Building a Computer System for Investment Uses

by John Bajkowski

Computers are one of those rare products that have largely defied the general upward force of inflation over the past decade. Products are continually released that offer additional features and capabilities at stable or decreasing prices. Processors are reaching ever-faster speeds; hard drives are becoming bigger and bigger, yet cheaper on a dollar per megabyte basis; even the amount of RAM memory found on systems is slowly creeping up. Computer vendors such as eMachines have emphasized low prices, forcing all computer manufacturers to concentrate on value or withdraw from the market. Manufacturers now focus on building faster and more powerful systems at attractive price points.

This computer hardware buying guide is geared toward the mainstream investor who is performing tasks such as Web surfing and E-mail, basic portfolio management, stock analysis, and charting, as well as word processing and spreadsheet building. The process of purchasing a new computer can be a daunting task. Issues abound, such as how much system you need to perform desired tasks and how to slow the inevitable process of obsolescence. In order to make the right purchase decision, you need to be aware of these issues through some basic education and research.

For a glossary of computer terms, see the Glossary link on the *Computerized Investing* Web site (www.computerizedinvesting.com).

Think Before You Shop

Many computer buyers complain that they either didn't get a system that met their computing needs or they spent too much on extras they will never use. These problems often arise from the fact that such buyers don't sit down beforehand and analyze what they will actually be doing with the computer. Ideally, you will identify what it is you want to do and purchase a system accordingly. If you are looking to just surf the Internet, a high-end system with all the bells and whistles would probably be a waste of money. Likewise, if you wish to perform technical analysis system testing and development or run other system-intensive software, a basic system would be ill-advised.

It is vitally important that you purchase a computer that supports the software you plan to use. Macintosh users are well aware of the limitations they face when trying to locate specialized investment programs that operate on the Mac OS.

At this point in time, Windows Me is the operating system of choice for the individual investor. Windows 2000, which offers a more stable platform, is more difficult to set up and does not support as broad a range of software and hardware.

The iMac and iBook have become top sellers and strongly influenced products throughout the computer marketplace. Apple's market share has been propelled to roughly 10% (up from about 5% a few years ago). While Mac systems are good choices for Web browsing, E-mail, word processing, and spreadsheet work, investment software for the Mac user remains scarce. The majority are personal finance programs such as Quicken.

Intended Uses

Depending on what you want to do with a computer, especially in terms of computer-assisted investment analysis, you will require a system with certain capabilities.

Technical analysis is probably the most system-intensive work in the realm of investment analysis. This type of analysis relies on the manipulation and graphical display of a great deal of data—typically daily data over several years. In order to perform such tasks, a computer requires a processor that can quickly perform the calculations. Furthermore, a high-quality monitor and possibly a color printer are necessary to examine and print charts and graphs. If you are looking to store a large amount of historical data for many companies—typical of fundamental screening and analysis programs—a large hard drive would be useful. For day-to-day downloading of data or for Internet-based research, a high-speed modem is a necessity. In contrast, most portfolio management programs require more simple processing requirements and, likewise, a less advanced computer.

While shopping for a new computer system, you need to be forward-thinking: Where will computing be in the future, and what may your computing needs be down the road? As you

Table 1. Recommended System

	Wintel	Mac
Operating System	Windows Me	Mac OS 9
Processor	700Mhz Celeron, Pentium III, or Athlon	500MHz PowerPC G3
Memory	128M RAM	128M RAM
Hard Drive	20G	30G
CD-ROM	CD-RW	DVD
Video Card	16M 2D/3D graphics accelerator	8M 2D/3D graphics accelerator
Sound Card	built-in audio	built-in audio
Modem	56K	56K
Network Adapter	10/100BASE-T Ethernet	10/100BASE-T Ethernet
Monitor	17" CRT	15" CRT
Price	$1,000 – $1,500	$1,499

decide which system you are going to purchase, be mindful of both your current and potential future needs.

The Ins & Outs of Computers

When you think of a computer, you may think of a singular item. However, a computer consists of various components, such as the processor, hard drive, disk drives, and video and sound cards. Each component requires a certain amount of understanding to make sure you create an overall system that is right for you. The major components are discussed below.

