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Survival guide for road warriors : essentials for the mobile CPA

Daniel S. Coolidge 1948-

J. Michael Jimmerson

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AICPA

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Essentials for the Mobile CPA

American Institute of Certified Public Accountants

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AICPA Technology Series

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Dedication

I dedicate so much of this book as to which I lay claim to the love of my life: my partner, companion, lover, and friend, Carolyn. Thank you with all my heart for your love, encouragement, and companionship. I also dedicate this work to my daughters, Lillian and Lydia, without whose understanding, generosity, and patience I would never have been able to accomplish it.

— Daniel S. Coolidge

I dedicate this book to my daughter, Megan. I am confident that she will soon be teaching me new tricks with the computer.

— J. Michael Jimmerson

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ACKNOWLEDGMENTS

The authors would like to dedicate this book to the memory of their friend, Harold Feder. A true warrior, if ever one walked the face of the earth, Hal is missed by his colleagues, friends, and fellow professionals.

Dan Coolidge would like to thank and acknowledge Carolyn, his wife, and his two daughters, Lillian and Lydia, who have with good grace supported his efforts and given up many weekends and evenings so that this work might be completed. Whatever successes Coolidge may have, they are made possible by their love, encouragement, and joint efforts. He would also like to thank his partners, associates, and staff at Sheehan Phinney Bass + Green (especially Melissa Fraser) for their encouragement and support.

Michael Jimmerson would like to thank his wife, Jill Goldstein, for her unfailing support.

THE WAY OF THE ROAD WARRIOR

"Nothing endures but change."
Heraclitus (c. 540–c. 480 b.c.)

chapter 1

Beware, Grasshopper! The Way of the Road Warrior is not for everyone. Do not read further unless you are up to the demands it will make of you, both personally and in your practice. It will change forever how you work and how you perceive your workplace. It will challenge you to learn both new tools and new ways to use old tools—tools that you will be able to carry with you wherever you are and that will support you in your primary mission: rendering service for clients efficiently, professionally, and promptly. These new ways will be strange to you. They will be frustrating at times. They will be forever changing. Just as you master them, new tools will emerge. The "Way of the Road Warrior" is not for the timid or complacent.

Right, then. We warned you. So, you are a road warrior wanna-be. Do you really want to join the legions of keyboard-clicking, techno-geeks you see in airports, with pallid faces buried in their laptop computers? You want to be one of those dweebs whose idea of a vacation in the sun is sitting on the beach with a laptop and cellular phone, downloading electronic mail? Where did they all come from? Can we make them go away? Alas, no—to the chagrin of many. They are here to stay. They are ubiquitous, like black flies in the northern forests.

Road warriors are just one response to changing social conditions and the availability of new technology, which both mandates and enables a new approach to the practice of accountancy: Toffler's Third Wave in yuppie dress. Road warriors are people trying to juggle the conflicting demands of a highly competitive practice with the need for a life beyond numbers.

What is a road warrior (at least the CPA subspecies)?[1] Any CPA whose practice keeps him or her in the office late, requires travel to client sites, or involves time spent in airports is a candidate for the nom de guerre "road warrior." Busy CPAs with homes and families they would like to see from time to time qualify. So do practitioners who want to accomplish more without the burden becoming unbearable, and seek means to increase their efficiency out of the office. So do CPAs who have mastered the tools in their offices, only to find that these same tools would support their practices in the field as well, and have found ways to accomplish this.

[1] The coauthors have battled for years about this term. Jimmerson is an early adopter of the noxious expression, while the embarrassed Coolidge prefers more tame expressions such as "virtual office." Guess who is the winner . . . Chacun à son goût.

Simply put, road warriors are those who have managed to find ways of utilizing emerging technology effectively to enhance the productive use of their time. Knowing that the practice of accountancy is service, they manage to keep in touch with their clients and practice no matter where they may be. Being a road warrior means being at ease and familiar with technology and an ever-changing array of tools.

Above all, road warriors are connected. Wherever road warriors are, there too are the tools they need to stay in touch. Cyberspace is their home court. No matter where they are located, road warriors can provide service—whether producing tax returns or spreadsheets, responding to phone calls, or reviewing financial statements.

Those who master the tools and techniques of the road warrior are the third-wave mammals who will thrive, and who will gain competitive advantage over and supplant the dinosaurs who dominated the past but are unable to adapt to changing conditions. They recognize that change is the only constant in their practice now and they have learned to embrace change and make it work for them.

As the demographics of the accounting profession change and social trends of the past thirty years continue, there is increasing pressure to integrate family life with the demands of being a CPA. This runs counter to the historical perception that only those who spend long hours in the office are the real workers. Road warriors have discovered that with a home office, they can often accomplish more than their office-bound peers, enabling work to be performed from the home without loss of availability to clients or coworkers or access to resources necessary to accomplish their work. Being home more often permits them to have more rounded lives, enjoying the fruits of their labors in the form of enhanced family life.

Of course, it requires self-discipline to manage time so that having a home office does not simply become one more straw on the back of an already overworked and harried CPA. The home or road office should be a convenience and not something that merely serves to make work oppressive by being omnipresent. The accomplished road warrior knows when to stop work. Time management is the goal, not time absorption. Playtime recharges the psychic batteries.

An accounting practice that involves time out of the office can result in upset clients not being able to reach their CPA. The road warrior has

found that a combination of a cellular phone, alphanumeric pager, electronic mail (email), and a portable computer can alleviate this problem, enabling the road warrior to convert otherwise lost time to productive time, thus freeing up time for more pleasant activities. Whatever the time of day, he or she can dial the office through a computer and retrieve his or her messages, communicate with associates, and create and transfer documents. Clients know they can readily maintain communications wherever their CPA may be. Indeed, the master road warrior's communication is so effective, simple, and transparent that clients are often not even aware their CPA is not in the office.

Consider this scenario: As Coolidge is dictating this chapter, he is driving to the distant site of a target acquisition. Along the way, he has his laptop computer call his office to retrieve his messages through his cellular phone and receives a message from an overseas client that requires immediate response. He pulls to the side of the road,[2] turns on his portable computer, and uses the word processor to create a response, which he then sends overseas by facsimile through his cellular phone. Repulsively pleased with himself, he drives on his way.

On arrival at the target site, an issue develops concerning the valuation of a subsidiary of the target. Coolidge plugs his computer into the phone line, connects—through preestablished links—to the applicable data files at the office, and obtains information related to the subsidiary's valuation, which he uses during the negotiations. As the day progresses, he keys in notes of what is agreed upon and what each party commits to accomplish in the ensuing weeks. Near the end of the day, he connects to an available printer and prints the memo. Everyone has a copy of the document and agrees on its contents.

There is nothing unusual about these activities. Indeed, what has always bemused the authors is that to a road warrior, such technology is commonplace. It may seem to the uninitiated like Buck Rogers technology, but to the already converted, it is routine. Road warriors are digital—at home in the electronic age. They tend to be early adopters, trying out new technology (and unafraid to abandon it if it turns out to be ill-suited to their needs).

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[2] Coolidge's recent near-death experience that resulted from trying to receive a fax while driving convinced him of the wisdom of stopping the car first in the future. Coolidge understands now that "road warrior" is a metaphor, not a driving style.

What is the basic weaponry of the road warrior? Central is a portable computer. This is the heart and soul upon which all else depends. Remember the advice of the keeper of the grail to Indiana Jones: "Choose wisely." The computer serves as the workstation, central communications device, and host to all the attachments. Add a printer, a modem (for telephone communications including data transmission, email, land fax), and a cellular phone, and you are on the way. With the modem and some prethinking, you have access to resources only dreamed of twenty years ago. You are doubtless already familiar with LEXIS-NEXIS. Have you taken advantage of the income tax regulations, in its entirety, now available for free (and searchable) on the Internet? Or have you retrieved a tax form? Nearly every state or federal form is available online. You can access many government agencies, such as the Securities and Exchange Commission. You can access 10K filings. Did a client call while you were out? Need to leave instructions for an associate? No problem—you have email. Need to have someone in your office review a document? Do not fax it; email the word processing document to him or her to make the corrections (as if road warriors made mistakes!) and send the finished document by a return email.

There is no one "best" combination of equipment and practices that is suitable for everyone. Each practitioner will need to develop what works best for him or her. Today's solutions will be supplanted by better solutions tomorrow. The purpose of this book is not to design the one perfect tool kit for the neophyte road warrior, but rather to share some of the experiences of the authors. The authors' goal is to share their knowledge and experience and to allow the reader to benefit from their mistakes—all to permit the newcomer to hit the road running. Take what you find useful, and explore! We will help you select the basic tool kit, and show you some of the ways to use it.

It is inevitable that by the time this book sees print, technology will have advanced. Accordingly, take our advice with a grain of salt. Maybe you can do better. Maybe better technology will become available (the only safe bet in this arena). A wealth of research material is available, especially in the various computer magazines and accounting office technology journals. Ask your friends what they do. Check out the Internet and find out what other practitioners are doing. Most important, find out what does not work. Just because a particular software program promises the world does not mean that it will deliver.

The American Institute of CPAs (AICPA) Information Technology Membership Section is an excellent resource. The Section has great newsletters and networking opportunities. For more information, call InfoTech information (212)596-6211 or email: infotech@aicpa.org. Also, the AICPA's annual Information Technology Conference offers a wealth of information and an opportunity to network with other CPAs facing similar problems.

Accordingly, we offer three bits of advice to consider as you read this book:

1. *Invest the time to learn your tools thoroughly.* Technology requires an investment in training. It is not when time is short that you should be just learning how to operate your communication software. You simply must spend the time required to learn how to operate your equipment well. There is no substitute. This means understanding it, rather than simply operating in cookbook fashion. If you are going to be innovative, and if you are going to be able to respond to difficulties, you must understand how to adapt. You need to know your tools better than the people with whom you are trying to compete.
2. *Do not be afraid to experiment.* Play around with different techniques and different combinations of equipment, and always seek to improve. The tendency toward inertia always exists: we all want to stick with what we know. We never feel we have the time to learn a better way, when the fact is that we do not have the time to continue our inefficient habits. Discard what does not work. Always question whether there might be a better way to do something. Evolve.
3. *Be prepared to spend some money.* All the tools of the road warrior cost money, and you will likely be changing the contents of your kit bag often. Do not figure that your $3,000 laptop is going to last forever. Indeed, if it lasts three years before you replace it, that is a pretty good run. One author turns over his laptop about every sixteen months. Look at your investment in terms of the time you can recoup and bill, and your expenditure as an investment not only in productivity, but also in quality of life.

Consider another scenario: In the midst of a large transaction, a CPA had to move a large amount of data quickly from a location on one coast

to a client site on the opposite coast. The client had a single fax machine, and many other ancillary documents needed to be dealt with as well. Trying to print the data, then send it by fax would have taken nearly five hours, tying up the fax machine and preventing it from being used for other equally important purposes. Clearly, some other technique needed to be found. The CPA could have printed the data and sent it by overnight express, but many valuable hours would be lost in the process. The answer was clear: transmit the data files themselves over the phone lines and print them out at the client site. The client had a computer and a modem, and presumably some kind of communication software. Fortunately, it was the same software program the CPA used. Unfortunately, no one at the client site knew it well enough to set it up to receive transmitted documents. However, the CPA knew the software well enough to write simple instructions and fax them to the client, who was then able to set up its computer to receive the document. The whole process took less than half an hour: the data files took less than ten minutes to send. If the CPA had not understood the operations of the communication software well enough to explain it to somebody three thousand miles away, the situation would have been lost.

So, prepare yourselves to enter the twenty-first century and embrace the opportunities that it affords. We hope that the information we have provided in this book will aid you in assembling your own road warrior's arsenal. We welcome your comments (and criticisms) and suggestions, as this is an evolving work. The authors can be reached via email (of course!) at:

Daniel Coolidge:
On the Internet: dcoolidge@sheehan.com
CompuServe: 76074,517

Michael Jimmerson:
On the Internet: jimmer@legalcounsel.net
America Online: mjimmerson
CompuServe: 72377,1722
Web: www.legalcounsel.com

Read on and go out and have some fun. Do not worry if someone looks at you and calls you a technoid yuppie. Remember these words:

"Oderint dum metuant."

Attributed to the Roman Emperor Tiberius
In translation, "Let them hate, provided they fear."

CHOOSING YOUR NOTEBOOK COMPUTER

"Be prepared."
Boy Scout motto

chapter 2

A mobile CPA is more than just a CPA with a computer, fancy gadgets, and some nifty software. Leveraging technology to produce a service takes preparation, experience, and old-fashioned common sense. As with any other tool (after all, computers are tools, not toys, right?), a good CPA chooses the right ones for doing the job, whether it be going to a client meeting or documenting a complex transaction. Arming yourself for the road starts with finding the right equipment for your practice, selecting the necessary accessories, and installing the software for your needs. This chapter focuses on the selection and purchase of the notebook computer, the core of the virtual office. The next chapter deals with the peripherals and software you will need with your notebook computer.

A SHORT HISTORY OF PORTABLE COMPUTERS

Portable computers have been known by many names over the years. Early portables were called "lunchboxes" or "clamshells." When the size was reduced, they became known as "laptops." This nomenclature is still often used. However, portable computers of the most recent generation are called "notebooks" because they are approximately the size of a notebook or ring binder. The authors will use the word "notebook" (although "laptop" will show up now and then) to refer to a portable computer of the latest generation. In the future we may all be wearing Dick Tracy watches or using neural implants, but for the foreseeable future, the notebook seems the term of choice.

Portable computers have really changed in the last fifteen years. The first truly portable computer was the Osborne I. That machine was more "luggable" than "portable," as the beast weighed in at approximately twenty-eight pounds. This was just before the introduction of the International Business Machine (IBM) personal computer (PC) in 1981.

The Osborne I ran on an operating system called CPM (the dominant one before DOS) and came equipped with 64K[1] of memory and two

[1] Storage on a computer, whether system memory (Random Access Memory or RAM) or disk storage, is measured in units called bytes. A byte is roughly equivalent to a single character. A thousand bytes equal one kilobyte (abbreviated as K, k, or KB; actually 1,024 bytes because for computer purposes specifications are usually binary numbers). Likewise, a million bytes equal one megabyte (or MB) and a billion bytes equal one gigabyte (or GIG or G). Kilobits (Kb) used for measuring transmission rates (see discussion of modems later on in this chapter) represent one thousand bits. The bit (b) is the smallest unit of computer storage. Eight bits (8b) make up one byte (B).

low-density disk drives of 120K. The sickly green monochrome screen was tiny. Of course, in those days, this was more power and storage than one could ever possibly use. Having a portable computer was useful, even if one arm was slightly longer than the other after hauling it from place to place.

This chapter was written on a Compaq 486-75 with 24MB of memory and a half-GIG hard disk. And with compression software,[2] the machine has over one GIG of storage, more than enough for any road warrior. And the full-color display panel is nothing less than stunning.[3] The machine is fast, but after a while one always longs for something faster. An interesting syndrome in personal computer use is the need for a faster computer (or the "need for speed"). Once you upgrade to a faster machine, you are happy for a (short) while, just until you see someone with something a little faster, a little fancier. Then you immediately start lusting for an even faster machine. And naturally, you can never go back. Imagine working on an original IBM PC today! Better to have your fingernails pulled out one at a time.

Another problem with computers is that no matter how fast a machine you get, new operating systems and programs demand more and more processing power. What the hardware vendor giveth, the software developer taketh away. Nevertheless, computers are continually getting better and faster, and thus old machines are becoming obsolete. This is occurring at an ever-increasing rate. Consider the case of the Compaq Concerto. In an astonishingly short period, the Concerto was rendered obsolete and discontinued just one year after its introduction. This phenomenon is exemplified by the "power curve." (See Figure 2.1 on page 13.)

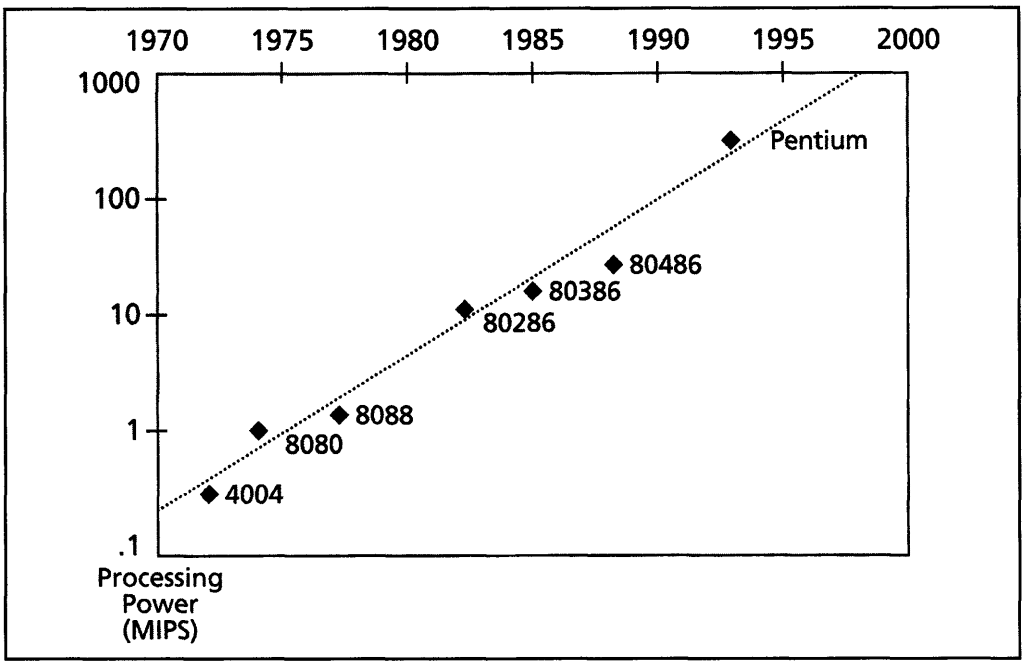
The message here is to buy the fastest machine that suits your requirements and that you can reasonably afford without the baby starving or your partners expelling you. When paddling your canoe, dip your paddle in the water as far ahead as you can. Never try to save a few dollars by getting a machine that is already outdated or will be imminently.

Do not fall into the common trap of many would-be purchasers: "I will wait six months until the price of machines has gone down." Of course,

[2] Compression software uses special algorithms to "compress" the data stored on the disk, which effectively squeezes more information onto the disk.

[3] Two years ago, when this book was originally written, the machine used was in front of the pack. Now it is a hand-me-down.

FIGURE 2.1: THE POWER CURVE



you can do that, but you will be playing an ultimately losing game. Why, you might ask? Because the investment in computers is recouped by using them. If you wait six months, you will not have use of the machine and the lost productivity will greatly outweigh any meager savings you might garner by waiting. And no matter when you buy, there will always be something faster and cheaper just around the corner. Eventually, you just have to jump in and swim. Recall the old adage: "He who hesitates is lost."

ADVANCE PLANNING STRATEGIES

If you have looked at computer magazines or advertisements lately, you are probably intimidated by the variety of equipment on the market. Complicating the issue is the constant change in features (always improving) and the range in prices (always decreasing). Before discussing the important features to consider, we ask you to keep in mind the following buying strategies.

Make a Budget

Before buying a notebook, keep in mind that you will be making a serious cash outlay, especially considering the accessories and software you will also need. Bear in mind that this is a piece of equipment that you will be using constantly. Therefore, get the very best that you can afford. Decide in advance how much money you can afford and then look at machines in that price range. Does your budget include money for accessories and software? If not, you must either increase your budget or lower your expectations. If you have only $1,500 to spend for a notebook and printer, do not spend your time looking at high-end, multimedia dream machines.

Once you have in mind what you can reasonably afford (being somewhat flexible), select the minimum features you will need. We discuss below many of the selection criteria for various parts and pieces. Read through these carefully, and then decide what you must have. Start with just the basic computer system. Then take a look in the ads for systems that meet your criteria. Approaching things this way may help keep you from overbuying. When reading the ads, there is always the temptation to let your eyes glaze over and convince yourself that you just must have that new Septium Sizzler with the three-dimensional display panel in five flavors.

On the other hand, be prepared to spend one to two hundred dollars more to get the machine you want. Skimping a few dollars here and there will ultimately lead to dissatisfaction and frustration. Research your choice carefully and weigh the advantages and disadvantages of alternative systems. If you want to avoid buyer's remorse, make an informed decision.

Use Mail-Order

If you want to save money, shop carefully and consider using mail-order. (See Hint 1 on page 15.) Both authors have been purchasing by mail-order for years, mostly without incident. Sure, things can go wrong, but you must take precautions to protect yourself. If you follow the suggestions outlined in Hint 1, mail-order is a great way to buy computer equipment. Above all, check the reputation of the vendor and mail-order house. Also, the warranty and service of the unit you are purchasing should be a major consideration. (See the discussion of *Warranty* later on in this chapter.)

HINT 1 BUYING BY MAIL-ORDER

1. Always use a credit card, for two reasons. First, in the event of a dispute, you can refuse to pay your credit card company and it will issue a charge back against the vendor until the matter is resolved. Second, many card issuers will extend your warranty up to an additional year. This can be very valuable if your machine croaks one month after the original warranty expires. Try to use a card (American Express, for example) that offers extended warranty protection.
2. Use a reputable mail-order house (such as Computer Discount Warehouse, PC's Compleat, or PC Zone) or a manufacturer direct sales outlet (such as Dell or IBM). (See Appendix A.)
3. Shop around for the best price and let the salesperson know that you are comparison shopping. You can often get a better deal just by asking. Most mail-order houses will match prices.
4. Always check availability and get an expected shipping date. Otherwise, you can wait a long time for popular items. This is especially true for newly released products.
5. Always insist that your card not be charged until the product is shipped. This avoids hassle if you cancel your order and avoids carrying debt on your card. If your credit card is charged before the product is shipped, complain to your vendor about its violation of the consumer credit laws.

Buying Brand Names

Portable computer manufacturers can be arranged into three tiers: (1) top-shelf companies (Apple, Compaq, Dell, IBM, and Toshiba); (2) middle-tier companies (Acer, AST, Digital Equipment, Fujitsu, Gateway, Hitachi, Panasonic, Sharp, Texas Instruments, and Winbook); and (3) resellers of notebooks made by original equipment manufacturers (OEMs). As with any name-brand purchase, you often pay more for the name, but you also get superior reputation and service. The top-tier companies account for most innovations, make high-quality machines, and offer unparalleled support. Consequently, they hold the greatest market share.

Middle-tier notebook vendors also offer high-quality machines and provide above average to acceptable technical support. Because these vendors are not among the market leaders, you are not paying for name-brand recognition. The third tier consists of vendors whose products are fungible and manufactured by OEMs. The differences among machines in this tier are slight and the technical support and service provided may be less than satisfactory.

Another decision you must make is whether to choose a PC (IBM PC compatible) or an Apple Macintosh (or Power PC603[4]). This book focuses on the former, primarily because the authors have both chosen

[4] The Power PC is a hybrid machine developed out of a collaborative effort among Apple, IBM, and Motorola. This machine can run both Macintosh and Windows software.

PCs and hence are not familiar with Apple computers or their progeny. We cast no aspersions upon the quality of these machines (they are first-rate, as far as we know), and acknowledge that many of the best features in the popular graphical-user interfaces have been around for years on Macintosh screens. However, one must note that Apples represent only a small percentage of the market, and an even smaller portion of the accounting market. This translates into potential issues of interoperability and communications with others using PCs. Moreover, the selection of accounting-specific applications for Apple users is limited. So be warned, our discussion is limited to PCs because both of us have been using these for almost fifteen years. If you want specific advice on purchasing a Macintosh or Power PC, you need to look elsewhere. Nevertheless, the general principles set out in this book apply to either platform.

This book often mentions issues involving the Windows operating systems. Both authors use Windows 95 and find many advantages with this operating system. (See Hint 2.) Neither of the authors uses IBM's OS/2, and thus we do not discuss its merits, and, like the Apple, there is far less accounting-specific software for OS/2 than for Windows. In the case of both Apple and OS/2, you should keep in mind the trend to move with the market. Anybody out there remember Betamax?

Compare Features

Before purchasing a portable computer, create a checklist of all the relevant features: processor, random access memory (RAM), hard disk, modem, CD-ROM, battery life, weight, display, pointing device/

HINT 2 ADVANTAGES OF WINDOWS 95 ON NOTEBOOKS

Windows 95 is the first operating system built to work equally well on laptops or desktops, and to manage the issues involved in using both. The main advantages of using Windows 95 with a notebook are:

1. Setup: Installing Windows 95 allows minimum configuration, which saves precious space on your hard disk.
2. Plug-N-Play: Adding devices such as PC-Cards to your notebook is greatly simplified. Insert the PC-card modem and it is instantly recognized.
3. File Synchronization: The "Briefcase" on the Windows 95 Desktop provides a convenient way to synchronize files between a notebook and a desktop machine.
4. Dial-Up Networking and Direct Cable Connection: Windows 95 includes tools to access your Microsoft Windows network directly, and to connect to another machine using a serial or parallel cable.

keyboard, input/output options (that is, docking stations and PC-card or PCMCIA slots), and warranty. (See Hint 3.) Some of the features are objective (RAM, hard disk, and screen size) and others are subjective (keyboard feel and display viewability).

Pick up some of the popular computer magazines, such as *Computer Shopper, Mobile Office, PC Magazine,* or *Windows Magazine,* and read the reviews for models in your price range. (See Appendix B.) These reviews generally provide unbiased opinions and good recommendations. Browse the ads for various vendors and mail-order houses. This will give you an excellent snapshot of the feature and price range at the moment. Study at least two or three machines and compare the features of each. Go to a computer store and spend some time with the machines you are considering and evaluate their feel and layout. This computer will be your constant companion and you should be comfortable with it. Once you have assembled the necessary information, you can make an informed decision.

One last caution before reviewing the features you should look for in a notebook: do not be fooled by machines that offer the ability to upgrade. These upgrade options are generally expensive and almost never cost-effective. Choose the "most powerful" configuration you need and can afford for use in the immediate future, and then use the

HINT 3 FEATURE CHECKLIST FOR NOTEBOOK BUYERS

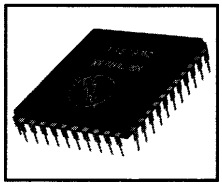
FEATURE	MODEL #1_____	MODEL #2_____
Price	_____	_____
Processor (Pentium)	_____	_____
Memory (Number of MB/MMX)	_____MB	_____MB
Hard Drive	_____MB	_____MB
DISPLAY		
VGA or SVGA	_____	_____
Screen Size	_____inches	_____inches
Maximum Resolution	**800×600/1024×768**	**800×600/1024×768**
Simultaneous External	_____	_____
Pointing Device Type	_____	_____
PORTS		
Parallel/Serial	_____	_____
Mouse/Keyboard	_____	_____
PC-Cards (Type and No. of Slots)	_____	_____
Warranty (Years/Type of Service)	_____	_____

machine as much as possible. Because computers become outmoded quickly, you never recover your investment on resale.[5] By going "most powerful," however, you are giving yourself the best chance at not becoming instantly obsolete. You have to realize that the return on your investment is measured by the productivity you get from using the machine.

COMPONENTS OF A NOTEBOOK COMPUTER

Notebooks, like desktop computers, consist of many components, assembled together into one package collectively referred to as "the computer." These components represent a hodgepodge of vendors, and the leading vendors in each category are identified below when applicable.

Processor



Computers are described according to the processor or central processing unit (CPU) that the machine employs to perform its magic. The original IBM PC used an 8088 (or 8086) processor. The 8088 was an 8-bit processor with an 8-bit "bus." Think of the "bus" as a highway on which the computer moves information. (No, not the information superhighway—we will get to that later!) The processor handles this information in loads containing eight bits of information and sends that information down the highway across eight lanes of traffic (the bus). The 8088 was soon superseded by the 80286, a true 16-bit processor (more lanes move more information faster). The 286, introduced in 1982, could handle sixteen bits of information at a time and had a bus twice as wide, so that it effectively had sixteen lanes of traffic. In 1985, the 80386, the first 32-bit processor, was released. Coincidentally, this was also the year Windows 1.0 was introduced. To

[5] Consider donating used computer equipment to a school or charity. You might also consider donating to a nonprofit organization that focuses on recycling old computer equipment. For example, the National Cristina Foundation (203-622-6000), the East/West Foundation (617-542-1234), and Gifts In Kind America (703-836-2121) each recycle used computer equipment and software to other organizations. Another worthy organization that accepts used equipment is the Pediatric AIDS Foundation (310-395-9051).

further confuse consumers, Intel released 386SX chips (basically a 386 with a 16-bit bus). In 1989, the 80486 premiered with an integrated math coprocessor; 386 chips lacked math coprocessors—additional circuitry for numeric-intensive operations. Even though 386 (and above) machines can handle 32-bit processing, most software before the release of Windows 95 was written only for 16-bit processing, mostly for reasons of compatibility with older hardware and software. Intel once again released two types of 486 chips: DX and SX. The 486SX chips lacked the math coprocessor but still had a 32-bit bus. A 486DX was a "full" 486 with 32-bit registers and a 32-bit bus.

The Pentium,[6] introduced in 1993, sports a 32-bit processor with a 64-bit bus.[7] In 1995, Intel released the P6 or Pentium Pro (having firmly broken with the x86 tradition), a chip with 32-bit processing and a 64-bit bus. The main difference between the Pentium and the Pro is that the latter has higher clock speeds and an L2 cache, which purports to dramatically enhance performance. In late 1996, the Pentium MMX was released. This new chip provides better performance, especially for multimedia applications.

The other significant measure of a machine's processing power is the speed of the chip. This is described in units of megahertz (Mhz).[8] This does not refer to the "hurt" you inflict on your pocketbook or credit card when you plunk down your hard-earned coin for the latest and greatest portable computer. The speed of the computer (133 MHz, for example) is the speed at which its internal "metronome" operates, which translates to how fast the computer can complete a specific task. The faster the machine, the higher the clock speed. Today, clock speeds for Pentium chips range upwards from 120 MHz and can handle more instructions than earlier chips.

Another important factor is the amount of "cache" memory onboard. This is a special, ultrahigh-speed memory area in the chip that is set aside for handling information locally without having to store it in slower system memory. The larger the cache, the more bits of data that can be

[6] In 1992, Intel decided to change its naming convention (8088, 80286,80386, 80486) and dubbed the 586 the "Pentium." More than a marketing ploy, Intel sought to further strengthen its stranglehold on the processor market by creating a new, protected trademark.

[7] Sebastian Rupley & John Clyman, p.6: "The Next Step," *PC Magazine* (Sept. 12, 1995, at 102-14).

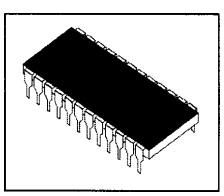
[8] A megahertz equals a million cycles per second.

handled locally with less need to go out to slow memory; hence the faster the performance of the chip. The Pentium Pro uses an L2 cache that enhances performance of the chip substantially.

Almost all notebooks these days come with preinstalled Microsoft Windows 95. Graphical environments make computers much easier to operate, but they require more speed, memory, and disk storage.[9] The current 32-bit operating environments (Windows 95, for example) can leverage these 32-bit processors and take advantage of the wider bus. Applications written for 32-bit processing will show significant speed gains because they leverage the raw processing power of these chips. Upgrading your software to 32-bit applications can result in a noticeable improvement in performance. Indeed, expect multimedia applications for MMX computers to start appearing in the near term.

Selecting the processor you need is not a trivial choice. In fact, buying a fast processor is not always the best solution. A faster and more powerful processor is also more expensive, has shorter battery life, and may even have heat problems. The first portable Pentium notebook allegedly melted down upon start-up. Most notebooks today employ chips and components that run at lower voltages (3.3 volts) to preserve power and reduce heat. Notebooks also use sophisticated power management to enhance battery life.

Memory



The next important consideration is the notebook's amount of memory, or RAM, which consists of memory chips used for temporarily storing information for processing by the computer. RAM is distinguished in this respect from hard-drive space, which is used for long-term storage of information. Older DOS computers and programs used another specification (expanded memory, or EMS), but this standard has basically disappeared. Conventional or lower memory includes the memory addresses up to 640K. The original IBM PC had only 64K, and later, 640K. With the 286, the PC could access high

[9] Novell PerfectOffice 3.0 required a staggering 98MB for a full installation. This has become a trend rather than an anomaly. (See Figure 3.2 in chapter 3.) Indeed, the fact that installation required twenty-five diskettes has driven many to choose software on CD-ROM for faster installation and fewer floppy diskettes.

memory (the memory addresses between 640K and 1MB—including a 64K segment for video memory) as well as extended memory, or everything above 1MB (conventional and high memory). Most users have at least 8MB of RAM, and some have as much as 16MB or more!

Nearly any notebook you buy will come with at least 8MB of RAM as the entry-level standard. The burning question is, how much is enough? The answer is that enough is never enough. There may, however, be an effective limit to how much you can really use. With Windows 95, system resources are managed to allow you to run far more programs, especially if you are running Windows 95-compatible versions. Nothing will enhance your performance under Windows 95 like having lots of memory. (See Hint 4.)

Not too long ago, memory in personal computers and notebooks consisted of dynamic random access memory (DRAM). Another type of memory, extended data out (EDO), has quickly gained acceptance, particularly in high-end machines. EDO RAM can result in performance gains of up to 10 percent. This type of memory is more expensive but should continue to drop in price as it becomes more widely available.

