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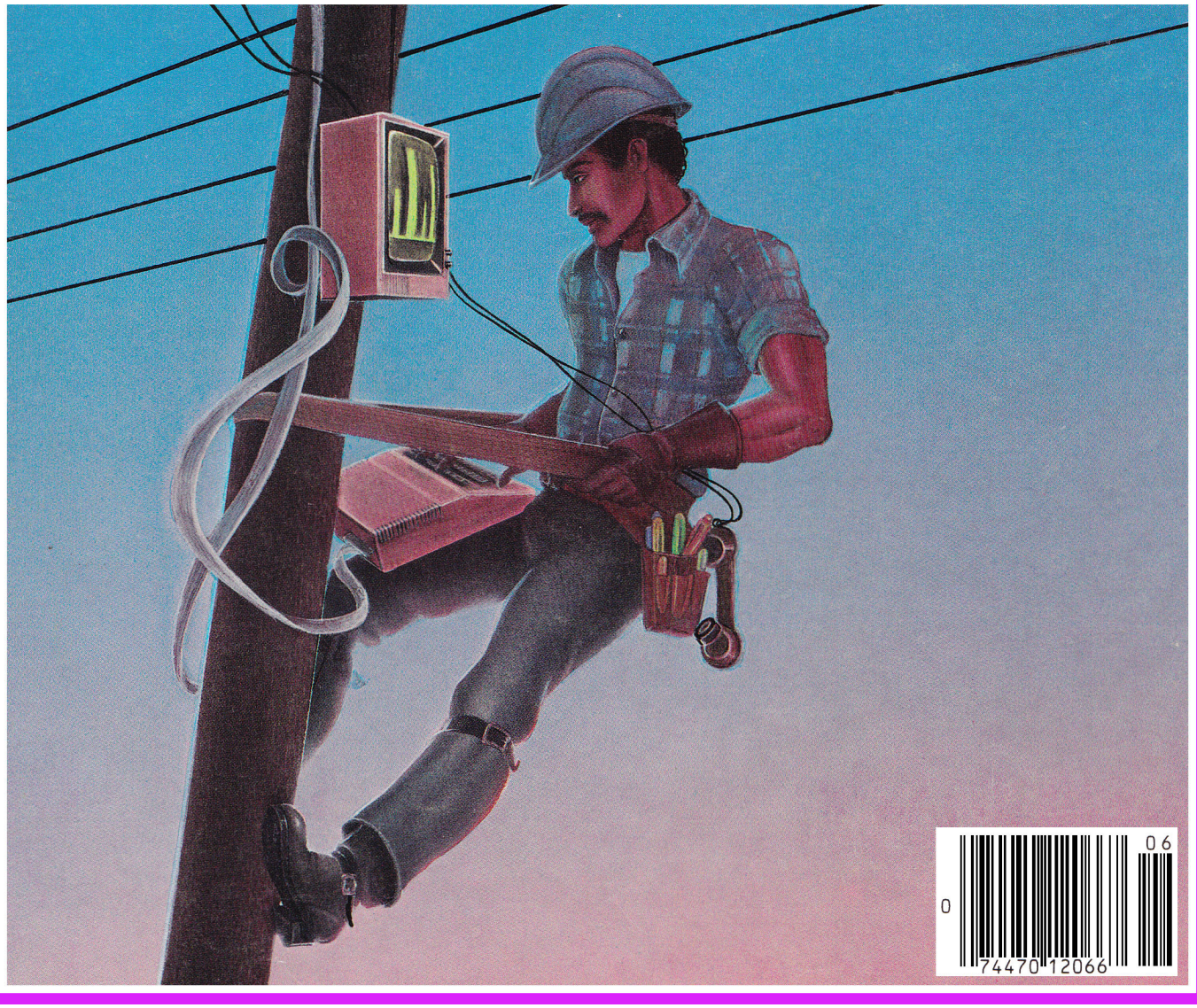

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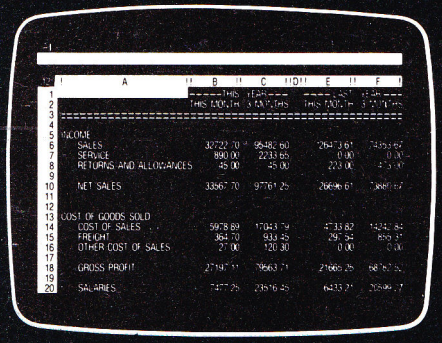