Processors

In the overall scheme of things, the processor is one of the smallest pieces of a computer system, but without it the computer is rendered useless. The processor is the brain of the computer. The faster the processor, the faster the computer is able to execute operations and perform calculations. Chip (processor) manufacturers are continually battling each other for the title of fastest processor. Consequently, faster and more powerful processors enter the market every few months. In fact, Moore's Law (credited to the co-founder of Intel) states that processor speeds double every 18 months.

While Intel has been the undisputed king of processors for several years, it has been facing ever-mounting competition from AMD over the past few years. At the time of this writing, AMD rules supreme over PC chips with its 1.2Ghz Athlon processor. Intel ranks a close second with its 1.0Ghz Pentium III chip. Intel was forced to pull a faster chip off the market recently, reaffirming the "bleeding edge" term often applied to the latest technology products. Intel is set to introduce the Pentium 4, which promises higher clock speed. In head-to-head tests, AMD and Intel chips are all but even in their performance when examining chips with similar clock speeds.

While the Athlon and Pentium III chips represent the high-end processor market, competition is just as keen in the value market. Here AMD and Intel vie for market share with the AMD Duron and Intel Celeron. These chips do not offer the processing power of their high-end cousins. However, they offer enough power for all but the most power-hungry users at only a fraction of the cost.

Significant savings can be realized by purchasing a system slightly below the top end, which is normally priced at a significant premium. For most users, buying a system with a 700Mhz or faster processor should provide more than adequate performance for the next few years.

In Macintosh systems, chances are you'll find either a PowerPC G3 (G3 for short) or PowerPC G4 processor from Motorola. The G3 is found in the consumer-oriented iMac and iBook, while the G4 is found in the high-end PowerMacs. In head-to-head comparisons, the G3 and G4 rival and often outperform equivalent Pentium processors. For most investors any of the G3 chips should be adequate. As you move up the iMac chain, faster processors and additional memory are available. The iMac DV+ and iMac DV Special Edition are packaged with hardware bundles providing a good balance of power, memory, storage, and features.

Data Storage Media

As today's programs become more sophisticated, their needs grow in terms of the amount of hard disk space required for installation and in terms of the amount of memory they require for proper operation. To ensure that your computer will be able to meet the demands of today's and tomorrow's software, make sure it has an adequate amount of data storage media.

Memory

In computers, temporary memory is just that—temporary. In other words, data is lost when the computer is turned off. In personal computers, RAM (random access memory) is the form of temporary data storage. The amount of RAM a system has impacts several aspects of computing, specifically what kind and how many programs can be used on a system at the same time.

The more applications you run simultaneously, the larger the files you deal with; the more complex your operating system, the more RAM you will need. Even with a top-of-the-line processor, a lack of memory can hinder your system's performance. The graphical operating systems available today—Mac OS, Windows Me, and Windows 2000—all benefit from additional memory. Most mid-range systems ship today with at least 64M of RAM, which is the bare minimum you should buy. We recommend that you purchase a system with 128M or more of RAM. This will probably cost you less than an additional $150 and will be money well spent. When prioritizing various components of a new computer, you would be better served by forgoing a larger hard drive or more powerful processor in favor of more memory.

There may come a time when you wish to add additional memory to your computer. Two things will impact your ability to do so—the number of slots the computer has, as well as the maximum amount of memory the system can handle. If the system has empty slots, you can simply add new memory components. However, if they are all full, you will have to remove existing memory components in order to add ones of larger increments.

Hard Drives

Temporary memory, as we have shown, is an important element of a computer. Inevitably, however, the need will arise where you will want to save data so you can use it at a later time. This is where permanent storage comes into play. With permanent storage, the data is retained once the computer is shut off. The primary type of permanent storage found in personal computers is the hard drive.

The matter of greatest practical importance when choosing a hard drive is its size. Today's graphical systems and many of the applications on the

market can demand a great deal of available disk space.

As you look at new computers, you should purchase one with a hard drive that has a capacity of at least 20G (gigabytes). While this may seem like a tremendous amount of storage space, keep in kind that if you are going to be using any type of real-time or historical data service, you will want to have the capacity to store this data. Outside of a computerized investing context, if you want to do any type of graphical design work or will be dealing with multimedia files, you will need sizable amounts of free hard disk space and should consider an even larger hard drive. Upgrading from a 20G drive to 40G drive should cost about $100.