Another decision regarding memory usage involves using a RAM disk, which is another type of memory device. A RAM disk is a place to store files, programs, or data, just like a hard disk or a 3.5" disk. When the RAM disk is created, it is assigned a drive letter ("e" for example). The chief advantage is that memory can be accessed at very high speed, enhancing performance. The major disadvantage is that this storage memory is volatile. Turn the computer off and the information is gone—not a place you want to save your most critical data. DOS includes a RAM disk utility, called RAMDRIVE.SYS. An excellent third-party RAM disk utility is Super PC-KWIK.

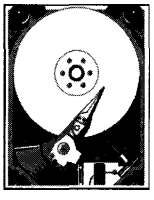
A RAM disk is an excellent place for temporary files or working files that your computer creates as you work. Windows creates "*.tmp" files

HINT 4 PURCHASING ADDITIONAL MEMORY

When considering memory expansion, particularly after purchase of your notebook, consider using mail-order. Many third-party vendors, such as Sigma Data and Kingston, offer memory upgrades at significantly less than retail prices. If you check the computer magazines, you can find several companies (such as Sigma Data, H.Co., First Source, and L.A. Trade) that specialize in memory upgrades for notebooks and computers. (See Appendices A and B.) Above all, shop around when you are purchasing your computer and consider the cost of additional memory.

as you invoke programs. Information in these files is temporarily stored while your computer does various tasks, such as opening and closing applications, printing files, and so forth. Windows requires a "TEMP" directory where it stores these files.[10] If you turn off your computer without exiting Windows, these temporary files can accumulate on your computer. Try directing these files to a RAM disk.[11] Once you turn off your machine, the files disappear, and you might notice some slight increase in performance.

Hard Disk



What size hard disk should you get with your notebook? A little perspective is useful in this regard. The IBM XT computer had a 10MB hard disk, more room than anyone ever imagined necessary at the time. These days, you probably need a 1GB+ (that is, 1 billion plus bytes!) hard disk to avoid instant obsolesence. In the old days, most users confined themselves to only one or two programs at a time. These days, you will have dozens of applications on your computer. Also, Windows programs continue to swell in size with every new release. WordPerfect 7.0 demands in the range of 100MB for a full installation. (See Figure 3.2, in Chapter Three, for other examples.) The moral here is: get a large hard disk. Notebooks regularly come with 1+ GIG drives now. Thus, it is no surprise that we recommend getting as big a hard disk as you can reasonably afford.

Another option, for older machines, is to use software to increase the storage capacity of your hard disk. The top choices for DOS and Windows 3.x users are Stacker from Stac Electronics, and DoubleSpace, part of Microsoft MS-DOS 6.0. Windows 95 users must use

[10] Windows will create a directory off the Windows directory named "\WINDOWS\TEMP." Temporary files can be directed to that directory by inserting the following two lines into your AUTOEXEC.BAT file:

```
SET TEMP=C:\WINDOWS\TEMP
SET TMP=C:\WINDOWS\TEMP
```

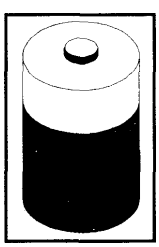
[11] Assuming you have created a RAM disk, you can direct your temporary files to that drive with the following commands:

```
SET TEMP=E:
SET TMP=E:
```

DriveSpace.[12] Stacker can increase the effective size of your hard disk up to 2.5 times its normal storage capacity. The amount of compression realized depends on what is stored on the disk: word processing files compress a lot, graphics files don't. The cost is a slight decrease in system speed when accessing the hard drive. Also, just as with any other utility or software, make sure you back up often! This should be done at least once a week, and daily is even better. These programs are covered more fully in Chapter Six.

Notebooks sometimes come with removable hard disks. This is an attractive option, particularly if you might be sharing the machine with someone else. For example, your firm could have several notebooks that can be checked out as necessary. Each user could have a hard disk that he or she simply slides in and boots up. This eliminates the need to configure and reconfigure the machine for different users. Each person can configure the notebook to his or her liking on an individual hard disk where all the information is stored. Moreover, each person can have data safe and secure on his or her own disk. Even without a removable hard disk, you can add another hard disk using a PC-Card, as discussed below. When choosing a notebook, compare how much storage you get for the money. Bargain shop as much as possible.

Battery



The beauty of a notebook is that you can work wherever you are, whether in a client's office or at 30,000 feet jetting across the friendly skies. For cross-country flying, a battery that will last three to six hours before requiring recharge is critical. The last thing you need is for the computer to shut off before you have finished your work. To save on battery life, most notebooks have power management features that will shut down devices such as the hard disk and display when they are not being used.

Type of Battery

The first portable computer batteries were nickel cadmium (NiCad). The NiCad did not offer very long battery life and suffered from a major

[12] For optimal performance and compression, get the version that comes with the Microsoft Plus! Pack.

flaw: "memory." Unless you fully discharged the battery before recharging, the battery would gradually hold less and less charge after several cycles. Ultimately, the battery would hardly accept a charge at all. As long as you were disciplined about conditioning your battery (that is, letting the battery fully discharge before recharging), this was not a problem. However, most of us do not have the memory of a NiCad battery and we recharge the battery willy-nilly. In addition, NiCad batteries posed an environmental hazard because of their cadmium content.[13]

The next generation battery was nickel metal hydride (NiMH). These batteries offered better battery life and purportedly were not susceptible to battery memory. At a minimum, buy a notebook with a NiMH battery. The latest generation battery is a lithium ion battery that offers outstanding battery life and lower weight. The downside is that these batteries are more expensive (almost $200 each) and susceptible to damage from overcharging (much like a client relationship). These set the current standard until other technologies emerge. Another option, although not widely available, is zinc-air. Some machines have allowed the use of AA batteries, but this has not really caught on due to the lack of battery standardization. This may change as battery manufacturers, such as Duracell, begin eyeing this market.

Battery Life

Batteries are gradually improving and you should consider this factor carefully and compare the battery life for several notebooks before your purchase. Check out the reviews in computer magazines—the manufacturers' claims are not always credible and should be considered with a grain of salt. Ask those who already have the unit you are considering what kind of battery life they get under normal use. Equally important is the amount of time necessary to recharge the battery. (See Hint 5.)

HINT 5 CHARGING YOUR BATTERY

The time necessary to charge the battery will vary widely among machines. A slow "trickle" charge takes longer but will result in longer capacity. A fast charge will not power the battery for as long as a slower charge. Also, if you charge the battery while using your notebook, the charging time could be substantially longer.

[13] Contact the Portable Rechargeable Battery Association (404-980-6688) for information on disposal of your portable computer batteries.

Battery life is greatly affected by how you're using your computer. Applications that use a CD-ROM or do a lot of hard-disk access will use your battery faster than those that do not. Use a disk-cache utility (such as SmartDrive, Norton Utilities, or PC-KWIK) to cut down on the time spent accessing the disk. A disk-cache utility saves the most recent information accessed from the hard drive to memory. If that same information is needed shortly thereafter, the computer reads the information from memory without going to the hard drive, thus saving battery life. The extent of fragmentation (see Chapter Three) of your drive will also affect battery life by increasing the time necessary to read and save files.

Power Management Features

Power management features can greatly enhance battery life. Most notebooks will "hibernate" and save the contents of RAM if you lose power. For example, Compaq computers use a DOS program (HIBRN8.EXE) to save the contents of memory to a hidden partition on the hard drive. The setup program for your notebook should also allow you to set the power management level of your computer. By slowing the clock speed, you may be able to eke out a few more minutes of machine use. Read your manual for specific details.

Ideally, your notebook will give you a visual and audible warning a few minutes before the battery croaks. The notebook should be able to gauge, and show a "meter" indicating, the remaining battery capacity.

Though not strictly a battery issue, the notebook's use of "suspend" and "resume" features should be investigated. These save you from booting up and shutting down every time you use your notebook. Most notebooks accomplish this feat by either closing and opening the cover (preferred method) or by hitting a special switch on the computer. The latter method is awkward because if you hit the on/off switch by mistake after invoking "suspend," you will lose your unsaved work.

The notebook should also allow for "hot-swapping" of the battery. Use the suspend feature, then remove the battery and swap in a recharged battery. Your work should be saved by an internal battery. This is useful on long flights, particularly if you have a notebook that will swap out the CD-ROM or floppy drive for a second battery.

Another way to enhance your battery power is to use additional power adapters to keep your notebook running without draining the battery. A car adapter can be useful if you spend quite a bit of time driving. (See Hint 6.) A spare AC adapter also eliminates carrying the adapter between home and the office. Also, if something happens to your adapter (Jimmerson knows a "road warrior" whose AC adapter actually melted), replacing it can take time and you are missing in action.

Weight

The first portable computers were painfully heavy (remember the Osborne I). The notebook—the latest generation of portable computer—weighs in at a svelte four to six pounds. When considering weight, do not be fooled by the weight of the machine alone. You must consider the "traveling weight," which is the total weight of the machine and all cables, adapters, and other items necessary to use the machine. A light machine with a clunky, heavy AC adapter is not as desirable as a slightly heavier machine with a built-in AC adapter and lightweight power cord.

Subnotebooks (or ultralights) weigh in at less than four pounds, but achieve this by eliminating important components, such as an internal floppy drive. If you need to share information often, a floppy disk is essential for loading programs and exchanging data with colleagues. These machines overcome this obstacle by using an external floppy drive, but if you are going to carry this unit and its cable, as well as the computer, power cord, and AC adapter, the traveling weight is approximately the same as a regular notebook. Consider how you will be using the machine and then determine the features you need and the sacrifices you are willing to make.

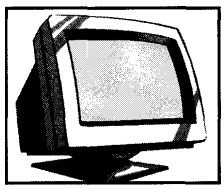
HINT 6 SPARE POWER SUPPLY, CAR ADAPTERS, AND SOLAR PANELS

Many notebook users buy a spare battery. You might also consider getting a spare AC adapter. Having an extra allows you to leave one at the office and use the other on the road or at home. The extra adapter saves you from crawling under the desk every night when you get ready to pack up!

A car adapter allows you to use your notebook on the road—literally! Use caution with these adapters. To avoid a nasty power surge, always disconnect from your notebook before starting the car.

Some vendors even carry solar panels for use with notebooks. These are perfect for that next camping trip when you just cannot leave your work at home. Get help, please!

Display



Not so long ago, no choice of displays existed. All portable computers came with monochrome liquid crystal display (LCD) panels. Thankfully, affordable color has finally made it onto notebook screens. Notebook screens are also steadily growing larger and thus more readable. Another important consideration is the notebook's ability to display your work on an external display simultaneously with the LCD display. You can then send a slide show to a projector and see what is being displayed without breaking your neck.

Color Display

Notebooks are either dual scan (DSTN) or active matrix (TFT). The former offers excellent color and acceptable battery life. Notebooks with DSTN are also more affordable, providing color without crippling either your checkbook or your battery. Another advantage of DSTN technology is that the view is limited to the person directly in front of the screen. This is useful in preventing prying eyes from seeing important client information. The flip side is that a DSTN machine is not useful if three or more people need to view the screen simultaneously. TFT displays are much brighter—they have a light behind them—which is great if you're working in low light. The price of TFT displays has also dropped dramatically recently. With better batteries, such as lithium ion, both displays are very desirable and practical. A TFT display will still probably drain your battery faster.

Screen Size

The size of notebook screens has been growing. The current standard is a diagonal size of approximately eleven to twelve inches wide, although larger screens can be found. Like the keyboard, the only effective limit of larger displays is the external size of the notebook unit. These larger screens are approaching the size of fourteen-inch monitors.[14] A large screen display improves viewability and cuts down on eyestrain. Also, if you will use the screen to display information to clients or others, a large screen is a boon.

[14] Notebooks use the entire diagonal measure of the screen, unlike monitors.

Screen Type

Choosing a notebook for its screen is similar to purchasing a television. Check the clarity of the screen colors. If the display is fuzzy or washed out, you should consider a different manufacturer. The controls for the display should be clearly marked and easy to use. Adjusting the brightness control can improve battery life. Contrast is also important. These controls should be easily acceessible, but positioned so that they cannot be disturbed by normal use. Keyboard-embedded controls should be clearly marked. Windows users can customize the colors by using the Control Panel. Screen savers are fun to use but not essential, and may take up valuable real estate on your cramped hard drive. (See Hint 7.)

Consider the effect of overhead or bad lighting. The angle at which you view the screen is also critical. When you open the notebook, you will tilt the screen back and find a good viewing angle. The amount that you can vary this tilt is important if you will use your notebook under varying conditions. For example, if you are working on an airplane and the person in front of you reclines the seat into your lap, the available tilt room is drastically reduced. Some notebooks allow greater tilt and may be more desirable for your application if you travel by plane frequently. Examine several models before making your decision.

External Display

Even with a good display, you might consider using an external monitor at home or in your office. Therefore, external display support is crucial. Most machines permit you to hook up to an external display device (for example, an external monitor or LCD panel). An external display may be capable of higher resolution than the LCD panel on the notebook.

HINT 7 SCREEN SAVERS

Screen savers used to serve an important function—to prevent burn-in. Older monitors would burn a copy of the image into the phosphor on the display if left on-screen too long. Newer monitors have a higher refresh rate (the rate at which lines of the display are replaced) and burn-in is no longer a problem. Notebooks do not suffer this problem because LCD displays do not use phosphor.

Nevertheless, screen savers are attractive and very popular. They can also aid in privacy by setting a password to reinvoke the screen. Most screen savers can be invoked by moving the mouse to a "hotspot" or by using a key combination. Anyway, they can be lots of fun. After Dark is the best known software vendor in this category, offering many amusing screen savers. MS Plus! is an add-on for Windows 95 that includes desktop themes with screen savers, wallpaper, sounds, icons, and animated cursors. Very cool!

This is especially important if you plan to use the notebook as your desktop machine as well as a portable unit.

Video graphics array (VGA) is essential, but you should make sure that the machine supports at least external Super VGA (SVGA). SVGA provides higher resolution—up to 1024x768 with 16-bit color. (The more bits, the more colors that can be displayed simultaneously; thus, better shading.) You will want a machine capable of SVGA resolution with at least 256 colors. Also, the machine must have a high refresh rate—75 MHz or better—on external displays. The refresh rate is the speed at which the system updates the scan lines. A low refresh rate results in flicker and should be avoided. The external monitor should also have a high refresh rate. When purchasing a computer monitor, you will see a specification for "dot-pitch." This is a measure of the pixels, or little dots that form the image on the monitor. Each "dot" consists of three pixels (red, green, and blue). The smaller the dot-pitch, the better the resolution. Purchase an external monitor with a dot-pitch of .28 millimeters or less.

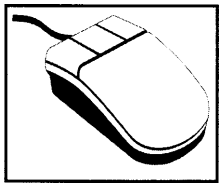
Displaying your notebook display on external sources typically involves one of two options: an LCD panel on an overhead, or a VGA-to-NTSC (National TV Standards Committee) adapter. NTSC is the input/output that television monitors use. This is generally a lower resolution than computer displays. If you purchase a VGA-to-NTSC adapter, test the unit to make sure that you do not get "flicker." Because computers have a higher refresh rate, the television screen may display a line that rolls through the image. This can be very distracting. Another option, although not frequently seen, is a notebook with a removable screen that can double as an LCD panel on an overhead projector.

Make certain that the notebook can simultaneously display on the screen and the external monitor. If you are going to use your notebook for presentations, you will want to see what your audience is seeing.

Pointing Device/Keypad

Aside from the display, the major means of interacting with your notebook will be via either the keyboard or a pointing device. Both are very important when considering which notebook you should purchase.

Pointing Device



If you are using Windows, you must have a mouse or pointing device. Back in the old days, you had to carry a mouse that plugged into either the serial or mouse port. These were awkward, added to clutter, and were difficult to use on a plane. (See Hint 8.) "Trackballs" (and other pointing devices) are now integrated into the notebook. However, placement of the pointing device and buttons is critical because these devices are used constantly with graphical environments. The worst pointing devices are trackballs placed above the keyboard or on the display panel. The best are located just below the keyboard or are integrated into the keyboard, because then you do not have to remove your hands from the keyboard to use the pointer.

Notebooks incorporate one or more of four types of pointing devices: trackball, integrated pointing stick, touch pad, or miniature mouse. A trackball is a small ball embedded somewhere on the notebook. It rotates and thus moves the cursor in the direction of rotation. It allows you to move the pointer around the screen with minimal effort but may not be as positive as other devices, depending on its placement. Other devices, such as the pointing stick and touch pad, are gaining favor.

The integrated pointing stick was introduced by IBM with its ThinkPad. This pointer is a small, pencil-eraser-size post inserted into the keyboard between the G, B, N, and H keys, such that either index finger is in position to push the post as you type. The cursor moves in proportion to the pressure applied, in the direction the post is pushed. This pointing device has become very popular because it is easy to use without taking your hands off the keyboard. These pointing sticks were originally susceptible to breaking, leaving you without a mouse. Later units (Type 2 and Type 3) are much improved.

Touch pads (such as Alps Glidepoint) control the pointer by your finger moving across a touch-sensitive surface. These are rapidly becoming

HINT 8 OPTIMIZE YOUR MOUSE WITH WINDOWS CONTROL PANEL

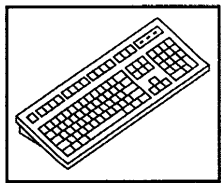
Locating the mouse cursor on a laptop screen can be difficult. Use Control Panel/Mouse to enable "mouse trails." As you move the cursor with this setting enabled, the cursor will leave a trail across the screen.

Depending on the type of pointing device, adjusting the speed of the mouse cursor may help immensely. The higher the cursor speed, the faster the cursor shoots across the screen. If your pointing device is awkward to move far, try bumping up the setting in Control Panel.

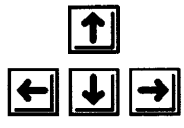
standard. One advantage of the touchpad is that dust and grime can't get into the mechanism. These touch pads are also available as a separate pointing device.

The miniature mouse was introduced by Hewlett Packard with its OmniBook. The mouse pops out of the case and attaches by a thin, flexible, plastic strip. The pointing device you choose is a matter of personal preference. We strongly suggest that you try them all and decide which one suits your taste: it's a very personal matter.

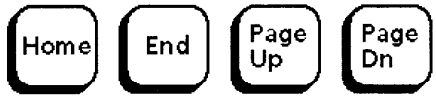
External Keyboard



The keyboard is also very important. Computer makers have resorted to many tricks when it comes to keyboards. The IBM Butterfly used a folded keyboard that opened to the size of a full external keyboard. Typically, however, notebooks must make some compromises with the keyboard because of the size limits imposed by the size of the case. For example, the numeric keyboard will be imbedded in the keyboard. Using the numeric keyboard (and other keys) requires use of a "Function" or "Fn" key. The keys should be logically arranged with dedicated arrow keys in an "inverted-T" configuration:



The keyboard should also include the following dedicated keys:

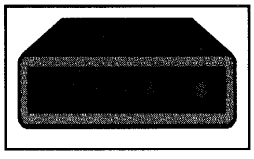


Consider the key "travel"—the distance the key (and your finger) travels downward to invoke that keystroke. The more abbreviated the travel, the more uncomfortable the keyboard will seem, especially to touch-typists. Key travel and "release" (that is, the feel of the key being released) measure the firmness of the keyboard. Key "clicks" can be distracting, if not damaging. CPAs using a notebook will not want a keyboard that clicks excessively. Notebooks that include a wrist rest can cut down on fatigue.

A full-size, external keyboard is often employed at home or at the office and is nice for extended typing. Ergonomic keyboards, such as the Microsoft Natural Keyboard, are a welcome relief to a cramped notebook keyboard. Another option is a keyboard that incorporates both a keyboard and pointing device, such as the Alps and Cirque keyboards.

Spend time with various models and evaluate the feel of both the pointing device and the keyboard. Never buy a computer by mail-order without using the pointer and/or keyboard. Otherwise, you might be disappointed when the machine arrives.

Modems



Here is where reasonable people disagree. Not on whether you need a modem or not: having a modem is a given. It is whether your notebook should come equiped with an internal fax/modem or an external PC-card fax/modem. Not too long ago, you would have had to buy a fax/modem as an add-on peripheral. Today there is a real choice: many machines come with internal modems. Actually, the internal modem was the standard before PC-cards.

The internal modem is simple; it comes as part of the package with minimal effort needed to get it up and running. Plug into a phone outlet and you are on your way. In contrast, the external PC-card modem is something extra to carry around with your laptop. However, if modem technology takes a leap forward, replace the PC-card modem and you are back at the cutting edge. Either way works for the road warrior; it's a matter of personal preference. (See Hint 9 on page 33.)

Speed

If you want to be a real road warrior you will seek out the fastest available modem within your budget. If you cannot afford the current standard of 33.6kbps (one thousand bits per second), you probably cannot afford a portable office that will give you enough years of service to allow you to recoup your investment. Saving money by skimping on modem speed—56kbps would be better—is penny-wise and pound-foolish.

When comparing modems, speed is one of the most important features. Computers communicate with one another either through a network or

HINT 9 CHOOSING A MODEM

1. Get the fastest you can—nothing less than 33.6kbps. Find a way to afford it.
2. Make sure it supports V.34.
3. Get a PCMCIA or PC-Card device (for external modem).
4. Get a combination fax/modem, or even better, a LAN card/modem.
5. Avoid external cables or parts.
6. Check how much power it uses—choose one that consumes the least.
7. Get one that has Flash ROM upgrade capability.
8. Buy a brand-name product, such as Hayes, Megahertz, or US Robotics.
9. Forget the free software that comes with it—you get what you pay for.
10. Read Chapter Four for more-detailed information on telecommunications and modems.

over telephone lines.[15] Computers "talk" on the phone by converting the bits of information they want to send into sounds through a process called modulation. It is somewhat like whistling one musical note for a "1" and another for a "0." The computer uses a device called a modem, which stands for MOdulator/ DEModulator (sounds like something the Martian character in Bugs Bunny cartoons might use). Modems convert computer bits into sounds and, in effect, play them into the phone receiver and convert them back into bits on the other end. Modem speed is measured by the rate at which data is converted and transferred across phone lines.

Although the telephone system (whether land line or cellular) limits the speed—the "bandwidth" of the transmission medium, such as POTS (plain old telephone service) or coaxial cable—at which you can communicate, the major limit is the speed at which the modem can operate. Modems can always talk slower to accommodate poor POTS lines or a slow modem at the other end. They can never, however, speak faster than they are designed to operate. Modem speed is measured in bits per second (bps) transferred. The more bps, the faster the modem. To eliminate repeating a whole bunch of zeros, modem speeds are normally indicated in kilo bits per second (kbps), or simply "k" (for example, 28.8k).[16] A computer needs eight bits (a byte) to encode a

[15] This distinction can become blurred, but we will worry about that later.

[16] Engineers used to rate modems by baud rate (for Baudot), which was a measurement of modulation rate. With the advent of advanced quadrature methods, baud became a less meaningful measure and modems are now rated in bits per second (bps). For rates above a thousand, the prefix "k"—for the Greek kilo, or one thousand—is used. Hence, 28kbps is 28,000 bits per second.

single letter or typewritten character, and an extra bit or two to send information over the phone line. Thus, whatever the rated speed of the modem, if you divide that measurement by ten, you get a rough idea of the number of characters per second the modem can send.

Modems have improved dramatically over the past ten years. The first modem operated at a snail's pace (110bps). For POTS lines, the current highest speed is 56k, with 33.6k the current standard. The old speed standard, 14.4k, though still found in older machines has been supplanted and should be avoided (14.4k is still the optimum fax speed; a reflection on existing fax technology). A slow speed will adversely affect your use of email and is too slow for efficient Internet browsing (those pretty graphics take soooo long to load at 14.4k; you can get impatient even at 33.6k). Although some online services no longer have hourly connect charges, the time needed to interact and download information is drastically reduced by using a 33.6k modem; likewise a 56k modem should theoretically further shorten the download time, but bandwidth limitations and other factors sometimes prevent the modem from operating at its maximum rated capacity. Thus, the money you spend on a faster modem is recovered in lower telephone charges, not to mention reduced wear and tear on your patience, and will save your laptop from obsolescence when bandwidth enhancements catch up to modem speeds.

One problem facing those who have still not upgraded to Windows 95—not likely unless you invested in a bargain basement machine on the surplus market, or a used machine—is that the serial port driver will not run any faster than 19.2kbps. (The driver is the software that tells the operating system how to talk to a particular piece of hardware. In Windows, it is a file called SERIAL.COM.) You can purchase various commercial higher-speed drivers (Hayes offers a good one), or you can download shareware[17] from a number of sources, such as CompuServe or America Online. Frugal users might try a freeware driver (no registration or license fee required) called CyberComm, which can be downloaded from CompuServe from the PC Communications forum in the Comm Utilities library. (See discussion on uploading and downloading in Chapter Four, "Using Email.")

[17] "Shareware" is software that is provided free to the user (typically distributed on online services or the Internet). The software's author requests registration of the program and payment of a small fee if the user continues to use the product. This is an excellent way to evaluate software before use.

Standards

At one time, when choosing a modem, you were confronted with a variety of different standards. This is not a problem for a new laptop with a 33.6k modem because it will meet the existing standard—namely, V.34 (pronounced "Vee dot thirty-four"). This is the highest speed standard for the current crop of modems. Some manufacturers' modems support an earlier not-so-standard "standard," called V.FST or V.FAST, which represented their attempts to sell 28.8k modems before the industry agreed on how they would all behave. Although it will not hurt to have a modem that can communicate with V.FAST, your modem must support V.34. This standard allows your modem to talk to the modem on the other end and test the phone line to see how fast the modems can reliably talk. If the phone line is good, they will talk faster than fast; if the line is bad, or becomes bad, they will slow down to whatever speed is needed to talk reliably. If things get better on the line, they will speed up. Remarkable!

Flash ROM Upgrade

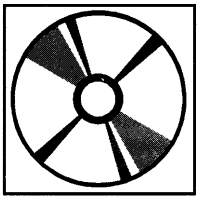
If you have a notebook with an older modem you may be able to upgrade it as new standards are developed. These modems are software controlled, storing their programs in nonvolatile (that is, they will not go away when you turn them off) read/write memories known as Flash Read-Only Memory (Flash ROM). When new software control programs are released, the internal programs can be updated by running a software program that writes into the modem's control memory or ROM. As new standards are developed, the manufacturer will send out disks with the upgrade software, or you can download the upgrade off the Internet or your favorite online service.

Compression Standards

To get even higher throughput rates (engineer-speak for the speed at which modems push information through the phone wires), modems can compress data. By using various techniques to reduce the size of the information sent, and then "unreducing" the data at the other end, modems can transmit more information. In simple terms, the compression techniques take advantage of certain patterns and redundancies in the data stream. For example, suppose the file contains a whole lot of 0s in a row. Instead of sending all the zeroes (say there were

a thousand of them), the modem sends only the code "~0~1000" and understands the code to mean it is really a substitute for a thousand zeroes. The process is, of course, a bit more mathematically complex, but you get the basic idea. Some information, such as a database, lends itself to compression very well, while other data, such as a program file, does not. To take advantage of compression ability and to find the best rate, set your communications package to run the modem in "auto-reliable" mode. Check the manual regarding your modem and communications software, because each is different.

CD-ROM



Using a CD-ROM on the road has changed rapidly in just the last couple of years. In fact, it is now almost a necessity. And because of this, almost every new laptop being sold in 1997 that is worth its salt has a built-in CD-ROM drive or a CD-ROM drive exchangeable with the 3.5" disk drive. The main reason for making a CD-ROM drive part of the "original equipment" is that most software is released on CD-ROM. The advantage is loading one CD-ROM rather than a handful of disks. A CPA will want a CD-ROM drive to access the information now available on CDs, such as professional standards and the tax regulations, to name just two items of interest. For example, a CPA has a meeting at a client's office. During the course of the meeting the need arises for an accurate income tax citation. Rather than dialing into an online service, a CD-ROM containing the Internal Revenue Code and Regulations is popped into the laptop's drive and the specific section is located with a minimum of effort.

CD-ROMs are also useful for storing large quantities of information, as each disk can hold approximately 680MB of information. In complex engagements involving thousands of documents, some CPAs have all the documents scanned and then mastered onto a CD-ROM. This provides a reliable and convenient way to transport mountains of documents. If you need a copy of a document, simply print a copy of the imaged document.

Currently, a major obstacle is the limited amount of storage on a single CD-ROM. The effective limit is approximately 680MB, which is fine for documents but can evaporate quickly if graphics are involved. A new standard, Digital Video Disc (DVD), has recently been adopted that will increase this limit fourfold. DVD will ultimately supplant laser discs.

Configuration

Long ago, the only option was a portable CD-ROM drive. These lightweight units generally required an AC outlet, although some were battery powered. These portable units also required a SCSI (small computer system interface: pronounced "scuzzy") adapter or an SCSI-to-parallel port cable. A bulky solution at best, but still a real lifesaver.

The first multimedia portables (such as those produced by IBM and Texas Instruments) used docking bases complete with CD-ROM, sound card, and speakers.[18] These are not to be confused with docking stations that include both card slots for full-motion video, network adapters, and so on, and drive bays for a CD-ROM or hard drive. The next generation of multimedia notebooks used internal CD-ROM drives that occupied the space reserved for the diskette drive. Then came the fully integrated CD-ROM drive. Most current modular notebooks allow swapping of the CD-ROM, disk drive, hard disk, or spare battery. These modular component notebooks are far superior and provide needed flexibility. In some cases, an optional multimedia base is required.

Speed

CD-ROM drives have become progressively faster, although the access speeds are nowhere near that of a hard disk. Multimedia requires fast output and seek times, as well as caching to improve performance.[19] Although not nearly as fast as a hard drive, CD-ROM drives are astonishingly fast. And you can commonly find drives with speeds of 10×. However, a 6× will be adequate for the needs of most CPAs. If your checkbook can stand it, faster is better yet.

Another factor you must consider is the throughput or average access rate. The throughput is a measure of how fast data can be transferred under optimal conditions, usually at least 600K (higher is better) with 4x drives. The average access rate indicates the average speed (lower is better) at which information can be retrieved off the CD-ROM disk.

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[18] One of the first multimedia portables was the Toshiba 6600C. This behemoth had an internal CD-ROM drive, a full-motion video card, internal speakers, a half-GIG hard drive, and a 486-66 processor. Unfortunately, it had no internal battery and weighed seventeen pounds. A true "road hog" for the road warrior.

[19] You can demonstrate this point by accessing full-motion video off a CD-ROM disk. The image will appear to jump or stutter on a slow drive.

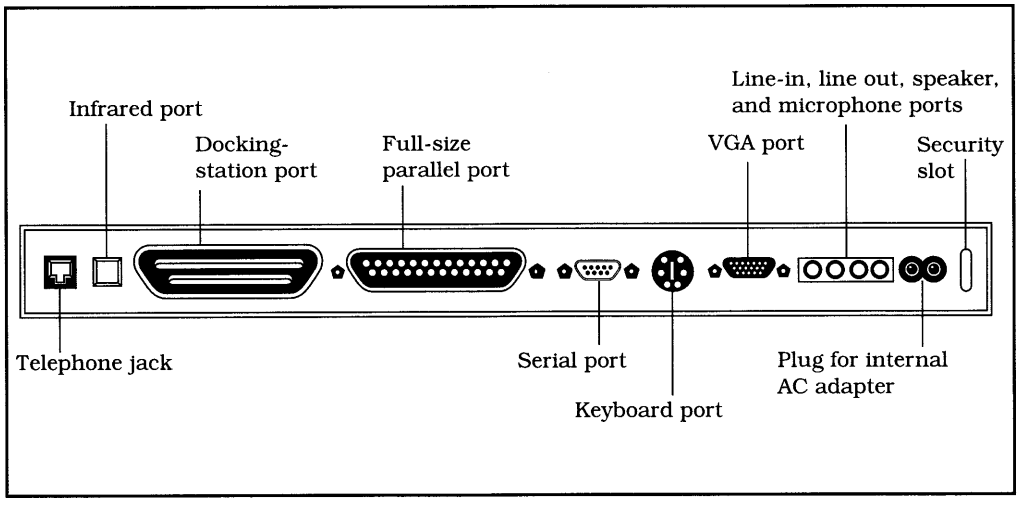
Other standards you will see for CD-ROM are "Photo-CD ready" and "MPC-compliant."[20] As with any other piece of computer equipment, faster always costs more, but it will be useful longer!

Other Input/Output Options

Ports

On the back of the notebook are connectors or "ports" for plugging into peripheral devices. The notebook *must* have the following ports: serial, printer, infrared, sound, MIC, external keyboard/mouse, external display, and docking station. (See Figure 2.2.) Also look for a security slot that accommodates a notebook cable (a Kensington lock, for example).

FIGURE 2.2: INPUT/OUTPUT PORTS



If you want to use both a mouse and an external keyboard, your computer should have a PS/2 port for each. If your notebook does not, you have two choices. You can either use a serial mouse and plug the keyboard into the PS/2 port, or get a PS/2 splitter to control both devices off one PS/2 port. These adapters are difficult to find (contact AST Research) and may not work properly on your machine. Consider your situation before purchasing your notebook.

