Getting Started

You can take the Apple Leopard Install DVD, insert it in your DVD drive, and start trying to install Leopard on your computer. Unless you are using a genuine Macintosh, you are unlikely to succeed, and you won't get the best experience of Leopard possible.

Many people have combined their expertise and experiences so those who follow can take a shorter path, bypassing many of the pitfalls. Why not capitalize on this experience?

In this chapter, you learn how to find out exactly what hardware your computer contains so you can be sure whether Leopard will run on your computer. You complete a table showing your hardware so you can find and use the additional resources you need. This becomes important in later chapters.

Determining Your Computer Hardware

Before you start trying to install Leopard, you should find out what hardware is inside your computer. The Windows Device Manager built into Vista and XP tells you most of the information you need to know; however, the *System Information for Windows* (SIW) software makes this very easy.

Although SIW shows details of all the software on your computer, you are interested only in the hardware details.

SIW was written by Gabriel Topala and is freeware for individual use. At the bottom of the download page is a link saying "If you like SIW, you can buy me a coffee." Click the link to send him a donation via PayPal.

To download and install this software, follow these steps:

1. **Point your Internet browser to** www.gtopala.com/.

2. **Click Download SIW.**

**3.** **When the file has downloaded, install the software.**

If you use Internet Explorer, click Run; if you use Firefox, click Save.

SIW adds itself to your programs list, available through the Start menu.

Figure 1.1 shows the start screen for System Information for Windows. The left pane is a collapsible list showing Software, Hardware, and Network components. To collapse a part of the list, click the – (minus) sign beside the major heading. To expand it again, click the + (plus) sign.

Figure 1.1

System Information for Windows—start screen
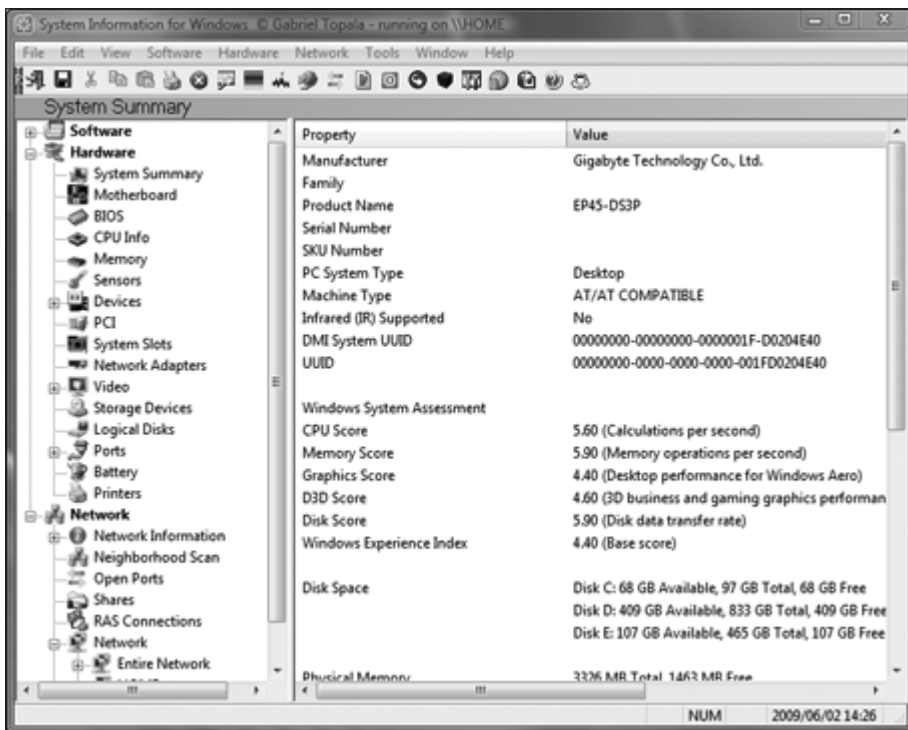
In the remaining parts of this chapter, you use SIW to find the information to complete the following table of hardware in your computer.

