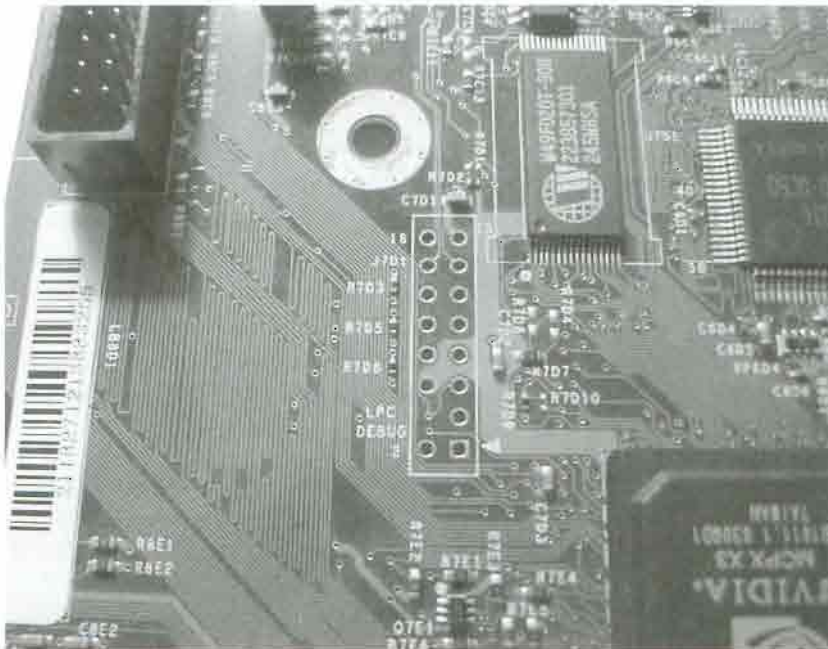
## Locating the LPC

The pin header (shown in Figure 6.10) is inserted into the LPC pin holes (shown in Figure 6.11).

The LPC is located at the same position on all Xbox revisions; the only difference is that early 1.0 and 1.1 motherboards have LPC points that are filled in (pre-soldered), and 1.6 motherboards have a hole for pin 4 (which should not be used).



**FIGURE 6.10** The pin header is soldered to the LPC.



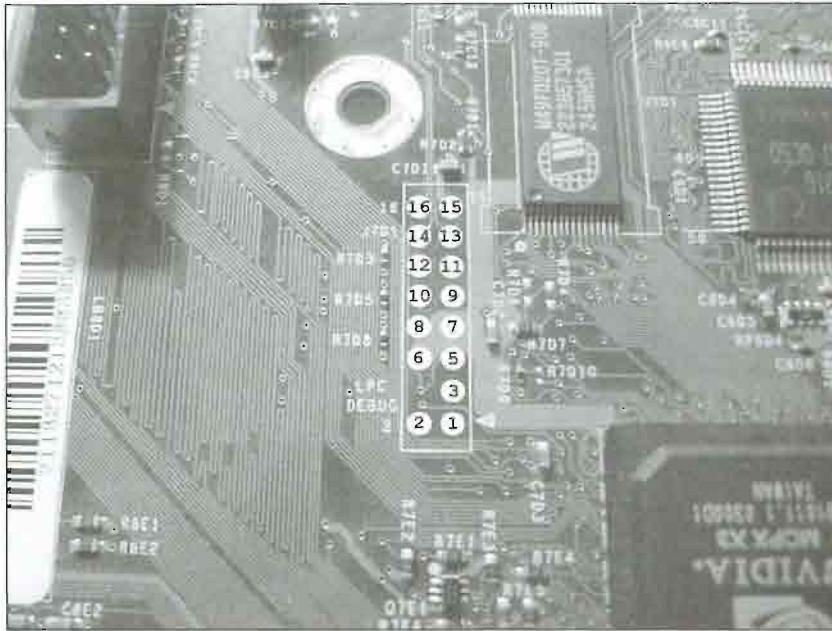
**FIGURE 6.11** The LPC is located near the Nvidia MCPX processor.



## Removing Pin 4

You first need to remove pin 4 from the pin header. On earlier Xbox revisions, point 4 on the LPC is blocked, so it's obvious, but on 1.6, point 4 is open. You absolutely must not use pin 4 because your mod chip and/or Xbox can become damaged.

Pin 4 is shown in Figure 6.12. Note that pins on the LPC start at the top right (pin 1), down to pin 2, up and left to pin 3, and down again to pin 4 (see Figure 6.13).



**FIGURE 6.12** The LPC has 16 points; only the first 12 are used.

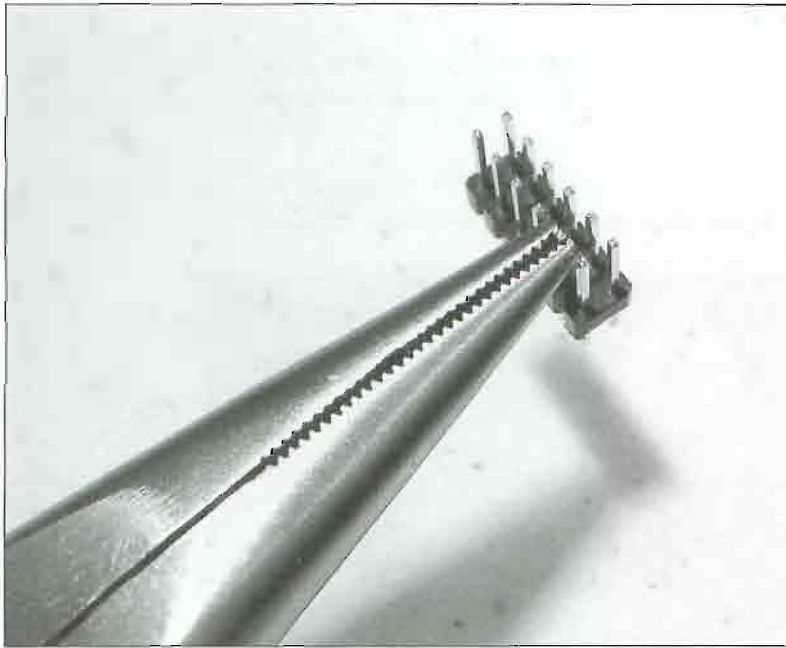
Pin 4 is shown in the jaws of my needle-nose pliers in Figure 6.13.

Take the pin in your pliers, as shown in Figures 6.14 and 6.15, and pull it straight out. Figure 6.16 shows the final result. Make sure you remove the correct pin; otherwise, you might end up needing a new pin header!

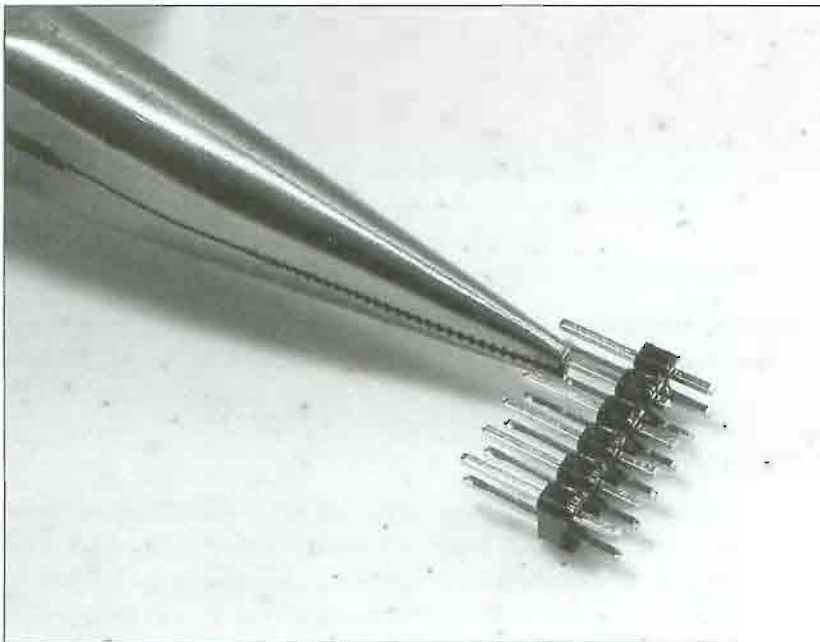
## Inserting the Pin Header

Next, take the pin header and insert it into the LPC holes. Be very careful of the orientation! Point 1 on the LPC is nearest the back of the Xbox, while point 16 is nearest the front of the Xbox. The pin header is placed into the first 12 LPC holes. Because the pin header must be soldered from the bottom side of the Xbox, you can use tape to hold in the pin header while you work on the other side (see Figure 6.17). While the figure shows clear tape (for illustrative purposes), I strongly recommend you use electrical “black” tape instead. If you can manage it, it is even advisable to use no tape at all, as it is *possible* to pull up motherboard traces when you remove the tape.

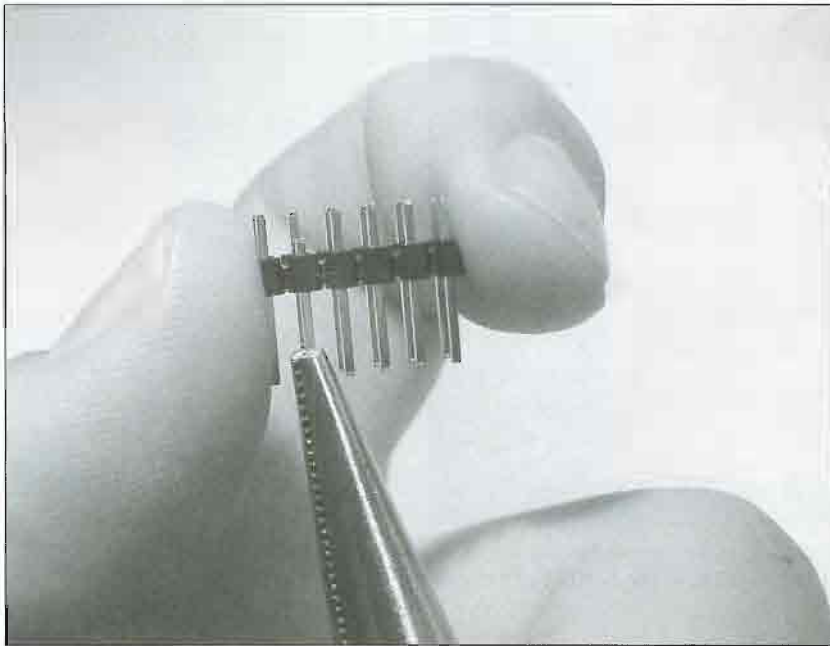




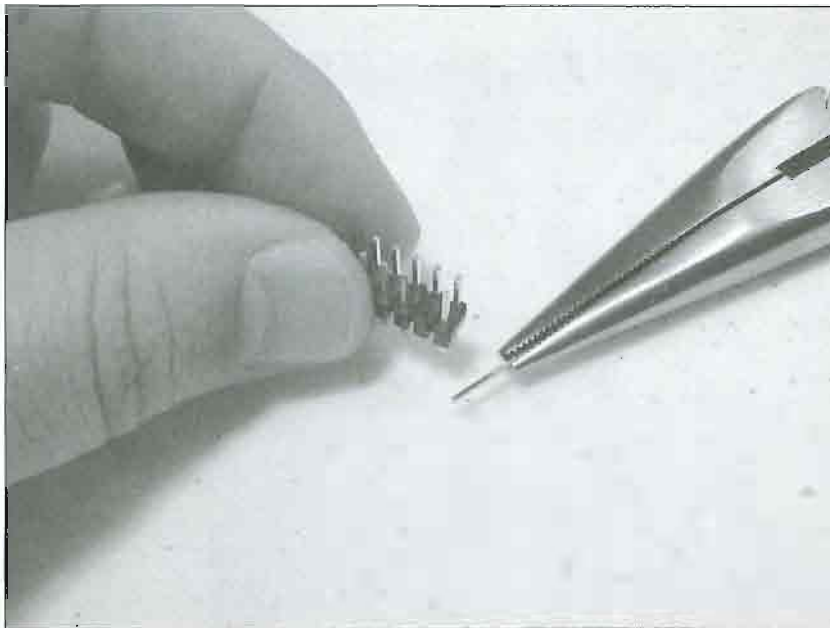
**FIGURE 6.13** Locating pin 4 on the pin header (for removal).



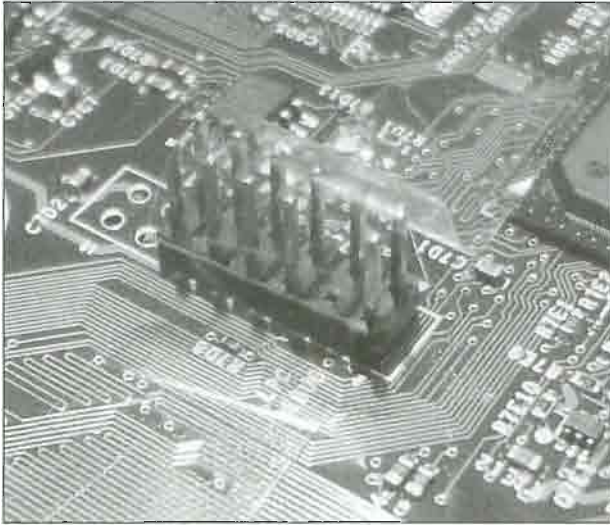
**FIGURE 6.14** Grasping pin 4 with needle-nose pliers.



**FIGURE 6.15** Removing pin 4 (note that the pin header is upside down).



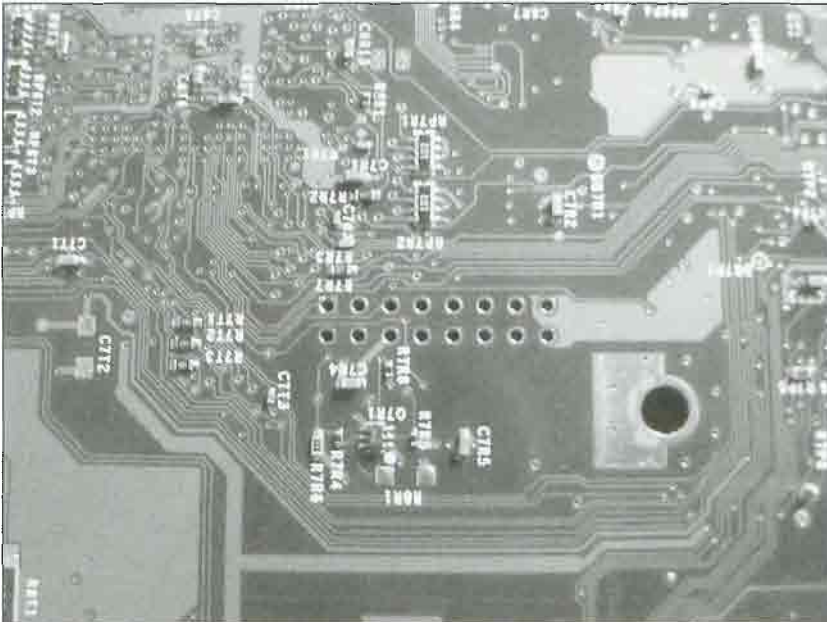
**FIGURE 6.16** Make sure you remove the correct pin.



**FIGURE 6.17** Use tape to hold the pin header in place while you solder it in on the bottom of the motherboard.

## Soldering the Pins

Turn over the motherboard and locate the LPC underneath (shown in Figure 6.18).



**FIGURE 6.18** The LPC on the opposite side of the motherboard.

Heat up your soldering iron and wait for it to warm up completely. Be very careful with the tip of the soldering iron! If this is your first experiment with soldering, I strongly recommend that you practice with a broken circuit board first before you make an attempt on a working Xbox motherboard; otherwise, you may end up with a “practice board” right there and will need a new Xbox motherboard entirely! You might use old worthless ISA or PCI cards, or even cheap electronic toys to gain some experience with your soldering iron.

If you do not yet own a soldering iron, I recommend you get a holder and soldering tools along with the iron. These tools are inexpensive; I purchased the tools shown in Figure 6.19 from Fry’s Electronics for about \$25. You can find similar tools at Radio Shack, Ace Hardware, and other stores. Even Wal-Mart carries soldering tools. Don’t get suckered into buying a \$40 soldering “gun.” Just choose a small iron that is easy to handle; imagine how it will feel in your hand while working up close with your cherished Xbox motherboard. You want something small, light, easy to use.



**FIGURE 6.19** Buy inexpensive soldering tools.

The soldering iron itself can be any cheap iron as long as it has a removable tip. The iron holder has a tip cleaning sponge that, when wet, provides an excellent way to clean your soldering iron tip. Just wipe the tip clean on the wet sponge after *every joint* to keep the tip clean and *hot*! If you use the iron for anything other than soldering (such as melting wire insulation or drawing pictures on a piece of wood!), the tip will become damaged, with “cold spots” that render it unusable. Tips are inexpensive. Just buy a new tip any time you need one instead of trying to work with a bad tool.

I am convinced that there is no absolutely *right* way to solder unless you are a trained electronics engineer. A few simple tips are all you need to successfully solder in a pin header (or the 1.6 LPC rebuild wires later in this chapter). A lot of experienced modders will tell you to use rosin flux sparingly when you solder. Well, I use a lot! I love this stuff. If you've ever tried to solder anything without rosin flux, I'm sure you have experienced the trauma of having your solder not cooperate! Rosin flux will help you to get the solder exactly where you want it. Basically, rosin flux attracts solder. When you have two small wires that are coated with flux, and it is heated, the solder will naturally flow between the touching wires without coaxing. Figure 6.20 shows a bottle of flux purchased from Radio Shack.



**FIGURE 6.20** Rosin flux is a necessity when soldering!

Rosin flux is like grease for electronics work and is non-conductive. Although I don't want you to make a mess, you don't have to worry about flux messing up your Xbox. Use the provided brush to dab a little bit of flux on whatever wires or points you need to solder; then apply heat with

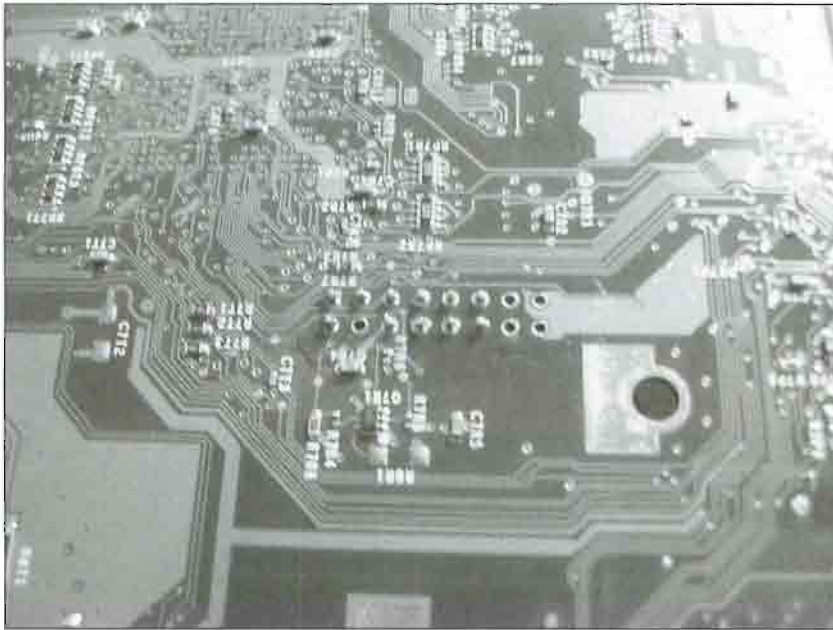
your iron to each point to melt the flux a little and make it work. Hold the iron to the parts for a few seconds (and no more!); then touch solder to the joint. At this point, soldering becomes as much an art as a science because you don't want to damage the electronics, but you do need to

#### TIP

Apply solder to heated joints, not directly with the soldering iron. The iron is not a *paintbrush*! Remember, a joint is the intersection of the two points you are trying to solder together, which will be a motherboard lead and a loose wire end in this case.

heat up the leads enough to melt the solder. Some experienced solderers will argue that flux is needed only when using non-rosin solder. So what? I find it is easier to solder when using flux, so I use it. You should do what works best for you, not what others tell you to do, because most people are just searching for personal affirmation (that is, “followers”).

After you have finished soldering the pins sticking through the LPC holes on the bottom of the motherboard, the result should look something like Figure 6.21.



**FIGURE 6.21** The pin header has been soldered to the motherboard.

## Installing the D0 Wire

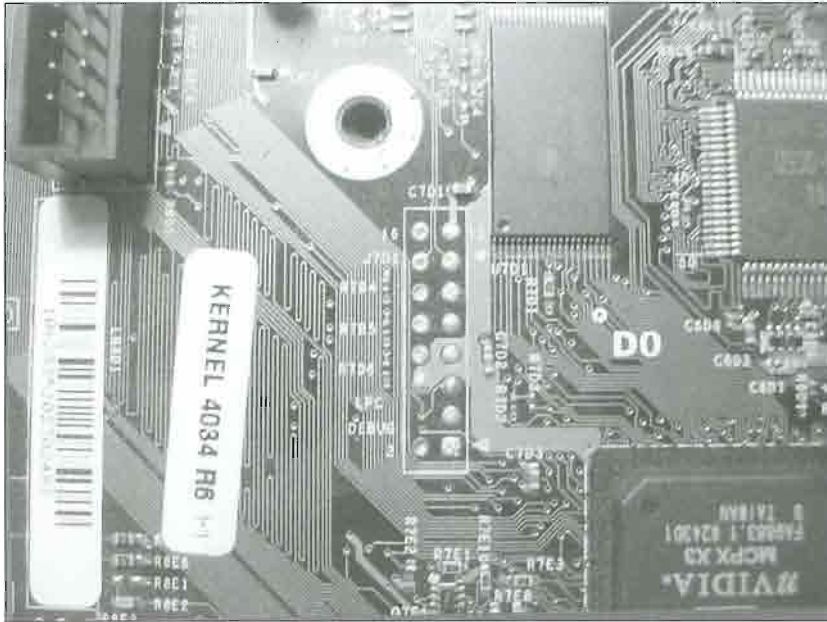
If you have an Xbox 1.0 through 1.4, all you need to do next is install the D0 wire and you're done. If you own a 1.6, skip ahead to the section titled “Xbox Revision 1.6.”

The D0 wire is located in two different locations on Xbox revision 1.0/1.1 and 1.2–1.4. If you own an Xbox 1.0 or 1.1, refer to Figure 6.22 for the location of the D0.

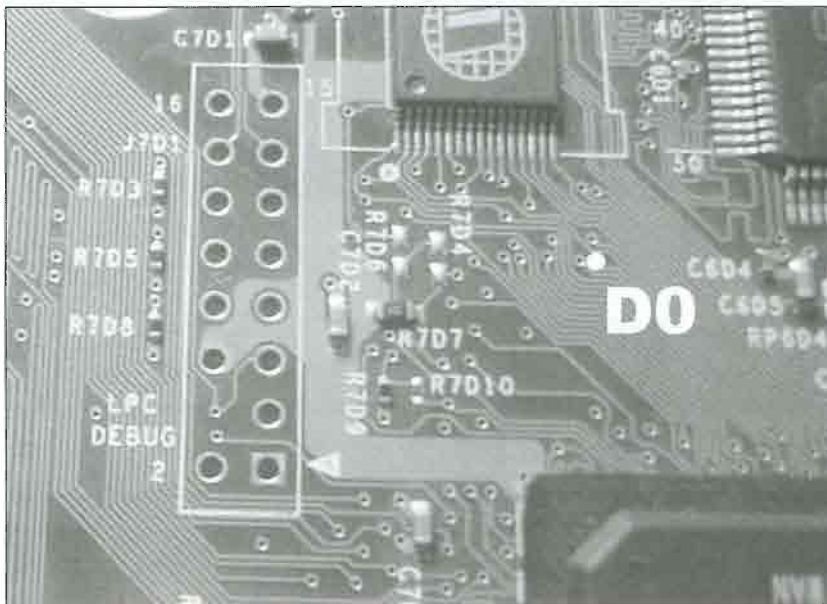
If you own an Xbox 1.2, 1.3, or 1.4, refer to Figure 6.23 for the D0 location.

You will need to solder the blue lead of the D0 wire that came with your Xenium chip (with the little adapter that plugs into the D0 port on the Xenium). If you don't have one, that's not a problem: Just solder a wire from the D0 point to the solder pad on the Xenium labeled “D0” (it's above the “X” in the Xenium logo).





**FIGURE 6.22** The D0 location on Xbox 1.0 and 1.1 motherboards.



**FIGURE 6.23** The D0 location on Xbox 1.2–1.4 motherboards.

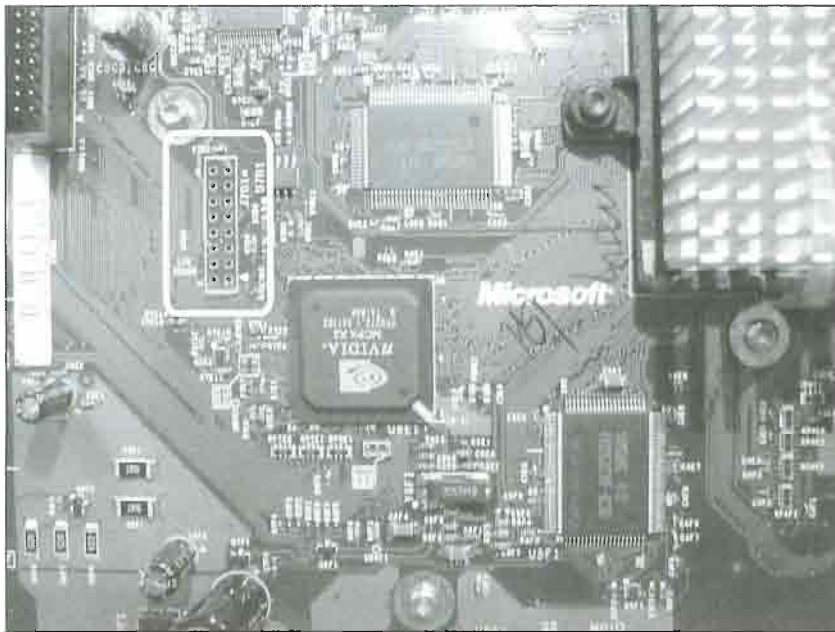
If you do have a Xenium D0 wire adapter, you will also need to solder the black lead to a ground, which can be the nearest motherboard screw pad on either the top or bottom of the



motherboard. If you solder to the bottom, you can run the negative wire through one of the open LPC holes (13–16).

## Xbox Revision 1.6 Mod Chip Installation

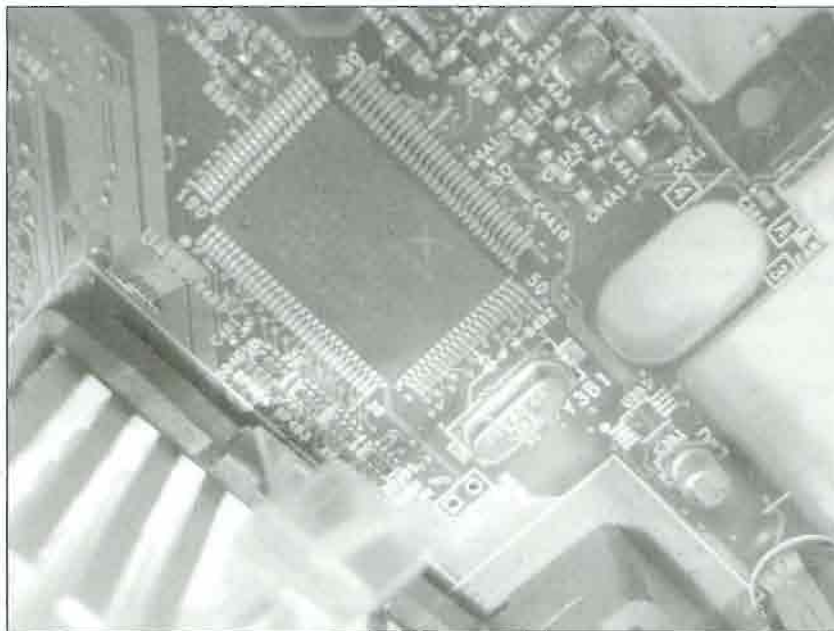
Xbox revision 1.6 motherboards have a different layout for the LPC than previous revisions, and the D0 is no more, replaced with a new point called LFRAME. Figure 6.24 shows the LPC on a 1.6 motherboard. Although it looks the same, the LPC no longer has a 5-volt pin. In addition, the 3.3-volt pin and four of the “LAD” data lines were removed altogether.



**FIGURE 6.24** The LPC on a revision 1.6 motherboard.

### Double-Checking the Revision

Before you start, are you absolutely sure you have a 1.6 Xbox? Aside from going through all the version-checking techniques discussed in Chapter 3, “Identifying Your Xbox Revision,” you can easily spot a 1.6 motherboard because it comes equipped with an Xcalibur video chip (shown in Figure 6.25).



**FIGURE 6.25** The Xcalibur video chip is found only on Xbox revision 1.6.

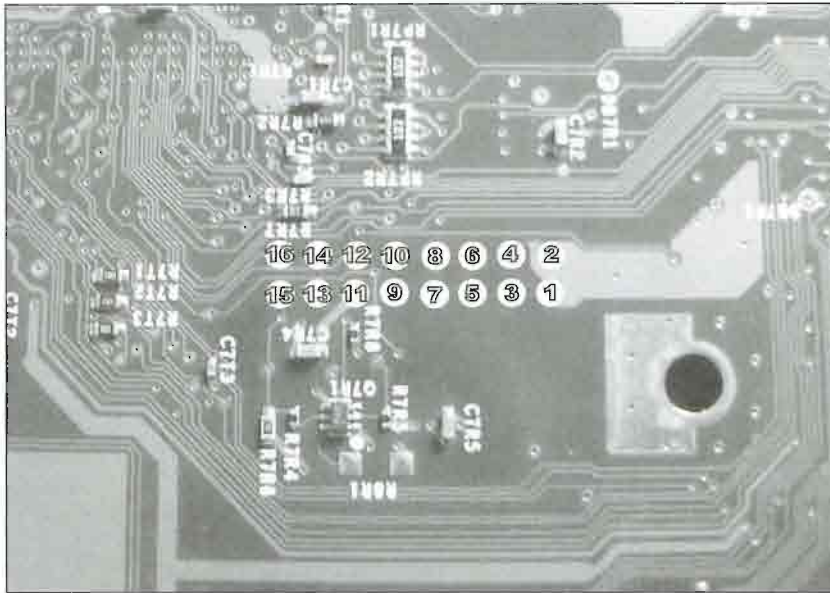
## Installing the Pin Header

The pin header is installed in exactly the same manner on 1.6 as it is for previous revisions, so refer to “Installing a Pin Header (All Revisions)” earlier in this chapter if you skipped over that section and follow the directions to install your pin header. When you’re done, it’s time to rebuild the LPC.

## Rebuilding the LPC

Why does the LPC need to be rebuilt? The 1.6 motherboard is significantly different from all previous revisions, and that includes the LPC. The mod chips are designed to work with any revision, so it wouldn’t make sense to custom-build a “1.6-only” mod chip. Instead, we solder in the pin header as usual and then solder connection wires to make the 1.6 LPC resemble the LPC on an earlier Xbox revision. Ready to start?

Figure 6.26 shows the points that you can refer to when soldering the five wires onto the motherboard (remember that the points are inverted because you are now looking at the bottom of the motherboard). Also, note the orientation of the motherboard in this chapter, where pin 1 is on the right side in these figures, and make sure you orient your motherboard in the same manner. Refer to Table 6.1 for wiring connections.



**FIGURE 6.26** Rebuilding the LPC on a 1.6 requires five wires.

**TABLE 6.1** LPC Rebuild Wiring Connections for Xbox 1.6

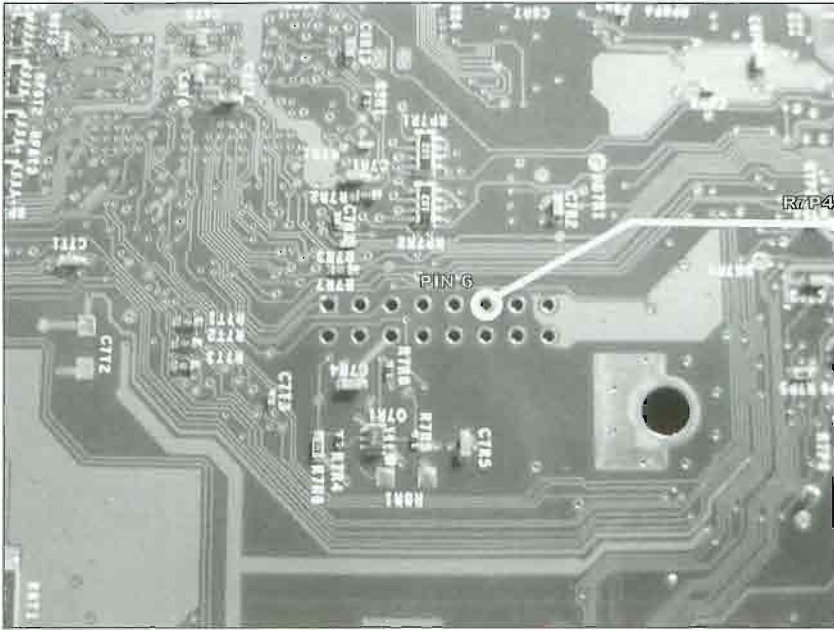
Wire	LPC PIN	To Point
1	Pin 6	Open point near R7P4
2	Pin 7	Open point near C7R2
3	Pin 2	Pin 8
4	Pin 10	Open point above Pin 10
5	Pin 9	Open point near R7T3

### Wire 1

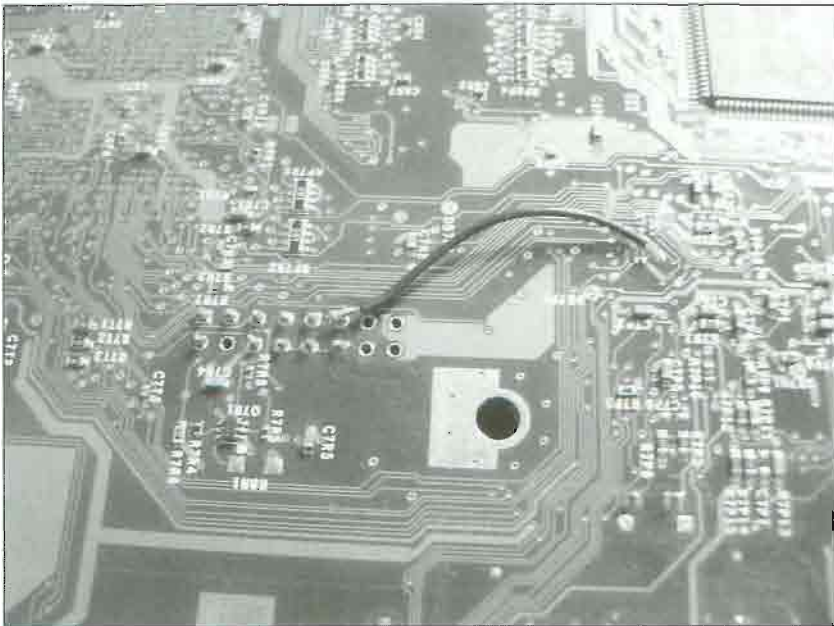
The first wire is soldered between pin 6 and the point labeled R7P4, as shown in Figures 6.27 and 6.28.

### Wire 2

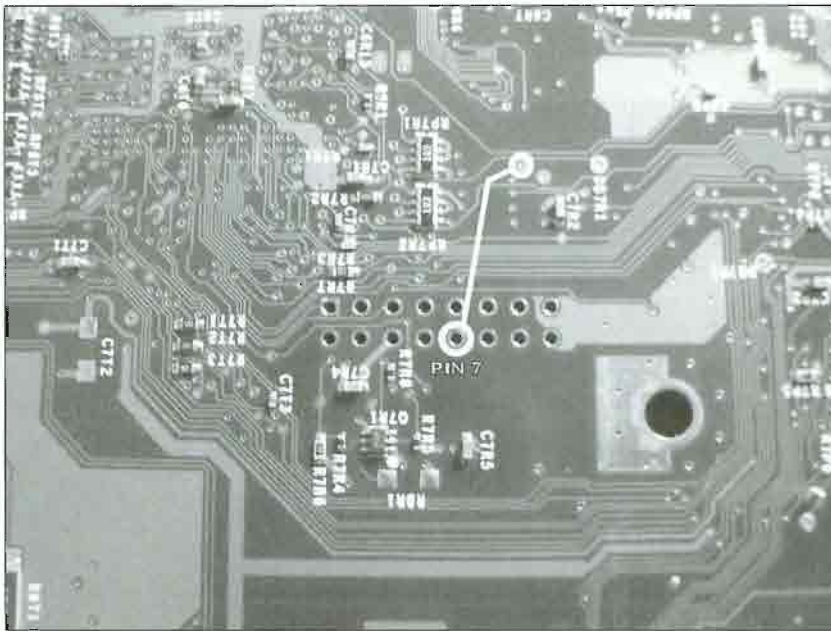
The second wire is soldered between pin 7 and the point near label C7R2, as shown in Figures 6.29 and 6.30.



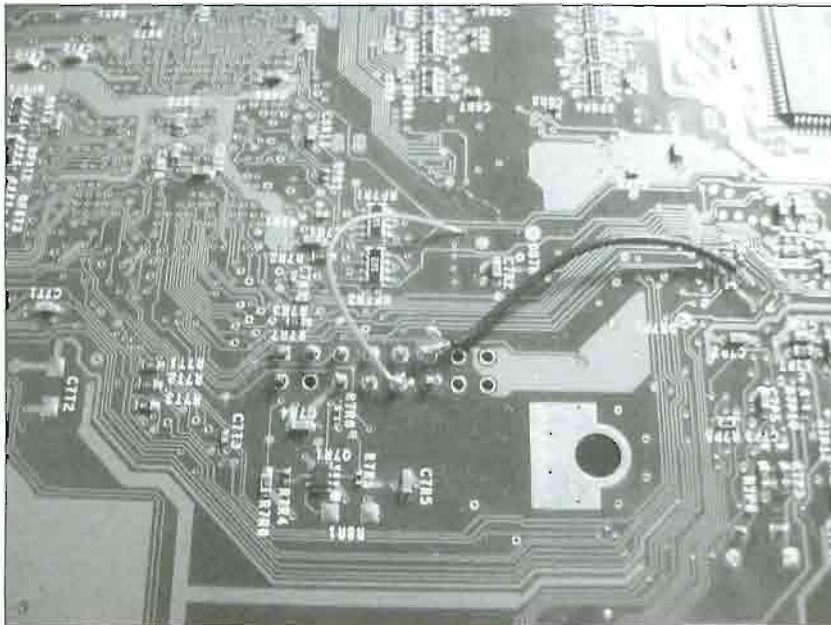
**FIGURE 6.27** The first connection: pin 6 to R7P4.



