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A+

THE INDEPENDENT GUIDE FOR **apple** COMPUTING

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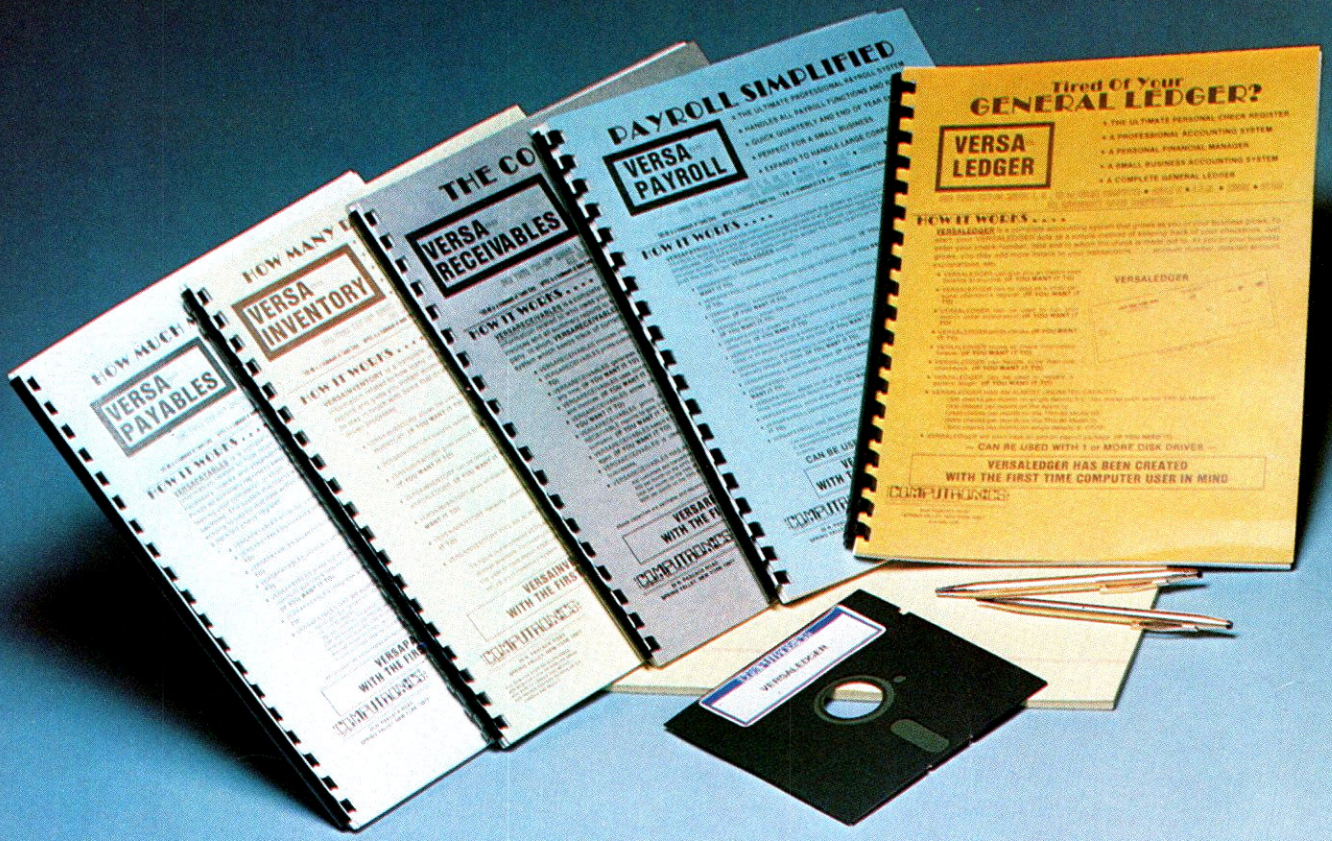

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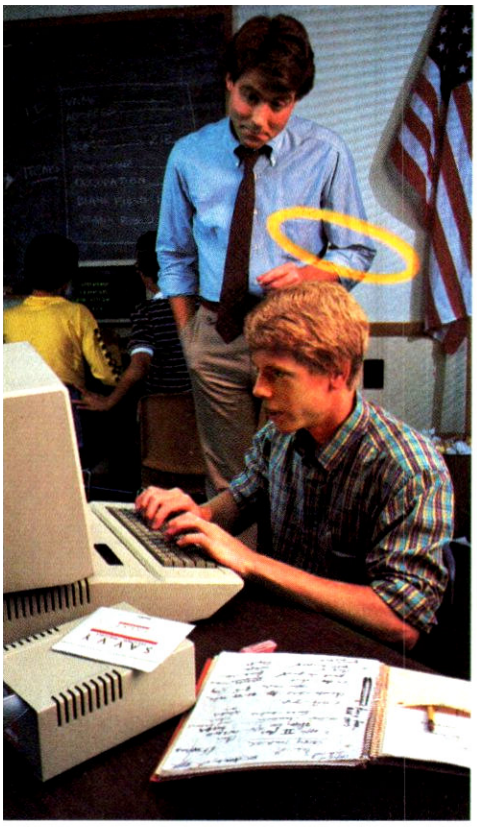

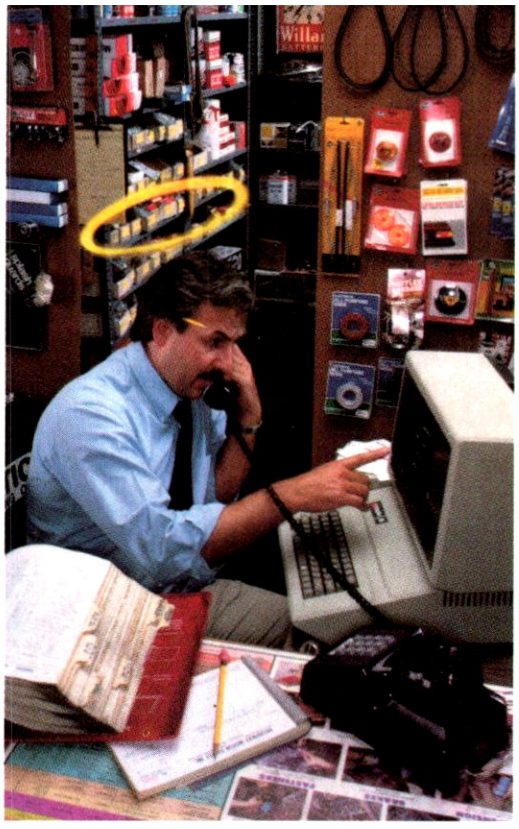

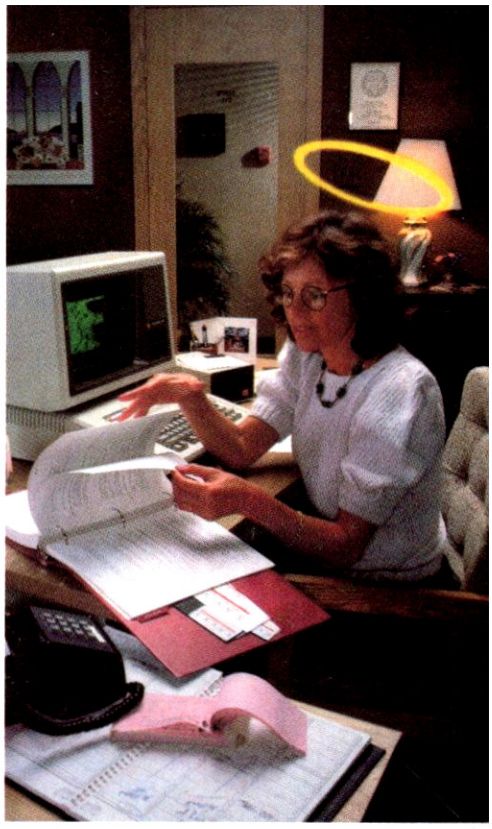

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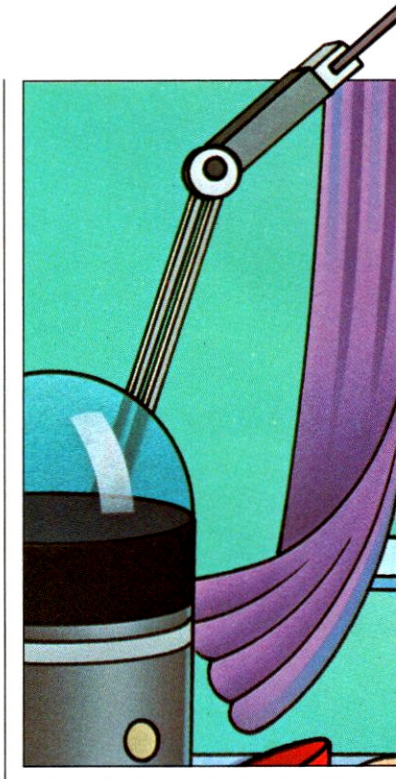

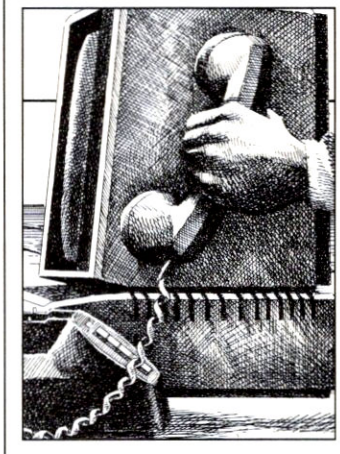

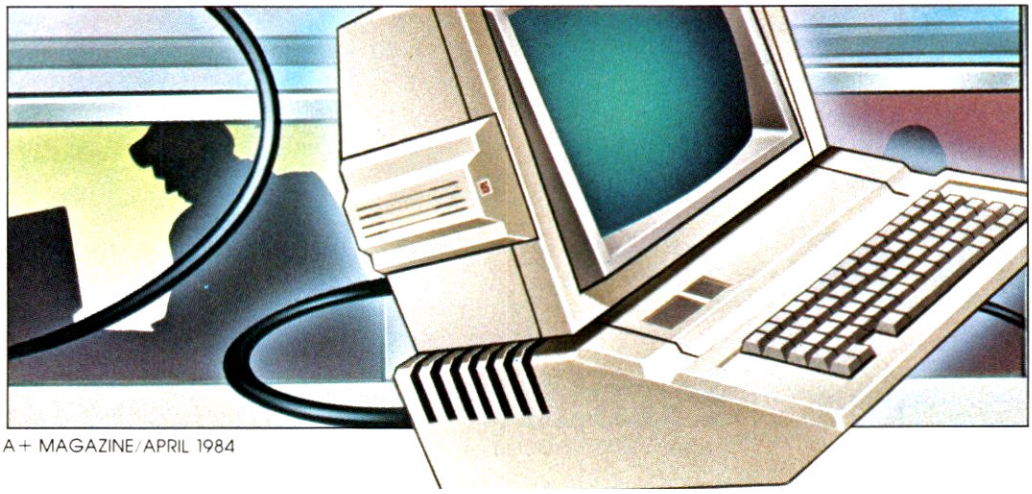

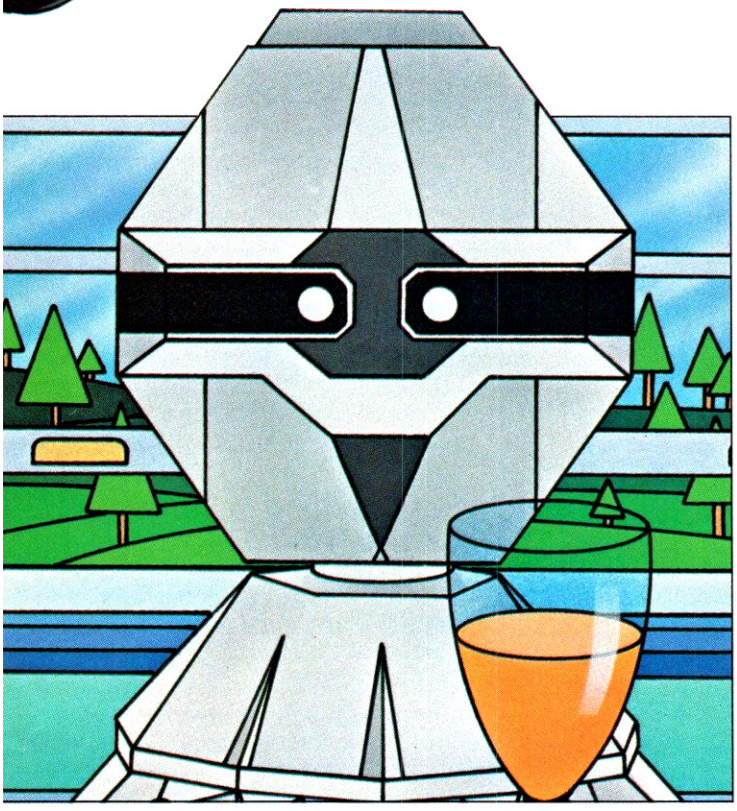

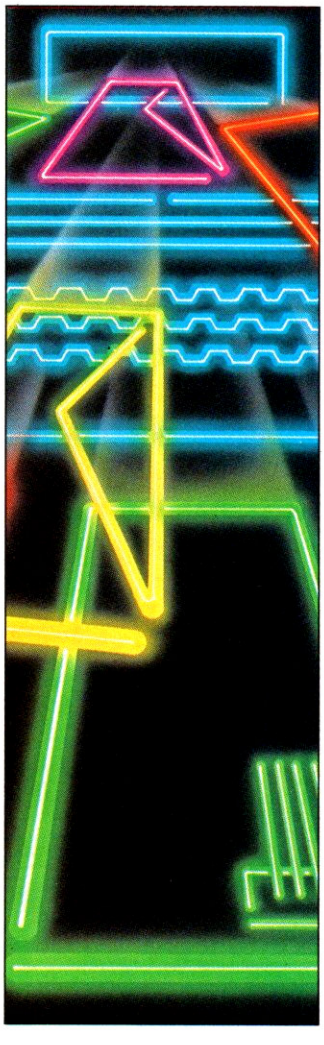

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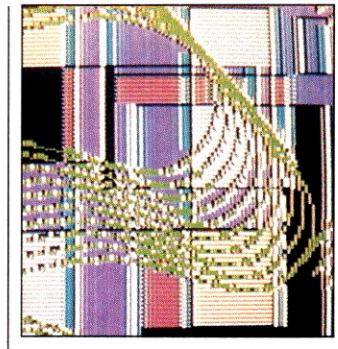

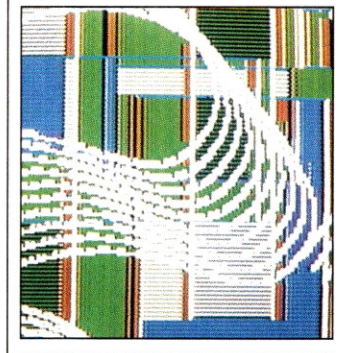

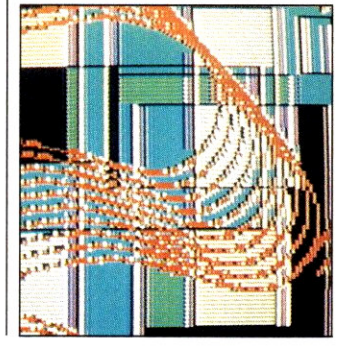

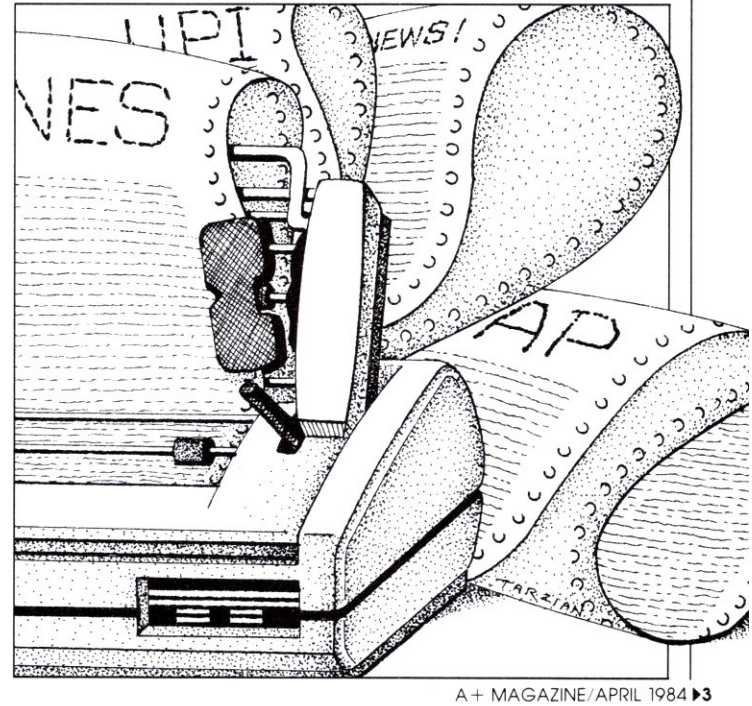

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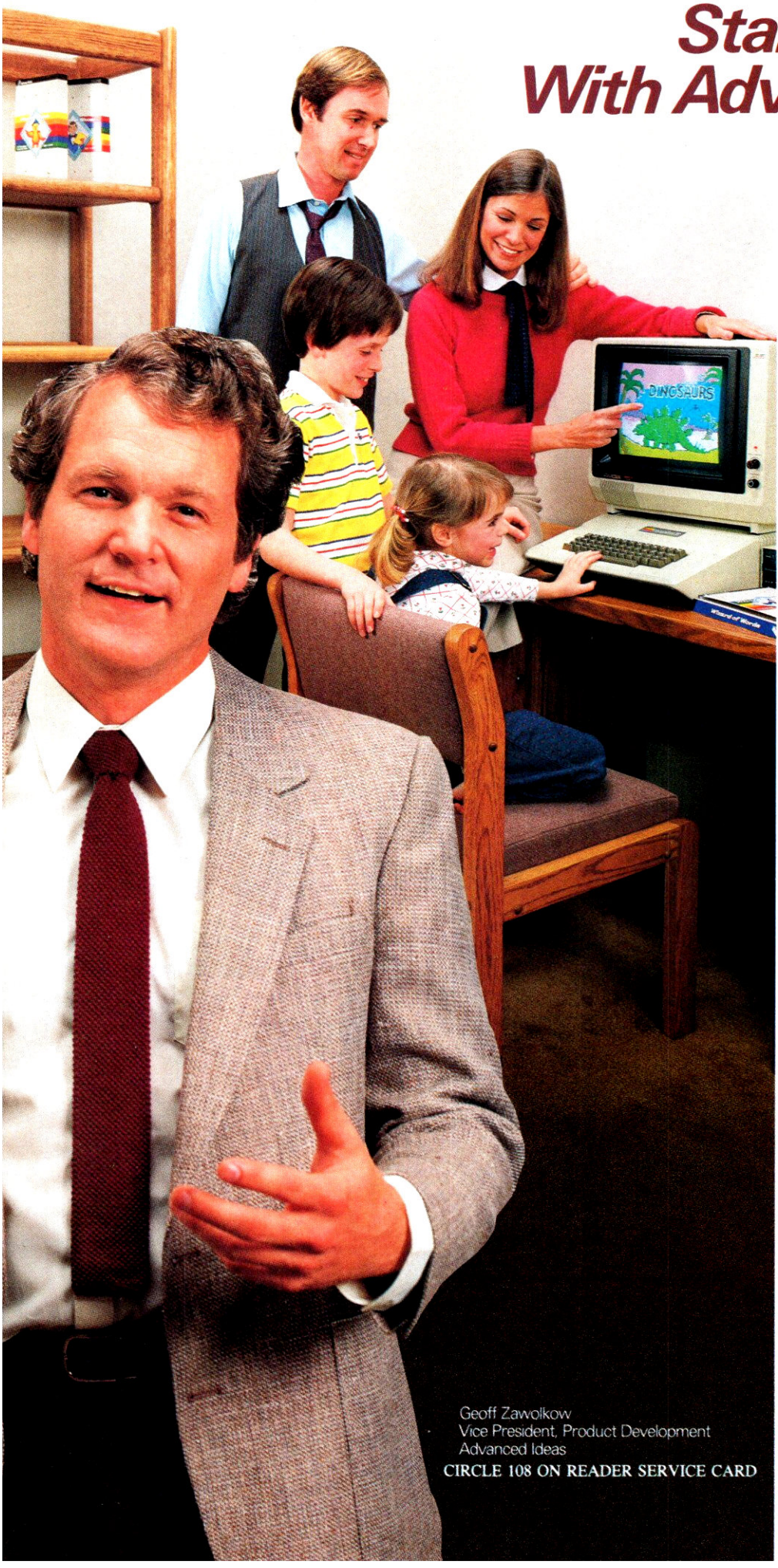

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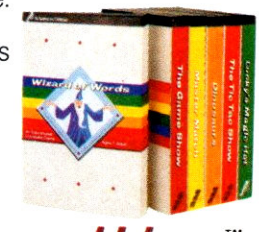

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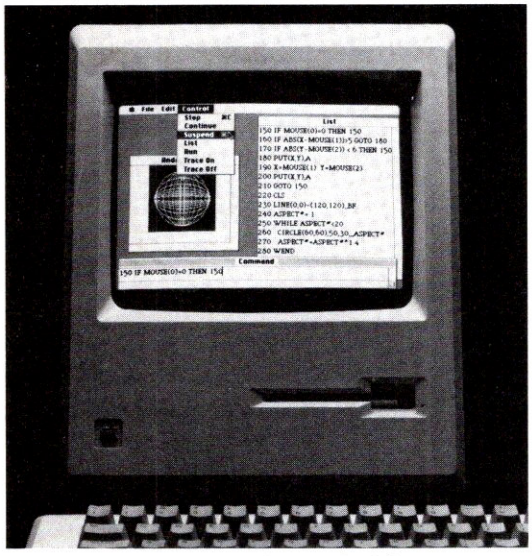

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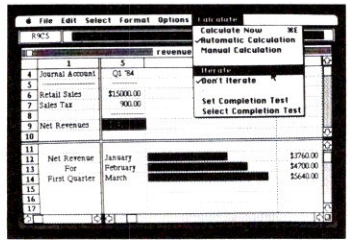

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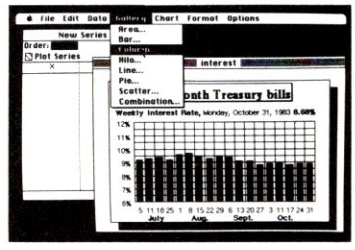

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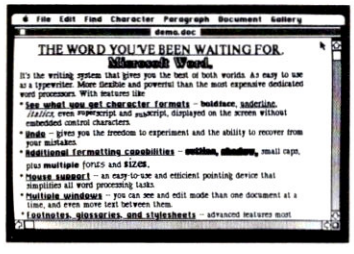

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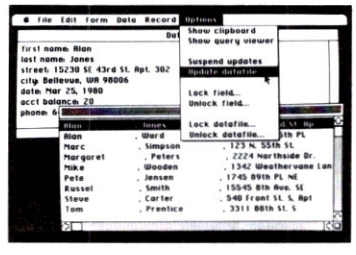

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A MESSAGE FROM MAGGIE

Now that we have settled down into regular publication of *A+*, we want to get you more involved in the magazine. The solution? We've decided to sponsor a contest that will test your mettle. Unlike the innumerable contests, sweepstakes, and lotteries that you have undoubtedly encountered—and maybe even entered—that are based on random luck, our contest will require skills to win. To challenge your programming abilities, we are proud to announce in this issue the *A+* Program of the Month contest.

The Program of the Month contest rules are simple: Anyone (other than Ziff-Davis employees) may submit an original, unpublished program for any Apple computer—Apple II, II Plus, or IIe; Apple III; the Lisa; or the Macintosh. The program should consist of 500 lines or less and must include a one-page description of what the program's function is and how it works. The program can involve any aspect of computing. Please submit the program and the description on a diskette. You can write it in any language, for any operating system, just as long as it runs on an Apple computer. Be sure that your name, address, and phone number are on a label on the outside of the diskette and that you include them on your file as well.

We will return programs that do not win to the author after two months. You may enter the contest as often as you like. Each month the editors of *A+* will consider all submissions and determine the winner. We'll base our decisions entirely on our subjective opinion of which program is the best.

The winner will receive a $500 prize, the winning program will be published in *A+* magazine, and we will consider the program for publication in *A+Disk* magazine. And that's not all: Every twelve months, we will pick a grand-prize winner, who will receive an additional $1000 prize, along with an *A+* statue of excellence. If the contest generates enough interest, we plan to make arrangements with The Source or CompuServe to run the program, so you will be able to download the winning programs to your computer.

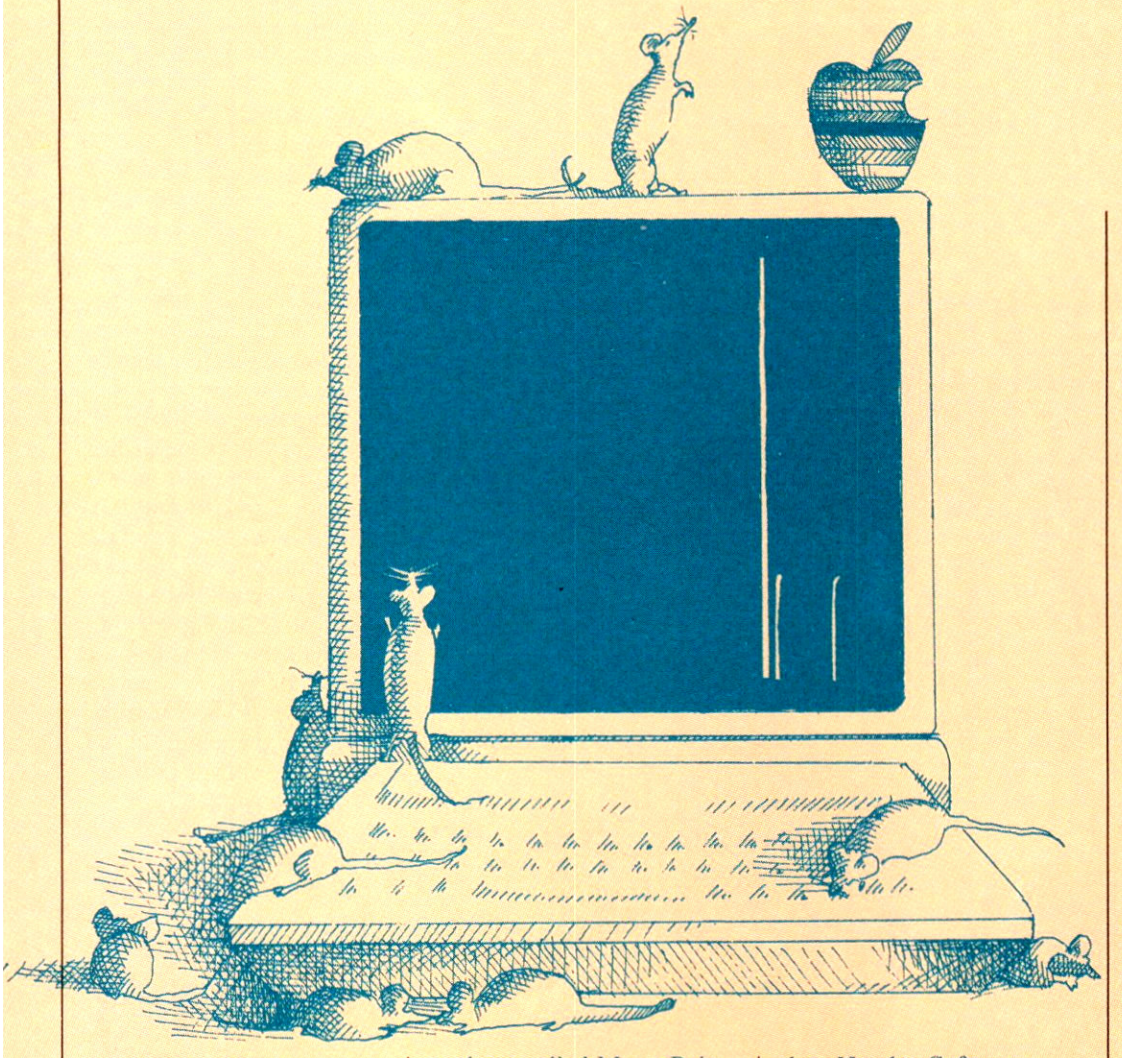
Submit your entries to *A+* Program of the Month Contest, *A+* Magazine, 11 Davis Drive, Belmont, CA 94002, Attn: Fred Davis.

In addition to the Program of the Month contest, we are initiating an annual awards program for the best hardware and software products for Apple computers. We want your help in determining the winners from among those companies whose products appear in advertisements and/or articles in *A+*. To gather your "votes" for which companies should receive an award of excellence, we will run a questionnaire. We'll weigh your opinions as well as ours in deciding which products we will honor. The questionnaire will include many categories, ranging from accounting software to utilities to printers and even mice.

We will announce the winners annually in our February issue (the issue that hits the stands in January). Each winning company will receive an *A+* statue of excellence, and the issue will include an in-depth article on the people behind the products that you and we have deemed the best of the year. ✚

Maggie Canon

A+ DISPATCHES



CASH COW NOT COWERING

While new machines spring forth full-blown from Apple computer's head offices, the company hasn't neglected the machine that's been its financial mainstay: the Apple IIe. Evidence of Apple's continuing commitment to the Apple IIe has appeared in the form of a new mouse package that is called AppleMouse II.

The AppleMouse II brings some of the technological breakthroughs from Apple's higher-powered machines down to the Apple IIe level.

Included in the AppleMouse II bundle is a single-button mouse (like the Lisa's), a graphics software package called MousePaint (like the Macintosh's), and a tutorial program.

MousePaint's software simulates bit-mapped graphics, prints in a variety of character fonts, and permits its users the luxury of freehand drawing and erasing.

Via the mouse, Apple II users also are able to move and copy text by calling pop-up menus, as well as insert text in drawings or position drawings within the text of reports and presentations.

The MousePaint software was developed with the new ProDOS operating system, slated to become standard on the Apple IIe this year.

Other companies haven't given up on the Apple IIe either. Hayden Software, Western Design Center, and GTE Microcircuits have joined forces and announced the production of the 65816 16-bit microprocessor for the IIe, along with compatible software-development tools.

The 65816 chip is completely hardware- and software-compatible with the 6502 8-bit microprocessor heart of the Apple IIe. Western Design Center developed the chip, and GTE Microcircuits will manufacture it. Meanwhile, the software-development tools from Hayden have been designed to extend the capabilities of ProDOS.

Obviously, the Apple IIe is a long way from being milked dry.

FLOOBY IS AS FLOOBY DUST

Move over, Pet Rocks! The latest gift gimmick for frustrated computer users is a potion called Flooby Dust which guarantees that it will cure everything from hardware glitches to Twonk's Disease.

Sprinkle this translucent, nay, transparent powder over a shorted-out memory board, a bug-infested program, even a sluggish computer operator, and the manufacturer, Wallace Micro-Marts of Peoria, Illinois, claims you will find the performance of the errant item miraculously improves.

"Inventor" Ron Wallace claims that his miracle product will also "mend broken hearts, patch dissolving marriages, repair tots' tricycles, and solve the balance-of-payment problems in Latin American countries."

There is absolutely no possibility of an overdose. Flooby Dust is an invisible, tasteless, odorless grit so

light that the user might swear the bottle contained nothing at all. Packaged to look like a headache tablet (with "antistrainophen"), Flooby Dust can be found at the patent-medicine counter of your local computer dealer.

A III BY ANY OTHER NAME

Yes, the Macintosh is out at last. But don't forget to check out the new and improved version of the Apple III—conveniently named the Apple III Plus.

You might not have read much about the Apple III lately, since the FCC put its foot down last year and demanded that Apple redesign the machine to conform to radio-frequency-interference standards. But the renamed Apple III Plus has come back bearing its RFI shields, not on them.

Apple has added some enhancements to sweeten the new design, along with the four-layer motherboard that now meets the FCC's standards for electronic "noise."

The Apple III Plus offers a clock/calendar function, a new keyboard modeled on the Apple IIe, a hefty 55-watt power supply (the Apple III operated on 35 watts), and a graphics "Interlace mode" that scans both on the lines and between them, giving the pictures and text a sharper, thicker line.

Apple III owners can purchase some of these features, such as the clock/calendar function for $35, and the Interlace mode for $75.

DIAL-A-WOZ

Who says business people have no sense of humor? Even the mastermind of a Fortune 500 corporation deserves a few giggles.

If you want proof, call (408) 438-5555. The number may have changed by now, but recently a caller heard a barely intelligible recording of a man with a thick Slavic accent telling bad Polish jokes. The mystery man's identity? You guessed it: Apple Computer's cofounder, Steven Wozniak.

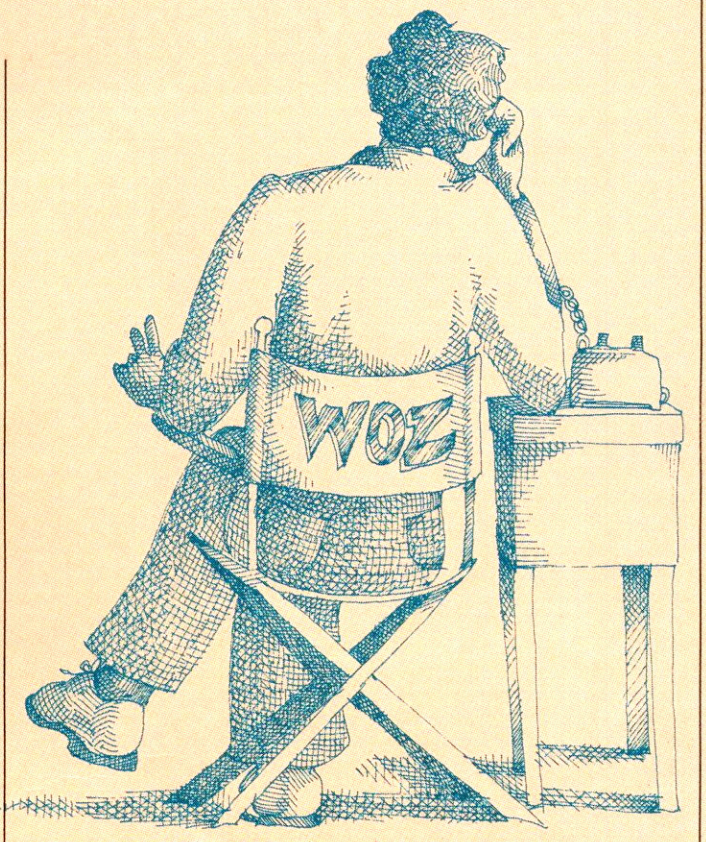
VICTORY OF THE MICRO-FLOPPY?

Now that the Macintosh has finally invaded computer stores, one potential piece of fallout could be a new de-facto disk standard: the 3½-inch micro-floppy.

The 3½-inch micro-floppy disk, first offered by Sony and also manufactured by Hewlett-Packard, Shugart, Tandon, and Mitsubishi, among others, is the system of choice for the Macintosh and the Lisa II.

Only time will tell if sales of this 32-bit family will return Apple Computer's titanic investment in the micro-floppy. Industry analysts have been predicting that the 3½-inch hard-jacket disk will take the lead in the 1980s.

A report from Creative Strategies International in San Jose, California, entitled "Mass Storage Media Technology, Evolution and Opportunities," says that the 3½-inch version will soon account for 50% to 60% of the U.S. market.



And, said Walker Mannes, industry analyst for CSI, that report was written long before the Macintosh's entry into the market. (It was also written before IBM announced that it would not use the 3.9-inch micro-floppy for the PCjr.)

Which sub-4-inch format will win is unclear. Four different standards for the micro-floppy have been proposed by the American National Standards Institute's X3B8 technical subcommittee. But with Apple throwing its considerable weight behind the Sony version of the 3½-incher, its chances are good for becoming the data-storage-configuration favorite for personal and portable computers in the 80s.

HEARD ANY COMPUTER GOSSIP LATELY?

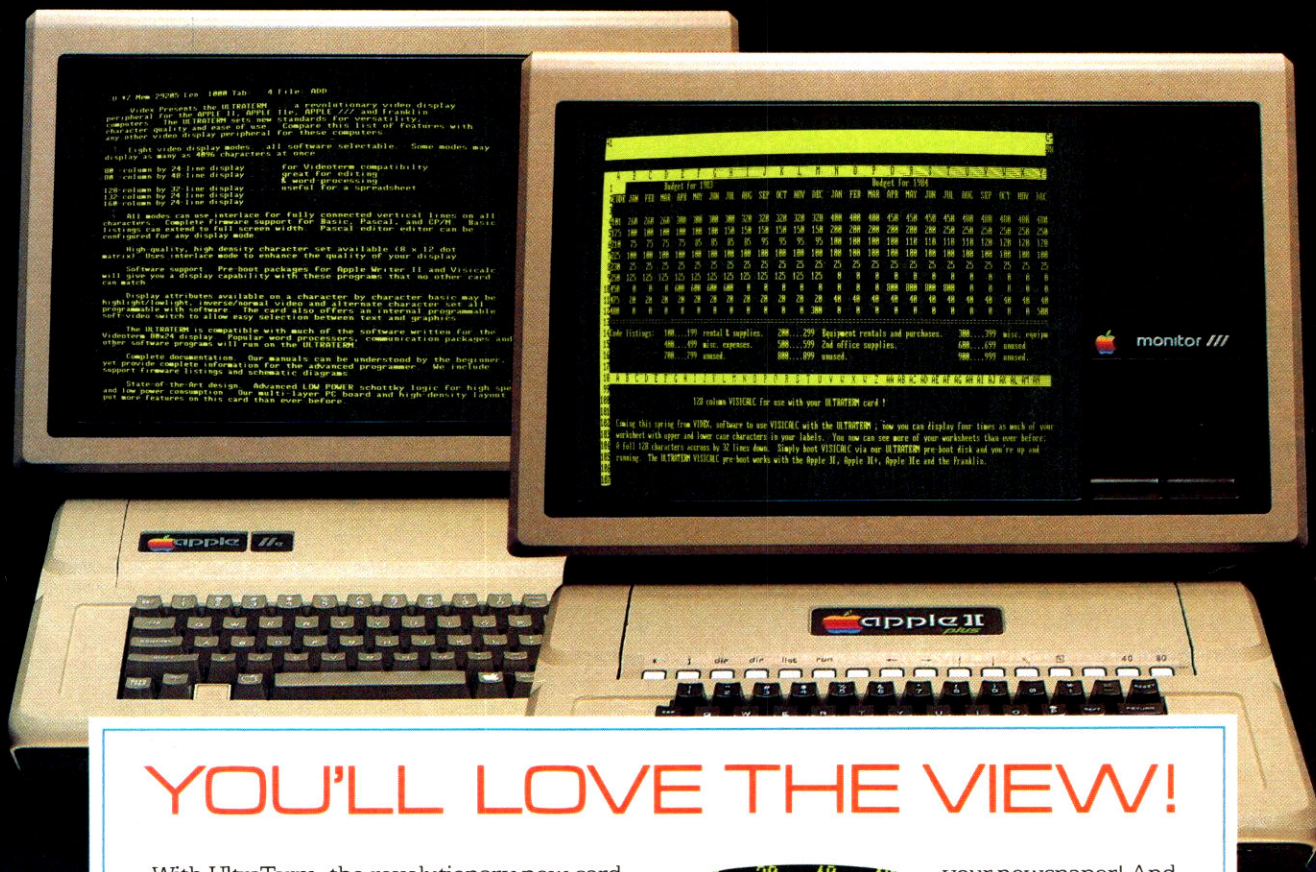
Are you doing interesting things with your Apple computer? Do you know someone else who's doing unusual Apple-related work? Have you heard any hot gossip about the computer world lately?

Come whisper it in our ear—we won't tell anyone, honest. (Anonymity will be preserved upon request.)

A+ pays $50 for items used in the Dispatches section.

Send your leads or short articles (typewritten, double-spaced, please!) to Dispatches, c/o *A+* Magazine, 11 Davis Drive, Belmont, CA 94002. All submissions are subject to editing and become the property of *A+*.

INTRODUCING ULTRATERM™



YOU'LL LOVE THE VIEW!

With UltraTerm, the revolutionary new card from Videx, you'll enjoy sweeping panoramas of spreadsheets that you've never seen before: 128 columns by 32 lines, 132 columns by 24 lines and even 160 columns by 24 lines. You'll revel in the scenics of a whole year of records stretching out across your screen.

You'll also delight in the new horizon of 80 columns by 48 lines—double the lines you normally have. So your word processing will reveal a "depth of character" never possible before!

Another breath-taking view of UltraTerm—it delivers absolutely flicker-free, state of the art display, with 8x12 character matrix giving you preposterously clear, readable characters. Not only will you see **more** characters on your screen (a whopping 4096 possible), but they'll also be larger and more readable than the characters you read every day in your newspaper! And you can differentiate those characters in several modes: normal (white on black), inverse (black on white), bright intensity and dim intensity.

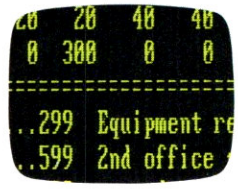


Photo of actual-size characters on Apple Monitor III.

UltraTerm. Come on over and enjoy the view.
Suggested retail price: $379

Videx INC. TM

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(503) 758-0521

UltraTerm features a built-in soft video switch and has complete firmware support for BASIC, Pascal and CP/M®. Use it with the Apple® II, Apple IIe

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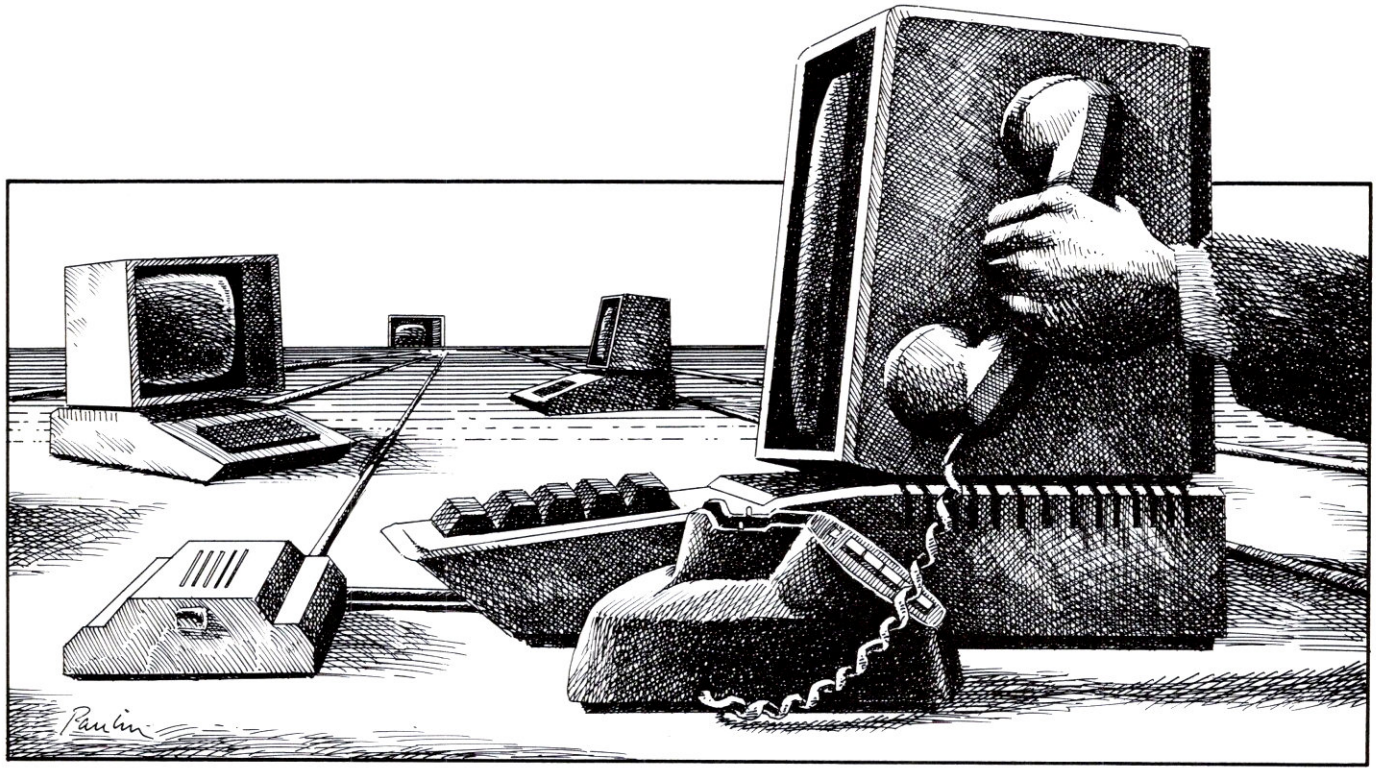
CIRCLE 141 ON READER SERVICE CARD

THOUGHTWARE/BY STEVE ROSENTHAL
A modem can be your ticket to the world of data communications.



DIALING FOR DATA

If you add a modem to your Apple, your personal-computer system will become a gateway to a rapidly expanding world of computer networks. Some of these networks are small, local, and free; others are national or international and can be costly. All of them exist because many people want to have their computer communicate with other machines.

For almost all of us, computer networking means connecting computers through the telephone system. You can also connect Apples with local-area networks, though, and some nontelephone data-communications networks involve large computers. For sharing data within an organization and getting by without multiple printers, local networks can serve well in many small and large businesses.

Neither local-area nor large-computer networks are a substitute for the greater reach of the telephone network. The telephone system is already in place, technically well defined, relatively inexpensive, and almost universal—virtually everyone who has a computer has a telephone.

Sending data across the country by phone is often easier than sending it directly across a room.

The basic phone system was, of course, originally designed only for carrying voices and not computer data, so some technological sleight of hand is necessary to get computer messages through the lines. By now, most of the problems have been solved, though, and sending data across the country by phone is often easier than sending it directly across a room.

The most popular reasons for connecting an Apple to the outside world are for fun or curiosity. With an Apple and a modem, you can call up a few hundred bulletin-board systems and exchange informal messages with other people. You can also use a commercial network, such as The Source or CompuServe, for services intended for your enjoyment.

You can also send messages for business use. With an Apple and a modem, you can exchange data either directly

TURN DOT MATRIX INTO A DAISY . . .

with the **NicePrint** Card
(formerly SUPER-MX Card)
for the **Apple II, II+, or IIe.**

The standard of printing excellence is the daisy-wheel printer. The **NicePrint** interface card improves EPSON or GEMINI printers so they have just about the same quality print as the daisy-wheels! And this high quality is easily available to all Apple software, even copy-protected diskettes.

Here is a sample of dot matrix printing.
Change it into a daisy with **NicePrint!**

Four optional font styles are available in addition to the standard Roman font shown above that simply plug into the card:

LETTER GOTHIC is modern looking.
ORATOR is easy to read and good for speeches.
SCRIPT adds the personal touch.
OLDE ENGLISH is very formal and elegant.

BETTER THAN GRAPPLER!

The **NicePrint** card has all the Apple Hi-Res graphic dump commands that the Grappler has including: double dumps (both pages side by side), dump from page 1 or 2, double size, emphasized, rotated, strip chart recorder mode, and text screen dump.

Spies Laboratories
(pronounced "speez")
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(213) 644-0056

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Grappler is a TM of Orange Micro, Inc.

CIRCLE 238 ON READER SERVICE CARD

with another personal computer or through a network or switching system. Electronic mail is faster than the service the best messenger companies can provide. With the right hardware and software, you can even have your Apple send financial or operational information automatically to a central computer any night after you've gone to bed.

You can also use your Apple and a modem to substitute for connection to the existing public written-message system—the telex and TWX networks. By subscribing to a service that collects your incoming mail or by adding a special modem that receives and stores messages, you can use an Apple to receive written orders and queries from customers, suppliers, or branch offices. Most commercial electronic-mail services also allow you to send outgoing telex and TWX messages through their networks—and the international telex network goes to almost every country on the globe.

Instead of sending messages, you can collect data. Hundreds of commercial information services, a half dozen of which were designed specifically for personal-computer users, are accessible by telephone. If you need information on anything from agriculture to zoology, somebody probably has indexed it all and is offering it for sale.

If you have data on your Apple and you need to use it on another brand of computer (or the other way around), the easiest way to transmit the information is often by telephone. Even if the computers are sitting side by side in the same room, exchanging data by telephone lets you bypass restrictions of disk size and format, connector styles, special cables, and special software.

To have your computer communicate over the telephone system, the essential piece of hardware is a modem, a printed circuit board or box that translates computer signals back and forth into the form the telephone network can accept.

Modems come in many varieties, but you don't need to know any technical details to use one. All the well-known brands and most less-familiar ones do the basic communications job well. If you're buying a modem, you should select one based on special features you want, compatibility with your system, product support, and price.

Most people who don't know much about hardware need help to connect and configure a modem, so the extent of your knowledge and the availability of someone to help you may determine what you select and where you buy it. Hooking up a modem involves lots of small details, and not everyone has both the knowledge and the patience for the job, so be prepared to spend some time or select your assistant carefully.

The two common modem types Apples use are the 103 and the 212, or 212A, both of which are named after the Western Electric models that have become the de facto industry standards. Type 103 modems transmit at speeds up to 300 baud (30 characters per second).

Type 212A's send data four times as quickly, at 1200 baud (120 characters per second), but they're significantly more expensive. Most include a built-in Type 103 modem, so you can also use them to communicate with systems that have only the slower equipment.

Most people read a screen at a rate faster than 30 characters per second but slower than 120. Thus, 300 baud seems painfully slow, but 1200 baud is quite comfortable. If you're paying for a long-distance phone call or for someone to sit at either or both ends of a data link, the savings of faster data exchange can add up quickly.

Hooking up a modem involves lots of small details, and not everyone has both the knowledge and the patience for the job.

You can get modems as separate small boxes or as boards that plug into the slots on your Apple (see the chart on page 42 and "Modem Quartet" on page 36 for details on the more popular brands). You can use stand-alone models with any brand of computer, but internal ones require less space and fewer cables.

A bare-bones modem has only a telephone connection, a connection for the computer, and a power switch—if the modem is a plug-in board, it may lack the switch. Any modem you buy for your Apple is likely to have some other features, however.

On some modems, you choose various configurations by setting switches, but the trend is to equip the modem with its own microprocessor and let you

See jane™ run

Once there was a time,

before the written word, when people used pictures to communicate. Symbols representing entire ideas were easy to see and understand. And the people were comfortable with this language. And they were happy.

But then came the computer.

And symbols were replaced by complicated commands. Soon data processing meant learning a whole new vocabulary. And the people became frightened of the new computer language. And they were sad.

Then came Jane.

Absolutely, positively, unequivocably, unquestionably, the most simple way to operate a computer.

Jane does away with the keyboard . Instead, a simple, hand-held device called a mouse selects from a variety of applications. From letters to lists, to calculations and spreadsheets. Jane does them all.

Jane does away with complex command words.

Instead, simple, easy-to-understand pictures tell the computer what to do.

From one operation to many, all on one screen at the same time.

Best of all, Jane doesn't cost lots of money. Now everyone can use a home computer. Jane gives back to the people a language they understand.

And they Jane. You can too.

One word is worth a thousand pictures.

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Jane comes complete with Janewrite™, Janecalc™, Janelist™, and of course, a mouse.

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CIRCLE 267 ON READER SERVICE CARD

Jane is now available for the Apple][,][+ [64K], //e, Commodore 64. Available soon for the new Atari™ series and the IBM PC™ and compatibles. Apple™, Commodore™, IBM™ and Atari™ are all registered trademarks.

Now a professional CAD system for $1,095!

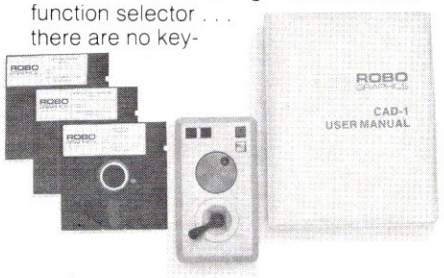
For Apple II and //e

Finally, there is a breakthrough in computer aided drafting and design that makes this work-saving technology affordable for every school, architect, engineer, designer and draftsperson.

The new Robographics CAD-1 system works with a standard off-the-shelf Apple* II+ or //e computer. A complete CAD-1 hardware and software package sells for $1,095, and you can add a drafting plotter for as little as $1,495!

Yet, this is a serious drafting and design system emulating other CAD installations costing over $15,000.

CAD-1 utilizes a unique handheld controller which serves as both drawing instrument and function selector . . . there are no key-



stroke commands to interrupt the workflow. And, when the drawing is completed, line work of reproduction quality can be plotted on paper, vellum or drafting film.

The easy-to-learn CAD-1 drafting process is fast, efficient and highly productive.

To preview this remarkable system, send for a free CAD-1 brochure, or send $17 for your advance copy of the CAD-1 User Manual. Credit will be given when you order a system.

Major credit cards accepted.

See your Apple dealer today for a demonstration or contact us directly.

ROBO GRAPHICS

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CIRCLE 183 ON READER SERVICE CARD

set it with commands you send directly from the computer. Such a modem is called an "intelligent" modem.