[20] Photo-CD is a standard advanced by Kodak for capturing images in digital format. MPC stands for Multimedia Personal Computer.

Infrared Port

Notebooks typically include an infrared port to send and receive data without cables. This technology was first used to exchange data with hand-held devices (PDAs) and to print. This type of port eliminates one more cable that you otherwise need to carry around. An infrared port on both your printer and notebook makes printing very quick and easy with no printer cable: you simply align the infrared ports on the notebook and printer and then print the document. Of course, you have to make sure that the path between the two infrared ports is unobstructed. Thus, the location of the infrared port is critical. These ports can also be used for networking. For example, if you are in a conference with your client and several other parties, you can use the infrared port to send a document or message to another user with an infrared port. If possible, get a machine with an infrared port. Ideally, there should be an infrared port on the side and back of the machine.

Port Covers

Ports (except infrared ports) on the back of the notebook are generally concealed by a door that slides out of the way or flips up. These "garage door" covers can easily break if not properly designed. A good design reveals the ports easily, with minimum hassle, and will not break off when traveling.

Docking Station

A docking station allows you to plug your external devices, mouse, display, keyboard, and printer into one unit that connects to the docking port on your notebook. This makes connection easier and saves wear and tear on your notebook's ports. If your notebook does not have a built-in CD-ROM, a docking station is ideal for one, or even a second hard drive. Docking stations generally come in two flavors: port replicators and peripheral docking stations.

Port Replicators

A port replicator provides a connection for each of your external devices and a single connection to your notebook. Attach the cables, monitor, keyboard, mouse, and printer to the port connector, and then plug it

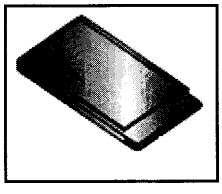
into the notebook. Pop the notebook off the port replicator and you are on your way. Port replicators are low-cost options and are typically available for one to two hundred dollars.

Peripheral Docking Station

A peripheral docking station has card slots for connecting additional devices to the notebook, just like a desktop computer. For example, you can put a sound card or full-motion video card in a card slot in the docking station. These full-size docking stations also include drive bays for a CD-ROM or second hard drive. A docking station with a CD-ROM drive can be a very effective tool for a CPA who has stored all of a client's or employer's financial information on a CD-ROM. Just walk into the meeting room, fire up the machine, and you have a complete workstation with all your information. If you are using Windows 95, the operating system automatically detects whether you are docked or undocked and configures accordingly. This conserves memory and resources, not to mention reducing aggravation.

A word of caution: peripheral docking stations are not cheap—they cost a few hundred dollars. So if you invest in a state-of-the-art, fully integrated notebook, there might be no need for a docking station. As a result, docking stations are slowly becoming obsolete as more components are being integrated into the notebook. Therefore, before investing additional money in a docking station for your present notebook, consider upgrading to a modular notebook.

PC-Cards (PCMCIA)



The standard method for adding accessories to your notebook is by using PC-Cards.[21] PC-Cards are credit-card-size devices that plug into special slots on the side of the notebook. These are useful for adding a variety of peripherals to your notebook, including fax/modems, flash memory, network or SCSI cards, and even miniature hard disks.

[21] PC-Cards were originally referred to by the standard adopted for their use: PCMCIA. This unwieldy acronym stands for "Personal Computer Memory Card International Association." (For more information, visit its Web site at http://www.pc-card.com.) This must surely win the award for worst acronym. Other possibilities: "People Can't Memorize Computer Industry Acronyms" or "PCs May Cause Indigestion." (Courtesy of Jeff Flax.)

PC-Cards are Type I (such as flash memory), Type II (such as fax/modem or network/SCSI interface), or Type III (hard disks). The difference is in the height of the card. A Type II card is 5.5 millimeters and a Type III card is 10.5 millimeters. Settle for nothing less than a machine with two Type II slots that can double as a single Type III slot. Even better, find a machine with one Type II slot and one full Type III slot. Another option is to use combo PC-Cards. For example, use one PC-Card for a modem and network interface card (NIC), or a combination SCSI and sound card. If you need three PC-Cards and have only two slots, combo cards can be a real lifesaver.

Any PC-Card should include the necessary drivers for configuring the card to work on your computer. You might also consider getting special software to aid you in this formidable task. (See Hint 10.)

If your notebook does not include an internal modem, this is the best choice for adding a fax/modem. (See discussion of modems above.) Plug the fax/modem into the PC-Card slot, and then connect with either a phone line (if your fax/modem has a built-in RJ-11 jack) or a device interface (or dongle) that plugs into the edge of the PC-Card with the phone line plugging into the other end. The first option requires only a phone cord because the fax/modem has a built-in jack that pops out of the end of the PC-Card. If the fax/modem requires an external cable or edge connector, then the fax/modem is useless if that cable or connector is lost. The first manufacturer to provide this type of interface was Megahertz with its X-Jack modems. Others (such as Hayes and Practical Peripherals) have since joined the fray.

Warranty

You must pay close attention to the warranty. The portability of these machines means that they take a lot of abuse as they are hauled around

HINT 10 CONFIGURING PC-CARDS AND DRIVERS

Using PC-Cards is not always easy. You must use special card drivers so the system recognizes and uses the cards. These drivers are notorious for their gluttonous use of memory. The task is compounded if more than one card is inserted (for example, modem and Ethernet cards). DOS and Windows 3.x users should consider using CardWizard Pro from SystemSoft Corporation, the industry leader in the field. This program will detect and configure your cards for use with Windows 3.1.

If you are using Windows 95, its Plug-N-Play technology eliminates most problems because PC-Cards are automatically recognized and configured when inserted. In rare cases, this will not work, so consider CardWizard Pro for Windows 95.

day after day.[22] Moreover, as notebook repairs can be very expensive, the length and extent of your warranty can be a major factor when selecting a notebook.

Most notebook vendors offer a warranty of one to three years and, obviously, the longer the better. You must also consider the nature of the warranty. Where do you have to go for service? Do you get on-site service or next-day replacement? What is the expected turnaround time, and will you be furnished with a replacement unit if the machine cannot be repaired immediately? Remember the internal/external modem confrontation? Your notebook goes to the shop for repair of the internal modem leaving you a garaged road warrior.

Better companies, such as Compaq, Dell, IBM, and Toshiba, offer overnight repair and/or replacement. Return the unit by overnight mail (most top-shelf vendors will have the product picked up from you) and the vendor will send back a repaired or replaced computer the day after it receives the machine from you. In effect, this means you have a working unit back within seventy-two hours of shipping the unit to the vendor. This is comparable to, or even better than, bringing your computer into your local computer store because it will probably do the same thing. (You do not really think they repair those machines themselves do you?) Some vendors offer in-office repair services for a small extra charge; it is well worth it.

If you need to return your computer (or any peripheral), you must contact your vendor before shipping and get a return merchandise authorization (RMA), and you should keep certain items. (See Hint 11 on page 43.) The RMA is very important for tracking your return item and is a prerequisite for any vendor. Call the manufacturer's customer service or technical support department (see Appendix A) and representatives will provide you with an RMA and shipping instructions. Hopefully you saved your original shipping materials. (They may take up room in the closet or storage room, but they sure come in handy when you need them.) If you are using an extended warranty from your credit card issuer (see Hint 1 on page 15) and the original warranty has lapsed, you will need to contact your credit card company

[22] Some magazines, for example, *PC Magazine*, routinely publish torture tests for notebooks. Dell almost always wins these.

HINT 11 RETURNING YOUR COMPUTER FOR REPAIR

If you must return your computer for repair, be very careful that you do not send it with your hard disk containing confidential client information. This is justification enough for getting a notebook with a removable hard drive.

Typically, the service department will advise you to remove peripherals, extra memory, and the hard drive.

and make a claim. Generally, that company has you return the item to the vendor and has the vendor send it an invoice.

You must also consider the reputation of the manufacturer for service and technical support.[23] The industry has been plagued in recent years with technical support call holding times that run into an hour or more (if the representatives answer at all). The best resources to investigate this issue are the computer magazines (*Computer Shopper, InfoWorld, Mobile Office, PC Magazine, and Windows Magazine*). These publications periodically review portable computers and include information about technical support and service experience. You should also ask other portable computer users about their level of satisfaction. Life is just too short to spend it holding for technical support.

A good warranty can save you money in both repairs and resale value. If you can upgrade your system two and one-half years into a three-year warranty, you can realize more from the sale of your old equipment. Often, you pay a bit more to get an extended warranty or a better turnaround time for repairs. These extended warranties are frequently well worth the investment.[24]

SUMMARY

The next chapter covers peripherals and other accessories you will want and/or need (not always the same thing). Purchasing a notebook computer is only half the job (and expense). You will need some essentials, such as a carrying case and printer. Keep this in mind when budgeting for your purchase. And remember software, which is also discussed in the next chapter.

[23] This is a very sore subject for Coolidge. He once had a nightmarish, months-long experience in getting a machine serviced. Ask him personally about his experience with various manufacturers.

[24] We know a friend who discovered a bug in his computer after the warranty expired. The dead bug had gotten lodged behind the display. He needed an extended warranty!

Further Reading

On the Road: The Portable Computing Bible, Jim Seymour (Brady Communications, 1992).

Quick Reference Guide™—Laptops, Notebooks & Mobile Computing, Edmund X. DeJesus (DDC Publishing, 1994).

PERIPHERALS, SOFTWARE, AND OTHER ESSENTIALS

"Well begun is half done."
Aristotle, *Politics*

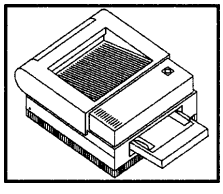
chapter 3

Choosing a laptop is only the first leg of the journey toward becoming a road warrior. The first half of this chapter focuses on peripherals or accessories that you will need with your notebook. The last half discusses software for your notebook, as well as advice on using these tools to create a virtual office that will make your practice more efficient, provide better quality service to your clients, and, hopefully, relieve some of the stress inherent in the practice of accountancy.

PERIPHERALS

Once you have acquired your notebook, you will need additional hardware. Until recently a modem and CD-ROM were the most important peripherals to add once you settled on your notebook. Today, because so many notebooks arrive with these two "former" peripherals built in, the discussion of their importance and use was moved up to Chapter 2. Now other hardware goodies, such as portable printers, scanners, and network interfaces, jump to the fore. Finally, once you have assembled this arsenal, you will need a toolbox (carrying case) to store everything.

Portable Printer



Generally, you can get by on the road without a portable printer. It adds weight and bulk to your portable office. In a pinch, you can fax a document to yourself and trot down to the hotel desk to pick up the hard copy. Alternatively, you can use the printer in the hotel business center. Make sure that you have installed a broad range of printer drivers on your notebook (or a printer driver diskette) so you can use whatever printer is available, whether in a client's office or a hotel business center. (See Hint 12.)

If you really need hard copy, you can use a portable printer. The available choices are somewhat limited, but they can be high-quality machines—rivaling the quality and output of desktop laser printers. The four types of printers are: laser, ink-jet, bubble jet, and dot matrix. Because of the hardware necessary for laser printing, there are presently

HINT 12 PRINTER DRIVERS

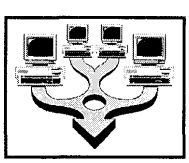
If you are using Windows 3.x, you should make a copy of the disks with the printer drivers. If you get caught with an off-brand printer, you will not be able to print without the correct printer drivers.

no portable laser printers, but this could change in the future. Ink-jet and bubble jet are the two most popular types of portable printers. Ink-jet printers spray ink onto the paper to form characters. Bubble-jet printers heat the ink into bubbles, which are then sprayed onto the paper. Dot-matrix printers use small print heads with rods that strike a ribbon, much like a typewriter. These offer the poorest print quality.

The two main contenders in the printer category are Canon and Hewlett Packard. Canon offers several choices for notebook users and they are all solid, rugged machines. Both manufacturers use ink-jet technology in their portable printers. An interesting twist with portable printers is the availability of color. Not only can you print on the road, you can also make a splash with stunning colors!

When selecting a printer, consider all your printing needs. What is the paper capacity of the machine? Does it include a sheet feeder? A sheet feeder holds the paper so that you do not have to feed individual sheets into the printer. If you are printing more than about ten pages, a sheet feeder is essential. Can you print envelopes and labels? How many pages can you print before replacing the print cartridge? The small ink cartridges on these portable printers are depleted much quicker than laser toner cartridges, so you may want to consider carrying a spare. (See Hint 13.) Most important, how fast does it print? Typically, this will be approximately two to four pages per minute (PPM). Do not expect a portable printer to produce high-volume copy. Relax, go have dinner, or do something else if you need to print forty to fifty pages. Yes, you might have to make compromises, but plan ahead. Do not wait to discover the shortcomings of your equipment while you are on the road.

Network Adapters



A local area network (LAN) connects computers together so users can share files and other resources, such as printers. If you have a LAN at your office, you will want to connect your laptop to share files, print documents, or send/receive email. Some manufacturers, for example, Hitachi, make notebooks with an Ethernet adapter built into the machine. Otherwise,

HINT 13 RECYCLING INK-JET CARTRIDGES

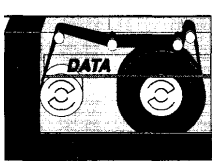
The ink cartridges on portable printers go dry very quickly. Unfortunately, they are not very affordable. The most economical solution to this quandary is to get refill kits for your ink cartridges. These can usually refill a cartridge three to four times at significantly less cost than buying a new cartridge each time.

connecting your notebook to the LAN requires a network interface card (NIC)—either an external adapter or a PCMCIA card. Whichever you choose, you must get an adapter that complies with the wiring architecture in your office, whether coaxial, twisted pair, or 10Base-T. Xircom and 3Com make many fine adapters for use with portable computers. If you have a docking station, it should include a network adapter and port.

If you have a PCMCIA network card, configuring your computer for linkage to the network can be tricky. (See Hint 14.) If not already loaded, you must load card and socket services (the drivers that are required to use PC-Cards), install the proper drivers, and then configure your networking software. (See Hint 10 on page 41.) You may need to consult with your network or system administrator. Windows 95 makes this process almost painless. Pop in the card and Windows 95 recognizes the new hardware.[1] The connection to the network is made automatically.

If your notebook is properly configured, you should be able to access the network just like any desktop computer. Many computer users are foregoing a desktop for a notebook computer connected to a network. If you work outside the office frequently, travel often, or want to conserve space on your desk, this is a very attractive option. Incidentally, if your notebook is set up properly, but one day ceases to work, check the cables to make sure that you are properly connected. If you do not have the cable plugged into your PC-Card, you cannot access the LAN!

Tape Backup



Probably no more than 10 percent of portable computer users ever back up their machines. In an office setting, you guard against data disaster by backing up your office machines on a regular basis. (You do, don't you?) Unfortunately, we often do not take the same precaution with our laptops. Indeed, they are even more at risk.

HINT 14 MULTIPLE BOOT CONFIGURATIONS

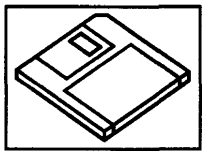
Make a copy of your CONFIG.SYS file for network configuration (for example, CONFIG.NET) and another for normal use (for example, CONFIG.OLD). Copy or rename to CONFIG.SYS as your needs require. This will save some valuable memory when you are on the road and off the LAN. Or use the multiple boot configuration in DOS 6.x. (See Appendix D.)

[1] Well, it works pretty often. But it fails often enough that "Plug-N-Play" has been called "Plug-N-Pray."

What will you do if your computer is stolen out of your car? Or, the car is stolen and your laptop with it.[2] Do not laugh—it might happen!

Portable tape backup units that attach to the parallel port offer a quick and economical way to preserve your data. Make sure that if you use the parallel port, a pass-through port for the printer is provided so you can print with the tape backup unit connected. If you have a PC-Card SCSI interface, you can use larger SCSI tape drives or hard drives. Although you will probably not carry this on the road with you, a portable tape backup unit can be a useful shield for a road warrior. (See Hint 15.)

Portable Storage Devices



Like a portable tape backup, a portable storage device can provide a great way to archive data. In the not-so-good-old-days, the only choice was disks. However, this technology has joined up with the mobile computing rage in two fine choices—hard drives or high-density drives.

Portable Hard Drives

These tiny wonders require a Type III PC-Card slot. These drives currently offer storage up to 340MB. Compression software (see discussion later in this chapter), such as Stacker or DriveSpace, can effectively double the storage capacity. A PC-Card hard drive is a great choice if you have an office notebook that is shared by many individuals. Each can have his or her own drive to store data. Also, if you have sensitive client data or a complex client meeting, you can purchase a separate PC-Card drive.

Removable Drives

The newest storage media are removable cartridge drives available from Iomega, ZipDrive (100MB), and SyQuest, EZDrive (135/270MB).

HINT 15 STORING BACKUP TAPES

You should always save at least one set of backup tapes in another location. Keep a set at the office and another at home. If you have a fire, flood, or other disaster, chances are that one location will survive. If both are destroyed, you have a problem so serious that tape backup is the least of your concerns.

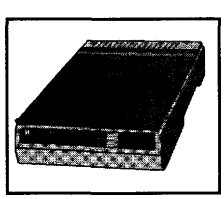
[2] Jimmerson knew someone who lost his notebook when his car was stolen. Although the car was recovered, the notebook was lost.

These drives use high-density disks, similar to floppy drives, that store over 100MB each. The speed is slightly slower than a hard disk, but is certainly an acceptable compromise. If you have programs you use infrequently, you might consider installing them on portable, removable media, thus preserving some of the valuable real estate on your hard disk. This is also a great way to archive all that clutter off your hard drive. CPAs could also use these for creating checklist libraries without sacrificing space on their hard drives. Or for more storage and faster speed, get an Iomega Jaz (1 GIG) or SyQuest SyJet (1.5 GIG). Both require a SCSI connection. These devices are just as fast as a hard drive.

These drives attach to the computer just like CD-ROM drives, either via the parallel port (the cable or drive incorporates a special SCSI interface) or by using a SCSI port or PC-Card. As noted earlier, the parallel port device is easier to use. You can "chain" these drives as with any other SCSI device. Chaining the drives involves using one port to run two or more devices. SCSI cards can run up to seven devices off one port. Connect each device to the cable and terminate the last device. A terminator is simply a switch or end connector that indicates the last device in the series.

Parallel devices are chained by using the pass-through parallel port. Connect the first device to the computer parallel port. The next device is then connected to the parallel port on the first device, creating a chain. Test the configuration thoroughly, particularly with Windows 95. For example, the ZipDrive from Iomega often balks if certain devices are plugged into its parallel port. A portable storage device can be a real blessing and may offer a viable alternative to much more expensive options, such as burning (creating) your own CD-ROMs. Creating your own CD-ROMs is more expensive, although the hardware has dropped in price to less than one thousand dollars.

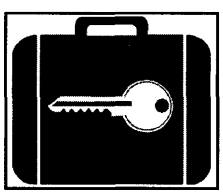
Portable Scanners



The hottest new gadget for road warriors is the personal scanner or desktop page-reader. These tiny units are easily transportable and quickly scan one page at a time. Their major benefit is that they do not take up as much room as a full-size flatbed scanner, as they are designed to fit between the keyboard and the monitor on a desktop system. Also, they are more reliable and easier to use than hand-held scanners that require a steady hand and multiple scans for a single page.

Using these portable page-readers is simple. Feed the page into the unit and the scanned image is then imported directly into your word processing document or other application. Documents can be saved as images, or you can use the bundled optical-character recognition (OCR) software to convert documents into text. This provides an easy way to fax documents if you do not have a fax machine at hand. However, these portable page-readers are not designed for heavy duty scanning, and they offer lower resolution than high-end flatbed scanners. The portable page-reader attaches to your computer by either the parallel or serial port. A parallel interface is preferred for speed and flexibility.

Carrying Case



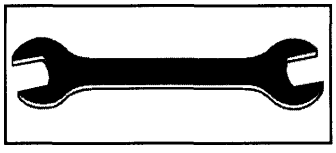
A carrying case that suits you is essential. A good case must have a secure, padded compartment for your notebook and, if you must, a separate compartment for a portable printer. The handles on the case should be very sturdy but comfortable, particularly when you're carrying a heavy load. You need plenty of well-organized storage for accessories such as cords, AC adapter, disks, mouse, etc. This should include plenty of pockets and Velcro straps to keep things arranged. There should also be convenient and separate storage spaces for folders and papers. The leading manufacturer of computer cases is Targus, which has many different models available that will fit within any budget. Best of all, Targus cases come with a lifetime warranty. If anything happens to the case, call the company and it will send you a new case when you return the defective one.

The case should have a strap with a pad for resting on the shoulder. A custom shoulder strap is far more comfortable than others, especially as you schlepp your computer and gear from one airport to another. Check out the straps at your local camera shop. Optech makes a strap that is both padded and elastic, making the load actually seem lighter! This saves wear and tear on the shoulders and neck. Make sure the case (when full) will fit under an airline seat or, at the very least, into the airplane's overhead storage compartment. Also, leather looks nice, but it tends to get beat up more quickly.

An interesting option is the Sherpa from Targus. This case doubles as a rolling luggage carry-on, with clothing compartments and space for

computer accessories as well as a removable case for your computer. Other manufacturers have begun making rolling computer cases. If you take frequent overnight trips, these are useful when rushing through the airport to make your connecting flight.

The Essential Tool Kit



Surviving on the road can be tough and downright impossible if you are not prepared. The essential tool kit includes everything you will need, particularly in an emergency. (See Figure 3.1.) A long PC cord for your AC adapter (if applicable) comes in handy when you go to a meeting and the only outlet is nine feet away. The standard six-foot cord that comes with your notebook just will not reach! Aarghh!!! These cords are readily available at Radio Shack (look in the appliance section). Newer machines with an internal AC adapter use a standard cord with one end that resembles a European shaver cord. If you have one of these, carry an extension cord. The same reasoning applies to the telephone cord for your modem. (Why is it that the phone in a hotel room is so often three feet farther from the desk than the longest phone cord I have?!?!!) Try the Telespool: an 8½ foot phone cord that rolls up into a PC-card sized case.

FIGURE 3.1: BASIC TOOL KIT

1. Twelve-foot PC power cable
2. Compact surge protector
3. Three-prong adapter and triple tap
4. Twelve-foot phone cord
5. Dual-outlet adapter for phone
6. Desktop mouse
7. Spare battery
8. No.1 and No.2 Phillips screwdrivers
9. Quarter-inch flat screwdriver
10. Small pliers
11. Miniature clip leads (experienced users only)
12. Printer cable
13. Windows printer diskettes or drivers
14. Special cable for file transfers (LapLink, for example)
15. Boot disk
16. Backup disk (for critical data files)
17. DOS or Windows 95 startup disk
18. Spare blank disks
19. Notebook manual

For International Travelers:

1. Telephone adapter
2. Power adapter

If you are traveling overseas, you will need (in some cases) a power adapter. For example, in England, the outlets use a different plug and are 240 volts, not 110 as in the United States. Many laptop power units are operable at the higher voltage but you will still need an adapter to physically connect. In other countries, you may need a power converter as well. Also, England uses a different plug to connect phones, so you will need a special adapter there as well. These can be purchased in many Radio Shack or other computer stores when you arrive. Also consider Tele Adapt (www.teleadapt.com), a mail-order company that specializes in adapters.

You can add other items depending on your needs. You might include a laser pointer, financial calculator, hand-held dictating equipment, and spare tapes. Considering your investment (not to mention your data), a small, portable surge protector to take care of power spikes is a reasonable and inexpensive precaution. Buy a good one (perhaps from Curtis Equipment) that carries a guarantee to replace your equipment if it does not work. Remember to carry a three-prong adapter (if your equipment requires one) for those occasions when the only outlet in the room does not have a ground.

Carrying a spare battery makes sense even if you are using lithium ion with plenty of normal battery life. You will run out of battery at some critical time, and batteries do fail. Having two batteries allows you to keep one recharging at all times. Some notebooks can accommodate up to three batteries at once. If you are using NiCad batteries, make sure you drain them completely before recharging. Otherwise, the battery develops a "memory" and loses charging capacity.

Always carry a bootable disk with your version of DOS, and your boot files. Some programs, such as Norton Utilities, will create an emergency disk in the event your system starts acting up or your system files get corrupted or lost. If you have an emergency disk, make sure that its contents are updated regularly. Better safe than sorry. Always carry a couple of backup disks and religiously preserve your most precious data every day. If you use WordPerfect for Windows, set the timed backup to direct the files to a disk (make sure you have one in the drive). If your machine crashes, you can walk to another machine and get back in business. You should also have your computer's support numbers and software packages with you at all times (but not stored on your

computer, where they are inaccessible if you cannot get into your machine).

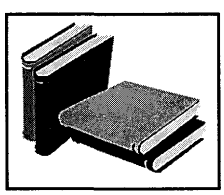
Above all, be prepared. Always remember that the more you count on your notebook, the more fickle it will seem. I have found that a computer chooses to fail just when you need it most. Knowing how to work around the problem may just save the day.

SOFTWARE FOR ROAD WARRIORS

Once you have your notebook computer, what will you do with it? Use it, of course! For most of you, the transition is straightforward: set up the notebook to mimic the desktop in your office. Thus, your choice of software is dictated by the software on your desktop and in your office. Moreover, you may need to access your office network remotely. For others, the notebook may be your only computer.

Portable computers are now just as powerful as desktop machines and the price differential is decreasing. If you use your desktop rarely, or you just want to save space on your desk, ditch the desktop computer in favor of a notebook. In either case, you must consider the types of additional software you require based on your individual needs. This section will address only those software options that are critical to mobile computing, and not all software. Many other fine books cover specific programs, such as WordPerfect and TimeSlips. Some references are listed at the end of this chapter.

Word Processing



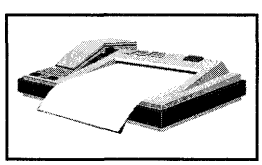
One of the most important applications is word processing. Using your notebook for word processing on the road can be a godsend. Turn downtime into billable hours by pulling out your notebook while flying across the country. Make changes to client documents while sitting in your client's office or revise documents during negotiations. If you have a printer or a fax/modem, you can propagate your documents from anywhere.

Although there are many alternatives in the word processing category, the market leaders in the Windows world are Microsoft Word and WordPerfect for Windows. Your choice is purely a matter of personal

preference, as all Windows word processors share essentially the same basic powerful features, and sport incredible ease of use.

One factor that may influence your decision is the emergence of software suites—a software vendor's bundle of applications that are optimized to work together seamlessly. An application suite will include a word processor, spreadsheet, presentations program, and personal information manager. Microsoft Office includes Word, Excel, PowerPoint, and Outlook. Corel PerfectOffice includes WordPerfect for Windows, Quattro Pro, Presentations, and CorelCentral. The IBM/Lotus SmartSuite contains WordPro, Lotus 1-2-3, Freelance Graphics, and Organizer. All three suites include powerful database applications in their professional versions. These suites are great values (at a street price of approximately two hundred dollars to upgrade from any previous version), and have equally powerful features. If you are using two or more applications from a vendor, then you should get the suite. However, do not be afraid to mix and match applications. Software is like ordering a la carte—try one from Column A and one from Column B. The choice is yours!

Fax Software

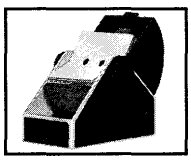


Fax software is worth the precious space on your hard disk. If you purchase a new fax/modem, chances are that fax software was bundled with it. Although this software might be useful, it is generally a stripped-down, "special edition" version with limited features. You should invest in a full-featured fax program, such as FaxWorks Pro or WinFax Pro. You might also consider getting a fax program that uses the address book in your personal information manager. This speeds things along by preventing the retyping of phone numbers, not to mention mistakes. If you are using Windows 95, note that fax capability is included in Microsoft Exchange (but you may have to go back to college to learn to use it!). Microsoft Fax is integrated into the operating environment and uses either a dedicated phone book or the address book in Schedule Plus.

Windows fax programs are the essence of simplicity. Run the install program and a fax/printer driver is added to the Windows Print Manager. Documents are faxed by printing from your application (click on File/Print) and selecting the fax driver. The document is then

processed into an image file with a cover sheet and the document is on its way. (See Hint 16.)

Personal Information Managers



An important and useful piece of software for your notebook is a personal information manager (PIM). A PIM is a software application designed to organize miscellaneous information, such as names, addresses, phone numbers, notes, appointments, to-do lists, and projects. These minutiae are the little details that often slip through the cracks. Moreover, if you are saving this information in paper form (on a Rolodex or calendar, for example), then you are isolated from that information when you leave your office. What about all those client notes, appointments, and memos in your office files? All these details and more can be captured by using a PIM. (See Hint 17.)

The beauty of a PIM combined with a notebook is that all your information is always at hand: phone numbers, calendars, deadlines, and client notes. Jimmerson has used his notebook to call a client from a

HINT 16 FAXING FROM A COMPUTER

1. Do not forget to plug the modem into a phone outlet.
2. Make sure that your modem is enabled and has power (sleep/suspend modes can shut down the power to PC-cards).
3. If you leave your fax software running, it takes control of your communications port. Either close the fax program or disable auto-answer.
4. Disable call-waiting (use the prefix "*70").
5. Read Chapter Four on telecommunications and faxing.

HINT 17 GOOD USES FOR A PIM

1. Phone book with addresses, phone and fax numbers, and email addresses
2. Calendar and alarms
3. To-do list and alerts
4. Frequent-flyer information and numbers
5. Hotel and car rental company numbers
6. Voice-mail numbers and passwords (only if you independently password-protect your notebook!)
7. Passwords for all your other applications
8. Remote dial-in numbers and passwords (only if you independently password-protect your notebook!)
9. Technical support numbers and serial numbers
10. Local access numbers for online services
11. Important birthdays (mom, spouse, kids, clients)

phone booth and talk about client notes he entered into his PIM. Using a PIM on a notebook gives you the freedom to be truly mobile.

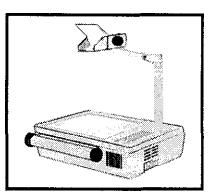
Choosing a PIM is a subjective process. Start by analyzing the way you work and your needs. If your work involves constant telephone calls, you might choose a PIM with a powerful phone book that allows auto-dialing and tracking phone conversations. This is useful when dealing with others whose recollection regarding previous conversations needs refreshing.

You may rely heavily on your calendar; if so, you should choose a PIM with a calendar that you like. Some CPAs focus their practice around to-do lists or outlines. If you do everything based on an outliner, you should consider a PIM with a powerful outliner such as Ecco Pro. If you have an application suite such as MS Office or Corel PerfectOffice, you already own a PIM (MS Schedule+, Outlook or CorelCentral). Try using that PIM and see if it works for you. At the very least, you can become accustomed to using a PIM and determine your likes and dislikes.

Using a PIM in a portable office setting involves synchronizing (merging) the information on your notebook with the data on your desktop machine or on the network. Changes you have made on the road should be easily incorporated into the office files (and vice versa). Otherwise everything you have entered must be rekeyed and you will make mistakes. Some PIMs, for example Ecco Pro, are now taking these considerations into account, and you should check to see if yours has this capability.

When choosing a PIM (or any other piece of computer equipment), read the reviews from leading computer magazines such as *InfoWorld, PC Computing, PC Magazine,* or *Windows Magazine.* These magazines run reviews and comparisons on a regular basis and rate all the leading PIMs.

Presentations



When speaking to groups or making presentations to clients, the use of presentation software can really add punch to your message. Any of the presentation programs (such as Aldus Persuasion, Astound, Lotus Freelance, MS Powerpoint, or Corel Presentations) creates an appealing "slide show," with each slide illustrating the points you are making. The best thing about these programs is that you do not

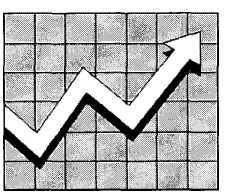
need to be a graphic artist or designer to create a pleasing presentation. These programs include templates and color schemes from which you can pick and choose. PowerPoint and Presentations include wizards or coaches that will walk you through the creation of the slides for your presentation.

Once you have created your presentation, you will need to display the slide show for the audience. If you are giving a presentation at a conference or continuing professional education (CPE) course, someone will likely take care of setup for you. Beforehand, however, you should always confirm the available equipment. To show your slide show on an external source, plug a cable into your external VGA (video graphics array) video port and the image is displayed on a screen, by using an LCD panel on an overhead or by using a color monitor or large-screen projector for direct display. You should always test this equipment before making your presentation. Newer notebooks have NTSC/PAL ports for connecting to a television. However, this works better in theory than practice. Experiment at home and plan on a fallback position.

Remember Murphy's Law: if something can go wrong, it will! To be on the safe side, you may want to make overhead slides for use on the projector. Jimmerson had the unpleasant experience of equipment failing in the afternoon after running flawlessly all morning for other speakers. Fortunately, he had acetates of his presentation and displayed these on the overhead. Plan for failure!

Before marching off to make your presentation, you should also learn how to switch to an external video source. This may occur automatically or may require a keystroke combination.[3] You may want to disable your screen-saver program to avoid distractions while speaking.