**FIGURE 6.28** The first wire has been soldered in place.



**FIGURE 6.29** The second connection: pin 7 to open point near C7R2.

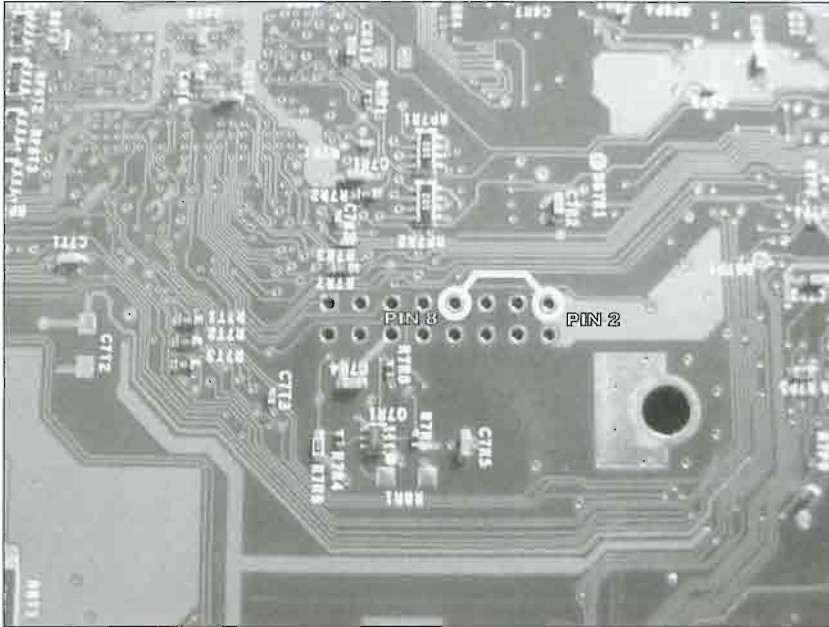


**FIGURE 6.30** The second wire has been soldered in place.

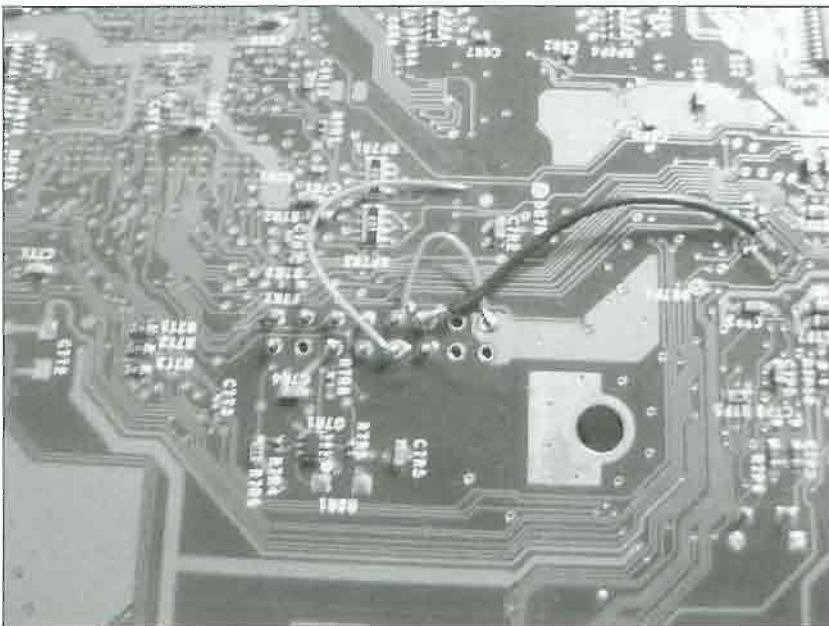


### Wire 3

The third wire is soldered between pins 2 and 8 on the LPC, as shown in Figures 6.31 and 6.32.



**FIGURE 6.31** The third connection: pin 2 to pin 8.

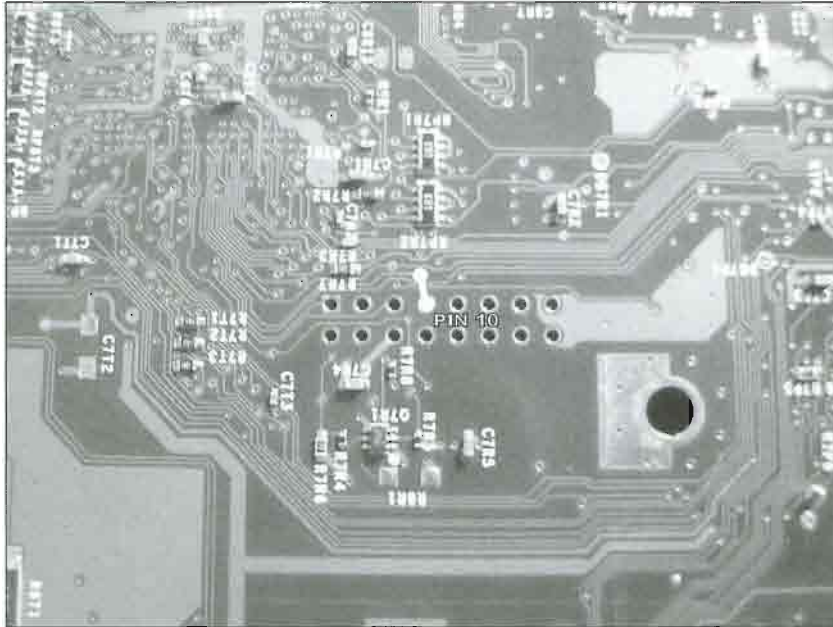


**FIGURE 6.32** The third wire has been soldered in place.

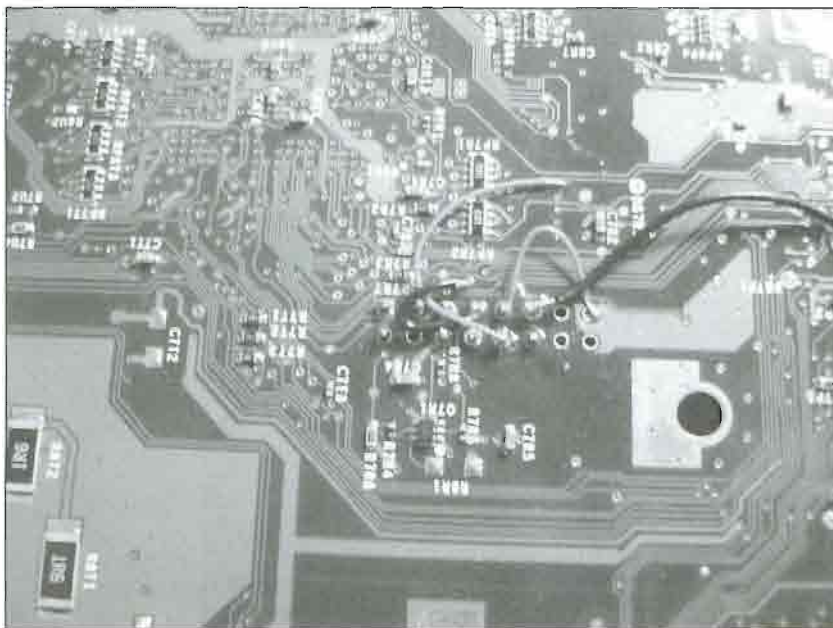


## Wire 4

The fourth wire is soldered between pin 10 and the open point directly above pin 10, as shown in Figures 6.33 and 6.34. Note that “up” is a relative term that refers specifically to the figure.



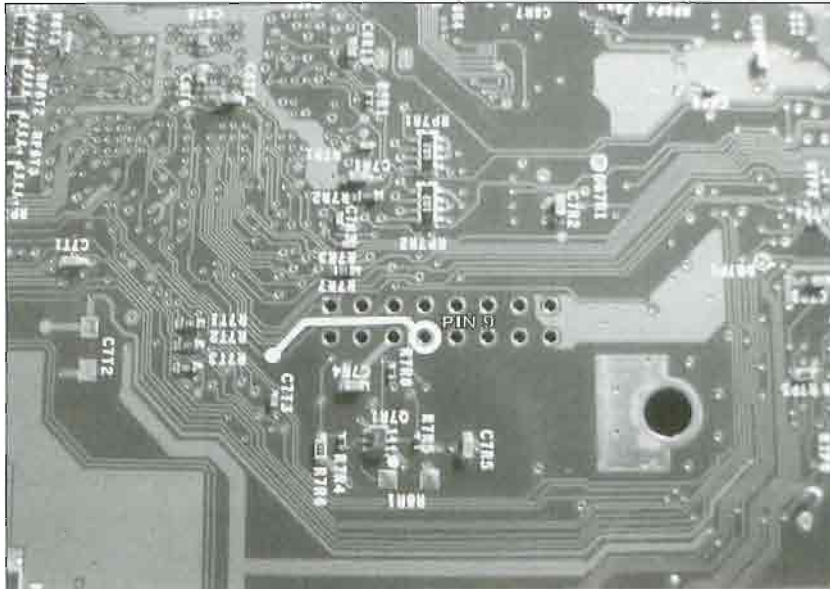
**FIGURE 6.33** The fourth connection: pin 10 to open point directly above pin 10.



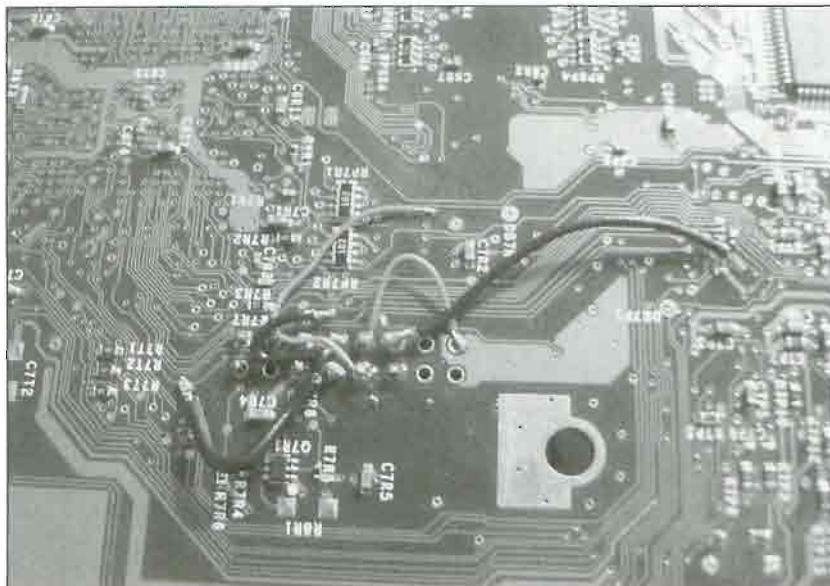
**FIGURE 6.34** The fourth wire has been soldered in place.

## Wire 5

The fifth wire is soldered between pin 9 and the open point that is best described as being near R7T3. It is actually just to the right (relative to the figure) of R7T2 and R7T3 (see Figures 6.35 and 6.36).



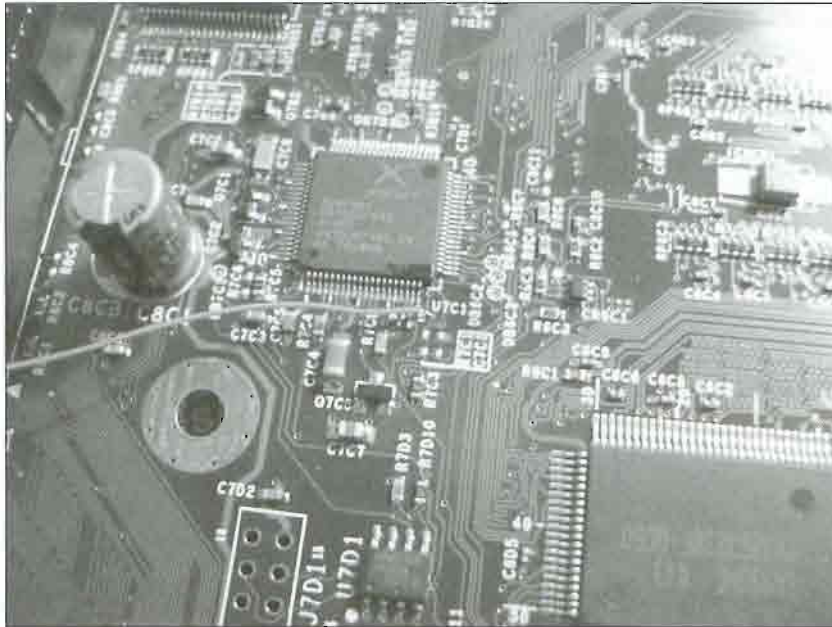
**FIGURE 6.35** The fifth connection: pin 9 to open point near R7T3.



**FIGURE 6.36** The fifth wire has been soldered in place.

## Installing the LFRAME Wire

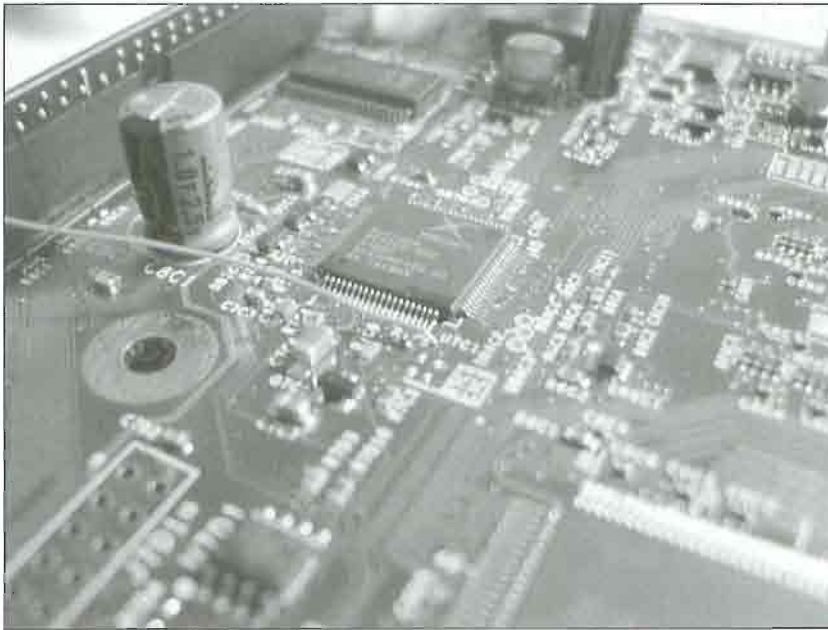
Xbox revision 1.6 has no D0 point. Instead, it simply uses a different point called LFRAME that seems to fulfill the same purpose as the D0. While the D0 is a type of ground that causes the Xbox to boot from the LPC (instead of the built-in BIOS), the LFRAME is a standard signal of the Intel bus protocol. The LFRAME point on the 1.6 is located close to the Xyclops chip at a point called U7C1 (see Figure 6.37).



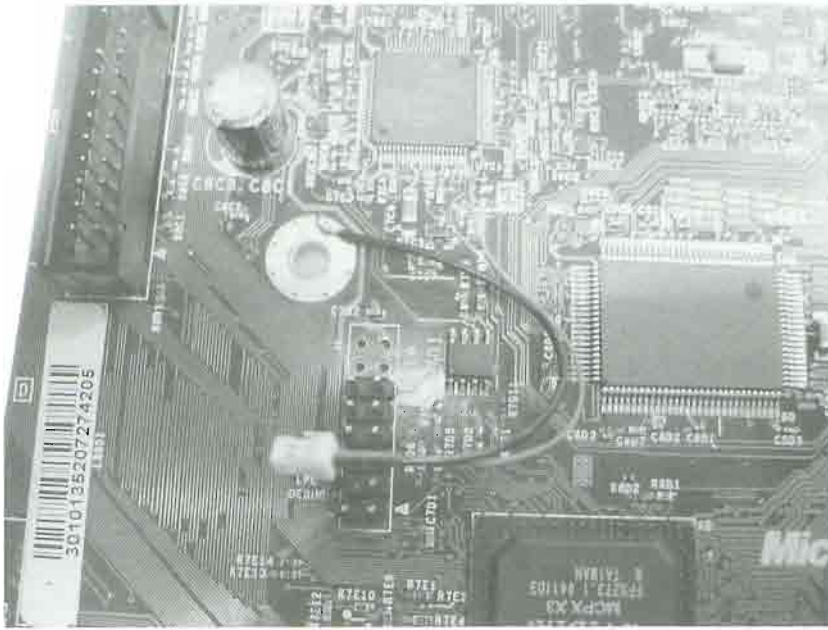
**FIGURE 6.37** The LFRAME point is located near U7C1.

Figure 6.38 shows a closer view of the LFRAME point. It is just below the “U” in the U7C1 label on the motherboard near the bottom-right corner of the Xyclops chip.

After you have soldered the blue wire to the U7C1 point, solder the black wire to a ground point, such as the one shown in Figure 6.39. Note that you do not absolutely need to use the D0 adapter provided with the Xenium (because it does require the ground); you can solder a single wire from the LFRAME point to the D0 solder pad on the Xenium and then not need the ground wire, but the small D0/LFRAME plug is helpful when you need to completely remove the Xenium. (Your mod chip of choice will have similar solder points but may not be exactly the same as the Xenium.)



**FIGURE 6.38** The LFRAME point is located near U7C1.



**FIGURE 6.39** The D0 adapter has been soldered to the LFRAME and ground, ready to be plugged into the Xenium.



# Troubleshooting

Even the most skilled solderer may have problems getting an Xbox to boot after a mod chip has been installed because all it takes is one LPC lead or a faulty D0 connection to render the Xbox unbootable. The following sections provide some pointers that may help to at least narrow down the possible problems you might have.

## Problem with the D0/LFRAME

The most common problem is a D0 connection (or LFRAME on the 1.6), in which case the mod chip will appear to be powered, but the Xbox will just boot up normally. What happens in this case is that the D0/LFRAME causes the Xbox to boot off the LPC, and when it's not jumpered, the Xbox ignores the LPC (and the mod chip is powered up, but useless).

If your Xbox boots up with the Microsoft Dash after installing your mod chip, check the D0/LFRAME, as you have at least soldered the 3.3v power line to the pin header correctly, but may still have other pins incorrectly soldered. The problem with no response is with the D0/LFRAME point. Double-check the position on the motherboard where you soldered it; make sure no lines are crossed. If you used the Xenium D0 wire, make sure you soldered the blue wire to the D0/LFRAME, and the black wire to ground—this can be any nearby motherboard screw-down point.

## Problem with the LPC

Whether or not your mod chip LED lights up, if the Xbox “FRAGS” (a condition in which the front power light blinks red and green), the problem is one or more faulty pin header wires soldered to the LPC. On earlier Xboxes, you likely have pin header leads that are not soldered properly, and 1.6 owners may have incorrect “LPC rebuild” solder points that are faulty. Double-check all of your solder points, making sure that they are solid, with clean, bright solder making a good connection. If your solder is gray in color or not smooth looking, the connections might be experiencing resistance, which the fine tolerances of the Xbox electronics might sense as a fault.

## Other Problems

If you believe your soldering work is good but the mod chip still doesn't work (no LED at all), your only recourse is to remove the pin header and start over from scratch because it is *very* possible that you have crossed lines underneath the pin header itself. To remove the solder, I recommend using desolder braid, which works great: Just touch the braid to a solder point, heat it up with your iron, and the solder will be drawn to the braid. Under no circumstances should you ever touch a point with the iron and then try to pull the pin header loose! That is guaranteed to pull up traces off the motherboard, which is pretty much a DOA situation.

If all else fails, remove the wires and pin header, reassemble your Xbox, and make sure it boots normally into the Microsoft Dashboard (or boots a game disc). If your Xbox is good, you can start over on the installation. I have found a lot of good information on several online forums, where other Xbox modders post their problems and solutions, and I guarantee you that any problem you run into has already been overcome by someone else. So, give the forums a try:

- <http://www.teamxodus.com>
- <http://www.xbox-scene.com>

If you are using a mod chip other than the Xenium, you'll want to refer to the installation instructions for that model anyway, so it's a good idea to browse the forums for assistance. Most of the mod chips have a similar installation routine.

## Summary

This chapter was technically challenging, covering the difficult subject of soldering a pin header to the motherboard and the even more difficult subject of rebuilding the LPC on an Xbox 1.6 motherboard. But persistence pays off, and with a little patience, you will have yourself a solid, permanent, reliable pin header for your mod chip.



# PART III

## Software Mods

**CHAPTER 7** The Xenium Operating System

**CHAPTER 8** EvolutionX Dashboard

**CHAPTER 9** Avalaunch Dashboard

**CHAPTER 10** Xbox Media Center



# The Xenium Operating System

**T**his chapter provides an overview of the Xenium operating system that is built into the Xenium mod chip. You will learn the basics of using the Xenium operating system in this chapter, assuming you have already installed a mod chip after reading one of the preceding two chapters.

## Overview of the Xenium O/S

The first thing you should know about the Xenium O/S is that it is not based on any copyrighted or proprietary software, nor is it derived from any Microsoft code. The Xenium O/S was completely written from scratch by Team Xodus and is not based on any prior code base. Many mod chips use the Cromwell bootloader, an open source Xbox boot program (using *some* Linux code) that was customized just for the Xbox architecture, or use a derivative of the Microsoft core. Cromwell is not a full Xbox operating system. By “architecture,” I mean that this software was written to run specifically on the Xbox, featuring an Intel processor, Nvidia graphics, and Nvidia media processor. The hardware in the Xbox is normally controlled by a custom version of Windows 2000—a stripped-down core with integrated drivers for these hardware components.

Here are the key points covered in this chapter:

- Overview of the Xenium O/S
- Editing the Launch menu
- Using the disk tools
- Using the EEprom tools
- Changing the Xenium settings
- Rebooting your Xbox
- Performing emergency system recovery
- Shutting off the Xbox

A mod chip must provide its own Xbox core because the Windows 2000 core is no longer available when bypassed by the mod chip. In fact, the mod chip bypasses the Microsoft BIOS completely by using its own, so when you install a mod chip, your Xbox may not use the original BIOS (based on Windows 2000) at all! (However, most mod chips are able to “boot” the original Xbox TSOP BIOS.) This is the place where the Cromwell Linux BIOS is used—in the mod chip itself. (Isn’t it ironic that modders use a competing operating system to modify their Xboxes?) Many PC users assume that “Windows 2000 core” refers to the software installed on the Xbox hard drive. This is just not the case, which comes as a surprise to many. The Xbox O/S is stored in a flashable EEPROM chip.

Remember in Chapter 3, “Identifying Your Xbox Revision,” when you learned how to identify the revision of your Xbox? The kernel (“K:”) version is sort of like a software version for the “Windows 2000 core” that is so often discussed in the Xbox community.

To better understand the way the Xbox user interface works, it helps to differentiate the BIOS from the *Dashboard*. When you power up your Xbox without a disc in the drive, what you see on the TV screen is *not* the operating system! It’s just the Dashboard, which is sort of like an Automated Teller Machine (ATM): It lets you do a few minor things, and nothing else.

## The Xenium O/S Main Menu

The Xenium O/S main menu is shown in Figure 7.1. If this is the first time you have fired up the Xbox after installing a mod chip, you’ll want to first add the Xbox TSOP BIOS to the Xenium Launch menu. That way, you’ll be able to load the Microsoft Dashboard from the Xenium menu.



**FIGURE 7.1** The Xenium O/S main menu.

## Launch

Highlight the first item called Launch Menu in the Xenium O/S main menu. Selecting that item will bring up the Launch menu. If this is indeed the first time you have used the mod chip, you will see a single item in the Launch menu, Add A New Item, as shown in Figure 7.2.



**FIGURE 7.2** The Launch menu as it appears at first run.

Selecting the single menu item will bring up a dialog box asking “Where would you like this item to launch from?” (see Figure 7.3) with the first item highlighted (TSOP). TSOP stands for Thin Small Outline Package, which describes the type of chip used for the Xbox BIOS.

Select TSOP from the three choices because you want to add a launch item for the standard Xbox BIOS (and Dashboard). Next, you will be asked to enter a name for the new launch item with a controller-based input screen, as shown in Figure 7.4.

Xenium O/S should have already filled in the name “Retail Kernel” for you, so you can just use this name or type one of your own. Select Done in the bottom-left corner of the virtual keyboard to continue. The next screen that comes up is the fun part: You get to customize the programmable LED on the Xenium to show a certain color when that particular launch item is launched (see Figure 7.5).

### NOTE

Xbox 1.6 no longer uses a TSOP chip for the BIOS because 1.6 is not flashable! This was done partially to prevent modders from modifying the stock Xbox BIOS because the earliest modders would actually replace the BIOS by exploiting a “load/save game” bug in some games (where some games are capable of running a binary program that is “smuggled in” as a save game file). This is no longer possible with 1.6, which features a new motherboard layout designed to reduce the cost of manufacturing the Xbox and reduce its size.



**FIGURE 7.3** Choosing the type of launch item to create.



**FIGURE 7.4** Entering the name of the new launch item.

After you have added this first launch item to the Launch menu, go ahead and launch it to make sure it is working correctly. You should see the familiar Xbox Dashboard come up. Returning to the Launch menu shows more options now (see Figure 7.6). From this new Launch menu,

#### TIP

If you have set a default launch item, you can always bring up the Xenium O/S again by powering down your Xbox and then pressing the eject button rather than the power button. The eject button brings up the Xenium O/S instead of the default launch item (only when you have InstantBoot enabled in the Xenium Settings).



you can add, rename, and remove launch items, as well as set a default item (which causes the Xenium O/S to launch the default item automatically when you power on your Xbox).



**FIGURE 7.5** Choosing a color for the Xenium's programmable LED.



**FIGURE 7.6** A new launch item has been added.

You are probably wondering how you can install other launch items to this menu and what types of items can be added, right? Well, for one thing, you can only add a BIOS image to the launch menu. The Xenium O/S actually writes an image into the 2MB memory chip on the Xenium. These images will usually be 256KB, but some images can be 512KB or 1024KB (but these are the

only three options). A BIOS image will have a .bin extension. You can add any BIOS you want to the Xenium Launch menu, as long as it was written for Xbox. Examples include the Cromwell and EvolutionX M8.

**NOTE**

I will explain the process of installing a new BIOS in the next chapter, when I show you how to install and use the EvolutionX Dashboard.

## Disk Tools

The second item on the Xenium O/S main menu is Disk Tools, as shown in Figure 7.7. The disk tools provided by Xenium O/S are perhaps the most important options in the O/S. You can lock or unlock the hard drive (required when making changes to it, but note that Microsoft Dashboard *requires* that the drive be locked!), make a complete backup of a hard drive, copy a partition, or format a partition.



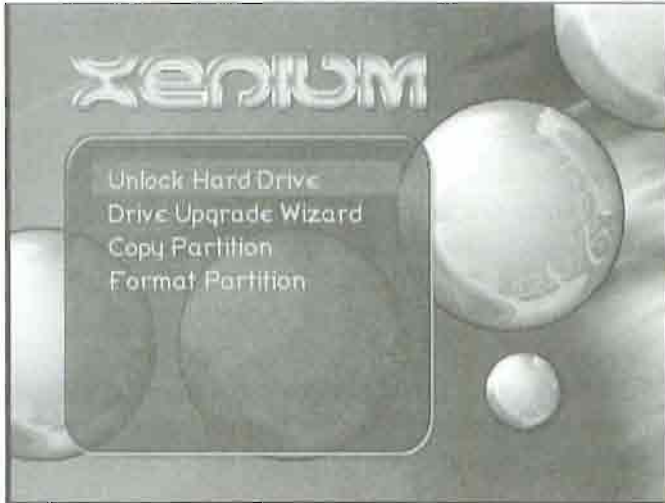
**FIGURE 7.7** The Disk Tools menu item.

Highlight this item and select it to bring up the Disk Tools menu, as shown in Figure 7.8.

### Lock/Unlock Hard Drive

You will want to keep the hard drive locked most of the time and unlock it only when necessary, after which it should be locked again. Why? The Microsoft Dashboard doesn't work at all with an unlocked hard drive. Locking the drive involves the use of a security key that is unique to each drive. You cannot simply plug a new hard drive into your Xbox and use Xenium O/S to format and prepare it for use. The hard drive locking key is actually stored in the Xbox EEprom! The

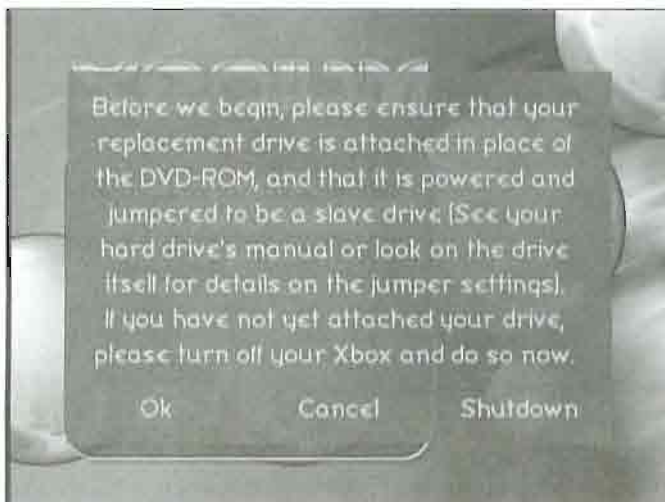
Xenium O/S is capable of reading the hard drive key and will use it to create a duplicate hard drive image when you choose Drive Upgrade Wizard from the menu.



**FIGURE 7.8** The Disk Tools menu allows you to maintain the hard drive.

### Drive Upgrade Wizard

The Drive Upgrade Wizard is a really awesome feature of the Xenium O/S. Using this feature, you can completely replace the old Xbox hard drive with a new one that has *much* more capacity (see Figure 7.9).



**FIGURE 7.9** The Drive Upgrade Wizard.

You can install a new hard drive in your Xbox with 300GB or more storage—and the Xbox will probably handle any size of IDE drive that is likely to come out in the near future. The only restriction is that the drive must be of the ATA-100/133 (IDE) variety; Xbox doesn't support the latest Serial ATA (SATA) drives because it just has an older IDE cable. I suppose you *could* use some sort of IDE-to-SATA adapter...hmm, that's an interesting idea.

Rather than explain how to upgrade the hard drive at this point, I'll postpone that discussion for a complete chapter on the subject because the hard drive upgrade requires more in-depth explanation than this chapter was meant to get into. Refer to Chapter 12, "Upgrading the Xbox Hard Drive," for a complete tutorial on how to install a new hard drive in your Xbox. Wait until you see what a new hard drive makes possible—especially when you're running Xbox Media Center (see Chapter 10, "Xbox Media Center")!

### Copy Partition

The Disk Tools menu in the Xenium O/S (see Figure 7.10) includes a handy feature that will copy one entire partition of a hard drive to another *drive*: Copy Partition. That is an important point: the procedure doesn't let you just copy one partition to another; it is used to copy a whole partition from one drive to another drive. You may want to do this if you have a drive prepared for your Xbox, but you need to copy over a partition. Just be careful when using this feature because (obviously) the destination partition is completely replaced. This feature doesn't just copy files; it replaces the destination partition entirely. I will discuss this feature again in Chapter 12.

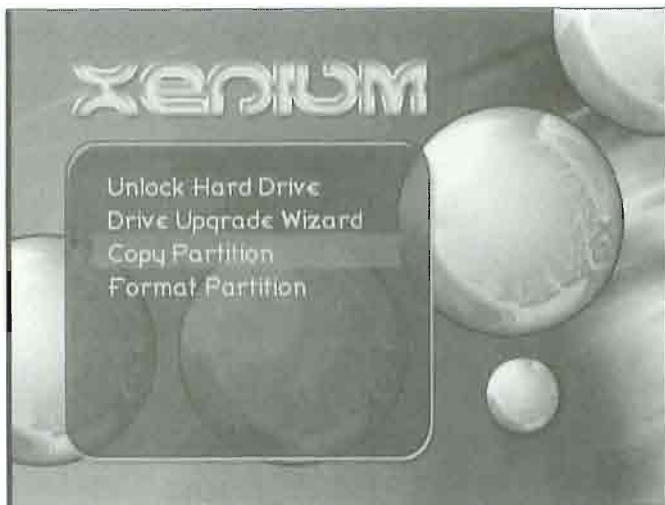


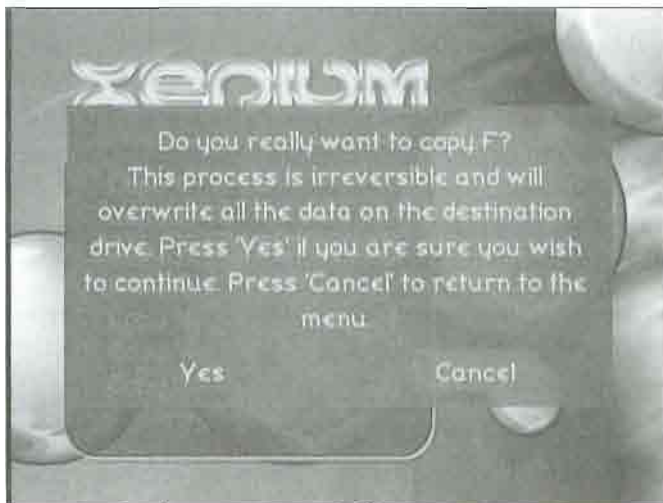
FIGURE 7.10 The Copy Partition option.

Select the Copy Partition menu option to bring up the next screen, shown in Figure 7.11. This screen lets you choose the source partition that you wish to copy.



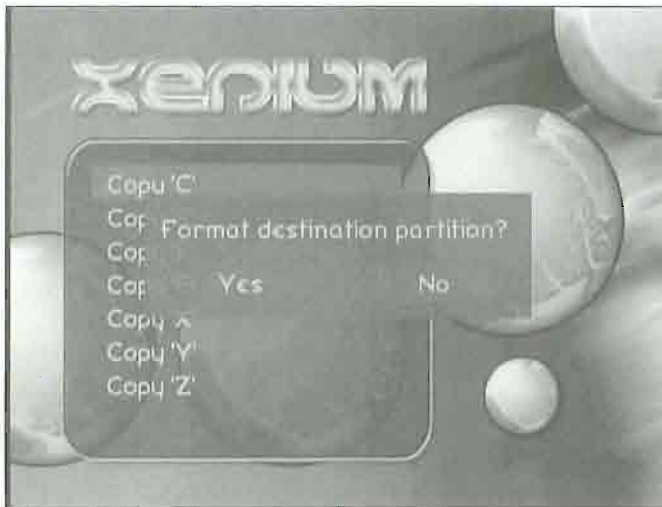
**FIGURE 7.11** Selecting the source partition.

After you select a source partition, you will get a confirmation screen (shown in Figure 7.12) that warns you of the result of the copy operation.



**FIGURE 7.12** The warning confirmation screen verifies that you want to proceed.

If you select Yes, you will then see the screen shown in Figure 7.13, asking whether you would like to format the destination partition before performing the copy operation. You would want to do this, for instance, if the partition doesn't already exist on the second hard drive. The copy process will begin immediately after you choose Yes or No to the format question.



**FIGURE 7.13** You can choose whether you want to format the destination partition.

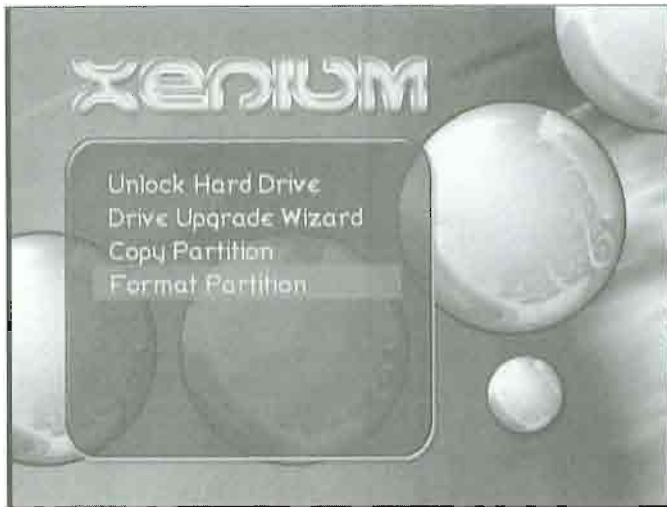
### Format Partition

Sometime you may need to format a specific partition on your old or new hard drive, such as if the partition becomes corrupted due to disk errors (the Xbox doesn't have a disk check feature, after all!) or if you have been using the partition for a long time, copying and deleting files for months or even years, and the files have become fragmented. Xenium O/S has no hard drive defragger, so the best way to overcome a fragmented partition is to make a backup copy of all the files, format it, and then copy the files back. You can copy the files to your PC using FTP or SMB, format the partition, and then copy the files back. I wouldn't think this is at all necessary unless you do a *lot* of file transfers because the Xbox hard drive is primarily a read-only drive; after you load it up, the Xbox only reads the files (to play music, games, and so on).

To format a partition, first select the Format Partition option from the Disk Tools menu, as shown in Figure 7.14.

Next, you'll be asked for the partition that you wish to format (see Figure 7.15). The Xenium O/S scans the local drive for an existing partition to format, but generally, the Xbox uses only seven partitions: C, E, F, G, X, Y, and Z. The Dashboard uses the first four partitions, where savegames and so on are stored. In particular, partition C is the place where you will install a new Dashboard (covered in the next chapter). Partition E is the main "work partition" of the Xbox, where savegames and music soundtracks are stored. If you install a larger hard drive, you'll see a partition F. Partition G is not as common but is an option if you have a very large hard drive and want it split into two parts. Partitions X, Y, and Z are used for game caches to speed up loading of game levels; a game has the option of copying large portions of content from the disc to one of these cache partitions for better game play.





