

COMPUTE!'s Personal Telecomputing



Don Stoner

A comprehensive guide to the fascinating world of telecomputing that shows you how to access data bases, receive software, and even talk to others using your home computer.

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Personal Telecomputing

Don Stoner

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Foreword

Someone once compared the personal computer to a car, since both offer a powerful kind of freedom. If that's the case, then telecomputing is to the home computer user what the open road is to the driver. Telecomputing can literally take you where you've never been before—to tremendous data bases, to up-to-the-minute financial information, to the latest news, and even to cross-continental "cracker barrel" sessions where you exchange ideas with people thousands of miles away. Telecomputing adds new dimensions to home computing, and *Personal Telecomputing* tells you everything you need to know to get started.

Telecomputing is one of the most popular (and growing) areas of home computer use. With your computer, a modem, and the information you'll find in this book, you can open hundreds of doors.

This book shows you how telecomputing works. First, you'll learn the technical basics as well as the practical how-tos. Then you'll check into bulletin boards, log onto services like CompuServe and The Source, and obtain free public domain software over the telephone lines. *Personal Telecomputing* also shows you how to write a sophisticated terminal program with the same features found on commercial software.

Whether you want to check into a major data base, get current financial information, or simply chat with other computer users, this is a book you're sure to refer to again and again. If you're a beginning telecomputing enthusiast, it will get you started on the right foot. If you're experienced, it will explain the technical details and show you some new tricks. No matter what your telecomputing experience, you'll find *Personal Telecomputing* an invaluable guide as you enter this new world of home telecomputing.

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Getting Started

Getting Started

Glance at the table of contents of virtually any computer magazine and you will almost certainly find a product review or an article on telecomputing. There's a good reason for this: Telecomputing is one of the most exciting, and most rapidly growing, areas of personal computing.

Unfortunately, very few articles show you how to get started. If you're a beginner, this chapter is written with you in mind.

The Buddy System

One method of learning about telecomputing is so simple that many seem to have overlooked it. For an introduction to this exciting area of personal computing, the newcomer should locate someone who has a telecomputing setup. The local computer store can be a good source of contacts and can probably help you find someone to help you get started.

Unless you live north of the Arctic Circle, there's probably someone in your area with a computer and a telephone interface. Get yourself an invitation to see how it works and how it's used. Most computer addicts are pleased to demonstrate their equipment. As a general rule, people with computers are friendly and outgoing, and in one visit you'll pick up many tips on telecomputing.

An equally obvious source of information is your local users group. A users group is a meeting of people who own a specific model of computer. They band together for mutual assistance and learning. You can determine if there is a group near to you by watching for listings published in magazines devoted to your type of computer. For example, *COMPUTE!'s PC & PCjr* magazine and *COMPUTE!'s Gazette* print lists of users groups every few months.

Assuming there is a users group in your area, try to attend the meetings. Some of the members will probably be beginners like yourself, but there will also be experienced enthusiasts who know how to get the most out of a

Getting Started

telecomputing setup. A users group can also help you save money by steering you away from the less desirable products and guiding you towards those that work best.

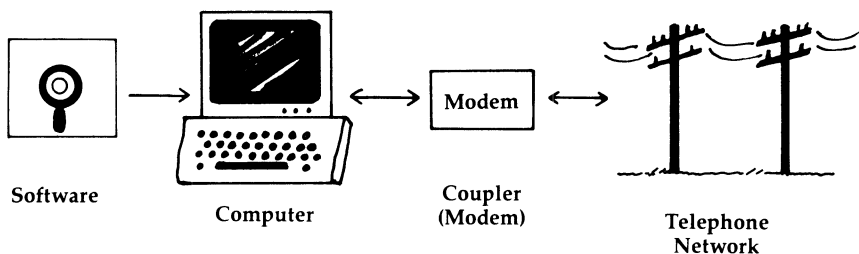
What You'll Need

Besides having access to a telephone, two principal items enable you to communicate over the phone line. The first is a device called a *modem*, which couples your computer with the telephone line. In the next chapter you'll see how modems actually work. For the time being, consider the modem simply a device that gives your computer access to the telephone line.

The second item is often overlooked, ignored, or forgotten by the newcomer. This important ingredient is the software to make your telecommunications setup perform properly. Like word processors, telecommunications software comes in all shapes and sizes. We'll discuss various choices in Chapter 6 and provide some basic software in Chapters 8 and 9.

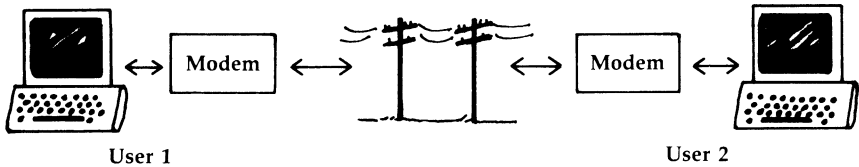
Once you've taken the big step and purchased a modem, what do you do with it? Assume that you have been able to install the modem and that it is working properly. The next step is to go on-line. A typical installation is shown in Figure 1-1.

Figure 1-1. A typical telecomputing installation involves a modem, computer, and communications software.



Modem communications with personal computers can be roughly divided into three broad areas. The first area is telecomputing directly between two users (Figure 1-2). The second area is bulletin board communications, and the third is interaction with information utilities.

Figure 1-2. Communication between users is popular with newcomers.



Direct Communications

You can communicate from your keyboard directly to another person's screen, but this can become tiresome since many computer hobbyists are not particularly good typists. In other words, you can say the same thing more quickly on the telephone. This makes keyboard-to-screen telecomputing a novelty or, at best, a learning tool.

You can also transfer software over the phone line. This can be a lot of fun. Telephone transfers can be invaluable when two programmers are jointly developing software. They can pass the revised program back and forth until it is fine-tuned and bug free. It's also particularly valuable where programs are to be transferred over long distances. But for the casual exchange of programs with your neighbor down the street, however, it's often faster to jump in the car and make the exchange in person.

What Are Bulletin Boards?

Bulletin boards have proliferated in the past few years. They allow anyone with a computer and a telephone interface to communicate with others by leaving messages on the system. The message can be either public or private, the latter having password protection. There are more than 1,000 bulletin board systems in operation. Virtually every state in the union is represented. Quite a few are appearing overseas, too, particularly in Europe.

The bulletin board is analogous to the old timers' cracker barrel in the country store. It is a place to meet and exchange information. These computer message systems are also public forums for all types of discussion. In the course of preparing

Getting Started

this book, quite a bit of time was spent on the local systems. During this period, there were messages about the space shuttle and the Presidential candidates along with "editorials" about many current controversial topics. Bulletin boards provide a sounding board for anyone who wishes to access them and represent a broad cross section of public opinion. Many times the opinions are not popular, and occasionally the subjects are distasteful. They are a unique manifestation of American individualism and are rarely dull.

A bulletin board system (BBS) develops when someone decides to dedicate a computer and phone line for public access. It is a phenomenon, since the owner usually receives no compensation for providing this service.

The bulletin board computer can be virtually any type from a simple Timex/Sinclair 1000 on up. The most popular computers for BBSs are the Apple, Atari, Commodore 64, IBM and the TRS-80. The BBS uses a modem which is configured to automatically answer the telephone and inform the computer that someone is calling. This action starts the BBS program. When the user hangs up, the software automatically resets the program for the next caller.

The First Bulletin Boards

The first BBSs came on-line in 1978, when two members of CACHE (Chicago Area Computer Hobbyist Exchange), Ward Christensen and Randy Suess, decided to set up a computerized message machine. They called it a computerized bulletin board system and trademarked the acronym CBBS in conjunction with their software. The system allowed club members to communicate with each other by placing messages and want ads on the system.

Later, two fellows by the name of Craig Vaughn and Bill Blue created bulletin board software for the popular Apple computer. Bill Blue went on to develop a very user friendly BBS called the People's Message System (PMS). Bill Abney wrote the first (and most widely distributed) bulletin board software for the Radio Shack TRS-80, called "Forum 80."

Why Use a Bulletin Board?

The reason you should practice telecomputing on a BBS is twofold: They are forgiving of user errors, and they are free. There is no membership or access charge.

A few people enjoy finding ways to crash these systems. This means the caller tries to introduce faults that make the program fail and return to the BASIC READY prompt. They can then list the program and obtain a free copy of some relatively expensive software. Some of the more violent types even erase disk files. Recently, the press has adopted the term "hacker" for these folks, confusing them with people who *hack* away at the keyboard learning BASIC and otherwise mastering the personal computer.

The authors of bulletin board programs spend considerable time trying to make their software virtually bulletproof. As a result, it is quite unlikely that you will hurt the bulletin board system if you make mistakes. Thus you are reasonably free to experiment with the commands as you learn how to use the BBS.

In practice, you simply dial the system phone number and follow the instructions or answer the questions as they appear on the screen. Since it may not seem all that simple for the newcomer, I've included a chapter on bulletin boards later in the book.

What do you see when you call the BBS? Figure 3-1, in Chapter 3, is a rough flowchart illustrating a typical system. In that chapter, you'll actually see what happens when you log on to a BBS, but we can cover some of the preliminaries here.

The Menu

One nice feature of the various BBS systems is they assume the person calling is a novice. To make things as straightforward as possible, most of the command functions of the BBS are described by a series of menus.

When you call a BBS, one of the first menus you'll see is the list of commands. From this display you can elect to read or scan messages, check for other system phone numbers, change your parameters (to get a line feed after carriage return, for example), or even leave a message for someone else.

Once you have become accustomed to using the system, you can choose the *expert mode*. What's the difference between the novice and expert user mode? If you have previously printed out the various menus (or know them by heart), what is the point of displaying them over and over again on your screen? At 30 characters per second (cps), the usual speed of

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low-cost modems, you can spend quite a bit of time on the telephone line just looking at menus.

If you select the expert user mode, the repetitive transmission of menus is eliminated. Instead, you will simply see something like SELECTION? or COMMAND (A,B,C,D,E,F)?. Some bulletin boards even allow the entry of multiple commands at one time. The system assumes that you know what the questions are and allows you to stack the answers separated by a comma, colon or some other specific character.

Don't be afraid to try the expert user mode. You can always get back to the novice menus. Even when you are in the expert user mode, most systems have a help command which will remind you what the commands are and what happens if you make a particular menu selection.

One of the most popular bulletin boards in the Pacific Northwest is SeaCom 80, a BBS that features what's called a *hot menu*. The software (RAX IX) is written for the TRS-80 and is one of the friendliest that you will encounter on any BBS.

The hot menu provides what may be the perfect compromise between beginner and expert user modes. One can elect to display the menus, but as soon as the option appears, you simply press the appropriate key. The menu display immediately stops and the program branches off to the area that has been selected.

Bulletin board technology has advanced significantly since the early efforts of Suess and Christensen. Not only can you now read and leave messages, but you can also transfer software from a BBS to your computer. This is called *downloading* and is often more practical than transfers between users. This is because the bulletin board end of the system is fully automated. Some systems, such as SeaCom 80, permit you to *upload* software (send a program from your computer to their disk).

You'll find specialized BBSs devoted to aviation, photography, genealogy, and even computer matching and dating.

Bulletin boards tend to come and go. Putting up a BBS seems to be a great idea until the reality sets in a few days after it is on-line. Since the computer is tied up awaiting phone calls, the owner does not have access to it for other tasks. As a result, some systems have a very short life or are only on-line evenings and weekends. The latter is often the case with BBSs operated by computer stores.

One of the most up-to-date lists of bulletin boards was compiled and is maintained by Bill Blue. Most of the participating People's Message Systems (PMS) have this list of BBSs on their system. The list can also be found on CompuServe MAUG XA4 and The Source PUBLIC 112.

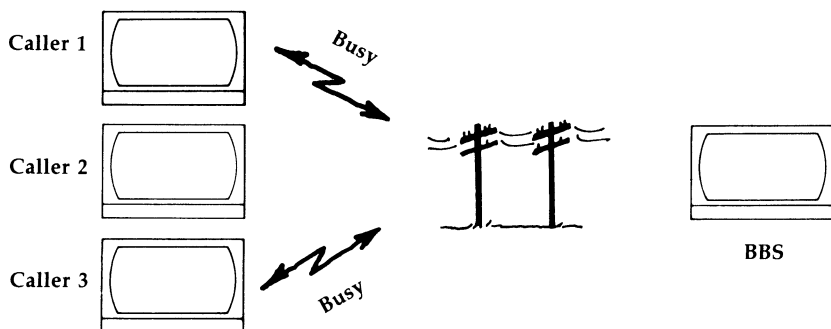
Apple Talks to Atari?

Telecomputing systems are very democratic. For example, you need not own an Apple computer to check into an Apple BBS. They all speak a common language (the ASCII code, described in Chapter 2), and you can easily communicate with other users no matter what type of computer you (or they) own.

Some BBSs may have 32, 40, 64, or even 80 column lines. In other words, they will print a specific number of characters on your screen before sending a carriage return to start a new line. As an example, if you are using an Apple (40 column lines) and are communicating with a TRS-80 BBS (64 column lines), the characters will wrap around. This means you will see 40 characters on the first line and 24 characters on the second line. It can be confusing, but you can still read the information presented, even on your 22-column VIC-20.

Bulletin boards do have one major shortcoming. Virtually all BBSs accommodate only one user at a time. If anyone else calls the BBS while it is being used, the result is a busy signal as illustrated in Figure 1-3. The popular bulletin boards seem to be constantly busy.

Figure 1-3. Only one user can access a bulletin board at a time.



Getting Started

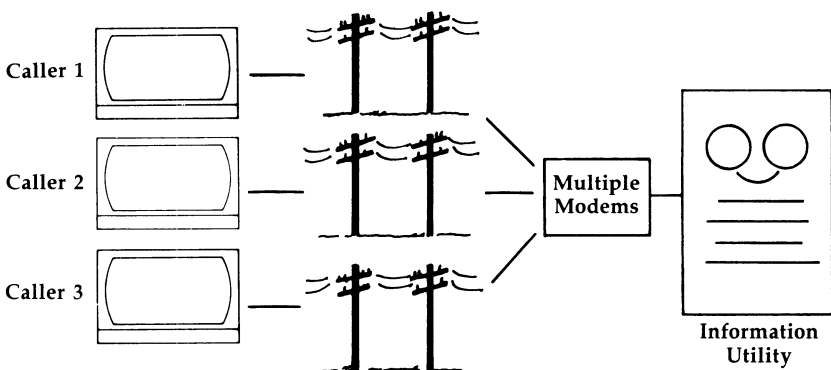
The Information Utilities

Multiple users *can* be handled by the information utilities (see Figure 1-4). This is the third major area of telecomputing interest. Unlike bulletin boards, these systems are not free.

A number of organizations have set up national data bases which can be accessed by telephone. These data bases are collections of information which are of value to various people. The area of telecomputer data bases can be subdivided into two broad categories, and the one of general interest to most computer users is called *information utilities*.

Among the more popular utilities are names like Compu-Serve, Delphi, and The Source. One of the most popular features is a message system similar to those found on bulletin boards. However, when it is a national system and you are paying for the service, it is given the fancy name of *electronic mail*.

Figure 1-4. Information utilities are capable of handling many users at a time.



Numerous computer manufacturers have set up national user groups on the information utilities. You can check in and communicate with others like yourself all over the country. These user group systems also provide voluminous amounts of free software which you can transfer to your machine.

In order to access the information, the user pays a sign-up fee to the system operator. A user code and password are then assigned by the information utility. Whenever you check in

you are charged for the amount of time the system is accessed. The charges for access vary from system to system.

CompuServe Information Service. One of the most popular systems among owners of personal computers is called CompuServe. This system is located in Columbus, Ohio. The company is owned by H&R Block, the income tax people. During the day, the majority of their computer capacity is devoted to commercial activity and business accounts. But after 6 p.m., when the system would normally be loafing, their computers are redirected to handle the flood of personal computer owners who call in. To encourage this separation, CompuServe charges \$12.50 per hour between 8 a.m. and 8 p.m. (prime time) and only \$6 per hour at night and on weekends and holidays.

Most information utilities charge more per hour for high speed access. They can accept input and respond at either 30 or 120 cps. The latter speed is available on more expensive modems, but the access charges are more expensive than for slow speed input. CompuServe charges \$15 per hour for prime time operation at 120 cps, and \$12.50 per hour at night.

Special Interest Groups. CompuServe has one of the largest numbers of Special Interest Groups (SIGs) of any utility. A list of these SIGs is given in Figure 1-5. There is an excellent chance that your computer is represented on CompuServe.

Many of these SIGs are simply computer owners who are banded together electronically. Only a few (such as the RCA and Commodore SIGs) are sponsored by the company making the computer. On these systems, one can actually send messages to (and receive messages directly from) the manufacturer.

If you would like more information on CompuServe, call (800) 848-8990.

Source Telecomputing. Another excellent service is called The Source. This system, located in McLean, Virginia, was one of the first to cater to personal computer owners. The system is operated by Source Telecomputing Corporation and is owned by The Reader's Digest Association, Inc. In the early stages, the system was rather difficult for the newcomer to use. With experience, The Source adopted menu structures similar to those found on bulletin boards, which made the system easier to use and much more popular.

Getting Started

Figure 1-5. Users of CompuServe Information Service will see a number of computer special interest groups (SIGs) listed on their screens.

Personal Computing SIGS

- | | |
|-----------------|-----------------|
| 1 CP/M SIG | 11 PowerSoft's |
| 2 HUG (Heath) | 12 Programmer's |
| 3 MAUG (Apple) | 13 CEM SIG |
| 4 MNET-11 (H11) | 14 Author Forum |
| 5 MUSUS p-sys. | 15 Commodore |
| 6 RCA micros | 16 Atari SIG |
| 7 TRS80 COCO | 17 IBM PC SIG |
| 8 Panasonic | 18 OSI SIG |
| 9 MNET80 TRS80 | 19 Instructions |
| 10 LSI Users | 20 Descriptions |

Input a number or key
<ENTER> for more choices

!

CompuServe

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Personal Computing SIGs

- 1 Microsoft Users Group
- 2 Telecommunications SIG
- 3 TRS-80 Model 100 SIG
- 4 Computer Art SIG

Source Telecomputing failed to anticipate its tremendous user acceptance, and their system was quickly overloaded. In the early days, it could take as much as two or three minutes for their computers to act upon a user command. The problem has since been corrected with the addition of more computers having greater processing power.

If you are interested in obtaining information, you can contact The Source at (800) 336-3366.

Dow Jones News Service. Another popular system, which claims to have more users than any other information utility, is called Dow Jones News Service. This is the same company which publishes *The Wall Street Journal*. One of the most impressive aspects of this system is that many articles, which have appeared in *WSJ*, can be accessed via telephone through Dow Jones News Service. They claim that major stories, which affect the financial community, are on-line within 90 seconds.

Dow Jones is not very big on menus, but it does offer an incredible array of financial information. The most popular area is the on-line stock quotations. The service also offers historical records on stocks and bonds, in addition to investor information on virtually every company listed on the various exchanges. To make maximum use of the service, you must spend considerable time learning about the system before going on-line. The charges can mount up quickly if you are not familiar with the DJNS system.

There are different charges on Dow Jones, depending on what type of information you are accessing. Generally speaking, the charges are more than those for CompuServe and The Source. However, the popularity of Dow Jones News Service seems to demonstrate that the information available is worth the price to a large group of people.

For more information on the Dow Jones News Service, call (800) 257-5114.

Bargain Subscriptions. Here's a tip regarding two of the three information sources. You can go to your favorite Radio Shack store and join CompuServe and Dow Jones at the same time! Radio Shack sells a package that provides a membership and free trial hour on both services. The cost is \$19.95 (plus local taxes) for the package. This may sound expensive, but it is quite a savings over the cost of direct sign-up fees. For example, if you sign up directly with CompuServe, the fee is \$39 for that one service alone.

The package carries Radio Shack part number 26-2224. As soon as you open the cover of the heavy-duty binder, you will find a computer-generated sealed envelope. This contains your CompuServe identification number and a secret password. That is followed by a sheet with the complete listing of CompuServe access telephone numbers. However, as they point out, their network is constantly expanding. A customer service number (800-848-8990 or 624-457-8650 inside Ohio) is provided so that you can get up-to-the-minute information on the best phone number to use in your area.

The binder also includes very well-written user guides to both the CompuServe system and the Dow Jones News Service. In later chapters, you'll see how to use the free hour on these services to learn how to access them and what you can expect to see on your screen.

Getting Started

You are billed by CompuServe in a number of ways. If you use a credit card, there is no service charge. You can also request to be billed directly. If your credit is approved, you are given a \$300 credit limit. You are also charged \$3.50 per month, presumably to cover the cost of bookkeeping and postage.

The method of signing up for Dow Jones is somewhat different. At the back of the binder is a contract called a "User Agreement." The document also has an imprinted "control number." To sign up, you call Dow Jones toll free at 800-257-5114 (609-452-1511 in New Jersey). This is also their customer service number, if you have any questions. The operators are extremely helpful and competent. They can not only answer technical questions but they understand financial matters and can help users solve access problems.

When you call DJNS, they request your control number and then assign an ID number and password to you. They also give you access to your one free hour of system time.

As you can see, each system has a different way of giving you your free hour. After your hour is up, you will be notified on the screen and can elect to sign up at that time and avoid their usual membership fee.

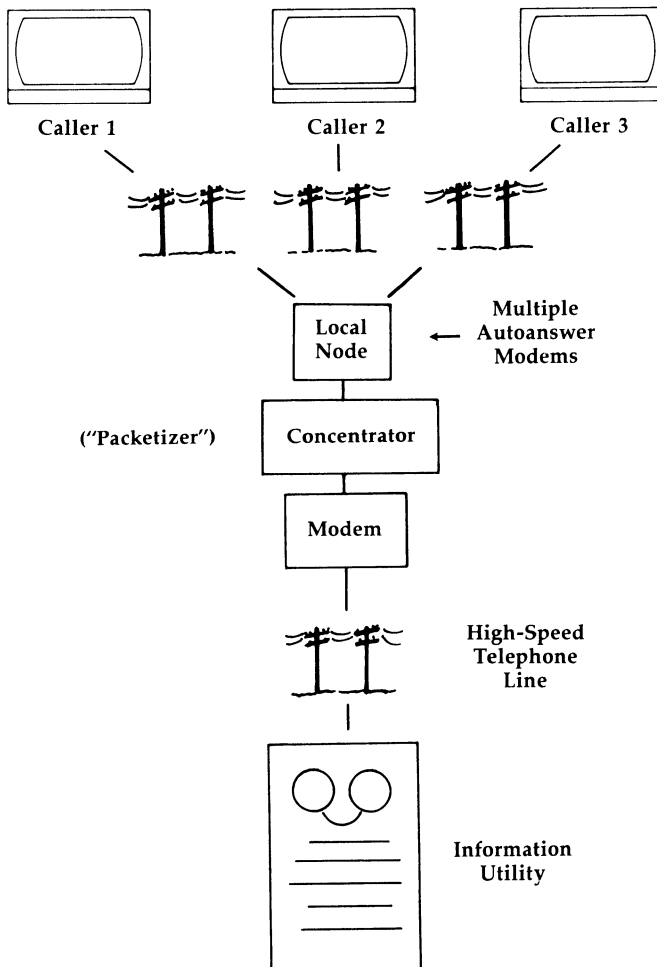
The Source memberships can be obtained at the major computer stores like the Byte Shop and Computerland. Major bookstores, like B. Dalton and Walden, also carry membership packages along with a detailed user guide. Unless you find a special deal (such as membership packaged with a modem), the membership fee is \$100. The hourly access charge is somewhat higher than for CompuServe, since The Source does not have its own digital network and must pay access fees to Telenet (see below).

The Packet Networks. You may be wondering about the cost of calling Virginia, Ohio, California, and other places. Fortunately, all the services previously discussed can be accessed by calling a local telephone number (in cities of 50,000 or more population).

In addition to the regular telephone network, the nation is wired with a number of digital networks. Rather than carry voices, these lines carry digital data. These systems are called *packet networks* and have been established by a number of companies called *value added carriers*. The two largest companies are Telenet and Tymnet. CompuServe originally used

independent packet carriers exclusively (The Source and Dow Jones still do) but is now in the process of setting up its own network. The local phone number for the network ties into a junction, called a *node*. CompuServe presently has nodes in more than 100 cities. In smaller cities, they interconnect into the nodes of other networks. As a result, you may call their network directly or through Tymenet, depending on where you live. This is illustrated in Figure 1-6.

Figure 1.6. Packet networks combine user transmissions in a device called a concentrator.

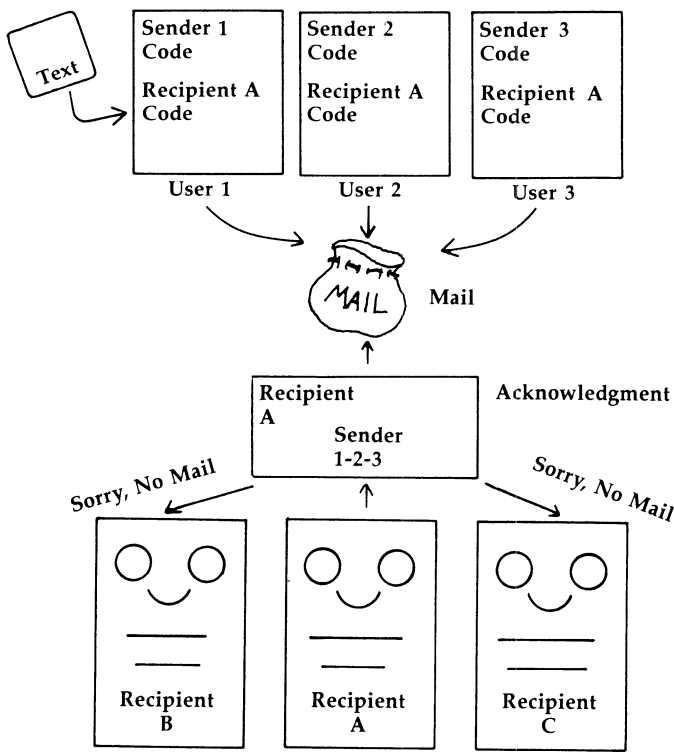


Getting Started

When you call one of these carriers, your transmission is put into a packet of information much like a letter is put into an envelope. The envelope also includes the destination address. This packet is combined with those of other users and sent into the network, which acts like a mailbag. The packet address is something like a postal zip code. The other "stations" (these are the nodes mentioned earlier) constantly monitor the transmissions (mailbags) looking for packets (envelopes) which are addressed (zip coded) to them. When one is found, it is extracted from the "mailbag" and an acknowledgment (proof of receipt) is sent to the originating node.

The extracted packet is then sent to the local destination just like a letter, but much more rapidly. The reply from the destination computer is handled in exactly the same way, but in the reverse direction. This is illustrated in Figure 1-7.

Figure 1.7. The packet network operates like a digital high-speed postal system.



The network transmissions (movement of the "mailbags") occur at very high speed. The information transfer rate between your computer and the local node will probably be at a rate of 30 cps. Most network transmissions are at 960 cps. Thus, 32 people can use a single "mailbag" simultaneously. If more circuits are required, more "mailbags" can be added.

This "packing" is what keeps the cost of using such a network so much lower than a long-distance voice call. In most cases, the carrier leases the transcontinental lines; needless to say, these dedicated high-speed telephone lines are expensive.

You can now see why there is a premium charge for 120 cps transmissions. If you use a telephone interface operating at this higher speed, you are using four 30-cps channels on the packet network. When the network is busy with digital traffic, this could mean a loss of revenue to the carrier.

While the technical standards on the various networks are virtually identical, the method of checking in to each one is different. If you hook up your modem and call the local numbers of several different networks, you will discover that the various information services seem to have a total lack of standardization. One of the greatest impediments to widespread use of telecomputing is the lack of standards. When you buy a speaker at the hi-fi store, it's not necessary to specify impedance, crossover frequencies, and the like. If you wire the speaker to an RCA-style phono connector, there is an excellent chance that it will simply plug into the back of your stereo. Unfortunately, such standardization has not yet come to telecomputing.

However, the packet carriers should be complimented on the outstanding performance of their systems. If you play the game their way, and use their protocol, the packet systems work almost perfectly. Even though they shuffle characters back and forth at a rate of 960 cps, their system generates less than one error in one million characters.

In the following chapters, as you check into various systems and see how they work, you'll discover the many differences among them. Each one uses unique check-in procedures and recognizes specific commands, but all have a great deal to offer.

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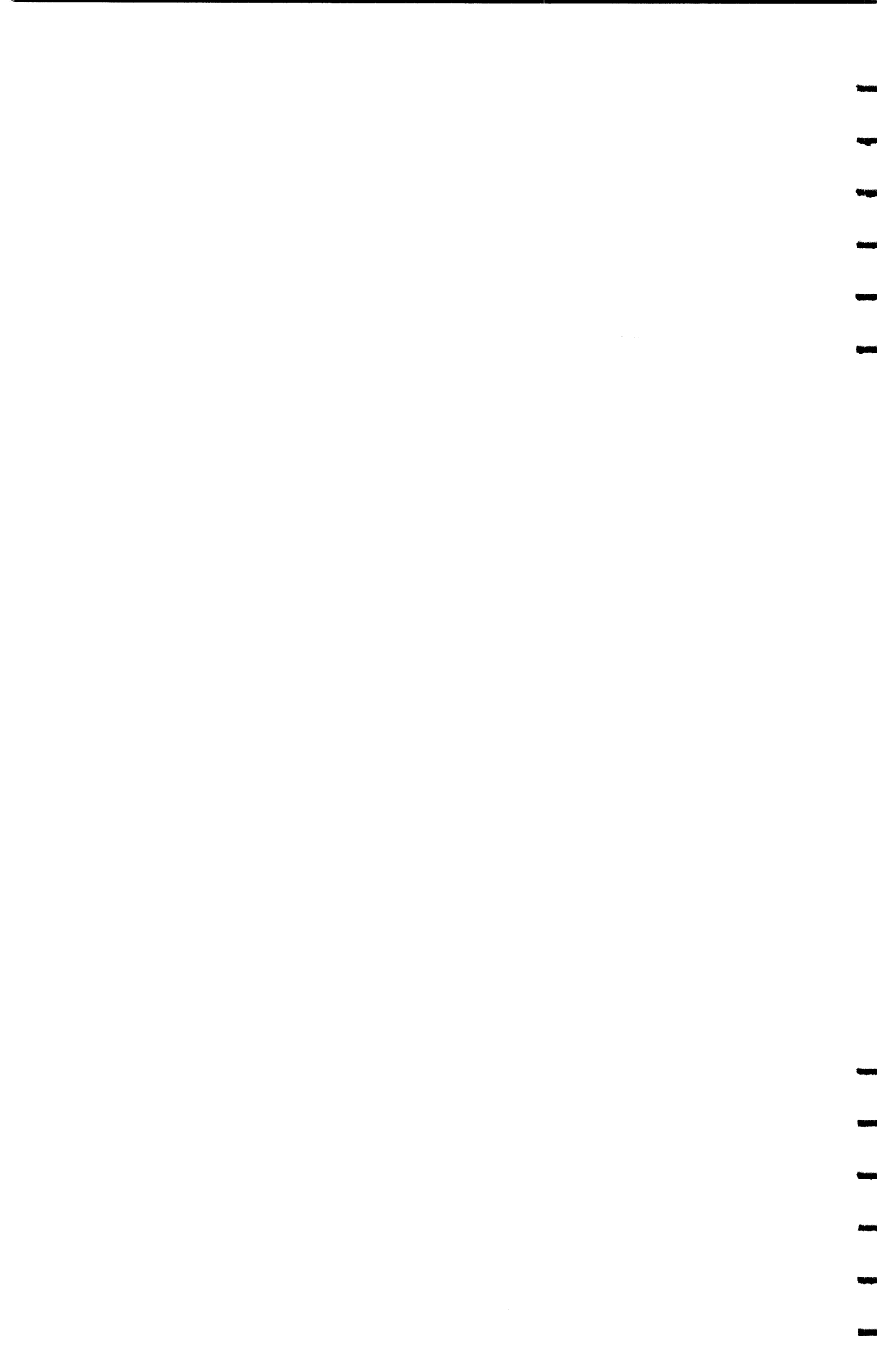
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Modems and Telecomputing



Modems and Telecomputing

There are some folks who say telecomputing got started in Gun Barrel, Texas.

Back in the fifties, a Gun Barrel resident named Tom Carter operated a company called Carterphone that sold and serviced mobile two-way radios. You've seen such radios in taxis and police cars, where they are used to dispatch mobile units and to provide communications between the home office and operators of the vehicles.

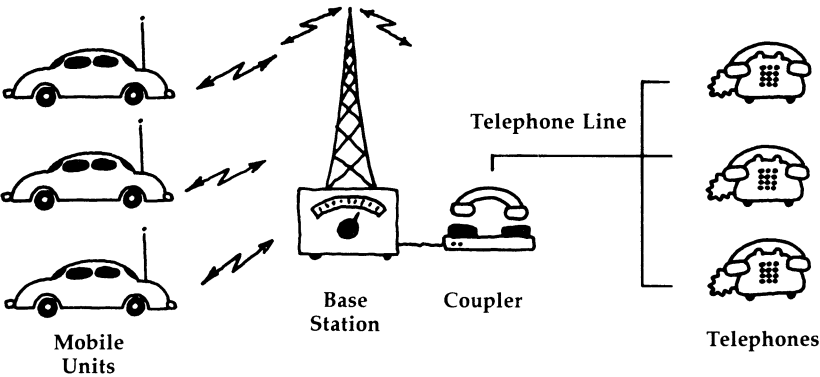
To increase the value of his service, Carter got the idea of connecting the base radio station to the telephone line. That would allow the vehicle operator to use the telephone system. In addition, businesses subscribing to Tom's service could talk to their drivers over the telephone without having to own and operate a two-way radio base station.

The Carterphone company developed a small device called an acoustic coupler. Picture a small box on which the telephone handset is placed. This small box contained a microphone and a speaker, which were connected to the two-way radio base station equipment. The microphone was used to pick up sounds from the handset, while the speaker sent sounds to the handset.

A mobile unit operator could talk on the telephone by calling the Carterphone base station by radio and telling the operator what number to dial. After the phone connection was made, the operator would place the telephone handset on Carter's amazing acoustic coupler, and the driver could talk to the person at the other end of the telephone line. It also worked the other way around. A company could call Carter's base station by telephone and have them contact the mobile unit. This type of network is illustrated in Figure 2-1.

Modems and Telecomputing

Figure 2-1. An acoustic coupler can be used to interconnect mobile radio units to the telephone network.

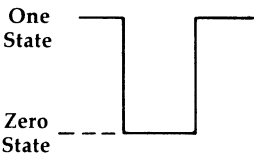


Radio Phones to Modems

What does this have to do with telecomputing? It doesn't take much imagination to realize that if a radio can be coupled to a telephone, a computer could too. It wasn't long before someone invented a similar box that would couple a computer into the telephone network.

But connecting the phone lines to a computer is not quite so simple as connecting them to a radio. There are several reasons why you can't simply run data bits down the telephone line. Even the least expensive computer is capable of thousands of calculations per second. Remember that each calculation consists of many changes between the one and zero state, as Figure 2-2 shows, and a typical data bit may change states several million times per second.

Figure 2-2. A single digital bit has only two states, defined as "one" and "zero."



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The telephone network simply cannot cope with anything that is changing that rapidly, since it is geared to handle the human voice. When a person is talking, the sound waves change at rates between 300 and 3000 cycles per second. There are sounds above and below those frequencies, of course, but most voice energy falls within that range.

Obviously, a telephone line cannot handle something that changes states 4000 times a second if it is designed for a maximum of 3000 cycles per second. You may put such a signal in one end, but it won't come out the other end. But it *will* try to go somewhere and can actually jump from one pair of wires to another and interfere with someone else's conversation.

Even low-cost computers propel ones and zeros at incredible rates. We were just talking about a maximum of 3000 changes per second, but an average computer can generate signals that change four *million* times per second. That's much faster than a telephone line is capable of handling. So, the first thing that must be done to send computer information over the telephone line is to slow it down.

The Sound of Music

Digital information is information that has been encoded as a series of ones and zeros. On the other hand, voice information is *analog* information that wobbles up and down and covers all the values between two extremes. It is those wiggles and wobbles that give each human voice a distinctive and different sound. You may have heard low-cost digital synthesizers that try to imitate the human voice without enough analog wobbles; they sound terrible.

After slowing down the digital information, the second step is to convert it to analog sounds, or better yet, to individual tones that can be sent over the telephone network.

The push button telephone is an example of how this can be accomplished. Push button telephones produce analog sounds made by combining two individual whistles or tones. By pressing the one and zero keys on a telephone, you could send information to a device at the other end of the telephone line. The process would be incredibly slow, but the tones you hear could be easily interpreted to represent the original ones and zeros.

This process of converting digital information into analog information is one of the functions of a modem. That is, it

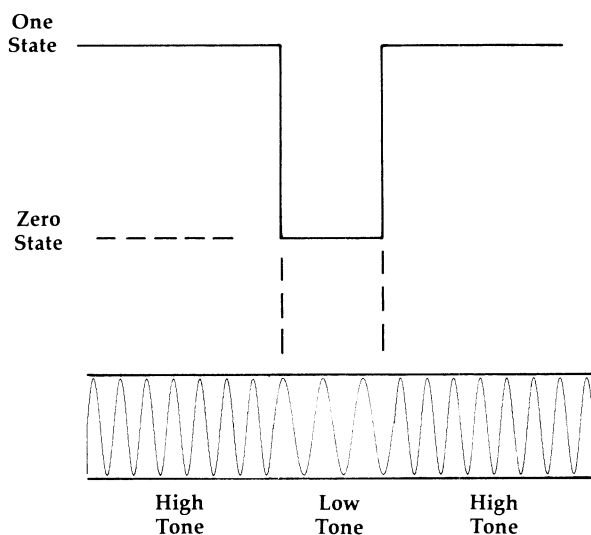
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converts digital information to analog sounds. The modem also converts the incoming tones back to the digital data that your computer can decipher, using a process called demodulation. The term modem is a contraction of the words *modulation* and *demodulation*.

Acoustical Couplers

Imagine that Tom Carter's acoustic box contains a sound (or tone) generator, something like the one connected to the buttons of your telephone, and that it is wired to send two tones (one representing the "one" state and the other representing the "zero" state). This circuit is connected to your computer. When no data is being serialized, the box sends the tone which represents a continuous one. When a zero comes zipping along, the modulator switches to the other tone frequency. The waveform represented by this action is given in Figure 2-3. The tone generator (or modulator) is connected to a loudspeaker, which is placed up against the microphone or acoustically coupled to the telephone handset.

Figure 2-3. The two digital states are used to control tone frequencies in a modem.



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But the design is not finished yet. You also need a circuit that will detect whether a one tone or a zero tone is coming in over the telephone line (from the other computer). Call that circuit the demodulator, and acoustically couple it to the earpiece of the telephone handset. Finally, connect the modulator and demodulator circuit to an input/output port of your computer. Presto! You have just invented the modem.

At the risk of injuring your feelings, you should be aware that you invented a rather poor modem. The microphone that detects sounds from the earpiece can also hear banging pots and pans or the noise of a clacking typewriter. The modem isn't smart enough to discriminate and pick the correct sound, and the result is that you have "noise" on the signal and garbage on the screen.

To minimize this problem, the sensitivity of the "listener" part of the modem must be reduced. Unfortunately, that reduces the modem's ability to hear incoming tones as well as its ability to hear noise. Thus, if the signal in the earpiece is weak, or if the handset is not down tightly onto the rubber cups, you will probably lose data information. Another problem with your invention is the loud outgoing tone that the modem must couple to the telephone handset. This noise can be very annoying, particularly in the quiet environment required by the acoustic coupler.

Just a few years ago this was the only type of modem used with computers. But as you may have suspected, there is a better way: the direct connect modem. The Federal Communications Commission has permitted various devices (including modems) to be connected *directly* to telephone lines. The modem itself generates the tones, sending them directly to the lines. That avoids the process of converting electrical signals to acoustic sounds and then reconvertng the sounds back to electrical impulses again.

Essentially, that is how a direct connect modem works. When you plug the modem cord into your telephone, you are delivering the tones directly into the telephone line. Autodial/autoanswer modems don't even need a telephone instrument. The modem does the dialing for you.

Eight Telephone Lines?

Unless you just unpacked your computer, you have probably heard mention of a data bus that runs around inside it. This is like an eight-lane highway that connects the central processing chip with the memory, video display generator, and other circuits. When characters are shuffled around inside the computer, they are done so eight bits at a time. Combined with two states, that gives you 2 to the 8th power or 256 unique combinations. Eight bits constitutes a single byte.

This eight-lane data highway is called a parallel data bus. All the ones and zeros making up the byte are handled in parallel and simultaneously. If you were to try and send these data bits the same way on the telephone network, you would need eight telephone lines.

As an example, take your telephone in hand and try to send the number 555-1212 by pressing the keys simultaneously. Obviously, you cannot do it. How do you dial the number? You do it sequentially, or serially. First one digit is sent, then the next, and so on until the number sequence is dialed.

This is the same thing that must be done when sending computer data over the telephone line. First, the circuitry looks at data line 1 and decides if it contains a one or a zero. The modulator then sends the appropriate tone. Next, it looks at data line 2, sends the one or zero tone, and so on until the eight data bits making up the byte have been transmitted. While it takes a long time to explain the action, it occurs within a fraction of a second.

Drawings of the conversion from parallel to serial are shown in Figures 2-4 and 2-5. As you can see, there are zeros on data lines 2, 4, 5, and 6, while ones are found on lines 1, 3, 7, and 8. When these bits are converted to a serial stream, their placement (based on Figure 2-4) is shown in Figure 2-5.

There is one problem in serializing the data in this manner. How does the device receiving the serial data (the recipient) know when the bit stream starts and ends? Note in Figure 2-5 that data bit 1 is a one, the same as the static state of the serial line. The serial stream does not start at the transition between data bit 1 and 2 but, rather, one bit before this. Without some way to indicate to the recipient the start of a character, the wrong group of bits would be interpreted. In other words, the recipient device would print the wrong character. (This

Figure 2-4. Digital bits found on the data bus of a computer all occur in parallel.

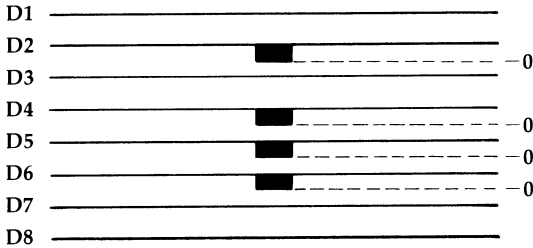
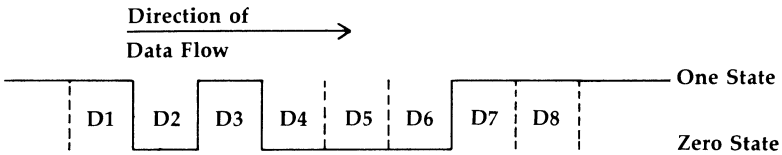


Figure 2-5. Serializing the data bits stacks them sequentially, like marching soldiers or cars in a line.

