PERSONAL SOFTWARE™

VISITERM™

USER'S GUIDE
APPLE II & II PLUS 48K — 16 SECTOR

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VISITERM™
USER'S GUIDE

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LESSON TWO

LESSON THREE

CHAPTER 3
REFERENCE

PREFACE

HOW TO USE THIS MANUAL

First of all, Congratulations! You have purchased an easy-to-use software package that lets your computer talk to the world. With the VisiTerm™ program you can log in to remote timesharing computers or in-house mainframe computers. You can connect with other Apple™ users for business, programming, or other sharings. You can transfer text files between these outside computers and your Apple, and make a printed record of your communications and files.

Second, you should feel free to experiment with the VisiTerm software. Try out different combinations of options and play with the various features in any way that strikes your fancy. You won't hurt it, and you won't hurt your Apple or remote host computer, if there is one. But you will see how the thing works, how its parts interact, and how you can use it to accomplish whatever you might desire of an intelligent terminal. Chapter 1 suggests many examples.

Use the index, glossary, and primer to clear up any fuzzy words or concepts, or just to expand how you see the VisiTerm functions. Browse and muse.

Chapter 1 is an introduction to some of the possible uses of your Apple as a terminal, and also covers the hardware required. Its final two sections give step-by-step procedures for communicating between two Apples and between your Apple and a remote timesharing service.

In Chapter 2, Lesson 1 provides a beginning discussion of the keyboard, the displays, and the four modes of operation that provide all the VisiTerm functions. This is a hands-on chapter with explanations, to orient you to the VisiTerm program and the simple use of your Apple as a terminal. The few controls you need to know for simple use are introduced and practiced in this chapter.

Lesson 2 discusses how to use the VisiTerm options not covered earlier. Keyboard macros, character sets, protocol character pairs, vertical spacing, horizontal tabs, and many others are explained with examples.

Lesson 3 explains all the options available for File Transfer from your Apple to another Apple or to another remote computer. It leads you through the option choices that you and the other party must agree on so as to communicate successfully.

The final chapter summarizes the data of the earlier lessons in a reference format, which is more useful after you already understand the issues you must handle. They are most relevant after you have practiced using the switches and options of all the operating modes, as shown in Chapter 2.

The first section of Chapter 3 summarizes concisely all of the messages displayed and the commands available when using your Apple simply as a terminal to a remote computer. These were discussed originally in Lesson 1.

The second part of Chapter 3 summarizes concisely all of the options, messages, and commands available under Options mode, including character set changes and keyboard macros. These were originally covered in greater depth in Lesson 2.

The last part of Chapter 3 summarizes concisely all of the options and commands pertaining to File Transfer mode, which were covered in greater depth in Lesson 3.

Appendix A contains historical and background material on data communications. The style is more conversational than in the glossary. The bibliography at the end of this preface can be used for study in greater depth.

The other appendices include a variety of reference material.

Appendix B discusses communications cards and modems, and how to install them.

Appendix C describes the character sets that come with the VisiTerm software. It lists every ASCII character and how to produce each character using the VisiTerm software.

Appendix D enables you to track down some common difficulties that can arise in using your Apple as a terminal.

Appendix E lists and explains all messages that the VisiTerm program displays in response to special conditions.

Appendix F discusses the PRINT program for printing text files.

Appendix G discusses utility programs for converting files of one type to another.

Appendix H describes diskette care and initialization.

A glossary of terms and concepts follows Appendix H.

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INTRODUCTION

HOW YOU BENEFIT

With the VisiTerm program, you have the new ability to access other Apples, timesharing computers, or in-house mainframe computers, opening up a world of exciting, interesting, and useful activities. There is an incredible wealth of information available to you on an astonishing variety of subjects, from taxes to music, from consumer data to learning games or languages.

There are programs beneficial to your business, helpful to your health, and stimulating to your head or your funny bone. You can access databases with current news, sports statistics, legal precedents, library catalogs, physics abstracts, homemaking hints, medical diagnoses, and on and on. Universities have additional capabilities and often make some of their services available to remote users during off-hours.

The VisiTerm software enables you to connect with any such computer once you have established an account. You can send or receive any text file over such a connection, using the VisiTerm File Transfer capability to store or access files on disk.

Listed below are a few more specific uses for your Apple when it operates as a terminal under the VisiTerm program.

For most of these applications you don't need to learn much about this program: all you do is load it and connect up with your chosen host computer system. Under VisiTerm control, your Apple sends what you type and displays the host's responses. It's that simple.

You can connect to a remote timesharing service or an in-house mainframe to:

- Provide input to systems running on the host computer, such as business programs like payroll, inventory, material requirements planning, and sales forecasting.
- Send and receive electronic mail with many other users of the host.
- Program in languages not readily available on the Apple, such as LISP or GPSS or Simscript.
- Use large or unusual programs not readily available on the Apple, such as very powerful mathematical programs to analyze large quantities of numerical data and provide optimum solutions under varying assumptions, or programs specific to certain industries such as architectural stress analysis, piping planning, geological mineral surveys, and census data extraction.

- Access large databases that are maintained on the host computer, creating reports to be printed there or sent to your Apple using the VisiTerm program's ability to receive and store text files on disk. These resources can include internal corporate databases of financial or inventory data, or external databases such as mentioned above. One down-to-earth application is to maintain, sort, and extract from large mailing lists, merging labels with form letters of various kinds.

- Learn a language or a game.

Of equal importance is your new ability to communicate with other Apples. Using the VisiTerm program, you can send your latest VisiCalc™ projections to a friend, associate, or partner anywhere there's a phone and an Apple. You can share an entire CCA-DMS database, or any other file in the Data Interchange Format™ (DIF). The VisiTerm program will transfer or receive any Apple sequential text file.

With the ability to connect to another Apple, you can —

1. share the results of personal work, including results from any of the above uses of a host computer;

2. send and receive electronic mail, including program listings, memos, itineraries, private instructions for your lawyer, spouse, accountant, fence, or sales promotion manager;

3. learn of new programs (or games) from a variety of sources using the Apple Bulletin Boards;

4. interconnect management and coworkers at remote sites for sharing instructions, plans, problems, or progress data and reports of any length, readily printed out or processed by Apple programs.

Communicating with other VisiTerm owners and users of remote services can increase your productivity, giving you access to data and tools you might otherwise have missed. Sharing programs, files, experiences, and even games, will expand your universe of friends and associates, of knowledge, and of applications for your Apple.

Furthermore, it's fun.

HOW EASY IS IT?

The two sections at the end of this chapter illustrate how easy it is to use the VisiTerm program, by giving exact, step-by-step procedures for communication from one Apple to another and from Apple to host computer. You don't need to study the entire manual to get going.

MAJOR FEATURES OF THE VISITERM SOFTWARE

Appearance

The VisiTerm program uses a high-resolution display for the characters on the screen. This permits 60 to 80 characters per line, using upper and lower case with variable-sized letters. You can use one of the character sets provided, or change the appearance of characters and special symbols with your own design for any or all of them. (More about this in Lesson 2.)

VisiTerm options also enable you to widen or narrow the space between lines of text. You can specify which line is the bottom, that is, the line at which everything on the screen moves (scrolls) up. You can set tabs so as to line up columns of data or text for display or printing.

Adaptability

You can meet the terminal requirements of almost any timesharing or mainframe computer by reconfiguring the VisiTerm options on-line. You can talk to them at their speed, since the program also controls the speed with which characters are transmitted.

Different computer systems sometimes use different codes for representing characters. The VisiTerm program sits in memory and examines all incoming and outgoing characters, translating them if necessary into those appropriate to your Apple or your host computer.

Sometimes the host requires that one or more stop bits be added to the end of each character, and VisiTerm options can do this. If special characters are to be used to stop and start transmissions between your Apple and your host, a few keystrokes change the appropriate options.

Frequently used keystroke sequences, such as logon lines with account number and password, can be predefined as keyboard macros in the configuration file loaded with the VisiTerm software. Pressing the single-character name of such a macro causes the entire sequence to be sent as if you had typed it at the keyboard. Standard command lines or typical responses can be similarly coded, available for use at the touch of a single key.

File Manipulation

Receiving lengthy reports, proposals, programs, or data is most efficient and secure when you can immediately store them on a disk file for later review or processing. Similarly, when you intend to create lengthy text files, it makes more sense to do so before connecting up with a

distant computer, and to be able to transmit the results more rapidly and reliably than while typing.

When you want to send or receive a file, as opposed to simply typing at the keyboard, you don't have to write or borrow a program to do it: the VisiTerm software is already set up to handle this. You can start and stop transmission while watching what's being sent. You can store what's being received in one or several files, for later review, printing, or use with other software such as the VisiCalc program (or programs of your own).

Utilities

The software includes utilities for printing any text file and converting program files into text files. Files in binary, integer BASIC, and FP BASIC can all be changed into text files for transmission or printing.

Partitioned Operation For Ease of Use

The VisiTerm software uses 4 separate modes or screens to provide all these functions.

Terminal Mode

When you first load the program, and while you are in communication with some other computer, you are in Terminal mode for typing text or commands.

```
CONGRATULATIONS!
Your VisiTerm software lets your Apple talk to the world.

This screen, with its status line at the bottom, is where you
will type your communications and commands to other computers:
in-house mainframes, timesharing systems, or other Apples._




         COL - 59    HALF DUPL    SET A
```

INTRODUCTION

Nearly all timesharing and Apple communication can be done without changing the options that are loaded with the program. Advanced features are available, however, by switching to the Options screen and selecting the desired values.

Options Mode

The Options screen shows you the options currently in effect and permits you to change them. (This can be while you are connected or not.)

As the bottom line shows, there are 9 commands you can access from this screen. One of them takes you to the File Transfer mode, for receiving or sending files. Another lets you define frequently used keystroke sequences and give them a one-character name, so all you have to type is that one character. These keyboard macros are defined or changed using a separate screen.

Macro Definition Screen

```
████████████████ VISITERM 1.00 ████████████████
███ ██ ██████ ██████ 1    ███ █████ 1411
---------------------------------------------
█████ ███ - HEX: #71  ASCII: Q
█████ █████████ (6 CHARACTERS)
████ ██ <J>




---------------------------------------------
        TYPE IN MACRO EXPANSION...
                  [CAPS]
████████████████ KEYBOARD MACROS ████████████████
```
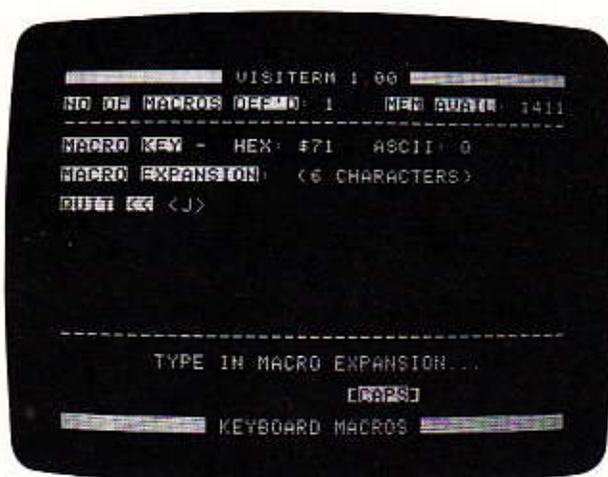
In this mode of operation you can define new macros or review those you have defined in the past, perhaps to change or delete them.

The final screen, also accessed only from the Options screen, is used for transferring files.

File Transfer Mode

```
████████████ VISITERM 1.00 ████████████
████████ MANUAL SAMPLE
PROTOCOL   NONE        CHRS TRANSF 144
BLOCK CHRS DROP        BLKS TRANSF 0
BLOCK SIZE 256         STOPPAGES   0
EOF CHAR   NONE        CHRS TO EOB 112
STATUS: READY

---------------------------------------------
THIS IS A SAMPLE OF HOW TEXT APPEARS
WHEN SENT IN FILE TRANSFER MODE.  THE
FILE NAMED SAMPLE CONTAINS A PROGRAM,
IN TEXT FORM READY FOR SENDING.
<TRANSFER DONE>
---------------------------------------------
     TERMINAL OPTIONS SEND RECEIVE
████████████ FILE TRANSFER ████████████
```
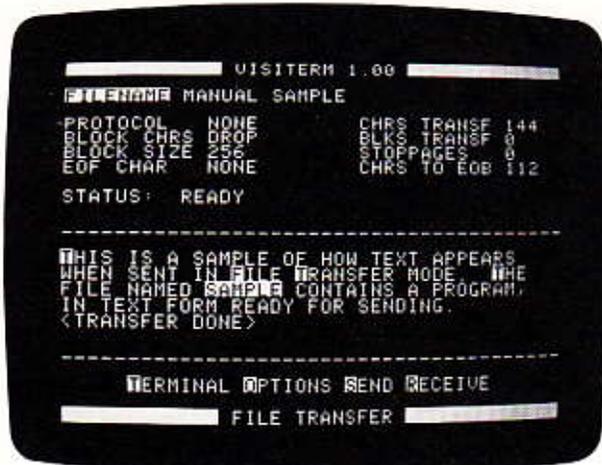
Using or changing the options shown here, you can send text files from your disk or receive new ones from a remote computer, as discussed in Lesson 3.

EQUIPMENT YOU NEED, AND WHY

1. An Apple II or Apple II Plus with one or more disk drives and a TV monitor.

2. A modem, if you plan to use a phone line for communication between the Apple and another computer. Many companies make them. Examples include acoustic couplers like the ComData Model 301A Acoustic Data Set or direct connection modems like the Universal Data Systems Inc. Model 1030ALP.

3. One of the following communication cards, to transfer data between your Apple and the modem or host computer:

    a. The Apple II Communications Interface Card (A2B0003X).

    b. The California Computer Systems (CCS) Apple II Asynchronous Serial Interface Card, Model 7710A.

    c. The D. C. Hayes and Associates Micromodem II™ package.

Full explanations of the need for these devices appear in Appendix A, a data communications primer discussing terms and concepts at an introductory level. Some additional terminology is clarified in the glossary, and installation details are in Appendix B.

Briefly, this is what happens when you connect to a distant computer: The communications card, which you plug into the back of your computer, takes data from your Apple and "serializes" it so it can be transmitted as electrical impulses along a wire. This wire is called an RS-232C cable, and it goes between the communications card and the modem.

A modem is a device that takes the electrical impulses from the RS-232C cable and converts them to sounds (tones of varying frequency) so they can be transmitted over the telephone.

The process works similarly with the distant computer at the other end of the telephone network (or wire). There is a similar modem for converting the tones back into electrical impulses, which are again sent along an RS-232C cable to an interface that "de-serializes" the information and presents the data to the destination computer.

004-003
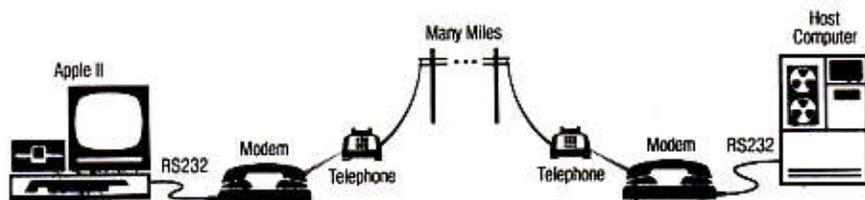
DISKETTE USAGE

The VisiTerm software is supplied on a small diskette. Additional files may be stored on this diskette. For example, you can keep files of the standard options and character sets you may need for communicating with others, such as your favorite timesharing system, mainframe computer, fellow professional Apple user, or friendly computer hobbyist.

Diskettes require careful, appropriate handling: no dust, no pressure or bending (use only a felt-tip pen to write on the label). If they are mailed, use tough packaging that will protect them from these hazards while travelling to their destination. Your dealer may have the right kind of mailers.

Appendix H discusses proper diskette care in detail, and how to initialize new diskettes to use during VisiTerm execution.

Enough introductory reading. Let's get started using the VisiTerm software!

HOW TO LOAD THE VISITERM SOFTWARE INTO YOUR APPLE

If you don't yet have a communications card and modem, you can still do everything discussed in this section. When you get them, Appendix B will help you install and connect them. Not much to it, really. If these terms are unfamiliar, read Appendix A "A Primer on Data Communications" or see the glossary.

Before turning the power ON, insert the VisiTerm disk in drive 1 and close the door. Now turn on the power to the Apple and your monitor. If you have an Autostart ROM in your Apple, you will hear some disk-reading noise as the VisiTerm program is loaded in, and the screen will change to look like this:
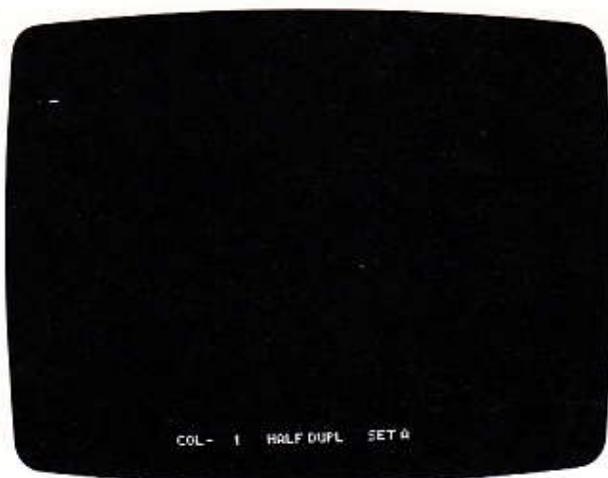
If you do NOT have an Autostart ROM, turn on the power, wait till you see the BASIC prompt character >, and type this key sequence: 6 CTRL P, holding down the CTRL key while pressing the P. (From BASIC you could type PR#6 or IN#6.) The Autostart ROM can be installed in any Apple II, but it comes automatically in any Apple II Plus or Language system.

COMMUNICATING TO ANOTHER APPLE

This section assumes both Apple owners have connected all the required hardware as described in Appendix B, and loaded the VisiTerm program as above.

(If you want to see what it's like to send a file even though you don't have a second Apple you can call, press the ESC key, the ! key, and the left arrow key until you see the word LOCAL appear. Then skip over the next few paragraphs and follow the SENDER instructions at the end of this section.)

The next step is making the telephone call, having agreed in advance on the time and who calls whom. There are several possibilities to be covered because of the varieties of equipment you could have installed, but the essence of the next few paragraphs is simple: you make the call, connect the two computers, and follow the few steps for sending and receiving a sample file on the VisiTerm disk.

A. If you are both using acoustic couplers, you simply dial the number of the other Apple normally. The other party answers, and you both place the handsets into the acoustic couplers. The caller's modem should be in ORIGINATE mode and the receiver's modem in ANSWER. There is usually a switch you can move to select either mode. The ANSWER modem will supply a carrier tone. The ORIGINATE modem detects the tone, turns on a light to let you know the carrier was detected, and sends back a different tone to let the other modem know it is ready.

B. If either of you is using a direct connection modem, then instead of placing the handset into a coupler you simply switch your modem into DATA mode. Again, the caller should be in ORIGINATE and the receiver in ANSWER.

C. If you are receiving and your communications card is a D. C. Hayes Micromodem II™, you should type the following sequence at the time the call is expected:

KEY	COMMENTS
ESC	
!	Press 1 while holding down the SHIFT
C	The bottom line will change
A	Bottom line will change again
1	You will hear a ring in the Apple
T	Terminal screen will reappear

D. If you are calling and your communications card is a D. C. Hayes,
    you type the following: ESC ! C D (Screen shows DIALING:) and
    then type the telephone number slowly, waiting for each digit to
    be displayed before typing the next digit. When the number is
    complete, you press RETURN and the screen shows

    MICROMODEM II: AWAIT CARR

    The modem waits for a carrier from the receiver. If one is not
    detected in 30 seconds, the modem hangs up. If the ANSWER
    modem is a D. C. Hayes, this is not a problem. If it is acoustic or
    direct, the receiver must be sure to send back a carrier within that
    30 second span.

After making the connection via one of the above methods, anything
that either of you types will appear on both screens. To avoid both typ-
ing at once and garbling both messages, you need to adopt some con-
vention to indicate "I'm done, your turn." You could, for example, type
OVER whenever you were done for the moment.

Also, to type more than one-line messages you need to type an extra
character after you press RETURN: hold down the CTRL key (second
key above the POWER light) while you press the letter J. This gives a new
line to type on.

After typing back and forth awhile, you can practice sending and receiv-
ing a file as follows (either of you can be SENDER or RECEIVER; just
decide):

SENDER	RECEIVER
Press ESC	Press ESC
!	!
F	F
ESC	ESC
SAMPLE	VERY FIRST FILE RECEIVED
RETURN	RETURN
(wait for okay)	R
(wait for okay)	OKAY TO SEND
S	

The OKAY TO SEND message will appear on both screens. After SENDER presses S, the text file named SAMPLE, supplied on the VisiTerm diskette, will be sent to the receiver. It will be displayed on both screens as it is sent.

```
▬▬▬▬▬▬▬ VISITERM 1.00 ▬▬▬▬▬▬▬

FILENAME SAMPLE

PROTOCOL     NONE        CHRS TRANSF 116
BLOCK CHRS   DROP        BLKS TRANSF 0
BLOCK SIZE   256         STOPPAGES   0
EOF CHAR     NONE        CHRS TO EOB 0

STATUS:  SENDING

--------------------------------------
10 HOME: INPUT"FILE TO LIST? ";F$
20 PRINT"<D>OPEN";F$
30 PRINT"<D>READ";F$
40 GET A$: PRINT
50 PRINT A$;
60 IF PEEK
--------------------------------------
         ▮BORT ▮ONTINUE
▬▬▬▬▬▬ FILE TRANSFER ▬▬▬▬▬▬
```
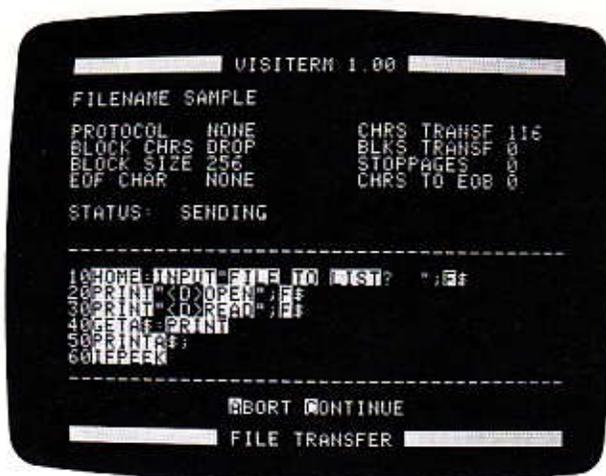
This particular text file has a BASIC program in it. Any text file can be sent, but if it is longer than 18,000 characters then you need to read Lesson 3 before sending or receiving it.

COMMUNICATING TO A REMOTE TIMESHARING SERVICE

This section assumes you have connected all the required hardware as described in Appendix B. Furthermore, you must have an established account at a timesharing service, such as The Source or Micronet.

Making the Call

At this point you're ready to start using the VisiTerm program to communicate with the computer at your timesharing service. If you haven't already done so, first load the program using the instructions given above.

The next step is to dial the number you got from your salesman, but how you do that and the step after it depends on which communications card and modem you are using:

1. Making the Connection

    A. If you installed a D. C. Hayes Micromodem,™ then type ESC SHIFT 1 to enter Options mode, C to make the call, and D to dial the number. Type the phone number slowly, waiting for each digit to be displayed, then press RETURN. Typing a left arrow hangs up and lets you start again. The VisiTerm program goes into Terminal mode automatically when a carrier tone from your timesharing service is detected.

    B. If you are using an acoustic coupler, dial the number and listen for the carrier tone. As soon as you hear it, place the handset into the coupler. Its signal light should come on, indicating the connection is made.

    C. If your modem is a direct-connection device rather than acoustic, just dial the number, and when you hear the tone, switch the modem to the data position.

2. Logging On

    At this point you must follow the instructions you received from the salesman as to how to sign on (log on) with the computer. Some require you to begin with one or two carriage returns, or a letter and a carriage return. Some want your account number as the first thing you type, followed by your password. Do the right thing for your particular service, and remember to use the ASCII Table in Appendix C for any special characters you may need, like ESCape.

    Many timesharing systems offer their services through networks such as TYMNET or TELENET. Standard log-in procedure for these networks are as follows:

    TYMNET: Shortly after you have dialed, received a carrier tone, and connected the modem, the terminal displays:

    PLEASE TYPE YOUR TERMINAL IDENTIFIER

    Your Reaction: Type the letter A but do not press RETURN.

    PLEASE LOG-IN

    Your Reaction: Press the left arrow key to select half-duplex operation, matching the VisiTerm program's initial state. You then immediately type the address of the system you want to connect to.

You now have reached the point of entering your account number or other signon keystrokes. (If you want to use full duplex, you simply omit using the left arrow key mentioned above, and put the VisiTerm program in full duplex by typing ESC SHIFT 2. Some systems make

use of the fact that in full duplex the host echoes what you type. This makes it easy for them to include additional meaningful responses such as sending you a visible symbol or message when you type a normally unseen character, like CTRL C.)

TELENET: After you have dialed, received a carrier tone, and connected the modem, press RETURN ; RETURN to be in half-duplex as the VisiTerm program initially is. Or, if you wish to use full-duplex operation, press RETURN twice, and use ESC SHIFT 2 to put the VisiTerm program into full-duplex mode. At this point the network displays

```
TELENET
408 5B
TERMINAL=
```

You press RETURN, and the system responds with an @ sign. You then type the address of the computer you want to connect to, press RETURN, and enter your account number, password, and any other signon characters.

```
TELENET
408 5D

TERMINAL=

@C 30138


301 38 CONNECTED
Primecom Network System 11

Please Sign On
>ID TCH662 HEE'YRH_




            CAPS    COL - 18    FULL DUPL    SET A
```

Troubleshooting

If the above procedures do not seem to be working, the first thing to check is whether all the hardware is set up correctly, connected appropriately, and turned ON. The modem and Apple must be connected by a cable, and the modem must be connected to the telephone system either by direct connection or by the handset in an acoustic coupler.

The second area to verify is the communication options: is the modem in full duplex? There's usually a switch on the modem you can move to go from full to half or half to full. The modem should be in full duplex. Is the VisiTerm program in half-duplex? Typing ESC SHIFT 2 changes it from half to full or from full to half.

Are the first three options correct for connecting to this timesharing service? You can check by typing ESC SHIFT 1 to enter Options mode, and viewing the first three lines in the left column. Does the COMM SLOT show the correct slot number for the communications card you wish to use? You can change it using the arrow keys. Is the COMM SPEED at the right value for this service? You can change it with the arrow keys: LOW means 110 Baud and HIGH means 300 Baud unless your card has been modified for different baud rates. Does DATA FORMAT show the appropriate bits per character, parity, and number of stop bits? Your timesharing salesman can tell you if it should be 8 bits and EVEN or 7 bits, EVEN, and 2 stop bits. The arrow keys let you change this option too.

After verifying each of the above points, retry the connection. It should work; but if there is still a problem, call your dealer to help sort it out.

Up and Running

Once you have made your connection and signed on, you are ready for business. You can type commands at the keyboard and have them interpreted by a computer many miles away, having the response displayed seconds later on your terminal screen. You have entered the world of modern data communications.

This is all you need to know to put the VisiTerm program to use as a standard terminal for many productive and enjoyable hours. But once you are comfortable with the product in this simple form, read on: there is a wealth of useful features you will want to learn about and use.

LESSON ONE

GETTING STARTED

Terminal Mode

The VisiTerm features are separated into four different displays, as shown in Chapter 1. Although the rules for each are similar, the things you can do are different in each one, so they are called "modes" (of operation).

COL- 1   HALF DUPL   SET A

The screen pictured above appears when you load the VisiTerm program. It is used whenever you are operating your Apple as a terminal: characters typed at the keyboard are sent to the other computer (time-sharing, mainframe, or Apple) and characters received from that computer are displayed on your screen.

The cursor is at the top left, awaiting input from you at the keyboard (or from the other computer).

The bottom line shows that no characters have yet been typed or received (Column 1).

The HALF DUPL message (half duplex) means that characters you type are put on the screen immediately by the VisiTerm software, as well as sent to the host computer. (A fuller explanation of "duplex" appears in later chapters and appendices.)

The last indicator on the bottom line shows that character set A will be used. There are two different sets available at a time, A and B.

Capital Letters

Here's your first chance to make something happen. Type a few words. Notice that the column counter on the bottom line (COL — n) changes. (If not, you need to type something first: press ESC, then !, and then the left arrow until the word LOCAL appears. Then press T to continue with Lesson 1.)

All the letters are lower case. To capitalize a letter, you first type an ESCape: the third key above the POWER light, on the left. If you were using a typewriter, you would hold down the SHIFT key while typing the letter you wanted capitalized. Using the VisiTerm keyboard, you type an ESC first, without needing to hold it down.

Press the ESC key. Notice the bottom line of the screen shows the letters ESC. Now press any letter; it should appear up where the cursor is, capitalized. To get all capitals, as if you had used SHIFT LOCK on a typewriter, press ESC ESC. After the first ESC you will again see ESC on the status line. The second time, the ESC goes away and the word CAPS appears. Now all letters you type will be in upper case; try typing a few more words. Now to clear the screen, you can type ESC 3.

A series of keystrokes beginning with ESC is called an escape sequence. There are several such sequences used to control VisiTerm features. This is a good time to practice some of them, as a way of becoming familiar with the keyboard and features of Terminal mode operation.

Changing Half to Full Duplex

Press ESCape and then SHIFT 2, that is, hold SHIFT down while you press 2. See the duplex sign switch to FULL? Press ESC SHIFT 2 again; the duplex sign will say HALF.

Press SHIFT 2 again. The quote sign should appear at top left of your screen, and the column counter should say 2 instead of 1. You didn't get full duplex back because the sequence that controls switching back and forth from FULL to HALF only operates by starting with ESC.

Changing Character Sets

Now press ESC SHIFT 4. As the bottom line shows, you've just switched character sets. Press that sequence again. Back to Set A. (If you still have Set B, you may not have started with ESC.)

Now type "The lazy brown fox bit the angry dog's tail" (or some other phrase you're fond of). See the column counter change?

Just for the fun of it, press ESC SHIFT 4 to shift into character set B. Now type something with numbers and SHIFT numbers. The results are quite different, because in character set B the display for each key represents its meaning in a special programming language called APL. This need not concern you other than to illustrate the flexibility of character set display. Lesson 2 discusses this in detail.

Switch back to Set A by pressing ESC SHIFT 4 again.

Other Keys and Conventions Used By The VisiTerm Software

001-002

Seven keys on your Apple keyboard have special uses in the VisiTerm program. At the far left, above the POWER light, you see the SHIFT key and the ESCape key, which we have already used. Between them is the CTRL (control) key, discussed below. At the far right of the row containing ESC, you find RETURN. Below that are the two arrow keys, ← and →. At the bottom, in line with the POWER light, is the SPACE bar, which has several uses in addition to putting spaces in text. Pressing the RESET key, above RETURN, reboots the program.

You don't have to memorize this section, or even completely under-
stand it. As you practice while reading this manual, you will become
thoroughly familiar with all the necessary keys.

Just read lightly the material that follows, with your Apple keyboard
nearby so you can easily visualize where each key is and how it will
be used. Full understanding and fluency in using all the keys will
come later.

The Control Key (CTRL)

Some characters that you might want or need to send do not appear
on the Apple keyboard. One example is the character that produces a
linefeed. A linefeed drops the cursor down a line on the screen, so that
what follows doesn't write over the line that is already there.

You indicate that you want a linefeed by holding down the CTRL
key while pressing the J key. The VisiTerm program will then send out
the linefeed character to the other computer and your terminal screen,
causing the screen cursor to drop down one line.

So you can use the CTRL key to send different codes (additional
characters) by holding it down while pressing the normal available
character keys. (We'll write CTRL XXX when we want to indicate a
control character, meaning you hold down the CTRL key while press-
ing the XXX key.)

Appendix C shows which codes the VisiTerm program sends for
each character or combination you press at the keyboard. Control char-
acters are shown within angle-brackets. For example, Control J appears
as <J>, Control H as <H>.