**FIGURE 7.14** Selecting the Format Partition option.



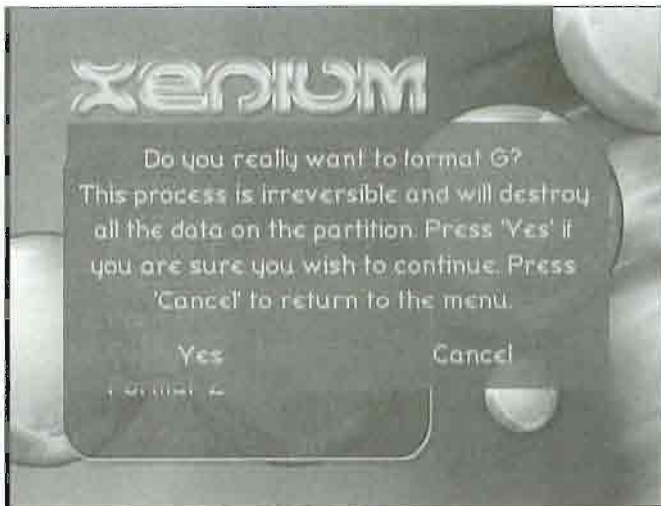
**FIGURE 7.15** Choosing a partition to be formatted.

After you choose the partition, you'll be asked on which hard drive the partition is located. You can format any partition on the primary or secondary drive, thanks to the screen shown in Figure 7.16. If you are confused, this basically means that the Xenium O/S supports two hard drives. You can remove the DVD-ROM drive and replace it with a second hard drive! (More on that in Chapter 12.)

Next, you'll see the confirmation screen shown in Figure 7.17, allowing you to change your mind about the format process. If you wish to proceed, select Yes.



**FIGURE 7.16** Selecting the hard drive to use (the Xenium O/S supports two!).



**FIGURE 7.17** Final confirmation before the partition is formatted.

## EEProm Tools

Figure 7.18 shows the EEPROM Tools item selected on the main menu, which brings up the EEPROM Tools menu (shown in Figure 7.19). This handy little screen gives you the basic settings of your Xbox, including the revision *range*, video standard (NTSC or PAL), DVD region (1 to 6), and game region (US/CAN, JAP, or EUR/AUS). The Xbox version item will tell you only if your

Xbox revision is 1.0, 1.1 to 1.5, or 1.6, without any details about specifically which version it is in the 1.1 to 1.5 range (it's difficult to tell in software).



FIGURE 7.18 The EEprom Tools menu item.

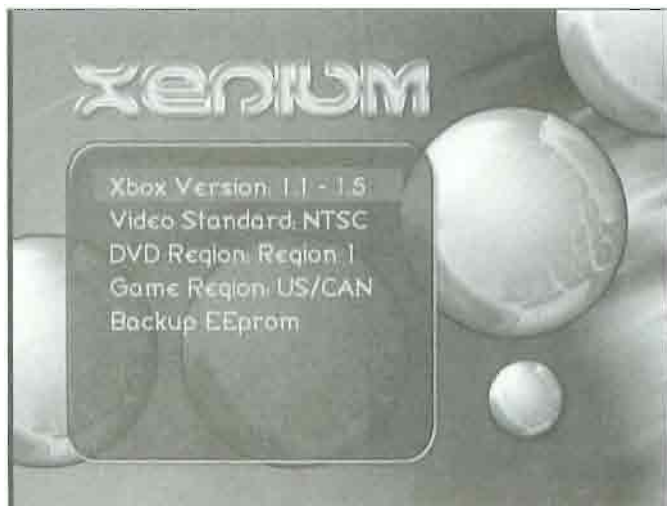


FIGURE 7.19 The EEprom Tools menu.

You can also *change* the video standard, DVD region, and game region from this menu. For instance, suppose you live in the United States and have an Xbox 1.3 that you are selling to someone in Europe (without a mod chip). That person will not be able to use the Xbox **unless the DVD**

region and game region values are changed. You might open up an Xbox store and sell the same basic Xbox unit internationally! (However, as you saw in the preceding chapter, this wouldn't be very practical for the 1.6 if you had to solder in a mod chip just to change the region settings.)

### Backing Up the Xbox EEPROM

The Xenium O/S has a very helpful feature that allows you to make a backup of the Xbox EEPROM containing all of the configuration settings of the Xbox. Why would you ever want to do this? Although this feature might not seem very important, it can save your Xbox from being stuck with unusable settings that might have been set from the Microsoft Dashboard. Because the Xenium O/S accesses the Xbox EEPROM directly and can make changes to it, you can correct mistakes in the DVD or game region codes. As a precaution, you should make a backup of the EEPROM *only* when you have a stable Xbox that is configured properly because the process is meant to restore a *good* backup in the event of a system error. Be sure you do not perform a backup immediately after making changes to the Xbox until it has been thoroughly tested.

To perform the backup procedure, highlight the Backup EEPROM menu item, shown in Figure 7.20, and then select it. The Xenium O/S will immediately perform the backup process, as shown in Figure 7.21.

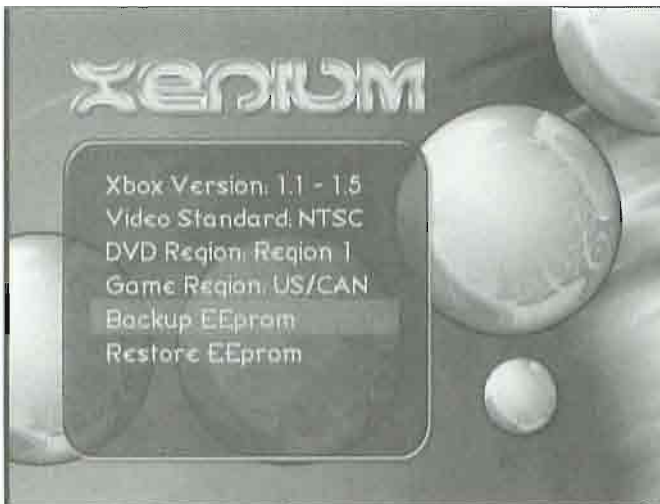
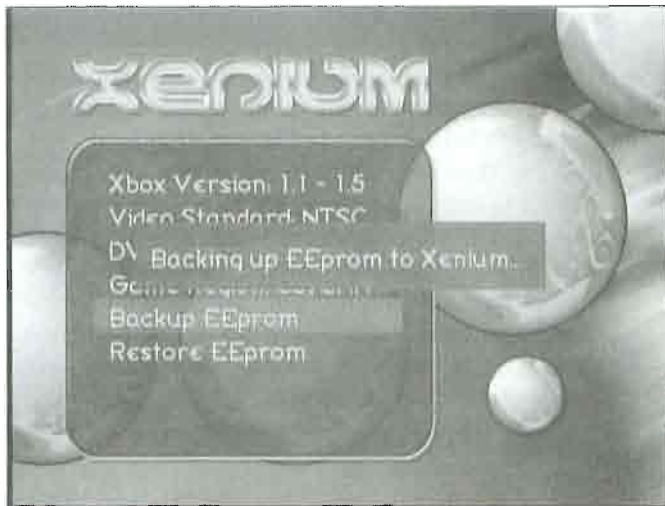
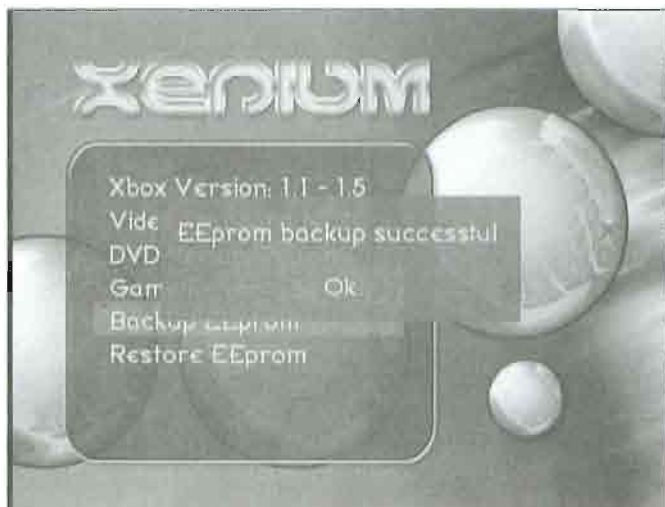


FIGURE 7.20 The Backup EEPROM menu item.

If an error occurs with the EEPROM backup, Xenium O/S will notify you; otherwise, you should see the message shown in Figure 7.22.



**FIGURE 7.21** Backing up the Xbox EEprom chip.



**FIGURE 7.22** The EEprom backup process was successful.

### Restoring the Xbox EEprom

You would want to restore the Xbox EEprom if your Xbox has a configuration problem that you cannot solve from the Microsoft Dashboard (or any other replacement dash). This will restore the EEprom to the configuration state of the Xbox at the time of the last backup. Highlight the Restore EEprom menu item and select it, as shown in Figure 7.23.

Selecting the Restore EEPROM choice brings up a dialog box that asks you to verify the Xbox revision (see Figure 7.24). If the revision is correct (in other words, you have not changed the motherboard since the last backup), you can proceed by selecting the button.

If you still want to overwrite the current EEPROM with the image stored in the Xenium memory, go ahead and choose Yes; otherwise, choose No, as shown in Figure 7.25.

#### CAUTION

If you used the Xenium chip on a 1.6 Xbox, for instance, then inserted it into a 1.3 Xbox, and accidentally restored the EEPROM, that could render the Xbox unusable. So be careful not to perform a restore unless you are *absolutely* sure it is the right EEPROM memory image, and don't do this frivolously—only when necessary. If the power were to go out during an EEPROM restoration, your Xbox BIOS would be ruined (which is repairable if you have a mod chip installed, but problematic nevertheless).

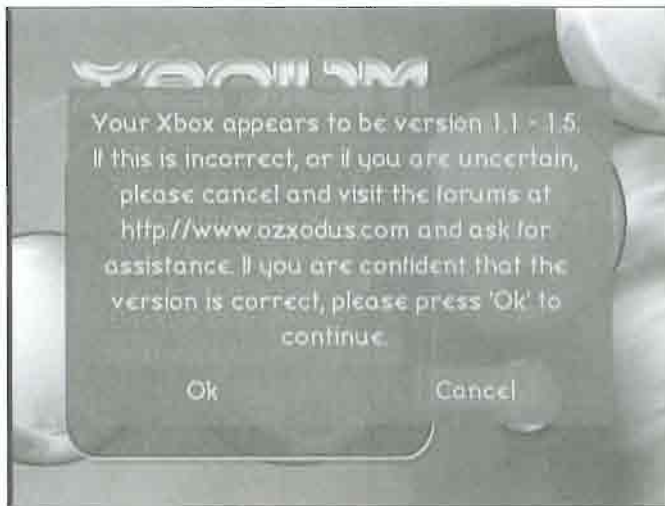


FIGURE 7.23 The Restore EEPROM menu item.

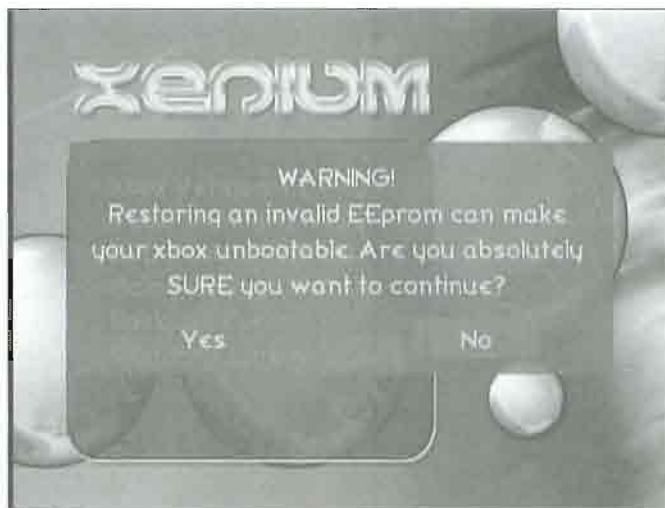
## Settings

Figure 7.26 shows the Settings menu item selected on the main menu. Selecting this item will bring up the Settings menu, as shown in Figure 7.27. This menu has five options: Xenium Settings, Network Settings, FTP Settings, Telnet Settings, and SMB Settings.





**FIGURE 7.24** Confirming the Xbox revision before writing to the EEprom.



**FIGURE 7.25** Final confirmation on the EEprom write procedure.

## Xenium Settings

First, select the Xenium Settings option to bring up the Xenium Settings menu, shown in Figure 7.28. This menu has a single option for setting Instant Boot either on or off. If you have selected a default item in the Launch menu, this setting will allow that launch item to automatically launch when you power up the Xbox.



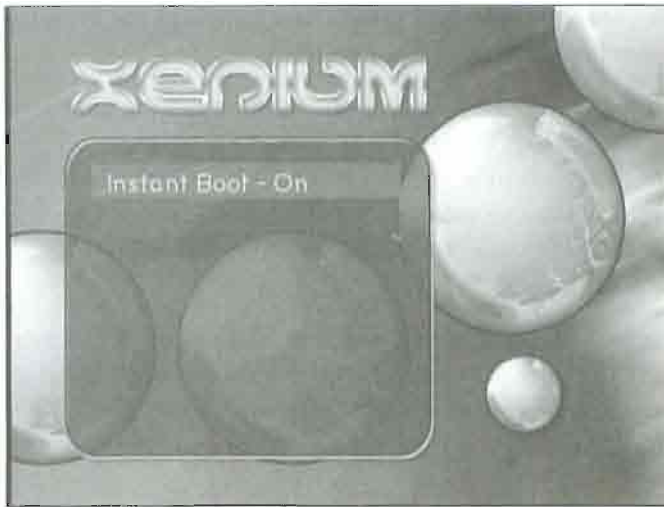
FIGURE 7.26 The Settings menu item.



FIGURE 7.27 The Settings menu.

## Network Settings

Selecting the Network Settings option brings up the Network Settings menu, as shown in Figure 7.29. This menu lets you change the settings used by Xenium O/S to configure the Xbox LAN connection.



**FIGURE 7.28** The Xenium Settings menu.



**FIGURE 7.29** The Network Settings menu.

If you have a router with a built-in Dynamic Host Control Protocol, (DHCP) service, you can configure Xenium O/S to use Dynamic IP. I prefer the Static IP option because then the IP address of the Xbox will always be the same, which is convenient when you need to connect to it to transfer files via FTP. However, you may want to connect to your Xbox using SMB, in which case you can just browse the Xbox file system with Windows Explorer (or whatever file browser you are using with your PC's O/S). I tend to use FTP more often because my Xbox is running EvolutionX

(which does not have an SMB server, unfortunately), so I usually have a static IP, but browsing the file system is definitely more convenient when using Xenium O/S.

Note also that the network settings used by Xenium O/S need not match the network settings in a Dashboard such as EvolutionX because, unlike a PC O/S, the Xenium O/S doesn't keep on running "in the background" when a Dashboard is running. Xenium O/S is a multi-threaded O/S, but it does not continue running when another program (such as EvolutionX) is run. One nice thing about SMB is that you can just connect to your Xbox using the server share name (such as "xbox") instead of needing to know the IP address.

Any time you want to make a change to the network settings and have it take effect immediately, just use the Restart Network option. This choice will cause Xenium O/S to completely restart all networking services (including the IP stack, network drivers, FTP, and SMB server), just like your PC does when it boots up (see Figure 7.30).



**FIGURE 7.30** Restarting the network connection in Xenium O/S.

The other network settings should match the settings of your router or the PC that you are connecting to, including the IP prefix (192.168.0.x is standard) and subnet mask (255.255.255.0 is standard). The gateway is important if you are using a router with a broadband connection to the Internet, in which case, the gateway should be the IP address of your router. You normally don't need to change the DNS setting unless you are using a shared Internet connection without DHCP.

If you don't have a router, you will have to set up your PC for a direct connection to the Xbox using two network interface cards (NICs). This is a cheesy way to do it, so why not just buy a hub for \$10 or, better yet, a cheap router for \$25? You'll want to share your Internet connection with

your Xbox anyway, so the cost of a router is money well spent. Of course, if you don't have a broadband Internet connection, I would *still* recommend a router because it will have DHCP, and configuring it is generally much easier than setting up networking on your PC.

**NOTE**

Because this isn't a networking book, I'll just refer you to a primer for more information on setting up a PC LAN. A good primer is *How Networks Work, 7th Edition*, by Frank Derfler Jr. and Les Freed (Sams Publishing, ISBN: 0789732327).

The important thing is to get your PC and Xbox on the same LAN one way or the other: That can be with a router (*very* easy), hub (easy), or dual NICs (hard!). If you have no DHCP service, you need to set the IP address of your PC and Xbox manually, using the same prefix. Two good examples include 192.168.0.1 and 192.168.0.2.

## FTP Settings

From the main Settings menu, choose FTP Settings to bring up the FTP configuration screen, shown in Figure 7.31.



**FIGURE 7.31** Xenium O/S includes an FTP server.

The only options here allow you to enable/disable the FTP server and set the username and password of the FTP server. If you have enabled the FTP server, it is running already, and you can connect to your Xbox using your favorite FTP client.

For the sake of simplicity, I will just use Internet Explorer to connect to my Xbox to test the FTP server. By all means, you should use your favorite FTP client instead if you wish.





to use the dash any longer and will have to *somehow* get a copy of the correct dash from someone else to replace it. Be *careful*!

## Telnet Settings

You can connect to your Xbox via Telnet because Xenium O/S includes a Telnet server. Telnet is mainly used during the development of Xenium O/S, so the Telnet commands are limited. The Telnet Settings screen is shown in Figure 7.34.



FIGURE 7.34 The Telnet Settings screen.

Basically, you see the same options here that you saw in the FTP Settings screen, with the ability to enable/disable the Telnet server and set the username and password. The Telnet server runs in the Xenium O/S by default, so you can use your favorite Telnet client to connect to your Xbox, or just use the command prompt in Windows, as shown in Figure 7.35.

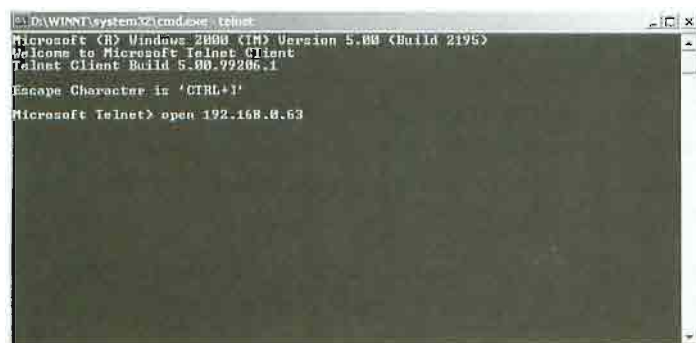


FIGURE 7.35 Connecting to your Xbox via Telnet.

Open a command prompt (by choosing Start, Run and typing **cmd**), and then type **telnet** to start the Microsoft Telnet client. From there, type **open** followed by the IP address of your Xbox to connect; then type in the username and password (usually **xbox** for both). Once connected, you can type **help** to get a list of commands, as shown in Figure 7.36.



**FIGURE 7.36** Displaying the commands in the Xenium Telnet server.

## SMB Settings

The SMB server provided by the Xenium O/S is *awesome*. This is the preferred method of accessing the file system of your Xbox for transferring files back and forth. It is treated just like another PC on your network! For this reason alone, the Xenium is an excellent mod chip to choose, especially for a beginner who is new to modding.

Let's go over the configuration of SMB so you can connect to it from your PC. I am using Windows 2000, but the same rules apply to later versions of Windows, as well as to other systems. First, highlight and then select the SMB Settings option on the Settings menu, as shown in Figure 7.37.

You will be presented with the SMB Settings menu, shown in Figure 7.38. From here, you can completely configure the file-sharing settings of your Xbox (via the Xenium O/S).

You can set the share path, username, password, workgroup name, and even the server name for your Xbox. Although these options may be needed for some systems, you can leave them all at their defaults when your PC is running a modern version of Windows. You may be asked for the username and password the first time you connect to your Xbox, but the settings are usually retained for the next access. Of course, the most important setting is to enable the SMB Server itself, so make sure it is set to On.

After you have made any necessary changes to the file sharing settings, you can then connect to your Xbox from your PC. The easiest way to do this is to use Windows Explorer (with the Location toolbar visible).

Type **\\xbox** for the location and press Enter.



FIGURE 7.37 The SMB Settings option.



FIGURE 7.38 The SMB Settings menu.

The Xbox workgroup should appear with a single computer called “Xbox” on the Xbox network. If you would rather have the Xbox be part of your own workgroup, you can change the workgroup used by the Xenium O/S from the SMB Settings menu (by choosing Set Server Workgroup). To connect to the Xbox, you can also choose Start, Run, and type `\\xbox` to open a new Windows Explorer window to access your Xbox (see Figure 7.39).

Check it out! At this point, your PC thinks it is connected to another PC on the LAN and will let you copy, delete, and yes, even *edit* files right on the Xbox hard drive! You can also see the

capacities of the Xbox hard drive partitions. Figure 7.40 shows the C: drive on my Xbox (note that your Xbox file system may not have the same files on it).



FIGURE 7.39 Accessing the Xbox file system from Windows Explorer.

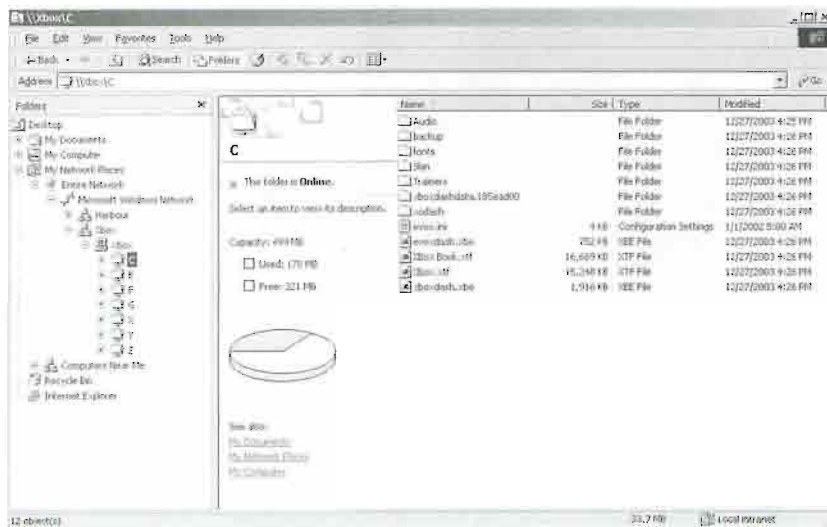


FIGURE 7.40 Browsing the file system of the Xbox.

A word of caution: Be very, *very* careful what you do to the files on your Xbox hard drive using Windows Explorer. It's all too easy to ruin the default Microsoft Dashboard and render the Xbox unusable with anything other than an alternate dash (unless you somehow restore the files). The danger here is that you *can* delete files on the Xbox hard drive at will! Don't ever leave your Xbox file system exposed if anyone else has access to your PC, and better yet, never leave the Xbox running if you aren't around because a simple *mistake* can wipe entire folders off the Xbox drive. "With great power comes great responsibility..."

Of course, the Xbox doesn't care whether you use it as a file server! I recommend creating a new folder if you want to store files on your Xbox. Imagine that you have secret files that you don't want anyone to find. Wouldn't it be cool to hide them on your Xbox instead of on your PC? This is exactly what we're going to do in Chapter 10 when I show you how to copy your favorite music and videos to the Xbox hard drive to turn it into a media server for the entertainment center in your living room.

## Reboot

The Reboot item on the main menu (shown in Figure 7.41) performs the simple task of rebooting your Xbox back into the Xenium O/S once again.



FIGURE 7.41 The Reboot menu item.

## Recovery

The Recovery item on the main menu (shown in Figure 7.42) allows you to restore the Xenium BIOS to the default settings in the event of a royal system screwup. For this to work, you must flip the “emergency recovery switch” on the Xenium before selecting this menu item to invoke recovery mode. You may also use Recovery to upgrade the Xenium OS, which will be out of beta and in full release form by the time you read this.

## Power Off

The Power Off item on the main menu (shown in Figure 7.43) simply shuts off the Xbox.



FIGURE 7.42 The Recovery menu item.



FIGURE 7.43 The Power Off menu item.

## Summary

This chapter provided an overview of the Xenium O/S that is built into the Xenium mod chip. This O/S runs when you turn on the power of your Xbox after the Xenium mod chip has been installed. In this chapter, you learned about the features of the Xenium O/S and learned how to connect to your Xbox from your PC to transfer files. I will discuss this topic and more in the next chapter on installing a new Dashboard.



# EvolutionX Dashboard

Here are the key points covered in this chapter:

- What is EvolutionX?
- Installing EvolutionX
- Creating a custom BIOS
- Using the EvolutionX Dashboard
- Creating your own EvolutionX sk

**T**his chapter explains how to install and use the popular EvolutionX Dashboard. A Dashboard is a front end for the Xbox, a graphical user interface similar to KDE, Gnome, OS X, and Windows. In other words, EvolutionX gives the user control over the computer system. In the case of EvolutionX, it gives you more control over your Xbox than is available with the Microsoft Dashboard, and it provides services that work only when a mod chip has been installed. You will learn how to install the latest EvolutionX BIOS and Dashboard and configure the Xenium O/S (or the O/S for your mod chip, if different) to automatically run EvolutionX when you turn on your Xbox.

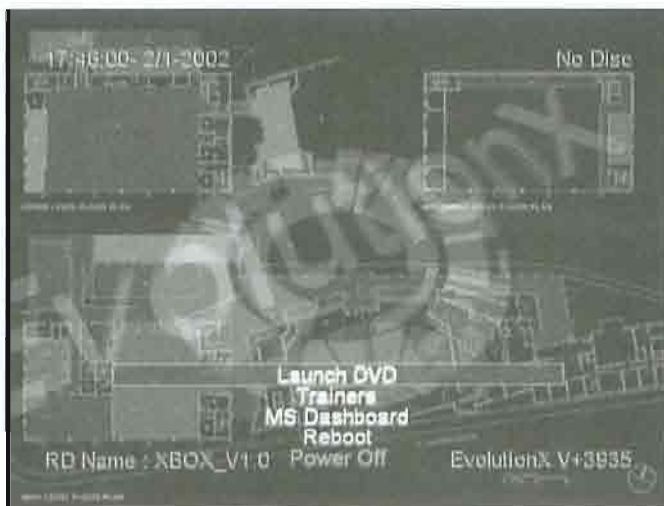
## What Is EvolutionX?

If you have never heard of EvolutionX before (which is very possible because it is not a widely advertised product), you may be wondering what EvolutionX is, why you might need it, and what it can do. So, let's discuss what EvolutionX can do for a minute before getting into the details of installing and using it.

EvolutionX (which was recently renamed to just EvoX) is a replacement for the Microsoft Dashboard (the familiar green interface that comes up when you turn on your Xbox without a disc in the DVD-ROM drive). Whereas the

Microsoft Dashboard can do little more than set the date and manage savegame files, a replacement such as EvoX is more like a complete operating system for your Xbox, above and beyond the mod chip O/S. You might recall that you mainly use the Xenium O/S (covered in the preceding chapter) to build a modded Xbox system by installing new BIOS images, creating launch items, installing and formatting new hard drives, and so on. EvoX, on the other hand, is all about the software.

There are two parts to EvoX: the EvoX Dash, and EvoX BIOS. At its core, EvoX Dash is basically just a launchpad itself for running other programs—which is, after all, the sole purpose of an operating system, to run other programs. No O/S is expected to have a full suite of applications and utilities built in, despite the feature bloat of modern systems. Figure 8.1 shows the start screen of EvoX.



**FIGURE 8.1** The EvoX Dash.

## Installing the EvoX BIOS and Dash

Perhaps the most seemingly difficult aspect of modding your Xbox is installing a new Dashboard. But after reading the preceding chapter on using the Xenium O/S, you will surely agree with me that it is an easy task to access the Xbox file system, and therefore, it is possible to copy new files to the Xbox hard drive. I'll show you how to install the EvoX Dashboard shortly, but before you do that, your Xbox will need a new BIOS (also known as firmware). Why? The firmware provides the low-level hardware services such as task-switching and memory management that make it possible to write Xbox software using the XDK rather than low-level assembly language (as is the case with the Nintendo Game Boy Advance, which runs binary programs with a boot loader built

in, so to speak). Without the firmware acting as an O/S core, an Xbox programmer would have to write all the low-level hardware interface code.

## Acquiring EvoX

EvoX has a somewhat mysterious history and is something of an orphan, with a lack of formal ownership (it was created and is still maintained by “Team EvoX”). I am unable to direct you to a specific website where you may *download* either the EvoX BIOS or Dash. However, the creators of EvoX, who are named only by alias, maintain an informational website at <http://www.evolutionx.info>. Note that you will not find EvoX at this site, only documentation.

### CAUTION

You will find the usual “militant hostility” from the Xbox community that you find in the open source community, so my advice is that you *never ask* for help unless it is on a forum and just keep looking for a BitTorrent link that will lead you to the EvoX package. Why is this so? It is a form of self-preservation, since much of this software was compiled with Microsoft’s XDK without a license, so the distribution of this software is illegal.

What I can suggest, in order to acquire EvoX, is that you download BitTorrent from <http://bit-torrent.com> and then find an Xbox fan website that hosts torrents where you will be able to get a copy of EvoX from another peer (which is how BitTorrent works, as a peer-to-peer file-sharing system).

What you are looking for is twofold: Remember, a dashboard replacement must include both the BIOS image and the Dashboard program. First, you need the EvoX BIOS image file. At the time of this writing, the latest version is M8, but the M7 is probably a better choice because it can be customized (see the section “Creating a Custom BIOS” later in this chapter for details).

The second part you need is the EvoX Dash. Usually, this will come with two files: `evoxdash.xbe` and `evox.ini`. You may also notice two folders called `SKIN` and `TRAINERS` (which are optional).

## Installing the EvoX Dashboard

The only practical way to install EvoX is to use a LAN connection, as described in the preceding chapter. Really, if you don’t have a network to be able to transfer files between your Xbox and PC, you will be severely limited by what you can do with your modded Xbox anyway, so it’s a necessity. You can use a hub or a router, both of which are as inexpensive (and essential) as the mod chip itself.

Installation of EvoX is simple when you have the files ready to be installed. First, connect to your Xbox using FTP or SMB (per the preceding chapter). Then copy `evoxdash.xbe` and `evox.ini`—as well as the `SKIN` and `TRAINERS` folders if you wish—to the C: partition on the Xbox hard drive.

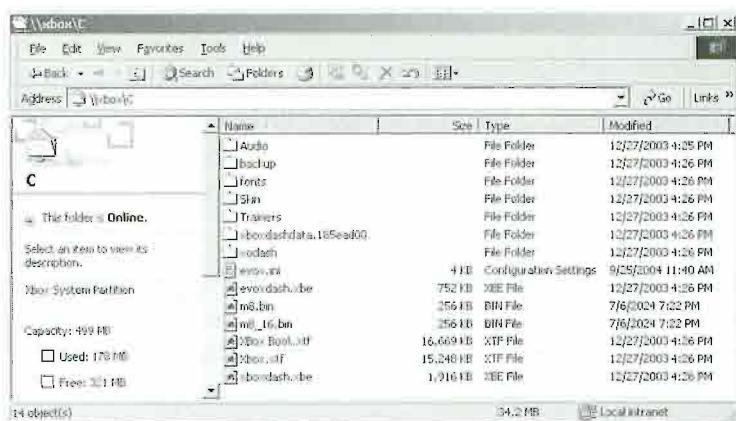
Just copy the files to the root folder of the C: partition. (Don't put EvoX inside a subfolder because the BIOS expects the Dashboard to be located in the root of C:.)

While you are at it, copy the M8.BIN file (the BIOS image) to the same location so you can install it from the Xenium O/S as a launch item later.

Believe it or not, that is all there is to installing the EvoX Dash, so you're all done as far as that goes, although you'll want to read the next section to learn how to customize EvoX by modifying the `evox.ini` file.

## Installing the EvoX BIOS

Okay, you've copied the EvoX files to your Xbox hard drive by one method or another, including the M8.BIN (or some as-yet-unknown new version of the BIOS). Next, you need to add a new launch item to the Xenium O/S via the Launch menu. The file system on the Xbox hard drive should look something like Figure 8.2.



**FIGURE 8.2** The EvoX BIOS and Dash files have been copied to the Xbox hard drive.

You'll notice two BIN files in the file list: M8.BIN and M8\_16.BIN. If you own a revision 1.6 and have successfully installed a mod chip in it, you'll want to use the M8\_16.BIN file, which was created specifically for that new revision (1.6 is somewhat different than older versions, as you have learned). You do not want to install a standard M8.BIN BIOS in your Xbox 1.6, so if you aren't absolutely sure which version of the BIOS you have, chances are it is *not* for the 1.6, and you need to find the correct one for your Xbox. All other revisions will use the standard M8.BIN.

If your Xbox is running, turn it off by pressing the power button. Then, bring up the Xenium O/S by pressing the eject button. (Pressing the eject button brings up the O/S regardless of any default launch item that is configured to run automatically after the power button is pressed.) Next, open the Launch menu, as shown in Figure 8.3.



**FIGURE 8.3** The Xenium O/S Launch menu.

At this point, you are going to install the M8.BIN image file (containing the EvoX BIOS) into a bank in the Xenium's memory. From the Launch menu, select Add A New Item to bring up the screen shown in Figure 8.4.

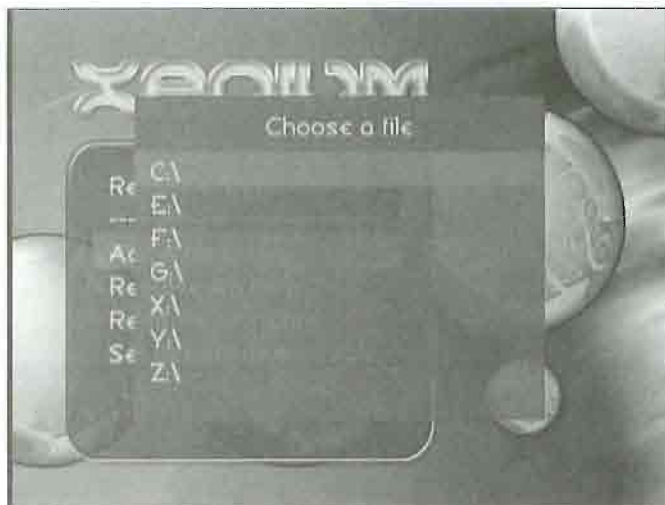


**FIGURE 8.4** Selecting the source for the BIOS image file.

Select the second option, Flash, to bring up a list of drives found in your Xbox. If you have a disc in the DVD-ROM drive, the D: drive will be shown. If you have already upgraded your hard drive to a larger model, you may see an F: and perhaps even a G: partition. There is another

possibility: If you have inserted the USB adapter (included with the Xenium mod chip) with a flash memory device, it will be identified as drive H: by your Xbox.

Because you need to copy the Dashboard files to the hard drive anyway, there is no practical reason to use a flash memory card for the BIOS image. All things being equal, all you really care about at this point are the files you copied to the C: drive from your PC. Select the C: drive from the list, as shown in Figure 8.5.



**FIGURE 8.5** Opening the C: drive to browse for the EvoX files.

When you select the C: drive, you should then see a screen that resembles Figure 8.6, showing the files on the root of C:. If you already copied the EvoX files to your Xbox, you should see the `evoxdash.xbe`, `evox.ini`, and perhaps the `SKIN` and `TRAINERS` folders as well. Most important at this stage is the `M8.BIN` file, which contains the new BIOS image. Select the `M8.BIN` file.

#### NOTE

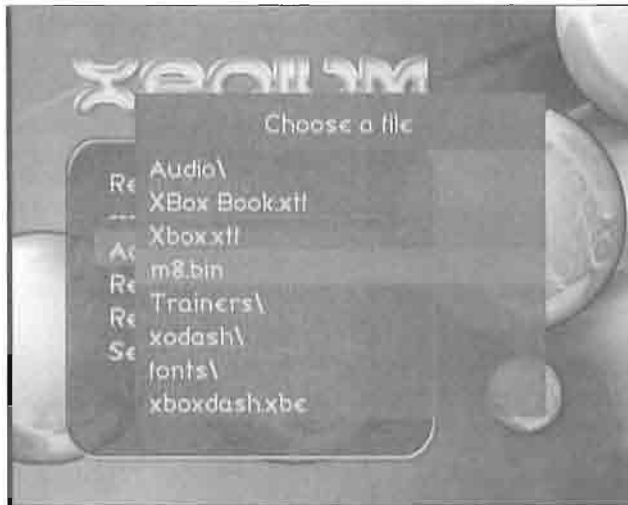
If you are using a different version of the BIOS, you will want to locate that file rather than the one I suggest here as an example.

The Xenium O/S will try to auto-detect the name of the BIOS and fill in the name for you, but if it can't figure out what type of BIOS is stored in the file you selected, you will get a blank name field. Enter a descriptive name for the BIOS image you have chosen, using the screen shown in Figure 8.7.

Next, you have an opportunity to choose a color for the programmable LED built into the Xenium (see Figure 8.8). Color choices include Red, Green, Amber, Blue, Purple, Teal, and White,



or you can choose to turn off the LED for this BIOS bank. The Xenium O/S will then display the screen shown in Figure 8.9 while it copies the image file into a BIOS memory bank.



**FIGURE 8.6** Locating and selecting the BIOS image file.



**FIGURE 8.7** Entering a name for the BIOS image.

You can now launch the EvoX BIOS, which will in turn execute the `evodash.xbe` file you copied to the C: partition. Figure 8.10 shows the Launch menu with the new item added.



FIGURE 8.8 Choosing a color for Xenium's programmable LED.



FIGURE 8.9 The BIOS image file is added to the Xenium flash memory.



**FIGURE 8.10** The new launch item is now available.

## Creating a Custom BIOS

You can run a very useful program called XBtool on your PC to modify an Xbox BIOS file, customizing the various options on your Xbox. This program is available for download at <http://home.alltel.net/nghtshd/xbtool.html>. Figure 8.11 shows XBtool with a custom BIOS file that I have modified. Of course, you can download fully customized BIOS files, but you can just as easily get XBtool and customize your own BIOS.