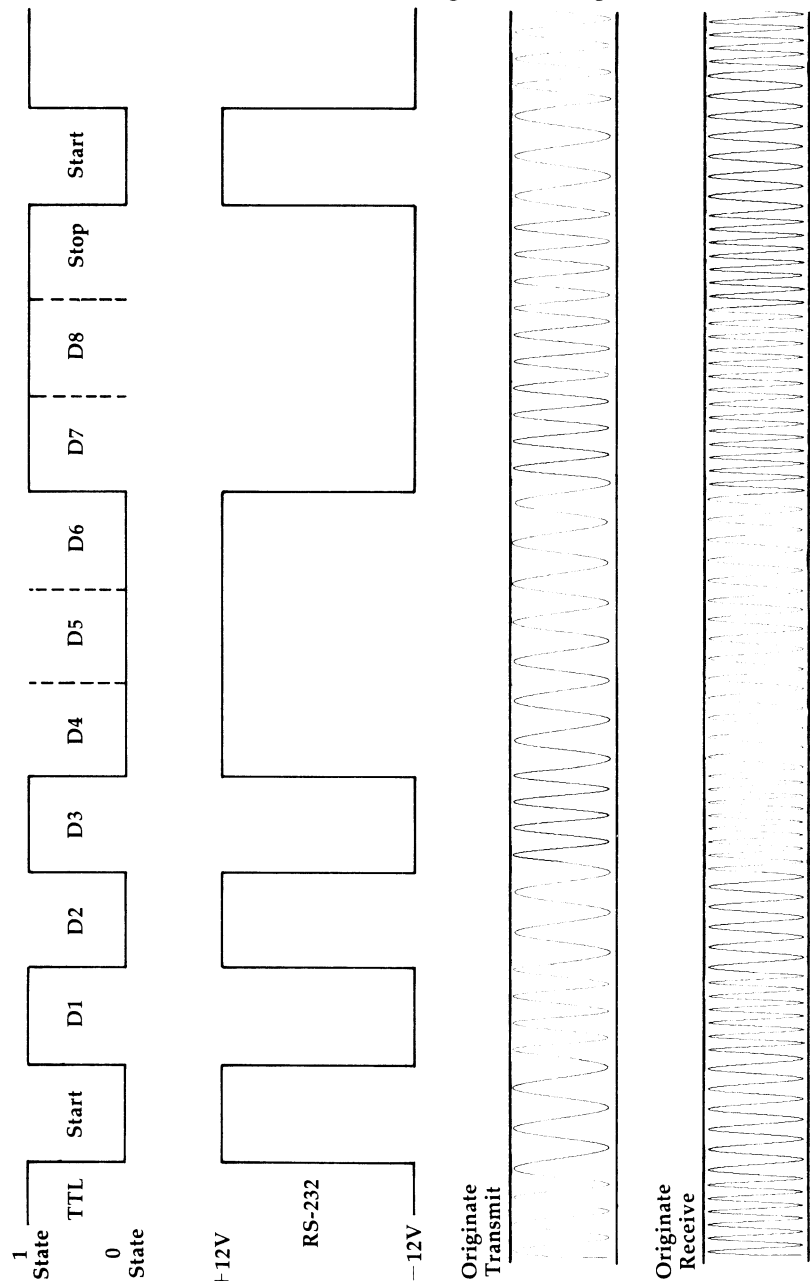


problem does not exist on the parallel bus within the computer. Every computer has a circuit to tell memory when valid data exists on the bus. If you used this method to tell the recipient device where the data starts, a second telephone line would be required.)

You can indicate starting and ending points by adding two more bits to the serial data stream, as shown in Figure 2-6. At the very beginning, add a one-zero transition called a *start bit*. The bit looks just like the data bit, but it always causes the first one-zero transition. It tells the recipient device that the next eight bits are significant. Just to insure that the byte is properly identified, a stop bit is tacked on after the eighth data bit. The stop bit tells the recipient device that it has just received eight data bits (one byte) of information.

The stop bit can continue right into another start bit (as shown in Figure 2-6), or the line can stay in the one state for any length of time until the next character comes along, preceded by a start bit. The parallel-to-serial converter does not care how long you wait until you press the next key.

Figure 2.6. The relationship of the data bits to the tone frequencies in a modem operating in the originate mode.



The objective is for the computer at the other end to know exactly where a character starts and stops. Essentially, the data byte is "framed" by start and stop bits to clearly define the contents of the data. A clear delineation of the byte is essential if you are to send valid data over the telephone network.

Introducing the UART

There is a hardware device that assembles the parallel bits into a serial stream. It is called a Universal Asynchronous Receiver Transmitter (UART). A UART chip contains thousands of semiconductor devices and is capable of assembling an outgoing serial stream from the incoming parallel data bits. By adding start and stop bits, it creates a standardized signal that is universally understandable by serial devices like modems and printers. The UART can also disassemble an incoming serial stream (from the computer you are talking to, for example) into the eight parallel data bits required by your computer.

Commodore does not use a hardware UART in the VIC-20 or Commodore 64 models. These computers use what is called a software UART. By using timing loops in machine language, it's possible to duplicate the action of the hardware device almost exactly. The software UART in the Commodore products works very nicely at speeds up to 240 cps (characters per second).

Standardized Code

The parallel-to-serial conversion (either hardware or software) goes to a great deal of trouble to insure that the recipient device understands the construction of the byte. But how do you make certain that the recipient understands what the byte means? Obviously, you must have a standardized code so that the byte means the same thing to both sender and receiver. To resolve this problem, ASCII (American Standard Code for Information Interchange) was developed a number of years ago.

You will recall that the eight bits can make 256 different bytes (2 to the 8th power). Each byte can represent an individual character. The first 128 characters are well defined by the ASCII code. The remaining 128 characters are different on each computer. The manufacturer can use the upper 128 characters for graphics, alternate character sets, and so on.

Figure 2-7 shows the 128 standardized characters which

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make up the ASCII character set. The chart gives the decimal, binary and hexadecimal values for each character. The numbers and characters outside the blocks are the hexadecimal equivalents. The value above the character is the binary equivalent, while the number below is the decimal value.

For example, the uppercase A is a hexadecimal 41, while the lowercase is hexadecimal 61. The same characters have decimal values of 65 and 97 respectively. The binary values are 1000001 and 1100001 for the upper- and lowercase A. These ones and zeros are the same as one would see if the serial stream for a given character were examined, bit by bit. Note that the binary representation is shown with the most significant bit (MSB) at the left and the least significant bit (LSB) at the right. Serial stream illustrations usually show the LSB to the left and the MSB to the right.

The only difference between an upper- and lowercase letter is the sixth bit (bit 5). It is 1 for the lowercase version and 0 for the uppercase version.

As you look over Figure 2-7, you'll notice some rather unusual designations in the first 32 positions. In addition to the usual alphanumeric information, codes are required to tell machines (or screens) when to skip lines, backspace, skip to the top of the next sheet of paper, and so on. The first 26 positions are called control codes, and all of the first 32 positions (the first two rows) are considered to be nonprinting machine instruction characters.

Table 2-1 lists the functions of the first 32 characters. We'll talk about these individual codes in detail as they become important for specific applications. Decimal 32 is a space, and from there the chart progresses through the printable characters in the ASCII code set.

Figure 2-7. Decimal, binary, and hexadecimal values for each character.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0000000 NUL 0	0000001 SOH ^A 1	0000010 STX ^B 2	0000011 ETX ^C 3	0000100 EOT ^D 4	0000101 ENQ ^E 5	0000110 ACK ^F 6	0000111 BEL ^G 7	0001000 BS ^H 8	0001001 HT ^I 9	0001010 LF ^J 10	0001011 VT ^K 11	0001100 FP ^L 12	0001101 CR ^M 13	0001110 SO ^N 14	0001111 SI ^O 15
1	0010000 DLE ^P 16	0010001 DC1 ^Q 17	0010010 DC2 ^R 18	0010011 DC3 ^S 19	0010100 DC4 ^T 20	0010101 NAK ^U 21	0010110 SYN ^V 22	0010111 ETB ^W 23	0010000 CAN ^X 24	0010001 EM ^Y 25	00101010 SUB ^Z 26	00101011 ESC 27	0011100 FS 28	0011101 GS 29	0011110 RS 30	0011111 US 31
2	0100000 SPACE 32	0100001 ! 33	0100010 " 34	0100011 # 35	0100100 \$ 36	0100101 % 37	0100110 & 38	0100111 ' (apost.) 39	0101000 (40	0101001) 41	0101010 * 42	0101011 + 43	0101100 , (comma) 44	0101101 - 45	0101110 . 46	0101111 / 47
3	0110000 0 48	0110001 1 49	0110010 2 50	0110011 3 51	0110100 4 52	0110101 5 53	0110110 6 54	0110111 7 55	0111000 8 56	0111001 9 57	0111010 : 58	0111011 ; 59	0100101 K 60	0100101 L 61	0100110 N 62	0100111 O 63
4	1000000 @ 64	1000001 A 65	1000010 B 66	1000011 C 67	1000100 D 68	1000101 E 69	1000110 F 70	1000111 G 71	1001000 H 72	1001001 I 73	1001010 J 74	1001011 K 75	1001100 L 76	1001101 M 77	1001110 N 78	1001111 O 79
5	1010000 P 80	1010001 Q 81	1010010 R 82	1010011 S 83	1010100 T 84	1010101 U 85	1010110 V 86	1010111 W 87	1011000 X 88	1011001 Y 89	1011010 Z 90	1011011 [91	1011100 \ 92	1011101] 93	1011110 ^ 94	1011111 _ 95
6	1100000 , 96	1100001 a 97	1100010 b 98	1100011 c 99	1100100 d 100	1100101 e 101	1100110 f 102	1100111 g 103	1101000 h 104	1101001 i 105	1101010 j 106	1101011 k 107	1101100 l 108	1101101 m 109	1101110 n 110	1101111 o 111
7	1110000 p 112	1110001 q 113	1110010 r 114	1110011 s 115	1110100 t 116	1110101 u 117	1110110 v 118	1110111 w 119	1111000 x 120	1111001 y 121	1111010 z 122	1111011 { 123	1111100 124	1111101 } 125	1111110 ~ 126	1111111 DEL 127

Table 2.1. Explanation of Nonprinting ASCII Characters

NUL	Null: Usually used to maintain machine synchronization.
SOH	Start of Header: Opening frame for the header of a message—usually frames the address or route.
STX	Start of Text: Opening frame of the message being sent.
ETX	End of Text: End frame of the message being sent.
EOT	End of Transmission: End frame of a complete transmission.
ENQ	Enquiry: Interrogate the other station, such as “who are you?”
ACK	Acknowledge: Confirms that message was properly received.
BEL	Bell: Rings the bell at receiving station.
BS	Backspace: Causes print head (or display) to move back one space.
HT	Horizontal Tab: Causes print head (or display) to move forward to next tab position.
LF	Linefeed: Causes print head (or display) to move down one line.
VT	Vertical Tab: Causes print head (or display) to move down to the next tab position.
FF	Form Feed: Causes print head (or display) to move to the top of the next sheet of paper.
CR	Carriage Return: Causes print head (or display) to move from right to left extreme.
SO	Shift Out: Permits shifting out of alternate character set.
SI	Shift In: Permits shifting into alternate character set.
DLE	Data Link Escape: Disconnect from data link.
DC1	Direct Control 1.*
DC2	Direct Control 2.*
DC3	Direct Control 3.*
DC4	Direct Control 4.*
NAK	Not Acknowledge: Confirms that message was improperly received.
SYN	Synchronous Idle: Code to maintain synchronization in the absence of data.
ETB	End of Transmission Block: Frames the end of a block of data.
CAN	Cancel: Used to cancel previous data.
EM	End of Medium: Frames end of media.
SUB	Substitute: Exchange an item (frame, block, character) for another.

- ESC** Escape: Used to provide fourth group of characters in conjunction with regular alphanumeric (Escape 1, Escape A, etc.).
- FS** Form Separator: Used as a delimiter between forms.
- GS** Group Separator: Used as a delimiter between groups.
- RS** Record Separator: Used as a delimiter between records.
- US** Unit Separator: Used as a delimiter between units.

* DC1 and DC3 used as X-on, X-off code in one direction, while DC2 and DC4 used as X-on, X-off in the reverse direction.

Error Detection

Only seven bits are required to represent the first 128 characters of the ASCII set (2 to the 7th power). If you are sending only text (as opposed to graphics), something rather crafty can be done with the eighth bit.

The UART contains an additional circuit to add up the total of ones in the first seven bits. In other words, the circuit keeps track of whether an even or odd number of ones makes up the byte. It can then make the eighth bit (bit 7) a one or a zero to make the total number of ones an even or an odd total. The same type of circuit can be used at the receiving end of the telephone line. It also adds up the ones in the first seven bits and then calculates whether the eighth bit should be a one or a zero. It compares its calculation with the state of the incoming eighth bit. If the state of the eighth bit agrees with the calculated condition, the computer assumes that the character was received correctly. If the two values do not agree, the UART knows that an error occurred in the process of getting the byte from the sender to the receiver. The software can inform the user of this error or request a retransmission of the defective information.

The eighth bit (bit 7) is referred to as the parity bit in the ASCII serial stream. The parity bit can be set as a one or a zero depending on the number of ones in the preceding seven bits. If a bit is added, to make the total of ones an even number, it is called even parity. If a bit is added to make the total of one bits odd, it is called odd parity. To further confuse matters, another option (besides odd and even) is the no parity bit.

The use of the parity bit for error detection is not fool-proof. If an odd number of errors is introduced into the data

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bit stream, the parity bit will catch it. However, if an even number of bit errors occurs, the parity check will not indicate that an error has occurred. A one-bit error is the most common condition, however, and the use of the parity bit will therefore detect most errors.

In this application, the term *parity* is defined as an indication of equality. While it is useful, the parity bit can cause a tremendous amount of confusion to the newcomer. If you have garbage on the screen when communicating, it's probably because your communication protocol does not match that of the other computer. For example, if you are configured for odd parity and the other computer is sending even parity, it can cause total chaos on your screen. In such a case, make certain that the status of the eighth bit is the same for the sender and receiver.

If you see graphics characters on your screen, it is very likely that the condition of the parity bit is incorrect. Often it is possible (and necessary) to contact the system operator to determine the makeup of his or her bytes.

Baud Rate

There are a number of other things that will cause problems in getting connected to another computer. The previous sections mentioned characters per second, and that figure can also be expressed in terms of baud or baud rate. Most modems send and receive data at the rate of 300 baud. This type of modem is said to be Bell (as in telephone) specification 103 compatible.

If you review some of the previous paragraphs, you will realize that each character in a serial stream consists of ten bits. There are a start bit, eight data bits, and a stop bit. Each bit, including the start and stop bits, is identical, except for the one/zero condition. In other words, they each last for a certain period of time. If the time it takes to send a bit is cut in half, the baud rate has been doubled. As the time a bit is in a stable one or zero condition is reduced, the time the modem detection circuitry has to decide which state it is receiving is also reduced—and (not surprisingly) more sophisticated circuitry is required in the modem. That is why higher speed modems become increasingly more expensive.

While it is not exactly correct technically, you can consider that a 300-baud modem transmits and receives approximately 30 characters per second (300 baud divided by 10 bytes). By the same token, a Bell 212 specification modem sends and receives approximately 120 characters per second (1200 baud).

Communication Parameters

Some systems send more than one stop bit. This is often the case if the system is communicating with mechanical printers rather than with displays. The extra long stop bit gives the mechanical device more time to get resynchronized between characters.

The importance of all this is that you must know the parameters and the protocol of the system with which you are telecomputing. The most common parameter is seven bits of data. This byte is sometimes referred to as a seven-bit *word* even though it is only one character long. The typical byte is completed with an even parity bit and one stop bit. This makes ten bits total, including the start bit. When someone says they are sending "seven, even, and one," this is what they mean. The start and stop bits are assumed rather than specified. The use of start and stop bits to frame each character is called asynchronous communication.

Most terminal programs have provision for changing these parameters. The change may be accomplished by a menu selection or a line of code in BASIC, which can be modified to suit the user's requirements.

You've probably come to the conclusion that a lot of banana peels are being thrown on your communications sidewalk. To a certain extent this is true. There are a number of things that can and will go wrong. You should expect a certain amount of frustration during the learning phase, but you will soon learn what works and what provides good results. When things do go wrong, try to analyze the problem and decide where the fault lies. Once again, a friend (or someone who has been down this slippery sidewalk before) can be very helpful.

Now that the ones and zeros are arranged like a matching column of soldiers, let's put them to good use. As mentioned earlier, they cannot be fed directly into the telephone line

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even though they have been slowed down to 30 baud. The one-zero transitions are still too fast for the telephone circuit to handle.

You will recall that tones can be used to represent the one and zero states. The tone frequencies to be used have been standardized in the Bell 103 specification. Thus, an acoustic coupler and a direct-connect type of modem can communicate with each other if they both meet the Bell 103 specification.

The resting, or static, state of the serial line driving the modem is a constant "one" when no data is being sent. This causes the modem to transmit a steady frequency of 1270 hertz (cycles per second). This steady frequency is commonly referred to as the *carrier*. Remember this term. The carrier will become very important later on.

When a start bit comes along, it produces a transition from the one to the zero state. The zero state causes the modem to switch momentarily from 1270 hertz to 1070 hertz. The frequency change, or shift, is 200 hertz.

As the serial stream progresses with its alternate ones and zeros, it causes the modem to constantly toggle between 1270 and 1070 hertz. The modem at the other end of the telephone line detects the variation between these two tones and controls a one-zero switch. The varying tones received produce a series of ones and zeros that are duplicates of the original serial data stream.

Duplex Communications

Amateur radio operators usually communicate only one way at a time. First one station sends, then the other. But can you imagine having to say "over" or "go ahead" when talking on the telephone? One-way computer communications would be just as inconvenient.

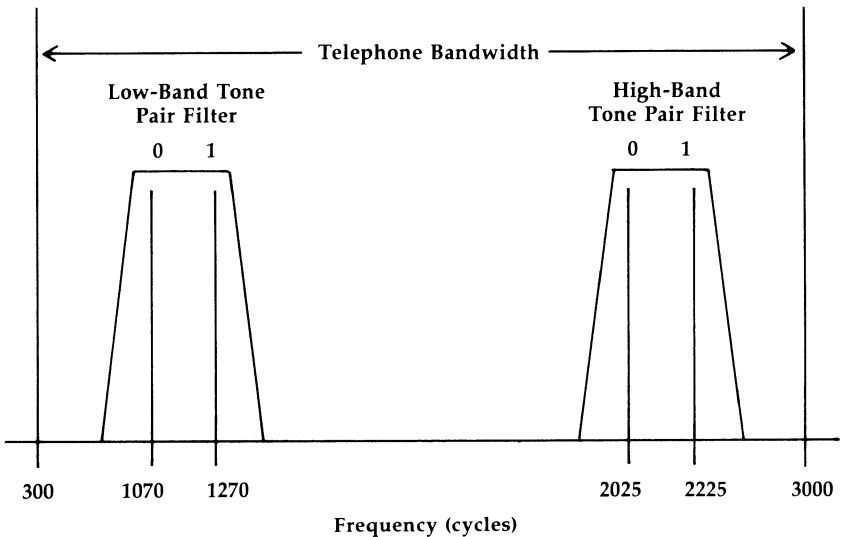
The Bell 103 specification permits sending data in two directions simultaneously. This capability, called *duplex* communication, is extremely important in computer communications.

There is no way that two computers can use the same tones at the same time. Computers cannot distinguish their own one and zero tones from those of the other computer if the same tone frequencies are used. Thus, to provide two-way communications, it is necessary to employ a second set of tones. They are used to communicate in the reverse direction.

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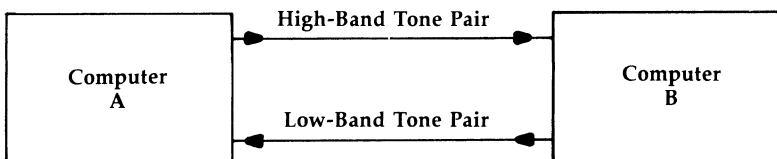
The principle is the same as that for the forward direction—that is, individual tones are used for ones and zeros. The frequencies selected for the incoming tone pair are sufficiently removed from the outbound tone pair so that they can be separated with electronic filters, as illustrated in Figure 2-8.

Figure 2-8. The *originate* and *answer* tone frequencies can be separated with filters.



The frequencies used for the second tone pair are 2225 hertz for ones and 2025 hertz for zeros. These tones are called the high-band tone pair and, like the low-band pair, are separated by 200 cycles. When the high-band tone pair is used, the frequency of 2225 cycles is considered to be the carrier. Later, you'll see which computer uses which tone pair.

Figure 2-9. Two computers (with modems) in the full-duplex mode.



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The two computers shown in Figure 2-9 can communicate both ways at the same time. This is called *full-duplex*, and permits one computer to interrupt or signal the other just as you are able to do with your voice on the telephone. For example, let's say computer A is sending a long text file to computer B. Somewhere in the transmission, computer B detects a problem (such as a parity error). Computer B can instantly signal A to retransmit the defective portion, without waiting for the completion of the entire transmission. By the same token, one computer can signal the other to confirm that everything is going fine. The ASCII codes (Table 2-1) for NAK, not acknowledge, and ACK, acknowledge, can be used to signal the sending computer concerning the validity of the data received, as just described.

Additional Error Detection

The reverse, or back, channel can also be used to return *echoes* to the sending computer. Say that computer A is sending the word "hi" to computer B. It sends the ones and zeros which represent the characters *h* and *i* in a serial stream to the modem. The modem converts these pulses to the low-band tones and sends these to the other computer. The modem at computer B demodulates the tones and produces a serial stream representing the characters *h* and *i*. Not only do these letters appear on the screen of B, but they can be sent back to the modem to modulate the high-band tone pair. These tones are then returned or echoed to computer A.

The modem at A will demodulate the echoed characters, and the computer will print them on the screen. What is seen on the screen, in a duplex system, is not a direct display of what was typed on the keyboard; instead, the character which appears is what the other computer *thinks* it received. This provides a rudimentary but effective error detection system. When you press the "h" key, that character is sent to the other computer and then echoed back to you. You should see the h on your screen. If you see some other character, you know that an error in transmission has occurred.

The character travels the path from computer A to computer B and back again in a fraction of a second. Thus, when you press a key, the echo appears on your screen almost instantly, just as if it had been placed there directly. The amount of time it takes for the character to appear depends on the

length of the telephone line between computers A and B and on how fast the software is able to recover and echo the character.

Half-Duplex

Let's say you are communicating with a computer that uses a printing terminal rather than a screen. These are often called teletype machines. Teletype is a trademark of the Teletype Corporation, which makes one type of printing terminal.

Some schools use these machines for communications between students and the central time-sharing computer. When the user of a printing terminal presses the h key, the character is sent out to the modem just as before. At the same time, it prints the h on a sheet of paper. If the character was also echoed back to the printer, it would produce a double h. The word "hi" would appear on the paper as "hhii."

If full-duplex was used, any data typed on the keyboard would appear on the paper as a series of double letters. Thus, with printing terminals, the character must not be echoed back to the computer using the printing terminal. When the character is not echoed to the sending computer, it is called half-duplex communications. The modem or the software must have provisions for switching between full- and half-duplex.

There is some disagreement over these definitions. A few books and articles define half-duplex as one transmission at a time. Communications engineers call this simplex; they define half-duplex as the omission of the echo.

Originate/Answer Modes

The terms *originate* and *answer* seem to cause confusion in the minds of some telecomputerists. The originate mode has nothing to do with who originates the telephone call. By the same token, the answer mode need not be used by the person who answers the telephone call.

To better understand, assume that computer A and computer B are talking to the CompuServe system. The communications circuit would appear as shown in Figure 2-10. In this illustration, CompuServe is considered to be the host computer. This system, like other information services, has hundreds of input/output ports and can communicate with many computers simultaneously.

As shown in the drawing, computers A and B are said to

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be in the originate mode. This simply means that A and B are both sending to the host (and the host is receiving) the low-band tone pair. By the same token, CompuServe is sending the high-band tone pair to computers A and B. CompuServe is said to be operating in the answer mode (receives low band, sends high band). It is only coincidental that the computers originated the call and CompuServe answered it.

So far everything works perfectly. Now, let's say that computer A and computer B decide to connect with each other rather than with CompuServe. The communications link would now be established as shown in Figure 2-11. In this illustration, A is sending the low-band tone pair to B, but B is configured to receive the high-band tone pair. The same conditions exist between B and A. Just like trying to force a square peg in a round hole, it won't work.

Something has to give. Either computer A or B must change operating modes. The user of one of the computers must switch from originate to answer, changing the outgoing tone pair from the low-band to the high-band. That also permits the modem to receive the low-band tone pair rather than transmit it.

The communication link then looks like that shown in Figure 2-12. The two computers can communicate without butting heads, and the modem which was switched to transmit the high-band pair (and receive the low-band) is said to be in the answer mode.

Figure 2-10. Originate modems are communicating with CompuServe.

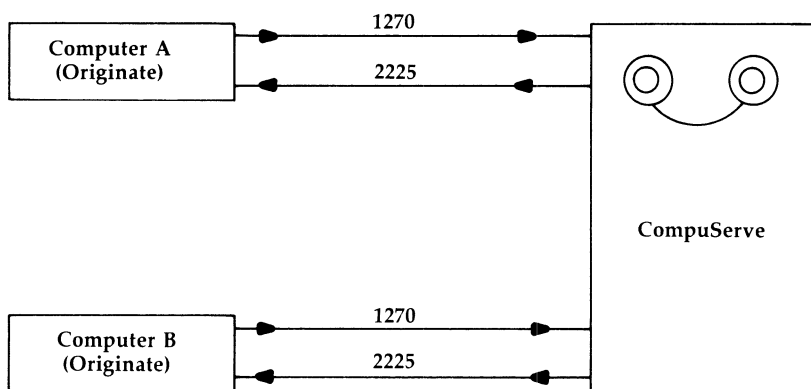


Figure 2-11. The modems shown in Figure 2-10 are trying to communicate with each other.

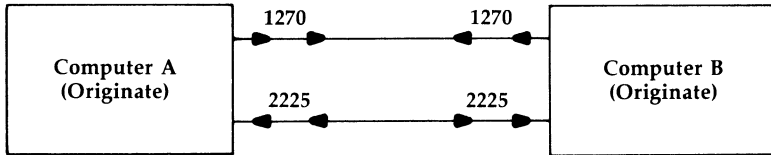
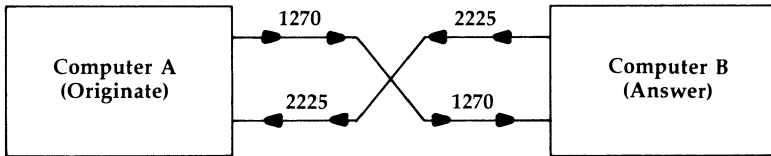


Figure 2-12. When modem B switches to answer mode, the two computers are able to communicate.



Originate Only

Some older modems, in an effort to reduce costs, provided only the originate mode. These are sometimes seen at computer swap meets and can be had for \$10 to \$20. They are quite satisfactory for communicating with bulletin boards and information utilities since bulletin boards and information utilities almost always use the answer mode and can, therefore, communicate with an originate-only modem. The originate-only modem can even communicate with another personal computer so long as the other modem is capable of operating in the answer mode. The only time a problem will occur is when trying to communicate with another originate-only modem.

Full Feature Modems

There are a number of additional features that can be added to significantly increase the usefulness of a modem.

One of the most useful is called autodialing. Most computerists don't mind punching buttons on the phone. What is annoying, however, is trying to call a BBS and finding it constantly busy. With suitable software, a modem can keep

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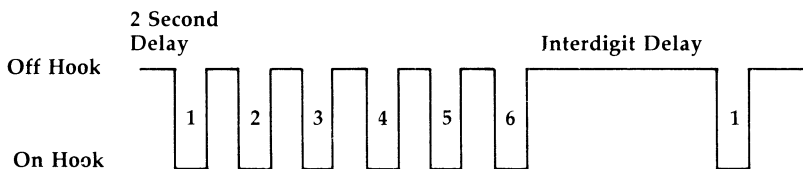
redialing the BBS number. The moment the bulletin board becomes available a connection is automatically made. This can be very convenient.

There are two types of autodialers. The simplest consists of an electro-mechanical switch called a relay; its contacts are connected in series with the telephone line. By pulsing the relay contacts open and closed, the modem can indicate to the telephone equipment the number to dial.

The relay also controls the *hook status* of the modem. When the modem is connected to the telephone line, it is said to be *off hook*. This is an archaic expression which should be explained for no other reason than the humor of it. Old fashioned wooden telephone boxes with a crank on one side had a big black plastic earphone hanging from a hook. When the earphone was lifted off the hook, the hook sprang up. A switch inside the box then connected the telephone to the line. This is the origin of the expression off hook, and it is used even today to indicate that the device is connected to the telephone line. By the same token, *on hook* means the device is not connected.

A typical dialing signal is shown in Figure 2-13. The modem goes off hook for one to two seconds awaiting the dial tone. In most modems, acquisition of this signal is assumed. Then the dialing relay pulses off and on in accordance with the digit desired. For example, to dial a 6, the relay will open and close six times. A time delay, called the interdigit delay, is introduced to permit the telephone company equipment to store the digit. The sequence then repeats for the next digit until the number is dialed.

Figure 2-13. Pulse dialing of the telephone line is done by opening and closing the line relay.



Some modems include provision for both pulse dialing and tones. Pulsing simulates the rotary dial. Modems which transmit tones duplicate the sounds you hear when you press the buttons on your telephone. Push button dialing is faster than pulse dialing, since it does not have to wait for relays to do their tasks. Note too that tones may be mandatory on certain systems such as MCI and Sprint. If you subscribe to these services, you should be sure that any autodial modem you purchase has tone capability.

If you plan to operate a BBS, or want other people to access your computer, you will need a modem that includes the autoanswer feature. Technically speaking, this type of modem includes circuitry which detects the electrical impulses that ring the telephone bell (the *ring signal*). When this signal is detected, the modem automatically goes off hook for a short period of time awaiting a carrier (the 1270 cycle tone) signal. If it receives a carrier, the modem knows that another computer is calling. If a carrier is not received, the modem assumes the call reached this number by mistake and automatically goes on hook (hangs up).

Smart Modems

Some modems have their own single-chip computer built in. These are called *smart*, or intelligent, modems and have widely varying features. They have one common characteristic, however. The communication between the computer and the smart modem is accomplished on the serial data lines. Normally, one controls an "unintelligent" modem by changing switches on the front panel or by means of wires connecting the computer and the modem.

The default condition of a smart modem is to initialize in the command mode. At this point the modem knows that data bits sent to it on the serial line are commands rather than words to be transmitted on the phone line.

These commands are interpreted by the single-chip computer and tell the modem circuitry what to do. One popular smart modem, the D.C. Hayes, uses the characters AT to get the modem's attention. For example, it interprets the command ATDT as "ATTENTION—dial using tones the following number." Usually, the modem signals the computer that it has understood and performed the commands. This can be done by sending the letters "OK" on the outgoing serial line.

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Most smart modems will store telephone numbers and provide automatic redialing. Some of the more elegant versions even include a help file of commands. To obtain information, the user simply types the command H; then a file stored in ROM briefly explains the correct command usage and syntax.

Serial Lines and I/O Port

So far the discussion of the serial lines and the computer I/O port has been on a nontechnical and nonspecific conceptual level. This section is intended for those who are interested in a more technical discussion of the I/O port and serial lines.

As you have seen, the construction and meaning of a serial "word" is well defined. The interface between the computer and the serial device is equally well defined by the RS-232 specification. This specification was generated by the Electronic Industries Association and does not concern itself with the content or makeup of the serial data. Rather, it attempts to define polarity (or direction) and level of signals, as well as the interfacing of RS-232 devices.

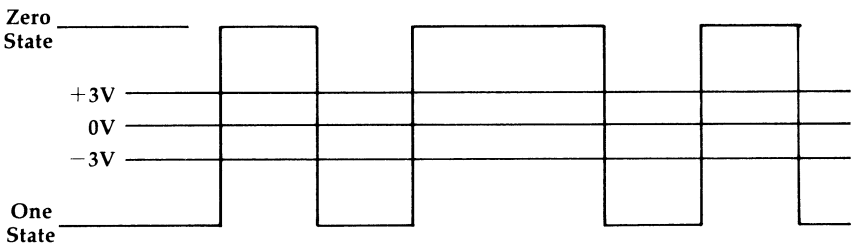
Up to this point we have been speaking of the two levels of digital data, that is, the zero and the one. In the digital world of TTL or transistor-transistor logic, a 1 is considered to be +5 volts, while a 0 is represented by 0 volts.

TTL levels are used extensively inside a computer. Most computers have a five-volt supply which powers all the TTL circuits. However, TTL is not intended to be run through wires for any great distance. Outside electrical interference, in particular, can mess up a TTL-level signal traveling within a wire cable. For example, let's say a serial printer in an office is 30–50 feet away from the computer. In this environment, interference from electrical cords and machines can scramble the digital data if TTL levels were used.

The makeup of a single digital byte, under the RS-232 specification, is shown in Figure 2-14. The first thing you will notice is that a digital one is a minus voltage while a zero is a positive voltage. There is a no man's land between minus three volts and plus three volts; in other words, a digital one must be more negative than minus three volts while a digital zero must be more positive than plus three volts. Thus, the polarity of an RS-232 bit is just the opposite of TTL. Also, the total amplitude is more than the five volt maximum found in

TTL circuits. To meet the RS-232 specification, the total amplitude must be at least six volts to go above and below the "dead" zone.

Figure 2-14. The RS-232 specification includes a dead zone. The signal must be above or below these limits.



The purpose of this six-volt zone is noise protection. Static which might be coupled into the RS-232 cable must exceed at least three volts before it will foul up the digital data. Such noise levels are not very likely, even in the presence of strong electrical noise.

The foundation of RS-232 is the use of a specific connector, called a DB-25. The DB-25 utilizes 25 connections in two rows. The use of the 25 connections is reasonably well defined. However, as we shall see, there is still a certain amount of confusion concerning interconnecting RS-232 devices.

A chart of the DB-25 connections can be found in Table 2-2. Only a few of the DB-25 connections are used in conjunction with personal computers. The remainder are for a secondary channel, testing, and so on.

The important connections are marked with an asterisk in Table 2-2 and are described below.

Table 2-2. Pin number assignments for the DB-25 connector used in the RS-232 specification. Note that pin 25 is unassigned.

Pin Number	Circuit	Description
1*	AA	Protective Ground
2*	BA	Transmitted Data (TXD)
3*	BB	Received Data (RXD)
4*	CA	Request To Send (RTS)

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Pin Number	Circuit	Description
5*	CB	Clear To Send (CTS)
6*	CC	Data Set Ready (DSR)
7*	AB	Signal Ground (Common Return)
8*	CF	Data Carrier Detect (DCD)
9*		Reserved for Testing
10		Reserved for Testing
11		Unassigned
12	SCF	Secondary DCD
13	SCB	Secondary Clear To Send
14	SBA	Secondary Transmitted Data
15	DB	Transmission Timing
16	SBB	Secondary Received Data
17	DD	Receive Timing
18		Unassigned
19	SCA	Secondary Request To Send
20*	CD	Data Terminal Ready (DTR)
21	CG	Signal Quality Detector
22*	CE	Ring Indicator (RI)
23	CH/CI	Data Rate Selector
24	DA	Transmit Timing
25		Unassigned

The first thing you may notice is the use of two ground connections. Pin 1 is called the protective ground and interconnects the metal parts, or chassis, of the computer and serial device. The other, pin 7, is the signal ground. This is a common connection for the other circuits which pass through the DB-25.

Pins 2 and 3 cause a tremendous amount of confusion, even to the people designing products that use the RS-232 specification. At the computer, the data bits to be sent to the serial device are on pin 2, the TXD line. The data bits sent from the serial device to the computer are carried on pin 3, the RXD line. The above is true for the computer end which is called the data terminal equipment, or DTE. All goes well so long as the DTE is communicating with a modem or other serial device configured as DCE (data communication equipment).

When DTE is wired to DCE, pin 2 connects to pin 2 and pin 3 connects to pin 3. However, when two computers or DTEs try to communicate with each other, the situation is similar to that discussed earlier for answer and originate

modes. In this case, the serial output line of one computer is trying to send to the serial output line of the other computer. Obviously, you cannot do this. Serial-out must communicate with serial-in. The solution is the same as before; the lines between pins 2 and 3 must be reversed. In other words, pin 2 at one DTE must connect to pin 3 at the other DTE. A device to accomplish this is called a *null modem*. It is simply a couple of DB-25 connectors hooked up back-to-back with various wires reversed.

Problems arise when manufacturers cannot decide whether their product is a DTE or a DCE. For example, take a serial printer. If it is connected to a computer, it is a DTE. If it's connected to a modem, however, pins 2 and 3 must be wired as if it were a DCE.

Pins 4 (RTS—request to send) and 20 (DTR—data terminal ready) transfer information from the computer to the serial device (for example, a modem). If pin 4 carries a one (above positive 3 volts), it tells the modem to send it data. Pin 20, data terminal ready, simply tells the modem that the computer is turned on and ready for communication.

Quite often these pins are used for something other than their intended purpose. Some products, for example, use RTS or DTR (or both) to control pulse autodialing. Others use these pins for switching between 300 and 1200 baud or between the originate and answer modes. This can cause considerable confusion if you are not aware of the redefined purpose of RTS and DTR lines.

Pins 5 (CTS—clear to send) and 6 (DSR—data set ready) provide information from the serial device to the computer. In this discussion, they tell the computer that the modem is ready to communicate. Quite often they are both wired to pin 8 (DCD, the data carrier detect) inside the modem. The idea behind this is that the modem is not clear or ready to send until it receives a carrier. When this happens, the voltage on pin 8 changes state to tell the computer that a carrier has been detected. The telecommunication software can tell when a carrier has been received by noting the state of the DCD line (or CTS/DSR if they are connected to DCD).

The last pin of interest is pin 22 (RI—ring indicator). This is tied to the ring-detect circuit in the modem. It changes state in unison with the signal that rings the telephone bell. The software can count the number of rings before answering the telephone.

Modems and Telecomputing

The states of the RS-232 connections are well defined, but in many cases they seem to be backwards from what you might expect. For example, consider the DCD line. When no carrier is present, this line rests at a negative voltage, or a one. When the modem connects with another line and a carrier is received, the line changes state to a zero or plus voltage. One tends to think of a zero as the absence of something rather than its presence.

Similar confusion exists with the ring indicator line, pin 22. Some modems hold this line high or in the zero state, while others hold it low in the absence of a ring. One cannot be certain without checking whether the change in state goes from high to low or the other way around. Small wonder that some people have difficulty trying to get Brand X software to work with Brand Y modem.

The RS-232 specifications require that serial devices (DCEs) utilize a DB-25 with a female connector. Virtually all modem manufacturers comply with this requirement.

There have to be individualists, however. It's the American way. The RS-232 specification also requires that the data terminal equipment (DTE) use a male DB-25. For some strange reason many of the computer or terminal manufacturers do not comply. However, the engineers at IBM decided they would follow the RS-232 specification to the letter. Their serial port uses a male connector—and they are big enough to make everyone else do it right.

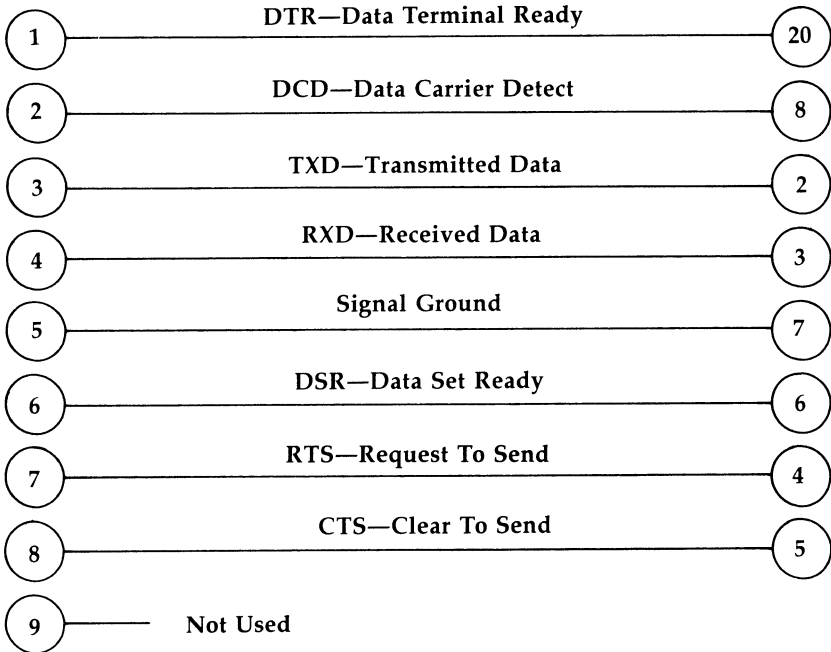
When Atari designed their Model 850 serial interface, they didn't even use a DB-25. Rather, they decided to get rid of all those unnecessary pins and use a DB-9 connector. This has required fabrication of thousands of cables with a DB-9 on one end and a DB-25 on the other end. Since this seems to cause a lot of confusion, I've shown the correct wiring for this cable in Figure 2-15.

Figure 2-15. Wiring diagram for interconnecting the Atari 850 to a modem.

Atari 850
(RS-232C)

Port #1
DB-9 Connector (Male)

Modem End
DB-25 (Male)



Commodore uses the main circuit board to make a card edge connector for the serial port. They simplified matters (or complicated them, depending on your point of view) by eliminating the DB-25 connector and using a TTL level interface rather than an RS-232.

Now that you know more than you ever wanted to about modems, you're ready to move on to the local bulletin boards.

9/15/17

9/15/17

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9/15/17

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9/15/17

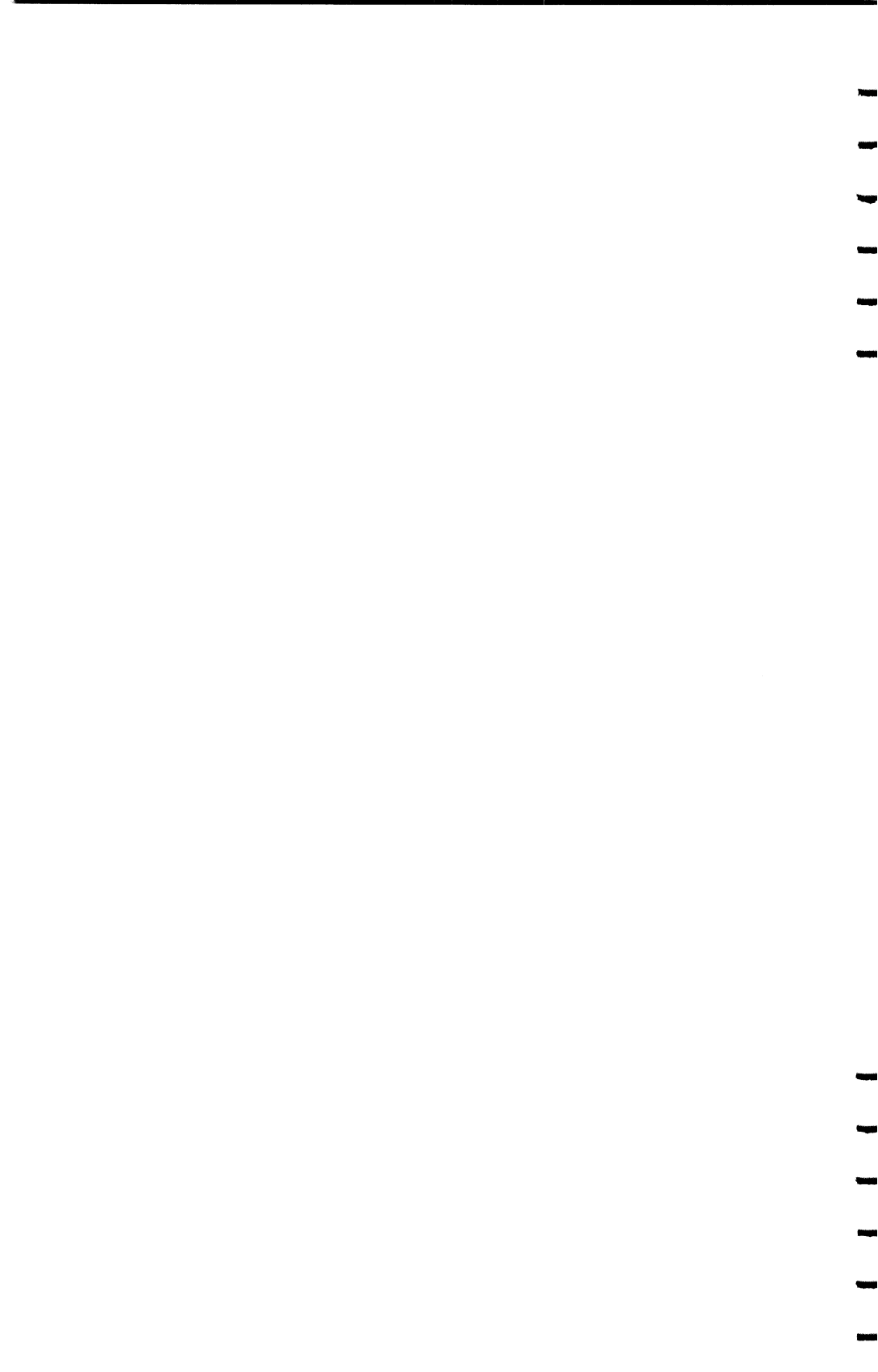
9/15/17

9/15/17

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3

Bulletin Boards



Bulletin Boards

In the early part of the century, before the advent of the telephone, the principal communication in a village took place at the country store. The standard fittings were a few comfortable chairs, a warm potbelly stove, and the ever-present barrel of crackers. The villagers would sit around this centerpiece, discussing all manner of topics and guiding the destiny of their domain.