When you have completed Table 1.1, you will have enough information about your computer to know whether you are likely to be able to install and run Leopard.

Table 1.1 Your Computer Components

Item	Description
Motherboard	
Processor	
Display adapter	
Network (wired)	
Network (wireless)	
Sound	
Printer	
Other peripherals	
Webcam	
Scanner	
Others	

Finding Specifications for Your Motherboard

The most important part of your computer specification is the motherboard. This is sometimes called the mainboard, and it's where the processor chip plugs in. It also holds the BIOS (Basic Input Output System) chip, which is the very lowest level of interaction between your software and hardware.

Most motherboards also contain the sound and networking chips; some also contain the graphics chips.

You need to know details of the motherboard and the BIOS. To find the motherboard details, follow these steps:

1. **Click the – (minus) sign beside Software.**

This collapses the Software part of the list and brings you to the Hardware details.

2. **Click Motherboard.**

3. **Read your motherboard details from the right pane, and write them in the table.**

4. **Read your BIOS details on the next line, and write them in the table.**

When I clicked Motherboard on the computer I used to write this, I found the following:

Manufacturer	Gigabyte Technology Co., Ltd.
Model	EP45-DS3P

When I clicked the BIOS line, I found the following information:

BIOS vendor	Award Software International, Inc.
BIOS version	F8
BIOS date	09/30/2008

Now you can fill in the first line of your table. Here is my table as an example:

Motherboard	Board: Gigabyte EP45-DS3P BIOS: Award F8 09/30/2008

Finding Your Processor Specifications

In this section, you use SIW to find your processor specifications.

1. **Using SIW, highlight the next line to find your processor specifications.**

On my computer, SIW showed me the following information:

CPU full name	Intel(R) Core(TM)2 Duo CPU E8400 @ 3.00 GHz

For my computer, this would be the next entry in the table:

Processor	Intel Core Duo E8400

You can now fill in that line in your table.

Working with older processors

For compatibility with older software, modern processors still have to work with instructions from earlier processors. In order to speed up processors, Intel developed the technique of using one instruction to operate on more than one set of data. This allows the code required to be much smaller so that, rather than having one set of instructions for each bit of data, one instruction works with all of them at once, effectively carrying out operations in parallel—hence the speed gain.

This technique is called Single Instruction, Multiple Data (SIMD). It is especially useful in putting graphics on the screen because several pixels can be processed at once.

SIMD comes in several versions, the most recent being SSE2 and SSE3. SSE stands for Streaming SIMD Extension. You don't need to understand exactly what that means, but you do need to know whether your processor can do it.

SSE2 was introduced in 2001, and SSE3 was introduced in 2004. Leopard cannot run on processors that don't support at least SSE2 instructions, and preferably SSE3.

While you are still on CPU Info, look down the right pane until you come to the line called Instructions. SIW shows you the instructions that your processor can process. This is the result for my computer:

Instructions	MMX, SSE, SSE2, SSE3, SSSE3, SSE4.1, ET64, XD, VMX, SMX, EST

Using an early Pentium chip

Pentium chips made since the Pentium 4 released in 2001 have supported SSE2, but SSE3 was not supported until 2004. If your chip was made before 2001, you can be almost certain that it is not capable of running Leopard.

Chips made after 2006 can almost certainly be made to run Leopard, though the task may not be simple. The most compatible chips are those of the Intel Core 2 family (either Core 2 Duo or Core 2 Quad) because Apple uses these chips in its own branded computers.

Finding Specifications of Your Video Setup

After the processor and the motherboard, the most important component for Leopard is your graphics chip. Unless it is reasonably fast and uses hardware acceleration, you can't get the full graphics effects of Leopard. Your graphics chip should also use its own memory, rather than using the main computer memory. However, almost any video setup allows you to use Leopard.