Spreadsheets

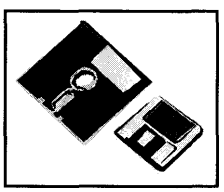


Spreadsheets are the wonderful tools that started CPAs off with computers. Since the days of VisiCalc the uses for spreadsheets keep mounting in number. It seems that the CPA's imagination is the only limiting factor. Spreadsheets can also be used as a database program for

[3] This is typically accomplished by using the function key "Fn" and pressing one of the upper function keys. Look for a display icon in blue on one of the function keys. Check your manual for additional information.

quick entry of information. Sorting data in a spreadsheet is very simple and the math functions prevent errors (unless you have a Pentium chip[4]). If you have a suite such as MS Office or Corel PerfectOffice, the package includes a spreadsheet. Using a spreadsheet from an applications suite makes it easy to import and use tables, charts, and graphs within your word processing documents. This can really add impact to your message. So together with your word processor, spreadsheet software should lead the race to be installed.

Disk Utilities

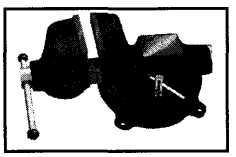


Your notebook computer requires maintenance just like any other tool. You should periodically run tests on the hard disk to make sure that files are not corrupted and you do not have a virus. These measures are vital and are covered at length in Chapter Six. This section discusses only the software that a mobile user might want. If necessary, the troubleshooting tips in Appendix E may get you out of a jam.

You should run hard-disk utilities on your computer to ensure that everything is working properly. (We cannot say this enough!) (See Chapter Six.) A mobile computer user should be prepared for disaster, and nothing can match the Norton Utilities for this purpose. This package includes the Norton Disk Doctor, an advanced hard-disk utility for checking the integrity of your data. You should run hard-disk integrity checks at least once a week. The Norton Scheduler automates this process for you. Set the Norton Disk Doctor to run every Friday night at 3:00 a.m. (make sure you leave your computer on overnight) and you will avoid many problems. If you are using any of the compression software mentioned below, you will need to use the disk-integrity utility included with the compression software. The Norton Utilities also includes a disk defragmenter and other useful tools. Norton has a separate antivirus program that is well worth the money. Antivirus measures are discussed in detail in Chapter Six.

[4] Intel suffered much embarrassment because some early Pentium chips yielded incorrect answers to simple arithmetic equations. This is no longer a concern, unless you are buying an old or used machine.

Compression Utilities



One of the first difficulties you will encounter after you begin installing programs on your notebook is that your hard disk will become cramped. For perspective, consider that the original IBM XT came with a 10MB hard disk. These days, you really need a 1 GIG drive or more. Most programs will attempt to lay claim to vast regions of your hard drive. (See Figure 3.2.) If you use imaging software and store your documents and exhibits on your hard disk, the space really gets cramped—quickly! One solution is to use a disk compression utility.

FIGURE 3.2: SOFTWARE STORAGE REQUIREMENTS

Application	Space Required for Full Installation
Windows 3.1	10.5MB
Windows for Workgroups	15.5MB
WordPerfect for Windows	30MB
Windows 95	44MB
MS Office Standard	68MB
MS Office Professional	82MB
MS Office95 Standard	89MB
Corel PerfectOffice Standard	98MB
MS Office95 Professional	124MB

The pioneer and original standard in this category was Stacker from Stac Electronics. The latest version offers compression up to two and one-half times the original size of your hard disk. MS-DOS 6.x includes DoubleSpace.[5] Windows 95 includes DriveSpace.[6] The figures quoted with these compression tools must be tempered somewhat, depending

[5] DoubleSpace was originally plagued with many problems. However, Microsoft seems to have resolved those problems and DoubleSpace is now reliable. Nevertheless, approach this tool (like Stacker and DriveSpace) with caution—always back up your work.

[6] DriveSpace is included with the Windows 95 setup. However, this basic compression utility is not as powerful as the version included with Microsoft Plus!, an essential Windows 95 add-on. These utilities and desktop applications were removed from the original release of Windows 95 to fulfill the compatibility and hardware specifications of Windows 95. Microsoft Plus! requires a 486 machine with at least 8MB of RAM.

on the nature of your files. The best compression is achieved with text files, databases, spreadsheets, help files, and any other type of data document. Dynamic Link Libraries (DLLs), executables (or program files), and graphics files do not compress as well. Files that are already compressed, such as ZIP files, do not benefit at all from compression. Using these utilities involves installing the software and then running the compression routine. The compression software creates a volume on your hard disk that contains the compressed data. The drive letter for the compressed volume is mapped with the drive letter of the original hard disk (for example, C:) and the host drive is remapped to a different drive letter. Thus, you continue using your files normally. Compression does result in some performance loss, but this is generally negligible and outweighed by the amount of available disk space created. But do not forget to always back up regularly—at least once a week! Compressed files and drives can get corrupted and recovery is complicated, if not impossible.

Telecommunications

Once you have acquired a notebook and a fax/modem, you will eventually want to send and receive files and perhaps even connect to a host computer remotely. The former is done using a communications program and the latter requires remote control or remote-access software.

Communications Software

The leading communications software packages are ProComm Plus and WinComm Pro. (See Appendix A.) The authors have used these packages and can recommend them for almost any purpose. Using these programs is discussed further in the next chapter.

ProComm Plus from Datastorm is the grandchild of the original shareware success, Procomm for DOS. It now comes as a commercial package in DOS and Windows flavors, including a Windows 95 version. ProComm Plus is truly full-featured, with an array of scripts to make it easier to use with commercial services, such as CompuServe MCI Mail. In the Windows version, it even comes with a full-featured facsimile module. The phone book is well designed and easy to use. Using this

program is very easy; a nice feature if you rely on telecommunications rarely. Downloading files is accomplished by simply pointing and clicking.

In addition to WinFax Pro, Delrina offers WinComm Pro. Combined with WinFax Pro, this equally good communications package is a solid alternative to ProComm Plus. Smart shoppers should look for combination bundles at cut-rate prices.

Remote Access

Another useful piece of software for your computer is a remote-access package such as LapLink or PCAnywhere. (See Appendix A.) These utilities allow you to dial into a host computer using a modem and a phone line. Using remote-access software, you can retrieve, modify, and save files on your office network from the road. Alternatively, you can run programs off the remote computer, although this is slower.

If you are using Windows 95, this function has been incorporated into the operating system with Dial-Up Networking. Also, using the Briefcase in Windows 95, you can take files on the road and synchronize them with the files residing on your desktop or network. The next chapter is devoted to telecommunications and remote access.

SUMMARY

Once you have purchased the necessary weapons (that is, your notebook, peripherals, and software), you are ready to hit the road (or take out a second mortgage). Take time now to familiarize yourself with all these components. Test everything thoroughly before setting out. If you run into problems, consult Chapter Six and Appendix E, which are devoted to troubleshooting.

Further Reading

Windows 95 Secrets, Brian Livingston & Davis Straub (IDG Books, 1995).

WordPerfect® in One Hour for Accountants, Gerald J. Robinson (AICPA, 1993).

WordPerfect® Shortcuts for Accountants: Merge and Macros in One Hour, Carol L. Schlein (AICPA, 1994).

MASTERING TELECOMMUNICATIONS

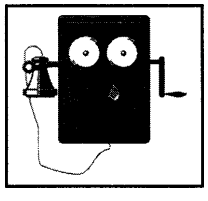
"What we've got here is failure to communicate."
The Captain, *Cool Hand Luke*

chapter 4

Telecommunication is the heart and soul of the road warrior's toolbox. Without it, the toolbox is just a briefcase with a computer in it. With it, the toolbox is the hub of a worldwide communication center, with all the resources a road-savvy CPA could want—and sometimes, more than one might want to sort through! Once your computer can talk on the phone lines, you can connect to anything that is set up for computer telecommunications and connected to the phone system. You have access to online information services, such as the Internet and LEXIS-NEXIS, as well as general information services, such as CompuServe and America Online. (See Chapter Five.) Through these, you can have access to weather and travel information, make travel reservations, and obtain stock reports and company profiles. You can send and receive faxes, connect to your office, have access to your files, send and receive email, and surf the Internet—the world is your oyster.

The telecommunications setup is probably the most important component of the road warrior's arsenal. If well organized, thought-out, and carefully designed, your system can be a pleasure. If not, it is a morass. In this chapter we discuss, in more detail, methods for connecting your equipment to telephone systems and sending faxes and email. The basics of downloading files are also covered, including information about file-compression utilities, such as PKZIP. We also discuss the cellular connection and some of the problems you might encounter when using it.

CONNECTING TO THE PHONE SYSTEM



The modem is designed to let you plug a phone cord (more accurately known as an RJ-11 jack) directly into it. This imposing name is for nothing more than the standard (U.S.) modular telephone plug. You will need a cord with an RJ-11 plug on both ends, one for the modem and the other for the wall socket or dataport on the phone. The dataport is a receptacle on the side of some hotel and office telephones, into which you can connect a modem. If a dataport is there, you can be assured it is designed to accept a normal modem. The cord will probably come with your modem, but you should get a longer one—maybe about twelve feet—from a computer or electronics supply store, such as

Radio Shack. Or, try the Telespool from TeleAdapt, an 8½ foot cord in a compact case.

Be careful, especially in offices and hotels: not all phone lines are suitable for connecting to a modem, even though the plugs might fit. Many office telephones operate by digital switching rather than the normal Dual-Tone Multi-Frequency (DTMF) system, and are not compatible with modems. DTMF tones are used by phone switching systems so you can tell the system the number you want. This is what you usually hear when you push buttons on a push-button phone. Some office phones with push buttons use a different system that does not rely on the tones but on internal digital switching. Such systems require special interfaces not covered here. To be on the safe side, you might want to use a digital line-testing tool.[1] Often, a DTMF line is available—just ask. One place that almost always has one is a fax machine. In any event, if you have a question about the suitability of the phone line, ask. Modems can be expensive to replace.

You may find yourself at a location that uses rotary pulses rather than touch tones, although these have nearly disappeared by now. If the phone has a dial rather than push buttons (remember dials?), you may need to tell your communications software to use pulse dialing instead of tone. You will not hurt anything by trying DTMF tones first. If that does not work, try pulse dialing.

You should always carry a long phone cord. It is amazing how often the phone jack in a hotel room is just two feet farther away from the desk than the length of your phone cord! Carry a twelve-foot cord, as well as a plug that converts a single socket into a dual socket, so you can plug in both your modem and the phone. You do not need the plug if you have a dataport available, but carrying one is a good precaution. You should also carry a phone-line surge protector—one that protects against not only power-line surges, but voltage spikes on the phone line as well.

In a hotel, watch out for how phone use is billed. Some hotels charge a different and much higher rate to use the dataport than the ordinary phone. (See Hint 18 on page 69.) That should generate a complaint to the manager. Also, you might find that using your telephone credit card to make calls is cheaper than charging them to your room. Most communications

[1] IBM Modem Saver, approximately $25.00, or try the one from Mobile Planet for $29.95 (800-675-2638).

HINT 18 SAVE MONEY BY TURNING OFF THE MODEM DURING INACTIVITY

Always set your communications program, if possible, to disconnect after a preset period of inactivity, such as ten minutes. Coolidge once used a hotel phone to connect to a long-distance Internet service provider, and forgot to disconnect. He went out for a run, attended some meetings, and returned seven hours later. Fortunately, the $400 phone bill was forgiven by a VERY nice hotel chain, to which he is deeply indebted and will love and cherish for a long time to come.

software programs offer a credit-card dialing option—but not all encrypt the number, so take care! If someone steals your computer . . .

Make it a practice to call ahead to any hotel you are considering and ask whether the room phones have dataports, and whether using them bears a surcharge. Surprisingly, many hotels cannot (or will not) tell you. Often, connecting to the business center helps. Speaking of the business center: check to see what they charge for printing services, and for sending and receiving faxes. It will amaze you. One of the authors stayed at a hotel in New York that charged $7.50 per page to send, and $5.00 per page to receive![2]

What do you do if there is no dataport or wall socket? If you are brave, you can carry a tool kit that might get you by. (See Figure 4.1.) It is pretty unlikely you will cause any harm, although we do disclaim any responsibility if anyone tries this technique. Also, the hotel may take exception to your playing with its phones, so be forewarned! We represent only that it has worked for us over the years.

FIGURE 4.1: MODEM COMMUNICATIONS TOOL KIT

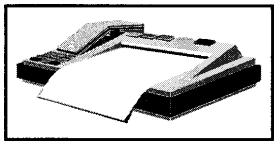
1. A flat-bladed quarter-inch and a No. 2 Phillips screwdriver
2. A few different-colored, twelve-inch clip leads
3. A modular RJ-11 socket with exposed connections
4. A fifteen-foot (or longer) double-ended phone cord (RJ-11 plugs on each end)
5. An adapter to connect two plugs into a single RJ-11 socket
6. A surge protector that includes phone line protection
7. Digital line-testing tool

[2] Coolidge discovered this when he was sent a sixty-page fax at a hotel, and the business center wanted $300.00 when he went to pick it up. He said they had no right to charge such a nonsensical figure, especially when the guest had not even requested the service. He told them that at those prices, it was cheaper to buy a fax machine and have the document resent, which they invited him to do. He did. The fax machine is in his home office now, together with a letter from the hotel announcing it changed its policy. Score one for the little guys!

With the above warnings in mind, buy three alligator-clip leads (short wires with metal grippers—alligator clips, technically—on each end). Get three different colors to keep things straight. You will also need an RJ-11 (standard O.S. phone jack) receptacle from your local Radio Shack. Using your screwdriver, take the cover off the wall plug into which the hotel phone is connected. There should be four colored wires: red, green, yellow, and black. If there are fewer, no problem—you can do the procedure with just the red and yellow wires. If these are not the colors you see, we cannot help you and you should cease immediately. Using the clip leads, connect the red, yellow, and black wires to the corresponding wires on the RJ-11 receptacle and plug your modem into it. If everything works, you are home free. If not, give up.

One really critical point: make sure you turn off any call-waiting feature on any phone you are using. Nothing will upset a modem link like the "click-burp!" of a call-waiting signal. Check with the hotel or office operator if you are unsure about how to disable call-waiting.

Sending and Receiving Faxes



A single device can serve as both modem and fax machine. In fact, it is getting hard to find one without the other, as they use so much of the same hardware. There is no good reason for not having a high-speed, combination facsimile and modem (fax/modem) attached to your notebook.

You may notice that the fax portion of your fax/modem transmits at a much slower speed than 28.8kbps. This is because most facsimile machines are not designed to operate at the higher speeds. This too will be changing over the coming years and, as with modems, the facsimile machines will adjust themselves to operate at the highest speed at which both the sending and receiving units are capable of operating. These days, most fax/modem combinations will support 14.4k rates and are Group 3 compatible, which is what you should require. Anything slower is really unacceptable, and anything not Group 3 compatible is going to give you problems, as most modern facsimile machines are Group 3. Fax machines were previously designated with group numbers

to assure compatibility. The world has pretty well settled on Group 3, however.

Fax/modems come with prepackaged software, which is usually a brain-dead or crippled version of full-featured packages. Usually, there will be an offer to upgrade to the full package at an attractive price. The prepackaged variety is generally of such little use that we suggest you stick it in a drawer, and then throw it away two years from now when you are cleaning out your desk.

Windows 95 supports fax/modems directly, eliminating the need for separate fax software. With it, you can create documents and send them directly from your word processor. (Then again, most good Windows-based fax programs do the same.) Unfortunately, the modem communications program that comes with Windows 95 is very weak, so you will still need to buy a good communications software package, which will also come with fax software. You may decide that using the fax program that matches your communications software is simpler than using Microsoft Fax, which takes a Ph.D. to set up.

Using Email

Email is a very effective means of communication. It is vastly superior to telephone tag and a wonderful improvement over voicemail. Email allows a meaningful exchange of information and easy distribution to a wide range of people. This section covers the basics of email, and also the use of email to send and receive files.

Simple Email

If you are on a network at your firm, chances are you are using email already. You will want to connect your notebook to your office email system. You should also consider getting an online account (such as America Online, CompuServe, or Prodigy), an Internet account, or a dedicated email server (such as AT&T Mail or MCI Mail). An account on any of these services will allow you to exchange email with anyone in the world via the Internet.

If you have more than one email account, you should consider getting a dedicated application just to handle your email accounts. E-Mail Connection from Connectsoft is an excellent email application that can

access America Online, CompuServe, the Internet, MCI Mail, Prodigy, and lots of other services. Having a dedicated mailer provides a repository for all mail and prevents duplication.

Attaching Files to Email Messages

There are a number of ways in which documents can be moved over phone lines. The simplest and most direct is to send the document as an attachment to an email message. If you have access to a commercial email system, or your system is accessible from the outside via a dial-up line, you could have your office send you an email message and attach a word processing or spreadsheet file to the message. This involves nothing more than creating a normal message and then telling the email software package to attach the file(s). Normally, this is done with a menu selection requesting an attachment and then telling the software where to find the file you want to attach. Then you simply send the message as you normally would. At the other end, the recipient receives the combined message and file and extracts out (detaches) the attached file(s).

Most commercial services, such as MCI Mail and CompuServe, provide for file attachment, but you have to use their special application software to attach and detach files. If your service (or in-house system that has a dial-up line to access the outside world) supports file attachment, that is great. But, as always, there may be a few flies in the ointment.

To accomplish file attachment, the sender and receiver must use compatible software. For example, if you use CompuServe's WinCIM software to create a message with an attachment, and the person to whom you send the message uses Procomm Plus to access CompuServe, that person will get a message with a bunch of garbled text that was your file. To detach the message, he or she needs to use WinCIM, or some other program that knows how to detach attachments made with WinCIM (such as E-Mail Connection). It is not always necessary to use identical software at each end, but it is necessary that the software works together. The best bet is to test the communications link in advance of a critical need.

One would think that something as ubiquitous as the Internet would have solved the email file-attachment problem, but unfortunately this is

not the case.[3] There are many schemes for attaching and encoding files (UUENCODE, MIME, and BinHex being the cryptic names of the most popular), which, when they work, work wonderfully. Unfortunately, there are also many areas in which things can go wrong. Again, the sending and receiving software must be compatible. Also, both sender and receiver go through a host of systems (the scope of which is way beyond what we can cover in this book, or even in a lifetime dedicated to understanding the arcana of Internet mail servers; frankly, we would sooner study Sanskrit) that often have a hard time dealing with attachments. We have found two Internet email packages that handle file attachments reliably—Eudora and Pegasus. E-mail Connection also handles Internet mail, including multiple accounts, with ease. There may well be many others, we just have not tried them (yet).

Until email file attachments achieve a measure of uniformity and standardization, we strongly advise you to figure out a reliable means of using email to send files in advance of a critical need. There is also a risk using file attachments: if you attach an executable file (one that you can run as a program), it can contain a virus. Thus, anyone receiving an executable file should be careful to use a good virus-protection program to scan the file before it is run, to make certain (or at least as certain as can be) that the file is not a virus carrier. And do not assume that a virus can come only in a program file. Shortly after Windows 95 was released, the first known example of a virus contained in a document file was discovered.[4] It ran as a macro in a Word for Windows document.

A very useful tool for sending and receiving files via email is a file-compression utility such as PKZIP. With this program, the file(s) can be drastically reduced in size, allowing faster transmission.

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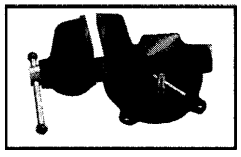
[3] The Internet poses a peculiar problem for file attachments: although text files can be sent using only seven bits per character, executable files (programs) and other types of files use eight bits per character (eight bits equal a byte—computer engineer humor) and some pretty terrible magic is worked on these files when the Internet strips off these eighth bits. To get around this, there are a variety of schemes (MIME being the name of one of them, which is becoming a de facto standard) that encode files for transfer on the Internet, basically by taking the first seven bits from the first byte, then combining the eighth bit from the first byte with the first six bits of the second byte, then combining the seventh and eighth bit from the second byte with the first five bits from the third byte, and so on. This whole process gets reversed at the other end.

[4] "First known" means first known to the authors of this book.

FILE COMPRESSION AND PKZIP



Almost without exception, every online information service (from either a vendor or commercial service) that offers file uploading and downloading uses a program called PKZIP (available in a Windows 95 version) to compress files and hence reduce the time necessary to transfer a file. PKZIP as a technique of file compression has become so ubiquitous as to be a de facto standard. This program, developed by Phil Katz, can be downloaded from almost every commercial online service (including CompuServe, America Online, and Prodigy). It is available as shareware, which means that you can obtain it and try it before buying it. It is such a tremendously useful and valuable program that the authors strongly encourage users to purchase and register their copies.

PKZIP can reduce some files by more than 50 percent, depending on the type of file being sent. Graphics files are less susceptible to compression than text files. The process of compression and decompression is simple, once you get the hang of it. PKZIP comes in two parts: PKZIP.EXE is the program that compresses files, and PKUNZIP.EXE is the program that reverses the process, producing the uncompressed original file. When you first download PKZIP, it will be in what is called self-extracting form, probably with a name like PKZ204G.EXE.[5] When you get it, put it into a separate directory somewhere and run PKZ204G. It will automatically extract the two parts of the program, as well as documentation (with the extension .doc) and other information. If you print out the documentation files, you will learn how to register and run the program. Make sure that the directory in which you put the files is also listed in your path statement, so the programs will be available whenever you need to compress or uncompress a file.[6]

[5] The 2.04g is the version number. You should use the most recent version—always. Previous versions may not work with files compressed with more recent versions. Usually, all that is posted on a bulletin board is the current version. It can be downloaded from PKWARE directly by calling its bulletin board at 414-354-8670, or on the Internet at HTTP://WWW.PKWARE.COM, or by anonymous ftp at PKWARE.COM. A license may be purchased for a single user for forty-seven dollars, and site licensing is available. PKWARE may be reached at 414-354-8699, or by snail mail at 9025 North Deerwood Drive, Brown Deer, Wisconsin 53223.

[6] A path statement appears in your AUTOEXEC.BAT file in a DOS or Windows-based machine. Refer to your DOS manual for its use.

Just to give you an idea of the process (but not as a substitute for the manual), say there is a file on a vendor's technical support bulletin board system that you want to download. You notice that the filename is SUPPORT.ZIP. The extension .ZIP is a tip-off, indicating that this is a compressed file. You download the file successfully. What do you do now?

To uncompress the file, create a directory. (See Hint 19.) Put the compressed file you just downloaded into that directory, and type:

PKUNZIP SUPPORT

You do not have to type the extension .ZIP because PKUNZIP will assume that is what you mean. PKUNZIP will uncompress whatever is in SUPPORT.ZIP, which could be one or more files, including executables, document files, or whatever.

The reverse process is just as easy. Say you want to send three documents (called Finplan1.DOC, Finplan2.DOC, and Finplan3.DOC), each 100,000 bytes long. You could just send them, one at a time. But that would be wrong, right? Why not compress them all into a single, neat, and smaller package (we will name it FINPLANS because we can use only eight characters in the name) and send them all together?[7] Go to the directory where you have the files you want zipped and type:

PKZIP FINPLANS Finplan1.DOC
Finplan2.DOC Finplan3.DOC

PKZIP will take FINPLANS as the name of the file into which you want the compressed files squeezed, give it the extension .ZIP, and then squeeze everything into it. These being document files, they will probably squeeze down into something around 150,000 bytes—a real improvement.

HINT 19 UNCOMPRESS ZIPPED FILES INTO A SEPARATE DIRECTORY

When you uncompress a file, put the zipped file (the one with the extension .zip) and the self-extracting file (with the extension .exe) in a separate directory. If you uncompress the file, it will produce one or more new files, and sometimes several. You do not know what these files are going to be named. Never uncompress files in your root (top level) directory to avoid clutter. If you uncompress in a separate directory, everything there is related to the file you just uncompressed.

[7] Zipping files together before attaching them to email is often appreciated by recipients who resent waiting for a long attachment to be sent. Zipping them makes them smaller and shorter.

If the person at the other end does not have PKUNZIP, you can turn a zipped file into a self-extracting executable file. Using our example above, type:

ZIP2EXE FINPLANS.ZIP

It will produce a file called FINPLANS.EXE, which is just a bit longer than the zipped file, but which, when run as a program, will automatically uncompress its contents. One caution, however: make certain that the zipped file you are turning into an "executable" does not have the same name as an existing "executable" in the same directory. Maybe an example might help. Say you want to compress the program MYFILE.EXE. You zip it into MYFILE.ZIP, and then convert that into a self-extracting file. The problem is, the self-extracting file has the same name as the original file and will have overwritten it. So, use unique names.

PKZIP has a number of other uses. Suppose on your hard disk you have a file that you want to put onto a floppy, but the file is too large to fit on the diskette. Even after compressing it, the zipped file is still too large. PKZIP will let you save the file on multiple floppies. PKZIP will fit as much of the file as it can onto the first disk, then request a second disk, a third, and so on, until it has managed to move the entire file. Use PKUNZIP to retrieve the file.

When a file is zipped, it is essentially unreadable unless and until it is uncompressed. This can be a useful feature if you have confidential information on your computer. When you zip a file, you can tell PKZIP to require a password to unzip it. Although this is by no means strong encryption (as discussed in Chapter Seven), it is a deterrent to all but the technically sophisticated and really persistent. If you use it, however, remember to eliminate (not just delete[8]) the original source file on your computer.

USING COMMUNICATIONS SOFTWARE TO SEND AND RECEIVE FILES

Your communications software package will be one of your primary tools. Spend the time to select it carefully: this choice will determine

[8] As discussed in Chapter Seven, simply erasing a file does not remove it from your hard disk. DOS and other utilities can recover many erased files. You must eliminate the file altogether by overwriting it. To learn how, see Chapter Seven.

how full-featured your portable office will be. Many types of software packages are available, but do not be lulled into believing you can get a great one for free or at little cost. As with so many other areas, you get what you pay for. Because this will likely be your interface to a host of different services, it is worth getting the best.

Dedicated versus General

Communications software has a way of proliferating on your system. Every service offers its own "special" log-on software which takes up valuable disk space. By the time you install a general-purpose communications package—including America Online, CompuServe's WinCIM, LEXIS-NEXIS, or Microsoft Internet Explorer—your email package from MCI Mail and another from AT&T Mail, special Internet-access software, Web browser, Dialog . . . well, you begin to get the idea. Unless the special-access software is absolutely necessary, or offers some spectacular advantage, you should consider replacing it with your general-purpose communications program. Not only does the proliferation of special-purpose software eat up disk space, but you must learn to operate all these different programs. Life is too short. Simplify, simplify, simplify!

Give this some thought, because you must be solidly familiar with not only your general-purpose communications program, but also the service you are calling. All too often, the "help" information for those services is built into the special-purpose access software, and if you have replaced the software, you will not be able to access that help. If there is a question in your mind, keep the special-purpose program on the disk for a while, until you are comfortable. In addition, navigating these online services is generally easier if you use their dedicated software, and they often offer additional features, such as file attachment, off-line composition, and email reading.

Log-in Scripts

Good communications programs come with a variety of prewritten sets of instructions to the telecommunications software, or scripts, designed to operate with many of the more popular services, such as CompuServe. No one likes to admit it, but sometimes we actually need to read the manuals that come with our software, and this is a perfect example

of that. Read the manual to find out how you can use the prepackaged scripts to access your online systems.

In some cases, specialized communications software is necessary, depending on the nature of the service. For example, LEXIS-NEXIS is most easily accessed by using its own software, especially if you use the services only occasionally and do not always remember the arcane commands needed to perform a search. (Do not hesitate to call the service for help in formulating a search—that can save a lot of time and money.)

The better programs allow you to automate logging on to your various online services by recording what you do when you log on manually the first time, remembering it, and thereafter doing it for you automatically. You should use some caution when doing this, however, because if you completely automate the process, anyone who manages to steal your computer will have not only your computer, but also access to your costly information services and your files, which may contain sensitive material. This is a real case of "Do as we say, not as we do," as the authors both have all their log-ons automated. With the increasing reports of theft of laptops at airport and hotel check-in counters, you should consider automating everything except the password, requiring it to be entered by hand. The communications programs we use permit us to edit the log-on recording. Again, "RTM"[9] is good advice.

Installing and Using

When you install your communications and fax software, you might consider not loading all the cute little cover pages that inevitably come with it. These take up room (lots of it!) and the jokes wear thin pretty fast. Whatever communications program you choose, it is important that you learn how to use it while you have the leisure time. Waiting until a critical time and then thumbing through the manual (if you can find the manual and have brought it with you) leads to ulcers. You should know how to log on and use each of the information services you intend to use, and how to send and receive files. When evaluating software, take a look at the online help facility. If it is well designed, then even though it may take up disk space, it should guide you through most common problems.

[9] "RTM" is the mantra of technical-support people: you can almost hear them think it as they explain the obvious to someone who has clearly never "Read The Manual."

Downloading Files

A major use of telecommunications software, including email applications, is to exchange files with other users and computers. Suppose you are in Peoria (or whatever location serves as a far-away place in your locale) and you need to get a copy of the Marzipan Inc. working papers right away. You could call your office and have it faxed to you, but this is a fairly complex audit with losts of odd-sized spreadsheets. That is going to be some long fax! Besides, once you get it, you will want to massage the numbers a bit. How can you do that—find a scanner somewhere? Not likely. And you are certainly not going to rekey it all.

There are many ways to move files around that are better than sending faxes, if only you know how to do it. Electronic file transfers are almost always better and more useful than hard copy (computer lingo for actual paper), because the end result is a word processing file rather than a pile of paper. You can manipulate files on your computer by editing a word processing document, for example, or by modifying assumptions in a computer spreadsheet. With hard copy, all you can do is read it or, if you need to massage it, retype it into your computer. The ability to send and receive files, especially spreadsheets, can save you both time and communications charges.

Take this example: You must send a 150-page document. If you were to send it at one page per minute by facsimile, it would take over two hours. That can quickly rack up long-distance phone charges. Alternatively, you could send the actual file, such as Excel or 1-2-3, over the phone lines, just as you might do if you were to write the file onto a diskette and put it in the mail. The only difference is, instead of sending the file by diskette, you send the file over the phone lines instantaneously. The same document can be sent (even without the benefit of first compressing the file) in under five minutes by a 28.8kbps modem. If you first shrink the file using file compression (discussed previously in the section on PKZIP), you could reduce this time to as little as two or three minutes. In addition to saving time and money, moving the file rather than hard copy means that the recipient can easily manipulate the document. There is no need to try to scan the document or send back a hard-copy facsimile of the changes. All this can be done electronically, and the amended file returned over the phone lines.

Consider another example: You are in your hotel room, it is late at night, and something goes wrong. Maybe a file gets corrupted, or you

need help getting your computer to work with the portable printer you bought that morning. A host of problems can arise (and always seem to) when you are the farthest from any resource that might be helpful.

Almost all hardware and software vendors provide online support, through either their own bulletin board systems (computers set up for remote dial-up access, on which the vendor can post support notices (see Appendix A)) or on a host commercial system, such as Prodigy, CompuServe, Microsoft Internet Explorer, or America Online. (See Chapter Five.) If you learn how to use these systems, they can really help when the crisis arrives.[10] They contain software updates and patches (bug fixes), as well as technical-support information. You can review discussions among users concerning problems they have found and work-arounds they have used. You can often "chat" online with a technical-support person who can help solve your problem. ("Chatting" is simply a two-way, typed conversation over the modem connection.) Using any of these systems is really quite simple, and is becoming more so each day. For vendor systems, you generally do not need to have signed up as a user in advance to obtain access to files and support information. For commercial services, you need to have an account set up in advance. To obtain the files on these systems, however, you need to know something about the process of uploading and downloading files (moving them from the host system to your computer) and file compression.

Moving a file from one computer to another is not a difficult task, but mastering all the lingo can be daunting. Each service has a menu structure for telling it which file to send and how, but all services share some common aspects.

Once you have made the connection to a service that has a file you are looking for, there will be instructions available on the service to enable you to initiate a download. ("Download" means sending from the host, the remote computer, to you.) This is simply the process of telling the remote computer to send you something. You must keep in mind that there are two computer systems running when you do this, and both of them must be instructed on what to do.

When you tell the host (the remote computer from which you are obtaining a file) to download a file, it will often ask you what protocol

[10] Of course, they are of little benefit if you cannot even turn on your computer. Hey, we can't solve all your problems in one book.

you want to use. (See Hint 20.) When a file is sent over the phone line, it is rarely sent as just a stream of bits directly from the original file. Because phone lines can be noisy, and noise can cause errors, there are a number of different ways files can be sent, many of which have built-in error detection and correction. Also, the guest computer must be able to grab the information from the host and store it. If the host is sending faster than the guest can handle the data, the guest must be able to talk back to the host and say, "Hey! Wait a minute, will you?" The various ways these functions are implemented are called protocols. You can think of it as the language the two computers will use to control sending the file. Hint 20 lists some common protocols, in order of preference. Choose the one available that is closest to the top of the list. It is important that both the host and guest systems are set to use the same protocol; otherwise the transfer will not work.