Modems use different tone patterns to send and receive data, and to communicate, any two must use mating tone pairs. If you want your Apple to communicate with another personal computer, at least one end needs a modem that can switch between the Originate and the Answer mode. The more restricted "originate only" models will suffice if you're only going to call up bulletin boards, commercial networks, or systems that can change modes.

If you want your computer to be able to answer the phone when you're not there, you need "auto-answer" capability. "Auto-dial" lets the modem dial numbers instead of requiring you to dial on a telephone set—with the right software, you can use this type of modem to let your Apple make calls at night when phone rates are lowest.

Just like telephones, modems now come with memory banks for frequently called numbers and circuits to detect and wait for sequences of dial tones. If you expect to spend a lot of time using your modem, these features could be worth the added price, and you might want to get a telephone line just for your computer. You don't need a special high-grade computer line for the Type 103 and 212A modems, but you may not want to have to compete with your machine for access to the outside world. You should definitely get a separate line if you want your modem to answer the phone—it confuses the modem and annoys callers when they try to talk and get the modem's whistle tone in response.

Data Communications Software

The minimum data-communication software takes an expert about ten minutes to write and occupies less than a page in the Apple's memory. There's rarely any point in having your Apple carry on an exchange as if it were a $595 video terminal without any processing ability or storage, though. Just as with other hardware that you can hook up to an Apple, a modem without good software becomes a chore to use.

Any modem software should at least allow you to send files that you have prepared beforehand and put data that you receive onto your Apple's disks for storage. You'll want to be able to prepare files ahead of time because you'll often pay by the minute to use electronic mail, database, or long-distance services. Also, you want your Apple to copy and store information, rather than

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Minit Man	19.95	15.95
Transylvania	19.95	15.95
Expedition Amazon	19.95	15.95
Sierra-On-Line		
Time Zone	99.95	69.95
Ultima II	59.95	41.95
Frogger	34.95	24.95
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The Business Analyst	195.00	146.50
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Applesoft Compiler Plus	99.95	69.95
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Multiplan (Z-80/Apple DOS)	275.00	192.50
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Fortran-80 (CP/M)	195.00	157.00
Applesoft Compiler	175.00	137.50
Micro Sparc		
Macrosoft & Assembler	99.95	89.95
Monogram		
Dollars & Sense	100.00	79.95
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Word Handler	59.95	44.95
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PFS-File	125.00	87.50
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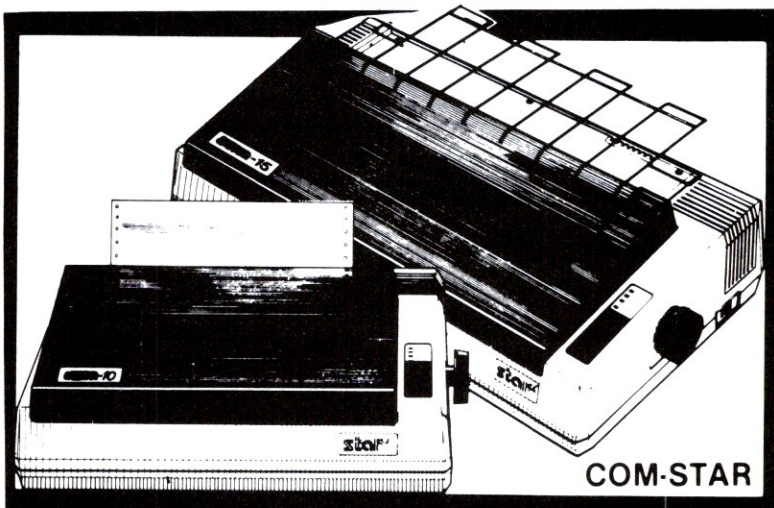

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Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal paper! Best thermal printer in the U.S.A.! (Centronics Parallel Interface).

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The COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interface).

Premium Quality—120 CPS COMSTAR T/F SUPER-10X PRINTER—$289.00

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We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

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make you struggle to write down what you see on the screen quickly and accurately by hand.

Some Apple modem-software packages include their own text editors, but with most you prepare any long text files with your favorite text editor before calling up the modem program. Almost all modem programs can capture data, but some temporarily store the data in memory, so you have to get the data written to the disk before going on to some other activity.

If you're going to use your Apple to exchange files with another computer, you may need special software that matches the way the other system communicates. Most widely advertised software packages support communication with commercial networks, and some have built-in settings for the idiosyncrasies of the most popular services. If you're not good at configuring programs or not interested in dealing with the details, software with built-in settings may be for you.

The bane of communications systems is the lack of universal standards.

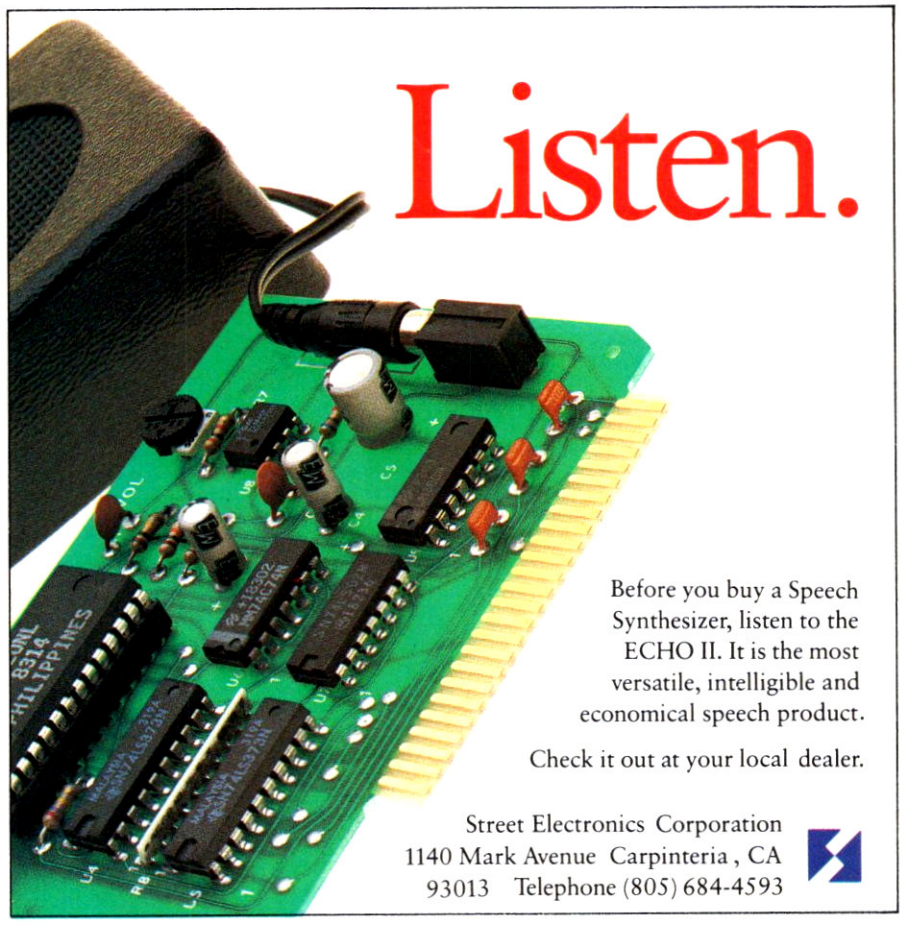
Modem software tends to be limited in its hardware compatibility, so make sure that any software you try to use matches your system. If you're buying modem software, you might ask the vendor to guarantee that it will work with your particular configuration.

Standards and Protocols

The bane of communications systems is the lack of universal standards and protocols. Most data-communications standards are amalgams of formal definitions, historical practice, and vendor preference. Some areas of general agreement exist, but chaos prevails in others.

Any modem that you buy for your Apple should either fit in one of the slots or have an RS-232, "serial," interface, which enables you to connect it at the Apple end. If you get a stand-alone model, remember that you'll need a serial card as well—any serial card should work, once you figure out how to configure it.

For at least the next few years, you should choose a modem that is compatible with the two types now in wide use. If you do so, you'll be able to com-



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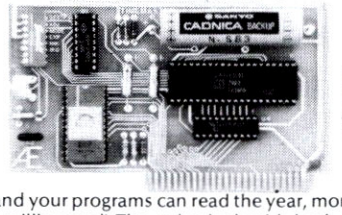
Apple Peripherals Are All We Make
That's Why We're So Good At It!

THE NEW TIMEMASTER II

Automatically date stamps files with PRO-DOS



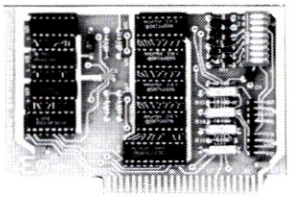
NEW 1984 DESIGN
An official PRO-DOS Clock

- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- NiCad battery keeps the TIMEMASTER II running for over ten years.
- Full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the TIMEMASTER to emulate other clocks, we just drop off features. That's why we can emulate others, but others CAN'T emulate us.
- The TIMEMASTER II will automatically emulate the correct clock card for the software you're using. You can also give the TIMEMASTER II a simple command to tell it which clock to emulate (but you'll like the Timemaster mode better). This is great for writing programs for those poor unfortunates that bought some other clock card.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Plus DOS dater so it will automatically add the date when disk files are created or modified. The disk is over a $200.00 value alone—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

PRICE $129.00

Super Music Synthesizer
Improved Hardware and Software



- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
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- Many many more features.

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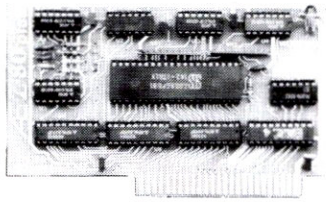
Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, COBOL-80, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHZ.)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

PRICE $139.00

Viewmaster 80

There used to be about a dozen 80 column cards for the Apple, now there's only ONE.

- TOTALLY Videx Compatible.
- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7x9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	**179**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUP'RTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE $179.00

MemoryMaster IIe 128K RAM Card

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.
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If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

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municate with public systems and systems that use other brands of equipment. If you have an application in which your Apple always communicates with the same computer, you can find faster modems, but they're not standardized and may cost more than your computer itself.

If you want to use your modem to exchange data, you should get software that supports some form of error checking. Although data transmission is generally reliable, if you're sending thousands of characters, even one error in several hundred characters could change a vital figure. If you're exchanging programs or nontextual data, even the loss of a single bit could radically change the way the received copy operates.

Most software companies that sell communications packages for Apple modems offer their own, proprietary error-checking protocol. Their operation is automatic (once you pick the Error Checking mode, the software checks each transmission for errors and resends any exchange that didn't arrive correctly), but they require the same brand of software at each end.

If you're running CP/M on the Apple or sending files to and receiving them from a CP/M system or an IBM Personal Computer, you might want to get software that is compatible with XMODEM, or MODEM7, error-checking methods—the popular public-domain (free) CP/M program called MODEM7 uses this method, and it's available for any CP/M or IBM PC-based system.

Apple Computer has joined with other firms in the personal-computer industry to endorse a communications method developed by Microcom Incorporated. This MNP standard has not shown up on Apple or Apple-compatible products yet, but it should be available soon. It will provide full error checking as well as a range of communications-control functions.

Start with a Bulletin Board

The best place to sample data communications with your Apple is probably with a local bulletin board. Even if you use your computer only for business and find the boards too lighthearted, they're a good way to get the feel of how things work, without running up charges on a commercial network.

Almost all bulletin boards work on the same general principles. You dial up their number with your modem and then give your name and some other identification. Many bulletin boards re-

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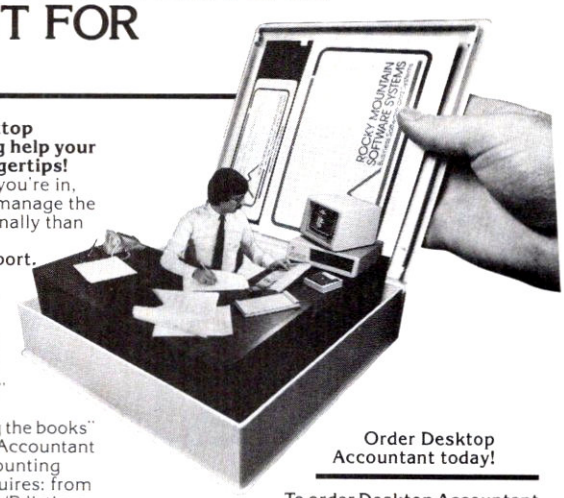

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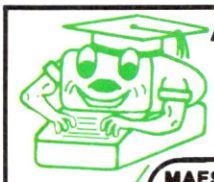

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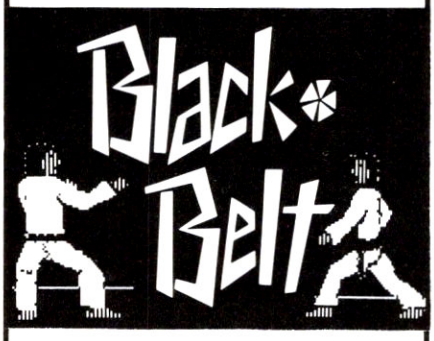
CIRCLE 148 ON READER SERVICE CARD

EARTHWARE
PRESENTS



Programming by Kevin Ryan

Black Belt is a challenging arcade game of the martial art, taekwondo. The Mockingboard sound and speech synthesizer, joystick and keyboard combine for both fun and learning. Championship sparring rules and the disk's practice section teach you the forms. Designed with input from professionals, **Black Belt** is a skill game in which brutality and rule infractions affect score.

The one-person game has a built-in artificial I.Q. rather than random generator. Instruction booklet included. Apple][computer, 48K, one disk drive, and joystick required. Mockingboard is optional, but adds exciting dimension. Suitable for ages 9-90.

$29.95.

STAR SEARCH

Pluto star base receives a signal from the direction of Epsilon Eridani (about 10 light years away). The players have their mission — find the origin of the signal. As captain, you must each choose a crew and supplies for your ship. Gather information by flying probes, with your automated telescopes, or by landing a pinnace. You may find alien life forms!

Go into the asteroid belt to conserve fuel but be ready to dodge meteoroids or destroy them with your laser gun. Each game is different and can be saved for re-entry. Win by managing your resources well and making discoveries.

Request educational version on school letterhead. Requires Apple][, 48K.

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CIRCLE 370 ON READER SERVICE CARD

quire you to be "validated" before you can access more than introductory functions.

Once you're connected, you generally get a menu of choices, two of which will be some form of a "scan" and a Read command. Scanning lets you look at the titles or subjects of messages posted on the board; reading shows you the full text of the ones you select. You can normally post messages, as well as read them.

The best place to sample data communications with your Apple is probably with a local bulletin board.

Most people who run bulletin boards do so as a personal hobby or as an adjunct to a computer-related business. Some schools and large noncomputer businesses also make their computers available for bulletin-board use during night and weekend hours. On some bulletin boards, you pay a fee to get a password, but most are free.

The advantage of learning the basics of data communications with a bulletin board is that most are imperturbable, patient, and available—and you can pick one that lets you remain anonymous, if you're shy. You can figure out how to use your hardware and software without keeping anyone else waiting or running up a big bill. As a courtesy, you probably should avoid tying up the more popular and busy boards while you're in the learning stage (the school- or company-sponsored ones are generally the most tame and least used).

To get started, try to find out about a board or two in your area. Most computer stores are aware of at least a few boards, and users' groups are also a good source of information on them. Some magazines also carry regular listings, and some modem manufacturers include a list that was current when they last revised their product's manual.

Once you start with a bulletin board, it will probably have a message area or a reserved area that lists the numbers of other boards. Some people, in fact, make a hobby of collecting as many numbers as they can.

After you know your way around the bulletin boards, then decide if you to sign up for any of the comm services (see "Planning to Join Electronic-Mail Revolution?" page 26).

Just over the Horizon

In perhaps as few as a dozen years, many of the data-communications questions that we must contend with right now will seem like worries about styles of harnesses for carriages. The entire communications network is poised on the brink of an abrupt plunge into new technologies. Rather than trying to force digital data through a basically voice-oriented network, the new network will be primarily digital, and voice will be the foreign element that needs translation.

The concept is called the ISDN, or Integrated Services Digital Network. It will probably make use of some combination of direct connection via satellite, fiber-optical cables, microwave and free-space optical links, and computerized switching systems. Since the largest costs in a communications network are design, installation, and maintenance, rather than routine operations, higher channel capacities usually can lower cost per use, since the expenses go up more slowly than the capacity. Consequently, these new technologies should be able to reduce costs, make more services available in rural areas, and offer a greater mix of services.

In the immediate future, some communications carriers are already building "X.25" or "packet switching" systems, special networks designed to transmit computer data inexpensively by handling it as a succession of small chunks. In the next half dozen years, you may see these networks soliciting individual personal-computer users.

The entire communications network is poised on the brink of an abrupt plunge into new technologies.

Until then, the data must get through. If you have an Apple and can afford a modem but haven't hooked yourself up, now may be the time. Even in the short term, most businesses will find data communications economically justifiable, and for personal or business use, the experience, knowledge, and perspective it provides may each be worth the cost. +

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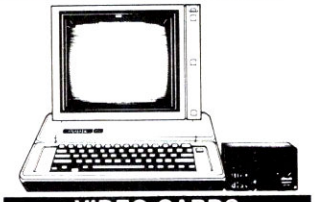

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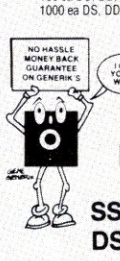

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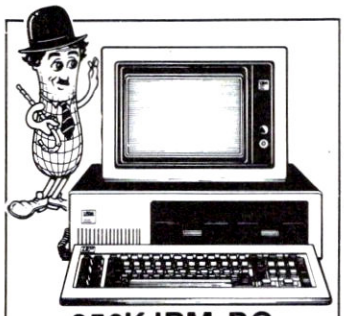

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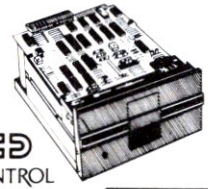

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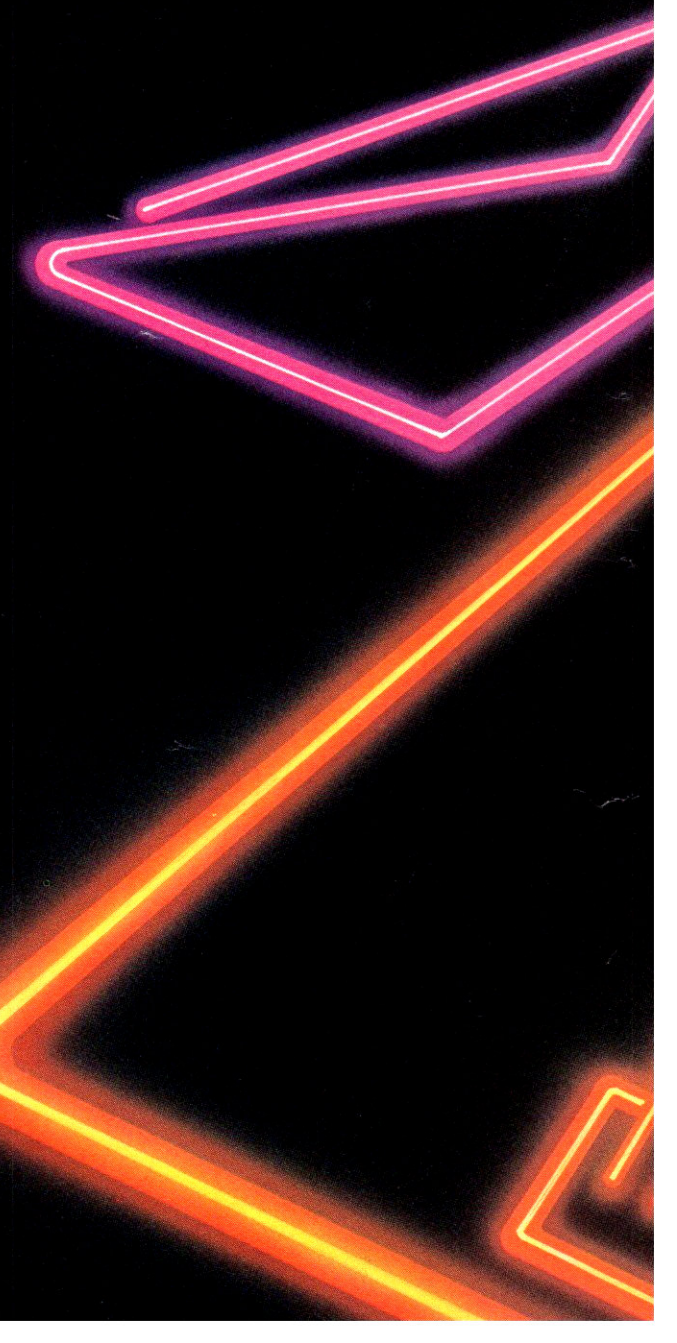
▶ TELECOMMUNICATIONS/BY JESSIE GUNN STEPHENS

ELECTRONIC MAIL BURSTS INTO BUSINESS

A SURVEY OF THE BURGEONING FIELD OFFERS SOME BASIC GUIDELINES.

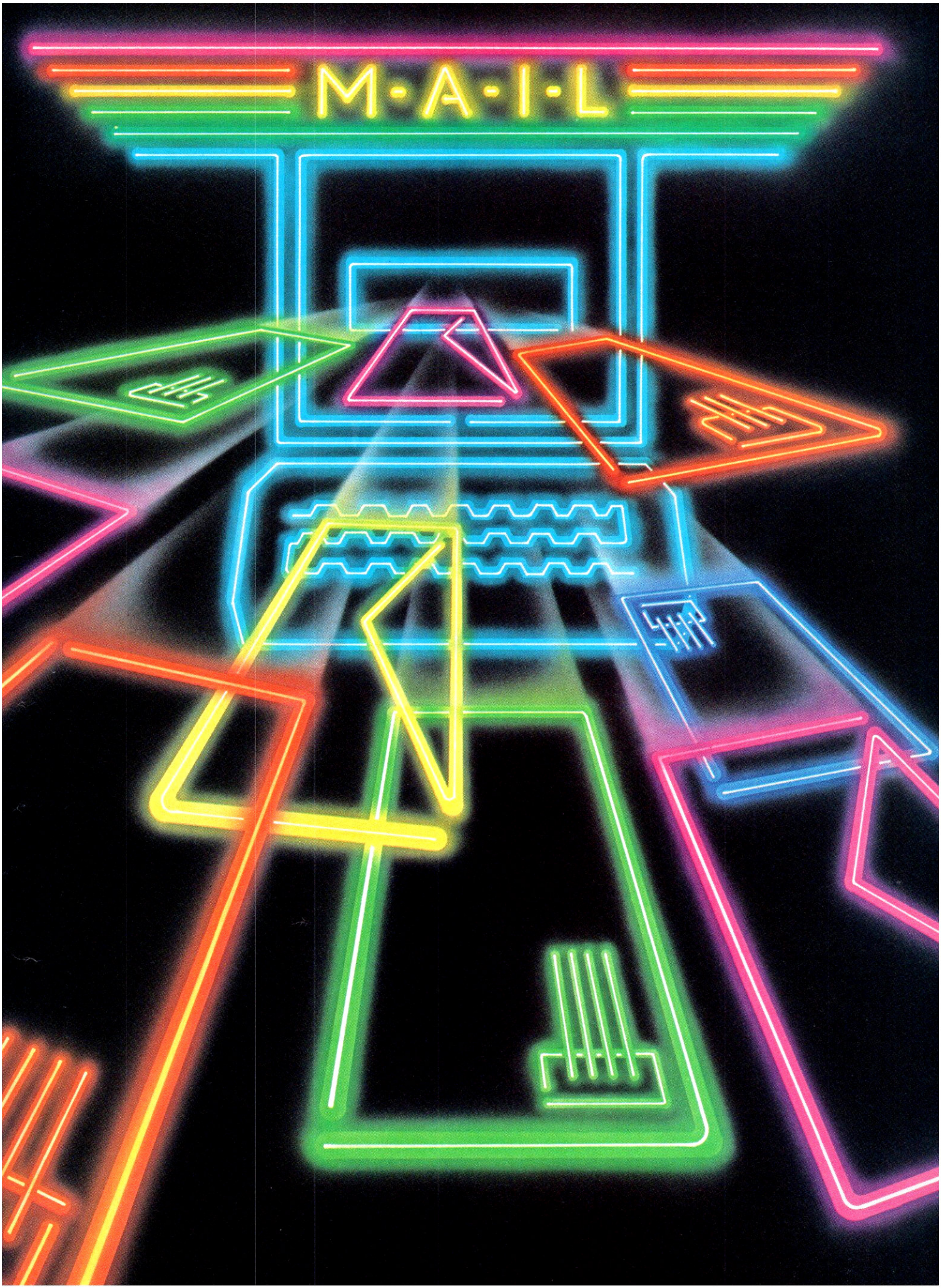


I received an intriguing envelope in the mail this morning. It was white, with a bold blue stripe across the front, and bore the words "E-COM: Electronic Computer Originated First Class Mail." I opened it first, bypassing nearly a dozen other letters jammed into my mailbox.

If you receive one of these attention-getting envelopes or a bright yellow, black-banded one from Western Union, then, like me, you're in the middle of the electronic-mail revolution, and you didn't have to do anything to get there.

Defining Our Terms

What is electronic mail? Like other computer jargon, the phrase is variously interpreted, depending on who's doing the talking. When I use it, I'm talking about business or personal corre-


M·A·I·L

spondence generated or transmitted via Apple computer. I'm talking about the electronic equivalent of letters, memos, interoffice directives, telegrams, telexes, reports, and other textual information. The term also suggests the idea of "co-respondence," which means communication between two entities. I write you a letter and you can, if you choose, respond to it.

Defining the Users

Who's using electronic mail these days, and why? Users include a wide spectrum of business people, from entrepreneurs like Jim Barnett, a Dallas insurance consultant who regularly communicates with clients in London, to the 200,000-member U.S Chamber of Commerce, which plans to combine Apples with dedicated word-processing systems and mainframe host computers.

Automobile salespeople, computer programmers, writers, corporate vice-presidents, newsletter publishers, word-processing service bureaus—that's who's using electronic mail. Just about everyone is beginning to zero in on its advantages.

Defining the Advantages

Its major advantage, of course, is speed. If Apples talk directly to Apples, you have virtually instantaneous communication. If Apples talk to intermediary services, such as the U.S. Post Office or other mail carriers, delivery takes a day or two. If your business generates large volumes of mail, electronic delivery may be the cheapest and most convenient method.

Getting On-Line

Apple owners who want to use their machines to send written messages to customers, coworkers, business associates, or friends can choose from many options. In general, your Apple can send (and often receive) mail in three ways: in connection with another Apple over the telephone, through an intermediary computer service, or with an electronic-mail carrier.

BEFORE MAKING THE FINAL HOOKUP DECISION, YOU SHOULD EVALUATE SEVERAL SYSTEMS, BECAUSE COMPETITION IN THE FIELD IS BEGINNING TO HEAT UP.

Apple to Apple

In the first way, your machine is connected directly to another Apple that has equipment compatible with yours. Both Apples need a modem, a phone line, and communications software.

If you have a phone line that can be dedicated at least part of the time to receiving and transmitting mail, you only need the phone company and the person you're communicating with. The phone company will bill you for long-distance calls.

Some communications-software packages let you compose messages with a built-in text editor. Others make you compose your letter by some other means, such as a word processor. Some word processors come with electronic-mail capabilities as part of the program. Others permit you to use separate mail programs.

Point-to-Point Apples

The U.S. Chamber of Commerce is currently testing the direct, point-to-point way of communicating. The test involves Apple IIe's in its Washington, D.C., headquarters and in six regional offices throughout the country.

"Our major purpose," says Edward Ziere, vice-president of operations, "is to improve communications with our membership, and we want to do so rapidly. Our second objective is improved internal communications."

Once equipment and software are standardized in its offices across the country, the Chamber of Commerce will probably use one or more commercial mailing services, rather than using just the point-to-point mode, because, Ziere says, "We don't want to reinvent the wheel."

If wrestling with concepts such as *baud rates* and *protocols* is not your cup of tea, and you're perfectly satisfied with the conventional "wheel," you may agree. You should investigate the services offered by professional electronic-mail carriers.

Electronic-Mail Carriers

Jim Barnett is a small-business owner who has discovered the advantages of commercial mailing services. Barnett's multifaceted business involves manufacture and sale of Barnett's SuperBoard, which plugs into an Apple game port and provides amateur radio lovers the chance to see what they hear. Barnett got into telecommunications through his interest in ham radio, but he quickly branched out. He was intrigued by the possibility that he could increase the effectiveness of his business communications.

With his Apple II Plus, a sophisticated modem, and communications software that he has modified for his specific needs, he uses both telex and TWX systems at $1.41 per minute during business hours. "I don't have to buy a telex machine, pay a carrier for a dedicated line, or pay for time I don't use," he says.

The international carrier he uses is ITT, because, he explains, it provides a "post-office-box" service, and his phone and computer are not tied up waiting for messages.

The ITT system stores mail addressed to Barnett until he retrieves it. This feature is especially important because of the six-hour time difference between Dallas and London and because he and his clients aren't always in their offices at the same times.

Who's Offering What?

The "post-office box" is only one of many features competing services offer. Most services have it, and some, such as Western Union's EasyLink, take the feature a step further: The system automatically dials your number until you answer and accept mail waiting for you.

Of all the services I contacted, the most courteous treatment and the promptest response to my requests for information came from two old standbys, the U.S. Postal Service and Western Union. Some of the newer entries in the mail-carrying business seemed much less accessible to me.

Querying my business acquaintances, I heard about similar experiences from people who had actually tried to sign up for services. Response time can be as long as several weeks.

Western Union, on the other hand, says it can get you on its EasyLink system within 72 hours. You use your own equipment and choose Telex I or Telex II

IF APPLES TALK TO INTERMEDIARY SERVICES SUCH AS THE U.S. POST OFFICE OR OTHER MAIL CARRIERS, DELIVERY TAKES A DAY OR TWO. IF YOUR BUSINESS GENERATES LARGE VOLUMES OF MAIL, ELECTRONIC DELIVERY MAY BE THE CHEAPEST AND MOST CONVENIENT METHOD.

(TWX); an electronic mailbox is optional. You can also send mailgrams, European mailgrams, telegrams, or E-COM letters and get a daily summary report of your outgoing traffic.

Subscribers to information services such as CompuServe or The Source will find electronic-mail features already available to them. If the people you want to reach are also subscribers, then CompuServe's EMAIL or The Source's SourceMail may offer all the services you need.

Things get more complicated with the Post Office's E-COM system. You must complete a long test procedure to make sure your computer is communicating properly with the Postal Service's.

Most limiting of all for individuals or small businesses, you must transmit at least 200 letters at a time. If you don't plan to be a frequent or heavy communicator, you should check the Yellow Pages to find a subcontractor who will transmit your occasional letters.

E-COM offers some substantial advantages, though. Twenty-five post offices in major cities around the country offer this service. Someone can format, print, fold, address, and deliver your text files within two working days, all without your handling a hard copy. Recipients need not have computers to receive mail from you. This feature makes E-COM a natural for direct-mail- advertising projects.

GTE Telenet's Telemail, ITT's DialCom, MCI Mail, and others offer similar electronic-mail systems. Before making the final hookup decision, you should evaluate several systems, because competition in the field is beginning to heat up. Shop around until you find exactly the features you want at the lowest price.

A User's Perspective

Edward Ziere, who is deeply involved in instituting electronic mail at the U.S. Chamber of Commerce, has some advice for anyone considering a large-scale electronic-mail system. Many of his recommendations also apply to small-scale users.

First, he cautions, people in a very large company may find themselves braving a whole new world—the world of retailing. The corporate-procurement process can take on unexpected dimensions in a retail environment as competitive, complex, and technical as the computer industry. "We found having to operate in a retail environment rather a new experience for us," he says.

The options for hardware, software, and services can stagger you. You must perform many tasks: select appropriate equipment, arrange for hardware repair and software support, train personnel to use computing tools, and elicit personal commitments to make the program work.

Procurement itself can be a major concern. How can you determine what's available, what's best for you, who sells it, who provides service and support, the type of warranty, and how to train your people to use the system?

Ziere urges business people who want to use electronic mail to define the specific problems they want to solve. "Identify clearly what you intend to accomplish," he warns. Then define your hardware and software needs carefully and seek reputable products that meet your needs. Determine who will support those products and the extent of that support.

"As purveyors of corporate information services across the country," Ziere explains, "we were particularly concerned about the widespread availability of hardware service and about whether our users could get technical advice, either locally or by hot line."

Next, be aware of hidden costs. Remember, if you plan to install several computers, you're talking about communications hardware and software for *each* computer. You must provide both time and a supportive atmosphere for newcomers to computers. "Be prepared to let your people have room to learn, grow, experiment, and gain the confidence they need before they can use these machines profitably," Ziere says.

IF YOU PLAN TO INSTALL SEVERAL COMPUTERS, YOU'RE TALKING ABOUT COMMUNI-CATIONS HARDWARE AND SOFTWARE FOR EACH COMPUTER.

Putting It All Together

Electronic mail is one of the fastest-growing segments of telecommunications. Mail is the lifeblood of the nation's business community, and that community is embracing the technology that permits speedier, more reliable, and more convenient communcations between it and its customers. Whether you want to send one letter or thousands, an electronic-mail service is available to meet your needs. +

MACHINE LANGUAGE

TELECOMMUNICATIONS
BY STEVE ROSENTHAL

A short glossary of Apple data communications

103—the industry standard for modems that exchange data at up to 300 baud (30 characters per second). Any Type 103 modems can exchange data with each other, regardless of brand.

202—a type of modem for older big computers that sends data at 1200 baud (120 characters per second). Don't buy one for use with an Apple—they can't communicate with the more common Type 212A modems.

212A—the industry standard for modems that exchange data at up to 1200 baud (120 characters per second). Almost all have built-in 300-baud modems as well. Any two Type 212A's should be able to exchange data, regardless of brand.

ACOUSTICALLY COUPLED—a modem that you connect to the telephone system by putting a telephone handset in a mating speaker and microphone built into the modem case. It's not as reliable as direct connection, but it doesn't require a modular jack to plug the modem into.

ANALOG LOOPBACK—connects the telephone side of a modem to itself internally, so you can test the modem by sending computer data in and seeing if it is converted to tones and back to data correctly.

ANSWER MODE—set to the tones the modem that answers the phone normally uses. The other modem must use the Originate mode. On auto-answer modems, set to answer the phone when it rings.

ASCII—the standard code used with microcomputers to represent letters, numbers, and symbols as bit patterns. Any two computers that use ASCII can exchange text files, but not necessarily programs or other data files, over the phone.

ASYNCHRONOUS—the method of sending characters back and forth between personal computers, in which there can be pauses between characters.

AUTO-ANSWER—a setting on some modems that tells the modem to answer the phone and tell your Apple that a call has come in.

AUTO-DIAL—a setting that lets the modem do the dialing (in response to what you type in on the keyboard or based on stored numbers) instead of having you dial numbers on a separate telephone. More advanced systems wait for dial tones, detect busy signals, and redial.

BAUD RATE—a measure of the speed at which data can be transmitted by modem. In a personal-computer context, it is usually ten times the number of characters (or bytes) transferred per second. You don't need to worry about the technical difference between baud rate and bit rate unless you design circuits.

BLOCK TRANSFER—a mode on some communications programs that sends data in chunks, checking that the data has been received without errors before going on to the next chunk.

BUFFERED CAPTURE—having the Apple store data in memory as it receives it from the modem. You can then store the data on a disk, display it, or print it.

BUFFERED PRINTING—having the Apple store up characters as they come in over the modem, and sending out blocks of the stored characters when the printer is ready for input. This approach prevents loss of data if you're printing a file and characters come in while the printer is performing a carriage return. If your printer can't keep up with the data, some communications programs tell the sender to pause for a moment, as needed.

CARRIER—the tone signal the modem transmits. Most modems check for this tone to make sure that there is another modem on the other end of the conversation.

CHAT MODE—a communications link that enables a person at each end of the link to send and receive messages as they are typed at the other end, allowing a sort of written conversation.

CONTROL-Q (^Q)—the control character that most bulletin boards and networks recognize as a signal that they can resume sending after you've asked for a pause. The character is also known as XON.

CONTROL-S (^S)—the control character that most bulletin boards and networks recognize as a signal saying you want them to stop sending for a moment. You might use this character to stop the screen while you read it, or your communications program might send it out to ask the system to pause while it prints or stores data to disk.

CRC CHECKING—a method of detecting errors used by some communications programs.

DATA BITS—the bits that send each character over a communications link. Text requires seven or eight; programs need eight bits. Sometimes referred to as word length.

DATA SET—an older term for a modem.

DIGITAL LOOPBACK—connects the computer side of a modem to itself internally, so a user at the other end can see if data sent over the phone is being received and transmitted.

DIRECT CONNECT—a style of modem that plugs in with the same modular cord ordinary telephones use. If you have modular jacks, this type is best.

DOWNLOAD—to receive and store a file from another computer, particularly a bigger one. Many businesses now let users download files from their central computer to desktop Apples.

DTMF—an abbreviation for dual-tone multi-frequency, the technical name for the standard tones for tone dialing.

DUMP—to transfer the contents of a buffer to a disk or a printer.

ECHOPLEX—the mode in which the computer or system at the other end sends back a copy of each character it receives from you (you set your Apple in full duplex, so it won't show what you type directly). As you get each character back, you know that the character you typed has been received.

ELECTRONIC BULLETIN BOARD—a computer system that lets users dial up with their computers and read or leave messages. You can use an Apple to run a bulletin board, but you should have a hard disk.

ELECTRONIC MAIL—a system for sending messages through computerized systems. You can use more than half a dozen commercial electronic-mail systems with an Apple or set up your own small one for your own private use.

FULL-DUPLEX—in data communications, a connection or program that can transmit data in both directions at the same time. It also means that characters sent out do not appear on the screen unless the other system echoes it back. This is the mode you normally

use with an Apple to hook up to an information utility or a data bank.

HALF-DUPLEX—in data communications, a connection or program that can transmit data in both directions, but only one direction can transmit at a time. Used mostly by older computers, or for the high-speed links of big computers.

HOST—the large computer or network that regulates the exchange with a large-computer network, or the personal computer that takes that role in a computer-to-computer exchange.

LOCAL-AREA NETWORK (LAN)—a system connecting several computers in a single building or cluster. These systems allow personal computers to share files, large disks, and printers while remaining able to do their own work.

LOG ON, LOG-ON—the procedure of telling a computer system that you want to use it. For dial-up systems, this is the first part of the system that you see. Some log-on procedures require you to enter an access code or password to protect the system from unauthorized use.

MESSAGE BUFFERING—for a system, holding messages until the receiving party is ready for them. For communications software, storing data that comes in over the modem in memory or on a disk.

MODEM—the printed circuit board or box that translates computer data back and forth into a form suitable for transmission through the telephone network. You can get ones that fit into slots on the Apple or stand-alone models that connect to a serial card.

MODEM7—a public-domain data-communications program for use on Apples running CP/M. Sometimes also used to refer to the error-checking method this program uses.

ORIGINATE MODE—set to the tones the modem on the end making the phone call normally uses. The modem on the other end must use the Answer mode. Also, in some communications programs, set to place a call rather than receive one.

PARITY—an error-checking feature communications programs use. The sender adds a 1 or 0 bit to each character as necessary to bring the total number of bits for each character to the state agreed on (either odd or even). The receiver then checks to see if characters have the specified odd or even total number of bits. If not, it means that one or more bits must have been changed. You can set parity to odd, even, mark (always a 1), or space (always a 0).

PROGRAMMABLE DIALING—a feature of some modems that allows storage of phone numbers in the modem program. You can call any of these programmed numbers by selecting them from a menu.

PROTOCOL—a method for regulating how data is sent back and forth in a telecommunications system—akin to the "rules of the road" for highways. Sometimes systems refer to a No Protocol mode, but they really mean an implied protocol based on the way computers have traditionally been hooked up to simple terminals such as Teletypes.

PULSE DIALING—the type of dialing produced by rotary-dial telephones and an option on some auto-dial modems. It's necessary where the local telephone exchange won't accept tone dialing, but this mode is unusable for many non-AT&T long-distance services.

RS-232 INTERFACE—a connection based on an industry standard for attaching computers or terminals to modems. It's now also used as the standard "serial" interface and is often found on printers and other peripherals as well.

SERIAL CARD—a plug-in card for your Apple that translates the data from the internal form (8 bits at a time on parallel wires) the Apple uses, back and forth to the form modems and some printers use (8 bits one after another on a single wire each way). You need a serial card to hook up an external modem.

SLOT 2—the slot you use for a modem card or serial card for talking to a modem. Because most modem software expects to find these cards in slot 2, you have to alter the software if you use some other slot for this purpose.

START BIT—one or more extra bits you add to each character for asynchronous communication to tell the receiving system where to look for the data bits. Almost all systems that you would access with the Apple use 1 start bit per character, but a few use 1.5 or 2.

STORE AND FORWARD—a mode of operation for electronic mail in which the sender is not connected directly to the receiving party. Instead, the sender loads the message into the system, where it is stored if necessary and delivered to the receiver at his convenience.

SYNCHRONOUS—a mode of transmission on networks based on large computers. Apples and other personal computers usually use the asynchronous mode, but you can get a special board to adapt Apples to the big-machine method.

TTL INTERFACE—a connection that works on signal voltages in the range the Apple uses internally. It is standard for parallel connections, but serial interfaces usually employ higher voltages.

TONE DIALING—dialing using tones instead of pulses. Tone dialing is faster and is needed for most computer-controlled systems such as long-distance services, banking by phone, and remote control of home appliances. Some telephone exchanges are not equipped for tone dialing, and in many areas you must pay extra for a tone-dial line.

UPLOAD—to send files to another computer, especially a bigger one.

WORD LENGTH—in data communications, the number of bits for sending each character over a communications link. It can be either 7 or 8 for text, but must be 8 for programs. Sometimes referred to as data bits.

XOFF—a signal that you want the system at the other end to pause. Most networks use the Control-S character for this purpose, but on many software packages for the Apple, you key in some other letter or combination to send this signal.

XON—a signal that you want the system at the other end to resume sending. Most networks use the Control-Q character for this purpose, but on many software packages for the Apple you key in some other letter or combination to send this signal. Some networks also send this character to you as a prompt each time they expect an answer.

XON/XOFF—a protocol (way of regulating how data flows in a communications link) that lets the receiver tell the sender to pause by sending a XOFF character and to resume by sending a XON character. If you're receiving files and storing them on disk, you need a protocol such as this or you will lose characters that come in while your Apple is storing away parts of the message on disk. ✚

ON-LIN

With NewsNet, you can have a wealth of information at your fingertips.

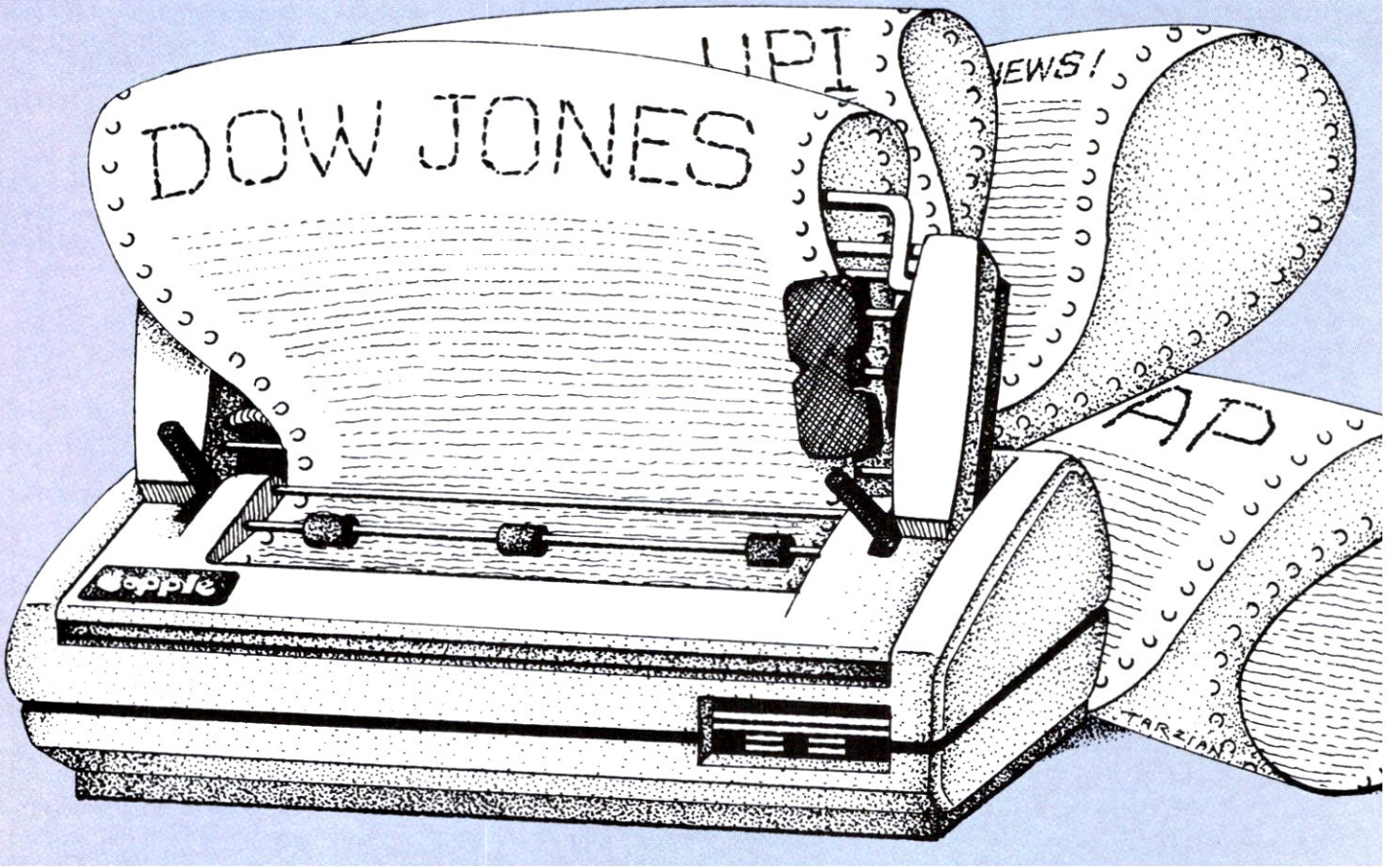
If you are an investor, executive, or other businessman, you've probably received advertisements urging you to subscribe to newsletters promising you the inside story on investments, a particular industry, or some other specialized field. These specialized newsletters thrive because they can provide timely information and analysis that are not available in other publications. To keep yourself informed of events directly or indirectly related to your field, you could subscribe to a virtual library of newsletters and then spend an inordinate amount of time and effort extricating information. Alternatively, you can plug into a single database that takes advantage of the speed and power of telecommunications and your Apple computer.

NewsNet, a database founded in 1981 and on-line since April 1982, offers 142 newsletters, five UPI news wires, and a press-release news wire. About a dozen of the newsletters are available exclusively through its service. NewsNet divides the newsletters into 33 industry categories, from Advertising and Marketing to Telecommunications, with a variable number of newsletters found under each category—Electronics and Computers holds 17 newsletters, Telecommunications has 21, and Retailing contains only one. You can search and retrieve articles from the individual newsletters and the press-release wire or trigger an automatic searching feature to notify you of articles matching your interests.

NewsNet keeps searching and retrieval procedures simple and easy-to-use. It uses a combination of commands, keywords, and menus to find newsletter articles.

The system uses three main commands—Read, Scan, and Search. Read provides the full text of a newsletter, Scan gives only the headlines, and Search lets you search the entire database. You enter a command followed by the code of a particular newsletter, the code of a particular industry, or the word ALL for the entire database. The system then asks for a date range. You can input LATEST, for the most recent issue; EARLIEST, for the first issue available; ALL for all issues; or specific dates. You can use NewsNet's Type Ahead feature, which lets you enter several commands at once, to speed your search.

It is best to use each of the three main commands for a particular purpose. You should use the Read command primarily for examining particular issues. Obviously, READ ALL



ALL, which roughly translates as "read the entire database," does not help you pinpoint particular areas of interest. READ EC22 LATEST, however, which translates as "read the most recent issue of the newsletter The Business Computer by PK Associates, Inc.," will provide timely analysis and information about computers for business use.

Scan allows you to examine the headlines before selecting specific articles to read. This command is also best used with a single newsletter. Its main advantage is saving you time by letting you winnow out the pertinent articles from the irrelevant ones.

Search represents the backbone of NewsNet's system and lets you search using specific keywords. Search works best with an industry code or the entire database. You can use up to seven individual keywords and string them on one line. For example, if you enter "Apple IBM computer," the system assumes you want articles containing all three keywords—*Apple*, *IBM*, and *computer*.

NewsNet builds some flexibility into keyword searching to help you find all the information in the database about a particular topic. If you insert an *or* between the words—for example, *Apple or IBM or computer*—the system will return all articles containing at least one of the keywords. The *or* option is useful when you are not quite sure how something would be named—for example, *Bell or ATT* and *Peanut or PCjr*.

If you insert an asterisk after a keyword—for example, *compu**—the system finds words that start with the letters to the left of the asterisk, such as *computer*, *computers*, *computing*, and *computerized*.

Keyword searching gives you flexibility, but it does possess a few idiosyncrasies of which you should be aware. Suppose you want to find articles about Apple and IBM computers. If you use *Apple IBM computer*, you will indeed retrieve articles about that subject. You might also retrieve stories about an orchard that keeps track of its apple production with an IBM computer. The rule of thumb is the more specific the keywords, the better your chance of weeding out irrelevant articles.

The more specific the keywords, the better your chance of weeding out irrelevant articles.

Also, different keywords representing the same idea carry different meanings. For example, in a recent issue of Defense R&D Update by Industry News Service, Inc., the keyword *airplane* did not retrieve a single article. Substituting *aircraft* for *airplane* retrieved ten.

Finally, if you use the * function, you can retrieve nonessential articles. Entering *compu** also returns *compulsive*, *compunction*, and *compurgation*.

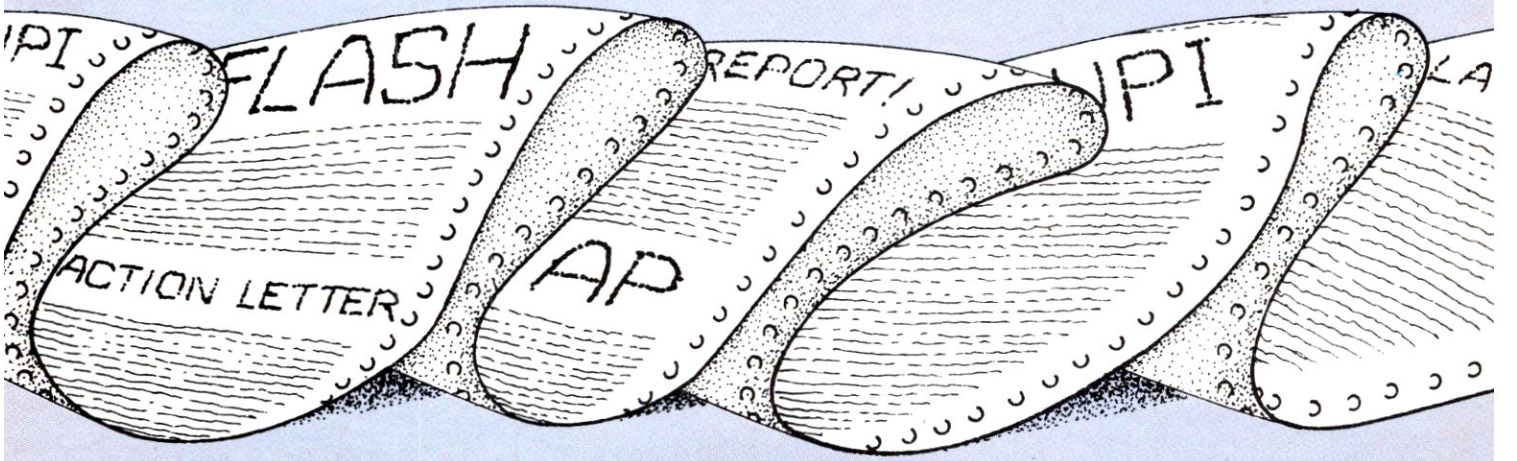
Once the system retrieves articles from your Search, you choose from three commands: Head, Text, and Analyze.

Head functions exactly as Scan does and lists the headlines of the articles in chronological order in menu form. To choose a particular article, you select a number from the menu, and the full text of the article appears on the screen.

Text functions exactly as Read does and displays the full text of the articles.

Analyze screens and categorizes the results of your search into table form. The table lists the total number of articles found by the search, the newsletter code and name, and the number of articles in each newsletter. Analyze lets you narrow your search by displaying which newsletters contain the articles and giving you an idea of where articles relating to your topic appear. A second search pinpoints your exact interests.

Once you have chosen an article, certain control commands help you avoid missing important information, reading irrelevant stories, and suffering eyestrain. NewsNet displays text continuously, so the words scroll from the bottom of the screen to the top. If you press Control-S, the display freezes; Control-Q unfreezes the display; and Control-P abandons the text and re-



turns you to the next prompt. The S and Q commands work instantaneously, but the P command takes about 10 to 20 seconds to return to a prompt.