Bulletin boards are the digital era equivalent of the cracker barrel. On bulletin boards, you will find many public opinion messages of a social, political, or economic nature, in addition to those offering items for sale or requesting information on hardware and software.

The bulletin board concept is also being adopted by businesses. Probably the first application was for computer stores to install a bulletin board service (BBS) for use by their customers and to promote the sale of modems and communication software. Many manufacturers of peripheral equipment for computers have installed bulletin boards to permit direct access by customers. This not only allows user feedback, but also permits ordering directly from the company for faster service. Other companies have simply modified BBS software to provide an electronic message service for their field salespersons and to permit verification of stock levels and delivery times.

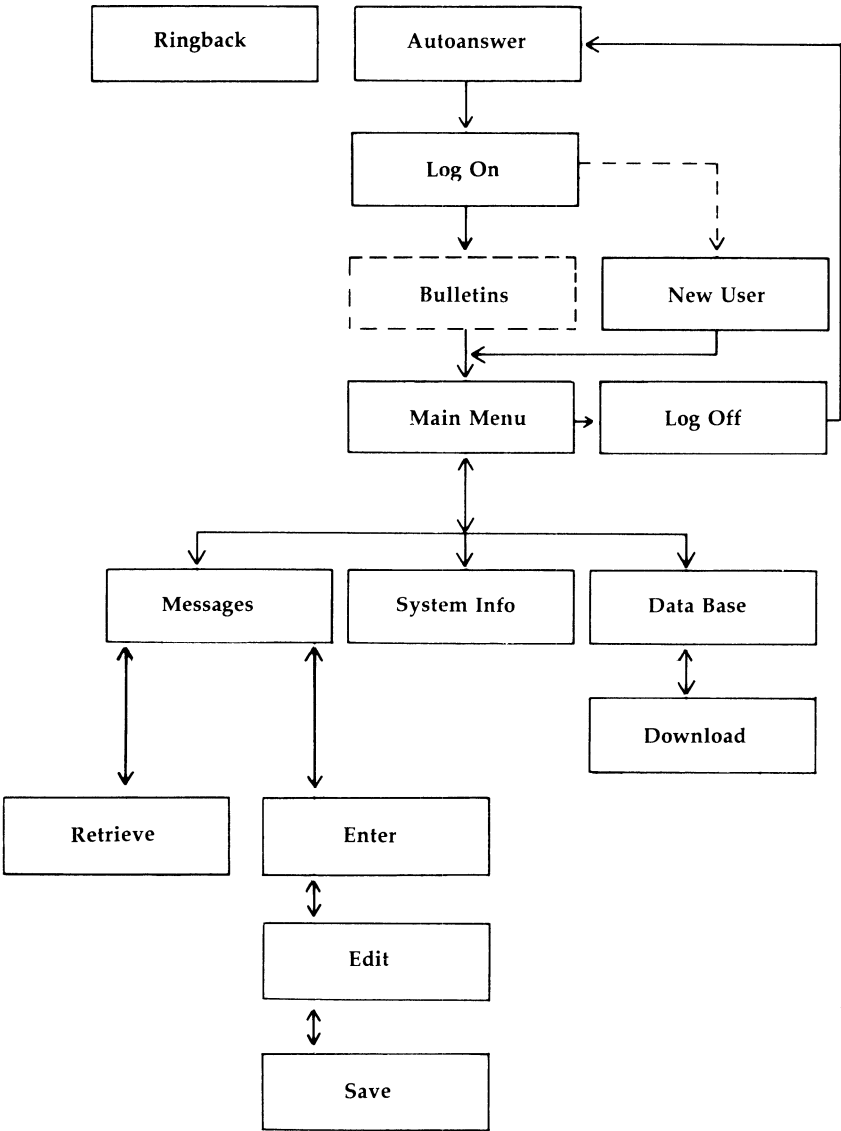
After you access a few local bulletin boards, you will find one or two which become your favorites. No matter what your tastes are, you'll find a cracker barrel that appeals to you.

Figure 3-1 shows a flowchart of a typical BBS; the autoanswer modem is required by all bulletin boards. As discussed in Chapter 2, the autoanswer modem detects the ring signal and completes the connection to the telephone line.

The Ringback Connection

An interesting variation on the typical BBS is found in the block labeled "ringback." Some systems, particularly those with a CP/M operating system, use the ringback scheme. The

Figure 3-1. Flowchart of a typical bulletin board.



user calls the BBS number, lets the line ring exactly once, then hangs up. This starts a timer in the BBS computer software. The user then redials the same number. If a second ring is received within 30 seconds or so, the computer (and nearby humans) know that it is a computer calling. The modem is then programmed to answer the phone and connect the caller with the BBS.

If the phone rings more than once, the first time around, the computer knows that it is not another computer calling. A human can then answer the phone and use the line for voice communications. The purpose of this system is to permit a single telephone line to be used for both voice and data communications. This avoids the installation of a second line solely for computer communications.

If the BBS does not use the ringback system, you can expect the modem to answer on the first or second ring. If more than four or five rings occur, you might as well disconnect and call another BBS. The system is either down or is recycling from a previous call. Some systems, with complicated software, take up to two minutes to recycle after a caller hangs up.

Logging On

Once the BBS answers, you will enter the log on process. Some systems start up without any action on the part of the caller. Others require you to press the RETURN key once or twice.

Until recently, most bulletin boards were open and easily accessible. However, many now offer (or require) a password. Others will not provide an access password without knowing who you are. The system operator (SYSOP) keeps track of things by maintaining records of user phone numbers.

It seems rather paranoid until you realize that not everyone who calls a BBS does so with good intentions. For example, some people enjoy logging on as someone else, then creating havoc on the BBS. More violent types take pleasure in breaking into the system, then erasing disk files. The system operator must spend hours reconstructing the system from previous backup disks. This happens only a few times before the SYSOP decides to institute a password procedure.

If it is your first time on the system, the program will request your name and the city where you live. If you make an

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entry mistake, you are always given a chance to reenter the information.

Once you have identified yourself to the BBS, a number of things may take place. First, your name and city may be placed in a user log. Others can review this log to see who has used the system recently.

If you are a new user, the system may branch off to a welcoming bulletin, which provides information about using the system. If you have checked in before, some systems will advise you if you have messages waiting.

The System Roadmap

The next thing you will see is the main menu, which is like a map through the byways of the BBS. If your computer has the capability, use the appropriate command to turn on the printer and obtain a hardcopy listing of this menu. Having this information will permit you to switch to the expert user mode (see Chapter 1) or to avoid relisting the menu every time you wish to do something.

Each type of BBS has its own way of handling commands. If you log on to various types, the different command structures can become quite confusing.

At this point, let's imagine that you accessed a typical BBS. This will show what you can expect to see when you log on to one of your local systems. I have selected an Apple BBS to illustrate this section. The ABBS does not use the most sophisticated bulletin board software; however, the Apple system is typical of BBS software and its usage is easy to learn. More important, there are more Apple BBSs around the country than any other kind. Almost all use the same software. Even if you live in some remote or out-of-the-way corner of the world, you are likely to see the following format when you call an Apple BBS.

Any negative comments in the following sections are in no way intended as a putdown of any BBS or the author of the BBS software. Anyone who has written a BBS program is to be praised, not criticized. Inconsistencies will occur since BBS programs are in BASIC, and the SYSOPs often modify or customize the software to suit their needs. Comments about inconsistencies are made simply to alert the new user to areas where confusion might occur. User response is shown in italics.

Rather than just talk about bulletin boards, let's log on to "Apple Crate II" located in Seattle. This is one of the most active BBSs in the area. After dialing, you will get an immediate response from the BBS.

TYPE (C/R)

Even this simple instruction can confuse the newcomer. Most computers do not have a key labeled C/R. If you have never been on a BBS before, you might be inclined to interpret everything on the display literally and type the characters C slash R.

Actually, the BBS wants you to press the ENTER or RETURN key to send the system a carriage return (C/R), even though the modem is already receiving a carrier and knows that a computer is calling. The purpose may be to check the word length (number of bits) or the type of parity which is being transmitted. At this point, many BBSs simply send a welcome message without any action on the part of the caller.

The Apple BBS invokes the password system that was mentioned earlier. They call it a user account number.

ENTER USER ACCOUNT #

HIT (RETURN) IF NONE

Note that the system now calls the carriage return key by the Apple designation of RETURN. Since some Apple computers do not have upper/lowercase provision, the BBS determines if you have this capability.

CAN YOU RECEIVE LOWERCASE (Y/N) ?YES

One nice feature of some BBSs is word completion. If you enter a Y to the case question, the system sends the letters ES to complete the word before you can press any other key. Now that the BBS knows that you have upper/lowercase provision, it sends in this mode.

Do you wish to apply for an account #

(You have limited access without one)

(Y/N) ?YES

First name ?DON

Last name ?STONER

Where are you calling from

City,State) ?MERCER IS WA

Is this all correct (Y/N)? YES

There are a couple of interesting points in this particular

Bulletin Boards

exchange of information. First, the system will not let you enter the information in upper/lowercase. This is true of almost every BBS and is a software simplification to permit searching the message log. If I were to log on one time as STONER and another time as Stoner, the search might not "find" me. Actually, the search routine could convert all lowercase entries to uppercase. However, this would slow the search and add memory requirements to the program.

Many of the sophisticated BBS programs will search for messages and advise you if there is a message waiting for you. Usually the BBS will print the message number but some even print the message header (From, Subject, Date, etc.).

Another variation worth mentioning is that some BBSs will repeat the "who are you" information. In other words, after you enter the information, the BBS will send:

```
You are DON STONER
calling from MERCER IS WA.
Is this correct (Y/N) ?YES
```

This provides an absolute indication that the BBS received the information correctly. If you press the N key, the program will take you back to the beginning of the log on routine.

At this point, the BBS remembers that you would like an account number. For some reason, the system switches to uppercase only. It then branches off to print new user information rather than assigning an account number.

```
ENTER 3 LETTERS TO BECOME PART OF YOUR USER AC-
COUNT # ?XYZ
```

```
** NEW USER INFORMATION **
```

```
As a new user we suggest you enter the
'H' command (for HELP), then select 'ALL'
for a full review of system services.
```

```
We require a validated User ACCOUNT #
for your security and to allow fast
access to the system. We will normally
validate within 24 to 48 hours.
```

```
At this time you may use all system
functions except message entry and kill.
```

```
Next time, validated or not, you may
sign on using your new account #.
```

```
If you applied for one it will be
assigned now.
```

After printing the user message, the system decides to

issue me a user account number. This was a pleasant surprise. Another ABBS wanted to know my phone number so the SYSOP could call me (to determine, I imagine, if I was a BBS crasher). Another simply informed me (after all the above interrogation) that there were no user account numbers available.

Your user account # is:
XYZABC Please make a note of it.
Hit any key

Finally, we reach the log on message, which has a personalized welcome. The BBS gives the log on time, the number of users who have been on the system, and the number that will be assigned to the next message.

Hello DON STONER from MERCER IS WA

Time in: 19:35:58

You are caller #: 29374

Welcome to APPLE II CRATE

Sponsored by: Michael and Cheryl Thyng

NEXT MSG # WILL BE: #105

Since the software knows I am a first-time user of the system, it automatically prints out a list of the system commands. It would be wise to have your printer turned on before this comes up.

SYSTEM FUNCTIONS

- A = Apple 40/80 column mode
- B = Bulletins
- C = Upper/lowercase change
- D = Duplex switch
- E = Enter message
- G = Goodbye
- H = Help
- K = Kill
- L = Line feed/no line feed
- N = Nulls
- Q = Quick scan messages
- R = Retrieve messages
- S = Scan messages
- T = Time and date
- V = Video mode
- X = Expert user mode
- ? = Prints this list
- AB = A.P.P.L.E. bulletins
- ES = Environment Specialties

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NM = New messages since last on

SI = System information

SYSTEM TIME: 13:29

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?H

For complete explanation of system

functions, enter: "ALL" for full list,

"CTRL" for Control Characters, or:

"A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI" for individual items

(C/R) to return to program

Since I am a new user, the BBS suggested earlier that I review the commands and the use of control characters. I followed that recommendation.

?ALL

Loading module ...

Description of the SYSTEM COMMANDS
and their usage.

CTRL E—This command retypes the
current line up to the present
location and allows you to continue
from that point.

CTRL H (BACKSPACE)—This command allows
you to backspace one character at a
time and prints a '/' followed by the
character you are backspacing over.

This is the same routine used for RUB-
OUT instead of TRUE DELETE (this is for
the benefit of printers—SEE HELP 'V')

CTRL K—This is an abort command. Use
of this command will abort the current
program module. Also used to advance to
the next message number.

CTRL S—Stop listing. Used to stop the
data on the screen so you may examine
it. Hitting any other key restarts the
listing.

CTRL U (FORWARD ARROW)—Starts you back
at the beginning of the current line
being typed. (I.E. start over).

Some simple terminal programs provide a very limited
number of control characters. This is particularly true for the
VIC-20 and the Commodore 64. Pressing the CONTROL and

an alpha key may or may not send a control character. It might be wise to see if your communication software provides a full set of control characters.

To save time on the BBS and to acquaint you with the command structure, the purpose of the alpha commands found on the Apple BBS is printed out below.

A: APPLE 40 COLUMN MODE. Normally you would be allowed 80 columns a line with a bell after the 75th character and all others that follow. You would be forced onto the next text line after the 79th character. With the 40 column mode on you will get a bell on the 35th and then the 38th and 39th character.

B: BULLETINS. This command will list out all current bulletins.

C: CASE CHANGE. This command is used to change the upper/lowercase state of your account record.

D: DUPLEX SWITCH. Using this command alternately changes from FULL to HALF duplex each time the command is used. It will also inform you of the current status of the duplex switch.

E: ENTER MESSAGE. Allows the entry of a message into the system, restricted to holders of a valid account #. After the message has been entered, use a '?' for help. You may restrict message retrieval to addressee or yourself by typing 'Y' for the lock feature. If you type 'Y', only you or the addressee may kill the message. Anything else will be an open message.

G: GOODBYE. Prints the sign off message and hangs up the phone. Please use this command to sign off the system.

H: HELP. You are in the help module.

K: KILL A MESSAGE. This is used to delete messages from the file. If the message was entered using the lock command then it may only be deleted by the sender or the addressee. Message # may be given after the 'K' or separately.

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L: LINE FEED ON/OFF. Default is on.

This command is for terminals that require an extra line feed character to advance to the next line.

N: NULLS. Set from 1 to 40. Default value is one. Each null adds approximately .30 milliseconds delay. This allows printer printheads to return to their starting position. This is inoperable unless used with the line feed option on.

Q: QUICK SCAN. An abbreviated SCAN. See 'S'.

R: RETRIEVE MESSAGES. Retrieves specified message from file. Message number may be input following the 'R' or separately.

A range of messages may be retrieved using the form 'R2,7'. Use a ',' between numbers to retrieve a range.

S: SCAN. Prints a list of all the current messages by number, to, from, subject, and file time. Starting number may follow the 'S' or be entered by itself.

T: TIME AND DATE. This command will give the current time and date.

V: VIDEO/STANDARD TERMINAL MODE. Use of the command 'V' will toggle between the above modes. In video mode a backspace acts as a true delete while in the standard terminal mode use of a backspace will print a '/' followed by the character(s) that are being deleted.

This is for printers. (See help-CTRL H).

X: EXPERT USER. Use of this command will delete some system prompts for users who are familiar with the system.

?: Prints the functions supported in the current mode of operation.

AB-A.P.P.L.E. BULLETINS. This command is used to list club meeting dates.

ES: ENVIRONMENTAL SPECIALTIES. This command defines the subjects we encourage you to call in and talk about.

NM: NEW MSGS. This command can be used to retrieve new messages since you were last on the system. It will advise you as

to the number of messages and retrieve them for you in forward sequential order.
SI: SYSTEM INFORMATION. This command will list information on this system's configuration and hours.
SYSTEM TIME: 01:38

To illustrate the various functions provided by the BBS, let's test the individual commands. Note that a number of the accesses and retrievals were spliced together to place them in alphabetical order. As a result, you may notice that the clock jumps around in a few places.

Function:
(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,
AB,ES,NM,SI) "?" Explains ?A
Now in Apple 40 Column Mode

Since the terminal program in use was set to print 40 character lines, there was no apparent difference in the print-out when switching to the "Apple 40 column mode."

Function:
(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,
AB,ES,NM,SI) "?" Explains ?B
BULLETINS UPDATED: 9/25/83
NOTICE:
WELCOME TO APPLE II CRATE.
THIS BULLETIN BOARD WILL ATTEMPT TO
SPECIALIZE IN
THE FOLLOWING SUBJECTS (IN NO PARTI-
CULAR ORDER.)
HELP IN HANDICAPPING (THOROUGHBREDS)
HELPING THE HANDICAPPED (PEOPLE)
ROBOTIC DISCUSSIONS - ADVICE
SYSTEM TIME: 00:57

Quite often the bulletin section will provide news of club meetings, upgrades to the system, and so on.

Like most systems, the "Apple Crate" has a provision for switching between upper and upper/lowercase.

Function:
(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,
AB,ES,NM,SI) "?" Explains ?C
NOW IN UPPERCASE ONLY MODE
SYSTEM TIME: 12:31

Bulletin Boards

FUNCTION:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?C

Now upper/lowercase mode

SYSTEM TIME: 12:39

During the following command exchange, the characters sent to the BBS were not echoed in the half-duplex mode. Just before the "Now in full duplex" line, the "D" key was pressed to toggle the mode.

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?D

Now in half duplex

SYSTEM TIME: 01:21

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?

Now in full duplex

SYSTEM TIME: 01.51

One of the most interesting features of a BBS is the ability to enter messages. I decided to send a message to the systems operator of Apple Crate II. The message entry process begins with the header. Besides the "who to" and public/private questions, some BBSs request information on the subject of the message.

Note that each line of text entered is numbered. The message is ended (on line 8) by entering a blank line. This simply means that one presses the ENTER or RETURN key rather than entering any characters.

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?E

This is message #: 126

Subject: ?NEW BOOK

To: ?SYSOP

Private Lock (Y/N) ?NO

You may enter up to 16 lines of no more
than 80 characters each

1?I AM WORKING ON A NEW BOOK FOR COMPUTE! PUBLICA
TIONS AND

2?WOULD LIKE TO USE YOUR BBS AS AN EXAMPLE OF A TYPICAL

3?SYSTEM THE NEWCOMER CAN ACCESS. WOULD APPRECIATE
YOUR

4?PERMISSION TO USE PRINTOUT TO ILLUSTRATE TEXT. WOULD
5?APPRECIATE A REPLY IN NEXT COUPLE OF DAYS. WILL CHECK
6?BACK THIS WEEKEND. BEST REGARDS,
7? DON STONER
8? (note—Press RETURN key to end message)

Upon completion of the message, you are presented with some cryptic choices. As before, the BBS is very helpful. Simply by selecting "?", a "help file" explains the commands.

(A,C,D,E,L,R,S,?) ??

A=Abort

C=Continue entry

D=Delete a line

E=Edit a line

L=List a line(s)

R=Restart message entry

S=Save message to disk

Let's change line 2 to demonstrate the editing function. The Apple system, like most other BBSs, requires that you re-type the line. Some systems permit word-replacement editing. As a reminder, the system reprints line 2, then lets you reenter the line or leave it unchanged.

(A,C,D,E,L,R,S,?) ?E

Edit which line: ?2

Line 2 currently reads:

WOULD LIKE TO USE YOUR BBS AS AN EXAMPLE OF A
TYPICAL

New line? (C/R) to leave the same

?WOULD LIKE TO SHOW YOUR BBS AS AN EXAMPLE OF A
TYPICAL

Line 2 currently reads:

WOULD LIKE TO SHOW YOUR BBS AS AN EXAMPLE OF A
TYPICAL

New line? (C/R) to leave the same

? (Press RETURN to indicate completion)

If you decided to append the message, the system allows you to continue with the C command. Entering this brings up the next line of the message. To illustrate the use of the continue command, add an additional line.

Function:

(A,C,D,E,L,R,S,?) ?C

8? MERCER IS WA

9? (again, a RETURN indicates completion)

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Finally, the system allows you to list all or part of the message in order to verify that it was entered correctly before being saved on the system disk drive.

(A,C,D,E,L,R,S,?) ?L

Start with which line #?1

1

I AM WORKING ON A NEW BOOK FOR COMPUTE! PUBLICA
TIONS AND

2

WOULD LIKE TO SHOW YOUR BBS AS AN EXAMPLE OF A
TYPICAL

3

SYSTEM THE NEWCOMER CAN ACCESS. WOULD APPRECIATE
YOUR

4

PERMISSION TO USE PRINTOUT TO ILLUSTRATE TEXT.
WOULD

5

APPRECIATE A REPLY IN NEXT COUPLE OF DAYS. WILL
CHECK

6

BACK THIS WEEKEND. BEST REGARDS,

7

DON STONER

8

MERCER IS WA

Once the wording and makeup of the message is satisfactory, it can be saved to the disk system of the BBS for others to retrieve.

(A,C,D,E,L,R,S,?) ?S

Saving Msg #: 126 to disk....

SYSTEM TIME: 100:10:18

The Apple Crate BBS permits the user to review message headers, without reading the entire message contents. The Q (or quick) function prints an abbreviated form of the message header while the S (scan) prints the entire header contents. Since they are quite similar, there is no need to retrieve headers with the S command.

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?Q

Starting Msg #: (1-104) ?100

Msg #: 100 Subject: FOR SALE

Date: 02:58:13 10/26/83
Msg #: 102 Subject: Help TUG meeting schedule
Date: 07:26:19 10/27/83
Msg #: 103 Subject: Reply to: TUG
Date: 19:05:09 10/30/83
Msg #: 104 Subject: PURCHASE?
Restricted
Date: 23:09:10 10/28/83
SYSTEM TIME: 02:07

The retrieve command (R) permits the system user to select a message by number. Since this is the case, one must review the headers to determine which message to retrieve. Some of the more powerful systems permit forward and reverse retrieval, selection of "marked" messages (when scanning headers, one presses a designated key to "mark" the message), and those which are addressed specifically to the user.

Function:
(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?
AB,ES,NM,SI) "?" Explains ?R
Msg # to retrieve: (1/104)?102
Msg #: 102
Subject: Help TUG meeting schedule
To: ALL
From: STEVEN Q. SMITH
Date: 07:26:19 10/27/83
Can anyone give me the meeting schedule
and location for the
Telecommunications Users Group (TUG)?
A name/phone number contact also would
help. Thanks.
Msg # to retrieve: (1/104) ?103
Msg #: 103
Subject: Reply to: TUG
To: WAYNE DON
From: STEVEN Q. SMITH
Date: 19:05:09 10/30/83
Thanks, Wayne. I will call them (him?).
(R)eply, (K)ill, (E)nd, (C/R) ?E
SYSTEM TIME: 10:55

To further explore the system, let's print out the two-letter command files. The NM (new message) command is particularly useful. The system remembers the current message number the last time the user checked in. The NM command

Bulletin Boards

prints all messages which have been entered since your previous access of the system.

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?AB

NEXT A.P.P.L.E. MEETING

7:30 PM, TUESDAY MARCH 15, 1983

PLACE: THE NEW A.P.P.L.E. OFFICES

(I THINKS IT'S EASY TO FIND, BUT)

SO ALLOW EXTRA TIME TO GET THERE.

SYSTEM TIME: 02:38

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?ES

ENVIRONMENT SPECIALTIES FOR THIS BBS

HELPING THE HANDICAPPED WITH COMPUTERS.

HELPING TO HANDICAP THOROUGHBREDS WITH

THE APPLE. ROBOTS AROUND THE HOME.

SYSTEM TIME: 08:00

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?NM

Note that since this was the first time on the BBS, all the messages contained in the system were new. For this reason, we find 104 new messages and the new message retrieval starts with number one.

Messages since last on: 104

Function:

Msg # 1 Restricted

Msg # 2 Restricted

Msg #: 3

Subject: VISTA OR HARD DISK

To: ALL

From: ED AVIS

Date: 13:04:33 08/31/83

TCS BBS(555-5847) SEEKS COUNSEL ON

MASS STORAGE DEVICES. WE NEED 5, 10 MEGS

TO WALL UP MILES OF CPS, MATHS/SCI

BULLETINS. KINDLY POST YOUR KNOWLEDGE ON

THIS MATTER. NOTE: TCS MEMBER MADE THE

COVER OF OMNI MAGAZINE THIS MONTH,

WE'RE ALL VERY PROUD!

(R)eply, (K)ill, (E)nd, (C/R) ?

Msg #: 4

Subject: MODEM INSTRUCTIONS

To: ALL

From: DALE LIKER

Date: 09:44:49 09/01/83

HELP!!!! I'M BORROWING A HAYES SMART
MODEM. IF ANYONE HAS ACCESS TO
INSTRUCTIONS(!) FOR ONE PLEASE DROP ME A
LINE THANKS A MILLION AND A HALF,

>>>>DALE LIKER<<<<

(R)eply, (K)ill, (E)nd, (C/R) ?E

SYSTEM TIME: 07:42

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "" Explains ?SI

SYSTEM INFORMATION

This system is an Apple II 48K, 2 drive,
D.C.Hayes Micromodem II, and a
California Computer System Clock. The
Bulletin Board is sponsored by Michael
and Cheryl Thyng Seattle. The system is
free of charge and is open for anyone to
use, however no messages may be entered
or killed until a valid account number
is used.

System operates 24 hours a day on the
weekend, 8pm to 8am wkdays.

Messages files will be repacked and 'NM'
command counter reset to zero at the
first of each month.

Messages addressed to 'ALL' and locked
may be read by all but only deleted by
the sender.

Account numbers not used within 60 days
will be deleted.

SYSTEM TIME: 03:20

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "" Explains ?R

Msg # to retrieve: (1/104) ?100

Msg #: 100

Subject: TUG MEETING

To: ALL

From: TOM BIRD

Date: 02:58:13 10/26/83

Can anyone furnish the schedule and
location for meetings of the

Bulletin Boards

Telecommunications Users Group (TUG)?
A name/phone number to contact would
also help. Thanks.
SYSTEM TIME: 101:18:06

Finally, let's log off the system with the G, or goodbye,
command. Some systems, such as those for the Radio Shack
TRS-80, use T for terminate. The T command on the Apple
system is used to print the current time.

Function:

(A,B,C,D,E,G,H,K,L,N,Q,R,S,T,V,X,?

AB,ES,NM,SI) "?" Explains ?G

DON logged out....

Time out: 19:32:03

Time on system: 00:18:17

> APPLE II CRATE HUNG UP <

NO CARRIER

To show you a somewhat different BBS system, let's log
on to the Seacomm-80 system, operated by Dick Keller. This
system uses a TRS-80 as the host computer. There is no need
to comment on the features and usage of the BBS, as in the
previous section. Most of the aspects are now self-explanatory.

WELCOME TO SEACOMM-80/RACS IX, A REMOTE ACCESS
COMPUTER SYSTEM

* SYSTEM NOW OPERATING ON PACIFIC STANDARD TIME—
ARE YOU?

WHAT IS YOUR LAST NAME OR PASSWORD --> STONER

WHAT IS YOUR FIRST NAME --> DON

CALLING FROM --> MERCER IS WA

YOU'RE DON STONER FROM MERCER IS WA, RIGHT? (Y/N)?

YES

SET TERMINAL SPECIFICATIONS:

ARE YOU:

TRS-80 MODEL I OR III (Y/N) YES

Have you ever called Seacomm-80/Racs IX before? (Y/N) YES

Please enter a password of your choice (up to 16 characters):

--> *DONABCD

Your password is:

*DONABCD

Remember that you MUST use a "*" before it!

Do not forget it, or you will be denied access to the BBS

11/09/80: * Seacomm-80 goes on-line *

05/24/83: * Seacomm-80 goes off-line with 32776 calls *

05/24/83: * Seacomm-80/Racs IX goes on-line for testing *

05/28/83: * Seacomm-80/Racs IX goes on-line full time *

Boards in use are:

GENERAL, Apple, Atari, Ham-80, IBM PC, Commodore, CP/M, TRS-80

Seacomm-80/Racs IX Main Menu:

- <L> Leave an electronic message
- <R> Retrieve electronic messages
- <S> Scan the messages
- <U> Access the userlog
- <F> Use system functions
- <D> Access the system data base
- <T> Terminate your call and log off
- <G> Fast log off
- <C> Chat with the Sysop
- <O> Set terminal output specifications
- <E> Check the elapsed time since you logged on
- <K> Kill messages
- <X> Take poll, or vote
- <V> Change menu sophistication level
- <H> Get detailed help

Tell me what to do, Don ----->D

Data base mode

Seacomm-80/Racs IX Data base access Menu:

Function:

- <1> Read text files
- <U> Upload a file to the system
- <9> System Information
- <V> Change menu sophistication level
- <A> Abort from data base access menu
- <H> Get detailed help
- <*> End call immediately

Tell me what to do, Don---->1

Text Mode

Menu Page 1

Programs

= = = = =

- 10> TRS-80 Model 100 Download Programs
- 20> Basic Programs (Reserved)
- 30> Hex Programs (Reserved)
- 40> Other System Phone List
- 50> Apple Download Programs
- 55> Atari Download Programs
- 65> IBM PC Download Programs
- 70> CP/M Download Programs
- 75> Commodore Download Programs
- 80> Informational Data
- 90> System Information Programs

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Data base menu: Enter 0 for list, 1-99 for menu,100-999 for file,
<ENTER> to end--> 40

Menu 40

Other System Phone List

=====

41> ABBS Systems

42> CBBS Systems

43> Forum-80 Systems

44> Misc. Systems

45> Pacific Northwest Systems

46> Comm/Mess-80 Systems

47> CP/M Systems

Data base menu: Enter 0 for list, 1-99 for menu,100-999 for file,
<ENTER> to end--> 45

These are the systems that are available
in the Pacific Northwest. (05/30/83)

The message system and other features of the BBS are well documented with the system help command (<H> Get detailed help). Rather than belabor the point, let's proceed to log off the system.

Tell me what to do, Don -->L

Log off mode

Would you like to leave a confidential message to the SYSOP? (Y/
N/A) NO

You logged on at 2:21 p.m.

The time now is 2:28 p.m.

You have been on the system 6 minutes, 24 seconds,.

Thank you very much for calling Seacomm-80/Racs IX.

Goodbye, Don

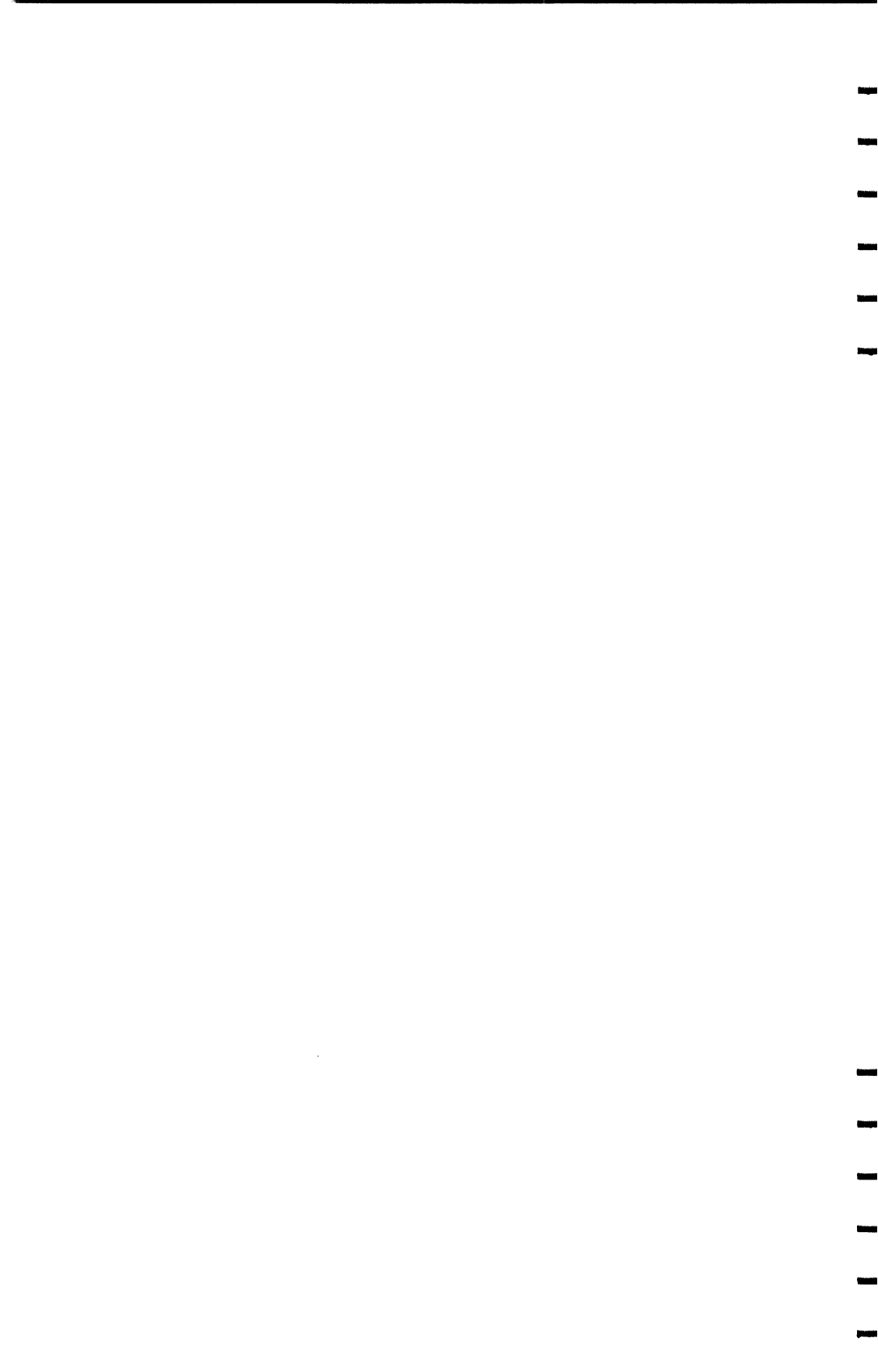
NO CARRIER

Originally a large list of bulletin board phone numbers were going to be included in this book. However, a number of people cautioned against this (see next chapter). As mentioned several times, BBSs come and go, and by the time this book is published, there is a good chance that a large percentage of the numbers would no longer be valid.

If you are interested in the phone numbers for other BBSs, your best bet is to call Seacomm-80, CompuServe or The Source as mentioned in Chapter 1.

The Seacomm-80 system, discussed above, is an example of one of the most elaborate single-user bulletin board systems. For a look at the world's most sophisticated multiuser bulletin board system, move on to Chapter 4 for a tour of the Special Interest Groups (SIGs) on CompuServe.

Exploring CompuServe



Exploring CompuServe

CompuServe Information Service (CIS) is an extensive information utility which you can access with your computer and a modem. An entire book could be written on the subject of using the service. As a matter of fact, CompuServe supplies numerous publications to assist the user, including manuals for remote programming in various languages. You can actually program its DEC computers in FORTRAN, Pascal, or a half dozen other languages, including BASIC.

The User Guide

CompuServe's most important publication is its User Guide, a highly recommended document for all serious users of the system. You do not need a guide to access CompuServe, but there is so much to see and do that a "roadmap" helps in getting to the source of the information with a minimum of access time. Remember, you are paying for the service by the hour (or fractions thereof). The longer you spend looking for something, the more it costs you.

If, like many people, you purchased a CompuServe membership at Radio Shack (part number 26-2224), you received a version of the User Guide in the documentation package. If you obtained a membership when you purchased a modem, you probably did not receive very extensive documentation. However, since many readers may not have a CompuServe membership or access to a User Guide, it may be helpful to explore the system in some detail.

Menu Structure

CompuServe is extremely easy to use, and the bulk of the available information can be accessed through menus. The display of selections is usually presented automatically or, in some cases, requested by you if necessary.

The information in CompuServe is arranged in a pyramid form. At the top of the pyramid is the master menu. Your selection leads to other menus, which lead to still more

Exploring CompuServe

menus, until you finally reach the desired information.

CompuServe uses a set of standardized commands consisting of single alpha characters. Some of the more useful commands are given below:

T (TOP menu page) takes you back to the top or master menu from almost anywhere in the system.

M (MENU) moves you back to the previous menu page. If the current menu does not provide the information you require, you can press M, return to the previous menu, then select another branch.

H (HELP) provides general instructions or, if followed by a keyword, more specific information.

S (SCROLL) allows the information to be continuously displayed (rather than being printed page by page, while waiting for user instructions to proceed).

F (FORWARD) takes you forward to the next page.

B (BACKWARD) takes you back one page.

The Keyword System

An alternative to the menu tree is a system called the *keyword search*. To reach information directly, enter the word (or words) that describe the material desired.

This system is baffling to many newcomers. For example, if the keyword *news* is entered, you will have to wade through every bit of information considered to be news. This may be a significant portion of the data base. Even if *aviation news* is entered, you will be presented with airline schedules, weather information, and the latest financial reports on Boeing.

Because the keyword system is widely used in commercial data bases, it will be explored in more detail in Chapter 6.

Looking Through CompuServe

It may be helpful, in discussing CompuServe, to think of it as an enormous series of caves and connecting tunnels. Each cave is filled with some specific kind of information. Menus provide a map of the tunnels and help you decide which cave you wish to visit.

CompuServe is extremely user friendly, and you can learn your way around the system simply by experimentation. Don't be afraid to explore new sections of the information utility. If you buy a membership package, CompuServe provides you

with a couple of free hours of access time to facilitate your experimentation.

But it will take more than two hours to become familiar with all that the system has to offer. After the free time expires, learning by experimentation can be expensive. In this chapter, you'll learn what you need to make your time on CompuServe as productive as possible. As anyone who has been exploring CompuServe for very long knows, there are lots of tricks for minimizing line charges.

For example, to save time reviewing menus, CompuServe has provided a crafty method of "teleportation." You can propel yourself from one cave to another without crawling through any tunnels (menus). This is accomplished with the single alpha command G (GO).

G is easy to use. CompuServe has identified each page of information, and you can go directly from one page to any other simply by typing G (or GO) *page ID*. For example, if you would like aviation weather, you would enter G AWX. No matter where you are in the system, this single command will transport you to the aviation weather data base.

Needless to say, there are an enormous number of page headings. If you are a CIS member, you receive a publication called *CompuServe Highlights*, which lists the major headings. You also receive a monthly publication called *Update*, which lists new headings that have been added to the system. If you are not a member of CompuServe, you can probably obtain sample copies from CompuServe, Customer Information Services, P.O. Box 20212, Columbus, OH 43220.

Accessing CompuServe

There are two ways to access CompuServe. When the system was introduced, access was through packet carriers (Telenet and Tymnet). However, unlike most of the other information utilities, CompuServe made the decision to develop its own proprietary network, rather than rely solely on the packet carriers.

Starting in a few of the larger cities, CompuServe rapidly added nodes (or I/O ports) in most of the major cities of the country. Today the CompuServe network has been expanded to over 200 cities. However, telecomputing enthusiasts living in the smaller towns must still use Tymnet or call long distance to one of the CompuServe nodes. Before you try to

Exploring CompuServe

access CompuServe, call or visit your local Radio Shack store. Ask the store manager to explain the proper method of logging on to CompuServe and what phone number is recommended.

You should also know that it costs an additional \$2.00 per hour to access CompuServe via Tymnet. When Tymnet uses its network to connect you with the computers in Ohio, it passes the charges on to CIS. CompuServe, in turn, bills you for the cost of using Tymnet. There may be times when it is less expensive to call long distance to reach a CompuServe node than it is to use a local Tymnet number.

Let's assume you are accessing CompuServe via a Tymnet node. What do you see and what do you do? The first step, of course, is to dial the local Tymnet number. Once they answer and you hear the tone, activate your modem. If everything is working correctly, your screen should read:

PLEASE TYPE YOUR TERMINAL IDENTIFIER-

Don't enter Apple II or Atari. Instead, press the A key. This character tells Tymnet that you are configured as a "dumb" terminal and require no special processing of your transmissions. You can obtain a list of other terminal identifiers by writing Tymnet, Inc., 2710 Orchard Parkway, San Jose, CA 95134.

The next thing you see on your screen is:

PLEASE LOG IN

If you are calling in during prime time (8 a.m. to 6 p.m.), enter CIS01. If your call is during the evening, use CIS02. At that point you will see the "User ID" prompt. This is the common entry point for CompuServe regardless of how you check in to the system.

If you had called CIS directly, nothing would happen on your screen. For that kind of access you must send CIS a CONTROL-C character. At this point, the screen responds with the same "User ID" prompt you see when checking in through Tymnet.

Going On-Line

The first step is to dial the CompuServe phone number, but nothing will appear until you send the CONTROL-C. CIS does echo the fact that it has received a CTRL-C. If your terminal provides an indication that a control character has been received, this fact should be evident from watching the screen.

Next, CompuServe requests that you enter your User I.D.

User ID:70371,111

This is the common entry point no matter whether you log on directly or through a packet network. Your User ID will probably be a 70000-series number, separated by a comma from a three- or four-digit suffix number. For example, my number is 70371,111. This number is not confidential. As a matter of fact, it will be displayed when you leave messages so that others know to whom to address the response.

Once you have entered your ID and pressed the RETURN key, you will see:

Password:

Never give your password to another person. You are totally responsible for the charges made by you or anyone using your account. If it is absolutely necessary to temporarily allow someone access with your password, be certain to change the password when the need ends.

Note that the system is switched to half-duplex during the period that you enter your password. In other words, the keys you press are not echoed to your screen. This is so that someone else cannot look at your display and see your password. As soon as you enter the password and press the RETURN key, the system switches back to full-duplex.