The Escape and Shift Keys

Similarly, to send certain other codes (characters) you must use a spe-
cial key sequence beginning with the ESC key. For example, to send
an open brace that looks like {, you must press two keys: ESC, then 8.
A closing brace } is sent by ESC 9. Appendix C also contains these
sequences and their character equivalents. The notation for escape
sequences in the tables of Appendix C shows only the second key
inside square brackets, e.g., [8] would mean ESC 8, [9] would mean
ESC 9, and so forth. This is also the notation used for several of the
options in Lessons 2 and 3.

Another useful example is the escape sequence that generates the BREAK signal, for which there is no specific key on the Apple keyboard. Many remote systems use this signal to interrupt a running program, as discussed in Lesson 2. The VisiTerm software will send a BREAK for you if you press the ESCape key followed by the number 1 key: ESC 1.

The SHIFT key does not control upper and lower case as is usual, although your dealer can install a hardware modification to make SHIFT work as it does on a typewriter. The VisiTerm program does use SHIFT, however, to turn certain options ON or OFF, to switch from the Terminal mode screen to the Options mode screen, and to create the special characters above the numbers.

We saw some of these uses above. Here's another: when using the VisiTerm program you hear a little click each time you press a key. This can be turned OFF (or ON) by the sequence ESCape SHIFT 3. Try it.

Terminal Mode: Table of Characters and How to Send Them

When you are communicating in Terminal mode, using your Apple under VisiTerm control, most of the normal characters you would type are sent exactly as you type them.

But some characters are used for controlling timesharing services or communication, and some (as we have seen) require extra keystrokes from you in order for the VisiTerm program to produce them. For these, you must consult the table of ASCII characters (Appendix C). Find the character you want to send, and then use the keystrokes indicated next to it in order to send it to your remote computer or service. For example, to send an ESCape signal out to your computer connection, you must use the sequence ESC 4.

There are also five additional escape sequences used as Terminal mode commands that we have not yet introduced. They are not needed until we reach the more advanced features of Lesson 2.

THE OPTIONS MODE AND SCREEN

We've just practiced the main functions of Terminal mode. Options mode is probably the next most important. Let's take a look:

To get to Options mode from the Terminal screen, type ESC SHIFT 1. The screen is suddenly filled with light; it should look like this:

The bottom line tells you that you are in Options mode. The next line up, the command line, shows you the nine commands you can execute from Options mode:

TERM FTRAN DEF CALL SAV GET ZAP XEQ QUIT

The first command, T, takes you back to the Terminal screen. The second, F, puts you into File Transfer mode, and the third, D, into Macro Definition mode. The screens for the latter two modes were shown in Chapter 1, and are discussed in Lessons 2 and 3.

The rest of the screen shows options you can change: eighteen lines at the left, plus the character set definitions at the right.

At first this is a bit intimidating. However, changes are usually unnecessary for average use, since the options in force when the VisiTerm program is loaded are very widely applicable.

Also, the options can be viewed in several broad categories, which makes them easier to understand. The first three, COMM SLOT, COMM SPEED, and DATA FORMAT are data communications options. They specify where the card is that controls the communication, and the rate at which characters are to be sent or received, and the make-up of each character, respectively.

The next six options have to do with interrupting and restarting transmission when more than a few characters are being sent in a row. The remainder control various aspects of how things look on the screen.

The data communications options will be discussed below.

All the rest will be discussed in detail, with examples and hands-on instructions, in Lessons 2 and 3.

Each VisiTerm option, starting with COMM SLOT and COMM SPEED at the top left, offers several choices you can select.

Space, Return, and The Arrow Keys

To pick the option whose setting you want to change, you press either the SPACE bar or RETURN until that option is highlighted by a white bar, in reverse video (black letters in a white field).

Then you can select among the choices for that option by pressing one of the arrow-keys. Each time you press one, the next choice appears, in a never-ending cycle. When the choice you want is present, stop. You may then select a different option to change by using the SPACE or RETURN to move the white bar.

SETTING OPTIONS WITH THE SALESMAN'S ANSWERS

When you are first setting up an account with a timesharing service, establishing an interaction with an in-house mainframe computer, or planning an Apple-to-Apple linkup, the first three options are the most important. The value for COMM SPEED, and usually DATA FORMAT, has to be the same for the VisiTerm program and the other computer.

For most remote services, the VisiTerm options that are loaded automatically, called the default options, work fine: no need to change them. But we can practice on these, partly to see the various values for them and partly to get the feel of how you change them.

If, for example, your contact at the other computer site told you that computer expected data at the 110 Baud rate, you would have to adjust the VisiTerm COMM SPEED option. Similarly, if odd parity were required, you would have to change the VisiTerm DATA FORMAT option, as shown below.

The first option, highlighted at the top by the white bar, is called COMM SLOT. This shows which slot your communications card is in. You may, of course, have more than one such card installed in your Apple II. The VisiTerm software looks for a communications card, and displays here the lowest slot number where it found one.

It also shows you what kind of card it found: Apple communications card (APPLE), CCS Model 7710 asynchronous card (CCS), or the D. C. Hayes Micromodem card (DCH). If you have no card installed, it shows LOCAL. (For more detail on these terms and devices, see Appendices A, B, and the glossary.)

Each time you press an arrow key while this option is highlighted you change the setting of COMM SLOT. One of the possible settings is LOCAL. When LOCAL is selected, what you type using half-duplex in Terminal mode (or send/receive in File Transfer mode) goes only to your screen. It will not go out on a line to another computer.

Press an arrow key until the correct slot number appears. Now press the SPACE bar. The white bar on the screen will move down to the second option, COMM SPEED. (If you were now to press RETURN, the white bar would move back up to COMM SLOT.)
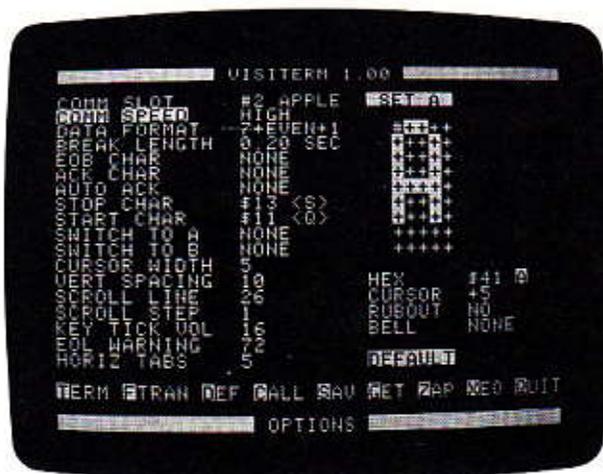
The picture on the preceding page shows the default speed setting, HIGH, which is acceptable for most network services. For the Apple and DCH communications cards, HIGH represents 300 Baud, or about 30 characters per second. This speed can usually remain as it is.

There are two other choices, as you can test by pressing the right-arrow key: LOW, which is slower, or AS SET, which is used only if your communications card requires you to physically set the speed on the card before you install it (like the CCS 7710). LOW usually represents 110 Baud, or about 11 characters per second. If you have physically set the card, it runs only at the speed you set.

Press SPACE to get to the next option, DATA FORMAT. You should see 7+EVEN+1. Press an arrow key 8 times to view the other choices, which are explained in Appendix A. Just briefly, the 7 means how many bits are used to represent each character. The EVEN means even parity, a bit tacked on so that the sum of all the bits in the character will be even. The 1 at the end is used as a stop bit, to signify the end of that particular character. As an example of the flexibility of many time-sharing systems, the Source can use any of these data formats except 8+EVEN+1 and 8+ODD+1.

The remaining options and commands are discussed in Lessons 2 and 3, with examples and hands-on directions.

CALLING YOUR TIMESHARING SERVICE AND SIGNING ON

When you sign up for a service and pay any initial fees, your sales-man tells you what local telephone numbers you can use to access the service. He also gets you an account number and password.

The timesharing computer checks incoming calls to see that they are valid customers. The usual procedure is to request your account num-ber, and sometimes a password that only you should know. The account number is fixed, but you can usually change the password once you're successfully "logged on," that is, once the computer accepts your call and gives you access to its services.

LESSON TWO

ADVANCED OPTIONS: MAXIMIZING FLEXIBILITY

Some of the VisiTerm features that make terminal usage more pleasant and easier than usual are simple things, like setting tabs or changing which line causes scrolling. Some are more powerful and complex, like changing the DATA FORMAT and COMM SPEED from the keyboard without opening up the terminal.

The VisiTerm program contains additional advanced features, saving you time at the keyboard (macros), making it easier to read the screen (vertical spacing), and enabling you to adjust your communication modes to the varying expectations of different remote computers (protocol characters, auto acknowledge). You can vary the appearance of individual characters or whole character sets, and switch back and forth in using them. You can cause the screen to scroll at any line.

You can save (or restore) the entire set of options, characters, and macros that are (or were) in effect at any given time.

This lesson explains how you use and adjust the VisiTerm options that provide all of the above capabilities and more.

To get to Options mode, press ESC SHIFT 1 if you are in Terminal mode. (If you haven't loaded the VisiTerm program yet, do so now by following the instructions in Chapter 1. Then press the ESCape key, hold down the SHIFT key, and press 1.)

Conventions

The VisiTerm program follows certain keyboard conventions in setting options, as mentioned in Lesson 1. To get to the option you want to change, you press SPACE or RETURN repeatedly until the white bar cursor highlights that option. The value in use is displayed to its right, and can be changed by pressing either arrow key (← or →) until the value you want is shown. If the option includes the possibility of NONE, typing N is a fast way to get that value, avoiding the arrow keys altogether. The values cycle, that is, if the range is 1 to 40 and the value showing is 40, a left arrow will bring you to 39, a right arrow back to 1.

The option is set to the value showing on the screen when you press either SPACE or RETURN again, which moves you on to other options. You can also leave Options mode altogether by pressing T to return to Terminal mode (or F to get to File Transfer mode.) Any of these actions leaves the selected option set the way you left it.

Let's look at some other options you might want to change.

CURSOR WIDTH, HORIZONTAL TABS, AND SPACES

Notice that the first time you enter Options mode, the white bar cursor highlights the first option, COMM SLOT.

Move it down to CURSOR WIDTH by pressing the SPACE bar 11 times. The default width that you get when you load the VisiTerm software is 5. Press the letter T to see how it looks when the cursor is 5 dots wide.

At the upper left on your Terminal screen, there should be a cursor, an underscore character. If you stare intently, you might make out the fact that it is 5 dots (also called pixels) wide. Changing the CURSOR WIDTH option can reduce this to zero, so no cursor shows, or raise it as high as 7, producing a very wide cursor.

Let's try it. Press the ESC SHIFT 1 sequence to return to Options mode. Now with CURSOR WIDTH highlighted, press the left arrow key 5 times, until the value NONE shows. Press T to return to Terminal mode and see what the cursor looks like. Try typing. No cursor is displayed.

Return to Options mode with ESC SHIFT 1 and press the left arrow one more time: Voila, you get the maximum number, 7. (You could also have pressed the right arrow seven times.) Again press T to see the cursor size. Bigger.

One Kind of Horizontal Tabs, Using Cursor Width

Now, to prepare for the discussion of horizontal tabs, type a sequence of numerals in order, like 12345678901234567890123456789 0, ending with RETURN and Control J (hold down the CTRL key while you press J). This positions the cursor at the left margin again, and on a new line. (When you're connected to a timesharing computer, it will send a line-feed (CTRL J) each time you send a carriage return, saving you the trouble. The J is capitalized here only for legibility; don't try to make it upper case when you type it.)

Return to Options mode and tap the left arrow twice to put CURSOR WIDTH back to 5. Then press SPACE six times to get down to the HORIZ TABS option. Press the right arrow key once, to get the number 6 as the tab value. Now press T to go back into Terminal mode.

Type CTRL I ("control eye") to get a tab character. The cursor should jump to be under the 7 you typed above. Notice also that the column counter in the bottom line has changed to read 7. Type the letter L to mark the tab stop.

Type CTRL I again. You should now be positioned under the 3, or thirteenth column on the screen. Type the letter L again to mark the tab stop. When the HORIZ TABS option is set at N, there is a tab stop at N+1, 2N+1, 3N+1, etc. So your first tab stop was at 6+1, then 12+1, 18+1, and so forth.

Horizontal tabs allow you to line up columns (of data, for example) with just a few keystrokes instead of many presses of the SPACE bar. Suppose you wanted to line up a series of figures at columns 11, 21, and 31. You could reenter Options mode, change the tabs option to 10, and be ready, in Terminal mode, to skip to the desired columns with a single keystroke, CTRL I. (Well, maybe that's a keystroke and a half. Easier than spacing over ten, though.)

If you wanted columns 7, 19 and 31 for some reason, you could use the value 6 we now have set for tabs, pressing CTRL I once for the first column, twice for the second, and twice for the third. Try it: you are now at character position 13; press CTRL I once. You should now be at character position 19. Press CTRL I twice again, and your position should be 31.

How It Works

There is a hidden issue here: how does the VisiTerm program know how far to move the cursor? It's not an obvious distance, since there are no "columns" built into the monitor screen, and the characters that are displayed are made up of dots, with different characters using different numbers of dots. To make that fact clearer, press ESC SHIFT 1 and then SPACE, to highlight the character display on the right side of the screen. A capital A is shown. Notice its width, and then press the left arrow to see the at-sign (@), which is much wider. Now press the left arrow again, to see the question mark (?), and again to see the greater-than sign (>). All are different widths, as you can notice dramatically by rapidly pressing the left and right arrows in succession. Now press the letter T to return to the Terminal screen.

The VisiTerm program knows how far to move the cursor because it uses the CURSOR WIDTH as its uniform "column" width. For the first tab, it moves the cursor to a new position so many cursor widths over from the left margin. The tab value tells how many cursor widths to go: this gives the total number of dots to skip over from the left margin.

Thus after the first tab character is typed (or received), the cursor is set to put the next character at the (tab value + 1) position. For the second tab, the dots skipped over from the left margin would be two times cursor width times tab value.

But since a tab may be typed anywhere, not just when you are at the left margin, the program must also be able to tell how far to go from the current position of the cursor, wherever it is. To do this, the program uses the column counter, as follows: the VisiTerm program increments the column counter for every character typed or received except for characters like the linefeed that do not display something. When a tab is typed, it compares the column counter to the tab stop locations to choose the next stop larger than the counter.

If the resulting value is to the left of the current cursor position, the cursor is not moved. This can occur when you use characters of varying widths, and have already displayed a number of characters wider than the current setting of cursor width.

Normally you want tabs to line up all the characters typed at the same tab stop, line after line. But for this to work, all characters have to be of equal width, namely the same as CURSOR WIDTH. Otherwise, narrow characters (or fat ones) cause subsequent characters NOT to be under their counterpart on the line above.

As you have seen, the character set we have been using, named DEFAULT, does not have equal-sized characters. Pretty, but not equal. Therefore when you are typing text with this character set, tabs will line up only the first character after each tab; subsequent characters will not line up perfectly. The MONO-SPACE configuration on your VisiTerm disk contains a uniform-width character set wherein all characters DO line up. It has a few other interesting properties also, which you may enjoy investigating later on.

Another Kind of Horizontal Tabs, Using Spaces

Some host computers may not handle tabs exactly as you would like. You may prefer to have the VisiTerm program convert outgoing tabs to the right number of spaces. To do so, reenter Options mode by pressing ESC SHIFT 1, back up to HORIZ TABS by pressing RETURN, and then press the SLASH key (/). The letters SP appear next to the numeric value.
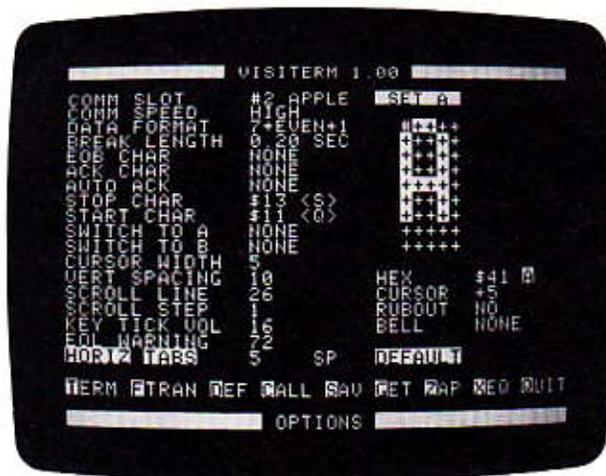
When the tabs option is using spaces, tabs are not sent out to the host. Instead, enough spaces are sent out to position the cursor at the next tab stop. Under the spaces version of tabs, the column counter adds 1 for each character typed at the keyboard, *including* characters that do not display something, such as CTRL C. Characters from the other computer are not counted.

Instead of using the CURSOR WIDTH to calculate the positions of the tab stops, the VisiTerm program now uses the width of the space character. In our present character set, that is 2 dots instead of the 5 we have set for CURSOR WIDTH. You can verify this by pressing SPACE again to highlight the character display and then 33 left arrows in a row (or use the REPT key). For a character set of uniform width, naturally, there would be no difference.

Let's try this type of tab stop right under the others. Press T to return to the Terminal screen. Press CTRL J and RETURN to begin at the left margin. Now press CTRL I followed by the letter i to mark the tab stop. Enter these last two characters five more times to see how things line up on the screen: CTRL I i CTRL I i CTRL I i CTRL I i CTRL I i..

As you see, the tab stops are much closer together. They are still 6 units apart, but the units are only 2-dot-wide space units instead of 5-dot-wide cursor width units. Type some text, too, and intersperse tabs and new lines, to see how things work out.

READING BETWEEN THE LINES

Now that you have practiced typing several lines, you've seen that each time you type a CTRL J (linefeed) the cursor moves down "a line," leaving some space between the lines of text.

The amount the cursor moves down is what is meant by VERTICAL SPACING, in Options mode. The value you choose may range from 1 to 40 dots. Since the standard characters are about ten dots tall, 40 means roughly 3 blank lines between text lines, and anything under 9 is likely to give you overlapping characters from one line to the next.

Capital letters are 7 dots tall, with 2 rows of blank dots at the bottom, so there's no overlap even at a VERTICAL SPACING of 8. But several lower case letters have tails (descenders) that go below the line and can touch characters on the next line unless VERTICAL SPACING is set to at least 10. You can test this for yourself, and also see it clearly when you view the large character displays in Options mode.

Let's see what varying the VERTICAL SPACING option does to the screen display. Type this:

THIS IS TEST TYPING RETURN CTRL J
TO ILLUSTRATE THE VERTICAL CTRL J SPACING.

Now press ESC SHIFT 1 to enter Options mode, and press the RETURN key 5 times to position the white bar on VERTICAL SPACING. It is set at 10 when the VisiTerm program is loaded. Hold the right-arrow key down and press the REPT key until you get the value 20 showing. Now press T and type:

CTRL J THIS JUMP WAS DUE CTRL J TO 20 DOT VERTICAL SPACING.

Reenter Options mode via ESC SHIFT 1 and press the left arrow key repeatedly to reduce the value from 20 to 7. Press T and type:

NOW THE SPACING IS CTRL J RETURN
DOWN TO ONLY 7 DOTS CTRL J AND A BIT HARD TO READ.

Some of the characters may overlap from line to line.

As a final example, press ESC SHIFT 1 and tap the left arrow 7 times; you should get 40 as a value. Press T and type:

THE FOLLOWING JUMP CTRL J IS DUE CTRL J TO A 40 CTRL J DOT VERTICAL CTRL J SPACING OPTION.

Notice how prior lines quickly disappear off the top of the screen. This scrolling effect depends on the next two options: SCROLL LINE and SCROLL STEP.

WHERE'S THE BOTTOM LINE?

You can define almost any row of dots to be the screen "bottom," that is, the place that causes everything to scroll up, or the last line on which anything normally prints. In Options mode it's called the SCROLL LINE, with values from NONE to 176. The SCROLL LINE is not a line of text, but rather one of the rows of dots that are used to create the characters we see as text.

The VisiTerm program uses the bottom line of text in Terminal mode to display various status messages, e.g., COL— 1 HALF DUPL SET A. Your transmission screen begins directly above this: the very first dot-row above these messages is called SCROLL LINE 1, and the rest count up from there.

With 10 as your vertical spacing, each linefeed you type (or receive) drops the cursor 10 dots. When this moves the cursor below the SCROLL LINE you have specified, the whole screen will scroll up, losing the top line. If you specify a SCROLL LINE between 11 and 20, scrolling will occur whenever you get to the second text line from the bottom. The amount it scrolls up is defined by the SCROLL STEP option discussed below.

If you set the SCROLL LINE to be 2 or more text lines up from the visual bottom of the screen, that is, a SCROLL LINE value of 20 or more, then characters can continue to be displayed even while smooth scrolling is going on. This makes viewing the screen display more pleasant. The value loaded with the VisiTerm program is 26, causing the type of scrolling you have observed thus far.

To show the effect of changing the SCROLL LINE, press ESC SHIFT 1 and then the SPACE bar.

Now press ESC SHIFT 1 and hold the right arrow down with REPT until SCROLL LINE shows 56. Press T and type:

NEW TRIAL WITH 56 SCROLL CTRL J

Scrolling continues until the cursor gets above the 56th row of dots, but still fairly slowly and smoothly. Notice you can type even while scrolling is continuing.

```
         EXAMPLE
               SHOWS
                   SCROLLING
                         AT LINE 122
                               WHICH IS
                                    HERE_




         CAPS   COL - 52   HALF DUPL   SET A
```

HOW FAR DO I JUMP?

The speed with which the VisiTerm program scrolls the screen is set by the SCROLL STEP option. A small value like 1 means the screen moves up very slowly and smoothly every time there is a linefeed at the SCROLL LINE. A large SCROLL STEP causes the screen to jump up quickly once every two or three linefeeds.

The amount that the display moves is always the SCROLL STEP value, but scrolling always continues until the cursor is above the SCROLL LINE. Thus when the cursor falls below that line and SCROLL STEP is smaller than VERTICAL SPACING, it can take several small moves and a few seconds for the VisiTerm program to get the cursor back high enough on the screen.

In fact, if the cursor has gone literally off the screen, the VisiTerm program panics just a little, thinking it may be falling behind your typing speed (or the speed of the lines being transmitted). In such a case it may move the cursor up farther than normally. It does this to catch up on characters that couldn't be displayed while the cursor was off the screen, and to leave room for new characters still coming in.

You should try several combinations of SCROLL LINE, SCROLL STEP, and VERTICAL SPACING to see what feels comfortable.

First test the settings you have now: SCROLL LINE at 56, SCROLL STEP at 1, VERTICAL SPACING at 40. Type T CTRL J several times just to watch the scrolling: it remains smooth until the cursor goes off the screen.

Now press ESC SHIFT 1, then SPACE, and then the right arrow 9 times to set SCROLL STEP to 10. When you now press T and type TEST CTRL J, the screen jumps for each linefeed.

If you now reset VERTICAL SPACING to 10, the jump will be less severe. Press ESC SHIFT 1, then RETURN RETURN, and then left arrow until 10 appears. Press T and type a few lines ending with CTRL Js.

If you now reenter Options mode, reset VERTICAL SPACING to 5, and return to the Terminal screen, you will find that 2 linefeeds are now needed to get scrolling.

In general, when the SCROLL STEP equals the VERTICAL SPACING, scrolling occurs for every linefeed (when the cursor has reached the SCROLL LINE). When the SCROLL STEP is twice the VERTICAL SPACING, it takes two linefeeds to get the screen to scroll.

When the SCROLL STEP is small, such as under ten, the screen rolls up gently. Larger values cause the display to jump rather abruptly, but only once every few linefeeds.

Try other combinations. Some of them seem really amusing.

CASTS OF CHARACTERS

When you load the VisiTerm program, two character sets come along with it. This pair of character sets, which is loaded into memory automatically, is called DEFAULT. One set of characters is immediately in use. You can alter it, change to the other one, or bring in a new pair of your own devising. ("How" is described below.) There are actually half a dozen such pairs on your VisiTerm disk, waiting for you to experiment with them. Just briefly, they include REGULAR & BOLD, CURSIVE & SHORT, UPPER CASE, MONO-SPACE, and VISIBLE CTRL, which shows a name for every character including the control characters.

Get into Options mode and use SPACE or RETURN to move the white bar cursor over onto the character set area. When you get there a whole white box surrounds the character display. Notice the highlighted word DEFAULT.
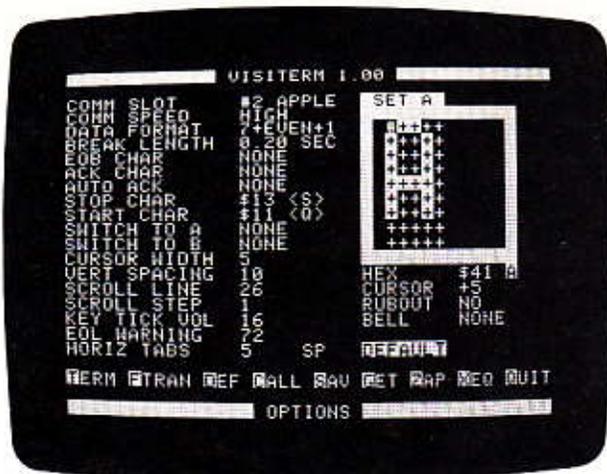
The first character displayed is a capital A, with a special # cursor in the upper left corner of the display rectangle. Underneath are four descriptors that tell how that letter gets displayed in Terminal mode. The first line, HEX, shows what key produces that display and what hexadecimal (base 16) number is sent to the host computer when that key is pressed.

The second line, CURSOR, shows how many horizontal dots are skipped to get to the next screen position when the character is displayed. For A, you can see that five are skipped but only four are used for the letter itself, leaving one as a spacing between letters.

RUBOUT, the third line, tells whether this key/character has the power, when typed in Terminal mode, to delete the character typed just before it on the Terminal screen. For A, the answer is NO.

The fourth line, BELL, indicates how loud a bell (if any) is sounded when this key is pressed. For A, no bell.

Pressing the right-arrow changes the letter to B, then C, and so forth. Each time, the display changes and the four descriptor lines do too, though often the new value displayed is the same as the last one.

Character Set B

If you press the dash or hyphen key —, you switch into a different character set, called Set B. Notice that the HEX line stays the same when you change character sets, but the display and other characteristics can vary drastically. Set B in DEFAULT is APL characters.

For example, press the right arrow key until capital D is displayed in character set A. Now tap the dash. In Set B, this is a character that looks like a lower case 1, and the CURSOR number is 6 instead of 5.

Tap the dash again, to return to Set A. Press the right-arrow until you see the letter G. Now press dash again. For keystroke G in character Set B, the display isn't even a letter. This is true for many letters in Set A—the same keystroke in Set B has a different meaning, intended for use with a different computer programming system and a different keyboard.

The options from CURSOR WIDTH down to HORIZ TABS change automatically when you change from any character set to another. These options include VERTICAL SPACING, SCROLL LINE, SCROLL STEP, KEY TICK VOL, and EOL WARNING.

While you are designing your own character sets, you can also vary the above options with a few keystrokes, if you choose. Naturally you can make them the same in both sets if that is preferable or more useful. You can even do so for the DEFAULT sets by changing them to meet your wishes and then saving them under the name DEFAULT. (It is advisable first to save the default set under another name, such as ORIGINAL CHARS, to keep them available for later use. How to do so is shown in a later section of this lesson.)

CHANGING APPEARANCES

You can also alter what gets displayed on your screen for each character. If you then make your altered characters the default, then they are brought in automatically each time you load the VisiTerm software.

Two examples will clarify how to change the character displays.

Tap the dash again to return to Set A. Let's make fat characters, starting with the G we were looking at. In order to have something to compare to after we finish, type a T to get into Terminal mode, ESC ESC to get all caps, and enter the following sentence:

GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G! CTRL J

Then reenter Options mode by typing ESC SHIFT I.

To change the character set display and descriptors, you use ten keys in addition to the two arrow keys. The ten are all together like this on the keyboard:

You can position the middle three fingers of your right hand on the J, K, L, and be able to reach any of the main nine easily.

The paragraphs below lead you through what each key does, but here's a summary:

LETTER	EFFECT ("Cursor" Below Means Special Cursor: #)
U	Varies cursor movement; reduces the number of + signs in the background.
O	Varies cursor movement; increases the number of + signs in the character display background.
I	Moves the display cursor up.
J	Moves the display cursor left.
L	Moves the display cursor right.
,	Moves the display cursor down.
K	Turns dots ON or OFF.
M	Switches between YES and NO for the RUBOUT operator.
.	Makes the bell louder or softer.
/	Deletes the display for the current character.

To make our fat Gs, first add two more columns of dots by pressing the letter O twice—watch the screen for what happens. Not only do you get two more columns, the CURSOR number goes from 5 to 7. Ten is the maximum number of columns for terminal cursor movement.

Now we move a special cursor, #, from its current position at the top left over to the right, by pressing the letter L three times. Turn the dot there ON by pressing the letter K. Turn the next two ON by pressing L K L K. (This special cursor can only go up to the eighth column, even though the terminal cursor can jump ten; the extra two are for spacing between characters.)

Move the cursor down by pressing the ', then press K J K J K to turn those two dots ON and the next one OFF. Then press J J K ' K ' K ' K to make the left bar of the G fatter. However, the cross bar from the old G must be replaced. Type L I K L K ' K to get rid of it, and I K L K L K as its replacement. Fill in the right bar with ' K J K ' K L K.

It does look like a G, but it's not faaatttt enough on the bottom. Turn ON that next row down: ' K, then five J K sequences in a row. Fill the hole above with I K. Voila, a fat G.

However, it lacks a certain style. Press the left arrow key four times, and take a look at the default C. Its corners are not ON. Let's try that with our G.

Tap the right arrow four times to get back to our G. Try the sequence ' K L L L L L K. There. A fat G, but with style.
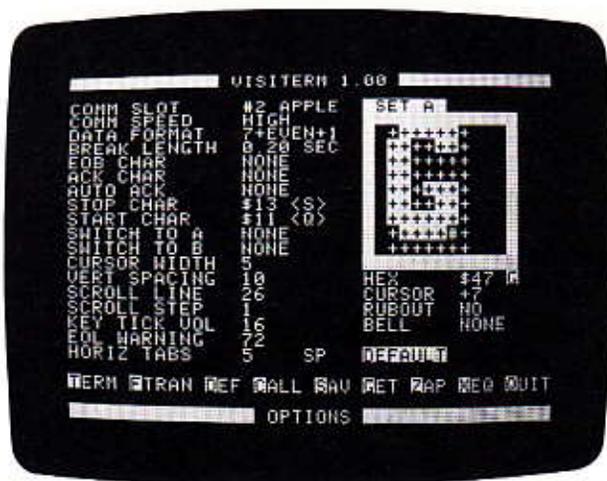
Now let's compare it with our original GOGO GORILLA. Press T, and retype that immortal line.

GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G!
GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G!_

CAPS   COL- 54   HALF DUPL   SET A

Certainly stands out, doesn't it? And you can see that the spacing turns out quite different, too.

For our second trial, suppose you want to be sure you notice whenever you send or receive a Control C. Return to Options mode and hold down the right arrow and REPT keys until <C> appears on the HEX line. As you see, in the default configuration, there is no display.

```
                    VISITERM 1.00
COMM SLOT        #2 APPLE     SET A
COMM SPEED       HIGH
DATA FORMAT      7+EVEN+1
BREAK LENGTH     0.20 SEC
EOB CHAR         NONE
ACK CHAR         NONE
AUTO ACK         NONE
STOP CHAR        #13 <S>
START CHAR       #11 <Q>
SWITCH TO A      NONE
SWITCH TO B      NONE
CURSOR WIDTH     5
VERT SPACING     10          HEX       $03 <C>
SCROLL LINE      26          CURSOR    +
SCROLL STEP      1           RUBOUT    NO
KEY TICK VOL     16          BELL      NONE
EOL WARNING      72
HORIZ TABS       5           DEFAULT

TERM  TRAN  DEF  CALL  SAV  RET  RAP  SEQ  QUIT

                    OPTIONS
```

If you really wanted it to stand out, you could do something like this: Tap the letter O ten times until all ten columns of dots are present. That makes possible a very wide display. Now turn on all the dots in every

other row by typing `"L L L` to return the # cursor to the home position, and then type the sequence KL eight times, then ` `, and eight KLs, ` `, until you have five white bars in the display. Now press T and type a few CTRL Cs, followed by CTRL J twice.

GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G!
GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G!

CAPS   COL- 6   HALF DUPL   SET A

Type ESC SHIFT] to return to Options mode, to alter the display slightly. Type IK IIK IIK IIK JK ` ` K ` ` K ` ` K. Now, in Terminal mode, type some more CTRL Cs and see how they look.

Either way, if you send or receive a CTRL C it will stand out on the screen, even when surrounded by other letters.

GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G!
GOGO GORILLA! GORGEOUS GEORGE GOES GAGA OVER GROSS G!

EVEN SURROUNDED BY OTHER TEXT THE CTRL C STANDS OUT.

CAPS   COL- 1   HALF DUPL   SET A

CHANGING EFFECTS

Here we touch on a slightly more complex subject. The VisiTerm program allows you to change which characters cause a carriage return, backspace, rubout, space, linefeed, tab, and clear (of screen). In fact, you can have many characters that do each of those operations. However, there are standards defining computer and terminal expectations, and most other computers or terminals will be using those standards. So if you play too radical a game of changing, your screen images will not resemble what was sent by your friendly host or pen pal.

For every character, the operations mentioned above are controlled by the descriptor labeled CURSOR under the character display box. To change it, you use the letters U or O. Each time you tap one of them, the width of the display image changes or, if you've gone beyond 10 columns, the extra choices appear. When you go on to another character or another option, the choice you left in CURSOR is what will happen when that character is typed or received.

For example, the normal carriage return character is hexadecimal 0D, shown as $0D, and there is no display for it. A linefeed is hexadecimal 0A, produced by a CTRL J, again with no display other than the cursor move. Hexadecimal 18 is a carriage-return and linefeed together, produced by a CTRL X.

Now, you can decide that you want a carriage-return and linefeed every time you type a semicolon (hexadecimal 3B). Hold down an arrow key and also the REPT key until $3B appears on the HEX line. Then tap the letter O ten times until you see, on the CURSOR line: CR & LF. That's it.

You can test it immediately by pressing T and typing something ending with a semicolon—that line ends and the cursor returns to the left margin. If you didn't want the semicolon but only the effect, you could turn off all the dots in the display, in Options mode using the slash key.

The line below CURSOR says RUBOUT. It can be YES or NO, changing each time you press the M key (with the white rectangle around the character display). If it is set at YES, then when the character currently shown is typed in Terminal mode using half-duplex, it will delete the character that was typed before it. In full-duplex the rubout character is the one whose CURSOR line says RUBOUT, which should be the character used by your timesharing host for this purpose.

The last line under the character display says BELL. It can be NONE, SOFT, MED, or LOUD, depending how many times you press the period (.) key. The bell will then sound at the volume you select, whenever the character shown here is displayed in Terminal mode. It is produced by CTRL G in the default configuration.

SAVING, GETTING, AND DELETING CONFIGURATIONS (OPTION SETS)

A "configuration," to the VisiTerm program, means the current settings of all the options and characters. Once you've gone to all the trouble to create or modify a configuration, you'd like to keep it available. The Save command does it.

Reenter Options mode (ESC SHIFT 1) and press the letter S. The word SAVE appears at the lower left. The VisiTerm software then waits for you to enter the name under which you'd like to save this set of characters and options. Type the name; you'll see it appear to the right of SAVE. It must begin with a letter followed by up to 14 more characters. Commas and control characters are ignored. A RETURN or CTRL M ends the name immediately.

NOTE: You can always back up using the left-arrow key and retype the name, or change your mind about saving it just now by erasing the whole name (with the left arrow) and hitting RETURN.

When you press RETURN, the options and character sets will immediately be written out to the disk in drive 1, saved in a file under the name you specified. The disk may be your VisiTerm disk or another one you put there instead.

If you want this configuration to be the default set, coming in whenever you load the VisiTerm program, you can use the name DEFAULT. Before you do that, however, you should be sure to save the original DEFAULT set that came with the VisiTerm software, under a new name like ORIGINAL CHARS. That way you can always use them again, even as the default set if you resave them using that name. There can be only one file with a given name on the diskette, so when you reuse a name, its old contents are written over.

To bring in and use any such file of options and characters, you use the GET command. Type G, followed by the name of the file in which they are stored, ending with a RETURN. This includes, of course, the name DEFAULT.

When issuing either the SAV or GET command, it is not always necessary to type the name you want. You can press either the left or right arrow key to select from configuration files on disk. Each press of an arrow key shows you the next such file. If the filename you want to use appears, then pressing RETURN executes the command: if it is GET, that configuration file is loaded. If it is SAVE, the current configuration is written out to that file (and its old contents are destroyed).

To delete such a file, making room for other things, use the ZAP command. Type Z, the filename, and RETURN. It will go away. Only configuration files can be zapped, and ZAP is the only way to get rid of them. These files are stored in a special format on disk, and regular DOS commands such as DELETE will not work for them.

CONTROLLING WHAT YOU HEAR

In Terminal mode there is a slight tick sounded for each character you type. The option KEY TICK VOL stands for Keyboard Ticker Volume, permitting you to make that tick softer or louder. The values run from 1 (soft) to 32 (loud).

The EOL WARNING option lets you set a bell to sound every so many characters—you set the number, from 1 to 198, or NONE, for no warning. (If you want none, type N.)

CONTROLLING TRANSMISSIONS AND APPEARANCES

Break Length

Many terminals can generate a signal called BREAK, which time-sharing computers often use to interrupt ongoing processes or to get the host's attention for other purposes. It has to last long enough for the host computer to notice it, and on terminals that have a BREAK key, the signal is sent as long as the key is held down.

Your Apple keyboard doesn't have a BREAK key on it, but the VisiTerm software will send this signal when you press ESC 1. Since a two-key combination is being used, the length of BREAK is set in Options mode.

The BREAK LENGTH option enables you to adjust VisiTerm execution to fit the expectations of any service you connect to. When this option is highlighted, each press of the right arrow adds 1/100th of a second to the duration of the BREAK signal, and each press of the left arrow subtracts that time.

The default, 0.20 seconds, is probably adequate. If you find the remote computer ignoring you when you send the BREAK signal, you can switch into Options mode and make it longer. Then switch to Terminal mode to send it, until the expected response is received.

Protocol Character Pairs

The next part of this section might well be called "Computer ingestion, digestion, and indigestion," or "Stopping and starting the sending of characters."

Computer systems are designed to handle input and output in chunks, in groups of characters. Sometimes these groupings are called lines, usually ending with a carriage-return and linefeed. Sometimes many lines can be accepted or transmitted in one continuous operation, from a single memory area referred to as a buffer. In either case the group as a whole is called a block (of characters).

When a block is received into a buffer area, it normally is soon rewritten into a separate area. There are three reasons for this: 1) the block and its contents can be referred to by name, 2) written swiftly to disk, and 3) the buffer area can be reused for further transmissions.

While this rewriting is going on, the buffer is normally unavailable: during "digestion," it is necessary to stop "ingestion." (Or else it will get ... "indigestion!")

But the sending computer must have some way of knowing when to stop sending temporarily. Otherwise the characters it sends while the receiving computer isn't paying attention (buffer full or being transferred) will simply be lost.

The conventions for stopping and restarting transmission are called protocols. Lesson 3 discusses them in detail. For the moment, in terms of what you can do in Options mode, just notice that there are four characters you can define. (These options appear immediately after the first five that we set in Lesson 1.) They are:

    EOB CHAR
    ACK CHAR
    STOP CHAR
    START CHAR

The first two stand for End-Of-Block and ACKnowledge, and they work as a pair. This is called the EOB/ACK protocol: when COMPUTER-1 is sending characters to COMPUTER-2 under EOB/ACK protocol, it continues to send until it sees an EOB in its output stream. At that point, it stops sending until the receiving computer sends back as ACK.

When COMPUTER-2 is ready to receive more characters, it sends an ACK signal to COMPUTER-1, which then knows it can continue to send without losing any characters. Each block is sent individually until the whole file transmission is completed successfully.

STOP and START also work as a pair, but a little differently. Under this protocol, COMPUTER-1 simply continues to send character after character unless COMPUTER-2 interrupts by sending out a STOP character. As soon as COMPUTER-1 sees that character, it stops sending. It will continue to wait forever unless COMPUTER-2 gives it the go-ahead by sending out a START character.

Naturally, these protocols can only work if the people who set up both systems agree to make each system recognize and act on these characters in the same way.

Timesharing computers or computer bulletin board systems usually make it clear if they use these protocols. The salesman or representative of a service, or the public messages on an automated system, can tell you. If it isn't apparent, just ask.

Auto Acknowledge Feature

Computers which need the EOB halt to accomplish some processing of each block may nevertheless not be set up to provide an ACK. Or, the time needed for each block may always be the same.

In either case you can use the AUTO ACKnowledge to establish a safe period of time to wait before automatically sending the next block.

It works like this: each press of the right arrow adds four to the AUTO ACK option value, and each left arrow subtracts four. From zero a left arrow takes you to 996, the maximum number. The value represents the number of null characters sent out before resuming transmission. (Null characters are universally ignored—but they take time.)

The delay depends on your COMM SPEED option. At 300 Baud it takes about 1 second to send 32 nulls. At 110 Baud that takes about 3 seconds, and at 1200 Baud, about one-quarter of a second. So if X is the delay you want, in seconds, you get the value for Auto Ack by multiplying your COMM SPEED by X and dividing by ten.

TYPE-AHEAD FEATURE

What if you hate waiting? Just turn on the type-ahead feature, by pressing ESC SHIFT 5 (in Terminal mode). What happens is, the VisiTerm program tells you when it has encountered an EOB or received a STOP. It must await the go-ahead, in the form of an ACK or START, respectively. It tells you what's going on by changing a status message at the bottom of the screen from SENDING to WAITING (or back again).

But as long as the protocol characters are defined, and you've turned on the type-ahead feature, you don't have to stop typing. The VisiTerm program will store up to 256 characters while it waits, and when the receiving computer sends its ACK or START character, away they go. Hence the name, Type-ahead.

The only slightly mysterious thing about it is, what you type stays invisible until sent. As you doubtless remember, in full duplex we rely on the remote computer to echo back each character we send—the VisiTerm program doesn't display them. And in half-duplex, nothing is displayed until sent to the host.

So while the VisiTerm program is in WAITING mode and you're typing away into its buffer, nothing appears on the screen. A bit disconcerting the first few times, especially if one is conscious of imperfect typing.

Trying It Out

This is something you can test or play with even when you are not actually hooked up to a remote computer. The VisiTerm program recognizes your EOB character, as it should, amidst your sending output in Terminal mode (or File Transfer mode). Normally it expects the ACK while receiving, not in your output stream of typed characters.

However, there are two VisiTerm features that permit you to get out of WAITING mode even without receiving an ACK from your host. In Terminal mode, you can type the self-acknowledge sequence of ESCape RETURN. Or, in Options mode, you can set the AUTO ACK option to the delay you desire after each EOB. Then in Terminal or File Transfer mode the VisiTerm program continues transmission after that wait.

To test or play with Type-ahead, you must first turn it ON using the sequence ESC SHIFT 5. It's ON if the message at the lower right on the screen says SENDING (or WAITING). It's OFF otherwise, and you can switch back and forth by repeating the ESC SHIFT 5 sequence. Turn it ON.
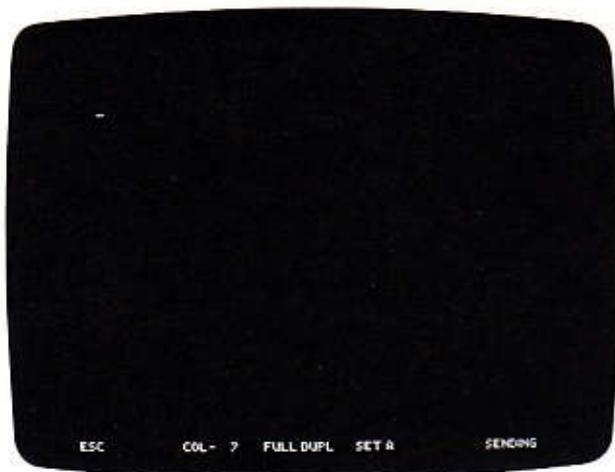
Now get into Options mode and SPACE down to the EOB CHAR option. Press the right arrow key three times, until you see $03 <C> appear to the right. Now press SPACE again, and again press the right arrow, this time six times until you see $06 <F> to the right. For the first test, leave the AUTO ACK feature at NONE, as it is when you receive the distributed VisiTerm disk.

2-33
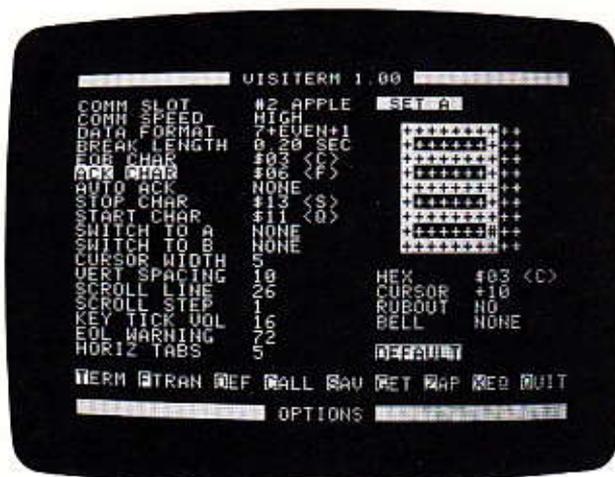
To start your test, type the beginning of some famous phrase you like, such as "Give me liberty or"; then type a CTRL C. Immediately you will see the WAITING signal at the lower right part of the screen. Now type the rest of the phrase and some commentary, for example: "give me death! Nathan Hale; Revolutionary War." (Invisible.)

Give me liberty or▣_

COL - 2   HALF DUPL   SET A   WAITING

The next step is to get the VisiTerm program to release the characters in the buffer: type the sequence ESC RETURN. The completed quotation and commentary now appear on the screen, assuming you are still in Half Duplex mode. (If not, type ESC SHIFT 2 to switch duplex modes and try the above test again.)

Give me liberty or give me death! Nathan Hale; Revolutionary War._

COL - 66   HALF DUPL   SET A   SENDING

Later, when you are connected to a timesharing host, you can do a second test of type-ahead, this time using the Auto Acknowledge. You can return to Options mode and reset that option to a value of 48. Then type some sentences in Terminal mode, ending some of them with CTRL C, and see the delay that occurs.

COMPUTER AESTHETICS

Well, not really. Perhaps we should call this section "letting the time-sharing host choose his appearance." The point of it is the use of the next two options: SWITCH TO A, SWITCH TO B.

This means selecting a character set, A or B, from the two possibilities always present. The VisiTerm software comes with two prepared sets, and you can change them or create entirely new ones, saving them on disk. Whether yours or ours, there are always two available at any given time.

The SWITCH TO A and SWITCH TO B options permit switching automatically between the two whenever the defined characters are seen by the VisiTerm program.

You define the characters by positioning the white bar cursor, in Options mode, on the SWITCH TO A option. Then use an arrow key to change the value to whatever character you wish to have that effect. Same for SWITCH TO B.

For example, get into Options mode and SPACE down to the SWITCH TO A option. Now press the right arrow until you see <A> appear. Press the SPACE bar again, and the right arrow again until you see <B> appear. (Of course, you may use any other characters instead, if you prefer.)

To verify that the switches are working, press T and type something in Terminal mode. Now enter CTRL B, and type some more. Hardly the same language, what? Now enter CTRL A, and the next text you type ought to be recognizable.

Now if those characters came from your timesharing computer, different lines could be displayed in different character sets. For example, try this out: get into Options mode and change both SWITCH TO A and SWITCH TO B to say $0D RET. This should do it. Press the right arrow 11 times, press RETURN, and press the right arrow 12 times. $0D is the carriage return. Now press T, get into all CAPS mode by pressing ESC ESC, and type some lines, ending each line with a carriage-return followed by a linefeed (Control J).

You say it's Greek to you? Me, too. What we've done is switch character sets at every line-end, so that each new line is in the other set. And as it happens, Set B is used in the APL programming language, which uses all those odd, Greek-looking symbols.

But suppose you had bold-face characters as Set B and normal characters as Set A. Then using carriage-return for both switches would cause a very clear distinction between what you typed at the keyboard and what your timesharing host (or Apple friend, or opponent) sent back to you. (Assuming they send carriage returns, of course.)

By the way, there is a reason that the carriage return doesn't also provide a linefeed like it does on a typewriter: many timesharing hosts provide it automatically. So if the definition of your carriage return character also gives one, everything on your screen will be double spaced. (Some hosts don't add one if they see one.)

However, it is easy to make the carriage return do both if you want to. In Options mode you position the white bar cursor on the character section of the screen, press an arrow key until you see $0D RET in the line beginning HEX. (That'll be 76 right arrows or 52 left arrows; use the REPT key.) Now press the letter O twice, and you should see the line beginning CURSOR change from CR to CR & LF. When you return to Terminal mode and type a sentence, your carriage return will not only end that line but bring the cursor down one as well.

DEFINING AND USING KEYBOARD MACROS

Character sequences that you frequently use in Terminal mode can be stored under a one-character (any character) name that you choose in Options mode. Whenever you type that special character in Terminal mode, the VisiTerm program sends out the sequence you defined, as if you had just typed it at the keyboard. This kind of capability is called a macro. You could conceivably have one for every ASCII character (but it might complicate your typing.)

Macros are saved along with the options and character displays when you use the SAVE command, and retrieved again when you use the GET command. If you define macros before saving a configuration under the name DEFAULT, then those macros will be loaded automatically every time you load the VisiTerm program. (But remember to save the original default option set first.)

One use for a macro is to issue your account number and password for signing on to a timesharing computer. One keystroke and you're on. If you always check the mail first thing, that command can be included. If there's a game or program you frequently use, whose beginning commands are always the same, again one keystroke and you're on.

To define a macro you press the letter D while in Options mode. The screen changes to look like this:
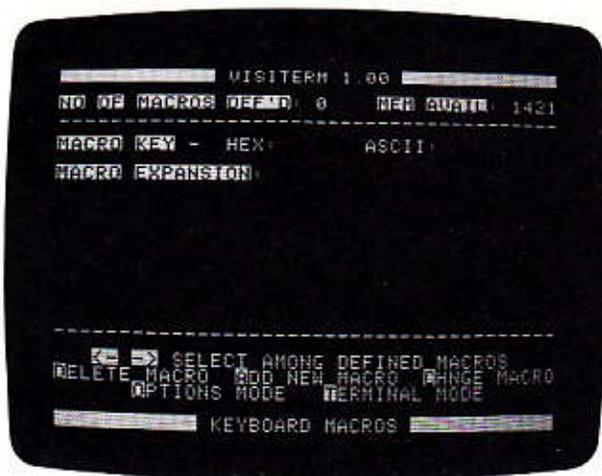
Six commands are listed at the bottom of the screen. The letters O and T take you back to Options Mode or Terminal Mode, respectively. "A" lets you add a new macro definition. "D" deletes the one you see on the screen (when you have any to look at), and displays the prior macro. "C" permits you to redefine an existing macro, by positioning you at the end of its definition and permitting you to back up, retype, or continue typing the desired keystrokes. In "D," the VisiTerm program asks you to verify that you really want to change or delete the macro, before it goes ahead and throws away what is there.

The left and right arrows cycle you through the list of macros already defined, so you can see what you've done or what's available, and add or change whatever you like. You can see how many there are by the top line of this screen, which also shows how many characters you can add to the macro space. Each macro has a maximum size of 249 characters. The total macro space has a fixed capacity, so that when you've filled it up and want to add more, you must delete something else to make room.

Adding a New Macro

Type an A. Your screen will change to look like this:

```
═══════════ VISITERM 1.00 ═══════════
NO OF MACROS DEF'D  1      MEM AVAIL  1417
------------------------------------------
MACRO KEY -  HEX:        ASCII:
MACRO EXPANSION:  (0 CHARACTERS)




- - - - - - - - - - - - - - - - - - - - -
     TYPE KEY TO BE DEFINED.

═══════════ KEYBOARD MACROS ═══════════
```
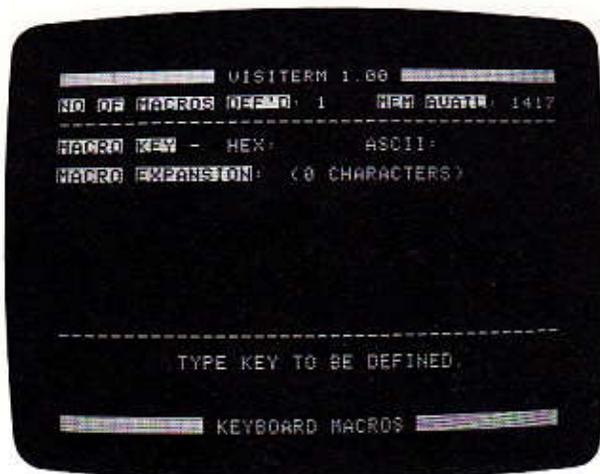
The number of macros shown now includes the one you are about to define. The bottom line says to type the key that you will use when you want this macro to type characters for you. As a first trial, type the letter s (for "start"). Now type "This is as if I were signing on some remote computer: my code is TOPBANANA777" and then a RETURN.

Notice that the spaces you type are displayed as underlines, so you can always tell how many are where in a macro. Also, if you made any mistakes and automatically used the left arrow to back up, you found that it works as you might expect. But it also reduces the character count shown on the line beginning MACRO EXPANSION.

Now press T to return to Terminal mode, and type an "s" once or twice. Almost magic. Each time you type "s," the whole line appears. If you type many "s"s, you will notice that the expansion of your macro starts immediately at the end of the last expansion, because there is no carriage return (or linefeed) in the macro. Try the sequence ESC s. All you get is a capital S: the macro "name" was lower-case "s" (and "s"s inside macros don't count.)
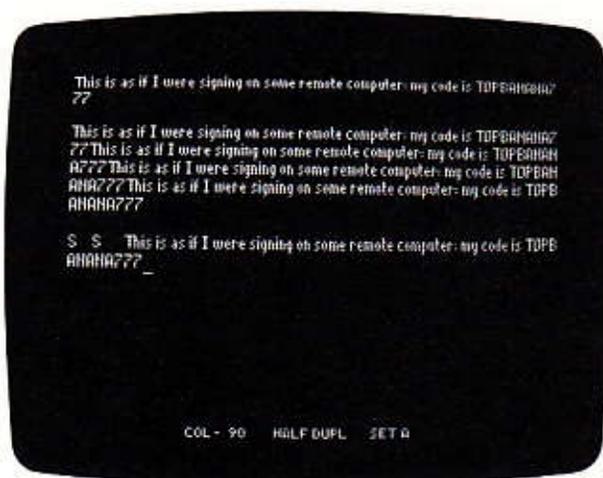
To get back to defining macros, type the sequence ESC SHIFT 1 and then the "D." Notice the number of macros is 1. Typing an "A" now changes that to 2, and gets you the macro defining screen again. Just for the fun of it, press RETURN. Hmm, that won't work; RETURN is what you press when you're done defining the macro. Notice the number of macros returned to 1.

But what if you want a carriage return in your macro?! The answer is to precede it with an ESCape: ESC RETURN puts a CR into the macro itself without ending the definition. It is displayed as a white square with two << symbols in it, as you will shortly see on your screen.

A backspace also needs a prior ESC to actually become part of the definition, rather than immediately deleting the last character you typed. Its display is a left arrow.

For all other characters, the sequences that work in Terminal mode (detailed in Appendix C) will work in defining a macro, too.

Try this: Type A to add the macro, and now ESCape RETURN. The MACRO KEY line will now show $0D for the HEX, and RET for the ASCII. Now type the little paragraph below, following these three rules:

1. Press the SPACE bar where the underline characters __ appear.

2. Press the ESCape key before the characters inside [ ].

3. Hold CTRL down while pressing the J key (shown as <J>).

(Helpful note: there are 26 ESC left-arrows in a row.)

THIS__WILL__SHOW__WHAT__HAPPENS__
[RETURN]<J>WHEN__YOU__USE__THE__
ESCAPE__BACKSPACE__CHARACTER__
[←][←][←][←][←][←][←]
[←][←][←][←][←][←][←]
[←][←][←][←][←][←][←]
[←][←][←][←][←]<J>

BACKSPACE__CHARACTER

End with a regular RETURN.

When you press T for Terminal Mode and then press the RETURN key, watch what happens on the screen: the cursor "rewrites" the last part of the sentence on a new line. (You can use the ESC 3 sequence to clear the screen between trials, making it easier to see what happens.) Notice that the column counter never returns to 1. Why? Because the macro doesn't end with another carriage return, and that's what resets the counter to 1.

Changing a Macro

Return to Options Mode and press D to see the macros. Now change the macro by pressing the letter C. You wind up positioned at the end of the macro, as if you had just created it but not yet pressed RETURN. You can add more to the end or back up, deleting characters as you go, and then add text from the middle outward.

For example, hold down the backspace and REPT keys until the cursor gets back to the beginning of the third line, and then type RETURN _ AS _ A _ MACRO ending with a RETURN. You have now redefined the macro to say something new. You could test it by pressing T and then RETURN. But let's delete it and redefine it from scratch.

Deleting a Macro

You probably wouldn't want every carriage return to do that little dance anyway. But you might want your name at the end of every line, say, of a program you were writing. So press D, for delete, and Y to say you really mean it. The number of macros will diminish by 1, and the next macro in turn will be displayed. Now type A, then ESC RETURN followed by your name and today's date): _ NAME _ DATE [RETURN] <J> RETURN.

Now when you press T to return to Terminal Mode, and type a few lines, each one is identified by your name and the date. (For the moment, you need the CTRL J to get new lines each time. Later, when you are connected to a host computer, you might not.)

Return to the Define Macro screen, and add a few macros. Now you can see the operation of the arrow keys, namely to show each definition in turn. To delete any of them, press D when the victim is on screen. This message will be displayed:

DELETE THIS MACRO
Y TO CONFIRM

If you press any key but Y (or y), the macro will NOT be deleted. If you press a Y, it vanishes.

By the way, before we leave macros, you might be interested in the idea of redefining the keyboard! One reason might be to type in non-English languages where the keyboards are different.

Another reason might be typing speed. The DVORAK keyboard pictured below takes some getting used to, but it has been shown to greatly increase the speed one can type. You can define and save a set of macros that make the Apple keyboard into a DVORAK keyboard.

004-001

CALLING OR ANSWERING ANOTHER COMPUTER

If you use the D. C. Hayes Micromodem as your communications card, you can use the VisiTerm Call command to dial another computer or to set up automatic answering.

Typing C in Options mode puts you in Call status, and displays MICROMODEM II: DIAL ANSWER. You can then press D to dial or A to set up automatic answering. After you press D, the screen shows MICROMODEM II: DIALING..

You dial the desired telephone number by typing it slowly at the Apple keyboard, waiting for each number to be displayed, ending with a RETURN. Typing a left arrow hangs up and lets you start again. The DCH communications card then makes the connection for you, displaying the message MICROMODEM II: AWAIT CARR.

The VisiTerm program goes into Terminal mode automatically when a carrier is detected, that is, when the connection with the other computer is established.

If you press A instead of D, the Micromodem displays ANSWER ON RING 1 2 3 4 5 6 7 8 9. When you press a number, you hear that number of rings, and see this display: MICROMODEM WAIT FOR N RINGS.

The N RINGS will show the number you chose, e.g., 3 RINGS. If the phone rings while MICROMODEM is in ANSWER mode, it displays this message until the correct number of rings, counting down from N to 0, and then answers the phone. The MICROMODEM then immediately issues an answer tone. When an originate tone is detected from the calling computer, the VisiTerm program automatically switches to Terminal mode.

EXECUTING A PROGRAM OR LEAVING VISITERM EXECUTION

The XEQ command turns execution control over to the program you name. When you type X, the prompt XEQ replaces the command line. may then type in the name of a program (file name) to be executed. It may be a binary, integer BASIC, or FP BASIC file. The name must start with a letter, contain no commas or control characters, and be no more than 30 characters long. As with SAV and GET, you can also ply use the arrow keys to show the available filenames on your diskette.

When you press RETURN, the file gets executed in place of the VisiTerm program. If you later need the VisiTerm program for further communication, it must be reloaded in the normal way.

The Quit command terminates VisiTerm execution and puts you back into the BASIC mode of Apple usage. (If you're using an acoustic coupler, don't forget to remove the handset and put it back on the switchhook.) If you need the VisiTerm program for further communication afterward, it must be reloaded in the normal way.

The next lesson shows you how to send and receive files. This enables you to store in a disk file any long messages or articles or reports you want to receive from (or send to) a remote computer, including VisiCalc sheets and DMS databases.

LESSON THREE

FILE TRANSFER MODE

Introduction

This lesson tells you how to set up and use all the options and controls that enable disk file transfers between your Apple and any other computer.

Although Terminal mode is ideal for line by line interaction with a remote host computer, lengthy reports or instructions can seem endless when you are reading a screen at a time. This can be especially undesirable when receiving the text of a program.

File Transfer mode gets you out of this bind by making it easy to receive bulk transmissions into a disk file, saved for later printing or visual review. Similarly, you can send out a disk file of anything longer or more complex than you want to type (or retype) sitting at the keyboard.

Sending or receiving VisiCalc sheets, for example, is an extremely rapid way to communicate detailed analyses and projections under various assumptions. Interrelationships among complicated or extensive sets of data can be preserved by sending a DMS database using File Transfer mode. In fact, any file in the Data Interchange Format (DIF) can be sent or received very easily.

Two other examples: you could choose to keep a log of an entire terminal session, perhaps to print it out later on paper. Or you could prepare in advance a set of commands for the host computer, have them saved in a file, and send them to the host any time you want.

Before you actually send or receive a file, you use Terminal mode to establish communications with the host. Then the actual transfer is done in File Transfer mode.

You enter File Transfer mode by typing the command F from Options mode. The screen then looks like this:

```
┌─────────────────────────────────────────────┐
│                                               │
│   ▃▃▃▃▃▃▃▃▃▃▃▃ VISITERM 1.00 ▃▃▃▃▃▃▃▃▃        │
│   FILENAME SAMPLE                             │
│   PROTOCOL    NONE        CHRS TRANSF 0       │
│   BLOCK CHRS  DROP        BLKS TRANSF 0       │
│   BLOCK SIZE  256         STOPPAGES   0       │
│   EOF CHAR    NONE        CHRS TO EOB 0       │
│   STATUS:   READY                             │
│                                               │
│   ------------------------------------------  │
│                                               │
│                                               │
│                                               │
│   ------------------------------------------  │
│                                               │
│     TERMINAL OPTIONS SEND RECEIVE             │
│   ▃▃▃▃▃▃▃▃▃▃ FILE TRANSFER ▃▃▃▃▃▃            │
│                                               │
└─────────────────────────────────────────────┘
```

There are five options you may change, at the left, and four message
lines at the right, telling you what occurs during transmission. The
STATUS message simply says whether you are sending, receiving, or
ready (or "error," if a problem has been detected).

Just as in Options mode, you select an option by pressing the SPACE
or RETURN key until the one want is highlighted. Then you change
the value for that option using the left or right arrow keys.

Transmitted text is displayed in the space between the dashed lines.
(Error messages, too, if necessary.) The command line near the bottom
shows what commands are available. This line changes to reflect what
you can do while sending, receiving, or ready, as we shall see.

Transfer of data to and from your Apple using the VisiTerm program
is always done with a file, whose name you supply. That is, when you
are receiving transmitted text, the VisiTerm program receives it and
writes it into a file on the disk in drive 1. When you are sending text
out to another computer, the program expects that text to be in a file
on disk, which it then reads and transmits.