Since the Intel Macs were released, Apple has used a small range of video processing chips. The most common is the Intel GMA950 series, which has appeared in many of Apple's laptops and Mac Minis. Other chips that have been used are either nVidia or ATI.

Manufacturers supply two types of video: integrated into the motherboard or a separate graphics card. Where the chip is integrated into the motherboard, it usually uses shared memory. This means part of the main system memory is used for video.

The advantage, for the manufacturer, is that it saves on a separate video card, especially in a laptop where space is at a premium; the disadvantage is that you are stuck with that chip's performance.

Using a separate video card

1. **In System Information for Windows, click Video in the left pane.**

This shows the name of your display adaptor.

For my computer, SIW shows:

Display adapter	NVIDIA GeForce 7600 GS

What this doesn't show is whether your video is generated from a separate card or if it's on the motherboard. If your computer is a desktop, it likely uses a separate graphics card. If your computer uses a separate video card, the card has its own memory onboard. In Windows XP, this is the amount of graphics memory available, but in Windows Vista, the system can steal some of the main memory as well as its own to increase the memory available to the video card.

A graphics card with its own memory is the ideal situation because it can then function as a separate entity, without you worrying about whether the processor is trying to access the motherboard memory at the same time. This means it is highly likely (but not certain) that you can use the full power of the Leopard graphics: Quartz Extreme and Core Image.

Using integrated video

If your computer is a laptop, it almost certainly uses integrated video. If Apple has used that chip then you will get good graphics performance. For older chips it's a bit of a lottery: if it is popular enough then someone will develop drivers for it.

Unfortunately, I can't talk in certainties about graphics performance; all I can say is that most likely you can see graphics regardless of what your graphics processor and memory are. But the quality and speed depend completely on the exact specifications of your display adapter.

For my computer, the next line of the table is:

Display adapter	NVIDIA GeForce 7600GS

Finding Your Audio Hardware Specifications

Apart from wireless networking, sound is the most difficult area to get working. Sometimes manufacturers even give incorrect specifications for their sound chips, which makes configuring sound even harder than it should be!

SIW gives information about your sound hardware, although it doesn't have a separate heading. Follow these steps to find the info:

1. **In the left pane of SIW, click the + (plus) sign beside Devices.**

2. **Click the + (plus) sign beside Sound, video, and game controllers.**

3. **Look for the word Audio, and click it.**

Figure 1.2 shows the information that SIW gave me for my computer.

Figure 1.2

System Information for Windows—audio
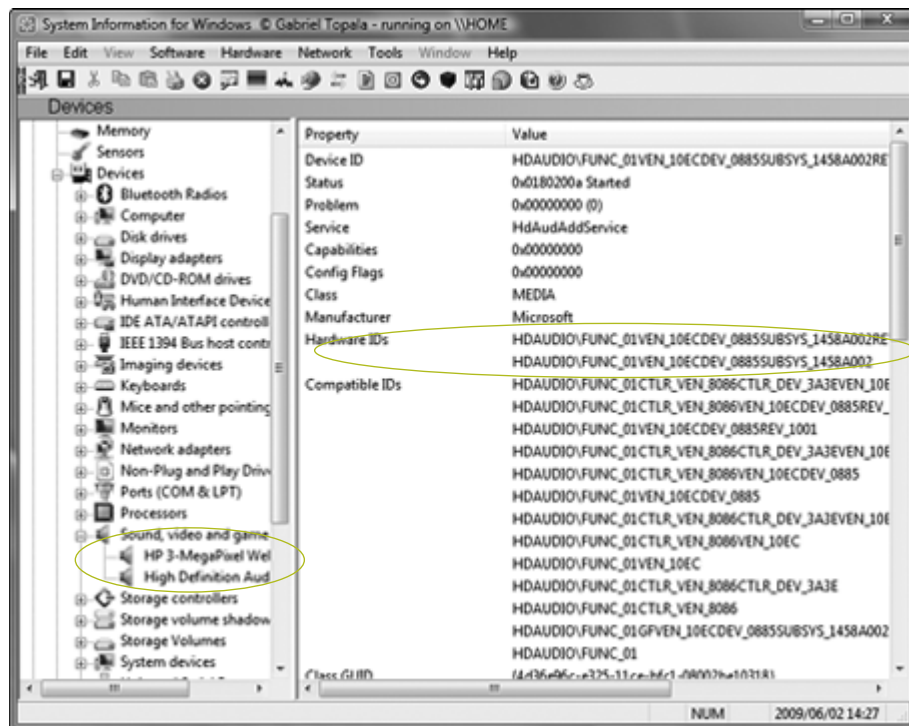
Because my computer has a Bluetooth dongle for synchronizing with my mobile phone, it shows three entries for Bluetooth audio, but we can ignore that.

