How To Connect

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This beautifully illustrated full-color guide is the ideal introduction to the world of on-line services. The book reveals the hidden secrets to buying your first modem, connecting to an on-line system, managing download files, and everything in-between.

This section contains Chapters 1, 2, and 4 from "How To Connect." To order the full book, call 1-800-688-0448, extension 199.

Click the turned up pages on the right and left corners to go forward and backward through the book. Click the sides of the Almanac to jump a chapter at a time.

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Worlds of Possibilities

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1 Connecting. The idea seems simple enough. People linking their

computers to other computers in order to communicate with one another. They exchange information, share data, and talk about ideas. But just what kind of information do they exchange? What data can they share? Just what do they talk about?

You might be surprised. Your personal computer, modem, and communications software open worlds of possibilities: libraries of information, shopping opportunities of all kinds, personal financial services, travel information, games, sports, weather, and much, much more-all available at the other end of the phone line.

Who's Out There?

So what exactly does on line mean? *On line* is any place that computer users go via modems and telephone lines to meet with one another. On line can be a commercial service, such as CompuServe, Prodigy, or America Online, where many members connect to a central system to gather information and exchange ideas. On line can be a local bulletin board system-a single computer into which users call to read messages or copy software programs to their computers at home or work. On line can be an electronic mail service, such as MCI Mail or AT&T Mail, that individuals use to send messages to other service users. (You'll learn much more about all these specific kinds of on-line connections in later chapters. For now, just open your mind to all the wonderful possibilities that are available when you use a modem to connect to another computer.) Sometimes, the terms going on line and connecting are used interchangeably because both refer to essentially the same thing: any kind of electronic connection between computers.

Who goes on line? Literally millions of people just like you. On-line services and bulletin board systems are virtual cities teeming with activity. The same people you might meet on a city street can be found on line talking about the same things they talk about on street corners. And the errands they do at the post office, the bank, the local shops, the newsstand, and the library-they're doing them on line, too.

There are computer enthusiasts talking about the latest technologies, copying software programs from the on-line network to their own PCs, and swapping war stories about hardware upgrades. And there are lawyers, too, checking into electronic law libraries to find legal rulings that support their cases. There are investors buying and selling stocks, business travelers rearranging airline tickets, and collectors bartering everything from vintage baseball cards to antique automobiles.

Children talk with other kids about homework, fads, television, and music. They compete with one another in electronic games. They find information for school projects, and, more often than not, they learn something new.

Shoppers come on line to get the skinny on what car dealers really pay for a particular car. They scan electronic databases to find out who's offering the best price on the laser printer of their choice. Sometimes they just get snagged by a really great deal and buy products-while they're on line.

There are whole communities of fence-post chatters talking about politics, sports, current affairs, and the arts. If you have an interest, a social cause, or a point of view, there's someone on line ready to talk to you. In fact, every day people are meeting one another and making new friends. And every once in a while, couples fall in love, meet, and get married.

All the News

If you're a news junkie, on line is the place for up-to-the-minute information. The Associated Press provides hourly news updates through CompuServe and other on-line services. The *San Jose Mercury News* and *The Chicago Tribune* post each morning's edition on America Online. But on-line services don't just wait for news to come across the "wire." They keep on top of the latest stories themselves. During the 1992 presidential election, for example, Prodigy updated voter tallies as each state reported its results. Services also poll members and report the ebb and flow of popular opinion on a variety of news issues.

Of course, there's much more than front-page news on on-line services. You can get weather reports for any location across the country or around the world-including satellite and radar maps. Sports fans tune into on-line services to gather the scores from all the games, get the scoop on who's been traded where, and find out who's on and off the injured reserve list. Hollywood watchers get the low-down on all the entertainment news, from the latest television deals to movie reviews and soap opera summaries. From time to time, the stars even come out on-line to talk to their fans.

Reference Desk

Have you ever wondered about...anything? Well, you can probably find the answer on line. When was the Magna Carta signed? How fast does the bullet train go? How many movies did Charlie Chaplin make? What should I pay for a new Ford Taurus? What can I do to treat poison ivy? Should we send our child to Princeton? And where will we get the money to pay for it?

If you can imagine a question, there is an on-line source to answer it. Most popular reference works-and many obscure ones-are now available in electronic form, enabling you to dial in, search a database, and get the information you need. There are dozens of databases that have abstracts and full articles from literally hundreds of thousands of magazines, journals, and newsletters. Government information-from census data to agency regulations-is all available on line. You can check government tax regulations (do you have to pay social security taxes for your nanny?), research the demographic profiles of cities and towns across the country (where's the best place to locate a new frozen yogurt factory?),

and stay current on pending government contracts (maybe your paving business can bid on that new highway job).