Filenames

The program is ready to take your filename, or show you the names
currently on disk, whenever the FILENAME line is highlighted. STATUS
will say READY.

First, get FILENAME highlighted, if it's not already, by pressing SPACE or RETURN repeatedly until it is there. To enter a filename, press ESCape and enter the name you want, followed by a RETURN.

Names must follow a slightly more restrictive version of the standard Apple DOS naming conventions: the name must start with a letter and have 1 to 30 characters, not counting any spaces in front (they are discarded). It may contain any characters other than commas, carriage returns, or control characters. RETURN ends the name and permits you to move on to change other options if needed.

To see, instead, the names of the text files on your disk, press either arrow-key. Every filename on the directory can now be displayed. The right (forward) arrow finds the first text file in the directory and displays it; pressing it again finds the next text file, etc. scrolling forward through the disk directory. The left (backward) arrow finds and displays the last text file in the directory. Pressing it again finds the next-to-last text file, etc., scrolling backward. A blank name indicates the end of the directory, after which the names repeat if you continue to press an arrow.

If the filename you want to use appears, just leave it there and go on to any other option via SPACE or RETURN. When you later press S or R for Send or Receive, that file name will be used.

Creating A File

For transmission, a file must be in ASCII text form rather than stored as a program. Data files written by BASIC programs are ASCII text files. When you do a DOS CATALOG of any DOS disk, the files marked by a T are text files and can be sent or received by the VisiTerm program. This would include VisiCalc sheets or DMS files.

Program files are marked A for Applesoft or I for Integer BASIC, and B for binary type files. None of these can be tranferred directly by the VisiTerm program. However, you can use the utilities described in Appendix G to convert such files into text format, and then transmit them normally.

You can make a text file yourself by writing a BASIC program to do it. You can also use the VisiTerm program to do it directly by entering Receive mode and typing at the keyboard, if you are in half duplex. The characters you type appear on the screen and are stored in the text buffer. There will be no disk activity for a while because the VisiTerm software only writes its buffer to disk about every 256 bytes. When you want to stop, press ESC 2 to end "receiving," and everything you've typed will be filed on disk.

Before we go on to examining everything you now see on the screen, let's create some files and test out the filename directory commands just discussed. Tap the letter O, returning to Options mode, and set COMM SLOT to LOCAL. Tap the letter T and, if necessary, the sequence ESC SHIFT 2 to insure you are in half-duplex mode, because then everything typed at the keyboard will be saved on disk.

Return to File Transfer mode by the sequence ESC SHIFT 1 and then F.

Now highlight the FILENAME option again, if it isn't already, by pressing SPACE or RETURN repeatedly until it is there.

Now press ESC and type in any name you'd like to use. Then press RETURN.

Press R, for receiving. Various parts of the screen change, which will all be discussed a little later in this chapter. For now, just type in some text—a letter to a friend, your favorite poem or math formula or political speech; whatever. As in Terminal mode, you can get capitals by preceding the letter with an ESCape, or use two ESCapes to get all caps. In File Transfer mode, however, all letters appear upper case in form. True capital letters are highlighted in reverse video. If your typing is imperfect, you will discover that the left arrow prints as a left arrow rather than backspacing as it does in Terminal mode.

```
╺━━━━━━━━━━━  VISITERM 1.00  ━━━━━━━━━━━╸

FILENAME MANUAL SAMPLE

PROTOCOL    NONE       CHRS TRANSF 184
BLOCK CHRS  DROP       BLKS TRANSF  0
BLOCK SIZE  256        STOPPAGES    0
EOF CHAR    NONE       CHRS TO EOB 72

STATUS:    RECEIVING

- - - - - - - - - - - - - - - - - - - - - - - - -

WHEN RECEIVING, IF YOU ARE IN HALF DUPLE
X, CHARACTERS YOU TYPE AT<-<-<-AT THE K
EYBOARD APPEAR ON THE SCREEN AND ARE PUT
 INTO YOUR DISK FILE.  BACKSPACE CHARACT
ERS DISPLAY AS LEFT ARROWS.

- - - - - - - - - - - - - - - - - - - - - - - - -

        ESC-R STOP RECEIVING
╺━━━━━━━━━━  FILE TRANSFER  ━━━━━━━━━━━╸
```

Now press ESC 2. Your file will be completed. If you like, you can repeat this process from the filename step, and create other new files.

Notice that now when you use the arrow-keys on the filename option, all the new names are there in addition to any that were there before.

Now you can try sending the file you have created, or any other text file. If you stay in LOCAL mode, it won't go anywhere, but you can see what it it like to transfer a file. You can, of course, switch to Options mode, change COMM SLOT to be where your communications card is, and connect up to a remote system to send your file there.

To start sending a file, you return to File Transfer mode, select the file you want, and type S. If you are still in half-duplex, the file will be displayed on the screen as it is sent. When the whole file has been sent, the VisiTerm program beeps and displays <END OF FILE>.

So, as you see, in their simplest form, the commands for sending or receiving a file from a host computer are quite easy. To send a file, you simply select the one you want and press S. To receive a file, you enter the name of the file you want, press R, and use the keyboard to type any commands you might want to send to the host to get it started sending.

Additional Issues

But file transfer is not **always** that simple. Some host computers cannot take a steady stream of characters; some can handle only one line at a time, with a pause at the end of each line. If the VisiTerm program were to send the whole file without any pauses, some characters would be lost because the host was not ready to receive them.

Similarly, when the VisiTerm program is receiving a large file, there can be times when it is not ready to receive further characters until it has written out to disk those it already has. For small files, it just saves up the characters it gets until it has received the whole file and then writes everything to disk. But there is only room for 18,384 characters in memory at once, and for files larger than that, the VisiTerm program must periodically save what it has onto disk. During that operation, new characters coming in from the host could be lost.

So the general problem is that the sending party must not issue characters when the receiving party is not ready to receive them.

The solution is for the receiver to tell the sender when it is ready and when it is not ready to receive data. The general term for such control is line protocol, also termed line discipline or link protocol.

PROTOCOL

A protocol in data communications is an agreement that certain characters (or signals) will be recognized as having special meaning for controlling the flow of data from one machine to another. If the use of protocols is required or advised the timesharing service you choose, your salesman will be able to tell you which characters have what meaning. If you are setting up your own communication with another VisiTerm owner, you may make your own choices after reading this lesson.

The VisiTerm program supports two common ways this is done, and it can use either method when sending or when receiving.

The first is called "STOP/START" protocol, or in some books, "XON/XOFF" meaning transmission ON/OFF. Under this protocol, the receiving computer can at any time send the agreed-upon STOP character (usually a Control S) to the sending computer, asking that transmission be temporarily halted. Later the receiving computer can ask that transmission resume, by issuing a START character (usually a Control Q) to the sending computer.

The second method is termed "EOB/ACK" protocol, which stands for End-of-Block/ACKnowledge. This protocol requires the sending computer to halt after transmitting a block of characters, ending each block with an agreed-upon end-of-block (EOB) character. It then waits, until the receiving computer indicates its readiness for more data by issuing an ACKnowledge character back to the sender. Upon receipt of that ACK, the sender resumes transmission, sending out the next block.

You may also have both character pairs active, or neither. This gives you four possibilities for protocol selection: NONE, STOP/START, EOB/ACK, or BOTH.

For a protocol to be effective, three conditions must be met:

1. The characters controlling transmission must be agreed upon by both computers, i.e., recognized by each as having the same meaning.

2. The characters must be identified to the VisiTerm program in the appropriate line of Options mode.

3. Transmission in File Transfer mode must use the characters appropriate to the protocol selected, as known from Options mode. For example, if you select STOP/START protocol, you cannot expect to control transmission using the EOB/ACK characters.

The first step is to tell the VisiTerm program which ASCII codes are to be used for the STOP, START, EOB, and ACK characters. This is done by highlighting the appropriate option in Options mode and using the arrow keys to bring the desired character on screen, as discussed in Lesson 2.

For example, setting

STOP CHAR   S13 <S>
START CHAR   S11 <Q>

tells the VisiTerm program to use (or interpret) CTRL S as the STOP character and CTRL Q as the START character, whenever the protocol is STOP/START or BOTH. This would apply whether the VisiTerm program were receiving or sending.

Similarly, the settings for EOB and ACK CHAR will be used when the protocol setting is EOB/ACK or BOTH, again in either sending or receiving mode.

Selecting a Protocol

In File Transfer mode you can choose one of the following four values for PROTOCOL:

NONE	Even if protocol characters have been defined in Options mode, the VisiTerm program will expect to send or receive a steady stream of characters, with no waits that depend on any characters being transmitted.
STOP/START	If START and STOP characters have been defined in Options mode, the VisiTerm program will use them as the receiving computer or react to them as the sending computer.
EOB/ACK	If the EOB and ACK characters have been defined in Options mode, the VisiTerm program will pause after sending each EOB, waiting until it receives an ACK to resume transmission; when receiving, it will react to each EOB by replying with an ACK.
BOTH	If all four characters are defined, then both protocols can be in effect at once. The VisiTerm program will use or react to each character as it comes up in the stream of transmitted characters, according to its correct interpretation for controlling the flow of data.

You select one of the four protocol choices when the protocol option line is highlighted. Pressing either of the arrow keys changes the protocol to a new choice.

Try it; press one of the arrow keys; again; again; one more time.

Each protocol will operate the same as NONE if the characters it depends on are not previously defined in Options mode.

Of course, the only characters that will work are those recognized and used by the other computer you're connected with. If you've defined Control S (<S>) as STOP but the other computer doesn't see it that way, it won't stop. Even if it does, it won't start sending again when you send a CTRL Q (<Q>) unless <Q> is also the START character it uses. And in EOB/ACK, the transmission will stop and wait forever after the very first block unless both computers agree on which character means ACK.

Stop/Start

If you choose STOP/START, then the receiving computer can interrupt and halt the transmission by sending the STOP character you've defined. When it is ready for more, it can then send the START character you defined; transmission will restart from the point of interruption. No characters are lost.

The normal characters recognized by computers using this protocol are, as mentioned above, CTRL S for stop and CTRL Q for start. You would set these in Options mode to be compatible with such systems.

The receiving computer may be your Apple, in which case the VisiTerm program will send the STOP character whenever its buffer is full. The buffer size used by the VisiTerm program in this protocol is set by the BLOCK SIZE option discussed a little later in this lesson.

After issuing the STOP character, the VisiTerm program waits a full second for the flow of incoming characters to cease. The sending computer cannot be expected to halt transmission as soon as that character is sent to it. Therefore the VisiTerm program inserts this delay before writing out the buffer to disk, and returning the START character to permit the host to continue sending.

If your Apple is sending, and some other computer is receiving, then the VisiTerm program will watch for a STOP character coming from that computer. When a STOP is received, the VisiTerm program halts transmission immediately and waits until a START character arrives, before sending more. The message WAITING FOR START CHAR is displayed under the word SENDING.

However, the other computer can still expect to get two or three characters after it sends the stop signal. This is due to delays inherent in serializing characters for transmission over a single wire. If you know the other computer simply isn't going to send a START, you can press RETURN to continue sending. Also, if you want to stop the transmission for any reason, pressing the SPACE bar does it.

EOB/ACK

After you define the End-Of-Block and ACKnowledge characters and select EOB/ACK protocol, then whenever an EOB character appears in the output stream, it will mean the end of the block being transmitted. The sending computer will then wait for a response, an ACK. If the VisiTerm program is sending, it will display the message WAITING FOR ACK CHAR. You can continue sending after an EOB even without an ACK from the receiver by typing RETURN, or continue automatically after the delay you set up in AUTO ACK under Options mode.

When the receiving computer has gotten one block and is ready for another, it transmits an ACK character out to the sending computer. If the VisiTerm program is receiving, it displays END OF BLOCK until it sends out the ACK character. Then the next block can be sent, again ending with the EOB character causing the sending computer to await an ACK.

As an example, some host computers put out a prompt character, say ">," when they are ready for input. Suppose you were to define that as the ACK character, and carriage-return as the EOB character. Then each line in your file, ending with a carriage-return, could be sent as a block to the host. If it were awaiting a command from you, it would act on that transmitted line as if you had typed it.

Then when it had completed that action, it would issue its prompt ">." The VisiTerm program would receive this as an ACK, and send the next line. You could create a file of command lines that use the protocol in this way to operate "interactively" with the command processor of your host. The whole process would be automatic once you had correctly set up the proper sequence of commands in your file.

Whenever you set something up to be automatic, extra care is required to ensure that unintentional effects are excluded. However, you can watch the interaction played out in the text-display area below the file-transfer options. If things are not occurring as you had planned or hoped, you can halt the file transmission and take control yourself.

Using the AUTO ACK feature from Options mode, you can set up a specific delay so that transmission can continue without an ACK from the other computer. If it DOES acknowledge, the AUTO ACK won't. Naturally, you would only want to continue the transmission if you knew in advance that the receiving computer could always be ready after the specific time that you chose.

The other possibility is to handle it manually yourself, that is, if you notice an unusually long wait after transmitting an EOB, you can decide to issue your own ACK by typing RETURN.

BOTH Protocols

When you select "BOTH" the sending computer will halt after each EOB character it sends, and also whenever it receives a STOP character. If it received a STOP, it will await a START before sending the remainder of the block or file—an ACK will not work.

Otherwise, if it is halted because of the transmission of an EOB, it will continue with the next block as soon as it gets the ACK from the receiving computer.

SUMMARY OF PROTOCOL CHARACTER RESULTS

PROTOCOL	EVENT	SENDING	RECEIVING
EOB/ACK or BOTH	EOB Transmitted	VisiTerm program halts awaiting an ACK character, displays WAITING FOR ACK CHAR; this also occurs when BLOCK SIZE count is reached	VisiTerm program displays END OF BLOCK, writes to disk if necessary, then removes message and sends back an ACK.
	ACK received	Resumes or continues transmission	Accepts as just another character
STOP/START or BOTH	STOP received	VisiTerm program halts awaiting a START character, displays WAITING FOR START CHAR	Accepts as just another character. The VisiTerm program issues this character out to the sender to cause a halt in transmission when BLOCK SIZE count is reached; can be issued manually. Displays STOP CHAR SENT.
	START received	Resumes or continues transmission	Accepts as just another character; if you have issued a STOP, you can later issue a START to cause transmission to resume. If the VisiTerm program issued a STOP, it issues a START as soon as necessary disk writing (if any) is done.

```
        ━━━━━━━━━━ VISITERM 1.00 ━━━━━━━━
        ▓FILENAME▓ SAMPLE

        PROTOCOL    NONE      CHRS TRANSF 0
        BLOCK CHRS  DROP      BLKS TRANSF 0
        BLOCK SIZE  256       STOPPAGES   0
        EOF CHAR    NONE      CHRS TO EOB 0

        STATUS:  READY

        ----------------------------------------



        ----------------------------------------
           ▓T▓ERMINAL ▓O▓PTIONS ▓S▓END ▓R▓ECEIVE
        ━━━━━━━━━━ FILE TRANSFER ━━━━━━━━
```

Block Chrs

This option is used only when the VisiTerm program is receiving a file. Pressing either arrow sets this option to INCLUDE or DROP. DROP means that whenever EOB characters are seen in text being received under EOB/ACK or BOTH protocol, they are discarded rather than included in the file. (This applies to an End-Of-File character also.)

INCLUDE means that the end-of-block and end-of-file characters are stored along with the file being saved to disk.

Block Size

There are two ways that the BLOCK SIZE parameter can be used:

1. When receiving a file in STOP/START protocol, or
2. When sending a file in EOB/ACK protocol.

When you receive a file under STOP/START protocol, you can control how frequently the disk gets updated with incoming data, by setting the size of the buffer.

Incoming characters are saved in a holding area in memory, the buffer. When that holding area is filled, the VisiTerm program issues a STOP character to halt transmission temporarily. The message STOP CHARACTER SENT appears.

The VisiTerm program then checks whether there are enough received characters to write out to disk. If so, it writes them out to the file you named, and then sends the START character. If not enough have come in, it sends a START immediately. It almost goes without saying that the STOP and START must first have been established in Options mode, and that they must be the ones recognized by the sending computer.

Each press of an arrow key adds or subtracts 1 from the BLOCK SIZE number displayed; you can also use the REPT key. The maximum size buffer possible is approximately 18,000. If the number present isn't close to the one you want, enter ESC, which clears it out, and simply type in the number you want. Either way you must end with a RETURN.

Since the sending computer will not halt transmission immediately upon the VisiTerm program issuing a STOP, there is always some extra memory set aside for extra characters that tag along after that point. If, however, the sending computer continues to send data, ignoring the STOP, the VisiTerm memory buffer could overflow, causing transmission to terminate without receiving the whole file.

When you are sending a file under either EOB/ACK or BOTH protocol, the file must be broken up into blocks. If there are already EOB characters scattered throughout, a "natural" blocking exists. However, the VisiTerm program can "artificially" break a file up into blocks at transmission time by periodically including an EOB character in the stream of output characters to the host. The BLOCK SIZE parameter is used to control the addition of "artificial" EOB characters to the file being sent.

This option specifies how many characters the VisiTerm program should send in each block. The software then counts down from this number, as shown in the CHRS TO EOB message on the right. When it sees a "natural" EOB character in the file, or when the count reaches zero, it sends out an EOB and halts, awaiting an ACK. Every time a "natural" EOB is encountered in the file, the count starts over.

Thus files with very large blocks or even files without embedded EOBs can be "artificially" blocked using the BLOCK SIZE parameter, and sent under EOB/ACK protocol. A "naturally" blocked file may have blocks of varying sizes, but an "artificially" blocked file will have blocks all the same size.

It is vital that you first define an EOB character in Options mode. If you do not, no blocks will be recognized or created, and the whole file will be sent without any stops.

EOF Char

Some files you receive, or create, may have a character at the end whose special meaning is End-Of-File. Since different computer systems can use different codes for this condition, you can set this option to any ASCII character you need, or NONE.

When the VisiTerm program receives this character in the transmission stream, it will stop receiving the file and terminate the transmission normally, just as it would if it had found there were no more characters. The character is included in (or dropped from) the file according to the BLOCK CHRS option above.

When the VisiTerm program is sending a file out and reaches the physical end of file on disk, it will append an End-Of-File character if one is defined here. However, it attaches no significance to finding such characters in the middle of a file being sent, and simply includes them in the output stream of characters.

Status

This line will say SENDING when the VisiTerm software is transmitting a file from your Apple to another computer. It will read RECEIVING when a file is coming in. The word ERROR will replace these if something has gone wrong, and a descriptive message will appear in the text-display area (between the dashed lines). For example, if you try to send a program file without converting it to a text file (as described in Appendix G), STATUS will say ERROR and you'll see the message NOT A TEXT FILE in the text display area. Otherwise STATUS says READY, meaning you can change file transfer options, send or receive a file, or leave this mode to get to Options or Terminal mode.

The command line near the bottom of the screen shows each of the four available commands with a highlighted first letter, which is what you type. You can go back and forth between File Transfer mode and Options mode just by pressing O, from here, or F, from there. But if you go to Terminal mode, by pressing T, you can ony get back through Options mode: ESC SHIFT 1 to Options mode, then F to get here.

SCREEN STATUS MESSAGES

On the right side of the screen you can see four additional status messages. As a file is transmitted, a cumulative count of characters sent or received is kept, next to the words CHRS TRANSF. You may have noticed that when you created your files up above.

Similarly, BLKS TRANSF displays the number of EOB characters seen, and STOPPAGES shows the number of transmission halts.

A stoppage indicates stops due to either a STOP character sent or received, or the SPACE bar pressed at the keyboard while a file is being sent. Halts due to EOBs don't count here.

The CHRS TO EOB is a countdown from the number you specified under BLOCK SIZE at the left. This feature enables you to send a file under EOB/ACK control even when that file doesn't have EOB characters in it. If PROTOCOL is set to EOB/ACK or BOTH, the VisiTerm program will create blocks of the size you give, and halt normally after sending each one. Restart of transmission then awaits an ACK from the receiving computer, from the AUTO ACK feature, or from your override by pressing RETURN after a suitable delay. An EOB character will be sent with each block.

Additional messages appear under the STATUS line or in the text area. These are described elsewhere in this chapter and in Appendix E.

SENDING A FILE

When you press S, the VisiTerm software begins to send the file you named (in the FILENAME line) out to the receiving computer. While sending, the characters being transmitted are also displayed on your screen, in the space between the dashed lines. (But if you're not connected to another computer, you have to be in Half-Duplex mode to see them.) Capitals are highlighted. When the cursor reaches the far right edge of the display area (40 characters in the default configuration), it automatically moves to the beginning of the next line. (If a carriage return happens to be the next character, you may get some apparently blank lines showing up as the file is transmitted. No extra lines are sent, however.)

The STATUS line changes to the word SENDING. The command line changes to read

SPACE STOP SENDING   RETURN ACK/START.

Let's try it. First get the white bar cursor on FILENAME, using SPACE or RETURN, and press an arrow key. The disk will whir and a name will be displayed. Continue to press an arrow key until the name SAMPLE appears (or some other name you prefer.)

```
                VISITERM 1.00
FILENAME XXXX OR SOME NAME YOU PREFER

PROTOCOL    NONE        CHRS TRANSF 0
BLOCK CHRS  DROP        BLKS TRANSF 0
BLOCK SIZE  256         STOPPAGES   0
EOF CHAR    NONE        CHRS TO EOB 0

STATUS:  READY

-----------------------------------------



-----------------------------------------
    TERMINAL OPTIONS SEND RECEIVE
              FILE TRANSFER
```

You're now ready to press S to begin sending. If you press the SPACE bar while sending, transmission will be halted and the command line changes again, this time to read

ABORT   CONTINUE.

Pressing C simply continues the transmission where it was interrupted.

Pressing A stops this transmission completely. The STATUS line returns to READY, the message <TRANSFER ABORTED> appears in the text display area, and the command line returns to TERMINAL OPTIONS SEND RECEIVE.

```
                VISITERM 1.00
FILENAME ABORT EXAMPLE

PROTOCOL    NONE        CHRS TRANSF 152
BLOCK CHRS  DROP        BLKS TRANSF 0
BLOCK SIZE  256         STOPPAGES   8
EOF CHAR    NONE        CHRS TO EOB 0

STATUS:  READY

-----------------------------------------
BRACKETS: CONTROL J IS <J>, CONTROL C
IS <C>. UPPER CASE LETTERS ARE
HIGHLIGHTED. OFTEN IT MAY BE NECESSARY

TO STOP
<TRANSFER ABORTED>
-----------------------------------------
    TERMINAL OPTIONS SEND RECEIVE
              FILE TRANSFER
```

Control characters appear on the screen as symbols or as angle-bracketed ASCII codes, such as shown in the character display of Options mode and as listed in Appendix C. For example, the backspace character, which is control H, appears as the left arrow, without actually backing up and deleting the prior character. The line feed character CTRL J, appears on the screen as <J>, without actually moving the cursor down to the next line as it would in Terminal mode. Carriage returns are not shown as characters, but they end the line.

When the complete file has been sent, transmission ends with the message <END OF FILE> in the text-display area. If an End-Of-File character is defined, it is sent as the final character, and appears on the screen above <END OF FILE>.

A full duplex connection allows two-way communication. You can be receiving messages or responses from the host while you are in File Transfer mode Sending a file down the line to the host. You can't see them, however, until the file transmission is complete or aborted. Then you can return to the Terminal mode screen, where they will be waiting for you. Similarly, you cannot send anything from the keyboard (except protocol characters) until you are again in Terminal mode.

NOTE: You can clear the text-display area quickly by typing the letters OF, which switch you to Options mode and back to File Transfer mode, discarding the former text display.

RECEIVING A FILE

If you press R, the VisiTerm program will begin receiving text into the file named above in the FILENAME option, using its buffer in memory.

In full duplex, everything sent from the other computer will go into this buffer, including any characters echoing what you type while receiving.

In half duplex, there is no echo but anything you type at the keyboard will be saved. The VisiTerm program displays the transmitted (or echoed or typed) characters on the screen in the area between the dashed lines, just as it does when you are sending in half duplex mode.

If the filename chosen is already used on your diskette, the VisiTerm program will ask you to decide what to do, by displaying this message:

APPEND REPLACE CANCEL.

If you press C, the receiving mode is cancelled.

Choose R if you want the newly received text to write over whatever used to be stored under that filename. Pressing A, however, preserves the old contents and simply writes the new text after that, at the end of the old text. (This feature also enables you to add comments at the end of a file, or to combine several old files into one.)

Every so often it will write out the contents of the buffer to a file, using the filename you selected or specified above. While you are receiving, the STATUS line says RECEIVING.

The command line at the bottom changes to say ESC 2 STOP RECEIV-ING. If you press ESC 2, the VisiTerm software stops receiving, and puts the text currently in its buffer out to the filename you specified. The message <TRANSFER DONE> appears in the text display area.

As an example and a bit of practice, let's use the same filename we sent, above. Press R. You should see the "Append..." etc. message. Press A, and then type in a new paragraph (or your address...whatever.) You get capitals only when you precede the letter with the ESC key, or if you set CAPS in Terminal mode via ESC ESC. All (and only) capital letters are highlighted.

Now press ESC 2, and the file is enlarged to include that new text. If you now send it by pressing S, you'll see your new text at the end.

Receiving Into Multiple Files

If the computer sending you this file operates in STOP/START mode, you can temporarily halt transmission by sending out its STOP character. You can be using any protocol. The other computer will await the START character. While it is halted, you can type in comments to be stored with the received file if you are in half duplex mode. Full duplex would require the other computer to echo what you type in order for it to get into the file.

You could also file away what you have so far under the filename you gave for this transmission by pressing ESC 2. The message <TRANSFER DONE> would appear under the text displayed. You could then give a new filename to the VisiTerm program, and type introductory comments (in half duplex), before sending out the START character to the sending computer. The remainder of the transmission would go into this new, second file. When the complete file has been received, the message <TRANSFER DONE> would again appear near the bottom.

APPLE TO APPLE: A SAMPLE SESSION

Suppose you and a friend of yours in another city have been talking about buying a house near your favorite ski (downhill? water?) resort. You have narrowed it down to two possible choices that look good, but the deals are very different.

Each of you has been using the VisiCalc program to analyze the costs and interest and tax results of one deal. Now you want to swap VisiCalc files, see how the two compare, and then get together later to make your decision.

It's simple when you both have the VisiTerm software. You agree on a time for the transfer, and who will place the call. The caller's modem will be originating, and the other answering. You get the Apples connected in half duplex, type interactively for a while, and then start the transfer as follows:

1. The first to send will await an OK from the receiver. To avoid getting any conversation into the file, press ESC SHIFT 2 to switch to full duplex.

2. a. Receiver gets into File Transfer mode and sets up the name he wants for the coming file, gets EOB/ACK into the PROTOCOL line, DROP for BLOCK CHRS, and a BLOCK SIZE of, say, 128.

   b. Sender also goes into File Transfer mode, gets FILENAME to show the name of the VisiCalc sheet to be sent, and puts DROP and 128 in the same options as above.

3. a. Receiver gets into Options mode and checks that the EOB/ACK characters are not likely to be in a VisiCalc file. Control C for EOB and Control F for ACK are good candidates.

   b. Sender sets the same characters for EOB and ACK.

4. a. Receiver reenters File Transfer mode and presses R to receive.

   b. Sender presses T to await, in Terminal mode, the OK to send.

5. Receiver then types OK, which appears on Sender's screen in Terminal mode.

6. Sender does not respond, but gets into File Transfer mode, and presses S to send the VisiCalc file.

7. When the transfer is complete, you can again converse in Terminal mode before reversing roles to send the other VisiCalc sheet to the former Sender.

The procedure is the same for any sequential text file, e.g., CCA DMS database files, or data files written by BASIC programs, or any Apple sequential text files.

REFERENCE

TERMINAL MODE REFERENCE

COL - 1   HALF DUPL   SET A
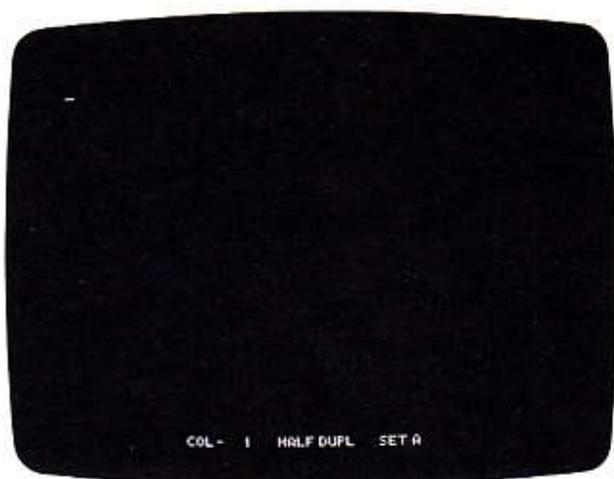
Commands:

ESC 1:	Sends a break (duration set in Options mode).
ESC 2:	Clears the terminal buffers of prior text, and resets the WAITING indicator and column counter.
ESC 3:	Clears the screen (no character sent out).
ESC SHIFT 1:	Switches to Options mode.
ESC SHIFT 2:	Switches between half and full duplex.
ESC SHIFT 3:	Turns ON (or OFF) the keyboard tick.
ESC SHIFT 4:	Switches between character sets A and B.
ESC SHIFT 5:	Turns type-ahead feature ON or OFF.
ESC ESC:	Switches into or out of all-CAPS mode.
ESC letter:	Makes letter capitalized.
ESC RETURN:	After type-ahead is enabled and an EOB or STOP character was encountered, ESC RETURN simulates the receipt of an ACK or START character, thus resetting the WAITING indicator and restarting transmission ESC RETURN sends no character itself.

These same commands can also be viewed in two separate categories:

Switches:

To all caps/lower: ESC ESC

To character set A/B: ESC SHIFT 4

To half/full duplex: ESC SHIFT 2

Keyboard tick ON/OFF: ESC SHIFT 3

Type-ahead ON/OFF: ESC SHIFT 5

Actions:

Automatic Acknowledge after a set time: AUTO ACK (in Options mode)

Clear screen: ESC 3

Clear terminal buffers: ESC 2 (also clears WAITING state and column counter)

Self-acknowledge an EOB: ESC RETURN

Send a break signal: ESC 1

To Options mode: ESC SHIFT 1

Indicators

CAPS	COL - ?	HALF DUPL	SET A	

CAPS: All characters will be capitalized (ESC ESC switch).

COL- n: The next character to be entered will be in column n (198 max.).

HALF DUPL: Characters will be displayed as soon as they are entered.

ESC	COL - ?	FULL DUPL	SET A	SENDING

FULL DUPL: Character display will await remote computer echo.

ESC: Indicates the ESC key was pressed once.

BREAK: A break signal has been sent.

SENDING: Type-ahead is ON, and no STOP character has been received, and no EOB character encountered in the output.

COL - ?	FULL DUPL	SET A	WAITING	

WAITING: Type-ahead is ON. A STOP has been received, or an EOB encountered in the output character stream. Characters typed from now on will be saved until an ACK or START is received, permitting them to be sent.

Any ASCII character can be sent. See Appendix C for the full list together with the appropriate keystrokes for each character. They are listed alphabetically as well as numerically.

When AUTO ACK is set in Options mode to be non-zero, the number represents how many null characters are sent out to the host before transmission of keyboard characters resumes. The approximate time between EOB and the automatic self-ACKnowledge is ten times the AUTO ACK number divided by the COMM SPEED (Baud Rate). For example, when sending at 300 Baud and using an AUTO ACK of 30, you get a delay of about one second (10 x 30 / 300). If the host acknowledges prior to that time, you don't need AUTO ACK, and it resets itself, awaiting the next EOB.

OPTIONS MODE REFERENCE

Option Mode Conventions

The SPACE bar moves the white bar cursor down to the next option; the RETURN key moves that white bar back up to the prior option. Pressing either key eventually returns the cursor back to the beginning. One of the options cycled through is the character set edit on the right side of the screen.