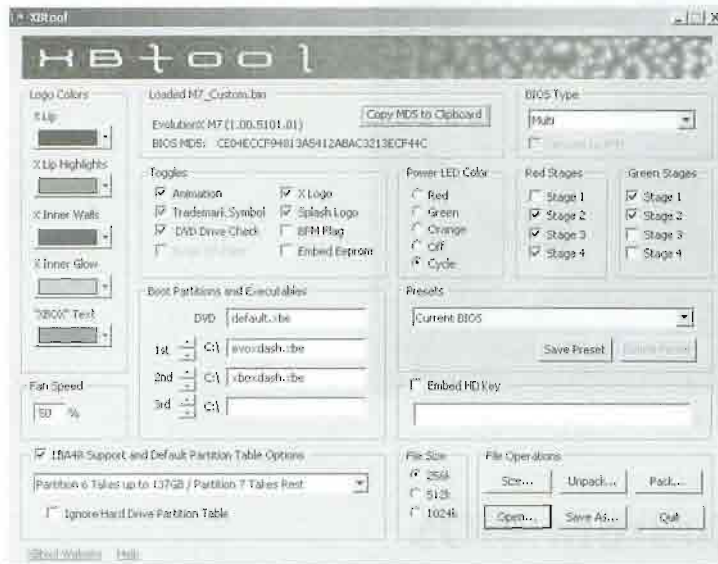
Just click the Open button, choose a BIN file, and then customize away! In this figure, I have created a custom version of the M7 BIOS: I have increased the Xbox fan speed to 50%, set the Xbox power light to cycle (from red to green to orange—a very cool effect that you should try out!), and enabled LBA48 support. (At the time of this writing, XBtool doesn't support M8, but a modified M7 will still *more than* get the job done!)

### NOTE

If you have a modded Xbox 1.6, then you will need to use EVTool (<http://home.alltel.net/nghtshd/evtool.html>) to customize the EvoX M8 BIOS, which is the only BIOS that works with the 1.6.

This last option is crucial when you are replacing your stock Xbox hard drive with a larger capacity drive, such as the 250GB Maxtor 7200-RPM drive I am using. Without the LBA48 option, your Xbox will not be able to handle a hard drive that is larger than 137GB—and even if you do install one using two partitions, the G: partition will not be usable without LBA48 support built into the BIOS. (See Chapter 12, “Upgrading the Xbox Hard Drive,” for more information.) Of course, one

option is to just install a hard drive with 137GB or less storage space—which is, I'll admit, a *ton* of space for storing music files, video files, and programs.



**FIGURE 8.11** Customizing the Xbox BIOS with XBtool.

Feel free to modify the BIOS file in different ways and then try them out using the Xenium O/S Launch menu. And get this—you can even install multiple versions of the same BIOS with different options! Did you notice that in the `M7_Custom.bin` file I created (back in Figure 8.11), the `evoxdash.xbe` file is specified as the first default executable? You can use this technique to configure the *same* BIOS (such as EvoX M7) to launch *multiple* Dashboards. Chapter 9 covers the Avalaunch Dashboard, and Chapter 10 covers Xbox Media Center, yet another Dashboard that is more focused on media playback. In these upcoming chapters, I will show you how to use XBtool to configure the same BIOS used by EvoX to fire up these other Dashboards automatically. The alternative—without setting them as launch items—is to run one of the alternates from within EvoX, which defeats the purpose of having a multifaceted list of launch items, made possible by Xenium's large flash memory bank (2MB doesn't seem like much, but the BIOS files are only 256KB each).

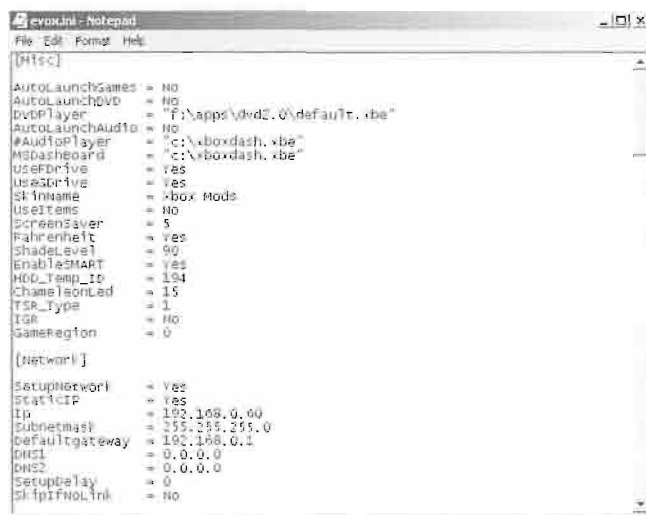
After you have the configuration you want, just click the Save As button to save the BIOS to a new file; then copy it over to the Xbox hard drive and install it as a new launch item.

# Using the EvoX Dash

The best overall feature of EvoX is the ease with which it can be customized. The interface uses a simple menu system with a scrolling highlight bar that you move up or down with the D-pad. You can edit the EvoX menu by simply modifying the `evox.ini` file.

## Tweaking EvoX Dash

Let's take a look at the `evox.ini` file to see what kinds of options are available. Figure 8.12 shows the `evox.ini` file loaded into Notepad. Most of these options *cannot* be edited from within EvoX, so you'll need to modify them on your PC and then copy the `evox.ini` file over to your Xbox again whenever you need to modify it. Alternatively, you can open the `evox.ini` file directly on your Xbox if you have SMB enabled (as a network share).



**FIGURE 8.12** The EvoX settings file.

In addition to all the settings here, you can also create simple scripts that will run based on a certain menu item. You can do quite a bit with EvoX just using the built-in scripting language (you can even format a partition using a simple command, so be careful when playing around with the EvoX script). For more details on the script commands available, check the documentation on <http://www.evolutionx.info>.

The really important thing to do in the `evox.ini` file is configure the network settings for your Xbox to match your LAN situation. You may want to set `StaticIP = No` to use DHCP, which will auto-assign an IP address to your Xbox. I prefer to use a static IP most of the time, as you can see in Figure 8.12. After you have verified that the network settings will work on your LAN, save the

file and transfer it to your Xbox. If you have already installed everything per the preceding section, you can launch EvoX from the Xenium O/S Launch menu, or you can select Reboot from the EvoX main menu. That selection will restart the EvoX Dash and pull in the `evox.ini` file again.

## The EvoX Dash Interface

The EvoX interface has a main menu with seven items on it by default: Launch DVD, Trainers, MS Dashboard, Reboot, Power Off, System Utils, and Launch Menu. You can edit this menu by modifying `evox.ini`. Let's take a look at each item in the menu.

### NOTE

You probably don't need to be reminded of something so trivial, but in the EvoX menus, button A selects, while button B returns.

### Launch DVD

The Launch DVD item (see Figure 8.13) will perform a different task based on what type of disc is in the DVD-ROM drive. If an audio CD is in the drive, Launch DVD will execute the standard Xbox CD player (part of the Microsoft Dashboard), after which you will have to power down and turn on the Xbox again to get back to EvoX. (The Xbox Media Center can play CDs and DVDs natively—more on that in Chapter 12.)



**FIGURE 8.13** CDs, DVDs, and games can be played from EvoX.



If you have a DVD movie in the drive, Launch DVD will also run the default Xbox DVD player from the Microsoft Dashboard. More than likely, you'll use this option to run a game you have inserted into the drive. You can configure EvoX to auto-launch any of these types of media when a disc is inserted.

## Trainers

The Trainers submenu (shown in Figure 8.14) will include a list of every trainer EvoX finds in the TRAINERS folder (which you may or may not have copied to the C: partition earlier). You can download new trainers for various games from Xbox fan sites such as <http://www.xbox-scene.com>. The “official” EvoX Dash trainer archive is located at <http://trainers.maxconsole.com>.



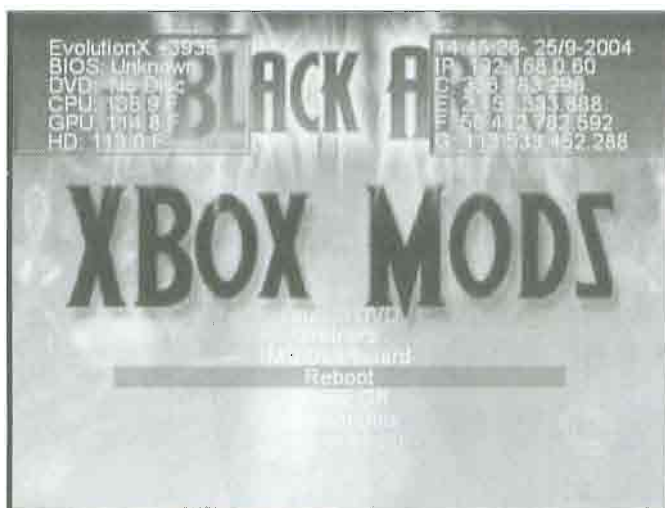
FIGURE 8.14 Trainers allow you to “cheat” in some games.

## MS Dashboard

The MS Dashboard option will jump out of EvoX and run the Microsoft Dashboard, the standard interface for the Xbox without a mod chip. I won't go into the problematic issues of logging on to the Xbox Live network with a mod chip because a *lot* of modders have been banned from playing on Live with a modded Xbox. If you do want to go to the Xbox Live configuration screen, this is one way to do so.

## Reboot and Power Off

The Reboot option (shown in Figure 8.15) will reboot *EvoX*, not the entire Xbox. You can use this option any time you have transferred new software or media to the Xbox hard drive and want EvoX to “pick it up” for use. This is especially true when you add a new homebrew application or game to the hard drive and want EvoX to display the new items in the Launch menu. The Power Off option is self-explanatory.

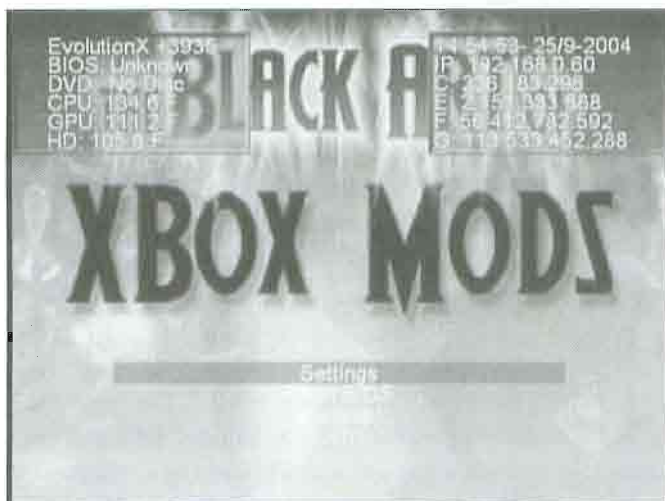


**FIGURE 8.15** You can quickly reboot EvoX to rebuild the menu.

## System Utils

The System Utils menu, shown in Figure 8.16, contains four items by default: Settings, Flash BIOS, Backup, and Skins. I won't get into the Flash and Backup choices because those are features best left alone, but the Settings and Skins options are very interesting. Select the Settings option to bring up the Settings/Info screen shown in Figure 8.17.

When you first install EvoX Dash, you should run the Backup option once to preserve the settings.



**FIGURE 8.16** The System Utils menu.



**FIGURE 8.17** The Settings/Info screen displays info about your Xbox.

You can scroll down the list of information about your Xbox, which is a dynamic listing—meaning that the information is refreshed continually. If you are transferring files to the Xbox hard drive using FTP or SMB, you can go here to look at the free space on each partition while the files are being copied to see the changes.

A *lot* of the items in this listing can be edited if you select one, but many are just read-only. For instance, you can enable or disable the servers (FTP, SMB, Telnet) from the Settings/Info screen, but you can't change the video standard. (If you do make any changes, you will need to scroll down to the bottom of the list to choose the Save And Exit option, or your changes will be ignored). Look at Figure 8.18, which shows the free space on the hard drive partitions.

You can see another interesting part of the Settings list, the temperature readings in your Xbox case, in Figure 8.19. If you want to experiment with some active cooling options for your Xbox, such as a side-vent cooler (available from <http://www.modchipman.com>, among other sources), you can attach the cooler to your Xbox and watch the temperature change—rather quickly I might add. By opening the Xbox case and setting a standard PC cooling fan pointing down right on top of the CPU, you can get the CPU temperature down to less than 100 degrees. Unfortunately, there is no *elegant* way to apply active cooling to an Xbox because the case is so cramped.

The other item on the Settings menu, Skins, is covered in “Creating Your Own EvoX Skins” later in the chapter.



FIGURE 8.18 The free space available on the hard drive partitions.

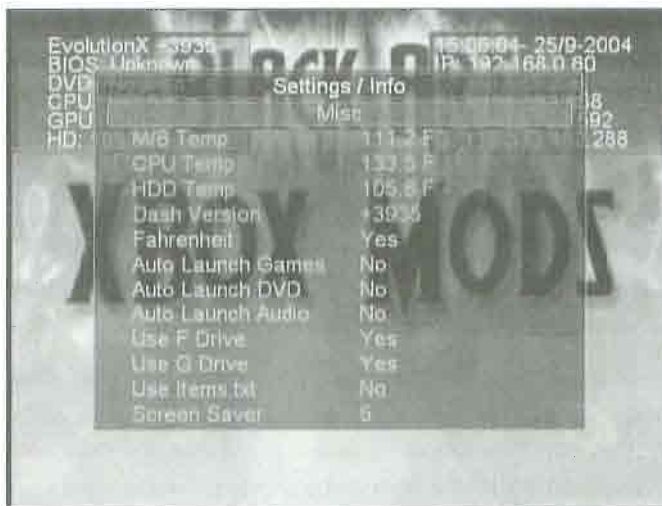
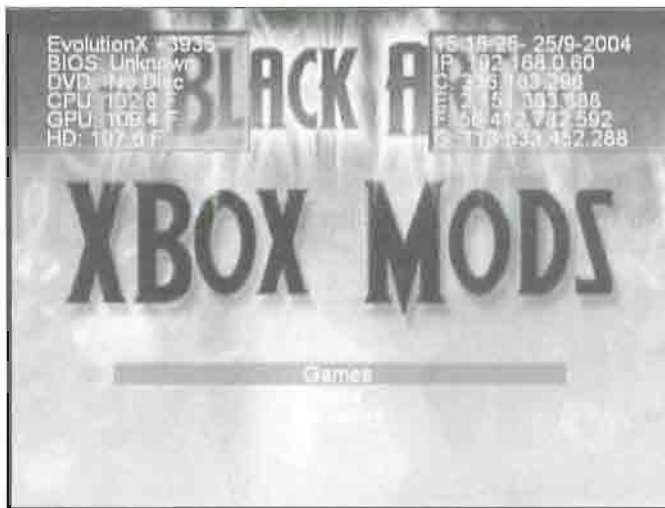


FIGURE 8.19 Three temperature values are displayed.

## Launch Menu

The Launch menu (shown in Figure 8.20) is the most *useful* part of EvoX; it lets you run any custom software you have installed on your Xbox hard drive. EvoX automatically scans the C, E, and F partitions for three folders: Games, Apps, and Emulators. If any of these folders are found on any of the aforementioned partitions, EvoX will add any programs it finds to the associated menu. It is up to *you* to create these folders when you install software on your Xbox hard drive.



**FIGURE 8.20** The Launch menu in EvoX.

## Creating Your Own EvoX Skins

Have you been wondering how I created the custom skin shown in the figures in this chapter? I'll show you in this section how to create your own custom Xbox skin.

EvoX Dash comes with some sample skins you can use. To browse the list of available skins, go to the System Utils menu and select Skins. The resulting screen is shown in Figure 8.21, with the first skin selected (called Original).



**FIGURE 8.21** The Skin menu in EvoX.

You can scroll up and down the list of skins and select each one to see what it looks like. Note that EvoX skins can have a graphic background as well as text items showing various data about the Xbox, and you can also insert your own “launching” bitmap that is displayed whenever a launch item is executed.

EvoX skins are stored in a folder called Skin (note it is singular) on the root of the C: partition. Each skin should be in its own subfolder, with one or two JPEG files for the background and loading images, as well as a skin.ini file that describes the skin.

Here is what a skin file looks like:

```
# Skinned By:Jonathan S. Harbour

SkinName "Xbox Mods","Xbox Mods"

[Skin_Xbox Mods]

Text = 35,25,1,0xf2ff06,0,"EvolutionX <Version>"
Text = 35,43,1,0xf2ff06,0,"BIOS: <BIOSVer>"
Text = 35,61,1,0xf2ff06,0,"DVD: <CD>"
Text = 35,79,1,0xf2ff06,0,"CPU: <Temp2>"
Text = 35,97,1,0xf2ff06,0,"GPU: <Temp1>"
Text = 35,115,1,0xf2ff06,0,"HD: <Temp3>"
Text = 412,25,1,0xf2ff06,0,"<Time>"
Text = 412,43,1,0xf2ff06,0,"IP: <IP>"
Text = 412,61,1,0xf2ff06,0,"C: <SpaceC>"
Text = 412,79,1,0xf2ff06,0,"E: <SpaceE>"
Text = 412,97,1,0xf2ff06,0,"F: <SpaceF>"
Text = 412,115,1,0xf2ff06,0,"G: <SpaceG>"

LogoType = 4

Main = "\skin\Xbox Mods\xboxmods1.jpg"
Launch = "\skin\Xbox Mods\xboxmods2.jpg"

BarColor1 = 0x004080
BarColor2 = 0x0080FF
BarAlpha = .5
MenuColor1 = 0xFFFFFFFF
MenuColor2 = 0x004000
```

You can edit the skin.ini file directly, which is rather hit-and-miss, or you can use a skin editor program called EvoX Skin Creator (shown in Figure 8.22), written by Anand Patel. You can download this program from <http://evoxsc.anandpatel.com>. On the primary tab in the program, you can select background and loading images used by the skin.



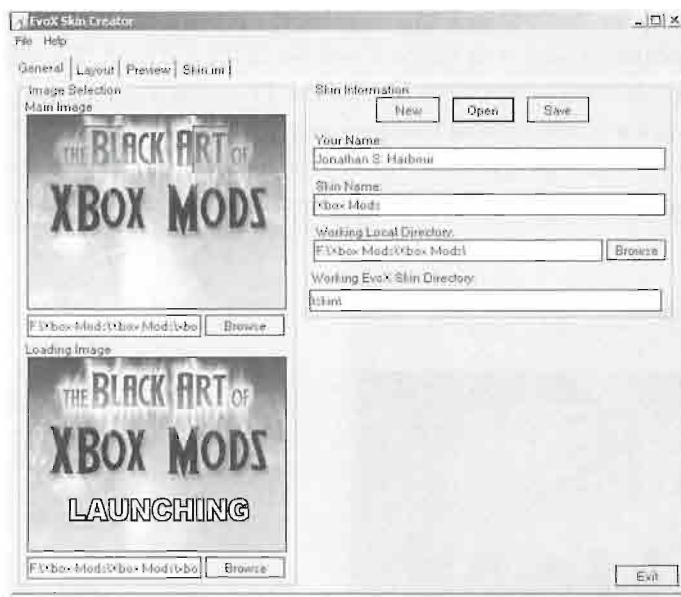


FIGURE 8.22 The EvoX Skin Creator program allows you to create custom skins.

Most of your work on an EvoX skin will be done in the Layout tab of the program, shown in Figure 8.23.

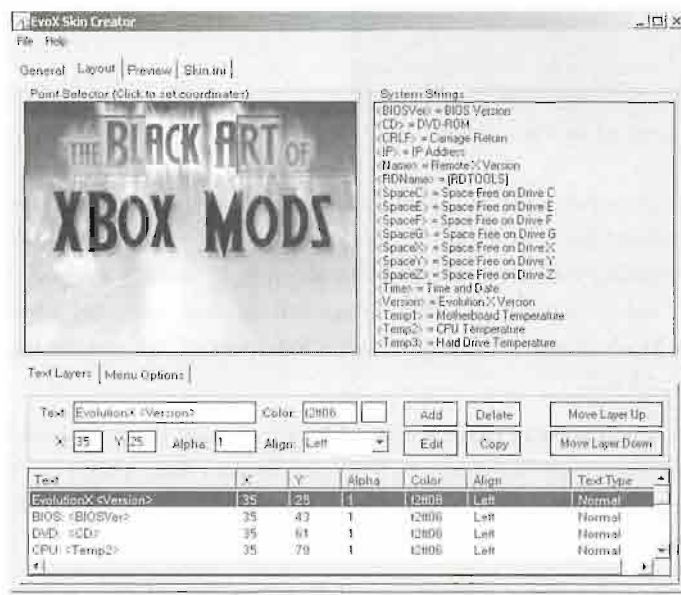


FIGURE 8.23 Editing the text layers of an EvoX skin.

You can get a general idea of what your skin will look like by using the Preview tab (shown in Figure 8.24), which shows an estimation of what your skin will look like in the real EvoX. You will need to be conservative with the positioning of text items because the TV screen is never exactly like the screen you see in this program. I have noticed that a widescreen TV can display almost the entire background image and placement of text layers, but a normal 4:3 TV will crop on the left, right, and bottom. You can figure out what works and what doesn't through trial and error, and you will get the hang of it.

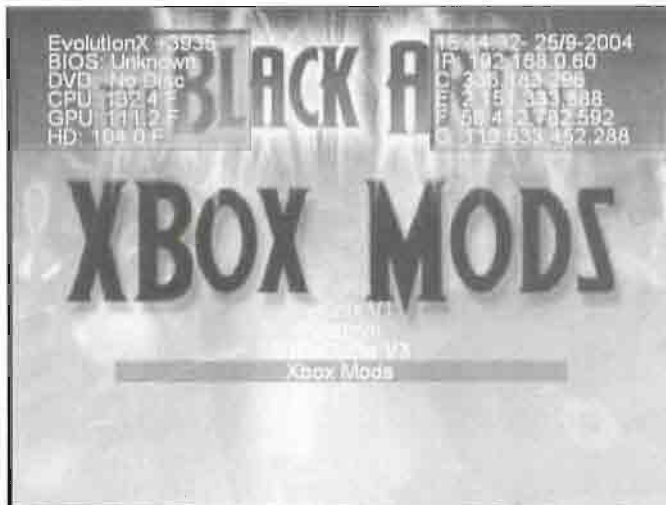


**FIGURE 8.24** Editing the text layers of an EvoX skin.

When editing, I've found that it helps to just leave the Xbox on. I'll make changes to a skin, save it, copy it to the Xbox, and then reboot EvoX to see the result. When you see what options are available, you'll have a lot of fun creating your own custom skins about your favorite subjects. I personally just really like to have a light-colored skin with *as much* information about my Xbox as possible, which is why my Xbox Mods skin displays temperature, free space, IP address, and so on, right there on the main menu of EvoX.

After you have created a new skin, you'll want to make a new folder for it, copy the images and skin.ini file to the new folder, and then copy that folder to C:\SKIN. You can then reboot EvoX so it will see the new skin. At that point, you can go into System Utils, Skins and scroll down to find your new skin, as I have down in Figure 8.25.

A good resource for pre-made skins is located at <http://www.allxboxskins.com>. If you create a really cool skin, you may want to submit your skin to this archive for others to use.



**FIGURE 8.25** The new Xbox Mods skin is now available in EvoX.

## Summary

This chapter provided a complete overview of EvoX, the combination BIOS and Dashboard replacement for your Xbox, giving it a lot more power and functionality. You learned how to install a new BIOS, install the new Dashboard, and customize and use EvoX, which was really designed for modding. In the next two chapters, I will go over two more Dashboard replacements that you may find interesting *in addition* to EvoX!



# Avalaunch Dashboard

Here are the key points covered in this chapter:

- Installing Avalaunch
- Avalaunch features
- Running games and applications
- Using the File Manager
- Configuring the Dash

**T**his chapter will show you how to install and use the Avalaunch Dash, an alternative Dash that is similar to EvoX but with a different set of features and a menu system that is more friendly. Avalaunch is a multi-threaded Dash, which means that it supports multi-tasking. You can copy files with the File Manager while browsing other parts of the Dash at the same time. I'll go over the major features of the Avalaunch Dash in this chapter. Note that it is a pre-alpha version at this point, so a few things are likely to change by the time you read this chapter.

## Installing Avalaunch

Acquiring Avalaunch is similar to what you will have to do to find EvolutionX because it is not advertised online, not offered for sale, and not available for download. You will have to search for Avalaunch on a BitTorrent site as your best choice. The home page on the Web for Avalaunch is <http://www.teamavalaunch.com>, where you can read up on the latest news about this Dash.

When you have a copy of Avalaunch on your PC, extract the archive file (usually a ZIP), and you will most likely find a `default.xbe` file (the executable for Avalaunch) as well as a settings file called `avalaunch.xml`. Two folders should also be included with Avalaunch: `MEDIA` and `SHOUTCAST`.

Now let's go over the procedure to install Avalaunch on your Xbox. You can copy the Dash to your Xbox hard drive and run it directly from EvolutionX, but that's not a very good way to launch it. Instead, you really should install Avalaunch as a launch item in your Xenium O/S Launch menu (or applicable menu in your mod chip, if different).

## Customizing a BIOS for Avalaunch

Okay, first things first: You need to customize a BIOS so that it will run Avalaunch from the Xenium O/S Launch menu. If you don't already have XBtool (which was discussed in the preceding chapter), browse some of the Xbox fan websites to locate XBtool and download it (the homepage is at <http://home.alltel.net/nghtshd/xbtool.html>). This program allows you to customize an Xbox BIOS (in other words, you are *Modding the BIOS*). You will also need a BIOS image file for this procedure. I recommend the EvolutionX M7 BIOS because it works well with XBtool, but if you own a revision 1.6 you'll need to use EvoX M8 and EVTool instead, because M7 doesn't work on the 1.6. Feel free to use a different BIOS if you wish; I based this tutorial on what works and is simple to use but am aware that you can customize other BIOSes just as well. You can locate the EvolutionX M7 from the same location you found the EvolutionX Dash or Avalaunch, usually as a torrent link.

When you run XBtool, click the Open button to locate a BIOS file that you want to edit. The only setting that I want you to pay attention to is the group of fields called Boot Partitions and Executables, shown in Figure 9.1.

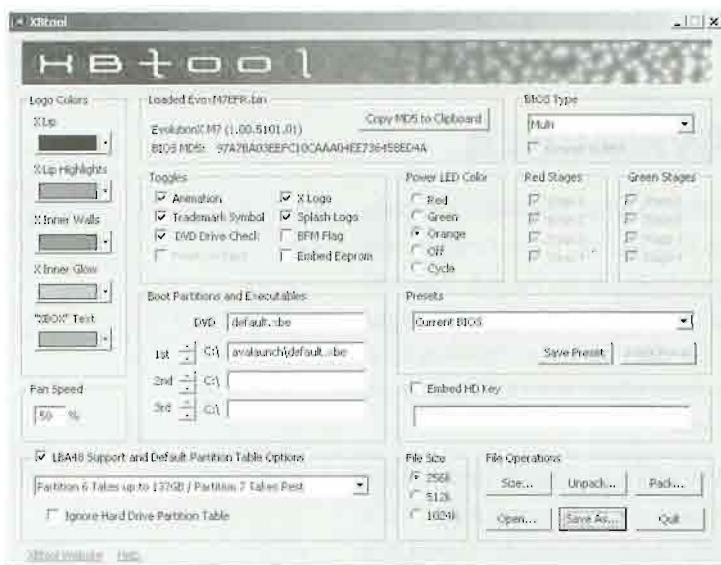


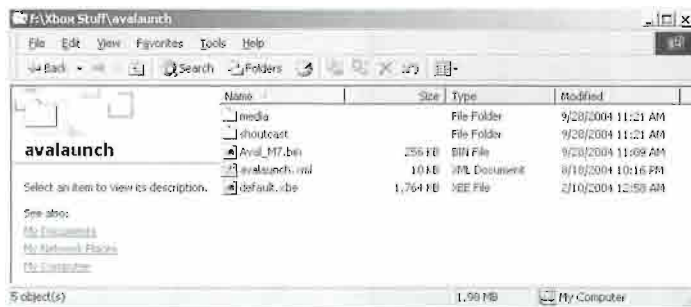
FIGURE 9.1 Modding an EvoX M7 BIOS.



I have edited the first item in the boot order and filled in `avalaunch\default.xbe` for the filename of the executable. The DVD field stays at `default.xbe`, while the second and third fields are left blank. The purpose of this change is to point the BIOS bootstrap routine to execute the `default.xbe` file inside `C:\avalaunch` instead of running `default.xbe` in the root of the drive. If you prefer, you can just as easily rename Avalaunch's `default.xbe` to something like `avalaunch.xbe` and then point the BIOS to that file, stored on the root of C. You have a lot of options with it, so do what you want in that regard. I decided that I wanted to put "alternate" Dashboards in their own subfolders, where EvolutionX is basically the only Dash on the root of C. Even in that case, it might make more sense to put EvolutionX in its own subfolder as well because you may end up with several Dashboards for your Xbox, each with different features that you may find useful now and then.

## Copying the Avalaunch Files to Your Xbox

Although it's not necessary, I usually leave the modified BIOS file with the Dash files, so in this case, I've saved the new version of this M7 BIOS (which is configured to run `C:\avalaunch\default.xbe`) in the folder containing the Avalaunch files. Figure 9.2 shows the folder at this point.



**FIGURE 9.2** Folder containing files for running Avalaunch, including the BIOS.

Copy this entire folder to your Xbox's C drive, using either SMB or FTP, which are available from the Xenium O/S. Because you'll need to add Avalaunch to the Xenium O/S Launch menu anyway, it makes sense to boot up with Xenium O/S (instead of EvolutionX, if you already have that Dash installed). After you have copied the files, you should have a folder called `C:\avalaunch` on your Xbox hard drive.

## Adding Avalaunch to the Xenium O/S Launch Menu

If your Xbox is turned on (such as in EvolutionX), turn it off now and then press the eject button to bring up the Xenium O/S. Open the Launch menu, as shown in Figure 9.3, and select Add A New Item.



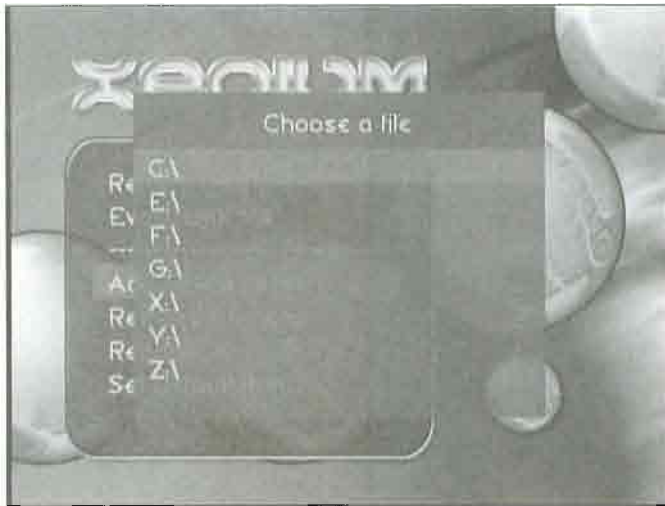
**FIGURE 9.3** The Xenium O/S Launch menu.

You will then see the screen shown in Figure 9.4, asking for the source of the launch item. Select the item called Flash.



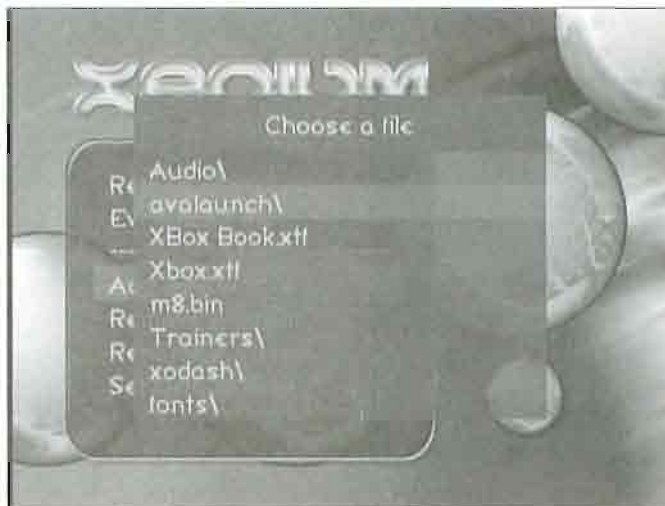
**FIGURE 9.4** Adding a new BIOS to the Launch menu.

Next, you will see the screen shown in Figure 9.5, asking for the location of the source file containing the BIOS image you want to add as a launch item.



**FIGURE 9.5** Selecting the partition where the BIOS file is located.

Browse the C:\ drive and select C:\avalaunch, as shown in Figure 9.6.



**FIGURE 9.6** Browsing to the C:\avalaunch folder.

You should see the Avalaunch files you copied to the hard drive, including the new hacked BIOS file, which I have named `Ava1_M7.bin`, as shown in Figure 9.7. Then select the BIOS file you wish to use.



**FIGURE 9.7** Selecting the BIOS file to add to the Launch menu.

The Xenium O/S will try to identify the BIOS and fill in the name for you, but some BIOS files don't have a proper name, so you may have to type in the name yourself. Since this M7 file is used to launch the Avalaunch Dash anyway, I have renamed it to Avalaunch, as shown in Figure 9.8.



**FIGURE 9.8** Renaming the new launch item.

Next, choose a color for the programmable LED, and it will show that color when you run this launch item (see Figure 9.9).



**FIGURE 9.9** Choosing a color for the programmable LED.

You should then see an “Adding Launch Item!” message come up on the screen (see Figure 9.10). While this message is being displayed, the Xenium O/S is copying the binary BIOS file into its onboard memory, which means that the `Aval_M7.bin` file is no longer needed after it has been installed in the Xenium.



**FIGURE 9.10** The BIOS file is added to the Xenium’s memory.

You will then have a new item in the Launch menu that you can use to run Avalaunch directly. Give it a try to make sure the launch item is working properly.

## Running Avalaunch

Avalaunch is more convenient than the EvoX Dash, in my opinion, because the main functionality that you need regularly is right there on the main menu, as shown in Figure 9.11.



FIGURE 9.11 The main menu in the Avalaunch Dash.

## Avalaunch Features

One thing you will notice right away about Avalaunch is that it is “wired.” In other words, it was written to work on the Internet. The most notable **feature of Avalaunch** is that it has an auto-update feature that will download the **latest** version of **itself from a list of servers on the Net**. The interface is also very user friendly, **with a scrolling news display that is retrieved online**. Rather than the usual long scrolling list of options in EvolutionX, Avalaunch uses a master-detail interface, and many items have icons. Avalaunch includes a full-featured File Manager. Let me give you a guided tour so you can see the versatility of this Dash.

## The Main Menu

The main menu of Avalaunch includes the following items; I will go over each item in the sections that follow:

- Xbox Media Player
- Games
- Applications
- Emulators



- File Manager
- IRC Client
- Telnet Client
- Settings
- Reboot
- Shutdown

The basic functionality of the main Launch menus (Games, Applications, Emulators) is the same in Avalaunch as it is in EvolutionX. The C, E, F, and G drives are all scanned for folders with these names, and any programs found therein are added to the respective menus.

## XBox Media Player

Avalaunch includes a link to Xbox Media Player, the old name of Xbox Media Center (XBMC), a full Dash that is covered in the next chapter. You can find more information at <http://www.xbox-mediacenter.com>.

## Games

The Games menu brings up a listing of all the games found on your Xbox hard drive (from the C, E, F, and G drives). The Avalaunch developers were very creative by reading the icon out of the XBE file for each game in order to display the icon in the menu (shown in Figure 9.12).



**FIGURE 9.12** The list of games found on the hard drive includes icons.

When you select a game from the list, a cube is displayed to the right showing the icon in 3D! From this list, you can select an item to launch it, or you can press the Start button to bring up a menu of options for that game (see Figure 9.13). At this point, it *really* gets interesting!



FIGURE 9.13 Press Start to bring up a menu of options for a selected game.

### Editing a Game's Title

From the context menu, you can launch a game, edit the title (shown in the list), download saved games, and view the properties. Let's take a look at the title editor first. Select Edit XBE Title to bring up the screen shown in Figure 9.14.



FIGURE 9.14 Editing the title of a game.

Here's an important tip that will save you some frustration: After you have finished editing the title, you must press the Y button to save and exit the virtual keyboard. Pressing B just cancels the change, whereas pressing Y saves it.

## Downloading Saved Games

Back at the context menu, select the Download Save Game option. This amazing feature (see Figure 9.15) epitomizes the level of detail put into this Dash. Imagine that! The Dash looks up the game online for saved game files, displays a list, and lets you download savegames right on the spot. Awesome is hardly descriptive enough!



**FIGURE 9.15** Viewing the list of available savegames online.

When you select a savegame from the list, Avalaunch will download the savegame file (showing the download progress on the bottom-right corner of the screen) and store it with your other saves for that game on the hard drive where the game expects to find it (see Figure 9.16).

## Viewing the Game's Properties

Again, returning to the context menu (which you bring up by pressing Start on a game in the Games list), select the Properties option to display the properties for a game, as shown in Figure 9.17.

## Installing Games

You may be wondering how to install your Xbox games onto your hard drive. You will need a larger drive for starters (see Chapter 12, "Upgrading the Xbox Hard Drive") because the stock Xbox hard drive has only about 3–4GB free, which is enough for maybe one game install. The easiest way to install your retail Xbox game collection onto your new high-capacity hard drive is

to use a program called dvd2xbox, available as a download from within Avalaunch (I'll cover the Download menu shortly), or you can find it at any number of Xbox fan sites. As I explained in Chapter 1, "Welcome to the Xbox Scene," you have a right to install your retail Xbox games on the hard drive to speed up load time and make it more convenient to play your games, as long as your *one* license is not illegally shared. In addition, installing your games allows you to keep your retail game library in good condition by shelving the discs rather than constantly inserting and removing them from the Xbox DVD-ROM tray; this kind of use will gradually wear out a disc over time due to micro scratches.



FIGURE 9.16 The savegame file is being downloaded from an online server.



FIGURE 9.17 The properties screen for a game stored on the hard drive.

I will give you a brief, fair warning here and now, because it needs to be said: If you illegally copy Xbox games, you are breaking the law. There are serious penalties for pirating software—and yes, people are sent to jail for it!—so just don't do it. Not only is software piracy illegal, bottom line, it's a *huge* waste of your game-playing time. Why go to all the trouble to copy games when you can just purchase a new game every month (or whenever you can afford it) and play it through? I mean, *come on*, who has time for that? Take pride in your hobby and take it seriously, or else you will not really enjoy it. Respect the power of your modded Xbox and support the hard-working people who produce these fantastic games.

## Applications

The Applications menu checks the C, E, F, and G drives for an \Apps folder to produce the list of applications displayed in this menu (shown in Figure 9.18). A context menu (similar to the one in the Games menu) comes up when you press Start while highlighting an app in the list.



FIGURE 9.18 The Applications menu.