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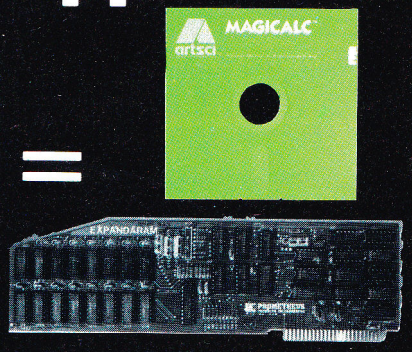

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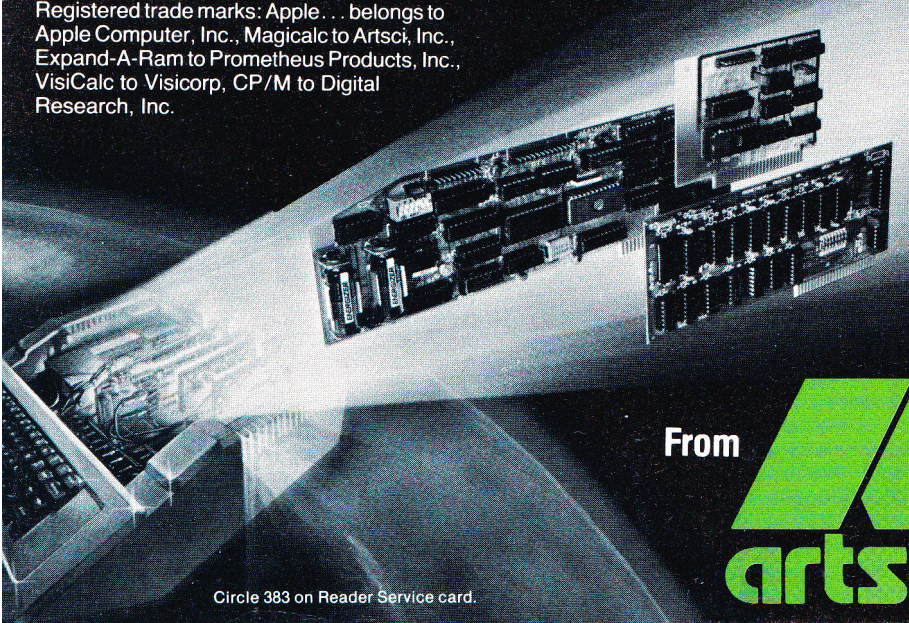

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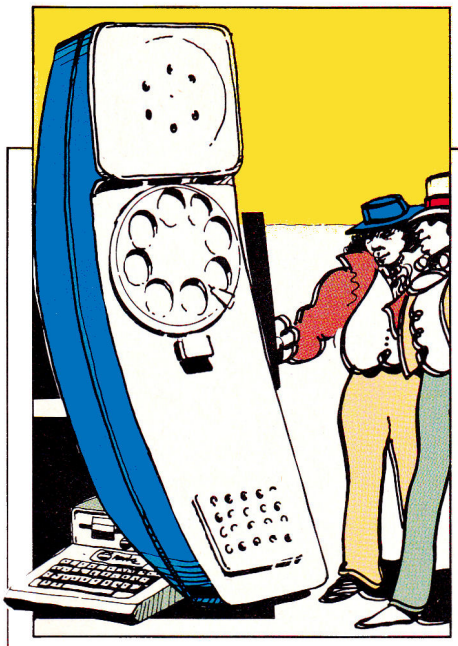

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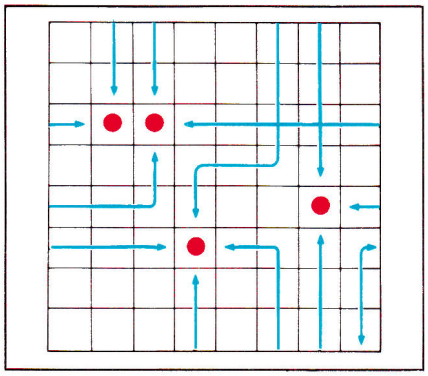