The values you may choose for any option are displayed by pressing either arrow key: the left arrow reduces numerical values, the right arrow increases them. Otherwise they each cycle through the entire range of available values for each option. Some options permit a choice of NONE. You can avoid the arrow keys and simply enter an N to select this choice.

The dollar sign ($) means the values indicated are hexadecimal, e.g., $12 means 18 decimal.

Characters shown inside angle-brackets are control characters, created at the keyboard by holding down the CTRL key and then pressing the character indicated. For example, <H> is the Apple backspace key, equivalent to the left arrow when you are typing text. You create it by holding down the CTRL key and then pressing H.

Characters shown inside square brackets are to be preceded by an ESC. For example, to clear the screen without sending out any signal to the host, you type the sequence ESC 3. This is sometimes written in the notation [3].

The options are discussed in this section in the order they appear on the left of the screen, with character-set editing last.

Commands available in Options mode are discussed at the end.
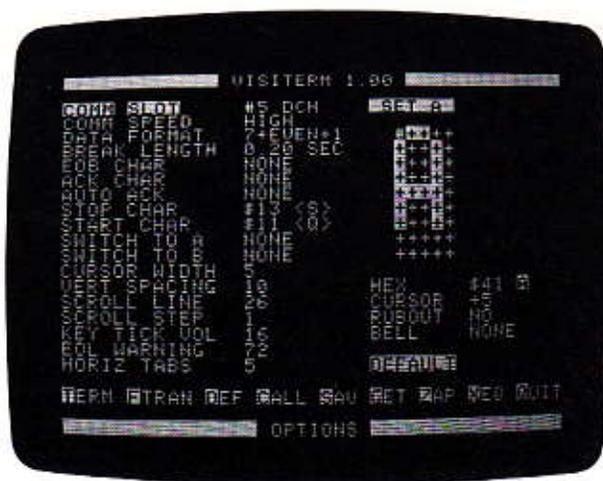
COMM SLOT: The location of the communications card.

Range: #0 through #7, or the word LOCAL.

Typical value: #2 or #3. The slot number is followed by the type of card occupying it, e.g., APPLE, CCS, or DCH.

This is the number of the slot in your Apple in which you placed the communications card you want the VisiTerm program to use. If the word LOCAL is selected, the VisiTerm program does not send or receive communications beyond the screen or the disk. You can still store and review files on disk, create macros, and so forth.

COMM SPEED: The speed of transmission.

Range: LOW, HIGH, or AS SET

Default: HIGH (300 Baud)

Typical value: HIGH 300 Baud

If a communications card is used whose higher value speed is greater than 300, e.g., 1200 Baud, that higher speed will be used but the display will still say only HIGH, indicating that the higher of the two choices is in use. AS SET applies to the CCS 7710 card, which you set by means of physical switches outside the VisiTerm program's control.

DATA FORMAT: The number and interpretation of bits per character, plus parity bit and stop bits.

Range: 7 or 8 bits, plus 1 or 2 stop bits, plus (optional) a parity bit for even or odd parity.

Default: 7+EVEN+1.

Parity is a bit added to the end of each character to check transmission. Stop bits are appended to each character, signalling end of that character. There are 8 choices total, the same 8 choices shown in the manual for the Apple Communications Interface card. They are displayed as follows:

BITS PER CHARACTER	PARITY	STOP BITS
7	+ EVEN	+ 1
7	+ ODD	+ 1
8	+	2 (no parity)
8	+	1 (no parity)
8	+ EVEN	+ 1
8	+ ODD	+ 1
7	+ EVEN	+ 2
7	+ ODD	+ 2

Computers and data communication systems vary in their use of these values. Garbled communications or difficulty in signing on to an unknown computer system can often be cured by changing the parity or stop bit settings.

BREAK LENGTH: How long, in hundredths of a second, a BREAK should last.

Range: 0.00 through 2.50 seconds

Default: 0.20 seconds

Typical value: 0.20 seconds

Many timesharing computers use the BREAK signal to control certain functions or permit interruption of an otherwise long process, e.g., listing. Trying different values with your host systems will establish the proper values. If typing the sequence ESC 1 does not have the desired effect of a BREAK signal, then go into Options mode, double the value shown for BREAK LENGTH, and try it again in Terminal mode.

EOB CHAR: Halts sending when encountered, IF EOB/ACK protocol selected.

Range: 1 through $7F, or NONE

Default: NONE

Typical value: $03 (etx) or $23 (etb)

When the sending computer encounters an EOB in the characters it is sending out, it halts, awaiting an ACK character from the receiving computer before resuming transmission. This is only true if the EOB/ACK protocol is in use.

ACK CHAR: Causes transmission to resume after an EOB halt.

Range: 1 through $7F, or NONE

Default: NONE

Typical value: $06 (ack)

Any two characters can operate as EOB and ACK if both parties to the transmission have agreed. If, however, the STOP/START protocol is also in effect in addition to EOB/ACK, and a STOP was sent by the receiving computer, that computer must send a START followed by an ACK in order to get transmission going again. (See also Lesson 3 and "FILE TRANSFER MODE REFERENCE" later in this chapter.)

AUTO ACK: Defines a time delay after an EOB is encountered. An AUTOmatic ACKnowledge is assumed after that delay, and sending resumes.

Range: 4 to 996, by fours, or NONE

Default: NONE

Typical value: NONE

In some cases the computer you're connected with may not provide an ACK response to transmission, even though it does need the EOB halt to accomplish some processing of each block. Or, it may be possible for it to provide the ACK, but unnecessary because the time between each block is totally predictable. In either event, the AUTO ACK feature causes the VisiTerm program to restart transmission after so many units of time beyond the occurrence of the EOB.

The units of this value represent sending that many NULL characters to the receiver after an EOB. The approximate delay in seconds, therefore, is 10 times this number divided by the COMM SPEED, i.e., (10 x AUTO ACK / COMM SPEED).

STOP CHAR: Permits receiving computer to halt transmission temporarily.

Range: 1 through $7F, or NONE

Default: $13 (CTRL S)

Typical value: $13

With computers that recognize this signal, you can send this any time you need to halt further transmission until you're ready. One example: while scanning a long listing that scrolls off the screen, to hold one "page" while you make notes or find what you're looking for.

START CHAR: Tells sending computer to resume transmission.

Range: 1 through $7F, or NONE

Default: $11 (CTRL Q)

Typical value: $11

SWITCH TO A: Causes the VisiTerm program to use character set A for display.

Range: 1 through $7F, or NONE

Default: NONE

Typical value: NONE

One use for this is to distinguish between what you type and what the other computer or person types, e.g., by defining carriage return as one switch.

SWITCH TO B: Causes the VisiTerm program to use character set B for display.

Range: 1 through $7F, or NONE

Default: NONE

Typical value: NONE

CURSOR WIDTH: The Terminal mode cursor (underscore) width; also used for tabs.

Range: 1 through 7, or NONE

Default: 5

Typical value: 5

A cursor width of NONE would mean no cursor displayed at all. The value supplied is also used as the standard character width when calculating a tab position.

VERTICAL SPACING: The vertical distance between lines of text.

Range: 1 through 40

Default: 10

Typical value: 10

A large value causes text lines to be spread far apart. A small value spaces them close together or even overlapping.

SCROLL LINE: When you reach this line on the screen, the display scrolls up.

Range: 1 through 176

Default: 33

Typical value: 8 to 33

The amount it scrolls up is defined by the SCROLL STEP option.

SCROLL STEP: Number of dots that the screen image moves up for a scroll.

Range: 1 through 40

Default: 1

Typical value: Equal to the VERTICAL SPACING option.

A large value means more lines are lost at the top of the screen and more room is created for further interaction at the bottom.

KEY TICK VOL: How loud a tick occurs whenever you press a key.

Range: 1 through 32 (loudest)

Default: 16

Typical value: 16

Pick the tick you like.

EOL WARNING: Which character position bells you that the end of line is near.

Range: 1 through 198, or NONE

Default: 72

Typical value: 72 to 76

HORIZ TABS: Where does a tab take you.

Range: 1 through 128, or NONE

Default: 5

Typical value: 5 or 8

This option sets how many units there are in a tab, where the unit may be CURSOR WIDTH or the width of the SPACE character. Tab stops will exist at (HORIZ TABS x unit) + 1, 2 x (HORIZ TABS x unit) +1, 3 x (HORIZ TABS x unit) +1, and so forth. For example, if you set this at 5, tab stops will exist at character positions 6, 11, 16, 21, etc.

To send out spaces instead of tabs, press the slash-key (/) instead of an arrow key. The indicator SP will show next to the number.

CHARACTER SET DEFINITION

On the right of the Options mode screen appears the character set currently in use. Its name is highlighted at the bottom, and whether it is set A or B is highlighted at the top. The four text lines underneath the image of the character itself tell the following:

HEX: What key (hexadecimal value) produces that character. Capitals are highlighted, escape sequences are in square brackets [ ], control characters in angle brackets < >.

To see the next or prior character, press an arrow key.

CURSOR: What action the cursor takes after displaying the charac-
              ter. The possible option values are given below.

To alter this, use the letters U or O. O adds columns to the width of
the character display, which will cause the cursor to produce broader
letters or leave more space between them. U does the opposite. Beyond
ten columns, there are eight choices: carriage return, line feed, return
with line feed, display a line feed, backspace, tab, rubout, clear. Rubout
here means the character used by the host, in full duplex, to rub out
characters sent to you.

RUBOUT: In half duplex, whether typing the character from the
              VisiTerm keyboard rubs out the prior character displayed
              from the keyboard.

To change to YES or NO, press the M key.

BELL: Whether the character causes the bell to ring.

To select SOFT, MED, LOUD, or NONE, press the period (.) key.

The characters themselves appear in the large block above these
lines. Each character is formed by a matrix of dots that are ON in a field
of dots that are OFF. There are nine rows of eight dots each. By turning
ON (or OFF) the dot location under the cursor, you create the character
image. The slash key turns them all OFF.

You use the letter K as a switch to turn each spot ON or OFF. To move
the cursor left or right, press the letters J or L respectively. To move it
up, press the letter I; for down, press the comma.

The number of columns determines how far the cursor jumps after
displaying the character. The character itself appears wherever you
have turned on the little dots: you can center it or place it flush left or
right within the space of those columns.

You can create new columns of dots by pressing the letter O, or
remove columns using the letter U. Either one cycles through all the
choices, from one column up to ten columns plus the eight choices
named above. The current value is displayed on the line labeled
CURSOR, and the columns also show in the highlighted box containing
the character.

COMMANDS

There are ten commands you can execute from Options mode. Nine are listed, in abbreviations, at the bottom of the screen. All are discussed below in the order they appear in that list.

Term: Typing a T returns you to terminal mode, where additional input may have been received and displayed while you were not watching. See Lesson 2 and "TERMINAL MODE REFERENCE" of this chapter for a complete description of Terminal mode commands.

Ftran: Typing an F puts you into File Transfer mode, where you can select and alter additional options relating only to the transfer of files, and can watch what is sent or received. See Lesson 3 and "FILE TRANSFER MODE REFERENCE" of this chapter for a complete description of File Transfer mode commands.

Def: Pressing D enables you to define macros using any key or ASCII character as a name. Once defined, such a macro can be used simply by typing its name. All the keystrokes in the macro will be generated by the VisiTerm program as if you had typed them at the keyboard. Carriage returns and backspaces must be preceded by an ESC in order to be included in such a macro. The maximum number of characters in a macro is 249. You may Add, Select, Change, or Delete a macro after pressing D as a command in Options mode. Change reopens the definition of the macro on the screen by placing you at the end of it, as if you had not yet pressed RETURN. You can then add more to the definition or backspace to delete characters from the end. Delete zaps the whole thing if you type a y to confirm your intention. Add lets you define new macros, and if you press a key for which a macro already exists, it shows you the current definition. You must then use change, or delete this definition, in order to get a different macro invoked by this name.

Call: Typing C puts you in Call status if you have a D. C. Hayes Micromodem™ installed. You "dial" a desired telephone number by pressing D and then typing the number slowly at the Apple keyboard, waiting for each number to be displayed, ending with a RETURN. Typing a left-arrow hangs up and lets you start again. The DCH communications card then makes the connection for you. The VisiTerm program goes into Terminal mode automatically when a carrier is detected.

Instead of pressing D, you can press A to set up automatic answering and choose the number of rings after which the Micromodem should answer. When the phone rings while the Micromodem is in ANSWER mode, it answers the phone and immediately issues an answer tone. When an originate tone is detected from the calling computer, the VisiTerm program automatically switches to Terminal mode.

Sav: By pressing S you begin the process of saving, into a file, all the options and macros currently in effect. After the S, you must enter either an arrow key or a filename by which you will later recall them. The arrow keys show you all the configuration filenames currently on disk. You may choose one of these, or enter a new name. When you hit RETURN, the options and macros are saved on disk under the name you gave. If you used a name already on disk, its earlier contents are written over. To escape without saving anything, don't hit RETURN unless there's no file name after the word Save. This occurs either at the end of the directory viewed by arrow keys, or by your hitting ESCape to clear out the name showing from the directory. If you entered the name from the keyboard, you must backspace it out using the left arrow.

Get: The Get command (type G) will bring in the options and macros stored in some file. You must supply the filename, or use the arrow key to survey the existing filenames. The only names you can use are those of configurations currently on disk. To escape without Getting anything, hit RETURN only when no file name is showing. If you entered the name from the keyboard, you must backspace it out using the left arrow.

Zap: Typing Z deletes a configuration file from your disk, i.e., an option and macros set. You must supply the filename or use the arrow key to survey the existing filenames, and select one. You can escape as above.

Xeq: Typing an X permits you to execute a program from your disk. You must supply the program's filename or use the arrow key to survey the existing filenames, and select one. If you need the VisiTerm program afterward, it must be reloaded.

Quit: When you type Q, the VisiTerm software stops its execution and returns control to BASIC: you get the prompt character "]".

Dash: The Dash command (not shown) switches you from one set of characters and options to the other. (Each configuration file has two such sets, and one set of macros.) Typing a dash switches you from Set A to Set B, and typing a dash again will switch you back.

FILE TRANSFER MODE REFERENCE

The conventions for moving the white bar cursor are the same as in Options mode: using the SPACE bar to go down to the next option or the RETURN key to go back to the prior one. Pressing either key eventually returns the cursor back to the beginning. Similarly, to alter the value for an option you use the arrow keys, either to display each choice in turn or to increase/decrease numerical values. The left arrow reduces numerical values, the right arrow increases them. Either arrow will cycle you through the entire range of available values for each option.

This applies as well to FILENAME and BLOCK SIZE, but for these you also have the option of pressing ESC to blank out the existing value and then entering the one you want directly.

The options and messages are discussed below in the order they appear down the screen.

```
━━━━━━━━━ VISITERM 1.00 ━━━━━━━━━
FILENAME  SAMPLE

PROTOCOL      NONE          CHRS TRANSF  0
BLOCK CHRS    DROP          BLKS TRANSF  0
BLOCK SIZE    256           STOPPAGES    0
EOF CHAR      NONE          CHRS TO EOB  0

STATUS:   READY

- - - - - - - - - - - - - - - - - - - - - - -



- - - - - - - - - - - - - - - - - - - - - - -
      TERMINAL  OPTIONS  SEND  RECEIVE
━━━━━━━━━ FILE TRANSFER ━━━━━━━━━
```

FILENAME: Any name from one to thirty characters beginning with a letter and NOT including control characters, a comma, or a RETURN.

PROTOCOL: An agreement, usually selected from existing standards, that character encoding for transmission will include certain information, and that certain characters will have particular meaning in controlling transmission. Character encoding conventions for Apple transmission include the 8 data format choices in Options mode. Typical characters recognized as meaningful include Control S for Stop, Control Q for continue, Control C for EOB, and Control F for ACK.

Range: NONE, EOB/ACK, STOP/START, BOTH

Default: NONE

Typical value: STOP/START

BLOCK CHRS: Whether to include or drop EOB characters on the disk when receiving a file using the EOB/ACK or BOTH protocol. End-Of-File characters are included or dropped according to this option regardless of protocol.

Range: INCLUDE or DROP

Default: INCLUDE

Typical value: INCLUDE

BLOCK SIZE: Maximum number of characters in a block.

Range: 1 to 18,175, or NONE

Default: NONE

Typical value: 256

When a file is sent under EOB/ACK or BOTH protocol, this option specifies the maximum number of characters the VisiTerm program should send in each block. The software then counts down from this number, as shown in the CHRS TO EOB message on the right. Upon reaching zero, it sends an EOB and awaits an ACK. If an EOB is encountered in the file, it is sent, and this count starts over.

When a file is being received under STOP/START or BOTH protocol, this option specifies how many characters the VisiTerm program will count before issuing a STOP character, so as to have time to write the buffer out to disk and then send a START.

EOF CHAR: Character to be recognized as the End-Of-File.

Range: 1 TO $7F, or NONE

Default: $1C

Typical value: $19 (end medium)

STATUS: A message line indicating system status. There are four mes-sages: READY, SENDING, RECEIVING, and ERROR. The five options above can be changed only when this line says READY. If a file is being sent or received, SENDING or RECEIVING appears. If any error occurs, e.g., the file is not text, this line reads ERROR, with further detail given in the text display area between the dashed lines (and described in Appendix E).

CHRS TRANSF: Cumulative count of characters sent or received.

BLKS TRANSF: The number of EOB characters seen during a trans-mission when EOB/ACK protocol is in effect (or BOTH protocol).

STOPPAGES: The number of times transmission was stopped due to your pressing the SPACE bar or sending or receiving a STOP character.

CHRS TO EOB: A countdown from the number you specified under BLOCK SIZE in the left column. When zero is reached, the count starts over when transmission continues. Only under EOB/ACK or BOTH protocol is there a halt at zero or upon encountering an EOB.

COMMANDS

Terminal   Typing the letter T returns you to the Terminal mode and screen.

Options   Typing the letter O returns you to the Option mode and screen.

Send   An S initiates sending from the file named in the FILE NAME line. The screen shows these choices:

SPACE STOP SENDING   RETURN ACK/START

If you have encountered an EOB or received a STOP, hitting RETURN acts as an ACK or a START, respectively.

If you hit the SPACE bar, the VisiTerm program will stop sending and offer you the following options:

ABORT   CONTINUE

Typing the letter A cancels the whole operation at this point, and returns to READY status. Pressing C continues the sending.

Receive   An R begins Receive mode by checking if the filename is already in use. If not, the VisiTerm program receives characters into its buffer and periodically puts them out to the disk under the filename given. If that name is already in use, the program displays the message FILE ALREADY EXISTS, and offers these choices:

APPEND   The new characters about to be received will be put at the end of the existing file, extending it.

REPLACE   The existing file will be written over by the new characters.

CANCEL   Ends receive mode and returns to READY status.

APPENDIX A

A PRIMER ON DATA COMMUNICATIONS

Introduction

The technology called data communications deals with all the various issues that arise when a person at one location uses a computer at a different location.

These issues combine many aspects of several related technologies. To discuss them you need terms from electronics, telephone systems, and data processing. Sometimes the same word is used in all three fields, but with different meanings and connotations.

This primer will try to clarify the terms and interrelationships that pertain to using your Apple as a terminal, that is, as a data communications device.

TERMINAL: A device to send information to a computer and receive some back.

Early computers could support only one user at a time, and that user (or the prepared input) had to be in the same room as the computer. As computer costs dropped and their speed rose, it was discovered that a computer could handle more than one user at a time. Each user could have his or her own keyboard and display to use the computer interactively, and all could be working at the same time. Each was connected with the computer by a separate wire. This sharing of computer resources is today called timesharing.

In that situation, what happens is this: when a person at a terminal keyboard types on the keys, electrical signals are sent along the wire to the large host computer. When the host computer wants to make a reply, it sends electrical signals along the wire back to the same terminal, and the information is displayed on the screen (or paper) in front of the user. The interaction is usually so fast that each person feels almost as if he were the only one using the computer. Using long wires, none of the users has to be in the same room with the computer.

There are limitations to that length, based on how fast electrical signals can be sent through a wire. The longer the wire, the longer it takes the signal to get from one end to the other. At some length the delay (and weakening signal) become intolerable. Besides, it takes a lot of wire to connect multiple terminals at significant distances.

Soon attention focused on the fact that the telephone system already had wires in place throughout the country and in almost every office and home. But phone wires are used for carrying audible frequencies rather than digital signals or data communications for computers. And the telephone companies were not eager to allow anything to be connected to the system that might harm it or interfere with its basic purpose. The solution was the modem.

MODEM: A device that converts digital signals to telephone frequencies and vice versa.

The phone company uses certain frequencies when voices are transmitted over their lines. Many pieces of equipment manipulate the signals on these lines, but these devices are constructed so that they never change those frequencies. (The phase and amplitude may change, though.)

When it came to sending the digital signals for computer uses over telephone lines, it was important not to harm or confuse any devices on the line. Those computer codes had to be converted into variations on the basic frequencies already handled by the phone companies. The method chosen uses the frequencies 1070 Hz (cycles per second) to send a zero and 1270 Hz to send a one. While using those frequencies to send, one can receive a zero on 2025 Hz or a one on 2225 Hz.
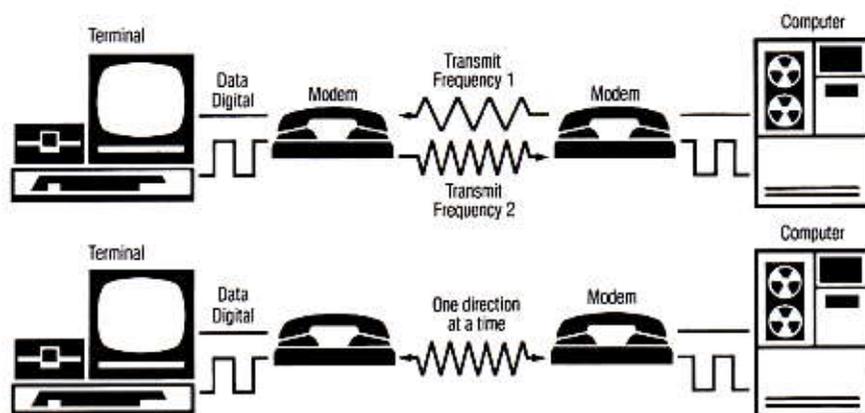
004-004

The device that did this conversion was called a modulator; its cousin, that changed those frequencies back into the original digital signals, was called a demodulator. Packaged together for data transmission to and from a computer, the result is called a "modem," for MOdulator/DEModulator. It can be wired directly onto the telephone lines.

An ACOUSTIC COUPLER, on the other hand, is a modem that "talks" into the telephone and listens to the audio signals that come back. Its conversions to and from digital signals are done before or after the use of telephone lines, without any direct electrical connection.

Historically this was important because of a longstanding claim of the telephone companies, that they had a legitimate monopoly on anything that connected to the telephone system. This claim was ultimately denied or overruled by the Supreme Court, and subsequent decisions have broadened the range of devices and situations permitting interconnection with or to the telephone system.

Computers got faster and faster, and more people began using them remotely via telephone. Attention increasingly focused on communication speed, to reduce the time spent on the phone and also any delays due to transmission.

Baud Rates

Baud rates are related to the speed of transmitting signals. When it comes to sending digital signals over telephone lines, baud rate is fairly directly convertible to characters per second by dividing by ten. For example, 300 baud works out to about 30 characters per second.

The reason it's not exact is that there are several variables involved in how many bits are sent to represent one byte or character, as discussed below.

The specific technical definition for baud is the rate of sending signals down a communication channel of some kind. One baud means one "signal" per second.

On a telephone line, a "signal" is any potential change from one frequency to another. The way most modems work, at least up to 1200 baud, is to convert each bit to one or the other frequency in use. So each bit becomes a signal.

The difficult part comes when you consider how to decode the data coming over the telephone line. You have to know where the code for each character starts and stops.

Otherwise a string of ones and zeros like 00101101001100 could correspond to different characters depending on where you started to group them. For example, 0010 1101 0011 00 is one grouping. If you were converting these bits into decimal numbers, this would "mean" 2,13,3,0.

Another grouping might be 00 1011 0100 1100, which would translate into 0,11,4,12. This interpretation might mean you consider the first two zeros as part of the prior character, or simply part of the telephone signal prior to any real characters coming across the line. Different groupings produce very different results.

There are really two issues here:

1. How does the receiver know when to pay attention, to ignore the inevitable noise on the line and "listen closely" when actual data is coming in? That is, where does the true data begin?

2. How does the receiver know when one character ends (and the next begins)?

These are called synchronization issues: the first is called "bit" synchronization; the second, character synchronization. Bit synchronization is achieved by the receiver knowing how fast incoming characters will be arriving (clock rate or Baud rate) after it sees an agreed-upon code to recognize the beginning of transmission.

Character transmission is either synchronous or asynchronous. In synchronous transmission, special characters called SYN are sent ahead of any text, to allow the computers to synchronize. Then the actual message begins with a start-of-text character (STX) and ends with an end-of-text character (ETX). The message between these boundaries is unbroken by other control signals.

Start and Stop Bits, and Parity

In asynchronous transmission, characters may arrive at random times, not always at the same rate. Someone typing at a terminal and pausing to think before continuing is an example of asynchronous transmission. For communications of this sort, each character is framed by start and stop bits. Once the receiver sees the start bit, he can count up to the pre-defined number of bits per character to form the next character, and use the stop bits to get the system back to a common place, ready for the next start bit whenever it arrives.

Typically, one start bit introduces the beginning of a character (byte), and one or two stop bits are used to signal the end of that byte. Some systems use one, some two.

So now we could have (Start)00101101001100(Stop)(Stop)(Start)10....

However, computers and telephone lines being what they are, misteakes do occurs from time to time. In order to have some indication that all is not well, the parity bit was introduced. It works like this: the computer always sends the same number of bits per character. Before it sends them out, it adds up all the bits, all the ones and zeros, in that character code. If the sum is even, it puts an extra zero at the end, so the sum stays even. If the sum is odd, it puts an extra 1 at the end, which makes the sum even. So the receiving computer, which knows that each sum is supposed to be even, can tell something is wrong if it gets a character code whose sum is odd.

For example, if you were sending out an alphabetic "A," 1000001, your sum would be even: $1+0+0+0+0+0+1=2$ in decimal numerals, 10 in binary numerals. So you would make your eighth bit 0, 01000001. If you were sending the letter "C," 1000011, the sum would be 3 in decimal, 11 in binary. The correct eighth bit would be 1 to make the sum even again (11000011). The eighth bit goes in front because bits are usually numbered from the rightmost, least-significant bit.

That's called EVEN parity, where the sum is made to be even. You have other choices: ODD parity, where the sum is made to come out odd, and NO parity, where the eighth bit (if there must be one) is always SET to 1 or always RESET to 0. The most common choices are those in the VisiTerm option DATA FORMAT, namely even, odd, or none.

The most frequent character coding is one start bit, one stop bit, and one parity bit. For ASCII character codes of 7 bits each, you then get 10 bits per character for transmission. This, conveniently, makes 300 baud convert to 30 characters per second.

Limits

There is a physical limit on how fast our present telephone lines can carry the signals. It is based on the frequencies they're built to handle, the techniques we use to vary those sounds (modulation), and the number of errors we can tolerate in each transmission. The faster we try to send information down the line, the higher the probability of an error. For the normal desired reliability, 1200 baud is about the limit.

Faster modems exist. The reason they don't violate this limit is that they encode and send several bits in each "signal" down the phone line. They stay within the 1200 baud limit on the telephone line, but the special encoding permits sending, say, 4800 bits per second. Then at the other end they decode each signal back into those original bits. Difficult, clever, and expensive; but worth it if the quantity (and importance, or time-value) of the data to be transmitted requires very high speed.

Duplex, Half and Full

In communications technology, a link that communicates in one direction only is called a simplex link. A radio transmitter is an example. When you have a simplex link going out and another one coming in, it's called a duplex link. A telephone is an example—both parties can hear each other, and even talk at the same time.

If you use a single link but have a way for the parties to take turns, you get most of the duplex results using only a simplex link. This is called half-duplex. CB radio works this way; when one person is done talking, he says "over" or "10-4, good buddy," and the other person gets the channel.

For a radio system to be full-duplex, there would have to be a transmitter and receiver on both sides, with the transmitters ON the whole time. Each transmitter would have to use a different channel so as not to jam the other. Full duplex takes two channels.

For data communications, this would normally mean two pairs of wires, one for outgoing communication and one for incoming. But the telephones in our homes and offices have only one pair of wires.

Fortunately, since full-duplex communication is more like face-to-face talk than half-duplex and people like it better, the phone companies created a solution. The phones contain a device called a hybrid transformer that permits the two opposite signal paths to share one pair of wires from the central office. (Inside central offices the two are kept separate.)

Long distance telephone communication, on the other hand, uses a separate circuit for each direction. For distances greater than a few hundred miles, you would normally get an echo because the distance causes a perceivable delay. To avoid this, long distance lines use a device called an echo supressor. In effect, this is a voice-controlled switch making the phone line actually work half-duplex. It seems full-duplex because of their very high speed.

The signal always goes full circle, from your phone out to the other phone and back to your phone again. For short distances, however, the time gap between your speech and the "echo" is so small that there doesn't seem to be one; it seems part of the original message.

Bell 103-Type Modems

The Bell System model 103 low-speed modem is by far the most widely-used modem in North America. Nearly all time-sharing or dial-up computer systems use it as their standard mode of access.

It is popular partly because it is simple and cheap, and partly because there are so many other 103-compatible modems already installed, available for communication. (Many operate at 110 baud, e.g., Model 33 Teletypes.)

The designers of the 103 divided the frequency band of the telephone into two narrower bands, using each for transmitting in one direction, like the two radio transmitters mentioned above. This even worked on long distance lines because the modems weren't bothered by the echos. They were designed to talk on one frequency and listen on the other, so they didn't care about the echos because they couldn't hear them.

The echo suppressor might have caused a problem, but its designers had included a self-turn-off feature now used by the 103 modem: when an echo suppressor hears a tone in a certain frequency band, it shuts itself off. The modems produce such a tone.

Character Echo

Some modems are half-duplex, especially the faster ones. This makes them more complicated because the computers then have to learn to say "10-4, good buddy" each time they're ready for the other to send.

When you use a full-duplex modem, you usually don't see the character you've typed until it is sent back to you by the remote computer. This means you see what the computer saw, regardless of what you typed. If it got scrambled during transmission, you see scrambled on the screen, or if lost, nothing on the screen. To round out the complex of terms used in data communications, this technique is called echo-plex.

This practice is the reason most terminals have a switch marked full or half duplex. Using half duplex, the terminal must display the characters it sends, because the computer on the other end usually can't send them back. (Sometimes it can and does, which causes everything you type to appear doubled, as in "HHEELLOO,,MMYY NNUUMMMBBEERR IISS 11998811.." If you see this on your screen, switch to full duplex.)

APPENDIX B

COMMUNICATIONS CARDS: INTRODUCTION AND INSTALLATION

There are several communications cards (comm cards, for short) you can use with the VisiTerm software. The three most common ones are:

- The Apple II Communications Interface Card (A2B0003X).

- The California Computer Systems (CCS) Apple II Asynchronous Serial Interface Card, Model 7710A. (This card requires connecting pins 4 and 20, as described in the CCS manual.)

- The D.C. Hayes and Associates Micromodem II™ package.

These cards are not equivalent, though they all provide a core of similar functions. What a communications card does is control the number of characters sent out each second (the speed, or baud rate).

In order for your Apple to talk over telephone lines, it also needs another device between the communications card and the phone line, called a modem. Modems and how to install them are topics discussed later this Appendix, with general explanations both here and in Appendix A.

Generalities

The main features of the installation process are the same in every case: MAKE SURE the Apple's power is OFF and take the top cover off. You insert the card of your choice into a slot of your choice; the slots are numbered from 0 to 7, left to right if you're looking from the keyboard side. Traditionally slot 2 (the third one from the left) is used, but this is not a requirement.

Then, after the card is in place, you connect it to the modem by an RS232C. This consists of up to 25 wires running parallel to each other, in a single package, with a connector at each end. (A minimum of 3 wires is necessary.) One connector attaches to the 25-pin end of the communications card cable, outside the Apple, and the other end connects similarly to the modem box.