Consumer Reports, Books in Print, Marquis Who's Who, Magill's Survey of Cinema, Peterson's College Database, a half-dozen encyclopedias, dictionaries, and thesauruses, even phone books-you can use them all on line.

Money Matters

It's hard to be a smart investor these days without going on line. In fact, most personal finance and investment software have built-in links to on-line services. There's no need to wait for the morning paper to find out how your stock did in the day's market. On line, you can get instant stock price quotes throughout the trading day. Thinking about investing in a new company? On-line services provide the latest news from Dow Jones, financial and company reports, ratings from Standard & Poors, and much more to help you make wise investment decisions. When you're ready to put your money into the company, you can buy the stock on line, too. A number of brokerage firms, including Quick & Reilly, Dreyfus, Fidelity Investments, and Charles Schwabb, make their services available electronically.

Popular personal finance programs, including Managing Your Money and Quicken, let you dial into on-line services and update your stock portfolio automatically. Another program, Fidelity Online Express, lets you buy and sell mutual funds through the Fidelity discount brokerage network. Reality Technology's innovative Smart Investor software and service gives all the tools investors need to evaluate, buy, track, and sell investments-all on line.

If you only dream about making your million in the stock market, on-line services let you make a game of it. CompuServe, for example, lets members compete with one another as they build imaginary portfolios. The player who makes the most money wins.

But on-line money management isn't just about investing. Some banks, such as Citibank in New York, let you handle basic bank transactions by dialing into the bank's computer and accessing your account. And a variety of services let you pay bills without ever writing a check. You simply send an electronic payment notice to the Checkfree or BillPay USA services, for example, and they transfer money from your account to pay the bills you specify-from major credit cards to the local drugstore.

The Electronic Mall

Imagine if every mail order catalog in existence arrived on your doorstep. That's just about what it's like to shop on line. Brooks Brothers, Lands' End, JC Penney, Books On Tape, Barnes & Noble, Columbia House music club, Hammacher Schlemmer, JDR Microdevices, Omaha Steaks, the Metropolitan Museum of Art-these are just a sampling of the organizations selling their wares on line. Need to send flowers, a fruit basket, or maybe some specialty coffees or foods? Dozens of companies ready to serve you are just a modem connection away.

Although there are plenty of things to buy on line, there are also ways to be smarter about what you buy. *Consumer Reports*, for example, provides its product-test results electronically. You can find out how much you should spend on a new car, including dealer prices for every option and tips on negotiating the deal. If you're in the market for computer products, Ziff Buyer's Market and PC Catalog are two services that provide a complete listing of direct marketing sources for hardware and software. In seconds, you can find out who's got the best price on hundreds of products. And the Boston Computer Exchange links buyers and sellers of used computer equipment.

If your idea of shopping is a lazy Saturday afternoon cruising yard sales, you'll find something on line, too. On-line classifieds are a giant swap meet where you can buy or sell just about anything-without ever taking the car out of the garage.

Travel and Leisure

Planning a trip? Make an on-line service the first stop on your itinerary. From airline tickets to hotel reservations, you can handle all your travel arrangements yourself, without having to

"hold for the next available agent." You can book flights, reserve rental cars, even sign up for an exotic cruise. Many prominent travel services are available to on-line users, but one of the most useful is the EAASY SABRE reservation system that enables you to search for, compare, book, and purchase airline tickets, reserve rental cars, and schedule hotel accommodations. You'll also find other handy traveler's resources, including the Official Airline Guide Electonic Travel Services, which features up-to-date listings of more than 200,000 flights and a bevy of travel-related information, including frequent-flier program rules, toll-free airline, hotel, and car rental phone numbers, and much more.

You might expect to find Zagat's Restaurant Survey on line-and you will. And you likely won't be surprised to find recommendations from other on-line users on the best bed-and-breakfasts, out-of-the-way restaurants, interesting sites, and all the rest. But you might be surprised to learn that U.S. State Department travel and visa advisories are on line and updated as international situations change.

The Mail's Here

It won't be surprising if the twenty-nine cent stamp winds up on the endangered species list. More and more people are taking advantage of fast, immediate electronic mail to get their messages across. Anyone who signs up for a major on-line service automatically gets a "mailbox" to receive electronic mail, commonly referred to as e-mail. There are even services, such as MCI Mail and AT&T mail, that do nothing but act as an electronic post office, delivering e-mail to their members.