Once you have instructed the host computer to send you a file and selected a protocol, you must tell your local guest computer to receive a file. Some software, such as Procomm Plus for Windows, will initiate Zmodem file transfers automatically if you set them up to do so. This is most convenient. Otherwise, you need to execute the command in your communications software that says "receive a file" and tell it which protocol to use and what to do with the file when it gets it. Each software package operates a bit differently, so we need to refer you (yet again) to the manual for your particular software to see how this is done. Once the transfer is complete, you then must find where your system has stored the downloaded file. This is usually a default location set up by your software. It is a good practice to change the default to a common location used by all your various applications, such as a directory called "Downloads." This saves lots of time looking around the maze of directories on your hard drive. Uploading a document is just the reverse of the above process—you send from the remote guest to the host.

HINT 20 CHOOSING A PROTOCOL

Your communications software will ask which protocol you wish to use. Choose one of the following, in this order:

Zmodem resume

Zmodem

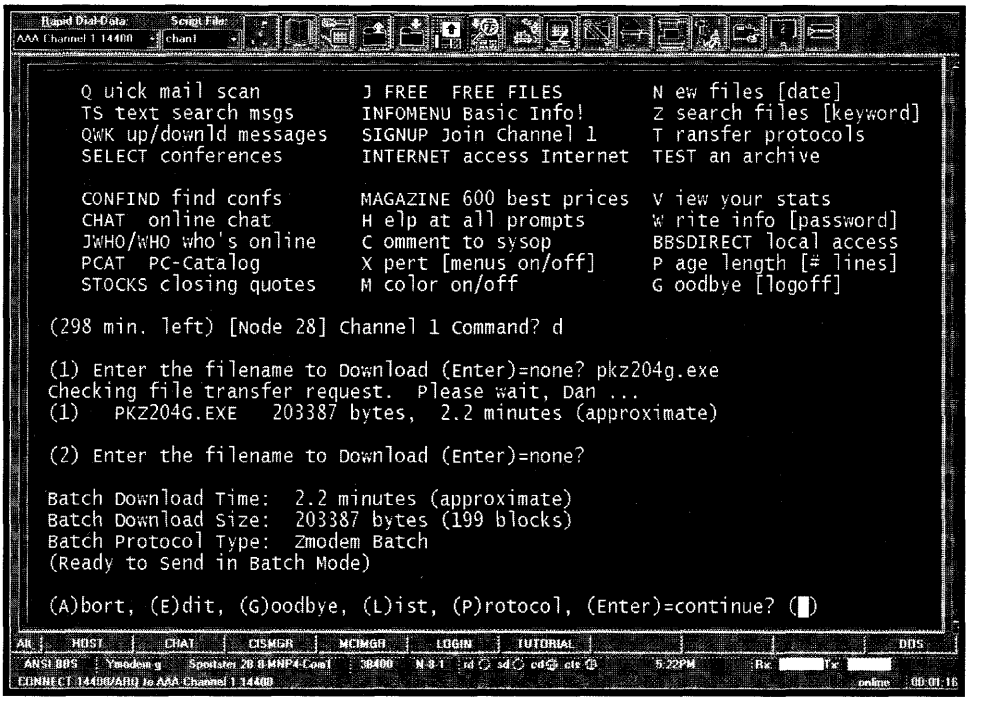
Ymodem-G

Ymodem

Xmodem

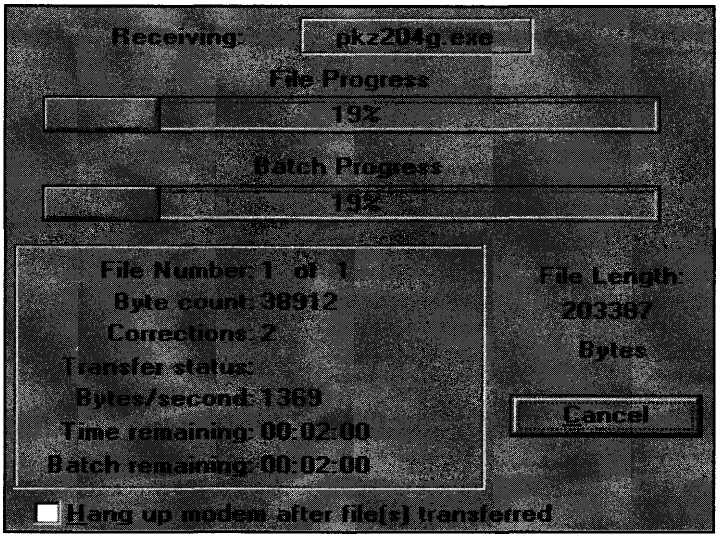
It might help to show an example. You have connected to a bulletin board system (BBS) and found a file you want to download. In this example, we are using Procomm Plus for Windows as the telecommunications software, and we dialed into a commercial BBS to get a copy of PKZIP. The first step is to locate the desired file and then initiate the download. On this system, a download is initiated by giving the command "D" and telling the system the name of the file we want. (See Figure 4.2.)

FIGURE 4.2: TYPICAL DOWNLOAD SCREEN



Select the default protocol the system will use with the "T" command. In this example, we have chosen Zmodem. (See Hint 20 on page 81 for other protocols.) Although Procomm can be set up to start a Zmodem file transfer automatically once the host starts sending, we will do it manually to show you how this is done. The host system has been told to send, and it is waiting for the local machine (my computer) to tell the host it is ready to receive. At the top of the screen, there is a small icon with a file and an arrow pointing into the file. This indicates incoming file transfers. By pressing that icon, the transfer begins, and a dialog box pops up to tell me the progress of the transfer. (See Figure 4.3.)

FIGURE 4.3: FILE TRANSFER IN PROGRESS



The dialog box tells me how large the file is, how much remains to be sent, and how long that should take. Not all protocols give so much information, which is one reason for favoring Zmodem. Once the file transfer is complete, the file resides on my local computer, and I can manipulate it as I would any other file.

REMOTE ACCESS

For those who want the ability to access an office directly while out of town, there are a number of techniques that work well. The one you choose depends on your budget, technical skills, and desire. This also depends on how much time you are willing to invest setting it up, because all these techniques require some learning time.

The most direct means of moving a document from one computer to another is simply to set up one computer to answer the telephone (the host), and have the remote computer call it. In host mode, the host computer will answer the telephone and operate as a computer BBS (bulletin board system), permitting the remote computer to send and receive documents. A BBS is simply a computer set up to accept incoming calls, and to allow the posting and reading of messages and files on the computer. Users can exchange messages, move files back and forth, and conduct online conversations. Commercial services include

CompuServe, America Online, and Prodigy, as well as Microsoft Network. Individuals often run bulletin boards as well, as do many hardware and software vendors to provide support. One of the authors has operated a stand-alone computer in host mode for years, as a simple means of file transfer that is accessible to clients. However, beware that unless the files being transferred are encrypted (put into a secret code—see Chapter Seven), they may be accessible to anyone with access to your system.

In host mode, the calling computer initiates a call to the host computer. When the host answers, the calling-computer user identifies himself or herself, enters any necessary passwords or other access precautions that may have been taken, and establishes the connection. To download a document, the calling computer identifies the document by name and location and requests a download. Procedures differ somewhat from one communications program to the next, but are generally self-evident from the online instructions that will appear on your computer screen. Note that it is not necessary that the host and calling computers be operating the same, or even similar, telecommunications software. It is simply necessary that the host computer offer the facility to load and download documents. Both systems must operate with the same protocol, but most telecommunications software packages offer a variety of protocols broad enough that at least one will be in common.

One item of confusion that often arises is the difference between uploading and downloading. By convention, downloading means a file goes from the host to the guest (the guest being the computer that placed the call), and uploading is just the reverse—the file goes from the guest to the host. It is sometimes a bit confusing to keep in mind which computer you are operating when you are online: instructions given to the host computer are not seen by the guest computer, but are merely relayed. You will need to understand your communications software package well, so you know how to issue instructions to your local computer to receive a download, and give those instructions in a manner that is communicated locally rather than across the phone lines to the host!

The simplest system is to have a computer in your office that is set up as a host running a remote-control program, such as Symantec/Norton's PC Anywhere or Norton Lambert's CloseUp. (See Chapter Three.) These programs permit a remote user (running the guest version of the software) to dial-up the host computer and, once the connection is made, to operate the host computer over the phone lines. From the

remote location, it appears as though you are running your office computer—you see the same screen, the same files, the same everything. You can read your messages, run your word processor, or do almost anything that you could do if you were sitting right in your office.[11] Things may run a little slower, as everything must be sent through the phone lines and a lot of data needs to be sent when you update a screen in Windows. However, you have complete access to your computer and the resources to which it is connected, such as your network.

Exercise caution when configuring a remote dial-in system. If you can dial-up your office system, so can anyone else. You do not mind letting some twelve-year-old computer hacker obtain access to your client files, do you? Of course not! For those who are obsessive about security (the authors include themselves in this group), all of the remote-control software programs support requiring a password to gain access. Indeed, some of them allow for each user to have his or her own password, and give different users different levels of access. For example, you might give individual CPAs access to only their own files, and the managing partner access to everything. Some systems are set up so that when you call, you give your identification and hang up. The host will then call you back at a prearranged number. (See Hint 21.) Of course, this is useful only if you will always be at that number!

HINT 21 USING A BOOT BOX

Those of us familiar with Windows (especially those versions before Windows 95) know that the most reliable aspect of Windows is its unreliability. It crashes so frequently we are not even surprised. We just reboot and continue on. But what do you do when you have connected to your office computer remotely and it crashes? Unless there is someone in your office to help reboot, you are stuck.

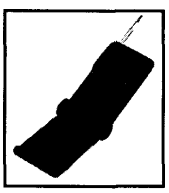
There is, of course, a solution. There are devices available (Comp USA carries them) that will attach to your phone line, and into which you can plug your computer. When you dial your office, the device (typically called a boot box) senses the phone ringing, and switches on the computer. The computer boots up, loads the remote-control software, answers the phone, and connects you. When you disconnect, the boot box senses that the phone is disconnected, and so turns off the computer. For the environmentally sensitive among us, it has the added advantage of leaving your computer turned off except when you are using it. And if your system crashes, all you do is disconnect, wait a moment for the boot box to turn off the host system, and reconnect. Your host will have rebooted!

An issue for consideration: your remote-control software must be able to load, and permit you to control, your host system remotely from boot-up. Although most remote-control systems can do this, be careful if you are using a network: especially in Windows-based systems, the network log-in script (demanding your user-ID and password) runs before anything else. If your remote-control software is not loaded yet, you cannot log in remotely.

[11] Of course, you cannot use it to cause your office computer to dial-up LEXIS-NEXIS, because you are already on the phone line. But you knew that, right?

Windows 95 supports dial-up access directly if you have also purchased Microsoft Plus!, which contains the dial-up host software. Although it does not give you remote-control access, it does allow you to use the printer and files that are on your host system and have been set to permit sharing. Thus, when you dial into the Windows 95 host system, all of the shared resources are available to you, just as if they were on a file server on your network. You can set the availability of individual disks, or even folders, based on who is connected to your host.

THE CELLULAR CONNECTION



It is all well and good that you have a portable office and can hook into a phone and stay in touch with the world. The only trouble is, you are on a boat. What do you do? Or what if there is no available phone at the airport, and the lines are a half-mile long? Or you find yourself ten miles from the nearest phone and must receive a fax. What do you do?

Of course, every upwardly mobile CPA has a cellular phone. Getting a cellular phone is as much a symbol of clan membership as your first audit client. How do you choose one that is best for a road warrior?

Be parsimonious. Look for a cellular phone that can do duty not only in your audit case, but also in your car. A number of portable hand-held units can be installed semipermanently in a car and removed when you are out of the car. Many of them even have a docking station that will boost their transmitting power from the tiny power permitted in a transmitter sending radio waves into your ear to the full three watts permitted for a regular car installation. These are a bit costly, but if you are in fringe areas far from the nearest receiving tower, they are well worth the cost. Steer clear of the so-called "transportable" units that are full-power, bulkier units with large, heavy batteries, because of their cumbersome size and weight. When you choose your cellular phone, also give some thought to how you might hook it up to your laptop. It may not be often that you will need this feature, but if you do, it is nice to have the capability. And besides, it will really impress your colleagues.

Hooking your modem to a cellular phone is something of a hit-or-miss operation. There is a wide variety of cellular services around the country,

each with different capabilities, and some are better than others. In general (especially given the high cost), avoid using your cellular phone for modem communications. Sometimes, however, it is unavoidable.

Hooking a cellular phone to a modem requires special considerations. In some cases, you may use a special interface cable that is designed specifically for your cellular phone and that has a general-purpose modem connection at the other end. In other cases, you can get special modems that are designed to operate specific cellular phones directly. (The Motorola flip phone, being so ubiquitous, is a favorite for these types of modems.) The reason why special equipment is required is because cellular phones operate differently from ordinary phones. Ordinary phones require only that you to connect to the line, take the phone off the hook (a simple switching operation), and dial the number. A cellular phone operates in just the opposite manner; you must first dial the number, and then press the "send" button on the phone. The special interface takes care of this operation.

You will need to speak with your cellular-phone provider to find out what interface equipment is available for your particular phone. All too often, providers do not really understand the problem, so you may have to do some digging (although providers seem to be slowly becoming more savvy on this issue). Even if the manufacturer does not make an interface, most phones have interfaces available from third-party vendors such as ORA Electronics. (See Appendix A.) The trick is finding them. Often, if you look in the ads in any of the various magazines that specialize in portable computing, you will find leads.

As always, it is preferable to minimize the amount of equipment you must drag around. Therefore, if you can find a modem that connects directly to your cellular phone without needing an external interface, so much the better. And if you can find one that gives you the option of hooking to either your cellular phone or the ordinary phone system, that is a lot better than buying two modems.

When operating your computer through your cellular phone while in your car, it is a good idea to pull off to the side of the road and stop.[12]

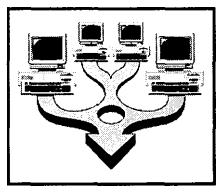
[12] There are rumblings about proposed legislation prohibiting the use of a phone while operating a car. In fact, a law has been proposed in England to do just that.

Aside from the obvious safety considerations, you will also minimize problems encountered when moving from one cell to the next. Cellular phones work by switching automatically from one cell to the next as you travel along. A short interruption on a voice communication is not a real problem, but it can wreak havoc when you are transmitting and receiving data.

Most modern modems can support a variety of error-correcting protocols with confusing names that are beyond the scope of this book. Suffice it to know that when an error is detected, the receiving modem tells the transmitting modem, "Hey! That last packet of information was garbled. Send it again." These protocols have greatly improved the reliability of modem communications. The Microcom Networking Protocols (MNP), a family of protocols from Microcom, Inc., are the most commonly found (for example, MNP-5 is a common data-compression protocol). Any modem that supports V.34 will also support error correction. For the most part, you can blithely ignore such issues, as the modems will generally sort out such issues between themselves without user intervention. In the modem-setup portion of your communications software, you will often see an option to run MNP or autoreliable. You can generally try running auto-reliable, and if you have problems with a particular connection, try changing to MNP.

Some cellular providers now offer special cellular/modem error-correction protocols. These require that your modem support the protocol, and that your carrier support it as well. These tend to be available only in urban areas. You can check with your cellular provider to see if such protocols are available where you are, and what you need to make use of them. Currently, you can expect transmission rates on the cellular phone to be limited to 4,096kbps. Although some local services may provide faster transmission rates, and some specialized services may offer substantially faster rates, you cannot be certain that these higher speeds will be available where you are, especially in rural areas. So be prepared for modem transmissions over a cellular phone to be much slower than those to which you are accustomed.

GROUPWARE ACCESS



Many groupware packages[13] permit remote access to their groupware functions, such as email and scheduling services. For example, GroupWise, the groupware offering from Novell, has a remote application that permits a remote user to compose email, make changes to a schedule, and dial into the GroupWise server. Like remote-control systems, groupware remote access is uniformly password protected.

Once connected, the groupware server automatically sends and receives all unsent messages, and synchronizes the remote calendar with the office version. For example, if you add two appointments on your remote system, and your secretary cancels one appointment, then when you connect, the groupware system will register all the changes on both the remote and office copies of your calendar. (Really good systems will also alert you to scheduling conflicts!) If you want to get a file, you can send a message to someone on the office system and ask that person to send you the file as an attachment to an email message.

Once set up, groupware remote access is a fine system for communications. It has the disadvantage (compared with remote-control systems) of requiring manual intervention to get at files on your office system. All too often, the only times you will really want something when out of the office is long after the office has closed. Accordingly, it is helpful to have access to both a groupware number and a remote-control access facility.

SIMPLE PRECAUTIONS

Inevitably, you will forget an important password or telephone number. We suggest that you create a file on your computer that lists all the various online services and other information you may wish to have, together with your secret passwords.

We are not so silly, however, as to suggest that you leave this file on your system and available for casual perusal by the thief who has stolen

[13] "Groupware" is a generic term, and its exact definition remains in flux. Generally, it refers to a suite of applications designed to assist in communications and management of a group connected by a network. Groupware typically contains email, individual and group scheduling and calendaring functions, to-do lists, and simple shared databases, such as telephone lists.

your computer. PKZIP (discussed previously) has the feature of allowing you to encrypt a file with a secret password. (See Hint 22.) Thus, only someone with the secret password can unzip the file and make it readable. Note, however, that not only must you erase the clear, unencrypted file from your system when you create the zipped, password-protected, encrypted file, you must also "scrub" the clear-text file to prevent it from being unerased.

It is also a good idea to keep a file of telephone numbers you can call for assistance and local-access numbers. When you are in San Francisco, you can, if you prefer, dial the CompuServe access number back home in New Hampshire. However, it may be cheaper to use the local-access number in San Francisco. You should also have phone numbers for customer support for your more important computer programs (especially your telecommunications software), so that when you are on the road and do not have the advantage of the manuals (which you will undoubtedly not carry because they are too bulky and heavy), you can still obtain critically needed help.

HINT 22 CREATE A SECURE TABLE OF PASSWORDS

You should keep a table of secret information, such as access numbers and passwords. Let us assume this is a relatively small file (less than 90KB). You want to keep it in a password-protected and encrypted zip file, and make sure that when you are done looking at it, the unprotected, unzipped file is really gone—not recoverable by undelete utilities. We do it by always recreating the zipped file from the unencrypted source (to get any updates or changes that may have been made), overwriting the source file with something else, and then deleting it. Anyone unerasing the source file will get only the overwritten material. We use command.com to overwrite. Following is a handy batch file that does it all. Say your secret password file is called PASSWRD. Create a batch file named PROTECT.BAT as follows:

```
PKZIP -sSECRET PASSWORD
copy command.com passwrd
delete passwrd
```

When you run it, it will ask you for a password to use (do not forget it!), then zip and encrypt (using password protection) your source file into SECRET.ZIP, and then overwrite PASSWRD with command.com—obliterating what used to be in it. Then it erases PASSWRD.

ONLINE SERVICES

"Why, then the world's mine oyster."
Shakespeare, *The Merry Wives of Windsor*

chapter 5

This chapter covers electronic information exchange using online services, including both commercial services and the Internet. The previous chapter provided the basics for using telecommunications hardware and software, including email, the cellular connection, and remote access. Once you have these basics mastered, you can tap into the extensive resources available online and begin exploring the new cyberspace frontier.

Personal computers are the heralds of the new information age. The amount of information or facts has doubled in the last fifteen years and will likely double again in the next five years. The richness and variety of information available via computer is staggering. This chapter examines electronic resources for exchanging and acquiring information by computer. Although these tools are not limited to mobile computers, road warriors will find them particularly useful because this massive storehouse of information can be accessed from anywhere on the planet.

COMMERCIAL ONLINE SERVICES

If you would like more than basic email capability,[1] you should consider a commercial online service such as America Online, CompuServe, or Prodigy. Others exist in the market, but these represent the big three. The subscriber base of these services has grown remarkably in the last five years. In 1989, just over one million users subscribed to an online service. By 1995, over five million subscribers had logged onto an online service.[2] The release of Windows 95 brought forth another contender, Microsoft Network, and, forecasters predict that by 1997, over eleven million users will subscribe to an online service.

This section reviews the major commercial online service providers on several factors: the user interface, features/content, discussion forums, accounting-specific content, email, local access, and Internet access. These are the critical elements of an online service.

Each of these commercial services is heaped with mountains of information. You can check news, sports, weather, or financial information as it happens. Also, special-interest forums include information on

[1] MCI Mail and AT&T Mail offer dedicated email service. (See Chapter Four.)

[2] *Investors Business Daily*, July 7, 1993, at 1; *USA Today*, July 12, 1995, at D1.

practically any subject under the sun. Check on computers and software, and download shareware. If you are a hobbyist, you can pick up lots of useful information and exchange information with others in the same field. Online encyclopedias provide a wealthy source of facts for both you and your children. Beware, though—these services can become addicting. Fees vary, but most services offer a monthly flat rate (typically about $20.00 per month) for unlimited hours.

Signing on to these services is straightforward.[3] Start-up disks are readily available; you probably received one from one or more of these service providers when you bought your laptop. Each of these providers offers either a Windows or Macintosh interface that makes navigating through this sea of information much easier. Install the software, sign on, and provide a credit card for billing. You will receive a user-ID and a temporary password. You should immediately change your password to something you will remember. Write down the user-ID and password in a secure place and take it with you when you go on the road. If you forget your password, you will need to request another, which will be mailed to you. Your user-ID is your address and allows others to send mail to you. You are now a member of the online community!

America Online

If you purchased a computer or computer magazine recently, you probably received a start-up diskette for America Online (AOL). This service has blitzed the market in an effort to obtain market share. Apparently that effort is paying off, because AOL is the fastest-growing commercial provider. In 1996, after AOL announced a new flat-fee billing schedule (no hourly charges), its subscriber base shot up so rapidly (1.5 million subscribers were added between October 1996 and the year end) it could not service its customers. Upwards of 7.5 million subscribers now use AOL.[4]

AOL sprang onto monitors and desktops in 1985, and is aimed primarily at home users. AOL is constantly upgrading and improving its interface,

[3] This assumes that your modem is working properly. If not, you should consult Chapter Four or see the troubleshooting tips in Appendix E.

[4] "Refunds planned by America Online in Internet Jam," *New York Times*, Jan. 30, 1997, A1; "On-Line Ire Not Pacified by Agreement," *New York Times*, Jan. 31, 1997, D1.

and this effort has kept the competition playing catch-up.[5] One of the nicest features of AOL is that your user-ID can be your name or some other nom de plume. Both CompuServe and Prodigy assigned a user-ID consisting of numerals and letters that are very difficult to remember (now, however, they are allowing names to be chosen). Because your user-ID is also your email address, using your name is more convenient. In fact, you can have more than one user-ID (screen name) for AOL. Thus, for example, each member of your family can have a user-ID.[6] If you have a common name, you may need to become creative to find a screen name that has not already been taken.

Although AOL is aimed primarily at home users, this service has matured over the years and professionals will find it very useful. You can sign on to AOL to check news, sports,[7] and weather from a main menu that lists several options, including Internet access. Financial information is easily accessed and you can even create a portfolio to track your stocks and mutual funds. (Be advised that under Securities and Exchange Commission rules, stock prices are delayed at least fifteen minutes.) This is a useful area to pick up information about your financially oriented clients. AOL is very rich in content, with new areas popping up almost daily. Move to various areas by using keywords (type Ctrl+K) to pop up a box for your selection.

AOL also offers several electronic publications, including both newspapers and magazines. The electronic newspapers (or e-papers) include the *Chicago Tribune, New York Times*, and *San Jose Mercury*. These e-papers may not replace daily print papers and are not as easy to read, but you can quickly check news stories from around the country through AOL. If you are researching an industry, for instance automobile dealers, you may find some interesting tidbits about a client by browsing the e-papers on AOL. The magazines available include *PC Magazine, Fortune,* and *Time*. You can search for information across a

[5] You may curse this constant upgrading as you wait for AOL to add new art.

[6] If you let your children use your account, be aware of the potential for misuse. As with any other medium, you should monitor the information your children are accessing. AOL incorporates parental controls to limit access by family members.

[7] AOL has the best sports page of any service. Capitalizing on a strategic alliance with ABC Sports, among others, this splashy page is probably the shape of things to come. Be warned, however; all those fancy graphics come at an expense—either slow transfer or vast amounts of real estate on your hard disk.

broad range of topics. This fundamental electronic research may provide some useful gems of interest to you or your clients.

AOL also offers many opportunities to discuss issues or topics with other users. From personal chat rooms to professional forums, AOL has something for everyone.

Using AOL email is straightforward. Mail can be read and composed off-line. This avoids connection charges and allows you to read and create messages at your leisure. Messages are sent automatically the next time you log on. Or, you can leave AOL active but not logged on. FlashSessions, or automated sessions to send and receive mail, can be scheduled. This feature separates AOL from the other commercial service providers. Messages can have files attached, although you can attach only one file at a time. The address book for storing names and email addresses is simple, but weak. Names cannot be sorted in the address book, as they can be on CompuServe. Also, there is no simple method for adding message addresses to your AOL address book.

Because AOL has thousands of local access numbers, you should be able to avoid long-distance charges. Of all the online services, AOL provides the easiest way to find a local number when traveling. (See Hint 23.) If you are not near a local access number, you can access the service through an 800 number, although additional charges may apply. AOL originally relied upon SprintNet and Tymnet, but it has recently developed its own AOLNet that promises 28.8kbps service. The other services will surely begin catching up to the leader.

In October 1993, AOL launched the Internet Center. This first effort was not very functional, but in 1995, AOL began offering full Internet access, including its own Web browser. Access to newsgroups, as well as Gopher and Wide Area Information Servers (WAIS), is easily accomplished. If you are an infrequent Internet user, this may be a viable option, although the AOL Web browser can be painfully slow. AOL has enhanced its service by including Web jump points throughout the service. This combination of proprietary online service and Internet access is an inexpensive and useful source of information.

HINT 23 TRAVELING WITH AMERICA ONLINE

Finding a local number for AOL is a snap. At the sign-on menu, instead of using your user-ID, click on the arrow to the right, select "New Local#," and sign on. Follow the instructions, enter your area code, and choose a primary and secondary access number from the list.

CompuServe

The granddaddy of the online service providers is CompuServe. The genesis of this company was to sell time to major corporate users on their mainframes. In 1979, CompuServe launched an information service that could be accessed using personal computers. In the good old days, you navigated the system by using a character-based menu. This was a clumsy interface and was soon supplemented with DosCIM, as well as third-party add-ons such as TAPCIS.

With the addition of a Windows interface (WinCIM), CompuServe has become a lot easier to use; just point and click to cruise around. The main menu for CompuServe is available before logging on and includes news, magazines, computers, money, education, entertainment, and travel. Log on to CompuServe and you see a welcoming message with hot new areas. You can also create a list of favorite places to which you can jump instantly. This avoids using the "GO" (type Ctrl+G) command to move to another area or forum.

CompuServe includes an extensive "shopping" forum with several online vendors. You can find almost anything here and pay for your purchases by using a credit card or, in some instances, by having the purchase billed to your CompuServe account.

CompuServe is also the home of ZiffNet, a feature of Ziff-Davis Publications, the largest publisher of computer magazines. On ZiffNet, you can find a wealth of shareware and information regarding personal computers. ZiffNet also offers a customized CompuServe interface for browsing.

CompuServe has always been a favorite of computer power users. Software vendors offer help through CompuServe, and they post fixes, patches, and updated drivers in their software libraries. (See Hint 24). You can also browse their forums for information about various problems and read messages that have been posted on various topics.

HINT 24 USEFUL COMPUSERVE FORUMS

Jump to any of these forums by using the keyword. Press Ctrl+G, then enter the keyword. You might also consider adding these locations to your "favorite places."

Name	*Keyword*
Microsoft	Microsoft
PC Magazine	PCMAG
Windows Shareware	WINSHARE

This is an easy and up-to-the-minute way to solve many common computer problems. Rather than waiting on hold for technical support, log on to CompuServe, go to the vendor's forum, and see if you can find the solution yourself. For example, if you are using a new software release, patches and bug fixes are often posted on CompuServe. Download the file using WinCIM or your communications software (see Chapter Four) and run the installation. You now have the latest version of the software and your problem may be solved. If not, post a message to the vendor and, within twenty-four hours, you will receive a reply about how to deal with the problem. If you post messages in a forum, you must revisit that forum to check your messages. Messages posted in a forum are a special kind of email and they are linked to the forum. Although you may incur surcharges beyond the normal connect charges, you can often find exactly what you need quickly and easily.[8]

CompuServe wins high marks for its email service. Messages can be composed off-line and sent when you log on to the service. The email address book in CompuServe is unparalleled. Adding names to the address book is as simple as clicking on a name in a message. Names are sorted automatically. You can attach files to your messages as long as the message is directed to another CompuServe user. You are not charged for messages unless they exceed 7,500 characters. After this limit, a small charge applies. Also, you can send and receive only a limited number of email messages before incurring additional charges. If you are receiving hundreds of messages per month, you should use an Internet email account for high volume.[9] One of the most annoying features of CompuServe, the numeric user-ID, has recently been changed to allow CompuServe subscribers to choose their own email addresses. Remembering "jimmersonm" is certainly easier than remembering "72377,1722."

Third-party vendors offer programs to access CompuServe email and forums. For example, E-Mail Connection from Connectsoft (see

[8] If you know where to look, you may find the files you need on the Internet. If you have a direct connection or a flat-rate, dial-up account, this may be cheaper, but only if you know how to locate the vendor and files you need.

[9] Some Internet list servers (automatic message routers for handling discussions on specific topics) can generate enormous traffic. If you are using an account, such as CompuServe, that limits the amount of mail you can receive for free, you should subscribe to the listserv in "digest" mode. All messages are accumulated daily into one or two messages.

Appendix A) provides automatic mail services for CompuServe, the Internet, and a host of other online services. If you use two or more email addresses, this integrated mailbox provides a single repository for all your email traffic, as well as a fine address book for all your names and email addresses.

If you are a CompuServe user and traveling beyond your local area, you should find the local access number for your destination before departure. You can also find the number by calling CompuServe. (See Hint 25.) A PIM or a spreadsheet is a great place to store this information. You can also access CompuServe via its 800 number (for 28.8 access, dial 800-454-8327), but additional charges apply. If you are using E-Mail Connection, look up a local number in the included database of CompuServe access numbers. You can download your email from CompuServe and find a local access number in one step.

CompuServe also has full Internet access through Spry Mosaic. This allows Web browsing by dialing in through CompuServe. As with any of the other service providers, if you do much Internet surfing, you may run up hefty fees. A word of caution about using CompuServe's Net Launcher (CNL): the installation may attempt to overwrite your WINSOCK.DLL file in the Windows directory. This file connects your PC to the Internet, and other programs (such as your Web browser) rely on this program to send and receive data over the Net.

If you already have an Internet connection, you should back up the WINSOCK.DLL file in the Windows directory before proceeding with installation of WinCIM and CNL. If possible, request during the installation that the Internet files be placed only in the CSERVE directory or wherever you have installed CompuServe. If you are using Windows 95 and the Internet Dial-Up (or an Internet connection automatically created by your local Internet provider), and your setup is damaged by installing CNL, then you should reinstall the Internet Wizard program. If you already had CompuServe installed when you loaded Windows 95, the old WINSOCK.DLL is renamed

HINT 25 TRAVELING WITH COMPUSERVE

The best measure to take is to find the local access number for your destination before your trip. However, in most larger cities, you can find the local access number by looking for CompuServe in the phone book and asking for the best number. You can also call CompuServe on its toll-free number (800-848-8990) to find a local number.

to WINSOCK.OLD. Rename to WINSOCK.DLL, then copy this file into the \CSERVE\WINCIM, \CSERVE\MOSAIC, and \CSERVE\CID subdirectories. For more information, use GO NETLAUNCHER in CompuServe.

If you are going to be a heavy user, then CompuServe (like the other commercial online service providers) may be an expensive way to access the Internet. Although the flat-fee billing has reduced the costs, anyone who uses the Internet more than ten to fifteen hours a month should investigate using a local Internet service provider (ISP) that offers unlimited time at a fixed rate, and compare the charges and the available search engines.

Microsoft Network

On August 24, 1995, the biggest software release of all time was staged—Windows 95. As part of that rollout, Microsoft launched its own information service, Microsoft Network (MSN). Access to MSN is simple using Windows 95.[10] Simply click on the MSN icon on your desktop and you are connected. A major advantage of MSN is the support available from within your Windows 95 applications. If you are using Excel, you can log on to MSN from within Excel and it automatically routes you to the forum where Excel answers are available. Vendors are flocking to MSN in droves to provide this support.

MSN is a mere fledgling compared with AOL and CompuServe. However, Microsoft hopes to forge many strategic alliances to provide content on its new service.

MSN is new and will continue to change. While early users were less than pleased with the interface, it has improved. Heavy users of Microsoft products will find MSN appealing, and you should at least give the service an audition to determine if it suits your interests and needs.

Prodigy

In the late 1980s, Prodigy entered the online community with a service based on a graphical interface and aimed at home users. Prodigy differs

[10] Too simple, according to some—including competitors and possibly the United States Justice Department. Rumor had it that the Justice Department would stop the Windows 95 rollout but it ultimately demurred.

from AOL and CompuServe in the advertising on its service. As you navigate through the various sections of Prodigy, you see on-screen ads enticing you to buy something. This minor annoyance is intended to help offset the cost of the service, although pricing for all three services is about the same due to the fierce competition in this market.