SLOT 2
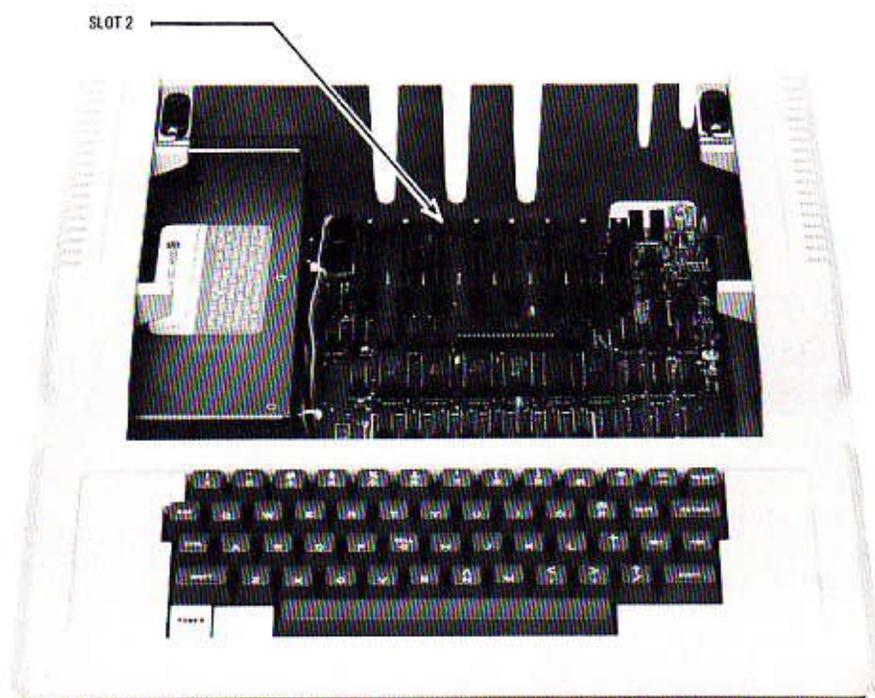
The Apple part of the process goes as follows:

After the power is OFF and the cover is removed, line up the "fingers" portion of the communications card with the metal grippers in the slot, and wiggle the card down into the slot by pressing the top of it, first at one end and then at the other, until it's firmly seated in the slot.

Then get the communications card's connector and its two metal plates over to the back of the Apple. Separate the plates so they fit over the back panel on either side of one of the large vertical openings in the Apple's case. Slide one metal plate down each side, leaving the connector's flange outside the Apple case. Tighten the screws until the connector assembly won't move in the opening; don't overtighten or you'll bend the metal plates.

Then replace the Apple's cover, connect the ribbon cable leading to the modem, and you're ready to turn everything ON.

Details
If you chose the D.C. Hayes Micromodem™ card, the connections are a little different.

After installing the card itself, you plug one end of its ribbon cable into the upper end of the card, nearest the keyboard. You lead the cable out through one of those vertical openings in the Apple's rear casing, and plug it into the Microcoupler™. Then you snap one end of the regular telephone cable into the modular wall jack, and the other end into the Microcoupler. Installation complete.

If you chose the CCS Asynchronous card, you have some choices before you close the cover of the Apple. Chapter II of the manual for that card is called Installation and Checkout. It contains instructions for setting the baud rate using little rocker switches right on the card itself.

With the card in front of you, position it so the switches are in the upper right hand corner, as above. The four switches are numbered from left to right, 1 2 3 4. When the numbered part of a switch is up and the other half is down, that switch is OFF. The three choices most appropriate with the VisiTerm software are: all four rocker switches OFF (110 Baud), only the second from the left ON (300 Baud), or only the third one from the left ON (1200 Baud).

NOTE: Two more details about the CCS card: pins 4, 6, and 20 need to be connected, as described in the CCS manual; and the cable connecting the card to a modem needs to have the wires from pins 2 and 3 crossed. This means that the modem end of the wire from pin 2 of the CCS card must be wired to connect to pin 3 of the modem, and the modem end of the wire from pin 3 must be wired to connect to pin 2 of the modem.

Modems: Introduction and Installation

The modulator part of the modem converts digital signals, ones and zeros, into modulated audio signals that are readily transmitted over telephone lines. The demodulator part of the modem converts audio signals it hears over the phone back into the original digital signals. A modem has both parts in one box.

A modem controls whether or not those characters are sent ONLY to the remote device or computer. If so, then communication takes place in what is called "full-duplex" mode. (For you to see the characters you've typed, the remote device must send them back to you.) However, if they are simultaneously sent to your monitor screen as well, it is called "half-duplex" mode. The communications card, under VisiTerm control, sets the duplex mode to full or half.

The modulated audio uses 1070 Hz (cycles per second) to represent a zero, and 1270 Hz to represent a one. If simultaneous transmission in both directions is required, another pair of frequencies is used for the other party. The standard other pair is 2025 Hz for zero, and 2225 Hz for one.

A modem that listens to the high pair and sends out the low pair is called an 'originate' modem. The modem that listens for the low frequencies and sends out the high frequencies is called an 'answer' modem. Traditionally, the computer uses an answer modem and the terminals communicating with it use originate modems.

You may want to purchase a modem with both capabilities, originate and answer. (Such modems are clearly labeled as having both modes.) This enables you to take full advantage of the worlds of timesharing, computer bulletin boards, and the sharing of experience, programs, and data with other remote computer users.

Direct Connection and Acoustic Coupling

As mentioned in Appendix A, there are two broad categories of modems. Some connect directly to the phone line without using the telephone handset, like the DCH (direct connection modems). Some do make use of the telephone handset, and are called acoustic couplers. These modems are the ones you must put the handset into after you dial the number and hear the special tone signifying a computer connection.

Summary

First, BEFORE you turn on the power to the Apple or the modem, connect them using an RS232C between the communications card connector and a 25-pin slot in the modem's case. This cable is just a straight connection of the 25 wires defined by the RS232 communications standard. In fact, for this usage only three are absolutely necessary.

Next, for direct connection modems, snap in the standard modular telephone cord, one end in the modem and one end in the wall jack.

Third, if your modem has any switches such as full/half duplex or originate/answer, set them to full and originate, respectively. (If you were planning to receive a call from another VisiTerm owner, you would use answer mode instead.)

Installation is now complete. You are ready to load the VisiTerm software and begin using your Apple as an intelligent terminal.

The Final, Beginning Step

Put your VisiTerm disk in drive 1 of the Apple and power on both the modem and the Apple. This loads the VisiTerm software as described in Chapter 1. You can then set the options you need for the computer you will be connecting with. Dial its number, either using your telephone or the Call command described in Lesson 2.

Hardware Shift for Upper Case

There is a 1-wire modification that can be made to your Apple that is called the One-Wire Shift Key Modification. This simple mod can be done by your dealer. It consists of running a wire from the shift key on the keyboard to paddle button 2 on the game I/O connector inside the Apple. With this modification the shift key works like the regular shift key on a typewriter.

APPENDIX C:

ASCII CHARACTERS

ASCII is the acronym for American National Standard Code for Information Interchange. It also has two other names: International Standard 646 (ISO 646) and Alphabet No. 5 of CCITT (the International Consultative Committee for Telephone and Telegraph).

ASCII is a 7-bit code, usually represented in a table of 8 columns by 16 rows. The rows are the low order 4 bits, 0000 through 1111 in binary, 0 to 15 decimal; the columns are the high-order 3 bits, 000 through 111 binary, or 0 to 7 decimal. So the character represented as 07 is found in the column headed by 0, in the row begun by 7. The letter A, 41, is found in the column headed 4 and the row begun by 1. (The letter L, appearing in the column headed 4 and the row beginning 12, can be referred to either as 4/12 or, using hexadecimal numbers instead, as 4C. The tables below use the hexadecimal notation.

b₈ b₇ b₆ b₅	b₄ b₃ b₂ b₁	COL ROW	0000 0	0001 1	0010 2	0011 3	0100 4	0101 5	0110 6	0111 7
	0000	0	NUL	DLE	SP	0	@	P	'	p
	0001	1	SOH	DC1	!	1	A	Q	a	q
	0010	2	STX	DC2	"	2	B	R	b	r
	0011	3	ETX	DC3	#	3	C	S	c	s
	0100	4	EOT	DC4	$	4	D	T	d	t
	0101	5	ENQ	NAK	%	5	E	U	e	u
	0110	6	ACK	SYN	&	6	F	V	f	v
	0111	7	BEL	ETB	'	7	G	W	g	w
	1000	8	BS	CAN	(	8	H	X	h	x
	1001	9	HT	EM	)	9	I	Y	i	y
	1010	10	LF	SUB	*	:	J	Z	j	z
	1011	11	VT	ESC	+	;	K	[	k	{
	1100	12	FF	FS	,	<	L	/	l	:
	1101	13	CR	GS	—	=	M	]	m	}
	1110	14	SO	RS	.	>	N	·	n	~
	1111	15	SI	US	/	?	O	_	o	DEL

Columns 0 and 1 are basically control characters, falling into five groups. Columns 2 through 7 are usually called "graphics," used for letters and numbers constant in meaning throughout the world though varying in appearance, at least in Russia (Cyrillic) and Japan (Kata Kana).

The five groupings of control characters are shown below, with the number of characters in the group given in parentheses. Brief discussions follow.

1.   Logical communication control (10).

2.   Physical communication control (4).

3.   Device control (11).

4.   Field separators (4).

5.   Characters denoting a change into a different set of code interpretations (3).

Logical Communication Control (10)

These codes include 01 through 06, 10, 15, 16, and 17.

01 1 SOH   Start of Heading. This is used as the first character in the heading of an information message, essentially saying more is coming. The VisiTerm software produces this character as Control A, denoted in text as CTRL A or on screen as <A>.

02 2 STX   Start of Text. This terminates the heading just before the text. The VisiTerm software produces this character as Control B, denoted in text as CTRL B or on screen as <B>.

03 3 ETX   End of Text. Indicates the last character in the text message. The VisiTerm software produces this character as Control C or on screen as <C>.

04 4 EOT   End of Transmission. This is usually the last character in any transmission, and in fact turns off many devices. The VisiTerm software produces this character as Control D, denoted in text as CTRL D or on screen as <D>.

05 5 ENQ   Enquiry. The enquiry character requests a response from a remote station, such as a status report or an identification, as in (Who are you?). The VisiTerm software produces this character as Control E, denoted in text as CTRL E or on screen as <F>.

06 6 ACK   Acknowledge Character used by a receiver to reply "yes" to a sender. The VisiTerm software produces this character as Control F, denoted in text as CTRL F or on screen as <F>.

10 16 DLE   Data Link Escape. This is an Escape character especially for communications, analogous to ESC (1/11). It signals the start of a character sequence that causes a shifting into another set of communication controls, whenever needed. The VisiTerm software produces this character as Control P, denoted in text as CTRL P or on the screen as <P>.

15 21 NAK   Negative Acknowledge. NAK is used by a receiver to reply "no" to a sender. The VisiTerm software produces this character as Control U, denoted in text as CTRL U or on the screen as <U>.

16 22 SYN   Synchronous Idle. Synchronous transmission systems need such a character to get (or stay) in synchronization when no other signal can be used unambiguously for this purpose. The VisiTerm software produces this character as Control V, denoted in text as CTRL V or on screen as <V>.

17 23 ETB   End Transmission Blocks. Signals the end of a division of data needed by the transmission system, unrelated to any such division contained logically in the data itself. The VisiTerm software produces this character as Control W, denoted in text as CTRL W or on screen as <W>.

Physical Communication Control (4)

The four codes included here are 00, 18, 1/10, and 19.

00 0 NUL   Null. Used to fill out time or media, the null may be freely inserted into a stream of data, or removed from it, without affecting the information content at all. This is quite similar to the use of DELete, at 7/15. One authority states the only difference he sees is that on perforated tape one can make any character into a DELete, and none into a Null. The VisiTerm software produces this character as Control @, denoted in text as CTRL @ or on screen as <@>.

18 24 CAN Cancel. The use of cancel depends on the agreement of sender and receiver. Cancel says the receiver is to disregard all data between a predetermined restart point in the transmission and the point of the cancel code. Sending (and receiving) begin anew at the agreed-upon restart point. A common agreement in timesharing is to have Cancel work on a line-by-line basis. You can then cancel an entry line by issuing the Cancel code (often a Control X), and start over at the beginning of the line. The prior carriage return is the usual restart point. The VisiTerm software produces this character as Control X, denoted in text as CTRL X or on screen as <X>.

1A 26 SS Special Sequence. Sometimes called SUB, this character is usually a filler for an undecipherable character garbled in transmission. Among other things, it keeps field lengths correct even though the information content has dropped. If the CRT or printer can display a question mark for this code, you can readily see the problem and sometimes figure out what the character actually was (especially in word text). The VisiTerm software produces this character as Control Z, denoted in text as CTRL Z or on screen as <Z>.

19 25 EM End Medium. This delineates the end of the medium, marking the character just before it as the last usable character on the medium, regardless of whether there is more recordable space on the medium. In some usages this would be an end-of-file. The VisiTerm software produces this character as Control Y, denoted in text as CTRL Y or on screen as <Y>.

Device Control (11)

These characters provide controls for printers and terminals, be they CRT or hard copy, as well as other devices. Their interpretation is sufficiently loose to allow for different actions appropriate to different devices. This means different manufacturers of the same type of device may use different controls and still be within the standard.

07 7 BEL   Bell. When the receiving device has a bell, this code causes it to sound, often without volume control. The intention is to get the operator's attention, perhaps originally derived from the use of unattended teletype machines. The VisiTerm software produces this character as Control G, denoted in text as CTRL G or on screen as <G>.

08 8 BS   Backspace. This character was originally designed for hard-copy devices to achieve underscoring or bold-face (via overstriking). Composite or accented characters in other languages were another use. On video terminals it is sometimes hard to create as part of a transmission, since its normal use is to back up over errors or unwanted items on the screen. The Visiterm File Transfer mode, however, does take this character literally as part of the stream of characters, and echoes it to your screen as a left-arrow. (The other modes just use it as an editing character, and backspace over the prior character to let you reenter it.) The VisiTerm software produces this character as Control H, denoted in text as CTRL H or on screen as <H>.

09 9 HT   Horizontal Tab. Advancing to the next "predetermined" position on the line, as "ht" does, requires that you have set tab positions at the terminal, or in the computer to correspond to your terminal. In some cases, there are physical settings you can make at the terminal. These then need to be entered into the computer program so it can move the cursor (or active position) to the correct next tab. The VisiTerm software produces this character as Control I, denoted in text as CTRL I or on screen as <I>.

0A 10 1F   Linefeed. According to the standard, this character advances the cursor (or active position) to the same character position on the next line. In some implementations the sender and receiver agree to jump to the first position of the next line, and call it New Line instead of Linefeed. More common is the separation of Linefeed from Carriage Return, so that although they are often generated as a pair, they are still accessible singly. The VisiTerm software produces this character as Control J, denoted in text as CTRL J or on screen as <>.

0B 11 VT   Vertical Tab. Similar to linefeed, the vertical tab character advances the cursor to the same character position on another line; but in this case, it may be a predetermined line below, rather than the very next line. This requires cautious use, since a predetermined vertical leap may not always fit the circumstances. Here too the agreement between sender and receiver can include a convention to move to the first character of the line used next, rather than the same position from the old line. The VisiTerm software produces this character as Control K, denoted in text as CTRL K or on screen as <K>.

0C 12 FF   Form Feed. Very similar to vertical tab, but in this case the predetermined line is tied to a physical form, say, a page on a printer: fan-fold 11 x 14 inch paper, for example, or pre-printed checks. In either case you want to jump to the first position to be printed. Judicious usage would be wise, since indiscriminate placement of these characters in your file could cause some wild runaway paper problems were the file ever sent to a printer. The VisiTerm software produces this character as Control L, denoted in text as CTRL L or on screen as <L>.

0D 13 CR   Carriage Return. This character, familiar to most of us, causes active position or cursor to move to the first position of the SAME line. Many terminals generate an automatic linefeed when you hit return, much like the typewriters which (in many cases) ACTUALLY move a carriage to the beginning of the line and then advance the paper. But in terms of the standard, the two functions are separate. The VisiTerm software produces this character as Control M, denoted in text as CTRL M or on the screen as <M>.

The final four characters in this group, DC1, DC2, DC3, and DC4 are device control characters used with great variation by computer and terminal manufacturers. No real, firm standard of use is current, so that compatibility is questionable even when you uncover particular usages or make specific agreements with one other computer user.

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY
11	17	DC1	Dev Ctrl 1	CTRL Q	<Q>
12	18	DC2	Dev Ctrl 2	CTRL R	<R>
13	19	DC3	Dev Ctrl 3	CTRL S	<S>
14	20	DC4	Dev Ctrl 4	CTRL T	<T>

Field Separators (4)

The separators are most useful in string processing or special formatting requirements. Programs designed to perform such functions can find and recognize the separators, which form a hierarchy: units include the least data, records include units, groups include records, and files include groups. Thus clear distinctions can be made and maintained when data is sent or received. Separation into distinct groupings for different processing or formatting is clearcut.

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY
1C	28	FS	file separator	ESC SHIFT ,	[<]
1D	29	GS	group separator	ESC SHIFT –	[=]
1E	30	RS	record separator	ESC SHIFT .	[>]
1F	31	US	unit separator	ESC SHIFT /	[?]

(This notation of a character within square brackets means the character is to be preceded by an ESCape character. For example, [<] means the sequence ESCape <, and [=] means ESCape = .)

Change-Code Characters

Alternate sets of graphics and controls can be accessed by recognizing the characters in this set as meaning a shift in interpretation, whether for processing or display. ESCape sequences have become a commonplace in the control of various peripherals such as letter-quality printers. Shift In and Shift Out have similar uses. The VisiTerm software follows this evolution by using ESCape as a key to various characters and functions, as for example in the separators above.

1B 27 ESC   Escape. The VisiTerm sequence for this is: ESC 4   [4]

0E 14 SO   Shift Out/Shift In. The shift out character, and his brother
0F 15 SI   shift in, might be used by some terminals to alter the video characteristics, for example showing white letters on a black background versus black letters on a white background, or for altering parity usage, or as cursor and screen control to put the cursor at the home position of a cleared screen. The VisiTerm software produces this character as Control N, denoted in text as CTRL N or on screen as <N>.

(Shift In is Control 0, or CTRL 0 <0>.)

NUMERIC LISTING OF ASCII CHARACTERS

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY NOTATION	APL	NAME
00	0	NUL	null	CTRL SHIFT P	<@>		
01	1	SOH	start heading	CTRL A	<A>		
02	2	STX	start text	CTRL B	<B>		
03	3	ETX	end text	CTRL C	<C>		
04	4	EOT	end transmission	CTRL D	<D>		
05	5	ENQ	enquire	CTRL E	<E>		
06	6	ACK	acknowledge	CTRL F	<F>		
07	7	BEL	bell	CTRL G	<G>		
08	8	BS	backspace	CTRL H, ←	<H>		
09	9	HT	horizontal tab	CTRL I	<I>		
0A	10	LF	linefeed	CTRL J	<J>		
0B	11	VT	vertical tab	CTRL K	<K>		
0C	12	FF	form feed	CTRL L	<L>		
0D	13	CR	carriage return	CTRL M, RETURN	<M>		
0E	14	SO	shift out	CTRL N	<N>		
0F	15	SI	shift in	CTRL O	<O>		
10	16	DLE	data link escape	CTRL P	<P>		
11	17	DC1	dev ctl 1	CTRL Q	<Q>		
12	18	DC2	dev ctl 2	CTRL R	<R>		
13	19	DC3	dev ctl 3	CTRL S	<S>		
14	20	DC4	dev ctl 4	CTRL T	<T>		
15	21	NAK	negative ack	CTRL U	<U>		
16	22	SYN	synchronous idle	CTRL V	<V>		
17	23	ETB	end trans blocks	CTRL W	<W>		
18	24	CAN	cancel	CTRL X	<X>		
19	25	EM	end medium	CTRL Y	<Y>		
1A	26	SS	special sequence	CTRL Z	<Z>		
1B	27	ESC	escape	ESC 4	[4]		
1C	28	FS	file separator	ESC SHIFT ,	[<]		
1D	29	GS	group separator	ESC SHIFT −	[=]		
1E	30	RS	record separator	ESC SHIFT .	[>]		
1F	31	US	unit separator	ESC SHIFT /	[?]		
20	32	SP	space	SPACE BAR	< >		
21	33	!	exclamation	SHIFT 1	!	¨	dieresis
22	34	"	quotation	SHIFT 2	"	−	overbar
23	35	#	number sign	SHIFT 3	≠	<	less than
24	36	$	dollar sign	SHIFT 4	$	<=	less or equal
25	37	%	percent sign	SHIFT 5	%	=	equal
26	38	&	ampersand	SHIFT 6	&	>=	greater or equal
27	39	'	apostrophe	SHIFT 7	'	>	greater than
28	40	(	open parenthesis	SHIFT 8	(	±	not equal
29	41	)	closed parenthesis	SHIFT 9	)	v	or
2A	42	*	asterisk	SHIFT :	˙	)	closed parenthesis
2B	43	+	plus sign	SHIFT ;	+	(	open parenthesis
2C	44	,	comma	,	,	,	comma
2D	45	−	minus	−	−	+	plus sign
2E	46	.	period	.	.	.	period
2F	47	/	slash	/	/	/	slash

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY NOTATION	APL	NAME
30	48	0	zero	0	0	0	zero
31	49	1	one	1	1	1	one
32	50	2	two	2	2	2	two
33	51	3	three	3	3	3	three
34	52	4	four	4	4	4	four
35	53	5	five	5	5	5	five
36	54	6	six	6	6	6	six
37	55	7	seven	7	7	7	seven
38	56	8	eight	8	8	8	eight
39	57	9	nine	9	9	9	nine
3A	58	:	colon	:	:	]	close bracket
3B	59	;	semicolon	;	;	[	open bracket
3C	60	<	less than	SHIFT ,	<	;	semicolon
3D	61	=	equal to	SHIFT -	=	-	minus
3E	62	>	greater than	SHIFT .	>	:	colon
3F	63	?	question mark	SHIFT /	?	\	backslash
40	64	@	at sign	ESC 6	[6]	←	left arrow
41	65	A	A	ESC A	[A]	a	alpha
42	66	B	B	ESC B	[B]	⊦	decode
43	67	C	C	ESC C	[C]	∩	cap
44	68	D	D	ESC D	[D]	L	floor
45	69	E	E	ESC E	[E]	∈	epsilon
46	70	F	F	ESC F	[F]	_	underscore
47	71	G	G	ESC G	[G]	∇	del
48	72	H	H	ESC H	[H]	△	delta
49	73	I	I	ESC I	[I]	⍳	iota
4A	74	J	J	ESC J	[J]	○	little circle
4B	75	K	K	ESC K	[K]	'	quote
4C	76	L	L	ESC L	[L]	□	quad
4D	77	M	M	ESC M	[M]	I	residue
4E	78	N	N	ESC N	[N]	⊦	encode
4F	79	O	O	ESC O	[O]	○	large circle
50	80	P	P	ESC P	[P]	★	star
51	81	Q	Q	ESC Q	[Q]	?	question
52	82	R	R	ESC R	[R]	ρ	rho
53	83	S	S	ESC S	[S]	⌈	ceiling
54	84	T	T	ESC T	[T]	-	not
55	85	U	U	ESC U	[U]	↓	down arrow
56	86	V	V	ESC V	[V]	∪	cup
57	87	W	W	ESC W	[W]	ω	omega
58	88	X	X	ESC X	[X]	⊃	implication
59	89	Y	Y	ESC Y	[Y]	↑	up arrow
5A	90	Z	Z	ESC Z	[Z]	⊂	subordination
5B	91	[	open bracket	ESC ,	[,]	⊢	left tack
5C	92	\	backslash	ESC /	[/]	◊	diamond
5D	93	]	close bracket	ESC .	[ ]	{	open brace
5E	94	^	circumflex	ESC ;	[;]	×	times
5F	95	_	underscore	ESC -	[-]	&	and
60	96	'	grave accent	ESC 7	[7]	→	right arrow
61	97	a	a	a	a	a	a
62	98	b	b	b	b	b	b
63	99	d	c	c	c	c	c

HEX	DEC	ASCII		NAME	KEYBOARD	DISPLAY NOTATION	APL		NAME
64	100	d	d			d	d	d	
65	101	e	e			e	e	e	
66	102	f	f			f	f	f	
67	103	g	g			g	g	g	
68	104	h	h			h	h	h	
69	105	i	i			i	i	i	
6A	106	j	j			j	j	j	
6B	107	k	k			k	k	k	
6C	108	l	l			l	l	l	
6D	109	m	m			m	m	m	
6E	110	n	n			n	n	n	
6F	111	o	o			o	o	o	
70	112	p	p			p	p	p	
71	113	q	q			q	q	q	
72	114	r	r			r	r	r	
73	115	s	s			s	s	s	
74	116	t	t			t	t	t	
75	117	u	u			u	u	u	
76	118	v	v			v	v	v	
77	119	w	w			w	w	w	
78	120	x	x			x	x	x	
79	121	y	y			y	y	y	
7A	122	z	z			z	z	z	
7B	123	{	open brace		ESC 8	[8]	←╵	right tack	
7C	124			line		ESC :	[ ]	$	dollar sign	
7D	125	}	close brace		ESC 9	[9]	}	close brace	
7E	126	‾	tilde		ESC 5	[5]	÷	divide	
7F	127	DEL	delete (rubout)		ESC 0	[0]			

ALPHABETIC LISTING OF ASCII CHARACTERS

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY NOTATION	APL	NAME
41	65	A	A	ESC A	[A]	a	alpha
61	97	A	a	A	⑂	a	a
06	6	ACK	acknowledge	CTRL F	<->		
26	38	&	ampersand	SHIFT 6	&	>=	greater or equal
27	39	'	apostrophe	SHIFT 7	⑈	>	greater than
2A	42	*	asterisk	SHIFT :	*	)	closed parenthesis
40	64	@	at sign	ESC 6	[⑁]	←	left arrow
42	66	B	B	ESC B	[b]	⊥	decode
62	98	b	b	B	b	b	b
5C	92	\	backslash	ESC /	[/]	◊	diamond
08	8	BS	backspace	CTRL H	<⊢>		
07	7	BEL	bell	CTRL G	<G>		
43	67	C	C	ESC C	[C]	∩	cap
63	99	c	c	C	c	c	c
18	24	CAN	cancel	CTRL X	<X>		
0D	13	CR	carriage return	CTRL M, RETURN	<V>		
5E	94	^	circumflex	ESC ;	[ ]	×	times
7D	125	}	close brace	ESC 9	[9]	}	close brace
5D	93	]	close bracket	ESC .	[ ]	{	open brace
29	41	)	closed parenthesis	SHIFT 9	⑈	v	or
3A	58	:	colon	:		]	close bracket
2C	44	,	comma	,		,	comma
44	68	D	D	ESC D	[D]	⌊	floor
64	100	d	d	D	d	d	d
10	16	DLE	data link escape	CTRL P	<P>		
7F	127	DEL	delete (rubout)	ESC 0	[0]		
11	17	DC1	dev CTRL 1	CTRL Q	<Q>		
12	18	DC2	dev CTRL 2	CTRL R	<R>		
13	19	DC3	dev CTRL 3	CTRL S	<S>		
14	20	DC4	dev CTRL 4	CTRL T	<T>		
24	36	$	dollar sign	SHIFT 4	S	<=	less or equal
45	69	E	E	ESC E	[F]	∈	epsilon
65	101	e	e	E	e	e	e
38	56	8	eight	8	8	8	eight
19	25	EM	end medium	CTRL Y	<Y>		
03	3	ETX	end text	CTRL C	<C>		
17	23	ETB	end trans blocks	CTRL W	<W>		
04	4	EOT	end transmission	CTRL D	<D>		
05	5	ENQ	enquire	CTRL E	<E>		
3D	61	=	equal to	SHIFT –	=	–	minus
1B	27	ESC	escape	ESC 4	[4]		
21	33	!	exclamation	SHIFT 1	!	¨	dieresis
46	70	F	F	ESC F	[F]	—	underscore
66	102	f	f	F	f	f	f
1C	28	FS	file separator	ESC SHIFT ,	[<]		
35	53	5	five	5	5	5	five
0C	12	FF	form feed	CTRL 1	<⑈>		
34	52	4	four	4	4	4	four
47	71	G	G	ESC G	[G]	∇	del

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY NOTATION	APL	NAME
67	103	g	g	G	g	g	g
60	96	`	grave accent	ESC 7	[7]	→	right arrow
3E	62	>	greater than	SHIFT .	>	:	colon
1D	29	GS	group separator	ESC SHIFT −	[=]		
48	72	H	H	ESC H	[H]	Δ	delta
68	104	h	h	H	h	h	h
09	9	HT	horizontal tab	CTRL I	<I>		
49	73	I	I	ESC I	[I]	⌐	iota
69	105	i	i	I	i	i	i
4A	74	J	J	ESC J	[J]	○	little circle
6A	106	j	j	J	j	j	j
4B	75	K	K	ESC K	[K]	'	quote
6B	107	k	k	K	k	k	k
4C	76	L	L	ESC L	[L]	□	quad
6C	108	l	l	L	l	l	l
3C	60	<	less than	SHIFT ,	<	;	semicolon
7C	124			line	ESC :	[:]	$	dollar sign
0A	10	LF	linefeed	CTRL J	<J>		
4D	77	M	M	ESC M	[M]			residue
6D	109	m	m	M	m	m	m
2D	45	−	minus	−	−	+	plus sign
4E	78	N	N	ESC N	[N]	T	encode
6E	110	n	n	N	n	n	n
15	21	NAK	negative ack	CTRL U	<U>		
39	57	9	nine	9	9	9	nine
00	0	NUL	null	CTRL SHIFT P	<@>		
23	35	#	number sign	SHIFT 3	#	<	less than
4F	79	O	O	ESC O	[O]	○	large circle
6F	111	o	o	O	o	o	o
31	49	1	one	1	1	1	one
7B	123	{	open brace	ESC 8	[8]	⊢	right tack
5B	91	[	open bracket	ESC ,	[,]	⊣	left tack
28	40	(	open parenthesis	SHIFT 8	(	≠	not equal
50	80	P	P	ESC P	[P]	★	star
70	112	p	p	P	p	p	p
25	37	%	percent sign	SHIFT 5	%	=	equal
2E	46	.	period	.	.	.	period
2B	43	+	plus sign	SHIFT ;	+	(	open parenthesis
51	81	Q	Q	ESC Q	[Q]	?	question
71	113	q	q	Q	q	q	q
3F	63	?	question mark	SHIFT /	?	\	backslash
22	34	"	quotation	SHIFT 2	..		overbar
52	82	R	R	ESC R	[R]	P	rho
72	114	r	r	R	r	r	r
1E	30	RS	record separator	ESC SHIFT	[>]		
53	83	S	S	ESC S	[S]	Γ	ceiling
73	115	s	s	S	s	s	s
3B	59	;	semicolon	;	.	[	open bracket
37	55	7	seven	7	7	7	seven
0F	15	SI	shift in	CTRL O	<O>		
0E	14	SO	shift out	CTRL N	<N>		
36	54	6	six	6	6	6	six
2F	47	/	slash	/	/	/	slash
20	32	SP	space	SPACE BAR	< >		

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY NOTATION	APL	NAME
67	103	g	g	G	g	g	g
60	96	`	grave accent	ESC 7	[7]	→	right arrow
3E	62	>	greater than	SHIFT .	>	:	colon
1D	29	GS	group separator	ESC SHIFT −	[=]		
48	72	H	H	ESC H	[H]	△	delta
68	104	h	h	H	h	h	h
09	9	HT	horizontal tab	CTRL I	< >		
49	73	I	I	ESC I	[I]	⌐	iota
69	105	i	i	I	i	i	i
4A	74	J	J	ESC J	[J]	○	little circle
6A	106	j	j	J	j	j	j
4B	75	K	K	ESC K	[K]	'	quote
6B	107	k	k	K	k	k	k
4C	76	L	L	ESC L	[L]	□	quad
6C	108	l	l	L	l	l	l
3C	60	<	less than	SHIFT ,	<	;	semicolon
7C	124	I	line	ESC :	[ ]	$	dollar sign
0A	10	LF	linefeed	CTRL J	<J>		
4D	77	M	M	ESC M	[M]	I	residue
6D	109	m	m	M	m	m	m
2D	45	−	minus	−	−	+	plus sign
4E	78	N	N	ESC N	[N]	⊤	encode
6E	110	n	n	N	n	n	n
15	21	NAK	negative ack	CTRL U	<U>		
39	57	9	nine	9	9	9	nine
00	0	NUL	null	CTRL SHIFT P	<@>		
23	35	#	number sign	SHIFT 3	▪	<	less than
4F	79	O	O	ESC O	[O]	○	large circle
6F	111	o	o	O	o	o	o
31	49	1	one	1	1	1	one
7B	123	{	open brace	ESC 8	[ô]	⊣	right tack
5B	91	[	open bracket	ESC ,	[ ]	⊢	left tack
28	40	(	open parenthesis	SHIFT 8	(	±	not equal
50	80	P	P	ESC P	[P]	★	star
70	112	p	p	P	p	p	p
25	37	%	percent sign	SHIFT 5	%	=	equal
2E	46	.	period	.		.	period
2B	43	+	plus sign	SHIFT ;	+	(	open parenthesis
51	81	Q	Q	ESC Q	[Q]	?	question
71	113	q	q	Q	q	q	q
3F	63	?	question mark	SHIFT /	?	\	backslash
22	34	"	quotation	SHIFT 2	"		overbar
52	82	R	R	ESC R	[R]	P	rho
72	114	r	r	R	r	r	r
1E	30	RS	record separator	ESC SHIFT	[>]		
53	83	S	S	ESC S	[S]	Γ	ceiling
73	115	s	s	S	s	s	s
3B	59	;	semicolon	;	;	[	open bracket
37	55	7	seven	7	7	7	seven
0F	15	SI	shift in	CTRL O	<O>		
0E	14	SO	shift out	CTRL N	<N>		
36	54	6	six	6	6	6	six
2F	47	/	slash	/	/	/	slash
20	32	SP	space	SPACE BAR	< >		

HEX	DEC	ASCII	NAME	KEYBOARD	DISPLAY NOTATION	APL	NAME
1A	26	SS	special sequence	CTRL Z	<Z>		
01	1	SOH	start heading	CTRL A	<A>		
02	2	STX	start text	CTRL B	<B>		
16	22	SYN	synchronous idle	CTRL V	<V>		
54	84	T	T	ESC T	[T]	-	not
74	116	t	t	T	t	t	t
33	51	3	three	3	3	3	three
7E	126	~	tilde	ESC 5	[5]	÷	divide
32	50	2	two	2	2	2	two
55	85	U	U	ESC U	[U]	↓	down arrow
75	117	u	u	U	u	u	u
5F	95	_	underscore	ESC -	[-]	&	and
1F	31	US	unit separator	ESC SHIFT /	[?]		
56	86	V	V	ESC V	[V]	U	cup
76	118	v	v	V	v	v	v
0B	11	VT	vertical tab	CTRL K	<K>		
57	87	W	W	ESC W	[W]	ω	omega
77	119	w	w	W	w	w	w
58	88	X	X	ESC X	[X]	⊃	implication
78	120	x	x	X	x	x	x
59	89	Y	Y	ESC Y	[Y]	↑	up arrow
79	121	y	y	Y	y	y	y
5A	90	Z	Z	ESC Z	[Z]	⊂	subordination
7A	122	z	z	Z	z	z	z
30	48	0	zero	0	0	0	zero

To Get	Press		To Get	Press	
÷	ESC	5	$	ESC	:
←	ESC	6	∧	ESC	−
→	ESC	7	×	ESC	;
↤	ESC	8	↦	ESC	.
∤	ESC	9	(	ESC	.
			◇	ESC	/

Cursor, Rubout, and Bell Entries

In Options mode, under the character display and below the HEX line showing the key pressed to get the hexadecimal value shown, there are three lines labeled CURSOR, RUBOUT and BELL.