## Emulators

The Emulators menu also checks the work drives for an \Emulators folder to produce a list of emulation programs that you have installed on your Xbox hard drive. It is similar in function to both the Games and Applications menus.

## File Manager

The File Manager built into Avalaunch is a powerful and useful file management tool (see Figure 9.19). Using the File Manager, you can copy entire folders from one location to another on your

Xbox hard drive, and you can delete files and folders. Best of all, you can *execute* programs on the hard drive directly, just as you can on your PC (using Windows Explorer or a similar file browser in your favorite O/S).



FIGURE 9.19 The File Manager.

## Running Programs

To run a program, just browse for any file that has an extension of `.xbe` (which might stand for Xbox Executable, though no one seems to know for sure) with the File Manager and select it by pressing the A button. Thanks to this great utility program, you can run programs on your Xbox hard drive without adding them to a menu first.

## Copying Files

Let me show you how to copy a folder from one location to another on your Xbox hard drive because the File Manager is a bit confusing at first. It has two panes, left and right. You can bring up a menu by pressing Start over any folder or file, from which you can rename, move, or delete it, among other things. But if you just want to copy, highlight the source on the left and use the D-pad to move to the right file browser to locate a destination. You can press the A button to open a folder or B to close it.

To copy, you press the X button. Now here's the interesting part: The source folder is whichever one is *currently* active. So, you can move to the right side and press X; then the right side will be the source, and the left side will be the destination. When you do this, the action is added to the transfer queue. Press Start to bring up the context menu; then select the Transfer Queue option (shown in Figure 9.20).





**FIGURE 9.20** The context menu in the File Manager.

When you select this option, the File Manager will perform the tasks in the transfer queue. Figure 9.21 shows a folder (XBMC) being copied to another partition. To exit the File Manager, press Start and then select Main Menu. Note that the File Manager retains its present status when you leave, as it is running in the background, so it will look the same when you return.



**FIGURE 9.21** Copying files from one partition to another in the File Manager.

## IRC Client

Surprisingly enough, the IRC Client option really does give you a client program to connect to Internet Relay Chat (IRC). Before you can sign on to IRC, you have to configure it first. Choose Settings, Network, and scroll down to IRC Settings, as shown in Figure 9.22.



**FIGURE 9.22** Changing the IRC server and username settings.

Editing the fields in the Settings menus is a little strange, but when you get used to it, you will appreciate the speed with which you can “type” with the controller. Figure 9.23 shows the KB-FTP input system used to edit the Nickname field. You can toggle the input system on and off using the White button on your controller. You use the left analog stick to move from one group of letters to another, and the right analog stick to choose one of the four letters in each group. The left trigger changes the case, and the right trigger selects the letter. Instructions are included on the screen.

At the time of this writing, the IRC Client feature of Avalaunch is still in the testing phase (see Figure 9.24). Since no work seems to have been done on the IRC Client for a very long time, it might not be updated any longer.

## Telnet Client

Avalaunch also includes a Telnet client that lets you connect to another computer running a Telnet server, which is basically a text-based administrative tool for managing systems. You can use the Avalaunch Telnet client to log in to *another* Xbox on your LAN if it is running a Telnet server (which is the case with the Xenium O/S and EvolutionX). Figure 9.25 shows the Telnet client.



**FIGURE 9.23** Editing your nickname with the funky XB-FTP input system.



**FIGURE 9.24** The IRC Client built into Avalaunch.

You can configure the Telnet server to connect to by using the Settings, Network, Telnet Settings screen, shown in Figure 9.26.

## Settings

The Settings screen in Avalaunch is rather complex with a large number of submenus and informational screens (which means you will *love it*, right?). Let's explore each part of the Settings.



FIGURE 9.25 The Telnet client built into Avalaunch.



FIGURE 9.26 The Telnet Settings screen.

## Network

The first Settings screen, Network, shows information about the network connection (see Figure 9.27). As you can see, there are several subscreens for IP, FTP, IRC, and other settings.

You can use the D-pad to navigate from the items in each Settings screen and back to the tabbed list of subitems in each Settings screen. From the IP Settings screen, you can edit almost every

aspect of your Xbox's network configuration, from the IP address to the DHCP connection. As you can see, Avalaunch can even connect to an SNTP server to keep the system time up-to-date.



**FIGURE 9.27** The Network IP Settings screen.

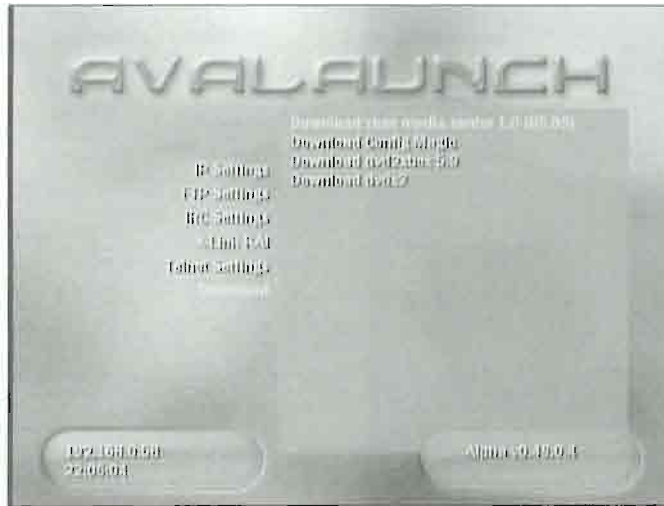
On the FTP Settings screen, you can change the options for the FTP server built into Avalaunch, as shown in Figure 9.28.



**FIGURE 9.28** The Network FTP Settings screen.

You can also explore other options in the Network settings screen, but I want to jump down to the Download options. As you can see in Figure 9.29, you can download frequently used

programs directly from within Avalaunch (without having to transfer these programs to the Xbox from your PC).



**FIGURE 9.29** The list of downloads available.

## Main Options

The Main Options screen, shown in Figure 9.30, contains a lot of tabs for the main options. The first tab is AV Settings, from which you can view and change the audio/video settings used by Avalaunch, and which affect the basic operation of your Xbox, as these settings are written to the EEPROM. From here, you can toggle options such as widescreen display, 1080i support, DTS, and so on.

Be *very* careful when making any changes to the system with this menu. You can very easily screw up your Xbox by saving incorrect settings to the EEPROM and render your Xbox unusable! It is best to leave this menu alone unless you really know what you are doing.

The next tab, Hardware Info, is shown in Figure 9.31. This screen provides a lot of useful information, such as the Xbox serial number, kernel version, and other interesting details (none of which are editable).

The Misc Info screen, shown in Figure 9.32, displays status information about your Xbox as well as some additional hardware details, such as the IDE devices and temperature. This screen also includes a very nice graphical, historical display of the system temperature.



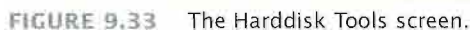
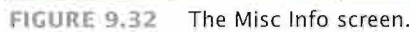
**FIGURE 9.30** The Main Options screen has a multitabbed display.



**FIGURE 9.31** The Hardware Info screen.

The Harddisk Tools screen, shown in Figure 9.33, includes options that let you lock or unlock the drive, and toggle support for the F and G partitions. One interesting thing about this screen is that it displays the hard drive lock key (or password), which is a very important piece of information. Without the valid key, your Xbox will not use the hard drive. The Xenium O/S will automatically read the old key and use it to lock the new hard drive when you perform a drive upgrade.





The Games extras screen (not shown) displays options on any future game data downloads that will be available from within Avalaunch.



FIGURE 9.34 The Boot Options screen.

## Skins

The Skin Settings screen, shown in Figure 9.35, displays options for changing the custom skin used by Avalaunch—and a lot of skins are available.



FIGURE 9.35 The Skin Settings screen.

You can browse the local skins that have been downloaded already, or you can browse the skins available on several servers hosting Xbox skins, as shown in Figure 9.36.



Selecting a server will bring up a list of skins available on that server, as shown in Figure 9.37.



The Sound Settings screen has two tabs: Background Music and Voice over IP (VoIP). The Background Music screen (shown in Figure 9.38) is a feature that will play MP3 music in the background when Avalaunch starts, just as sort of an interesting option (though not very useful without the ability to choose which files to play). VoIP is a fun option to play with if you have

your Xbox Live headset handy, in which case you can chat with other Avalaunch users without using Xbox Live. Save some money on long distance telephone calls!



**FIGURE 9.38** The Background Music Settings screen.

## Languages

The Languages Settings screen, shown in Figure 9.39, lets you choose the language used for the text in Avalaunch.



**FIGURE 9.39** The Language Settings screen.

## Quickstart

The Quickstart screen, shown in Figure 9.40, lets you configure some of the controller buttons as Quickstart commands so that if you hold that particular button while Avalaunch is first starting up, the associated XBE file is run. The Left Trigger, shown here, will automatically run the last program that was run via Quickstart.



FIGURE 9.40 The Quickstart Settings screen.

## About Avalaunch

The About Avalaunch option brings up a mostly blank screen that displays the Avalaunch version number and “Team Avalaunch.”

## Update Dashboard

The Update Dashboard option is perhaps the most interesting part of the settings in Avalaunch. This screen, shown in Figure 9.41, shows the version numbers of the components of Avalaunch currently installed, and whether an update is available (so an Internet connection is required here, obviously). You can select an item from the list if you wish to update that component with a newer version.

## Reboot

The Reboot option will cause Avalaunch to reboot (to reload any changed settings, such as in one of the program menus) back to the main menu.



**FIGURE 9.41** The Update Dashboard screen.

## Shutdown

The Shutdown option will cause your Xbox to power down, as if you had pressed the front power button.

## Summary

This chapter presented you with an in-depth look at the versatile and fully featured Avalaunch Dash for Xbox. This powerful Dash lets you do just about everything you need to do with your Xbox from the GUI point of view, short of installing an alternative O/S (such as Linux).





# Xbox Media Center

Here are the key points covered in this chapter:

- Overview of Xbox Media Center
- Installing Xbox Media Center
- Running Xbox Media Center

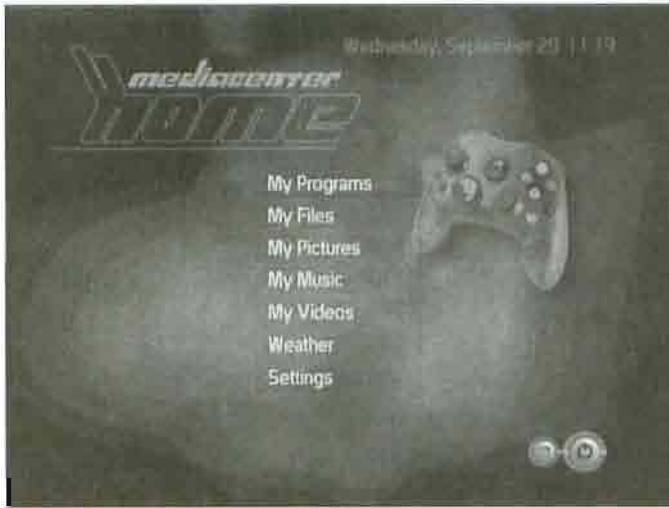
**X**box Media Center (XBMC) is a custom Dashboard for the Xbox that provides an attractive, easy-to-use interface for the playback of multimedia. It turns your Xbox into an entertainment center capable of playing audio and video files of various formats through your TV and stereo system. As a Dashboard, Xbox Media Center is best installed as a launch item so it will start up automatically when the Xbox is turned on. This chapter will explore most of the features that make Xbox Media Center a well-rounded, indispensable, cutting-edge Dashboard.

## Overview of Xbox Media Center

One might argue that it is always wise to save the best for last. When it comes to Xbox Dashboards, Xbox Media Center is in a class all by itself. I wouldn't say that Xbox Media Center is *better* than either EvoX or Avalaunch, but it is certainly loaded with a feature set that draws a compelling argument in its favor. When you look at some of the features put into these Dashboards, it is really extraordinary how the developers have gone all out to make an excellent product. You can feel the dedication and, well, *love* for this hobby in every menu and in every nuance of the program.

Xbox Media Center (shown in Figure 10.1) is really just another program with an .xbe extension, as is the case with

EvoX and Avalaunch (which were covered in the preceding two chapters). To call these programs “Dashboards” simply means that they are the front-end GUIs that are used most often and are as such, for all practical purposes, the O/S. In Xbox terms, the Dashboard *is* the O/S because it allows you to run programs stored in the system, which is the primary goal of an O/S.



**FIGURE 10.1** The main menu of Xbox Media Center.

Xbox Media Center is designed to do many of the things that EvoX and Avalaunch can do, but is tailored for media file playback, with built-in support for numerous video codecs (such as Divx and Xvid). XBMC was designed to be easy to use, with a simple interface that can be controlled with the Xbox DVD remote control (however, a controller will still work).

The home for Xbox Media Center is <http://www.xboxmediacenter.com>, where you can go to read the user manual, among other things.

## Installing Xbox Media Center

You install XBMC using the same process you used to install EvoX and Avalaunch. Basically, you hack a BIOS so that it will run the appropriate XBE file that you will install on the hard drive. You then use the mod chip's O/S to add the BIOS file as a launch item (or as the sole BIOS if your mod chip supports only a single BIOS bank), thus allowing you to configure the Dashboard as the default start item when you turn on the Xbox. Imagine running XBMC in your Xbox, which is connected to your entertainment center and big-screen TV; now you're starting to get the idea!

XBMC is in the same boat with EvoX and Avalaunch as far as availability. You'll need to search Xbox fan sites and BitTorrent sites for an XBMC torrent file to acquire XBMC. You will also need a BIOS file that will work with XBtool, such as EvoX M7 (or the M8 if you have an Xbox 1.6).

## Installing the XBMC Files

Xbox Media Center has a configuration file called `XboxMediaCenter.xml` that must be modified for XBMC to launch as a Dashboard. Take a look at the top of the configuration file (it is best to edit this file with a simple text editor such as Notepad):

```
<xboxmediacenter>
<!-- When using XBMC as dashboard, define home directory here ! -->
<!-- and move the XBMC xbe plus this xml config file to C:\    ! -->
<!--           Example: <home>E:\Apps\XBMC\</home>           ! -->
    <home>-</home>
```

I would like to install XBMC to `E:\APPS\XBMC` and launch it from there (so it will be available as a launchable Dashboard as well as an application that can be run from any other Dashboard), so I will simply edit the home setting in the config file to look like this:

```
<home>E:\APPS\XBMC\</home>
```

That will get the job done! If you don't edit the `XboxMediaCenter.xml` configuration file, it simply won't run from the subfolder (and I wouldn't advise installing XBMC on the root because it has many subfolders that will clutter your root partition).

The `default.xbe` and `XboxMediaCenter.xml` files *must* be in the root folder if you want to run XBMC as a Dashboard. Therefore, you will want to rename `default.xbe` to `xbmc.xbe` so it won't conflict with any other programs in the root. XBMC expects the XML file to reside in the same folder as the XBE file, but all other files are referenced from the home setting.

Copy the XBMC folder to `E:\APPS`, retaining the `default.xbe` and `XboxMediaCenter.xml` files within the XBMC folder. You will then be able to run XBMC from another Dashboard, and you will then place a

copy of the renamed `xbmc.xbe` and config file in `C:\` so it is launchable as a Dashboard. Whew, confused yet? If all else fails, you can always just run XBMC from EvoX or Avalaunch as a regular application.

### NOTE

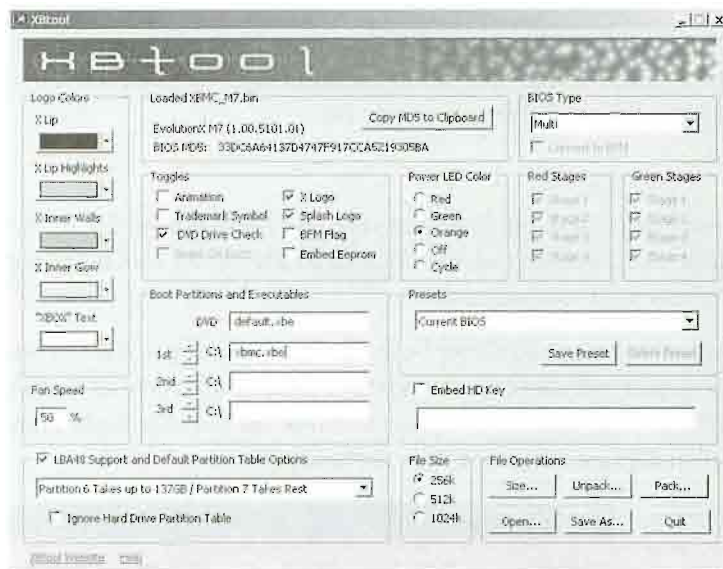
XBMC will run fine from any folder with the default `XboxMediaCenter.xml` configuration file untouched. You need to modify it only when you want to run XBMC as a Dashboard.

## Installing a Hacked BIOS

To get things rolling with XBMC, you'll need to hack another BIOS file and then install it in the Xenium O/S (or whatever mod chip you are using, to be fair; please understand that I don't have the time or space to cater to *every* mod chip, so substitute "Xenium" with whatever mod chip you are using).

Because I have covered this process twice already, I refer you to the preceding two chapters for step-by-step instructions (with figures) on how to add an item to the Launch menu. That way, I can skim over it in this chapter. (For specifics, refer to “Adding Avalaunch to the Xenium O/S Launch Menu” in Chapter 9, “Avalaunch Dashboard”).

You will want to use XBtool again to modify your favorite BIOS file, specifying that it should execute a certain XBE file on the hard drive—which will be `C:\xbmc.xbe` in this case. Figure 10.2 shows XBtool with the changes made to an EvoX M7 BIOS file (which I find to be a good customizable BIOS to use, but again, you can use whatever BIOS you wish).



**FIGURE 10.2** Modding a BIOS file with XBtool to auto-launch Xbox Media Center.

When you have a BIOS file to use, you'll need to copy it over to your Xbox using SMB or FTP. Be sure to copy the Xbox Media Center files to `E:\APPS\XBMC` and make sure `default.xbe` exists in that folder so it will run! Of course, feel free to change this folder name if you wish, as long as it matches what you specified in the BIOS file. If you don't ever plan to run XBMC from another Dashboard, you can go ahead and put it in `C:\XBMC`.

After you have copied XBMC to the Xbox hard drive, including the hacked BIOS file (which I called `XBMC_M7.bin` for easy reference), you can fire up the Xenium O/S and enter the Launch menu, as shown in Figure 10.3.

Because I have covered this procedure so many times before, I'll skim over the details this time and simply explain what to do. If you have any difficulty, refer to the preceding two chapters for

more detailed instructions on installing a new item on the Xenium O/S Launch menu. If you are using a different mod chip, you will need to refer to the documentation for that mod chip on how to install a BIOS image. If you are using a mod chip with just a *single* BIOS (and no room for multiple BIOS images), I strongly suggest you not install this hacked BIOS file for running XBMC; you may want to install EvoX or Avalaunch instead and then open XBMC as an application from within one of those Dashboards. Refer to the website for your mod chip manufacturer for instructions on how to use the mod chip, how to configure the BIOS, and so on.



**FIGURE 10.3** Adding a new item to the Launch menu.

Select Add A New Item from the menu, select Flash, and then browse for the `XBMC_M7.bin` file (or whatever BIOS file you are going to use). After you select the BIOS file, you can enter a name for the launch item and choose a custom color for the programmable LED; then the Xenium O/S will copy the binary image into flash memory. After you have added the new launch item for XBMC, your Launch menu should look something like Figure 10.4.

You can now run XBMC from the Launch menu. If you plan to use XBMC as your main Dashboard, you may want to set it as the default launch item at this time.

## Running Xbox Media Center

XBMC was designed to be operated with the Xbox DVD remote control. All of the menus work with the controller D-pad, which the remote control's arrow buttons simulate. You access each menu with the Select button on the remote and exit with the Back button.



**FIGURE 10.4** XBMC has been added to the Launch menu.

## The Main Menu

The following seven items appear in the XBMC main menu:

- My Programs
- My Files
- My Pictures
- My Music
- My Videos
- Weather
- Settings

I will go over each of these menu items and the services they provide in the following sections.

## My Programs

Selecting My Programs from the main menu will bring up the My Programs screen, as shown in Figure 10.5.

By default, My Programs displays only the programs that it finds on the root of any partition. It would be best to create a shortcut to programs you use frequently, but that is not very realistic in a dynamic system like your Xbox. You'll want to go into the Settings screen under My Programs to change a few settings so that you will be able to browse the entire file system rather than just the root. Figure 10.6 shows the Settings, My Programs screen.





**FIGURE 10.5** My Programs is actually a file system browser.



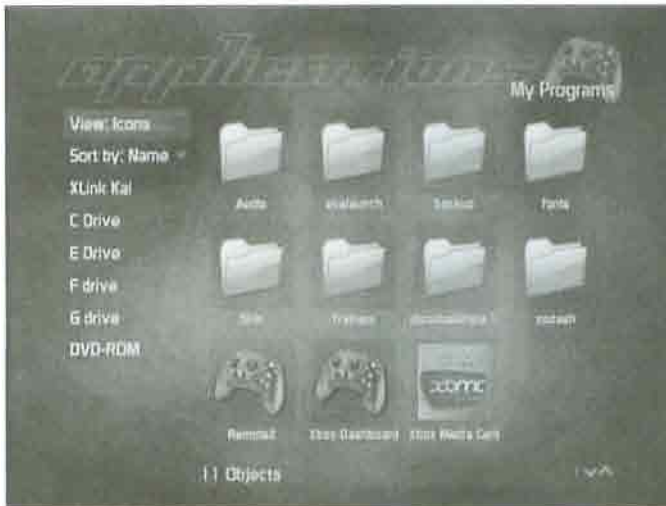
**FIGURE 10.6** The settings for My Programs.

I have disabled all of the options in this screen so that all files are displayed in the My Programs screen. Returning to My Programs from the main menu, you can now select a drive partition to see a complete list of files and folders, as shown in Figure 10.7.

You can change the view from List to Icons to Big Icons to change the way files are displayed. When you're using the remote control, it is probably easiest to use icons because you will probably not be sitting close enough to the TV screen to read the small text in the simple list. Selecting



a folder from this screen will browse into that folder, and selecting a program (denoted with an icon) will run the program (see Figure 10.8).



**FIGURE 10.7** Browsing the file system in the My Programs screen.



**FIGURE 10.8** Running a program from the My Programs screen.

In most cases, you will have to reboot your Xbox to return to XBMC, which defeats the purpose of XBMC—operating as a media center (connected to your TV and stereo system). However, this does give XBMC the flexibility of being able to function like a regular Dashboard at the same time.

## My Files

The My Files screen might at first seem to be a duplicate of the My Programs file browser, but it also allows you to browse the network shares on your LAN (see Figure 10.9).



**FIGURE 10.9** Viewing the My Files screen.

Browsing for files on the LAN is as easy as selecting the WORKGROUPS item in My Files, as shown in Figure 10.10.



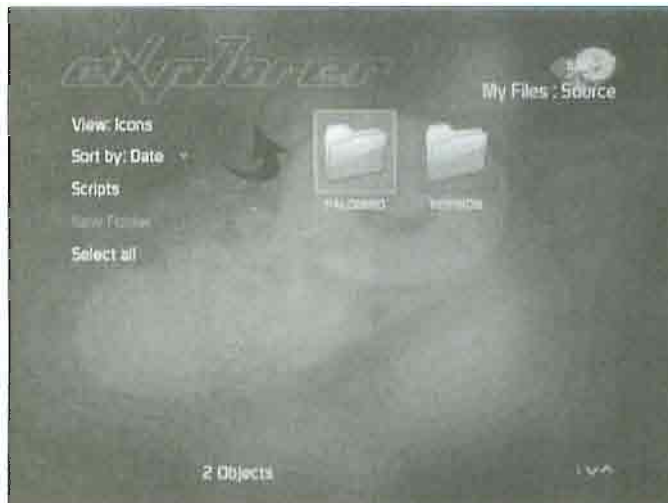
**FIGURE 10.10** The WORKGROUPS icon in My Files.

Selecting this item brings up a list of workgroups found on the LAN, such as the HARBOUR workgroup shown in Figure 10.11. Selecting the icon will open the workgroup browser, allowing you to see network shares.



**FIGURE 10.11** Browsing the local workgroups on the network.

On the next screen, you see the computers found within that workgroup, as shown in Figure 10.12. Selecting a computer name will open the shares for that computer.



**FIGURE 10.12** The computers in the chosen workgroup.

You can also browse files on the local Xbox hard drive. Figure 10.13 shows some files on the F partition. You can select a file by pressing Y to bring up options on the left side, where you can delete, rename, copy, or move the file. So, as you can see, XBMC does have rudimentary file management support built in.



**FIGURE 10.13** Selecting a file brings up more options.

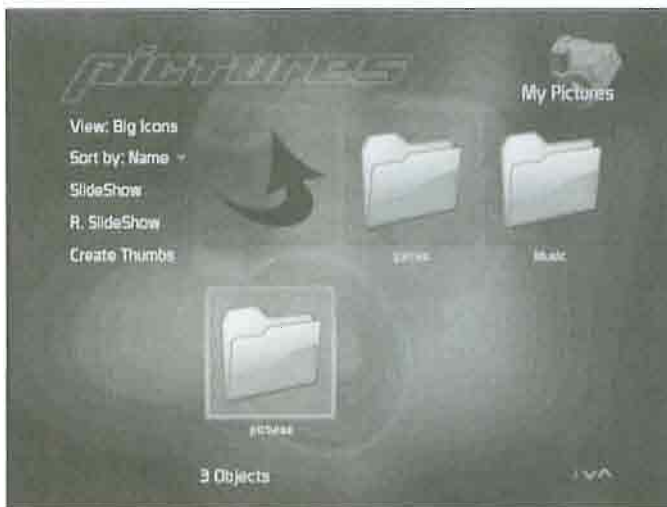
## My Pictures

One of the least conspicuous but perhaps most useful features of XBMC is the photo browser, available in the My Pictures screen (shown in Figure 10.14).



**FIGURE 10.14** My Pictures is basically a digital photo browser.

You can browse the file system on your Xbox or network shares in one or more workgroups. Selecting the F drive reveals that I have a folder called pictures (see Figure 10.15) that contains some images and photos.



**FIGURE 10.15** Browsing the local file system for pictures.

When you find a folder containing your pictures, the screen will look like Figure 10.16 until you select Create Thumbs to create thumbnails of the local files.



**FIGURE 10.16** The default display will show thumbnails after you create them.

When you select Create Thumbs, all of the image files in the current folder are opened and thumbnails are generated (see Figure 10.17).



**FIGURE 10.17** Generating thumbnails of the image files in the current folder.

If you have a lot of thumbnails, you may want to change the display to Icons (rather than Big Icons, which takes up a lot of screen space), as shown in Figure 10.18.



**FIGURE 10.18** Viewing the thumbnails of pictures in the current folder.

Selecting a thumbnail will display the full image on the screen (see Figure 10.19). You can then use the Select button to zoom in on the image. Remember that XBMC was designed to work with the remote, so you use the Select and Back buttons to navigate (just remember that when you get frustrated over the B button not working the way you expect).



**FIGURE 10.19** Displaying a photo on the screen.

The Slideshow and Reverse Slideshow are *very nice* features, especially if you want to peruse your digital photo collection on a big-screen TV! Not only does the slideshow display all of the photos in a given folder, but it also presents them with interesting screen transitions.

If you want to change the time that each picture is displayed and the speed of the transition, you can change these values from the My Pictures Settings screen (in the Settings menu), as shown in Figure 10.20.



**FIGURE 10.20** Changing the settings of the picture viewer.



## My Music

Now for the really fun part of XBMC: the digital audio system. Figure 10.21 shows the My Music screen.

### Browsing Your Music Library

Although you can use a network share (SMB or SAMBA) for music playback, I recommend copying your music library to the Xbox so it does not depend on a PC on the LAN for media. It's better to keep the Xbox self-contained as a media center, but, of course, that's your choice.

#### NOTE

The Xbox file system seems to be able to handle filenames of up to 42 characters and no more (including the extension). It is pretty common for MP3 filenames to be long because they include the track, artist, album, and song name (at least, that is how I rip my CDs). You will need to shorten the filenames if they exceed 42 characters; otherwise, you will not be able to copy the files to your Xbox.



**FIGURE 10.21** Browsing for music files in My Music.

Figure 10.22 shows the My Music screen with an open folder containing MP3 files. The files shown are *not* the filenames, but rather the data stored in each MP3 file about the songs.

### Listening to Audio CDs

If you want to just listen to a regular audio CD with XBMC, you can insert a CD into the drive, and XBMC will download the CD information (CDDb) to display the artist, album, and track names on the screen. Once XBMC has looked up one of your CDs online, it will store the CDDb

locally so it won't have to perform another online search. XBMC will automatically start playing an audio CD, but you can also start playback manually by going into My Music and browsing to the DVD-ROM drive (see Figure 10.23). If an audio CD is in the drive, XBMC will read the CD information from CDDb and display the tracks, which you can then play.



FIGURE 10.22 Viewing a list of MP3 files.



FIGURE 10.23 Listening to an audio CD.

## Ripping Audio CDs

When you select the DVD-ROM drive to play an audio CD, you will see the list of songs available on the CD. From the My Music song listing (make sure the view is set to Songs using the Switch View option), you will see an option called Rip CD on the left-side menu. This option will convert the tracks of the CD to MP3, as shown in Figure 10.24. Because you have no control over the MP3 settings, you may want to do this on your PC instead and transfer the MP3 files to your Xbox. However, this very convenient feature produces 192Kbps-encoded MP3 files. I personally prefer 320Kbps CBR for the highest possible quality, although some audiophiles might argue that 192 is plenty. It's up to you!



**FIGURE 10.24** Ripping an audio CD to the Xbox hard drive.

## My Music Settings

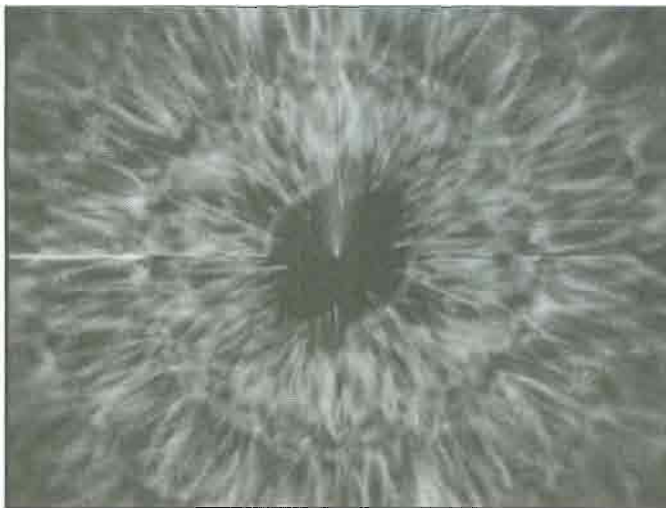
You can configure the My Music settings from the Settings menu, as shown in Figure 10.25. Here, you will find many options on how music is played, including options for the visualization.

## Visualizations

At any time while music is being played by XBMC, you can open the Visualization screen by pressing X. The visualization you selected in the My Music Settings screen will fill the screen with an interesting display that is synchronized with the music (see Figure 10.26). The visualizations are actually written with script rather than being compiled into XBMC, so you can modify the visualizations and create your own if you wish.



**FIGURE 10.25** The My Music Settings screen.



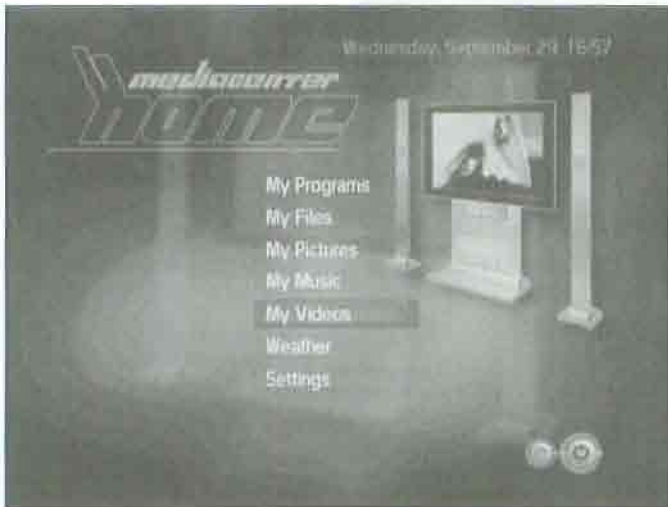
**FIGURE 10.26** Visualizations play in sync with the music.

## My Videos

The video support in XBMC is very strong, with built-in codecs for playing XVID, DIVX, MPEG2, and WMV9 files. To help manage your movie collection, XBMC can connect online to the Internet Movie Database (IMDb), which has a huge catalog of movies, with details such as genre, title, release date, and cast; it even provides thumbnail images. Because XBMC is a media center to be used in conjunction with a big-screen TV and audio system, its video support allows

you to convert your Xbox into a home video server. Can't find that tape of your friend doing a nosedive at the skate park? Next time, convert it to an MPEG2 and keep it stored in your Xbox for safekeeping. XBMC can play videos on an SMB network share as well, so if your hard drive runs out of space, you can use a network storage device (or your PC) to handle the overflow and stream videos over the network for playback in XBMC.

Let's start by selecting My Videos from the main menu, as shown in Figure 10.27.



**FIGURE 10.27** Opening the My Videos browser screen.

Selecting this option will bring up the My Videos browser that you can use to locate your videos, either on the local hard drive or on a network share. I have a collection of videos stored on the F drive, as shown in Figure 10.28.

Playing a video is as simple as selecting it from the video file browser, which will bring up the video player shown in Figure 10.29.

### The On-Screen Display (OSD)

While video is playing, you can press the Select button to pause or resume playback. The Y button (Menu on the DVD remote) brings up the On-Screen Display (OSD), showing some playback options at your disposal. Figure 10.30 shows the video settings.

Because there are so many options to the video playback, I won't get into all of them; instead, I'll let you explore the complete feature-set of XBMC (after all, it is an open source product, meaning it is *never really finished*). You can create bookmarks within a video so that you can quickly jump to that point in the video without fast forwarding or rewinding, as shown in Figure 10.31.



**FIGURE 10.28** Locating videos on the Xbox hard drive is as easy as pointing and clicking.

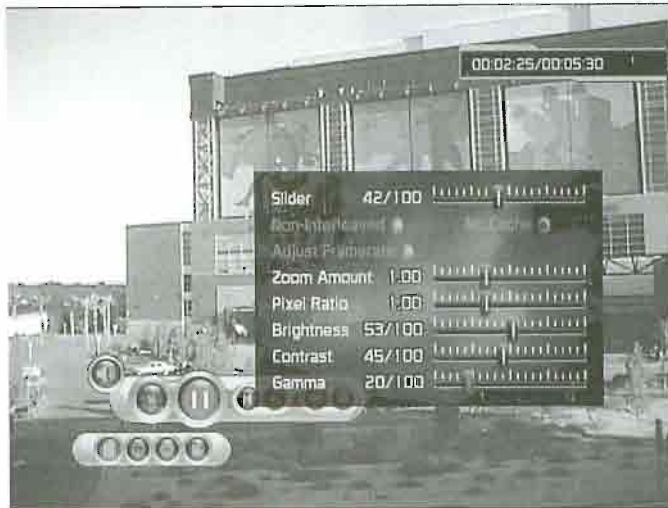


**FIGURE 10.29** The Xbox Media Center video player supports a wide variety of video formats.

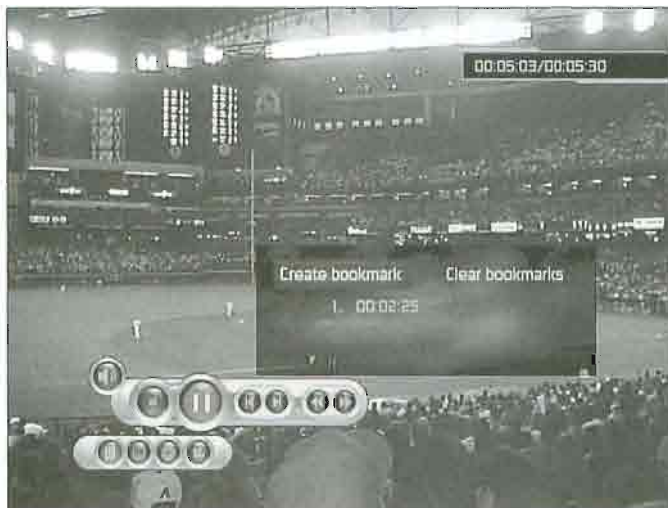
## Weather

The Weather screen is a nice option that rounds out this great Dashboard. You need to configure the Weather settings so that this screen reflects your part of the world. You can use an international region code or a ZIP code for your city to see the current weather forecast for your area. Figure 10.32 shows *The Weather Channel* on your Xbox, with data provided by <http://www.weather.com>.





**FIGURE 10.30** You can modify the video settings during playback.



**FIGURE 10.31** You can modify the video settings during playback.

To set your local area, select Settings, Weather to configure up to three locales that you wish to see in the Weather screen. Using the Search option next to each locale (shown in Figure 10.33), you are given a virtual keyboard with which to enter a search value.

You can search by ZIP code, city name, or international code. Type in the name of the city in which you live using the virtual keyboard, as shown in Figure 10.34.





FIGURE 10.32 You can view the current weather forecast for your local area.



FIGURE 10.33 You can enter a search value to change the locale.

Typing **phoenix** into the search field brings up a list of matches from the weather database at <http://www.weather.com> (see Figure 10.35). You can scroll through the list to find the city you are looking for.

When you select one of the locations, it is entered into that position (of which there are three in XBMC). You can then return to the main menu and open the Weather screen to view the new locations you have selected (see Figure 10.36).



FIGURE 10.34 Typing in the search criteria for a locale.

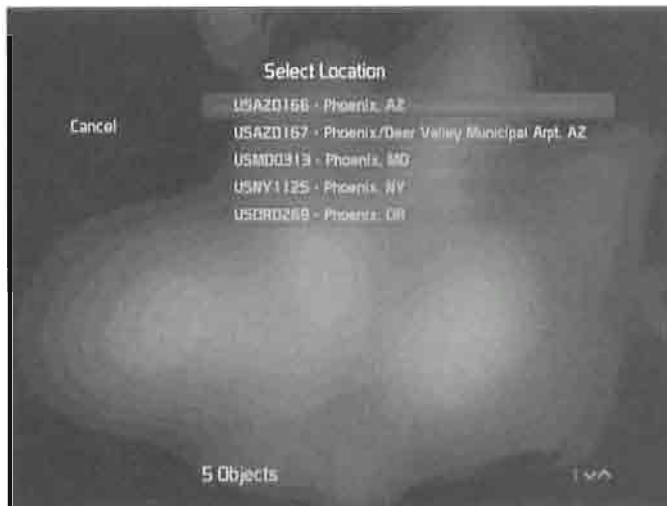


FIGURE 10.35 The search criteria resulted in a list of matches.