My main audio is the Realtek High Definition Audio. This is a generic term, much like saying that your car has disk brakes: That's nice to know, but it's not much help if you want to replace the pads. Realtek uses many different sound chips, as do other audio output manufacturers.

When your motherboard was installed, the correct drivers for Windows were installed. These are supplied on a CD that comes with your computer. But, sadly, that CD is useless for Leopard. You need to dig much deeper to find drivers.

Look in the right pane to the Device ID. In this case, the Device ID line is:

Device ID	HDAUDIO\FUNC_01VEN_10ECDEV_0885SUBSYS_1458A002REV_1001

You need to divide this information into parts before you can find out exactly what your audio system is.

Following "HDAUDIO\FUNC_01" are the letters VEN followed by four characters. This is the vendor (manufacturer) ID. In this case, the characters are 10EC, which is a hexadecimal number.

1. **Write this number in the second column of the following table in the Vendor ID row.**

You can ignore the HDAUDIO\FUNC_01 part.

Vendor ID	
Device ID	

Immediately following the vendor ID is the device (DEV) identifier. This is another four-digit hexadecimal number—in this case, 0885.

2. **Write this number in the following table in the Device ID row.**

As an example, here is the table completed with my details:

Vendor ID	10EC
Device ID	0885

Finding the manufacturer

To find the name of the vendor and the device, search in the PCI database at `www.pci database.com`.

Searching for vendor 10EC shows that the vendor is Realtek, which we knew from the SIW display.

Finding the device name

Searching on 0885 shows that the device is a "7.1+2 Channel High-Performance HDA Codec with Content Protection," which doesn't get you much further!

Follow these steps using the table in the online database:

1. **Click the Realtek Semiconductor link.**

This lists all the devices made by that manufacturer.

2. **Look down the Device ID column to 0x0885, which shows that the device is an ALC885.**

This becomes important later when trying to find drivers.

Interestingly, in its promotional literature, Gigabyte (the motherboard manufacturer) identifies it as an ALC889A, which is not correct. It's hard enough installing Leopard without manufacturers giving you incorrect information!

This line in the table becomes:

Sound	Realtek ALC885

Fill in the appropriate line in your own table.

Finding Your Networking Hardware Specifications

Now you need to find the specifications of your networking hardware. Your computer may have both wireless and wired networking abilities, as mine does. If you are going to use only one or the other, you can skip one part.

Using System Information for Windows again, follow these steps:

1. **Click the – (minus) sign to close the Sound, video, and game controllers line.**

2. **Click the – (minus) sign to close the Devices line.**

3. **Click Network Adapters.**

This shows all the network adapters that have been used on your computer. Figure 1.3 shows a display of networking hardware for my computer.