The CURSOR entry shows either how far the cursor jumps (in dots) after displaying the character, or what other action the cursor takes when given that character, e.g., carriage return or linefeed upon getting $0D or $0A respectively. RUBOUT shows what character(s) cause the prior typed character to be wiped out. BELL tells what character(s) ring the bell. In the default configuration there is only one RUBOUT and one BELL.

In the alphabet A to Z (and a to z), the norm is a cursor movement of 5 dots. Among the capitals, the exceptions are I, which moves cursor only 4 dots, and M and W, which move it 6. In the lower case case, there are more exceptions: i, l, and t move 2; f and j move 3; a through e move 4, and m and w move 6. The numbers also move 5, except 1, which moves 4. Who's on first.

The special cursor actions (in the default configuration, at least) are these:

Control G gives a BELL, default SOFT
Control H (left-arrow) gives the RUBOUT action
Control I gives the TAB action
Control J gives the LINEFEED (LF) action
Control L gives the CLEAR action
Control M gives the RETurn action
Control X gives the CR & LF (carriage return and linefeed action)

As a reference, all characters you can generate via the VisiTerm program use a cursor movement of 5 dots in the default character set, except the following:

MOVEMENT (in dots)	CHARACTERS
0	<H>, <I>, <J>, <L>, <M>, <Q> [0]
2	i, l, t, space, period, colon
3	[7], f, j, !, ;, comma, apostrophe
4	a, b, c, d, e, I, [,], [:], (,), double quotes, minus, 1
6	M, W, #, $, %, +, ʌ, *, ?, m, w, <A>, <B>, <C>, <D>, <E>, <F>, <G>, <K>, <N>, <O>, <P>, <R>, <S>, <T>, <U> (right arrow), <V>, <W>, <X>, <Y>, <Z> [4], [5], [8], [9], [<], [>], [?], [=]
8	@
10	BREAK

APPENDIX D

TROUBLESHOOTING

This Appendix describes a number of common difficulties you can run into when you are unfamiliar with the VisiTerm software or unfamiliar with the remote computer you are dealing with.

It is naturally incomplete, since not everything can be predicted and many minor problems you will readily solve yourself. If you are confronted with a situation not covered here, try to think what parts of this manual might help. Use the index to find relevant bits of information — perhaps there is an option whose setting you should change. If you cannot resolve it to your satisfaction, call your dealer and discuss the difficulty. He may have faced it with others and know how to handle it correctly.

SYMPTOM: Display characters are doubled.

Checkpoints:

You are probably in Half Duplex mode. If the host echoes what you send, then both your modem and the VisiTerm program should be in Full Duplex. If your host does not echo, then only one of them should be in Full Duplex, and the other in Half Duplex. It does not matter which, as long as one is Full and one Half.

References: Lesson 2 and Appendix A.

SYMPTOM: Display is garbled (and perhaps jumpy).

Checkpoints:

1.   Baud rate may not be the same for host and Apple. Try the other setting in Options mode of the VisiTerm program. If using CCS comm card, turn the Apple's power OFF. Physically reset the speed to a different rate (verify host usage) and redial the connection.

2.   Data format may not match that of host. Check the manual for your host or call service/sales of host organization to verify parity, stop and start bits, and 7 or 8 bit characters. Then reset the VisiTerm program's DATA FORMAT option to match.

3.   If you are using an acoustic coupler, check that the telephone handset is fully seated in the rubber cups — they are designed to reduce outside noise interference. Another possibility is extraneous noise on the telephone line, things like static or other voices or dialing tones or pulses. You can check by picking up the handset and listening. If it seems like a bad connection, hang up and redial. Many services save

what you may have done up to now so you can avoid starting from scratch.

4.   If the options Switch to A or Switch to B are set to recognize some character, perhaps that character is somehow appearing in your input or output. This will cause the VisiTerm program to display succeeding text in the other character set until switched back. Thus some lines will look garbled if the character sets are very different.

References: Lessons 1, 2, and Appendix A; Appendix B.

SYMPTOM: Disk whirs forever with no action in loading the Visi-Term program.

Checkpoints:

1.   The disk may be inserted incorrectly, e.g., with the label down (should be up) or inserted first (should be last) or both. Reinsert the disk with the label up and entering the drive last.

2.   The drive door may not be closed (down). Close it.

3.   The disk may not be in Drive 1 as expected. Insert the VisiTerm disk correctly in Drive 1.

4.   Your Apple may not be set up to read 16-sectored diskettes (unlikely for recent systems). If this is true, you will need to buy PROMs for the Apple drives so they can read the newer disks. Your dealer will know about this and be able to help.

5.   You may not be using the VisiTerm diskette, or the one you ARE using may somehow have encountered a destructive environment such as dust or magnetism. If it clearly is the right diskette, and just won't work, see your dealer.

References: Appendix H, and your Apple DOS and BASIC manuals.

SYMPTOM: Funny little characters appear when I use control codes in Terminal mode.

Checkpoints:

In Half Duplex, every character typed is displayed, and control characters have unique squiggles to identify them. Most hosts do not echo them, so if you switch to Full Duplex they are likely to go away. (You can see which squiggles go with which control characters: scan the character-display part of the Option mode screen, tapping an arrow key until the control characters of interest appear in angle brackets on the HEX line, e.g., <S> for control S.)

References: Lessons 1, 2, and Appendix A.

SYMPTOM: I get odd pauses while connected, sometimes when I type and sometimes when messages come from the host. Sometimes parts of lines appear garbled.

Checkpoints:

Hosts often pause due to the demands of other users, making you wait while some high priority or demanding task is handled. However, pauses while you are typing may indicate something else: you may have reset various options such as EOB or SWITCH TO A, using characters that actually appear in your text at points you did not originally intend or expect. The delay may be due to such an EOB character, and the recovery is a response of the Auto Acknowledge feature. Take a look at the discussion of the "Garbled display" symptom, too.

References: Lessons 2, 3, and Appendix A.

SYMPTOM: I cannot get the VisiTerm program to send anything out. I dial the host, get the tone, place the handset in the acoustic coupler, but the host never gets my signon signals (carriage return, letter or password). It asks for them and then after a while cuts me off, having gotten nothing.

Checkpoints:

1. With an acoustic coupler there is always the possibility of placing the handset with the mouthpiece in the wrong rubber cup (don't laugh, it's not obvious which is which). The clue is the light telling you the connection is made: If the light does come on, the problem is not in the coupler connection, but perhaps in a VisiTerm option setting (see below).

If that light (called carrier detect) doesn't come on, then the VisiTerm program cannot send out your characters. Try reversing the handset position in the acoustic coupler. If it still does not light, see your dealer.

2. Assuming the coupler light tells you the connection is made, check in Options mode that your COMM SLOT option correctly identifies where you put your communications card. If not, switch it to the correct one, hit T for Terminal mode, and RETURN plus the correct signon characters.

3. If you are not using an acoustic coupler, you might still check the cables and connections from the coupler to the wall and to your Apple. Sometimes the simplest detail can block progress.

4. Similarly, if your COMM SPEED is too slow, the host may simply not be seeing what you send. Again, get into Options mode, space down to COMM SPEED and tap the right arrow to raise it. Then type T plus your signon.

References: Lessons 1, 2, and Appendix A; Appendix B.

SYMPTOM: Sometimes the program (or listing or game) I am using goes on and on forever. How do I get out of it without just hanging up the phone?

Checkpoints:

1. Many systems use the BREAK character for this, i.e., to interrupt a seemingly interminable process. Use the sequence ESC 1 to send the BREAK. If it fails, try two of them quickly in a row, or enter Options mode and increase the value in the option BREAK LENGTH; then try it again. Check the host's manual to see how they say to do it. Look under BREAK or interruptions.

2. If you are connecting to another Apple, you must use whatever characters or conventions it recognizes. Sometimes you can learn what they are by conversation with the person running the system, or by a command such as "HELP." If you are setting up the connection in advance, you and the other party can agree on using BREAK or CTRL G or just picking up the phone, causing loss of the carrier, noticeable to the other person.

References: Lesson 2 and the manual for the remote computer system.

SYMPTOM: I cannot get Type-ahead to work!

Checkpoints:

A common reason for this is forgetting to define STOP and START characters in Options mode before using Type-ahead.

References: Lesson 2.

SYMPTOM: I dial my remote host and hear the tone, but when I put the handset in the coupler (or switch over the direct modem) I get a beep and a line of gibberish on the screen, followed by an asterisk prompt. Then I have to reload the VisiTerm program, but still with no connection to the host. What should I do?

Checkpoints:

This can occur if the modem and remote hosts are both trying to use answer mode, or both trying to use originate mode. Whichever you were using, try switching over to the other mode and you ought to succeed in getting the carrier detect light indicating a successful connection. Then you can follow the normal signon procedure for your system.

References: Appendix A.

SYMPTOM: The VisiTerm program is simply not recognizing the protocol characters I defined in the Options mode. They are in the file and on the Option screen, but no reaction.

Checkpoints:

There are two errors that are easy to fall into. First, the characters may be upper case in one spot and lower case in the other. Look carefully to observe whether one or the other usage is highlighted, meaning true capital letters, when the other usage is not highlighted. These would appear to the VisiTerm program as entirely different characters, since they are different ASCII codes, despite their obvious similarity to us.

The second possibility is a mismatch of characters with protocol in use. STOP/START characters will not be obeyed or used properly if you have specified EOB/ACK or NONE; EOB/ACK characters will not be recognized as you would expect if the protocol in use is STOP/START or NONE.

References: Lesson 3 and the "FILE TRANSFER REFERENCE" of the Reference Chapter.

SYMPTOM: I tried to save my options, characters, and macros into a file and got an error message! (and funny disk noises)

Checkpoints:

If the disk directory is full, you need to delete or combine some of the files to permit new entries into the directory. If the disk itself is full, you must either use a different BASIC-initialized disk to receive the file, or delete a file or two to make room on the VisiTerm disk. If this problem was accompanied by raucous disk noises, there may be some physical problem with the drive or the disk. The most common (and embarrassing) one is forgetting to close the drive door.

References: Appendices E and H.

SYMPTOM: I'm receiving in EOB/ACK but never see that END OF BLOCK message and the disk seems to be rarely accessed. Is anything wrong?

Checkpoints:

Not if your expected file is on disk when transmission is done. That message is flashed on the screen only for the small amount of time the VisiTerm program needs to check whether it is time to write to disk, and then to actually do it if necessary. The most often this will ever occur is every 256 characters, and if a larger block size is used, disk accesses are less frequent.

References: Lesson 3.

SYMPTOM: I sent a file successfully but saw nothing on my screen.
Why?

Checkpoints:

Most probably you were in full duplex and your host did not echo
what it received. In half duplex (or when the host echos in full
duplex), everything sent is displayed on the text area of the File
Transfer screen.

References: Lesson 3 and the "FILE TRANSFER REFERENCE" of
the Reference Chapter.

APPENDIX E

SCREEN MESSAGES

This Appendix lists all the messages issued by the VisiTerm software, first by the modes in which they appear and then alphabetically. Messages explained earlier are covered here only lightly. You should check in the glossary and, using the index, in the earlier chapters for explanations of terms or concepts you don't fully understand.

Terminal Mode

MICROMODEM: DIAL ANSWER

When you type C for CALL, you get this message: D lets you dial, A sets up answer mode and asks you the next question:

ANSWER ON RING 1 2 3 4 5 6 7 8 9

Pick the ring you want answered on. The Micromodem will answer the phone for you.

MICROMODEM: WAIT FOR n RINGS

If the phone rings while MICROMODEM is in ANSWER mode, it displays this message until the correct number of rings, and then answers the phone. The MICROMODEM then immediately issues an answer tone. When an originate tone is detected from the calling computer, the VisiTerm program automatically switches to Terminal mode. The number n counts down to zero before the answer.

MICROMODEM II: DIALING

If you typed C for CALL and D for DIAL this message shows you each digit as you type it.

MICROMODEM II: AWAIT CARR

After dialing, you need a carrier to connect the VisiTerm program with your host.

MICROMODEM II: H TO HANG UP

Once you are connected, H allows you a graceful disconnect.

MICROMODEM: HUNG UP

If you type H, or 30 seconds go by without a carrier signal, MICRO-MODEM hangs up the phone.

Options Mode

Command line:

TERM FTRAN DEF CALL SAV GET ZAP XEQ QUIT

Action line:

SAVE_____

Saves the current configuration onto the disk file you name.

GET_____

Brings in the configuration file you name.

DEL_____

Results from a ZAP command to delete a configuration file.

Y TO CONFIRM

Deletion will occur only if a Y or y is pressed, to avoid accidental loss of a configuration file that you suddenly realize you did NOT want to scratch.

Error messages:

DIRECTORY FULL

A BASIC/DOS disk directory can contain about 105 entries, displayed by the CATALOG command in BASIC. To add a file to a disk with a full directory, you must delete one of the names, possibly after combining some of the files.

DISK FULL

A disk contains 496 sectors of 256 bytes each. Even empty files take space, 1 sector for text, 2 for programs. To add new files you must delete old files.

(PRESS RETURN)

For recovery from an error state and return to a usable VisiTerm command level.

WRITE PROTECTED

A disk with no notch, or its notch covered, cannot be written on. The attempted operation did not occur.

VOLUME MISMATCH

The expected disk was not found.

DRIVE ERROR

Some physical problem has occurred when trying to read from or write to disk, such as no disk in drive or drive door left open.

READ ERROR

The data could not be read from disk or had errors in it.

FILE NOT FOUND

The filename given is not on disk or is not a configuration file.

NOT A PROGRAM FILE

The file found was not a program file as expected.

Macro definition messages:

<— —> SELECT AMONG DEFINED MACROS

Pressing either arrow key shows you the next macro currently defined, if any.

DELETE MACRO, ADD MACRO, CHNGE MACRO, OPTIONS MODE, TERMINAL MODE.

These are the five commands in macro definition mode. You use the initial letters D, A, C, O, or T.

DELETE THIS MACRO
Y TO CONFIRM

This message gives you a second chance if you hit D by mistake or change your mind.

TYPE KEY TO BE DEFINED

The first key you strike, after typing A to add a macro, will be the macro's name.

TYPE IN MACRO EXPANSION

Every keystroke after the first, in add mode, becomes part of the macro definition/expansion and will appear on the screen in Terminal mode when you hit the name-key.

File Transfer Mode

Command line:

TERMINAL OPTIONS SEND RECEIVING

Bottom line:

APPEND REPLACE CANCEL

When RECEIVING, this line appears if the filename given is already used on your disk. See also FILE ALREADY EXISTS message.

[SPACE] STOP SENDING   [RETURN] ACK/START

When SENDING, this line enables you to stop or continue as needed.

ABORT   CONTINUE

When SENDING, after you hit the SPACE bar to stop sending, you can press A to halt altogether, or C to continue sending when you are ready.

ESC 2 STOP RECEIVING

When RECEIVING, you can end the process at any time by typing the sequence ESC 2.

—PRESS RETURN—

This is the response for most error conditions discovered by the VisiTerm program.

Last text line:

< TRANSFER ABORTED >

Shows when SENDING. Was halted by your pressing the SPACE bar and then typing A to abort.

< END OF FILE >

Shows when final character of file is sent by the VisiTerm program.

< TRANSFER DONE >

Appears when you end receiving by typing the ESC 2 sequence, or when the VisiTerm sees an incoming character matching the End-Of-File character you defined, if any.

< BUFFER OVERFLOW >

Occurs if you have received a file longer than 18175 characters under NONE protocol. File is closed, receiving ends, but you can later append more data if desired.

FILE ALREADY EXISTS

The name you gave is in use. You can write over it, append to the end of it, or forget the whole thing. See the APPEND message above.

Status Line:

STOP CHAR SENT

The VisiTerm program issued a STOP to write to disk if necessary.

END OF BLOCK

An EOB was received by the VisiTerm program.

Error Messages:

All those listed under Options mode apply, plus these:

NO FILE NAME

You typed R to receive but had not yet named the file into which received characters were to go.

NOT A TEXT FILE

The filename you gave is not a text file, and the VisiTerm program will not send it until you convert it to text format using the utilities in Appendix F.

FILE LOCKED

This file is protected against inadvertent destruction via SAVE, BSAVE, WRITE, or DELETE (although it can be APPENDed to). Either use another name or, after getting into BASIC, UNLOCK this file following the directions in the DOS manual.

Alphabetic Listing of Screen Messages

ABORT CONTINUE

When SENDING, after you press the SPACE bar to stop sending, you can press A to halt altogether, or C to continue sending when you are ready.

ANSWER ON RING 1 2 3 4 5 6 7 8 9

Pick the ring you want answered on. The Micromodem will answer the phone for you.

APPEND REPLACE CANCEL

When RECEIVING, this line appears if the filename given is already used on your disk. See also FILE ALREADY EXISTS message.

<— —> SELECT AMONG DEFINED MACROS

Pressing either arrow key shows you the next macro currently defined, if any.

< BUFFER OVERFLOW >

Occurs if you have received a file longer than 18175 characters under NONE protocol. File is closed, receiving ends, but you can later append more data if desired.

DEL_____

Results from a ZAP command to delete a configuration file.

DELETE MACRO   ADD MACRO   CHNGE MACRO
OPTIONS MODE   TERMINAL MODE

These are the five commands in macro definition mode. You use the initial letters D, A, C, O, or T.

DELETE THIS MACRO
Y TO CONFIRM

This message gives you a second chance if you hit D by mistake or change your mind.

DIRECTORY FULL

A BASIC/DOS disk directory can contain about 105 entries, displayed by the CATALOG command in BASIC. To add a file to a disk with a full directory, you must delete one of the names, possibly after combining some of the files.

DISK FULL

A disk contains 496 sectors of 256 bytes each. Even empty files take space, 1 sector for text, 2 for programs. To add new files you must delete old files.

DRIVE ERROR

Some physical problem has occurred when trying to read from or write to disk, such as no disk in drive or drive door left open.

END OF BLOCK

An EOB was received by the VisiTerm program.

< END OF FILE >

Shows when final character of file is sent by the VisiTerm program.

ESC 2 STOP RECEIVING

When RECEIVING, you can end the process at any time by typing the sequence ESC 2.

FILE ALREADY EXISTS

The name you gave is in use. You can write over it, append to the end of it, or forget the whole thing. See the APPEND message above.

FILE LOCKED

This file is protected against inadvertent destruction via SAVE, BSAVE, WRITE, or DELETE (although it can be APPENDed to). Either use another name or, after getting into BASIC, UNLOCK this file following the directions in the DOS manual.

FILE NOT FOUND

The filename given is not on disk or is not a configuration file.

GET_____

Brings in the configuration file you name.

MICROMODEM: WAIT FOR n RINGS

If the phone rings while MICROMODEM is in ANSWER mode, it displays this message until the correct number of rings, and then answers the phone. The MICROMODEM then immediately issues an answer tone. When an originate tone is detected from the calling computer, the VisiTerm program automatically switches to Terminal mode. The number n counts down to zero before the answer.

MICROMODEM II: DIALING

If you typed C for CALL and D for DIAL this message shows you each digit as you type it.

MICROMODEM II: AWAIT CARR

After dialing, you need a carrier to connect the VisiTerm program with your host.

MICROMODEM II: H TO HANG UP

Once you are connected, H allows you a graceful disconnect.

MICROMODEM: HUNG UP

If you type H, or 30 seconds go by without a carrier signal, MICRO-MODEM hangs up the phone.

NO FILE NAME

You typed R to receive but had not yet named the file into which received characters were to go.

NOT A PROGRAM FILE

The file you named was not a program file as needed.

NOT A TEXT FILE

The filename you gave is not a text file, and the VisiTerm program will not send it until you convert it to text format using the utilities in Appendix F.

(PRESS RETURN)

For recovery from an error state and return to a usable VisiTerm command level.

READ ERROR

The data could not be read from disk or had errors in it.

SAVE_____

Saves the current configuration onto the disk file you name.

[SPACE] STOP SENDING [RETURN] ACK/START

When SENDING, this line enables you to stop or continue as needed.

STOP CHAR SENT

The VisiTerm program issued a STOP to write to disk if necessary.

TERM FTRAN DEF CALL SAV GET ZAP XEQ QUIT

Command line in Options mode.

TERMINAL OPTIONS SEND RECEIVING

Command line in File Transfer mode.

< TRANSFER ABORTED >

Shows when SENDING was halted by your pressing the SPACE bar and then typing A to abort.

< TRANSFER DONE >

Appears when you end receiving by typing the ESC 2 sequence, or when the VisiTerm sees an incoming character matching the End-Of-File character you defined, if any.

TYPE IN MACRO EXPANSION...

Every keystroke after the first, in add mode, becomes part of the macro definition/expansion and will appear on the screen in Terminal mode when you hit the name-key.

TYPE KEY TO BE DEFINED

The first key you strike, after typing A to add a macro, will be the macro's name.

VOLUME MISMATCH

The expected disk was not found.

WRITE PROTECTED

A disk with no notch, or its notch covered, cannot be written on. The attempted operation did not occur.

Y TO CONFIRM

Deletion will occur only if a Y or y is pressed, to avoid accidental loss of a configuration file (or macro) you suddenly realize you did NOT want to scratch.

APPENDIX F

PRINT UTILITY

The PRINT program of the VisiTerm software offers over a dozen options to let you create the printed text you want. Its screen is like the others, such as Options mode. The options are lined up in a column. You then SPACE down to each option in turn, entering your desired value or using the arrow keys to select among the built-in values available.

To enter a value, type ESCape to clear out any existing value and then simply type what you want. If the cursor is a black plus sign inside the reverse-video white block, then all your letters will be capitals. If the cursor shows a minus sign, all letters are lower case. As in Terminal mode, you can switch back and forth by typing ESC ESC, or get individual caps by preceding the letter with ESC.

Every character normally available on the VisiTerm keyboard is also available here by the same sequence of keystrokes.

```
         DOS TEXT FILE PRINT UTILITY
    COPYRIGHT 1981 - PERSONAL SOFTWARE INC

        FILE TO PRINT    SAMPLE
        TODAY'S DATE

        PRINTER SLOT     #1
     INITIALIZE STRING
      TERMINATE STRING
       EXTRA LINEFEED    YES
    END-OF-LINE PAUSE    0.0 SEC

          PAGINATION     YES
          PAGE DEPTH     66 LINES
      FORMFEED STRING     <L>
     NEW-PAGE PATTERN
    START NUMBERS WITH    PAGE 1
    START PRINTING AT     PAGE 1
         INDENTATION      0
         LINE LENGTH      80 CHARS
       LINE OVERFLOW      WRAP
       CHARS TO DROP      <J>

    PRINT FILE  GET CONFIG  SAV CONFIG  QUIT
```

FILE TO PRINT: the name of the file you want printed

Range: any name acceptable to BASIC and DOS. Their rules require a letter as the first character followed by up to 29 more characters not including any commas, Control M, or RETURNs. Blanks are allowed.

TODAY'S DATE: the date you want printed on the document

Range: any character you want to see as a date heading

PRINTER SLOT: which slot holds the communications card that you are using to drive the printer

Range: #1 through #7, or SCREEN;

Default: #1

Typical Value: #1

INITIALIZE STRING: some printers require a unique string of characters to come before the text to be printed, to initialize the printer. If needed, enter that string here.

Range: sequences of any ASCII characters, up to 16 non-control characters or up to 6 control characters, or combinations (but control C is not allowed);

Typical Value: <I> 80N   (used by Apple Parallel Interface card)

TERMINATE STRING: similarly, if needed, enter an ending string

Range: same as for initiating string

EXTRA LINEFEED: should each carriage return get a line feed added after it? Some printers take care of this without help from the VisiTerm program

Range: YES or NO

Default: YES

Typical Value: YES

END-OF-LINE PAUSE: how long a delay does the printer need while moving the paper up one line?

Range: 0.0 to 4.0 seconds

Default: 0.0 sec

Typical Value: 0.0 seconds

PAGINATION: should the PRINT program compute when to begin a new page?

Range: YES or NO

Default: YES

Typical Value: YES

PAGE DEPTH: how many lines on a page of your paper?

Range: 15 to 10,000 lines

Default: 66 lines

Typical Value: 66 lines

FORMFEED STRING: what character(s) mean "new page" to your printer? That is, what character or sequence causes it to advance the paper to the top of the next page. If no string is specified, the PRINT program will calculate the correct number of linefeeds to use instead. This only applies when PAGINATION is YES.

Range: sequences of any ASCII characters, up to 16 non-control characters or up to 6 control characters, or combinations (but control C is not allowed);

Default: none

Typical Value: Control L <L>

NEW-PAGE PATTERN: is there a character sequence periodically at the beginning of lines in the text, such that whenever it is encountered you would like to force a new page?

Range: sequences of any ASCII characters, up to 16 non-control characters or up to 6 control characters, or combinations (but control C is not allowed);

Default: none

Typical Value: READ MAIL: (for electronic mail, perhaps)

START NUMBERING AT: the page number that should be applied to the first page printed from this file.

Range: PAGE 0 to 10000

Default: PAGE 1

Typical Value: PAGE 1

START PRINTING AT: the page number in this file at which printing should begin.

Range: PAGE 0 to PAGE 10000

Default: PAGE 1

Typical Value: PAGE 1

INDENTATION: when positive, how many characters in from the left edge of the paper should printing begin? When negative, how many characters should be skipped at the beginning of each line in the file?

Range: −200 TO +200

Default: 0

Typical Value: 0

A positive indentation causes the text in the file to be printed farther to the right on the paper than it appears in the file.

A negative indentation causes the first so many characters of each line to be left off when the file is printed. For example, if every line in the file begins with 10 spaces but you want only 5 spaces at the beginning of each line of printout, use INDENTATION −5. Or, if you have a 40-column printer, but want 80-column output, follow these steps:

1. Set LINE LENGTH to 40 CHARS and LINE OVERFLOW to CHOP.
2. Print the file once with INDENTATION at 0 to get the first 40 characters of each line.
3. Print the file again with INDENTATION at −40 to get the last 40 characters of each line.
4. Lay the two 40-column strips together and photocopy to get an 80-column page.

LINE LENGTH: how long a line do you want printed?

Range: 2 to 200 chars

Default: 80

Typical Value: 80 to 131

LINE OVERFLOW: If a line of text in the file is too long to fit on one print line, should the remainder be cut off or printed on the line below?

Range: WRAP or CHOP

Default: WRAP

Typical Value: CHOP

CHARS TO DROP: are there characters in the file, e.g., EOB or ESC characters, that should not be sent to the printer when encountered?

Range: sequences of any ASCII characters, up to 16 non-control characters or up to 6 control characters, or combinations (but control C is not allowed);

Default: <]>

Typical Value: <escape character> (keyboard sequence ESC 4)

Escape characters are often part of printer initialization or modification, so you may not want your printer to see them in the middle of printing a file.

The four commands available are

Print file

Get configuration (a filename)

Save configuration (a filename)

Quit

where configuration means the current options as you have set them up. "Quit" simply returns you to BASIC. "Save configuration" creates a file with this set of options in it, recallable using the "Get configuration command." Examples might use the names

S QUME-TYPE PRINTING

G LINE-PRINTER-TYPE PRINTING

The P command asks for confirmation that you are ready to print, (is the printer ON?), and then begins printing the file whose name you specified in the FILE TO PRINT line. The characters for printing are sent out through the interface card in the slot you named in the PRINTER SLOT you named above.

At any time while the file is being printed, you may temporarily stop printing by pressing the SPACE bar and then continue by pressing RETURN. Or you can terminate the printout completely by pressing S, which will return you to the PRINT program menu. Since some printers have internal buffers, there may be a delay after you press SPACE or S, while characters accumulated in the buffer are printed. RESET takes you back to BASIC.