## Settings

At this point, I believe you have seen enough of the options in XBMC to make your way through the Setting screen without requiring an overview of it. The Settings screen (shown in Figure 10.37) includes many options for customizing the functionality of XBMC, so I encourage you to browse each of the configuration pages within the Settings screen to see whether there are any options that you would like to use to personalize XBMC for your needs.



**FIGURE 10.36** Viewing the weather forecast for the newly selected location.



**FIGURE 10.37** The Settings screen is the place where you go to fully customize XBMC.

## Summary

This chapter provided a complete overview of Xbox Media Center as both an application and installable Dashboard that can be booted up when the Xbox power is turned on. XBMC is a powerful media playback application that excels at playing numerous types of audio and video files. In addition, XBMC comes with a digital photo viewer with thumbnail and slideshow features.

# PART IV

## Major Hardware Mods

- CHAPTER 11** Replacing the Xbox Case
- CHAPTER 12** Upgrading the Xbox Hard Drive
- CHAPTER 13** Lighting Up the Case
- CHAPTER 14** Cooling Down Your Xbox
- APPENDIX A** Xbox Resources



# Replacing the Xbox Case

Here are the key points covered in this chapter:

- Swapping your case for a new one
- Swapping out to an aftermarket case
- Creating a custom system jewel

**T**his chapter gives you step-by-step instructions on how to replace your Xbox case with a new case, which might be a factory original, a special edition case, or even an aftermarket case. Why would you want to do this? Well, you would replace it if your Xbox case became damaged, obviously, but you can do some really fun things with a clear case, such as adding LEDs and cold cathode light kits to make your Xbox more fun.

## Stock Cases

In the following sections, I'm going to show you how to replace your Xbox case with another stock case. You can find replacement cases on eBay as well as on Xbox fan sites and aftermarket reseller sites on the Web. You might want to replace your Xbox case just for cosmetic reasons, which was certainly my goal. It is a lot of fun to add LEDs and cold cathode light kits to your Xbox to liven up a LAN party!

After you have completely torn down your old Xbox, you can proceed with the following instructions that will explain how to remove the rest of the parts in your Xbox and install them in the new case. You do *not* need to remove the motherboard to install an aftermarket clear case, because these are usually just a front panel and top cover.

You will need to remove the motherboard, of course, which is held down with 11 screws (10 for revision 1.6 Xboxes), as well as the power supply. If you're lucky, your new case already has the metal inner lining. If it does not, you will have to remove the metal lining (which helps with cooling but is primarily there to prevent electromagnetic interference either coming *from* the Xbox or entering *into* the Xbox from other sources).

Here, you'll learn to take your stock Xbox (see Figure 11.1) and transplant its components into another stock case (see Figure 11.2). I am using the Halo Special Edition case to make this procedure more interesting. The Halo case is translucent, so it's a great choice for your modified Xbox.



**FIGURE 11.1** A typical stock Xbox case.

## Tearing Down the Old Case

You can refer to Chapter 2, “Disassembling Your Xbox,” for complete instructions on how to open the case and completely disassemble your Xbox, all the way down to removing the motherboard. I’ll go over the basic procedure here, but you’ll want to flip back to Chapter 2 for details if you get stuck at any point of taking apart your Xbox.

### Quick Disassembly

Figure 11.3 shows the bottom of the stock case with the rubber pads removed. Six Torx screws must be removed (two of which are behind labels).





**FIGURE 11.2** The new case that will replace the original case.



**FIGURE 11.3** The bottom of the stock case.

Figure 11.4 shows the back of the stock Xbox. After you have removed the six screws, you can just lift the case upward. If it seems stuck, you can use a small screwdriver at the bottom of each side to pry it up, after which the case cover should lift off easily.



**FIGURE 11.4** The case cover lifts off after the screws have been removed.

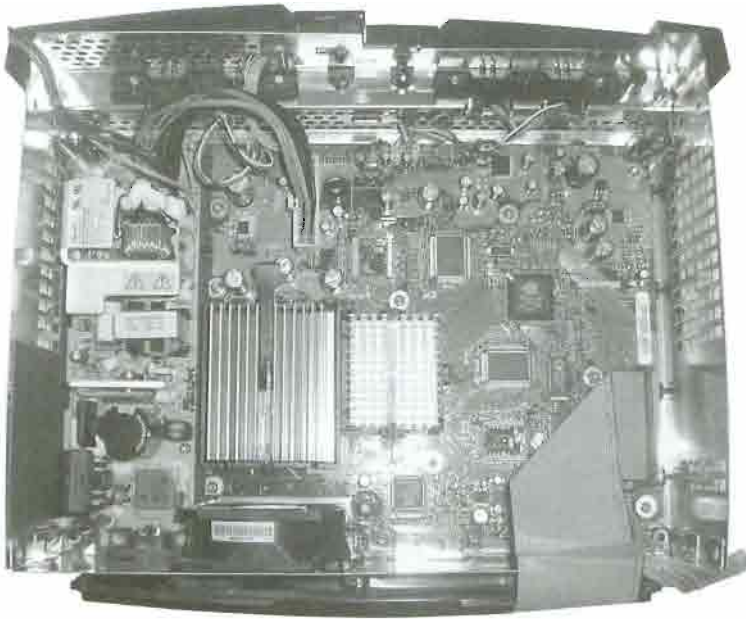
Figure 11.5 shows the inside of the stock Xbox after the case cover has been removed. You must remove three more small screws, and then you can lift out the hard drive and DVD-ROM drive, unplugging the IDE and power cables as you do so.



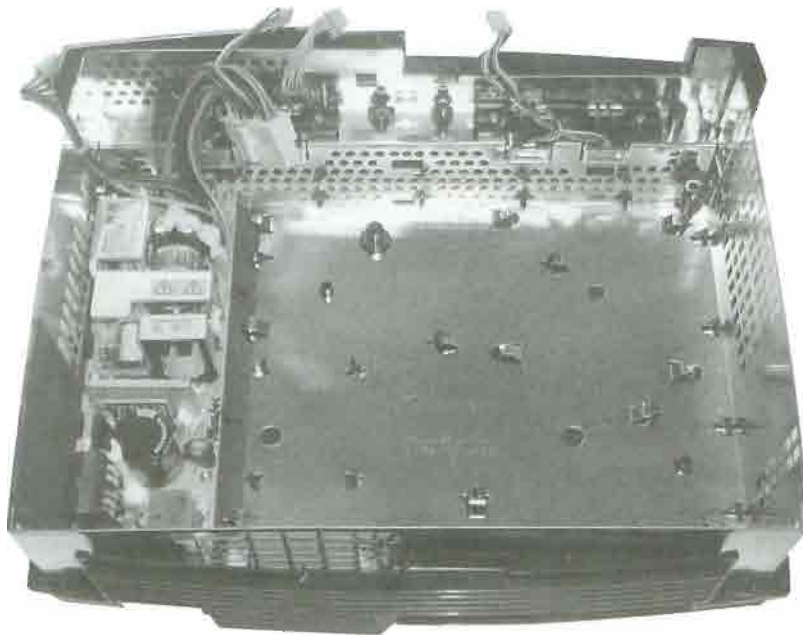
**FIGURE 11.5** You have gained access inside the Xbox.

You don't need to remove the hard drive and DVD-ROM drive from their plastic frames because the frames will just be installed into the new case. For now, just remove all the cables and set the drives aside. You will then see the motherboard and power supply, as shown in Figure 11.6.

Next, remove the power cord, front button cable, controller cables, and fan cable from the motherboard. Remove the screws holding down the motherboard and lift it out. You end up with an empty case (for the most part), as shown in Figure 11.7.



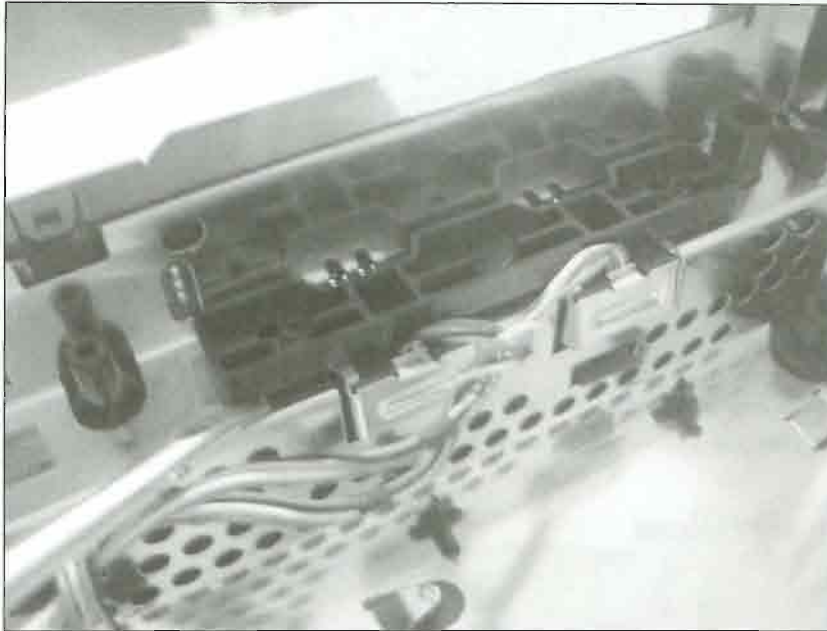
**FIGURE 11.6** The “barebones” Xbox with the motherboard visible.



**FIGURE 11.7** The case is mostly empty at this point.

### Removing the Controller Port Assemblies

Okay, now this is as far as we went in Chapter 2, so I'll show you how to remove the remaining few parts that you'll need to transplant into the new case. Figure 11.8 shows the controller ports 1 and 2 from the inside. Both ports share a connector on the motherboard. The controller port assemblies are held in place by two Torx screws that must be removed.



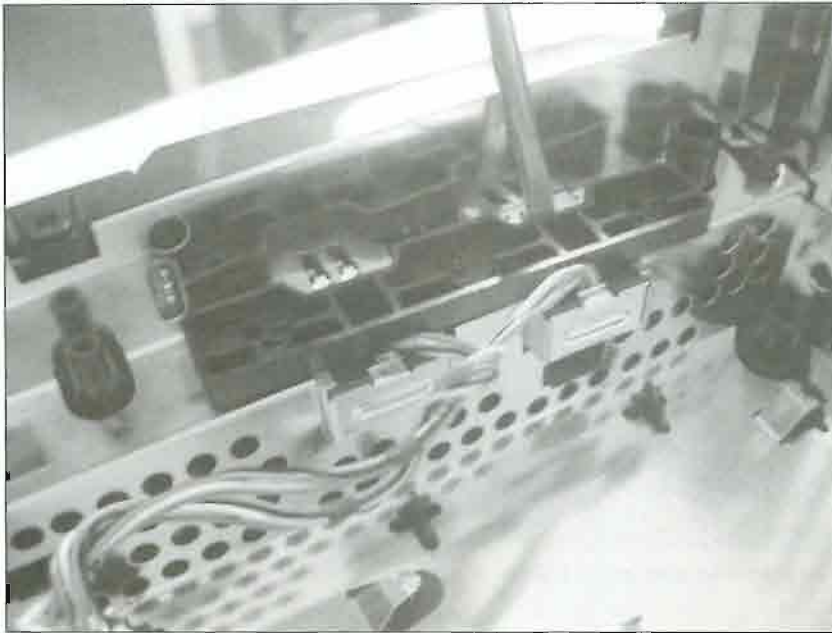
**FIGURE 11.8** Controller ports 1 and 2 share a connector.

After removing the two screws, you can use a screwdriver to gently pry the controller ports from the front of the case, as shown in Figure 11.9. The assembly is pried more up and out rather than just straight back.

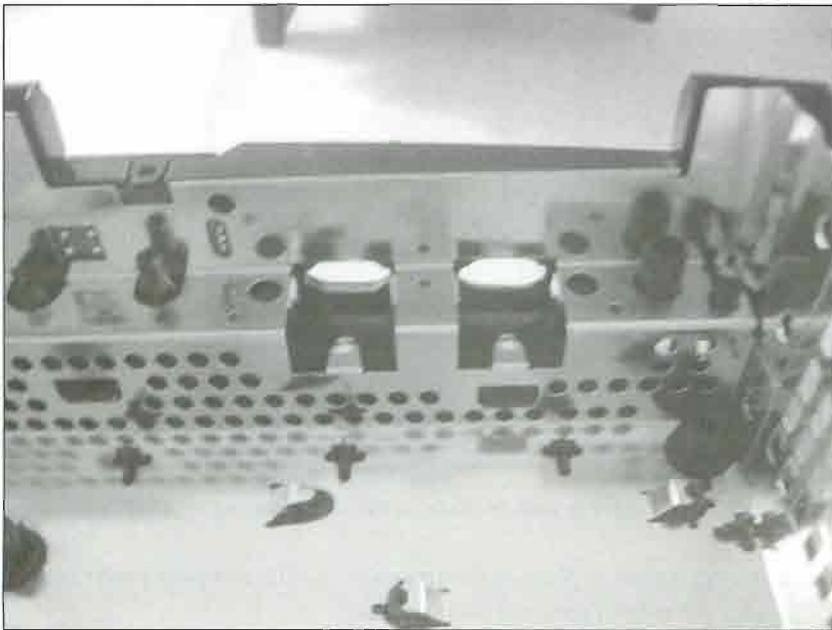
After you have loosened the controller ports, the entire controller assembly will come loose, leaving the ports empty (as shown in Figure 11.10). The assembly itself is shown in Figure 11.11. This will be installed into the new case.

### Removing the Power Supply

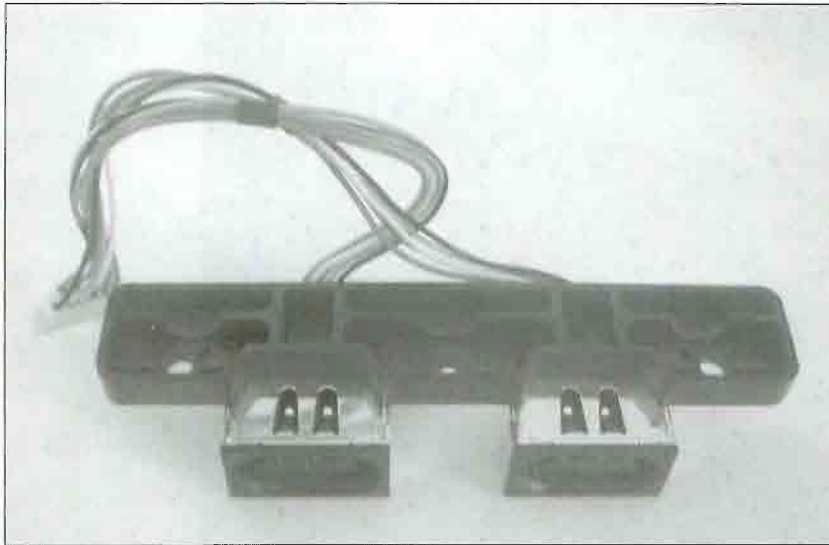
The power supply for the Xbox is located on the right side of the case next to the motherboard, as shown in Figure 11.12. This goes without saying, but please double-check that you have removed the power cord from your Xbox before you try to remove the power supply, okay? Let's not introduce any new candidates for the Darwin Awards (<http://www.darwinawards.com>) by electrocuting yourself. *Always* remove the power cord any time you open the case. And just to be safe, after you have removed the power cord, press the power or eject button on the front of the Xbox, which should drain the larger capacitors on the power supply unit. You can still get quite a shock if a capacitor is fully charged even after the power cord is removed.



**FIGURE 11.9** The controller ports are gently pried away out of the case.



**FIGURE 11.10** The controller port assembly has been removed.



**FIGURE 11.11** The controller port assembly.



**FIGURE 11.12** The Xbox power supply is held in place by two Torx screws.

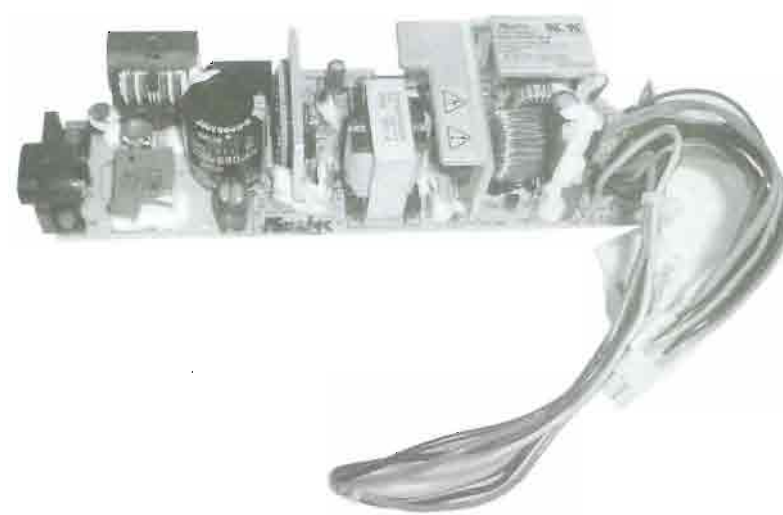
Two Torx screws hold the power supply in place, as the arrows show. The complete power supply is shown in Figure 11.13 after it has been removed from the case.

### **Removing the Front Button Assembly**

If you are doing a stock case swap, you may not need to remove the front button assembly from your old case because the new one very likely has the front power button and eject button, with

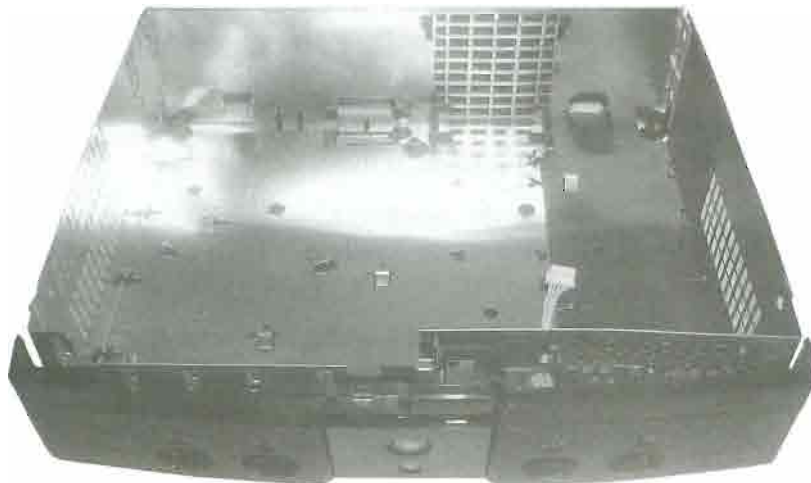


a connector ready to be plugged into the motherboard. But if you happen to have found a replacement case without the front buttons, you'll need to transplant them.



**FIGURE 11.13** The Xbox power supply removed from the case.

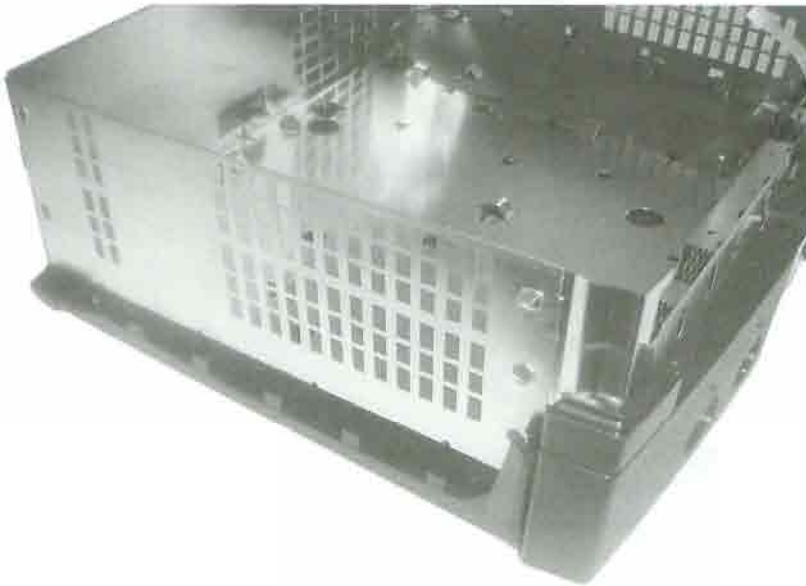
The only way that I've been able to determine to remove the front button assembly is to remove the inner metal liner inside the Xbox case. There just doesn't seem to be any other way to get to the assembly, which is located behind the metal liner. Fortunately, you can just pull it out with a little tugging at each corner (see Figure 11.14).



**FIGURE 11.14** The inner aluminum liner inside the Xbox case.



Try not to warp or bend the aluminum as you pull on each corner to coerce it out of the case. Figure 11.15 shows the side of the case with the liner starting to come up.



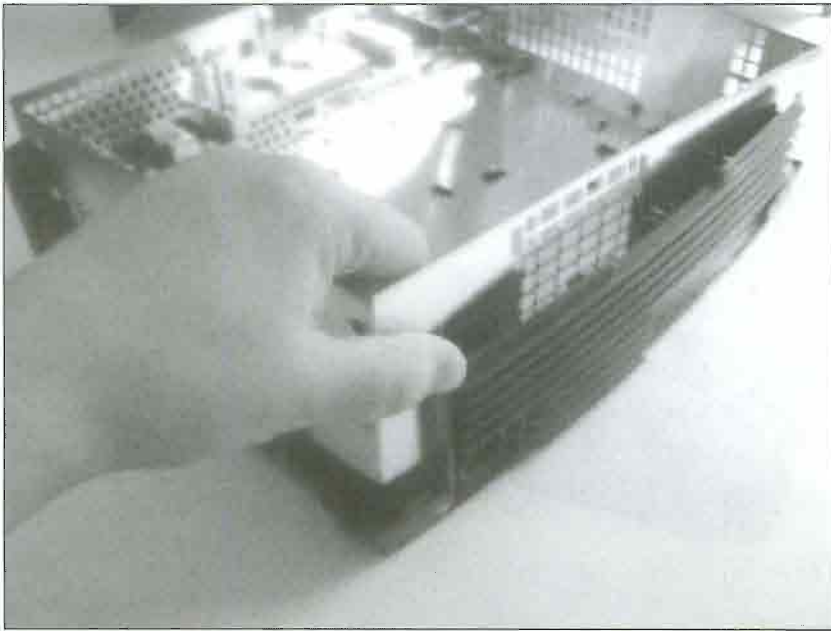
**FIGURE 11.15** The sides of the case liner are the best places to lift.

Small pegs on the bottom of the case hold down the aluminum liner, and three pegs on the inner side of the front panel also hold down the liner. Gently tug on the metal to pull it upward, little by little. You will want to pull at each corner, as shown in Figure 11.16, and lift the back side higher than the front side to clear the three pegs in the front that are holding the liner in position.

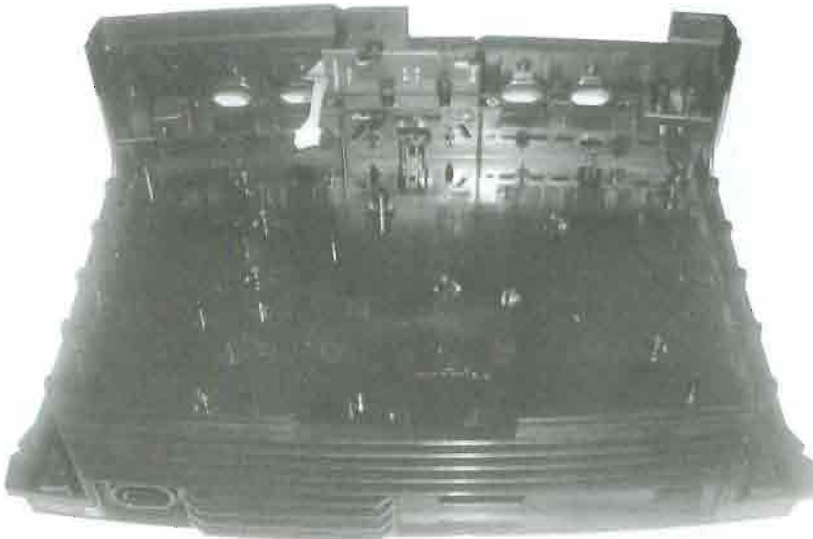
After the liner has been removed, your Xbox case will be down to just the bottom and front panel, with the power/eject button assembly still attached, as shown in Figure 11.17.

Now you are able to remove the front panel from the dwindling Xbox case. The front panel just snaps off, from a tab on each side and one in the middle (inside the case). Simply pull out on each end of the front panel to free it (see Figure 11.18).

When you have the front panel off, you can then gently lift a small tab above the eject button to remove the button assembly circuit board. Two tabs on top of the panel free the button cover, as shown in Figure 11.19.



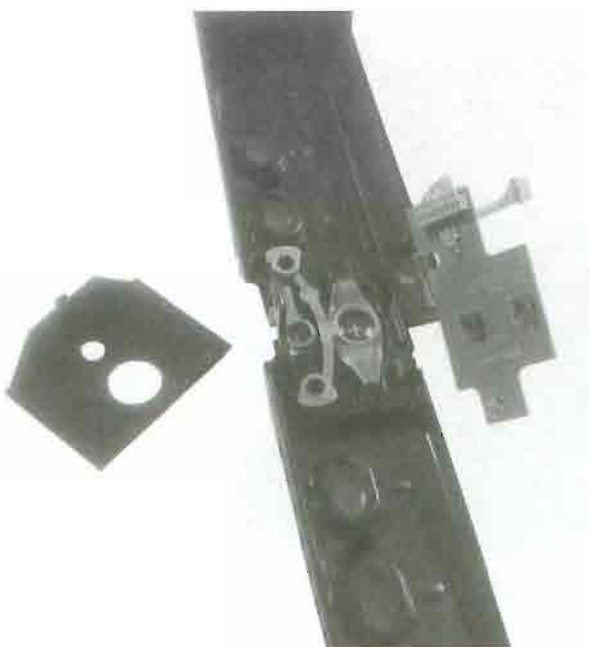
**FIGURE 11.16** Lift out the liner by lifting the back side of the liner first.



**FIGURE 11.17** The case liner has been removed.



**FIGURE 11.18** The front panel pops off easily.



**FIGURE 11.19** Detaching the power button circuit board from the front panel.

## Replacing the DVD-ROM Tray Panel

If you are swapping to another black case, you can ignore this part. But more than likely you'll need to replace the DVD-ROM tray panel to match the new case. Removing the tray panel is a little tricky unless you know where to look. Starting with the DVD-ROM drive, shown in Figure 11.20, flip the drive over and look at the bottom of the front tray panel. Note that you should be sure to remove any media from the drive before working on it.



**FIGURE 11.20** The front tray panel on the DVD-ROM drive.

From that angle, you will be able to see a small slot on each side of the panel where you can insert a screwdriver to gently release the panel with a side-to-side motion, as shown in Figure 11.21.



**FIGURE 11.21** Releasing the front tray panel with a screwdriver.

The DVD-ROM front tray panel slides off after the two tabs have been raised, and you'll then be able to replace the panel with a new one to match your new case (see Figure 11.22).



**FIGURE 11.22** The front tray panel has been removed.

## Assembling the New Case

Now you'll need to prepare the new case for the components of your Xbox. If you haven't done so already, remove the new case cover. Figure 11.23 shows the bottom of the new case.

If you had to reuse the front power and eject button assembly from your old case, insert them into the front panel of the new case. Next comes the aluminum case liner, if your new case doesn't already have one. Insert the new liner by pressing it down into the case.

## Installing the Power Supply

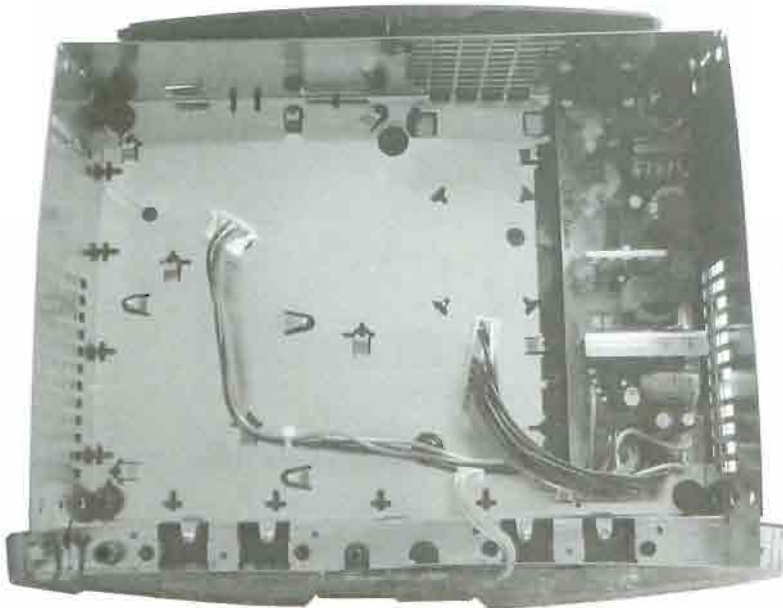
The first major component that you should install in the new case is the power supply. Slide it into the right side of the case under the tabs and insert the two screws to hold down the power supply to the case, as shown in Figure 11.24.

## Installing the Controller Port Assemblies

After you have installed the power supply, next comes the two controller port assemblies, shown in Figure 11.25.



**FIGURE 11.23** The bottom side of the Halo Special Edition case.

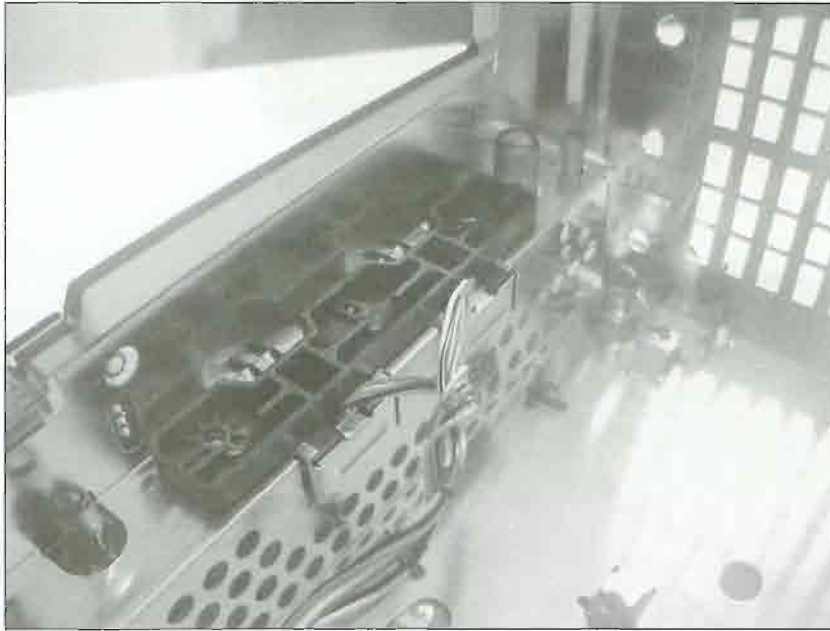


**FIGURE 11.24** Installing the power supply in the new case.

Remember that two Torx screws hold the controller port assembly to the front case panel. Position the assembly as shown in Figure 11.26 and then install and tighten the two screws.



**FIGURE 11.25** The two controller port assemblies.



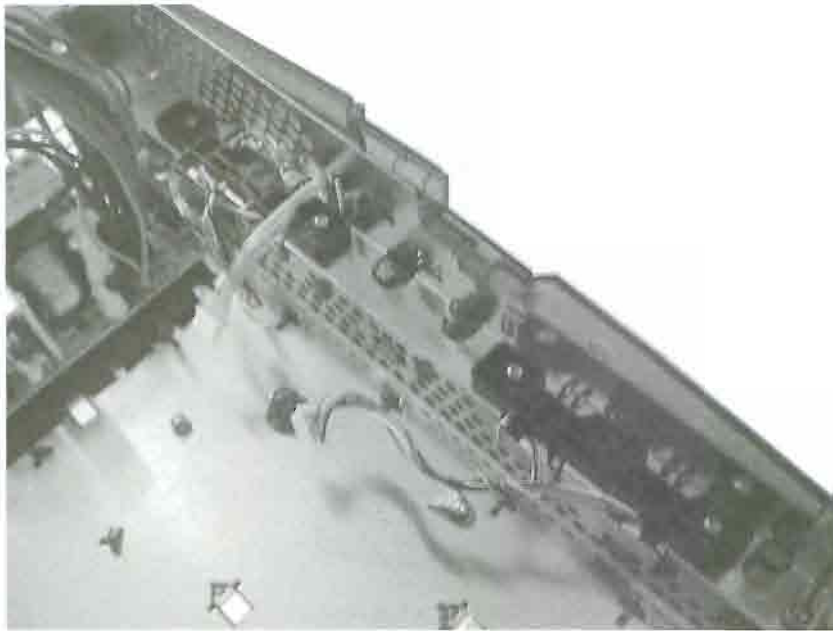
**FIGURE 11.26** Installing the right controller port assembly.

After you have installed both assemblies, your new case should look like Figure 11.27.

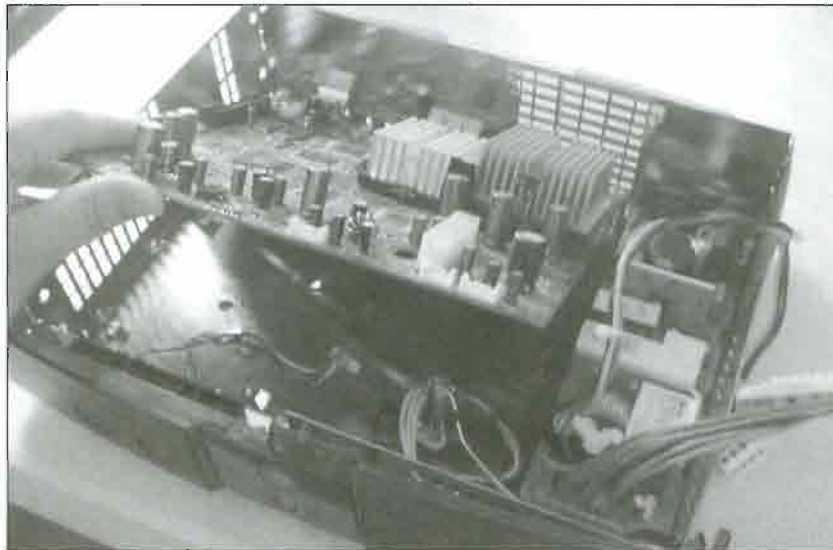
### **Installing the Motherboard**

Next comes the motherboard. Slide the motherboard into the case with the back side first so the LAN, video, and power cord ports are in position. Then lay the motherboard flat on the bottom of the case, as shown in Figure 11.28.



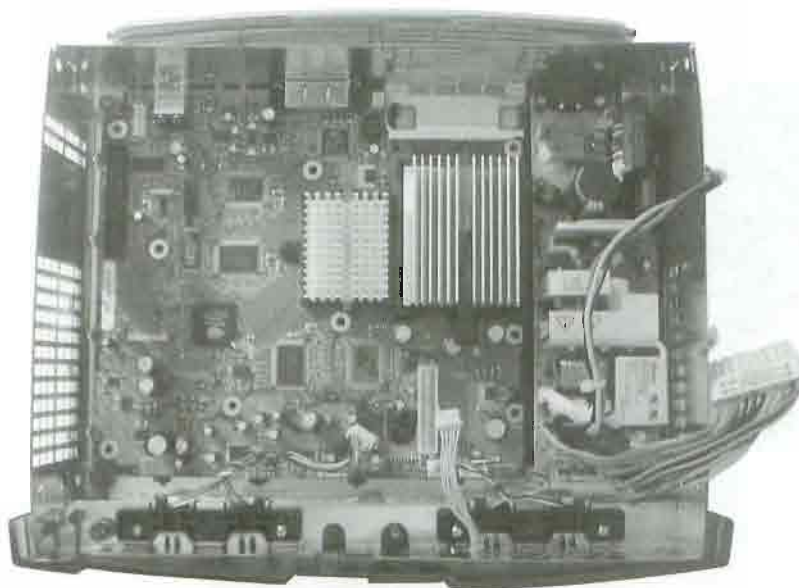


**FIGURE 11.27** Both controller port assemblies have been installed.



**FIGURE 11.28** Removing the motherboard from the case.

With the motherboard in place (see Figure 11.29), you have but to install the screws to hold down the motherboard (see Figure 11.30).



**FIGURE 11.29** The motherboard has been positioned in the case.



**FIGURE 11.30** Screwing down the motherboard.

## Installing the DVD-ROM Tray Panel

You insert the DVD-ROM front tray panel onto the front of the DVD-ROM drive by sliding it down over the slots and tabs on the front of the tray, as shown in Figure 11.31.



**FIGURE 11.31** The new tray has been installed on the DVD-ROM drive.

## Finishing Touches

The only thing that remains to be done is to install the drives and replace the six case screws from the bottom to complete the Xbox case swap. The result is shown in Figure 11.32.



**FIGURE 11.32** The case swap is finished.

## Aftermarket Cases

The following sections are similar to the preceding ones in that I'll show you how to swap out your stock case for another, but here it will be an aftermarket case not originally available for the Xbox. The case I'm using in this example was purchased from HexCorp and is available on the Web at <http://www.customps2.com> (the name refers to this reseller's original PlayStation 2 aftermarket cases). From this website, you can order any one of several colors available, each of which is translucent and ultraviolet sensitive, so a cold cathode light will cause the entire case to glow! You can build an Xbox that looks like the one shown in Figures 11.33 and 11.34.