System information—network adapters
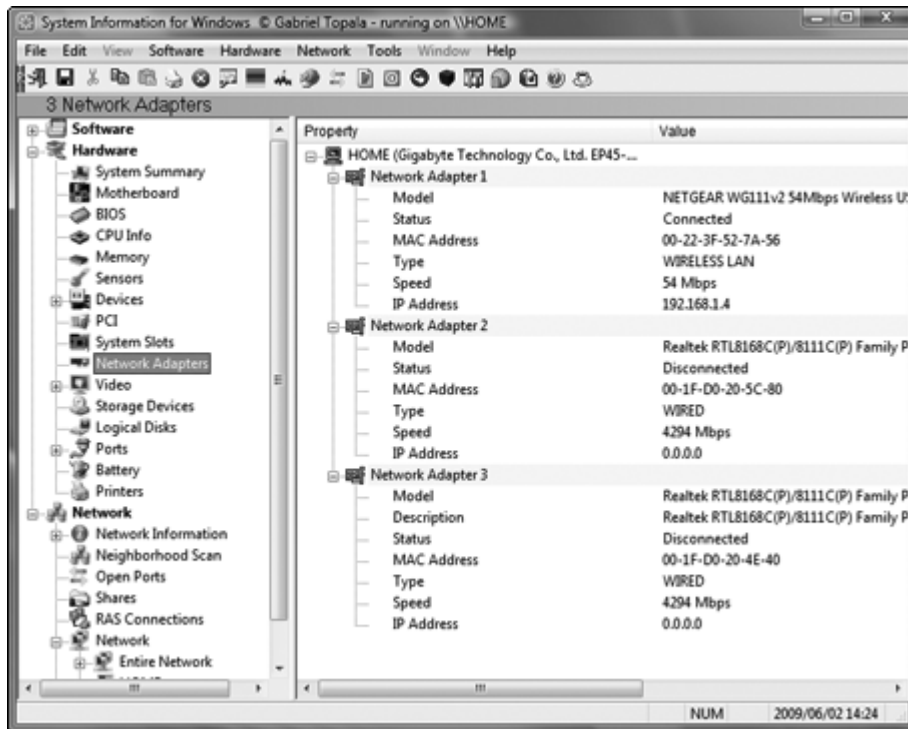
My computer has three network adapters: one wireless and two wired. Adapter 1 is my wireless adapter, and 2 and 3 are the adapters built in to the motherboard.

The primary network connector in use is the ASUS USB wireless adapter.

Wired networking

My motherboard has two wired network adapters, both Realtek RTL8168C. This is a common network adapter chip and is highly likely to work with Leopard.

Adding another line to the hardware list for my computer, we now have:

Network (wired)	Realtek RTL8168C

Add the appropriate information for your own computer to your table.

Wireless networking

Getting wireless networking to work is one of the most difficult parts of building a Hackintosh. Apple uses basically the same wireless adapter, with its chip made by Broadcom, in all its computers. If you can use that, you should have no problems. But, and it's a big but, finding what chip your wireless adapter uses is not easy, nor is finding wireless network adapters using the same Broadcom chip, or even finding wireless adapters that work at all, mainly because of a lack of drivers.

After all, if almost every Mac comes with built-in wireless networking, what incentive do manufacturers have to develop drivers to make them work with a Mac?

SIW and the Windows Device Manager list my wireless adapter simply as ASUS USB Wireless Network Adapter. You need to find out what model it is.

This should be relatively easy: Look on the box it came in or on the device itself. The box for this adapter is labeled WL-167G. You would expect to be able to go to the manufacturer's Web site and download the appropriate drivers.

A Google search on WL-167G shows that it's made by Asus. Digging deeper shows a single driver for Mac Leopard, dated 15 September 2006, and it supports only OS X 10.3 and 10.4 (Panther and Tiger) but not Leopard.

Using the Properties panel in the same way as you did for the sound, the hardware vendor ID is 0b05 and the device ID is 1723.

Again, you need to dig a bit deeper! Several Hackintosh Web sites often (but not always) have answers to questions about drivers. All sites have a search facility, but some work better than others.

One way to improve your success is to use a targeted Google search. To do this, add the name of the site at the end of what you're searching for. This restricts the search to that site only.

Let's search for information about the device on `insanelymac.com`. To do this, type **WL-167g site:insanelymac.com** into Google.

You end up with lots of queries about the device from users, and maybe you will be able to get drivers that way. The end of this chapter features a list of useful Hackintosh sites.