At that point any of several things may happen. First you will see a time and date line. Next, you will probably go directly to the top or master menu (page CIS-1). However, if you have electronic mail waiting, CompuServe will advise you of this and transport you to the electronic mail menu.

If CompuServe wants to advise you about new services or information, it adds a WHAT'S NEW screen. If you see something of interest, such as a phone number change in your area, you can retrieve the information by entering GO NEW at the prompt. You can see the progression from the following printout.

CompuServe Information Service

9:42 PST Saturday 19-Nov-83

WHAT'S NEW

- * Games Menus Receive Facelift
- * Multi-Player Game Surcharge
- * EBB Better Than Ever
- * AUTONET Compares 1984 Autos

Exploring CompuServe

- * Interest Rates Forum in Mr Fed
- * Edutech Adds Scientific Method
- * TVL Offers Gloves and Atlases
- * Have a Cigar from Savings-Scan

For details, see What's New

Enter: GO NEW at the prompt
on any page.

Key <ENTER> for next page!

Note that CompuServe uses the exclamation point (!) as a prompt. Whenever you see this, it means that they are waiting for you to enter a response such as a menu selection number or a "GO" instruction.

CompuServe Page CIS-1

CompuServe Information Service

- 1 Home Services
- 2 Business & Financial
- 3 Personal Computing
- 4 Services for Professionals
- 5 User Information
- 6 Index

Enter your selection number,
or H for more information.

!1

In the following section, you'll branch from the main menu selection to the second-level menus. This is done to give you an idea of the wide range of information which is available. Following this second-level menu, you'll return to the main menu and select the next item of the main menu. These menus are diagrammed in Figure 4-1. Note that the repetitive printing of the main menu is not shown.

Figure 4-1. Main Menus Found On CompuServe

CompuServe	Page CIS-1
CompuServe Information Service	
1 Home Services	(HOM-1)
2 Business & Financial	(FIN-1)
3 Personal Computing	(PCS-2)
4 Services for Professionals	(SFP-1)
5 User Information	(CIS-4)
6 Index	(IND-1)

CompuServe	Page HOM-1
HOME SERVICES	
1 News/Weather/Sports	(HOM-10)
2 Reference Library	(HOM-20)
3 Communications	(HOM-30)
4 Home Shopping/Banking	(HOM-40)
5 Discussion Forums	(HOM-50)
6 Games	(HOM-60)
7 Education	(HOM-70)
8 Home Management	(HOM-80)
9 Travel	(HOM-90)
10 Entertainment	(HOM-100)

CompuServe	Page PCS-1
PERSONAL COMPUTING SERVICES	
1 News	(PCS-10)
2 Reference	(PCS-20)
3 Communications	(PCS-30)
4 Shop at Home	(PCS-40)
5 Groups and Clubs	(PCS-50)
6 Programmer's Area	(PCS-60)

CompuServe	Page CIS-4
USER INFORMATION	
1 What's New	(NEW-1)
2 Command Summary/Usage Tips	(CIS-58)
3 FEEDBACK to CompuServe	(CIS-8)
4 Order Products, Guides, etc.	(CIS-54)
5 Change Terminal Settings	(CIS-9)
6 Change Your Password	(CIS-175)
7 Billing: Your Charges, Rates Options, Making Changes	(CIS-55)
8 Logon Instructions & Numbers	(CIS-37)
9 Electronic Bounce Back	(EBB-1)

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CompuServe	Page FIN-1
BUSINESS AND FINANCIAL SERVICES	
1 News & Financial Analysis	(FIN-10)
2 Investments & Quotations	(FIN-20)
3 Communications	(FIN-30)
4 Brokerage & Banking	(FIN-40)
5 Reference Library	(FIN-50)
6 Discussion Forums	(FIN-60)
7 Travel Services	(FIN-70)
8 Personal Finance	(FIN-80)

CompuServe	Page SFP-1
SERVICES FOR PROFESSIONALS	
1 Agribusiness	(SFP-10)
2 Aviation	(SFP-20)
3 Engineering/Technical	(SFP-30)
4 Environmental	(SFP-40)
5 Legal	(SFP-50)
6 Medical	(SFP-60)
7 Jewelers	(SFP-70)

CompuServe	Page IND-1
INFORMATION SERVICE INDEX	
1 To Search Index	(IND-99)
2 Complete Index List	(IND-4)

The first selection is number 1, "Home Services," which CIS has given page number HOM-1.

CompuServe	Page HOM-1
HOME SERVICES	
1 News/Weather/Sports	
2 Reference Library	
3 Communications	
4 Home Shopping/Banking	
5 Discussion Forums	
6 Games	
7 Education	
8 Home Management	
9 Travel	
10 Entertainment	

As you can see, there are ten more branches from this menu. You can explore these if you see selections which are potentially interesting. Communications will take you to the electronic mail service. It also leads to a number of bulletin boards, oriented toward specific groups (for instance, ham radio operators).

Last menu page. Key digit
or M for previous menu.
!M

Note that the M command takes you back to the previous menu. This would be the main menu (page CIS-1). It is not shown, to shorten the listing.

The Business and Financial Services (page FIN-1) is self-explanatory, as are those which follow. This is one of the features that makes the system so easy to use.

Page FIN-1 leads to an enormous amount of information of interest to investors, bankers, and others involved with the stock market. You can obtain stock quotations (delayed) with selection 2.

!2

CompuServe Page FIN-1
BUSINESS AND FINANCIAL SERVICES
1 News & Financial Analysis
2 Investments & Quotations
3 Communications
4 Brokerage & Banking
5 Reference Library
6 Discussion Forums
7 Travel Services
8 Personal Finance
Last menu page. Key digit
or M for previous menu.
!M

One of CompuServe's most popular features is the "Personal Computing Services" menu, designated page PCS-1. It leads to the various Special Interest Groups (SIGs). These were listed in Chapter 1.

You can also branch to the "Programmer's Area." This allows you to go deep into the CompuServe computers and command them without using menus. We'll spend some time in the programmer's area later on.

!3

Exploring CompuServe

CompuServe Page PCS-1
PERSONAL COMPUTING SERVICES
1 News
2 Reference
3 Communications
4 Shop at Home
5 Groups and Clubs
6 Programmer's Area
Last menu page. Key digit
or M for previous menu.
!M

The next main menu selection is "Services for Professionals." As you can see, it offers a number of features that appeal to professional people.

!4

CompuServe Page SFP-1
SERVICES FOR PROFESSIONALS
1 Agribusiness
2 Aviation
3 Engineering/Technical
4 Environmental
5 Legal
6 Medical
7 Jewelers
Last menu page. Key digit
or M for previous menu.
!M

One of the most useful menus is CIS-4, "User Information Selection" (number 5 on the main menu). Here you can obtain assistance with commands, structures, etc. You can send messages to CompuServe personnel with FEEDBACK, or order manuals, software, and so on, with selection 4 of page CIS-4.

!5

CompuServe Page CIS-4
USER INFORMATION
1 What's New
2 Command Summary & Usage Tips
3 FEEDBACK to CompuServe
4 Order Products, Guides, etc.
5 Change Terminal Settings
6 Change Your Password

7 Billing: Your Charges, Rates
Options, Making Changes
8 Log on Instructions & Numbers
9 Electronic Bounce Back
Last menu page. Key digit or
M for previous menu.

As I mentioned above, you may have occasion to change your password. You can do this by selecting 6 from this menu. If you have any questions regarding your account, selection 7 gives you billing information. If you need phone numbers for other areas, they can be found under selection 8. Finally, Electronic Bounce Back lets you request information on products that are advertised in the CompuServe publication *On Line Today*.

If you have a printer connected to your system, you should select number 2 and print out the entire file of command summary and usage tips.

!2

CompuServe Page CIS-58
COMMAND SUMMARY AND USAGE TIPS
1 Explanation of Menus and "GO"
2 Navigational Menu Commands
3 Control Characters
4 Communication Standards
Last menu page. Key digit or
M for previous menu.
!1

CompuServe Page CIS-59
WHAT IS A MENU:

The menu approach to information selection and display is quite simple. Most features of this service are available through page-numbered menus. You will notice that an exclamation point (!) is displayed prior to the user entry. The exclamation point (!) is the symbol used within. Key S or <ENTER> to continue
!SCROLL

Exploring CompuServe

Note that the word SCROLL was entered, rather than simply pressing the RETURN key, which causes the remainder of the file to display without stopping at each page.

CompuServe Page CIS-65
the menus to prompt you for input. When
you see an ! and the cursor stops, you
are expected to type in a selection or a
command followed by <ENTER> at some
prompts. Please read the prompt before
responding. (Remainder edited out.)
Last menu page. Key digit or
M for previous menu.

Look at the final selection on the top, or main, menu. You
will recall that the use of the keyword SEARCH was discussed
earlier; to illustrate its significance, use it to call the numbers
of all pages having to do with "NEWS." Every heading with
the word "news" will be displayed. The complete output
would fill several pages in this book and was interrupted
before completion by sending a CTRL-P. However, the partial
output below will give you an idea of how it is done.

!M

!6

CompuServe Page IND-1
INFORMATION SERVICE INDEX

1 To Search Index
2 Complete Index List
Last menu page. Key digit or
M for previous menu.
!1

CompuServe Page IND-99
The Index program allows
you to search for topic areas
available in the Information
Service based on keywords.
Please enter keyword.
: NEWS

AAMSI Communications AAM
 Newsletters

Altertext	
Newsletters	ALT
Automotive news	
Popular Science Maga	PSC
Business news	
Canadian	BIW
Cinema news	HHL
Commodore	
Newsletters	CBM
Commodore newsletter	CBM
Corporate news release	TBW
Key: <i>GO page#</i>	

If you typed *GO CBM* at this point, for instance, you would be teleported directly to the Commodore newsletter. Similarly, even though you were located some distance from the main menu, the top command (T) instantly moved you to CIS-1.

!T

```
CompuServe          Page CIS-1
COMPUSERVE INFORMATION SERVICE
1 Home Services
2 Business & Financial
3 Personal Computing
4 Services for Professionals
5 User Information
6 Index
Enter your selection number,
or H for more information.
```

Let's move on to the most popular section of CompuServe, the Special Interest Groups (SIGs). I've selected the Atari SIG to demonstrate how these bulletin boards are used. The structure of virtually every SIG is identical. Once you learn to navigate one of them, the procedure is the same for all the others. One or two may charge a membership fee (such as MNET-80, for TRS-80 users), but most are free access.

You could reach the Atari SIG by menu selection, but it is much easier to type:

!GO PCS132

Note that CompuServe will accept *G PCS132* or *PCS-132*.

Exploring CompuServe

CompuServe Page PCS-132

Request Recorded,
One Moment, Please
Thank You for Waiting
Your Name: *DON STONER*
Do you wish to be added to
the member list at this time? Y

These questions are only asked the first time you log on to a new SIG. Once the system has recorded your name and PPN (personal number), it will recognize you as a member the next time you log on.

Inserting name and ID;
please standby...
One Moment, Please
Thank You for Waiting
Welcome to SIG*ATARI,V. 2C(7)
Name: Don Stoner 70371,111
Last on: 17-Nov-83 19:50:28
You are user number 72598
System contains messages
29270 to 29746

The header tells which SIG has been reached, gives the version number of the SIG software and identifies you by your PPN (the 70000 number). The system remembers the last time you were on and gives the current time. The high message number is the most recent message which existed the last time you logged on to the system. Since this is the first time on the system, the high message number is actually the lowest number presently stored in the SIG.

When you first log into a SIG, the software assumes that the user is totally unfamiliar with its operation. Therefore, you are presented with the inevitable menu:

- 1 (L) Leave a message
- 2 (R) Read messages
- 3 (RN) Read new messages
- 5 (B) Read bulletins
- 6 (C) On-line conference
- 9 (OP) Change your SIG options
- 0 (E) Exit from the SIG

Notice that the exclamation point is no longer used for a prompt. It is now a colon (:).

The use of menus, particularly when using the SIG, can

cost you a fortune in line charges. Thus, before spending much time in the SIG, you should switch to expert user mode. Do this by selecting (OP).

Enter selection or H for help: *OP*

User Options menu:

- 1 Change to command mode
 - 2 (LL) Change line length
 - 3 (T) Return to function menu
 - 0 (P) Make options permanent
- Enter selection or H for help: *H*

The ever-present help command lists what the options are. The listing offers the following choices:

- T - return to Function level
- ST - stop between messages (*)
- NS - don't stop between messages
- LL - change line length (64)
- BR - set brief mode, which suppresses
repetitious display of options
- NB - clear brief mode (*)
- CN - change name
- DS - set default login Section (0)
- P - make options permanent
- MEN - use menus instead of command prompts

Items in parentheses are the default values. For example, the asterisk in the ST line means that the program will list a single message, then stop until the user makes an input. The 64 in parentheses indicates the line length is set to 64 columns.

Make the changes necessary to save line time or better format your display. Your first step is to select command mode (#1). This will eliminate the repetitive printing of menus.

Enter selection or H for help: *1*

- | | |
|---------------------|----------------------|
| User option: LL | (Sets line length) |
| New line length: 40 | (40 for Atari) |
| User option: BR | (sets to brief mode) |
| User option: P | (makes permanent) |
| User option: T | (returns to SIG) |

Now the prompts are short, sweet, and to the point. Since you're not sure what functions are available, turn on your printer and enter a question mark.

Exploring CompuServe

Function:?

Functions:

B	- Bulletins	CO	- Conference
D	- Delete	E	- Exit
G x	- Go pg. x	I	- Instructions
L	- Leave msg.	M	- Prev. menu
NEW	- New chngs.	OFF	- Log off
OP	- User opt.	QS	- Quick Scan
R	- Retrieve	R x	- Run SIG x
RT	- Read Thread	S	- Scan hdrs.
SD	- Scan&Dsp.	SEN	- Send msg
SN	- Sec. Names	SS	- Set Sect.
T	- Go DISPLA	U	- User log
UST	- Cur. users	V	- Interests
X	- Data base	XA	- X ACCESS
? x	- Explanation of function x		

Message Retrieval

The retrieval of messages is one of the most popular aspects of accessing a SIG. As you will see shortly, messages don't simply consist of "Hi Charlie, how are you?" They can present news of interest to computer hobbyists, provide assistance with computers and peripherals, or describe product features.

How do you retrieve messages? Once again, ask for help.

Note: There must be a space between the question mark and the command for which help is requested.

Function: ? R

The R function has several forms.

Most forms are for Retrieving messages.

If you enter just R, you will be asked

for a specific kind of retrieval,

such as Forward (by increasing message number) or Reverse (by decreasing message number). In

addition, you may specify a

starting message number by giving the Function as R #. Other forms

of the R Function are:

RF - read forward; you will be asked for starting message #

RF # - read forward from message #

RI - read an individual message

- RI # - read message #
- RM - read marked messages
Messages are marked when you enter the SIG if they are addressed to you, or by using the Scan Mark Function (see S Function).
- RN - read new messages. This Function will retrieve messages starting from the highest message you read the last time you were on the SIG.
- RR - read reverse; you will be asked for a starting message #
- RR #- read reverse; starting with message #
- RS - read Selective; you will be asked which field to Select from, To, From, or Subject. You will be asked for a search string. You may enter this function as R;S;All to select the Subject field containing the word "All."
- RS #- read Selective starting with message #

When a message has been retrieved, you will be given a set of options. The options allow you to Continue to the next message, return to the Top Function prompt, Reply to the message, and if the message is addressed to you, to Delete it.

To skip message text and go to the options prompt, enter a control-P. Note that the SYSOP may not have enabled non-members for retrieval of messages.

The remaining form of the R Function is actually a request to exit from the SIG and transfer to another SIG. It is entered as follows:

R(xxxxxx)

where xxxx is the name of the SIG to which you wish to go.

Exploring CompuServe

Start looking at the newest messages with a reverse retrieval. Here are a few which are typical of those providing useful information.

Function: *RR*

System contains messages

29270 to 29746

Starting message number: 29746

#: 29746 Sec. 0 - the WORLD of ATARI

Sb: Congress and modems

19-Nov-83 08:50:21

Fm: Frank Smith 09222,222

To: All

The House has gone home, but before it did, it passed the bill which prohibits telephone companies from charging extra for the use of their lines to carry data. The Senate has a similar bill (which doesn't have this same provision, although it may not be hard to see), and we are told that the legislation is the number one priority when they come back in January. We can begin to relax, but just a little bit.
(C RE T):

Notice that you can either continue (C) the retrieval, reply (RE) to the message or delete (D) it. You are permitted to delete only messages that you have originated yourself (or those which are directed to you). No one else can delete the messages you enter or those sent to you. Simply pressing the RETURN key, without an alpha character, does exactly the same thing as the C (continue) command.

#: 29745 Sec. 4 - ASK THE SYSOP

Sb: EPSON MISCELLANEOUS

19-Nov-83 08:47:40

Fm: Joe Murphy 09333,345

To: SYSOP

Since the printhead on the EPSON MX80 is replaceable, how can I tell when that time has arrived? Also, what is the difference between the GRAFTRAX and

GRAFTRAX+ especially as regards
ATARIWRITER? THKS.

(C R E T):

#: 29721 Sec. 0 - the WORLD of ATARI

Sb: #29710-#TRAK DRIVE

18-Nov-83 21:29:06

Fm: Robert Brown 04263.432

To: KEN JONES 07924,123 (X)

Ken, I think the Rana is one good
drive. I wanted some features on the
Trak that are not on the Rana. See my
message 29718 for initial comments.
By the way, the features are 4K RAM
for the "Turbo-Dos" as well as
hardware as well as software switchable
density. Regards, Bob

* Reply:

29743

(C R E T): T

The selective retrieval of messages can save you a lot of time and be very useful. Let's say you are thinking of getting a new modem. You could do a selective retrieval by a search field of "SUBJ". This means you are interested in a particular subject. For the search string, you would enter "modem," and all messages with the word "modem" in the subject line would appear on the screen. The search string could be any word representing the information you need (i.e. disk, downloading, and so on).

To demonstrate the selective retrieval process, I decided to retrieve messages which had previously been sent to me. On a previous access, I had asked the SYSOP (system operator) if a list of Atari bulletin boards was available in the data base. The search field was "TO" and the search string was "STONER". By the way, you can use either upper or lowercase (or a mix of the two) and the system will still find the string you are looking for.

Function: RS

Search field: TO

Search string: STONER

System contains messages

29270 to 29746

Starting message number: 29270

Exploring CompuServe

Since the system searches from the oldest message to the most recent, the lowest number (29270) was entered.

#: 29275 Sec. 4 - ASK THE SYSOP

Sb: #NEW BOOK

13-Nov-83 11:55:15

Fm: SYSOP*Greg Thomas 07524,962

To: Don Stoner 70371,111 (X)

Sorry to butt in for Mike, Don --

there's a list in XA2 called LIST.BBS

that has a pretty comprehensive listing

of Atari BBSs. No guarantees are made, though,

and it would probably be smart to check

the numbers out before publishing them.

A lot of BBSs lead short lives.

SYSOP*Greg Thomas

* Reply:

29358

(C RE T) (D=delete):

A second message put a new slant on the reproduction of bulletin board phone numbers in this book.

#: 29387 Sec. 2 - TELECOMMUNICATING

Sb: #29381 - #NEW BOOK

14-Nov-83 14:35:07

Fm: SYSOP*Ron Love 06263,245

To: Don Stoner 70371,111 (X)

Don—As a person that is still

getting calls to a BBS that was shut

down over 1 year ago, I urge you NOT to

publish such a list in any book.

BBSs come and go, and most such

lists cause more problems than they are

worth. Of the 300+ ATARI BBSs now

running, I would feel secure in listing

the numbers of less than a dozen. These

are backed or funded by the larger user

groups. If I may suggest an

alternative, just publish a few of

these numbers, and describe how to get

to SIG*ATARI here on CIS. Tell your

readers that current listings of active

BBSs can be obtained from these

sources. We try to post an updated list

(usually obtained from a BBS) at least every 60 days.

Ron Love

Ron's message probably prevented a certain amount of confusion caused by publishing phone numbers which were disconnected or no longer used for a bulletin board. A reply message thanking him was in order. This was accomplished with the RE (reply) command.

The entry of messages on CompuServe SIGs is quite similar to the procedure for free-access bulletin boards discussed in the previous chapter. Each line is numbered, and the message is terminated by entering a blank line.

* Reply:

29430

(C RE T) (D=delete): RE

1:

Hi Ron.... Actually you did it for me! I am including

2:

your message in the book (along with this reply) to

3:

help demonstrate the SIG. Many thanks for the suggestion

4:

which I intend to follow. Best regards, Don Stoner

5:

Note that a blank line terminates the message entry.

Once the message is entered, what do you do with it? The customary help command will describe the procedure.

Leave option: ?

A - abort	C - continue
D - delete	E - edit
I - insert	L - list
P - preview	R - replace
S# - Store to Sec #	

Valid Section #s:

0 - the WORLD of ATARI
1 - "THE" GAME MACHINE
2 - TELECOMMUNICATING
3 - BASIC stuff
4 - ASK THE SYSOP
5 - Beyond BASIC...
6 - SIG*SOAPBOX
8 - Privileged Access

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10 - TALK with the TRADE

?x - explain x

The list and preview commands are similar. The former presents the message with line numbers just as you entered it. The preview command shows how the message will be formatted for the user line length. You can see the difference by comparing the message entry and the preview listing.

Leave option: P

Hi Ron.... Actually you did it for me!
I am including your message in the book
(along with this reply) to help
demonstrate the SIG. Many thanks for
the suggestion which I intend to
follow. Best regards, Don Stoner

The system also lets you continue the message in case it is necessary to add something. To demonstrate this, a P.S. was added to the message for Ron Love.

Leave option: C

5:

P.S. I'd like to have numbers for a couple of the more

6:

stable Atari BBSs. Thanks again dls

7:

The message-editing scheme is somewhat more sophisticated than those found on public bulletin boards. You can replace the line with the R command or do a string replacement edit with the E command. To show this, a word was changed in line 5.

Leave option: E

Line # to edit: 5

Line 5 reads:

P.S. I'd like to have numbers for a couple of the more

String to replace: *couple*

Replacement string: *few*

P.S. I'd like to have numbers for a few of the more

Okay? y

Note that "n" or "no" would restart the edit.

Having completed the message satisfactorily, it was stored for retrieval by Ron Love. The next time he checks in, a line

reading "You have a message waiting" will appear on his screen. The system confirms that the message is stored, and confirms the sender, the recipient, and the message number of any replies. Note the "X" in brackets. This informs anyone looking at the header that a message has been retrieved by the recipient.

Leave option: SO

Message # 29747 Stored

#: 29387 Sec. 2 - TELECOMMUNICATING

Sb: #29381-#NEW BOOK

14-Nov-83 14:35:07

Fm: SYSOP*Ron Love 06263,245

To: Don Stoner 70371,111 (X)

* Replies:

29430, 29747

(C R E T) (D=delete):

T would return to the function prompt.

One of the most exciting aspects of the various SIGs is the free software that they provide. Sometimes this comes from the computer company that the SIG supports. More often, it is provided by members as a service to other members. It's all public domain and free to anyone who takes the time to access it.

To enter the software data base, one types XA, or XA followed by a number, following the function prompt. There may be as many as 12 sections in the data base. One section might contain games, another utilities, while a third could contain telecommunications software.

To provide a brief look at a couple of the software programs, let's access the XA 0 data base. To see what help is available, a question mark was entered as suggested.

Function: XA

Data base for which Section

0 1 2 3 4 5 6 8 10

SIG*ATARI Data base Access

Use ? for help

XA 0: ?

Valid commands:

PUB - retrieve from Public ACCESS

NOR - normal SIG access

XA - Change to new data base

S - Scan

BRO - browse thru files

Exploring CompuServe

R - read a file
DOW - download a file
UPL - upload a file
SUB - submit a file
KEY - search keyword list
ERA - erase a file
EXI - exit from ACCESS
UST - list users in SIG
SEN - send message to user
SET - set menu & brief on/off
HEL - explains ACCESS
OFF - logs you off
? xxx - explain command xxx

The last line indicates that you can also get help on a specific command by entering the question mark followed by the command. For example, ? BRO would explain the browse command.

Two particularly valuable commands are not given in the chart. One is CAT, which provides a catalog of the software in the data base. Since it is seldom possible to determine the purpose of the software from the filename, the second command (DES) will provide a brief description of the software.

Note that the description tells who submitted the program (the PPN in square brackets), the name of the file, the date submitted, and how many times the file has been accessed (92 in the printout below).

The description is considered to be a series of keywords. For example, if you had typed "CAT/KEY:DISK", any program with the word "disk" in the keyword description would list on your screen.

XA 0: CAT/DES

[05241,012]

FENTER.ATR 27-Oct-83 845

92

Keywords: DISK ENTER

THIS IS A SHORT FILE TO SHOW YOU
HOW TO ENTER A PROGRAM IN MEMORY
WITHOUT HITTING ANY KEYS

[02346,129]

DSKED1.CRE 18-Oct-83 11950

36

Keywords: ATARI DISK EDITOR SECTOR
UTILITY BASIC

A disk sector editor for DOS 2, 810
floppy drive. It allows direct
modification of the disk directory,
and VTOC. Also can directly modify
files on the disk.

Enter CTRL-P to terminate the listing.

It is necessary to digress a little and again talk about control characters. When you request a catalog of software, it can take several minutes for a complete listing. Often the new-comer "panics" as the listing rolls on and on while the line charges continue to accumulate. But stopping the listing, with a return to command level, is painless if you know how. To accomplish this, one simply types CTRL-P. This stops the listing and, after a short wait, the XA 0: prompt will appear.

Another situation can occur if you want to temporarily stop the listing to write down a filename for later inspection or listing. You can do this with CTRL-S. The action is almost instantaneous. When you are ready to proceed, type CTRL-Q and the listing will resume.

If you want to download software to your computer and then save it to cassette or disk, you will require a smart terminal program (discussed in Chapter 7). However, you can still download programs, even if you have a dumb terminal program, if you have a printer connected to your computer. Turn on the printer before you list the program, and you'll end up with a printed copy of the listing. You will have to type the program into your computer, which can be a lot of work, but the price is certainly right.

Don't use the DOW(nload) command unless you are using a compatible smart terminal program (such as the Compu-Serve *Vidtex* series). Instead, you should use the TYP(e) command.

XA 0: TYP FENTER.ATR

```
100 REM *****
110 REM*          ENTER FILE FROM DISK
120 REM*
130 REM*          BY JOHN SLAN
```

Exploring CompuServe

```
140 REM*
150 REM*
160 REM*
170 REM *****
180 REM FILE$ IS PROGRAM TO ENTER
190 DIM FILE$ (20)
200 FILE$="D1:TEST.LST"
210 GOSUB 1000:REM MAKING TEST FILE
220 PRING CHR$(125)
230 POSITION 2,5
240 PRINT "NEW":? :?
250 PRINT "ENTER";CHR$(34);FILE$:? :?
260 PRINT "POKE 842,12"
270 POSITION 2,0
280 POKE 842,13:STOP
290 REM
300 REM END
310 REM
1000 REM
1010 REM TEST FILE
1020 REM
1030 OPEN #1,8,0FILE$
1040 PRINT #1;"10 REM "
1050 PRINT #1;"20 REM TEST FILE"
1060 PRINT #1;"30 REM IN LIST FORM"
1070 PRINT #1;"40 REM "
1080 CLOSE #1
1090 RETURN
```

XA 0: EXI

To return to the SIG, use the EXI(t) command.

Command Level

Now that you've completed your guided tour of the SIG, you're ready to go into the very heart of the CompuServe system: the command level. You could enter T to return to the main menu (CIS-1), but there is an easier way. By typing GO PCS-71, you will be taken directly to command level. Try it and see what happens. The EXI(t) entered earlier takes you back to the SIG from the XA software data base.

```
Returning to SIG*ATARI
Welcome back to SIG*ATARI
Function: GO PCS-71
Exiting at 19-Nov-83 10:11:56
```

Last message on system: 29747
High message retrieved: 29746
Thank you for visiting SIG*ATARI

Note that a message was left on the system while you were experimenting with the XA data base.

CompuServe Page PCS-71
OK

This is the third prompt used in the programmer's area: the letters "OK." It means "Okay, I'm ready for a command."

As a CompuServe member, you are given 120 kilobytes of storage space on the system's hard disks. You can use this space to store messages and programs or to practice programming in any one of about ten different languages.

To get a feel for the programmer's area, type the letters DIR (for directory). Since you have nothing stored, as yet, the following message will be returned:

DIR
? DIRNDF - No directory for DSK:[70731,111]
OK

Start by entering text, which you'll later use to send a message. This is done with the FILGE program. The letters stand for "file generator." Type the letters FILGE TEST. That tells CompuServe that you want to invoke the FILGE program. TEST becomes the filename. After you see the following message, anything you type will go into the file until you close it. When the file is closed, it will be stored automatically.

Don't enter lines which contain more than 80 characters before pressing the RETURN key. If you try to enter a line which is too long, the system will simply abandon the extra characters.

FILGE TEST
New file TEST created - ready

Hi Ron:

I'm sending you this message to demonstrate how the FILGE and electronic mail programs work. No need to reply.

Best regards,

Don Stoner

/EX

OK

Exploring CompuServe

The FILGE program uses commands which are preceded by a slant bar. As you can see from the end of the above message, to exit from FILGE, one uses the /EX command. The system then returns the "OK" prompt.

There is an extensive list of commands that can follow the slant bar. Those commands allow you to edit material, rearrange it, list it, and so on. Very likely, the FILGE program is different from any word processor that you may have used before. If you plan on using FILGE extensively, you should order the CompuServe manual covering this word processing system.

Once again, type DIR. Now you find that it contains a directory listing called TEST. The listing also shows the length of the file (1920 bytes) and the date the file was created. Finally, you are advised that the protection level (ability of others to access the file) is (4).

```
DIR
TEST          1920      22-Nov-83 (4)
Total chars   1920 in   1 filesOK
```

CompuServe creates files in blocks. Even though you entered only a few characters, you have consumed 1920 bytes of storage space. Even if the message was twice as long, the listing would still be 1920 bytes.

You can read the data in your files using the command TYP FILENAME. Since the filename was TEST, you would enter:

```
TYP TEST
```

Hi Ron:

I'm sending you this message to demonstrate how the FILGE and electronic mail programs work. No need to reply.

Best regards,

Don Stoner

OK

How else do you use FILGE? Let's say you wanted to upload a file from your computer to CompuServe. You would do it in exactly the same way. In other words, you would open a FILGE file, just as you did earlier. However, rather than keying in the text manually, you would activate your smart terminal program, load the file to be transmitted, and proceed.

Here's an uploading tip. When you send files to CompuServe, the echoed characters may appear as garbage on your screen. The system doesn't seem to be able to send the echo characters (see Chapter 1) at the full speed of 30 per second. However, when you check the stored file, you will probably find that the characters were received correctly.

Most of the software you saw in the Atari SIG was uploaded to CompuServe using the FILGE program. Once it is saved in the user's file space, it is transferred to the SIG.

When you have completed the uploading, enter the /EX command, just as before, to end the entry and save the file. To see the file saved in your workspace, type TYP TEST (or whatever filename you assigned, as indicated by the directory). You will see the file listed on your screen exactly as it is saved on the CompuServe disks. If you want to kill the file, type DELETE TEST.

If you ever get locked up in the programmer's area and cannot get back to the "OK" prompt, send a control "C" character. This acts like a panic button and will almost always return you to the prompt.

If you want to return to the main menu (CIS-1), type R DISPLA. To go directly to the Electronic mail program (and send the message to Ron), enter GO EMA-1 (the first page of the mail program).

GO EMA-1

CompuServe Page EMA-1

Electronic Mail Main Menu

1 Read mail

2 Compose and send mail

Last menu page. Key digit

or M for previous menu.

If you had been advised that electronic mail was waiting, you would select number 1. After reading the mail, the options are to save the message in your disk space, reply, or discard it.

Sending mail is a little more complicated. Select # 2 to see how it is done. Note in the list below that the reply message could be created in a temporary workspace, again using FILGE. The ICS editor could also be used. However, in this example you should use selection three, since the message was previously created in your disk space.

Exploring CompuServe

!2

CompuServe Page EMA-4

CREATE a new message in your
temporary workspace using:

- 1 FILGE editor
- 2 ICS editor
- 3 File from disk space

EDIT message in workspace using:

- 4 FILGE editor
- 5 ICS editor
- 6 SEND message from workspace
- 7 Information on FILGE
- 8 Information on ICS

Last menu page. Key digit
or M for previous menu.

!3

CompuServe Page EMA-7

Name the input file, ? for help,
or <ENTER> to quit

Having made this selection, you must tell the system the
name of the file. Recall that it was previously named TEST.

:TEST

Workspace loaded from

DSK:TEST.

Key <ENTER> to continue

!

CompuServe Page EMA-4

CREATE a new message in your
temporary workspace using:

- 1 FILGE editor
- 2 ICS editor
- 3 File from disk space

EDIT message in workspace using:

- 4 FILGE editor
- 5 ICS editor
- 6 SEND message from workspace
- 7 Information on FILGE
- 8 Information on ICS

Last menu page. Key digit
or M for previous menu.

!6

The system returns you to the main mail-transmission menu for a new selection. Since the message does not need to be edited, you can send it as is. Filing the message is simply a matter of answering a series of questions. Here's how it's done.

```
CompuServe          Page EMA-8
Key <ENTER> to leave; ? for help
Send to User ID
:06263,245
Subject (32 characters max)
:Test Message
Your name (32 characters max)
:Don Stoner
Is this correct?
(Y or N):Y
Message awaiting delivery.
Key <ENTER> to continue
```

The message is on its way. However, it will be about four hours before Ron Love is advised there is a message waiting for him.

If you press the RETURN key, the electronic mail menu will be repeated. But since you are done with it, proceed to a new section. Earlier you browsed the XA0 section of the Atari SIG data base. There were dozens of programs in eight other XA sections that you did not examine. These were a small fraction of the programs available on CompuServe.

Each SIG has its own XA data base, but in addition there is another section of CompuServe—the Public Access files—that holds hundreds of programs.

To reach the Public Access section, you must return to the programmer's area.

```
!GO PCS071
CompuServe          Page PCS-71
OK
```

You can use a new command, RUN (abbreviated R) to reach these files. Note that a new prompt (Access:) is used in this data base. The commands are similar to those used for searching the SIG's data base; for example, you could look for VIC-20 programs by using the keyword "VIC." The total listing goes on for more than ten minutes, but in this example the CTRL-P key was pressed to stop the listing at the end of the second entry. This returned the "Access:" prompt.

Exploring CompuServe

R ACCESS

Public File Access System

Use ? for help

Access: CAT/DES/KEY:VIC

[05126,124]

ALIEN.IMG

30-May-83

171

Keywords: VIC VIC20 VIC20 GAME

This is a game for the VIC-20

computer called 'ALIEN 2'. It is

NOT the ALIEN game by UMI but is a

BASIC game from Public Domain.

Submitted by SYSOP/Jim Dar.

[05126,124]

ANIMAL.SEQ

30-May-83 2135

62

Keywords: VIC VIC20 VIC20 GAME

This is a game for the VIC-20

computer. The player gives hints

CTRL-P

The procedure for listing a program is exactly the same as when using SIG. Use the TYP command unless you have a CompuServe *Vidtex* smart terminal program. Again, listing took a long time and was interrupted with CTRL-P.

Access: TYP ANIMAL.SEQ

0 POKE36879,27

5 printchr\$(147)::rem clr-home

10 print tab(7);() () "animal"

20 print:print:print"play 'guess the animal!':print

30 print"think of an animal and the computer will try to guess it."

60 print

70 dim a\$(200)

80 for i=0 to 3

90 read a\$(i)

100 next i

CTRL-P

For some reason, the system may occasionally lock up and not return the "Access:" prompt. After 45 seconds or so, the CTRL-C key should be pressed. This will end the program and display the "OK" prompt used in the programmer's area.

Exploring CompuServe

If you wanted to download more programs, you could type R ACCESS once more.

CTRL-C

OK

OFF

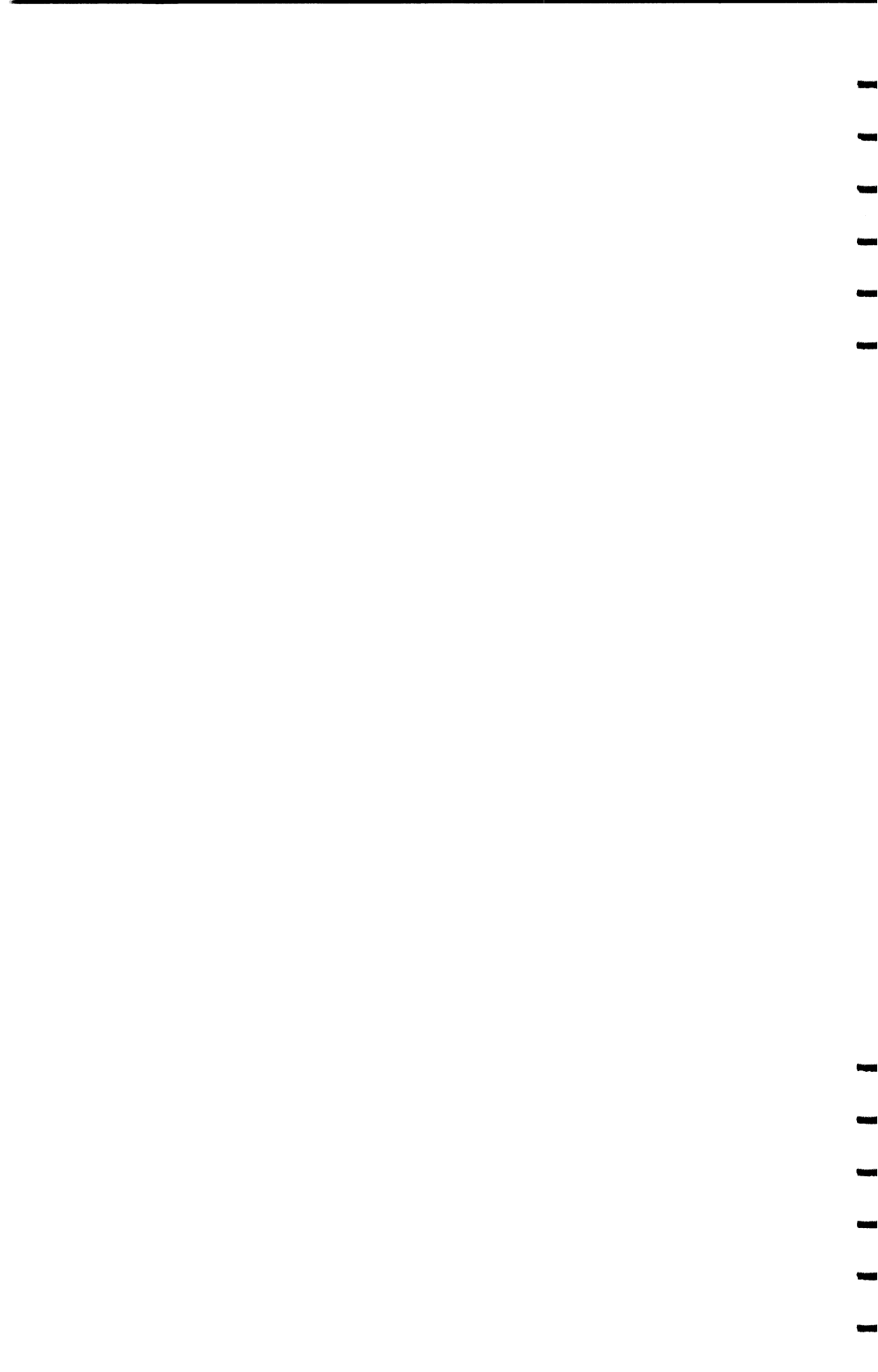
Off at 7:34 PST 22-Nov-83

Connect time = 0:13

NO CARRIER

To log off CompuServe, enter OFF or BYE. You should not disconnect your modem or switch from DATA to VOICE to end a session. If you do not make a legal log off, CompuServe will wait for you to resume sending data. After 15 minutes, the system will decide you are gone and disconnect. However, 15 minutes represents a quarter hour, and you will be charged \$2.00.

The Source



The Source

Imagine an enormous library, without a single book or periodical in sight, where the only way to find and read anything is with the help of a computer terminal. If you can picture this, you have an inkling of what it is like to access The Source. It is a giant collection of almost every conceivable type of information that anyone could possibly want to use.

There are more than 1300 different sections in The Source's data base, and you can obtain a broad description by requesting the current edition of *The Source Command Guide* from Source Telecomputing, Inc. The business office and computers are located in Virginia (Source Telecomputing Corp., 1616 Anderson Rd., McLean VA 22102); the company is owned by The Reader's Digest Association, Inc., of publishing fame.

The Source was one of the earliest data bases to cater to those with personal computers, going on-line in 1979. Most early computer buffs first heard about the new service as the result of an article in *Time* magazine. Today, The Source customer service can be reached at 800-336-3330, from 8 a.m. until 1 a.m. If you are calling from Virginia, the number to use is 800-570-2070 (from 8:30 a.m. until 5:30 p.m.). There is no charge for a call to these 800 numbers, and the operators are glad to answer your questions.

What does it cost? The Source is one of the most expensive of the popular information utilities. The regular subscription signup costs \$100. However, if you are a prudent shopper, you can obtain a membership for considerably less. For example, you can often get a membership with the purchase of a modem. Even if you already have a modem, it may be worthwhile to buy another one (and sell the modem itself to someone else) just to get the subscription to The Source. Note, too, that several terminal program packages include a Source membership in the price of the package.

In addition to the initial signup fee, there is a minimum monthly charge of \$10.00. Even if you don't go on-line for an extended period of time, you will be billed for the monthly

The Source

minimum. If you are a typical user, though, you'll spend an average of twice that amount each month.

Actual rates depend on the time of day that you call. During non-prime time (6:00 p.m. until 7:00 a.m. weekdays, plus weekends and holidays) The Source currently charges \$7.75 per hour for 300 baud service and \$10.75 for 1200 baud access. During prime time (7:00 a.m. until 6:00 p.m.) the charges increase to \$20.75 and \$25.75, respectively.

These charges are for the continental U.S. and do not include the value-added information service called "Source*Plus." This section of the data base includes information which has a higher value to some users, particularly those involved in finance. The charges for this service are approximately 50% higher. The non-prime charges for Alaska, Hawaii, and Canada are \$25.00, \$12.75, and \$10.50, respectively.

The \$10.00 monthly minimum charge includes 4096 bytes of storage space (2 records, of 2048 bytes each). One is reserved by The Source to store your ID number and other pertinent information; the other lets you store any special log on sequences. If you need a bigger storage cabinet, The Source charges for additional 2048 byte records. For one to ten records, the cost is 50 cents each; it drops to 20 cents each for 11-99 records. The cost continues to go down as the number of records goes up, and if you have really big storage needs you will be happy to know that 10,000 or more records go for 5 cents apiece. The Source's on-line storage space is significantly more expensive than the cost for storage on CompuServe.

Originally, The Source was totally keyword driven (that is, one accessed the information by entering a word command followed by the name of the program containing the desired information). However, newcomers found the system difficult to use. It was not easy to determine the expected keyword or the proper syntax. In an effort to make the system more user friendly, menus were added and the documentation was significantly upgraded.

The User's Manual you receive with a Source membership is extensive and informative. In fact, it is so extensive that the material must be contained in a three-ring binder. The manual is registered, and members receive periodic updates. Pages must be replaced or added by the owner to keep up-to-date

with the new services which are constantly added to The Source.

The updates often arrive 90 to 120 days after the service is added, since the documentation is included in the next available mailing. As a result, it is an excellent idea to download or print out the instructions for new services whenever they are announced on The Source. These additional pages can be added to the manual until the printed documentation arrives.