An electronic message costs about the same to send as a paper letter, but with added benefits. You can be sure that your message is instantly delivered to the recipient's electronic mailbox. You can even request a "return receipt" that notifies you when the recipient has opened your message. If you need to send a mass-mailing, you can write one message and send it to dozens of mailboxes, without copying and addressing all those envelopes. And when you want to reply to a message, the system automatically addresses the envelope; you just fill in your response.

E-mail is a great way for friends and family to stay in touch, too. One message, sent to every family member, for example, can launch a discussion of the type usually shared around the Thanksgiving table. And e-mail lets you quickly speak what's on your mind. Do you have a gripe for the president? Drop him an electronic message. In fact, according to one news report, the White House gets up to 5,000 e-mail messages a week.

Entertainment

Just because you are home alone doesn't mean you have to play by yourself. Imagine, instead, going into combat, descending a dark cave, or rocketing into space-by dialing into an on-line service to match wits with other members in on-line interactive games. GEnie provides a host of multiplayer games. Prodigy's Baseball Manager is a season-long venture that pits you against other members in a rotisserie baseball league. Rotisserie baseball uses the performance of real-life baseball players across the major leagues to chart the performance of the game-player's dream team. You draft and trade players, arrange the lineups, and play games with other on-line league members. How your team performs in a given game depends on how the real-life ball players did in that night's outing at the ballpark. Just about every on-line service hosts lots of games, including trivia contests of every flavor and stripe with chances to win real prizes.

On-line services offer a host of downloadable games, too. You can copy these game programs from the on-line service to your own computer and play them after you've disconnected from the on-line service. Games are among the most frequently downloaded programs, and you can find them in a number of categories including sports, arcades, education, role playing, strategy, and many more.

But games aren't the only entertainment you'll find on line. Many on-line services have complete movie, theatre, book, and arts reviews to let you know what entertainment is worth your pursuit and what isn't. On-line service users get together in special discussion

areas to share the opinions on the latest in pop culture. And oftentimes authors, television actors, and movie stars come on line to talk with their fans.

Software Availability

Picture a room filled with floppy disks. There are word processing and spreadsheet programs. There are programs that teach kids to read and spell and multiply and subtract. And there are drawing programs and desktop publishing packages, and thousands of ready-made graphics to use with them. In one corner of the room there's nothing but utilities to back up your hard drive, fine-tune your system, and make your PC easier and more fun to use. There's a stack of programs that make music, and mountains of databases to manage everything from business client lists to baseball card collections. The middle of the room is piled high with games, games, and more games.

You'll need a very large imagination to picture just how big this room needs to be to hold all the software available at the other end of a modem connection. Most of the programs are *shareware*, which you can copy to your PC and try before paying for them. Others are absolutely free. And they're all just a phone call away.

The "Virtual Community"

You're never lonely when you're on line; there are always lots of people to talk to, and talk to, and talk to. But what is everyone talking about? Food, politics, religion, fitness, literature, hobbies, art, music, their pets, and their pet peeves.

On-line services are "virtual communities" where people come together to share ideas, tell their secrets, and criticize and compliment just about everything. In computer speak, "virtual" is any electronic experience that mimics real life. You may have heard the term "virtual reality" used to describe computer-simulated experiences that seem to the user to be like the real thing. A *virtual community* is a group of people who come together and interact, even though they come from across the country or around the globe.

On-line services, then, become a forum for meeting people who share your interests and ideas. No matter what your profession or passion, there's a group already talking about it. You can talk about fly-fishing with someone in Wisconsin, even though you live in Alabama. Or you can share your recipe for barbecue sauce with a "neighbor" in Maine. No matter that you live in Texas. Because when you're on line, location doesn't matter; you're still all in the same "place."

Catching the latest news, doing your banking, shopping, playing games, talking to people around the globe-it all sounds great, but isn't it *expensive*? The honest answer is yes and no. Connections do cost money. Even local bulletin board services must pay for the hardware and software, and perhaps even personnel, to keep the service up and running. Larger on-line services must keep a network of larger computers up and running day in and day out so that you can dial in to get the information you want, when you want it. They buy the rights to make information such as encyclopedias, news, sports scores, stock quotes, weather reports, airline schedules, and much more available to their members on line. They need a staff of programmers to keep the computers running and editors to make sure you always get the most current information. And their biggest costs, by far, are telecommunications costs that enable you to make a local call to access their services, even when their service is located across the country.