Although NewsNet specializes in newsletters, it offers some time-oriented services. Although newsletters are published from daily to monthly, NewsNet updates these time-oriented services more than once per day. Much of the newsletters' information is perishable, and it often becomes outdated by the end of the day.

PR Newswire distributes full-text versions of about 150 press releases per day from its 7000 sources, which include corporations, government agencies, unions, nonprofit organizations, and major public-relations firms. Most of the press releases contain business news, with emphasis on contracts, mergers, earnings, and other financial information. PR Newswire is updated every hour on the half hour and uses the same search procedures as other newsletters.

Other time-oriented services include Daily Petro Futures, AgriMarkets Data Service, Fintex All-Day Foreign Exchange Monitor, Fintex All-Day US Money Market Monitor, Fintex International Economic Summaries, and Trude Latimer's Stock Traders' Hotline.

Since the whole idea of telecommunications is to get information to you faster than traditional print methods, NewsNet has set up an electronic clipping service called NewsFlash. This service monitors all incoming information from the newsletters, PR Newswire, and UPI news wires. NewsFlash is NewsNet's most popular service.

You provide keyword phrases—a maximum of ten phrases of 79 characters each—just as if you were searching the database with the Search command. You can easily alter, add, and delete keyword phrases. You can choose to monitor a single newsletter, an industry category, or the entire database. You can also choose to exempt up to four newsletters or industry categories from the search.

Unlike the regular Search command, NewsFlash searches for your keywords and extracts incoming news automatically, without you interacting with the database. Since it only examines incoming news, the information is fresh and current. In fact, NewsNet receives the on-line editions of newsletters before the print versions are mailed.

Although newsletters are published from daily to monthly, NewsNet updates these time-oriented services more than once per day.

As newsletters and other news arrive at NewsNet, the system tallies and stores the "hits," or articles, NewsFlash has captured. NewsNet provides two options for retrieving the articles: Online and Outcall.

Online lets you read the articles on the screen. Each time you sign on to NewsNet, the system tells you how many hits NewsFlash found and asks if you would like to read them. The system displays the headlines, five at a time, in menu form. You can pick a headline and read the article or go to the next set of five headlines. You can save NewsFlash articles.

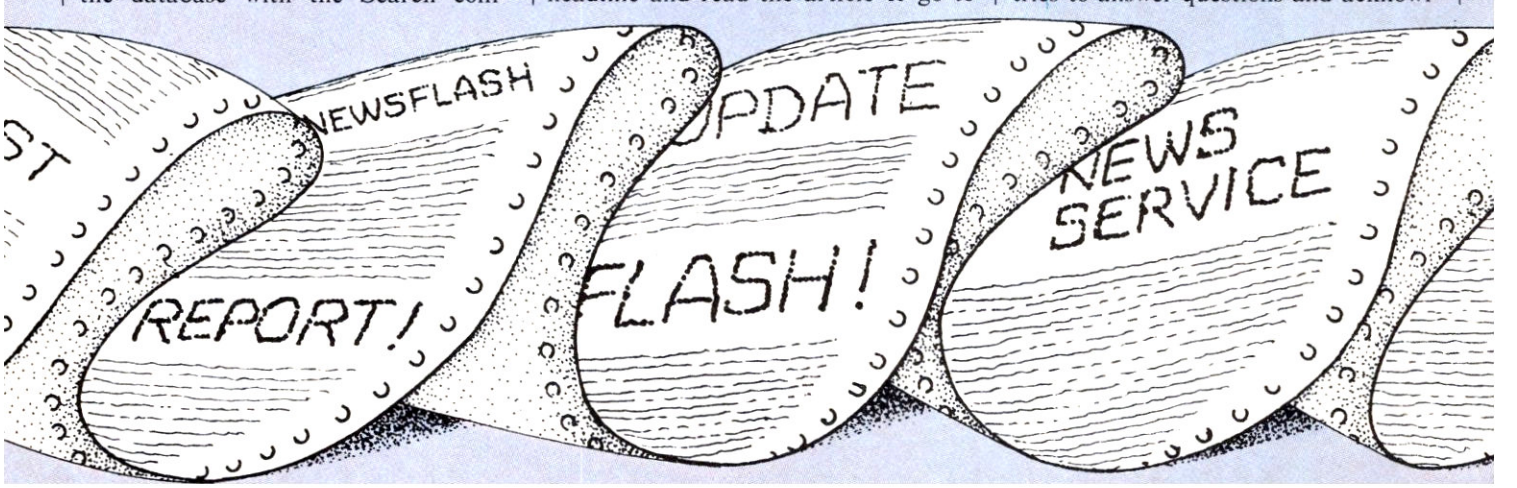
Outcall sends the articles to a teleprinter in your office as fast as NewsNet receives them. You must rent the teleprinter from NewsNet and keep a dedicated telephone line open at all times. Outcall also carries a telecommunications surcharge.

NewsNet contains other commands to help you use the system. The Help command provides a thorough explanation of a particular searching or retrieving function and then gives a clear step-by-step example of how the function works.

Paging sets text output at 24 lines per screen, so you do not have to fiddle around with the S and Q commands. Nopage returns the output to continuous display. The Info command, followed by an industry category, describes the industry and the newsletters available within a particular category. The same command, followed by a newsletter code, displays promotional information about the newsletter.

You can use the Order command to order print subscriptions of the newsletters, more information, and NewsNet's teleprinter and other equipment. Prices lists all newsletters and the price per hour to read their articles. Library holds sample copies of most newsletters.

NewsNet offers an interesting version of electronic mail, appropriately called Mail. It is not trying to become a postal system, so you cannot send messages to other subscribers. You can, however, use Mail to send messages to the newsletter publishers and receive messages back from them. You can also send comments, criticisms, and pleas for help to NewsNet. NewsNet checks for messages several times per day and tries to answer questions and acknowl-



edge comments within 24 hours.

NewsNet does not publish a users' manual for the service. It does include a six-page guide listing the newsletters, a two-page listing of the newsletters and their rates, a four-page overview on searching procedures, one page describing a sample search on NewsFlash, and one page listing all commands.

In addition, NewsNet publishes, both in print and on-line, a monthly newsletter of its own called NewsNet Action Letter. It contains searching tips, newsletter information, reviews of telecommunications equipment and software, answers to questions received by the Customer Service Department, and general news and trends in the telecommunications industry.

For really urgent questions and comments, NewsNet staffs a toll-free hot line on business days from 9:00 A.M. to 8:00 P.M. EST.

So what does all this business information cost? If you have only a vague idea of what you are looking for and have not bothered to figure out how the system works, it costs a lot. If you have pinpointed a particular topic and become familiar with the system, it costs a reasonable amount.

NewsNet presents new subscribers with a $24 coupon, which provides one free hour of use to learn the system. If the rates seem expensive, keep in mind that if you ordered print subscriptions to all the newsletters available on NewsNet, it would cost you over $20,000 annually. Presumably, like subscribing to newsletters, NewsNet costs are tax-deductible.

During business days, from 8:00 A.M. to 8:00 P.M. EST, NewsNet charges a flat $24 per hour to Scan, Search, and use other system features at 300 baud. During off-hours, from 8:00 P.M. to 8:00 A.M., and all day on weekends and holidays, NewsNet discounts its flat rate 25% to $18 per hour.

For actually reading (or seeing the text of) articles, NewsNet charges a different rate, depending on the newsletter and whether you subscribe to the printed version or not. If you already subscribe to the print version of a newsletter and get the newsletter publisher to confirm it, you use a "validated" rate from $24 to $72 per hour at 300 baud. If you do not subscribe to the print version, you use a higher "nonvalidated" rate of between $24 and $120 per hour at 300 baud. NewsNet discounts its validated and nonvalidated rates 25% if you Read during off-hours.

NewsNet offers a wide selection of business newsletters.

All rates are doubled when you use 1200 baud. The Mail service to send a message to NewsNet and a subscription to the print version of NewsNet Action Letter are free of charge. NewsNet carries a $15 per month minimum charge.

According to NewsNet, roughly 80% of all newsletters carry a $24 per hour validated read rate, and retrieving an average 16-line article costs about $0.25 at 300 baud. Although the rates vary, the cost averages out to about $27 per hour for a validated subscriber and $50 per hour for a nonvalidated subscriber. Typical subscribers can expect to spend about $50 per month for NewsNet services.

The Outcall service of NewsFlash carries a surcharge, and you must rent a teleprinter from NewsNet to receive the service. The teleprinter has a one-time $50 shipping and handling fee and costs $59 per month to rent. You pay the Read rate for articles sent via the teleprinter.

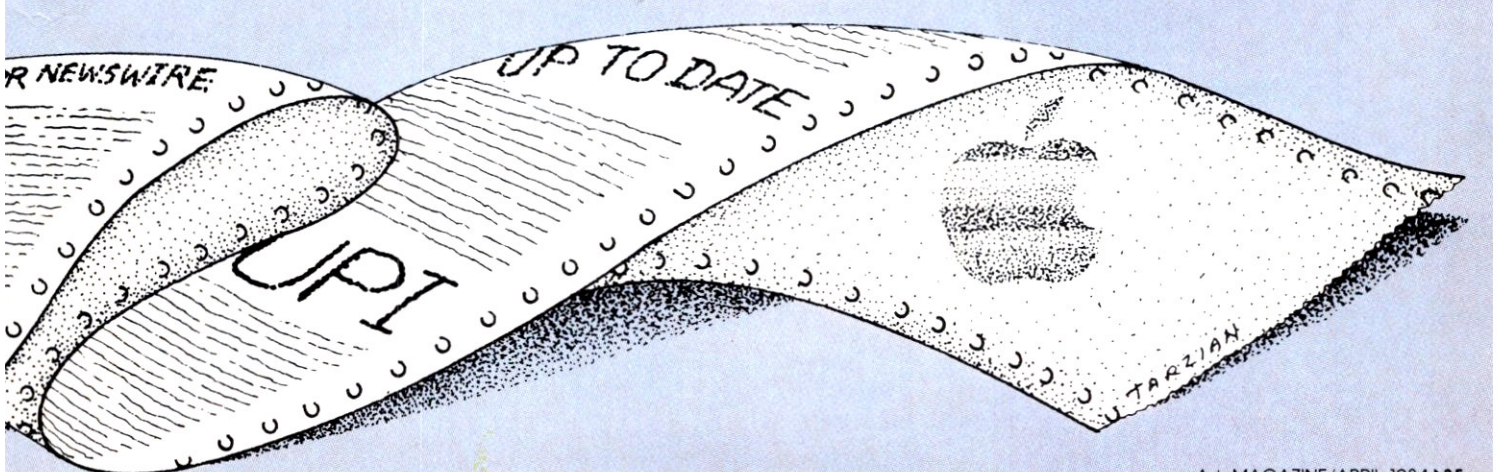
NewsNet plans to offer 175 newsletters on-line at the beginning of 1984 and 300 newsletters by the end of 1984. Newsletters scheduled to appear include Howard Ruff's *Financial Survival Report*, *The Wellington Letter*, *Medical Abstracts*, a newsletter from American Banker, and *Commerce Clearinghouse's State Tax Review*.

NewsNet obviously put a lot of thought into creating an easy-to-use flexible system. By combining a limited number of commands with keyword searching, NewsNet offers a simple yet versatile system that you can easily learn and operate. Any lapses in memory are more than compensated for with the elaborate Help command.

My only gripe against NewsNet is the lack of a manual. NewsNet does provide subscribers with information, but it is scattered throughout various loose pages and numerous Action Letters. It is putting together a quick reference card, but it would be far better to place all the information in a three-ring binder.

You can spend a lot of money on NewsNet services. The key to keeping your costs low is to plan your search before signing on. Searching through two or three industry categories instead of the entire database saves time. Using the type-ahead feature also saves time. Scanning the headlines for relevant articles instead of plunging into the text saves a lot of time. With an on-line meter running, time is money.

NewsNet offers a wide selection of business newsletters and its innovative NewsFlash service highlights the ease and speed of bringing perishable information to a businessman's desk. It puts a virtual library of newsletters inside your Apple. +



▶ TELECOMMUNICATIONS/BY ALAN ROSZKIEWICZ

MODEM QUARTET

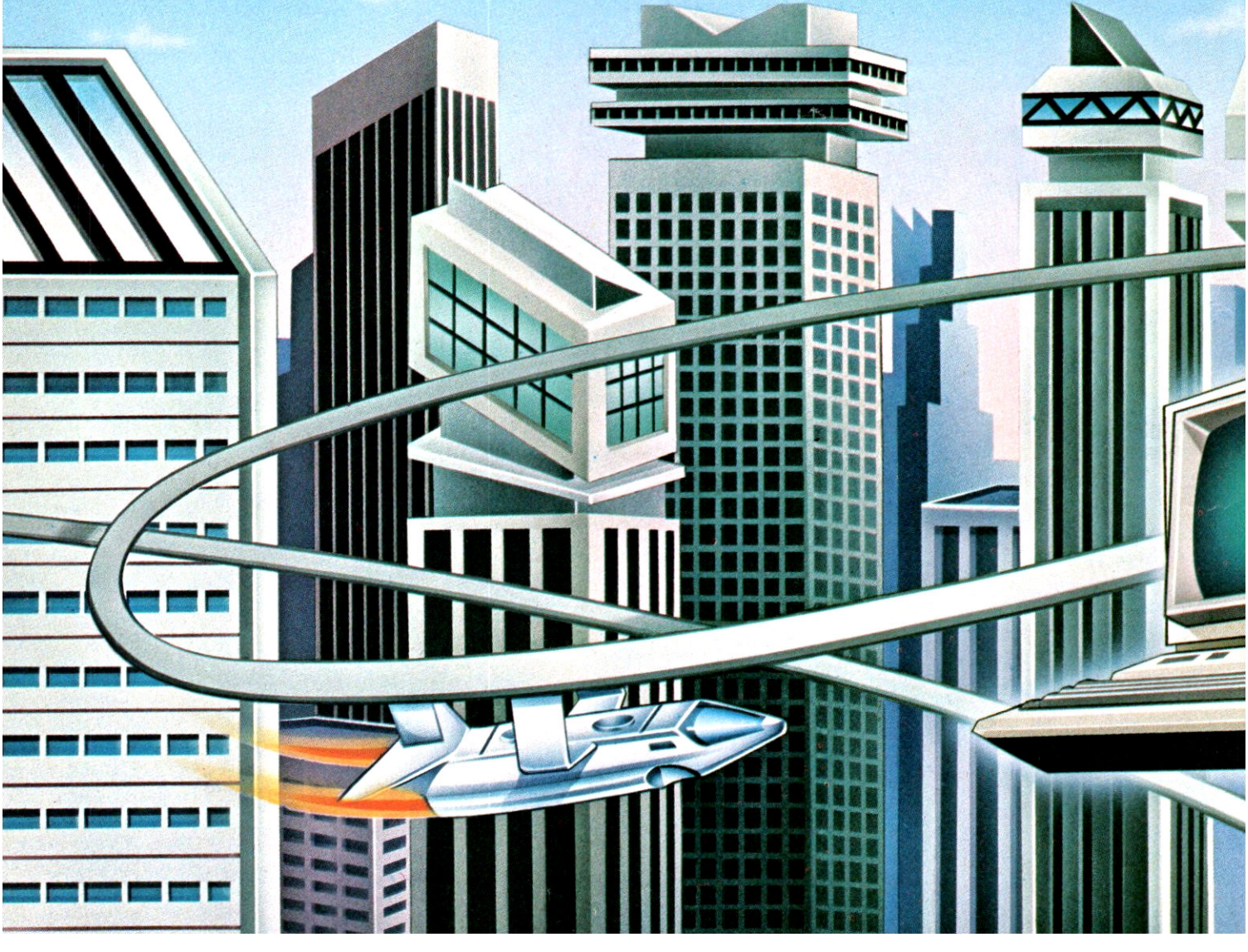
A comparison of four modems that can turn your Apple into a great communicator

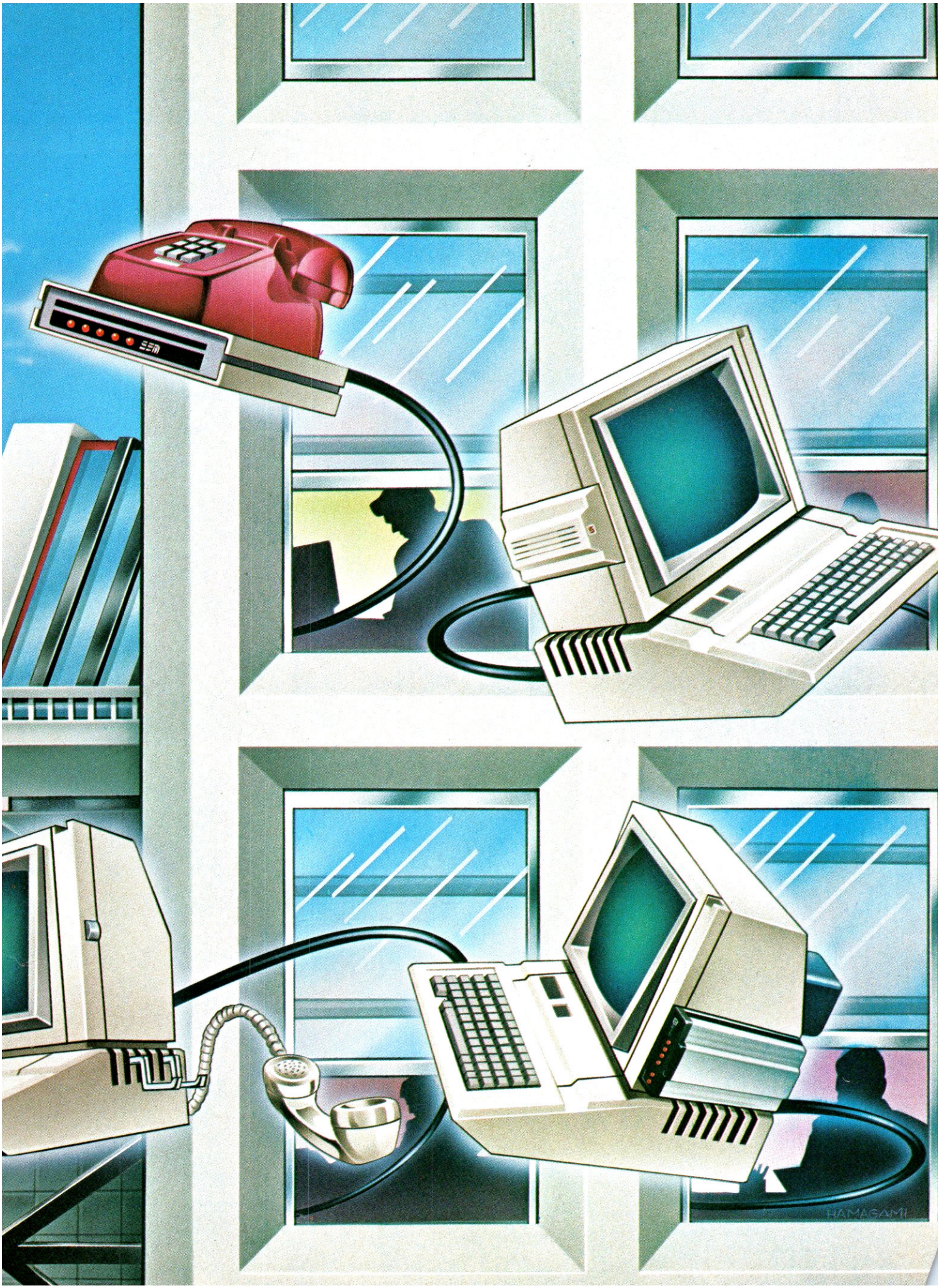
For this comparison article, I put four 1200-bps Bell 212A modems through their paces: the Password 1200 from U.S. Robotics, the 212 Apple-Cat II from Novation, the Smartmodem 1200 from Hayes Microcomputer Products, and the TransModem 1200 from the Transend Corporation.

All four are direct-connect modems—they plug directly into a modular phone plug rather than being acoustically coupled—that can place calls, using either Touch-Tone or rotary-pulse dialing. All can handle incoming calls either automatically or under a computer program's control, making your choices of software important. All but one of the modems, the 212 Apple-Cat II, are external, self-powered modems that require an RS-232 port to hook up to an Apple. Keeping this difference in mind, we will start our discussion with the one exception.

Novation's 212 Apple-Cat II

The 212 Apple-Cat II, from Novation, Inc., was the only unit I tested that you install inside an Apple. This system's normal configuration, which consists of an Apple-Cat II modem card and a 212 Apple-Cat II Upgrade modem card interconnected with a jumper cable, requires use of two Apple slots. A slot-saver kit that comes with the modem lets you mount the Upgrade card on top of the power supply and patch it into the main-power-supply output with a separate cable. I'm not sure that this slot saver is a good idea—if you're that pressed for slots, then you're probably already taxing your Apple's power supply beyond reasonable limits. A modem

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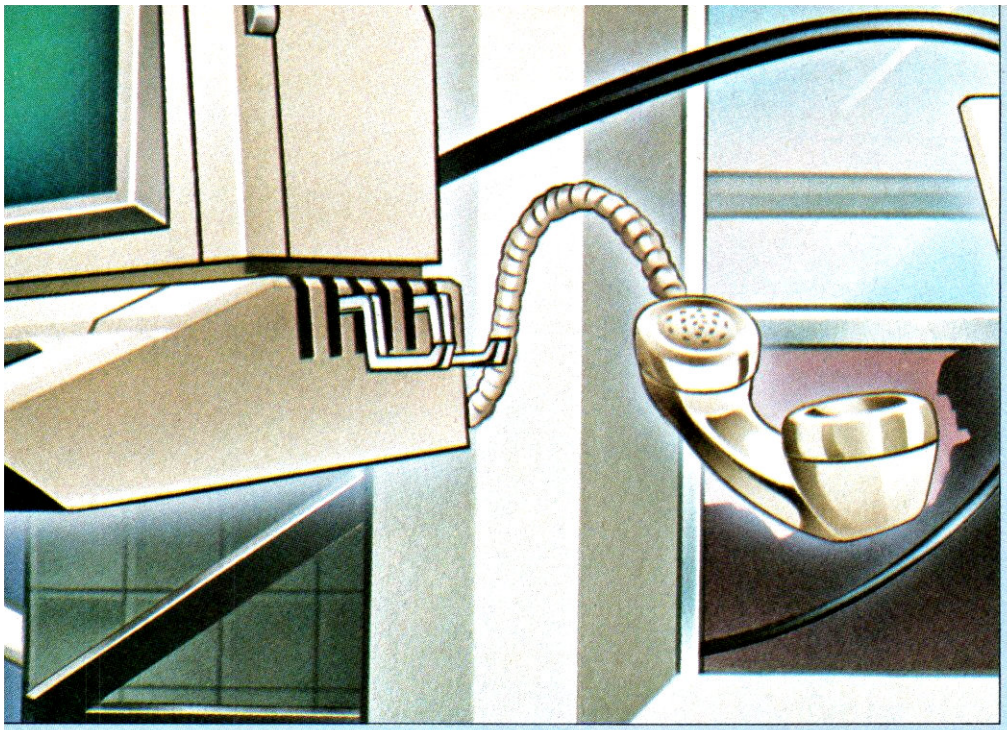


with a printer, an 80-column card, and a Language Card already approaches too much power usage.

An acceptable solution to the slot problem involves using an expansion chassis from Mountain Computer, Inc., 300 El Pueblo Road, Scotts Valley, CA 95066. With this product a typical setup might be to put the modem cards in slots 2 and 5 of the expansion chassis while having the Apple's slots 0, 1, 3, and 6 enabled, allowing access to a Language Card, a Grappler+, a Videx 80-column Card, and disk drives, respectively.

This setup worked fine with plenty of slots to spare. If you already own one of the older expansion chassis models, you can buy the interface card separately to realize this added power. The possibilities with this system are extensive.

Com-Ware for the Apple-Cat II

To complete the hookup of the Apple-Cat II, you connect the system to the phone lines with the included phone-line cable. You turn on your Apple and boot the supplied Com-Ware 5.03 software. Com-Ware 5.03 turns your computer into a fully operational communicating terminal. This program takes over full control of the computer but still allows complete access to conventional DOS commands, which helps make this system as it is sold the most flexible for use with the Apple.

The Com-Ware software brings up a menu of all the available options (see table 1). You select terminal, modem, and printer characteristics and save them to the disk, which is unprotected. You can dial numbers directly from the Apple's keyboard, or you can select them from the phone list of up to 26 numbers that you create on the disk.

Options with the Apple-Cat include an expansion box that plugs into the board and attaches to the side of the Apple. It gives you convenient access to required and optional equipment to interface with the Apple-Cat. You can control a BSR remote-control system as well as a cassette recorder with your computer. A plug-in ROM helps programmers who want more program control, and a Touch-Tone-receiver option allows the Apple-Cat II to decode standard DTMF (dual tone multi-frequency) tones from Touch-Tone telephones.

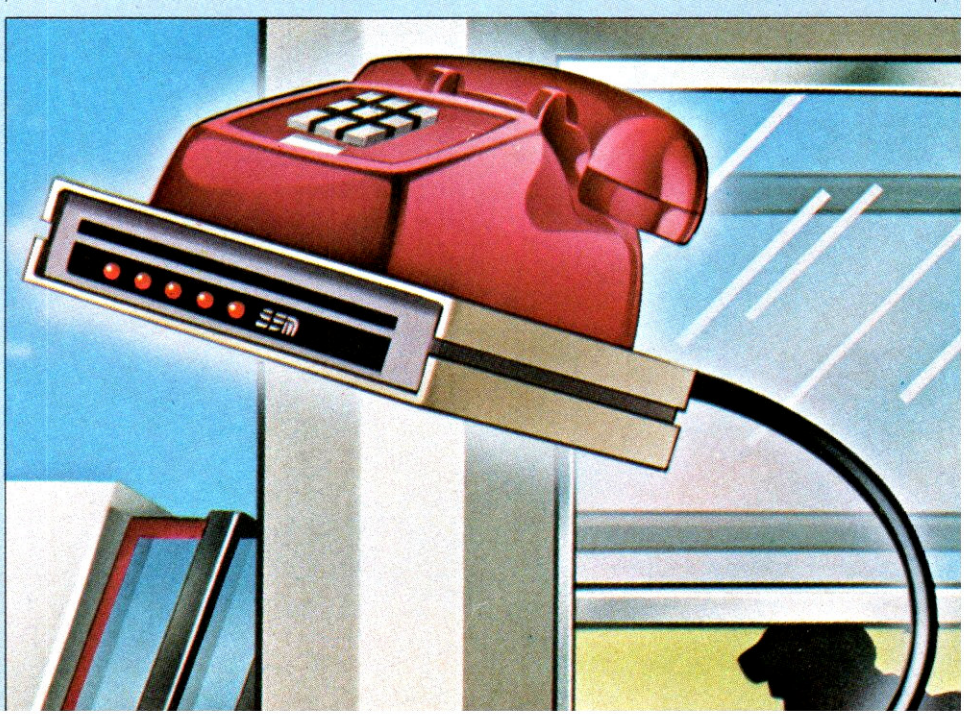
The Apple-Cat II's documentation is clear and complete. Its information can aid anyone from novices or casual users to advanced programmers or intensive users who might want to customize their modem software.

All in all, it is a superb product that has an added advantage: You can buy the unit as just a Bell 103, 0–300 bps Apple-Cat II, upgrading to full Bell 212 at 1200 bps whenever you want to. Both versions come with Com-Ware, so you won't have any compatibility problems.

External Modems

The Password from U.S. Robotics, Smartmodem 1200 from Hayes Microcomputer Products, and TransModem 1200 from Transend Corporation are all direct-connect, high/low speed, external modems that you can use with any computer or terminal with an RS-232C serial port. For the Apple, you'll have to purchase a peripheral card that will provide the Apple with a RS-232 serial port, as well as a cable to connect the modem to the Apple.

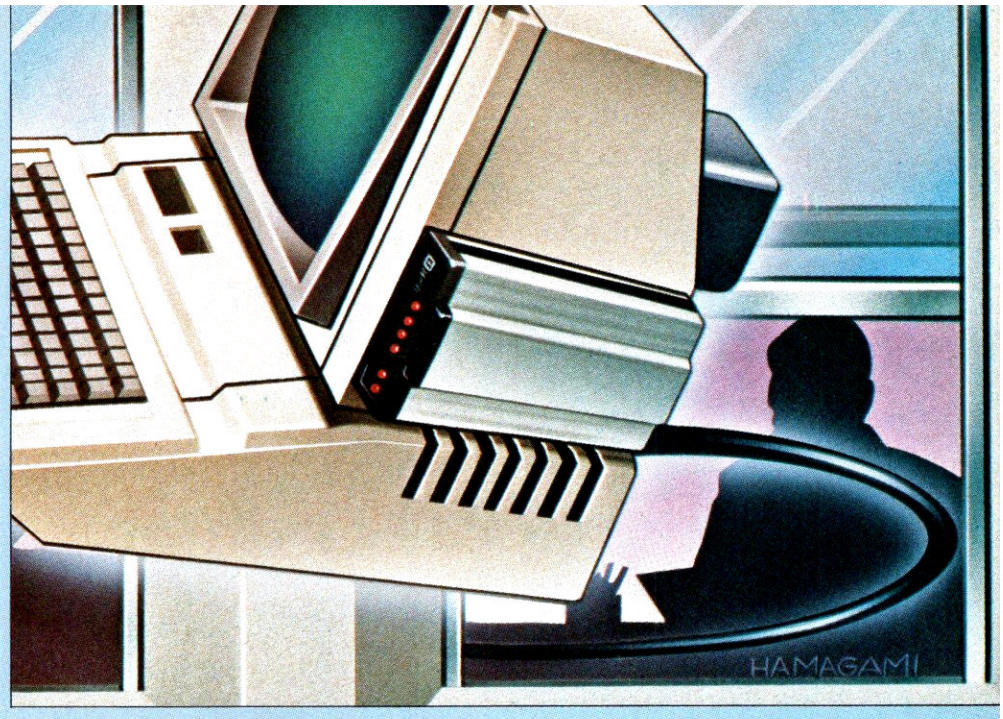
With the Password 1200, you can



omit the cable, as the unit comes with an attached two-foot length of cable, terminated with an RS-232 plug. If you buy a Password, make sure you specify what connector you require, as several different types are available.

The units include a modular telephone socket for connection to the phone line and a power adapter that plugs into a standard 115-volt outlet. All three can place calls using either Touch-Tone or rotary-pulse dialing. They can answer calls automatically or under computer control. The Smartmodem 1200 and Password also have an on/off switch; the TransModem 1200 has a second modular telephone socket, which allows the connection of a handset or a second telephone without an external adapter.

The Smartmodem 1200 and the TransModem both use numerous LED lights to indicate modem and line states; the Password has only a logo-shaped light that illuminates when the unit is on. Lights are sometimes a helpful tool, but you'll miss them only if something goes wrong.



Password 1200 and Smartmodem 1200

Both the Password and the Smartmodem 1200 use an audio speaker to let you monitor the progress of a call; on the Smartmodem 1200, the speaker volume is adjustable, and you can disable the speaker on either machine under program/terminal control.

WHAT IS A MODEM?

A modem is a device that enables terminals and computers to communicate via ordinary phone lines. The name modem is a contraction of two words describing the functions of devices that allow such communication. Digitized data from each computer must be changed to an analog representation suitable for transmission in a process called modulation. An incoming signal, in turn, must be restored to a digitized form, which can be read into memory—this is demodulation.

Telecommunications systems operate at *half-duplex* when only one of these functions can occur at a time, but most modems work at *full-duplex*, which allows for simultaneous bidirectional data flow between two modems. The speed of this interchange—measured in baud—can be excruciatingly slow. I had misgivings, therefore, when I agreed to evaluate four modems for *A+*. Nearly two years ago, I bought a Novation Apple-Cat II modem and subscribed to The Source, a major information utility, with visions of tapping the world's knowledge on-line and in real time, but I soon tired of communications at only 300 baud. I took a few naps waiting for the thing to transmit before concluding I'd made a mistake. The slow speed of data transmission made my grand plans too tedious to undertake.

Therefore, I looked at the *A+* project with more enthusiasm when I learned the devices in question were all somewhat faster, at 1200 bps (bits per second), gaining by a factor of four.

You get two-way traffic when each modem, depending on whether it originates or answers the call, operates at specific frequencies to send and receive data. The frequencies the originate modem uses complement those the answer modem employs.

Modems of the low-speed (1–300 bps) type are called Bell type 103, and they modulate signals using a technique called frequency-shift keying (FSK). This method requires a bandwidth 1.5 times the modem's baud rate. Baud, though often synonymous with bits per second, is actually the modulation rate, or the number of times the carrier signal is modulated per second.

FSK-encoded data differentiates between digital 1's and 0's by transmitting the 1's at a slightly higher frequency than the 0's. This results in a waveform that you could visualize as a waveform of constant amplitude with the digital 1's showing up as denser sections of the waveform.

The scheme above works fine for the slower Bell 103 modems, which require a maximum bandwidth of 900 Hz for full-duplex operation at 300 bps. This requirement falls well within the average 2300 Hz of bandwidth available on telephone lines between 700 Hz and 3000 Hz. This method falls short of working at a rate of 1200 bps, however, as this rate would require a bandwidth of about 3600 Hz, or 1300 Hz more than the bandwidth available from the phone company.

To overcome this limitation, an alternate method of modulation called phase-shift keying (PSK) or quadrature-phase-shift keying, increases the effective baud rate by encoding two data bits per baud. This way 1200 bps are encoded in a modulation of 600 baud.

Bell 212A modems, which use the PSK method, transmit at 1200 bps and are more sensitive to phone-line quality, as well as any distortion or noise in the system, than are the Bell 103 modems. Because of this sensitivity, it is necessary to incorporate more complex transmitting, receiving, and error-checking hardware in the Bell 212A modem.

TECHNICAL DETAILS: TABLES 1, 2, 3, AND 4

P	—	Pick up phone
H	—	Hang up phone
A	—	Auto-dial
	D	—Dial a number
	R	—Re-dial a number
	L	—Dial number from list
T	—	Toggle between 103/212/202
C	—	Terminal chat
M	—	Terminal memory
Z	—	Toggle print (on/off)
U	—	Unattended answer mode
F	—	High-speed Com-Ware II transfer
	T	—Transfer data from memory
	R	—Receive data to memory
	<esc>	—Abort transfer
I	—	Toggle echo (local/remote)
L	—	Load memory from disk
S	—	Save memory to disk
X	—	Send memory
J	—	View memory
K	—	Keyboard to memory
B	—	Print memory
G	—	Speaker toggle (on/off)
R	—	Re-configure characteristics
D	—	DOS command
O	—	Clear memory
V	—	Verify memory
Q	—	Quit program

Table 1: Apple-Cat II command menu

AT	—	Attention, must precede all commands except A/ (repeat) and +++ (escape)
A	—	Answer mode
A/	—	Repeat last command
D	—	Dial
En	—	Echo command characters (n=1); no echo (n=0)
Fn	—	Full duplex (n=1); half duplex (n=0)
Mn	—	Speaker off (n=0); on until connect (n=1); always on (n=2)
P	—	Pulse dial
Qn	—	Result messages sent (n=0); quiet mode (n=1)
T	—	Touch-Tone dial
VN	—	Single digit result codes (n=0); word result codes (n=1)
XN	—	Standard result code set (n=0); extended set (n=1)
Z	—	Reset modem
,	—	Pause during dialing
+++	—	Escape code causes modem to exit on-line mode

The Smartmodem 1200 also recognizes/executes these additional commands:

CN	—	Transmitter carrier disabled (n=0); enabled (n=1)
Hn	—	Off hook (n=0); on hook (n=1); special (n=2)
In	—	Return product code (n=0); or ROM checksum (n=1)
O	—	Return to on-line state from command state
R	—	Reverse mode (call a number in answer mode—for calling originate only modem)
Sr?	—	Read contents of register r
;	—	Return to command mode after dialing

Table 2: Smartmodem and Password command menu

OK/0—command received and executed
CONNECT/1—remote carrier detected, connection made
RING/2—incoming ring signal detected
NO CARRIER/3—carrier lost or never received
ERROR/4—invalid command or command line too long (max length for Smartmodem 1200 = 40, for Password = 60)
CONNECT 1200/5—high speed CONNECT (only if extended code set enabled)

Table 3: The result codes the Password and the Smartmodem 1200 return

A	—	Answer
B	—	ALB
D	—	DIAL
E(C)	—	LOG ON
H(C)	—	BACKSPACE
I	—	IDLE
K	—	PAUSE
M	—	MEMORY
O	—	OPTIONS
P	—	PRINT MENU
R	—	REDIAL LAST NUMBER
T	—	TABLE OF OPTIONS
V	—	VOICE DIAL

MODEM MODE	FREQUENCIES (Hz)	
	TRANSMIT	RECEIVE
ORIGINATE		
Logic 1	1270	2225
Logic 0	1070	2025
ANSWER		
Logic 1	2225	1270
Logic 0	2025	1070

Table 4: TransModem 1200 command menu

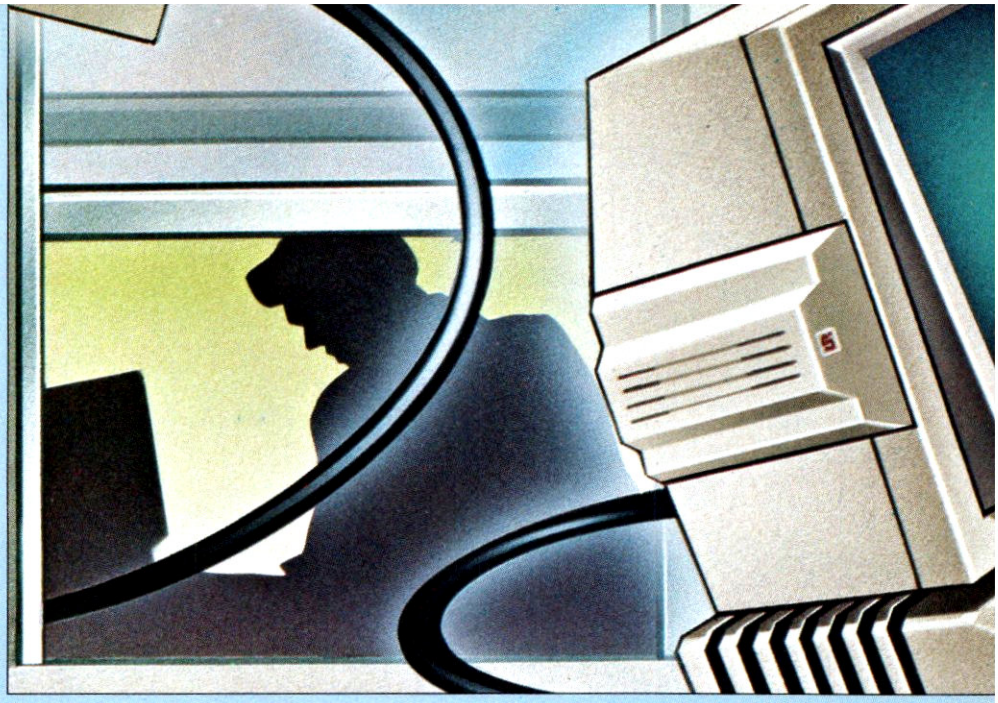
Hayes' and U.S. Robotics' approaches to making their products convenient are impressive. Most commands have sufficient mnemonic content to spare you from the tedium of a menu (see table 2).

The one feature of both command sets that stands out as ill considered is the A/ command. Although repeating the last command might seem to be a general and useful capability, having a last-number redial would be a more welcome convenience.

TransModem 1200

The TransModem 1200 from Transend Corporation (formerly SSM Microcomputer Products, Inc.; formerly Solid State Music) is both a capable and easy-to-use unit. Some of its more pleasant features are direct consequences of its powerful hardware. Its ability to detect a dial tone enables it to choose between tone- and pulse-dialing on the basis of the response it detects. Each time it detects a dial tone, either at the start of the dial operation or as a result of a K command, the TransModem tone-dials the next digit. If the dial tone remains, it pulse-dials that digit again and then the rest of the number; otherwise it continues to tone-dial the remaining digits. Another consequence of dial-tone detection is that you don't have to program a delay that will occur before the modem dials the first digit of a number.

When the TransModem 1200 detects a busy signal, it reports BUSY and hangs up, rather than waiting 30 or 60 more seconds and reporting NO CARRIER. If you enable the appropriate option, the TransModem 1200 can also detect a voice answering the phone.



If you buy a Password, make sure you specify what connector you require, as several different types are available.

Although the manual warns that this feature is not 100% accurate, it has worked without a hitch so far.

Documentation

One minor criticism of the TransModem 1200 concerns its documentation. Although it is adequate in most sections, several of its descriptions are both confused and confusing. One option description appears to have the enable and disable codes reversed. In defense of Transend, I have to say that the product obviously has been undergoing extensive upgrades and enhancements. Changes that postdate the manual are overprinted and on an insert. Since all these changes appear to be real improvements, I don't object too much to the disruption. I do hope that when the revisions stop, the quality of the manual will catch up and begin to approach that of the hardware.

The Hayes Smartmodem 1200 comes with a Hardware Reference Manual that is complete, professionally bound, easy to use, and altogether worthy of the hardware it accompanies. In fact, the Smartmodem 1200 package is a good product in all respects, as its long standing in the marketplace demonstrates.

The U.S. Robotics Password seems like a scaled-down version of the Smartmodem 1200. Its functions and commands are essentially the same as those of the Smartmodem, the main difference being the Password's extensive use of VSLI chip technology to minimize the parts count and costs while maximizing system reliability. This modem performed at all speeds without difficulty. Its documentation, consisting of 16 8½ x 11-inch sheets stapled in the upper left corner, is not a glamorous affair, but it is intelligently laid out, clearly written, and altogether adequate for the purpose. As with the hardware, its production with a minimum of frills allows USR to offer a solid product at a relatively low price.

In Sum

You won't go wrong with any of these four modems. My testing showed all of them to be fundamentally sound, and I found them equally pleasant to use. +

▶PRODUCT INFORMATION

Smartmodem 1200
Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791
Requires: any Apple computer; RS-232 port
List Price: $699

Transmodem 1200
Transend Corporation
(previously SSM Microcomputer Products, Inc.)
2190 Paragon Drive
San Jose, CA 95131
(408) 946-7400
Requires: any Apple computer; RS-232 port
List Price: $695

Password 1200
U.S. Robotics, Inc.
1123 West Washington Street
Chicago, IL 60607
(312) 733-0497
Requires: any Apple computer; RS-232 port
List Price: $449

212 Apple-Cat II
Novation, Inc.
20409 Prairie Street
Chatsworth, CA 91311
(213) 996-5060
Requires: Apple II, II Plus, or IIe
List Price: $725
Novation also sells an RS-232 version called the SmartCat 1200, which lists for $595

MODEM COMP

MANUFACTURER	CIRCLE ON READER SERVICE CARD	PRODUCT	(SOLD) DIRECT	(SOLD) DEALER	(SOLD) BOTH	MODEL NUMBER	PRICE	DIRECT CONNECT	ACOUSTIC
ANCHOR AUTOMATION 6624 Valjean Ave. Van Nuys, CA 91406	500	Mark 12 Apple		■		Mark 12 Flash A	$499	■	
ANDERSON-JACOBSON 521 Charcot Ave. San Jose, CA 95131	501	AJ1212-81			■	AJ1212-81	$595	■	
BIZCOMP P.O. Box 7498 Menlo Park, CA 94025	502	Bizcomp 1012			■	1012	$499	■	
HAYES MICROCOMPUTER 5923 Peachtree Industrial Blvd. Norcross, GA 30092	503	Micro Modem II		■		Micro Modem II	$329	■	
HAYES MICROCOMPUTER (See Above)	504	Smartmodem 1200		■		Smart-modem 12	$699	■	
MULTI-TECH SYSTEMS 82 Second Ave. S.E. New Brighton, MN 55112	505	Modem II		■		MT103E	$329	■	
NOVATION 20409 Prairie St. Chatsworth, CA 91311	506	Apple-Cat II		■		490402	$389	■	
NOVATION (See Above)	507	212 Apple-Cat II		■		490412	$389	■	
PROMETHEUS PRODUCTS INC. 45277 Fremont Blvd. Fremont, CA 94538	508	Prometheus ProModem 1200			■	ProModem 1200	$495	■	
TIMECOR P.O. Box 8928 Boston, MA 02114	509	The Operator			■	The Operator	$159	■	
TRANSEND CORP. 2190 Pargon Dr. San Jose, CA 95131	510	Apple Modemcard			■	AMC300	$325	■	
TRANSEND CORP. (See Above)	511	TransModem 1200			■	MDM1200	$695	■	
U.S. ROBOTICS 1123 W Washington Chicago, IL 60607	512	Password Modem		■		Password Modem	$449	■	
VEN-TEL 1390 Walsh Ave. Santa Clara, CA 95051	513	Smart Modem 1200 Plus		■		1200 Plus	$449	■	
ZOOM TELEPHONICS, INC. 207 South St. Boston, MA 02111	514	Networker		■		NW1	$129	■	

ARISON CHART

BAUD: BOTH	BAUD: 300	BAUD: 1200	MODE: BOTH	ASYNCHRONOUS	FULL DUPLEX	ORIGINATE	ANSWER	BOTH	AUTO-ANSWER	AUTO-DIAL	SOFTWARE AVAILABLE	SOFTWARE INCLUDED	SEPARATE UNIT	PLUGS INTO MOTHER BOARD
			■	■	■			■	■	■	ASCII Express Professional	Yes		■
			■	■	■			■	■	■	No Software Required	No	■	
			■	■	■			■	■	■	ASCII Express	No	■	
	■			■	■			■	■	■	Smartcom I	Yes	■	
			■	■	■			■	■	■	Smartcom I	No		■
	■			■	■			■	■	■	Software By Multi-Tech	Yes		■
	■			■	■			■	■	■	Com-Ware	Yes		■
		■		■	■			■	■	■	Com-Ware	Yes		■
			■	■	■			■	■	■	ProCom	No	■	
	■			■	■			■	■		The Connection	Yes		■
	■			■	■			■	■	■	Transend	No		■
			■	■	■			■	■	■	Transend	No	■	
			■	■	■			■	■	■	Telpac	No	■	
			■	■	■			■	■	■	Any Industry Standard Smart Modem Package	No	■	
	■			■	■			■			Networker Software	Yes		■

WHEN OVERNIGHT ISN'T FAST ENOUGH

MCI MAIL

ON THE APPLE

I don't run my printer nearly as much as I used to—now that I've signed up for MCI Mail. I've been using this new electronic-mail service to send letters, articles, and proposals to people I do business with all around the country. It's costing me less than an express package-delivery service and gets my materials there faster as well. In many cases, I've gained an extra day when I had a deadline.

MCI Mail is a public electronic-mail system run by a subsidiary of a company that offers cut-rate long-distance telephone service. You can send and receive messages through MCI Mail with an Apple or any other computer equipped with a modem. If your recipients are also MCI Mail users, they can call up their messages seconds after you leave them. Otherwise, the system prints out your message in the big city closest to its destination—at one of the 15 MCI Mail Centers—and sends it by U.S. mail—or, in most large cities, by messenger, if you choose.

The system is a "store and forward" system, rather than a conversational one. When you send a message, your recipient does not have to be on-line, you cannot "chat" back and forth. If you're sending business documents, you probably want to do your chatting by phone anyway and send messages whenever you're ready. Store and forward also means that your recipient does not have to worry about what kind of computer you're using, what protocols, what settings, and so on.

The cost of the service is reasonable compared to alternative ways of rapidly sending text information. You pay $1 for up to 7500 characters (about three typewritten pages) and $1 for every 7500 characters or fraction thereof after that. Delivery by the U.S. Postal Service involves no extra charge, but delivery costs $5 extra for one-day service and $24 extra for four-hour service, which is available in 15 major cities.

Furthermore, signing up for the service is free. Instead of paying by the month or by the hour, you pay per message and, just as with ordinary mail, you don't pay anything to receive an MCI message. Advanced service (described below) costs $10 per month, but you probably won't need it.

The MCI Mail network is less than a year old, so it's still in a period of expansion and refinement. As of the beginning of 1984, you could access MCI Mail with a local call in a few dozen cities. For regions outside the local calling areas for those cities, MCI provides a toll-free 800 number. All numbers work at 110, 300, and 1200 baud (10, 30 and 120 characters per second).

Overnight messenger delivery (by Purolater) goes to most urban areas in the continental U.S.—a list by State and ZIP code is available on the system. The MCI overnight delivery area is basically the same as Purolater's.

If you sign up for MCI Mail, you will also have access to DOWJONES, which lets you use the Dow Jones News/Retrieval Service, a business news-oriented database system. During most of the day, the cost of the main news-retrieval service is $72 per hour, but from "9:01 P.M. to 4 A.M. Eastern Time" and "weekends and holidays," you can use the service for one-sixth as much. This service is entirely separate, merely accessed and billed through MCI.

Using the Service

After you sign up for the service, you receive your user name, number, and password.

IT COSTS LESS THAN AN EXPRESS PACKAGE AND GETS THERE FASTER.

To connect to the system, you set up your computer as if you were going to call into a bulletin board (see "What You Need"). Then you call the local access number or the 800 number if there is no direct number in your immediate area.

After the system answers, you must enter a carriage return or two, so it can set itself to your communications speed. In actual practice, the system doesn't always respond after two returns, but if you give it too many it interprets them as an answer in the log-in dialogue and figures that you have a blank user name.

The dialogue goes like this:

```
<CR> <CR>
Please enter your user name: SROSENTHAL <CR>
Password:        <CR>
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
```

Unless you arrange otherwise, your user name is your

first initial and last name (without any intervening space). Your password is an eight-letter combination. If you are using the system in the normal full-duplex mode (in which your Apple prints what you type only if the MCI Mail computer has echoed it back), your password won't be displayed. If you make an error in either your user name or password, the system lets you try again.

Once you've signed on successfully, you get a message confirming that you are on the network, followed by a short announcement giving the latest system news. At present, you cannot skip the announcement, but at least you're not paying by the minute.

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
Connection initiated . . . Opened.

Welcome to MCI Mail!

REWARDS FOR THE WORKING WEEKEND

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

MCI Mail lets you post ONITE Letters on weekends
for Monday delivery to 15 major cities. Type HELP
NEWS to $ave.

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

MCI Mail Version 1.14

     Your INBOX has 1 message

Press <RETURN> to continue
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
```

At this point, the news message is often the announcement of a service enhancement. In the last few weeks, MCI has added more delivery options, a reformatting option for text, and a link to the international telex system (you can now send messages to, and receive messages from, any telex terminal in the worldwide system, including any on the domestic Telex-TWX system).

If you have any mail waiting, the system lets you know and also tells you if you have an unsent draft. Now you're finally at the main menu:

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
You may enter:

SCAN       for a summary of your mail
READ       to READ messages one by one
PRINT      to display messages nonstop
CREATE     to write an MCI Letter
DOWJONES   for Dow Jones News/Retrieval
ACCOUNT    to adjust terminal display
HELP       for assistance

Command (or MENU or EXIT):
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
```

You'll probably key in SCAN first if you have any mail. It shows you a numbered list of what has arrived—since the last time you checked in (your "inbox"), anything you sent within the last day (your "outbox"), any letters that have arrived within the past day that you have already read (your "desk"), and any letter you have started but not sent (a "draft").

When you do have mail, you can also pick READ and go through each item. If you have a communications program that captures everything you receive and sends it to a file, or if your printer can keep up, you can select PRINT to download all your mail.

The first time you sign on, you'll want to pick ACCOUNT to set various parameters such as your time zone and terminal height and width. You won't need to select it again, unless you change video cards, computers, or time zones.

YOU DON'T PAY ANYTHING TO RECEIVE AN MCI MESSAGE

HELP, as on most other systems, gives you general assistance for the immediate situation, as well as a list of more specialized subject areas. By typing HELP <name of a state>, you can also get the current list of overnight-delivery zones for any state.

In a recent MCI Mail session, I did have mail, so I entered SCAN and then read my inbox.

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
Command (or MENU or EXIT): SCAN

You may enter:

INBOX   to SCAN your unread messages
OUTBOX  to SCAN messages you sent
DESK    to SCAN messages read before
DRAFT   to SCAN your DRAFT message
ALL     to SCAN ALL your messages
HELP    for assistance

Command (or MENU or EXIT): INBOX

   1 message in INBOX

No.  Posted        From
   1  Jan 13 14:04  Michael O'Cone
   Subject                 Size
   RCVD: Letters to send   43

Press <RETURN> to continue

You may enter:

READ   to READ the scanned messages
PRINT  to display messages nonstop
SCAN   to SCAN for other messages
HELP   for assistance

Command (or MENU or EXIT): READ
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
```

If you want to send a message, you pick CREATE from the main menu. The system then asks you to whom you want to send the message. You can answer with a user's name, a first initial and last name, a last name, or an MCI user number. If you pick any form but the last, the system searches

through memory to see if the name matches that of any current customers.

If it doesn't find a match, the system prompts you for an address that it can use to send the message by mail or messenger. If more than one user matches the name you give, you get a list of matching names with their company and city, and you pick the one you want.

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
Command (or MENU or EXIT): create

TO:  A+Readers
     (A+Readers not found. Enter a postal address or TLX:(telex address), type HELP, or
     press RETURN to delete.)
     c/o A+Magazine
     11 Davis Drive
     Belmont, CA 94002

TO:
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
```

After you provide the recipient's name and address, the system prompts you to enter a CC:, the recipient of a "courtesy copy" (that used to be a "carbon copy" not so long ago). If you don't want to send any copies, you simply answer by pressing Return. You can specify multiple recipients and multiple copies. The subject line doesn't appear in the delivered message, but it does show up in the listings of the contents of the inbox, outbox, and desk that the Scan command provides.