If you obtain one of the bargain memberships, you may have to purchase a copy of the User's Manual. However, you should still receive a subscription to *Sourceworld* a publication for users of The Source.

Even now, beginning users will find The Source somewhat perplexing to use. There is so much information available that it is virtually impossible to access it all by means of menus. In addition, The Source is tied into dozens of other data bases around the country. For example, if you want to shop at Comp-U-Store, your transmission is passed on to the computers in Ohio. The packets (see Chapter 1) carrying your communication to The Source are "gatewayed" to another packet network which then carries them to Connecticut. Even though the Comp-U-Store data is not held by The Source in Virginia, you operate just as though it was. The only indication that a transfer is being made is the request to "Please stand by..." Note, however, that each of these outside data bases has its own way of doing things, with individual prompts and formats. Since these data bases are already established and serve other customers besides The Source, they cannot change their format to match that of The Source.

If you plan to use The Source extensively, you should acquire the User's Manual mentioned above. Even with this weighty document, you are cautioned to carefully read the instructions as they appear on your screen. In particular, make a note of how you get out of the data base you are accessing. You will find that the words *top*, *exit*, and *previous* are used as escape words. Only a few menus have a selection for exiting.

Here's a helpful hint. The Source can direct you to various data bases with menus, but when you leave, you are always taken back to "Command Level." This is indicated by the caret sign (^) prompt. To get back to the main menu from command level, type the word MENU.

The Source

Here's another hint. If you are done looking at a data base, you generally exit by typing the word QUIT. Whenever The Source is looking for an input from you, it seems to recognize this word and interpret it to mean that you wish to go to command level.

However, there are some cases when this doesn't work. For example, if you are looking at a series of stories from United Press International, they run on and on without waiting for an input from you. The instruction manual says to send a CTRL-P to exit the news stories. Unfortunately, this does not always work. You may wind up turning off your modem and making an illegal exit from The Source.

Keep in mind that hitting the panic button will cost you money. Don't make it a general practice to pull the plug in order to sign off The Source. Their computers don't know that you have signed off until they receive no input from you for several minutes, and you will be charged for this waiting time.

By experimentation, several users have discovered an exciting technique which always seems to work. If a true break signal is sent, it will interrupt virtually any program on The Source and return one to command level. A true break signal means that the modem tones you send out are switched from a steady mark (a one) to a space (a zero) for roughly two-tenths of a second (see Chapter 2). When the PRIME computers at The Source see this condition, they know the user wants to exit from the current program or data base. This does not seem to be mentioned in The Source User's Manual.

Unfortunately, not all computer terminal programs have the ability to send such a break signal. However, if the software is in BASIC, it should not be difficult to select a key to represent "break." When the key is pressed, the program should branch to a FOR-NEXT timing delay loop which outputs a zero to the modem for a fifth of a second.

Logging On

As mentioned in Chapter 1, The Source uses the packet networks for national communication. To access The Source, you must call a local node for one of these networks. If you are logging on through Telenet, press the RETURN key twice, then once again for the terminal identifier. When you see the "at" sign (@), enter the address recommended by The Source.

A log on through Tymnet is similar. After dialing the local Tymnet number, you will see "Please type your terminal identifier." Respond with the letter A. When the "Please Log On:" prompt appears, type SOURCE12;PRIM and press the RETURN key. Note that the letters PRIM will not be echoed to your screen.

Either system should take you to the entry point for The Source. Here's a typical session, accessed through a local Telenet node. We'll assume that you have already been connected to Telenet. Press the RETURN key twice, and you should get the following display:

```
TELENET                (log on procedure, see Chapter 1)
TERMINAL=
@ C 30147              (SOURCE Telenet Address)
301 47 CONNECTED      (SOURCE response)
```

At that point, you are connected to The Source.

```
-> ID TCD142          (User ID)
Password?             (Enter your password)
```

Here's a hint regarding the log on process. You can type your ID and password all on one line (for example, ID TCD142 PASSWORD). However, if you do a single-line log on, the echo will not be turned off during password entry. In other words, everything you type in will be printed on your screen. If you are not accessing The Source in private, you should press the RETURN key after entering your user ID.

```
TCD142 (user 43) logged on
Sunday, 27 Nov 83 12:04:36.
Welcome, you are connected to
THE SOURCE
Last log on Saturuday, 26 Nov 83
23:22:28
```

Here's a security hint. The Source keeps a record of each time you enter the system and advises you the last time you were on, as shown. If this does not correspond to your recollection of your last access, it is possible that someone else is logging on your account. If this should occur, immediately use the program for changing your password. If you are certain you could not have logged on when The Source says you did, advise Customer Service and change your password.

You will then get the log on menu:

The Source

(C) COPYRIGHT SOURCE TELECOMPUTING
CORPORATION 1983.

WELCOME TO THE SOURCE
1 USING THE SOURCE
2 TODAY
3 BUSINESS UPDATE
4 THE SOURCE MAIN MENU
5 WHAT'S NEW
6 COMMAND LEVEL

The entry to The Source is via this initial display. The only time you see this menu is during log on. The selections provide rather broad information of general interest. For example, selection number 1 provides an overview of using The Source, with few specifics.

Selection 2 may be the most interesting submenu. It includes the astrological sign for the day, along with a "Today in History" listing of what happened this day in years past. You'll take a sidetrip to this menu in a moment.

"Business Update" (Selection 3) summarizes the day's business events, while "What's New" (Selection 5) describes new features which have been added to The Source.

Items 4 and 6 are of principal interest. New users will probably feel more comfortable with the menu selections and should choose number 4. This leads to the Main Menu for the system. As a matter of fact, the selection of any items found on the log on menu will eventually take the user to the Main Menu.

Look at the menu for the TODAY listing.

Enter item number or HELP 2

((updated every weekday at 7 a.m.))

***** WEEKEND *****

NOVEMBER 26-27, 1983

- 1 A WEEKEND TO REMEMBER, BECAUSE...
- 2 A GLIMPSE AT THE WEEKEND'S BEST TV SHOWS
- 3 How Healthy are Vitamin Supplements?
- 4 WRITE-AWAYS: Consumer Info on
Microwave Ovens
- 5 THE OPINION FORUM: "The Day After"—
NO ONE will Survive
- 6 Courtroom Drama Found on TV's "The
People's Court"

- 7 YOUR WEEKEND HOROSCOPE
- 8 PERSONALITY PROFILE: H-bomb Inventor
and Physicist

Although the instructions don't mention it, you can enter MENU, rather than a selection number of HELP. From most data bases in The Source system, this selection leads to the Main Menu mentioned above.

Enter item number or Help *MENU*

THE SOURCE MAIN MENU

- 1 NEWS AND REFERENCE RESOURCES
- 2 BUSINESS/FINANCIAL MARKETS
- 3 CATALOGUE SHOPPING
- 4 HOME AND LEISURE
- 5 EDUCATION AND CAREER
- 6 MAIL AND COMMUNICATIONS
- 7 CREATING AND COMPUTING
- 8 SOURCE*PLUS

Table 5-1 shows where each of these selections will lead you. From these secondary menus you can reach virtually every data base on The Source.

Table 5-1. THE SOURCE Main Menu

- 1 NEWS AND REFERENCE RESOURCES
- 2 BUSINESS/FINANCIAL MARKETS
- 3 CATALOGUE SHOPPING
- 4 HOME AND LEISURE
- 5 EDUCATION AND CAREER
- 6 MAIL AND COMMUNICATIONS
- 7 CREATING AND COMPUTING
- 8 SOURCE*PLUS

NEWS & REFERENCE RESOURCES

- 1 NEWS AND SPORTS
- 2 GOVERNMENT AND POLITICS
- 3 BYLINES NEWS FEATURES

BUSINESS/FINANCIAL MARKETS

- 1 FINANCIAL MARKETS
- 2 ANALYSIS
- 3 NEWS AND COMMENTARY
- 4 RESEARCH AND REFERENCE

CATALOG SHOPPING

- 1 BOOKS
- 2 RECORDS, TAPES, VIDEOTAPES
- 3 CLASSIFIED ADS
- 4 COMP-U-STORE

HOME AND LEISURE

- 1 GAMES
- 2 ADVICE AND BIORHYTHMS
- 3 TRAVEL & DINING
- 4 ENTERTAINMENT

EDUCATION & CAREERS

- 1 CAREER NETWORK

MAIL AND COMMUNICATIONS

- 1 MAIL
- 2 CHAT
- 3 POST
- 4 PARTICIPATE
- 5 MAILGRAM MESSAGES
- 6 ECOM MESSAGES

CREATING AND COMPUTING

- 1 MICROLINA
- 2 USER PUBLISHING
- 3 SOURCE MANUALS
- 4 TEXT EDITOR
- 5 FILE TRANSFER TO THE SOURCE
- 6 PROGRAMMING

SOURCE*PLUS

- 1 OVERVIEW
- 2 MEDIA GENERAL STOCK ANALYSIS
- 3 MODEL1 FINANCIAL MODELING
- 4 DATA MANAGEMENT (INFOX)

News Stories

One of the most popular offerings provided by The Source is the news from United Press International (UPI). When a major news story breaks, it's impressive to see what's happening in real time. You "see" these stories on The Source at the same time they are being delivered to newspapers, radio, and television stations.

Now, let's access one of these stories to show you how it's done. First, select 1 for "News and Reference Resources", then 1 again for "News and Sports" and finally 1 for "UPI News Service."

Enter item number or HELP 1

NEWS & REFERENCE RESOURCES

- 1 NEWS AND SPORTS
- 2 TRAVEL AND DINING
- 3 GOVERNMENT AND POLITICS
- 4 CONSUMER INFORMATION
- 5 BYLINES NEWS FEATURES

Enter item number or HELP 1

NEWS AND SPORTS

- 1 UPI NEWS SERVICE
- 2 THE EDITORIAL PAGE
- 3 UPI SPORTS

Enter item number or HELP 1

The news retrieval is based on the use of keywords. You can enter one or more words to provide a narrow search. The system uses the same type of logic as a BASIC program. In other words, in the following search, the keywords "crash" and "747" and "Madrid" could have been entered. If this had been done, all stories containing these three words would have been "flagged." You could then review them to see if the stories contained the information you desired. If *or* had been used instead of *and*, stories which have any one of these words would have appeared. In other words, *and* provides a narrowing search while *or* is very broad.

Keyword (press return for all stories): CRASH

Enter starting & ending date—or press

The Source

return for today:

Pick a starting story number—from 1

(the earliest) to 5 (the latest): 5

Read forward in time (RF), read

backward (RB), scan forward (SF) or

scan backward (SB)? *RB*

After the keywords are entered, the system asks for a date. If you press the RETURN key, only those stories (containing the keywords) of the current date will be displayed. You could enter "crash" and "747" with an earlier starting date and retrieve stories of previous accidents involving the 747.

In the selection above, you were advised that there were five new stories. The system then asks which number story you would like to access. Finally, you were allowed to read or scan the stories from oldest to newest or vice versa. When you try the same thing on-line (and do not want to get stuck), you may wish to select the newest story and read forward. This will insure that only one story is printed before a user prompt occurs.

Having made the selections just described, the system responds with:

upi 11-27-83 12:01 pes

5-27-83 07:51 aes

(complete-writethru-death toll rises;

black box found)

By LAWRENCE ROBERTS

MEJORADA DEL CAMPO, Spain (UPI) A

crippled Colombian jumbo jet with 194

people aboard crashed in flames Sunday

on approach to the Madrid airport, and

authorities feared 185 people died.

Avianca Flight 011 from Paris to

Madrid crashed shortly after 1 a.m.

(7 p.m. EST) about 5 miles north of the

Madrid airport into rolling hills covered

with brush and vegetable fields near

the town of Mejorada del Campo.

This rather long story was intentionally interrupted to shorten the example. This brought the inquiry:

WE ARE ON STORY 5

Type R,S,N,B or G and a Story Number:

There was no explanation of what these cryptic letters stand for. Fortunately, the HELP command helps you out:
HELP

Type: R to restart this story, or
S to stop this query, or
N n to go forward n stories, or
B n to go back n stories, or
G n to go to a particular story.
WE ARE ON STORY 5
Type R,S,N,B or G and a Story Number: S
Keywords (press return for all stories):
QUIT
->

Entering the word "QUIT" returns us to command level, as evidenced by the -> prompt. Entering the word "MENU" following the prompt displays the Main Menu.

THE SOURCE MAIN MENU
1 NEWS AND REFERENCE RESOURCES
2 BUSINESS/FINANCIAL MARKETS
3 CATALOGUE SHOPPING
4 HOME AND LEISURE
5 EDUCATION AND CAREER
6 MAIL AND COMMUNICATIONS
7 CREATING AND COMPUTING
8 SOURCE*PLUS

Business and Finance

To give you an idea of the wide scope of information available, let's look at some of the other submenus.

Enter item number or HELP 1

BUSINESS/FINANCIAL MARKETS
1 FINANCIAL MARKETS
2 ANALYSIS & COMPUTATION
3 NEWS AND COMMENTARY
4 PERSONAL FINANCE
5 RESEARCH AND REFERENCE

Those involved in business and financial matters will find considerable information of value in menu selection 2. This Business/Financial Markets menu includes closing prices for both the New York and American stock exchanges. The Ralux

service provides both a business outlook and a financial decision program. This can be extremely useful when making purchase decisions. The Commodity News Service provides information of interest to the financial community. For an extra charge, you can access Stockvue, a service of the Media General Financial organization. This data base covers more than 4,000 stocks, and the program can provide selection by rank and performance. The Source also has a program called "Unistox," from United Press International, which provides stock quotations, history, and other valuable information on listed companies.

One of the most useful features of The Source is the ability to create a financial log on file. By entering your portfolio of stocks into this file, your investment position will be updated each time you log on to the system. The method of creating this log on file is described in the User's Manual.

As you can see from the menu printed below, there are several other areas of interest to business. This section also includes a category for organizing personal finances.

Creating and Computing

One particularly interesting area is "Creating and Computing." This is its menu:

```
CREATING AND COMPUTING
1 MICROLINE
2 USER PUBLISHING
3 SOURCE MANUALS
4 TEXT EDITOR
5 FILE TRANSFER TO THE SOURCE
6 PROGRAMMING
```

"Creating and Computing" is unusual. Users are actually allowed to publish their material by storing it in The Source data base. Whenever anyone accesses the material, the author receives a credit to his or her Source account. If the material is interesting, and read by enough people, the author can actually use The Source for free or even receive income from Source Telecomputing.

The Microline menu (selection 1) takes you to a data base published by Digital Equipment Corporation (DEC). "User Publishing" is the section referred to above. In this data base, system users are allowed to submit "electronic manuscripts" for others to read. Note that manuals and additional instruc-

tion may be required to properly use this section. These printed publications are described in selections 3 and 4 of the Creating and Computing menu. A comprehensive description of uploading data to The Source is also provided by selection 5. The final selection provides an excellent guide to uploading data to The Source computers.

As mentioned in the first part of this chapter, there is an extra charge for accessing the Source*Plus section. This area of the data base provides useful information on analyzing the value of stocks and bonds, in addition to financial modeling and data management. Here is the Source*Plus menu:

SOURCE*PLUS

- 1 OVERVIEW
- 2 MEDIA GENERAL STOCK ANALYSIS
- 3 MODEL1 FINANCIAL MODELING
- 4 DATA MANAGEMENT (INFOX)

Home and Leisure (and the submenus it leads to) provides an interesting selection of information. You may wish to investigate these choices (see menu below) and decide which are of interest.

HOME AND LEISURE

- 1 GAMES
- 2 ADVICE AND BIORHYTHMS
- 3 TRAVEL & DINING
- 4 ENTERTAINMENT

Enter item number or HELP 4

ENTERTAINMENT

- 1 WEEKLY BESTSELLERS LIST
- 2 MOVIE REVIEWS
- 3 MUSIC NEWS
- 4 TV PREVIEWS
- 5 SOAP OPERA TUNE IN

The games are comparable to those available in the public domain, and getting addicted to them can run up a sizable bill for access time. Selection 3 leads to several areas of interest, particularly for those who live on the East Coast.

The Entertainment submenu (selection 4) is particularly popular. It will keep you informed concerning best-selling fiction and non-fiction books, for instance, and the movie reviews will tip you off to the best and worst of the current shows. Search the movie reviews much as you would search

The Source

news stories. The Music News section gives you the rundown on what's happening in the music business. If you or your spouse are into soap operas, selection 5 will deliver the highlights of all the popular programs. You can determine, in advance, the inevitable crises which occur on each program.

Selection 5, under the main menu, is "Education and Careers." It offers some interesting submenus; for instance, if you are upwardly mobile, look into the "Career Network." This is found under selection 5 of the Main Menu ("Education and Careers").

EDUCATION & CAREERS

1 ELEMENTARY EDUCATION

2 CAREER NETWORK

You can even prepare an attractive resume with the help of The Source. The system provides tips on resume writing, and once you are satisfied with wording, you can file it in The Source data base for others to review. The "Career Network" also provides editorials and tips on how to participate in interviews, in addition to employment opportunity listings.

Although the menus described above will give you an idea of the services available on The Source, it is by no means complete. In fact, if the output from all the preceding menu selections was printed, it would fill many books this size.

Shopping with The Source

Everyone loves a bargain, and The Source has a popular section which operates like a digital general store. For example, there is Tradenet, a section for bartering of goods and services. When you link up to Tradenet, you can place or view listings and read about the world of barter in the newcomers section. If your barter is successful, you pay a commission to Tradenet. The terms of the commission agreement are easily accessible from a menu selection.

Another popular section available to folks looking for a bargain is called Comp-U-Store. The Source describes the Comp-U-Store as a bargain shopping service. The access is item six in the "Catalog Shopping" menu.

Let's say you are interested in purchasing a video cassette recorder. You can check out the availability and prices on this

item via the Comp-U-Store menus. When you access this section, the first thing you see on your screen is:

Processing bargains...

BARGAINS MENU

- 1 Home & car stereo
- 2 TV & video equipment
- 3 Major appliances
- 4 Camera & optical equipt.
- 5 Fine china & flatware
- 6 Computer & electronics
- 7 Phones/answering machines
- 8 Time pieces/jewelry
- 9 Sporting equipment
- 10 Miscellaneous

Accessing the TV and Video Equipment section, for example, typically reveals a selection of several video cassette recorders and television receivers. If you look at a particular one, you'll get a complete description of the products featured, followed by the list price and the discounted Comp-U-Store price.

Other popular shopping sections sell books, records, tapes (audio and video), and radio recordings. You can also place classified ads.

Mail and Communications

One of the most exciting features of The Source is the Mail and Communications selection. Not only is there provision for electronic mail (both regular and express) but you can also access the Chat mode from this menu. The Chat mode allows you to interrupt other users to ask if they would like to chat, a feature that some users find quite annoying.

The Post section allows you to access the world's largest digital bulletin board. There are almost 100 different categories, with both wanted and for sale sections. A newcomer to The Source will invariably spend considerable time (and money) accessing this section.

The Participate section offers on-line conferences on all manner of subjects. You can retrieve the comments of dozens of others who have accessed the ongoing conference and contributed their thoughts; you can also jump in and add your voice to any discussion.

The Source

“Mailgram Messages” allow you to send Western Union “Mailgrams” via the U.S. Postal Service. Although you are charged for this service, it does provide a convenient way to send an electronic letter to someone. However, since the Post Office only guarantees two-day delivery, some of the advantages of electronic transmission are lost.

The Source has recently added a selection called ECOM to the Mail and Communications menu. Electronic Communications (ECOM) is a multiple-message mailing service from the U.S. Post Office. Normally the USPS requires that at least 200 messages be filed at the same time. The Source will accept messages in much smaller quantities, however, and then bundle them with the messages of others to meet the 200 quantity minimum.

However, an infinitely faster method of sending mail to another Source user is available from the Mail and Communications menu. To use it to send electronic mail to another member, first access selection number 1 from the Mail and Communications menu. This leads to the mail selection menu. To determine if you have mail waiting, use the “Mail Check” option. This is what your screen will show.

MAIL AND COMMUNICATIONS

- 1 MAIL
- 2 CHAT
- 3 POST
- 4 PARTICIPATE
- 5 MAILGRAM MESSAGES
- 6 ECOM MESSAGES

Enter item number or HELP 1

MAIL

- 1 OVERVIEW
- 2 INSTRUCTIONS
- 3 MAIL CHECK
- 4 MAIL SEND
- 5 MAIL READ
- 6 MAIL SCAN
- 7 MAIL DISPLAY

Enter item number or HELP 3

Your Mailbox is empty at this time.

If there had been mail in your box, the system might display something like this:

MAIL CALL (3 UNREAD, 1 UNREAD EXPRESS, 2 READ:5
TOTAL.)

These letters could then be read or scanned. The read selection will print out the entire letter, while scan simply prints the headers. A typical header might read as follows:

1. FROM:TCD142 POSTED WED 4-JAN-81 2:45 SYS10(5)
SUBJECT:NEW BOOK

If you elect to read a message, the header is sent first, followed by this prompt:

---more---

If you press the RETURN key, the system will display the letter described by the header. If you type NO, the system moves to the DISPOSITION prompt. Entering NEXT or NE moves on to the next message. A QUIT or Q will return you to the main menu while DEL or D serves to delete the message.

After the "disposition" question, you can initiate a reply by entering the word REPLY or simply the letter R. Another convenient command is to enter FORWARD or simply FO. This allows you to send the correspondence, along with your comments, to another member. As always, the QUIT (or Q) command takes you back to Command Level. The message can also be saved in your file space. The procedure for doing this is described in the User's Manual.

Sending mail to other Source members is extremely simple. You can access the mail routine from the Mail and Communications menu; you could also simply type the word MAIL at the Command Level prompt (*). The system will ask you if you want to send, read, or scan. If you enter the word SEND, a routing prompt (TO:) will be returned. In response, you simply enter The Source user number of the recipient. You can determine who is on the system by entering the word WHO at the command level.

If the identification is for a valid user, you are prompted to enter the message (TEXT:). At that point, simply type until all the text is entered. You need not worry about pressing the RETURN key after a specific number of characters.

To get out of the message entry program, you must use

The Source

so-called "dot commands," which are used by The Source's text processor. During the course of message entry, it is very unlikely that you would enter a word preceded by a period at the beginning of a line. If the system sees the dot (a period), it knows the following information (up to the point where the RETURN key is pressed) is a command instruction and not part of the text.

The dot command to send a message is easy to remember; it is simply .SEND. After a short wait, the system will respond with "message sent."

A typical example of electronic message transmission is given below. It takes less than 60 seconds to punch out and send this demonstration message.

To:ABC1237

Subject:GREETINGS

Enter text:

Hi Frank, just a short note to let you know

I am on THE SOURCE and to wish you a happy vacation in the Carribbean.

With best regards,

Don Stoner TCD142

.send

Wait...

Sent to - ABC123

[S]end, [R]ead, [SC]an, [D]isplay, or [Q]uit?Q

One feature of the message system can be either a blessing or a curse, depending on your point of view. With the "carbon copy" option, you can send the same message to as many as 200 other users of the system. This is great for keeping in touch with field salesmen. On the other hand, it also leads to junk electronic mail. Few want to read about the Great American Widget at \$7.75 per hour.

Chat

Newcomers, in particular, will enjoy the Chat feature of The Source. This feature allows a direct interconnection between system users. Using Chat, it is extremely easy to connect with another computer buff. First, you may wish to use the DICHECK feature (enter PUBLIC 132 DIRECT from Command Level). This will give you the User Directory and will show you who is currently on-line. Again, from Command Level, enter ^CHAT TCD142 HELLO WANT TO CHAT? This message, along with "TAA 111 USER 20," will appear on the

screen of the other person almost immediately after you press the RETURN key. If you receive such a message, and want to chat, press the BREAK key or type QUIT to return to the command level. Then type ^CHAT TAA 111 SURE WHAT'S UR NAME & WHERE LOCATED? or words to that effect. Don't forget, the message you type will not be sent until you press your RETURN key.

If you don't want to be disturbed while you are on The Source you can type REFUSE CHAT at Command level. If you don't ever want to chat, add the letters PERM to the above command. If you have refused a chat, the system will automatically send TCD142 IS BUSY. TRY AGAIN LATER.

The Post

The Post section of The Source is one of the most valuable and useful data bases. Let's make a quick trip to the Post section and see what is available on the public bulletin board. To read the contents of this interesting data base, select number 3 from Post menu. You can then enter a category like Apple, Real Estate, Software, and so on. To leave a notice on the system, you would select number 4 in the Post menu.

Table 5-2 provides a list of the various categories which are available in the Post section of The Source, and you can review the data base by selecting one of these categories. Entering a C will prompt you to enter the name of the category you wish to look at (you could also elect to enter a U). The next prompt would request the ID for a system user; entering one would list out all the advertisements and notices that have been posted by that particular member. Finally, if you entered the letter D you would be asked for a date (or range of dates) and would see all notices which were entered during that period.

The D selection was made in the example below. After a little help from the system (determining the correct syntax for entering the date) notices for November 27, 1983, were requested.

```
POST
1 OVERVIEW
2 INSTRUCTIONS
3 READ
4 POST
5 PURGE
6 SCAN
```

Table 5-2. POST Categories

ANTIQUES	KAYPRO
APARTMENTS	MERCHANDISE
APPLE	MUSIC
AUTOMOBILES	NOVATION
AVIATION	OFFICE—EQUIPMENT
BOOKS/PUBLICATIONS	OSBORNE
BULLETIN-BOARD	PARTI
BUSINESSES	PERSONAL
CADO	PHOTOGRAPHY
CHATTER	PLATO
CLUBS	POLITICS
COLLECTABLES	PROGRAMMING
COMMODORE	PUBLIC
CP/M	PUBLIC-FILES
CTSLATE	REAL-ESTATE
DEC	SERVICES
DOCUMENTATION	SOAP-OPERA
EDUCATION	SOFTWARE
EPSON	SOURCE
GAMES	SPORTS
GRIPES	TANDY
HAM-RADIO	TEENS
HARDWARE	TI
HAYES	TRANSEND
HEATH	TRAVEL
HELP-WANTED	VICTOR
HEWLETT-PACKARD	VIDEO
HOBBIES-AND-CRAFTS	VISICALC
IBM	XEROX
INVESTMENTS	ZENITH

Enter item number or HELP 3

[C]ategory, [U]ser ID, [D]ate. [K]eyword:D

Starting and ending date or [H]elp:H

Dates may be entered any of these ways:

Day Month Year 15 JAN 1982

Month Year JAN 1982

Day Month 15 JAN

Year 1982 (for 1st of year)

Month FEB (for 1st of month)

Day 16 (for curr. mo & yr)
Enter starting and ending dates like this:
16 JAN 1982, 18 MAR 1982
You must insert a comma or a space between
dates. Months must be entered as follows:
JAN FEB MAR APR MAY JUN

-More-N

Since you now know the format for entering the date,
additional instructions are not required. Entering the letter N
(as was done above) tells the system that no more output is
required.

Starting and ending date or [H]elp:
27 NOV 1983, 27 NOV 1983
Searching...
49 notices valid.

[N]arrow, [E]xpand or Return for all:N

Most users do not have the time to review 49 messages.
The Post program anticipates this and asks if you want to narrow
the search, which can be done by entering the letter N.
The Notice search can be done both by date and by another
selection (such as category). Enter the letter C to look at
notices for a specific category which were entered on the selected
date.

[C]ategory, [U]ser ID, [D]ate, [K]eyword:D

Categories, or [H]elp:APPLE

Searching...
7 notices valid.
[N]arrow, [E]xpand or Return for all:

Wait...

Category:APPLE
From:TCD912
Posted: 27 NOV 2:29 am
[N]ext, [P]ost, or Return for text-
"News & Views #13" mulls over PCjr,
hails king of chess programs & more.
In "Woz Conference," Apple co-founder
Steve Wozniak tells how Apple got started,

The Source

answers questions on the Ile, III and Lisa,
and provides glimpses of Apple's future.

To visit Apple City, just type:

- PUBLIC 113 DIRECT

-More-Y

Category:APPLE

Subject:WANTED! USED RANA ELITE I

From:LE4596

Posted:27 NOV 9:15 am

[N]ext, [PO]st, or Return for text-

I need an Elite I for Apple compatability.

If you can sell me yours for around \$100,

let me know. (New Elite I's selling for

around \$200).

Steve/LE4596

-End-QUIT

Quitting..

The description of "Apple City" sounded interesting, and it can be accessed by entering PUBLIC 113 as instructed. As you can see from the following, it is a bulletin board system which is laid out much like a city, with digital equivalents of the concert hall, library, and so on.

- PUBLIC 113

THE WORLD OF COMPUTING

1 TRADEWINDS CL3035

2 PUBLIC ACCESS SYSTEMS TCU583

3 APPLE CITY TCD912

4 IBM PC GAZETTE TCA257

5 S.A.U.G. MAGAZINE TCA265

6 PRODUCT REVIEWS TCY617

7 REAL TIMES MAGAZINE TCS091

Enter item number or HELP 3

One moment, please ...

* = = = = = *
* = = = = = *

APPLE CITY

* = = = = = *

(C) 1983 BY WALT MARCINKO (TCD912)
MAIN STREET

1 ... What's New—11/9/83
2 ... Eamon Adventures
3 ... Welcome To Apple City
AS ... APPLE SQUARE
PL ... PROGRAM LIBRARY
AG ... ART GALLERY
GS ... GENERAL STORE
Command: 3

WELCOME TO APPLE CITY

Greetings and salutations!

As chairman of the Apple City
Booster Club, it is my great pleasure
to welcome you to our town. You'll
find the natives extremely friendly
and willing to assist you at every turn.

Apple City has attractions to suit
most any taste. Here's a quick atlas
to help you find your way around:

MAIN STREET—where you are now.
From here you can visit any area of the
city, and also find out "What's New."

APPLE SQUARE—the center of town.
Here you can read the latest ramblings
of the mayor, articles of general
interest, software reviews and other
good stuff.

PROGRAM LIBRARY—A storehouse of
useful and entertaining programs, ready
for you to download. At \$0.00 per
program, the price is right!

ART GALLERY—A unique way to acquire
multicolor, hi-res pictures for display
on your screen.

One navigates around Apple City by
answering "Command:" prompts. Each
prompt is usually preceded by two
letters in parentheses designating your
current location. For example, "(MS)"
means you are on Main Street (the top-
most menu). "(AG)" denotes the Art
Gallery, and so on.

The Source

Obviously you've already learned that you can read a particular file by typing its corresponding number. In addition to menu numbers, there are several other commands available.

Enjoy Apple City, and tell your friends about it when you get home...

Following this introduction, you're presented with a directory for "Main Street."

----- MAIN STREET -----

1 ... What's New—11/9/83
2 ... Eamon Adventures
3 ... Welcome To Apple City
AS ... APPLE SQUARE
PL ... PROGRAM LIBRARY
AG ... ART GALLERY
GS ... GENERAL STORE

Command: GS
GENERAL STORE

1 ... Best of P.D. Applesoft
2 ... Best of P.D. Integer
3 ... The Music Disk
or: MS, AS, PL, AG, GS, Q, H, [RETURN]
Command: QUIT
Have a nice day...

Logging Off

To log off, use the following procedure:

-OFF

TCD142 (user 43) logged off Sunday, 27 Nov 83 13:04:28.
Time used: 01h 00m connect, 00m 57s CPU, 00m 20s I/O.
Wait...

Bye

301 47 DISCONNECTED 00 00

In this chapter, we have barely scratched the surface of The Source system. For every section mentioned here, there are many more that have not been discussed. You can learn more about these by reviewing the User's Manual and other Source publications.

Some Other Data Bases

Some Other Data Bases

CompuServe and The Source have received a tremendous amount of publicity. Whenever the subject of on-line telecommunications comes up, the services provided by CompuServe and The Source are invariably mentioned. However, there are literally hundreds of other data bases available to telecomputing enthusiasts. Some are incredibly expensive while others represent outstanding value for personal computer users.

Most such data bases are designed to appeal to the business community. However, the fact that they cater to business or professional users does not necessarily mean that the sign-up or access cost is higher. Rather, it simply means that the data base operators construct the system based on the assumption that the user understands the intricacies of a commercial data base. Many of the niceties of a user-friendly system such as CompuServe may well be abandoned in favor of access and search speed.

When specific information is desired from a commercial data base, a keyword search scheme may be used. For example, if you want to know the production of gold, you might enter the search string "gold;production". To the uninitiated, this would return hundreds of stories paid for by the minute of on-line time. The knowledgeable user would enter "gold; production; So. Africa; 1978" and so on, to narrow and focus the search field. Otherwise, you could burn up a lot of money retrieving unwanted information.

Anything more than a brief overview of such data bases is beyond the scope of this chapter. However, if you are interested in specific types of information, you may want to obtain a copy of *Directory of Online Information Resources*. It is published by Computer Bookbase, P.O. Box 1217, Cerritos, CA 90701.

Another valuable resource is *Data Bases for Business*, published by Chilton Book Co. It can be purchased from most bookstores in paperback or hardback.

Yet another useful guide is *The Directory of Online*

Some Other Data Bases

Databases, published by Cuadra Associates, 2001 Wilshire Blvd., Suite 305, Santa Monica, CA 90403. This directory is actually a subscription service which is updated quarterly.

The remainder of the chapter describes a number of useful data base services, listed in alphabetical order. Obviously, such a list cannot be complete; if you need a more complete listing, refer to one of the references mentioned above.

AgriData

My grandfather was a farmer in Michigan. Every spring he would borrow money to buy seed, then borrow more money when it was time to rent the combines and harvesters. If it was a good crop, he paid the money back in the fall. My grandfather was fortunate if he made 25 cents an hour for his labor.

Times have certainly changed. Now progressive farmers can use a computer to make money, and AgriData is one of the many tools that make the job easier. Previously called AgriStar, it is a national on-line information service.

This agricultural data base can be used by professional farmers, managers, extension specialists, and agribusiness executives. It provides 24-hour access to agricultural marketing, finance, weather, general business, and production information. The system also provides an electronic mail service called "StarGram" as well as various user exchange programs.

Several publications from California Farmer Publishing Company are carried on-line. Among them are *FarmFutures Magazine*, *AgriChemical Age* and *AgriChemical Briefing*.

AgriStar is not expensive considering the service it provides. The farming industry apparently agrees, as Agridata Resources, Inc. claims to have more than 10,000 signups as of December, 1983. The system has been vigorously promoted by Tandy, and subscriptions are sold in Radio Shack Computer Centers. Subscriptions are also sold by a number of retail stores.

The AgriStar Information Network package (Radio Shack part number 26-2227) costs \$199.95. This covers the signup, software, and first six months of service. After this period, the basic service fee depends on the particular services used. The connect time charges are \$25 per hour, and information charges vary depending on the material requested. High speed access (1200 baud) is available for an additional \$5.00 per hour.

Some Other Data Bases

For more information on the service, contact AgriData Resources at 205 W. Highland Avenue, Milwaukee, WI 53203. You can also call them at 800-558-9044 or (in Wisconsin) at 800-242-6001.

Billboard Information Network

If you are involved in show business, this data base will be of interest. The information is supplied by the company that publishes *Billboard* magazine. The business office is located at 1515 Broadway, New York, NY 10036 and can be reached by telephone at (212) 764-7300. The rates vary from 25 cents to \$5 per hour.

BRS and BRS After Dark

For some time, a service called Bibliographic Retrieval Services has been distributing bibliographic and source information to the business, scientific, and academic communities. The prime-time service is expensive (\$750 for an annual subscription) but useful. However, like many other commercial data bases, the system was virtually unused at night. BRS recognized this, as well as the fact that their data base contained considerable information of interest to owners of personal computers. Thus the system called BRS After Dark was born.

BRS After Dark has not advertized its service very extensively. However, it offers between 15 and 20 of its regular BRS data bases to After Dark users. The non-prime time rates are reasonable. There is a \$75.00 one-time signup fee, and the hourly rate for non-prime time varies from \$6.00 to \$20.00 per hour, depending on the data base being used. This service can be contacted at 1200 Route 7, Latham, NY 12110, or at 800-833-4707 (outside of New York). In New York, dial 800-553-5566.

Delphi

Delphi, a service which may soon offer competition to CompuServe and The Source, was started by Wes Kussmaul in 1980. He got the idea to optically scan the text of an encyclopedia (Cadillac Modern Encyclopedia) and put it on-line. He did this in 1981 by placing the entire text on a DEC VAX computer. The system was accessed by personal computers and quickly became known as the Kussmaul Encyclopedia.

However, it soon became obvious that the public desired more general information, and the concept of Delphi was

Some Other Data Bases

born. The encyclopedia is still there, but now it is just one of the many data bases which are available.

One of the best features of Delphi is its ease of use. Like CompuServe, it uses menus to help you find your way around. It also gives you a gateway to other data bases. For example, you can send mail to friends on The Source, or study the on-line information of Dialog, via Delphi. You can access the same Official Airline Guide (OAG) that is available on Dow Jones News/Retrieval without having to subscribe to that service separately.

Access to Delphi is via either Telenet or Tymnet. A life-time membership costs \$49.95. The access charge is \$6.00 per hour during the evening or \$16.00 per hour during prime time. Also, when Delphi gateways to other services like Dialog or AP news, there is a premium charge. Your membership includes 25K of disk storage; additional storage blocks can be purchased if needed. Unlike CompuServe, there is no electronic broom to periodically sweep out old files.

The system operator is General Videotex Corporation, 3 Blackstone Street, Cambridge, MA 01083. For additional information, you can call General Videotex at (617) 491-3393.

Dow Jones

Most newcomers (and even a few old timers) are surprised to learn that a data base even more extensive than CompuServe or The Source is operated by Dow Jones. Dow Jones is usually associated with the satellite delivered and locally published *Wall Street Journal*.

It may come as a further surprise to learn that Dow Jones has the largest subscriber base of any information utility. The company claims to have more than 90,000 members, with approximately 3,000 new signups each month. This is about the same as CompuServe and The Source combined and is remarkable, considering the specialized nature of the data base. While there is some content of a general nature, the majority of information stored in the Dow Jones computers is related to financial matters.

When the service was originated, each computer terminal was connected to Dow Jones via a dedicated telephone line. The data base was formatted for 80-column business terminals, on the assumption that most users would be businesses equipped with such terminals. Of course, this severely limited

the market and made the service quite expensive.

Dow Jones was not a significant supplier of information for personal computer owners until the Apple II skyrocketed in popularity. Thousands of Apples, equipped with the Hayes Micromodem, were sold for the singular purpose of accessing the Dow Jones data base, and today you can use virtually any terminal program to access Dow Jones. However, if you do not have an 80-column screen you will sometimes have to tolerate the skewed columns.

Dow Jones' large subscriber base is all the more remarkable when you consider the relatively high cost of accessing the service. Charges vary with the time of day and the type of data you are accessing. Like CompuServe and The Source, Dow Jones News/Retrieval has prime and non-prime-time rates. However, unlike CompuServe and The Source, prime and non-prime time for Dow Jones News/Retrieval is based strictly on the Eastern Time Zone. Note, too, that 6:01 p.m. is the magic moment. If you log on before this, the entire session is billed at prime-time rates. As with other services, weekends and holidays are not billed at prime-time rates.

Dow Jones offers three volume rates, and the initial cost is not bad. However, the ongoing expenses can be rather heavy. A number of options are available; you can find out about the current offerings by contacting Dow Jones & Company, Inc., P.O. Box 800, Princeton, NJ 08540. The phone number is 800-257-5114; within the state of New Jersey, call (609) 452-1511. Customer service lines are open from 8 a.m. to 12 p.m. EST weekdays, and 9 a.m. to 6 p.m. EST on Saturdays.

Do your homework before you log on to Dow Jones News/Retrieval. Know what information you want, where it is located, and how to access the information before it costs you money to find out. Not everything on Dow Jones News/Retrieval is expensive, however. Orientation information such as //INTRO and the HELP sections are free. Dow Jones turns off the clock when these sections are accessed.

Dow Jones makes it easy for you to sign up. The \$19.95 "Universal Sign-Up Package" from Radio Shack (part number 26-2224) includes a membership application that must be mailed to Dow Jones. However, you can call their 800 number to sign up and receive a password over the telephone (though you must still follow up by mailing in the form). The password can be easily changed on-line if you are concerned about

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the security of receiving your password in this manner. Each month, you will receive a detailed bill itemizing the charges you have incurred during the previous period.

What can you do on Dow Jones? The first thing which may come to mind, when thinking of a financial data base, is to check stock and bond quotations. Dow Jones has this (and a lot more) to help you decide when to sell and what to buy. Similarly, if you are considering the major acquisition of a specific stock for your portfolio, you can uncover a plethora of information about it, of both a current and historical nature. Dow Jones can't tell you what to do, but it can provide you with decision-making tools.

Dow Jones News/Retrieval has recently made some significant improvements to its system. For example, most screens (or pages) feature formatting which is suitably narrow for personal computers. The service has also added a number of new data bases beyond those which provided the original attraction for their service. In addition, you can obtain help at any time for the data base you are accessing. You simply append the word "HELP" (example: //DISCLO HELP), and a fairly extensive list of instructions is transmitted to you.

Available services. The following is a brief description of the major sections and services on Dow Jones News/Retrieval. Note that two slant bars precede each of the words or symbols given below. They have been deleted to avoid repetition.

CQ stands for current quotes. The section provides quotations on stocks and other financial instruments, but the quotations are delayed by fifteen minutes, as required by stock exchange regulations.

DEFINE may help you to understand some of the terms used in the Dow Jones system. The information is based on *Words on Wall Street*, written by Pessin and Ross and published in 1983. You can enter the word or words you don't understand, and the data base will provide the definition(s).

DJA provides historical averages and a daily summary of the four Dow Jones Market Averages.

DJNEWS is one of the most interesting sections of the data base, particularly if you don't happen to receive the *Wall Street Journal*. In addition to this publication, the section also provides news from *Barron's* and The Dow Jones News Service.

DSCLO lets you get financial and managerial information

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on a company. Disclosure II, provided by Disclosure, Inc. constitutes a data base on 8,700 public and 3,000 over-the-counter companies. Much of the information is a composite of data filed with the Securities and Exchange Commission (SEC). Since the OTC companies may not be on NASDAQ, the SYMBOL data base provides substitutes for use on the Disclosure II data base.

EARN lets you check a company's earnings. This data base provides a corporate earning estimator (that is, earnings forecasts) for 3,000 companies.

ENCYC is the on-line edition of the Academic American Encyclopedia. It is provided by Grolier, Inc. and is updated twice yearly. Useful as a research tool, it provides more than 28,000 articles.

FORBES lets you access the Forbes Directory. The information is compiled from the January 1984 Annual Report on American Industry. The data base provides a ranking of the top corporations and major U.S. industries by sales, profits, assets, and market value. It also ranks 46 major industries by profitability and growth.

FTS, or "Free Text Search," is not a text search for free, as you might think. Rather, it is a powerful method of searching Dow Jones News (/ /DJNEWSS) using keywords.

HQ provides historical quotations. In other words, you can check the performance of a stock for the previous 15 days, for the month, or for any given year.

INTRO can be accessed at no charge. If you are serious about utilizing Dow Jones News/Retrieval, you should review the material in this section with your printer turned on. The printout can provide an adjunct to your user guide.

KYODO is the Japan Economic Daily, produced by Japan's Kyodo News Service. It provides same-day coverage of business and economic news from Japan, via satellite.

This section is handled using a "front page" format (see NEWS below). It provides the day's top news stories, a section on the Tokyo financial markets, and a section on general economic and political news. The previous four issues are stored in the data base.

MEDGEN (Media General) provides price, volume, and fundamental data on more than 3,000 companies. This section uses the "ENTER QUERY" prompt.