Ultimately, you help pay for these costs. Depending on what you are connecting to, the costs will vary. Sometimes, the charge is as little as a local phone call to a bulletin board service that you can use as much as you'd like at no additional costs. Other times, the bulletin board operator will ask you to pay a small registration fee to support the on-going operation of the board. Most on-line services charge a membership fee-typically less than $10 a month-that gives you access to many, if not all, the service's features.

In addition to this membership fee, you may be charged for the amount of time you use all or some parts of the service. These charges, often referred to as *connect time rates,* typically range from about $4 per hour to as much as $20 or more, often depending on what

time of day you call the service and what modem speed you use. The theory here is that it is cheaper for on-line services to cover their telecommunications costs during nonpeak evening and weekend hours. Faster modems allow members to get much more information in a shorter time on line, so you pay a premium for that extra information. Incidentally, because you can get so much more information sent to your computer using a faster modem, it ultimately costs less to use a faster modem, even if you pay a bit more for the connect time because you are connected to the service for significantly fewer minutes.

Most on-line services have special service plans that include several hours of connect time in the monthly membership fee. As a result, you can get a lot of use from a service such as America Online or Prodigy for less than $10 a month.

Chapter 2
The Culture of Connecting
–A Language All Its Own
–Minding Your Manners On Line
–What's an Emoticon?
–Your On-line Rights

2 If you've ever traveled in foreign countries, you know that customs

vary greatly from place to place. On-line communications is a world all its own, and it, too, has its own set of customs and courtesies. Just as it is important to know the local customs when you travel, knowing the etiquette of on-line communications will make you a more welcome member of the on-line community.

A Language All Its Own
Perhaps the first word in good manners is to learn the few key words and phrases that will help you understand your new environment and get along better with the people in the on-line community. On-line communications has a language all its own. There are dozens of technical terms-baud, parity, protocol, and handshake, for example-that you may hear from time to time. Throughout this book, I'll define those terms in context. Rest assured, though, that you'll not have to develop a whole new "techie" vocabulary in order to gain all the advantages of on-line communications.

But there's much more to on-line language than dull communications jargon. The on-line community has its own unique conversational words and phrases, and these are the words you'll really want to know. Furthermore, each on-line environment has its own dialect. For example, conversations might be called messages, notes, or threads, depending on the service you are using. But there are a number of words and phrases that are constant across all services. Here are a few that you'll need to know to be part of the "in" on-line crowd.

>**bulletin board system** *also* **BBS** n*: an on-line electronic service on which users can exchange messages and data or program files, most often for public consumption by all*

other members. Some services, such as Prodigy, refer to the places where members write messages to one another as bulletin boards.

>**chat** n*: an on-line dialog in which two or more people participate in live electronic conversation, also known as a* conference *or* CB*. v: the act of participating in a live electronic conversation.*

>**download** v*: the act of copying a file from a bulletin board or on-line service to your PC.* n*: an electronic file that has been copied from a bulletin board or on-line service to your PC. Also referred to as* DL*, usually in the text of an on-line message.*

>**electronic mail** *also* **e-mail** n*: a private message sent from one person to another via an on-line information network. v: to send a message.*

>**flame** n*: a message or group of messages that are hostile, angry, or outrageous (did you see that flame about Microsoft's new support policies?). v: to post a disparaging or controversial message.* **flamer** n*: one who regularly posts angry messages.*

>**forum** n*: originally from CompuServe, an area on an on-line   service devoted to a single topic (the politics* forum*).*

>**forward** v*: to pass along to someone else an electronic mail message previously sent to you.*

>**log on** v*: to connect to an on-line service by dialing the service and entering name and password.*

>**lurker** n*: one who reads and "listens in" on discussions without participating or contributing in the discussion.* **lurk** v*: the act of reading messages without posting responses.*

>**on-line service** n*: a commercial venture tdat provides information via an electronic connection (for example, America Online, CompuServe, Delphi, GEnie, Prodigy).*

>**post** v*: to place a message on a bulletin board or in a forum for   public reading.*

>**sysop** n*: a person who monitors on-line conversations to be sure they stay on track and aboveboard. Some services refer to this person as the* board manager *or* guide.

>**thread** n*: a series of messages or conversations that follow a single thought or topic; one continuous discussion.*

>**upload** v*: to send a file from your PC to a bulletin board or on-line service.* n*: the file that has been sent to the service.*

       With this list, you're well on your way to developing a whole new vocabulary. You'll learn several other new words as you make your way through this book, and even more as you explore on-line services. In fact, many terms will be specific to the on-line services you choose to use. As you come across new words or familiar words used in strange new ways, it is absolutely okay to ask other on-line service users just what they mean. Remember, they were new to on-line services once, too.