Floppy Drives

While not as glamorous as a processor, a floppy drive is still useful—make sure your system has one. Beyond providing long-term storage, backups and file transfer, floppy drives are invaluable in the event of a major system crash. Using your floppy drive, you are often able to boot, or start, the system and perform some basic repairs. iMac, iBooks, and PowerBooks do not ship with a floppy drive, so be prepared to spend about $100 to purchase a floppy drive that connects to the USB Port on these systems.

"SuperDisk" drives from Imation are being offered as a replacement for the typical floppy drive. This drive can read both traditional 3.5" floppies with up to 1.44M of storage space, as well as "SuperDisks," which can hold either 120M or 250M of data. The advantage of SuperDisks: Beyond having comparable storage capacity as other removable media such as Zip disks (which can store up to 250M), you can still read or write 3.5" floppy disks. Some of the major computer retailers provide SuperDisk drives as an upgrade option for desktops for around $100. More likely, however, you will find SuperDisk drives as an option on laptop systems. The drives themselves cost around $150, and the 120M disks cost about $15 apiece.

CD Drives

CD-ROM (compact disc read-only memory) drives allow you to read data from compact discs as well as play ordinary music CDs. Compared to floppy drives, CD-ROM drives have much higher data transfer rates. However, they cannot match the transfer speeds of hard drives. As is the case with hard drives, the speed at which the CD spins translates into how fast graphics and video are read from the CD and displayed on the system. With slower drives, you may experience pauses in the video from time to time as the data is being transferred. CD-ROM drives range in speed from eight- to 72-speed and can either be internal or external—although you should choose an internal CD-ROM drive. An internal CD-ROM drive costs an average of $60.

CD-R (recordable compact disks) drives allow you to save data on CDs—something you are unable to do with a regular CD-ROM drive. CDs offer a significant storage capacity—up to 700M—compared to other types of removable storage media. Furthermore, CDs are relatively cheap (about $1 per disk when coupled with a jewel case, and under 50 cents in bulk). While CD-Rs offer the advantage of being able to write to the CD, once one has been cut, or written, the disc cannot be used again. CD-Rs have grown into a popular option for individuals creating custom audio CDs.

The shortcomings of not being able to re-record CD-Rs was solved with the introduction of CD-RW (re-writable compact disc) drives. CD-RW discs can be reused and read in any standard multi-session drive found on PCs. Note, however, most consumer audio CD players can read CD-Rs but not CD-RWs. The average cost for an internal 8x/24x CD-RW drive is around $200. Lastly, CD-RW drives can handle CDs, CD-Rs, and CD-RWs.

DVD or DVD-ROM, which stands for digital versatile disc, is making its way into the computing mainstream. Although there are a large number of movie titles being released for DVD, software development has been al-

most nil, with the exception of some titles in the gaming area and reference area (such as encyclopedias). First-generation DVD drives were limited in their ability to play CD-R discs. Today's DVD drives can read all types of CDs—standard music CDs, CD-Rs, and CD-RWs. While their usefulness is limited on desktop systems, many laptop users select DVD drives to view movies on the road. Beyond the physical drive, you will also need a decoder to view the video contained on a DVD disc. There are two types of decoders—software and hardware. Hardware decoding is less CPU-intensive and is recommended for systems with processors less than 500Mhz. Brand new systems should have the processing power to support software decoding, although it still places a considerable burden on the CPU which, in turn, could reduce video quality.

In addition, there are recordable DVDs (DVD-RAM), which allow users to write data to discs just like CD-Rs and CD-RWs. These drives are also able to read all CD formats. The main attraction of DVD-RAM is its capacity—5.2G on double-sided discs or 2.6G on single-sided discs. This means that for one double-sided disc, you are given the storage capacity of over five 1G Jaz cartridges, eight 700M CDs, or over 3,600 standard 3.5" floppies. While Apple has offered DVD-RAM drives on select Macs, the format has not really caught on.

DVD drives that can also read and write standard CD-Rs and CD-RWs seem more popular. Ricoh and Teac offer these types of drives at about $200 to $250.

Zip/Jaz Drives

The industry leaders in removable storage are Iomega's Zip and Jaz drives. Internal Zip drives offer data transfer rates slightly below that of a hard drive, while external parallel and USB port drives operate at much slower speeds. Zip drives offer both 100M and 250M of storage. Zip 100 drives typically cost around $100 and are available in both internal and external models. Zip 250 drives are also available as both inter-

nal and external and cost around $170. Ten-packs of 250M disks and 100M disks cost $150 and $90, respectively. Most computer manufacturers offer Zip drvies as an additional option.