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To obtain price and volume data, enter the company stock symbol, followed by a slash and the letter P (for example, IBM/P). To obtain fundamental data, use /F rather than /P.

MLYNCH gives you access to weekly research highlights compiled by Merrill Lynch's Securities Research Division. They cover material issued during the previous four weeks and show revisions in earnings estimates and changes in the QQQ investment ratings on stocks made during the previous week.

MMS accesses the Money Market Services section of the data base via a menu. You simply make a selection from the five choices provided. Sections 1 and 4 have multiple text pages, while section 2 is a table of median forecasts. Sections 3 and 5 show how the forecast varied, through the use of bar charts.

MOVIES may seem to be an odd category in a financial data base. However, movies are much like a business. If they are put together and managed properly within budget and provide a needed (or desired) product, they make money. Otherwise they do not. The information is provided by The Cineman Syndicate, which has developed an enormous data base. It is updated with new film information weekly.

NEWS is Dow Jones' continuously updated world news report. When entering this section, a "front page" is used which features the top five stories at any given moment. To retrieve a story, you simply enter the number which is associated with the story. You can also enter letters, such as N (for more headlines) or F (for foreign news headlines).

The stories are continuously updated from 7 a.m. to 1 a.m. EST daily. Since they are continuously updated, you may occasionally request a story and get a different one. This can occur when a new story is placed in the "pocket" you were trying to access.

OAG lets you check airline schedules using the Official Airline Guide (OAG). It contains flight schedules for 650 airlines worldwide, as well as fare information for all North American flights. The fares are updated daily and schedules are revised weekly. The commands allow you to move easily between the fares and schedules to make your travel plans.

SPORTS offers continuously updated sports reports and works much like the //NEWS section discussed above. The only difference is that the information is updated more often during periods of intense sports activity.

STORE is the on-line shopping service Comp-U-Store. If you are not a full member (the system will ask you), you can still select the browse option. If you want to become a full member, you can select the third option on the menu. If you have problems or questions which are not answered by the system, the welcome screen provides an 800 number to call for assistance.

SYMBOL provides a directory of all the symbols used for accessing financial information. The directory contains more than 15,000 securities symbols, news retrieval categories, Media General Industry codes, and recent symbol changes. The Main Menu for this section contains 10 selections, which are more or less self explanatory.

WSW is principally a transcript data base called Wall Street Week. The format is somewhat different from the other sections, with the RETURN or ENTER key used to advance to the next page.

WTHR is a weather summary that is also handled using a front page format. It provides forecasts and a high/low listing, as well as forecasts. There is also a monthly travel planner which, hopefully, will allow you to avoid bad weather.

General Electric Information Services

General Electric operates an extensive data base. The majority of its content is supplied by so-called "information providers." GE supplies the computers, system management, and the access network; the information is provided by others. Virtually all the information is commercially oriented.

For more information, call GE Information Services, 401 N. Washington St., Rockville, MD 20850, telephone (301) 340-4000. The cost for accessing the GE data base varies, depending on the type of information, terminal, and baud rates.

Investext

A new data base for investors has been announced by Business Research Corporation. It combines the resources of a group of almost 30 investment bankers to offer full text on-line investment reports. The service has information on several thousand companies in a large number of industrial groups, and the service is available on either an on-demand or subscription basis.

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For information, contact Business Research Corp., 1660 Soldier's Field Road, Boston, MA 02135, telephone (617) 787-2205.

MCI Mail

Most people think of MCI as nothing more than a provider of an alternative, low-cost long distance telephone service. This is not the case.

MCI has recently joined the digital era with an outstanding electronic mail service called MCI Mail. They guarantee four-hour, same-day delivery in major cities and guaranteed overnight delivery in 20,000 smaller towns and cities.

You have four delivery options. An "instant letter" is delivered by the U.S. Postal Service at MCI's option, while an MCI letter is usually delivered by mail the next day. A premium service, called an "overnight letter" is guaranteed to be hand delivered by noon of the following business day. If you absolutely must have written information delivered in the shortest possible time, MCI also offers guaranteed four-hour, same-day hand delivery.

Charges are based on the number of "ounces" of information you need to transmit. One ounce amounts to about 7,500 characters; after the first ounce, additional ounces are billed at a flat per-ounce rate, regardless of the option that you choose. MCI Mail has no minimums, no connect time charges, and no monthly or storage fees.

You can access MCI Mail via Dow Jones News/Retrieval. For information, enter the command MCIHELP. If you're not a member of Dow Jones, you can call MCI customer service toll free at 800-424-6677.

NewsNet

NewsNet provides a novel approach to the world of information. Basically, it supplies 2,000 news stories daily from more than 150 business newsletters, PR Newswire, and United Press International. A "NewsFlash" feature provides an electronic clipping service for subscribers. The system uses the keyword search to find information on virtually any subject in the data base.

NewsNet is moderately expensive compared to Compu-Serve or The Source. There is a \$15 monthly minimum, and the minimum usage fee is \$24 per hour during business

hours or \$18 per hour for non-prime time at 300 baud. A 1200 baud service is available at extra charge.

The corporate offices are located at 945 Haverford Rd., Bryn Mawr, PA 19010. For information, call NewsNet at 800-345-1301. If you live in Pennsylvania, call 215-527-8030.

The Shuttle Information Service

The data bases described so far all have one thing in common: each is oriented to a national audience. They offer an incredible variety and depth of information, but not one of them can tell you much about what is going on in your own home town. You can't ask CompuServe or The Source for a listing of this week's jazz entertainment in Atlanta, for instance, or for the current ferry schedule in Seattle.

Recognizing the need for locally owned, operated, and oriented data base systems, Michael L. Darland founded the Shuttle Corporation and launched the Shuttle Information Service in 1983.

The Shuttle is a remarkably flexible and inexpensive videotex system that serves subscribers who live within a local telephone call of each installation. The company sells its turn-key systems to operators in hundreds of communities across the country, and then links them together by satellite transmissions, thus creating a national network of locally-based systems. The local operators are responsible for putting information and services from their area onto the Shuttle data base and for soliciting subscribers from their community. The Shuttle Corporation sends national news, weather wire services, securities trading, educational programs, even a pets and animals segment.

Additional information is supplied to the Shuttles by wire services such as Associated Press, United Press International, and the National Oceanographic and Atmospheric Administration (NOAA). Their wires connect directly to Shuttle's system, which sorts the stories into categories accessed by the menus.

Subscribers to the system are able to call their local Shuttle system and tap into any other Shuttle around the country. For instance, a subscriber in Atlanta could find out about shows and restaurants in Seattle—and even make reservations electronically.

Shuttle can be accessed by personal computers equipped

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with a 300-baud modem. In fact, you don't even need a computer to communicate with the Shuttle. The company offers a modem/keyboard device about the size of this book. This small information terminal plugs into a standard telephone jack and connects to the VHF antenna input of a regular TV set. The television receiver is set to receive either channel 3 or 4. The information sent by the Shuttle system to the information terminal appears on the TV screen. With this terminal, subscribers can receive the service at 1200 baud and have color and graphics on their screen along with the text. This inexpensive terminal will also operate at 300 baud so you can use it to access any of the data bases described above.

The Shuttle Information Service was designed to be operated by people with no background or experience in computers. It is entirely menu-driven, and you respond to choices and prompts given on every screen by pressing a number on your keyboard. You can step through the menus one at a time until you reach the information you are looking for. However, that can become tedious, particularly if you know where you are going already.

To save time you can press the "period" key, followed by the sequence of menu selections you would have to make. This bypasses the menus and takes you directly to the desired information. To get back to the main menu, simply press "period" and the RETURN key.

Perhaps the most remarkable aspect of the Shuttle Information Service is its price. There is a \$25.00 lifetime membership fee; then you pay \$5.00 per month and \$3.00 per hour of connect time. This same charge applies regardless of the time of day. There is no prime-time charge. Compared to prime-time rates on The Source or CompuServe (especially at 1200 baud), the Shuttle is a real bargain. Since the Shuttle is a local data base, none of the access revenue is paid to Telenet, Tymnet, or the other packet networks.

As mentioned above, the Shuttle provides an electronic mail service. Subscribers to a Shuttle system can send short (250 character) messages to each other at no charge. They can also post notices on the various bulletin boards. The system automatically includes the name and electronic address of the sender, as well as the date and time the message was sent or

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posted. There is also an on-line conferencing feature that allows up to 50 simultaneous users to contribute to a scrolling public screen.

Other services include the ability to receive uploaded files (see Chapter 7) for immediate display to all subscribers. This allows stores, businesses, and other information providers to update their advertising every day, without the need for the system operator's staff to type in the information. A club or group can upload its newsletter and maintain a current calendar of events on the system. Other information providers can contribute to the data base from remote locations.

One particularly interesting application of the Shuttle's services is in the field of electronic banking. Local banks can offer electronic bill paying and account status inquiry to their customers on a Shuttle system without having to reconfigure their mainframe software. The Shuttle is able to make itself look like an automated teller machine (ATM) to the bank's system. A major retailer can interface to a local Shuttle system in a similar way, and offer shopping at home.

For further information on the Shuttle Corporation's videotex systems, contact the company at 2569 152nd Ave. NE, Redmond, WA 98052, or call (206) 882-3447.

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Free Software

Free Software

If you ask 100 people why they bought a modem, you will probably get 100 different answers. Some people want to send and receive electronic mail. Others go on-line with a modem to receive stock quotations, up-to-date news, and so on.

One of the most powerful attractions of owning a modem is the availability of free software. There are literally thousands of programs available at the other end of your telephone line. Bulletin boards are some of the best sources for free software. Most BBSs have a section listing software which is available for transfer to your computer. You can obtain as many programs as you want for little more than the price of the telephone calls.

Where does free software come from? Many personal computer owners write short programs to solve particular problems. An example might be a simple utility to renumber BASIC programs or print out mailing labels—or to keep track of a stamp collection. You may not collect stamps, but you probably know enough about BASIC programming to modify the program to catalog your record or tape collection.

Probably the world's largest collection of free software is held by the CP/M Users Groups. They claim to have more than 55 megabytes of program data in the CP/M format. Bulletin boards which cater to those using the CP/M operating system are an inexhaustible source of free programs. There are similar groups, for other types of computers, all over the country. You can easily determine who they are and where they are located by talking to other computer buffs. There are listings of user groups in magazines and you should subscribe to publications which cater to your specific type of computer.

Public Domain

To avoid problems later on, you should understand exactly what the term *public domain* means. Basically, it indicates that the software has been given to the public by the author. Public domain software can be copied or distributed in any way

desired, but it cannot be legally sold or exchanged for something of value. The situation is somewhat analogous to the rules governing use of a public park. Anyone can use the park but no one can sell it to someone else. The reason, of course, is that you don't own it. You do not own public domain software either. It is simply available for use by the public.

Just because you find a program on a BBS, it does not mean that the software is in the public domain. There seems to be a certain amount of competition between BBS operators to have the best free software. Some operators get a bit carried away and include programs which they know (or suspect) are copyrighted and not in the public domain. Make sure the programs that you transfer from a BBS to your computer are truly public domain. It is not fair to the authors of salable programs to find their efforts given away on a public bulletin board. Note, too, that programs which appear in magazines are not public domain unless this fact is specifically stated in the article.

In some cases, the SYSOP may not be aware that the program is copyrighted. Possibly the person submitting it removed the copyright notice. If you have reason to believe that a program is not public domain, you should advise the SYSOP. Most will appreciate it. If they don't, the BBS is probably catering to pirates and will not be around for long anyway.

Modem Madness

Shortly after you purchase your modem, you will discover bulletin boards and all the free software they provide. If you are a typical new modem user, you will soon contract an incurable disease called "freebie-itis." You'll know that you have freebie-itis when you start downloading software whether you need the program or not.

There may be only a few bulletin boards in your local dialing area. However, there will invariably be a listing of telephone numbers for other BBSs outside your local calling area. You can get more free software simply by calling these other systems on the long distance network. But unless you exert a great deal of self discipline, you will run up an enormous telephone bill downloading software of dubious usefulness. You will also wind up with an enormous collection of "free" programs, most of which will be useless or with which you will soon become bored. Only you can decide if it's worth the cost

of the telephone usage.

The moral? Don't bother acquiring a program just because it is "free." Make sure the software is really useful before you bother with it. The data may not cost anything, and there may even be no long distance charges, but you're still using time and disk space.

Dumb Terminal Programs

In order to turn your computer into a communications terminal, you will need software called a *terminal program*.

You've probably heard the expression "dumb terminal program." The most basic form of terminal program is said to be dumb. It uses little or none of your computer's computing power but simply converts your keystrokes into electrical impulses and sends the data to your modem. The program also checks the modem to see if there is an incoming character. If one is detected, the character is placed on your screen.

For example, Program 7-1 may be the dumbest dumb terminal program ever written for the VIC-20 and/or Commodore C-64. Line 10 opens channel 2 for communications with the modem. The CHR\$(6) sets the baud rate to 300 with an eight-bit word (see Chapter 2 and the Commodore Programmer's Manual). Line 20 checks to see if a key is pressed. If a keypress is detected, line 30 sends it to the modem. If no keypress is detected, the program branches to line 40 and checks for input from the modem. If a character is received, line 50 prints it on the screen. This process repeats until you turn the computer off.

Program 7-1. Simple Dumb Terminal Program

```
10 OPEN 2,2,0,CHR$(6)
20 GET #2,A$:IF A$= "" THEN 40
30 PRINT A$;
40 GET A$:IF A$= "" THEN 20
50 PRINT#2,A$;:GOTO 20
```

Translation Table

Program 7-1 has a number of shortcomings, and its most important flaw is the lack of a translation table. This means that the program must be used to "talk" with another Commodore computer which is using the same program.

Here's why a translation table is important. Computer designers don't seem to like the ASCII code (the industry standard for information transfer) and constantly try to improve on it. However, revising the ASCII code fouls up the computer's ability to communicate with another computer that *does* employ standard ASCII, and the problem can only be resolved with the use of tables that translate the modified characters into standard characters.

To completely solve this problem, the terminal program must include two translation tables. One is used to convert the incoming ASCII characters to the computer equivalents. The other reverses the process and converts the unique characters to the ASCII.

The dumb terminal program does not use the computer's memory to store or transfer characters. After they scroll off the top of the screen, they are lost forever. In order to download data, the characters must be captured and saved.

Uploading and Downloading

These are terms which will be used frequently in this chapter. Stated simply, uploading is the sending or transmission of data from your computer for storage in a host computer. Conversely, downloading is the transfer of data from a host computer for storage on media that can be used by your computer.

Note the use of the term *data* rather than program. In addition to programs, other types of information are available for downloading. For example, you can download text files, templates, and other types of data in addition to actual programs.

In its simplest form, downloading can consist of nothing more than having the host list the data, while you write it down as it appears on your screen. Of course this is a great deal of trouble and assumes that you can start and stop the listing of the host computer.

Somewhat less absurd is the use of a printer. It is not at all unusual for the beginner to download programs by listing them on a printer. You simply turn on the printer and start a download of the program; the result is a hardcopy listing.

However, there may be problems with getting hard copy. Some computers will not permit the printer and modem to operate at the same time. This precludes listing programs in the manner described above. It may be necessary to temporarily

store the program or data in the memory of the computer. Then, after you disconnect from the telephone line, you can disable the modem and activate the printer to obtain a listing. An even more imposing aspect, with either system, is the fact that one has to retype the program back into the computer to get it to run.

Smart Terminal Programs

Most of the data bases discussed in the previous chapter send only printable characters plus a few control codes. Terminals which require nothing more than this to function are called "glass teletypes."

A number of the more exotic data bases are programmed to operate with specific, expensive, and intelligent terminals. These terminals also permit screen acrobatics, such as cursor addressing and positioning. A terminal emulation program may enable your computer to mimic the functions of these more expensive terminals; if it operates properly, the host computer cannot tell that it isn't talking to the terminal being emulated. Thus, one of the characteristics which define a smart communications program is the ability to emulate one or more specific intelligent terminals.

Another character of a smart terminal program is the ability to download data from a host computer. Each brand of personal computer seems to have spawned a different type of smart terminal program and a different downloading format.

Because of these differences, it is difficult to provide specific downloading instructions and procedures for all computers. However, there are several general considerations that may help you in understanding the documentation which accompanies your smart terminal program.

One form of smart program receives the incoming characters, which are being downloaded, and inserts them into successive memory locations. At the end of the downloading process, the stored characters are taken from memory and transferred to a tape, disk, or other storage medium. This is a form of indirect downloading. In other words, the data being downloaded is not sent directly to the final storage medium. Rather, it reaches its final resting place indirectly after being stored in the computer memory first.

The temporary memory storage area is called a *buffer*. The

area of memory allocated for the buffer provides a digital sponge that soaks up and holds the characters until they are finally printed or stored on media.

Some smart terminal programs allow the user to control the opening and closing of the buffer. In other words, you tell the host computer to start the downloading process, then you press a specific key which has been assigned to open the buffer. After the download is complete, you press a second key which closes the buffer.

One variation in communications software affects how the program reuses the buffer. Some programs will allow you to reopen the buffer and append more material at the end of the previously stored characters. Other programs will truly close out the buffer. If you reopen the buffer, new material is placed at the beginning and overwrites whatever is already in memory. This, of course, erases previously stored material.

Although this system of manually opening and closing the buffer is quite popular, it is relatively crude. For example, there is no provision for error detection. This may be satisfactory for text files. A transmission error will appear as a misspelled word, which can be corrected. A few transmission errors may be marginally acceptable for a BASIC program listing, since a transmission glitch will cause an easily discovered and corrected syntax error.

But there is another more important shortcoming of manual buffer manipulation. The buffer must open and close at exactly the right instant. If it is opened too soon, it will contain extra characters which are not part of the data. If it is opened after the data starts flowing, it will miss some of the characters at the beginning of the data. The same is true if the buffer is closed too early or too late.

The system just described was used during the early days of personal telecomputing after the TRS-80 was introduced; fortunately, it was possible to use a word processing program (Scriptsit) to edit the defective data. A similar technique may work with your computer. If you have a file which will not load or run, try loading it into your word processing program. You may be able to delete extraneous characters or add those which are missing.

The Autobuffer

Not surprisingly, it didn't take long for an improved system to appear. Someone decreed that CONTROL-R should be used to automatically open the buffer, while CONTROL-T would be used to close it. These are the complementary control characters to those used for X-On/X-Off (CONTROL-Q and CONTROL-S).

This system is popular with TRS-80 users, even though there is no provision for error detection. Any TRS-80 software to be downloaded is preceded by a CTRL-R. The next character following this control code is allowed to enter the download buffer.

CONTROL-T is transmitted just after the last character of the data being downloaded. This tells the smart terminal program to close the buffer automatically. This virtually eliminates the possibility of getting extraneous characters at the beginning or end of the file. It does not provide any error checking, however.

The Art of ACK-NAKing

Unlike the direct procedures described above, the following method of smart terminal downloading makes only minimal use of the computer's memory by depositing incoming data directly on the storage medium as it arrives. For this method to be successful, a form of digital handshaking is required. This is called an ACK-NAK protocol.

Say that you and a friend are downloading data from his computer to yours. At the end of the session, he picks up the phone and asks, "Did you get it?" (ACKnowledge correct receipt). You may reply, "No, it has an error (Not AcKnowledged, or NAK). Please send it again."

If your friend could check with you after every few characters, he would only have to resend those few characters where the error occurred. If the computer does the checking and correcting, you have what is called electronic error detection and correction.

A simple electronic error detection scheme makes use of the parity bit. However, as mentioned in Chapter 2, this technique will only detect an odd number of bit errors (one, three, five, etc.). An even number of bit errors will pass undetected.

The ACK-NAK method of downloading makes use of this

concept. It makes minimal use of the computer's memory; rather than using a huge buffer to hold the characters, the incoming data is deposited directly onto the storage medium (once it is verified to be error-free). That means that files of any length (even those which exceed the size of your computer's memory) can be transferred from computer to computer.

Downloading starts with the transmission of a "start of header," or SOH (CTRL-A), followed by a block of characters. The block can be any length, but usually contains between 128 and 1024 characters. By using an error detection scheme, the receiving computer can then request retransmission of any defective block.

One reliable method of error detection is to use a checksum. In addition to the block of data, the host computer sends a tally of the ASCII value of the characters sent. This is called a checksum and is the binary addition of all the characters and codes in the transmitted block. If the binary addition of two or more characters exceeds 255, this figure is subtracted from the total. The balance is carried forward and added to the next character. Again, when the sum exceeds 255, the process repeats. Thus, the total checksum of the block will never exceed 255 (hex FF).

Say that a series of uppercase A's are being downloaded. This character has a decimal, or ASCII, value of 65. The second character is added to the first for a checksum total of 130. The ASCII value for the third character makes the total 195. The fourth A makes it 260, which exceeds 255, so the algorithm subtracts 255 from 260, leaving a checksum of 5.

The rollover could occur at any desired number so long as both ends use the same algorithm. But regardless of the number used, a remainder with a value between 0 and 255 will always occur. This number is called the *block checksum*.

The downloading terminal program repeats the process of adding the total ASCII value of the characters to create its own checksum calculation. If the same algorithm is used at each end, and if no errors occur, the transmitted checksum should equal the computed checksum. If they do, an acknowledgement character is sent from the downloading computer to the host. This character is called an ACK and is a CONTROL-F (decimal 6).

If the transmitted and computed checksums do not agree, the downloading computer sends a NAK, or CTRL-U (decimal

21). If the host receives this signal from the downloading computer, it knows that an error has occurred and will resend the block of data.

Virtually all ACK-NAK smart terminal programs permit resending a defective block several times. The exact number of retries will depend on the individual software. Five to ten repeats are standard. After this number, the program assumes that the telephone line is defective and aborts the download.

These programs also have a time out. If the software is expecting an ACK or NAK, and receives neither, it will time out. The usual timeout period is 10 to 20 seconds.

Once all the blocks have been sent, the end-of-transmission character (EOT- CTRL-D) follows. The receipt of this character tells the receiving computer to close the disk file and end a successful downloading session.

The system just described is the basis for most smart terminal programs. Essentially, the software looks for transmission errors and advises the sending computer whether or not the data has been received.

CRC Error Checking

The ACK-NAK error checking system will catch virtually all errors. Occasionally, however, one may still turn up in the stored program.

To detect such errors, you need a more elaborate error checking system. One such system is called a cyclic redundancy check (CRC). You may hear of a program using CRC-12 or CRC-16 error checking. The concept is similar to ACK-NAKING, but the error detection formulas are more complex.

Some terminal programs permit you to select between a checksum and a CRC-16 algorithm for error detection. In either case, if you use an ACK-NAK downloading system you are virtually assured of an error-free data transfer.

Downloading to Apple

The Apple was one of the earliest computers to provide downloading and file transfers. There are many smart terminal programs presently available for the Apple, and one of the first (and still one of the best) was written by Bill Blue and is called "ASCII Express." It uses the ACK-NAK protocol and makes direct-to-disk transfers.

Another good program is called *Softterm*, available from

Softronic, Inc., 3639 New Getwell Road, Suite 10, Memphis, TN 38118, phone (901) 683-6850. It provides exact emulation for most terminals and is compatible with DOS, CP/M and PASCAL files. It uses an error-detection file-transfer system similar to that described above.

Another excellent program is *TermExec*, available from Exec Software, 201 Waltham Street, Lexington, MS 02173 (617) 862-3170. It provides for transfer of extremely long files even when the computer is unattended. Error checking can be turned on and off. The memory can be back-scrolled to review data that has scrolled off the top of the screen. Rated on the basis of power versus cost, *TermExec* gets high marks.

Downloading to Atari

Most people who use the Atari as a communications terminal soon graduate from TeleLink. There are a number of smart terminal programs in the public domain, and they enjoy wide popularity. They seem to grow and improve as each user adds a new touch here and a refinement there.

One of the most popular programs for the Atari is called "JTERM." It is a good general-purpose terminal program and can be used with BBSs which speak either ASCII or ATASCII. The program was written by Frank Jones and appeared in the January 1983 issue of *COMPUTE!* magazine.

Another popular public domain terminal program for the Atari is called "AMODEM" and was written by Jim Steinbrecher. It uses the ACK-NAK protocol, which is called XMODEM by the Atari folks. This system uses 128-byte blocks and will retransmit a defective block up to nine times before it gives up.

If you access CP/M bulletin boards, or Atari BBSs which observe the XMODEM protocol (such as AMIS), then AMODEM is superb. You can use this program to upload or download machine language, tokenized BASIC, and music files as well as BASIC and text files in ASCII format. A number of Atari bulletin boards provide a text file called "The XMODEM, AMODEM, CP/M Saga," by Greg Leslie, that will help you use these programs.

Downloading to Commodore

Steve Punter, a well-known author of Commodore software, devised the Commodore downloading system back in the days when no one realized how popular downloading would become. At the time, efficiency or line charges may not have seemed very important. Today, virtually all BBS program files for Commodore (even for the VIC-20 and C-64) are stored in CBM or so-called "Punter format." This includes text and other forms of ASCII data, in addition to BASIC and machine language programs.

Punter format seems to be based on the Intel paper tape method of storage. The last number in each line is the checksum for that line, and that (plus considerable addressing baggage) approximately doubles the size of the stored program. In other words, if you want to download an 8K program, the terminal program will have to process approximately 16,000 characters. That means that it takes twice as long to transfer a given file as it would on an Apple or an Atari.

In addition to creating Punter format for Commodore computers, Steve Punter has placed an excellent smart terminal program into the public domain. One version, called Terminal 64, requires a machine language driver (Term.64).

One of the finest smart terminal programs available for the Commodore VIC-20 and C-64 is called *SuperTerm*. It is available from Midwest Micro, Inc., 311 West 72nd Street, Kansas City, MO 64114, (816) 333-7200 and is priced at \$119.50. You might question why you should pay almost as much for software as you did for your computer, and the answer is that you get what you pay for. *SuperTerm* will allow you to do virtually anything that is expected of a communications software package.

As mentioned above, an important feature of a smart terminal program is called emulation. Emulation is the ability to turn a computer into the equivalent of an expensive intelligent terminal. One of the most popular intelligent terminals, the DEC VT-100, costs more than \$1,000, but the default emulation of *SuperTerm* is for this model terminal. *SuperTerm* will make any host think it is talking to a DEC VT-100 rather than to a lowly Commodore VIC-20 or a C-64. However, emulation is not limited to the VT-100. In fact, *SuperTerm* is

so flexible that it can emulate virtually any terminal ever designed.

Another important and useful feature of *SuperTerm* is its built-in text editor. Normally it is used for the preparation of text or documents to be transmitted on-line by *SuperTerm*. In download applications, the text editor can be used to clean up transmissions that contain garbage. The text editor can also be used for word processing, independent of the on-line communication application. You can write and print letters or other desired documents. The full-screen global-editing capability is equivalent to that found in the most expensive word processors.

The *SuperTerm* disk contains a number of powerful utilities, in addition to the main terminal program. There is a program called *Spoiler* which will convert a tokenized BASIC program into an ASCII format. This converted program can then be loaded into the text editor. This will permit looking for invisible characters (such as control codes) which prevent the program from functioning properly.

Some systems store in an ASCII format, which takes considerably less space than does CBM (Punter) format. A program on the *SuperTerm* disk called *Cruncher* will convert the ASCII listing to a tokenized version which can be loaded as a BASIC program and run by the Commodore computer.

The disk contains a number of other programs which are used to customize your use of *SuperTerm*. For example, you can create a disk file which will allow you to automatically log onto a data base, retrieve data, and then log off. By using the clock function, the program can even do this in the middle of the night!

CompuServe Downloading

CompuServe has taken downloading to the ultimate in hands-off, trouble-free operation. The thousands of programs in their archives are, for the most part, provided free by members and considered to be in the public domain, and there are several ways you can download them into your own library.

At the ACCESS: prompt, enter TYP filename. The CompuServe system will then simply list the data and it will appear on your screen. If you can run the printer simultaneously, you can obtain a hardcopy listing. By using a manual buffer open/close command, your computer can capture the

incoming data. However, a more sophisticated method is to use CompuServe's *Vidtex* software. *Vidtex* is a custom terminal program which is supplied by CompuServe for all popular personal computers. The typical price for the program is \$39.95.

Vidtex is written to provide trouble-free uploading, downloading, and communication with CompuServe. It can be used with other systems, but you will find its features best suited for use on CompuServe.

The command for downloading a program (with *Vidtex* or other software) is DOW FILENAME, which lets you download the file with the specified name. When the CompuServe system receives this command, it sends out an interrogation signal to see if you are using *Vidtex* software. If you are not using *Vidtex*, CompuServe will revert to what is called the "A" Protocol. This uses the CONTROL-R and -T buffer open and close codes discussed above. Use this method if you do not have *Vidtex* and your software recognizes these open and close buffer codes.

However, if you are using *Vidtex* software, your computer will respond with a code that tells CompuServe to use the "B" Protocol. In that case, your job is done, and you can sit back and relax while the computers do all the work. They start with a block of data. If the program checksums correctly, then that block is saved to disk and an ACK signal sent to the host. A plus sign or a period appears on your screen, indicating an error-free transfer. Then the next block is sent, the process repeats, and so on until the entire file has been sent. Then the ACCESS: prompt appears on your screen. You have just successfully downloaded a file to your computer.

As with your first BBS experience, you may be tempted to download a pile of unneeded software. Again, you are cautioned to be selective. Just because it is free and can be downloaded painlessly, don't take the time to get it unless you can use it.

You may not be sure of the purpose of the program from the filename. If you enter CAT/DES at the ACCESS: prompt, CompuServe will respond with a catalog of file descriptions. Whenever a file is uploaded to CompuServe, the individual uploading the program is asked for a few keywords that describe the program. The system will also request a more complete description (no longer than 500 words).

A variation of the CAT/DES command allows you to search the keywords. It is useful when looking for a specific program. Say you would like to have a sorting program which will run on your Atari. You would enter the command CAT/DES/KEY:SORT ATARI. The CompuServe access program would search through the entire data base looking for programs which have both "sort" and "Atari" in the keyword list. If it finds such a program, it will send the name and description to you. After entering the above command, for instance, you might see something like this:

```
SORT.HEX70007,132. A short machine  
language program which will sort  
500 entries in less than 2 seconds.
```

Uploading

Uploading is the opposite of downloading. The host computer opens a buffer, and data is then passed from the remote computer to the host. The procedure for uploading can be manually initiated by the user of the remote computer, or data can be transferred directly from a disk file. If an automatic buffer control scheme is used, the remote computer will send a CTRL-R, followed by the data and ending with a CTRL-T.

If the XMODEM protocol is used, the remote (uploading) computer will send the start-of-heading character (CTRL-A), followed by the blocks of data. The ACK-NAK characters are exchanged until the end-of-file character is received by the host accepting the upload. That closes the file and ends the upload session.

The CompuServe *Vidtex* program has a provision for transmitting a file directly from your disk to the computers in Ohio. When you enter the public file section (R ACCESS), use the UPL command to upload a file. The CompuServe system will interrogate your computer to see if you are using *Vidtex*. If you are, it will ask the filename of the program on your disk to be uploaded. The *Vidtex* program then takes over and sends the data block-by-block with a protocol similar to XMODEM.

In the next chapter, we'll look at some of the software used to convert computers to communication terminals.

Terminal Programs

Terminal Programs

If you try to use the short terminal program given in the last chapter, you'll soon discover that it suffers from some significant problems. The upper- and lowercase characters are randomly mixed, for example, and there are graphic characters interspersed with the text. In addition, some of the characters are actually incorrect.

Program 8-1 is a renumbered version of the short terminal program. In this chapter, you'll be adding additional lines to turn this simple program into a working and useful terminal program. It is written for a Commodore computer (VIC or 64), but the principles of its operation apply to many computers which use Microsoft BASIC. By understanding why we do certain things in the makeup of the program, you can see how it applies to a terminal program for your computer. You may wish to modify the program in steps. You can then see how the additions and modifications affect the operation of the program.

The Cursor

One of the most obvious missing elements in the simple program is the lack of a cursor. The characters will print on the screen, but without a cursor you never know where the next character will appear.

How does the cursor work? When the revised program is run, the first action should be to print a cursor on the screen. Then, when an incoming character arrives, the cursor must be erased and the character printed in its place. In addition, the cursor must be advanced to the next printing position. Thus, during the initializing of the program, the cursor and back-space character must be defined.

It is annoying to have previous information remain on the screen when you run a program. Thus, while you are defining characters, add a code to clear the screen. That can be done with `CHR$(147)`, the `CLEAR/HOME` character for Commodore.

You can accomplish all of the above characters by adding the following line:

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```
10 C$=CHR$(147):J$=CHR$(20):K$=CHR$(187)
```

The clear screen, CHR\$(147), becomes C\$. Thus, whenever you print C\$, the screen will clear. The backspace and erase string is J\$, while the cursor is defined as CHR\$(187). This is a small block which will appear whenever you print K\$. You can change the 187 to any character desired.

To use these redefined characters, add the following line:

```
20 PRINT C$+CHR$(14)
```

It will clear the screen and switch to upper/lowercase mode. The latter is accomplished by printing CHR\$(14). To activate the cursor, add line 200:

```
200 PRINT C$+"ON LINE":PRINT K$;
```

The underline beneath the O and L in the line above indicates that you should hold down the SHIFT key when you type these letters. They will appear as graphics characters when typed in, but will be displayed as uppercase letters when the program is run. This line clears the screen, prints the words On Line, drops down one line, and prints the cursor block. In addition, change line 220 as follows:

```
220 PRINT J$+A$+K$;
```

When a character arrives, and the program passes through this line, J\$ will erase the previously printed cursor, print the newly arrived character (A\$) and follow this with a cursor (K\$).

Word Length and Parity

If you run this program now, note that you still have incorrect characters. One of the reasons for the garbage characters is the use of an eight-bit word. This is determined in line 5 by the CHR\$(6). This string tells the computer that you want to use 300 baud, but since the other parameters are not specified, the program defaults to an eight-bit word with no parity and one stop bit.

If you are talking to a Commodore BBS, the eight-bit word represents no problem because that is what you'll receive. However, systems like CompuServe (which use packet networks) send a seven-bit word, with even parity and one stop bit—and the simple terminal program developed so far is not compatible with that. Thus, you'll find upper- and lower-case characters mixed together, depending on whether or not the parity (or eighth) bit is set. Fix this by replacing line 5:

```
5 OPEN2,2,0,CHR$(38)+CHR$(96)
```

You can see how these numbers were arrived at by reading the RS-232 section of the VIC-20 or 64 *Programmer's Reference Guide*.

Character Translation

Run the program again, and you'll notice a significant improvement. In fact, the program is usable except for the fact that the upper- and lowercase characters are reversed. The reason for this inversion is that Commodore did not observe the ASCII standard character set. For reasons best known to their engineers, they revised and substituted their own character set instead.

To correct this problem, there is only one solution: You must use translation tables. In other words, all incoming ASCII must be converted from ASCII to Commodore, and all outgoing characters must be converted from Commodore to ASCII.

To accomplish this, you need two buffer storage areas: one for incoming characters and another for the outgoing characters. These buffers are set up by line 1000. Line 1020 changes the Commodore backspace (20) to an ASCII backspace (8) and converts a Commodore SHIFtEd space (160) to an ASCII space (32).

The remaining lines provide the case reversal for the input/output buffers. Type in the following lines to establish the translation tables:

```
1000 DIM I%(255),O%(255)
1010 FOR Z=32 TO 64:O%(Z)=Z:NEXT
1020 O%(13)=13:O%(20)=8:O%(160)=32
1030 FOR Z=65 TO 90:Y=Z+32:O%(Z)=Y:NEXT
1040 FOR Z=91 TO 95:O%(Z)=Z:NEXT
1050 FOR Z=193 TO 218:Y=Z-128:O%(Z)=Y:NEXT
1060 O%(133)=03:O%(134)=19:O%(135)=17:O%(136)=16
1070 FOR Z=0 TO 255:Y=O%(Z):IFY<>0 THEN I%(Y)=Z
1080 NEXT:RETURN
```

To write out the tables, the program must read these added lines. It can be made to do this by adding a GOSUB 1000 at line 100. Insert this line:

```
100 PRINT"LOADING TRANSLATION TABLES":GOSUB1000
```

Terminal Programs

As before, the underlines mean that you should hold down the SHIFT key when you type the indicated letter.

To provide the Commodore/ASCII translation, the input and output characters must pass through the tables. This requires that two previously entered lines be significantly modified. Note that I% and O% pass the characters through the previously established buffers. Retype lines 220 and 360 as follows:

```
220 A=I%(ASC(A$)):PRINT J$+CHR$(A)+K$;  
360 PRINT#2,CHR$(O%(ASC(A$)));:GOTO210
```

There is one interesting fluke which can occur with the Commodore computers. The reception of the quote character (") can put the machine into the quote mode. This occurs due to a resetting of the flag at memory location 212. To avoid this, it is necessary to POKE a zero into location 212 whenever a quote is received. Do this by adding a line 225:

```
225 IF A=34 THEN POKE 212,0
```

At this point, you should have a useful and bug-free terminal program (Program 8-2).

Control Characters

Now you're ready to add some additional features to make the program even more useful. For example, there is no provision for transmitting control characters, which you will need to check into CompuServe. Normally, you would press a key labeled CTRL, in conjunction with one of the letter keys. However, this is not the case with the VIC-20, since the Commodore key labeled CTRL does not permit the transmission of control characters. Software can be written to allow the CTRL key to transmit control characters. However, a program to do this must be written in machine language.

If operation on CompuServe is desired, there are four indispensable control codes (CTRL C,S,Q AND P). These codes are used to log on, stop and start listings, and exit programs. The easiest method of implementing these codes is to redefine the f1, f3, f5, and f7 keys, and you can accomplish this by adding one line to the translation table section of the program. Add line 1060:

```
1060 O%(133)=03:O%(134)=19:O%(135)=17:O%(136)=16
```

The four function keys produce values of 133, 134, 135, or 136 when f1, f3, f5, or f7 are pressed. The translation just added converts these keys to ASCII 03, 19, 17, and 16, respectively.

VIC/64 Compatibility

The program, to this point, will work equally well on the VIC-20 and 64. However, if you want to do anything fancy, POKE statements will probably be required—and it is certain that POKES will be different for the VIC-20 and C-64.

Say you don't like the screen colors or have just purchased an autodial modem. If you would like to change colors or implement the autodial feature, the two computers will require different POKES.

Rather than write two different programs, make the program determine which computer is being used. It can then issue the correct POKES for the VIC-20 or the 64.

Using the SCREEN routine in Kernal ROM is the recommended way to find out which computer is being used. This routine is entered via location 65517 (\$FFED) in both the VIC and 64. When the routine is executed, it reports the number of columns on the standard video screen: 22 for the VIC, 40 for the 64. Since this routine is part of the Kernal operating system, using it is more reliable than checking the value of a particular memory location.

Add lines 30 and 40 to determine the computer:

```
30 SYS 65517:IF PEEK(781)=40 THEN MACH=6:P1=
56577:P2=56579
40 IF PEEK(781)=22 THEN MACH=2:P1=37136:P2=37138
```

You could shorten the listing slightly by saying P1+2 to provide the POKE location for P2. However, this might be confusing to those not entirely familiar with BASIC.

These two lines will provide the necessary POKES for autodialing the Commodore 1650 and the Microperipheral Corp. AutoPrint Microconnection modems. You need to utilize one of these POKES at the beginning of the program to insure that the modem is on-hook and does not busy out your telephone line. To do this, add the following line:

```
50 POKE P2,(PEEK(P2)OR36):PRINT CHR$(1)
```

While you are adding POKE statements, you might as

Terminal Programs

well customize the screen colors, too. If you do not like the default colors which Commodore selected for the border, screen, and characters, you can have almost any color combination you desire by adding the following lines. Adjust the values POKEd into the color locations to suit your taste. The following line is active if you have the program loaded into a 64.

```
60 IF MACH=6 THEN POKE 53280,1:POKE 53281,1:PRINT  
    CHR$(152)
```

The 53280,1 will make the border white, while the 53281,1 produces the same screen color. You can change the 1 to another number for other colors. The CHR\$(152) produces gray letters. You may prefer CHR\$(144) instead, which gives black letters.

The border and screen color POKE location is combined in the VIC-20. There is a chart in the manual which came with the VIC, or in the *Programmer's Reference Guide*, which lists the numbers to POKE into location 36879 to control these colors. To produce a white border and screen with black letters on the VIC-20, enter the following line:

```
70 IF MACH=2 THEN POKE 36879,25:PRINT CHR$(144)
```

Obviously, if you don't intend to use the program on a VIC, you can ignore line 70.

Autodialing

An autodialing modem may seem like an extravagance, since it typically costs 50 to 100 percent more than a manual dial modem. However, after you've had to redial a busy BBS 20 or 30 times, you begin to appreciate the ability to dial a telephone number automatically.

To incorporate an autodialing function into the program, you'll need a menu of phone numbers as well as the code to pulse the modem relay.

Autodialing is accomplished by taking the phone off hook for several seconds. This is accomplished by telling the modem to close the relay contacts which connect the modem to the telephone wires. The standard, established by Commodore, is to use the unassigned pin of the user port. This is pin J and is controlled by line PB5 of the 6526 Peripheral Interface Adapter (PIA) chip. Pin J is defined as an input line by the RS-232 Kernal routines. To use it for controlling the modem relay, it must be redefined as an output line. You did

this earlier in line 50. The address for the data direction register is 56579 in the 64 and 37138 in the VIC-20.

The relay contacts are controlled by toggling the sixth bit of the user port. The user port is located at memory location 56577 in the 64 and 37136 in the VIC-20.

The first step in the autodialing sequence is to take bit 6 low for about two seconds. This allows time to acquire the dial tone and is equivalent to picking up the telephone handset. Next, open and close the telephone line in a prescribed manner. As already noted, you can do this by toggling the sixth bit of the user port off and on a number of times equal to the number being dialed. For example, if you take the bit low then high, the relay will open and close once. The telephone company will interpret this as dialing a one. If you caused the bit to go high and low twice, it would dial a two, and so on.

The timing needs to be rather precise, particularly if you are on an older telephone system. The newer electronic switching systems seem to be far more tolerant. The standard is to open the relay contacts for 60 milliseconds and close them for 40 milliseconds. This means you can make one complete pulse cycle in a tenth of a second or 10 pulses per second. Thus, you'll need one second to dial a zero (10 pulse cycles). Some of the newer exchanges will permit pulse dialing up to 20 pulses per second.

Once you have dialed the telephone number, you must determine if a carrier is being received. This will tell you that you have made the connection. If no carrier is received, you may have reached a wrong number or the computer may be busy or out of service. Thus, if a carrier is not received in 20 seconds or so, the modem should hang up and either redial that number or try another.

Occasionally, when using the autodial feature, a busy signal may fool your computer into thinking it has established a connection. If this is a problem you will have to dial manually. Of course, if you don't have an autodial modem, you'll have to dial manually anyway, though you might want to add the autodial lines as a subroutine that can be used later on if desired.

If you include the autodial routine, the first step is to establish the menu. Enter these lines:

Terminal Programs

```
1900 P$(1)="1234567":P$(2)="1234567":P$(3)="1234567":  
    P$(4)="1234567"  
1910 P$(5)="1234567":P$(6)="1234567":P$(7)="1234567":  
    P$(8)="1234567"
```

The sequences "1234567" represent phone numbers that the program will autodial. Obviously, you will have to change the digits to those for your favorite systems or services.

Next, add these lines to print, in menu form, the phone numbers you entered:

```
1920 FORX=1TO8:PRINTX;+"-P$(X):NEXTX  
1930 PRINT" 9 -MANUAL ENTRY"  
1935 PRINT" 0 -TERMINAL MODE"  
1940 PRINT:PRINT"SELECTION ?"  
1950 GETB$:IFB$=""THEN1950  
1960 B=VAL(B$)  
1970 PH$=P$(B)  
1980 IFB=0THENPOKEP1,36:GOTO200  
1990 IFB<9THEN2010  
2000 PRINT:PRINT"ENTER PHONE NUMBER";:INPUTPH$  
2010 PRINT:PRINT"HOW MANY REDIALS (1-100)":INPUT RD  
2020 FOR R=1 TO RD
```

Variable RD becomes the number of times for the program to redial the number you are calling.