Next, the system prompts you to enter text. You can enter lines up to 80 characters long, ending each with a carriage return or carriage-return/line-feed pair. To exit from the Text Entry mode, you enter a line whose only content is a slash (/).

YOU HAVE TO INSPECT ALL YOUR MESSAGES OR SPELL OUT CRITICAL NUMBERS

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
CC:
Subject: Send Us Your Comments!
Text: (Type / on a line by itself to end)

  We're always interested in what you have to say about A+. If you write us an MCI Mail letter in the next two months, we promise you a speedy personal reply. Address your comments to APLUS (spelled as ''APLUS,'' not as ''A+''), MCI ID 175-2179. We'll also give away a free year's renewal to the first person who suggests an improvement we like that we haven't already started working on. If we get some useful suggestions this way, we'll make this a permanent service.

The editors of A+
/
You may enter:

READ          to review your letter
EDIT          to correct your letter
SEND          U.S. Mail for paper;
              instant electronic delivery
SEND ONITE    OVERNIGHT courier for paper;
              PRIORITY electronic delivery
SEND 4HOUR    FOUR-HOUR courier for paper:
              PRIORITY electronic delivery
HELP          for assistance

Command (or MENU or EXIT):
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
```

Because the system has no error-checking protocol, you might want to watch your message as it goes out to MCI and is echoed back or use the READ function. I have had problems at 1200 baud, so I either send at 300 baud or review my text after it's been loaded.

The Edit function lets you read, delete, add, or change text on any line—you specify lines with line numbers, starting from the beginning of your text. You can also add to, delete, or replace the TO:, CC:, and SUBJECT: fields, the so-called envelope. As of this writing, you don't pay anything

WHAT YOU NEED

To use MCI Mail with an Apple, you need a modem and a simple communications program. Either a built-in modem or a serial card and an external modem will do. You can get by with simple software, but advanced packages will help you sign on faster and send and receive stored files.

You don't need auto-answer capability (where your modem answers the phone), since the system never calls you. Audo-dial (where your modem dials the number) is not essential either, unless you have Advanced Service, since the Basic User software is not well enough designed to permit unattended operation. The system doesn't care if you send at 300 or 1200 baud, and you pay nothing extra either way. If you are using MCI Mail for business, 1200 baud is preferable, because it cuts down on the time you spend using the system.

As with any other communications link, you have to make sure that your system is set to the parameters that the receiver (the MCI computer, in this case) expects—for example, 8 data bits, no parity bits, 1 stop bit, and full duplex. I've been successful with several other settings too, so I suspect that if your software accepts MCI's format, MCI's computer is relatively tolerant of what you send it.

For example, I tried using a Transend Apple Modemcard, first by itself and then with Transend's software package. The modem has some simple built-in communications software; with it I was able to sign on to MCI within about ten minutes of opening the Transend box. The software package is considerably more complex than the built-in software, and the manual is not as clear as it could be—I had to spend more than an hour reading the manual and setting parameters before I could use the software successfully. The new revision of the Transend software, scheduled for release before this article is printed, should have an MCI setting built into the predefined formats.

for editing time.

After you've entered, read, and edited your message, the last step is to send it. If the recipient is an MCI Mail user, he can retrieve it from his inbox as soon as you order the message sent. Otherwise, it goes out by mail or messenger, depending on what you select. If you specify RECEIPT when you address your letter, you'll be notified when the recipient has read his mail on the system, or when the letter was mailed or delivered.

Other Features and Services

One of the best features of the system is its error recovery. If you trip over a cable, lose power, or have to interrupt your session in the midst of composing a letter, you don't lose the letter. If you call back within a day, the system reminds you that you have an unsent draft, and you can finish or delete it.

The laser printer that prints out messages for U.S. mail and messenger delivery can also print out a copy of your letterhead and signature, if you supply a clean reproduction-quality copy of each. This service costs $20 annually.

You can also sign up for Advanced Service, at $10 extra per month. This level of service gives you five-day storage in your outbox instead of one, with the ability to store lists that you can reuse to send mail and the privilege of using commands instead of menus. Aside from the switch to commands, though, most of the sophisticated communications programs for the Apple can provide the same advanced features, so you may not need Advanced Service unless you are using a simple teleprinter or video terminal.

Actual Performance

As a communications service, this product is a welcome addition. Compared to ordinary express delivery, it is faster and often less expensive, and compared to sending text directly between computers, it is cheaper than a long-distance

YOU HAVE TO REMEMBER TO SIGN UP WELL BEFORE YOU WANT TO USE THE SERVICE

call and easier than directly connecting systems with different protocols and settings. It's wonderful to be able to send text whenever you're done, without having to synchronize schedules or worry about whether recipients remembered to turn on their auto-answer computer for the night.

They are probably due to the newness of the system, but I did run into two serious hardware problems. I found that the local (Oakland, California) phone to the system cut me off at random times, so I had to use the toll-free national number. If my experience is typical, the 800 number may be swamped with calls. Once, I sent an important four-hour delivery to New York and received a phone call the next day saying that the laser printer had broken and that text had not been delivered the day before, as scheduled. I would have expected MCI to have a backup system or at least to call me the day of the missed delivery.

As software, the system is barely acceptable. The menus, which are designed to lead less experienced users through the system step by step, are interminable, inconsistent, and inconvenient. Unless you sign up for Advanced Service, you probably won't be able to make the system work for unattended operation for sending or receiving messages. The colon that the system uses to prompt for your input also appears within menus, so you can't program your Apple to respond automatically when it sees this character. The system periodically stops for an extra response when it thinks it

AS SOFTWARE, THE SYSTEM IS BARELY ACCEPTABLE

has filled your screen.

The process of sending a message takes much more time than it ought to. Because you can't know in advance exactly what your side of the exchange will be, you must be present when you send a message. I can fill out a Federal Express form, arrange for a pickup, and say hello to the driver faster than I can get a letter out with MCI Mail's Basic User service. If you're sending short messages, you'll find that the cost for your time is higher than the MCI charge.

Because of the lack of an error-checking protocol, you have to inspect all your messages or spell out critical numbers. I'd like to see options for both the widely used XMODEM protocol that most public-domain communications software uses and the new MNP protocol (endorsed by Apple, among other companies).

I would also like to be able to bypass the menus when I don't need them. I find it strange that I would have to pay $120 per year more for Advanced Service to use the system more productively by using commands instead of menus, even though it would actually decrease MCI's costs and encourage me to use the system more. I'd also like to see someone with some experience and skill with responsive systems redesign the menus.

Signing Up

Despite all my complaints, I do use the system regularly and try to get anybody with whom I do business to sign up as well.

To get on the MCI Mail network, you have to open an account and get a password. Signing up takes only a few minutes, and you can do it by telephone, with your computer and modem, or by mail. By voice, you call (800) MCI-2255. An employee takes your information over the telephone, a process that lasts only a few minutes. You can also sign yourself up—dial (800) 323-7751 and sign in with the user name REGISTER and the password REGISTER.

After you sign up, you have to wait for your password and system-user guide, which takes a week to two weeks to receive. Thus, you have to remember to sign up well before you want to use the service. If you want to sign up but don't know whom to send a message to, write *A+*. ✚

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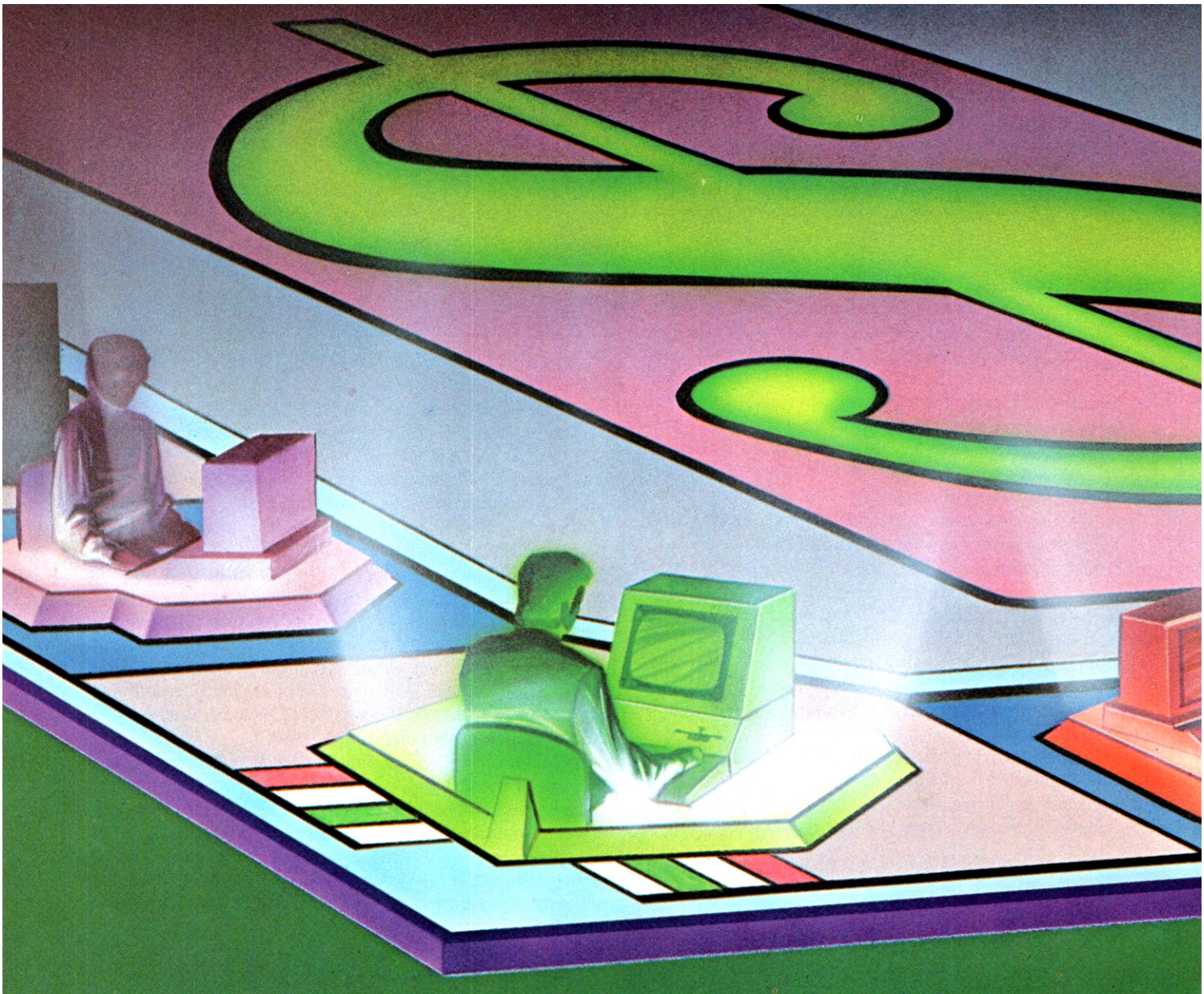


NEW STRATEGIES

TELECOMMUNICATIONS
BY BETSY GILBERT

Some case histories prove its value in dollars and cents.

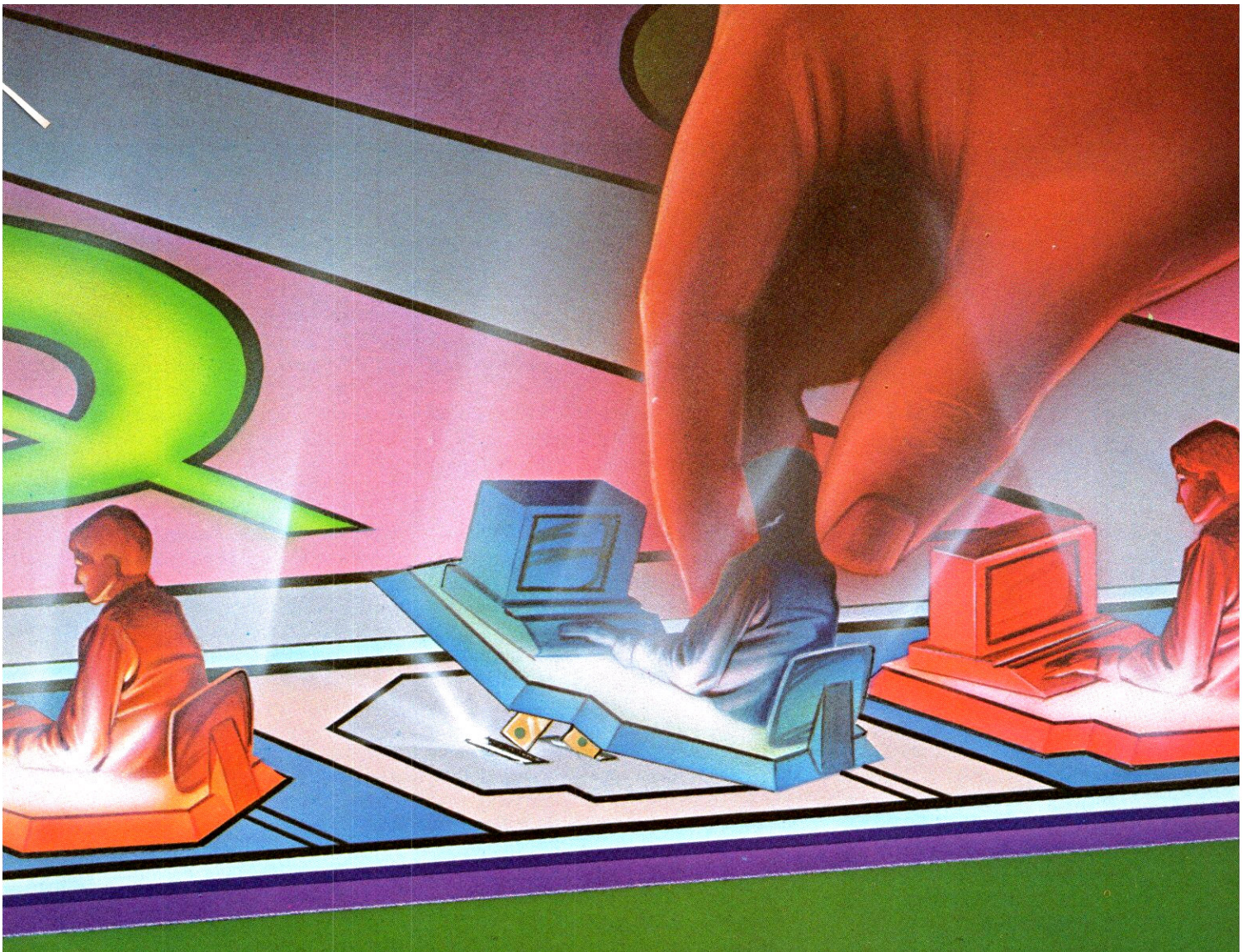
A couple of years ago, when forecasters were saying that soon a computer would be on every business person's desk, plenty of snickers were heard. Today, those snickers have been silenced, and the reason can be summed up in a single word: networking.

Professionals from all types of businesses are discovering the benefits of tying their Apples (and other models) together in networks. As a result, more computers are being installed in businesses, and more professionals are learning what a difference a desktop computer can make.

Networking combines all the advantages of individual computers into one powerful system. Each user has both a personal system and access to the other computers on the network; people can share information through direct communication. Additionally, everyone can share expensive peripherals, such as printers and mass-storage devices. When you calculate the expense of peripherals for each person in a system, the cost advantage of a network is obvious.

"Our company actually considered buying a number of single-user computers, but by the time we totaled up the cost of such a purchase, it was apparent that networking was much more economical," says Ken Sherwin, the principal engineer for technical support at TRW's Ross Gear Division in Lafayette, Indiana.

Specifically, Sherwin's group, a



FOR NETWORKING

$100 million operation with 2000 people, was considering the purchase of three Apple IIs, six floppy-disk drives, and at least one high-speed printer. What it got instead was a Corvus Constellation network, (from Corvus Systems, San Jose, California); five Apple IIs, and a 10-megabyte hard disk.

"We had started out initially with a single Apple system, which was to have been used in the area of hydraulic testing," explains Sherwin, whose division provides both new and replacement components for heavy industrial and agricultural vehicles. "As things turned out, it didn't last too long in that job."

That happens when business people discover the advantages of computers. The lone Apple was soon assigned to what Sherwin saw as a more pressing need: manpower scheduling.

"Part of my job is ensuring that all our engineers are as efficient as they can possibly be," he says, "and one of their most inefficient areas seemed to be in scheduling their time. I figured the best way to overcome that problem was through the Apple."

That turned out to be true. The old scheduling system consisted of 3- by 4-foot sheets of paper tacked to a wall, with penciled-in jobs that people altered constantly. It was replaced by a manpower database within the Apple, which produced clean printouts that engineers could read easily but could not alter without conferring with Sherwin first.

"We took the Apple and turned what has been a real disaster into a smooth-running operation," he says.

That success, however, led to another stumbling block. Scheduling duties had replaced hydraulic testing, the computer's original assignment. After consid-

ering alternative solutions to the problem, Sherwin opted for networking.

"It was obvious from our experience with the scheduling that we were going to need several computers and a lot more storage than we could get from floppy disks," Sherwin recounts. "It turns out that the day Corvus announced its Constellation network, we ordered it. In fact, we were the first buyers in the state of Indiana."

'The fact that we had to share one unit was causing a lot of unnecessary delays.'

The original installation, purchased in mid-1980, was recently replaced by the new Corvus network, Omninet, with two 20-megabyte hard-disk drives. The number of Apple IIs has increased from 5 to 17; 10 are dedicated to hydraulic testing, 3 to word processing and 4 to hardware development and programming.

According to Sherwin, the company has saved approximately $250,000 in labor alone since installing the network. Manual hydraulic testing, which involves many detailed factors, required two full-time employees and around 80 hours to complete *one* test. The same job takes only four hours with the Apple networking system.

Increased Productivity

Deon Whitman can appreciate Sherwin's enthusiasm over increased productivity through networking. As controller for L&H Plumbing in Placentia, California, he saw the 2½-year-old company grow from $500,000 in sales to more than $2.5 million in less than a year and saw the need for computer power grow right along with it.

"We specialize in plumbing contract work, primarily in residential construction, but also in the commercial and motel areas," Whitman says. "We were doing a healthy business our first year, but during the past 12 months, sales have just gone through the ceiling, and it's been a hectic job trying to stay on top of things during the growth."

Whitman attributes that impressive revenue leap to more attractive interest rates for builders as well as the recent surge in motel construction for the 1984 Olympic Games in Los Angeles. Whitman doesn't have much time to analyze the reasons for his company's sales explosion, however; he's too busy trying to take care of business.

"We started out with a single desktop computer when the company first opened its doors," Whitman recalls, "but as we went through this tremendous growth period, it became obvious that we needed more computing power to handle what a single unit had handled before. Things like accounting, word processing, and financial modeling had expanded so fast, it was impossible to perform them all on one system."

The four people who most needed the system—the firm's president, office manager, receptionist, and Whitman himself—found themselves vying for computer time to get their jobs done.

"All of us needed access to the system throughout our workdays, and the fact that we had to share one unit was causing a lot of unnecessary delays for everyone," Whitman says.

Those delays prompted the company to purchase the Corvus Omninet system, a 20-megabyte hard-disk drive, and four Apple IIs in September 1983. Since then, the four principal computer users have been able to perform their jobs efficiently, without worrying that someone else will usurp their places at the computer. Each user has an individual file on the hard disk and an individual access code, so each can perform word-processing, accounting, financial-modeling, and other jobs without interference.

"If this kind of networking hadn't been available with Apples, the company would have likely gone with an IBM mainframe, or a minicomputer at the very least," Whitman says. "The alternative to that would have been slowing down or stopping our growth altogether, and that would have meant a lot of revenue down the drain. Fortunately, the Apples and the network were available to meet our needs, at a cost that we could easily justify."

Fruits on Apples

What's good for industry is also good for agriculture, as Mel Brown can attest. He is the president of the Wenatchee, Washington, Wells and Wade Fruit Company, a 66-year-old firm that grows and ships apples and pears. He discovered the benefits of networking when he purchased an Apple II to streamline the company's fruit inventory. Within a couple of months, employees throughout the firm were lobbying for their own computers.

"Before we got the first Apple, all our inventory was done manually, something that's hard for me to imagine today," Brown says.

Considering the size of the company—it ships more than 600,000 cartons of fruit each year to the tune of $7 million—it *is* hard to imagine performing a job as demanding as inventory with a pencil and paper. These days, however, that chore is just a dim memory.

"The first Apple proved so successful that we decided to install a few more," Brown says. "The only problem was the cost. Single-user computers would have meant buying additional disk drives and printers for each user, and we weren't prepared to invest that much money."

Fortunately, the company didn't have to, because Brown had heard about the Corvus Omninet, investigated it, and decided that networking was exactly what his organization needed. He installed the Omninet with a 20-megabyte hard disk and six Apple II Plus computers in October 1982. It's been smooth sailing ever since.

"No one can know what a difference a system like this can make to a company until it's been running for a while," Brown states. "Everyone who needs to use the network can do so without having to wait. The time that's been saved just in terms of document preparation has been unbelievable."

In fact, Brown adds, many records now retained on the computer were simply not kept during the pre-Apple days because of the time-consuming preparation involved. Today, employees use the network not only for sales invoicing and inventory, but also for sales-

'The time that's been saved just in terms of document preparation has been unbelievable.'

invoicing analysis, payroll and payroll records, general ledger, and accounts payable.

Furthermore, because the system's popularity is spreading, the company has ordered more Apples to add to the network.

Analyzing Loans

Violet Dawkins, like Mel Brown, has vivid memories of pre-Apple days. Her firm, the CoAmerica Bank of Detroit, Michigan, analyzed commercial loans the old way—by hand—before install-

ing 14 Apple IIIs and a 33-megabyte hard-disk drive on the Cluster network from Nestar Systems, of Palo Alto, California. Since then, the analysis work has been substantially easier.

"We have a group of 60 bank-credit analysts located in our headquarters building and in four branches in the Detroit area," Dawkins explains. "When a company calls for a loan, it's the analysts' job to review that company's credit history and make a recommendation on whether the loan application should be approved."

The credit experts consider hundreds of applications, and each requires a detailed review and analysis. Dawkins estimates that one person working on just one application using pencil, paper, and calculator took more than an hour. Of course, if an analyst made an error, he had to start all over again.

Now, using the Apple III network configuration, analysts have a much easier time. Credit files on all customers are maintained on the 33-megabyte database disk. When a company asks for a loan, the analyst simply keys in that firm's code, and its entire credit history appears on the Apple's screen. Using special software, the analyst completes the whole process in less than ten minutes.

"Obviously, the time savings and the improvement in accuracy are key benefits of the networking system," Dawkins says, "but what I see as the major value of the network is the fact that all of our analysts are now able to share information that they didn't have access to before. That's a real plus."

Truck Components

The same communications aspect of networking appealed to John Horne, finance manager of Rockwell International's automative-division headquarters in Troy, Michigan. A $2 billion business that manufactures components for heavy trucks, the automotive division employs more than 5000 people, 600 of them in Troy.

'Obviously, the time savings and the improvement in accuracy are key benefits.'

"The need for communicating financial information quickly and accurately among our people is of primary importance to this division," Horne emphasizes. "Profits, losses, balances, forecasts—they've all got to be kept up on a daily basis, and a lot of people must have access to the figures at any time during the day."

Before a Nestar network was installed with 15 Apple IIIs (as well as several IBM Personal Computers) and 137 megabytes in hard-disk storage in July 1983, employees communicated all financial data throughout the company on paper.

'Communicating financial information quickly and accurately among our people is of primary importance.'

"We had access to the company's mainframe-computer database, which contains all information pertinent to the operation of Rockwell," Horne says, "but once an individual called up what he needed, the only way to communicate that information to another employee was through a written memo or report. That, as you can imagine, was extremely slow and often inaccurate."

It's the same old story: memos are lost, a page from a report is missing, information is miscommunicated.

"Now that our networking system is running, all areas within this division, from marketing to engineering to personnel, have access to the data they need," Horne says. "We download data from the mainframe onto the network's hard disk, so that anyone who needs it can retrieve it instantly. That information, in turn, can be uploaded to floppies to be used with VisiCalc or Lotus 1-2-3."

Horne is so pleased with the network's performance that he plans to expand the system to provide computers on at least 80% of the employees' desks. To handle such a large network, the division will eventually use about five gigabytes of mass storage, he estimates. That will permit not only file transfer and electronic mail, but also word processing, accounting, and other desired functions.

"Networking can make any office more efficient and productive," Horne concludes. "Anyone who could benefit by this and isn't taking advantage of it is making a mistake." +

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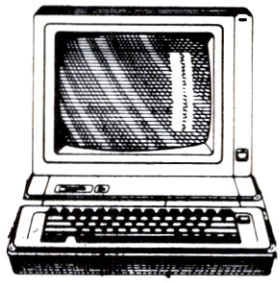

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Requires: Apple II, II Plus, or IIe (IIe recommended); 64K RAM; 80-column card recommended; two disk drives

If you have a lot of information to manage and records to keep and are thinking about using your Apple computer to help you organize and analyze your information, you will need information-management/record-keeping software. PFS:File and PFS:Report comprise a solid information-management system that is easy to learn and use, practical, and flexible.

With PFS:File, you design and manage files that organize your information for efficient storage and easy retrieval. With PFS:Report, you design and print reports that summarize your information in a tabular format for easy analysis. With both products, you can organize, manage, and analyze information to suit your current and future needs.

PFS:File communicates its practical and simple nature right from the start with its readable documentation. Truly a "users' " manual, it stands out as a model of an organized, thorough, and understandable document. A tutorial as well as a reference guide, it is replete with examples to follow; you learn by reading about and using PFS:File's functions step by step. Since you direct the program through menus, you don't have to suffer through tedious rote learning. In less than 30 minutes, I read through the introduction and the first two chapters, followed an example to design a file, and began adding information to it.

PFS:File and PFS:Report comprise a solid information-management system that is easy to learn and use, practical, and flexible.

To PFS:File a file has a specific format, called a "form," with its contents, called "items," in a set order. When you design your form, you get a clean screen for arranging your items. First, don't worry about wasting valuable space on your diskette, because PFS:File efficiently stores your form and information. You can name your items as descriptively as you like, and you can be liberal with the amount of space you allow for your entries. Consider the form's layout; you use your form to add information to your file, so layout is important. PFS:File does have two constraints that affect retrieval speed and printing that you should consider when you arrange items on your form.

For optimal retrieval speed, the first item on your form must be the one on which you will base your searches most frequently—last name, employee number, or date, for instance. This item is called the search key, and you get only one. You can also search your file based on any of the other items it contains, in any combination you require—it just isn't as fast as using the search key.

When you print with PFS:File (as opposed to printing with PFS:Report), you must consider printing order. Although you can print any or all of the items in your form, you cannot print them out of their set order. For instance, you can choose to print only item 1 and item 4, but item 4 cannot print before item 1. This restriction is beneficial if you plan to print mailing labels or lists that require a certain order to make the most sense.

If you are wondering about a form's maximum size limits, you needn't be concerned. At 100 items per page and 32 pages per form, the size falls into my "unlimited" category; you are unlikely to fill any form's capacity. The two real form-design constraints are insignificant—this program provides excellent flexibility.

Fill in the Blanks

Adding information to your forms is as easy as filling in blanks, because that is exactly what you do. With a copy of your form on the computer screen, you type in your entries. Entering dates or numbers poses the only nuisance, but only if you intend to sort forms chronologically or in numerical order.

Instead of entering dates as "dy/mo/yr" or "mo/dy/yr" (depending on your roots), you must enter dates as "yr/mo/dy," and you have to use two digits in each part. For example, you enter January 2, 1984, as 84/01/02. In PFS:File's numbering system, 19 is less than 2, and 19 is greater than 119. To put these numbers in order, you must enter them as 002, 019, 119.

When you add information to your

forms, PFS:File tells you the name of your file, the number of the form you are working on, the page number in the form, and how full your file is. File capacity depends on the number of items and pages in your form and the size of each item's actual entry. As a point of reference, a typical mailing-label file runs about 500 forms per diskette. The manual clearly explains storage calculations.

Search, Retrieve, and Print

From your stored file, you can search for and retrieve forms for reviewing, removing, updating, copying, or printing. PFS:File's method of describing forms for retrieval is practical and simple, while still providing most of the basics for a versatile search. You receive a copy of your form, and on it you can describe the characteristics of an item, or multiple items, that PFS:File will search for to qualify forms for retrieval. Think of searching as a game of finding certain attributes—"Find all my forms for the month of November through December that have the budget category *gift*." You can choose from full item matches, partial item matches, numeric matches (greater than, less than, or equal to), and numeric-range matches. Additionally, you can apply a "not" match qualifier to any of the choices.

One search feature that PFS:File does not provide is the ability to qualify items with an "or" condition. For example, you can't say, "Find all my forms that have the budget category *gift* 'or' *miscellaneous*." In other words, you cannot describe a single item in more than one way. When you describe two or more items on your form, a form has to match on all counts; if not, the program does not retrieve the form. Nevertheless, PFS:File does provide most of what you need for flexible form retrieval.

By copying selected forms, you can spread your file out onto several diskettes or merge forms onto a single diskette.

Printing, like form retrieval, is practical and simple. After you describe the form you want printed, PFS:File presents you with a copy of it. On the form, you can choose the items you want printed. You have the option of printing with or without the item names, as well as printing one or more items per line. You can also designate one item as a sort item, albeit in ascending alphabetical or numerical order only. For repeated printing jobs, you can save up to eight print designs for subsequent use—a nice time saver. If you are not sure which forms you want to print, PFS:File lets you peruse all of them and choose certain ones.

Protection, Growth, and Change

PFS:File's Copy feature gives you the flexibility you need for file protection and growth. For file protection, you can copy an entire file to serve as a backup. If your diskette is full, you can copy a form's design to start another diskette. And, by copying selected forms, you can spread your file out onto several diskettes or merge forms onto a single diskette. The program protects you when you make requests that result in irreversible changes to a diskette, such as copying and removing forms, by asking whether or not you really want to proceed; you can change your mind before the program makes any changes.

Another more important facet of growth, the ability to change a file's form for future needs, is a must feature.

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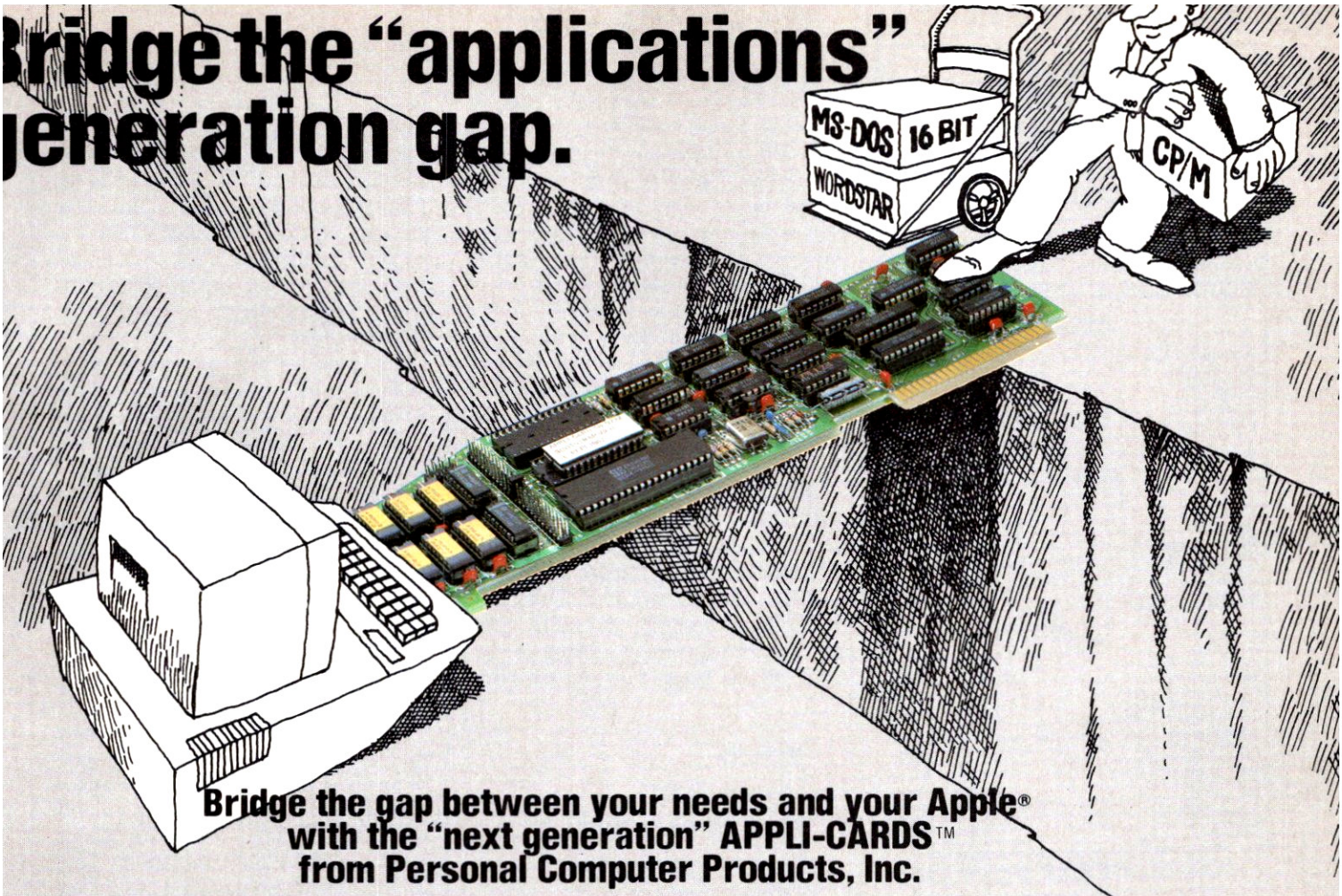

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Your form's initial design is unlikely to be perfect. You'll inevitably discover ways to improve your form, whether it be adding, deleting, or rearranging your items. PFS:File does the job by giving you a copy of your form to change to include your improvements. After you make your changes, PFS:File transfers your existing information to your newly designed form. One minor irritation is that PFS:File requires you to name an item identically on the new form if you want that item's entries to be included in the transfer—if you don't, no transfer.

Reports, Information Summary

Besides managing information, the other main function of record keeping is summarizing the records you have so carefully kept. PFS:Report is a general-purpose report writer that summarizes your information in tabular (row and column) reports. PFS:Report performs all the basics that you need and expect from a report writer. As with PFS:File, you make your requests on menus. Additionally, PFS:Report's "personality" and manual obviously come from the same source as PFS:File, so learning PFS:Report is a comfortable experience.

You'll inevitably discover ways to improve your form, whether it be adding, deleting, or rearranging your items.

Report printing begins with retrieving forms from your file. You select forms by describing the characteristics of items, just as with PFS:File. Next, you define your report on a copy of your form—sound familiar? But now, since the primary purpose of reporting is to summarize your information for analysis, you have different types, and a greater variety, of options.

With PFS:Report, you can include up to nine items, in any order, on a report. The first two items are considered sort items (ascending only). To analyze your figures, you can request totals, subtotals, averages, subaverages, counts, and subcounts. Requests can even be in combination, as in "Subtotal and subaverage each employee's commission." You can create new items, including running totals, that the program calculates arithmetically from existing numeric items. Also among the print options is the ability to predefine and keep up to eight reports that you use on a regular basis. Of course, you can change, remove, or add new reports as your needs dictate.

PFS: Solutions

For those of you who prefer to buy as much help as possible, Software Publishing offers PFS:Solutions, a set of predesigned forms that go with PFS:File and PFS:Report. So far, 12 Solutions are available: Stock$, Home Budget, Disk Library, Home Inventory, Mail List, Employee, Payroll, Ledger, Invoices, Inventory, Checks, and Tickler. You can use them right off the shelf or enhance them as you please. Either way, PFS:Solutions can give you information management with a minimum amount of effort on your part.

I gave the Home Budget solution a try. I needed only 30 minutes to enter 52 forms, a month's worth of financial transactions. These forms took up only 5% of the diskette. Simple reckoning tells me that I could organize my budget by entering my transactions once a week, at less than ten minutes a sitting, and a year's worth of budget would easily fit on one diskette.

Home Budget's four reports fulfill the requirements for monitoring and maintaining a budget. You can tally all your tax-deductible expenses, help balance your checkbook, and list a running account of expenses by date and/or budget category.

PFS:File can work with two other products from Software Publishing: PFS:Write, a word-processing program, and PFS:Graph, a graph generator. With either, you can retrieve information from your PFS:File forms to use in text and graphs.

Summary

PFS:File and PFS:Report are information-management tools that give you all the benefits of computerized record keeping and reporting in a package that is practical, flexible, and simple to use. Its sustained popularity attests to its usefulness. You design files to fit your current needs with the assurance that your files can grow and change. You can print reports that clearly summarize your information for easy analysis.

If you want to use your Apple to help you organize, manage, and analyze information, then you should seriously consider PFS:File and PFS:Report. ✚

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HARDWARE REVIEW/BY DAVID TOWNSLEY

Keyboard alternatives for your Apple

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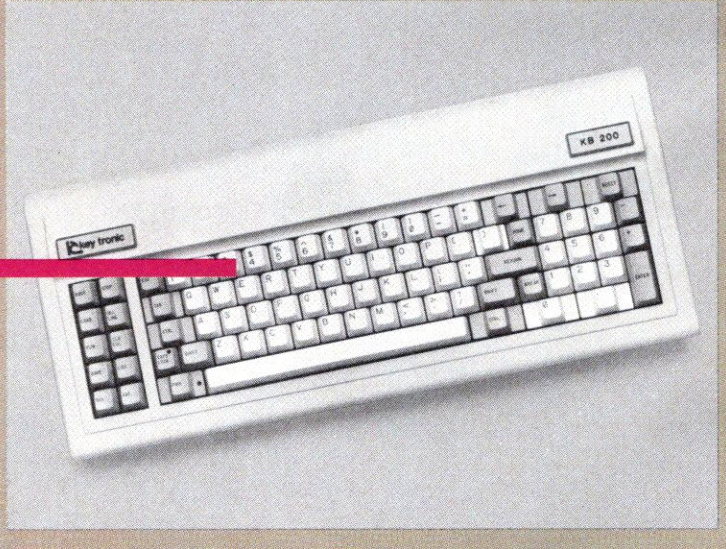

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"Don't look at the keyboard!" Remember when your typing teacher barked this at you as you were first learning to type? Unfortunately, this rule is hard to follow when you're using a computer keyboard, since it has keys we never used in typing class—Escape, Repeat, Control, and Reset, for example. If you have an alternate keyboard with a numeric keypad and special-function keys, looking at the keyboard becomes a necessity.

We are going to take a look at four interesting keyboard options for Apple II, II Plus, and IIe computers: Key Tronic KB200, Preh Commander, Executive Peripheral Systems (EPS) KB-A3, and the Keywiz VIP. Although these four represent only a sample of the keyboards available today, they are a good cross section of the less-expensive options.

Why should you be interested in alternate keyboards? If you are unhappy with your present keyboard, you have one reason. Most of the keyboard designs we'll look at are fancy replacements for your Apple keyboard. If you want to enhance your present keyboard with programmable keys, you have another reason to be interested in alter-

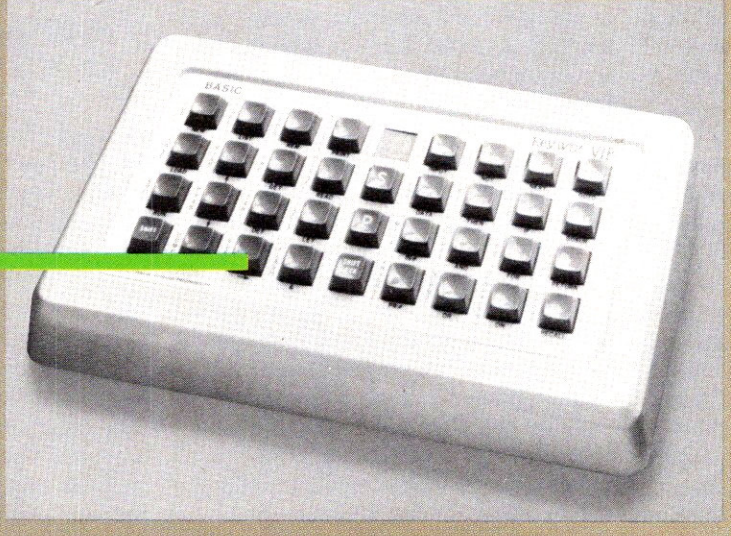
FOR DIFFERENT FOLKS

natives. One of the keyboards that follows gives you programmable keys without replacing your present keyboard.

The "touch" of the keys is another important factor for some people. The keys on the Apple II, II Plus, and IIe feel the same as you push the key through its "full travel" (the full keystroke). In contrast, some of the keyboards we'll examine have a touch with a "two-tone" quality. As you depress the keys, the feel changes before you reach the end of the key's movement. The idea is to give you "tactile feedback" so that you don't have to push the key through the full travel.

All the keyboards I tried had the advantage of a detachable keyboard with a "lower profile" than that of the Apple II family. Most typists find the lower keyboard height comfortable, since they bend their wrists less while typing. Even though it may seem fun to type in your lap, you may run into a space crunch if you opt for a detached keyboard, since it replaces your present keyboard functionally, not physically. You'll end up with an overcrowded desk if you don't think of somewhere to put your old Apple keyboard (and attached computer).

PREH COMMANDER



KEYWIZ VIP

The Key Tronic KB200

When IBM introduced its streamlined Personal Computer keyboard, many PC owners were disappointed with some of its features, such as its loud click with each keystroke and the location of some crucial keys. The Key Tronic keyboard was originally a response to the disenchantment with the IBM PC keyboard's shortcomings. As a result, the Key Tronic design for both the IBM and the Apple II and II Plus—it is not available for the IIe—reflects the PC keyboard's style, with certain improvements in the areas of greatest dissatisfaction.

The touch of the Key Tronic KB200 keys makes for efficient and quiet typing, and their color-function coordination helps you find the right key in a hurry. When you depress the keys halfway, their touch suddenly changes from a soft, springy feel to a firmer "foam" feel. Although this change is a "positive tactile response," some users claim that the Key Tronic keyboard feels a little too mushy. I found that the keys' touch helped me type faster, because I didn't have to depress the keys fully to receive tactile feedback.

Comfort is obviously a high priority at Key Tronic. The low profile of the keyboard's home-row keys (30 millimeters above the desk-

top) reduces the fatigue associated with bending your wrists. Collapsible feet in the rear of the keyboard can tip its angle further toward you. Either way, the keyboard remains low enough that you can easily slip a floppy disk into a disk drive that is sitting right behind the keyboard. A long, spiral, flexible cord attaches the keyboard to the computer and allows you to type from up to eight feet away.

The numeric keypad increases your productivity on spreadsheet and similar data-entry programs. Although most alternate keyboards have this feature, the KB200 has a few extras that come in handy: Enter, +, −, and Home. You can also use the numeric keypad to move the cursor in four directions by holding down the conveniently located second Control key (on the right side of the space bar) and pressing 2, 4, 6, or 8. Watch out, though—the Reset button is also in this area. One accidental keystroke when you are controlling the cursor here, and good-bye to your unsaved work!

Comfort is obviously a high priority at Key Tronic.

A special-function keypad stands at the left of the other Key Tronic keys. Probably a carryover from the IBM PC function keys with the same setup, this keypad holds almost exclusively nonprogrammable BASIC/DOS commands: Boot (PR#6 or PR#7 if shifted), Load, Run, Save, Delete, Catalog, List, Clear to End of Line, Delete Line, and Stop (Control-C). Remember that these commands generally aren't useful in commercial software programs (unless those programs drop you back into DOS). Unfortunately, the Load, Save, and Delete keys don't produce a space after the command. I had to remember every time to type the space before I typed the filename.

The Preh Commander

The German-made Preh Commander keyboard has a wonderful "two-tone" touch to it and a flat, slim look. If touch is the most important factor in your decision to purchase a new keyboard, this keyboard may be for you. A price tag of just over $200 makes it hard to beat.

Like the Key Tronic, the Preh stands only 30 millimeters high at the home row. Disk drives immediately behind it are easy to get to, and you'll rarely suffer from weary wrists with this keyboard. Its injection-molded plastic construction makes for an unusually light keyboard.

Since it has such a nice feel and low profile, you'd think this keyboard would help you move along at top speed with little effort. Well, maybe. As a European company, Preh opted for the ASCII keyboard layout rather than the traditional typewriter layout. The ASCII layout exists on the Apple II and II Plus and is usually less popular in the U.S. than the standard arrangement of the Apple IIe or of IBM Selectric typewriters.

Second, the flat design eliminates the tiered key rows most of us are used to, as well as some of the contouring of the keys to your fingers. I found it harder to keep my fingers on the home-row keys and easier to overshoot keys on other rows.

What's more, the nubs most keyboard manufacturers include on home-row keys (so that you can easily locate the right key) are lacking on the Preh, where they would certainly help (actually, a bead of Elmer's glue on several chosen keys would probably suffice). One other aspect of the keyboard that can inhibit blinding speed is its two-key rollover, meaning the keyboard can handle no more than two keys down at a time. So if you type fast, watch out! You might lose a character here and there.

The numeric keypad is a separate group of keys bordered by five cursor-control keys and three S function keys. Added to the four standard cursor directions is a Home key labeled with a diagonal arrow. Unfortunately, a Return must follow this Home key before you can go home again. Backspacing is even more fun: I couldn't find a backspace key. Since the key to move the cursor left is located on the far right of the numeric keypad, I began to wish my right pinkie were much longer, whenever I made a typo.

The several S keys bordering the top of the numeric keypad are simply more function keys that didn't fit with the others along the bottom of the main ASCII keyboard. The function keys along the main keyboard are F1–F7 and S1–S3 along the numeric keypad. The commands are such favorites as Save, Load, PR#6, Catalog, List, Run, INIT, Call-151, PR#1, and DIR. I'm not sure why the function keys were not labeled with these DOS commands; neither do I know what makes S commands different from F commands. Remember, however, that these keys aren't much help in most of the commercial software you will use.

The subtle convenience of a space added to the file commands (such as Run and Save) on the function keys is a nice touch, but the Call-151, PR#1, and PR#6 commands act immediately when you press those function keys. The lack of mnemonic labels on these keys, as well as their proximity to the strike zone of alphanumeric keys, can make them potential land mines for your careless fingers.

How about the instructions? If you read German, you may get more out of them than I did. Although it comes with English translations, the documentation tended to make the installation sound more difficult than it was. At first I thought I needed to be a skilled electronics technician, but I later realized that the skilled work had already been done, and I simply needed to plug the keyboard in.

The EPS KB-A3

EPS can truly claim that it makes this keyboard with the business executive in mind. It has enough keys to make almost any keyboard connoisseur happy, but it also makes for fewer keystrokes and less head scratching when you use commercial software. The large selection of keys and functions makes for a big keyboard, measuring 20 × 9 inches and 50 millimeters in height to the home-row keys. This height puts the keyboard about halfway between the 30-millimeter keyboards we saw earlier and the height of the keyboards in the Apple II line. The EPS keyboard connects to your Apple with a six-foot-long spiral (telephone-like) cord, making it easy to move the board around.

The functional keypads on the EPS keyboard are its best feature. It has five distinct keypads: (1) standard "QWERTY" typewriter keys, (2) enhanced numeric keypad, (3) selected edit keys, (4) cursor-control keys, and (5) programmed-function keys. With all these options, the KB-A3 almost demands of you, "Look at the keyboard!"

EPS can truly claim that it makes this keyboard with the business executive in mind.

Even if you can refrain from looking at the standard typewriter keys while typing, the numeric keypad will attract your attention. In addition to the usual ten digits, decimal point, and comma, it includes single keys for entering multiple zeros, skipping to the right, back-

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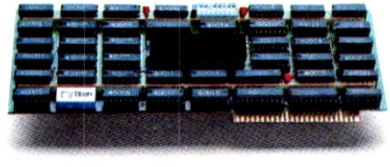

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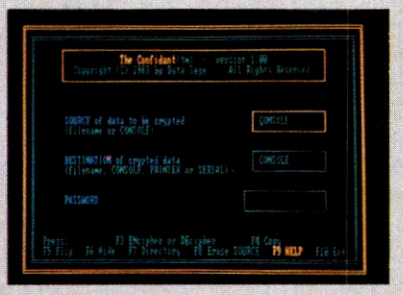

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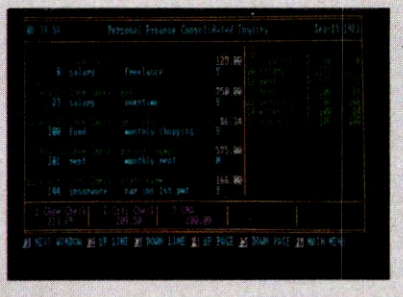

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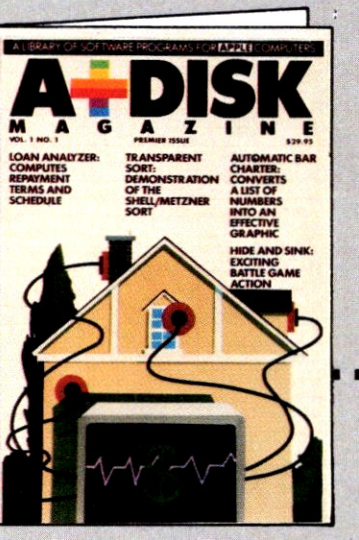

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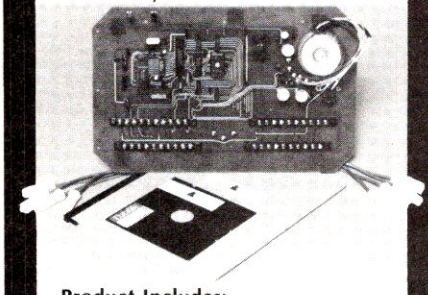

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spacing to the left, and entering any of the four basic arithmetic operations. Spreadsheet users will love it!

The selected edit keys and cursor-control keys each have their own separate locations. The edit group dedicates its six keys to character deletion and insertion, line deletion and insertion, and the Search and Replace commands. The cursor-control group, also six keys, gives you efficient control of all cursor directions. The last two keys in the group move the cursor left or right at a faster-than-usual speed.

Executives will undoubtedly appreciate the programmed-function keys, called "promware" keys, the most. These keys have nothing to do with attire for waltzing and fox-trotting—no, they are simply keys fitted with templates and memory to make them handy for many specific software packages. The promware itself is a 1 × 1 × ½-inch memory module that plugs into the top of the EPS keyboard. The module makes the keys "smart" so that they can fulfill different software commands, corresponding to the software program you buy. A template or mask that fits around the keys comes with each promware module to label the keys' new functions. Although you still must own the software and know how to use it, the promware will help you get by without memorizing all the specific commands. You can buy EPS promware for BASIC/DOS, VisiCalc, WordStar, and many other applications for $29.95 each.

The module makes the keys 'smart' so that they can fulfill different software commands.

The EPS keyboard instructions are clear and complete, a nice change from the norm for most technical hardware, but they are not bound. Before you decide to read them or any of the EPS promware instructions, make sure you have purchased a nine-inch, three-ring binder for them. Otherwise, you will no doubt find yourself playing "52-card pickup" with the pages, time and again.

One disadvantage of the EPS KB-A3 is that each piece of commercial software you buy requires the appropriate additional promware from EPS (at $29.95) to keep your keyboard in tune with the latest programs. If you are a busy executive without the time to remember all the commands for your commercial programs, you may decide that the extra memory jog of the promware keys and the reduced typing requirements are worth the occasional expenditures.

The Keywiz VIP

If you don't mind spending time programming your keyboard and can afford a higher initial cost, the Keywiz VIP may be more your style. Unlike the other boards we have looked at, the Keywiz enhances your present Apple keyboard instead of replacing it. Although the Keywiz sits in its own separate box, it's like adding 31 special-function keys to your Apple and having them do whatever you want—each one, in combination with the Shift key (two choices) and the mode-selection key (four choices), can produce up to eight functions. Actually, since each key has eight modes, it's more like having 248 function keys. Although the keyboard does not do anything else, that's quite a bit of flexibility and power at your fingertips.

Consider that each key can potentially hold several commands. Menu-driven programs such as WordStar can be less tedious if one keystroke takes the computer screen through several menus. In addition, you can customize the keys to issue commands to any software you wish, with the commands recorded alongside the keys on do-it-yourself templates. You can even make some of the keys a numeric keypad in one mode and still have other modes in which to program those same keys with different functions. With 248 functions, you can use the Keywiz to command many different software programs (depending on how you allocate your Keywiz keys).

How easy is it to program the VIP? It couldn't be any easier, even for nonprogrammers. You just use your regular Apple keyboard to type in the Keywiz keys' new functions. Until you reprogram the keys, they will hold on to the phrase you typed in—power on or off.

The touch of the keys is nothing to get overly excited about, though. Then again, you don't type from the Keywiz keyboard; rather, you command from it. I was disappointed with one imperfection on my Keywiz VIP, and that was a Shift key that tended to stick. Unfortunately, this stickiness made the shift key act more like a Shift Lock key!

The key box is shorter than the usual keyboard, yet it has large keys and is 50 millimeters high. Although the stiff cord connecting the Keywiz to my Apple was

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only two feet long, I found a perfect location for the key box that needed even less cord. By pushing the Apple monitor back on the computer case and raising the CRT onto a couple of books, I made an accessible place for the programmable-function keys between my old keyboard and the monitor. What's more, the color of the Keywiz VIP case matches the color of my Apple components, giving the system the look of an integrated setup.

I was not thrilled with the installation procedure for the Keywiz VIP. I knew I was in trouble when the plug that was supposed to go into my Apple motherboard did not match the one pictured in the instructions. I was able to get around the problem by "jumpering" a few of the plugs' leads. I hope that my Keywiz VIP was the only fluke that slipped through the manufacturer's quality control. Although the instructions on how to operate the Keywiz are good, the instructions on how to install it should be rewritten. The latter seem to be in an incorrect order and are a bit confusing.

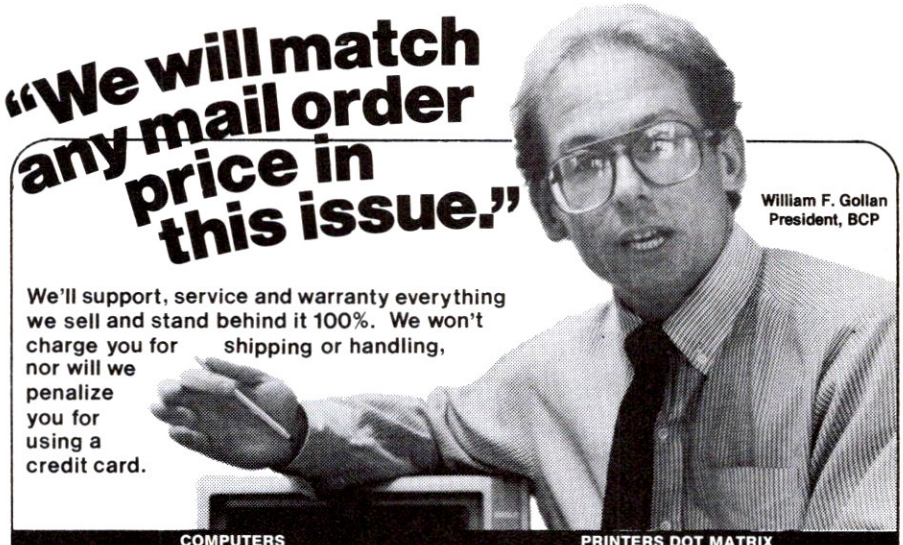
Frequent Apple II or II Plus users stand to gain more from a new keyboard.

Reviewing how you spend your time with your Apple will tell you in some ways whether you should even bother looking at other keyboards. Do you use your machine to type an occasional letter, balance your checkbook, play some games, and learn programming? Or are you already a heavy user of word-processing or spreadsheet programs, with which the touch of the keys or a numeric keypad is important?

The kind of equipment you already own can make a difference in the value of an alternate keyboard. Frequent Apple II or II Plus users stand to gain more from a new keyboard than frequent Apple IIe users. This distinction is especially true if you own a II or II Plus and have already invested in an 80-column card with uppercase and lowercase characters and in an expanded-memory card so that you can run good-quality word-processing and spreadsheet software. Apple IIe users have keyboards with features such as Caps Lock, auto-repeat, and up- and down-cursor keys and will thus have to look harder at their needs to decide if a fancier keyboard can earn its keep.

The instruction manual is one area in which all four packages could improve. For example, keep in mind that "pin 1" of a chip or plug is usually the one with the ink dot next to it. All four manuals failed to mention this fact—something you need to know if you install the keyboard yourself. The moral of the story for any hardware installation is simply to read all the instructions first, think about what you are going to do before you do it, and remember that pins on chips and plugs can and do break. If you're in doubt, consult the company or your dealer first.

To decide whether to buy an alternate keyboard and to choose among the options, try to match your needs and budget with your purchase. Our sampling of alternate keyboards shows that the freedom to customize the keyboard seems to increase with price. Be aware, however, that keeping track of all those changing keys will pull your eyes toward the keyboard. Luckily, your old typing teacher won't be around to bark at you! ✚



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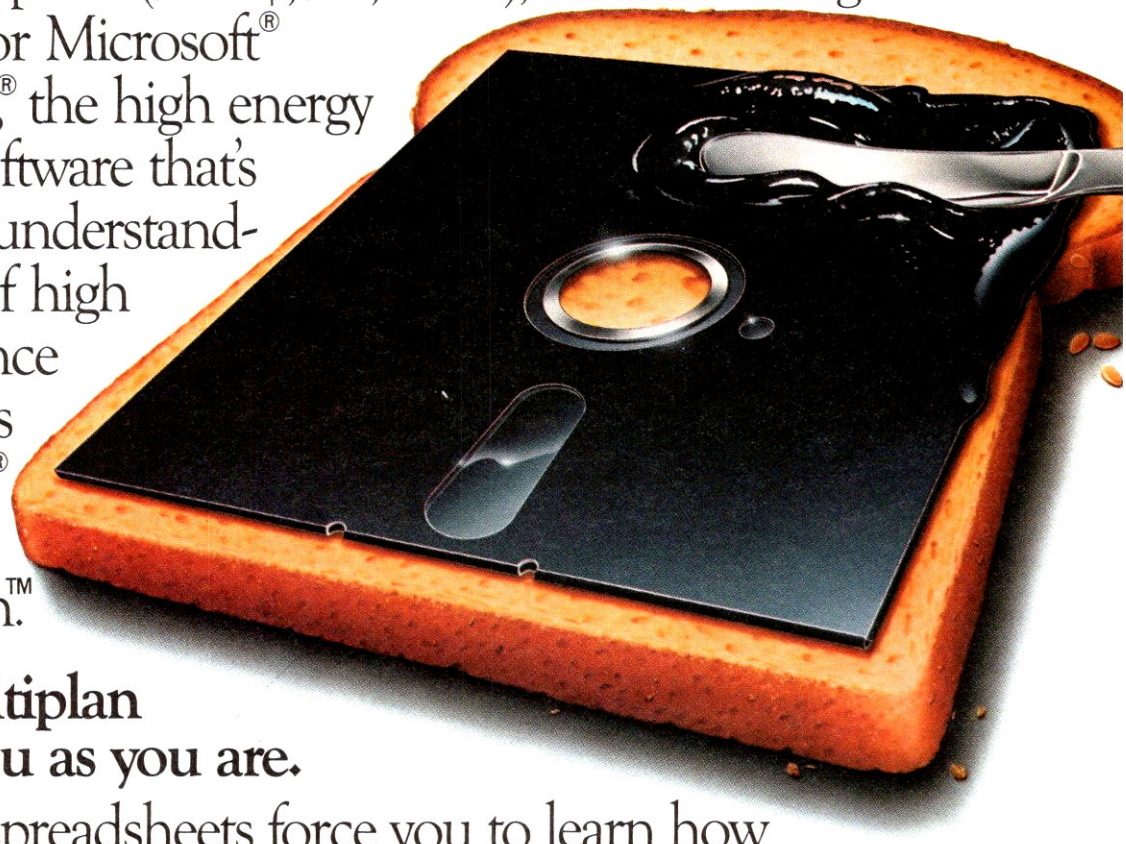

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THE ROBOTS ARE COMING

WHY NOT INTRODUCE ONE TO YOUR APPLE?

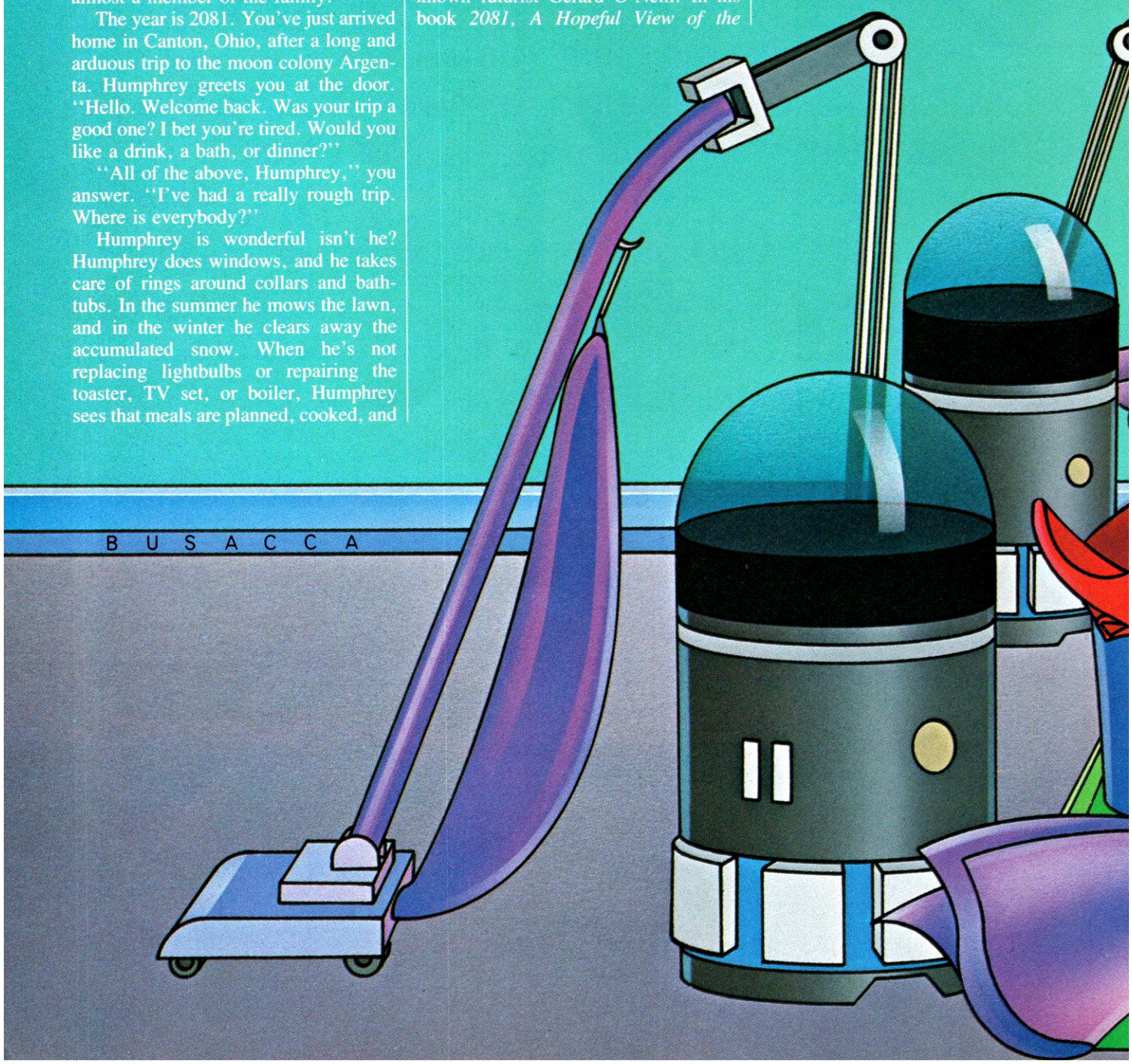
Meet Humphrey, your favorite advanced personal home robot. Humphrey is almost human. He's sophisticated, efficient, and opinionated. In fact, he's almost a member of the family.

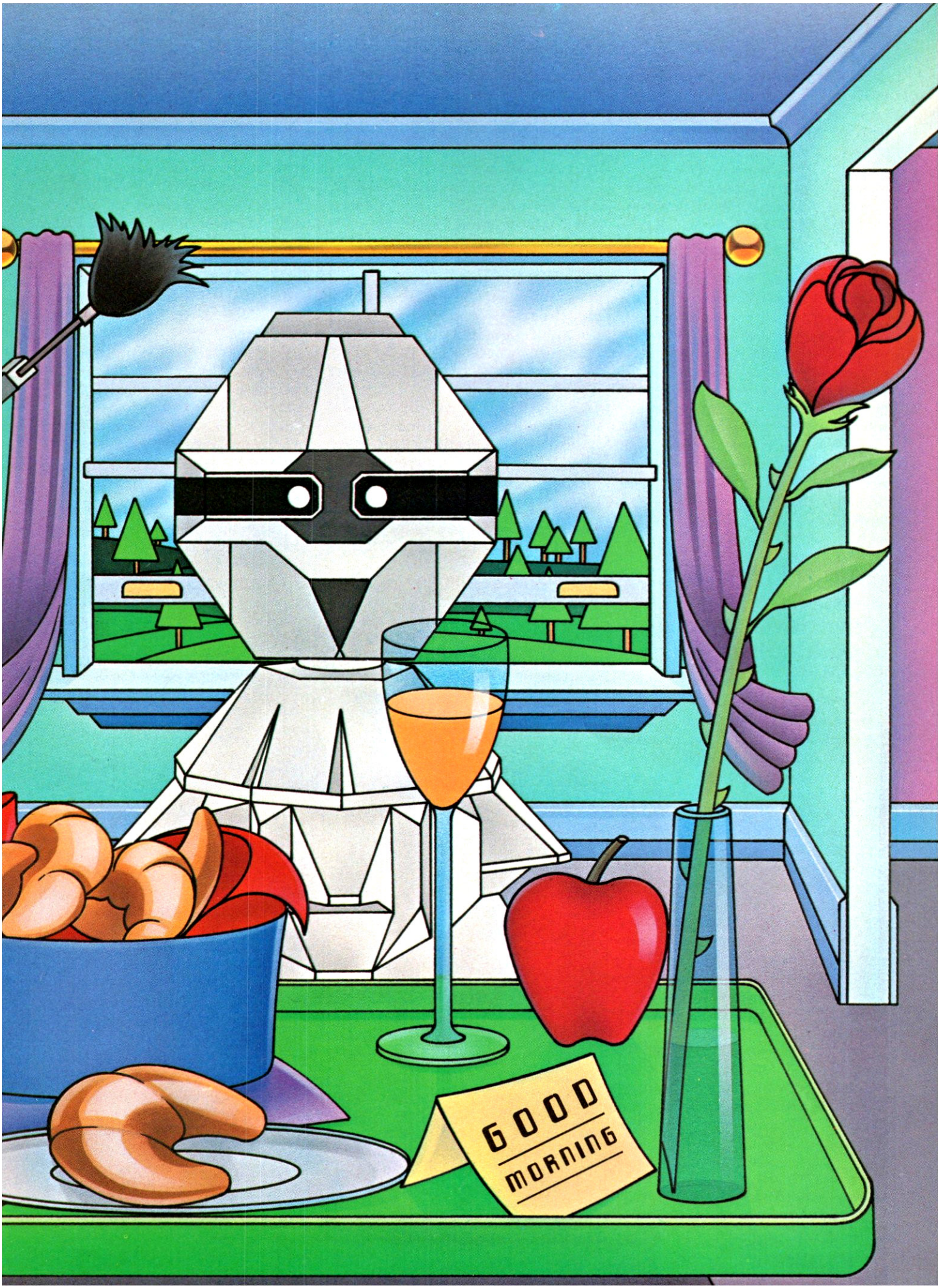
The year is 2081. You've just arrived home in Canton, Ohio, after a long and arduous trip to the moon colony Argenta. Humphrey greets you at the door. "Hello. Welcome back. Was your trip a good one? I bet you're tired. Would you like a drink, a bath, or dinner?"

"All of the above, Humphrey," you answer. "I've had a really rough trip. Where is everybody?"

Humphrey is wonderful isn't he? Humphrey does windows, and he takes care of rings around collars and bathtubs. In the summer he mows the lawn, and in the winter he clears away the accumulated snow. When he's not replacing lightbulbs or repairing the toaster, TV set, or boiler, Humphrey sees that meals are planned, cooked, and served with style, and the mess afterward dispatched with aplomb.

This vision of our robotic tomorrow is adapted from a book written by the well-known futurist Gerard O'Neill. In his book *2081, A Hopeful View of the Human Future*, O'Neill predicts that robots will be an indispensable part of everyone's lives 100 years from now.




GOOD
MORNING

What of the Present?

If you want a robot like Humphrey for your very own today, how close can you come? In 1984 you can get a lot closer than you think, if you have an Apple, a standard interface, and the patience for imaginative programming. One company, in fact, encourages software authors to invent marketable robotic programs. RB Robot, of Golden, Colorado, offers a 12% royalty on the list price of robotic software it accepts for marketing, along with a 25% refund on the price of your robot as extra inducement.

Although robotics today is still in its infancy, many in the field expect a spurt in the development of personal home robots any time now—1984 could be the year. If you want to join the robot revolution, you might begin experimenting with the RB Robot RB5X (X stands for experimental). By interfacing it with your Apple, you can begin to use and adapt commercially written software or, if you're ambitious, develop your own.

Many in the field expect a spurt in the development of personal home robots.

Starting is a snap. You need a communications card and communications software for your Apple. A standard RS-232 cable introduces the computer to the robot, and you're ready to roll. Essentially, you use your computer as an intelligent terminal.

RB5X speaks Tiny BASIC, a subset of BASIC, through an interpreter on a chip embedded in the robot. With the Apple II Plus and the Apple IIe, you can use Robot Control Language with Savvy, an operating system/database manager from Excalibur Technologies. This combination is about as close to English as you can get. Essentially, RCL with Savvy allows you to teach your robot your language.

Run or write your programs on the computer, and download them directly into the robot's own internal memory. The standard RB5X has 8K; an additional 16K is optional. Sharon Smith, public-relations coordinator for RB Robot, says, "Super Serial and the California Systems 7710 are two telecommunications packages we have run successfully with RB5X, but any one that fits your computer will work just fine." Plug your RS-232 cable into the serial port on your Apple and the end with the 25-pin D female connector with male pins into the RB5X. Download your programs and then unplug the cable, and your robot will move independently.

What's Available Now

Voice and sound synthesis is now an available option. The sound generator and the voice chip are on the same card. On-board voice recognition is currently in the development stage, but you can talk to your robot through your Apple already. Any off-the-shelf voice-recognition board that plugs into your Apple can enable you to start chatting with your electronic companion. The folks at RB Robot recommend the voice-recognition assembly made by Scott Instruments, of Denton, Texas. Whichever model you choose, just plug the voice-recognition board into your Apple, and the Apple into the robot with the RS-232 connector. You have now established direct voice communications with your robot.

When using voice commands, you are limited by the length of your cable—the RB5X must remain connected to the Apple in order to hear you.

What else can your RB5X do? You can turn RB5X into a butler for your next party. When the doorbell rings, RB5X responds by saying, "Come on in, the door's unlocked." When the door is closed, RB5X says, "I'm so glad you could make it. The coatrack is down the hall." You can write another subprogram to make RB5X shake hands with all the guests. "RB5X uses either a patterned program or self-teaching software that enables the robot to learn its environment after being turned loose."

RB5X can navigate through mazes and obstacle courses. Perhaps you could

JUST WHAT IS A ROBOT?

Although there are a lot of complicated definitions around, one useful way to think of a robot is in terms of how it functions in comparison with a human equivalent. The brain of a robot is a microprocessor. A mechanical arm can perform in ways similar to a human arm. Legs are replaced with wheels and run by a motor. The various senses are mimicked by various other devices. Photoelectric cells and sonar replace touch, a voice synthesizer replaces speech, optical-recognition systems replace the sense of sight. Even the sense of taste can be paralleled, in an approximate way, with complex chemical systems.

Approaching these human equivalents is complicated. Joe Bosworth, the president of RB Robot says, "None of the elements that make up the robot are unique. Robotics is not a discipline in its own right but a package assembled from available technologies." As we reach the solution to each particular element and refine the subsystem, the entire robot becomes more capable. For instance, refinements in the bumper switches and sonar devices for the RB5X constitute a major step in the robot's ability to "sense" its location in relation to objects such as tables and chairs.

Several companies have introduced, or are close to introducing, personal home robots. Once you purchase the basic robotic body, you have the option of buying additional peripherals: arms, motors, more memory, and more software programs. All the companies tell us that the current robot is just a first step, that they will be supporting their product with a lot more add-ons.

Ron Seman is a man in his twenties who has formed a company called Personal Touch. He describes it as an association of about 100 people—scientists, technicians, engineers, computer specialists, and marketing people—all dedicated to making a great breakthrough in personal home robots. Seman will talk robotics to you 24 hours a day. We asked him to elaborate on the field and its future.

Robotics is still in a primitive stage today according to Seman. He says that many elements of the necessary technology are around, but no one has yet put the pieces together. "There are companies making headway in robotic vision systems, dedicated arms are getting better, we're seeing superior software and faster processors coming out . . . but all the pieces just haven't fallen into place because nobody has created a demand, a market for home robots."

Steve Truman, an engineer and ambassador-at-large for R.B. Robot, thinks his company has produced a home robot that could create a home market, one that could spark excitement. "RB5X can potentially be programmed to do many, many exciting things. He's built in such a way that his basic capabilities for processing information, for carrying on various types of actions, for performing humanlike sensory activities are there. I'm excited that RB5X has this enormous base of possibilities. It allows a user to get very creative."

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stage a robotic steeplechase, spin the robot, or musical chairs. If you really get going, you can program RB5X to play a sort of football, with offensive and defensive plays all worked out in advance. (This last scenario works best if yours is not the only robot on your block.)

Getting back to that party, RB5X is a gifted story- or joke-teller, given a good voice-synthesis program and some programming on your Apple. If you're clever enough, you can get it to do imitations of famous movie stars. You can program RB5X to dance, to conduct with a baton in hand, to lead a group in singing "Happy Birthday," or to remind your departing guests to reciprocate: "When are *you* going to have a party?"

On a more serious note, you can program RB5X to function as a mobile home-security system. The company also promises an attachment that serves as a fire extinguisher if RB5X senses a sudden rise in temperature in your house.

Another future development is an intruder-alert siren. It won't yet clear the table and wash the dishes, but with the arm and vacuum options now available it

▸MOVE OVER, PICASSO

The City of New York has hired a robot to paint sanitation trucks side-by-side with human workers. While the futurists debate the long-range effects of robots on the economy, speculate about just when they're going to arrive, decide how many workers will be displaced, and contemplate other issues of grave importance, New York City has taken the plunge.

Without too much fuss or bother, the bureaucrats have gone ahead and added a robot to the ranks charged with beautifying the city's supposedly white sanitation trucks. With a speed previously unknown in any municipality, all the technicalities and paperwork have been completed. The $375,000 robot, made by the DeVilbiss/Trallfa Corporation, is on its way.

The robot's programming will enable it to imitate human motions in spray painting, and the robot will labor right next to the flesh-and-blood sanitation workers to repaint more than 600 of the city's garbage trucks per year. About ten workers, none of whom seem saddened by the robot's arrival, are involved in the painting.

Both managers and workers approved the decision to bring in the robot. All concerned agreed that painting the trucks was fumy, hazardous, and boring, a job that they would just as soon leave to an android. The long-term effects of spray-painting on people are unknown, but many believe spray-painting to be hazardous to general health and a possible cause of lung cancer.

The Sanitation Comissioner, Norman Steisel, referring to the French Impressionist painter, dubbed the robot, a "mechanical Manet." Steisel further described the robot as being a flexible, dedicated arm that could be programmed to simulate human painting motions.

The process of teaching the robot to move its arms in the appropriate patterns involves physically leading the arm through each detail of the range of motion. The robot stores the memory of these physical motions on a disk. Its coworkers run the disk to put the robot through its painting paces.