The Jaz drive offers 1G or 2G of storage capacity per disk, but it is becoming difficult to find new 1G drives. The 2G drives currently cost $330 with a three-pack of 2G disks costing $270. Zip and Jaz drives have become less popular options with the growth of recordable CDs.

Backups

To save yourself a great deal of torment, it is highly suggested that you establish an effective backup system for your computer. While breakdowns of computer equipment are infrequent, crashes caused by ill-behaving software can wreak havoc on your system. Abnormal program terminations, a.k.a. "program bombs," can corrupt system files and render your system inoperable. Don't wait until it is too late to implement a backup system. Backups have normally been performed on high-capacity tape drive systems, but CD-Rs and RWs can also be used to create effective backups.

Monitors: Size Matters

While the computer itself performs the analysis and tasks you want, the monitor is important in that it displays the finished product. When shopping for your new computer system, make sure the quote you receive includes the monitor, because not all companies include this cost in their computer prices. As you are comparing prices for your new system, don't attempt to save money by skimping on the monitor. While other aspects of a computer, such as the amount of memory, can be upgraded or expanded by simply adding more, a monitor can only be upgraded by buying a whole new one. The increased viewing area and clarity of a better monitor will be well worth the money (not to mention the fact that your eyes will thank you).

When looking at monitors, there are

basically four critical factors to consider: size, resolution, refresh rate, and dot pitch.

Size

The size of the monitor determines how much "real estate" you have for displaying data. Typical monitor sizes for personal computers range from 15" to 19". Monitors that are 21" and larger are generally reserved for desktop publishing and computer-aided design (CAD) applications. Most new computers today come with a 17" monitor standard, otherwise a 15" is typically provided. Upgrading from a 15" to a 17" monitor is usually about $100 and will provide you with over 30% more viewing area. At the retail level respected name-brand 15" monitors seem to cost around $150 to $200; 17" monitors cost around $200 to $350; and 19" inch monitors are selling for around $300 to $550. The extra cost will be more than recovered in reduced eye discomfort over several years of ownership. If you do decide on a larger monitor, keep in mind the desktop space you will need for it. A monitor is typically as deep as the diagonal length of the screen. If you are short on desk space, you may opt for a short-depth monitor, or a flat panel LCD display. A 15" LCD is roughly comparable in display quality and viewable size to a 17" CRT monitor. Normally at least an inch of the stated CRT display size is hidden behind its bezel. LCDs offer wonderful flicker-free display, but at a significant price premium. Expect to pay from $700 to $1,200 for a 15" LCD panel.

Resolution

A monitor's resolution is the number of pixels both horizontally and vertically and determines the relative size of the objects on the desktop. A higher resolution means objects will appear more clearly on the screen. When running at high resolutions, such as 1024 by 768 or higher, the need for a larger monitor becomes more apparent. At such resolutions on a 14" monitor, the objects are so small that viewing becomes difficult.

Refresh Rate

The refresh rate of a monitor refers to the number of times the screen is redrawn each second. The higher the refresh rate, the less the screen flickers or strobes. Reducing the flickering of the screen lessens the strain on the eyes. For the best viewing, look for a monitor with a refresh rate of at least 75Hz (hertz) for planned resolution.

Dot Pitch

Dot pitch has to do with the distance between the phosphors in the monitor and only applies to CRT (cathode ray tubes) monitors, not LCD displays. As a rule, the smaller the pitch, the clearer the images that appear on the screen. The largest you should go is a 0.28mm diagonal dot pitch, while 0.25mm or smaller offers a clearer display.

In conclusion, a new monitor should be at least 17", support a high refresh rate (at least 75Hz), and have a dot pitch no larger than 0.28mm. Purchased separately, such a monitor currently costs around $250 to $350.

Sound and Video

With the advancements that have been made in PC audio and video the past few years, you have the potential of turning your computer into a home entertainment system. Even if this isn't your goal, most systems come with built-in audio suitable for typical users.

Most of the video boards that ship with today's computers offer both 2-D and 3-D graphics. Even if you aren't planning on doing any gaming with your PC, the extra cost is negligible. For quality 2-D and 3-D graphics, you should select a video board with at least 8M of video RAM. Video RAM of 16M will benefit those that have monitors with high refresh rates and resolutions as well as those looking for optimal 3-D performance from games. Cards such as these cost between $100 and $200.