```
2030 PRINTC$:PRINT"DIALING...":POKEP1,36:FORY=1TO  
    1000:NEXTY  
2040 FORPN=1TOLEN(PH$)  
2050 NN=VAL(MID$(PH$,PN,1))  
2060 GOSUB2500:NEXTPN  
2070 FORDL=1TO2000:Q=PEEK(P1)AND16:IFQ=0THEN200
```

Line 2030 takes the modem off hook and waits roughly two seconds before proceeding to the dialing sequence. The variable Q represents the carrier (or lack thereof). A carrier will cause Q to have a value of zero. If there is no carrier present, Q will have a value of 16. The program keeps checking (for 20 seconds) to determine if a carrier is present. If it is, the program branches to the terminal portion at line 200.

You may want to escape from the redial action. For instance, if you want to press the up-arrow key to go back to the menu, you can add line 2075:

```
2075 GET A$:IF A$=CHR$(94) THEN POKEP1,0:GOTO 160
```

If no carrier is received, the program must fall through the 20-second carrier wait delay loop. It then redials the specified number of times, and finally returns to the menu if no connection is made, via the following lines:

```
2080 NEXT DL:POKE P1,0
2090 PRINT:PRINT"NO CONNECTION ON";PH$:FOR Y=1 TO
1000:NEXT Y:NEXT R:GOTO 160
```

The following lines provide the pulse dialing action. Line 2500 prints the digit on the screen and converts a 0 in the phone number to 10 pulses.

The 45 and 24 determine the number of milliseconds that the line relay is open and closed, respectively. If you think your phone system can handle 20 pulses per second, try dropping these numbers to 22 and 12. If a connection is made, after dialing a number at this speed, your phone company equipment can handle the higher dialing rate. If this dialing rate is too fast, you can try intermediate numbers.

```
2500 PRINT NN;:IF NN=0 THEN NN=10
2510 FOR X=1 TO NN
2520 POKE P1,0:FOR XX=1 TO 45:NEXT XX
2530 POKE P1,36:FOR XX=1 TO 24:NEXT XX
2540 NEXT X
2550 FOR DL=1 TO 200:NEXT DL:RETURN
```

Line 2550 provides the interdigit delay. The phone system equipment requires a finite amount of time to make sure that one digit has ended before the next one begins. The 200 in line 2550 provides an interdigit delay. You can try 100 (or even 75) to see if your phone system can handle it, and by trying different values you can adjust the program so that the dialing will be as fast as your telephone system can handle.

There is one more line that must be added to the program. You must tell it to go to the menu before it reaches the terminal part of the program. Do this by inserting line 160:

```
160 PRINT C$:GOTO 1900
```

Canned Messages

There is one more feature which can be easily added to the program, and that is the ability to transmit presorted phrases or codes called *canned messages*. For example, if you are active on CompuServe, it is convenient to have your ID and password stored in the program. You can also "can" commands

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that let you go to a favorite SIG or log off the system with a single keystroke.

The following lines will add such a function. Three new sections must be added. You must define the strings, watch for a keypress, and then transmit the string.

This can be done in the 100, 300 and 800 line number sections of the program. Start by defining the strings:

```
120 ID$(1)="77770,101"+CHR$(13)
130 ID$(2)="FREE-DEMO"+CHR$(13)
140 ID$(3)="GO CBM-963"+CHR$(13)
150 ID$(4)="OFF"+CHR$(13)
```

The CompuServe ID and password in lines 120 and 130 are valid numbers. They will take you into the CompuServe free demonstration account. You will not be able to interact since it simply provides a "guided tour" of their system. However, it is useful if you would like to be convinced that you should join CompuServe.

If you are a paying guest, however, line 140 will take you directly to the Commodore 64 Special Interest Group (SIG). Line 150 provides the command to log off CompuServe.

You can customize these lines in any way you want. If you want to use an auto log on with a system other than CompuServe, simply change these lines to provide the necessary sequence. Remember to terminate the custom command with a CHR\$(13). If you forget this carriage return, the program may lock up.

Next, you have to determine when these commands are to be transmitted. Look at the f2, f4, f6, and f8 keys. These are accessed by pressing the SHIFT and the desired function keys simultaneously. Add these lines to detect the keystrokes:

```
320 IFA$=CHR$(137)THEN S=1:GOTO800
330 IFA$=CHR$(138)THEN S=2:GOTO800
340 IFA$=CHR$(139)THEN S=3:GOTO800
350 IFA$=CHR$(140)THEN S=4:GOTO800
```

Pressing f2, f4, f6, or f8 generates numbers 137, 138, 139, or 140, respectively, within the computer. These numbers are detected and converted to message numbers by the above lines.

Finally, add lines to transmit the message. Obviously, it is necessary to look at the characters in the string and send them

in sequence. The following lines do that for you:

```
800 FORX=1TOLEN(ID$(S))
810 T$=MID$(ID$(S),X,1)
820 PRINT#2,CHR$(O$(ASC(T$)));
830 NEXT
840 IFS=4THENPRINT"LOGGING OFF...":FORX=1TO1000:NE
    XTX:POKEP1,0:GOTO160
850 GOTO210
```

A word of caution: line 840 assumes that ID\$(4) is a log off command. If you change that command to something else, be sure to eliminate line 840. If you do not, the program will log you off everytime you press the f8 key.

There is one more feature that is really convenient. You are encouraged to do a legal log off of any host system. However, there are times when it is necessary or desirable to do an instant log off. In addition, some systems may not accept the word "off" as a log off command.

One way to accomplish this is to simply pull out the telephone cord or switch the modem from DATA to VOICE. A more elegant way is to program the up-arrow (↑) key to provide an instant log off. If you add the following line to do this, be careful not to press the key accidentally or you will immediately disconnect.

```
310 IF A$=CHR$(94) THEN POKE P1,0:GOTO 160
```

Note that some systems like CompuServe or The Source will not consider this a proper log off and will continue to charge for line time until the host computer determines it is no longer receiving a signal from you.

At this point, your listing should resemble Program 8-3. It is a fully functional terminal program and should prove to be quite useful, especially since you should have a detailed understanding of how it works.

There are other features which could be added to the program. For example, it would be useful to have the sound channel make a noise when the modem finally does make connection after several redials. This will permit you to do other things while the modem is trying to establish a connection.

By the way, the program uses a few bytes more than are available in an unexpanded VIC-20. If you have only 3.5K

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available, delete any unnecessary spaces in the program and make the following changes:

```
30 Delete this line entirely:
40 Change to: P1=37136:P2=37138
60 Delete this line entirely
70 Delete the "IF MACH=2 THEN"
```

This will allow the program to run without crashing and will leave a FRE(0) of slightly more than 100 bytes.

Commodore Downloaders

Newcomers to telecommunications are caught in a Catch-22 situation. You probably use the dumb terminal program supplied with your modem. You check into the local BBS and discover a valuable downloading program. The dilemma, of course, is how do you download it without a downloading program?

A number of software authors have addressed this problem. The answer is to use a simple program to download more elaborate software. Many such programs are in the public domain and can be downloaded from bulletin boards using simple software.

The World's Simplest Transfer Program?

It's quite likely that Program 8-4 is the world's shortest transfer program. It can be used to transfer BASIC programs between two Commodore owners via the telephone network, and it works equally well with the VIC or 64. Furthermore, it can be used to transfer programs even if you store them on cassette.

Line 0 opens the modem port for 300-baud operation with an eight-bit word, no parity and one stop bit. The program then loops in line 1 until something is received from the modem. If a character is received, the program advances to line 3 where it again loops, this time looking for a carriage return.

As soon as a CHR\$(13) arrives (from the person sending a program to you), the program goes to work. The next character received (and all subsequent characters in the current line) are displayed on the screen as if they had been typed in from the keyboard. When the next CHR\$(13) is received, line 4 prints POKE152,1:GOTO6 on the screen and line 5 puts a CHR\$(19) (HOME) and three CHR\$(13) (RETURN) characters

into the keyboard buffer. When END is encountered, contents of the buffer are processed as if they had been typed in. The CHR\$(19) moves the cursor to the top left of the screen, and the CHR\$(13)s cause the received line to be entered and the POKE152,1:GOTO6 to be executed. Line 6 clears the screen and returns to line 3 to receive the next line from the modem. The computer thinks someone is typing in a BASIC program at 30 characters per second!

Type in Program 8-4 exactly as shown and save a copy with the filename DOWNLOADER. Then connect your modem and run the program.

When you want to send a program, first load the program to be transferred and make sure there are no line numbers between 0 and 6. Make sure that the receiver has loaded a copy of Program 8-4. Then type:

```
OPEN2,2,0,CHR$(6):CMD2:LIST
```

Make sure that your modem is on "telephone." Then call the person who will receive the program; when you get an answer, switch your modem to "data," and press RETURN. When the cursor returns, type (on a separate line) PRINT#2:CLOSE2. Press RETURN again. Nothing will happen on your screen, but the program will have been sent out through the modem and over the telephone line to the receiver. When the entire program has been sent, it will be in the memory of their computer.

When someone wants to send you a program, you should first load in DOWNLOADER and type RUN (but don't press RETURN yet). Make sure that your modem is set for "telephone" and wait for the sender to call. When you have answered the phone, switch your modem to "data" and hit RETURN. You should see the program lines appear on your screen as they are received. When you have received the entire program, disconnect your modem and type LIST. You will see the original seven lines (numbers 0-6) followed by the program that was transferred to you. Delete lines 0-6 to erase the transfer program. Save the BASIC program as you would normally. Then, if desired, you can reload the seven-line downloader to receive another program. It's as simple as that.

This same technique for transferring programs could probably be adapted to other computers which have a keyboard

buffer. Simply POKE the incoming characters into the keyboard buffer as they arrive.

“STONER-MODEM,” An ACK-NAK Program for the 64

The only disadvantage of the previous program is its limitation to BASIC programs. What do you do if you want to transfer a machine language program? To ensure an error-free transfer, it is necessary to use a smart terminal program with an ACK-NAK protocol as discussed in the preceding chapter.

Program 8-5 will let you do just that. The first part of the program (lines numbered less than 1000) may look familiar; it is actually the dumb terminal discussed earlier in this chapter. The remainder of the program is a splice of two separate public domain programs (“Sender” and “Receiver”), which are available on Commodore bulletin boards. Incidentally, this program will not handle “Punter protocol” transfers, nor will it work with public-accessed programs on CompuServe. It is intended for disk-to-disk transfers of any program between Commodore 64 computers.

There are a couple of changes and improvements which you may wish to incorporate into previous versions of the dumb terminal program. A redial option (lines 610–620) has been added to help when accessing busy bulletin boards. Also, the 3000-series line numbers let you select the word length and parity. A seven-bit word is required for CompuServe, The Source, Dow Jones, etc., while an eight-bit word is required for software transfers between Commodore computers.

A full/half duplex selection has also been added. You’ll want full duplex on bulletin boards and data bases but you will require half duplex when you are “keyboarding” with another Commodore owner.

The function keys f1, f3, f5, and f7 send the four control codes required by CompuServe; f2 and f4 control the downloading and uploading functions, respectively.

If you would like to transfer programs with a friend, it is not necessary for both of you to type in the program. One person can do the typing, then transfer it to the other person with the simple seven-line downloader described earlier.

Assume that both you and your friend have a copy of STONER-MODEM. Here’s how you would go about receiving a program from your friend. Run the STONER-MODEM

program and establish all the necessary parameters, then press the f2 key (SHIFT-f1). This takes you into the downloading part of the program. You will be asked for a filename for saving the program; if you have forgotten what is on the disk, you can simply press RETURN and the directory for the disk will be displayed. Pressing any key will stop the directory listing and return you to the downloading routine. If you want to abort and return to the terminal program press the T key.

Once you enter the filename, OK should appear on your screen. The person sending you the program follows a similar procedure, except that he or she presses the f4 key (SHIFT-f3) and enters the filename of the program to be transmitted. Again, OK will appear on the sender's screen. Then, if all goes well, you will see a series of dashes on your screen. If a period appears, it indicates that a block of data was retransmitted. If you see nothing but periods, it indicates that continuous re-sends are occurring; perhaps one of you forgot to turn on the modem, or the communications link may have been disrupted.

Finally, at the end of the transfer, the total time will be noted and both computers will return to the terminal mode. At that point you can switch back to voice contact or use the keyboard. If you make it all the way through the transfer without an abort, there is an excellent chance that the program you have transferred will load and run.

Keep in mind that many machine language games and programs are very long. It may take a half-hour or more to complete the transfer. Don't be impatient. As long as you see those dashes, you know that the transfer is proceeding normally.

Program 8-1. The Short Terminal Program (Renumbered)

```
5 OPEN2,2,0,CHR$(6)
210 GET#2,A$:IFA$=""THEN300
220 PRINTA$;
300 GETA$:IFA$=""THEN210
360 PRINT#2,A$;:GOTO210
```

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Program 8-2. Modified Terminal Program, Version 2

Refer to "The Automatic Proofreader," Appendix B, before typing this program. Hold down the SHIFT when typing any underlined letters.

```
5 OPEN2,2,0,CHR$(38)+CHR$(96) :rem 40
10 C$=CHR$(147):J$=CHR$(20):K$=CHR$(187) :rem 100
20 PRINTC$+CHR$(14) :rem 56
100 PRINT"LOADING TRANSLATION TABLES":GOSUB1000 :rem 101
200 PRINTC$+"ON LINE":PRINTK$; :rem 43
210 GET#2,A$:IFA$=""THEN300 :rem 202
220 A=I$(ASC(A$)):PRINTJ$+CHR$(A)+K$; :rem 38
225 IFA=34THENPOKE212,0 :rem 92
300 GETA$:IFA$=""THEN210 :rem 73
360 PRINT#2,CHR$(O$(ASC(A$)));:GOTO210 :rem 140
1000 DIMI$(255),O$(255) :rem 131
1010 FORZ=32TO64:O$(Z)=Z:NEXT :rem 27
1020 O$(13)=13:O$(20)=8:O$(160)=32 :rem 155
1030 FORZ=65TO90:Y=Z+32:O$(Z)=Y:NEXT :rem 219
1040 FORZ=91TO95:O$(Z)=Z:NEXT :rem 39
1050 FORZ=193TO218:Y=Z-128:O$(Z)=Y:NEXT :rem 121
1070 FORZ=0TO255:Y=O$(Z):IFY<>0THENI$(Y)=Z :rem 78
1080 NEXT:RETURN :rem 34
```

Program 8-3. Modified Terminal Program, Version 3

Refer to "The Automatic Proofreader," Appendix B, before typing this program. Hold down the SHIFT when typing any underlined letters.

```
5 OPEN2,2,0,CHR$(38)+CHR$(96) :rem 40
10 C$=CHR$(147):J$=CHR$(20):K$=CHR$(187) :rem 100
20 PRINTC$+CHR$(14) :rem 56
30 SYS65517:IFPEEK(781)=40THEN MACH=6:P1=56577:P2=56579 :rem 180
40 IFPEEK(781)=22THEN MACH=2:P1=37136:P2=37138 :rem 92
50 POKEP2,(PEEK(P2)OR36):PRINTCHR$(1) :rem 223
60 IFMACH=6THENPOKE53280,1:POKE53281,1:PRINTCHR$(152) :rem 184
70 IFMACH=2THENPOKE36879,25:PRINTCHR$(144) :rem 50
100 PRINT"LOADING TRANSLATION TABLES":GOSUB1000 :rem 101
120 ID$(1)="77770,101"+CHR$(13) :rem 242
130 ID$(2)="FREE-DEMO"+CHR$(13) :rem 158
140 ID$(3)="GO CBM-963"+CHR$(13) :rem 99
150 ID$(4)="OFF"+CHR$(13) :rem 9
160 PRINTC$:GOTO1900 :rem 200
200 PRINTC$+"ON LINE":PRINTK$; :rem 43
```

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```

210 GET#2,A$:IFA$=" "THEN300 :rem 202
220 A=I$(ASC(A$)):PRINTJ$+CHR$(A)+K$: :rem 38
225 IFA=34THENPOKE212,0 :rem 92
300 GETA$:IFA$=" "THEN210 :rem 73
310 IFA$=CHR$(94)THENPOKE1,0:GOTO160 :rem 201
320 IFA$=CHR$(137)THEN S=1:GOTO800 :rem 174
330 IFA$=CHR$(138)THEN S=2:GOTO800 :rem 177
340 IFA$=CHR$(139)THEN S=3:GOTO800 :rem 180
350 IFA$=CHR$(140)THEN S=4:GOTO800 :rem 174
360 PRINT#2,CHR$(O%(ASC(A$))):GOTO210 :rem 140
800 FORX=1TOLEN(ID$(S)) :rem 109
810 T$=MID$(ID$(S),X,1) :rem 211
820 PRINT#2,CHR$(O%(ASC(T$))): :rem 154
830 NEXT :rem 218
840 IFS=4THENPRINT"LOGGING OFF...":FORX=1TO1000:NE
    XTX:POKE1,0:GOTO160 :rem 199
850 GOTO210 :rem 105
1000 DIMI$(255),O$(255) :rem 131
1010 FORZ=32TO64:O$(Z)=Z:NEXT :rem 27
1020 O$(13)=13:O$(20)=8:O$(160)=32 :rem 155
1030 FORZ=65TO90:Y=Z+32:O$(Z)=Y:NEXT :rem 219
1040 FORZ=91TO95:O$(Z)=Z:NEXT :rem 39
1050 FORZ=193TO218:Y=Z-128:O$(Z)=Y:NEXT :rem 121
1060 O$(133)=03:O$(134)=19:O$(135)=17:O$(136)=16
    :rem 123
1070 FORZ=0TO255:Y=O$(Z):IFY<>0THENI$(Y)=Z :rem 78
1080 NEXT:RETURN :rem 34
1900 P$(1)="4479012":P$(2)="6341713":P$(3)="123456
    7":P$(4)="1234567" :rem 6
1910 P$(5)="1234567":P$(6)="1234567":P$(7)="123456
    7":P$(8)="1234567" :rem 27
1920 FORX=1TO8:PRINTX;+"-":P$(X):NEXTX :rem 56
1930 PRINT" 9 -MANUAL ENTRY" :rem 84
1935 PRINT" 0 -TERMINAL MODE" :rem 129
1940 PRINT:PRINT"SELECTION ?" :rem 203
1950 GETB$:IFB$=" "THEN1950 :rem 195
1960 B=VAL(B$) :rem 233
1970 PH$=P$(B) :rem 209
1980 IFB=0THENPOKE1,36:GOTO200 :rem 137
1990 IFB<9THEN2010 :rem 11
2000 PRINT:PRINT"ENTER PHONE NUMBER":INPUTPH$
    :rem 92
2010 PRINT:PRINT"HOW MANY REDIALS (1-100)":INPUT R
    D :rem 162
2020 FORR=1 TO RD :rem 164
2030 PRINTC$:PRINT"DIALING....":POKE1,36:FORY=1TO
    1000:NEXTY :rem 145
2040 FORPN=1TOLEN(PH$) :rem 72
2050 NN=VAL(MID$(PH$,PN,1)) :rem 6
2060 GOSUB2500:NEXTPN :rem 38

```

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```
2070 FORDL=1TO2000:Q=PEEK(P1)AND16:IFQ=0THEN200      :rem 84
2075 GETA$:IFA$=CHR$(94)THENPOKEP1,0:GOTO160          :rem 130
2080 NEXTDL:POKEP1,0                                   :rem 223
2090 PRINT:PRINT"NO CONNECTION ON ";PH$:FOR Y=1TO10   :rem 247
      00:NEXTY:NEXT R:GOTO160
2500 PRINT NN;:IF NN=0THEN NN=10                      :rem 102
2510 FORX=1TO NN                                       :rem 180
2520 POKEP1,0:FORXX=1TO45:NEXTXX                     :rem 73
2530 POKEP1,36:FORXX=1TO24:NEXTXX                    :rem 128
2540 NEXTX                                             :rem 98
2550 FORDL=1TO200:NEXTDL:RETURN                       :rem 9
```

Program 8-4. The World's Simplest Transfer Program

Refer to "The Automatic Proofreader," Appendix B, before typing this program.

```
0 OPEN2,2,0,CHR$(6):PRINT CHR$(147);                 :rem 242
1 GET#2,A$:IFVAL(A$)=0THEN1                            :rem 38
2 PRINTA$;                                              :rem 95
3 GET#2,A$:PRINTA$;:IFA$<>CHR$(13)THEN3               :rem 32
4 PRINT:PRINT"POKE152,1:GOTO6"                        :rem 153
5 POKE631,19:POKE632,13:POKE633,13:POKE634,13:POKE  :rem 207
  198,4:END
6 PRINT CHR$(147);:GOTO3                               :rem 146
```

Program 8-5. The STONER-MODEM

Refer to "The Automatic Proofreader," Appendix B, before typing this program. Hold down the SHIFT when typing any underlined letters.

```
10 PRINT CHR$(14):GOTO 3000                            :rem 219
20 J$=CHR$(20):K$=CHR$(187):R$=CHR$(13):G$=CHR$(19  :rem 126
   9):H$=CHR$(6)
25 N$=CHR$(1)                                           :rem 153
30 P1=56577:P2=56579:OV=255:W=199:ML=828:BU=870:D=  :rem 179
   8
50 POKE P2,(PEEK(P2)OR36)                               :rem 149
60 POKE 53280,1:POKE 53281,1:PRINT CHR$(152)         :rem 110
70 REM                                                  :rem 75
100 PRINT CHR$(147);CHR$(18);TAB(6)" LOADING TRANS  :rem 181
   LATION TABLES ":GOSUB 400
160 PRINT CHR$(147):GOTO500                             :rem 26
200 PRINT CHR$(147):PRINT CHR$(18);TAB(16)" ON LIN  :rem 211
   E ":PRINT K$;
```

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```

210 GET#2,A$:IF A$="" THEN 300 :rem 202
220 A=I$(ASC(A$)):PRINTJ$+CHR$(A)+K$: :rem 38
225 IF A=34 THEN POKE 212,0 :rem 92
300 GET A$:IF A$=""THEN 210 :rem 73
305 IF HD THEN PRINT J$+A$+K$: :rem 66
310 IF A$=CHR$(94) THEN POKEP1,0:GOTO 160 :rem 201
320 IF A$=CHR$(137) THEN 1100 :rem 164
330 IF A$=CHR$(138) THEN 2000 :rem 166
340 IF A$=CHR$(139) THEN 200 :rem 120
350 IF A$=CHR$(140) THEN 200 :rem 113
360 PRINT#2,CHR$(O$(ASC(A$)));:GOTO 210 :rem 140
400 DIM I$(255),O$(255) :rem 86
410 FOR Z=32 TO 64:O$(Z)=Z:NEXT :rem 238
420 O$(13)=13:O$(20)=8:O$(160)=32 :rem 110
430 FOR Z=65 TO 90:Y=Z+32:O$(Z)=Y:NEXT :rem 174
440 FOR Z=91 TO 95:O$(Z)=Z:NEXT :rem 250
450 FOR Z=193 TO 218:Y=Z-128:O$(Z)=Y:NEXT :rem 76
460 O$(133)=03:O$(134)=19:O$(135)=17:O$(136)=16 :rem 78
470 FOR Z=0 TO 255:Y=O$(Z):IF Y<>0 THEN I$(Y)=Z :rem 33
480 NEXT:O$=CHR$(0) :rem 71
490 FOR X=828 TO 862:READ A:POKE X,A:NEXT:RETURN :rem 86
500 P$(1)="4479012":P$(2)="6341713":P$(3)="1234567
    ":P$(4)="1234567" :rem 209
510 P$(5)="1234567":P$(6)="1234567":P$(7)="1234567
    ":P$(8)="1234567" :rem 230
520 FOR X=1 TO 8:PRINT X;+"-"P$(X):NEXT :rem 171
530 PRINT" 9 -MANUAL ENTRY" :rem 31
535 PRINT" 0 -TERMINAL MODE" :rem 76
540 PRINT:PRINT"SELECTION ?" :rem 150
550 GET B$:IF B$="" THEN 550 :rem 89
560 B=VAL(B$) :rem 180
570 PH$=P$(B) :rem 156
580 IF B=0 THEN POKEP1,36:GOTO 200 :rem 84
590 IF B<9 THEN 610 :rem 170
600 PRINT:PRINT"ENTER PHONE NUMBER";:INPUT PH$ :rem 48
610 PRINT:PRINT"HOW MANY REDIALS (1-100)":INPUT RD :rem 118
620 FOR R=0 TO RD :rem 119
630 PRINT C$:PRINT"DIALING....":POKE P1,36:FOR Y=1 :rem 101
    TO 1000:NEXT Y
640 FOR PN=1 TO LEN(PH$) :rem 28
650 NN=VAL(MID$(PH$,PN,1)) :rem 218
660 GOSUB 700:NEXT PN :rem 202
670 FOR DL=1 TO 1000:Q=PEEK(P1)AND16:IF Q=0 THEN 2 :rem 39
    00

```

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```

675 GET A$:IF A$=CHR$(94) THEN POKE P1,0:GOTO 160
                                                    :rem 86
680 NEXT DL:POKE P1,0
                                                    :rem 179
690 PRINT:PRINT"NO CONNECTION ON ";PH$:FOR Y=1 TO
    1000:NEXT Y:NEXT R:GOTO 160
                                                    :rem 203
700 PRINT NN;:IF NN=0 THEN NN=10
                                                    :rem 54
710 FOR X=1 TO NN
                                                    :rem 132
720 POKE P1,0:FOR XX=1 TO 24:NEXT XX
                                                    :rem 22
730 POKE P1,36:FOR XX=1 TO 12:NEXT XX
                                                    :rem 77
740 NEXT X
                                                    :rem 50
750 FOR DL=1 TO 200:NEXT DL:RETURN
                                                    :rem 217
1100 PRINT CHR$(147):PRINT CHR$(18);TAB(11)" DOWNL
    OADER PROGRAM ":PRINT:PRINT
                                                    :rem 221
1110 GOSUB 2410
                                                    :rem 10
1135 CLOSE 8:CLOSE 15
                                                    :rem 142
1140 OPEN8,8,8,FL$+",P,W":OPEN15,8,15:INPUT#15,A,B
    $:PRINT" B$:IFA<>0THEN1110
                                                    :rem 121
1150 TI$="000000"
                                                    :rem 41
1170 GOSUB 1360:IF X<>8 THEN FOR L=1 TO 1100:GET#2
    ,B$:NEXT:GOTO 1170
                                                    :rem 209
1180 L$="":CN=0
                                                    :rem 243
1190 FOR L=1 TO 100:GOSUB 1360
                                                    :rem 36
1200 IF RE THEN CN=CN+1:IF CN=3 THEN GOTO 1230
                                                    :rem 203
1210 NEXT:GOTO 1170
                                                    :rem 63
1230 IF N<>13 THEN 1170
                                                    :rem 121
1240 CK=0:TS=-5:FOR L=1 TO 200:GOSUB 1360
                                                    :rem 214
1260 IF RE THEN CK=CK+N
                                                    :rem 240
1270 IF RE THEN L$=L$+CHR$(N):IF LEN(L$)=>128 THEN
    TS=CKAND255:GOTO 1300
                                                    :rem 205
1280 NEXT:PRINT":":GOTO 1170
                                                    :rem 198
1300 FOR L=1 TO 125:GOSUB 1360
                                                    :rem 36
1320 IF RE AND N<>TS THEN PRINT":":GOTO 1170
                                                    :rem 223
1330 IF RE AND (N=TS) THEN PRINT"-":GOTO 1380
                                                    :rem 234
1340 NEXT:GOTO 1170
                                                    :rem 67
1360 GET#2,B$:X=ST:IF X>7 THEN RE=0:N=-5:RETURN
                                                    :rem 17
1370 N=ASC(B$+O$):RE=1:RETURN
                                                    :rem 219
1380 PRINT#2,R$:R$:CHR$(6);:PRINT#8,L$:
                                                    :rem 248
1390 IF LEFT$(L$,1)="_G" AND RIGHT$(L$,3)=R$+R$+R$
    THEN 1410
                                                    :rem 144
1400 GOTO 1170
                                                    :rem 199
1410 PRINT#8:CLOSE 8:CLOSE 15:PRINT R$R$"ACTUAL TI
    ME=";
                                                    :rem 4
1415 PRINT MID$(TI$,3,2)": "RIGHT$(TI$,2):GOSUB 240
    0:GOTO 200
                                                    :rem 58

```

```

2000 PRINT CHR$(147):PRINT CHR$(18);TAB(11)" UPLOA
      DER PROGRAM ":PRINT:PRINT                                :rem 74
2010 REM                                                         :rem 167
2060 POKE 251,D:CLOSE 15:CLOSE D                                :rem 9
2070 REM                                                         :rem 173
2080 GOSUB 2410                                                  :rem 17
2100 OPEN 15,D,15                                              :rem 93
2110 OPEN D,D,D,FL$+"",P,R":TI$="000000"                        :rem 1
2120 INPUT#15,A,B$:PRINT B$:IF A THEN 2070 :rem 12
2130 SYS ML:GOSUB 2180                                          :rem 227
2140 FOR L=1 TO 800                                           :rem 163
2150 GET#2,B$:IF B$<>H$ THEN NEXT:PRINT":": :GOSUB
      2180:GOTO 2140                                           :rem 81
2160 IFPEEK(BU)=WANDPEEK(BU+125)=13ANDPEEK(BU+126)
      =13ANDPEEK(BU+127)=13THENEFF=1                          :rem 240
2165 IF EF THEN 2210                                           :rem 220
2170 PRINT"-":GOTO 2130                                         :rem 60
2180 C=0:PRINT#2,N$;N$;R$;                                     :rem 206
2190 FOR L=0 TO 127:N=PEEK(L+BU):PRINT#2,CHR$(N):;
      C=C+N:NEXT                                              :rem 4
2200 PRINT#2,CHR$(CAND255):RETURN                               :rem 43
2210 CLOSE D:CLOSE 15                                          :rem 149
2215 PRINT R$R$"ACTUAL TIME= "MID$(TI$,3,2)": "RIGH
      T$(TI$,2):GOSUB 2400:GOTO 200                             :rem 143
2290 DATA 166,251,32,198,255,160,0                          :rem 142
2300 DATA 166,251,32,228,255,153,102                        :rem 229
2310 DATA 3,200,192,128,208,243,96                          :rem 134
2320 DATA 96,252,200,192,127,208,238                        :rem 240
2330 DATA 96,0,0,0,0,0,0                                     :rem 121
2400 FOR X=1 TO 1000:NEXT:RETURN                               :rem 106
2410 PRINT"PRESS RETURN TO SEE YOUR DIRECTORY OR T
      FOR TERMINAL MODE..."                                :rem 112
2420 FL$="":PRINT:INPUT"FILE NAME ";FL$:IF FL$=""T
      HEN GOSUB 2500:GOTO 2420                                  :rem 183
2430 IF FL$="T" OR FL$="T" THEN 200                             :rem 80
2440 RETURN                                                    :rem 170
2500 PRINT CHR$(147)" PRESS ANY KEY TO STOP LISTIN
      G":PRINT:OPEN 6,8,0,"$0"                                :rem 84
2510 GET#6,A$,B$:GOTO 2550                                     :rem 99
2520 GET#6,B$:PRINT B$:IF B$>"" THEN 2520:rem 165
2530 PRINT:GET E$:IF E$<>"" THEN 2570                          :rem 199
2540 REM BY STEVE BLAIR                                         :rem 59
2550 GET#6,A$,B$,C$,D$                                         :rem 79
2560 IF ST<>64 THEN PRINT ASC(C$+O$)+256*ASC(D$+O$
      );:GOTO 2520                                           :rem 103
2570 CLOSE 6:RETURN                                             :rem 148
3000 PRINT CHR$(147);CHR$(18);" MAKE THE FOLLOWING
      SELECTIONS.... ":PRINT                                :rem 219
3010 PRINT" DO YOU WANT.....":PRINT                        :rem 186

```

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```
3020 PRINT"(1) SEVEN BITS, EVEN PARITY (COMPSERVE
)"                                     :rem 216
3030 PRINTTAB(20)"OR":PRINT          :rem 137
3040 PRINT"(2) EIGHT BITS, NO PARITY (BBS OR XFER)
":PRINT                               :rem 37
3050 PRINT CHR$(18);TAB(15)"SELECTION";:INPUT X
                                     :rem 160
3060 IF X=2 THEN OPEN 2,2,2,CHR$(6):GOTO 3100
                                     :rem 89
3070 IF X=1 THEN OPEN 2,2,2,CHR$(38)+CHR$(96):GOTO
3100                                :rem 122
3080 GOTO 3000                      :rem 199
3100 X=0:PRINT:PRINT"(1) FULL DUPLEX (COMPSERVE &
BBS) OR":PRINT                     :rem 33
3110 PRINT"(2) HALF DUPLEX (XFER)":PRINT :rem 211
3120 PRINT CHR$(18);TAB(15)"SELECTION";:INPUT X
                                     :rem 158
3130 IFX=1 THEN HD=0:GOTO 20        :rem 25
3140 IFX=2 THEN HD=1:GOTO 20        :rem 28
3150 GOTO 3100                      :rem 198
```

9

Host Programs

Host Programs

Have you ever wanted to use your computer as a host rather than as a terminal? Maybe you would like to establish a communications link for your friends, or (if you have a business) you may wish to provide a computerized catalog or order entry system.

What's the difference between using your computer as a host rather than a terminal? There are several hardware and software considerations. By convention, your modem should be set to the answer mode. Of course, it will also be working in the originate mode, but those calling your computer will expect to find it in the answer mode. They will have their modem set for originate. If you are not set for answer mode, no connection will be established.

It is the software that determines whether your computer is a terminal or a host. The first few lines of a typical host program will configure the modem for the autoanswer mode. This is not the same as answer mode. Selecting the answer mode is usually done by the hardware. Most low cost-modems have a switch to select between originate and answer modes, and the switch position determines which tone frequencies are used for send and receive. The autoanswer mode means that when the modem is called (receives a ring signal on the telephone line), it will answer the call (take the modem off hook) and thereby connect the modem to the telephone line.

The software must also provide a character echo. You will recall that when you call a host, operating in full duplex, the host echoes the characters you send. In other words, characters received by the host are retransmitted and appear on your screen. The character echo can be done with hardware but again, by convention, it is usually accomplished with software.

The Notepad, a Simple VIC or 64 Host Program

To illustrate just how simple a host program can be, take a look at Program 9-1. It was written for the Commodore 64 but will even work with an unexpanded VIC-20. There is provision for keyboard sending between computers, if desired.

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Line 1 specifies the address of the RS-232 port. Use 56577 for the 64 and 37136 for the VIC.

Line 5 sets up the Commodore 1650 modem and places it in the autoanswer mode. The CHR\$(38) and CHR\$(96) set the RS-232 Kernal routines for 300 baud with a seven-bit word and even parity.

Line 10 establishes K\$ as the backspace-and-erase character, C\$ as the clear-screen character, and J\$ as the cursor character. The latter can be changed to any character desired.

Line 15 changes the 64 screen to all white. Replace this with POKE 36879,25 for the VIC-20. The CHR\$(14) in line 20 converts the screen to upper/lowercase, while C\$ clears the screen.

When the modem is called, a one-line message is sent out to the calling party. This message is called MS\$ and is established by line 40. You can change this to any message desired so long as it is less than 80 characters in length.

At that point, the program loads the customary translation tables. Even though it is a host program, tables to translate between ASCII and Commodore are still required. A message, printed by line 30, assures you that something is happening during the pause while these tables are being loaded. The translation tables are set up by lines 50-100.

Once the tables are in place, the modem is ready to answer the telephone. You are advised of this condition when the message in line 105 is printed. A reminder about setting your modem switches is printed by line 107.

Line 110 zeros out all the bits of the user port address (56577 for the 64). It then looks at bit 4 of the port to see if the ring indicator line is active. If a ring signal is received, line 112 causes the program to jump to line 118. If no ring is present, the sequence falls through line 112, and line 116 causes a return to line 110. The program once again looks for a ring signal. This sequence repeats until a call comes in.

When the modem goes off hook, the program branches to line 118 and announces the fact that the modem has answered the ring. Line 120 decides if a computer is calling or if a human has stumbled onto a wrong number. The FOR-NEXT loop waits about 20 seconds for the calling party to send a carrier; if no carrier is received (that is, if variable Q does not change to zero), the program falls through line 120 and line

125 causes a reset to line 105. If a carrier is received, line 120 causes the program to branch to line 135.

The FOR-NEXT loop in line 135 provides a slight delay before the MS\$ message is sent. Line 140 scans the string a character at a time. A temporary string (T\$) is created from the MID\$ established in line 150. Line 160 prints the characters (held in T\$) on the screen and also sends the character out the user port to the modem. Line 170 gets the next successive character in the message string (MS\$). The process repeats until the message is sent to the caller.

Line 190 prints the cursor on the screen, while lines 200–350 provide the main line of the program. Line 200 looks at the fifth bit to see if there is still a carrier present. If the carrier drops, the value of Q changes to 16. The remainder of the line resets the modem, preparing it for another call, and branches to line 105.

Line 210 gets a character from the modem. If none is present, the program looks at the keyboard. If a modem character is received, it prints it on the screen. Line 230 also echoes the incoming character back to the sender. Note that the echoed character need not pass through the translation tables. Line 350 prints any character input from the keyboard and sends it to the calling computer.