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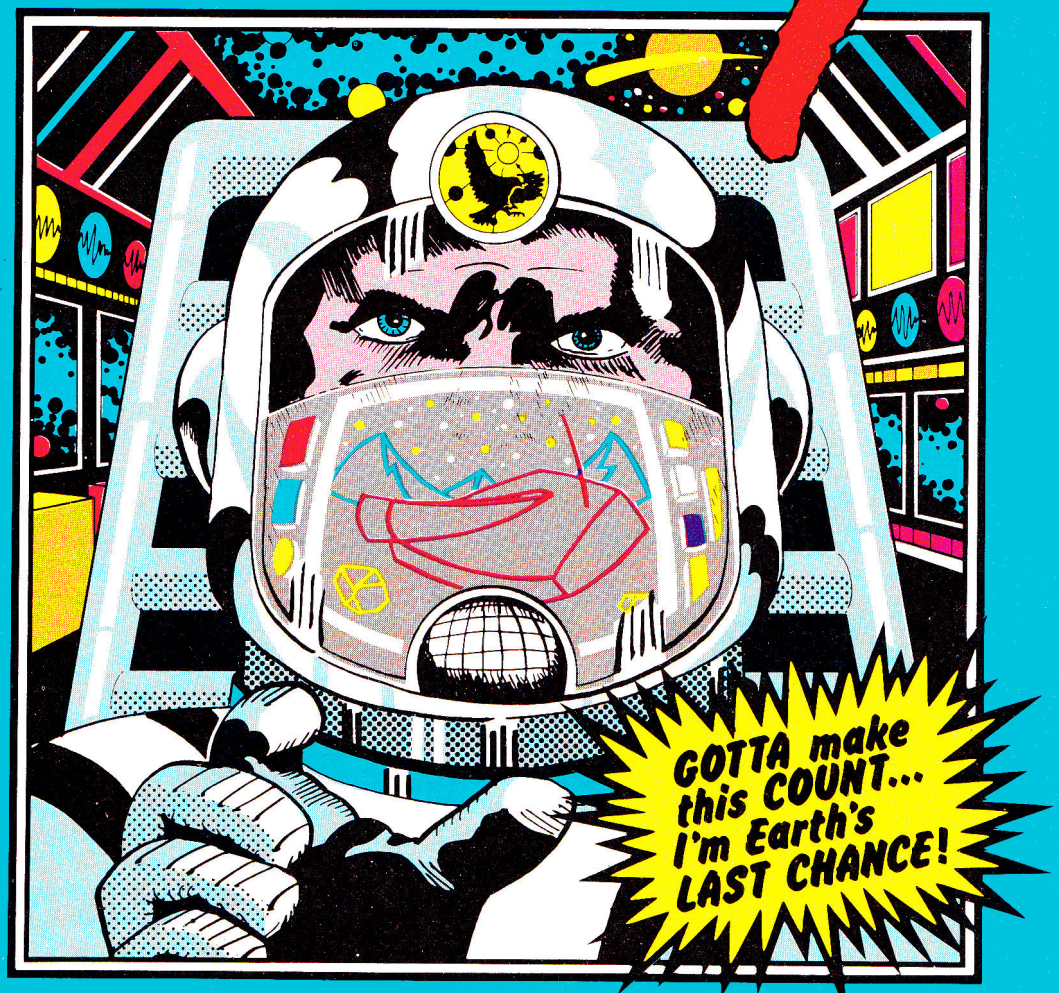

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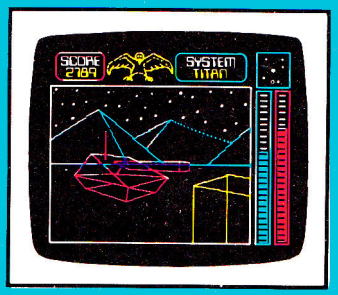

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PUBLISHER/EDITOR
Wayne Green
EXECUTIVE VICE PRESIDENT
Sherry Smythe-Green
GENERAL MANAGER
Debra Wetherbee
ASSISTANT TO PRESIDENT
Matt Smith
ASSISTANT PUBLISHER
Jeff DeTray
CORPORATE CONTROLLER
Roger Murphy
ASSISTANT TO CONTROLLER
Dominique Smith
CIRCULATION MANAGER
603-924-9471
Patricia Ferrante
BULK & NEWSSTAND SALES MANAGER
Ginnie Boudrieau