APPENDIX G

FILE CONVERSION UTILITIES IN THE VISITERM SOFTWARE

There are four utility programs for file conversion. They permit you to create text files from program or binary files. You can also make a text file into a binary file to run it if, for example, a friend converted a binary file of his into text and sent it to you. In summary, the following conversion programs are included:

1. Applesoft BASIC Files to DOS text file: FP TO TEXT
2. Integer BASIC Files to DOS text file: INT TO TEXT
3. Binary file to DOS text file: BIN TO TEXT
4. DOS text file to binary file: TEXT TO BIN

You may also recall that the EXEC command enables you to run any text file as a BASIC program. This is described in the Apple DOS manual.

GENERALITIES

These conversion programs are "standalone," that is, they do not run under the control of the VisiTerm program itself, they run separately under DOS and BASIC.

If you have been using the VisiTerm program and now want to do a conversion, typing Q for quit in Options mode will get you to the command level in BASIC. If you have been doing other BASIC work, all you need do to begin is insert the VisiTerm diskette into drive 1.

To use any conversion program at this point, you merely type its name after the RUN command. For example,

RUN BIN TO TEXT MY_BYNARY_FILE, MY_NEW_TEXT
_FILE

will try to find a binary file named MY_BYNARY_FILE and, if successful, will convert it to a text file and name it MY_NEW_TEXT
_FILE.

The other programs use the same syntax, i.e., the commands all look alike except for the specific program name and file names you choose.

In each case the program asks first what file you wish to give it, and then what file you want it to create. For example, the BASIC programs display

PROGRAM TO CONVERT?

and then, after you type a filename and press RETURN, they display

PROGRAM TO CONVERT? **MY BASIC PROGRAM**
TEXT FILE TO CREATE?

After you type the name you want for the text file to be created, and press RETURN, the program says

INSERT DISK AND PRESS RETURN.

When you do so, the program reads the program whose name you gave and creates a text file with that program as its content, under the name you supplied. When it completes this task, it prints DONE on the console.

If you change your mind about either file before you insert the disk and press RETURN, you can simply press RESET to get back to the BASIC prompt and begin anew. If the program file you named is not cataloged on the disk you insert, the conversion program will display

FILE NOT FOUND

before it quits.

Binary to Text Conversions

The BIN TO TEXT program differs only slightly, in that it displays

BINARY PROGRAM TO CONVERT?
TEXT FILE TO CREATE?

After you have supplied both filenames, the program displays its conversion in rows of sixteen bytes, with the beginning address at the left. It allows you to stop it by pressing the space bar, displaying

PRESS SPACE TO STOP

If you press SPACE, the conversion stops and you return to BASIC.

Checksum Program

This program will compute the sum of all the bits in the file you intend to transmit and, if you tell it to do so, add this sum to the end of the file. This enables a person receiving your file to compare the sum of all the bits he received with the sum you sent. If they are not the same, there is some discrepancy and the file should be re-transmitted.

The program gives you a running count of characters, records, and three types of checksum. When it has completely added up all the bits in all the characters of the file, it displays

```
          TEXT FILE CHECKSUM UTILITY
       COPYRIGHT 1981 - PERSONAL SOFTWARE INC
FILE TO CHECKSUM? SAMPLE
NO OF CHARACTERS   170
   NO OF RECORDS   12
      CHECKSUM A   10138
      CHECKSUM B   49441
      CHECKSUM C   62913
CHECKSUM DONE

PRESS RETURN TO QUIT
PRESS A TO ADD CHECKSUMS TO FILE
PRESS N TO DO ANOTHER FILE
```

As you can see, the three choices are simply to quit by pressing RETURN, to add the checksums to the file by pressing A, or to checksum another file by pressing N. You could, for example, compare two files you have on disk by running CHECKSUM against one of them, noting down the five sums, and then running checksum against the other. If the sums were not identical, the files are not the same.

The five totals calculated by CHECKSUM are as follows:

NO. OF CHARACTERS

This is the number of characters in the file on disk.

NO. OF RECORDS

This is the number of carriage returns in the file on disk.

CHECKSUM A

Sum of the ASCII values of every character in the file.
(Sum of C(i), where C(i) is the ith character of the file.)

CHECKSUM B

Sum of [C(i)*(i mod 11)], where C(i) is ith character of file.

CHECKSUM C

Sum of [C(i)*$2^{(i \bmod 7)}$], where C(i) is ith character of file.

When the totals are added to the end of a file, the format is

<eof><return>   (Hex value for ASCII character <eof> is **1C**.)
CHECKSUM <return>
<number of chars><return>
<number of records><return>
<checksum A><return>
<checksum B><return>
<checksum C><return>.

Deleting Files

While there are several ways to create files using the VisiTerm software, the only deletion capability included is the Zap command. It removes only configuration files of options and character sets. Files received onto the VisiTerm disk can be rewritten or expanded with new contents by a new receive command. They can be sent out to a host or a friend. But they cannot be deleted by the VisiTerm software.

The DELETE command in DOS is used to clear out unwanted files and make room on diskettes. If you Quit the VisiTerm software, you find yourself in BASIC. Type CATALOG to see the list of files on your diskette. It could look something like this:

```
              VISITERM  1.00
              BY TOM KEITH
             COPYRIGHT 1981

*A 002 INIT
*I 002 APPLESOFT
*B 067 VISITERM
 B 016 MONO-SPACE        <UT-CONFIG>
 B 016 CURSIVE & SHORT   <UT-CONFIG>
 B 016 UPPER CASE        <UT-CONFIG>
 B 016 VISIBLE CTRL      <UT-CONFIG>
 B 016 REG & BOLD        <UT-CONFIG>
 B 016 DEFAULT           <UT-CONFIG>
*A 004 FP TO TEXT
*I 004 INT TO TEXT
*B 002 CRUNCHER
*A 005 BIN TO TEXT
*A 004 TEXT TO BIN
*A 011 CHECKSUM
*A 045 PRINT
 T 002 SAMPLE
 T 002 DEFAULT.PRINTER
```

The letters at the left mean the following:

A   means   Applesoft Basic program file

B   means   Binary file

I   means   Integer Basic program file

T   means   text file

The files labeled <CONFIG> are sets of options and characters retrievable in Options mode with the Get command. They can be saved by Save and deleted by the Zap command. Those labeled .PRINTER are options created and saved using the PRINT utility, which is discussed in Appendix F.

To delete any file (except configurations) you type

DELETE FILENAME

and BASIC removes that file from the directory. (Make sure it is one you will not want later.)

APPENDIX H:

DISKETTE CARE AND INITIALIZATION

Your diskettes are small plastic disks coated with magnetic material on which data can be stored, like recording tape. Each diskette is permanently sealed in its square cover, for protection against dust or other particles or scratches. The diskette spins freely inside this cover, which is never opened.

Diskettes can store an enormous amount of information. The individual bits of this data take up a very small area of the diskette. A microscopic scratch on the surface of the diskette, or even a fingerprint, can destroy data.

Never let anything touch the brown or gray surface of a diskette, and handle it only by the plastic cover. When it's not being used in a disk drive, keep it in the paper pocket that came with it. These pockets are treated to minimize static buildup, which attracts dust. Never put diskettes on a dirty or greasy surface. Storing them vertically is best, in their box, a diskette holder, or a notebook designed specifically for them.

Labels should be written separately, not on the diskette itself, and then attached. Don't press hard. If you need to write on a label that is already on a diskette, use a felt-tip pen, and don't press hard.

Since the data on the diskettes is recorded magnetically, it can be altered or destroyed by strong magnetic fields. For this reason, you should keep your diskettes away from magnets, electric motors, and television sets.

You should also keep them away from high heat. Don't allow them to lie in the sun, stay on the dashboard, or remain in the trunk of a car on a hot day. Heat above 52 degrees Celsius (about 125 degrees Fahrenheit) can warp the diskette or its cover and cause data loss.

Normally a diskette will last an average of 40 hours, with reasonable care. Each access and use of a disk is less than 20 seconds, roughly speaking, sometimes more, sometimes less. So 40 hours is actually a long period in terms of how many times you really put it to use.

Inserting a Diskette

There's a notch in the middle of the front of the drive. You open a disk drive door by reaching in this notch, grasping the bottom of the door, and pulling gently out and up. It will pop up after the initial resistance. Or you can gently poke the top of the door, also causing it to pop open.

The diskette is slipped into the horizontal slot, with the label facing up as shown in the photograph. The oval cutout goes in first; the label enters last, face up.
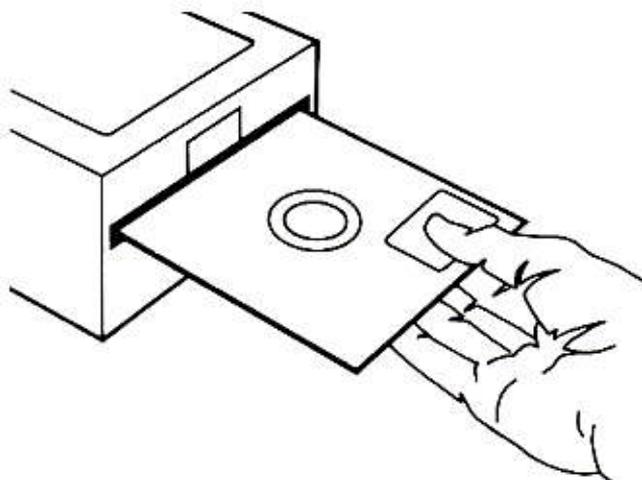
001-001

Push the diskette gently into the drive. Do not bend it. After the first inch or so, there will be some resistance...push gently through it. At the end there will be a little click, and almost a little jump as the diskette seats-itself properly.

When it is totally in the drive, close the drive door by pushing it down, gently. There should be no resistance until the very last, when you can already see the two metal fingers inside the slot. They should clear the disk. If there is any resistance before that point, don't push. Release the door and reseat the diskette in the drive as far as gentle pushing will take it. Listen for the little click.

Removing a Diskette

To remove a diskette, open the door and pull the diskette straight out of the slot. Opening the drive door lifts the read/write head from the diskette surface. When you pull on the disk, there will be some initial resistance and a small click; it's okay.

(If you're going to leave a diskette in a drive for any lengthy period without use, it helps to open the door so the head is not resting on the diskette.)

NEVER remove a diskette while the IN USE light on the drive is lit. This can permanently damage the diskette and is almost certain to destroy the information on it. The diskette may sometimes be reusable but the lost data is gone forever.

Initializing a Diskette

The VisiTerm software can read and write any BASIC-initialized diskette you place in drive 1. To initialize the diskette, you must do the following:

1. Boot the Disk Operating System.

    a. You put the DOS 3.3 disk in drive 1, power up, and you should then see the Master DOS sign-on message.

2. Now remove the DOS disk from drive 1, put in a blank disk, and close the door.

3. Type NEW and then an optional greeting program, such as
    41   PRINT "I INITIALIZED THIS DISK ON APRIL 1, 1981"
    97   END

4. Choose a name like HELLO, and type the command: INIT HELLO.

5. The red light will come on, the disk will whine and whir about 30 times, and then the red light will go out. After it goes out, remove the diskette and label it, say, SLAVE HELLO 4/1/81.

The VisiTerm software can now use this diskette for saving, retrieving, or sending any text or character set files. This can occur using the Save or Get commands in Options Mode, or the Send or Receive commands in File Transfer Mode.

GLOSSARY

A

BASIC CATALOG flag for Applesoft Basic program file.

ACIA

Acronym for Asynchronous Communications Interface Adaptor, a chip containing an integrated circuit which formats the data and provides controls necessary for your computer, which expects eight bits at a time to work with, to interact correctly with bit by bit serial transmission.

ACK CHAR

Options mode display telling which character causes transmission to resume after an EOB halt.

Acoustic Coupler

A data communications device that converts outgoing digital signals into acoustic frequencies for transmission over telephone lines using a conventional telephone handset. It also converts incoming acoustic frequencies into the original digital signals.

Answer mode

When a modem/terminal recognizes an incoming signal and answers by acknowledging that it is ready to receive (or in some cases, that it has received what was sent).

APL

Acronym for Algorithmic Programming Language developed by Ken Iverson at IBM in 1967 to provide concise notation specifically designed to express programming structures directly. APL is available from many timesharing services.

ASCII

A mnemonic acronym for the American (National) Standard Code for Information Interchange. The code consists of seven bits plus a parity bit per character. The ASCII codes have 96 printable characters and 32 non-printable (control) characters.

ASR

Acronym for Automatic Send Receive, meaning any keyboard terminal capable of generating a message into off-line storage for later transmission. See also KSR.

Asynchronous

Data transmission not synchronized by a clock signal, where unequal time intervals can occur between transmitted characters. The receiver knows when to "listen" by the sender's use of a start bit or code. End of transmission is indicated by a stop bit or code.

AUTO ACK

Options mode display telling how many nulls are to be sent out after an EOB is encountered. This defines a period of time after which an automatic ACKnowledge takes place as if the receiving computer had sent it. The time in seconds is approximately the Auto Ack number divided by one-tenth of the Comm Speed.

Auto linefeed

A feature on many terminals that provides a linefeed after every carriage return, so that the cursor not only returns to the first character of the line but it also drops down to the next line to avoid printing over existing characters.

B

BASIC CATALOG flag for a Binary file.

Baud (Baud rate)

Speed of transmission measured in number of (potential) signal level changes per second. Different from bits per second. Named after Baudot, a French telegrapher (1874) who invented the Baudot code and distributor, precursors of teletype equipment.

Baudot code

Five-level code using five bits per character.

BELL

Options mode display telling whether the character causes the bell to ring. To select SOFT, MED, LOUD, or NONE, press the period key.

BELL 103A

A telephone-company specification for a modem, that divides the the telephone voice frequencies into two narrow bands, using each for sending messages in one direction only, thus creating two channels usable at the same time on the same telephone line.

Bisynchronous

A protocol for synchronous transmission of binary coded data, developed by IBM.

Bit

Abbreviation for binary digit, the smallest information unit recognized by computers, with exactly two states usually written 1 or 0.

Boot

The process of loading and starting up a computer program.

BREAK LENGTH

Options mode display telling how long, in hundredths of a second, a BREAK signal should be transmitted.

BSC

Binary Synchronous Communication. See Bisynchronous.

Buffer

A storage area for a block of data, often for input/output.

Byte

Eight binary digits that are operated on as a unit, the smallest addressable unit in many computers.

Cable

A set of separate wires bound together in a unified package for their full length, carrying separate but related signals as in connecting a computer to a printer.

Call

Typing C in Options mode puts you in Call status if you have a D.C. Hayes Micromodem™ installed. You "dial" a desired telephone number by typing it slowly at the Apple keyboard, waiting for each number to be displayed, ending with a RETURN. The D.C. Hayes Micromodem makes the connection for you. Typing a left-arrow hangs up and lets you start again. The VisiTerm program goes into Terminal Mode automatically when a carrier is detected.

CAPS

Terminal mode screen notice that all letters typed at the keyboard will be generated and displayed in upper case capitals. Turned ON by the ESCape ESCape sequence.

Carriage Return
Carrier Return
Usually a key on a keyboard whose function is to return the cursor on a video terminal (or the typing element on a printing device) back to the first character position on the line being displayed or printed; typewriters incorporate the new line feature that video terminals usually call "linefeed," which drops the cursor to a new line (or advances the paper on a hard copy device) so as to avoid overprinting the prior line.

Carrier
An analog signal of fixed frequency and amplitude, to be modulated by tones created by the modem from the information coming from the computer.

CCITT
A United Nations standards group for data communications concerns: the Consultative Committee on International Telephone and Telegraph. They design and maintain standards for representing alphabets, graphics, control information, and numerous other fundamental information interchange issues.

Character set
The total number of different characters the VisiTerm program can recognize at any one time for display, transmission, or control purposes. Two sets of characters, options, and one set of macros are stored in each configuration file.

CHARS TO DROP
PRINT program option: are there characters in the file, e.g., EOB or ESC characters, that should be dropped out when encountered?

CPS
Characters per second.

Common Carrier
A government-regulated private company providing telecommunication (or transport) to the public, e.g., telephone or telegraph companies.

COMM SLOT
Options mode display telling the number of the slot in your Apple in which you placed the communications card you want the VisiTerm program to use.

COMM SPEED
 Options mode display telling the speed of transmission, typically 110
 Baud or 300 Baud.

Communications interface card
 A printed-circuit-board installed in the computer, containing pro-
 grams (as well as hardware) to control data format, transmit/receive/
 interrupt conditions, communication speed, and other communication
 factors.

Configuration file
 File containing two sets of options, character displays and effects,
 and one set of macros, as seen in the Options mode of the VisiTerm
 program.

Connect time
 Total elapsed time between initial signon to a remote computer and
 final signoff or hangup. Often the measure used for billing remote
 services.

Control character
 A code generated by holding down the control key (often marked
 CTRL or CNTRL) while pressing another key, resulting in a different
 signal than the second key normally generates. Usually associated
 with the first two columns of the normal ASCII table of characters,
 where 32 non-printing/displayed data communication and control
 characters are defined (as opposed to the 96 that can normally be
 displayed).

Conversion
 Change of codes or formats from one convention to another. For
 example, from the format used for binary or BASIC programs into
 the format used for text files.

CRT
 Stands for Cathode Ray Tube, used as synonym for video terminals
 which incorporate such a tube for displaying characters and other
 graphics.

Cursor
 The indicator marking the current active position on a video (CRT)
 display, often a blinking white rectangle.

CURSOR
 Options mode display telling what action the cursor takes after dis-
 playing the character, e.g., how many pixels the cursor moves, whether
 it returns or line feeds.

CURSOR WIDTH

Options mode display telling the width of the Terminal mode cursor (underscore); also used for tabs.

Dash

Command in Options mode that switches you from one character set to the other, or back again.

Data bits

Bits representing the actual data to be transferred or used, as opposed to bits added to the front or back of such a grouping to ease synchronization and error checking, i.e., start bits, parity bits, or stop bits.

Data communication

The art and science of designing and using communication lines to transmit and receive messages, information, and files, usually in the sense of electronic networks with and without wires, often with mirrors.

DATA FORMAT

Options mode display telling the number and interpretation of bits per character, plus parity bit and stop bits. For example, when 7+EVEN+1 is displayed it means 7 bits per character, plus a parity bit to make the sum of all bits in the character code (plus the parity bit) even, plus one bit at the end to signal the end of that character's transmission.

Data Interchange Format (DIF)

A standard format for the interchange of files of data between computer programs. Developed by Software Arts, Inc., this standard treats a data file as if it were organized as a table, with numbers and letters (strings) in rows and columns. A file in this format has a header part describing its contents, and a data part containing the actual information. DIF is used in transmitting files created by other software programs, e.g., the VisiCalc product of Personal Software, Inc., in whose manuals it is documented. Full specification appears in a Software Arts Technical Note.

Def

Hitting D in Options mode enables you to define macros using any key as a name. Once defined, such a macro can be used simply by typing its name. All the keystrokes in the macro will be generated by the VisiTerm program as if you had typed them at the keyboard. Carriage returns can be included in such a macro, and 249 is the maximum number of characters. You may Add, Select, Change, or Delete a macro after pressing D as a command in Options mode.

Change allows you to alter all but the macro name, i.e., all but the
character you use to invoke it. Delete zaps the whole thing. Add lets
you define new macros.

Demodulator
That part of a modem which converts incoming analog frequencies
into the original digital signals, usually for use by a computer.

DIF
See Data Interchange Format.

Duplex
A communication line that can carry messages in two directions
independently at the same time; also called full-duplex, to distinguish
it from half-duplex (and simplex).

Dvorak Keyboard
Dr. August Dvorak patented a keyboard arrangement of letters, num-
bers, and symbols in 1932 which many find to permit greater speed
and productivity than the standard arrangement, called QWERTY for
its top letter line.

EBCDIC
Acronym for Extended Binary Coded Decimal Interchange Code,
using eight-bit codes as opposed to ASCII's seven, accommodating
256 characters, developed by IBM.

EIA Interface
Electronics Industries Association standards for the characteristics of
signals used in connecting terminals to modems and a variety of
other device interconnections.

Electronic Mail
Correspondence and documents generated, stored, transmitted, or
displayed by computers or other electronic means.

END-OF-LINE PAUSE
PRINT program option: how long a delay does the printer need while
moving the paper up one line?

EOB CHAR
Options mode display telling which character halts sending when
encountered, IF EOB/ACK protocol selected.

EOL WARNING:
Options mode display showing which character position bells you
that the end of line is near.

EXTRA LINEFEED
PRINT program option: should each carriage return get a line feed added after it? Some printers take care of this without help from the VisiTerm program.

File name
The character sequence by which a file is known, that is, by which a set of blocks of data is cataloged, sent, received, appended, or deleted.

FILE TO PRINT
PRINT program option: the name of the file you want printed.

FORMFEED STRING
PRINT program option: what character(s) mean "new page" to your printer? That is, what character or sequence causes it to advance the paper to the top of the next page?

Ftran
Typing an F in Options mode puts you into File Transfer Mode, where you can select and alter additional options relating only to the transfer of files, and can watch what is sent or received. See Lesson 3 for complete reference on File Transfer Mode commands.

Get
The Get command (type G) in Options mode (or the PRINT utility) will bring in the options and macros stored in some file. You must supply the filename, or use an arrow key to survey the existing filenames. The only names you can use are those of configurations currently on disk. To escape without Getting anything, hit RETURN only when no file name is showing, by hitting ESCape or pressing an arrow key till you get to the end of the list.

Half Duplex
A communication line that can carry messages in either direction, but only one direction at a time.

Handshaking
The rules and procedures for interfacing devices operating remotely from each other, so that each is ready for the signals that can come from the other. These include hardware level rules such as which lines mean "ready to receive." Error detection, correction, and avoidance procedures such as parity checks, retransmissions, and pacing messages are usually discussed under the higher level heading called "line control procedures."

Hertz
A measure of frequency, abbreviated Hz: cycles per second.

HEX
Options mode display telling what key (hexadecimal value) produces a character. Capitals are highlighted, shifts are in square brackets [ ], control characters in angle brackets < >. To see the next or prior character, hit an arrow key.

Highlight
To make more visible or noticeable, usually by reversing the video image from the normal white lettering against a black background into the reverse video of black lettering against an all white background, for each letter in certain areas of the screen, or the whole screen.

High resolution screen
One that can display up to 80 characters per line by exercising a finer degree of control over the CRT.

HORIZ TABS
Options mode display telling where next tab takes you; every so many characters, e.g., every 5th, meaning tab takes you to columns/positions 6, 11, 16, 21, 26, etc.

Hz
See Hertz

I
BASIC CATALOG flag for an Integer Basic program file.

Idle line
A communications line empty of intentional transmissions, usually a continuous series of ones. See also Mark.

INDENTATION
PRINT program option: When positive, it means how many characters in (or out) from the "left edge" of the paper should printing begin? When negative, it means how many characters should be dropped from the beginning of each line.

INITIALIZE STRING
PRINT program option: some printers require a unique string of characters to precede the text to be printed, to initialize the printer. If needed, enter that string here.

Intelligent terminal
One which has extended memory capability, plus firmware and software to perform most validation, edit, and remote data entry functions. At the lower end of this range, all such functions might be restricted in scope; at the higher end, such functions are quite extensive, including being programmable by the user. Both include the ability to be polled (asked to transmit) and called (asked to receive).

Interactive
Refers to processes in which each action produces a response, e.g., each entry at the terminal elicits an answer or further request from the host computer. If such interaction is continuous, it is often termed conversational.

Interface card
A printed circuit board intended for insertion into a computer so as to control signals between that computer and other devices.

Keyboard macro
Generates multiple characters when its one-character name is pressed at the keyboard. See also Macro.

KEY TICK VOL
Options mode display telling how loud a tick occurs whenever you press a key.

KSR
Acronym for Keyboard Send Receive, meaning immediately send what is typed at the keyboard.

Line control
Link control
See Protocol.

Linefeed
A signal to advance the cursor or active position on a video (CRT) terminal to the next line down, in the same position as now relative to the beginning of the line. On printing or typing devices this signal advances the paper up one line, effecting the same results. A typical character for this signal is Control J <J>.

LINE LENGTH
PRINT program option: how long a line do you want printed?

LINE OVERFLOW
PRINT program option: should everything after the line length be cut off or printed on the line below?

Lowercase
Non-capital letters or, in some instances, those characters created when the SHIFT key is not held down.

Macro
That which creates multiple effects, usually the same each time, for a single cause. In the VisiTerm program, the generation of up to 249 characters earlier defined under a one-character name.

Mark
One of the two conditions for a data communications line, the other called space. Mark usually means an "idle line" before transmission has begun, and space means an "open line." Mark traditionally corresponds to a one bit and is used as a stop bit.

Modem
A device for converting digital signals into analog frequencies for transmission across telephone lines, and also for converting received telephone frequencies into digital signals; contraction of MOdulator/ DEModulator. See also Transmission frequency.

Modem eliminator
RS232C cable with wires to pins 2 and 3 reversed. Used for connecting computers that are close enough not to require telephone connection using modems.

Modulator
That part of a modem which converts digital signals into analog frequencies for sending out over a telephone line (or other communication channel).

NEW-PAGE PATTERN
PRINT program option: is there a character sequence periodically in the text, such that whenever it is encountered you would like to force a new page?

Open line
Corresponds to a space or zero-bit condition. See Mark.

Originate mode
When a modem/terminal is to send out transmissions.

P
PRINT program command: begin printing the filename you specified in FILE TO PRINT, as soon as you confirm that is what you want by typing RETURN.

PAGE DEPTH

PRINT program option: how many lines on a page of your paper?

PAGINATION

PRINT program option: should the PRINT program compute when to begin a new page?

Parity bit

A bit appended to the end of a character, intended to aid in the discovery of faulty transmission or reception. Parity refers to the sum of the bits in the character: if the sum is always to be odd, odd parity is in use. If the sum is always to be even, then even parity is in use. If the sum is ignored by the communicating computers, it is called no parity.

Peripheral card

A printed circuit board intended for insertion into a computer, for communicating to or controlling peripheral devices.

Printer file

File containing a set of options used by the PRINT program of the VisiTerm software, defining line and page length, printer controls, and other convenient or necessary conventions.

PRINTER SLOT

PRINT program option: which slot holds the communications card that you are using to drive the printer.

Protocol

The convention for transmitting data over a communications line. It includes whether there will be stop and start bits, and how many, as well as which characters shall have special meaning for controlling the transmissions. Error detection and retransmission procedures also come under this heading, which is variously termed line protocol, link protocol, line control procedures, or line discipline.

Quit

When you type Q in Options mode (or the PRINT utility), the VisiTerm software stops its execution and returns control to BASIC; you get the prompt character "]."

Receive

To await and accept characters coming across a communication line, for display or storage.

Receive frequency

That frequency used for receiving as opposed to sending signals on a communication line. See transmission frequency for more detail.

RS232C (EIA RS232C)

A standard for the interface between a terminal and a modem. It specifies the wires that carry data and control signals, and the electrical signals and levels that are sent along those wires. RS232C is equivalent to the international standard called CCITT V24, with minor variance in terminology.

RUBOUT

Options mode display telling whether typing the character rubs out the prior character displayed.

Sav

By pressing S in Options mode (or the PRINT utility) you begin the process of saving, into a file, all the options and macros currently in effect. After the S, you must enter either an arrow key or a filename by which you will later recall them. The arrow keys show you all the filenames currently on disk. You may choose one of these, or enter a new name. When you hit RETURN, the options and macros are saved on disk under the name you gave. If you used a name already on disk, its earlier contents are written over. To escape without saving anything, don't hit RETURN unless there's no file name after the word Save. This occurs either at the end of the directory viewed by arrow keys, or by your hitting ESCape to clear out the name showing. If you typed the name, you can only clear it out by backspacing.

SCROLL LINE

Options mode display: when you reach this line on the screen, the display scrolls up.

SCROLL STEP

Options mode display telling number of pixels (dots) that the screen image moves up for a scroll.

Send

To put characters onto a communication line.

Serial interface

A communication path that carries one bit at a time, one after the other; as opposed to a parallel interface, in which multiple such paths are used simultaneously to send and receive 8 bits (usually) at a time.

Slot
Long narrow rectangular socket with printed circuit edge connec-
tors, intended to receive the plated "fingers" of a printed circuit
board such as a peripheral or interface card. There are eight slots at
the back of the Apple.

Space
One of the two conditions of a data communications line, the other
called mark. Space usually means a zero bit, used as a start bit show-
ing a change in the line as the beginning of transmission.

Start Bit
A bit placed in front of every character, to aid in synchronizing the
computers sending and receiving. Derived from the Baudot Distri-
butor, the first device to free telegraphy from the need to have human
operators at each end of the communication line. Start bits are usually
zeros, also called spaces.

START CHAR
Options mode display showing which character tells sending com-
puter to resume transmission.

START NUMBERING AT
PRINT program option: the page number that should be applied to
the first page printed from this file.

START PRINTING AT
PRINT program option: the page number in this file at which print-
ing should begin.

Stop Bits
These are bits appended to the end of every character, to aid in syn-
chronizing the computers sending and receiving data. Also derived
from the invention of Baudot, in France, of a physical commutator
that detected current on the line corresponding to a five-bit code and
"decoded" signals by physical movement of the commutator. Tele-
type was derived from this. Stop bits are usually ones, also called
marks.

STOP CHAR
Options mode display telling which character permits receiving com-
puter to halt transmission temporarily.

SWITCH TO A
Options mode display telling which character causes the VisiTerm
program to use character Set A.

SWITCH TO B
Options mode display telling which character causes the VisiTerm program to use character Set B.

T
BASIC CATALOG flag for a text file.

Term
Typing a T in Options mode returns you to terminal mode, where additional input may have been received and displayed while you were not watching. See Chapter 3 for complete reference on Terminal Mode commands.

Terminal
A device connected to a communication line, capable of sending or receiving signals (or both) on that line; see also Intelligent terminal.

TERMINATE STRING
PRINT program option: Some printers require a unique string of characters to end the printing process; if needed, enter an ending string.

Text file
A file containing strings of ASCII codes representing usually printable characters comprising usually printable words, sentences, etc., on subjects of some interest to the creator or recipient. Distinguished from Basic or binary files, which can be LOADed or RUN (or BLOADed/ BRUN), text files can only be displayed, printed, transmitted, or received. Useful only between humans. Also called data files.

Timesharing system
A computer system accessible from remote terminals, each receiving a portion of the total resources of the host system and short but frequent accesses to the central processing unit (CPU).

TODAY'S DATE
PRINT program option: the date you want printed on the document.

Transfer (of files)
Transmitting a file from one computer to another, as in using the VisiTerm program's Send and Receive commands.

Transmission
Sending of signals, usually characters, along a communications line. The signal so sent.

Transmission frequency

That frequency used for sending signals as opposed to the frequency used to receive. In modems on a telephone line, the originating modem sends a mark (one) at the frequency 2225 Herz (Hz) and a space (zero) at 2025 Hz. (Herz means cycles per second.) It "listens" for any responses down in the range 1070 Hz for a space and 1270 Hz for a mark. The answering modem listens at 2025-2225 Hz and answers using signals of 1070 Hz and 1270 Hz.

Type-ahead

A feature or condition in which characters entered at the keyboard are saved when their use or transmission is inhibited, and then used or sent at the next opportunity.

Uppercase

Capital letters; or in some cases, the set of characters created while the SHIFT key is held down.

VERTICAL SPACING

Options mode display telling the vertical distance between lines of text.

Video terminal

Displays interactions on a CRT screen; see Terminal, CRT.

VisiCalc Program

Program performing sophisticated financial manipulations and projections, created by Software Arts, Inc. and published by Personal Software, Inc.

Xeq

Typing an X in Options mode permits you to execute a program from your disk. You must supply the filename or use the arrow key to survey the existing filenames, and select one. If you need the VisiTerm program afterward, it must be reloaded.

Zap

Typing Z in Options mode deletes a configuration file from your disk, i.e., an option and macros set. You must supply the filename or use the arrow key to survey the existing filenames, and select one. You can escape as described under Sav.

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NOTE: Please see the Glossary for definitions of many terms and con-
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