Program 9-1. Notepad for the VIC and 64

Refer to "The Automatic Proofreader," Appendix B, before typing this program. Hold down the SHIFT when typing any underlined letters.

```

1 PO=56577:REM FOR VIC USE 37136 :rem 243
5 OPEN2,2,3,CHR$(38)+CHR$(96):POKE PO+2,32 :rem 33
10 K$=CHR$(20):C$=CHR$(147):J$=CHR$(187) :rem 100
15 POKE53280,1:POKE53281,1 :rem 189
20 PRINT CHR$(14)+C$ :rem 56
30 PRINT CHR$(144)+"LOADING DATA..." :rem 236
40 MS$=C$+"HI-HERE'S DON STONER'S NOTE PAD. LEAVE
   {SPACE}ME A ONE SCREEN MESSAGE" :rem 109
50 DIM I$(255):DIM O$(255) :rem 15
60 FOR Z=32TO64:O$(Z)=Z:NEXT:O$(13)=13:O$(20)=8:O$(
   160)=32 :rem 209
70 FOR Z=65TO90:Y=Z+32:O$(Z)=Y:NEXT:FORZ=91TO95:O$(
   Z)=Z:NEXT :rem 26
80 FOR Z=193TO218:Y=Z-128:O$(Z)=Y:NEXT :rem 27
90 O$(133)=03:O$(134)=19:O$(135)=17:O$(136)=16 :rem 29
100 FOR Z=0TO255:Y=O$(Z):IFY<>0THENI$(Y)=Z :rem 23

```

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```
103 NEXT:PRINT C$                                :rem 1
105 PRINT:PRINT"AWAITING CALL...."              :rem 86
107 PRINT:PRINT"MAKE SURE MODEM IS ON D AND A"   :rem 16
110 POKE PO,0:Q=PEEK(PO)AND8                      :rem 164
112 IF Q=0 THEN 118                               :rem 170
116 GOTO 110                                       :rem 99
118 POKE PO,32:PRINT"PHONE ANSWERED"             :rem 215
120 FOR X=1TO2000:Q=PEEK(PO)AND16:IF Q=0 THEN 135 :rem 11
125 NEXT X:GOTO 105                               :rem 56
135 FOR X=1TO1000:NEXT X                          :rem 123
140 FOR X=1TO LEN(MS$)                          :rem 217
150 T$=MID$(MS$,X,1)                             :rem 63
160 PRINTT$;:PRINT#2,CHR$(O%(ASC(T$)));          :rem 17
170 NEXT                                           :rem 215
180 FOR X=1TO1500:NEXT                           :rem 40
190 PRINT J$;                                     :rem 208
200 Q=PEEK(PO)AND16:IF Q<>0 THEN POKE PO,0:GOTO 10 :rem 149
5                                           :rem 202
210 GET#2,A$:IF A$="" THEN 300
220 A=I%(ASC(A$)):PRINT K$+CHR$(A)+J$;:IF A=34 THE :rem 35
N POKE212,0
230 PRINT#2,A$;                                  :rem 67
240 GOTO 200                                       :rem 97
300 GET A$:IF A$="" THEN 200                     :rem 72
350 PRINT K$+A$+J$;:PRINT#2,CHR$(O%(ASC(A$)));:GOT :rem 36
O 200
```

A Simple Bulletin Board

If you have a Commodore 64 or VIC-20, you can have a lot of fun with Program 9-2. It will let people call your computer, read your bulletins, and leave or read messages. There is even a user log so that you (or others) can see who called your bulletin board system. A "chat" function has been included, in case the person calling your computer wants to talk with the SYSOP.

Everything is held in memory, which is no problem for the 64. For the VIC, however, you will need a memory expander that provides at least 16K. You do not need a disk drive to use the program, but if you turn the computer off you will lose any messages which have been left by callers. There is room to add a cassette or disk message save routine, however, as you'll see later on.

This is an ideal learning program. If you have a little

knowledge of BASIC programming, you can gain considerable practical experience with the language by modifying and customizing the program. For this reason, detailed explanation of the program functions is provided in the following paragraphs. However, if you make modifications, always save an unmodified copy of the original program or a backup of your previous version in case you foul something up.

The program is written in modules. For example, the 1000 section provides the translation tables. Section 2000 prints the 10-line bulletin. Section 3000 opens the system so that the system operator (SYSOP) can communicate with the calling party. Section 4000 is the message entry routine, while section 5000 prints the information bulletin. Section 6000 handles the log off, and section 7000 permits message retrieval. Section 8000 prints the user log, and section 9000 offers some protection against those who try to crash the system.

Section 10000 holds the strings for bulletins, information about the system and so on. Section 20000 is used for the system operator routines.

Line 10 opens the modem port at 300 baud and selects a seven-bit word with even parity. If you prefer an eight-bit word with no parity (very common on Commodore BBSs), change the line to read `10 OPEN2,2,3,CHR$(6)`.

Line 20 checks to see if your computer is a VIC or 64. `SYS 65517` executes a routine which puts the number of screen columns into location 781. By `PEEKing` 781 the program determines whether your computer has 22 columns (which means you have a VIC) or 40 (which means you have a 64). Variables are then set accordingly.

Line 40 defines the commonly used strings. For example, `R$` becomes the carriage return, `C$` is defined as the clear-home character, while `K$` is the block cursor and `J$` does a backspace and erase.

You may recall, from the development of the terminal program in Chapter 8, that it's necessary to `POKE` a zero into memory location 212 whenever a quote character is received. The speed of program execution can be increased slightly by defining these two values as constants. Line 50 defines the quote character as constant `U`, memory location 212 is defined as `V`. The commonly required value of zero is defined as constant `W`. The constant `D` is the bit value at the modem port when no carrier is received.

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Some commonly used variables are initialized in line 60. For example, US is the user number, MN is the message number.

Storing Messages

Line 70 dimensions several arrays which are used by the program. The translation tables are defined as I% and O% for input and output, respectively. The messages are held in ME\$, and each message may be up to nine lines long. The number of messages that can be stored is determined by the value of MX in line 60. The program is shown with MX=50, since that is about the maximum number of messages that can be held in the 64. For the VIC, the number of messages depends on the amount of memory available. The program will run on a VIC with 8K expander, but with no memory left over to hold any messages. A VIC with 16K expander can hold about 20 messages. Change the value of the MX to suit your configuration. Other arrays used with messages are SU\$, which holds the message subject, TU\$, which holds the message recipient, UR\$, which holds the name of the sender, and NL, which holds the number of lines used in the message.

There is one other way to reduce the amount of memory required, and thus increase the number of messages which may be stored. That is to reduce the allowable length of each line of input, controlled by the variable L. The program is currently set up to allow lines of 80 characters, but this can be changed to limit the amount of memory a message can occupy. For example, you might limit the caller to 40 characters (one screen line on the 64) or 44 characters (two screen lines on a VIC). Do this by assigning the desired value to L in line 60.

The other array dimensioned in line 70 is US\$. This array holds the log of system users. The maximum number of names maintained in the log is specified by the value of MU in line 60. You can change the length of the log by changing the value assigned to MU. Although MU and MX are presented here with the same value, the two do not have to be kept equal.

Line 80 sets the modem to the autoanswer mode and advises that the program is loading the translation tables. These are located at line 1000 and were discussed in Chapter 8. Line 90 switches to upper/lowercase printing and reminds you to set the modem switches.

Lines 100–120 set the screen color and print notes to the operator, while line 130 advises that the system is ready. The wait-for-ring loop is located in lines 140–170. When the modem receives a call, variable Q changes to a zero and the program branches to line 180. The screen color changes and a message advises that the modem has been called.

Who's Calling

The next step is to see if the caller is a computer. Lines 200–210 wait approximately 20 seconds to see if a carrier is being sent. If none is received, the modem is reset and the program awaits the next caller. If a carrier is detected, line 200 branches to line 220. This line causes the modem to go off hook and then proceeds to print the welcome message.

Throughout the program the string variable P\$ is frequently used. Whenever you send a character or sentence to the calling party, it is converted to P\$ and sent to the character output routine (section 1200). If there are a series of lines to send (such as the welcome message or information bulletin) they are called P\$(1), P\$(2), and so on.

The first instance of sending a message occurs at line 230. The program branches to line 10000, where the welcome message is located. It could be made up of as many as 10 strings, each containing 80 characters.

Note that P\$(4) contains only an asterisk (*), which is used as a message end delimiter. If you use less than 10 strings, make this character the last string. If you do not, the program will crash.

After P\$ is loaded with the characters to be sent, the program returns to line 230. A FOR-NEXT loop in lines 160–230 sends up to 10 strings. If the asterisk is detected before completion of the FOR-NEXT loop, the program ends the loop.

The section beginning at line 300 determines who is calling. The first step, GOSUB 10100, diverts to the subroutine that inserts the name and location questions into P\$ and returns. Line 310 then makes P\$ equal to P\$(1). The GOSUB to 1200 prints the characters on your screen and sends the string to the modem and the caller. This routine (lines 1200–1230) is the familiar disassembly technique that was used for auto log on in Chapter 8.

At this point, "First Name?" appears on the caller's screen. The program then GOSUBs to section 1300 and looks

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for incoming characters. That subroutine first looks at the carrier detect bit (lines 1105 and 1150) to insure that the caller is still on line. If $Q=16$ then the program immediately resets the modem and awaits the next call. In such a case, the caller's name is not added to the user log. Note that the status of the carrier detect bit is checked every time the program attempts to receive a character from the modem.

The same procedure handles the last name and location questions. The program then repeats the caller's name and location and asks if the program has it correctly (line 330). If there is an error, line 350 branches back to the beginning of the log in routine. If the caller answers Y or y, the program proceeds to the welcome line at 400. If any character other than an upper- or lowercase Y or N is entered, line 360 repeats the confirmation message at line 330.

Note that the welcome is personalized and repeats the caller's name. Another feature is word completion upon entry of the first character. For example, if the caller presses the Y (to signify the log in data is correct), the program automatically completes the word by sending "es" back to the caller.

Line 410 combines the log in data into the string U\$. This will be used to identify the caller in any messages he or she sends, and to create an entry in the user log when the caller logs off.

The Main Menu

The main menu section begins with line 500, which provides a slight delay before printing the menu. The GOSUB in line 510 gets the menu lines in array P\$. Since there are seven menu selections, a FOR-NEXT loop is included in line 510. If you add more menu items, this loop will have to be modified. To be consistent, the menu selections in 10200 should have been terminated with an asterisk as was done earlier. This would permit adding more selections without other changes.

The GOSUB in line 510 prints the menu on the caller's screen. Line 520 prompts the caller for an input, while lines 530–560 determine what input has been received from the caller. If the caller enters something other than a valid selection, the prompt in line 520 repeats. If a correct selection is made, these lines branch to the modules discussed earlier.

Lines 1000–2000 hold various subroutines. Lines 1000–1040 are the translation tables. Lines 1100–1115 get input

from the operator or from the modem. Line 1120 is an answer prompt, while lines 1125 and 1130 provide word completion for yes and no. Line 1140 is a commonly used delay loop. Line 1150 checks the status of the modem. Lines 1160–1175 set up the sound generator. This is used to alert the SYSOP if someone wants to keyboard back and forth. If someone selects the chat option, the monitor or TV will emit a tone. Line 1180 is used to pause action after a screen display.

Section 1200 handles outgoing strings, while 1300 looks for incoming characters. Line 1350 checks to see if the variable SS has been set to 1, which indicates that the routine is to get only one character. Otherwise, the routine gets characters until RETURN is pressed (see line 1340, which checks whether the character received was CHR\$(13), the RETURN character). Line 1360 handles the delete or backspace character, and lines 1370–1390 check whether the input string length has been exceeded and branch accordingly, using the subroutine at 9000 to print a warning if the limit has been exceeded.

The bulletin handler is located in the 2000 series numbers. The bulletin strings are stored at 10300. You can modify this bulletin to suit yourself. Be sure that each line is identified as P\$(n), and (if you use less than the full 10 strings) that the last string contains only an asterisk.

The 3000 numbers contain the chat with SYSOP routines. If someone selects this option, the program branches to this section and prints the text contained in line 3000. Lines 3010–3030 turn on the sound for about 30 seconds. If you press the up-arrow key, the sound will stop and the keyboard will be activated (see line 3020). If you do not press this key, the FOR-NEXT loop falls through to 3040, which sends the “sorry” message to the caller. You can modify this line to contain other messages, if desired.

Lines 3100–3220 contain the actual keyboarding routine for the SYSOP. The characters you type are printed on your screen and sent to the modem by line 3210. If you press the up-arrow again, it ends the chat routine and returns to the main loop of the program.

The 4000-series lines hold the message entry routine, with editing capability built in. As you may recall from the dimension statements at the beginning of the program, there is sufficient memory in the 64 to hold 50. The number of messages which may be stored in a VIC will depend on the amount of

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expansion memory installed. If the message storage array is full, line 4000 informs that caller that no additional messages can be entered and then returns to the main menu.

Lines 4010 and 4020 give the caller details of the message entry. Line 4030 identifies the recipient of the message, and line 4040 allows the caller to specify the subject. The actual message entry loop is lines 4050–4090. Line 4050 includes a warning to the sender when there is only one line remaining. Line 4070 allows you to end the message by typing only Q as the entry for a line; otherwise, message entry ends when nine lines have been entered.

Line 4100 asks the caller what to do with the message. Lines 4120–4150 echo the choice and branch to the selected section of the message entry program. If the caller selects the Abort option, line 4200 calls the subroutine at 1120 to be sure that the caller really wants to leave the message entry section.

Message editing starts at line 4300, which asks what line needs editing. Line 4310 checks that the specified line exists, and line 4320 displays the selected line. When the line is re-entered, the program branches back to the message entry menu at line 4100.

The routine in lines 4400–4460 allows you to review your message. In addition to displaying the message, the routine repeats From-To-Subject information just as it will be stored. The names of all message originators are stored in the user log, which can be called from the main menu.

The system information routine is located in the 5000-series line numbers. It functions the same as the bulletin routine in the 2000-series line numbers. The actual strings which are sent to the caller are stored between lines 10400 and 10490. These should be changed to suit your system.

The log off routines are located in the 6000 line number range. Line 6000 calls the subroutine at line 1120 to insure that the caller actually intends to leave the system. The messages in lines 6010 and 6020 can be changed to suit your needs. Line 6030 resets the modem to autoanswer. The delay loops in line 6030 are needed to provide sufficient time for the telephone company equipment to disconnect. They also prevent the program from starting over when no carrier is present. Line 6040 adds the caller's name and location to the user log and increments US, the count of system users. If US is greater than the maximum number of entries, the program

branches to 6100; otherwise, the program returns to line 100 to await the next caller.

The routine in lines 6100–6110 handles the situation where the number of callers exceeds the number of available entries in the user log. Rather than halt the system, the program moves all entries in the array down (line 6100). The oldest entry in the user log is lost, and a message to the system operator is added (line 6110).

The message retrieval section is contained in the 7000-series numbers. This portion of the program simply lists messages from oldest to newest. It could be improved by letting the caller select the message to view and/or by allowing review from newest to oldest. This would be a relatively simple task and should provide an excellent exercise for those trying to master BASIC.

The user log is printed by lines 8000–8070. It is simply a FOR-NEXT loop (line 8020) which sends all the entries in the user log.

Protecting the Program

If a user tries to crash the system by entering lines with more than the specified number of characters, the action is detected in the message entry section. A branch occurs to the 9000-series lines. Each time it occurs, variable BB increments and the user is sent a different warning message. After three occurrences, the user is rather rudely dumped off the system.

The system operator functions in lines 20000 onward make use of several of the routines used to handle callers. Setting the variable SY to 1 allows the character input subroutine at line 1300 to get characters from the keyboard instead of the modem. This makes it possible to use the existing routine at line 4000 to enter messages, the routine at line 7000 to read messages, and the routine at line 8000 to read the user log. Other options currently available from the SYSOP menu allow you to return to await the next caller, which does not affect the messages or user log, or to rerun the program, which will clear the messages and user log. The option to end the bulletin board program is also available.

This section has been structured to make it easy to add additional SYSOP functions. Simply add the option to the menu after line 20060, add the starting line number for the new routine to line 20120, and add the routine itself

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following line 26000. One possibility that was mentioned earlier was the option to store the messages on disk or tape. To add this feature, add line 20070:

```
20070 PRINT " 7 STORE MESSAGES"
```

Then add ,27000 to the the list of numbers in line 20120 and add the routine to store messages beginning with line 27000. The routine should OPEN a channel for writing to disk or tape, then use PRINT# within a loop to write the contents of the UR\$, TU\$, SU\$, and NL arrays for each message. A second loop should be used to write the contents of each line of the message from ME\$. Remember to CLOSE the channel when you finish storing all the messages.

Before you add many extra features to the SYSOP routines, however, you should note that adding these features will make the program longer and thereby reduce the number of messages which can be stored in memory.

Program 9-2. Commodore 64 Bulletin Board

Refer to "The Automatic Proofreader," Appendix B, before typing this program. Hold down the SHIFT when typing any underlined letters.

```
9 REM * INITIALIZATION                                :rem 111
10 OPEN 2,2,3,CHR$(38)+CHR$(96)                       :rem 87
20 CS=53280:PO=56577:VOL=54296:MACH=6:SYS 65517:IF
  PEEK(781)=40THEN40                                   :rem 231
30 CS=36879:PO=37136:VOL=36878:MACH=2                 :rem 155
40 R$=CHR$(13):C$=CHR$(147):K$=CHR$(187):J$=CHR$(2
  0)                                                    :rem 10
50 U=34:V=212:W=0:D=16:B=13:C=20:S=1                :rem 20
60 US=1:MN=1:L=80:MX=50:MU=50                        :rem 233
70 DIMI%(255),O%(255),ME$(MX,9),SU$(MX),TU$(MX),UR
  $(MX),NL(MX),US$(MU)                                :rem 215
80 POKEPO+2,32:PRINTC$+CHR$(144)+"LOADING TABLES":
  GOSUB1000                                             :rem 11
90 PRINTC$+CHR$(14)+"MAKE SURE MODEM IS ON D,A AND
  F"                                                  :rem 128
99 REM * WAIT FOR CALL                                :rem 184
100 IFMACH=6THENPOKECS,12:POKECS+1,6                  :rem 236
105 IFMACH=2THENPOKECS,238                             :rem 106
110 PRINT:PRINT"PRESS ↑ FOR SYSOP FUNCTION" +M1$+M2
  $                                                    :rem 155
120 PRINT:PRINT"BYTES FREE:"FRE(0)                 :rem 236
130 PRINT:PRINT"WAITING FOR CALL"                  :rem 194
140 POKEPO,0:BB=0                                       :rem 234
150 Q=PEEK(PO)AND8:GETA$:IFA$=CHR$(94)THEN20000
  :rem 14
204
```

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```

160 IFQ=0 THEN 180 :rem 172
170 GOTO 150 :rem 103
180 POKEPO,32:PRINT:PRINT"PHONE ANSWERED" :rem 29
190 IFMACH=6 THEN POKECS,1:POKECS+1,1 :rem 190
195 IFMACH=2 THEN POKECS,25 :rem 61
199 REM * ACKNOWLEDGE CALLER :rem 136
200 FORX=1 TO 2000:GOSUB1150:IFQ=0 THEN 220 :rem 111
210 NEXTX:GOTO100 :rem 46
220 POKEPO,100:GOSUB10000 :rem 202
230 FORX=1 TO 10:IFP$(X)="*" THEN X=10:GOTO250 :rem 6
240 P$=P$(X)+R$:GOSUB1200 :rem 130
250 NEXTX:GOSUB1150:IFQ=D THEN 100 :rem 10
299 REM * GET CALLER INFO :rem 113
300 GOSUB10100:FORX=1 TO 3 :rem 194
310 P$=P$(X):GOSUB1200:GOSUB1300:IFLI$="*" THEN 310 :rem 77
320 ONXGOSUB370,380,390:NEXT :rem 172
330 P$=R$+"YOU ARE "+FI$+" "+LN$+R$+"CALLING FROM :rem 220
    "+LO$:GOSUB1200
340 GOSUB1120:IFP$="ES" THEN 400 :rem 244
350 IFP$="O" THEN 300 :rem 45
360 GOTO330 :rem 104
370 FI$=LI$:RETURN :rem 93
380 LN$=LI$:RETURN :rem 105
390 LO$=LI$:RETURN :rem 107
400 P$=R$+"WELCOME TO THE SYSTEM, "+FI$+R$:GOSUB12 :rem 71
    00
410 U$=FI$+" "+LN$+" ", "+LO$+R$ :rem 124
499 REM * MAIN MENU :rem 14
500 GOSUB1140:P$=R$+R$:GOSUB1200 :rem 90
510 GOSUB10200:FORX=1 TO 7:P$=P$(X)+R$:GOSUB1200:NEX :rem 193
    TX
520 P$=R$+"TELL ME WHAT TO DO, "+R$+FI$+"? ":GOSUB1 :rem 176
    200
530 SS=1:GOSUB1300:X=VAL(CHR$(A)):IFX=0 THEN 520 :rem 20
540 P$=MID$(P$(X),2)+R$:GOSUB1200 :rem 50
550 ONXGOTO2000,3000,4000,5000,6000,7000,8000 :rem 51
560 GOTO520 :rem 107
998 REM * SUBROUTINES :rem 27
999 REM * ASCII/COMMODORE CONVERSION :rem 252
1000 FORZ=32 TO 64:O%(Z)=Z:NEXT:O%(13)=13:O%(20)=8:O :rem 44
    %(160)=32
1010 FORZ=65 TO 90:O%(Z)=Z+32:NEXT:FORZ=91 TO 95:O%(Z) :rem 76
    =Z:NEXT
1020 FORZ=193 TO 218:O%(Z)=Z-128:NEXT :rem 77
1030 FORZ=0 TO 255:X=O%(Z):IFX<>0 THEN I$(X)=Z :rem 71
1040 NEXT:RETURN :rem 30

```

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```

1099 REM * SHORT SUBROUTINES                                :rem 212
1100 IFSYTHENGETA$:GOTO1115                                  :rem 172
1105 GOSUB1150:IFQ=DTHEN100                                  :rem 105
1110 GET#2,A$                                                :rem 137
1115 RETURN                                                  :rem 168
1120 P$=R$+"IS THIS CORRECT (Y/N)? ":GOSUB1200:SS=         :rem 111
    1:GOSUB1300                                              :rem 111
1125 IFA=89ORA=217THENP$="ES":GOSUB1200                    :rem 57
1130 IFA=78ORA=206THENP$="O":GOSUB1200                    :rem 232
1135 RETURN                                                  :rem 170
1140 FORX=1TO600:NEXT:RETURN                                :rem 63
1150 Q=PEEK(PO)ANDD:RETURN                                  :rem 155
1160 IFMACH=2THENPOKEVOL,0:RETURN                            :rem 164
1165 FORX=54272TO54296:POKEX,W:NEXT:RETURN:rem 209
1170 IFMACH=2THENPOKE36874,240:RETURN                      :rem 38
1175 POKE54277,190:POKE54278,248:POKE54273,17:POKE        :rem 46
    54272,47:POKE54276,17:RETURN
1180 P$=R$+R$+"PRESS RETURN TO CONTINUE"+R$:GOSUB1        :rem 172
    200:GOSUB1300:RETURN
1199 REM * SEND OUTGOING STRING                              :rem 79
1200 FORI=1TOLEN(P$):A$=MID$(P$,I,1)                      :rem 25
1210 PRINTJ$+A$+K$;:PRINT#2,CHR$(O$(ASC(A$)));:NEX        :rem 39
    TI:RETURN
1299 REM * ASSEMBLE INCOMING STRING                          :rem 90
1300 LI$=""                                                  :rem 254
1310 GOSUB1100:IFA$=""THEN1310                              :rem 170
1320 A=I$(ASC(A$)):IFSYTHENA=ASC(A$)                      :rem 63
1330 PRINTJ$+CHR$(A)+K$;:PRINT#2,A$;:IFA=UTHENPOKE        :rem 16
    V,W
1340 IFA=BTHENRETURN                                         :rem 38
1350 IFSSTHENSS=0:RETURN                                     :rem 90
1360 LI$=LI$+CHR$(A):IFA=CANDLEN(LI$)>1THENLI$=LEF        :rem 222
    T$(LI$,LEN(LI$)-2)
1370 IFLEN(LI$)<=LTHEN1310                                    :rem 252
1380 P$=R$:GOSUB1200:LI$="*":GOSUB9000:IFBB<3THENR        :rem 92
    ETURN
1390 GOTO100                                                  :rem 151
1999 REM * SYSTEM BULLETIN                                  :rem 46
2000 GOSUB10300:FORX=1TO10:IFP$(X)="*"THENX=10:GOT        :rem 14
    02020
2010 P$=P$(X)+R$:GOSUB1200                                  :rem 175
2020 NEXTX:GOSUB1180:GOTO500                                :rem 231
2999 REM * CHAT WITH SYSOP                                  :rem 229
3000 P$=R$+"PAGING SYSOP!"+R$:GOSUB1200                  :rem 108
3010 GOSUB1160:GOSUB1170:POKEVOL,15                       :rem 123
3020 FORX=1TO2500:GETA$:IFA$=CHR$(94)THENGOSUB1160        :rem 51
    :GOTO3100
3030 NEXTX:GOSUB1160                                         :rem 223
3040 P$="SORRY, SYSOP ISN'T HOME"+R$:GOSUB1200:GOT        :rem 217
    0500

```

Host Programs

```

3100 GETA$:IFA$=""THEN3200 :rem 172
3110 IFA$=CHR$(94)THENP$=R$+"END OF CHAT MODE":GOS
    UB1200:GOTO500 :rem 48
3120 PRINTJ$+A$+K$;:PRINT#2,CHR$(O%(ASC(A$)));
    :rem 77
3200 GET#2,A$:IFA$=""THEN3100 :rem 45
3210 A=I%(ASC(A$)):PRINTJ$+CHR$(A)+K$;:PRINT#2,A$;
    :IFA=UTHENPOKEV,W :rem 19
3220 GOTO3100 :rem 196
3999 REM * ENTER MESSAGES :rem 194
4000 IFMN>MXTHENP$=R$+"SORRY, MESSAGE STORAGE FULL
    ":GOSUB1200:GOTO4600 :rem 232
4010 P$=R$+"ENTER UP TO 9 LINES,"+STR$(L)+" CHARS
    PER LINE."+R$:GOSUB1200 :rem 161
4020 P$="PRESS 'Q' WHEN FINISHED."+R$:GOSUB1200:UR
    $(MN)=U$ :rem 214
4030 P$=R$+"TO: ":GOSUB1200:GOSUB1300:TU$(MN)=LI$+
    R$:IFLI$="*"THEN4030 :rem 98
4040 P$="SUBJECT: ":GOSUB1200:GOSUB1300:SU$(MN)=LI
    $+R$:IFLI$="*"THEN4040 :rem 47
4050 FORLC=1 TO 9:IFLC=9THENP$="LAST LINE":GOSUB12
    00 :rem 212
4060 P$=STR$(LC)+": "+R$:GOSUB1200:GOSUB1300:IFLI$=
    ""ORLI$="*"THEN4060 :rem 190
4070 IFLI$="Q"THENLC=9:GOTO4090 :rem 89
4080 ME$(MN,LC)=LI$+R$:NL(MN)=LC :rem 76
4090 NEXTLC :rem 155
4100 P$=R$+" 1)ABORT, 2)EDIT, 3)REVIEW, OR 4)SAVE
    ?"+R$:GOSUB1200 :rem 234
4110 SS=1:GOSUB1300:A$=CHR$(A) :rem 199
4120 IFA$="1"THENP$=" ABORT":GOSUB1200:GOTO4200
    :rem 63
4130 IFA$="2"THENP$=" EDIT":GOSUB1200:GOTO4300
    :rem 240
4140 IFA$="3"THENP$=" REVIEW":GOSUB1200:GOTO4400
    :rem 159
4150 IFA$="4"THENP$=" SAVE":GOSUB1200:GOTO4500
    :rem 255
4160 P$=R$+"MISTAKE!"+R$:GOSUB1200:GOTO 4100
    :rem 102
4200 GOSUB1120:IFP$<>"ES"THEN4100 :rem 145
4210 P$=R$+"MESSAGE ABORTED":GOSUB 1200:GOTO4600
    :rem 29
4300 P$=R$+"LINE TO EDIT? ":GOSUB1200:SS=1:GOSUB13
    00 :rem 86
4310 X=VAL(CHR$(A)):IFX=0ORX>NL(MN)THEN4160
    :rem 105
4320 P$=R$+"THAT LINE READS:"+R$+ME$(MN,X):GOSUB12
    00 :rem 80

```

Host Programs

```

4330 P$=R$+"REENTER THE LINE:"+R$:GOSUB1200:rem 86
4340 GOSUB1300:IFLI$=""ORLI$=""*THEN4330 :rem 16
4350 ME$(MN,X)=LI$+R$:GOTO4100 :rem 193
4400 P$=R$+"YOUR MESSAGE READS:"+R$:GOSUB1200
:rem 249
4410 P$=R$+"TO: "+TU$(MN)+"SUBJECT: "+SU$(MN):GOSU
B1200 :rem 57
4420 FORX=1TONL(MN):P$=ME$(MN,X):IFP$=""THEN4440
:rem 106
4430 GOSUB1200 :rem 14
4440 NEXTX:GOTO4100 :rem 155
4500 MN=MN+1:IFMN>MXTHENM1$=R$+"MESSAGE STORAGE FU
LL!" :rem 192
4600 IFSYTHENRETURN :rem 20
4610 GOTO500 :rem 153
4999 REM * INFORMATION ABOUT SYSTEM :rem 147
5000 GOSUB10400:FORX=1TO10:IFP$(X)=""*THENX=10:GOT
O5020 :rem 21
5010 P$=P$(X)+R$:GOSUB1200 :rem 178
5020 NEXTX:GOSUB1180:GOTO500 :rem 234
5999 REM * LOGOFF :rem 171
6000 GOSUB 1120:IFP$<>"ES"THEN500 :rem 97
6010 P$=R$+R$+"THANK YOU FOR USING"+R$+"OUR BBS, "
+FI$:GOSUB1200 :rem 66
6020 P$=R$+"PLEASE CALL AGAIN!":GOSUB1200 :rem 178
6030 GOSUB1140:POKEPO,96:GOSUB1140 :rem 50
6040 US$(US)=U$:US=US+1:IFUS>MUTHEN6100 :rem 175
6050 PRINTC$:GOTO100 :rem 195
6100 FORX=1TOMU:US$(X-1)=US$(X):NEXT :rem 241
6110 US=MU:M2$=R$+"USER LOG FULL!":GOTO100 :rem 71
6999 REM * RETRIEVE MESSAGES :rem 173
7000 IFMN=1THENP$=R$+"SORRY, NO MESSAGES ON SYSTEM
.":GOSUB1200:GOTO7200 :rem 205
7010 P$=R$+"MESSAGES LISTED FROM OLDEST TO NEWEST"
+R$:GOSUB1200 :rem 145
7020 P$="PRESS: RETURN FOR NEXT MESSAGE"+R$:GOSUB1
200 :rem 46
7030 P$=" 'MM' FOR THE MAIN MENU"+R$:GOSUB12
00 :rem 231
7040 FORX=1TOMN-1:P$=R$+"MESSAGE # "+STR$(X)+R$:GO
SUB 1200 :rem 155
7050 P$="FROM: "+UR$(X)+"TO: "+TU$(X)+"SUBJECT: "+
SU$(X):GOSUB1200 :rem 17
7060 FORLC=1TO NL(X):P$=ME$(X,LC):IFP$=""THEN7080
:rem 88
7070 GOSUB1200 :rem 17
7080 NEXTLC:P$=R$+"RETURN?":GOSUB1200 :rem 9
7090 SS=1:GOSUB1300:IFA<>BTHENX=MN :rem 135

```

Host Programs

```

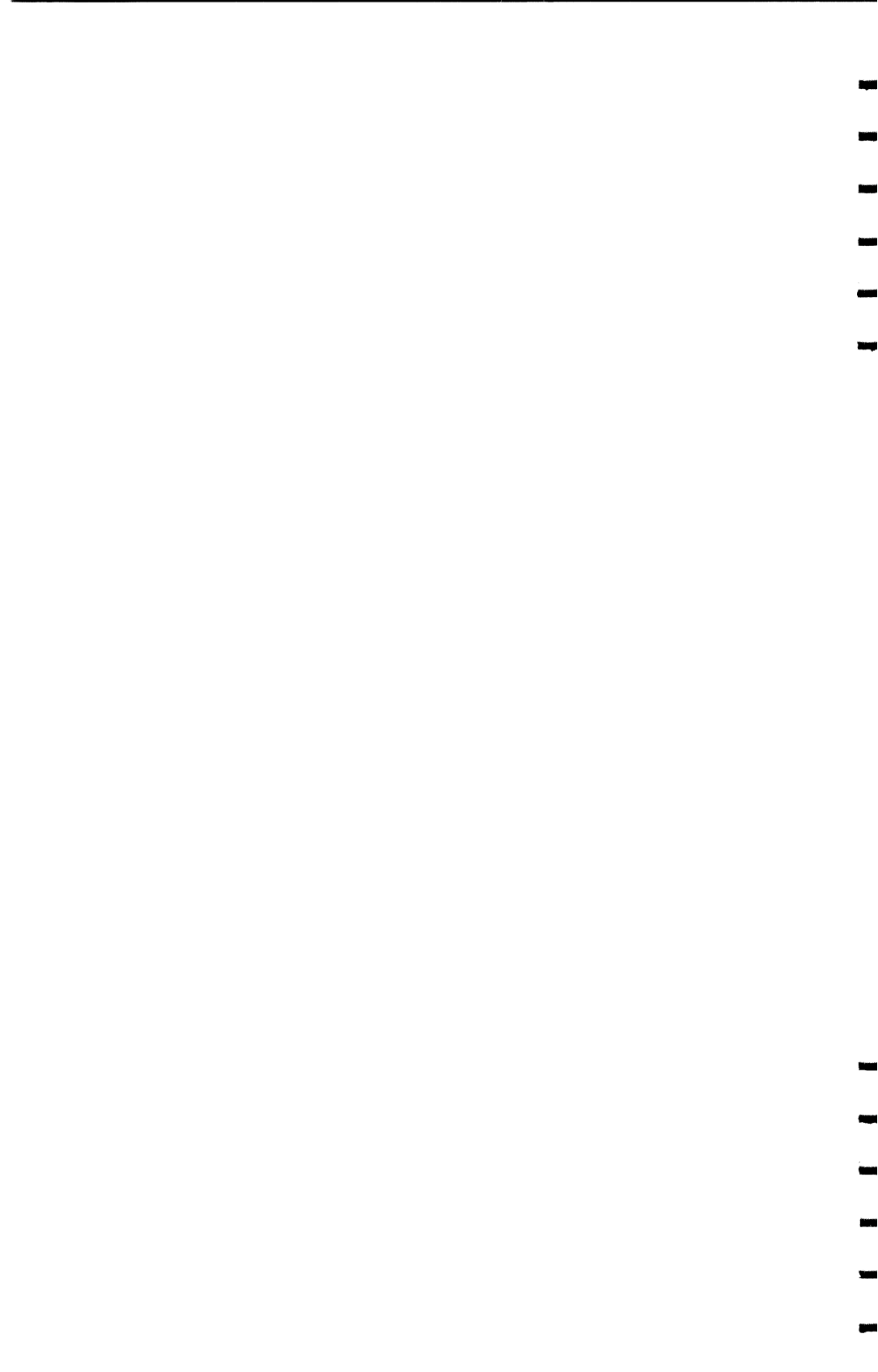
7100 NEXTX:IFA=BTHENP$=R$+"END OF MESSAGES":GOSUB1
    200:GOTO7200                                :rem 170
7110 SS=1:GOSUB1300                              :rem 91
7200 IFSYTHENRETURN                              :rem 19
7210 GOTO500                                      :rem 152
7999 REM * USER LOG                             :rem 17
8000 P$=R$+"LOG OF SYSTEM USERS"+R$:GOSUB1200
                                                :rem 234
8010 P$=R$+"PRESS ANY KEY TO STOP LISTING"+R$:R$:G
    OSUB1200                                      :rem 255
8020 FORX=0TOUS:P$=US$(X):IFP$=""THEN8050 :rem 219
8030 P$=P$+R$:GOSUB1200                          :rem 14
8040 GOSUB1100:IFA$<>""THENX=MU                 :rem 96
8050 NEXTX:IFA$=""THENP$="END OF USER LOG":GOSUB12
    00                                           :rem 193
8060 IFSYTHENRETURN                              :rem 24
8070 GOTO500                                      :rem 157
8999 REM * ERROR MESSAGES                       :rem 211
9000 BB=BB+1                                      :rem 106
9010 IFBB=1THENP$=R$+STR$(L)+" CHARACTERS MAXI"+R$
                                                :rem 125
9020 IFBB=2THENP$=R$+"LINE TOO LONG - SECOND WARNI
    NG"+R$                                       :rem 124
9030 IFBB=3THENP$=R$+"LAST WARNING - GOODBYE"+R$
                                                :rem 53
9040 GOSUB1200:RETURN                            :rem 42
9999 REM * SCREENS                              :rem 5
10000 P$(1)=R$+"THIS IS WHERE YOUR WELCOME MESSAG
    E"                                           :rem 56
10010 P$(2)=" WOULD GO IN THIS BBS. ADD THE MESSAG
    E"                                           :rem 14
10020 P$(3)=" BY TYPING INTO LINES 10000-10090"
                                                :rem 175
10030 P$(4)=" (END WITH * IF LESS THAN 10 STRINGS.
    )"                                           :rem 38
10040 P$(5)="*"                                :rem 154
10050 P$(6)="*"                                :rem 156
10095 RETURN                                     :rem 223
10100 P$(1)=R$+R$+"FIRST NAME? "              :rem 147
10110 P$(2)="LAST NAME? "                     :rem 255
10120 P$(3)="CALLING FROM? "                  :rem 218
10130 RETURN                                     :rem 213
10200 P$(1)="1 BULLETINS"                     :rem 205
10210 P$(2)="2 CHAT WITH SYSOP"               :rem 152
10220 P$(3)="3 ENTER MESSAGE"                 :rem 36
10230 P$(4)="4 INFO ON SYSTEM"                :rem 82
10240 P$(5)="5 LOG OFF SYSTEM"                :rem 201
10250 P$(6)="6 RETRIEVE MESSAGES"             :rem 104
10260 P$(7)="7 USER LOG"                     :rem 206

```

Host Programs

```
10270 RETURN                                     :rem 218
10300 P$(1)=R$+R$+"THIS IS A TEST BULLETIN WHICH W
AS"                                             :rem 63
10310 P$(2)="DEVELOPED FOR DEMONSTRATION PURPOSES.
"                                             :rem 130
10320 P$(3)="PUT WHATEVER YOU LIKE IN THIS DISPLAY
"                                             :rem 85
10330 P$(4)="BY TYPING INTO LINES 10300-10390 OF"
                                             :rem 79
10340 P$(5)="THE PROGRAM."                   :rem 154
10350 P$(6)="(END WITH * IF LESS THAN 10 STRINGS.)
"                                             :rem 45
10360 P$(7)="*"                               :rem 161
10370 P$(8)="*"                               :rem 163
10380 P$(9)="*"                               :rem 165
10390 P$(10)="*"                             :rem 206
10395 RETURN                                  :rem 226
10400 P$(1)=R$+R$+"HERE YOU WOULD PUT INFORMATION
ABOUT"                                       :rem 148
10410 P$(2)="THE SYSTEM BY TYPING INTO LINES 10400
_"                                           :rem 129
10420 P$(3)="10490 OF THE PROGRAM."         :rem 42
10430 P$(4)="(END WITH * IF LESS THAN 10 STRINGS.)
"                                             :rem 42
10440 P$(5)="*"                               :rem 158
10450 P$(6)="*"                               :rem 160
10460 P$(7)="*"                               :rem 162
10470 P$(8)="*"                               :rem 164
10480 P$(9)="*"                               :rem 166
10490 P$(10)="*"                             :rem 207
10495 RETURN                                  :rem 227
19999 REM * SYSOP ROUTINES                  :rem 58
20000 PRINTC$:PRINT"SYSOP ROUTINES":PRINT   :rem 79
20010 PRINT" 1 ENTER MESSAGE"               :rem 120
20020 PRINT" 2 CHECK MESSAGES"              :rem 173
20030 PRINT" 3 CHECK USER LOG"             :rem 248
20040 PRINT" 4 RETURN TO BBS"               :rem 85
20050 PRINT" 5 RESET SYSTEM"               :rem 101
20060 PRINT" 6 HALT SYSTEM"                :rem 13
20100 SY=1:PRINT:PRINT"WHICH?"             :rem 145
20110 GETA$:IFA$=""THEN20110               :rem 11
20120 ON(VAL(A$))GOTO21000,22000,23000,24000,25000
,26000                                       :rem 82
20130 GOTO 20110                             :rem 35
21000 U$="SYSOP"+R$:GOSUB4000:GOTO20000    :rem 143
22000 GOSUB7000:GOSUB1140:GOTO20000       :rem 32
23000 GOSUB8000:GOSUB1140:GOTO20000       :rem 34
24000 SY=0:PRINTC$:GOTO100                :rem 65
25000 CLOSE2:RUN                           :rem 206
26000 PRINTC$+CHR$(142):CLOSE2:END         :rem 243
```

Appendices



A Beginner's Guide to Typing In Programs

What Is a Program?

A computer cannot perform any task by itself. Like a car without gas, a computer has *potential*, but without a program, it isn't going anywhere. All of the programs published in this book are written in a computer language called BASIC. BASIC is easy to learn and is built into all VIC-20s and Commodore 64s.

BASIC Programs

Computers can be picky. Unlike the English language, which is full of ambiguities, BASIC usually has only one right way of stating something. Every letter, character, or number is significant. A common mistake is substituting a letter such as O for the numeral 0, a lowercase l for the numeral 1, or an uppercase B for the numeral 8. Also, you must enter all punctuation, such as colons and commas, just as they appear in the book. Spacing can be important. To be safe, type in the listings *exactly* as they appear.

SHIFTed Characters

There is one exception to the rule of typing characters exactly as they appear. When you see an underlined character, hold down the SHIFT key as you type the character. For example, when you see S in a listing, you should hold down the SHIFT key and type S. The resulting graphics character will appear on your screen as a heart shape.

About DATA Statements

Some programs contain a section, or sections, of DATA statements. These lines provide information needed by the program. Some DATA statements contain actual programs (called machine language); others contain graphics codes. These lines are especially sensitive to errors.

If a single number in any one DATA statement is mistyped, your machine could lock up, or crash. The keyboard and STOP key may seem dead, and the screen may go blank. Don't panic—no damage is done. To regain control, you have

Appendix A

to turn off your computer, then turn it back on. This will erase whatever program was in memory, *so always save a copy of your program before you run it*. If your computer crashes, you can load the program and look for your mistake.

Sometimes a mistyped DATA statement will cause an error message when the program is run. The error message may refer to the program line that reads the data. *The error is still in the DATA statements, though.*

Get to Know Your Machine

You should familiarize yourself with your computer before attempting to type in a program. Learn the statements you use to store and retrieve programs from tape or disk. You'll want to save a copy of your program, so that you won't have to type it in every time you want to use it. Learn to use your machine's editing functions. How do you change a line if you made a mistake? You can always retype the line, but you at least need to know how to backspace. Do you know how to enter reverse video, lowercase, and control characters? It's all explained in your owner's manual.

A Quick Review

1. Type in the program, a line at a time, in order. Press RETURN at the end of each line. Use the INST/DEL key to erase mistakes.
2. Check the line you've typed against the line in the book. You can check the entire program again if you get an error when you run the program.
3. Make sure you hold down the SHIFT key when typing any characters that are underlined in the listings.

The Automatic Proofreader

CHARLES BRANNON

“The Automatic Proofreader” will help you type in program listings without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after you type a line from a program listing if you have made a mistake. Please read these instructions carefully before typing any programs in this book.

Preparing the Proofreader

1. Using the listing below, type in the Proofreader. Be very careful when entering the DATA statements—don’t type an l instead of a 1, an O instead of a 0, extra commas, etc.

2. Save the Proofreader on tape or disk at least twice *before running it for the first time*. This is very important because the Proofreader erases part of itself when you first type RUN.

3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there’s a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place—you’ll need it again and again, every time you enter a program from this book, *COMPUTE!’s Gazette* magazine, or *COMPUTE!* magazine.

4. When a correct version of the Proofreader is run, it activates itself. You are now ready to enter a program listing. If you press RUN/STOP-RESTORE, the Proofreader is disabled. To reactivate it, just type the command SYS 886 and press RETURN.

Using the Proofreader

All listings in this book have a *checksum number* appended to the end of each line. An example is :rem 123. *Don’t enter this statement when typing in a program*. It is just for your information. The rem makes the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will confuse the Proofreader, even if you entered the rest of the line correctly.

Appendix B

When you type in a line from a program listing and press RETURN, the Proofreader displays a number at the top of your screen. *This checksum number must match the checksum number in the printed listing.* If it doesn't, it means you typed the line differently from the way it's listed. Immediately re-check your typing. Remember, don't type the rem statement with the checksum number; it is printed only so you can check it against the number that appears on your screen.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience, since spacing is generally not important. But occasionally proper spacing *is* important, so be extra careful with spaces since the Proofreader will catch practically everything else that can go wrong.

There's another thing to watch out for: if you enter the line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check it. After entering the line, list it. This will eliminate the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way.

Special Tape SAVE Instructions

When you've finished typing a listing, you must disable the Proofreader before saving the program on tape. Disable the Proofreader by pressing RUN/STOP-RESTORE (hold down the RUN/STOP key and sharply hit the RESTORE key.) This procedure is not necessary for disk, *but you must disable the Proofreader this way before a tape SAVE.*

A SAVE to tape erases the Proofreader from memory, so you'll have to load and run it again if you want to type another listing. A SAVE to disk does not erase the Proofreader.

Hidden Perils

The Proofreader's home in memory is not a very safe haven. Since the cassette buffer is wiped out during tape operations, you need to disable the Proofreader with RUN/STOP-RESTORE before you save your program. This applies only to tape use. Disk users have nothing to worry about.

Not so for VIC or 64 owners with tape drives. What if you type in a program in several sittings? The next day, you come to your computer, load and run the Proofreader, then try to

load the partially completed program so you can add to it. But since the Proofreader is trying to hide in the cassette buffer, it is wiped out!

What you need is a way to load the Proofreader after you've loaded the partial program. The problem is, a tape load to the buffer destroys what it's supposed to load.

After you've typed in and run the Proofreader, enter the following lines in direct mode (without line numbers) exactly as shown (be sure to type 10 spaces between the quotes after B\$=):

```
A$="PROOFREADER.T":B$="{10 SPACES}":FOR X = 1  
TO 4: A$+B$: NEXTX  
FOR X = 886 TO 1018: A$=A$+CHR$(PEEK(X)): NEXTX  
OPEN 1, 1,1,A$:CLOSE1
```

After you enter the last line, you will be asked to press RECORD and PLAY on your cassette recorder. Put this program at the beginning of a new tape. This gives you a new way to load the Proofreader. Anytime you want to bring the Proofreader into memory without disturbing anything else, put the cassette in the tape drive, rewind, and enter:

```
OPEN1:CLOSE1
```

You can now start the Proofreader by typing SYS 886. To test this, PRINT PEEK (886) should return the number 173. If it does not, repeat the steps above, making sure that A\$ (PROOFREADER.T) contains 13 characters and that B\$ contains 10 spaces.

The Proofreader will load itself into the cassette buffer whenever you type OPEN1:CLOSE1 when PROOFREADER.T is the next program on your tape. It does not disturb the contents of BASIC memory.

Replace Original Proofreader

If you typed in the original version of the Proofreader from the October 1983 issue of *COMPUTE!'s Gazette* magazine, you should replace it with the improved version below.

Appendix B

Automatic Proofreader for the VIC and 64

```
100 PRINT"{CLR}PLEASE WAIT...":FOR I=886 TO 1018:READ
  A:CK=CK+A:POKE I,A:NEXT
110 IF CK<>17539 THEN PRINT"{DOWN}YOU MADE AN ERRO
  R":PRINT"IN DATA STATEMENTS.":END
120 SYS886:PRINT"{CLR}{2 DOWN}PROOFREADER ACTIVATE
  D.":NEW
886 DATA 173,036,003,201,150,208
892 DATA 001,096,141,151,003,173
898 DATA 037,003,141,152,003,169
904 DATA 150,141,036,003,169,003
910 DATA 141,037,003,169,000,133
916 DATA 254,096,032,087,241,133
922 DATA 251,134,252,132,253,008
928 DATA 201,013,240,017,201,032
934 DATA 240,005,024,101,254,133
940 DATA 254,165,251,166,252,164
946 DATA 253,040,096,169,013,032
952 DATA 210,255,165,214,141,251
958 DATA 003,206,251,003,169,000
964 DATA 133,216,169,019,032,210
970 DATA 255,169,018,032,210,255
976 DATA 169,058,032,210,255,166
982 DATA 254,169,000,133,254,172
988 DATA 151,003,192,087,208,006
994 DATA 032,205,189,076,235,003
1000 DATA 032,205,221,169,032,032
1006 DATA 210,255,032,210,255,173
1012 DATA 251,003,133,214,076,173
1018 DATA 003
```

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