Minding Your Manners On Line
For all its advantages, on-line communications have one very major drawback: They're totally dependent on the words you type to communicate your meaning. The gestures, eye

movements, intonation, volume, smiles, and grimaces that help people understand the meaning and innuendo of your spoken communication are absent from your on-line messages. The on-line community has developed its own code to add this subtle layer of meaning to on-line messages. In polite on-line conversation, for example, you use upper- and lowercase characters, just as you would in a business letter or office memo. The mix of upper- and lowercase is easier to read online. But how do you raise your voice in an on-line message? Simple: TYPE IN ALL CAPS! The recipient will know you're yelling. But never type in all capital letters unless you really do want to yell out your point. Messages in all capital letters are very hard to read and considered quite rude in on-line circles.

And what if you want to add emphasis to just a word or phrase, but you don't exactly want to yell it? On-line messaging doesn't support italic or bold text. Place an asterisk at either end of the word for *just the right* emphasis.

Perhaps the most important courtesy is KISS: Keep it short and simple. On most on-line services, brevity is not only the soul of wit, but also the key to more effective communications and lower connect time costs. When you write a letter to a friend on paper, you have the whole page to convey your ideas. With just one glance, your friend can take in the scope of your message, easily skip to the middle or end, and very quickly grasp the essence of your words. Not so on line. When you write an electronic message, you have a few lines transmitted one screen at a time. The recipient of your message must read your message sequentially-there's no skipping to the end to find key ideas buried there. As the communicator, you need to make your point quickly. Otherwise, your on-line pen pal may give up on your message before you've had your say. That's why short and sweet is the rule of thumb on line. Try to keep your messages to one or two screens. "Four score and seven years ago, our forefathers brought forth upon this continent a new nation" may sound good in a speech and it may read well on paper, but on line, "This country was founded 87 yrs. ago" plays much better.

To help keep messages brief, the on-line community has come up with hundreds, perhaps thousands, of shortcuts to say in a few letters what would otherwise take a dozen or more characters. The point of these acronyms is to make on-line messages brief, using the fewest characters to communicate the most information. Many of these acronyms will already be familiar to you; they are commonly used in everyday communications-ASAP (as soon as possible) and FYI (for your information). Many acronyms are specific to certain situations. The military, for example, has its own abbreviations, such as SNAFU (situation normal, all "fouled" up). Star Trek fans have theirs: SFS (search for Spock) and TFF (the final frontier). As you participate in bulletin board discussions, you'll come to learn the acronyms unique to various special interests. And just as when you encounter unfamiliar new terms, when you don't know the meaning of an acronym, just ask.

These shortened messages could fill an entire dictionary. Let's get started with a few dozen of the most frequently used TLAs (three letter acronyms). IMHO (in my humble opinion), the list covers the acronyms you're most likely to see on line. BTW (by the way), the creative uses of many TLAs will have you LOL (laughing out loud). You'll notice that many TLAs have grown beyond three letters. TLA generally includes acronyms of any length, but in the interest of precision, some on-line users have adopted MLA to refer to multiletter acronyms. See the figure A TLA Dictionary for more examples of TLAs.

In addition to cryptic TLAs that pepper electronic conversations, on-line communicators have dozens of phonetic contractions, or words that are spelled like they sound. Many of these contractions, such as "tho," and "thru," are standard fare. Others are a bit more creative. For example, you may be asked, "how RU," and you could answer, "fine, thx." So if you see a strange letter combination and you aren't sure what it might mean, fall back on the advice of our grade school teachers: sound it out. You may just find that you *do* know what's being said.

What's an Emoticon?

For many on-line communicators, simple bracketed comments just aren't expressive enough. They needed something else to convey the spirit in which messages were intended. So these

folks came up with whole galleries full of emoticons, strings of type characters that say what they mean. The most simple emoticon is the smiley :) composed of a colon and a closed parenthesis. The smiley gave way to the frown :(and then dozens and dozens of variations started rolling in. Today there are hundreds of symbols to communicate a wide range of emotions.

When you see one of these character strings on line, the best way to make sense of it is to tilt your head to the left and look at it sideways. If you observe a colon, a hyphen, and an end parenthesis, you'll be face to face with the standard smiley. See for yourself:

<div align="center">:-)</div>

The use of an emoticon may also depend on the context. A message using :-# means "I wear braces" in a discussion about dental work, but means "I'm censoring my remarks" in a discussion about the performance of your employer.