Prodigy is another excellent source for news and educational material. The initial menu shows current areas as well as standard choices such as business/finance, computing, entertainment, and travel. The sections for news, sports, and weather are exceptional. Political mavens might like the "polls" area. Move to other areas by using "jump" words (type Ctrl+J, then enter the jump word for the desired area). The financial information available on Prodigy is also first-rate. If you are an investor, you will appreciate the stock and mutual fund information. If you have children, they will enjoy Prodigy's outstanding educational areas for young users in the "Kid's Zone." The main menu will also take you directly to the Internet.

In early 1995, Prodigy became the first commercial provider to provide access to the World Wide Web. However, the interface is weak compared with a regular Internet connection, and painfully slow. One benefit of Prodigy is that subscribers can create their own Web pages.

INTERNET SERVICE PROVIDERS (ISPs)

If you are a serious Web surfer, you will want an account with an Internet service provider (ISP). (See Hint 26.) Nearly all information services are making their resources available through the Internet,[11] and eventually, all of us will have Internet accounts. When choosing an ISP, find out what services the ISP will provide. At a minimum, you should

HINT 26 FINDING AN INTERNET SERVICE PROVIDER (ISP)

Paradoxically, the best way to find an Internet access provider is to get on the Internet. Perhaps the best source is the PDIAL list by Peter Kaminski. Send email to "info-deli-server@netcom.com" and in the subject or body include the message "send pdial." Another good source is InterNic, available through FTP (ftp to "is.internic.net," then look in "/info guide/getting-connected/united-states" for the file "INTERNIC-LONG"), or email (Info @internic.net). These lists are also available via the commercial online services either by email or in forums.

[11] As you will see in the following section, accounting information providers are moving toward using existing Internet accounts to access their services.

get the following: email, Gopher (access to remote servers), FTP (for sending and receiving files), WAIS (a search and retrieval system for remote servers), USENET (newsgroups and discussion groups), and the World Wide Web (usually referred to as "the Web"). This last feature is the most popular on the Internet landscape and is probably the place where you will spend most of your time. Everything can be found on the Web—from the AICPA's Web site to politics to music to art galleries to sex to computer vendors and everything in between. Previously the Web (and the Internet itself) was largely noncommercial. However, that paradigm has fallen by the wayside as businesses rush en masse to get on the Web and the Internet.

ISPs fall into one of three categories: national, regional, and local. National providers (Earth Link, NetCom, and PSINet, for example) have Points-of-Presence (POPs) all over the country that use local access numbers. (See Appendix C.) If you frequently travel out of your regional area, this may make sense for you. National providers tend to be more expensive because they charge higher fees and typically do not offer unlimited access. Another alternative is a regional provider such as CERFnet or PrimeNet. These providers cover a wide area of the country. For example, PrimeNet covers the Southwest and has begun branching into the Midwest. If you travel in a limited area, a regional provider could be just the ticket. However, if you travel infrequently and use the Internet mainly at home or in the office, a local Internet service provider is the way to go. You should be able to get unlimited access for approximately twenty dollars a month.

Make sure that you have a Serial Line Internet Protocol (SLIP) account or Point-to-Point Protocol (PPP) account, with the latter being the newer and preferable standard. This will enable you to use any of the widely available Internet software programs. Some providers offer only a Dynamic SLIP account, which will run only their software. This is a serious disadvantage given the explosion of Internet programs on the market.

A PPP account is required for Internet access using Windows 95 and its integrated Internet connection: Microsoft Internet Explorer. The Internet access tools provided with the Microsoft PLUS! package make connection to the Net very simple. If you prefer, you can get the 32-bit

version of Trumpet WinSock,[12] which works fine with Windows 95. You should definitely download the 32-bit version of Netscape Navigator (http://www.netscape.com). This is the most popular Web browser for surfing the Net.

SUMMARY

Access to information is the fulcrum for the practice of accountancy in the coming years. The services discussed in this chapter provide a broad range of tools for garnering and promulgating information. You should sample different services and settle upon the one or two (or more) that work best for your needs. Whatever you do, make sure that you get connected. A CPA who does not have one foot in cyberspace is going to fall behind the pack very quickly.

"The world's my home when I'm mobile."
Pete Townshend, "Going Mobile"

Further Reading

Connecting to the Internet—An O'Reilly Buyer's Guide, Susan Estrada (O'Reilly & Associates, 1993). (An excellent resource for getting on the Internet.)

The CPAs Guide to the Internet, John Graves and Kim Hill Torrence (AICPA, 1996). (A comprehensive guide to the Internet designed specifically for the needs of CPAs.)

The Whole Internet for Windows 95, Ed Krol (O'Reilly & Associates, 1995). (This is a definitive guide to all the utilities and services on the Internet. New users will find this invaluable in learning how to navigate the new electronic frontier.)

Zen and the Art of the Internet (4th ed.), Brendan Kehoe (Prentice Hall, 1996). (A very understandable and short introduction to the Internet.)

[12] Trumpet WinSock is one of the communications programs necessary to initiate Internet access. WinSock manages communication between your computer and your Internet access host. WinSock must be loaded before running your other Internet applications, such as Netscape.

Dealing With Problems on the Road

"Forewarned is forearmed; to be prepared is half of the victory."
Miguel de Cervantes, *Don Quixote de la Mancha*

chapter 

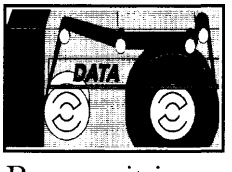
Once you have purchased a notebook and accessories, and loaded and configured the software, then you are ready to hit the road. You have armed yourself with a formidable arsenal of telecommunications tools and you have hooked into cyberspace through a commercial online service or the Internet. At this point, you are probably feeling a little cocky. Beware, pilgrim, the road is fraught with peril. The best way to avoid problems is to take preventive measures before the problems occur. A good CPA never enters the client's office without being prepared. The same motto applies when using computers: a good road warrior is armed for common problems and equipment failure. This chapter concludes with a troubleshooting section to provide assistance for common problems.

HARD-DISK MAINTENANCE

"An ounce of prevention is worth a pound of cure."
English proverb

You must handle your hard drive with care and affection, else it will turn on you like a mistreated dog. If you have Norton Utilities or one of the other products mentioned in Chapter Three, you should use it regularly. Even without a special utility package, you can avoid many problems by taking some simple measures using the tools supplied with DOS or Windows. These include backup, disk integrity checking, disk optimization, and virus checking.

Backup

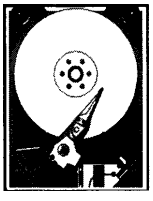


Do not forget to back up your notebook. Most desktop users back up their data regularly (or should). However, probably no more than 10 percent of notebook users back up regularly. This is dangerous and foolhardy. Because it is portable, your notebook is subject to more physical abuse than your desktop machine. Consequently, your notebook's precious data is more likely to vanish than the data on your desktop. This issue is even more important if your notebook is the only repository for your critical files. For example, the chances of your desktop machine's being stolen are fairly remote, but your notebook computer could vanish at any moment. What if your car is stolen? What if your case falls off the

luggage cart in the airport?[1] What if someone steals your computer out of a meeting room? All of these scenarios can, and do, happen. You must also make sure that your notebook is properly insured. (See Hint 27.)

Most important, make certain you have a current backup at all times. If your notebook is backed up, you can at least recover from the disaster with a minimal amount of grieving and no loss of precious data. You can back up your notebook by using the backup software included with DOS or Windows, although you may prefer a dedicated package such as Arcada BackupExec, Colorado Backup for Windows, or Norton Backup. Using one of these backup programs, you can back up your essential data to disks or a tape drive. Why not create a backup the night before that long trip while you are packing your bags? At the very least, you should keep a backup of the essential system files for DOS or Windows. (See Hint 28 on page 109.) If you run into problems, you can use this diskette to restore these files instantly.

Disk Integrity Checking



You can use ScanDisk, a DOS utility, to check the integrity of your hard drive. ScanDisk comes with both DOS 6.x and Windows 95. At the DOS prompt, type:

SCANDISK

and then press the Enter key. This DOS utility checks your hard disk for cross-linked files and lost clusters, and optionally does a surface scan

HINT 27 INSURING YOUR COMPUTER

Considering the investment you have made in your portable computer, accessories, and software, you should make certain that they are properly insured, through either your firm policy or personal insurance. If your computer is stolen, your homeowner policy carrier will assert (probably correctly) that the machine is used for business purposes. Accordingly, it is excluded from coverage unless you have a rider on your policy (bet your agent never told you this).

You can get a computer policy by calling SAFEWARE (800-800-6132). For a very low premium, you can be completely covered against loss from theft or casualty. Better safe than sorry.

[1] You might think this could never happen. However, Jimmerson once had his briefcase fall off the luggage cart in the Salt Lake City airport. Fortunately, the case was retrieved. He was, however, psychologically scarred by the event and can no longer use a luggage cart. Be advised that you should always push those carts—do not just drag them along behind you. Things can disappear and fall by the wayside!

HINT 28 BACK UP ESSENTIAL SYSTEM FILES

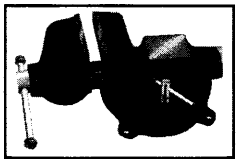
You should always have a current backup of the following files. Save these on a formatted and bootable disk by using the COPY command at a DOS prompt. If you are using Windows 95, some of these files are created on your startup disk, which should be kept current.

DOS and Windows 3.x users	
Root Directory:	AUTOEXEC.BAT (system and TSRs)
	CONFIG.SYS (drivers and system settings)
DOS Directory:	CSALLOC.INI (card services setup)
\Windows Directory:	WIN.INI (Windows settings)
	SYSTEM.INI (Windows System settings)
	WIN.COM (startup settings)
	PROTOCOL.INI (network settings)
	All *.INI FILES (program settings, usually located in Windows directory)
	All *.GRP Files (program groups in Windows directory)
Windows 95 users	
Root Directory:	AUTOEXEC.BAT (system and TSRs)
	CONFIG.SYS (drivers and system settings)
\Windows Directory:	WIN.INI
	SYSTEM.INI
	All *.INI files
	SYSTEM.DAT
	USER.DAT (these two DAT files are hidden system files; use ATTRIB -R -H -S to remove these attributes and to back up these files)
Windows\System Directory:	VMM32.VXD (Virtual Device Manager)
WordPerfect users	WPCSET.BIF (located in Windows directory)

(checks for physical defects on the drive) if necessary. Corrupted files occur when the file header or data structure has been damaged, and cross-linked sectors occur when two files share the same physical sector on the disk. Both problems can occur when you turn off your machine without first exiting your programs, or when a program terminates improperly. You can run ScanDisk automatically by adding the line C:\DOS\SCANDISK.EXE to your AUTOEXEC.BAT file.

Checking your hard disk and fixing errors may take a long time if you have a large disk or if you are using a compression utility, such as Stacker or Drive-Space. Any files with lost clusters or sectors will be saved to files with the extension *.chk. These files can be deleted unless you have the means to recover the information they contain with a disk editor such as Norton Utilities. Otherwise, that data is not useful. If you are using Windows 95, ScanDisk can be run regularly by using the System Agent.

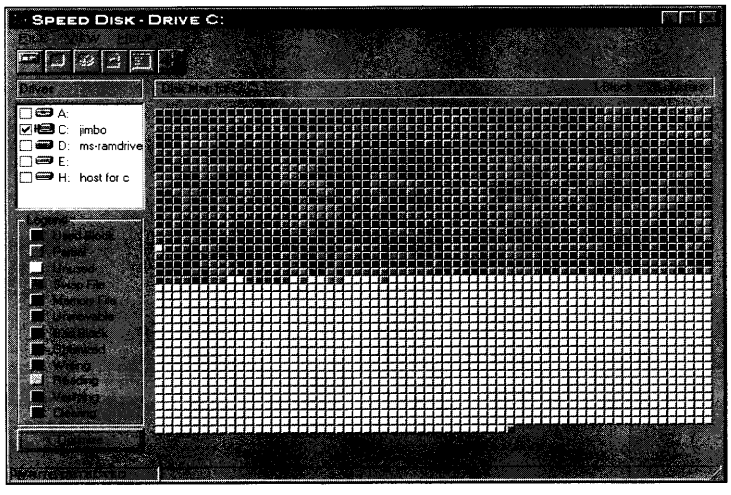
Defragmentation and Disk Optimization



Another important disk maintenance chore is defragmentation or optimization of your hard disk. As you use your files, the process of creating, opening, editing, and saving files results in files being scattered in pieces all over the hard disk. (See Figure 6.1.) A good analogy is to think of a hard disk as a large warehouse where files are pages stored in boxes. Each page (or cluster) holds a fixed amount of information and a file may be stored on several pages. Each box (or sector) can hold a fixed number of pages. The size of the warehouse (or hard disk) is determined by the number of boxes it can hold.

When a file is created, it is stored on pages that are then placed in one or more "boxes." Depending upon the number of pages, the file may not fit into a single box. As you open, modify, and save your files, they grow larger, or sometimes smaller. If the file has become bigger and the box in which it was stored is already full, the remainder of the pages must be moved to the next box with free space available. This may be the neighboring box, a box just down the aisle, or one halfway across the warehouse. Gradually, as pages are retrieved and modified, they get scattered in boxes all over the warehouse. Of course, this slows things down, as your computer must retrieve these fragments from the various boxes in which the files are stored.

FIGURE 6.1: DIAGRAM OF FRAGMENTED DISK



The more the files are fragmented, the longer it takes to retrieve and save files, thus slowing hard-disk performance and access speed. If you have never optimized your disk, this can result in a significant performance penalty. Fortunately, you can remedy this situation easily by using the tools that came with your computer. Optimizing the disk puts all the files in contiguous blocks on your hard disk, thus cutting down on the time necessary to retrieve and save files.

If you are using DOS 6.x, run the included optimizer by typing:

DEFRAG.EXE

at the DOS prompt, and then press Enter. Follow the on-screen instructions to complete the process. Files can be sorted by name or extension at the same time by selecting Configure after the initial testing stops. This results in a much cleaner disk, which is easier to navigate. This operation could take a while, so you should begin the optimize program to run overnight or during a period when you do not need your computer. Another option is to use a scheduler (Norton Utilities, for example) to set the disk to optimize in the early morning hours. (You must leave your computer running for this to work.)

If you are using Windows 95, go to the Accessories folder, then System Tools, and run Defragmentation. If you have Microsoft Plus, you can set up System Agents that perform this and other tasks automatically.[2] Norton Utilities for Windows 95 includes, among other things, Speed Disk, a defragmenter. Choose one of these tools and use it at least once a week.

Antivirus

Nothing can ruin your day like finding out that you have a virus on your computer. Computer users who frequently download files or share diskettes with others are prime candidates for viruses. Viruses are the offspring of sick, twisted minds with nothing better to do than devise sneaky ways to wreak havoc on other computers. The impact of a virus can range from a message on the screen informing the user that the computer has been infected (for example, the "Stoned" virus), to

[2] This is included on the Microsoft Plus! CD-ROM, not the standard Windows 95 upgrade. These accessories were removed from the basic upgrade because of the additional hardware requirements (for example, 486 chip and 8MB+ of memory). However, the cost is minimal and very worthwhile.

destruction of the hard disk and/or the File Allocation Table (FAT).[3] Old viruses would attempt to reformat the hard drive. More subtle, and undetectable, forms of mischief have become prevalent.

A recent wrinkle is a new form of virus that infects document files. Up till now, viruses infected only system or executable files and could not be spread by the exchange of data files. This new virus infects Word documents by attaching a macro to the document file. This virus is easily overcome,[4] but poses a major threat and ups the ante substantially because documents and data files are exchanged far more often than programs and executables. A virus that attaches to an executable file can take months or years to spread. A virus attached to a document can become widespread in a matter of days over the Internet.

The best prevention measure against viruses is the same as with other transmitted infections: "Just don't do it!" Failing total abstention, you should be extremely careful and follow some basic rules. Do not use files downloaded off BBSs or the Internet, or any questionable source. Do not exchange disks with other users or use disks of unknown origin. Do not exchange executable files with others. If you must use downloaded files, always check for a virus before use.

Many virus-checking programs are available (for example, Norton Anti-Virus). Even DOS 6.2 includes antivirus software, although its efficacy is doubtful because the effectiveness of these programs depends upon current data on existing viruses. New viruses and variations (mutations) of old ones are always being propagated. The worst varieties are "polymorphic" viruses. These nasty devils can actually change form to avoid detection. An older virus program without current data files may fail to detect newer or mutated viruses. Update your virus software on a periodic basis to avoid infection.

Two of the best virus programs are available as shareware: F-Prot (DOS only) and McAfee Anti-Virus (DOS and Windows). You can find these on CompuServe in the NCSA (National Center for Supercomputing Applications) forum (GO NCSA or GO MCAFEE). These programs are also available on the Internet, but so are many viruses. Be cautious with any downloaded software.

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[3] The FAT stores information regarding the hard disk, including information about all the files stored on the disk. If the FAT is destroyed, the information on the hard drive is generally lost.

[4] Microsoft has released a fix for this virus that scans for Word documents on the hard disk and expunges the virus. This is available on its Web site (http://www.microsoft.com).

Create a safe disk by formatting a blank disk with this command:

```
FORMAT A: /U
```

This unconditionally formats the disk, including the boot sector and master boot record. Then put the antivirus software on this "clean" boot disk. Move the read/write tab to "read-only." This prevents your antivirus disk from being infected by a boot sector virus. (See Hint 29.) To be extra safe, run a virus checker on the downloaded antivirus software—you cannot be too paranoid here! Anytime you download or copy questionable files, run the antivirus program from this clean disk. If you run an antivirus program such as F-Prot or McAfee, you should consider always running from a clean disk.

Windows 95 users must use antiviral programs specifically written for that operating environment, because of the long file names and new file storage system. Do not use a virus checker designed for DOS or Windows 3.x. You run the risk of destroying files and folders with long file names. Fortunately, both Norton Utilities and McAfee have Windows 95-compatible products on the market.

Always run a virus-checker on a regular basis.[5] Either purchase one of the commercial products or download one of the shareware products. You cannot be too cautious about viruses. Above all, be careful, and back up files often!

FEAR OF FLYING: DEALING WITH AIRPORTS AND AIRLINES

So, you are about to hit the road. You have your bags packed. Hopefully you did not forget your airline tickets. Did you do some

HINT 29 BOOT SECTOR VIRUSES

Did you know you can get a boot sector virus through an unsuccessful boot from a disk? If you are using a notebook, you might keep a disk in the drive, perhaps to back up critical data. However, if you start your machine with this disk in the drive, and the disk is infected with a boot sector virus, you can infect your hard disk, even if the boot is unsuccessful. Typically, when you boot from a nonsystem disk, you get a message asking you to remove the nonsystem disk and then press Enter to continue. Have you ever NOT received this message? If so, you may have already become infected with a boot sector virus. Hope you have Norton Anti-Virus or McAfee.

[5] What constitutes a "regular basis" depends upon you and your computer usage. If you never download shareware or share files with anyone else, you can probably get by with every six months to a year. However, the more you engage in risky activities, the more careful you must be.

preparation regarding your notebook before catching your flight? For starters, you should plug in your machine overnight and charge the battery. Or, if you have an older battery, completely discharge it and then charge it again before your trip. If you have a second battery, make sure it is charged as well. While you are charging the battery, why not back up your notebook hard disk? Remember to pack your AC adapter and power cord. Finding the right AC adapter for your computer can be a pain, but power cords have become commodity items.[6]

Always carry your laptop on the plane. Trusting your precious notebook to the baggage handlers is like checking your baby as luggage. If you already have two carry-on bags, try putting the notebook inside one of the other bags. Airline regulations say only that you can carry two bags on the plane, but nothing about how many you can have when you exit. Having a slipcase cover for your notebook is very handy in this regard. Most portable computer cases are just too large to stuff into an audit bag. Always carry on your person the critical files or disks you will need upon arrival. Bags get lost all the time. You may be able to get a new toothbrush and some clothes to tide you over, but you will not be able to replace that one crucial file that you need.

Before going through airport security, you should keep a couple of things in mind. First, you may be asked to turn on your machine so that the security officer can see that the thing is a computer, not a cleverly disguised bomb. This does not happen often, but if it does and your battery is dead, this can be a real hassle. Make sure you can get to your computer quickly and that it is all set to turn on. Otherwise, if the guard is insistent on checking your computer equipment, you may miss your flight, not to mention enduring the looks of hatred you will get from fellow travelers backed up behind you. Second, should you carry disks through the magnetometer arch or should you put them through the X-ray machine? Neither poses any real risk to your disks. Both have been done millions of times without any apparent damage and the choice is really arbitrary.[7] They should be fine either way, but if you are

[6] AC adapters typically use a standard PC/appliance cord to plug into the electrical outlet. You can find these power cords almost anywhere. If your computer has a built-in AC adapter, finding a power cord can be difficult. If your cord ends with a two-prong female connector, look for cords at electronics or appliance stores.

[7] All the photography buffs in the crowd will recognize this debate. Should you hand-check your camera and film? The answer depends upon how concerned you are about the film.

paranoid, you can have them hand-checked. The same applies to your notebook. Putting it through the X-ray machine does not impose any substantial risk, under normal circumstances.

Once you are on the plane, seat belt in place, you can begin working, right? Wrong!!! In the last few years, airlines have insisted that all "portable electronic devices" be turned off during takeoff and landing. This includes CD players, portable phones, and computers. You should promptly put your computer away when requested, else you will get some baleful stares from fellow passengers because you failed to power down. You might just close the machine if your notebook is equipped with auto-resume. First save your work in case you do not get back to your machine before the battery dies. In fact, you should save your work frequently when you are flying. What will you do when the flight attendant pours a cup of coffee on your keyboard? What if you hit unexpected turbulence and your machine bounces off the ceiling? Save your work often! If you are using Windows, press:

Ctrl+S

Working on the plane is no picnic, either. You have no room to spread out material and invariably the traveler in the seat in front of you will recline the seat back into your lap. Exit rows are preferred for this reason. You should avoid sitting in the front row of the coach section because the seat may lack a seat tray. Forget about using an external mouse on the seat tray. If you do not have a good built-in pointing device, you are going to be playing territorial domination games with your neighbor. Be mindful of prying eyes; privacy is almost nil on an airplane because everyone likes to peek at your work.[8] (See Chapter Seven.) If the material is sensitive client information, better to wait till you get to the hotel.

As you work on the flight, your battery will slowly discharge. (See Hint 30.) You can extend the life of your battery by taking some simple measures:

HINT 30 CONSERVING YOUR BATTERY WHEN FLYING

If you are stuck in the airport for more than thirty minutes, find an electrical outlet in the waiting area and plug in your computer. You can keep working without fear of draining your battery before you even get on the plane. And you can be assured that your battery is topped off for that long flight in front of you.

[8] At least one vendor has addressed this problem by making a polarizing filter that stops prying eyes. However, the filter requires wearing special glasses to see the screen.

1. *Enable Power Management.* This is done either through your computer setup or by loading a DOS TSR (for example, POWER.EXE). A message warning of low battery will flash about five minutes before your battery dies. Windows 95 users enable power management by selecting:

   Control Panel/System/Device Manager/System Devices/ AdvancedPowerManagement/Settings and making sure that Power Management is enabled. The APM (Advanced Power Management) icon should appear on the system bar if enabled, appearing as a power cord when you are plugged in and as a battery when not.

2. *Shut Down Power to Unnecessary Devices.* You should turn off the power to your modem while in flight. This could save precious minutes. Consult your user manual for your modem or simply pop out the PC-Card.
3. *Condition Your Batteries.* If the battery runs all the way down, this is a good opportunity to condition the battery. Save your work and let the computer keep running until the battery is fully discharged. NiCad batteries develop a memory over time unless properly conditioned.[9]
4. *Carry a Second Battery.* A second battery can be a real lifesaver, particularly on a long flight. Otherwise, you could just bring a good mystery novel!

Airlines have begun offering data lines for road warriors. You can plug into a telephone jack and retrieve mail, check the news, or surf the Internet. Access is costly and best limited to quick sign-on for email and not much else. Nothing that you will do at 50,000 feet cannot wait till you get to your hotel. Many airports now have pay phones with data ports that offer access at reasonable prices. In most cases you will need a major credit card or an ATT calling card. Another option is to join the airport club for your preferred airline. These clubs are open to frequent flyers with preferred status, and generally have phones and data jacks that convert those layovers into billable time. If you are a frequent traveler, these can be very convenient.

[9] You can have your batteries reconditioned. One vendor, Batteries Plus (612-929-6699), will recondition your battery for five dollars (plus shipping and handling). This is a great alternative to buying a new battery.

COPING WITH HOTELS

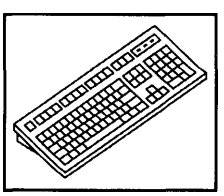
Hotels are slowly adapting to the computer age. If you are a frequent traveler and diehard road warrior, it is worth your time to find out what electronic amenities the hotel offers. Does the room have a second dedicated data line? If not, does the phone have a data port so you do not need to drag the bed away to plug into the phone jack? Check to find out what fax service is offered and how much it costs. Most nicer hotels have business centers, but the range of services and pricing varies.

Once you get to the room, you should immediately plug your notebook into a wall outlet to recharge your battery. Otherwise, if you have not saved your data, your battery could die overnight, and you will lose your information. Always carry an extension cord, a three-prong converter (if necessary), and a triple tap. The extension cord may include a triple tap, which is essential when the only plug in the room has only one open outlet and you need to plug in two devices. The extension cord is also nice if that outlet is in an awkward spot. You have to crawl under the bed only twice—once to plug in and once when you leave! A three-prong adapter can be a real lifesaver if your room has no grounded outlets and your cord has three prongs. You might also consider carrying a small surge protector. This may sound like a lot of equipment, but an organized road warrior can fit everything into a carrying case.

Once all your equipment is plugged in and charged up, you can settle in for some real work. The next obstacle you will face is getting your modem to work with the phone line. (A more detailed discussion of telecommunications is provided in Chapter Four). After plugging into the wall or data port, try logging onto your email. Remember that generally you must dial "8" or "9" to get an outside line. Otherwise, you will call some hapless guest in another room and wake him or her to the annoying buzz of a data connect signal. The easiest procedure is to create a separate configuration in your communications software. Use the access line number, and then name the configuration file "hotel." When you get ready to log on, change to that configuration file for the duration of your stay. If you are really forward thinking, you will have checked for the local access number to CompuServe, or whatever commercial provider you use. When you get back home, change back to your original configuration.

Sending a fax from your hotel room should be a straightforward procedure. However, hotel phone systems are notoriously bad. Line noise and other problems can interrupt your fax transmission. If you must start over, you will incur another access charge. If you need to try too many times, be suspicious of the hotel phone system. Demand that the additional phone charges be removed from your bill. Faxing is also useful for obtaining a hard copy of your work. Fax your document to the hotel fax line and hop down to the concierge desk. But check first to see if the hotel charges to receive a fax. As noted earlier, one New York hotel charged five dollars a page! Also, many hotels now offer a business center where you can get documents printed if you have the right printer drivers. (See Hint 31.) This makes a portable printer unnecessary unless quality printing is essential.

DEALING WITH A SMALL KEYBOARD



Using a notebook is far different from using a desktop. The screen and keyboard are smaller and the pointing device is sometimes unwieldy. IBM addressed this problem with its clever Butterfly. This machine achieves a larger keyboard through use of a folding mechanism that collapses into two parts when the case is closed. If you are using a notebook for brief periods, you can probably get by without a full-size keyboard and pointing device. For extended use, consider attaching an external keyboard and mouse. A large screen is also nice, but not essential.

Working on a full-size keyboard is far preferable to the smaller keyboards of portable computers, no matter how well designed the latter may be. One way to overcome the disadvantages of a cramped keyboard is to learn keyboard shortcuts. Almost every command has a keyboard

HINT 31 PRINTER DRIVERS

You should always install additional printer drivers on your notebook. The most commonly used printers are:

Apple StyleWriter
Canon BJ-100
HP LaserJet III, IV, and V
Epson LQ 850
IBM ProPrinter

If you have these printer drivers, in addition to your own, you should be able to print on almost any machine.

equivalent. Windows and Windows programs use standard keystrokes for basic commands such as saving and printing files, closing programs, and so on. (See Hint 32.) This highlights one of the advantages of Windows—once you learn one program, that knowledge can be carried forward to the next Windows program you use.

These keyboard shortcuts also come in handy when editing a document. The basic functions, such as cutting and pasting, can be done just as easily without a mouse. These keyboard shortcuts make editing documents effortless if you are more comfortable using a keyboard. (See Hint 33 on page 120.) If you make a mistake, you can undo your last entry by hitting:

Ctrl+Z

Many other keyboard shortcuts exist. Do some exploring!

PORTABLE COMPUTERS IN MEETINGS

CPAs who spend any time at meetings out of their offices will want to bring their notebook along. These venues have their own unique problems. Generally, the first problem is finding an outlet. In a large conference room, the only outlet will likely be across the room or just out of reach. An extension power cord is a lifesaver in these situations. You could operate off the battery, but meetings tend to drag on and you may not make it through the day.

Another problem with using a portable computer in these situations is that the keyboard can be annoying to others present. If you intend to use your portable extensively during a meeting, you should check the

HINT 32 KEYBOARD SHORTCUTS FOR WINDOWS PROGRAMS

Invoke any of these standard commands by pressing the indicated key or combination of keys at the same time:

File Open	CTRL + O
File Close	CTRL + F4
File Print	CTRL + P
File Save	CTRL + S
Find	CTRL + F
Switch Document Windows	CTRL + F6
Switch Programs	ALT + TAB
Exit Program	ALT + F4

HINT 33 BLOCKING, CUTTING, AND PASTING USING THE KEYBOARD

Editing documents can be done easily using the keyboard. Block text by holding the Shift key down and then using the Arrow keys or PgUp/Dn or Home/End keys. Once the text is blocked, it can be deleted (cut) or copied/pasted from or to the Clipboard by using the following commands:

Cut	SHIFT DEL or CTRL X
Copy	CTRL INS or CTRL C
Paste	SHIFT INS or CTRL V

keyboard to see how distracting it is. The last thing you want is for the meeting attendees to get irritated while you bang away at the keyboard. Often the key clicks can be eliminated by the computer setup. Find the keyboard preferences section in your BIOS (Basic Input-Output System) setup, then choose "disable key clicks."[10]

If you have meeting notes or some electronic trial balances in your notebook, you should copy your files on a disk or print out a hard copy every day. Bad things happen sometimes, and clients are notoriously unwilling to accept the cyber-excuse that your "computer ate the files." Almost instantly, the technology that looked so glamorous and modern suddenly makes you look stupid and unprepared.

Once you have become comfortable using your portable computer, you may decide to work a computer presentation into the meeting. Presentation software, such as MS PowerPoint, can provide all the tools you need to create a powerful presentation. The key to making a convincing presentation is to use the material to support your position without overpowering your message. Highlight the important points, and display the crucial documents and images necessary to get the message across.

Computer presentations should always be practiced in advance. Hook up the equipment in the meeting room, if possible, and make sure everything works. Standing in front of a group of expectant listeners is not the time or place to learn that you do not have the right cable or that your notebook is incompatible with the meeting room's presentation equipment. A useful tool for these presentations is a cordless pointer that attaches to your serial port and allows you the freedom to walk around. Point the remote control at the infrared sensor and you

[10] Consult your manual about how to change the setup for your computer. This is typically accomplished by running a setup program or by invoking a hot-key to access the computer setup screen.

can advance from slide to slide while moving around. You should also have a laser pointer to point at the screen and highlight important issues. These are readily available for less than fifty dollars, and are both useful and cool.

CUSTOMIZING YOUR COMPUTER

As you get more comfortable with your notebook, one of your first inclinations is to start tinkering and tweaking. Naturally, this sometimes leads to disaster. If you are perfectly happy with the configuration of your machine, skip to the next section. If you are the more adventurous sort, the following hints and tips will assist you in creating a desktop that suits you perfectly. Be warned, however, these may be measures for trained professionals and should not be tried at home.

Desktop Managers

Windows 3.x was not famous for its intuitive interface. Beyond creating their own program groups and icons, users could do little else. A new category of software—desktop managers (such as Dashboard, Norton Desktop for Windows, and PC Tools for Windows)—was created. These Windows add-ons replaced program managers with a "shell" or interface more conducive to customizing. These programs allowed a user to mold the machine, at his or her whim, by adding icons directly to the desktop, creating virtual desktops, and enhancing the file manager. Windows 95 is a vast improvement over Windows 3.x, but could still use some enhancement. Norton Utilities has introduced Norton Navigator and Starfish Software has released Dashboard 95. Both offer users an opportunity to tweak the interface to suit their personal tastes.

PC Speakers

Even if your computer does not have internal multimedia sound or you do not want to spring for a PC-Card with sound, you can still get sound by using the PC speaker; a bit tinny perhaps, but better than nothing. Download the speaker driver from Microsoft (SPEAK.EXE).[11] This is a self-expanding, executable file that creates two files—SPEAK.DRV and

[11] This is available from Mobile Office Online on AOL. (See Appendix C.)

SPEAK.TXT. Copy the SPEAK.DRV file to the Windows\System directory, and then open Control Panel and install through the Drivers Option. Reboot your machine, and *voilà*—you have sound. Adjust the sound using the function keys on your notebook (see the manual). CAVEAT: the speaker driver can interrupt communications. You may wish to disable sounds when online.