Printers

Printers, while technically not part

of the computer itself, are a vital part of any computer system. You will find this out when you want to print out text, a Web page, or a chart. Printers, just like computers, come in many different kinds with numerous options and issues to consider.

Inkjet Printers

Inkjet printers offer both black and white and color printing. They work by squirting liquid ink through a nozzle that forms the image of text or graphics on the page. They are fairly cheap, fast, quiet, and achieve respectable resolution. Color printing is usually built-in. Color can be useful for distinguishing between data on printed graphs with multiple lines or bars—often a concern when printing reports from investment software and information from the World Wide Web. A good-quality color inkjet printer will cost $100 and up, offering good print quality, speed, and color at a reasonable price.

Laser Printers

Laser printers work by bonding powdered toner ink to high-quality paper under high-heat conditions. Laser printers are fast, increasingly cheap to manufacture, and produce the best output of the two technologies. Personal laser printers do not usually support color, although this technology is becoming more accessible all the time. Black and white laser printers cost, on average, $150 and up, while color personal laser printers start at around $1,300.

The standard for resolution today is 600x600 dpi (dots per inch), but printers geared toward reproducing photos go as high as 2,400 dpi. You should avoid printers with resolutions lower than 600 dpi. Furthermore, you don't need high resolutions such as 1,200 dpi or higher unless you plan to print high-quality graphics. Keep in mind that many inkjets have different resolutions for color and black and white (monochrome) output.

Take a look at both the price of an ink or toner cartridge for any given printer and the number of pages it will print. An inexpensive cartridge that prints relatively few pages may actually be much more costly than a more expensive cartridge that prints more pages. Higher-capacity cartridges also mean you won't have to change them as often, which can be particularly important depending on how much printing you plan on doing. If you are using a color inkjet printer, look for a model that uses separate black/white and color cartridges.

Modems: Key to the Internet

A modem (modulator/demodulator) allows communications between computers over POTs (plain old telephone lines) and is generally used to access commercial on-line services, Internet service providers (ISPs), or the Internet.

Today's modems are capable of using advanced error correction and data compression to achieve much higher data transfer rates than their basic connection speeds allow. A 28.8Kbps (kilobits per second) modem may allow data transfer at 115.2Kbps when correctly configured and accessing another equivalent, compatible modem.

Most new computers ship with 56.6Kbps modems. These modems allow you to download data at 56Kbps but will only allow you to upload data at 33.6Kbps. In reality, due to FCC regulations, the modems are only capable of downloading at up to 53Kbps. Furthermore, when line conditions are taken into account, the average rate you will currently achieve is up to 46.6Kbps. A V.90 56Kbps data modem can run from $30 to just under $200 and offer a variety of features.

Modem Substitutes

Alternatives to modems, which tend to offer much greater connection speeds, are also available depending on your geographic location. These include ADSL (asymmetric digital subscriber lines or DSL), cable modem, and satellite. DSL service is offered by phone companies, although not in all areas. It uses standard phone lines and offers theoretical download rates of 128Kbps to 8Mbps. Most services offer minimum download speeds of 15Mbps. ADSL service costs start at $40 per month, with an additional $100 to $500 for equipment and installation.

Cable modems also offer an "always on" Internet connection with speeds ranging from 384Kbps up to 4Mbps. Cable modem service, unlike DSL, usually does not allow you to select your own ISP—which means you are locked into one service and fee structure. Monthly fees range from $30 to $50. Setup costs vary by region and can be up to $200.

Depending on your geographic location, your only high-speed Internet option may be satellite. Hughes Electronics DirecPC provides download speeds of up to 400Kbps. The service, however, does have several drawbacks. First, you still need a phone connection in order to upload, or send, data. This means you may have to install a second phone line. Furthermore, beyond the $300 to $800 cost for equipment, you are levied hourly usage fees beginning at $30 for 25 hours. Unlimited access fees range from $40 to $50 per month. Lastly, the 24" dish you install outside must have a clear view of the southern sky.

Desktops vs. Laptops

After deciding whether or not you will purchase a new computer, inevitably the question of whether to go with a desktop or laptop system will arise. While both have their merits, their functionality (and usefulness to you) depends in large part on the intended uses for the computer.