The next line in my table reads:

Network adapter (wireless)	ASUS WL-167G USB

Fill in the table with your own details.

Finding Your Other Hardware

All the other hardware, if it is relatively recent, should have drivers available at the manufacturer's Web site because the hardware can be connected to a genuine Apple Macintosh. Nevertheless, enter the identifiers into the table.

For my computer, the table now looks like Table 1.2.

Table 1.2 Hardware for my Computer	
Item	*Description*
Motherboard	Board: Gigabyte EP45-DS3P BIOS: Award F3 05/29/2008
Processor	Intel Core Duo E8400
Display adapter	NVIDIA GeForce 7600GS
Network (wired)	Realtek RTL8168C
Network (wireless)	ASUS WL-167G USB
Sound	Realtek ALC885
Printer	Fuji-Xerox FX203A
Other peripherals	
Webcam	HP 3-MegaPixel Webcam GX607AA
Scanner	Epson Perfection 1670
Bluetooth	Broadcom Bluetooth 2.0+EDR USB dongle

Determining Your Hardware Compatibility

Now that you have listed all the devices, it's time to find out how compatible they are with Leopard. Remember that this is not an exact science; it relies on other people contributing to help the whole community because no support is available from Apple.

Although your exact hardware may be shown as compatible, almost invariably you'll encounter small glitches. Of course, your hardware may not even be shown in the lists.

Hardware compatibility lists (HCL) are found on the OSX86 Project Web site at `http://wiki.osx86project.org/wiki/index.php/Main_Page`.

Several compatibility lists exist, but the most complete at the time of this writing is the list for Leopard 10.5.2.

If you are using a name-brand desktop or laptop, you can go straight to the appropriate table by selecting either Portable Computers or Desktop Computers. These are listed alphabetically by manufacturer. Figure 1.4 shows part of the list for desktop computers.

Figure 1.4

Hardware compatibility list for systems

If your exact computer is listed, you are halfway there! Click the link, and read what people have said about installing and running Leopard on your computer.

Under the heading Graphics, "no QE/CI" means that hardware acceleration (Quartz Extreme, Core Image) does not work, which affects the way images are displayed in Time Machine, wDashboard, and other Mac applications, for example.

If your particular computer is not listed in the HCL for 10.5.2, check the other lists, up to 10.5.6 at the time of this writing. If you still can't find it, you need to look up each individual component.

Finding my motherboard

Unfortunately, I found no exact matches for my motherboard. These are close:

Compatibility List for Leopard Version	Motherboard
10.5.1	GA-EP35-DS3P, GA-EP45-DS4P
10.5.2	GA-EP45-DS3, GA-EP45-DS3L, GA-EP45-DQ6
10.5.4	GA-EP45-DS4

After reading the user comments about each of these, I can reasonably conclude that the EP45-DS3P will work, but I'll need patching to get the audio working. In fact, this is what I found.

Finding my processor

Intel CoreDuo E8400: working with vanilla kernel. (Vanilla kernel refers to the unmodified Leopard core operating system.)

Finding my graphics card

NVIDIA GeForce 7600GS: all resolutions work; QE/CI supported.

Finding my wired network

Realtek RTL8168C: The chip is built into the motherboard, so the motherboard entry covers it. No mention of networking problems. This is what I found.

Finding my sound device

Realtek ALC885, although Gigabyte's documentation says it is an ALC889A.

I posted a query on an OSX86 forum, and another user e-mailed me drivers that work perfectly.

Finally you have enough information about your computer to be able to make a good attempt at installing a retail copy of Leopard.

Summary

By now, you have completed a table showing the complete specifications for all the hardware in the box your computer sits in—from the motherboard and processor chip to sound, networking, and video.

From the various hardware compatibility lists, you have a good idea of how likely it is that Leopard will run on your computer.

In addition, you have summaries of your peripheral equipment—the stuff that sits outside your main computer box. You need this summary in the next few chapters.