SUMMARY

Despite taking every precaution, you will occasionally run into problems ranging from disk errors to complete computer failure. Appendix E covers many of those situations. If your notebook fails, sometimes simply turning off the machine and waiting thirty seconds before powering back on will resolve the problem. A backup disk with your essential system files is a lifesaver if disaster strikes.

More often than not, the problem is a faulty or loose connection that is remedied by restarting the machine. The troubleshooting tips and tricks in Appendix E may solve your problem. In the event none of these measures is effective, you may be facing a hardware problem that necessitates contacting your vendor. (See Appendix A.) Most vendors offer overnight service, so that you can ship the computer to the vendor (generally at its expense) and have it returned via overnight mail the day after the vendor receives it.

The best measure you can take is to recognize and deal with problems when they occur. You do not want to check your hard disk for errors when you are preparing to start your presentation. Always have a fallback, and be prepared for Murphy's Law to strike at the most inopportune time.

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Further Reading

Books:

Maintain and Repair Your Notebook, Palmtop, or Pen Computer, Stephen J. Bigelow (Windcrest/McGraw-Hill, 1994).

On the Road: The Portable Computing Bible, Jim Seymour (Brady Communications, 1992).

Windows 3.1 Secrets, Brian Livingston (IDG Books, 1992). (This book has everything you will ever need to know about Windows 3.1.)

Windows 95 Secrets, Brian Livingston (IDG Books, 1995). (Ditto for Windows 95 users.)

Magazines:

PC Computing (Ziff-Davis Publications). (This publication runs a regular issue that reviews portable computers.)

PC Magazine (Ziff-Davis Publications). (Every August issue analyzes portable computing, offering reviews and advice.)

SECURITY, PRIVACY, AND ETHICS

"Facilis descensus Averno."
Roughly, "The descent to hell is easy" from Virgil's *Aeneid*

chapter 7

With the advent of so many electronic gizmos and sophisticated methods of conducting a practice from remote locations, it should come as no surprise that CPAs must come to grips with a variety of thorny ethical problems. Consider these issues: Who bears the liability, and what are the responsibilities of the various parties, when a facsimile or electronic mail message is misdirected? What happens if a telephone conversation is overheard at an airport? What about someone listening in on a cellular phone transmission? What precautions should you take when using your computer to work on sensitive documents in a crowded airplane?

Various boards, professional organizations, and courts are dealing with these and other problems posed by the adoption of new forms of communication. For example, what is the expectation-of-privacy issue for those engaged in portable telephonic communications. Courts have addressed the effectiveness of facsimile signatures. Legislatures have considered the adoption of digital signature standards for document authentication. With so much in flux, what can the attentive road warrior do to make certain that he or she does not transgress ethical requirements?

The short answer: Do not run near the ragged edge. Questions most often arise when someone is trying to skirt the edges of appropriate behavior, or is behaving without giving adequate thought to the consequences. Most ethical standards are little more than good manners writ large. Using good manners, avoiding the questionable, and applying some common sense, along with paying attention to detail and maintaining sensitivity, should go a long way toward keeping your practice on the road and out of the fens. This final section discusses some potential dangers posed by new technology, and suggests a pattern of thinking that may help avoid problems.

TELEPHONE COMMUNICATIONS

Keep the following in mind at all times: When you are talking on a portable or cellular telephone, you are broadcasting to the world. Anything you say can be intercepted and potentially misused (remember Speaker Gingrich's *contretemps*). Therefore, you should have no expectation that such communication is private, and should govern yourself accordingly. Most important, you should inform the party on the other end of the phone that you are talking on a cellular or portable phone, and therefore nothing of a confidential nature should be discussed.

Because mobile communications are easily intercepted and the equipment to do it is readily available, several courts have held that those using cordless telephones have no justifiable expectation of privacy.[1] Accordingly, using a cellular phone to discuss client confidences could violate the Code of Professional Conduct.

The telephone communications issue obviously goes further than just portable telephone use. The authors are appalled at the number of times they have overheard confidential information being discussed at open telephone booths in hotel lobbies or airports. As practitioners, we become so accustomed to talking on the telephone in our offices that we are unaware that a change in location may well eliminate the reasonable expectation of privacy we normally have. This problem can become exacerbated when using the radio telephones that are often found on the backs of seats in airplanes. Anything you discuss on these phones can be readily overheard by your neighbors.

The marketplace is beginning to recognize the need for secure telephone communications, and is responding with various means to scramble telephone messages. No system has yet seen wide adoption, but if your situation warrants it, systems are available. They generally require that both sender and receiver have the same system. They also range in price from the ridiculously expensive (tens of thousands of dollars) to the merely inconvenient. The latter includes systems that will work in conjunction with your computer to digitally encrypt the voice signals, which requires a computer linkup to the phone. The latest information about these systems is hard to find, but often a posting on a computer BBS (bulletin board system, such as those available on CompuServe or America Online) that focuses on security issues will get you up-to-date information. Phil Zimmerman, the developer of the most widely used encryption system in the world, reportedly will soon release such a system for voice communications.

THE UNINTENDED FAX RECIPIENT

The use of fax cover sheets has become ubiquitous. CPAs are accustomed to incorporating language on the cover page that says, in effect,

[1] See, for example, Edwards v. Bardwell, 632 F. Supp. 584 (M.D. La.) , *aff'd*, 808 F.2d 54 (5th Cir. 1986), and Tyler v. Berodt, 877 F.2d 705 (8th Cir. 1989), *cert. denied*, 110 S. Ct. 723 (1990).

"If the highly confidential and secret information (making certain to pique the unintended recipient's interest) contained in this facsimile is not intended for you, please do not read it and return it to us immediately." Reliance on such language seems risky, and even negligent and foolhardy. Although courts that have considered the issue may have said the genie must go back in the bottle, it amounts to closing the proverbial barn door after the old gray mare walked out.

Whenever you send a fax, you need to stop and think: "How do I know where this is going? Is the number I have the correct number? Maybe I should check." Having confirmed the number, stop again and think: "Who is going to be at the fax machine receiving this document? How do I know? If the wrong person in the recipient's office gets this, could it cause a problem?"

It is often advisable to ask the intended recipient specifically whether you should phone in advance to inform him or her that the fax is coming, so that he or she may intercept it and keep it from being inadvertently seen by those who should not see it. For example, during negotiations for the sale of a company that has yet to be announced to employees, it is probably unwise to send a fax about the transaction through the company mail room. In these circumstances, it is up to the CPA to think about any necessary precautions. Also, having explicitly verified that the telephone number and location and method for sending the fax are acceptable to the recipient (and also your client), you will have assured yourself that the communication is reasonably secure and confidential. Moreover, you may have sensitized your client to the need for confidentiality when he or she may have overlooked the issue. At the very least, you have shown yourself to be sensitive to the client's interests.

The unintended recipient is a particularly difficult problem with email. You receive a message from someone and, utilizing the "reply to sender" feature of your email program, you give a highly confidential answer and send it. Unfortunately, you overlooked the fact (so easy to do!) that the original message was also copied to half a dozen people on the "cc:" line, all of whom have now received your highly confidential message to the original sender; sure hope you were not commenting about one of them!

Another easy way to commit malpractice is through the careless use of address groups. Many email packages permit you to define a group of

addressees and simply use the group name when entering the address in an email message. For example, you may be involved in negotiations that involve half a dozen parties (with whom you frequently communicate) on each side of a transaction. It would be simple to create a group consisting of all these people, call it the "MegaCorp Group," and make reference to the group when sending a message to everyone. However, groups change. Sometimes there may be one or more parties to whom you do not wish to send a message, or to whom it might be inappropriate. Unless you think about the issue each time you send a message, and review the specific list of intended recipients and consider whether they should receive this particular message, you run the risk of misdirecting your email.

INFORMATION SECURITY

Your portable computer has one serious flaw: it is a high-profile target for thieves. We fail to consider that when a computer is stolen, the thief gets not only the physical machine, but all of the data and information contained on the hard drive and disks. Did you automate all of your log-on procedures for online services? If so, the thief could log on to these services. What about client confidentiality? Does your hard drive contain letters or documents that, if in the wrong hands, could compromise a client? We suggest that rather than making these judgments regarding individual documents, you protect all client information on your portable computer by encryption.

Encryption has recently become the subject of heated debate. It is, loosely defined, the process of encoding information to keep it confidential from all except the intended recipient. There are literally thousands of different means of encryption. Even the most sophisticated are, with sufficient effort and resources, subject to being broken—that is, decoded.[2] The government is quite concerned that any encryption scheme should include a means whereby, for law enforcement purposes, the government could decode the text. The government proposed an encryption algorithm embedded in the so-called "Clipper Chip," to which the government would hold the key. For apparent reasons, this

[2] You might recall that a significant advantage to the Allies in the Second World War resulted from breaking not only the German Enigma Cipher System, but also the Japanese High Command Code. As a result, the Allies had advance information about military plans from both these Axis powers.

idea was not uniformly popular, especially among companies wishing to do business overseas. The technology and mathematics of encryption have advanced so far that anyone who so desires can encrypt communications well enough to make them virtually unbreakable.

To encrypt a document, one applies an encryption algorithm (fancy talk for the mathematical formula used to transform a text string into an encoded message, called cipher text) and sends the encrypted text to the intended recipient. Someone who intercepts the encrypted text and does not have the key to decipher the encoded message would, in a perfect world, be unable to decode the encrypted message. The recipient who has the key to decode the message applies it (using the encryption algorithm used to encode the message) and gets the decoded text (plain text). That is how the perfect world works. The real world works quite differently.

Encryption algorithms come in all sizes and flavors. Simple encryption algorithms are more susceptible to being broken than more complex ones. Often, with simple coding schemes, patterns can be found in the cipher text that can give clues to decoding the message. For example, simple substitution codes (substitute every "a" with an "x" and every "b" with a "y" and so on) can be broken readily by the frequency distribution of letters. Look for the character that appears most frequently, and assume it is an "e." Does that give some hints about the text? Carry this process forward, and you can decrypt the text.

A number of available shareware programs can apply this and other more sophisticated code-breaking techniques to decode messages. In fact, some shareware programs can break into the password protection schemes used in most commercial word processing packages, such as WordPerfect and others. Simple, easily broken encryption techniques are called soft encryption. Although better than having none at all, the use of soft encryption, in the authors' view, offers the user a false sense of security. In an era when hard encryption is easily available and implemented, it seems sensible to use that which is known to be safe.

How do you determine whether an encryption algorithm is safe? Often, companies that implement encryption algorithms in their products announce they are using the top secret "zippy-quick system for encryption," and it is so secret they cannot tell you anything about it for fear of compromising the integrity of the encryption methodology. Blather and nonsense. Any encryption algorithm that would be

compromised by knowing how it works is inherently soft. Moreover, if such knowledge cannot be obtained, then the encryption algorithm cannot be placed in the field and subjected to testing by hordes of encryption enthusiasts, which is, by far, the best existing method to test encryption. Around the world, hosts of people—for either professional or personal reasons—engage in an ongoing attempt to break encryption algorithms. All too frequently, someone announces a breakthrough in encryption technology, puts the system out for examination, and shortly thereafter is dismayed to find that someone else has discovered a simple means to break the algorithm. This is not bad. Thorough testing serves to increase the level of confidence one might have in a particular algorithm. Public knowledge of the mathematics behind the encryption algorithm ensures that those testing it can put the algorithm through a truly rigorous test. Any algorithm that relies on secrecy for its security is risky.

PGP: ENCRYPTION FOR THE MASSES

Recently, much interest has been expressed in an encryption program written by Phil Zimmerman and called Pretty Good Privacy (PGP). In fact, PGP is much better than pretty good privacy: in its strongest implementation, it appears to be, for all practical purposes, unbreakable. Indeed, the encryption algorithm is so good that the government does not like it being used, and maintains that export of the program or disclosure to foreign nationals is a felony under the International Trafficking in Arms Regulations (ITAR). The government seems quite serious in its attempts to keep encryption technology out of the hands of foreign nationals, notwithstanding that the program has been circulating in Europe for years and that the underlying mathematical algorithms are disclosed in a United States patent that is readily available to anyone. The futility of such laws notwithstanding, anyone using PGP should be warned that he or she should obtain the appropriate export licenses before leaving the country.[3]

[3] Recently, the regulations governing the export of encryption technology were relaxed to provide for a limited exemption from the requirement to obtain an export license for the temporary export of cryptographic products for personal use, provided the cryptographic product remained in the possession and control of the exporter. The rule amends 22 CFR Parts 123 and 126, and appears in 60 Fed. Reg. 6111 (February 16, 1996). For further information, contact Rose Biancaniello, Deputy Director for Licensing, Office of Defense Trade Controls, Department of State, 703-875-6643 or FAX 703-875-6647.

PGP can be obtained from a variety of sources, and is also shareware.[4] A commercial version is available from Pretty Good Privacy.[5] The authors wholeheartedly recommend it. It is simple to use, operates equally well under DOS or Windows, and provides substantial piece of mind, not only for data on your hard disk, but for communications, as will be discussed below.[6]

PGP uses a so-called public-key encryption system. When you install PGP, the program creates a unique pair of keys, which are nothing more than unique strings of characters (actually, a long string of binary digits) that are used by the encryption algorithm as a unique scheme to encode your messages. The public key is made available to anyone, especially those from whom you wish to receive confidential communications. It does not matter that others may also have the key, as it is useless except to send encrypted messages to the person holding the private key. Messages encrypted with the public key can be decrypted only with the private key. Once a message is encrypted with the public key, not even the person who encrypted the message in the first instance can decrypt it without access to the private key. As long as you keep your private key secret, messages encrypted with your public key are safe and secure.[7]

Perhaps the following example would help to understand this. Joe and Mary want to exchange secure messages with each other across the

[4] You can obtain PGP from the NCSA form on CompuServe, after certifying that you are not a foreign national and will not export the program illegally. It can also be obtained on the Internet from Massachusetts Institute of Technology via FTP at dist.mit.edu. Note that the shareware version may not be used for commercial purposes.

[5] Pretty Good Privacy, Inc., 2121 South El Camino Real, Suite 902, San Mateo, CA 94403; 415-631-1747.

[6] For a superb discussion of PGP, including a history, background on the governmental concerns and export restrictions, and how to use it, see Simon Garfinkle, *PGP: Pretty Good Privacy* (O'Reilly & Associates, 1995).

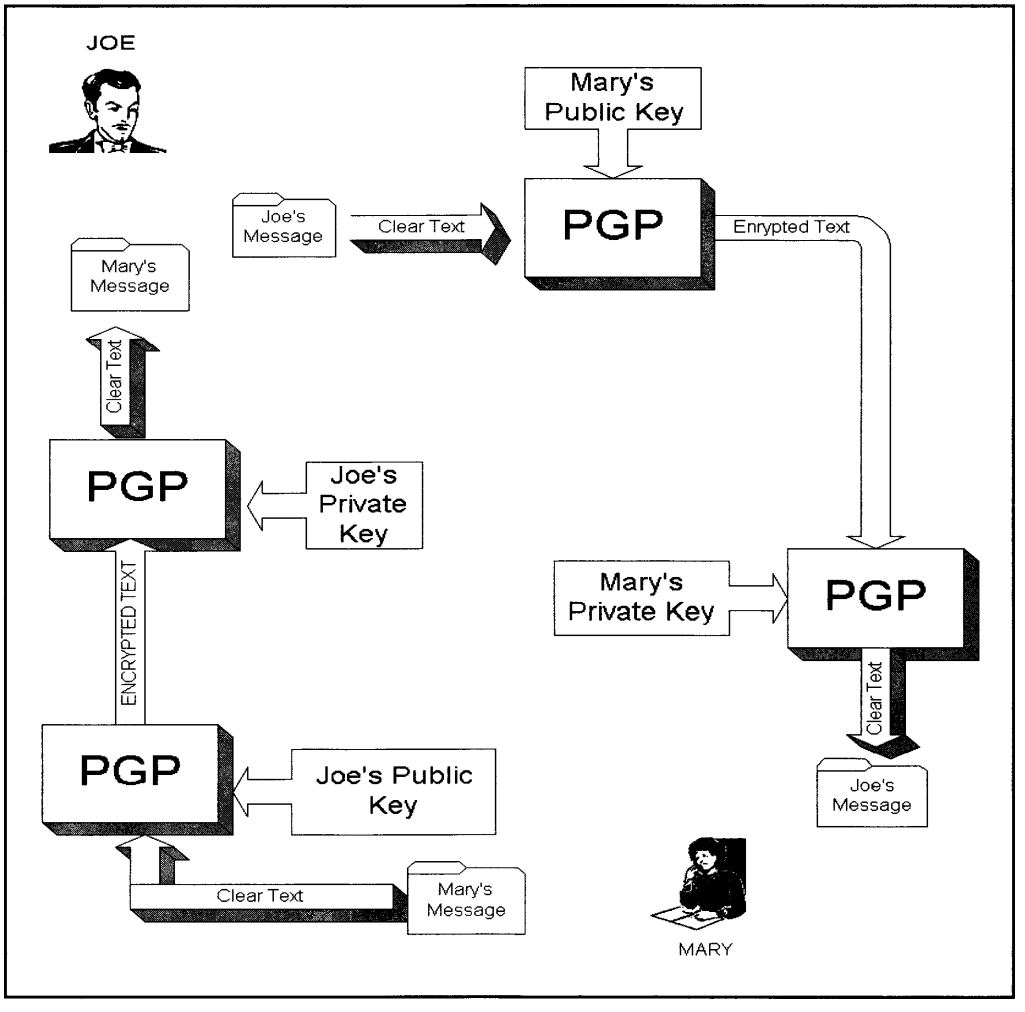
[7] The observant reader will notice one theoretical flaw: How do you know that a public key you received is, in fact, the public key of the person from whom it purports to be? Conceivably, evil misguided sorts could send you a public key that supposedly is from your client, for the sole purpose of intercepting your messages and decrypting them. Of course, your client would never receive these messages and would not be able to do anything with them anyway, because he or she would not have the corresponding private key. Although this flaw is more theoretical than actual, taking reasonable care to assure yourself of the validity of a public key should minimize risk from this concern.

Internet. (See Figure 7.1.) They want to make certain that no one else can read their messages. Joe and Mary have their own copies of PGP. Joe uses his copy of PGP to create a unique pair of public and private keys (Joe's keys) and Mary does the same (Mary's keys). Mary gives Joe her public key and Joe gives Mary his public key. When Joe wants to send Mary a message, he encrypts it using Mary's public key and sends it via email across the Internet to Mary. Mary uses her private key to decrypt Joe's message. Mary responds to Joe, encrypting her message with Joe's public key. Joe receives Mary's message and decrypts it with his private key. Not having access to either party's private keys, no one intercepting either of these messages could do anything to decrypt them.

The length of the key they created is a measure of the encryption's security. Older versions of PGP gave a choice of key sizes ranging from 512b (low commercial grade) up to 1024b (military grade). The longer the key, the longer it takes to encrypt and decrypt. However, for all but the very longest files, the process on a modern computer (100MHz or faster) really does not take much time at all. Although shorter key systems are breakable, the level of effort required may be disproportionate to the advantage to be obtained. Some 40b key systems have been broken using networks of computers churning for weeks. These simpler systems have the advantage of not being export regulated, and will provide most practitioners with a reasonable level of protection. More secure systems (such as PGP) are export regulated under ITAR (as previously discussed). Indeed, PGP was recently modified to allow using a 2048b key (to the government's apparent displeasure), which appears to be unbreakable by any brute-force techniques (those trying every possible combination). If nothing else, it would certainly slow someone down, so that by the time he or she was able to decrypt the information, it would likely be unusable.

Access to the private key in PGP is protected by a password, which is perhaps the weakest link in the system. If you had your laptop stolen, and used a short password, it would be relatively easy to try brute force. PGP lets you choose a long password, which, if properly selected, should provide reasonable security—on top of the normal security you apply to keep your laptop from being stolen!

FIGURE 7.1: HOW PUBLIC-KEY ENCRYPTION WORKS



DOCUMENT AUTHENTICATION: DIGITAL SIGNATURES

Public-key encryption systems have another use: they can be used to authenticate documents, and even verify that they have been unaltered. Just as the public key can encrypt a document that can be decrypted only by using the private key, the reverse is true as well. The private key can encrypt a document that can be decrypted only by using the public key. If you have my public key, and I send you a document encrypted with my private key, you will know it is from me because you can decrypt it with my public key.

This process has such a high degree of utility that Phil Zimmerman made it available even for unencrypted documents. Let us say that in some public place, I want to post a message that anyone having my public key can verify is, in fact, from me. PGP takes a look at the clear-text (unencrypted) document, and calculates a number (called a digest) based on the private-key encryption method. I post my clear-text document together with this digest number. Anyone wishing to verify the document's authenticity and the fact that it came from me can, with PGP, use my public key and confirm that the document bears my "signature." Moreover, if any part of the document has been changed, the digest number calculated when verifying the signature will not match the digest number appearing with the signed document, and the reader will know right away that the document has been altered. This process has such obvious use for electronic commerce that digital-signature legislation is under consideration in a number of states.

ENCRYPTION PITFALLS

With every good intention, you encrypt all the confidential information on your hard disk. You even go the next step, and delete all the clear-text files. Are you safe? Clearly not; DOS and other utility programs provide undelete functions that can often recover deleted files.[8] The only sure method to physically delete a file is to overwrite the file with new information. Doing the job completely requires that the information used to overwrite the original file is at least as large as—if not larger than—the original file, so that every piece of that file will be overwritten. Norton Utilities contains a "Wipe" function that does this, but it was not included in the Windows 95 version of Norton Utilities.

[8] Information for the more technically inclined: Files are stored on a disk in sectors. (See Chapter Six) All that is written to the directory is the filename and location of the first sector. When a file is "deleted," all that physically happens is that the first character in the filename is replaced with a special character, and the locations of each sector into which the file was written are put back into the FAT, available for use again. To unerase a file, all one must do is look in the directory for filenames with the special character, and follow the chain. If the sectors have not been used by some other disk write, everything is still there. Even if some of the sectors have been used, others may still be around unused and permit a really dedicated snoop to look through your entire hard disk a sector at a time. The only surefire technique is to physically overwrite the information in each sector with new information, and even that may need to be done multiple times to be completely secure from snoops with unlimited budgets.

If you do not Wipe (overwrite) the entire file contents, anyone with a so-called "sector editor" can examine the contents of your hard drive and read your document files.

It can be fascinating to look at a diskette that purportedly contains only a single document. Unless that diskette has been wiped clean of its prior contents, all kinds of interesting information can be found by undeleting files. Never give a disk to anyone without formatting it first. This is a good habit to develop, even with brand new disks. If you always do it, you will never have reason to regret leaving confidential information for others to find.

One problem with file-wiping programs is that unless they use truly random patterns of bits to overwrite the old files, thus destroying the original data, they may not completely work with file-compression programs such as DoubleSpace and Stacker. File-compression programs work, in part, by recognizing patterns in the uncompressed files, and replacing patterns of bits with short codes representing the larger patterns. A file containing 100,000 "1s" could be replaced by a code with the number "100,000" and a single "1"; saying, in effect, to replace the pattern of 100,000 bits with this code. If you were to look at this file with the directory command, it would appear to be 100,000 bytes long. However, if you were to use a file-wiping program to overwrite a true 100,000-byte-long file, it would, because of disk compression, overwrite only the first few characters, leaving the remainder of the file unchanged on your hard disk.

Phil Zimmerman thought of all this when he wrote PGP, and he included a very strong file-deletion-after-encryption option, which overwrites the unencrypted source file with a random pattern and thoroughly scrubs it from the disk. Thus, PGP is a good choice for encrypting files on your hard disk to protect them from inadvertent disclosure.

VIRUSES

You must be concerned about viruses infecting not only your own computer, but also about potential damage you might do to others by passing along a virus. Protecting yourself against viruses should be a matter of ingrained habit. (See Chapter Six for a discussion of virus-protection programs.)

Even the best antivirus programs will not detect all forms of viruses, but they can help. Every new disk you receive from someone else (even program disks from a manufacturer!) should be scanned for viruses by using a good antivirus program. Also, before you give a disk to someone else, make sure that you have scanned it and it is virus-clean. You can imagine the type of commotion a client might make after your virus-infected disk has caused his or her hard disk to be wiped clean.

Polymorphic viruses have the ability to alter themselves in ways that make it difficult for antivirus programs to find them, and new viruses are always being developed by warped minds that enjoy this sort of vandalism. You should make certain that your antivirus program contains the most recent data files describing viruses. These are available by subscription from publishers, or can be downloaded from online services, such as CompuServe, Prodigy, or America Online.

PASSWORD-PROTECTING YOUR NOTEBOOK

Many notebooks offer the option of requiring a password to gain access to the computer. Absent the password, the computer will not boot. Although this feature is a good precaution, it is not something upon which you should rely for security. On many computers, it takes nothing more than a screwdriver and two minutes to get past the password protection. As with a lock on a door, a password will keep out the idly curious, but the truly dishonest will find a way around it.

Nevertheless, should you use a password, there are a few simple rules you should follow to protect against hackers gaining access to your system:

1. Choose a random set of letters and characters; do not use easily identifiable names or phrases. Do not use your Social Security number, your birthday (or any birthdays for that matter), or the names of famous people or anything like that. Remember: the easier it is to remember, the easier it is to break. You can always keep a list of passwords in an encrypted file on your computer, and then you have to remember only one complex password. Use something like "Hjddke3t!k(8." Include numerals and nonalphabetic characters if you can.
2. Change your passwords periodically.

3. Do not write down your passwords except in an encrypted file. Do not write them on your blotter, or hide them on the underside of a desk drawer.[9]
4. Do not use the same password on different systems.
5. If you tell your password to someone, it is compromised. Change it soon.

EMAIL AND THE EXPECTATION OF PRIVACY

When you send an email message, you often have the subliminal expectation that it will be received and read by only the recipient. This is an unjustified expectation. When an email message is sent across the Internet, it may end up physically residing on a host of intermediary computers before it is finally delivered. On any of these, the message could be intercepted and read.[10] Moreover, when you create an email message, it resides on your system, possibly subject to view by a system administrator. Also, at the recipient's end, the message could be seen by persons other than the intended recipient. You never know what security measures are being taken at the other end. There is also the risk that a message sent to one person may be reposted by that person to another address—even to a public forum—without your consent.

Unless you use encryption techniques to ensure that only the intended recipient can unencrypt your email message, you should assume that whenever you send a message, it is, in effect, a postcard. Postcards can be read by anyone and, conceivably, so can your email. As a precaution, save or archive all outgoing email.

[9] Richard Feynman, the Nobel physicist, when working on the Manhattan Project to develop the first atomic bomb, amazed his coworkers with his uncanny ability to crack safes and locked file drawers containing atomic secrets. His method? He looked around to see where someone was likely to have written the combination. All too often, he was able to find it. He would also look at the dials on the safes when they were open, thus obtaining many of the third numbers in the combinations. (The owners rarely spun the dial after they opened the safe.) As the dials were accurate only to within a whole digit (plus or minus), and the numbers on the dial ran only to forty-five, he had to try, at most, only 225 combinations (on a three-number combination lock) to get the right one.

[10] The likelihood that anyone looking for a particular message could find it has long been the subject of debate. The authors maintain that it is much like searching for a needle in a haystack. Nevertheless, the theoretical possibility exists.

Often, we still operate with the implicit assumption that if something came off a computer, it must be right. This can be fatal. Do not automatically assume that email is, in fact, from whom it purports to be. There is a growing concern about email forgery. It is a simple exercise to send out email with someone else's name on it, and only a bit trickier technically to send it from someone else's location, so it appears to have the correct provenance. Therefore, you would be prudent to confirm and authenticate messages, particularly when they involve critical actions.

SUMMARY

When using technology, we have a tendency to assume it will work. It will fail. Always. Is it malpractice not to have backed up a critical document so that you are unable to make a filing deadline? It seems preferable to operate in a way that the question need not arise. Although it may seem intrusive, developing a set of careful habits when using a portable office (or even when using technology in your office) swiftly becomes second nature, and establishes a prudent mind-set.

What is called for is really nothing more than traditional ethics and careful behavior in a context with which we are just becoming familiar. We no longer think consciously about our habits in our traditional offices; prudent behavior (not leaving a confidential file open on a desktop or closing a conference-room door when meeting with clients) is ingrained. Such behavior needs to be conscious in the context of the portable office, because it has yet to become habit. Moreover, because technology changes so quickly, our conclusions need to be reevaluated more often. This is not a bad thing—it will make us better practitioners.

Further Reading

The CPA's Guide to Information Security, John Graves and Kim Hill Torrence (AICPA, 1997).

Information Security and Privacy in Network Environments, U.S. Congress, Office of Technology Assessment, OTA-TCT-606 (September 1994).

PGP: Pretty Good Privacy, Simon Garfinkle (O'Reilly & Associates, 1995). (A superb discussion of PGP, including a history, background on governmental concerns and export restrictions, and methods for using it.)

APPENDIX A:
VENDOR INFORMATION

Note: These numbers were accurate at the time of publishing but change all the time. Verify these numbers before you are caught in an emergency!

(s) Sales
(ts) Technical Support
(faxbk) Fax Back*
(bbs) Bulletin Board System

Hardware and Peripherals

Vendor	*Products*	*Address*	*Internet*	*Phone Nos.*
Acer America	Full Line of Notebooks		http://www.acer.com	800-733-2237 (s) 408-432-6200 (s)
Adaptec	SCSI Controllers	691 South Milpitas Milpitas, CA 95095	http://www.adaptec.com	800-934-2766 (s)
Apple Computer Corp.	Full Line of Notebooks (PowerMacs)	1 Infinite Loop Cupertino, CA 95014	http://www.apple.com	800-538-9696 (s) 800-767-2775 (ts) 800-505-0171 (faxbk) 408-996-1010
AST Research	Full Line of Notebooks (Ascentia)	16215 Alton Pkwy. Irvine, CA 92718	http://www.ast.com	800-876-4278 (s) 800-727-1278 (ts) 800-926-1278 (faxbk) 714-727-4273 (bbs)
Canon	Printers and Fax Machines (BubbleJet)	2995 Redhill Ave. Costa Mesa, CA 92626	http://www.ccs1.canon.com	800-848-4123 (s) 757-413-2848 (ts) 800-423-2366 (ts)
Compaq	Full Line of Notebooks	P.O. Box 692000 Houston, TX 77269-2000	http://www.compaq.com	800-345-1518 (s/faxbk) 800-652-6672 (ts) 281-518-1418 (bbs) 800-OK COMPAQ

* Fax Back is an interactive system many vendors provide that delivers documents with answers to commonly asked questions. Call the Fax Back number and follow the voice-menu system to request documents, including a directory of documents.