ADVERTISING, 603-924-7138
David Schissler, Manager;
Denis Duffy, Craig Everett: Sales;
Patty Lesser: Advertising Coordinator.
New England Advertising Representatives:
John A. Garland, Frank Surace,
Garland Associates Inc.,
Box 314 SHS,
Duxbury, MA 02332 617-934-6464

PRODUCTION
Nancy Salmon, Manager; Michael Murphy, Assistant; Frances Benton, Michael Ford, Phil Geraci, Donna Hartwell, Kimberly Nadeau, Lynn Parsons, Deborah Stone, Theresa Verville, Robert Villeneuve, Karen Wozmak; Ad Coordinators: Paula Ramsey, David Wozmak, Mary Seaver; Advertising Production: Bruce Hedin, Fiona Davies, Scott Philbrick, Jane Preston
PHOTOGRAPHY
Thomas Villeneuve, Supervisor; Katherine Coker, Sandra Dukette, Laurie Jennison, Irene Vail
TYPESETTING
Sara Bedell, Supervisor; Darlene Bailey Melody Bedell, Michele DesRochers, Prem Gongaju, Lynn Haines, Debbie Nutting, Lindy Palmisano, Heidi Thomas
DESIGN
Jonathan Graves, Creative Director; Christine Destrempes, Design Director; Joyce Pillarella, Supervisor; Denzel Dyer, Howard Happ, Susan Donohoe, Laurie MacMillan, Dion Owens, Diane Ritson, Susan Stevens, Donna Wohlfarth

Remarks from the Publisher... Wayne Green

A couple of years ago the microcomputer field was fortunate to have a few good mentions a year in the consumer press...now it is almost unusual if there isn't some sort of article on micros in a half dozen of the major magazines every week. The Lisa introduction certainly made news all over the place.

Just how much of a bonanza the Lisa is going to be for Apple...and in due course the Apple supporting firms...isn't at all clear. My natural tendency is to be enthusiastic and optimistic, but there are some storm clouds that worry me. I wish I felt as excited about the Lisa as I do about some of the new low end computers. Let me explain.

On the positive side is the enormous success of the Apple II. But we really have to remember that a substantial part of that success lies in the wide variety of excellent programs that are available for it...and the almost incredible range of accessories. Add to that the powerful information backup with magazines and books, probably only challenged by the TRS-80, and maybe you understand the concept.

Now look at the darker side. The debacle of the Apple III would seem to tell us that the magic was not in the name Apple, but in the Apple II with its software and information support...plus one hell of a lot of dealers selling it. I get the impression that much of Apple's advertising thrust has been semiproductive. They've helped the whole field become legitimate, but the consumer doesn't associate Apple with small computers, which was the aim.

Okay. Anyone who has wandered around NCC or Comdex has to come to the conclusion that there are an incredible number of small computer manufacturers. Way over 250 different firms make desktop computers that are sold in the US. Most of these systems have common problems, despite some brilliant hardware developments. The problems are much like those of the Apple III...a lack of applications software and of user information. The difficulty of running Apple II programs on the Apple III, while not really serious, may have been enough of a psychological hurdle to blunt sales. The Apple magazines have tended to dwell on the II because that's where most of the interest has been.



So now we have the Lisa. Granted, it is easy to use. A true marvel. But you can buy a lot of computer these days for $10,000...a whole lot...including a rather good-sized Winchester drive. And at that price you are definitely out of the casual buy bracket that made the II so attractive. We're not looking at a home computer...or at one for schools. We're perhaps not even looking at one for particularly small businesses or one that solves the usual business problems.