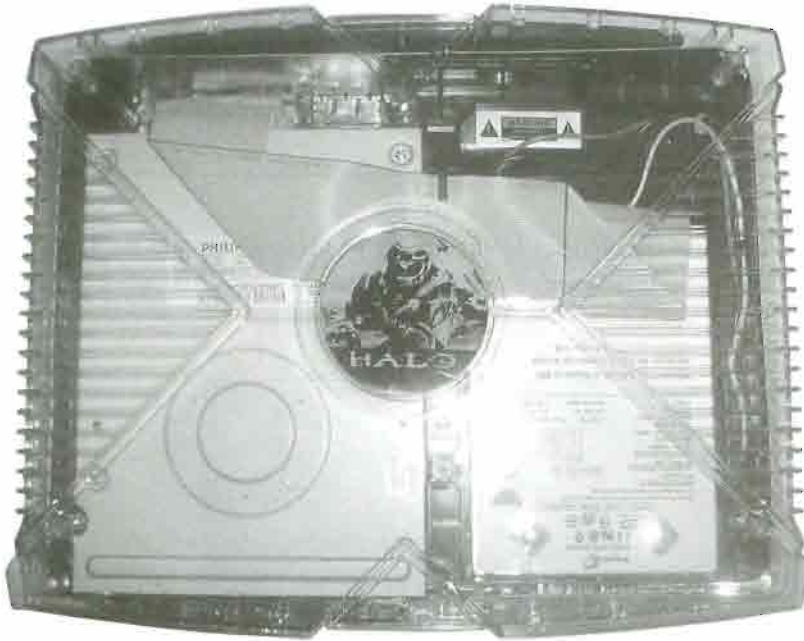
**FIGURE 11.33** Nothing says "Mods Inside" like a clear case!

### Assembling the Aftermarket Case

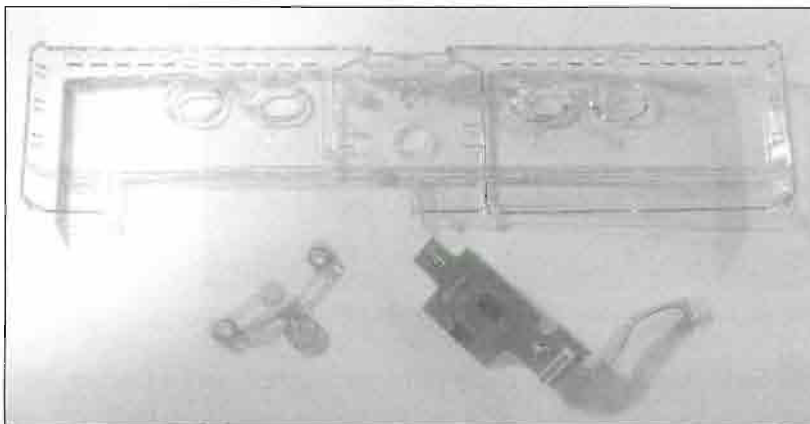
I will assume you have already read the chapter up to this point, so you will know how to remove the DVD-ROM front tray panel and replace it, and understand how to replace the controller port assemblies. All that remains at this point is to take the parts from your old Xbox case and assemble them inside the new aftermarket case.

## Installing the Front Button Assembly

Let's start with the new front panel. Figure 11.35 shows the parts needed to assemble the new front panel; they include the aftermarket clear front panel and buttons, along with the button circuit board that was removed from your old case.



**FIGURE 11.34** The UV-sensitive clear case as seen from the top.



**FIGURE 11.35** The parts needed to assemble the front panel.

The buttons are installed as a single unit, attached by fragile plastic pieces. As a matter of fact, the entire aftermarket clear case cover and associated parts are made from very fragile plastic that will crack or break easily, so you must be very careful when you're installing these parts.

Carefully slide the front button assembly into the notches on the back side of the new front panel, as shown in Figure 11.36. Then press the top part down until it snaps into the tabs on the panel. Be very careful at this stage because you can easily break the small tabs; a tiny dab of lubricating oil is helpful.

**CAUTION**

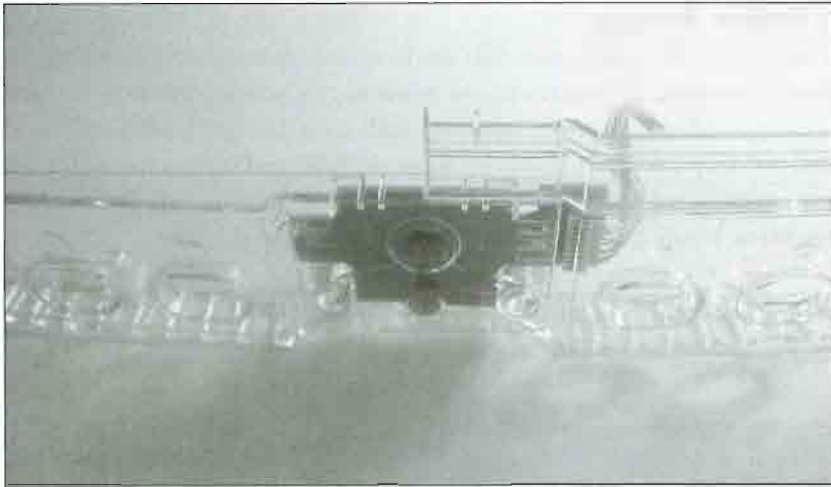
**Warning!** Be especially careful with the case cover because it is prone to cracking along the center if you exert even a tiny amount of weight on it before it has been installed over the Xbox case. It is also especially prone to breakage due to bending and twisting. The aftermarket case covers are very lightweight (and significantly more fragile) compared to the sturdy stock Xbox case covers.



**FIGURE 11.36** Inserting the front button assembly into the new front panel.

The new buttons fit the button circuit board perfectly and were designed just for this new front panel (but not an original stock case). Figure 11.37 shows the button assembly in place.





**FIGURE 11.37** The power and eject button assembly has been installed.

### Attaching the Front Panel to the Case

With the button assembly in place, you can now attach the front panel to the case. Note that the aluminum case liner has already been installed. As a matter of fact, the new case cover and front panel are just installed on an original Xbox base. There is no “bottom” part of this aftermarket case; it just spruces up the front, top, and sides.

The front panel snaps into the front of the case, as shown in Figure 11.38. Be sure to feed the button wire plug through the large hole in the front before snapping the panel in place. The sides each have three tabs that must be snapped into place, and one tab on the bottom of the front panel keeps it firmly in place.

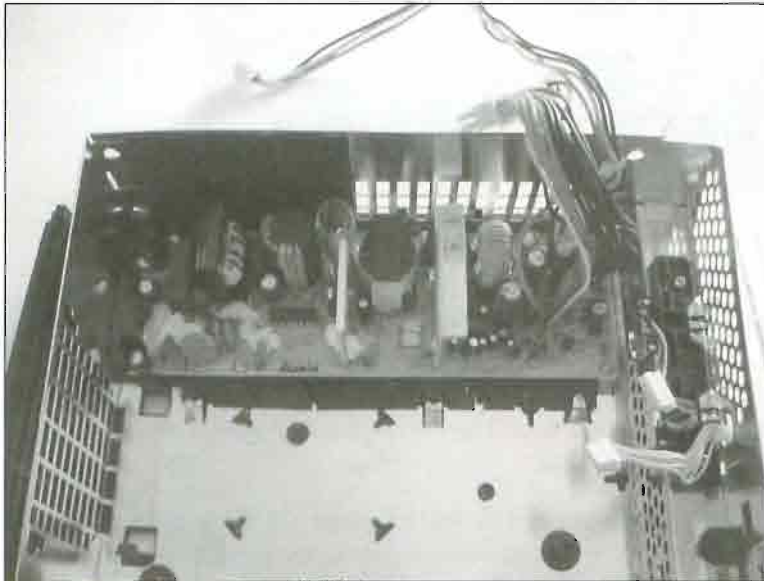


**FIGURE 11.38** The clear front panel has been installed on the case.



### Installing the Power Supply

The next step is to reinstall the Xbox components that you have come to know intimately thus far from previous chapters of this book. Let's start with the power supply, which needs to be in place before the motherboard is installed. The power supply is installed on the right inside of the case. There are indentations that keep the power supply up above the liner, and tabs on the right edge that the power supply circuit board slides into. Make sure the screw holes line up; then replace the screws and tighten them. Figure 11.39 shows the power supply in the new case.



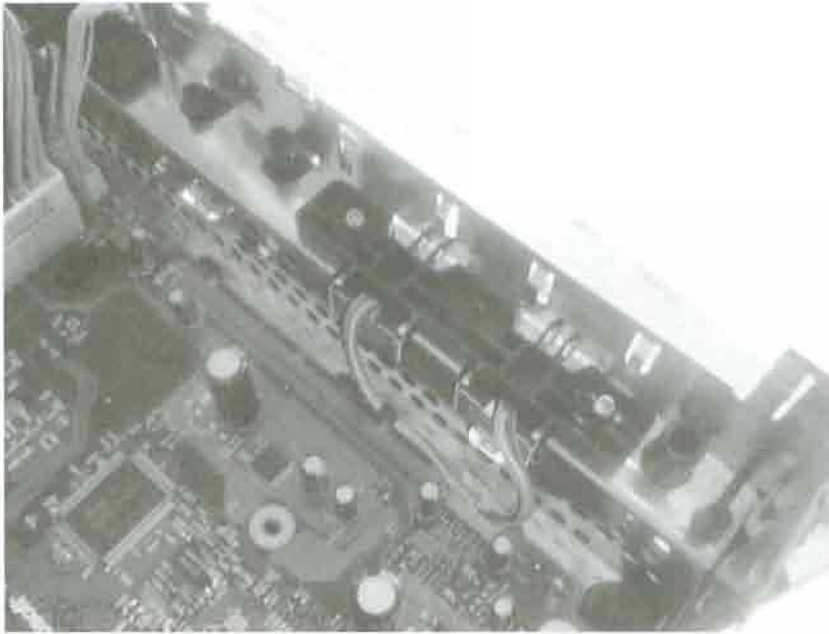
**FIGURE 11.39** Installing the power supply into the new case.

### Installing the Controller Port Assemblies

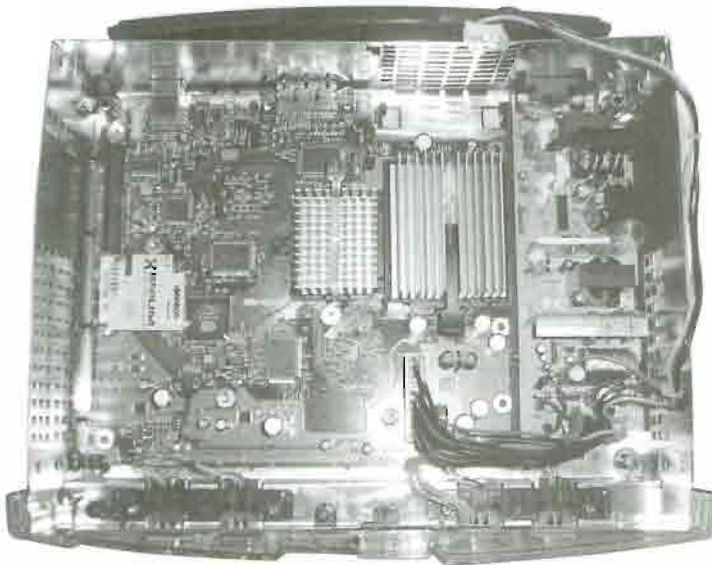
Next, install the controller port assemblies by placing each one in the port openings inside the front panel of the case, and push down. Replace the two screws to hold down each assembly, as shown in Figure 11.40.

### Installing the Motherboard

The motherboard comes next (see Figure 11.41). You install the motherboard with the rear side first (positioning the LAN, video, and power ports in their respective openings in the back of the case) and then gently lower the front side of the motherboard down into the case, lining up the screw holes. Install the screws and tighten them to keep the motherboard firmly in place.



**FIGURE 11.40** Installing the controller port assemblies.



**FIGURE 11.41** Installing the motherboard into the new case.

### Installing the Remaining Components

You are now ready to install the drives (which should be intimately familiar to you at this point, if you have read the previous chapters), followed by the case cover. The new case cover fits snugly, so you will want to make sure the drives are screwed in firmly so the case will fit properly. The final result is shown in Figure 11.42. I don't know about you, but I think it looks spectacular!



**FIGURE 11.42** The new Xbox looks terrific with the case mod finished.

### The System Jewel

You have probably been wondering up to this point where I got the custom Halo system jewel featured in the preceding figures. Although these jewels are available on eBay and on some Xbox fan sites, you can make one yourself fairly easily (and on any design that you like).

Just go to the nearest office supply store and buy some transparency sheets that will work with an inkjet or laser printer—the type used for an overhead projector. You will also need a sheet of laminating paper, which is clear and has a sticky side. Print the logo you want on the transparency sheet (at about 3" in height and width); then, with a felt pen, trace out the jewel on top of your Xbox case over the image you printed on the transparency.

Next, cut out a sheet of laminating film large enough to cover the circle and apply just enough to cover the circle. You can then cut out the custom transparent logo with a pair of scissors. Next, you can glue the new “system jewel” to your aftermarket clear case using simple stick glue; just be sure to buy stick glue that is clear when dry.

## Summary

This chapter explained how to replace your stock Xbox case with a different type of case, such as the Halo Special Edition case or even an aftermarket clear case. Nothing quite nails the point home that your Xbox has “Mods Inside” like a clear case, so this is definitely one of the most fun mods you can do with your Xbox—and it's inexpensive too!

# Upgrading the Xbox Hard Drive

Here are the key points covered in this chapter:

- Overview of the swap
- The Hard Drive Upgrade Wizard
- Verifying the upgrade process

**T**his chapter explains how to replace the stock hard drive in your Xbox with a higher capacity drive. I will show you how to format the new drive, copy your existing hard drive data over to the new drive, and then use the new hard drive exclusively, shelving the original one. With a few exceptions, there are hundreds of hard drives that will work in the Xbox, as long as you have the means to format the drive so that it will work. The drive used as an example in this chapter is a Maxtor 250GB, 7200rpm drive, and it is utilized fully in my Xbox. I will show you how to do the same.

## Overview of the Swap

After you install a mod chip, the next thing you'll usually want to do with your Xbox is install a larger capacity hard drive to be able to copy all of your media files to it, especially if you'll be running Xbox Media Center (covered in Chapter 10). I use one Xbox just for games and have another Xbox that I use in the living room as a media center, loaded up with music and videos, each with a very large hard drive. The Xbox dedicated to games has my game library stored on the hard drive, which allows me to keep the games all in like-new condition on my bookshelf. I especially like this capability because my young children "discovered" that the Xbox

games are more fun than their Nintendo 64. My goal was to let them use the N64 because the cartridges are rugged, unlike Xbox game discs. For the most part, this approach works because the N64 is still—in my opinion—the best system ever designed for kids. However, some games such as Spider-Man 2 are not available on the N64, and my son loves this game—and who wouldn't, with free-roaming game play and realistic web slinging?

In the final analysis, an Xbox hard drive is far, far more useful as a file server than it is for just storing games. Many gigabytes of my PC drive are used up with music files that I ripped from my CD collection—which is the only way to do it. I rip my CDs to 320-kbit MP3s because my sole interest is in audio fidelity, not storage space. A typical music CD rips to about 100–120MB in MP3 format at 320-kbit. In contrast, the typical MP3 that you can download (such as sample tracks from [www.mp3.com](http://www.mp3.com)) are encoded at 96-kbit or 128-kbit at best, which sounds like white noise to me. I *hate* poor quality MP3s, so I never buy downloadable music (although it should be noted in all fairness that some contemporary online music stores like Napster and MusicMatch now provide 320-kbit MP3s). The result, however, is that my music collection is quite large—eight typical CDs per gigabyte.

Now, think about that for a moment. Eight doesn't sound like a lot. But did you know that a 250GB hard drive will be able to hold 2,000 CDs in MP3 format, even encoded at this highest bit sampling rate? I don't even own a fraction of that number of CDs, so I can put my *entire* CD collection—currently in a single 200-disc changer—on the Xbox hard drive and have the entire music collection set up in custom playlists using Xbox Media Center. After I set up this system, I was encouraged to buy even *more* CDs from artists I have always enjoyed (on the radio, and so forth) but had never gotten around to buying. You just can't compare anything with 320Kb encoded MP3s, unless you have gotten into music *DVDs*, something rather new to the marketplace, but with a *lot* of potential, because DVD audios support Dolby Digital 5.1 Surround Sound, whereas a music CD supports only Dolby Stereo.

The real gist of the argument for a new Xbox hard drive is this: How much use do you get out of your PC's hard drive? A modded Xbox is *more* like a PC than a video game console, so you might want to take advantage of your mod chip investment.

If you own a late-model Xenium mod chip, you will be pleasantly surprised to learn that the Xenium O/S has a feature that will copy the original Xbox hard drive data over to a new hard drive—get this—using the same IDE cable normally plugged into the DVD-ROM drive!

## The Stock Xbox Hard Drive

The stock hard drive for your Xbox will be either a Seagate or Western Digital drive, like the one shown in Figure 12.1. The Xenium O/S will copy the contents of this original drive (including the all-important drive-locking key) to the new hard drive.



**FIGURE 12.1** A stock Xbox hard drive made by Seagate.

## The Replacement Hard Drive

The replacement drive can be from any hard drive manufacturer, with one stipulation: The drive must support locking. Most drives can be locked, but there are a few exceptions that you should avoid for your Xbox because they will not work. Because so many hard drives are available, the best way to determine whether your drive is compatible with the Xbox (in other words, whether it supports locking) is to look it up on the Web. There is a website with a huge list (more than 600 entries at the time of this writing) of hard drives, showing which ones support the Xbox and which ones do not (look at the “Locking” column in the hard drive listing). You can search by hard drive make and model number. Be sure to check the status of a drive before you buy it new (especially if you buy from a mail-order company). You may peruse this compatibility chart at <http://xboxdrives.x-pec.com>.

Figure 12.2 shows the Maxtor DiamondMax Plus 9 (model number 6Y250P) that I am featuring in this chapter.



**FIGURE 12.2** The new hard drive that will be installed in my Xbox.

## Connecting Both Hard Drives

If you have a replacement hard drive ready to go and have verified that it supports locking, you are ready to connect the new drive to the IDE cable in your Xbox.

First, open the case and remove the DVD-ROM drive from the Xbox case (leave the IDE cable attached to the motherboard). You will have to first remove the hard drive package to get to the DVD-ROM drive. While you're at it, go ahead and just remove the stock hard drive from its carrier package because it's more convenient to work without the package getting in the way. The old and new drives are shown side by side in Figure 12.3. The new drive is thicker than the stock drive, but there is plenty of room under the hood, so don't worry about clearance.

### Master/Slave Settings

Now, it's important to make sure the drives are configured properly as master and slave. The stock Xbox hard drive should be configured as the master and the new drive as the slave. Figure 12.4 shows the diagram on the Seagate drive showing its setup.



Check on your new hard drive for a similar master/slave pin setting label because it should be present on all hard drives. Figure 12.5 shows the pin settings on the new Maxtor drive that I will be installing into my Xbox.



FIGURE 12.3 A stock Seagate 10GB hard drive next to a new Maxtor 250GB drive.



FIGURE 12.4 Master/slave settings for the stock Seagate drive.



FIGURE 12.5 Master/slave settings for the new Maxtor drive.

## Connecting the IDE Cable

Make sure the original drive is set as master and the new drive is set to slave because the Xenium O/S is expecting this configuration for the hard drive upgrade procedure. You can then hook up both drives to the IDE cable, with the new drive taking the place of the DVD-ROM drive on the cable, as shown in Figure 12.6. You can then plug the IDE cable into the motherboard.

## Connecting the Power Cables

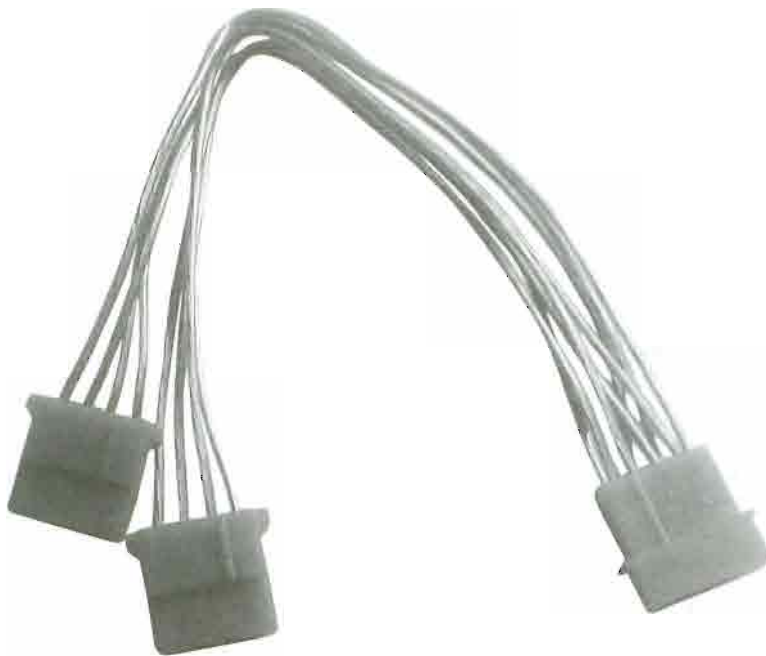
Next, you'll need a Y adapter (shown in Figure 12.7) for the power cable to give power to the new drive (because the DVD-ROM drive uses a different type of power cable that plugs into the motherboard). You can purchase the Y adapter from any local computer store or retail electronics store such as Radio Shack or Fry's Electronics. One of my favorite websites—<http://www.newegg.com>—also carries Y adapters. Be careful, as you can easily add a few hundred dollars' worth of gear after browsing the site for a while.

You can plug the power cable splitter to the Xbox's hard drive power cable to add an extra cable to power the new hard drive temporarily while the data is copied over from the old one, as shown in Figure 12.8.

After plugging the IDE cable into the motherboard, you will then want to plug each end of the power cable splitter into a hard drive. When it is all hooked up, your Xbox should look something like the setup shown in Figures 12.9 and 12.10.



**FIGURE 12.6** Installing the IDE cable on both drives.



**FIGURE 12.7** A Y splitter will provide power to both hard drives.



**FIGURE 12.8** The Y splitter is connected to the power cable.



**FIGURE 12.9** Both hard drives are now connected to the Xbox.



**FIGURE 12.10** View of the dual hard drive setup from the front.

## The Hard Drive Upgrade Wizard

Now, go ahead and plug in the Xbox and press the eject button to bring up the Xenium O/S. If there are any errors in your drive settings, the Xenium O/S might still come up, or you may get a “frag” (where the front light flashes, alternating from red to green), at which point you should recheck the hard drive settings and cable installation. (This problem will most likely occur if you press the power button rather than the eject button to bring up the Xenium O/S, as most Dashboards will pitch a fit over the dual-drive setup by default.)

If Xenium O/S boots but detects a problem with the drive jumpers, it might “Kernel Panic,” which results in a flashing red eject light for 10 seconds, followed by a reboot. If this happens, you’ll need to double check that your original Xbox hard drive is set to Master, and the new drive is set to Slave.

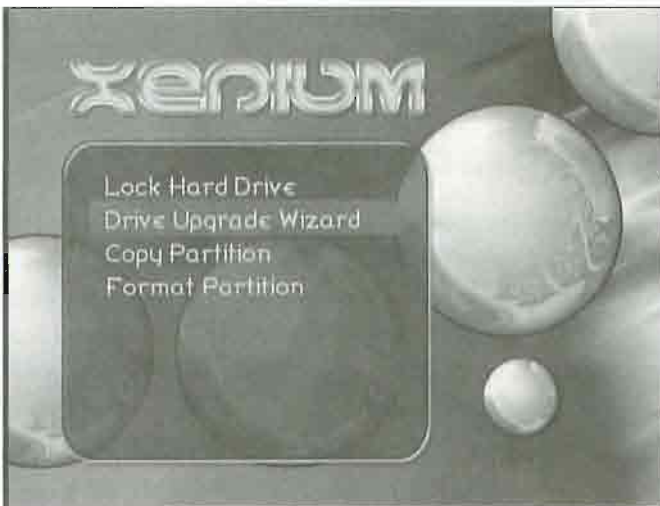
### Running the Drive Upgrade Wizard

If all goes as expected, you should soon see the Xenium O/S main menu. Highlight Disk Tools and select it, as shown in Figure 12.11.

The Disk Tools menu will come up. Highlight the Drive Upgrade Wizard option, as shown in Figure 12.12, and select it.



**FIGURE 12.11** The main menu of the Xenium O/S.



**FIGURE 12.12** The Disk Tools menu.

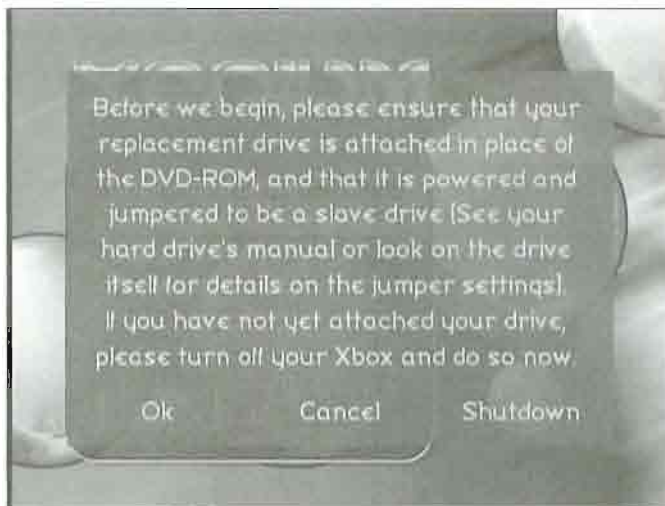
A new screen will appear, as shown in Figure 12.13, with the following message: "This wizard will walk you through the steps of upgrading your Xbox's hard drive. Press 'Ok' to continue, or 'Cancel' to exit." Select the Ok button.

The next screen that comes up (see Figure 12.14) provides some instructions on how to set up the hard drives so that the Drive Upgrade Wizard procedure will work correctly. Basically, this screen

tells you how to configure the drives, just like you have already done, with the stock drive as master and the new drive as the slave. Select the Ok button to continue.



**FIGURE 12.13** Preparing to start the Drive Upgrade Wizard procedure.

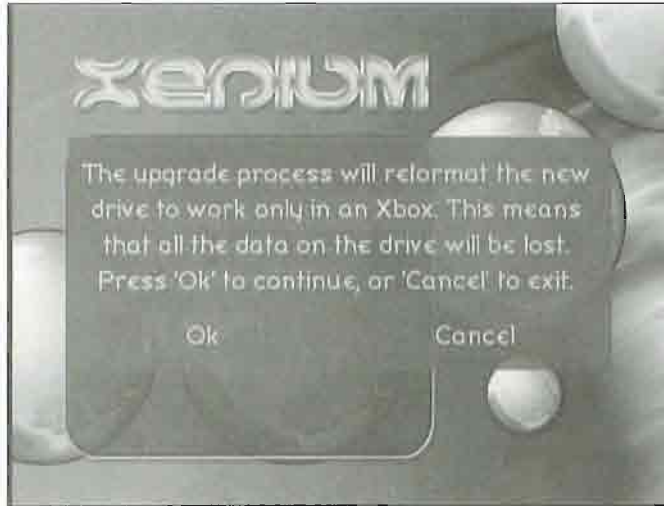


**FIGURE 12.14** This screen provides instructions on how to install the drives.

The next screen that comes up (shown in Figure 12.15) tells you that the new drive will be formatted to work only in an Xbox and that all data will be lost. If you are using a used hard drive, and you *like* the files on that drive, *don't* press Ok at this point. Instead, first hook it up to your



PC and then save the data, because no one (not even Peter Norton) will be able to save you after this step.



**FIGURE 12.15** This screen warns that the new hard drive will be formatted.

And just because Team Xodus is so used to newbies, there is yet *another* screen that asks whether you are ready to begin the process. This screen appears in case you are having last-minute doubts about the whole thing (see Figure 12.16).

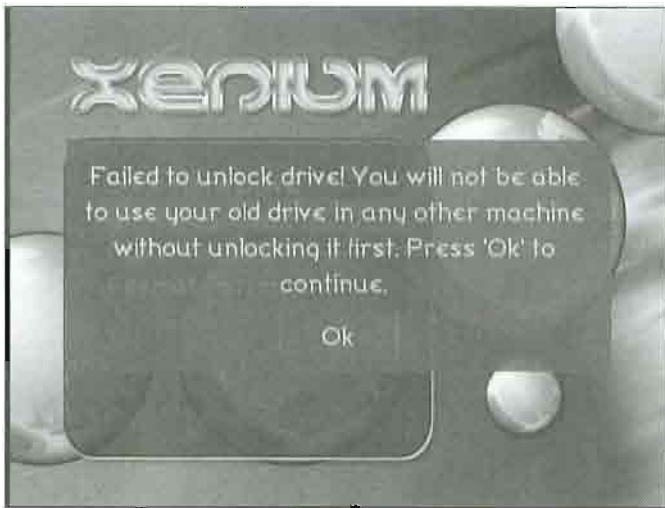


**FIGURE 12.16** The final confirmation dialog box before the upgrade process is started.

A screen will come up asking whether you would like to create one large “extra” partition for your files called F, or whether you would rather create two partitions, F and G. I recommend going with just one large F partition because it is easier that way, but if you have a *really* large drive like my Maxtor 250GB, splitting it into two parts, F and G, might be a good idea. The standard Xbox partitions will be skimmed off the top first (which takes up only 2–3 gigs), and then the remaining space will be divided between the two.

## Formatting the New Drive and Transferring Data

At this point, the Drive Upgrade Wizard will either go ahead with the upgrade by formatting the new drive and then copying data from the old drive, or it will come up with an error. Many conditions could cause an error, primarily due to an improper master/slave setting, bent IDE pins, or an improperly connected power cable. Figure 12.17 shows one possible error message. The “unlock error” shown here indicates that the original drive is not recognized, which may be due to a problem with the IDE cable or power cable.



**FIGURE 12.17** One possible error message that may be displayed if an error occurs.

Assuming that everything is configured properly, you should instead see a screen that tells you the new drive is being formatted, which is a brief process, and then files will be copied from the old drive to the new drive. You will see a screen similar to Figure 12.18 that shows each file as it is copied to the new drive.

The Xenium O/S Drive Upgrade Wizard is a wonderfully useful tool that makes it a breeze to upgrade your hard drive. When the process is complete, you will see a screen that looks like Figure 12.19.



FIGURE 12.18 Files are copied from the old hard drive to the new drive.



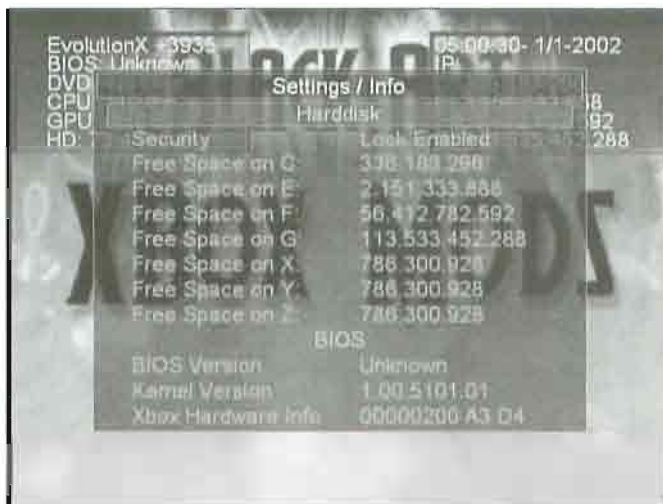
FIGURE 12.19 The drive upgrade process has finished successfully.

## Verifying the Upgrade Process

After the upgrade process is complete, you'll want to verify that it succeeded. A lot of things were done automatically for you by the Xenium O/S in this process, including the creation of all the partitions used by the Xbox and transfer of the hard drive lock key to the new drive. I'll assume that you have installed EvolutionX already on your old drive (and if so, it will be on the new drive now). If you have not, refer to Chapter 8, "EvolutionX Dashboard," for instructions on how to install EvolutionX.

Power down your Xbox; then remove the IDE cable and power cables from the drives. Store the original Xbox hard drive in a safe place because without the lock key, your Xbox will *never* be able to use another hard drive; you'll need this if your new drive fails for any reason.

Now, set the new hard drive to master, reassemble the drive package, plug everything back in, and reassemble your Xbox. You can then power up your Xbox and run EvolutionX. Figure 12.20 shows the drive information reported by EvolutionX. Your version and skin in EvolutionX may look different, but the information will basically be the same. Here, I have chosen to create two partitions, F and G, along with the standard Xbox partitions (C and E are for files; and X, Y, and Z are used for cache). Note that my F partition has already been filled up with a whole bunch of files, as it is only about half full at this point.



**FIGURE 12.20** Verifying the new hard drive from the EvolutionX Settings screen.

What happens if your G partition reports 0 space free? That is a common problem that you can easily remedy by using the XBtool I discussed back in Chapter 8, which included a section on

customizing and installing a new BIOS. You can use XBtool to configure an EvoX BIOS with LBA48 support (which provides support for very large drives—and we have Oz PaulB to thank for the LBA48 mod). Interestingly enough, this is a common problem with Windows 2000 because a similar LBA48 “driver” has to be installed on Windows 2000 PCs to work with large drives. The Xbox shares the problem, which is *completely* excusable—it was never designed to work with super-large drives. We should feel *very* lucky to be able to do this at all!

I remember a time when I had to install a special driver so Windows 95 would support my new 500MB (yes, that’s *megabyte*) hard drive, but that was another era....

## Summary

This chapter explained how to upgrade the stock Xbox hard drive with a new drive with greatly expanded capacity. You learned that your meager Xbox console will support hard drives of up to 250–300GB (and perhaps even higher because these are top of the line at present). You learned how to use the Drive Upgrade Wizard in the Xenium O/S to automatically format the new drive and transfer all the data from your old Xbox hard drive to the new drive. The result is an even more severely modded Xbox, now with *scads* of storage space.

## Lighting Up the Case

Here are the key points covered in this chapter:

- Cosmetic Xbox modifications
- Cold cathode lighting
- Custom lighting with LEDs
- Putting it all together

**T**his chapter is lighter than previous chapters because it focuses on the cosmetic aspects of Xbox modding, with emphasis on installing a light kit in your Xbox. You will realize better results with a clear case (such as the aftermarket cases covered in Chapter 11, “Replacing the Xbox Case”), but a stock Xbox case can still be modded with lighting kits to produce a nice glowing effect in areas such as the side vents, controller ports, and jewel at the top.

### Cosmetic Xbox Modifications

There comes a time when you have done everything that it is possible to do with your Xbox to make it do just about everything but take out the trash for you, when you are *finally*, after weeks of modifications, ready to reinstall those six screws into the bottom of your Xbox—because it is *done*.

You may not be interested in cosmetic enhancements to your Xbox, preferring to keep the “Mods Inside” something of a mystery. Maybe you don’t want to let on what you have under the hood, like a primed 1967 Mustang with the stock “6-cylinder” running horse logo on the side that—to everyone’s surprise—is actually packing a Ford Racing 347 stroker engine with a Paxton supercharger.

Nothing says “cheese” better than a neon light kit under your car, so the same may be true for video game consoles and PCs. But, if you think about it for a minute, who cares? It’s not like anyone thinks you are *cool* because you own an Xbox in the first place! And second, cold cathode-equipped PCs with sound modulation kits are now such a part of pop culture that it’s like the return of psychedelic disco. Instead of a spinning ball above the dance floor, we have bubble-lights mounted on the side of PC monitors that flash in sync with the music and sound effects in the game. So where are the VW Beetles and bell bottom pants? Well, at a typical LAN party, you are likely to see quite a few “Strongbad Owns You” and “Got Root?” t-shirts, so I guess it’s a start.

Lighting up your Xbox case is *fun*. Basically, anything you can find available for your PC will work in the Xbox, for two reasons:

Proof #1. The Xbox has a standard hard drive power cable. Oh, this is the bomb! You can do *anything* when you have one of these babies.

Proof #2. The Xbox also has a standard case fan header on the *motherboard*. Whoa! Do you know how many different kinds of case fans *alone* there are for the PC today? At least five or six. Note that the Xbox case fan is smaller than a typical 80mm PC fan, so a custom PC fan will have to be filed down to fit in the Xbox case.

Proof #3. Okay, this isn’t a proof, but it’s a good reason. Cold cathode lights are fun to play with too. Figure 13.1 shows me with my Yoda lightsaber. Yes, I am very young—but age matters not!

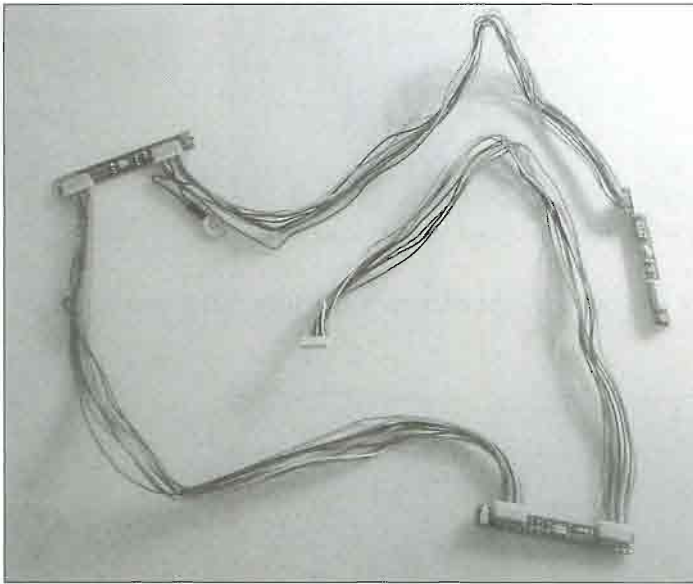


**FIGURE 13.1** Cold cathode jewels are perfect for constructing Yoda lightsabers.



If you own a Xenium mod chip, it probably came with an external LED module. The purpose of the external LED is to basically provide status information on the Xenium, which is tucked away down below the DVD-ROM drive and therefore invisible. (I meant to say *not visible*. I've been watching too much *Scooby Doo* lately.)

You can combine the external LED modules together to add multiple LEDs to your Xbox (see Figure 13.2). The only problem with the module is that it is too big, the wires get in the way, and it just doesn't look good anywhere on the outside of the case. I do think it's a good idea to use one of them on the *inside* front panel (next to the DVD-ROM tray there is space for it). But if you just want to liven up your Xbox, I'll show you an easier way later in this chapter.