You use emoticons just as you use gestures in a conversation. For example: My great, great Uncle Louie died. (:-... Then his lawyer called and told me I inherited a million bucks! :-D Not that I won't miss, Uncle Louie, of course :(

Your On-line Rights

All this talk of showing emotion begs the question of just how much emotion you can show. Just how far can you go on-line? Each on-line service has its own guidelines for good taste. Many are family-oriented services that prefer the Seven Dirty Words stay off their messaging systems. Other on-line services provide special adults-only forums to discuss issues such as human sexuality (in all its various forms). And there are many free-for-all bulletin boards where anything goes. To know what conversation topics are appropriate on the services you choose to use, check out the membership agreements carefully. These will outline exactly what goes and what doesn't.

If you do step out of line, unintentionally or otherwise, nearly all on-line services and bulletin boards retain the right to remove your message from public view. When this happens, a sysop generally informs you of your mistake and asks you to repost your note in more appropriate form. This practice has been perceived by some as censorship. To be sure, there are arguments on all sides of this question. Some people say that because members of on-line services agree to certain rules, it is reasonable for the services to scan messages for violations of the rules. Others believe that on-line services and bulletin boards violate a member's First Amendment rights when any message is removed from public view. Tangled up in these arguments are the on-line service's legal liabilities. Is the service responsible if one member slanders another in an on-line message? If members use the service to publicly conduct illegal business, is the service an accomplice to the crime? Can a service be subpoenaed to turn over records of on-line conversations to the courts? Lawyers and judges are wrangling over these issues and have yet to come up with complete answers.

One thing does seem to be clear: Personal electronic messages sent and received on public electronic mail and on-line services are private, much like paper mail sent through the U.S. Postal Service is private. On-line services, contrary to rumors that flare up from time to time, aren't reading the contents of members' messages. Within the confines of electronic mail, you can say to anyone else anything you want. These messages are for your eyes and those of your recipient only.

Chapter 4
What You Need to Get Connected
How Modems Work

4 Getting connected is a lot easier than most people

think. In fact, it requires only a PC, modem, phone line, and communications software. Each of these plays an important and necessary role in getting on line. The PC and communications software work together as the command station for the whole operation. The modem is the go-between for the PC and the telephone system, and the phone line is the pathway across which information travels. Without one, the others are absolutely useless in communicating information on line. So just how do they all work? And how do they work together?

How Modems Work

Have you ever been in a foreign country where you didn't speak the language? Wonderful conversations happen all around you. A young woman enthusiastically recommends a great neighborhood bistro. A shopper describes the terrific bargains at an out-of-the-way boutique. Two friends laugh at a shared joke. A stockbroker whispers a tip on a sure investment. And you don't understand any of it. You need a translator.

That's how it is for computers and telephones. They speak different languages and can't understand one another without a translator. A modem is that translator. Computers understand only *digital information*-electronic signals that represent one of two positions: on or off. It's the combination of these on-off signals that represents information to a computer. Telephones, on the other hand, understand only analog tones-continuous sound waves that move over wires or through the air. The trouble comes because digital and analog machines-PCs and phones, in this case-can't understand one another directly because they speak different languages. Without a translator the computer can't understand information sent over telephone lines.

The word modem stands for MOdulator/DEModulator. When you send information from your PC, the modem converts (modulates) digital signals coming from your PC to analog signals that can be sent over telephone lines. When you receive information, the modem converts (demodulates) the analog tones from the phone line back into digital signals the computer can understand.

Though all this sounds complicated (and there is a bit of technical wizardry inside a modem), the modem itself is a pretty simple device. Its sole purpose is to act as the go-between between your computer and the phone, making sure the two can understand one another.

What to Look for in a Modem

Modems come in several flavors, but your choice will be determined by three things: compatibility, design, and speed.

Compatibility is the easiest to deal with of these three issues. You need to choose a modem that is compatible with your computer, and that's a cinch because nearly a hundred percent of all modems will work with both IBM-compatible and Macintosh computers. In most cases, you'll simply need to ask your computer salesperson for the appropriate style of connector cable depending on whether you're using a PC or a Mac.