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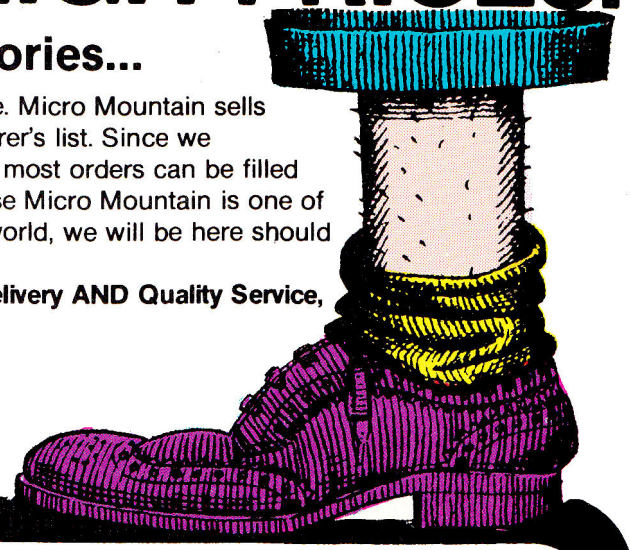

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trol, accounting or payroll. None of these have been mentioned as yet available for the Lisa. As an executive I would like to be able to use the programs that are available for Lisa, but even though my firm is fair-sized, I'm reluctant to gamble ten big ones. And the prospect of having to sit there entering reams of facts and figures to develop my economic models is not attractive. Of course, if Lisa could be networked to some low end computers that could be used for data entry, I might go for it.

In all, I suspect that Lisa may turn out to be a hard sell for dealers. Dealers, like the rest of us, tend to take the path of least resistance... and Lisa may just push more businesses toward IBM...where there *are* accounting and other popular program packages.

How enthusiastic I would become if I actually tried Lisa is a question... and one not likely to be answered in the next year or so. Magazine publishers are right down near the bottom of the list for demonstration units from most manufacturers. And, having been burned far too often, the chances of my spending that kind of money on a gamble seem remote. Ask me about the Algorithmics word processor disaster some time.

"If Lisa could be networked to some low end computers that could be used for data entry, I might go for it."

The *inCider* editors will be looking for articles from happy Lisa users, as will the editors of their sister publication, *Desktop Computing*, which is totally non-technical and read by businessmen who want to find out what computer system to buy for their business. Lisa users who are able to come up with some conversions of Apple II/III programs will find a ready readership in *inCider*.

Getting back to Apple. With most of the II sales via dealers, even if we dismiss the growing discontent of dealers over low profit margins, there could be almost insurmountable marketing problem for Lisa. Remember that the aim for this system seems to be mangagement in larger firms...not exactly the people who go out to a computer store and try to understand the totally bewildering array of equipment there. These people are used to salesmen coming to them...demonstrating the equipment...and then providing a class for the people who will be using it. How resistant and fearful of failure will older managers be? Plenty!

Remember, too, that most larger firms are in the process of cutting down on management...cutting a lot. Further, many managers will be in a position, if they authorize the Lisa expense, of having to show substantial benefits to the firm or being in a weak position with other managers. The psychological problems can be tough.

Well, on the bright side, there are rumors that much of the Lisa technology may be handed down to the lower-priced line with the entry of the Macintosh later this year. And there are rumors, too, that E.T., a long-awaited really low end system that might provide some serious competition to the other $250 and under computers, may be on the way.

Getting back to the need for more than the software that comes with Lisa, there seems to be a monumental obstacle. Sure, a few of the larger firms will be able to spend the money for a development system...but what about the thousand smaller programmers...the ones that made the II such a success? These are the same people who did not even spring for a III and rewrite their programs for that one.

I'm reminded of one of my all time bum predictions. Back in the 1950s Collins Radio came out with an expensive receiver that I predicted the average ham could not afford to buy. It turned out to be the best selling ham receiver in history. Perhaps Apple is going to do a fantastic job of selling Lisa...and their dealers will come back into line to get a piece of the action. ■

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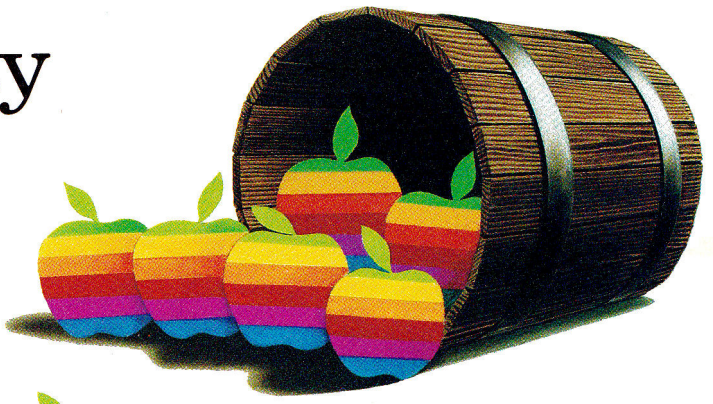