**FIGURE 13.2** The Xenium LED adapters can be chained together.

## Cold Cathode Lighting

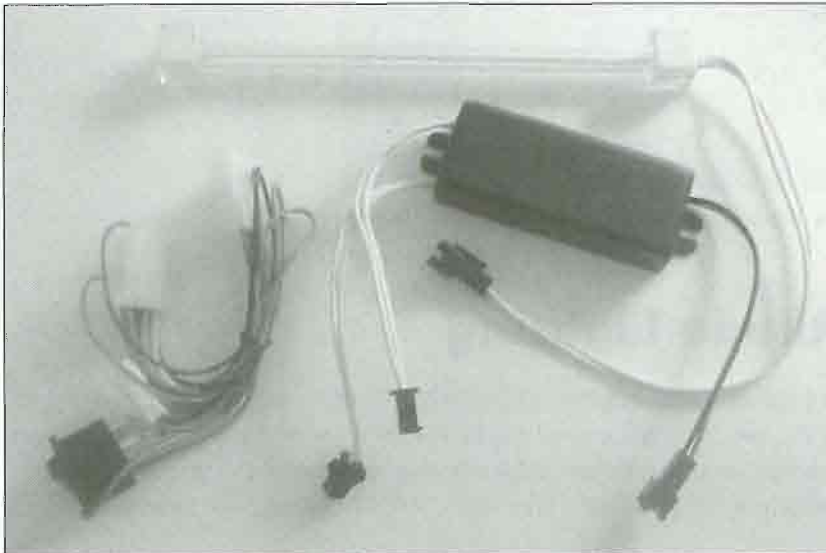
Cold cathode lights produce a very brightly colored light that tends to produce a good level of raised ambience in the case, centered around the light source—which is usually a circular or straight tube. A single circular cold cathode light is probably enough to light up your entire Xbox case from within, but if you opt for straight tube lights, you may squeeze one in on each side of the case.

Figure 13.3 shows a typical circular cold cathode light kit. This particular kit was designed for the front panel of a PC case to give the case a nice custom look of glowing from within.



**FIGURE 13.3**    A cold cathode circular lamp designed for a PC case front.

Figure 13.4 shows another type of cold cathode light kit, with a stick light that is suitable for the drive rails inside a PC case.

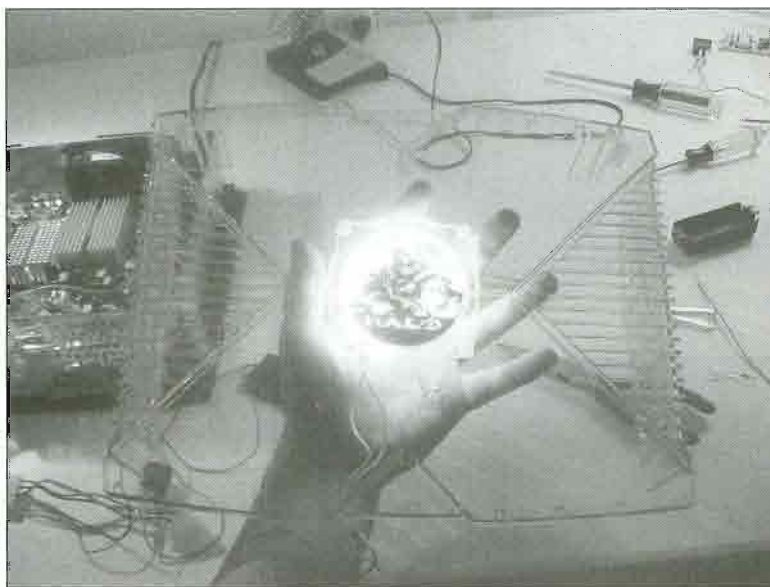


**FIGURE 13.4**    A cold cathode stick lamp provides brightly colored light.

There is room for a small light stick in the front bottom of the Xbox case, and may be room for one next to the DVD-ROM drive on the bottom left side of the case. When I was considering the types of cosmetic mods I wanted to do, I decided to use only what would fit *inside* the case. There is room in the Xbox case if you are creative, but you should be careful not to put anything near the power supply because most of the components on the power supply get very hot and will easily melt a wire or light if it gets too close!

## How About a Glowing Jewel?

The idea with the round light is to mount it below the custom case jewel, as shown in Figure 13.5.



**FIGURE 13.5** Lighting up the jewel produces a nice effect in the case.

A close-up view of the cold cathode light underneath the custom jewel shows how well it causes the jewel to glow (see Figure 13.6).

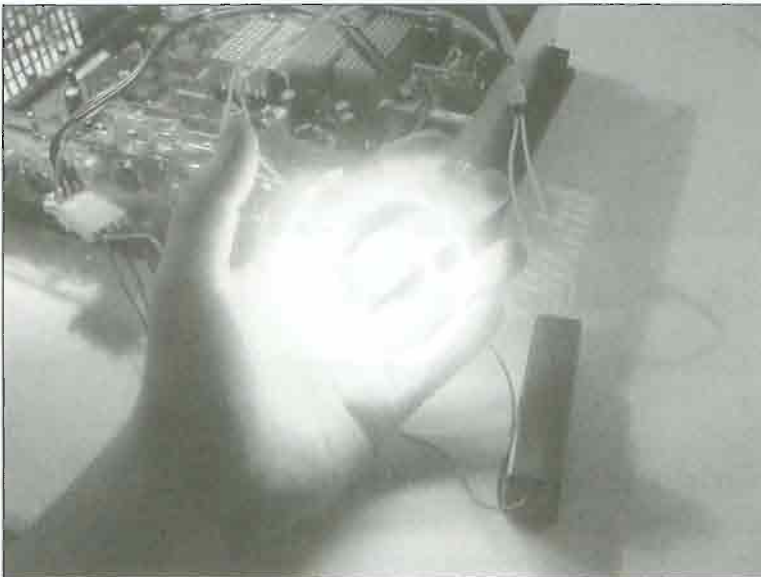
## Removing the Cold Cathode Bulb

The only problem with the circular cold cathode light is the casing, which is too thick to fit under the Xbox case cover. You don't want it being pressed against the drives, or it could crack. The solution is to just remove the actual cold cathode "bulb" from the plastic enclosure, which comes apart easily. You might need to crack some enclosures to extract the bulb. Take care that you don't

damage the bulb itself when removing it from the enclosure. The result is a much smaller light that will easily mount on the underside of the case cover, as shown in Figure 13.7.



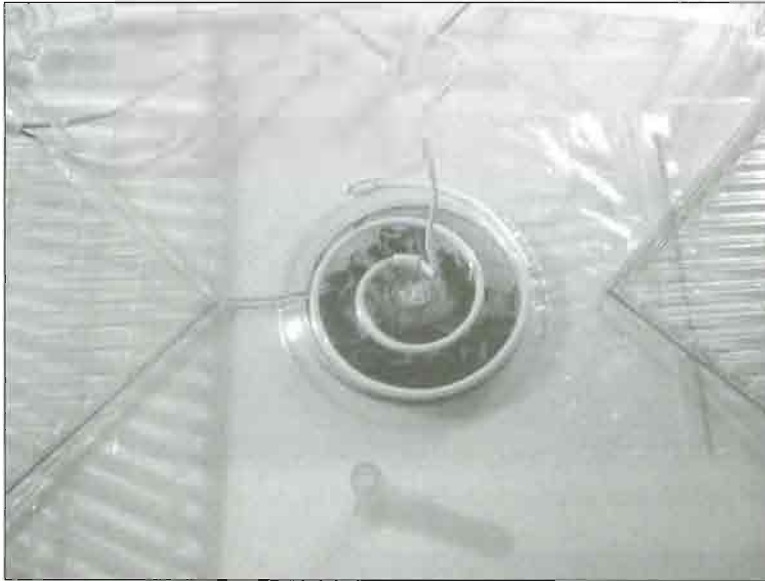
**FIGURE 13.6** Close-up of the cold cathode shining through the custom jewel.



**FIGURE 13.7** The cold cathode light has been removed from the plastic casing.

## Gluing the Light to the Case Cover

The next step is to glue the cold cathode light to the underside of the case cover. I used simple “super glue” available at any grocery or hardware store. Figure 13.8 shows the light mounted to the case cover. A few drops of super glue on the cold cathode tube is sufficient to hold it to the underside of the case.



**FIGURE 13.8** The cold cathode light is glued inside the case cover.

Because I’m going to add some LEDs to the inside of the case, I’ll show you the final result of the case mods at the end of the chapter.

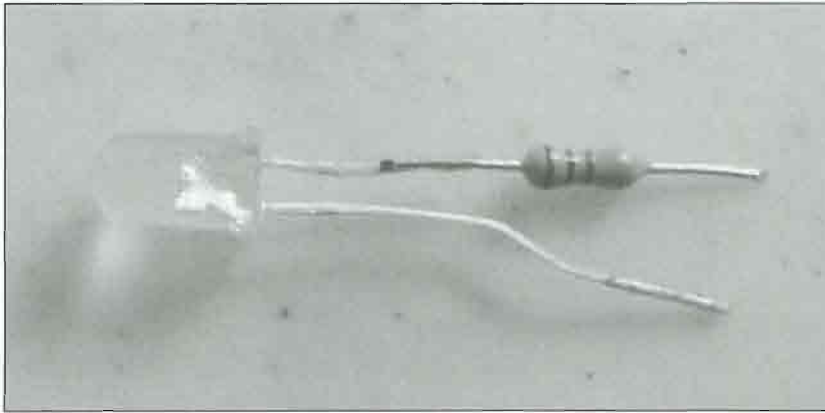
## Custom Lighting with LEDs

You can easily create your own custom case light mods with super bright LEDs, a few resistors, and a spool of wire. There are many colors available for an LED, as a quick perusal of an electronics store will reveal to you. You can buy LEDs individually or usually by the bag full, and in a variety of colors. Figure 13.9 shows an LED with a resistor soldered to the positive lead on the LED.

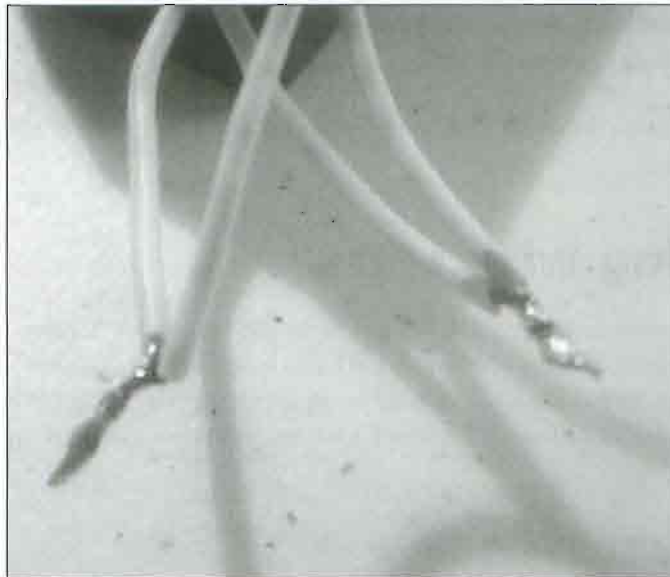
### Creating Your Own LED Light Show

The positive lead is the longer wire on the LED. You need to trim the long wire under the LED and then trim the resistor ends, as Figure 13.9 shows. The resistor works regardless of which

direction it is pointed. I used a 100-ohm resistor, which has a stripe pattern of Brown-Black-Brown-Gold. You can look up the resistor color codes on the Web. Pocket resistor reference books are also available at your favorite electronics store. As long as you “resist” the voltage coming in to the LED, you can connect it to just about any power source inside the Xbox—which are either 5 or 12 volts. You will always want to solder your LED leads to the wires used to connect them to a power source, as shown in Figure 13.10 (after you do a quick power-on test to verify that the LED is working).



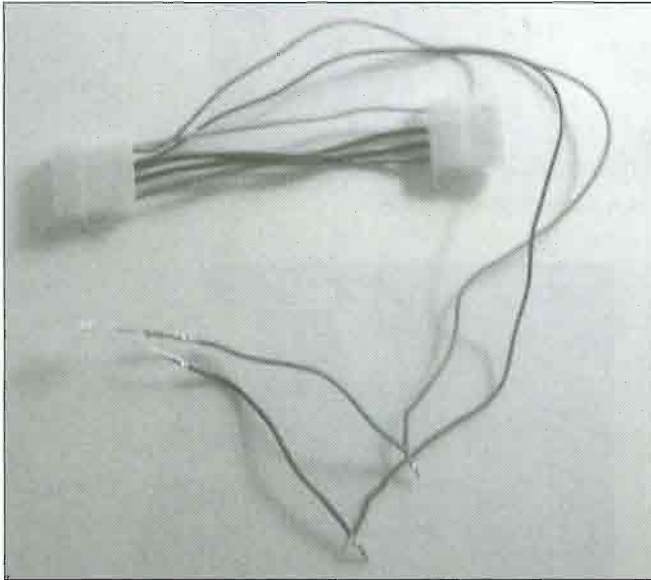
**FIGURE 13.9** A super bright LED with a 100-ohm resistor attached.



**FIGURE 13.10** When you have a working LED, solder the wires together.

## Building the Main LED Wire Loom

You can use a single power cable adapter to provide power to all of the LEDs you want to install into your Xbox case. You can buy a power cable adapter at any computer or electronics store, although you may have to buy a cheap case fan or light kit if the store doesn't carry just the power cable. You will want to trim off any plug at the end of the positive and negative wires and then solder your LEDs to those wires, as shown in Figure 13.11 (part of the wires is exposed for additional LED leads).

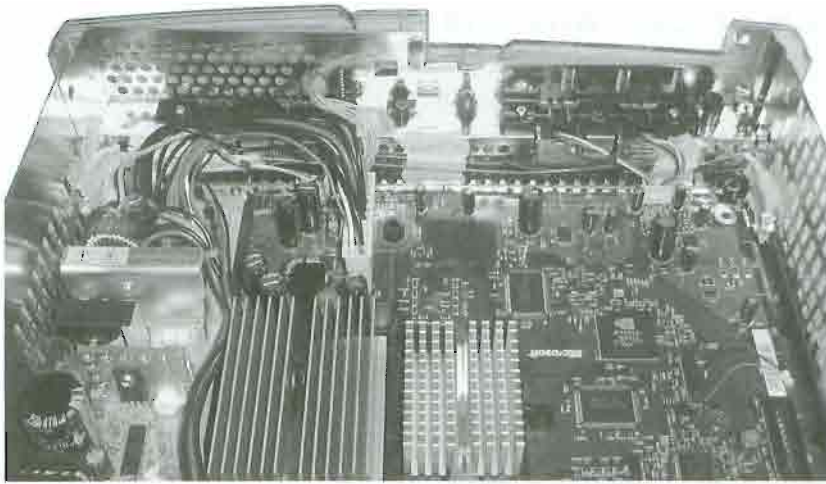


**FIGURE 13.11** The LED is soldered to the power cable adapter.

After adding another LED attached to a longer wire, I installed the two LEDs inside the front of the case, to send the light out through the side case vents, as shown in Figure 13.12.

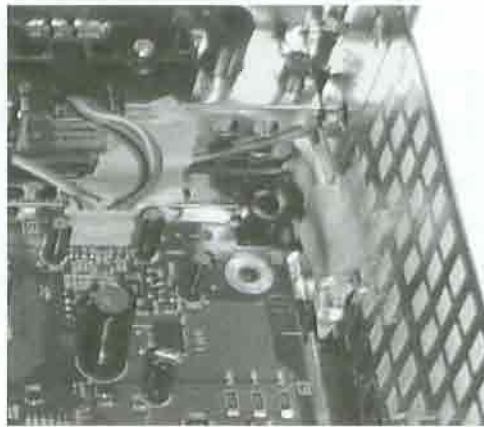
You can see a close-up of the right LED in Figure 13.13. Note how I routed the LED wires down at the bottom front of the case, below all other cables, and taped the positive and negative wires to the inside of the case to keep them from moving around.



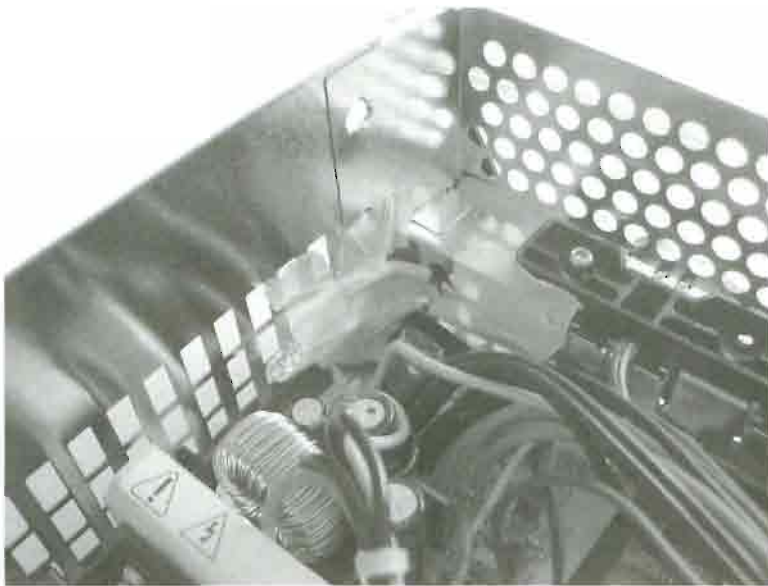


**FIGURE 13.12** The LED assembly is mounted inside the case.

Figure 13.14 shows the left LED taped to the inside of the case. Be sure to keep the wires out of the way of the drive mounts on the bottom of the case; otherwise, you won't be able to get the drives to fit back into the case.



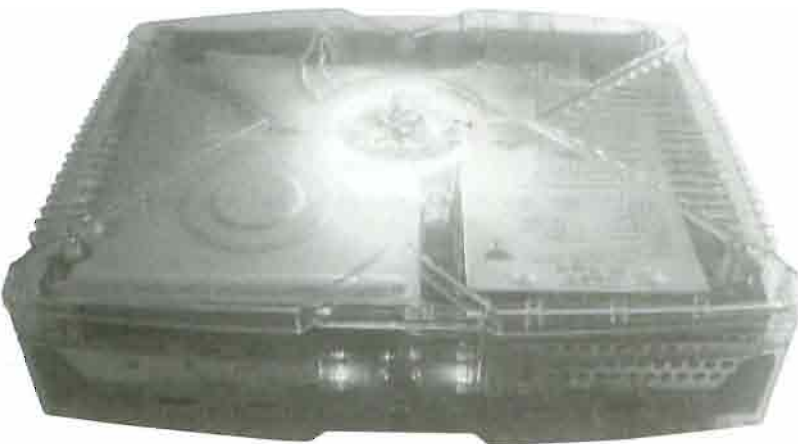
**FIGURE 13.13** Taping the right LED to the inside of the case.



**FIGURE 13.14** Taping the left LED to the inside of the case.

## Putting It All Together

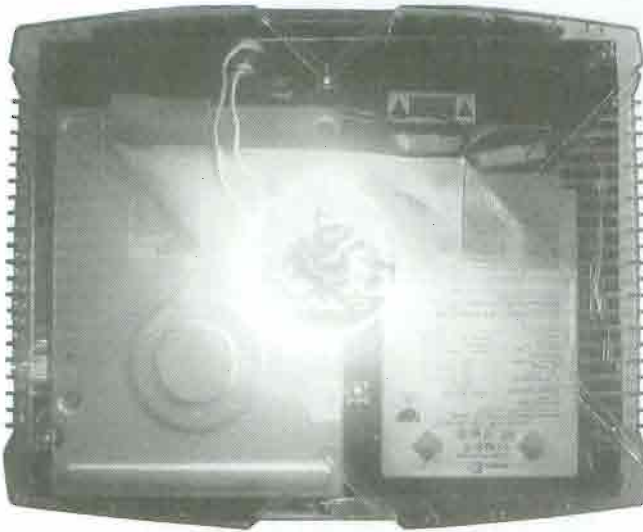
After you install the cold cathode light and the two LEDs, the result is a highly customized Xbox case that looks terrific and just screams “Mods Inside!” Take a gander at Figure 13.15.



**FIGURE 13.15** The side-vent LEDs and cold cathode light are installed.

## Examining the Cold Cathode Light

You will also obtain very good results with a stock (black) Xbox case, because the side vents allow light to pass through. However, you will need to replace the stock system jewel (on top) with a new jewel to really see a cold cathode light under the case cover, in order to achieve a result similar to the one shown in Figure 13.16), because the stock case jewel is opaque. As an alternative to replacing a stock jewel, you should consider buying an aftermarket case or finding a “Halo Special Edition” case, which is also translucent and looks fantastic with light mods installed!

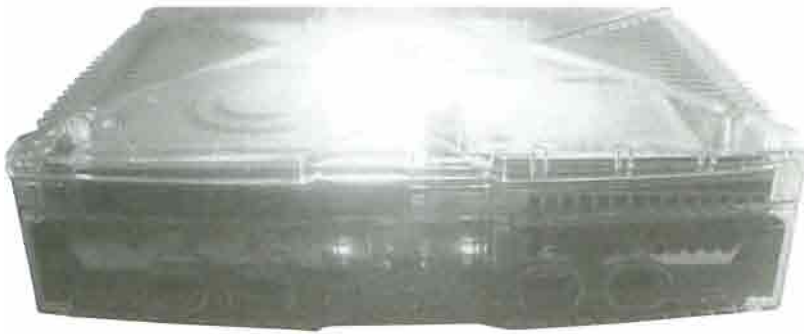


**FIGURE 13.16** The glowing case jewel is really bright!

There is another option that you might consider if you purchase an aftermarket case like I have used as an example here. These cases are UV (ultraviolet) sensitive, meaning the case will react if you install a UV light. I have used cold cathode here, but a UV light has more of an ambient glow to it, especially when the case is UV sensitive! Figure 13.17 shows the clear case with *some* UV reaction showing, especially on the right side (in color it looks somewhat purplish).

## The Custom LEDs

Let's take a look from the right side of the case to see how the LEDs turned out. As you can see from Figure 13.18, the right LED is not only glowing inside the case, but shining its light through the case vent and reflecting off the side of the case, exactly like I was hoping it would!



**FIGURE 13.17** View of this heavily modified Xbox from the front.



**FIGURE 13.18** This LED is shining through the right case vent.

The other side of the case is actually a different color than the right LED (blue and green).

## Summary

I have shown you only a small example of the light mods you can do with your Xbox to greatly enhance the appearance of your Xbox case. Cold cathode is definitely an impressive look but may be too strong for the taste of some. Ultraviolet is a great option that you should definitely consider if you have invested in an aftermarket clear case (especially if it is in a designer color rather than my “regular” clear case). After you have learned how to construct an LED loom (with a 100-ohm resistor and wires), there is no limit to the creative work you can render in your Xbox using LEDs in a variety of colors.



# Cooling Down Your Xbox

Here are the key points covered in this chapter:

- Software cooling solutions
- Active cooling solutions

One thing that many modders take for granted is the thermal condition of their Xboxes. In the rush to install a mod chip, a new hard drive, and case lighting, many assume that the Xbox will run with the same operating temperature that it ran in the stock configuration. However, modifications to the Xbox tend to decrease airflow within the case, which is critical to cooling and based on the limited dimensions of the case's design. Therefore, if you have modified the Xbox case airflow dynamics in any way, you will want to install an active cooling solution to counter the heat buildup that may occur.

## Software Cooling Solutions

Depending on your Xbox's configuration, you may get away with software-based thermal management, which basically means that you can adjust the speed of the Xbox case fan to improve cooling. By default, the Xbox fan runs at 20% of full speed. This means that if the fan is rated at 7,500rpm, the Xbox utilizes it only at 1,500rpm. This minimal setting was

designed to keep the Xbox cool—but also *quiet*. The fan is quite loud when running at a full speed of 100%.

## Setting Fan Speed in BIOS

You can control the Xbox case fan in two ways using software: by setting the fan speed in the BIOS or by using a Dashboard (or other program) to control the fan. You can use XBtool to set the default fan speed that will be maintained unless a program adjusts the fan (see Figure 14.1).

### CAUTION

A fan speed setting of 10% is negligible and may lead to overheating your Xbox, which could damage components. A fan speed of at least 20% is advisable, and I recommend 50% to keep your Xbox cool with aftermarket parts installed.

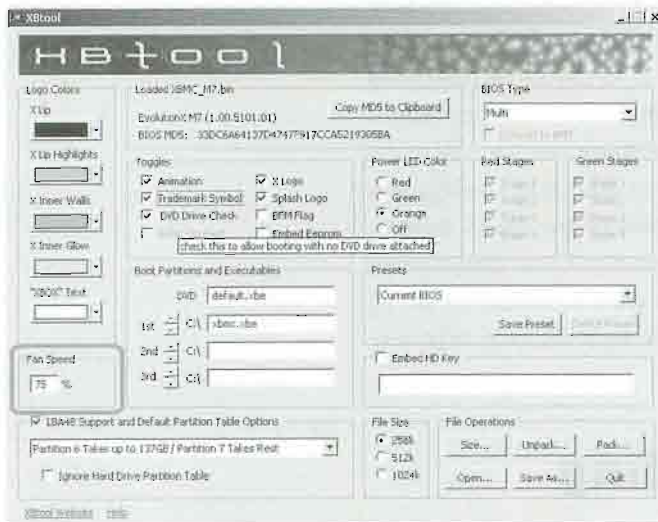


FIGURE 14.1 Setting the default fan speed in the BIOS.

If you would like to perform some tests on your Xbox with various fan speed settings, you can come up with a good setting that meets your Xbox usage habits. If you use it as a media center and file server, you may want to increase the fan speed and/or install a secondary fan.



## Setting Fan Speed in XBMC

Xbox Media Center is one Dashboard that includes a temperature setting, allowing you to adjust the fan speed directly. Figure 14.2 shows the System Settings screen (which you can open by going into Settings, General, System). You can set a reasonable temperature here (such as 135° F), and XBMC will adjust the fan speed, like a thermostat.

The second fan control option in this screen is a direct fan speed control setting, shown in Figure 14.3. This setting can be adjusted from 10% to 100%.

You can monitor the fan speed from within most Dashboards. In Xbox Media Center, go to Settings, System Info, to see the screen shown in Figure 14.4. Here, you can see the temperature with the fan set to 10%. The highest I have ever recorded in my Xbox is 145° F, which is not dangerously high but could contribute to your Xbox components wearing out sooner (especially the hard drive). You really don't want to *see how high you can take it* because plastic parts inside the Xbox (including wire



**FIGURE 14.2** Setting the Auto temperature control in XBMC.

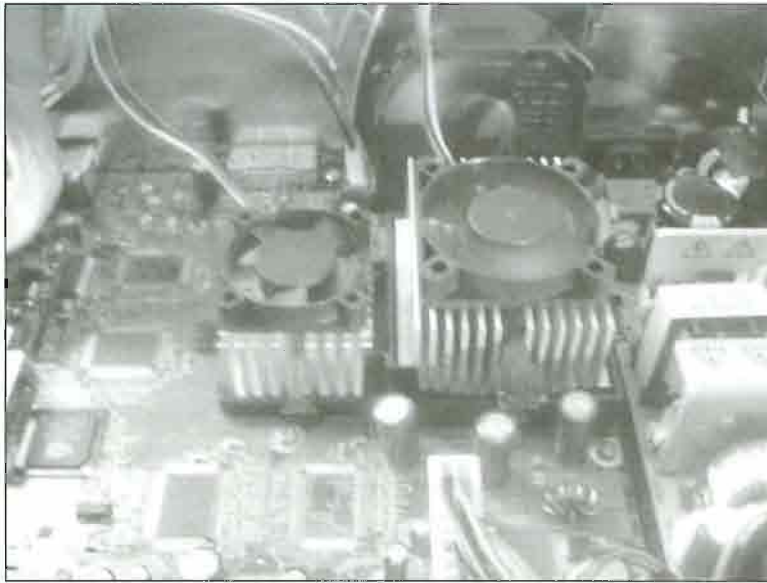


**FIGURE 14.3** Setting the fan speed directly (by percentage) in XBMC.



ambient temperature in the case, which contributes to heating up all the other components, as well as decreasing the life of the hard drive itself. Hard drives will deteriorate *rapidly* if they overheat, and that is the number one reason why hard drives fail.

Just for fun, I'd like to show you what active cooling will do for the CPU and GPU. I moved the drives out of the way and plugged in two small fans, one on each heatsink, as shown in Figure 14.6. The bigger fan is 60mm wide, and the smaller fan is 40mm wide. This is not a permanent configuration, although it is food for thought, as you might consider a case modification in order to accommodate active cooling.



**FIGURE 14.6** Did someone forget to install these in my Xbox?

I configured Xbox Media Center to run the fans at 100%, which pushes them to their rpm limits, and then recorded the temperature drop with a total of three fans running in the case (the original case fan and the two smaller fans sitting on the heatsinks). The result is very encouraging, if only there was room to mount these fans. The drives don't fit with the fans in place, but I'm certain that a 40mm fan could be placed *beside* the CPU to blow air onto the CPU heatsink from the side. If you want to do something like this, I recommend a few drops of glue from a hot glue gun to keep the fan in position.

The resulting temperature drop with the two additional fans is dramatic, as you can see in Figure 14.7. The temperature dropped from 145° F to 125° F by maximizing the fan output. The temperature was further dropped to 107° F for the CPU and 96.8° F for the GPU with active cooling! Why would you want to do this if the Xbox was designed to run as-is? Because modding

introduces changes to the closed architecture, and the addition of lighting, a mod chip, and a high-speed hard drive increases heat, so every attempt to cool it down will add to the longevity of your Xbox.

## Hard Drive Cooling

If you have upgraded your hard drive to a large-capacity drive, but it is not one of the *faster* models—such as a 7,200rpm drive—you can probably get away without adding a fan to cool off the drive. But if you have upgraded to a 7,200rpm drive like the one I installed in the Xbox fea-

tured in this book, it *definitely* needs cooling. The trick to cooling is sucking heat away from something, not just throwing cold air *at* something. The key word here is *airflow*. Consider the effect of the water-cooling systems available for PCs. The whole point of a water-cooling system is to suck heat *away* from the components by flowing water across a metal surface that is mounted to a processor. When the water flows over the metal surface, heat is transferred to the water, which carries the heat away. One hopes there is enough water circulating in the water-cooling system to allow the water to cool before it comes into contact with the hot components again.

An active *air-cooling* system is a lot easier to deal with than water-cooling because no sealed hoses and pumps are required. Usually, an air-cooling system simply involves the use of one or more high-speed fans that blow air *onto* components as well as directing air *out* of the case.

## Finding Room in the Case

As far as I can tell, the *only* realistic place to put an intake fan inside the Xbox case is right behind the DVD-ROM drive. This will require you to drill holes in the metal liner inside the case so the fan will be able to draw in air from outside. You might even want to cut out a hole in the



**FIGURE 14.7** Active cooling drops the CPU and GPU to “touchable” temperatures.

### CAUTION

The Xbox power supply has a built-in surge suppressor that will shut off the power (using a strong relay) if the power fluctuates by even a small percentage. You must not plug and unplug fans and lights and so forth with the power *turned on*, or the Xbox will shut down. This is generally a *bad thing* and could lead to damaged components in your Xbox. Power loss is especially harmful to the hard drive.

metal liner using a drill, Dremel, or similar tool (after disassembling the Xbox, of course) to provide the maximum amount of airflow into the case. You would then mount a fan in an orientation that sucks air *into* the case.

Despite the good location and available room, I have opted in this chapter to install a hard drive cooling fan instead. I would encourage you to do *both* if you wish: an intake fan behind the DVD-ROM drive and a small fan to cool the hard drive. Both options will increase air circulation within the case. Just be sure your fans don't draw too much juice from the Xbox power supply.

## Installing a Hard Drive Cooling Fan

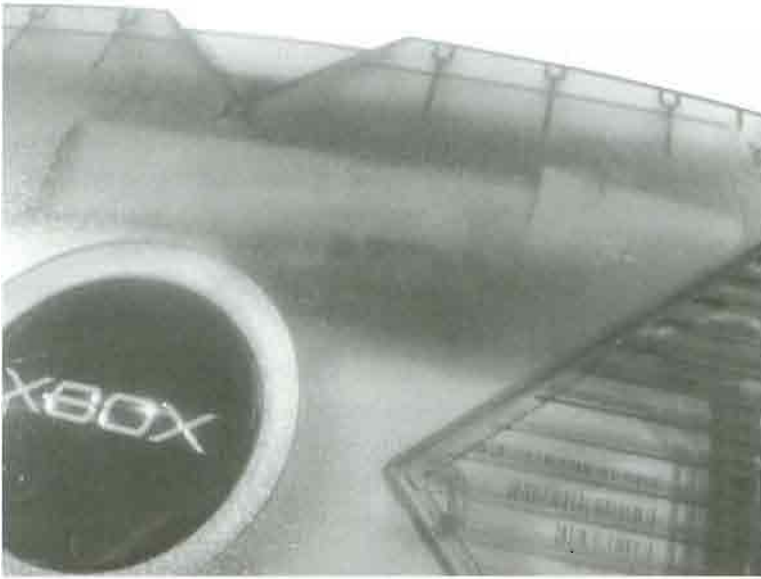
The minimal cooling solution should at least include a small fan to cool off the hard drive, which can get very hot when in constant use (especially the high-rpm models). Even if you have installed a 5,400rpm drive, a hard drive fan will increase the life of this otherwise relatively cool-running drive (because every degree of heat contributes to eventual failure in an electromechanical device).

A 40mm fan fits quite snugly in the hard drive tray with the case cover in place. You may want to mount one or two small fans like the one shown in Figure 14.8 behind the hard drive (because two would do an even better job at cooling).



**FIGURE 14.8** A new high-performance hard drive upgrade requires active cooling.

As you can see from Figure 14.9, the 40mm fan fits underneath the case cover with a little room to spare. A fan this size is very convenient for Xbox cooling because you can find many places inside the Xbox case where such a small fan will fit without getting in the way of other components (such as the two large drive trays).



**FIGURE 14.9** The 40mm fan is small enough to fit beneath the case cover.

## Summary

This chapter provided just a brief summary of the cooling options available for the Xbox. It is a good idea to add one or more fans to the inside of your Xbox case if you have modded it because heat will eventually wear out components like hard drives, especially if you use your Xbox for long periods at a time. You may not notice any component damage at first because heat damage is not immediately noticeable. Adding a fan or two under the Xbox hood will ensure that your Xbox runs reliably and consistently cool for years to come.

# Xbox Resources

This appendix provides a list of online resources that should provide you with additional information that you may refer to in the event that you encounter a problem or additional Xbox mods not covered in this book. This list is by no means complete, but does represent the main sites I visit most often.

## Xbox Information Sites

**Xbox 365.** <http://www.xbox365.com>. Nice Xbox fan site with an *underground* feel to it.

**Official Xbox Magazine.** <http://www.officialxbox-magazine.com>. Since it's "official," this magazine is definitely *not* XBN, the "unofficial" Xbox magazine. Good content with fair reviews.

**Official Xbox Site.** <http://www.xbox.com>. The official Xbox home site on the Web.

**The Xbox Reporter.** <http://www.xbreporter.com>. Reports on the latest Xbox news and provides articles about Xbox games, hardware, and accessories.

**IGN Xbox.** <http://xbox.ign.com>. Online magazine that covers all things related to the Xbox and provides game reviews.

**Team Xbox.** <http://www.teamxbox.com>. Good breadth of information about Xbox hardware, software, game reviews, rumors, and news.



**GameSpy Xbox.** <http://xbox.gamespy.com>. Mainly dedicated to game reviews and rumors that almost never come true, but good overall content.

**Xbox Gamers.** <http://www.xboxgamers.com>. An attractive Xbox fan site with news, rumors, previews, reviews, and interviews.

**Xbox Nation.** <http://www.xbnmag.com>. A good alternative magazine (full color, glossy, retail) dedicated to the Xbox.

**Xbox Scene.** <http://www.xbox-scene.com>. Contains a wealth of information for Xbox modding.

**Xbox Solution.** <http://www.xboxsolution.com>. Nice fan site with personal reviews, surveys, and blog-style comments.

## Mod Chip Manufacturers

**SmartXX.** <http://www.smartxx.com>. Manufactures the SmartXX mod chip.

**Team Xodus.** <http://www.teamxodus.com>. Manufactures the Xenium mod chip.

**Team Xecuter.** <http://www.teamxecuter.com>. Manufactures the Xecuter mod chip.

## Xbox Hardware Sites

**American Xbox Mod Chips.** <http://www.americanxboxmodchips.com>. Despite the obnoxious name, this site offers all of the Xbox mod chips at reasonable prices.

**Custom Xbox Cases.** <http://www.customps2.com>. Sells aftermarket “clear” cases in the following translucent colors: crystal, blue, yellow, orange, and green.

**ModChip.com.** <http://www.modchip.com>. Offers all available Xbox mod chips for sale at competitive prices.

**Mod Chip Man.** <http://www.modchipman.com>. Offers mod chips and other hardware accessories for sale.

**NewEgg.com.** <http://www.newegg.com>. Good source for Xbox-compatible hard drives at a good price, usually with free shipping.

**Xbox Chips.** <http://www.xbox-chips.com>. Xbox mod chip online store and information site.

**Xbox Hackz.** <http://www.xboxhackz.com>. A hardware site providing information about Xbox mod chips and related information.

## Xbox Software Sites

**Avalaunch.** <http://www.teamavalaunch.com>. Home site for the Avalaunch Dashboard with online documentation and screenshots.

**EvolutionX.** <http://www.evolutionx.info>. Home site for the EvolutionX Dashboard, with online documentation, forums, and version information.

**Xbox Linux.** <http://www.xbox-linux.org>. All the information you need to install and run Linux on your modded Xbox.

**Xbox Media Center (XBMC).** <http://www.xboxmediacenter.com>. Home of the XBMC Dashboard/application for your modded Xbox.

**Xbox Saves.** <http://www.xbox-saves.com>. Provides a database of saved games that are available for download.

**Xenium O/S.** <http://www.teamxodus.com>. Information and downloadable manuals for the Xenium O/S (pre-installed on Xenium mod chips).



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# THE BLACK ART OF XBOX® MODS

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**Jonathan S. Harbour** has been an avid gamer and programmer for 17 years, having started with early systems such as the Commodore PET, Apple II, and Tandy 1000. The first console he disassembled and tried to hack was the Atari 2600. He holds a degree in computer information systems and enjoys writing code in several languages. Jonathan has experience with several platforms, including Windows, Linux, Pocket PC, and Game Boy Advance. Jonathan has written nine books on the subjects of game programming, application development, console programming, cross-platform programming, and console modding. He maintains a website dedicated to these subjects at <http://www.jharbour.com>.

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