Vendor	*Products*	*Address*	*Internet*	*Phone Nos.*
Computer Discount Warehouse	Mail-Order House	1020 E. Lake Cook Rd. Buffalo Grove, IL 60089	http://www.cdw.com	800-726-4239 (s)
Curtis Computer Products	Surge Protectors and Accessories	2210 Second Avenue Muscatine, IA 52761		800-955-5544 (s) 800-272-2382 (fax)
Dell Computer Corp.	Full Line of Notebooks (Latitude)	One Dell Way Round Rock, TX 78682	http://www.dell.com/buydell	800-289-3355 (s) 800-624-9896 (ts) 800-948-3355 (ts) 800-950-1329 (faxbk) 512-728-8528 (bbs) 800-862-4272**
Epson Computer	Printers and Portable Hard Drives	20770 Madrona Ave. Torrance, CA 90509	http://www.epson.com	310-782-0770 (s)
First Source Int'l.	Memory Upgrades	7 Journey Aliso Viejo, CA 92656	http://www.firstsource.com	800-430-9866 (s) 714-448-7760 (fax) 714-448-7770 (ts)
Gateway 2000	Full Line of Notebooks and Subnotebooks	610 Gateway Dr. P.O. Box 2000 N. Sioux City, SD 57049	http://www.gw2k.com	800-846-4206 (s) 800-846-2000 (ts) 800-846-4526 (faxbk) 605-232-2224 (bbs)
Hayes Microcomputer Products, Inc.	Modems	P.O. Box 10523 Atlanta, GA 30348	http://www.hayes.com ftp://ftp.hayes.com	800-377-4377 (s) 800-HAYES-FX (faxbk)
H.Co. Computer Products, Inc.	Memory Upgrades	16812 Hale Ave. Irvine, CA 92714		800-347-1273 (s) 714-833-3389 (fax)
Hewlett-Packard Co.	Computers and Printers (DeskJet/LaserJet)	P.O. Box 580549 Santa Clara, CA 95051	http://www.hp.com	800-752-0900 (s) 208-323-2551
IBM	Full Line of Notebooks (ThinkPad)	3039 Cornwallis Rd. Building 203 RTP, NC 27709	http://www.pc.ibm.com	800-426-2968 (s) 800-772-2227 (ts) 800-426-4329 (faxbk) 919-517-0001 (bbs) 800-426-7763 (ts)

** For AICPA Member Benefits (including Dell Computer discounts).

Vendor	*Products*	*Address*	*Internet*	*Phone Nos.*
Intel Corp.	Processors, Video-Conferencing	2111 N.E. 25th Ave. Hillsboro, OR 97124	http://www.intel.com	800-321-4044 (s)
Kensington Microware Limited	Trackballs, Security Cable	2855 Campus Drive San Mateo, CA 94403	http://www.kensington.com	800-535-4242 (s)
Kingston Technology Corp.	Memory/PC-Card Hard Drives	17600 Newhope St. Fountain Valley, CA 92708	http://www.kingston.com	800-835-6575 (s)
LexMark Int'l Inc.	Printers and Multifunction Office Machines	740 New Circle Rd. Lexington, KY 40511	http://www.lexmark.com	606-232-3000 (ts)
Mascot Metropolitan, Inc.	CompuCruiser Carrying Case	380 Swift Ave., Unit 18 South San Francisco, CA 94080	http://www.tutto.com	800-949-1288 (s)
Maxtor Corp.	PC-Card Hard Drives	510 Cottonwood Dr. Milpitas, CA 95035	http://www.maxtor.com	408-432-1700 (s) 408-432-4510 (fax)
Megahertz (see 3COM)				800-527-8677 (s)
Micron	Full Line of Notebooks	900 East Karcher Nampa, ID 83687	http://www.micronpc.com	800-423-5891 (s/ts)
NEC Technologies	Notebooks (Versa)/ CD-ROM Drives	1414 Massachusetts Ave. Boxborough, MA 07719	http://www.nec.com	800-NEC-INFO (s) 800-366-0476 (faxbk) 508-635-4706 (bbs)
New Media Corp.	PC-Cards (Modems/ SCSI/Sound)	1 Technology Building A Irvine, CA 92618	http://www.newmediacorp.com	800-CARDS-4-U (s) 888-595-2195 (ts) 714-789-5212 (fax) 714-453-0214 (bbs)
ORA Electronics	Cellular, Data Link/ Batteries	9410 Owensmouth Ave. Chatsworth, CA 91311	http://www.orausa.com	818-772-2700 (s) 800-423-5336 (s/ts)
Panasonic	Notebooks and Portable CD-ROM Drives	2 Panasonic Way Secaucus, NJ 07094	http://www.mitl.research.panasonic.com	201-392-4500 (s)
PC's Compleat	Mail-Order House (specializing in portable computing)	34 St. Martin Dr. Marlborough, MA 01752	http://www.compuse.com	800-669-4727 (s) 800-697-4727 (ts)
Practical Peripherals	PC-Card Modems	P.O. Box 921789 Norcross, GA 30092-7789	http://www.practinet.com	770-840-9966 (ts) 800-225-4774 (faxbk)

Vendor	*Products*	*Address*	*Internet*	*Phone Nos.*
Samsung Electronics	Full Line of Notebooks	105 Challenger Rd. Ridgefield Park, NJ 07660	http://www.samsung.com	800-933-4110 (s)
Seagate Technology	Hard Drives	920 Disc Dr. Scotts Valley, CA 95066	http://www.seagate.com	408-439-7810 (s) 408-438-6550
Sharp Electronics	Full Line of Notebooks	Sharp Plaza Mahwah, NJ 07430	http://www.sharp-usa.com	800-237-4277 (s)
Sigma Data		26 Newport Rd. New London, NH 03257-4565	http://www.sigmadata.com	603-526-6909
SyQuest	Storage Media	47071 Bayside Pkwy. Fremont, CA 94538	http://www.syquest.com	800-245-2278 (s)
Targus	Carrying Cases	6190 Valley View Buena Park, CA 90620	http://www.targus.com	714-523-5429 (gen)
Teleadapt, Inc.		2151 O'Toole Avenue Suite H San Jose, CA 95131	http://www.teleadapt.com	408-965-1400 (s) 408-965-1414 (fax) 408-965-1410 (ts) 408-965-1411 (ts)
Texas Instruments (see Acer America)	Full Line of Notebooks			
3COM	Networking Cards	5400 Bayfront Plaza Santa Clara, CA 95052	http://www.3com.com	800-NET-3COM (s) 800-876-3266 (ts)
Toshiba America Computer Systems Div.	Full Line of Notebooks	P.O. Box 19724 Irvine, CA 92713-9724	http://www.toshiba.com	800-457-7777 (s) 800-999-4273 (ts) 714-583-3800 (faxbk) 714-837-4408 (bbs)
Trantor (see Adaptec)	Portable SCSI Adapters			
U.S. Robotics (see 3COM)	Modems (External and PC-Card)			
Visioneer, Inc.	Personal Page Scanners	Palo Alto, CA	http://www.visioneer.com	800-787-7007 (s) 541-884-5548 (ts) 888-368-9633 (ts)

Vendor	Products	Address	Internet	Phone Nos.
Western Digital Corp.	Hard Drives and Controllers	8105 Irvine Center Dr. Irvine, CA 92718	http://www.wdc.com	714-932-4900 (ts)
WinBook Computer Corp.	Full Line of Notebooks	1160 Steelwood Rd. Columbus, OH 43212		800-722-4391(s)
Xircom	Modems and Network Adapters	2300 Corporate Center Dr. Thousand Oaks, CA 91320	http://www.xircom.com	800-438-4526 (s) 805-376-9200 (ts)
Zenith Data Systems	Full Line of Notebooks	2150 E. Lake Cook Rd. Buffalo Grove, IL 60089	http://www.zdsdirect.com	800-645-7789 (s) 800-227-3360 (ts) 708-808-5500 (ts) 800-582-8194 (faxbk) 708-808-2264 (bbs)

Software

Vendor	Products	Address	Internet	Phone Nos.
Adobe Systems	Adobe Photoshop	P.O. Box 1034 Buffalo, NY 14240-1034	http://www.adobe.com	800-628-2320 (s)
Artisoft	Networking Software	2202 North Forbes Blvd. Tucson, AZ 85745	http://www.artisoft.com ftp://ftp.artisoft.com	800-846-9726 (s) 520-670-7000 (ts) 520-884-8648 (bbs)
Berkeley Systems, Inc.	After Dark Screen Savers	2095 Rose Street Berkeley, CA 94709	http://www.berksys.com ftp://ftp.berksys.com	510-540-5535 (ts)
Capsoft Development Corp.	HotDocs	2222 South 950 East Provo, UT 84606	http://www.capsoft.com	801-354-8000 (s) 801-354-8080 (ts)
Command Software Systems, Inc.	F-Prot	1061 E. Indiantown Rd. Suite 500 Jupiter, FL 32712	http://www.process.com	561-575-3200 (s)
ConnectSoft	E-Mail Connection	11130 NE 33rd Place Suite 250 Bellevue, WA 98004	http://www.connectsoft.com	206-827-6467 (s) 206-822-9095 (fax) 206-803-3039 (ts)
Corel Corp. (Word Perfect)	Corel Draw, Corel Gallery Perfect Office	Order Center P.O. Box 1036 Buffalo, NY 14240	http://www.corel.com	800-77-COREL (s) 613-728-0826 (faxbk) 613-728-4752 (bbs)

Vendor	*Products*	*Address*	*Internet*	*Phone Nos.*
Delrina (see Symantec)	WinFax Pro			
Folio Corp.	Folio Views	5072 North 300 West Provo, UT 84604-5652	http://www.folio.com	800-543-6546 (s) 801-229-6650 (ts)
Lotus Development Corp.	Lotus Notes, WordPro, SmartSuite, Organizer	55 Cambridge Pkwy. Cambridge, MA 02142	http://www.lotus.com	770-828-5705 (s) 800-223-0303 (ts) 800-343-5414 (s) 508-988-2500 (ts)
McAfee	Antivirus Software	2805 Bowers Road Santa Clara, CA 95051	http://www.mcafee.com ftp://ftp.mcafee.com	408-988-3832 (s) 408-988-4004 (bbs)
Microsoft	Windows 3.x, Windows 95, MS Office (Word, Excel, PowerPoint)	One Microsoft Way Redmond, WA 98052	http://www.microsoft.com	800-426-9400 (s) 800-936-3500 (ts) 206-936-6735 (bbs)
NetManage	Ecco Pro, Chameleon Suite, WebSurfer	10725 North DeAnza Blvd. Cupertino, CA 95014	http://www.netmanage.com ftp://ftp.netmanage.com	408-973-7171 (s) 408-973-8181 (ts) 800-457-4243 (s)
Netscape	Netscape Navigator	501 E. Middlefield Rd. Mountain View, CA 94043	http://www.netscape.com	415-528-2555 (s) 800-320-2099 (ts) 415-937-2112 (fax)
Norton-Lambert Corp.	Close-Up	P.O. Box 4085 Santa Barbara, CA 93140	http://www.nortonlambert.com	805-964-6767 (s/ts) 805-683-5679 (fax)
Novell	Netware and Group Computing Products	1555 North Technology Way Orem, UT 84097	http://www.novell.com	888-321-4272 (s) 800-858-4000 (ts)
PKWare	PKZip	9025 N. Deerwood Dr. Brown Deer, WI 53223-2480	http://www.pkware.com	414-354-8699 (s/ts) 414-354-8670 (bbs)
Polaris Software	PackRat	1928 Don Lee Place Escondido, CA 92029	http://www. polarissoftware.com	760-735-2300 (s/ts) 800-722-5728 (s) 760-738-0113 (fax) 760-738-8640 (bbs)
QualComm	Eudora Pro	6455 Lusk Blvd. San Diego, CA 92121-2779	http://www.qualcomm.com	619-587-1121 (s) 800-338-3672 (ts) 800-238-3672 (s)

Vendor	*Products*	*Address*	*Internet*	*Phone Nos.*
QuarterDeck	QEMM97	5770 Roosevelt Blvd. Suite 400 Clearwater, FL 34620	http://www.qdeck.com	800-354-3222 (s) 800-683-6696 (s) 573-875-0932 (ts) 800-371-4566 (faxbk) 800-282-8366 (fax) 573-875-0503 (bbs)
Seagate Software	Backup Exec	37 Skyline Dr. Lake Mary, FL 32746	http://www.arcada.com	800-3ARCADA (s)
Smith Micro Software	Hot Fax Menu	51 Columbia, Suite 200 Aliso Viejo, CA 92656	http://www.smithmicro.com support@smithmicro.com	714-362-2350 (ts) 714-362-2399 (fax) 800-964-7674 (s) 714-362-5822 (bbs)
Stac Electronics	Stacker, ReachOut for Windows and DOS	12636 High Bluff Dr. San Diego, CA 92130-2093	http://www.stac.com	800-522-7822 (s) 619-794-3700 (ts) 619-794-3710 (faxbk) 619-794-3711 (bbs)
Starfish Software	Sidekick 97	1700 Green Hills Rd. Scotts Valley, CA 95066	http://www. starfishsoftware.com	408-461-5800 (s) 800-503-3847 (fax) 800-661-7840 (s) 870-522-4610 (ts)
Symantec	Norton Utilities, Norton Anti-Virus, PC Tools for Windows	10201 Torre Ave. Cupertino, CA 95014	http://www.symantec.com ftp://ftp.symantec.com	800-268-6082 (ts) 408-973-9834 (bbs) 541-484-6699 (bbs)
SystemSoft Corp.	CardWizard Pro for Windows 95	2 Vision Dr. Natick, MA 01760	http://www.systemsoft.com	508-651-0088 (s/ts)
Traveling Software	LapLink for Windows 95	18702 North Creek Pkwy. Bothell, WA 98011	http://www.travsoft.com	800-343-8080 (s) 425-483-8088 (ts) 425-487-1284 (fax) 425-487-5410 (faxbk) 425-485-1736 (bbs)

APPENDIX B:
INFORMATION RESOURCES

Buying and using a notebook is much easier if you are informed. The easiest way to learn is by leafing through magazines and other sources. If you have been to the magazine rack lately, you have doubtless seen the vast array of computer magazines. The following list will provide some good sources, as well as pointers related to online services maintained by these publications. Another useful source of information is the Internet. Listed below are some discussion groups that cater to road warriors.

Note: These numbers were accurate at the time of publishing but change all the time. Verify these numbers before you are caught in an emergency!

(s) Sales
(ts) Technical Support
(fax) Fax
(bbs) Bulletin Board System

Magazines

Publication	*Address*	*Phone*	*Email address*	*Keyword/Web Site*
Computer Shopper	P.O. Box 52568 Boulder, CO 80322-2568	800-274-6384 303-665-8930 (s) 303-604-7455 (fax)		http://www.cshopper.com
PC/Computing	P.O. Box 58229 Boulder, CO 80322	800-365-2770 (s) 303-665-8930 (s) 303-604-7455 (fax)		http://www.pcomputing.com
PC Magazine	P.O. Box 54093 Boulder, CO 80322	800-289-0429 (s)		http://www.pcmag.com
PC World	P.O. Box 55029 Boulder, CO 80322	800-234-3498 (s) 303-604-7644 (fax)	suborder. pcworld@neodat.com	http://www.pcworld.com
Windows Magazine	One Jericho Plaza Jericho, NY 11753	800-829-9150	winmag@mcimail.com	AOL: WinMag CServe: WINMAG WWW: http://www.techweb. cmp.com/win/current

APPENDIX C:
ONLINE SERVICE PROVIDERS

Note: These numbers were accurate at the time of publishing but change all the time. Verify these numbers before you are caught in an emergency!

(s) Sales
(ts) Technical Support
(fax) Fax
(bbs) Bulletin Board System

Commercial Services

Vendor	*Address*	*Email*	*Phone*
America Online	8615 Westwood Center Drive Vienna, VA 22182	info@aol.com	800-827-6364 (s) 703-448-0760 (fax) 800-827-3338 (ts)
AT&T Worldnet	Room 2061 5000 Hadley Road South Plainfield, NJ 07080	Worldnet@attmail.com	800-967-5363 (ts)
CompuServe	5000 Arlington Centre Blvd. Columbus, OH 43220	7006,101@compuserve.com	800-848-8199(s) 800-848-8990 (ts)
Delphi Internet Services	1030 Massachusetts Avenue Cambridge, MA 02138	service@delphi.com info@delphi.com http://www.delphi.com	800-695-4005 (s) 617-441-4500 (s) 617-441-4902 (fax)
MCI Mail	1133 Nineteenth Street, NW Seventh Floor Washington D.C. 20036	moreinfo@networkmci.com http://www.internetmci.com	800-955-6505 (s) 800-444-6245 (s)
Microsoft Network	One Microsoft Way Redmond, WA 98052	info@msn.com http://www.msn.com	800-386-5550 (s)
Prodigy Services Co.	445 Hamilton Ave. White Plains, NY 10601	freetrial@prodigy.com http://www.prodigy.com	800-PRODIGY (s) 800-213-0992 (ts)

Internet Service Providers

Vendor	*Address*	*Email/WWW*	*Phone*
CERFnet (national)	3570-A Dunhill Street San Diego, CA 92121	info@cerf.net http://www.cerf.net	800-876-2373 (s) 619-455-3990 (fax)
Concentric Network Corp. (national)	10590 N. Tantau Avenue Cupertino, CA 95014	sales@concentric.net http://www.concentric.net	800-939-4CNC (s) 408-342-2810 (fax) 800-745-2747 (ts)
Netcom (national)	3031 Tisch Way San Jose, CA 95128	info@netcom.com http://www.netcom.com	800-501-8649 (s) 408-556-3153 (fax) 408-881-1810 (ts)
PrimeNet	1224 East Washington Street Phoenix, AZ 85034	info@primenet.com http://www.primenet.com	800-463-8386 (s)
PSINet	510 Huntmar Park Drive Herndon, VA 22070	interramp-info@psi.com http://www.psi.net	800-774-0852 (s) 705-904-4200 (fax) 518-283-8860 (ts)
Sprint Internet Passport		http://www.sprintsite.com	800-877-4646 (s) 800-786-1400 (ts) 800-829-0965
Uunet	3060 Williams Drive Fairfax, VA 22031-4648	info@uu.net http://www.uu.net	800-488-6386 (s)

Information Service Providers

Vendor	*Address*	*Email*	*Web Site*	*Phone*
Lexis-Nexis	P.O. Box 933 Dayton, OH 45401	newsales@lexis-nexis.com	http://www.lexis-nexis.com	800-227-4908 (s)

APPENDIX D: USING MULTIPLE BOOT CONFIGURATIONS

Setting up a multiple boot configuration is very useful if you use your notebook in a variety of settings: in the office on a network, at home with a CD-ROM drive or tape backup, or just on the road. MS-DOS makes it easy to boot to alternate configurations. Of course, these are applicable primarily to DOS and Windows 3.x—Windows 95 uses multiple hardware configurations, used automatically. Use the following sample files as an example (the comment after the semicolon explains the operation of that line):

CONFIG.SYS FILE:

```
[MENU]                                  ;Notifies the system of multiboot configuration.
                                          ;Each menu item will appear on the boot-up
                                          ;screen as a user selectable option. The
                                          ;program then jumps to that section of the
                                          ;program with the same title.
MENUITEM=MOBILE                         ;Sets the configuration when using on the road.
MENUITEM=NETWORK                        ;Sets the network configuration.
MENUDEFAULT=NETWORK,6                   ;Sets default to network config after six seconds.
MENUCOLOR=7,1                             ;Sets the colors of the menu.

[MOBILE]                                ;A program block title—program jumps here if
                                        ;"Mobile" was selected by the user from the
                                        ;boot menu.
DEVICE=C:\DOS\SMARTDRV.EXE /
  DOUBLE_BUFFER /V
DEVICE=C:\DOS\HIMEM.SYS                 ;Microsoft memory manager.
DEVICE=C:\DOS\EMM386.EXE
  NOEMS X=D000-D1FF
BUFFERS=10,0
FILES=50
DOS=UMB
FCBS=32,0
SHELL=C:\COMMAND.COM /P /E:512
DOS=HIGH                                ;Loads DOS into high memory.
DEVICEHIGH=C:\DOS\POWER.EXE             ;Loads APM driver.
SET PATH=..;C:\BIN;C:\BAT;C:\DOS;C:\
  WINDOWS;C:\WINDOWS\SYSTEM
DEVICE=C:\DOS\PCMSMIX.EXE
DEVICEHIGH=C:\DOS\SSVLSI.EXE            ;Loads socket services.
DEVICEHIGH=C:\DOS\RAMDRIVE.
    SYS 10000 /E                        ;Creates RAM drive on Drive E:.

[NETWORK]                               ;Program block title—program
                                          ;jumps here if user selected "Network"
                                          ;from the boot menu.
DEVICE=C:\DOS\HIMEM.SYS                 ;Microsoft memory manager.
DEVICE=C:\DOS\EMM386.
  EXE NOEMS X=D000-D1FF
```

```
BUFFERS=10,0
FILES=50
DOS=UMB
SHELL=C:\COMMAND.COM /P /E:512
DOS=HIGH                          ;Loads DOS into high memory.
DEVICEHIGH=C:\DOS\POWER.EXE       ;Loads APM driver.
DEVICE=C:\DOS\PCMSMIX.EXE
DEVICEHIGH=C:\DOS\SSVLSI.EXE      ;Loads socket services.
DEVICEHIGH=C:\DOS\CS.EXE /IRQ 5   ;Loads card services.
DEVICE=C:\DOS\CSALLOC.EXE         ;Loads card services allocation driver.
DEVICE=C:\DOS\CARDID.EXE C:\
  DOS\CARDID.INI                  ;Loads card identification services.
DEVICEHIGH=C:\DOS\RAMDRIVE.
  SYS 5000 /E                     ;Creates RAM disk.
DEVICEHIGH=C:\DOS\IFSHLP.SYS      ;Windows for workgroups driver.
SET PATH=..;C:\BIN;C:\BAT;C:\DOS;C:\
  WINDOWS;C:\WINDOWS\SYSTEM

[COMMON]                          ;You can put lines here that are common to all
                                  configurations. When the selected program
                                  block finishes, it will by default jump to the
                                  common block.

AUTOEXEC.BAT FILE:

IF %CONFIG%==MOBILE
  GOTO :MOBILE                    ;Using the same names for program
                                  ;blocks used by the CONFIG.SYS file
                                  ;(VERY important!) you can have
                                  ;alternate portions of AUTOEXEC.BAT.
                                  ;Note that program blocks are named
                                  ;using a different format than in
                                  ;CONFIG.SYS.

IF %CONFIG%==NETWORK
  GOTO :NETWORK

:MOBILE                           ;This is the MOBILE block.
LH C:\DOS\SMARTDRV.EXE 4096 128
C:\DOS\HIBRN8.EXE
SET PROMPT=$P$G
MD E:\TEMP
SET TEMP=E:\TEMP
SET TMP=E:\TEMP
GOTO :COMMON                      ;Note that if this line were not here,
                                    ;the program would just go on executing
                                    ;the NETWORK block (unlike in
                                    ;CONFIG.SYS). This line causes the program
                                    ;to jump around the NETWORK block.

:NETWORK                            ;This is the NETWORK block.
LH C:\WINDOWS\NET START
MD E:\TEMP
SET PROMPT=$P$G
SET TEMP=E:\TEMP
SET TMP=E:\TEMP

;COMMON                           ;This is where you can insert
                                  ;instructions that both configurations
                                  ;might use.

:END
WIN                               ;Starts Windows.
```

Add additional boot configurations by adding menu items to both CONFIG.SYS and AUTOEXEC.BAT. If you are using MEMMAKER to maximize memory, you must test each separate configuration, and then paste and clip into the menu files.

For Windows 95

Windows 95 handles multiple boot configurations somewhat differently, and without the necessity of writing program code in most cases. If you have one hardware configuration while on the road, and another while hooked up at your office, you can simply define multiple hardware profiles on the system manager (reached either by right clicking "My Computer" or from the Control Panel). Give each profile a name, and then simply tell the system which hardware is available in which profile, under the device manager tab. When you boot up, Windows 95 will ask which profile you want, and then will load the appropriate drivers during the boot process.

"Don't Panic!"
Douglas Adams, *Hitchhiker's Guide to the Galaxy*

APPENDIX E: TROUBLESHOOTING TIPS AND TRICKS

Problem	*Necessary Tools*	*Cure*
System fails to start or dies during use	Lamp or other electrical device	1. Check to make sure the electrical plug is not loose and that you have power by plugging something else into the outlet. Also try a different outlet.
	Spare battery	2. Remove the battery and check the contacts. Try a second (charged) battery.
	Computer manual	3. Check the computer setup to make sure the CMOS settings did not get scrambled. (Check your computer manual.)
	DOS system diskette	4. If you recently changed settings, try going back to the defaults. You might be able to use a bootable DOS diskette to get the machine started.
System hangs during startup		1. Turn off the power and then turn back on after thirty seconds. Do not laugh—it works!
	Backups of system files	2. Check your system files (DOS users should check autoexec.bat and config.sys; also see Hint 29) and make sure they are not corrupted. If so, reinstall backups (hope you have some!).
Hard drive does not work or fails intermittenly		If you have a removable hard drive, make sure it is seated properly.
Hard disk shows errors or runs slowly	Bootable floppy diskette with correct copy of SCANDISK.EXE	1. Use a bootable diskette and run SCANDISK. Correct any errors and try rebooting.
	Computer manual	2. Check the CMOS settings. These sometimes get corrupted. You may need to contact your vendor to determine your hard-disk type.

Problem	*Necessary Tools*	*Cure*
		3. Check the power management settings. The drive may be turned off prematurely to conserve power.
	Optimizer or defragmentation program such as DEFRAG.EXE	4. Defragment your hard disk using a disk optimizer.
Battery does not hold charge		Condition the battery by discharging completely, then charging fully. Alternatively, have the battery reconditioned.
Battery light begins blinking and/or computer gives low battery message		1. Immediately save all work
	Spare battery	2. "Hot-swap" the battery by suspending the computer or completely power down and replace the battery. Or plug the computer into an AC outlet.
Screen is too dim	Brightness and contrast controls	Check your brightness and contrast controls. You may have accidentally changed these. Also, check your power management software.
Trackball does not work properly	Cotton swab or tissue	1. Try cleaning the trackball—both the ball and the rollers.
	Mouse drivers	2. Make sure that the mouse driver is present and not corrupted. Manually reinstall the mouse driver.
		3. If you have attached an external mouse after initial power-up, either restart the machine or try to suspend and then resume.
Modem does not respond or will not connect		1. Check to make sure the connection is not loose. Is the phone line plugged in properly?
	Modem drivers	2. Check to make sure that the drivers are properly loading when you start the machine.

Problem	*Necessary Tools*	*Cure*
		3. Try using the modem at a lower speed.
	Alternate phone number	4. If you are trying to connect to an online service, try an alternate number.
Printer does not respond or print		1. Make certain the printer is "on-line" by checking the indicator light and pressing the appropriate button on the printer.
	Paper supply	2. If the printer indicates it is "off-line," check the paper path and paper tray.
	Printer cable	3. Check the printer cables.
	Printer drivers	4. Reinstall the printer driver.

GLOSSARY

This glossary is intended to supplement the use and definition of terms contained in the text of the book. Many of these terms are not included in the book because they describe more technical matters beyond the basic purview of the book. However, these terms are often encountered when shopping for a notebook and are thus included for the sake of completeness. The authors have gleaned these definitions from experience and their regular perusal of computer magazines, including *Computer Shopper, InfoWorld, Mobile Office, PC Magazine,* and *Windows Magazine.*

Active-Matrix. A liquid crystal display (LCD) in which pixels are controlled by a thin-film transistor (TFT) driver placed directly behind the LCD screen. Active-matrix screens are vivid, with high contrast and refresh rates. They also deplete batteries more quickly than other screens.

Aspect Ratio. The ratio of the width to the height of the screen or image. On notebooks, the aspect ratio refers to the squareness of the individual pixels. An aspect ratio of 1:1 indicates exactly square pixels.

Backlit Screen. A screen with a light source directly behind the LCD. Back lighting improves viewability but decreases battery life. You can determine if you have back lighting by using your notebook in a dark room. If you can see the screen, you have a backlit screen.

Contrast. The difference in luminance between a selected pixel (ON) and an unselected pixel. Contrast will vary greatly on notebooks, depending on the viewing angle and room lighting.

Dot. A single-picture element of a flat-panel display. On color monitors, each dot consists of three pixels (red, green, and blue). See "Pixel."

DSTN. Dual-Scan Twisted Nematic. A type of passive-matrix liquid crystal display. DSTN screens display scan lines twice as often as super-twisted nematic screens. These have better contrast and viewability than older passive-matrix screens, and are commonly referred to as "Dual-Scan."

Flash Memory. Memory that is usable for storage. Unlike RAM, where the contents of the memory registers are lost when powered down, flash memory is nonvolatile. Flash memory is added using PC-Cards and special drivers.

IDE. Integrated Drive Electronics. IDE is a current standard for connecting a hard drive or other storage device internally. Enhanced IDE drives offer faster performance. The alternative to IDE is the SCSI interface.

Internal Simultaneous Colors. The number of colors that can be displayed on the screen at any one time. Combinations of colors can result in more colors being displayed on the notebook's screen.

Laptop. An older term for portable systems. These machines were generally ten to fifteen pounds heavier than current notebooks. Generally still used to refer to any portable. See "Notebook."

LCD. Liquid Crystal Display. An LCD uses a thin layer of liquid crystal positioned between two electrodes. An electric field applied across the liquid crystal causes the crystals to rotate and appear opaque. This works just like the display on your wristwatch. Color is achieved by twisting the liquid crystals.

Notebook. A portable computer. Notebooks derive their name from their appearance. That is, they are approximately the size of a one-inch, ring-binder notebook. They are sometimes thicker, depending on the peripherals in the machine. Notebooks weigh between five and ten pounds, and generally have floppy and hard drives, a QWERTY keyboard, and an LCD panel. The floppy may be omitted to yield a lighter machine called a subnotebook.

Palmtop. A small computer designed to be held in one hand and operated with the other hand. These typically weigh less than two pounds. Palmtops usually employ off-the-shelf batteries (AA or AAA) and often include a PC-Card slot for expansion.

Passive-matrix. An LCD panel that uses an array of row and column electrodes to control pixels. This type of screen scans lines one row at a time, in sequence. These screens are typically slow in response time and have washed-out colors. (Compare with active-matrix or DSTN.)

PC-Card. A device about the size of a credit card that is inserted into special slots on the notebook. PC-Cards can be used to add a modem, network card, hard drive, or SCSI interface, among other things. Also known as PCMCIA cards.

PCMCIA. Personal Computer Memory Card International Association. This is the group that formulated the original standard for PC-Cards. The standard includes three types of cards, based on usage and thickness of the card. Type II cards are approximately 5.5 millimeters thick, and are used for modems, network cards, and so on. Type III cards are approximately 10.5 millimeters thick, and are used almost exclusively for portable hard disks.

Personal Digital Assistant (PDA). A hand-held computer that serves as an organizer and notetaker, as well as an e-mail system with wireless transmission. These often employ pen technology to compensate for the small keyboard.

Pitch. The center-to-center dimension between adjacent dots.

Pixel. A single element on a computer display. See "Dot."

Polarizers. Sheet material made of polymer acetate with iodide molecules. The molecules allow scattered light to enter only one pane. Twisted Nematic (TN) LCDs require two polarizers, one in front and one in back.

Random Access Memory (RAM). Memory used by the system to process information. Expressed in MB. Distinguished from hard-disk storage, which is used to save

information. Windows 3.x runs best with 8+MB, and Windows 95 runs best with 16+MB of RAM.

Response Time. The time required for a display pixel to turn on or off after the pixel has been addressed by the computer system. Also referred to as refresh rate. Measured in hertz or milliseconds.

SCSI. Small Computer System Interface. This term describes a type of port and device interface for connecting drives and other accessories to a personal computer. Rhymes with fuzzy.

Shareware. A method of software distribution. The author of the program freely circulates the program for use but requests that users register the program if they continue to use it after an evaluation period. Registration involves a small fee and insures receipt of updates in the future.

Subnotebook. A notebook computer that weighs less than five pounds. This is typically accomplished by using an external floppy drive. Also known as "Ultralight."

Super Twisted Nematic (STN). A liquid crystal material that is more stable and provides better contrast than regular twisted-nematic liquid crystal. These also have a lower refresh rate, because the liquid crystals are supertwisted. Also called "Super Twist."

Super VGA. Super Video Graphics Array. A graphics mode that refers to a resolution of 800x600 or 1024x768. This resolution is generally realized only on an external monitor attached to the notebook.

TFT. Thin Film Transistor. Thin, transparent transistors embedded on the rear surface of an active-matrix screen. Each TFT driver controls a single pixel of the screen.

Transportables. The original, portable computers that weighed approximately fifteen to thirty-five pounds. Lunchbox computers, such as the Osborne I, were transportable and barely portable.

Traveling Weight. The combined weight of the notebook and all cables and adapters necessary for its use (for example, AC adapter, power cord, floppy drive, and cables).

Twisted Nematic (TN). An inexpensive liquid crystal display with low contrast that has been supplanted by higher contrast LCDs in most notebooks.

VESA Local Bus. A standard of the Video Electronics Standards Association that describes adapter cards that receive information directly from the processor at very high data-transmission rates. Sometimes referred to as "VL-Bus."

VGA. Video Graphics Array. This graphics mode offers a resolution of 640x480 with 16 colors, or 320x200 with 256 colors.

VRAM. Video Random Access Memory. VRAM is a special type of memory for video adapters. The more VRAM, the better the colors and resolution of the machine.

About the Authors

Dan Coolidge grew up in Greenwich, Connecticut, from which he fled to the bucolic regions of central New Hampshire where he seeks a reclusive and somewhat misanthropic life with his wife, Carolyn, his two daughters, Lillian and Lydia, and an assortment of sheep, ducks, guinea pigs, cats, and dogs. He worked for a few years as a computer engineer, designing wicked spacecraft gizmos and computerized thingamajigs. He attended Harvard Law School where he got his J. D., in 1980, practiced one and a half miserable years in the periphery of New York, then sought the more congenial environment of New Hampshire. He is a partner in the Manchester law firm of Sheehan Phinney Bass + Green, focusing on intellectual property and computer law and anything else that will pay the rent. He is chair of his firm's technology committee, a past chair of the Lex Mundi intellectual property section (Lex Mundi is an international association of selected law firms), chair of the Computer and Technology Division of the American Bar Association's Law Practice Management Section, and also on the governing council of the section. Mr. Coolidge is a frequent author and speaker on technology, intellectual property, and law practice topics, and is a member of the Board of Legal Technology Advisors to John Marshall Law School. He has been on the faculty of the ABA's TECHSHOW for the past six years, and on the organizing committee for the past four years. His interests include physics, computers, fly-fishing, hiking and troublemaking.

J. Michael Jimmerson is a lawyer and technology consultant to legal professionals. Before moving to Chicago, where he founded Legal Counsel & Computing, Mr. Jimmerson was a civil litigator in Tucson, Arizona. He earned his J. D. and M. A. in Philosophy from the University of Arizona and is a member of the State Bar of Arizona. Mr. Jimmerson was the co-chair of the ABA's TECHSHOW from 1994 to 1996. An extensive writer in the field of legal technology, he is a columnist for the *Compleat Lawyer* (ABA's General Practice Section) and *Law Office Computing*. Mr. Jimmerson is presently working on a book on Windows for lawyers. When he is not banging away at his notebook computer, Mr. Jimmerson has been seen perusing the used bookstores for first-edition mysteries.