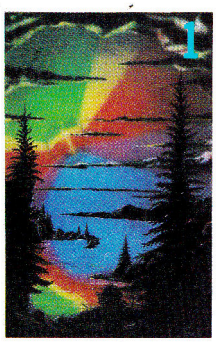

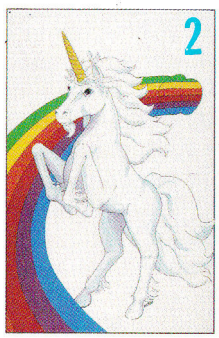



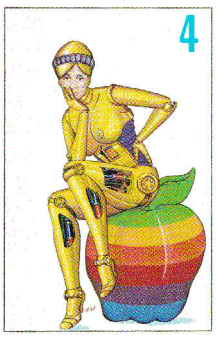

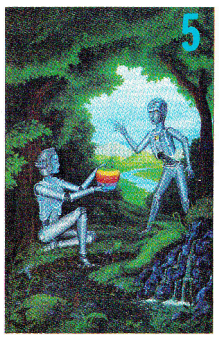



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What's New This Month?

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Manuscripts are welcome at *inCider*. We will consider publication of any Apple material. Guidelines for budding authors are available. Please send a self-addressed envelope and ask for "How to Write for *inCider*." *inCider* is published monthly by Wayne Green Inc. Entire contents copyright 1983 Wayne Green Inc. No part of this publication may be reprinted, or reproduced by any means, without prior written permission from the publisher. All programs are published for personal use only. All rights reserved.

You won't often find a lot of *inCider*'s pages devoted to a single topic: Apple owners have notoriously varied interests, from spreadsheets to Sea Dragon, and we want to meet *all* your needs. But this issue brings together some of the most talented and knowledgeable people in the field of telecommunications, each eager to help you get on-line and get the most from your Apple.

The infamous Ed Magnin offers good advice on getting started—there's not much to it, you know. You probably already have a phone, and a modem is the next logical investment. Ed has promised to keep in touch (electronically or in the old-fashioned way) and to answer your concerns in future articles.

Frank Derfler, who has authored "Dial-Up Directory" in *Microcomputing* for many a moon, contributes some valuable insights for Apple owners. Getting the right software for your particular setup can be the difference between beeping for fun and profit and tearing out your hair.

And from John Davidson, our local CP/M freak, ably aided by Peter Ferrand, comes the world of bulletin boards and information services. These fellows display their bias somewhat—the information is slanted toward those of you with Z-80 boards hidden in your Apples, but perhaps that's no mistake. Maybe you're missing out on more than WordStar if you forego CP/M.

Reviews of several state-of-the-art modems round out the discussion. If telecommunications is in *your* future, check them out. And take a look at Max McKee's little data entry utility—it's a simple answer to getting the numbers into your automatic dial-up system with minimum hassle.

We've been asking for conversions, particularly conversions of programs published in *80 Micro*. The switch from TRS-80 Basic to Applesoft requires some deft programming, and we know some of you folks have the skill. Conversions are beginning to trickle in. "The Black Box" is a delightful logic game originally written for users of "the other machine," and now available to Apple gamers. So let's see more conversions—why reinvent the wheel!

If graphics is your passion—for whatever purpose—two of our authors have colorful suggestions for you. Albertan A. E. Doughty wraps up his screen formatting series, and regular Don Fudge offers some tips for graphics animation.

Readers have asked us for more applications for education. Well, if there's a preschooler at your house, check out Gary Leonard's counting program. Also in this issue, Greg Stone presents a clever little Logo program that draws. . . well, you'll see what it draws. But the point of getting youngsters programming in Logo is not the product but the process. Logo is more than a language, it's a new way of thinking and learning. So we'll continue to bring you new ideas for getting kids involved with Logo—and watch for September!

For your other varied tastes and needs, *inCider* includes hints for programming in Pascal, Applesoft and assembly language. And you'll find plenty of valuable information about choosing the best commercial software.

So enjoy June—and next month will be a whole new adventure.