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will vacuum your major traffic areas while you're at work. And according to RB Robot's Smith, "You have to remember that RB5X technology is only a year old, so in spite of our high expectations it is only in its infancy."

Shaping the Market

Nolan Bushnell, founder of Atari, Inc., in Sunnyvale, California, started Androbot, a company you're going to be hearing more about. Androbot is well-financed, and no one believes Bushnell has lost any marketing savvy in the process of moving from Atari to Androbot. Rick Gibson, the product manager, told us, "The home-robotics market is in its infancy now. We think Androbot is going to have a major hand in shaping that market by having products at different price and performance levels for the home and the education market. We've got exciting robots, but we don't want to promise more than we can deliver. We'd rather surprise and delight people than dash expectations."

The Androbot family consist of Fred, Topo, and B.O.B, the most advanced of the lot. Those initials stand for "brains on board" and refer to the central-processing unit contained among the robot's metallic innards.

Fred, the youngest member of the family, stands 12 inches high and sells for $400. Gibson says, "Fred is a friendly, robotic educational device that's designed to help make learning fun and pleasant. Fred has many humanlike characteristics. He can move, he can talk. We expect to sell hundreds of thousands to homes and schools." You control Fred with an infrared mechanism that allows you to steer him, in much the way you would a remote-control car or plane. When you connect Fred to an Apple, you can make more complicated demands on him. You can have him draw various shapes and patterns when he's connected to the Fred Pen and Pad. He can be used to teach programming, acting as a three-dimensional lesson in geometry, much the way the Logo turtle operates. If you equip Fred with a voice synthesizer, you can program him to run kids through their lessons.

Topo is larger, contains more memory, and has a greater capacity for upgrading.

Androbot expects to develop many educational and entertainment programs for Fred as the robotic device starts to sell. Programs can be developed on the Apple to enlarge Fred's range of possibilities.

Topo is larger, contains more memory, and has a greater capacity for upgrading and expandability than does Fred. He costs $1595. You can hook Topo to an Apple interface and program him in robotic language. You can program him to walk, to move his universal arm in various ways, to pull his Androwagon. Gibson says, "Topo will be able to do all kinds of fun things. He can be programmed to serve drinks that are placed in his wagon. He will ask your guests, 'Would you like a drink?' Topo can pause for 30 seconds, give them a chance to pick up a drink, and go on. Toward the end of the evening, Topo can come in and say, 'Put your empty glass in my wagon, please.' " Also on the horizon are voice modules that allow Topo to speak in different languages, such as French or Japanese, or in regional accents. He could drawl like a Texas sheriff or be a one-man barbershop quartet.

For the more serious experimenter, B.O.B features a memory chip with

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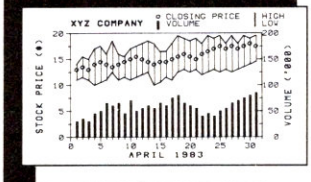

"The Prime Plotter is the kind of graphics package you'd expect to find on a mainframe computer." "Once mastered, there is no plotting package that is quite this versatile and powerful."

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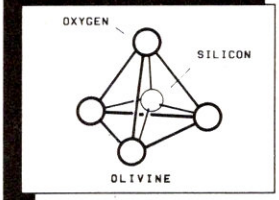
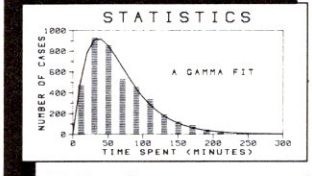
InfoWorld September 5, 1983



"The Prime Plotter contains more power than any graphing package I have used." "It can do many things not found in other packages; I know of no competing program which can do as much!"

David Morganstein
Washington Apple Pi May 1983



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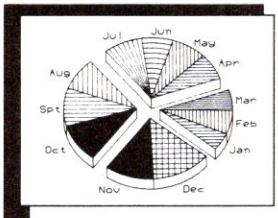

"Prime Plotter is a carefully conceived, well-executed package for business or scientific applications that can benefit from its great power." "Flexibility is the hallmark of this package."

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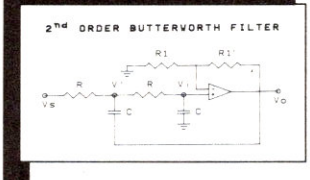

"At first glance, it's almost overwhelming." "While simplicity is a key, the myriad of possibilities featured can test the ingenuity of even the most knowledgeable user."

Business Software
Vol. 1, No. 5, Sept./Oct. 1983

PEELINGS II Rating

The Prime Plotter	A+
Apple II Business Graphics	A–
PFS Graph	B
Versaplot	D

"In conclusion, if you are looking for the most powerful program for scientific or business use and are willing to spend several days learning the system, The Prime Plotter is your best choice."

Plotter Summary
PEELINGS II Vol.4, No.4, 1983

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greater information-processing ability, more programmable features, and a wider range of peripherals. It costs anywhere from $3000 to $5000. Gibson says, "We are at the beginning of a brand-new ball game. As we get feedback from dealers and customers, Androbot will put more and different features into our machines or encourage third-party developers to do so."

The Dark Ages

Recently, we heard Steve Wozniak reminisce about the dark ages, just ten years ago, when there were no personal computers. "My dream as a kid and as a young man was to own a personal home computer. In my late twenties, there was a marvelous breakthrough. Computers with 4K were available in kit form. They took a lot of work to put together. I belonged to a ham-radio club, and we would help each other assemble them. Who would have dreamed that from those humble beginnings a multibillion dollar industry would spring forth?"

Will robotics take off the way personal computers did? Ron Seman of Personal Touch, a personal-robot company, thinks they might: "The technology is there to do a lot more than is being done right now. For instance, there are people doing advanced work in optical-recognition systems. There's no national program to coordinate their efforts with other experimenters doing very similar things. So you have pockets of advanced research going on here and there without any coordination."

There is no great national urgency comparable to the Japanese effort to get more robots into the workplace, Seman points out. "Robots can take a lot of the drudgery out of manufacturing situations. They are perfect for single-function jobs that can be clearly defined. I am talking about messy, dirty, dangerous work, such as painting cars and doing welding."

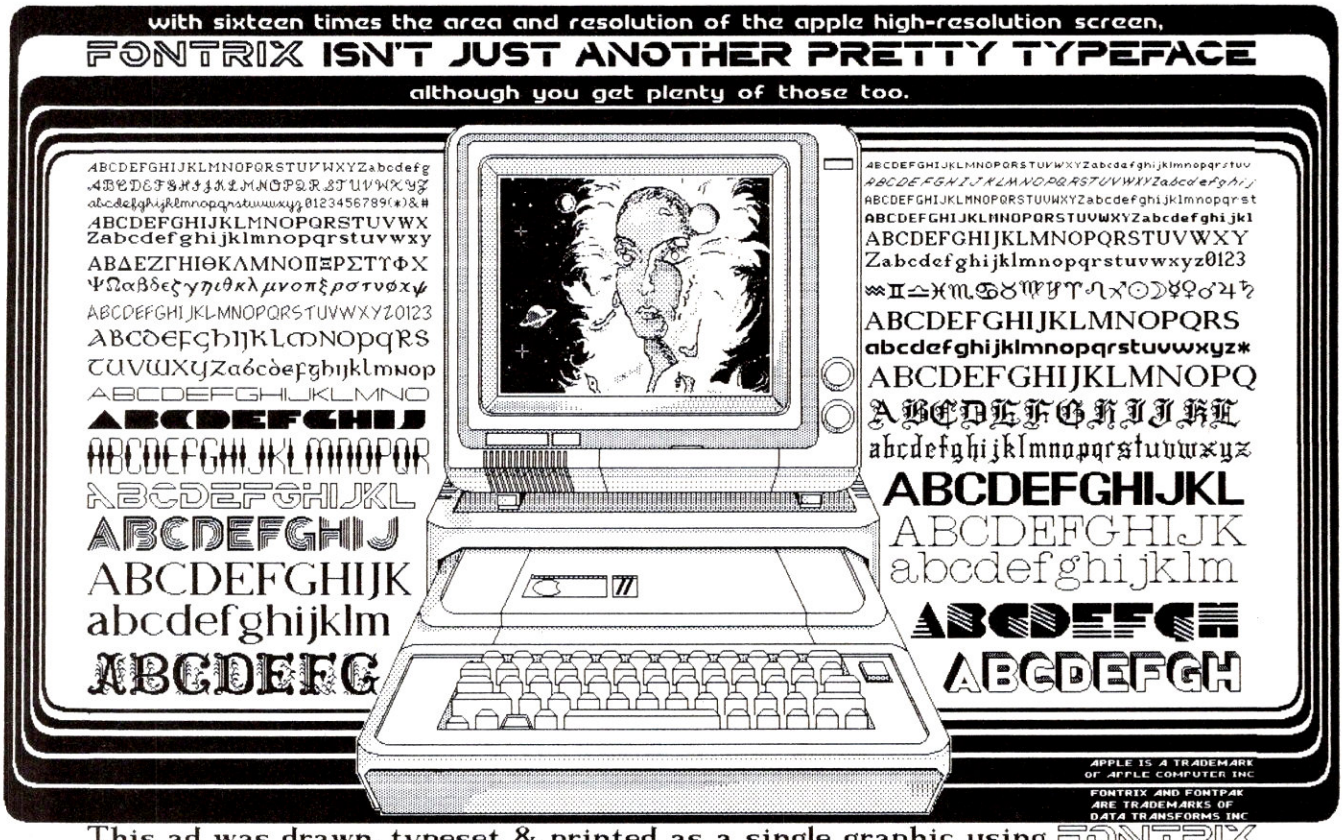
'Think of a squad of robots parachuted into a raging forest fire or descending into a collapsed mine shaft'.

Advantages

Seman conceives of robots as eventually replacing people in emergency situations. "A robot is perfect for a situation like defusing a bomb. You can equip him with armor plate that will withstand the blast. Operated by remote control, he can safely defuse a bomb. Think of a squad of robots parachuted into a raging forest fire or descending into a collapsed mine shaft to rescue trapped miners. These situations are not science fiction. They will come to pass in just a few years," Seman assures us.

Efficiency experts assert that companies can save a lot of money and often produce better-quality products if robots do the work instead of people. Westinghouse uses robots to push rods of tungsten into blast furnaces. Cincinnati-Milacron has put in robots to weld its hydraulic tanks. The robots turn out the tanks six times more cheaply than humans. While a $50,000 price tag for a dedicated arm may seem high, GM estimates that a robot costs $6 per hour and a human $19 per hour, with benefits. A study by Unimation, a major robotics producer, shows that the auto maker could save $800,000 a year if 14,000 robots were installed in GM plants by 1990.

Robots have other advantages from an employer's point of view. You see very few robots attending meetings of Alcoholics Anonymous or overcoming an addiction to cocaine. Robots don't get



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bored on an assembly line. They don't ask for raises or organize strike committees when their work demands aren't met. They don't need vacations or coffee breaks.

Many people who work in routine or hazardous areas would be glad to hand their jobs over to a willing robot if they got retraining for jobs in which judgment, flexibility, and managerial skills play a major role. The June 1982 issue of *Inc.* detailed the story of shipyard welder who continually was burned, poisoned, and nearly blinded by years of welding ships and submarines. The job required him to work in airtight compartments, even hanging by his feet to reach certain difficult areas, with the hot flame of iron inches from his face. This man was glad to hand his job over to a robot.

The encroachment of robots on humans' employment turf worries many people, though. One congressional study estimates that robots may cut humans out of 1 to 3 million jobs in the near future and 7 million by the year 2000. Another study shows that if robot costs drop to $30,000 (very likely, as volume production of robots gains in efficiency), 5% of the 80 million blue-collar workers in the United States and Europe may be getting their pink slips. The job categories most vulnerable include welding, production, painting, wrapping, and packing.

When are we going to see mature robots like Humphrey, our friend from 2081?

Says Seman, "I anticipate major jumps in computing power within the next five years. A lot of personal computers have 16-bit memories as their basic information chunk now. That will soon jump to 32 bits, and then 256 bits. Set up several of these coprocessors working in parallel, and you get a lot more computing power. Speech synthesizers, for instance, can now recognize 2000 words in a sophisticated system." According to many observers, we'll soon see a great leap in the ability of robots to recognize and speak; systems of 10,000 and 20,000 words will become commonplace.

So, we have general agreement that robots will be able to walk better, to coordinate their arms better, to communicate better. They will soon taste food for seasoning, mind the kids, wash your car. The possibilities are limitless, but we await a catalyst. That catalyst will be the interest of the home experimenter. Hobbyists and enthusiasts will make the market.

The technology awaits. Introduce your Apple to a robot today. ✚

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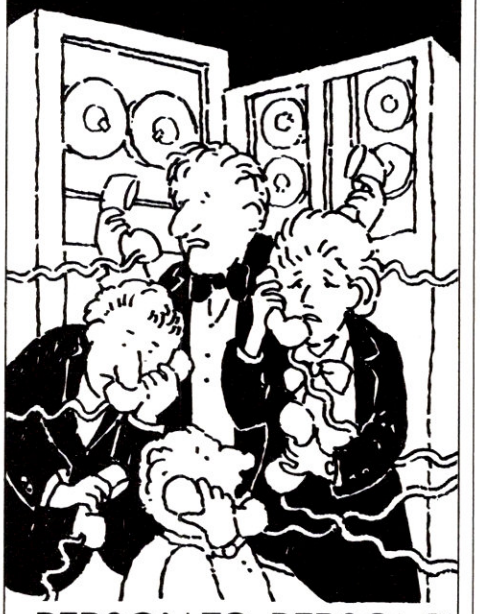

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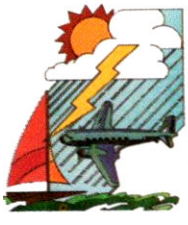

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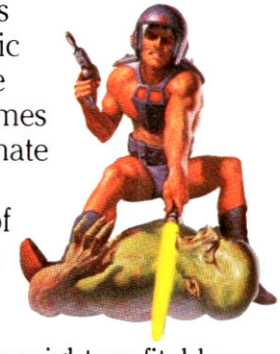

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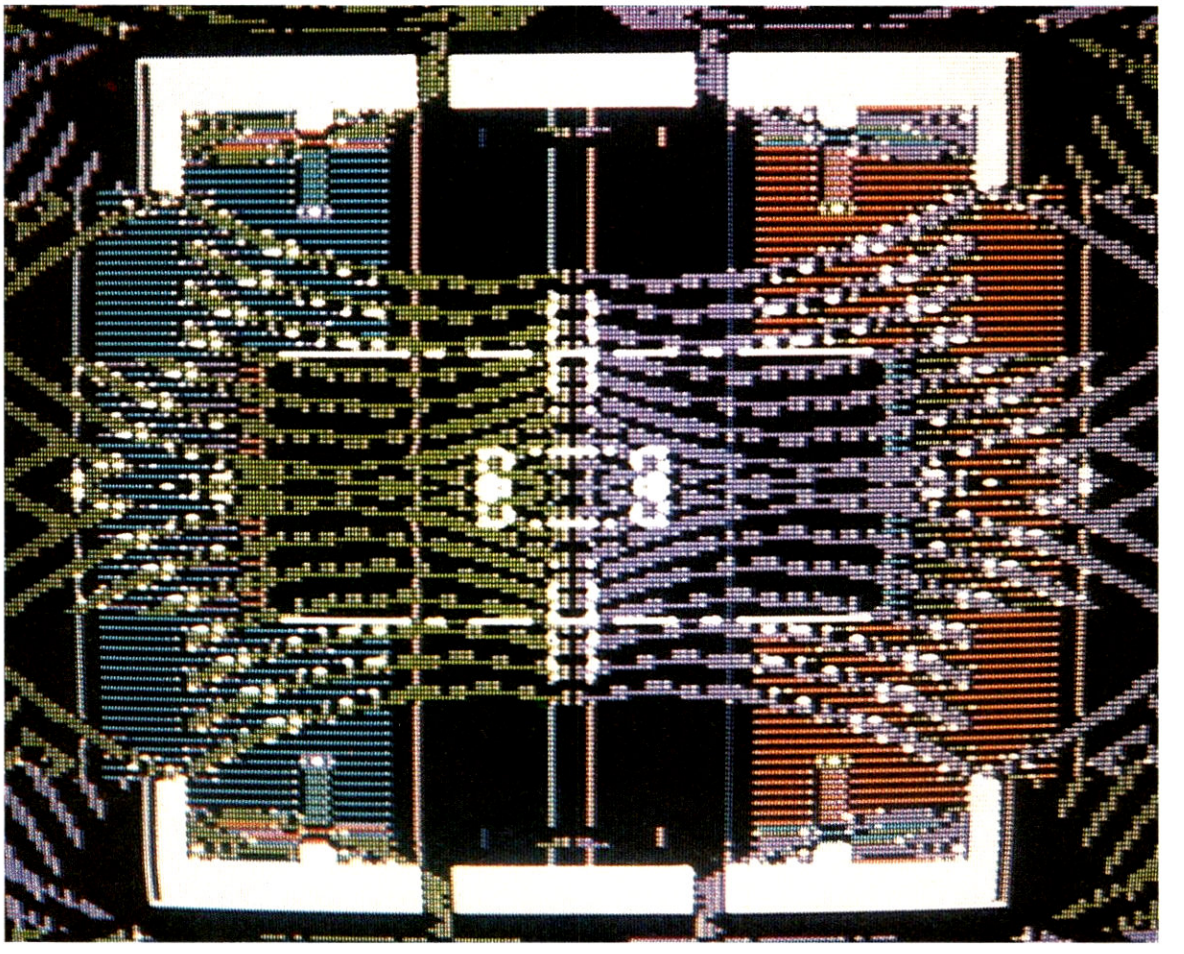


SAME SKETCH AS ON FACING PAGE, TRANSLATED INTO A SYMMETRICAL PATTERN BY UTOPIA SYSTEM'S KALEIDOSCOPE COMMAND

▸GRAPHICS/BY FREFF

For decades, artists in science-fiction stories—artists either centuries in the future or galaxies away—have painted not with brush and canvas but with the raw stuff of light itself.

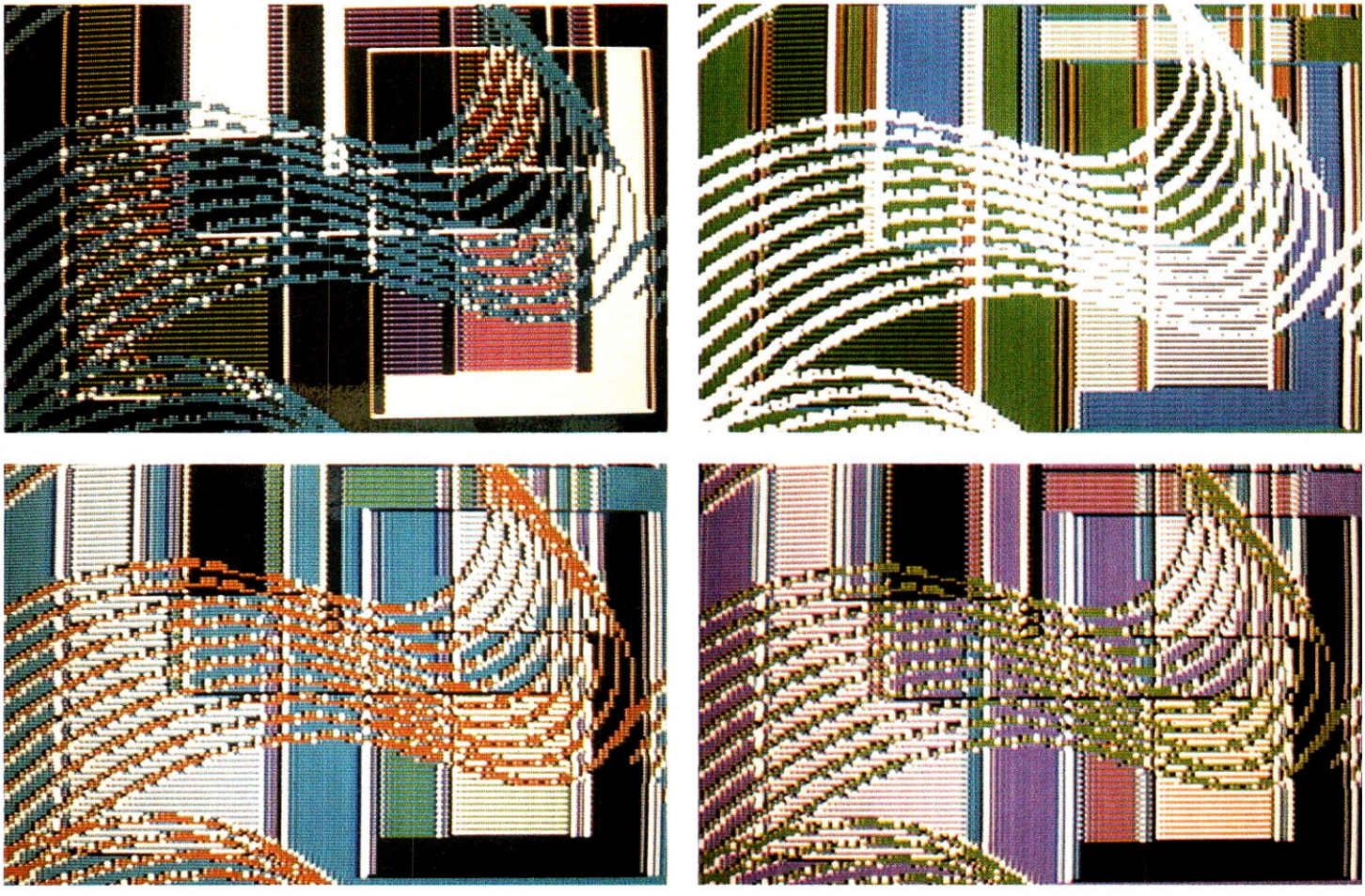
Such creative endeavor is no longer merely the stuff of science fiction. The real world has caught up with this particular part of the fantastic. Nowadays, painting with light is something that everyone can enjoy—without having to go to Andromeda to do it. All you need are the right tools:

The first tool is a computer with a color monitor. An Apple II Plus or IIe fills the bill here just fine, and many inexpensive but good color monitors, such as the Sakata, Commodore, and Amdek models, are available.

The second tool is some kind of input device or devices. Which one you should choose depends on how much money you want to spend and what painting software you select. You can choose from graphics tablets such as the Apple Graphics Tablet, the KoalaPad, and the Powerpad; light pens such as the Gibson; and any number of different brands of joysticks and game paddles.

The third tool is the paint program itself. Here again you have a wide range of choices, because more than ten packages are available. The Apple was the first computer in the general marketplace to offer high-resolution color graphics, and competing software writers have wasted no time in doing great things with its abilities.

That's all you'll need. Figure out what you want to do, from doodling to architectural rendering to electronic fine art; select the right set of tools; set them



TOP: A QUICK SKETCH WITH THE UTOPIA GRAPHICS TABLET SYSTEM
BOTTOM: SAME SKETCH, WITH INSTANT COLOR CHANGES, DONE WITH UTOPIA SYSTEM'S ROTATE COMMAND

TOP AND BOTTOM: SAME SKETCH WITH INSTANT COLOR CHANGES, DONE WITH UTOPIA SYSTEM'S ROTATE COMMAND

up; and soon—like others in the rapidly growing legion of creative people using computers—you could be painting with light, too.

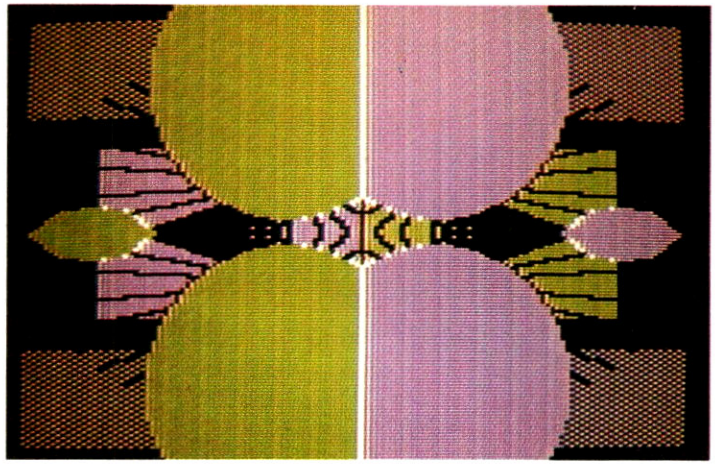
Rules of the Ground

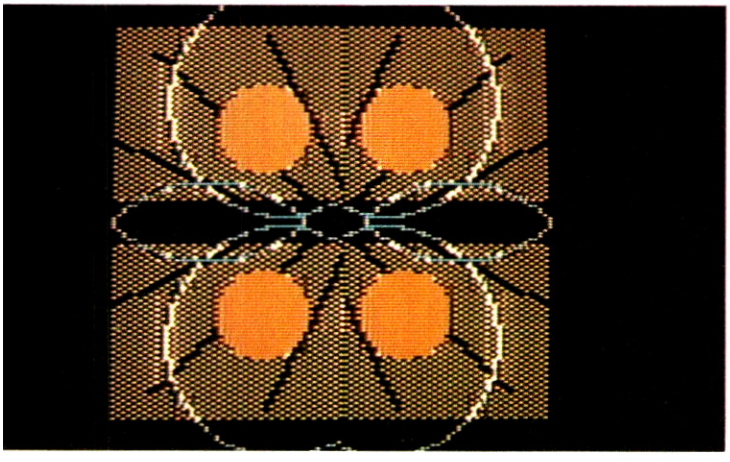
In art, the *ground* is the surface onto which you actually lay paint. It's very important, because its texture, flexibility, durability, and relative slickness are what set the limits on what you can achieve with your paint.

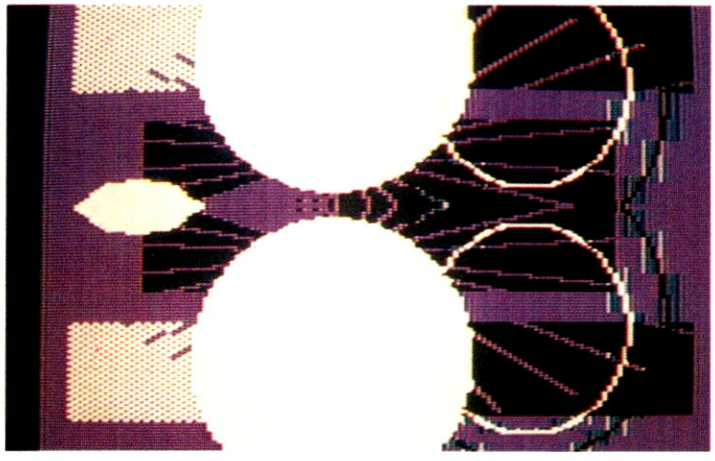
Your Apple has a ground, too; it's based on the resolution and color-mapping limitations of its hi-res screen. Although you don't have to understand it to make pictures (any more than it's essential for a Sunday painter to know how to grind his own oil colors), you'll be happier if you do. Like many other things in the world of computers, the system is a compromise; and until you know *what* was compromised and *why*, the results you'll get won't necessarily make a lot of sense to you.

Measured in the individual dots of light, called pixels, that make it up, the Apple screen is 192 pixels high by 280 pixels wide, for a grand total of 53,760 available pixels. That number probably sounds like a lot to you, but in terms of visual precision, it isn't. The screen just doesn't have enough available pixels to draw angles and curves accurately—in fact, it would take at least four times that many pixels to really do the job well. Here's the first rule of the ground: Unless you're dealing strictly in straight vertical and horizontal lines, your drawing will have a slightly rough texture that computer artists call "the jaggies."

The other ground rules come from computer memory—or, rather, from the







TOP: A QUICK SKETCH DEMONSTRATING COLOR-ANOMALY EFFECTS AND THE DISK-DRAWING FEATURE OF MICRO-ILLUSTRATOR
BOTTOM: SAME SKETCH, MIRRORED TOP-TO-BOTTOM AND LEFT-TO-RIGHT WITH "TRICKS" MODULE OF SPECIAL EFFECTS

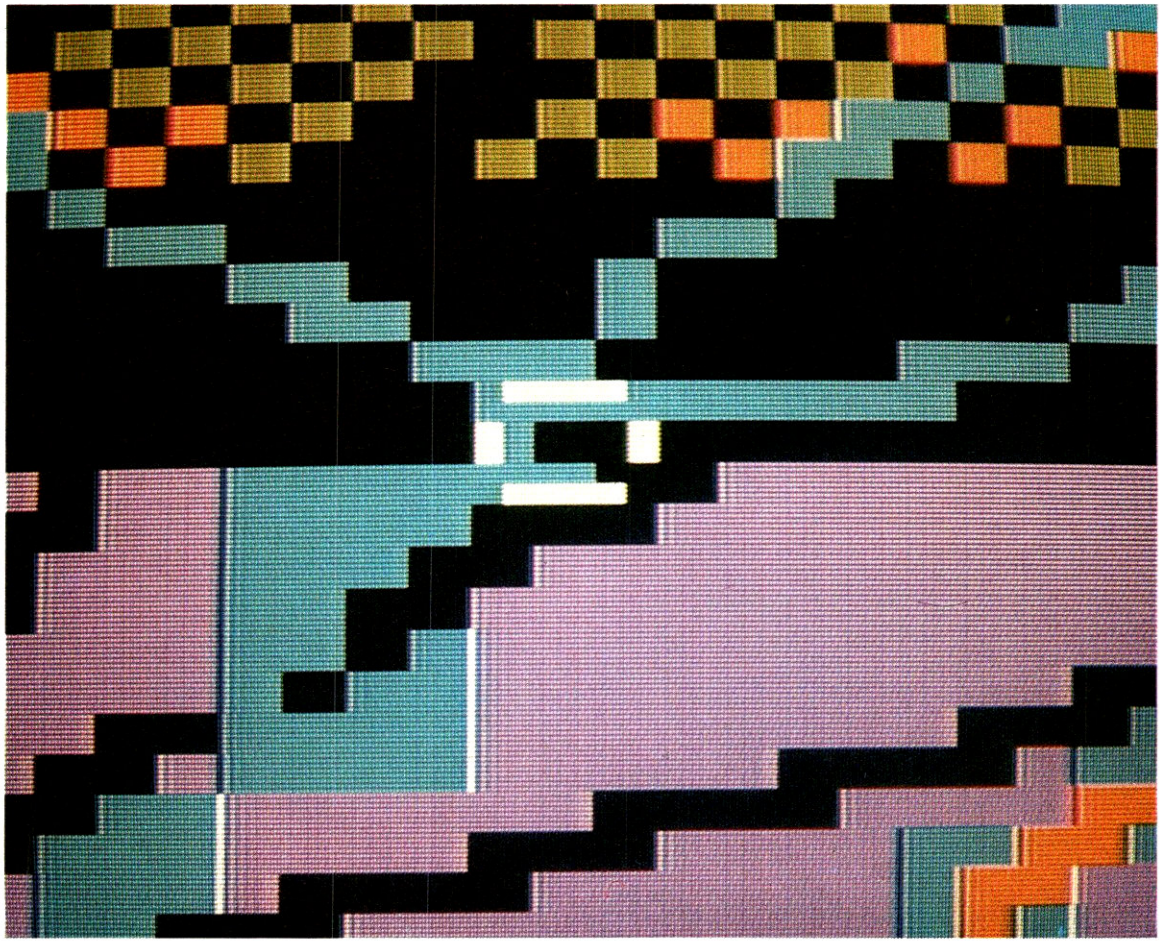
TOP AND BOTTOM: SAME SKETCH RUN THROUGH OTHER MIRROR AND COLOR-CHANGE TRICKS FROM SPECIAL EFFECTS

lack thereof.

Even though 53,760 pixels are too few for real precision, they're far too many for the Apple's memory. If the color and location of each pixel were stored as a byte of information, which would be the ideal case, then drawing a single picture would take up 54K of precious memory space. Clearly, this wouldn't work. If you needed 54K for the picture and 8K for the Apple's operating system, you'd have only 2K left for the entire painting program (assuming you had a 64K machine in the first place)!

To get around this problem, the Apple's designers compromised. They decided to divide the screen into horizontal lines and let the pixels be stored as horizontal groups of eight, corresponding to the eight bits in one byte of memory. In this scheme of things, a screen is really 40 bytes wide by 192 high and requires just under 8K of memory to control.

That's an elegant solution in terms of practical use of memory, but, like other compromises, it introduces a new set of problems. With this arrangement, only eight pure colors are possible: green, blue, violet, orange, two different blacks, and two different whites. (The two whites and two blacks are identical in appearance on the screen, but their pixel constructions are slightly different. White1 and white2, for example, react differently with other colors). This method of storing pixels also cuts the screen resolution of the four true colors in half, down to 140 by 192. In addition, it creates a whole nest of "color anomaly" problems, difficulties that have acquired names such as "ghosts," "ze-



A CLOSE-UP EDITING VIEW OF SAME SKETCH, MAGNIFIED SEVEN TIMES, SUPPLIED BY MICRO-ILLUSTRATOR'S MAGNIFY COMMAND

bra stripes,'' and ''flips.''

These color quirks are actually both bad *and* good. Unplanned, they can frustrate you mightily and destroy an otherwise good drawing, but thought out and controlled, they can be powerful creative tools. Sometimes, to make a great picture, an artist has to go a little wild, and color anomalies can come in handy.

Painting by Program

Each of the available painting programs has had to tackle these problems and reach some kind of negotiated peace with them. As a result of the need for compromise, many of the programs bear only a surface similarity to one another—and none is absolutely ideal.

What follows is only an overview. Even the simplest program here is too complex to discuss fully in a single article. After the program descriptions, I'll offer a few tips on how to get more out of these packages and give you a hint of new delights to come.

In the meantime, let this information edify you, even guide you, but not *lead* you. Find a store or a friend who has one or more of these packages, and try them out. Contact the companies. Join a users' group. Read books and manuals. Above all, *ask questions*—no question is too dumb when you're an Apple hi-res beginner. Believe me, everybody was there once.

Most important, be ye a seasoned pro or a Sunday dabbler, have fun!

The painting programs we'll be taking a quick look at are

- The Apple Graphics Tablet Software, from Apple Computer
- Designer's Toolkit, from Eclectic Electric and Apple Computer

- Micro-Illustrator and The Illustrator, from Island Graphics
- The Complete Graphics System II, Special Effects, and The Graphics Magician, all from Penguin Software
- The Utopia Graphics Tablet System, from Todd Rundgren
- Painter Power, from Micro-Lab

The Apple Graphics Tablet Software

The Apple Graphics Tablet was the first true art tool anyone manufactured for a home computer, and thus the software that came with it originated many of the functions that now serve as standards: things like being able to choose *what* to draw with—lines, dots, frames, or filled boxes of different sizes—and designate "windows" to protect portions of a picture from accidental change. The software is primitive—there's no denying it. Its principal advantages today are that (a) it comes with the tablet automatically when you buy it; (b) it has a wonderful, largely blank overlay screen with a grid and many empty control boxes, which you can use to control your own programs; and (c) the manual that comes with it is one of the best ones Apple has ever produced: concise, clear, and abundantly full of alternative programs and the tablet code you'll need to learn how to program the tablet.

If you do buy an Apple Graphics Tablet—which you should if you plan to do any serious study of Apple graphics—do yourself a favor and start out with this software. As it stands, thanks to its extensive tablet-reformatting commands (which allow you to do things like fill the entire hi-res screen with work that fits on only a few square inches of the tablet), it is one of the best *sketching* programs around. Although you will quickly outgrow its other features, what you learn from it will make it easier to understand the ways other systems work—something a few of their manuals will definitely not.

Designer's Toolkit

The other program Apple markets for the Graphics Tablet is Designer's Toolkit, which was created by the husband-and-wife team of Lucia Grossberger and Harry Vertelny and programmed by David Rifkind. Grossberger is an artist and Vertelny an architect; one look at the tablet-overlay sheet that comes with their program is enough to show that they mean business.

A brush is really a shape table that the computer displays on the screen.

Around the tablet's drawing area are six horizontal rows of color-coded boxes, one above and five below. These 120 boxes represent different functions of the program, all of which you can call up with a press of the tablet's stylus. Thirty colors are available: the original Apple eight, plus combinations of them that create the effective illusion of other tints, shades, colors, and textures. Fourteen of the colors are user-programmable.

The program also offers 20 different "brushes" to draw with, 10 of which you can design for yourself. A brush is really a shape table that the computer displays on the screen when you give it the right command, and that shape table can represent any figures. The 20 that come with Designer's Toolkit, for example, include everything from simple dots and lines to electronic-circuit symbols

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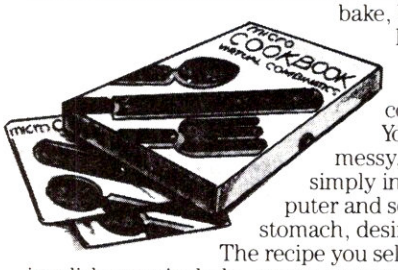

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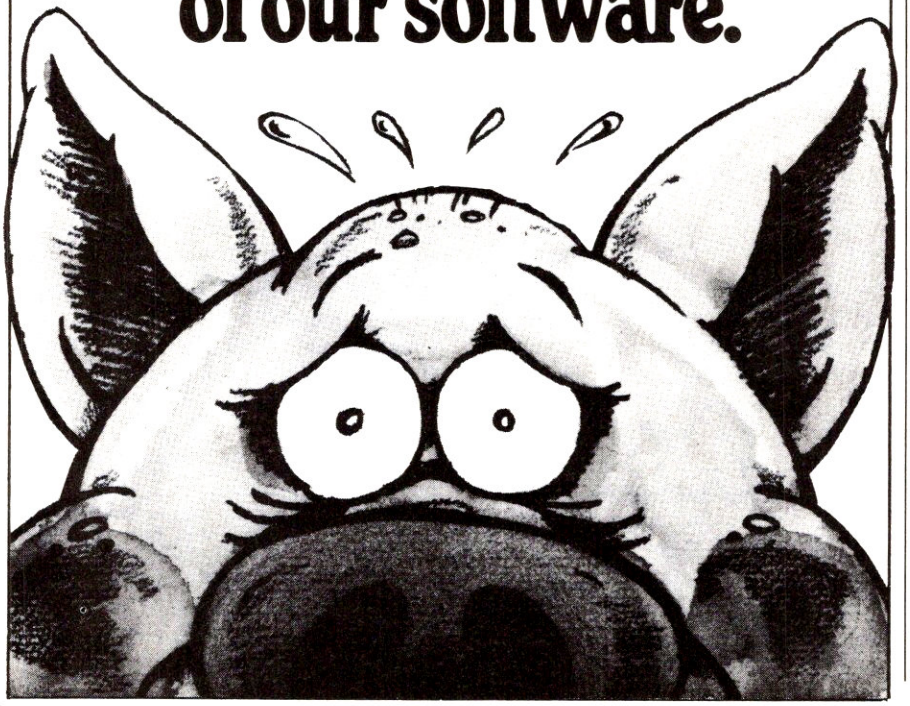

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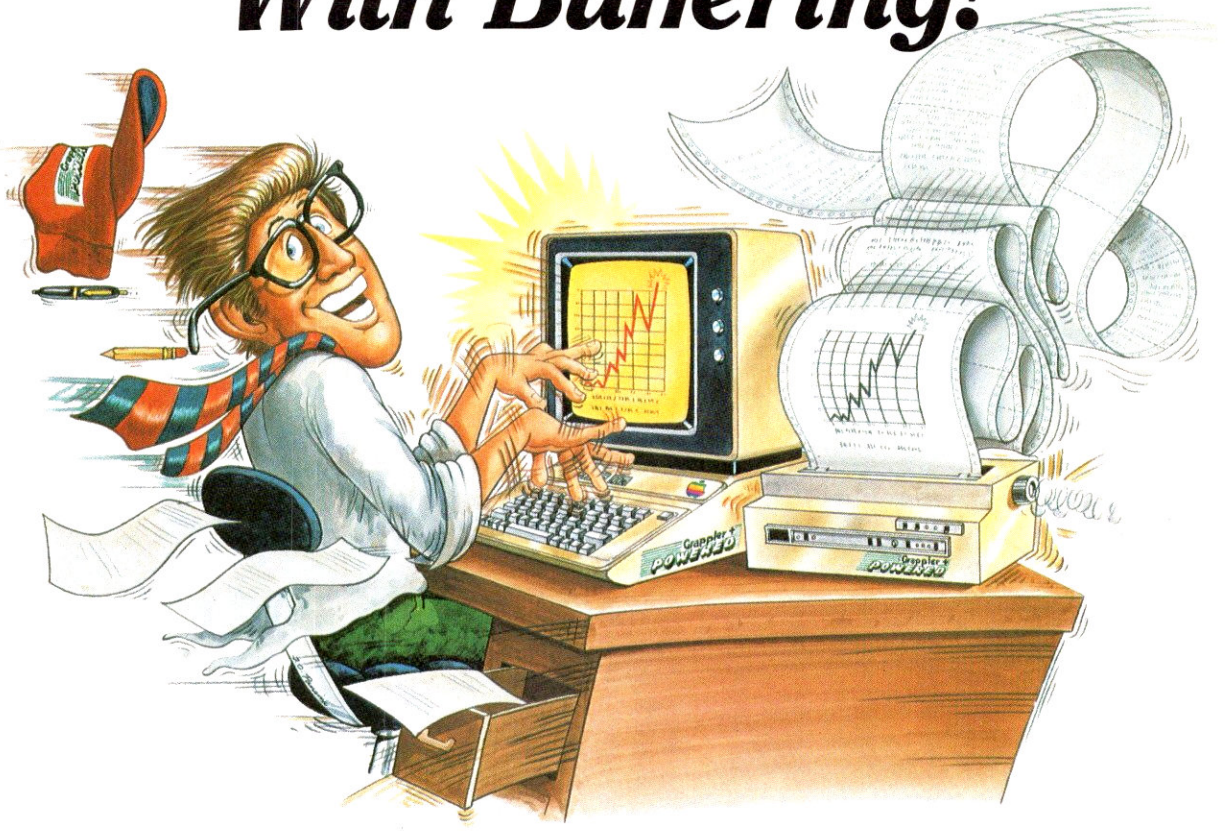

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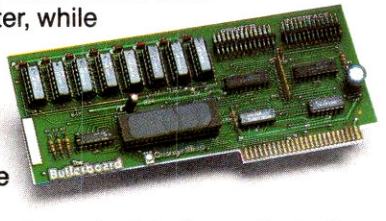

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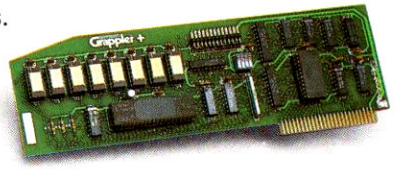

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and little drawings of cartoon men and women. As you can see, a brush can be anything you want it to be—a star, your signature, a drawing of your cat—as long as it doesn't exceed a certain size limit imposed by the way the program uses memory.

This software also introduced some features that have become "standards," such as being able to work on two pictures at once (with the Apple's two separate hi-res-graphics pages) and merge them in interesting ways; do various types of color inversions, separations, and image mirrorings; draw in filled and unfilled circles; and add text to an image. In fact, on the latter score, Designer's Toolkit is well ahead of other packages that require separate software for extra typefaces. Fifteen different typefaces, from Broadway to Greek to Shadow to ASCII, come with it.

You may consider one of this program's strengths a weakness, depending on your point of view. It does not offer a way to preview any of the user-programmed colors or brushes, so unless you write them down in the boxes on the mylar overlay, it's easy to lose track of what is available to you. Furthermore, when you paint with a user-programmed brush, the cursor you see on the screen has nothing to do with the shape of the brush you are using, so you might have trouble being precise.

These complaints are minor, however. Designer's Toolkit is a powerful program that would serve well as the centerpiece of a system.

Designer's Toolkit is a powerful program that would serve well as the centerpiece of a system.

Micro-Illustrator and the Illustrator

These programs are both creations of Steve Dompier, a Californian whose history in the computer field goes all the way back to the Homebrew Computer Club, which inspired Steve Wozniak to come up with the Apple in the first place. Dompier has always been interested in making graphics tools more easily available, and his two programs represent, in some ways, both the top and bottom of the Apple graphics world.

Micro-Illustrator is everywhere. It comes bundled with Powerpads and KoalaPads as standard software. Recently, the back of a cereal box even offered it for sale as a promotional tie-in for a major computer manufacturer. There is no better beginner's package in terms of price and performance, which makes it ideal for kids, students, or anyone interested in computer graphics but hesitant to dive into the deep end of the pool.

Micro-Illustrator is simple to operate with the KoalaPad, the Powerpad, a joystick, or game paddles (the two pads will enable you to draw in a more natural fashion). Everything you will need is on one menu; it contains eight possible brushes; 18 basic colors, tints, and shades; and your choice of drawing modes from freehand to points, lines, connected lines, rays, frames, boxes, circles, or discs. An efficient "fill" program lets you place your choice of color within any enclosed area on the screen.

How well and fast a fill program operates is one way to tell how good a program is. Another way is to see if the software makes any provision for *stopping* it once it has begun. Micro-Illustrator does, which is good, because fills can often leak through gaps in lines that were too small for you to notice, changing the color in areas of your drawing that you

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didn't want changed.

Another nice feature of this program is its Magnify command, which automatically enlarges the drawing you are working on by a factor of 7, making it easy to move around and edit on a pixel-by-pixel basis (so you can prevent problems like the one mentioned just above). In addition, the program has a Help page, about the only one of its kind to be found in Apple Graphics packages.

Going from Micro-Illustrator, good though it is, to Dompier's The Illustrator is like jumping from a moving bicycle onto a moving jet. The version of The Illustrator that I received for review was in beta-test form, so there may be changes before it is fully marketed. But even with that caveat, I feel safe in saying that this is one of the best—if not the single best—system currently available to the Apple artist.

The best illustration of its flexibility is to describe how its color palette works. Other systems allow you to design your own "colors" (pixel-by-pixel combinations of the basic eight), certainly, but they are slow and cumbersome. In The Illustrator, when you call up the color menu, you get a list of different sections that work together to make color creation easy. The top section is a close-up, enlarged view of two bytes of color memory—16 different boxes in 4 horizontal rows of 4 boxes each. Whatever controlling device you use (a joystick or game paddles are acceptable, but a Graphics Tablet is better) can place the color of your choice in the box of your choice. The large empty box beneath the pixel display changes instantly to show you exactly what that section of pixels will look like if you use it as a color on the screen. Experiment until you find one you like and then store it among the 90 spaces available on the page for pattern display. (According to the numbers, by the way, this system makes over 17 billion "colors" possible. Whew!)

In The Illustrator, you can choose functions anytime from either the tablet or the computer keyboard.

The Illustrator has many other good points, but there's one respect in which it truly shines: In most systems that use the Graphics Tablet, the designers have opted for placing all controls on the tablet itself, reserving the computer keyboard for typing titles and changing numerical settings for different functions. This approach is good, in that it allows you to concentrate on the tablet and the screen. It can also be slow, though, as you hop back and forth from one menu to the other to issue repetitive commands.

In The Illustrator, you can choose functions anytime from either the tablet (by placing the cursor over the appropriate command and pressing down) or the computer keyboard (by pressing the letter associated with a function). This situation is really the best of both worlds, because as you learn the letters that correspond to different functions, you can press them with one hand while drawing with the other and never have to leave the drawing you are working on.

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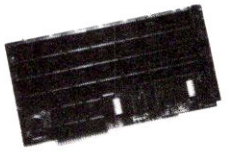

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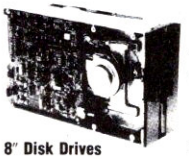

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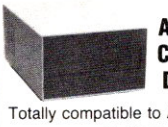

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techniques. Even better, they comprise individual modules that you can use to enhance the graphics in your own programs, and the manuals that come with the software are full of useful hints and programming tips.

Not that you have to be a programmer to use them—but if you are or think you might ever lean in that direction, these packages are definitely right for you.

They are also the best programs on the market for making your images move. In fact, animation sometimes seems to creep into them by accident. Take, for example, one of the most useful Penguin modules, the one that "packs" pictures, condensing them so that they take up less space when you store them on a disk. Storage of the normal hi-res page requires 34 sectors of disk space. A "packed" picture takes many fewer sectors, requiring only 7 to 25 sectors, depending on how complex it is. You can "string" several packed pictures together, so that you can reload them into the computer's RAM at the same time. When you call these pictures back onto the screen, the program "unpacks" them—that is, it redraws them—and the result is a kind of animation. A careful artist can actually use this process to create lively, changing storyboards. It's no wonder that this software has become a favorite among those who do business presentations and computer "slide shows."

In executing more standard Apple graphics techniques, these packages compete well with the other available programs, offering a palette of 107 colors and many interesting color-inversion and mirroring functions. If the system has any limitation, it is that it's designed to work with game paddles or joysticks and must be altered to function with a tablet.

You can 'string' several packed pictures together, so that you can reload them into the computer's RAM at the same time.

The Utopia Graphics Tablet System

The Utopia System was designed by computer/video artist and rock star Todd Rundgren, and for a while Apple's Special Delivery Software line marketed it. The official word from Rundgren's management is that the system is under revision and will be released again at some future date, from some unknown software vendor. In the meantime, Apple has a few copies left—I was able to get one for this article—and certain stores around the country have a few more.

This program certainly isn't for everyone, but it does have some functions that no other system has, and that makes it worth having if you're truly hooked on Apple graphics.

It's like a psychedelic offspring of the original Graphics Tablet program. All of its functions are there, and it also has image-altering options such as "dither," "reticulate," and "kaleidoscope" and commands to make your brush shapes automatically rotate or change color as you draw with them. (Dither lets you deliberately unfocus a picture slightly—"fuzzing it up," as the program's manual puts it. Reticulate creates an automatic quilt of vertical lines across the pages, all of different colors and widths, letting you pick whatever one you want on which to start building your own mad patchwork. Kaleidoscope takes anything

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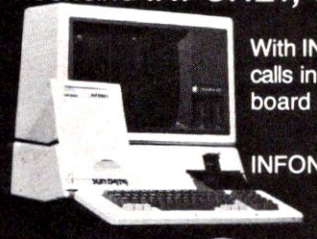

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that is on the screen, no matter how random, and runs it through a cycle of automatic mirrorings until it becomes a symmetrical pattern.

It's really a wonderful program, albeit annoyingly slow because it spends so much time switching from one menu-driven module to another, and I hope that it—or its update—is back in general circulation soon.

Painter Power

Painter Power is the reincarnation of Jackson Pollack as a computer painting program. You design your own brush shape or work with one of the program's presets, and then set it into motion. By steering the brush with a joystick or game paddles and putting the brush "down" or "up" with the game buttons, you can create intricate abstract designs in a short time.

In a sense, it is freer than the other electronic painting programs, chancier, more experimental. It's almost like art as a video game, with more and more risks coming your way as you advance to faster brush moves and more ambitious levels of the program.

I highly recommend Painter Power for its limbering, stretching effect on your visual creativity, and its capacity for "jamming"—real-time, spontaneous visual creation—beats every other program discussed in this article. I have seen its creator, Eric Podietz, hold his own in computer-music jam sessions (at the annual Symposium on Small Computers in the Arts, in Philadelphia), frantically manipulating the joystick and keyboard of his Apple and keeping a large audience vastly entertained with the visual shenanigans that were happening on the large-screen projection TV.

The manual is *very* tough to follow, though, and will frustrate you greatly at first. Persevere. For one function alone—the ability to create a brush and then make that brush move in a pattern identical to its own shape—if no other, it's worth the price of admission.

Eenie-meenie

So, we have nine programs. How do you choose?

The best answer may be "don't." Start out with one that matches the intensity of your interest and the extent of your pocketbook. Micro-Illustrator and the KoalaPad are a good combination in that regard. Then go on from there, acquiring other software packages and hardware as your interest grows and your needs change.

All of these packages are good, and with the possible exception of the original Apple Graphics Tablet software,

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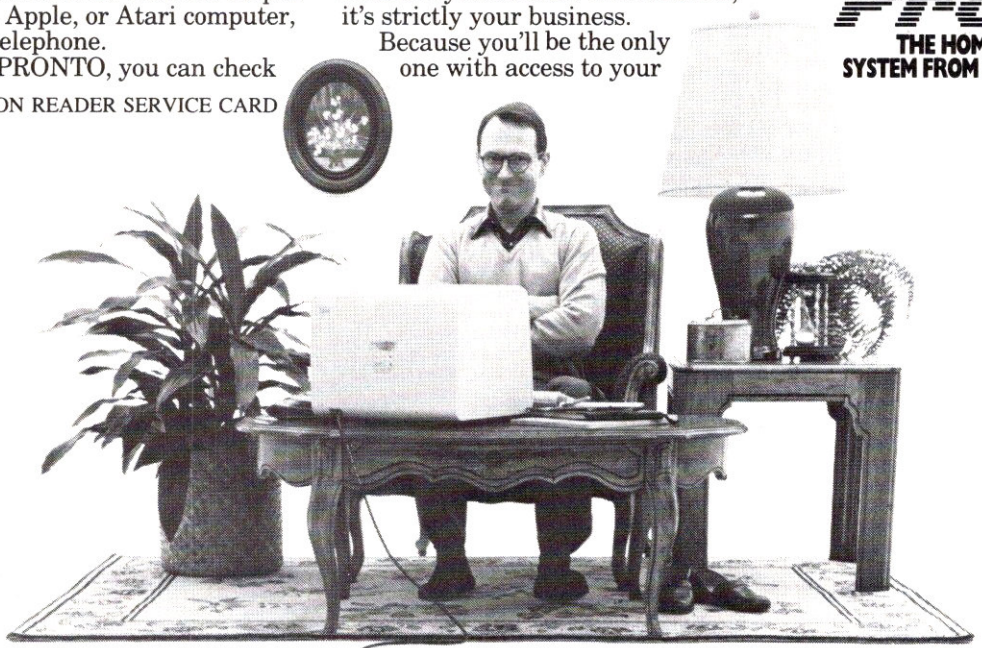

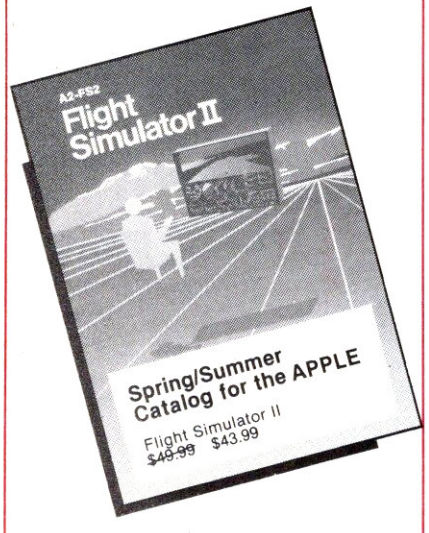

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none has been completely outdone by any of the others. So why not have more than one? To an Apple, a hi-res screen image is a hi-res screen image. Once you've stored it on a diskette, you can transfer it from one program to another with relative ease and bring the best functions of each to bear upon your creation.

I invested in a game-paddle expander with two zero-insertion-force sockets and a selection switch, so I could move back and forth between the KoalaPad, game paddles, and the joystick at will. I took the plastic tablet overlays that came with the Apple Graphics Tablet and Designer's Toolkit software and taped them both down to the tablet so I could see both sets of commands at the same time and use the tablet's grid overlay with the Toolkit's printed-on protractor. They work great together.

Above all, experiment freely. Let your creativity blossom and carry you ahead, because that's where the future lies. The *16-color* future.

You see, if you have a IIe and an extra 64K of memory in the form of the right 80-column card, then you aren't limited by the eight-color shackles of the normal Apple hi-res page. Instead, you can use what is called the "double hi-res" mode and paint with 16 colors of light and no color anomalies at all. Doublestuff Software, in Brooklyn, New York, already has a package out that takes advantage of this new color-mapping screen, and all the other paint-program manufacturers are making enhanced revisions to their packages.

During the Renaissance, painters talked of working with *chiaroscuro*, the careful creation of the illusion of light and shade, but there's no need to work with illusion any longer. It's a colorful future, indeed, and it's already here. ✚

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Penguin Software
830 4th Avenue
Geneva, IL 60134
(312) 232-1984
List Price: $59.95

Graphics Magician
Penguin Software
830 4th Avenue
Geneva, IL 60134
(312) 232-1984
List Price: $39.95

The Utopia Graphics Tablet System
Available at some Apple dealers
List Price: $75

Painter Power
Micro Lab
2699 Skokie Valley Road
Highland Park, IL 60035
(312) 433-7550
List Price: $40

Doublestuff
Doublestuff Software
2053 West 11th Street
Brooklyn, NY 11223
(212) 449-6300
List Price: $39.95
Requires: Apple IIe

All of these programs require an Apple II Plus or IIe (except Doublestuff, which requires a IIe) with a color monitor and a graphics tablet, light pen, game paddles, or joystick.

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TYPEFACE
AND FILE-TRANSFER SOLUTIONS

To help you use your Lisa and your Apple III more efficiently, we are reprinting a section of an in-house manual, *Lisa Solutions*, from Apple Computer. This section covers text-file transfer between the Lisa and the Apple III.

TEXT FILE TRANSFER BETWEEN LISA AND THE APPLE III PERSONAL COMPUTER

Objective: To allow a Lisa, equipped with LisaTerminal, to communicate with an Apple III Personal Computer, equipped with Access III.

Solution: Communication between the Lisa and the Apple III requires the following:

- A Lisa equipped with LisaTerminal
- An Apple III equipped with Access III
- A standard communication cable
- A modem eliminator (full modem) cable

Using the following method, you can communicate either character-by-character information or entire files in either direction. The following description covers communications with an Apple III Personal Computer located near your Lisa only. If you want to communicate over telephone lines, you must replace the null modem cable with a modem for each computer.

Setting up to communicate

Upon opening a new sheet of LisaTerminal paper, open the computer compatibility dialog box. The figure below is an example of a Lisa set up to communicate with an Apple III system.

To set up the Apple III, boot up Access III and enter the setup mode by hitting the Open-Apple key and the S key simultaneously. Using the cursor arrow keys, set up the following characteristics:

ANSI mode
Send LF after CR
7 bits per character
Enable XON/XOFF
Half duplex
Wraparound
Parity: None

Any settings not specifically mentioned can be set to your convenience. The baud rate should be set to the same value as the Lisa baud rate. Hitting Ctrl-S saves the values entered. To communicate, select resume terminal mode.

Communicating

Plug the communications cable and the modem eliminator together. Plug one end into the selected Lisa serial connector B and the other into the connector on the back of the Apple III system. It does not matter which end goes where.

If LisaTerminal and Access III are both running and set up correctly, communication is now established. If you type in your LisaTerminal document, the characters appear on both computers. Similarly, if you type on the Apple III, the characters should appear both on the Apple III and the LisaTerminal screen area.

To send information to the Apple III, open the Lisa document, copy the section that you want and paste it into the bottom of the screen area of your LisaTerminal document. To send a file to Lisa, set the 'remember/forget' field of the comfort characteristics dialog box to remember. On the Apple III, enter 'setup mode' and select 'exit terminal mode.' From the main menu select 'transmit a file,' then press return. Select the file to be transferred by specifying the complete file pathname.

Note: Only ASCII files may be transmitted in this manner. ✚

File/Print Edit Setup

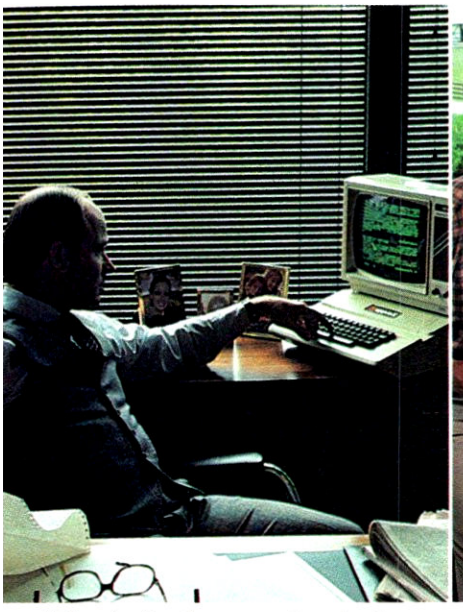
Connector:	☐ Serial A	■ Serial B		Cancel
Parity:	■ None	☐ Even	☐ Odd	
Handshake:	☐ None	■ XOn/XOff		
Baud Rate:	☐ 50	☐ 75	☐ 110	
	☐ 134.5	☐ 150	☐ 200	
	☐ 300	☐ 600	☐ 1200	
	☐ 1800	☐ 2000	☐ 2400	
	☐ 3600	☐ 4800	■ 9600	
Modem:	☐ Hayes 1200	☐ Hayes 300	■ Other	
Dial:	☐ As the Document is Opened		■ Using the Phone Menu	
Terminal:	■ VT100	☐ VT52	☐ TTY	
Duplex:	☐ Full	■ Half		
Auto New-Line:	■ On	☐ Off		
Communication:	■ On (On-Line)	☐ Off (Local)		OK

The Lisa must be configured exactly as shown with the following exceptions: either connector may be selected, as defined in preferences. The baud rate may be set to any desired value as supported by Access III (note: the serial A connector does not support 3600 baud communications).

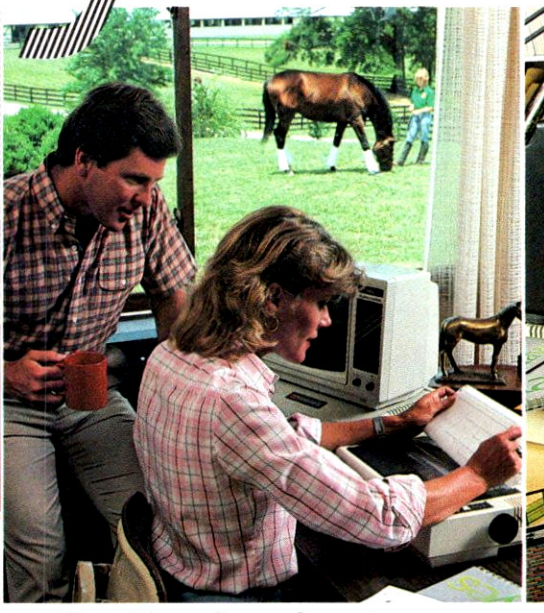
Figure 1: An example of a Lisa set up to communicate with an Apple III system.

Your Apple's telephone.

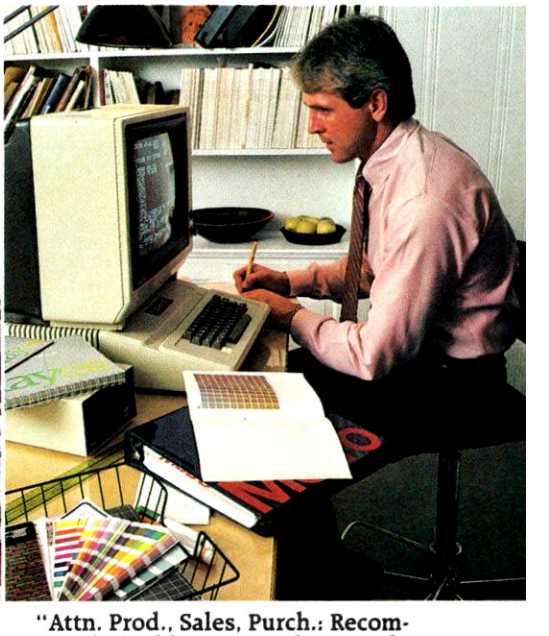
Hayes™



"Thanks for the prompt reply. Sure was a lot faster than waiting for the mail!"



"Gary: The pedigrees for next week's auction are as follows..."



"Attn. Prod., Sales, Purch.: Recommend 50% blue, 30% red screen for closest match."

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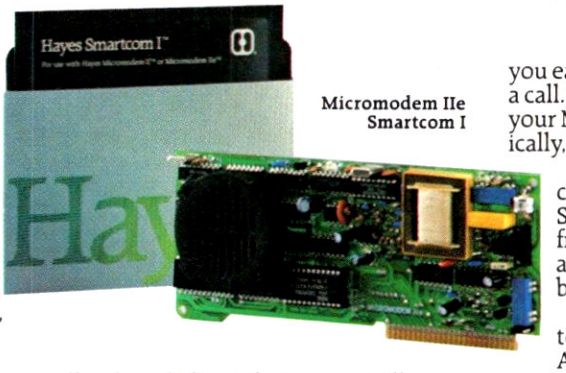

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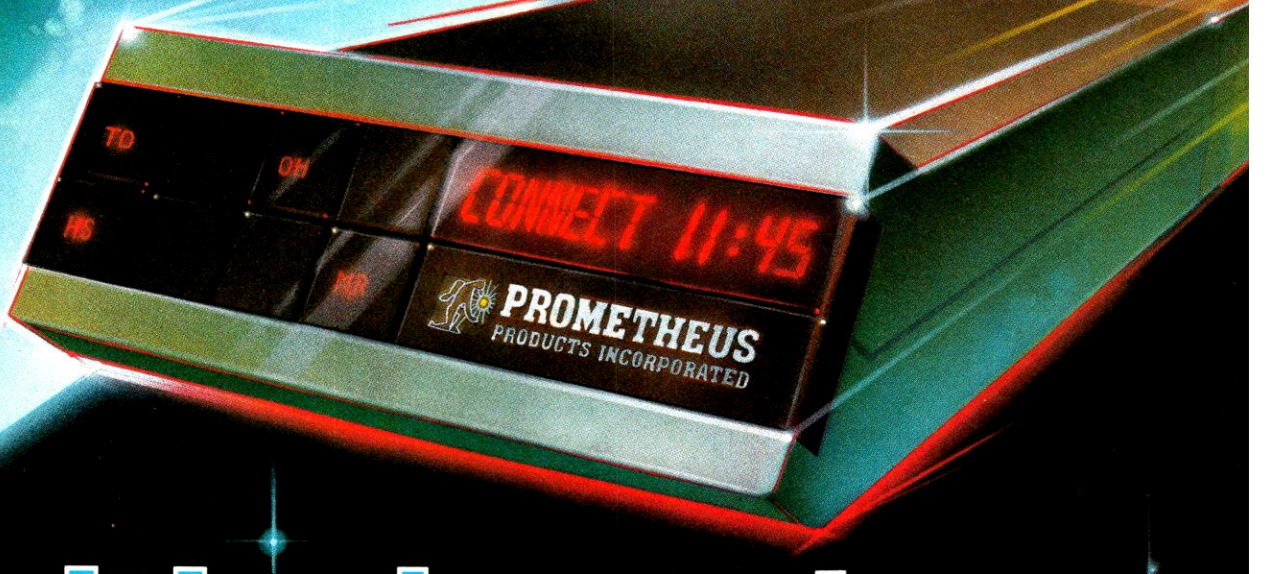

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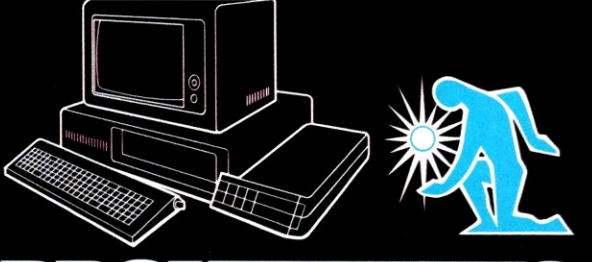

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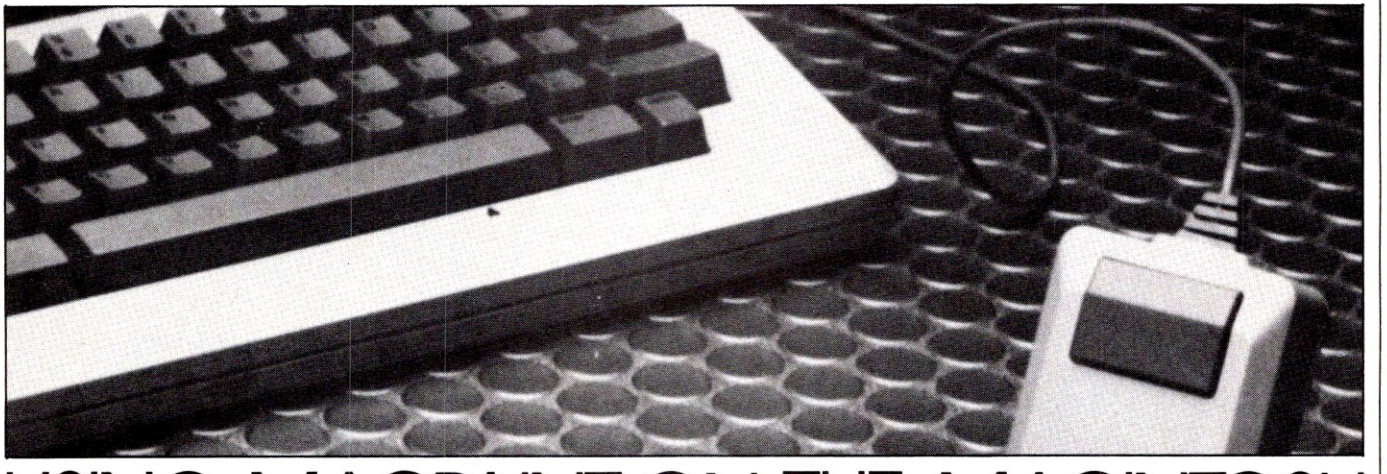


USING MACPAINT ON THE MACINTOSH

If you've already purchased a Macintosh computer, you've probably discovered what many have: The MacPaint program is the most addicting piece of software yet. Even the LisaDraw program doesn't have quite as much appeal as MacPaint does.

I've watched as otherwise serious businesspeople sit down in front of a Mac and spend three or four hours just doodling with MacPaint. Indeed, I'm the first to admit that since I got my Macintosh in mid-December 1983, I've used MacPaint more than half the time to satisfy a need for mindless experimentation that seems to overtake me.

Such testimony might make you wonder if you can do anything practical with the Macintosh and the MacPaint program. The manuals that accompany the Mac contain few suggestions of what to use the MacPaint program for and even fewer details on how to proceed. In addition, the manuals fail to point out some major limitations of the program.

Loading up with Blanks

The first practical function I decided I should use MacPaint for was to create a blank letterhead. I reached this conclusion since, once I had created the logo, I could use the Clipboard buffer to move it to another drawing or to text I created with MacWrite.

The process of creating a logo for letterhead is simple:

1. Use MacPaint to create the logo,

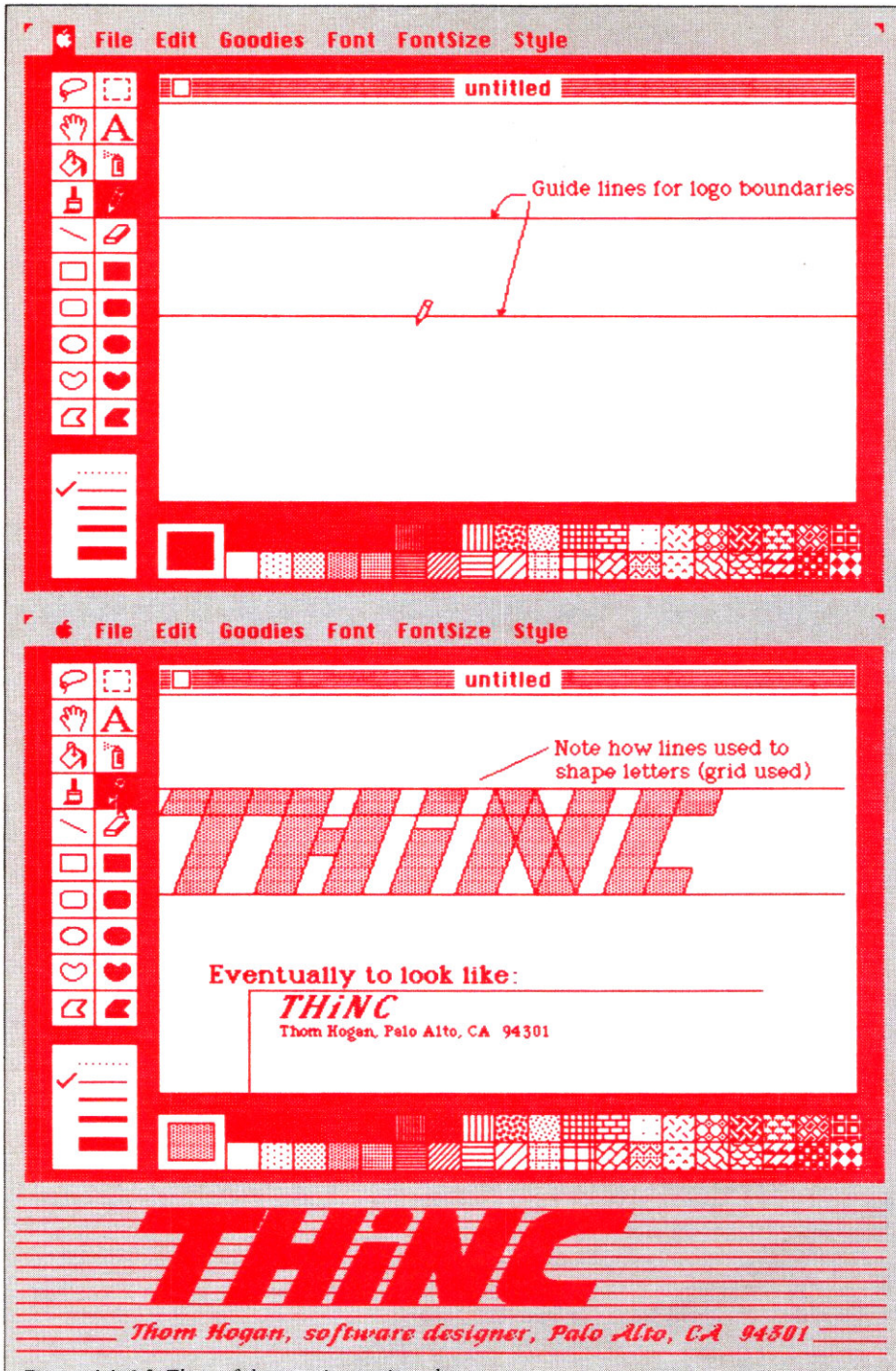
The MacPaint program is the most addicting piece of software yet.

2. Use the Select Window icon to outline your logo,
3. Use the Edit pull-down menu to copy the logo to the clipboard,
4. Exit from MacPaint,
5. Start MacWrite,
6. Use the Edit pull-down menu to copy the logo from the clipboard to the display, and
7. Save the resulting sheet of paper; use a filename such as LOGO or Blank Letterhead.

One of MacPaint's limitations shows up even in this simple exercise. Since the drawing screen (window) represents only about a third of a page vertically and two-thirds of a page horizontally, the size of your logo is limited. This restriction won't present problems when you create letterhead, because you won't normally want to fill too much of the page with your logo and address. Figures 1.1–1.3 show three screens that illustrate the logo-creation process.

When you want to type a letter on your letterhead, first duplicate your blank letterhead; then call up MacWrite by pointing to the Copy of Blank Letterhead icon and clicking the mouse button twice. Enter the body of your letter. When you're done, save the letter using the Save As menu choice.

I've taken this letterhead-creation scheme two steps further: first, I created a few stock letters, to which I add only the date and the name and address



Figures 1.1–1.3: Three of the steps in creating a logo

of the letter's recipient and perhaps a few customized lines; second, I created a file folder called Masters in which I keep my blank letterhead and stock letters.

If you follow suit, you'll find yourself confronting another of the Macintosh's limitations: disk space. On the prerelease Write/Paint diskette I've been using, the system file takes up 141K, MacPaint 60K, MacWrite 52K, the Finder 45K, and the Imagewriter drivers 17K. Miscellaneous odds and ends fill up all but about 30K of the remainder of the diskette—I'll never get many master forms and letters onto this diskette!

The Macintosh lets you read in several diskettes sequentially (the prerelease software I'm using allows up to three diskettes), which offsets the dearth of on-line disk space. The Mac remembers what files are on which diskettes, prompting you when a certain diskette is needed.

I've developed the habit of turning on the Mac first thing in the morning and having the computer read the directories from my Write/Paint, Masters, and Current Data diskettes. I do not turn the machine off until the end of the day (electricity bills notwithstanding!). I can tolerate the diskette switching this system entails, at least until someone comes out with a hard-disk drive for the Mac. (One note of caution: Label every Mac diskette with the name that appears underneath the diskette icon; if you don't, you may have to insert all your Mac diskettes until the Finder encounters the one it wants.)

Forms Conclusion

Having created my basic "working papers," I decided to use MacPaint for another practical function: creating forms. Unfortunately, what sounds great in practice is next to impossible in reality.

For instance, you would expect to be able to create a form—say an invoice—and then fill it in, using MacWrite. MacWrite does not allow you to type text over a drawing, however, which rules out using MacPaint to draw the form (unless, of course, you want to draw the form line by line, typing text between the lines).

Using MacWrite to create the form also proved troublesome. Since most forms consist of boxes, the basic idea is to create the horizontal lines for the boxes with a large-size font (24-point Geneva, for instance) and fill in the boxes with a smaller-size text (such as 12-point Geneva), adding vertical lines as you go. MacWrite prevents you from taking this approach, however. When you move the cursor to an area to start typing, the font size changes to that of the line at that spot. Changing the font size after moving the cursor results in the line moving ahead of you as you type because MacWrite is in the Insert mode. Thus, you have to create your boxes by double-spacing and using a single font size. Proportional spacing and nonextending vertical characters result in a poor approximation of a form, as you can see in figure 2.

The Macintosh lets you read in several diskettes sequentially.

Alas, this seemingly perfect practical use of the Macintosh and its software is, in practice, extremely disappointing—you could do just as well with almost any computer currently available (indeed, my Osborne Executive and Diablo 630 do a better job

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than does the Macintosh and Imagewriter combination!).

The Best-Laid Plans

Despite my initial disappointment in trying to make the Mac do something practical that other computers can't, this computer does shine in some areas.

Art designers—magazine illustrators, advertising layout artists, and the like—will have a field day with MacPaint. For them, the Macintosh and MacPaint offer all the abilities of paper and pen, with the added advantages of electronic manipulation. The Stretch, Constrain, and Copying functions of MacPaint let you quickly modify basic illustrations in ways that used to be impossible without high-cost equipment.

I finally discovered some of MacPaint's practical abilities by fooling around with some ideas about how to remodel my house. At first, I just used MacPaint as a sketchpad, using crude box drawings to try different arrangements of rooms. The more I fiddled around, however, the more I became intrigued with the idea of actually drawing the final plans on the Macintosh. In doing so, I discovered just how useful MacPaint can be when you make a concerted effort to use its full abilities.

Let me describe some of the highlights of my architectural meanderings with MacPaint. As you read this, you'll surely pick up a few tips or ideas that you might not get from reading the MacPaint manual.

My first step was to decide how to arrange my drawing. Normally, residential architectural plans are drawn to a ¼-inch scale—that means each quarter inch represents one foot. If you put MacPaint into the Grid mode (in which the mouse lets you position the cursor only at certain fixed locations), you'll find about 70 positions across the page and almost 90 down the page. Thus, the grid lets you draw most plans at a scale of one unit equivalent to one foot. On this scale, the second fattest of the four line widths MacPaint offers is close to being equivalent to a four-inch wall (actually 4/9ths of a foot—erasing one bit-width later using the FatBits mode gives an exactly four-inch wall, just what we need for most single-story dwellings).

Instead of using the Grid command on the Goodies pull-down menu, I simply fill the page with dots one grid-space apart (see figure 3). The reasons for this approach are two-fold. First, I want to be able to put a wall anywhere, not just on a grid mark. Second, when you're in the Grid mode, your lines are centered on the grid marks. If the final plans are going to be correct to scale, we can't accept this limitation. I do draw preliminary plans in the Grid line-drawing mode, however, since having the Macintosh figure out the location of a grid mark is substantially faster than the manual method of doing so in the FatBits mode.

On the other hand, when we begin later to draw single-bit-wide lines that occur on foot-wide boundaries (kitchen counters, shelving, and so on), do turn the Grid mode on, since it will help you line things up quickly.

The Macintosh and MacPaint offer all the abilities of paper and pen.

Another thing you soon learn when you try to do something as complex as an architectural drawing is the advantage of creating broad strokes first and using FatBits to modify the result later. For instance, to draw a dotted line (to indicate a shelf above floor level or to show open beams across an area), I draw a solid line and then erase every fourth dot, using FatBits.

Likewise, you use FatBits to draw and refine common objects such as the refrigerator, washer, and dryer with the Box icon.

The MacPaint manual doesn't explicitly say so, but most functions work fine in FatBits—enter the FatBits mode, select the Box icon, position your cursor at the upper left corner of the desired box, hold down the button, and pull the mouse to the bottom right corner of the box before letting go of the button.

Yet another thing you'll learn as you start using MacPaint for something serious, such as architectural drawing, is that MacPaint doesn't have an icon builder. In other words, you can't create one symbol—say a circle with two lines through it, to represent a wall socket—and then pop it onto the drawing by pressing a key.

You can copy an existing portion of a drawing, however, which is how you "cheat" to draw all those wall sockets quickly. Create your symbol outside the regular area of your drawing. Use the Select Area icon to outline the symbol you've created. Move the mouse into the outlined area—the cursor should become an arrow instead of a crosshatch. Next, press and hold the Option key to create a copy, and press and hold the mouse button while moving the copied symbol to its destination. Release the mouse button to leave a copy, and press the mouse button again to move another copy to a new location.

Invoice

QTY	DESCRIPTION	PRICE
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1	MACabre Horror Adventures	$25.00
	Tax	2.75
	TOTAL	57.75

Figure 2: Proportional spacing gives you an imperfect form.

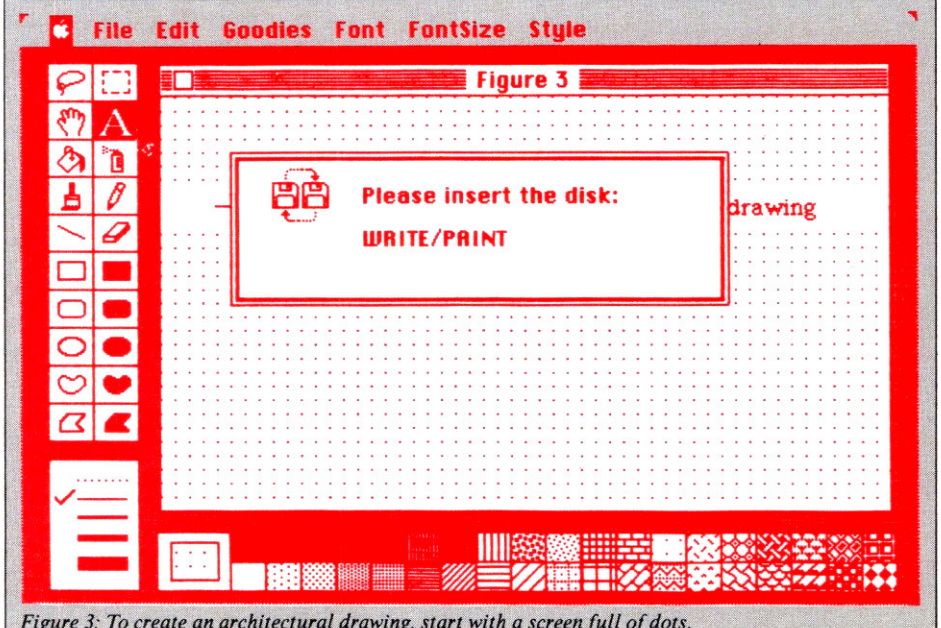

Figure 3: To create an architectural drawing, start with a screen full of dots.

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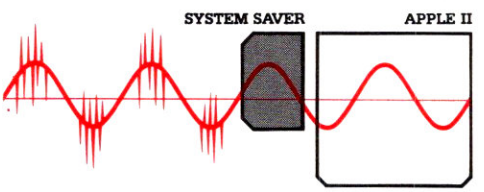
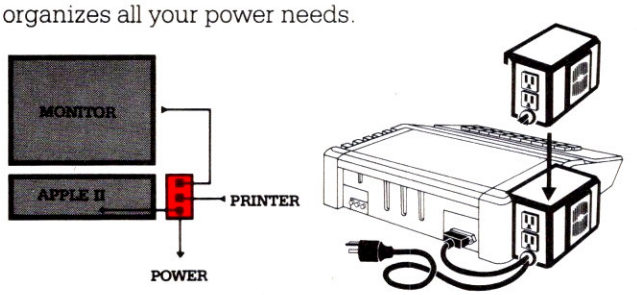


System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

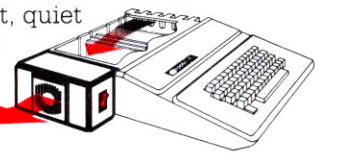


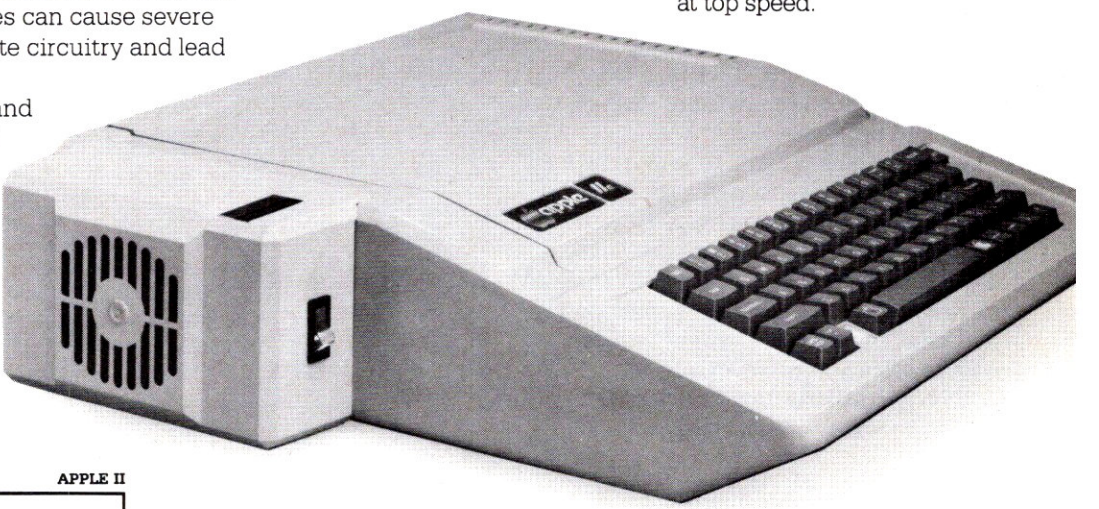
It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand

$89.95 at Apple dealers everywhere.

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*Softsel Computer Products Hot List. **PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

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© 1983 Kensington Microware Ltd. System Saver is patent pending.

CIRCLE 132 ON READER SERVICE CARD

In this manner, I created one wall-plug symbol, copied that symbol to all the places on walls represented vertically where wall sockets were supposed to go, and used the Rotate function to make the symbol useful for the walls represented by horizontal lines in my drawing. Within a minute, all the wall sockets were in place. The same method worked well for wall switches (T's) and lights (crosshatches with a circle around them).

Since I need most of the symbols I'm working with for every drawing, I made one copy of each and put it in a box on the side of my drawing. Before saving my entire drawing, I saved the box of symbols to the Clipboard buffer.

Later, I came back to MacPaint, copied the Clipboard buffer to my piece of paper, and saved the boxed symbols as a file. So, when I do architectural drawings in the future, I'll simply copy the boxed symbols to my blank sheet of paper and begin drawing.

The last thing you add to your drawing is the text. In some cases, you'll accidentally overwrite some of your drawing, but with practice, you'll be able to estimate how much room the various fonts take and how to position the cursor so that your drawing isn't destroyed when you enter text.

One particularly troublesome problem arises when you type text and later use the Fill function to put a pattern in the area that the text occupies. More often than not, the pattern overlaps part of the text, making it unreadable. I deal with this difficulty in two ways: sometimes I box the text so that the fills won't overlap it, and sometimes I simply use FatBits to erase the offending pattern from around the text. The complexity of the pattern usually dictates which method I use—it's easy to erase a few bits but more difficult to erase complex patterns bit by bit.

The complexity of the pattern usually dictates which method I use.

Figure 4 shows one of the results of my architectural experimentation on the Macintosh—a single page from a hypothetical house plan. This plan is simpler than what you need to obtain a building permit, but it should give you a good idea of what is possible. Note the boxed text in the lower right corner—this is another "predrawn" section that I sometimes bring in, using the clipboard.

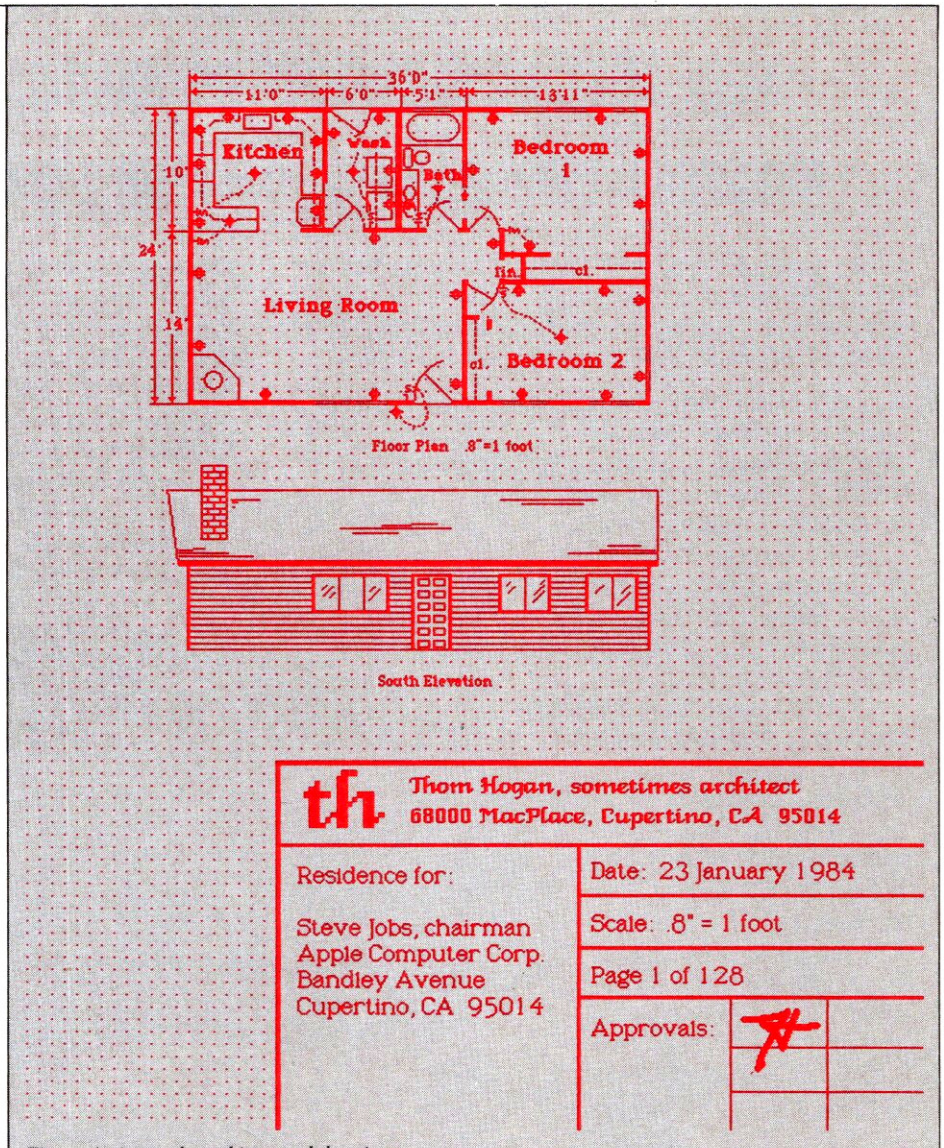

Figure 4: A sample architectural drawing

Also notice that I've used the grid to align the floor plan (at the top of figure 4) with the elevation (outside view, at the middle of the figure).

Even nonarchitects should find MacPaint's architectural abilities useful from time to time. Consider how useful the Mac would be to prepare new office or home layouts.

You'll probably discover that the order in which you do things with MacPaint directly influences the amount of time you'll need to complete a task.

In general, after a month of drawing every day with the Mac, I've concluded that you must learn to think in terms of backgrounds, foregrounds, detail, and text, in that order, to finish drawings efficiently with MacPaint. When I draw with pen on paper, I start with foregrounds, and add detail, then text, then backgrounds—using MacPaint has drastically changed the way I draw.

Now I always start a drawing by doing the background. By background, I mean scenery for a cartoon, or possibly just a grid for a chart. The background sets the scale for your drawing. I find that working on the background first is no problem—I just draw the foreground and add details right over it. MacPaint has so many different erase functions, and they're so easy to use, that you can quickly get rid of background that you want to cover up.

Next, I do the main foreground figure of the drawing. If I draw a person, it is the outline of the body; for a house plan, it is the outlines of the walls and main features. As I draw the foreground, I often begin erasing parts of the unnecessary background that I drew earlier.

Once I've completed the main drawing, I add the details. For architectural drawings, I use the special symbols and other detailed items that I've created

The word is out on word processors. Format-II™ ranked number one.

We've always thought of Format-II as the finest, easiest to use word processor for Apple® II+, IIe and Franklin® computers. We're pleased that Peelings II magazine agrees. They judged Format-II best out of 18 leading word processors. Here's why:

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The Peelings II reviewer said, *"Format-II is one of the few word processors that is so comfortable and predictable, I would consider it as an addition to my small library of personal software."*

Peelings II Magazine Rating

FORMAT-II™	1
SCREEN WRITER II™	2
PIE WRITER™	3
WRITE AWAY™	4
LETTER PERFECT 5™	5
WORDSTAR™	6
MEGAWRITER™	7
APPLE WRITER II™	8
PERFECT WRITER™	9
CORRESPONDENT™	10
SPELLBINDER™	11
MAGIC WINDOW II™	12
ZARDAX™	13
SUPERTEXT 40/80™	14
GUTENBERG™	15
WORD HANDLER™	16
SELECT™	17
SANDY™	18

Reviewed by John Martellaro, September 1983, based on Peelings II rating system for performance and performance to price ratio.

In the words of the Peelings II reviewer: *"This is the best program I have seen for people who do a lot of work with mailing lists, form letters and short correspondence."*

An easy to follow manual.
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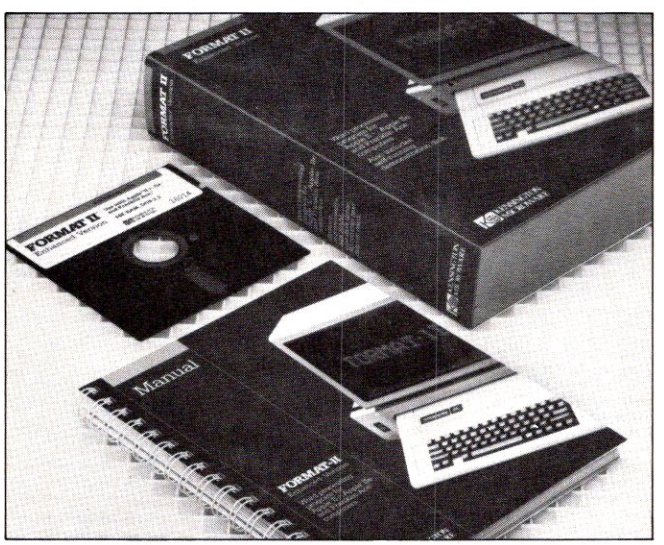
Put it all together. Then add features such as support of hard disk drives and a standard DOS text file format compatible with spellers and communications programs, and it's not hard to see why Format-II has earned the number one rating.

The words of the Peelings II reviewer sum it up: *"I cannot think of another word processor that would be better overall for business use."*

Thanks Peelings II. We couldn't have said it better ourselves.

For a reprint of the full review, or to order Format-II, fill out coupon and send it to: Kensington Microware, Ltd. 251 Park Avenue South, NYC, NY 10010 or call us at (212) 475-5200. Tlx: 467383 KML NY. Or visit your local Apple dealer.



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Format-II requires 64K and an 80 column card.

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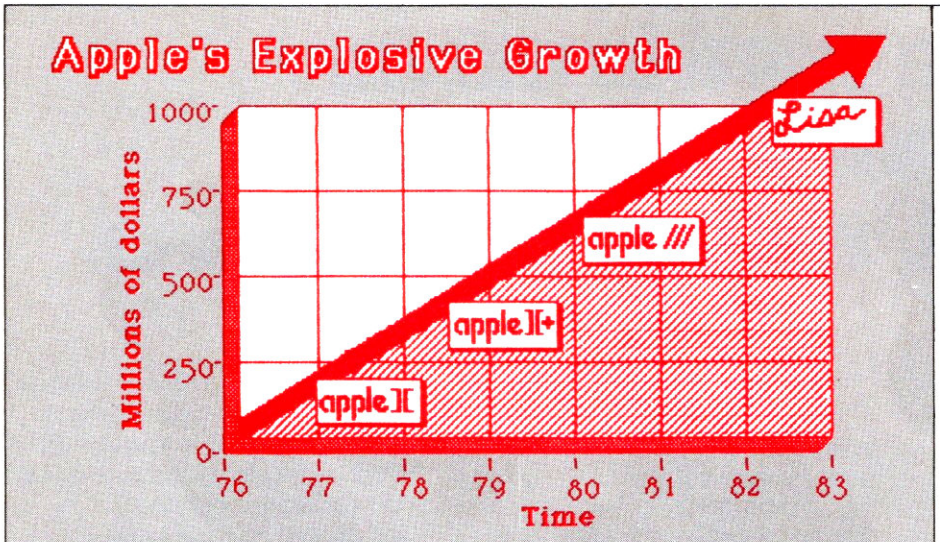

Figure 5: Charting Apple's growth

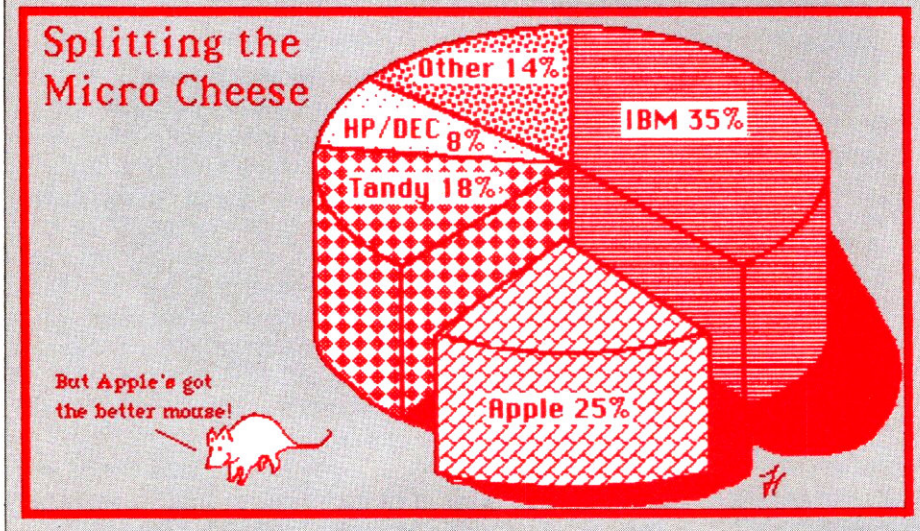

Figure 6: A pie chart with a difference

and stored. When you're adding your detail, don't forget to look for places where you can add shadowing or highlights to make your drawing look three-dimensional.

The last step in any of my MacPaint drawings is to add text, which frequently goes on top of something else. If you put your text down early and then have to use a Fill function in the area the text occupies, you will get unreadable text. By saving the text till last, you avoid this problem. Since the Mac has so many immediately available fonts, it's also nice to be able to try out several different ones and see their overall effect before committing yourself to one type style.

Form Follows Function

So, if architectural drawing is one practical use of the MacPaint program, what else can we think up?

Well, how about some dynamite presentation graphics?

Programs such as VisiPlot from VisiCorp and PFS:Graph from Software Publishing Corporation, or the graphing functions of Lotus 1-2-3 from Lotus Development Corporation, generate nice, businesslike charts. Usually, you can choose a bar chart, a line chart, a scatter plot, or a pie chart. If you're lucky, you get to specify shading for each section of the chart.

With MacPaint you can do better. The main object of presentation graphics is to get a point across, not to pinpoint specific numerical comparisons. Suppose you want to convey Apple Computer's rapid growth without meticulously charting each quarter's sales. With MacPaint you can quickly put together a professional-looking chart that gets across your main point: Apple went from $0 to $1 billion (that's right, billion) dollars a year in just six years. Take a look at figure 5. Wouldn't you say the point is amply clear here?

I created figure 5 by laying out the background grid first. Next, I added and filled in the dynamic upward arrow. The boxes with the product names came next, after which I filled in the appropriate text (Using FatBits to try to capture some of the spirit of Apple's various logos).

Another thing you can't easily do with traditional graphing programs is add little touches to your work. Figure 6 shows a normal pie chart, with a shadow and a captioned cartoon in the lower left corner. Drawing the pie chart and filling it in took no more than five minutes. I drew the mouse freehand (with the Apple mouse) and then refined it slightly with FatBits—again, less than five minutes' work. So, in ten minutes we have a usable, professional-looking graphic.

We've barely begun to explore the practical uses of MacPaint. Business-people will want to use the program to maintain departmental organization charts, an easy process: Draw a box. Surround it with the selection window. Use the keyboard commands to make copies, and use the mouse to place them where they belong. Use the Line Drawing function (with the help of the grid marks) to show the hierarchy. Then fill in the names with the Text function. If you leave out an employee's name, outline the name, use the Edit pull-down menu to invoke the Clear function, and fill in the name.

In ten minutes we have a professional-looking graphic.

And what else?

How about a calendar laid out the way *you* want it to look (e.g., one that starts at noon and goes to 8:00 P.M. each day)?

Perhaps a poster announcing a company picnic?

This list could quickly become endless. Although the Macintosh and the MacPaint program have their limitations, they also have a lot of ability. While we Mac users are waiting for MacDraw (a drawing program for organized graphics, such as flowcharts, organizational charts, and so on) and MacForm, we'll have plenty to keep us busy while we spruce up our business's graphics.

I'm glad MacPaint is so addicting. Each day I use it I learn a new trick or try a new idea, and my graphic presentations for my books, lectures, and consulting work have never looked better since I started letting Mac do the hard part. ✚

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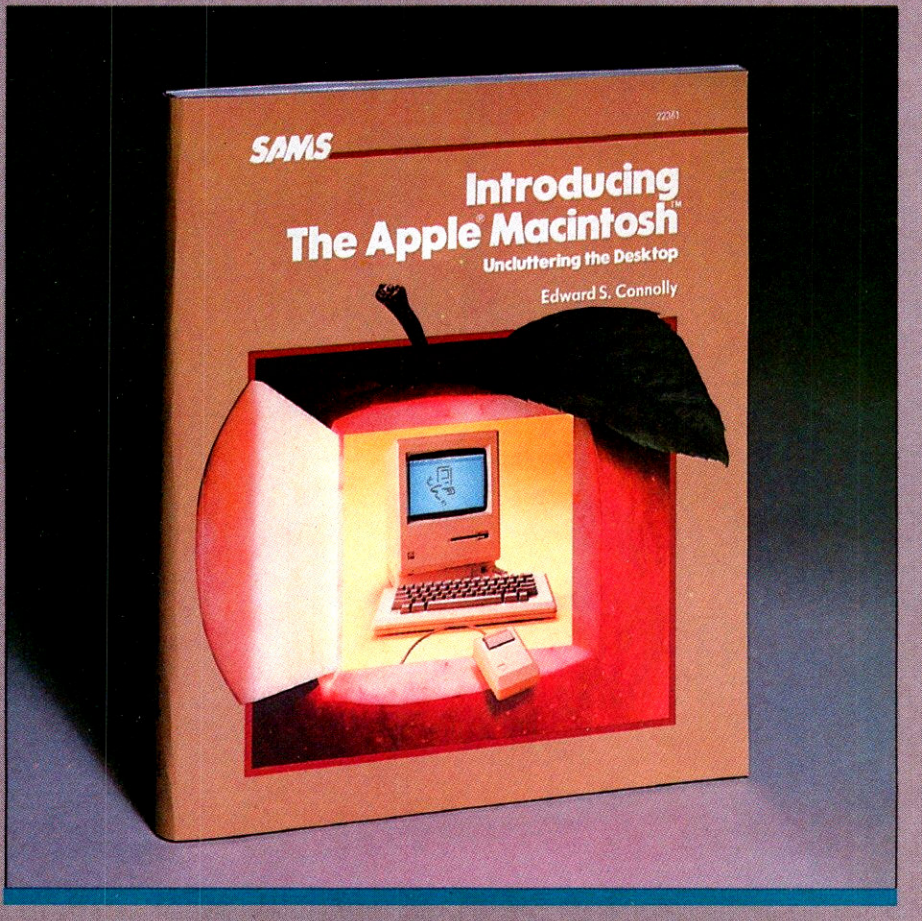

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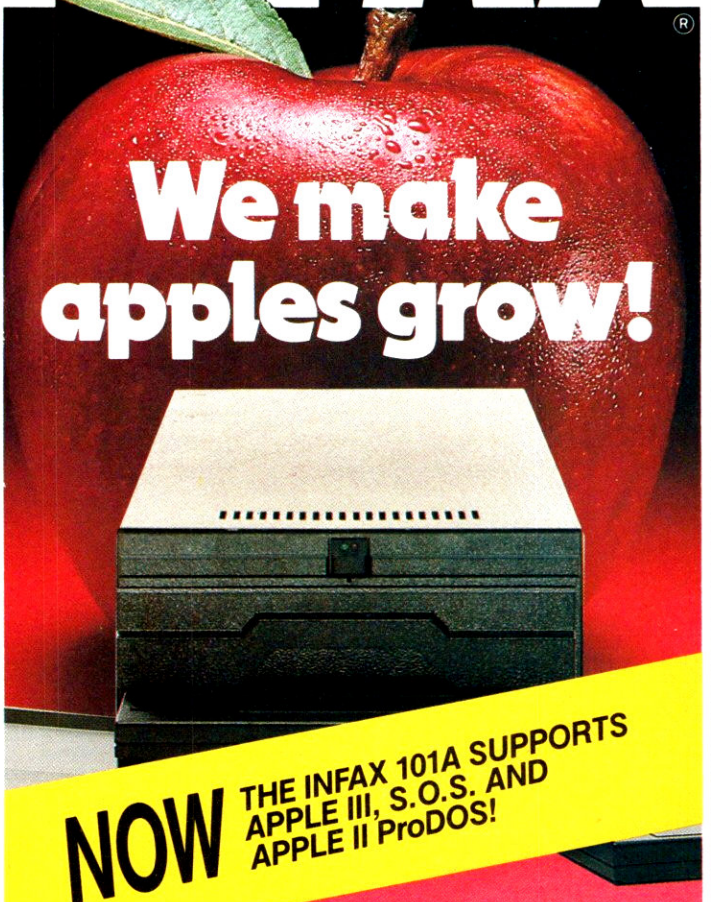

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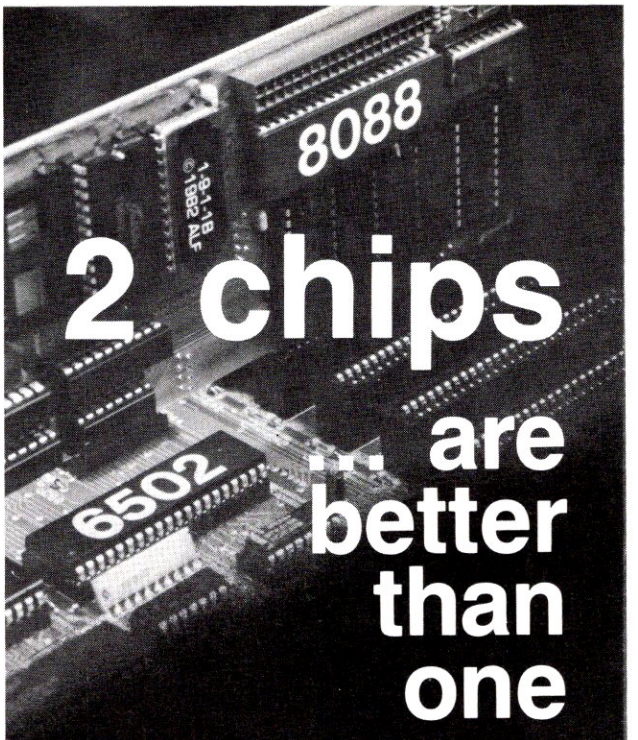

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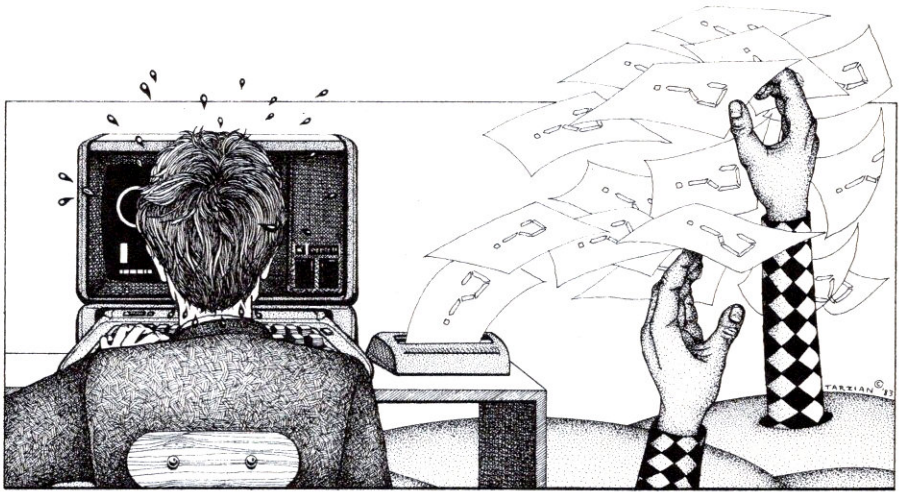
RESCUE SQUAD/BY LINDSAY McGRATH

In this session, Rescue Squad answers questions about underlining with Apple Writer, passing control characters and commands with your computer, and PR# commands in Applesoft.



ASCII Codes and Apple Writer IIe

Q. In volume 2, issue 2, you ran a program for entering control characters into Apple Writer II. It looked great, but I can't use it because I use Apple Writer IIe. How can I put an ASCII 0 (NUL) into my Apple Writer IIe?

A. *Just follow these instructions. Create your Apple Writer IIe document as usual. When you need a NUL (ASCII 0) put a ~ (or any other unused character) in wherever you need a NUL. Then save the document to disk using Control-S.*

Now type Control P? to get the print-program menu. Type PD8 to change the print destination to slot 8. This is how Apple Writer prints to disk. Type NP to begin printing. Apple Writer IIe will prompt you for a filename to put the document under. Make sure the name is different from the one you saved it under before, and press Control-S again. Exit from Apple writer and start up a DOS 3.3 disk.

Type in and run the following program:

```
5  ONERR GOTO 200
10 D$ =CHR$(4)
20 INPUT ''APPLE WRITER FILE
   NAME:'':F$
30 PRINT D$:''OPEN'':F$
40 PRINT D$:''READ'':F$
50 REM ** MAIN PRINT-READ LOOP **
60 GET A$
70 PRINT D$:''PR#1''
80 IF A$ ='' ~'' THEN
   A$ =CHR$(0)
85 REM ** THE CHARACTER BETWEEN
   '' '' SHOULD BE WHATEVER YOU
   USED IN YOUR DOCUMENT **
90 PRINT A$
100 GOTO 60
199 REM ** FINISH PROGRAM AND
    CLOSE FILE **
200 PRINT D$:''PR#0''
210 PRINT D$:''CLOSE'';F$
220 END
```

This will print out the Apple Writer IIe file with the desired NUL characters. I have used an Apple Parallel Interface Card successfully, but some interface cards may have difficulty with this routine.

Passing Control Characters and Commands in Apple Writer

Q. How can I pass control characters and commands to my printer in Apple Writer?

Inverse characters are those in which your Apple monitor's normal colors are reversed.

A. *You can do this by using the Control-V function ([V]=Control-V). Let's say you want to print elongated characters on an Apple Dot Matrix Printer. To do that, you would type: [V] [N] [V] (Control-V, Control-N, Control-V). Refer to your printer's manual for the appropriate control codes.*

For more information on the Control-V function, see the following computer manuals:

- *Page 50 in the Apple Writer III manual*
- *Page 51 in the Apple Writer II manual*
- *Page 48 in the Apple Writer II manual*

To find out what to type on the Apple keyboard for each control code, refer to the following Apple manuals:

- Applesoft BASIC Programmers' Reference Manual—*Volume 2 (for IIe only), pages 241 and 242*
- BASIC Programming Reference Manual, *pages 138 and 139*
- Apple III Standard Device Drivers Manual, *pages 136 and 137.*

Escaping with Apple Writer II

Q. How do I enter an Escape character in Apple Writer II using the Control-V function?

A. *To enter an Escape character, type the Escape key twice. The first time will give you an inverse caret (^), and the second time will give you an inverse left bracket ([). The inverse left bracket ([) is the Escape character. Inverse characters are those in which your Apple monitor's normal colors are reversed.*

If you use a black-and-white monitor, an inverse character will appear in black on a small white background. If you use a green-and-black screen, an inverse character appears in black on a small green background. ✚

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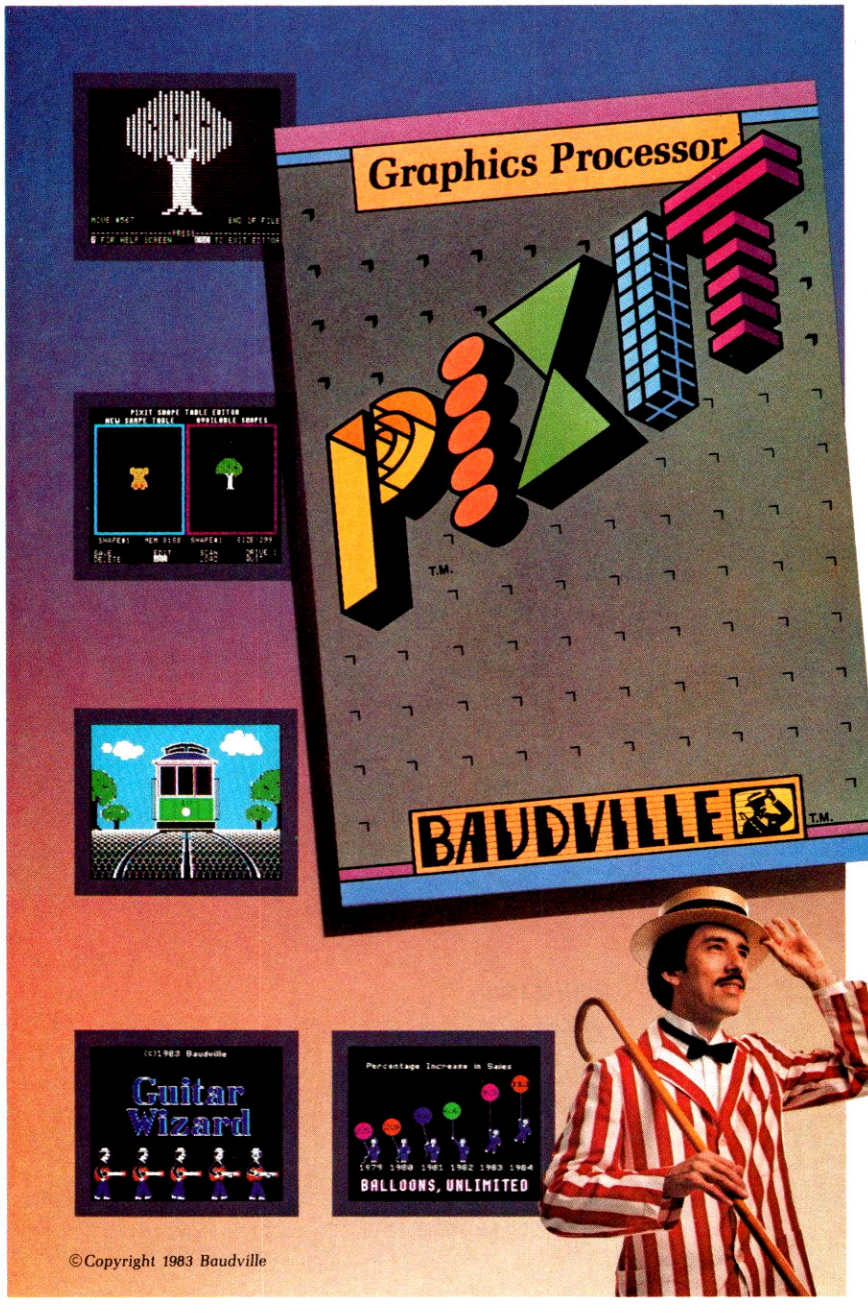

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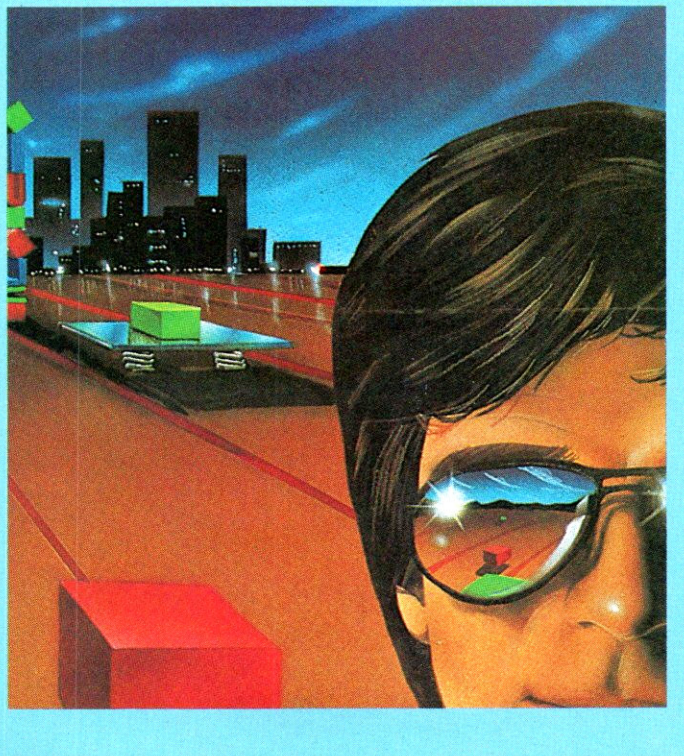
Kids love building blocks. Not just little kids, but big kids, too. Take this fellow named Barnaby, a construction worker. He's erecting a high-rise skyscraper, but time pressure and an assortment of irregularly shaped blocks may cause the architectural wonder of his dreams to crumble before his very eyes.

Highrise, a challenging combination of brain teaser and arcade game, puts you in Barnaby's steel-toed boots. As Barnaby the Master Builder, you run underneath chutes filled with blocks, select one that seems to fit, position it on a springboard, and flip the block onto the pile. After the stack reaches a certain height, you climb like a human fly to the next, more difficult level.

The game contains five chutes, each filled with four blocks. The blocks measure up to three stories high by three units wide, and most come in a variety of interesting, and sometimes frustrating, shapes. The lower levels contain simple shapes, such as squares and rectangles. As you progress through the levels, the blocks become like jigsaw-puzzle pieces—oddly shaped and unbalanced. Generally, the higher the level, the more irregular the shape.



The object of Highrise is to keep building balanced stacks of blocks so you can climb to higher levels. The higher the level, the more points you score.

You can only grab the end block of each chute, which can cause some consternation when none of the end blocks seems to fit on the pile. You then carry the block to the springboard, which consists of six colored segments—white, green, blue, purple, orange, and purple—each measuring one unit wide. These segments correspond exactly to colored segments that form the foundation next to the springboard.

An assortment of irregularly shaped blocks may cause the architectural wonder of his dreams to crumble.

You position a block on the springboard, using the colored segments to figure out where the block will land after it's flipped. Thus, if you place a two-unit wide block on the green and blue segments of the springboard, it will land on the green and blue segments of the foundation.

If a block already rests on those segments of the foundation, your two-unit wide block will land on top of it.

The stack must reach 18 stories before you can climb it. Thus, you must place at least six blocks on the foundation. You can scale all types of blocks, including the skinny three-unit-tall, one-unit-wide types. No matter how uneven the stack looks, if it reaches 18 stories, you can advance to the next level.

The object of Highrise is to keep building balanced stacks of blocks so you can climb to higher levels. The higher the level, the more points you score.

On the first and second levels, most blocks are square or rectangular, so stacking 18 stories is easy. The third and higher levels contain blocks of various shapes and sizes, though. With planning, you can eventually place these esoteric shapes on the pile. Planning does consume time, and the timer ticks off seconds relentlessly. The higher the level, the less time you have to complete the stack.

On the first and second levels, the timer is set at 200 and 170 seconds, respectively. On the third level, it starts at 140, lowers to 110 on the fourth, and drops to a scant 80 seconds on the fifth level. If you misplace a block and cause the stack to come tumbling down, the timer does not reset. Instead, you start rebuilding the stack in whatever time remains.

The game ends when you fail to reach the next level before time expires.

Highrise contains a thoughtful option called the Instructor mode, which lets you play a leisurely game without any time constraint.

The game's controls are fast and responsive. You press either arrow key to move rapidly from chute to springboard and back. You press the space bar to release a block from the chute; pressing it again drops the block onto the springboard. You press the Return key to flip a block onto the stack. You may place more than one block on the springboard before you press the Return key.

The graphics are well done. Your alter ego, Barnaby, complete with hard hat, strides along the bottom of the screen, blocks at arm's length. The blocks come in a variety of colors, including purple, blue, orange, green, white, and an assortment of stripes. You can easily read the time, score, and level across the top of the screen.

The springboard springs up when you flip the blocks onto a stack. The blocks themselves arc gracefully onto the stack. If you place the blocks correctly, the pile remains standing. Otherwise, the stack topples, disintegrating into an avalanche of blocks.

The sound effects are as good as the graphics. A high-pitched chirping sound signals that Barnaby has taken a block from the chute. A staccato clicking noise accompanies his footsteps, while climbing to the next level sounds a happy tune. If the stack falls, Highrise gives you a low-pitched electronic chuckle. With ten seconds left on the timer, the game sounds notes with each passing second. When time expires, Highrise sets off an electronic raspberry.

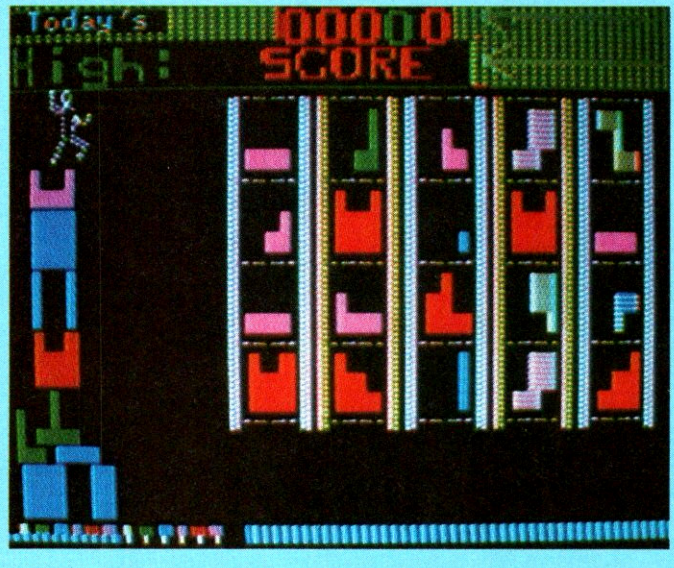
Whether you call it an educational game, puzzle game, or arcade game, Highrise is fast, fun, and exciting.

The instructions are only half a page long, and, for once, the brevity is appropriate. Highrise is a simple game. In many ways it is an electronic version of a Parker Brothers game called Blockhead, which Parker Brothers rated for ages four to adult.

MicroLab labels Highrise "educational software" and even markets the game out of its computer-education division. I'm not sure that designer Joe Calabrese had education in mind when he programmed such a fun game. I always thought that educational software taught you a skill such as typing, math, or spelling. I think Highrise only teaches you how to play a better game of Highrise.

Still, whether you call it an educational game, puzzle game, or arcade game, Highrise is fast, fun, and exciting for kids of all ages. Although simple to learn and play, it takes a tremendous amount of skill to master. Highrise towers over most arcade games and rates a full 100 stories.

Russ Lockwood



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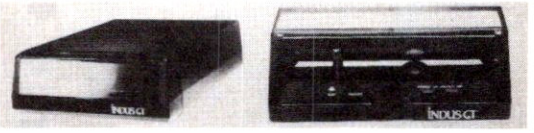

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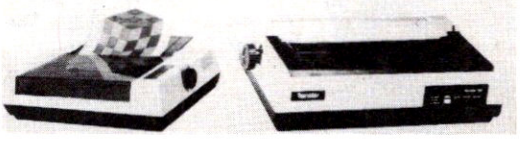

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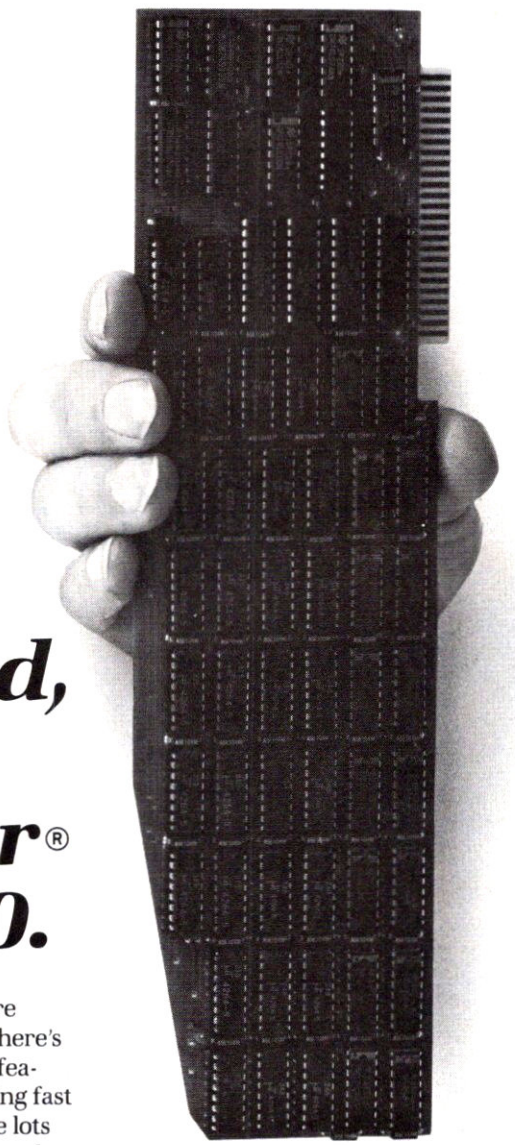

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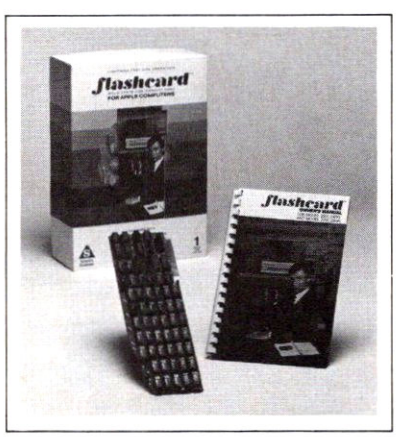

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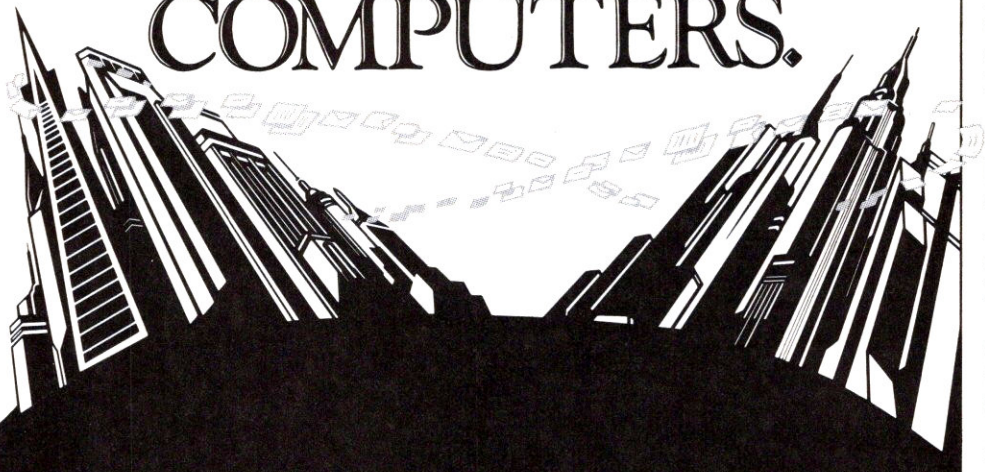

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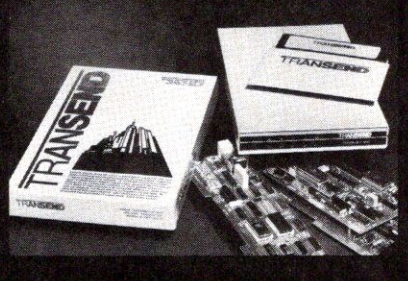

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TUTORIAL/BY ROBERT COWART

HOW TO dBASE II

PART VI

In a tutorial series on dBase II, a popular program for database management

So far in the *A+* series of dBASE II tutorials, we have covered techniques for creating databases, storing information in them, and keeping that information updated. In addition, we have explored almost all of the dBASE II commands for data retrieval, including the use of sorted and indexed databases, as well as the advantages of using the Report command for easy report generation.

This time, we will cover some odds and ends that will help you use more complex commands when you retrieve your data:

- shortening your command line
- adding a record in the middle of your database
- using operators
- string and substring searches
- using the Sum command

Tutorial Conventions

These tutorials involve numerous examples. Sometimes I ask you to type in a command, and then dBASE II responds. Just to differentiate between what you do and what dBASE II responds with, the lowercase words are the ones you type. Uppercase works too, so it doesn't really make a difference—it's just clearer this way. Some examples may specifically ask you to type uppercase letters, but these cases always involve a series of words between quotes. The dBASE II responses are usually in uppercase letters. All screen interactions are in larger type to distinguish them from the text.

To make these sections more readable, carriage returns are implied rather than included.

In the command-syntax examples, words between square brackets (e.g. [before]) indicate an optional phrase or "argument."

Time Savers

So, with no further ado, let's begin. Assuming you are sitting in front of your Apple, try opening a file and looking at its structure:

```
. use <filename>
. display structure
```

If you have been following along with our tutorial, you may have noticed that several of the regularly used commands (such as this last one) are tedious to type. In case you don't already know, it isn't necessary to type all those letters each time, since dBASE doesn't look at them all. In fact, only the first four letters of a command are of any significance, unless you are referring to a filename, a field name, a field's contents, or a memory variable. Therefore

```
. disp stru
```

will do just as well. Two other time savers are

```
.go top                    (instead of)
.goto top

.go bott                   (instead of)
.goto bottom
```

If you are wondering why I waited for six issues of *A+* to give you these tips, here's why. It's better (and easier) to learn the complete command names when you're starting out, because the abbreviations don't make a lot of sense.

It takes a great deal less time to insert a record than to append and sort, and uses fewer commands too.

If you are still not familiar with the commands, you may want to stick with using their full names for a while longer. At any rate, I will continue to spell out entire command names for tutorial purposes. Remember, whenever you refer to things that you created and named (files, fields, and the like), you will have to use the full name; otherwise dBASE will issue an error message of some type.

Inserting a Record in the Middle of Your Database

Occasionally you'll have to stick some data into the middle of your database. For example, say you have a very large sorted database. It may have taken your computer and dBASE several hours to sort it into order. Now you realize that you left out one record! How can you slip this new record into the database where you want it? You could use the Append command and then re-sort the database, or you could use another command designed for just this purpose, Insert.

It takes a great deal less time to insert a record than to append and sort, and uses fewer commands too. As you may recall, sorting creates another database that you have to name. Here's a comparison of the two commands and the time my computer took to complete inserting and sorting a 263-record database on a hard-disk system.