As you analyze your computing needs and any of these concerns come to mind, perhaps a laptop will serve your needs better than a desktop:

- Do you work while travelling?
- Will you need to move the computer from room to room or location to location?
- Do you have space (desktop) constraints?

However, if your concerns tend to lie

in any of these directions, a desktop may be the preferred choice:

- Will you be at one location?
- Do you plan to upgrade?
- Do you have budget constraints?
- Do you prefer a larger display?
- Are you interested in the best performance and the latest features?

When dealing with desktop and laptop systems, be aware that you face differing upgrade possibilities. Desktop systems tend to be easier to upgrade and repair, largely because there are a number of "generic" components available that can be installed with relative ease and without compatibility issues. Laptops, on the other hand, are more delicate creatures and they are more difficult and expensive to upgrade and repair. If you wish to upgrade a laptop, oftentimes you need to go directly to the manufacturer to obtain component parts to ensure they function properly with the system.

Lastly, there is a sizable price difference between laptops and desktops. Given two relatively identical systems in terms of computing power, the desktop system will cost several hundred dollars less than the laptop (Table 2).

Where to Buy

In today's marketplace, you basically have two choices of where to buy a computer—directly through a mail-order vendor or from a local retail store. While many systems, such as Dell and Gateway, are only available from mail-order sources, several large and reliable manufacturers, such as Hewlett-Packard and Compaq, make computers available at retail outlets.

Mail Order

Most mail-order sources are reliable, but as is the case with any retailer, you must consider the possibility that not everything will work right out of the box. Companies like Dell and Gateway have a good reputation for delivering what they promise, when they promise it. One major trade-off with purchasing from a mail-order company is the lack of face-to-face assistance offered by retailers should some-

thing go wrong. You do, however, typically have free telephone support. In addition, most mail-order companies offer one year of free on-site service as part of any warranty. These two options should cover the majority of problems at least for the first year. After that, should something go wrong, chances are you will have to ship the computer back to the manufacturer for any repairs.

For those looking for repair service coverage for a longer period of time, many larger mail-order companies have signed third-party agreements to provide continuing maintenance. However, these contracts can be quite expensive and are not worth the additional cost beyond three years.

Mail-order manufacturers generally build their systems to buyer specifications. As a result, you are more apt to find the exact system you are looking for through mail order. In addition, due to inventory practices, these companies also tend to bring new technologies to consumers in a more timely manner than retail companies.

Retail

Buying from a retail store doesn't necessarily mean you will be paying much more. Popular stores such as CompUSA, BestBuy, and Circuit City are very price-competitive with online and catalog vendors. On the other hand, once you have purchased the system, it may be difficult to get a retailer to offer free consultation and technical support.

When you go to a retail store, you are typically confronted with several computers of various configurations. While it may be possible to find a system that offers almost everything you are looking for, be prepared to alter your wants to fit the systems available.

Putting It All Together

Individual computing needs are just that and will vary from person to person. The type of system you buy depends largely on what you need and what you can afford. Consider both the current and future intended uses of the system. Be concerned about the vendor's reputation for reliability, service, and support.

Table 1 indicates the recommended specifications when buying a computer today.

Given the rapid changes in technology, the only thing certain is that what is top-of-the-line this year will be relegated to mid-line by the next. Some readers and users have voiced their concern that the systems discussed here are too advanced for their needs. Our goal has been to recommend systems that will provide sufficient computing power for the next few years and, perhaps, beyond. The ultimate decision, however, is yours to make.

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Table 2.
Cost Comparison: Desktop vs. Laptop

	Dell Dimension 4100	Dell Inspiron 8000 Notebook
Operating System	Windows Me	Windows Me
Processor	800Mhz Pentium III	700Mhz Pentium III
Memory	128M RAM	128M RAM
Hard Drive	20G	20G
CD-ROM	CD-RW (8x)	CD-RW (8x)
Video Card	16M 2D/3D graphics accelerator	16M 2D/3D graphics accelerator
Sound	built-in audio plus speakers with subwoofer	built-in audio
Modem	56K	56K
Network Adapter	10/100 Base-T Ethernet	Xircom 10/100 Base-T Ethernet Card
Monitor	17" CRT (16" viewable)	15" LCD
Price	$1,418	$3,057