You may also hear something about AT compatibility in modems. In the early days of personal computers, Hayes Microcomputer Products developed a set of commands that let software tell modems what to do. These commands are called the AT *command* set. Because Hayes sold so many modems that used the AT command set, and because communications software makers rapidly took advantage of the command set to make their programs more useful, many more modem makers began selling what they called *Hayes-compatible*, or *AT-compatible*, modems. Today, it is virtually impossible to buy a PC modem that is not Hayes-compatible. I mention it here only because you may come across the term, and this nugget

of information will keep you out of the dark.

With compatibility out of the way, you can focus on the more important distinctions. Modems are designed in one of two ways: They are either *internal* (installed inside your computer) or *external* (attached to the outside of your PC). Internal modems take the form of a circuit board that fits inside your computer. An internal modem requires an *expansion slot*, which is simply a connection between any circuit board and the PC's main processing system. Expansion slots are used for a variety of purposes-storage devices, a mouse, a scanner, sound systems, and so on. Each of these things can require an expansion slot. If all the slots have been used for another purpose, you'll need to use an external modem rather than an internal one. External modems are usually a flat box about the size of a book that houses the circuit board and connects to your PC with a cable. Both types of modems do the same job. The type you choose depends largely on whether you have available space inside your PC.

Incidentally, more and more PCs come with an internal modem preinstalled. If your computer included a modem when you bought it, the dirty work of installing the modem has been done for you, and you can skip right past this section of the chapter.

Once you've determined whether your modem will be internal or external, you'll need to know a bit about its speed. A modem's speed determines how quickly it can send and receive data. Essentially, the faster the modem, the faster it can translate the PC's digital signals into analog signals and stuff them down the phone line. Modem speeds are rated by the bits (or individual pieces of data) that the modem can send to the phone line in one second. This rating is called *bits per second,* or *bps.* Modem speed is also measured in *kilobits per second,* or *kbps.*

Note *The term bits per second is sometimes confused with the term baud. Baud rate has to do with the telephone line itself and refers to the number of signal changes that can take place in a second.*

While modems come in a variety of speeds, the most common speeds for personal computers are 2,400 bps, 9,600 bps, and 14.4 kbps (usually called "fourteen dot four"). Obviously, the faster the modem, the more quickly information is sent from and received by your PC, and the less time you spend waiting for information to arrive. Fast modems, such as 9,600 bps modems, can talk to slower modems by slowing the speed at which they send and receive information. But under normal circumstances no modem can talk faster than its rated speed. For example, a 2,400 bps modem can talk to a 9,600 bps modem because the 9,600 bps modem will slow down for it. But a 2,400 bps modem can't send data faster than 2,400 bits of information in one second. For a 9,600 bps modem to work at its fastest, it must be talking to another 9,600 bps modem or to one rated even faster. However, what should be a simple truth with computers-a modem can't send information faster than its rated speed-is not always strictly true. A modem can send more data per second than its rating by compressing the information. Using special techniques, the modem can squeeze information that might take 100 bits in a normal form to just 70 bits in compressed form, for example. As a result, a modem rated at 14.4 kbps and designed to send 14.4 kilobits of data per second might actually be able to send 30 kilobits worth of data per second by compressing the information into fewer bits.

The ability to send information this quickly depends a lot on the quality of the telephone line. Sometimes when you make a telephone call, the connection is crystal clear. Other times, you hear a lot of static or clicking on the line. You can overlook this so-called line noise when youÕre talking to someone on the phone, but a modem can't. It tries to interpret everything it "hears" coming across the line. When data is being sent slowly, say at 2,400 bps, the modem has an easier time differentiating data from noise. At faster speeds, say at 9,600 bps, the task of separating noise from data becomes much harder. As a result, the modem may make a mistake and interpret line noise as data. Fortunately, most modems today are self-correcting, using something called an error correction protocol. Error correction protocols can be quite complex. Suffice it to say that the modems on either end of

the connection compare notes on what one has sent with what the other has received. If their notes don't match, the sending modem will resend that data in question.

Fax Modems

As you shop for a modem, you may hear the term *fax modem* or *data/fax modem.* The words mean the same thing: a modem that can handle both data *and* fax transmissions. While a fax modem looks no different from a standard data-only modem, it has the ability to communicate with office fax machines and other fax modems. Even if you don't need fax capabilities right now, you might want to consider buying a fax modem rather than a data-only modem-*just in case*. Typically, a fax modem costs only a little more than a standard data modem, and often the fax software you need to send and/or receive faxes with your computer is included in the price.