```
.use phonebk
.sort on last:name to temp     (2 min. 28 sec.)
.delete file phonebk
.rename temp to phonebk

.use phonebk
.goto 10
.insert                        (47 seconds)
```

Still, with large databases the Insert command does, as the dBASE II manual warns, take a bit of time. So beware. Sticking with indexed databases is usually the better bet (see the last issue of *A+* for an in-depth discussion of sorting vs. indexing). Also, you have to consider the time it takes to figure out where in the database you want to insert your new record.

Assuming you have decided to use Insert, here is the syntax:

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4. **DUMP Memory to screen/printer in Hex with Ascii on right side.**
5. **DISA disassembles Binary to screen or printer.**
6. **AL prints last loaded program Address & Length in decimal & hex.**
7. **HIDOS moves DOS to Language Card & continues operation of program.**
8. **/ is a one keystroke Catalog in addition to the original command.**
9. **DATE prints with any clock. Also File Dating with clock or manual.**
10. **FIND prints address's of hex found in 64k memory. Hidos cmd only.**

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All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DIVERSI DOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO	NO
	TLOAD	6.2	NO	NO	NO
(791 Strings,	WRITE	29.3	28.0	29.4	88.4
32 chars ea)	READ	24.3	16.3	24.3	83.8
	PRINT/READ	44.2	45.9	45.1	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	151.1	1231.2
APPLESOFT (100 Sectors)	*SAVE	7.1	16.4	6.4	33.1
	LOAD	5.0	4.0	5.0	23.5
INTEGER (100 Sectors)	*SAVE	7.3	NO	6.6	33.4
	LOAD	4.9	NO	4.9	23.4
BINARY (100 Sectors)	*BSAVE	7.8	18.4	7.3	28.7
	BLOAD	5.8	4.8	5.8	24.5
48K PROGRAM SPACE	APPLESOFT	36,352	NO	36,352	36,352
(With 3 Bufs avail)	INTEGER	36,352	NO	36,352	36,352
	BINARY	36,352	34,816	36,352	36,352
64K PROGRAM SPACE	APPLESOFT	46,592	31,232	45,658	35,162
(With 5 Bufs avail)	INTEGER	46,592	NO	35,162	35,162
	BINARY	46,592	40,704	45,658	35,162
NUMBER OF DOS COMMANDS		37	29	31	28
CLOCK FILE DATING		YES	YES	NO	NO
MANUAL FILE DATING		YES	NO	NO	NO
ONE KEYSTROKE CATALOG		YES	NO	YES	NO
AUTO USE INTEGER CARD ANY SLOT		YES	NO	NO	NO

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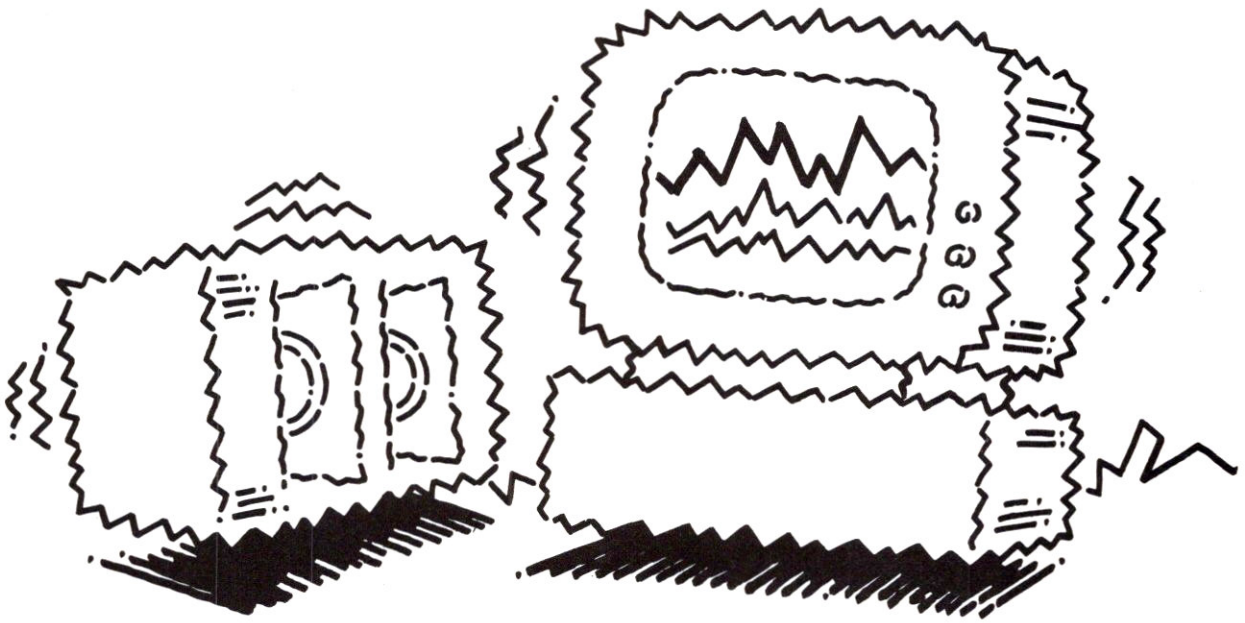

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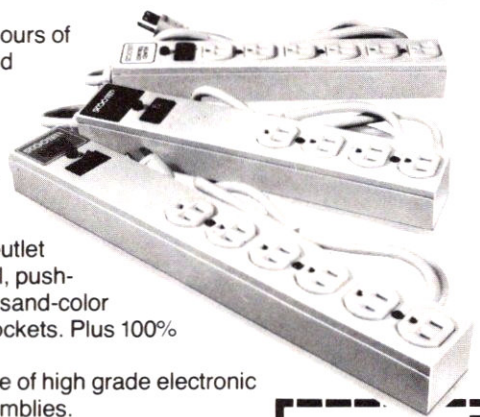

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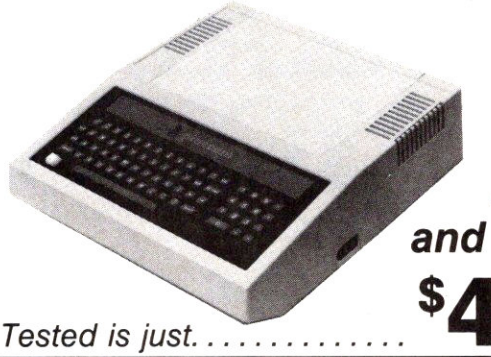

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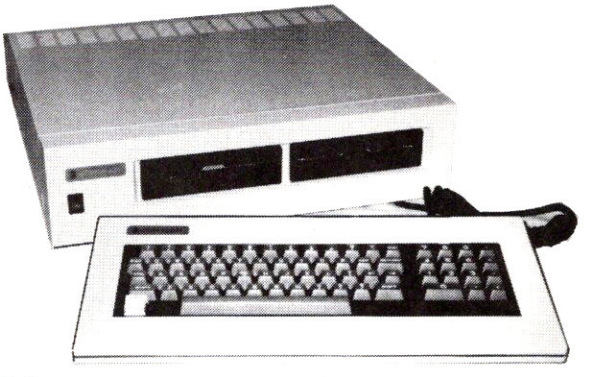

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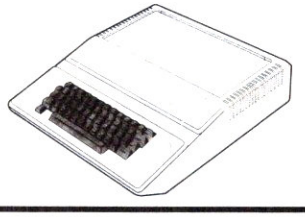

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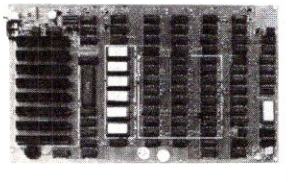

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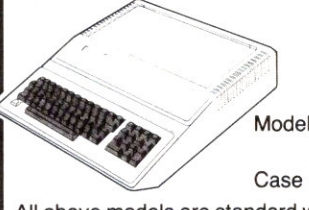

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```
INSERT [before ] [blank ]
```

Since the bracketed words are optional, we can use a simple case to start. Create the following database called Camplist (unless you still have it from past issues of *A+*):

```
STRUCTURE FOR FILE:          A:CAMPLIST.DBF
NUMBER OF RECORDS:           00015
DATE OF LAST UPDATE:         00/00/00
PRIMARY USE DATABASE
   FLD      NAME      TYPE      WIDTH      DEC
   001       Item       C         010
   002      Weight      N         002
   003       Cost       N         005        002
   004      Owner       C         010
    **TOTAL **                   00028

00001   BACKPACK      10   65.00   KARL
00002   FOOD          30   45.27   GROUP
00003   RAINGEAR       7   12.95   VALERIE
00004   STOVE         25   85.00   KARL
00005   TENT          12   62.33   LISA B.
```

Perhaps we want to take a canteen on our camping trip, too. Notice that the database is sorted on Item. Canteen should fit between BACKPACK and FOOD.

First we have to get the record pointer to the correct spot in the database. The Goto command is the easiest way, though anything that works would be fine. Normally, dBASE inserts a new record just *after* the record the pointer is on.

```
. list
00001   BACKPACK      10   65.00   KARL
00002   FOOD          30   45.27   GROUP
00003   RAINGEAR       7   12.95   VALERIE
00004   STOVE         25   85.00   KARL
00005   TENT          12   62.33   LISA B.

. goto 1
. insert
```

Now your screen should look just as it does during the Append or Edit process. Fill in the blanks with

```
ITEM    :CANTEEN          :
WEIGHT  : 3:
COST    :12.50:
OWNER   :FRED             :

. list

00001   BACKPACK      10   65.00   KARL
00002   CANTEEN        3   12.50   FRED
00003   FOOD          30   45.27   GROUP
00004   RAINGEAR       7   12.95   VALERIE
00005   STOVE         25   85.00   KARL
00006   TENT          12   62.33   LISA B.
```

What if you wanted to create an empty record between some other records? This procedure might be useful for dividing records into groups when you list them out, or just as a place holder, reminding you to fill in the blanks later. Here the [blank] part of the command comes into play. For example,

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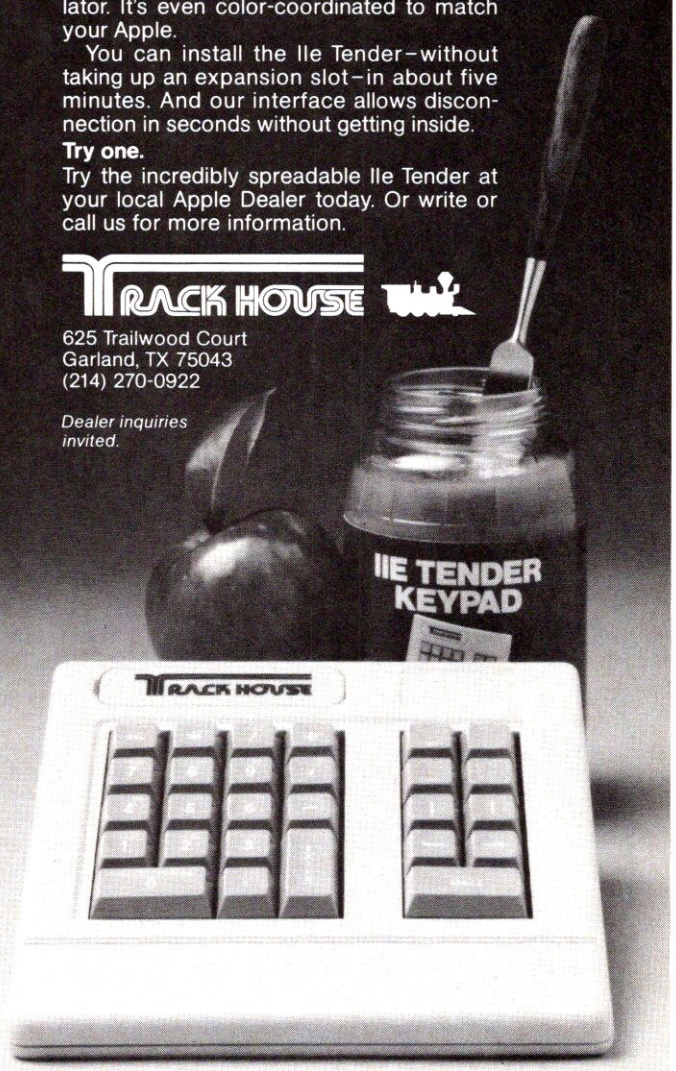

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CIRCLE 255 ON READER SERVICE CARD

```
. goto 4
. insert blank
. list

00001   BACKPACK      10   65.00   KARL
00002   CANTEEN        3   12.50   FRED
00003   FLASHLIGHT     5   15.00   CECI
00004   FOOD          30   45.27   GROUP
00005                  0    0.00
00006   RAINGEAR       7   12.95   VALERIE
00007   STOVE         25   85.00   KARL
00008   TENT          12   62.33   LISA B.
```

Notice that character fields are blank and numerical fields are filled with zeros.

Leaving no leaf unturned, Ashton-Tate decided to offer the option of inserting a record *before* the current pointer position. You use the [before] clause:

```
. goto 3
. insert blank before
. list

00001   BACKPACK      10   65.00   KARL
00002   CANTEEN        3   12.50   FRED
00003                  0    0.00
00004   FLASHLIGHT     5   15.00   CECI
00005   FOOD          30   45.27   GROUP
00006                  0    0.00
00007   RAINGEAR       7   12.95   VALERIE
00008   STOVE         25   85.00   KARL
00009   TENT          12   62.33   LISA B.
```

Another nifty feature you can use with Insert (as well as Append) is Set Carry On. When you type

```
. set carry on
. goto 4
. insert
```

you should see a record that looks just like the fourth record.

```
RECORD 00004

ITEM    :FLASHLIGHT    :
WEIGHT  : 5:
COST    :15.00:
OWNER   :CECI          :
```

What has happened? Set Carry On tells dBASE to carry the data from the previous record into the one you are inserting, in order to eliminate unnecessary typing when data is repetitive. Here's the fine print, though. If you just type

Another nifty feature you can use with Insert (as well as Append) is Set Carry On.

<Return>, Control-Q, or Control-W when the new record first appears, the program won't insert the record. You must type in at least one letter of the new record, even if it's the same letter that is already there.

One last note: you can insert only one record at a time.

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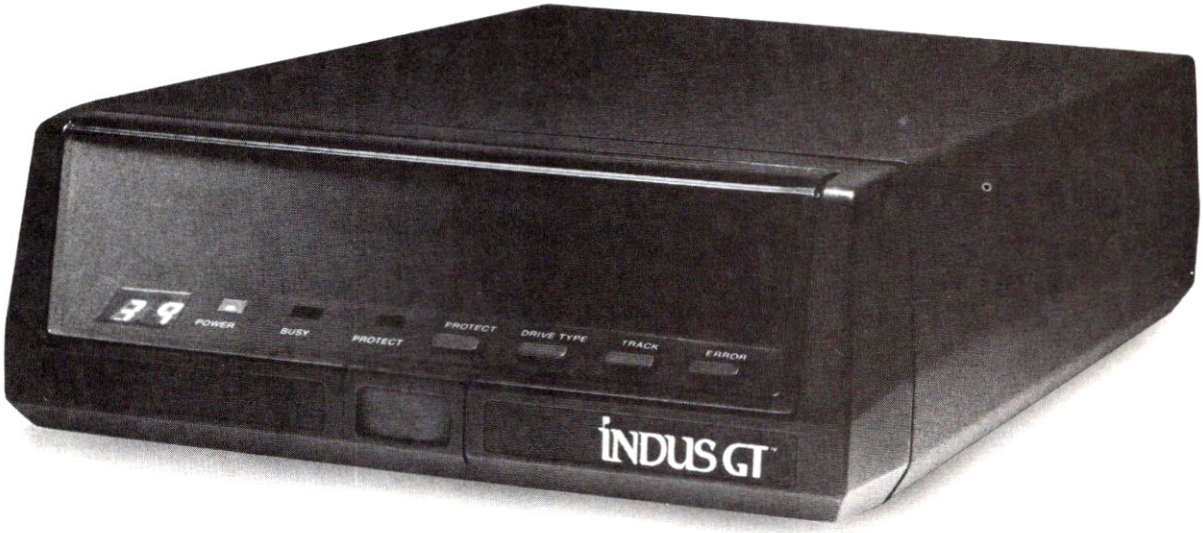

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Some Simple Functions, Operators, and Expressions

dBASE II allows you to ask some pretty sophisticated questions about information in your database. We saw evidence of some of this ability when we covered the List and Display commands several issues back. Now let's consider asking dBASE to do a little more work for us. Even though the Camplist database is small, there are lots of things we might want to know about it. A few examples:

- What do all the costs add up to?
- What is the total weight of the items?
- Which of the items cost more than $20.65?
- Which items weigh less than 20 pounds, cost more than $12.50, and are owned by Fred?

In order to go any further in this direction, we'll have to look at some built-in features of dBASE.

Operators

Operators are so called because they operate, or act upon, some data that already exists in a database. dBASE II has four basic types of operators and three types of results:

- arithmetic (generate numeric results)
- comparative (generate logical results)
- logical (generate logical results)
- string (generate string results)

Arithmetic Operators

For many people, especially those who are new to programming, arithmetic operations are the most familiar. In essence, dBASE II has a built-in four-function calculator with tons of memory for storing its input and answers. You can add, subtract, multiply, or divide, just as if you were using a calculator, or ask dBASE questions about your databases by using these operators.

Let's give the Calculator mode a try first. (The / means "divided by," the * means "multiplied by," and the parentheses group the numbers.)

```
. ? 3 +5
  8
. ? 5/2.5
  2.0
. ? ( 3 +2) +( 14- 10)
  9
. ? ( 3 +2) +( 14- 10)-
      (( 12.56 +3.5)*( 126.23/25))
      -72.0901
```

Were you surprised by how quickly your computer arrived at that last result? It did cost you a bit more than a calculator, didn't it? Also, you can tell by the result of that last calculation, should you care to analyze it, that the numbers stored in pairs of parentheses are processed first. Using parentheses is often necessary for obtaining proper results.

You can add, subtract, multiply, or divide, just as if you were using a calculator, or ask dBASE questions about your databases by using these operators.

Now, instead of just using meaningless numbers for our calculations, let's use data in the Camplist database.

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CIRCLE 269 ON READER SERVICE CARD

```
. use camplist
. list
00001   BACKPACK       10   65.00   KARL
00002   CANTEEN         3   12.50   FRED
00003   FLASHLIGHT      5   15.00   CECI
00004   FOOD           30   45.27   GROUP
00005   RAINGEAR        7   12.95   VALERIE
00006   STOVE          25   85.00   KARL
00007   TENT           12   62.33   LISA B.

. goto bottom
. ? cost +weight
  74.33
. ? cost-weight
  50.33
. ? cost/weight
  5.19
```

Adding cost and weight together doesn't make much sense, but as long as both fields are numerical, we can do it.

If our database had another field in it, we could use the Replace command to fill it with the result of some mathematical calculation.

Dividing cost by weight, however, gives you the price per pound that Lisa B. paid for her tent. You get the idea. Once we try a few more examples, you will see that this type of operation can be a real time saver. If our database had another field in it, we could use the Replace command to fill it with the result of some mathematical calculation, which could be handy for an inventory database.

Notice that the calculation involves only the "current" record. Repositioning the pointer would give us different results.

Comparative Operators

In the case of our Camplist database, the comparative operators will be of most help. As the name implies, these operators compare data to produce a result. "Is X larger than Y?" is an example of comparison operation. Here's a list of the types of comparison operators you can use with dBASE:

symbol	meaning
<	less than
>	greater than
=	equal to
<>	not equal to
#	not equal to
<=	less than or equal to
>=	greater than or equal to

Now, try the following:

```
. display for weight <20
00001   BACKPACK       10   65.00   KARL
00002   CANTEEN         3   12.50   FRED
00003   FLASHLIGHT      5   15.00   CECI
00005   RAINGEAR        7   12.95   VALERIE
00007   TENT           12   62.33   LISA B.
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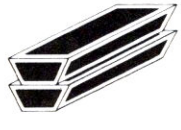

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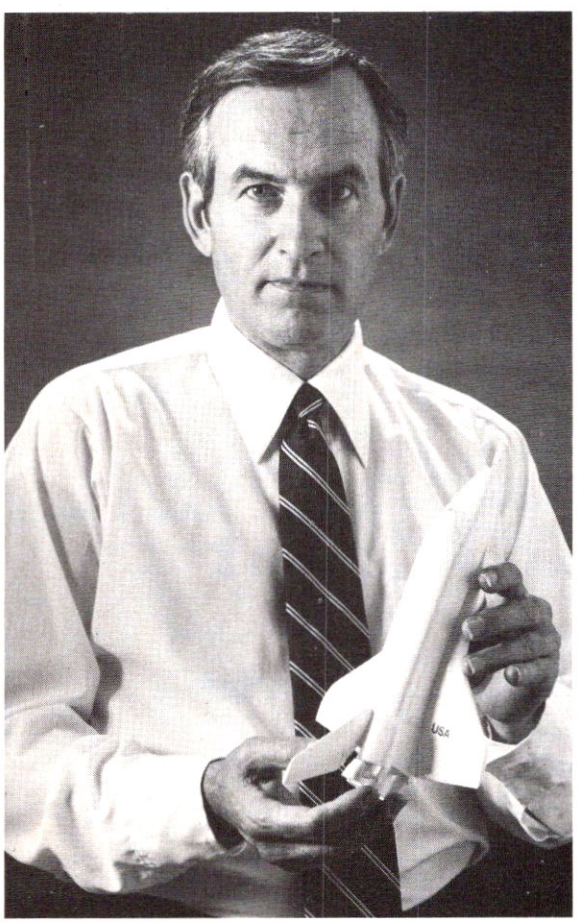

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```
. display for cost >15.95
00001   BACKPACK        10   65.00   KARL
00004   FOOD            30   45.27   GROUP
00006   STOVE           25   85.00   KARL
00007   TENT            12   62.33   LISA B.

. list for cost >10.95 .AND. weight >10
00004   FOOD            30   45.27   GROUP
00006   STOVE           25   85.00   KARL
00007   TENT            12   62.33   LISA B.
```

Another trick! Did that last one throw you a curve, or did it make sense? The .AND. is one of the logical operators mentioned earlier. The functioning of logical operators is based on the arcane mathematical discipline called Boolean algebra, which is central to many computer languages' ability to manipulate data. If you don't know what Boolean algebra is, don't worry. Just as an aside, though, most of the semiconductor chips in a computer operate according to Boolean rules, and if you are interested in learning more about them, most computer-language and hardware books discuss the topic in detail. In general, these operators can examine specific fields in your database and then produce a logical (true/false) result. In most cases, the commands are easy to decipher. For instance, the example above simply amounts to "Show me a list of all the records in which the cost is greater than $10.95 and the weight is greater than ten pounds." Simple enough. Here is a list of the logical operators:

In general, these operators can examine specific fields in your database and then produce a logical (true/false) result. In most cases, the commands are easy to decipher.

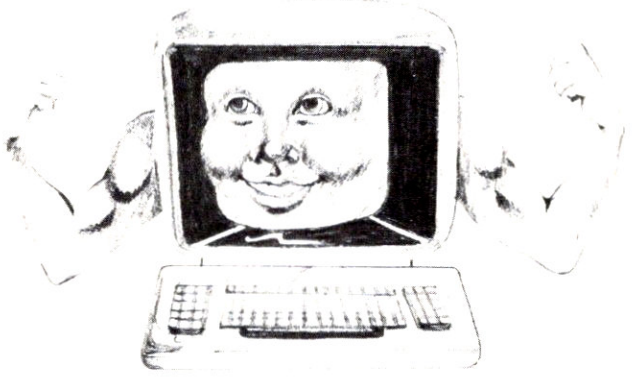
symbol	meaning
.NOT.	Boolean not
.AND.	Boolean and
.OR.	Boolean or
$	Substring logical operator

As I said, logical operators produce a true-or-false result. So why did we get the listing in the last example, after using the .AND. operator? It's because we used the List For phrase. If we were to eliminate the List For part of the last command, the result would be different:

```
. use camplist
. goto 3
. disp
00003   FLASHLIGHT      5   15.00   CECI

. ? item = "FLASHLIGHT ".AND. weight =5
.T.
```

When you use the List command along with the rest of the phrase, the listing occurs for all records that would result with a .T. if we were to go through the database manually. Here are some more examples:



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```
. use camplist
. list
00001   BACKPACK      10   65.00   KARL
00002   CANTEEN        3   12.50   FRED
00003   FLASHLIGHT     5   15.00   CECI
00004   FOOD          30   45.27   GROUP
00005   RAINGEAR       7   12.95   VALERIE
00006   STOVE         25   85.00   KARL
00007   TENT          12   62.33   LISA B.

. disp for item = "BACKPACK " .or. item = "TENT "
00001   BACKPACK      10   65.00   KARL
00007   TENT          12   62.33   LISA B.
```

In order to demonstrate the .NOT. operator, I modified the database to include another field called Going—a logical (L) field.

Then I filled in the fields to indicate which items were going on the camping trip. Using the .NOT. operator, we can see which ones are going and which ones are .NOT. going:

```
. display for .NOT. going
00003   FLASHLIGHT     5   15.00   CECI     .F.
00004   FOOD          30   45.27   GROUP    .F.
00006   STOVE         25   85.00   KARL     .F.

. display for going
00001   BACKPACK      10   65.00   KARL     .T.
00002   CANTEEN        3   12.50   FRED     .T.
00005   RAINGEAR       7   12.95   VALERIE  .T.
00007   TENT          12   62.33   LISA B.  .T.

. display for weight <10 .AND. (.NOT. going)
00003   FLASHLIGHT     5   15.00   CECI     .F.
```

Finally, let's look at the last of the logical operators, the substring search. In case you don't already know, a "string" is a collection of any printable characters, including numbers. A string has no special mathematic or logical value of its own, and so your computer usually doesn't try to make heads or tails of it, it just stores strings away for humans to look at later. Now this operator is called a "substring" search operator because it looks to see if one string is included in another string. For example: is *the* included in *another*? Yes.

Substring searching is a handy tool because it can look through any character field and let you know whether the

A 'string' is a collection of any printable characters, including numbers.

word you are looking for is anywhere in that field. You could even search through an entire database looking for every occurrence of an important word if you needed to.

The syntax for this operator is as follows:

.? <"string">$<field>

Try these commands to get the hang of it:

```
. goto 6
. display
00006   STOVE         25   85.00   KARL
```


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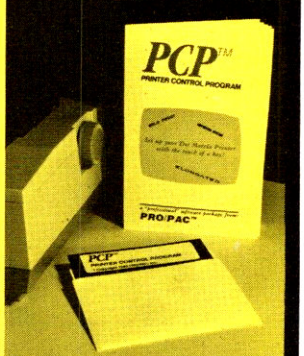

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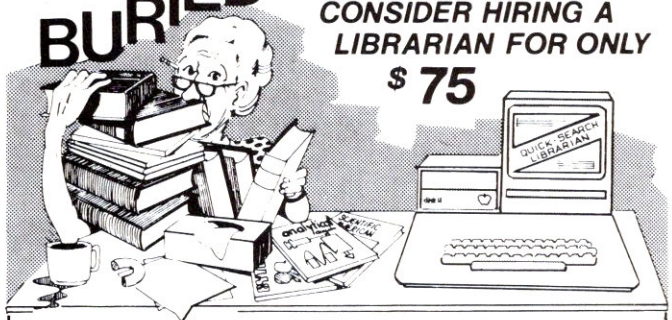

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```
. ? "STO"$item
.T.

. display for "STO"$item
00006   STOVE        25   85.00   KARL

. display for "EN"$item
00002   CANTEEN       3   12.50   FRED
00007   TENT         12   62.33   LISA B.
```

Summing It Up

When it comes to numbers, another useful command is Sum. This command is similar to the arithmetic operator +, which we used earlier, except that it adds information from many records into one total (the + function referred only to the current record). For instance, say we wanted to sum the cost of all the items in the Camplist database. It would go something like this:

```
. list
00001   BACKPACK     10   65.00   KARL
00002   CANTEEN       3   12.50   FRED
00003   FLASHLIGHT    5   15.00   CECI
00004   FOOD         30   45.27   GROUP
00005   RAINGEAR      7   12.95   VALERIE
00006   STOVE        25   85.00   KARL
00007   TENT         12   62.33   LISA B.
. sum cost
298.05
. sum weight
92

. sum weight,cost
92 298.05

. sum cost +weight
390.05
```

The first command simply added up the cost column. The second command did the same for the weight column. With the third command, we accomplished both commands at once, using a comma to separate the two field names. Finally, the last command resulted in one large number that is the sum of all the weights and all the costs.

As a more complex example, let's do something a bit more practical. If you still have the inventory database we used last time, try duplicating figure 1.

Next Time

Next issue will cover some complicated techniques for filewide manipulation, including experimentation with joining two databases together and with the Update command, which helps keep your databases current. So, until your next issue arrives or appears on the newsstand, try to take the time to experiment on your own, and of course, always keep a backup disk of your files in a safe place. ✚

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```
. use invntory

. display structure

STRUCTURE FOR FILE:          A: INVNTORY.DBF
NUMBER OF RECORDS:           00010
DATE OF LAST UPDATE:         00/00/00
PRIMARY USE DATABASE
FLD     NAME            TYPE    WIDTH   DEC
001     PART:NUMB       N         005
002     CATEGORY        C         010
003     BRAND           C         010
004     MODEL           C         006
005     QUANTITY        N         002
006     COST            N         006    002
007     PRICE           N         006    002
** TOTAL **                      00046

. list
00001          1 RECEIVER      NIZO          T-33        5   225.49     350.49
00002          2 RECEIVER      NIZO          T-35        4   312.00     425.25
00003          3 RECEIVER      ACME          R25-MT     13    19.99      49.99
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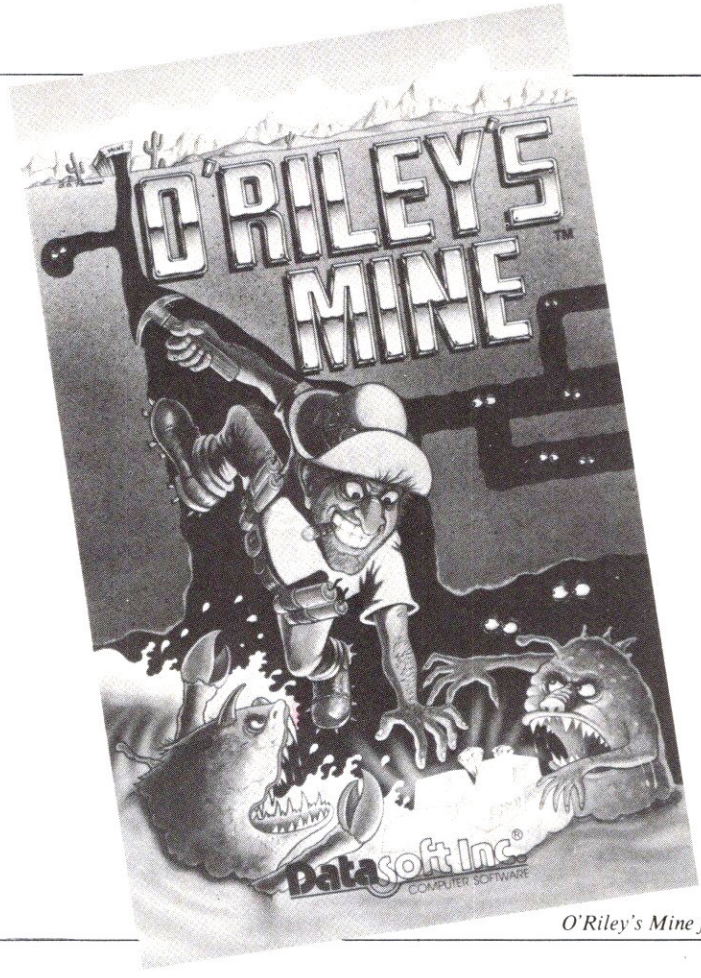
00009          9 TURNTABLE     XIRTAM        25-L        5    99.99     149.99
00010         10 TURNTABLE     RALURIC       RND-1       3   595.00     850.00
. sum quantity * cost
15040.92
. sum quantity * cost for part:numb =10
1
1785.00
```

Figure 1: Using the Sum command



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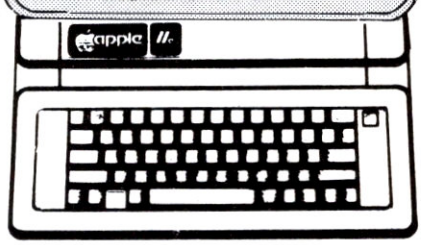

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Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive

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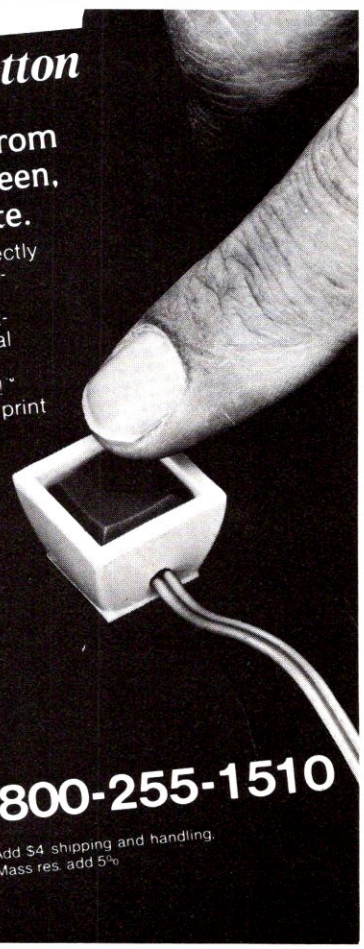

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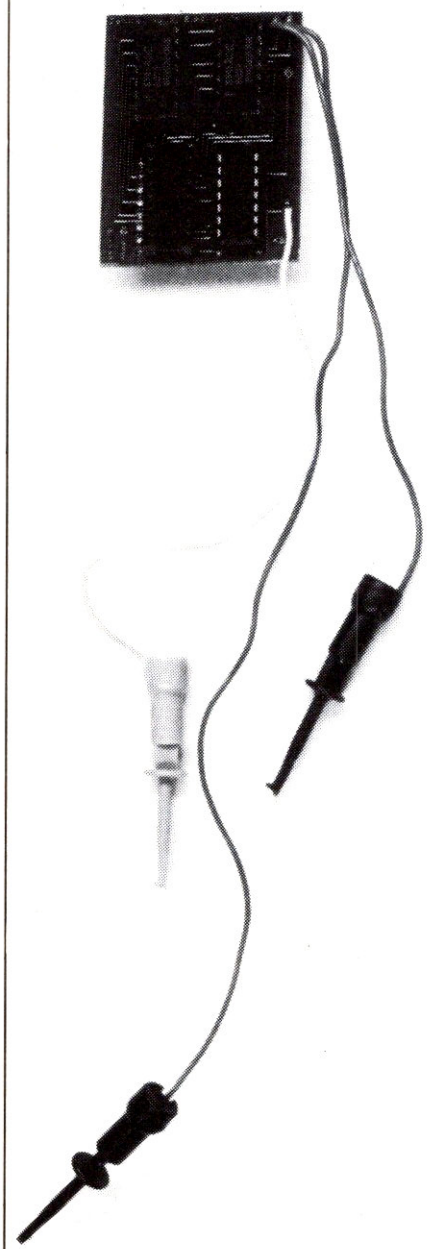

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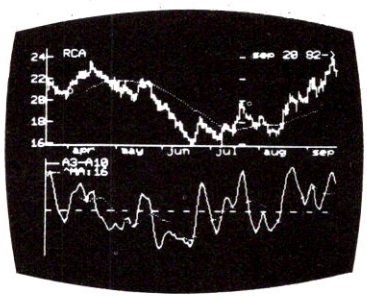

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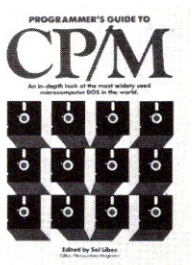

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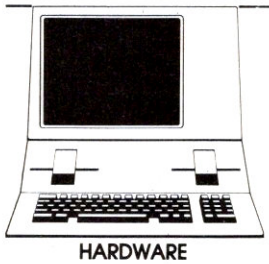

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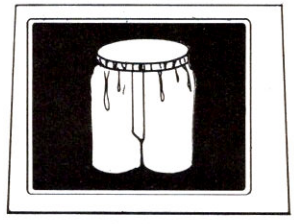

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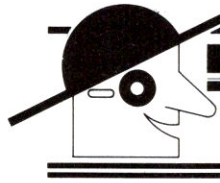

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Requires: Apple II or IIe; 64K RAM; Apple DOS; two disk drives; 132-column printer

Systems Plus, Inc.
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DisCache is a high-speed, high performance Winchester disk subsystem for personal computers. The new 10- or 20-megabyte (formatted) subsystem includes a 5¼-inch hard disk, fast RAM cache memory (up to 256 kilobytes), a specialized microcomputer, as well as a newly designed incremental backup system.

The DisCache system uses a built-in microcomputer and high-speed cache memory to improve disk-access speed, security backup, and print spooling. The subsystem makes some of the programs and/or data on the Winchester immediately available from RAM rather than from disk, with a maximum access time of 100 microseconds.

Networked shared access at 0.5 megabytes exists for up to 21 computers. Connection is simply "daisy chaining," with no external multiplexer required. *(List Price: $3000)*

Requires: Apple II, II Plus, or IIe; DOS 3.3

Eicon Research Limited
Unit 9, Viking Way
Bar Hill, Cambridge CB3 8EL

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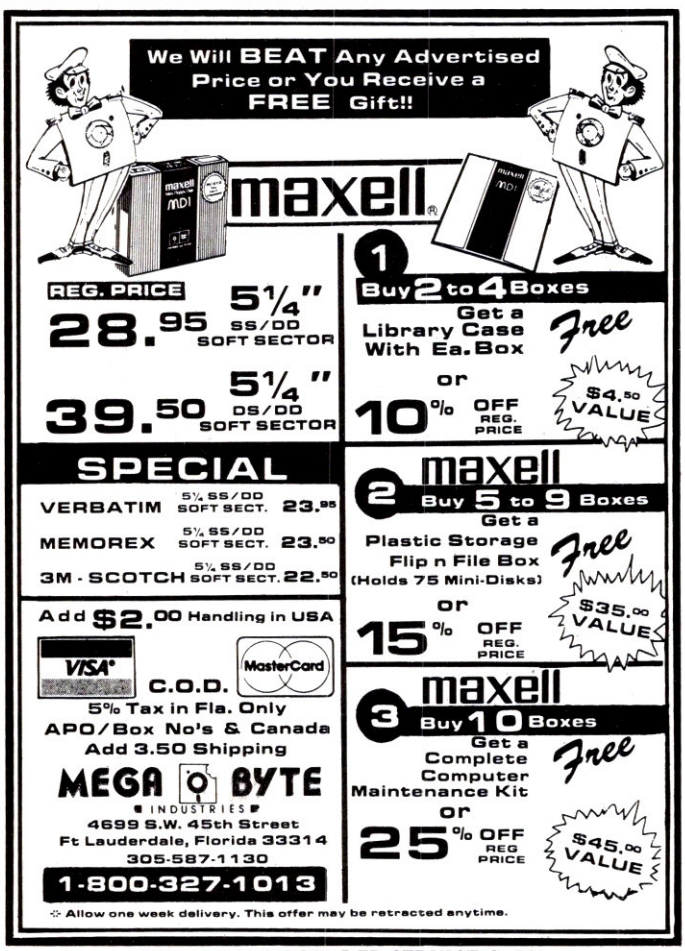
Magellan Light Pen System

This light pen interacts directly with the monitor or television screen of the Apple II Plus and IIe, unlike graphics tablets and joysticks, which require a mental translation. High-resolution detail allows single-dot editing on the Apple's hi-res display. The built-in push button gives users maximum control over drawing operations, eliminating distracting interaction with the key-



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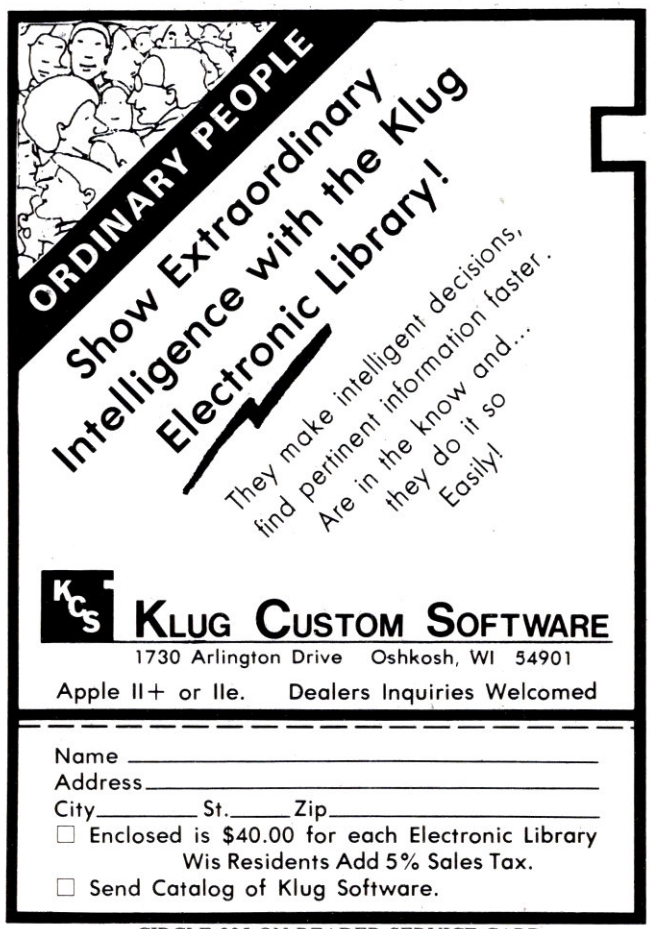

CIRCLE 235 ON READER SERVICE CARD

board. In contrast to other models that use one of the expansion slots, the Magellan Light Pen is connected to a miniature electronic module that connects to the computer through the game port.

Included with the system are the Quick-Draw and Amper-Pen software packages. Quick-Draw is a complete graphics-creation program that allows users easily to create and edit commercial-quality graphics designs. Amper-Pen provides the means to incorporate light-pen operation into programs written in Applesoft BASIC. The package includes the pen, associated interface electronics, and both software packages. *(List Price: $189.95)*

Requires: Apple II, II Plus, or IIe with language card; 64K RAM; one disk drive

Magellan Computer, Inc.
4371 E. 82nd Street, Suite D
Indianapolis, IN 46250
(317) 842-9138

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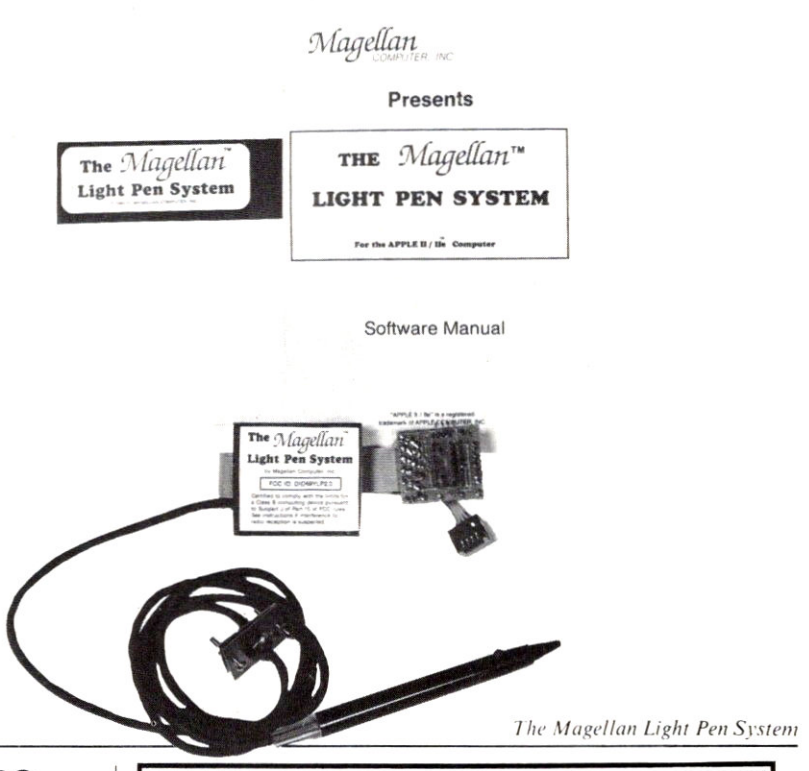

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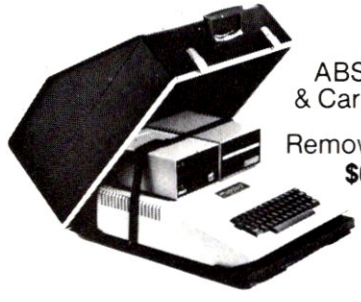

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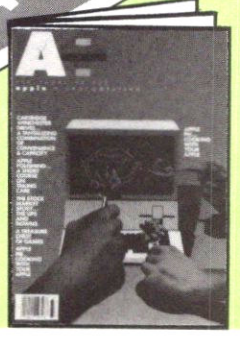

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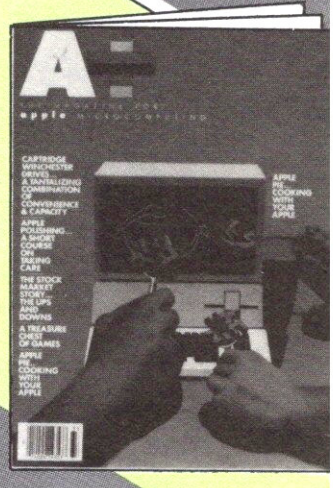

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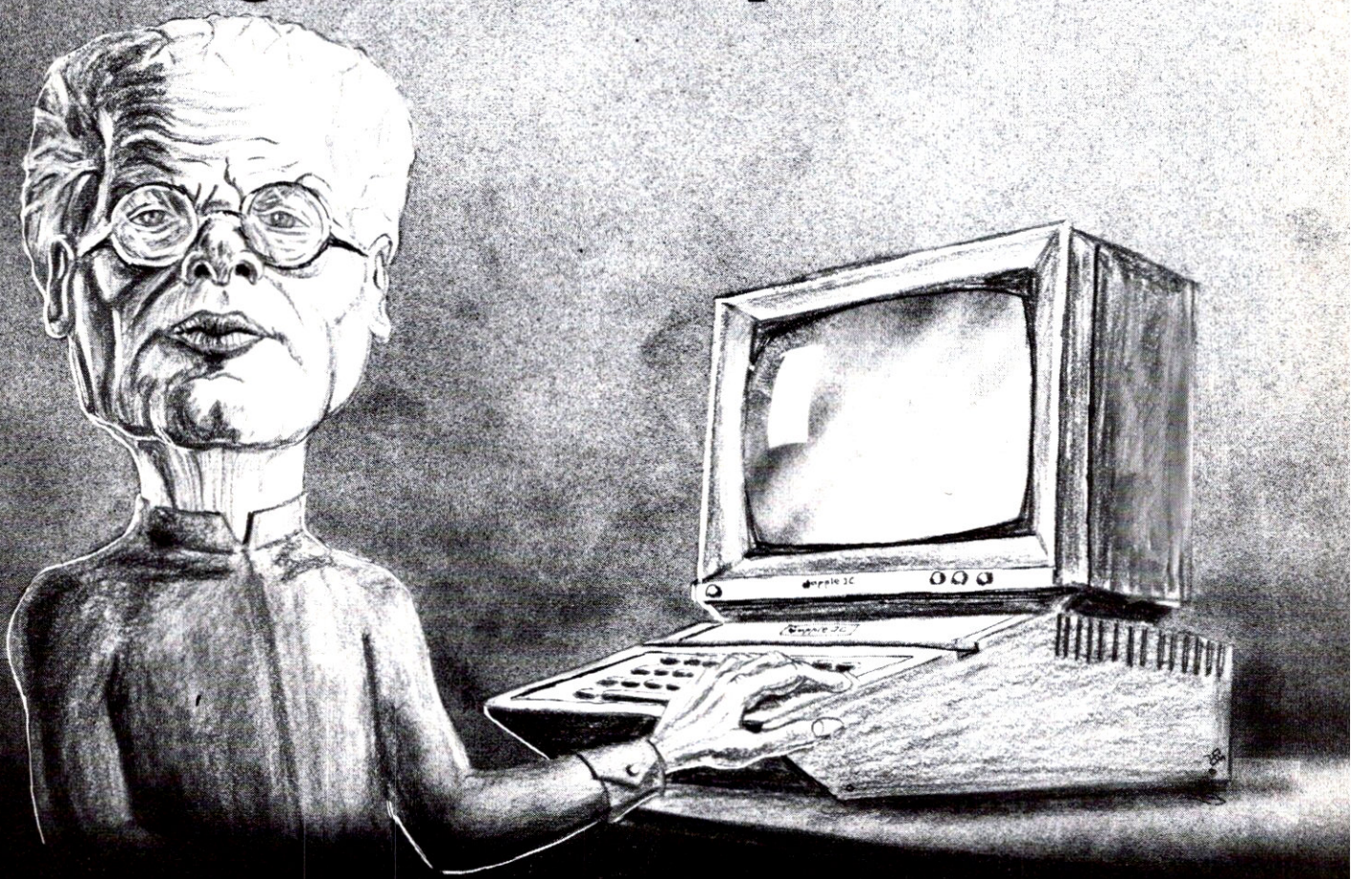

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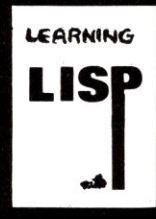

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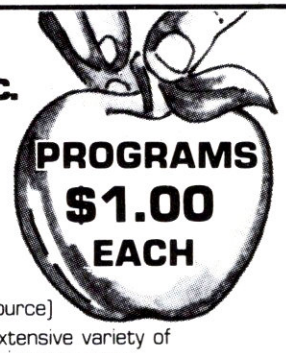

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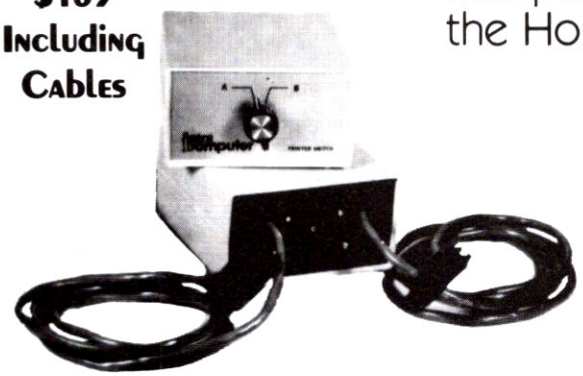

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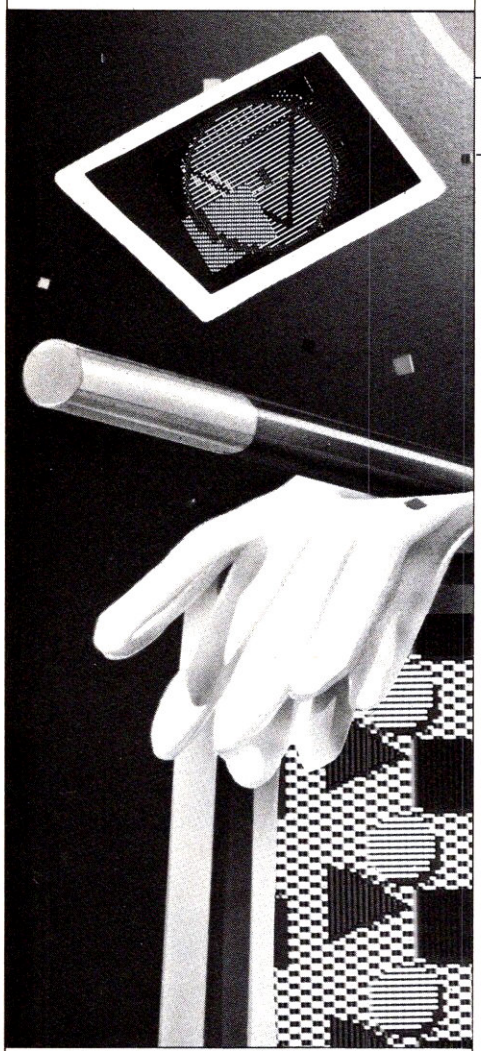

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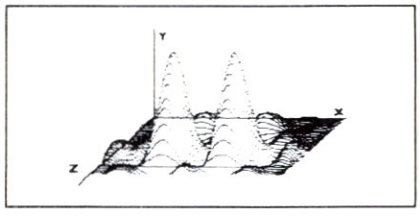

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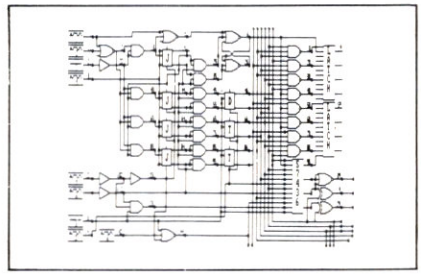

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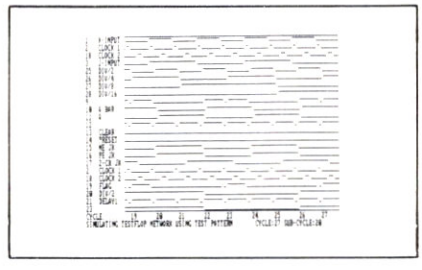

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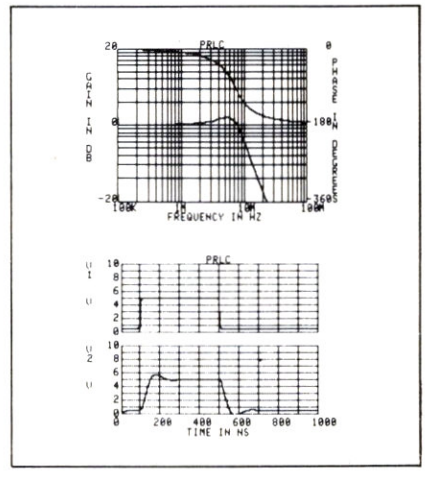

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1 Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	Own	Plan to Buy
Apple II	A	G
Apple IIe	B	H
Apple III	C	I
Lisa	D	J
Other (specify)	E	K
None	F	L

2 For what, if any, business application(s) do you use the microcomputer you currently own?_____

PLEASE PRINT CLEARLY—Use only one card per person.

NAME_____PHONE NO. (____)_____

COMPANY_____TITLE_____

ADDRESS_____APT.____

CITY_____STATE_____ZIP_____

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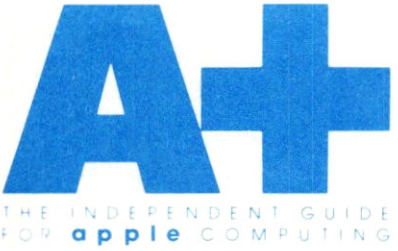

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NAME_____PHONE NO. (____)_____

COMPANY_____TITLE_____

ADDRESS_____APT.____

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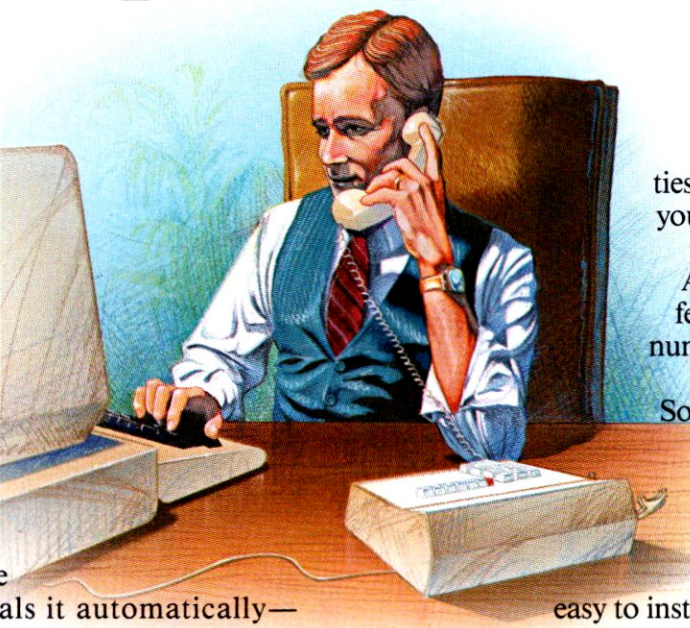

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