There are several types of fax modems, but the differences are pretty basic. First, some fax modems can only send faxes-they can't receive them. If you want to receive incoming faxes with your computer, you should be sure the fax modem has *send* and *receive* capabilities, and these days most fax modems do. Secondly, be sure your fax modem is at least Group 3 compatible, or better yet, Group 4 compatible. Group 3 and Group 4 are fax standards and determine the speed at which a fax is sent, among other things. Group 3 and Group 4 fax modems are able to talk to one another. It's just that a Group 4 fax modem will communicate more quickly with another Group 4 fax modem or fax machine than it will with a Group 3-compatible device. Finally, you may want to look for a CAS-compatible modem. CAS, or Communications Application Specification, was developed by Intel and defines how most software applications communicate with fax software. Your fax modem doesn't have to be CAS-compatible, but you may find it a big convenience because CAS will allow you to fax a document without leaving the application in which you created it.

To use a fax modem, however, you must have special fax communications software. This software allows you to send almost any document created by a word processor, graphics program, spreadsheet, or other application to a fax machine anywhere in the world. Generally, the fax software intercepts selected documents heading to the printer and saves them in a file as a graphic image of the document as it would have looked on the printed page. Once the file is captured, you direct the fax software to prepare a cover page, append the document image file, dial a fax number, and send the document. At the receiving end, the cover page and document look just like an incoming call from another fax machine. In fact, the document typically looks *better* than if you had printed it and fed it into a fax machine because often graphic clarity is lost in the translations from the electronic file to the fax printout.

Just as with ordinary data modems, fax modems also come in external and internal models. Fax modems are installed in the same way as data-only modems.

Understanding Your Phone Line

What would you possibly need to know about phone lines? After all, there's just an outlet in the wall into which you plug your phone, right? It's almost that simple. That outlet in your wall leads to an intricate web of phone systems connecting with one another, much like an on-ramp leads to a highway that connects to many other roads and highways. That may seem obvious enough, but like highways, not all phone systems are the same. The first thing (and likely the last) you need to know about phone lines is what kind of phone system you have.

Essentially, there are two kinds of phone systems: touch tone and pulse. The majority of phone systems in the United States are touch tone, which means that each number is represented by a different pitch or tone. Pulse phone systems send a series of electronic pulses to represent a number-five pulses for the number five, for example-rather than sending a tone for each number.

Your modem will work with either touch-tone or pulse systems, but you'll need to know which type you have. To make this determination, pick up your phone and press the

number 5. If you hear a musical note, you have a touch-tone phone line. If you hear five clicks, you have a pulse system.

The second thing you'll need to know about your phone line is whether you have call waiting. Call waiting is a convenience in voice calls that alerts you to incoming calls. But it's a major inconvenience when it interrupts-and cuts off-your modem connection. You can avoid these interruptions by suspending call waiting during your modem communications sessions. Just add the digits 1170 to the beginning of the number you want the modem to dial. Then incoming calls get a standard busy signal and you have a connection free of unwanted interruptions. Once you hang up your modem, the call waiting feature is resumed for subsequent calls.

Communications Software

If modems are the translators between PCs and phone lines, and phone lines are the highways across which information is sent, then communications software is the glue that holds it all together. Communications software tells the modem what telephone number to dial, what sort of computer to expect at the other end, and how to talk to it. Communications software is also your window into the on-line connection.

Communications programs handle basic functions such as dialing a phone number, sending text, and receiving text and other information. But communications software can have other, more advanced features, too. Typically, communications software includes a telephone directory where you enter the information and phone number of the on-line services and bulletin boards you use. The software may also have a mini word processor that you can use to compose messages. When you are connected to a service or bulletin board, the communications software acts as the go-between, telling you what information the on-line connection is requesting and relaying your commands back to the service. Some communications packages even have a *scripting language* that lets you write out and store instructions so that your software can automatically call on-line services without your intervention.

Note *If your computer came equipped with a modem already installed in it, it probably also came with communications software. If your PC runs the Windows graphical interface, you have a simple communications program in the Windows Terminal application.*

Many on-line services, such as the Prodigy Information Service and America Online, have their own communications software that you'll need in order to use these services. Other on-line services, such as GEnie and CompuServe, can be used with any communications packages. Still, there are several programs, such as WinCIM and TAPCIS on the PC, and Navigator for the Mac, that are designed to work exclusively with CompuServe. These programs make getting around the large and complex information service much easier and much more cost-effective.   Communications capabilities are also built into many other kinds of software. For example, the personal finance programs you read about in Chapter 1 include communications software for dialing into bill-paying systems, such as Checkfree, or into on-line services to gather stock quotes. Address-book programs might include a communications component that instructs the PC to dial a phone number for you.