—LS



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The AMDISK-I Micro-floppy disk system is an engineering breakthrough in disk size, storage capacity, media protection and user convenience. It's fully compatible with your Apple II*® and Apple IIe and is furnished with an interconnect cable. Enjoy a full 286K storage† capability and the extra convenience of the new 3" hard plastic encased diskette. Packed 10 per box, the disk cartridge fits into a shirt pocket and is easy to mail.

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The Amdisk Single Drive system is ruggedly constructed for years of trouble-free operation and is backed with our 90 day warranty on parts and labor.

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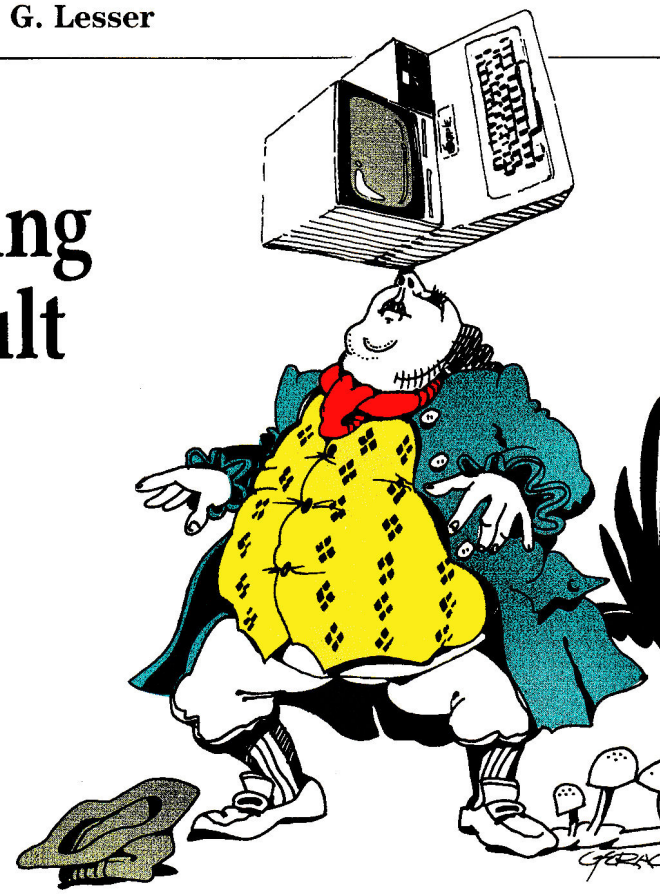
AMDEK CORP.

Amdek . . . your guide to innovative computing!

Circle 95 on Reader Service card.

by Hartley G. Lesser

Hints For Surviving The Retail Assault



Very little can overcome the bitter taste from a harrowing experience at a computer store. Here are some suggestions that might help you avoid further trauma.

If you've been getting out to the shows lately, you're probably feeling overwhelmed by the many and varied computer systems that are choking the market. For a company to really make the grade in the future, their product had better be one of the best in the field. I doubt whether a 1 percent market share is going to be enough for many companies. Watch for a lot of closures—and I don't mean surgical.

Speaking of surgery, many retail computer stores could stand a scalpel's artistry. Let's take a closer look at these purveyors of information processing. If some don't begin to take seriously their role in the microcomputing industry, their roles may well end up dismal flops. A competent retail computer outlet is a godsend. Why do there seem to be so few of them around?

Perhaps some of the following observations . . . tips . . . experiences . . . may help you select your hardware and software suppliers. A good deal needs be done in the area of computer retailing, but let's make one thing very clear—many competent retail outlets might be overlooked because consumers have suffered at the hands of other retailers. So please judge each on its own merit.

Here are some examples of what yours truly has run into over the past few years. If it happens to you, you'll know what to do.

When telephoning a computer store's technical department to schedule repairs on your computer or to ask a technical question:

- You're told by a salesperson that the technician doesn't accept phone calls. (Can't the tech speak English?)
- You are informed that the technician hasn't arrived at work yet because he's an independent sort. It's 10:30 AM. (Perhaps the manager needs time to run out and find someone to play technician.)
- You're informed that the technician is on the floor selling a unit to a customer. (Obviously, there is no technician. There is a salesperson in techie clothing. And the store can't manage enough profit to hire a full-time technician.)
- They tell you that the technician is working on a toaster, and will call you back when he's done. (A Pop-Tart freak!)

Call prospective computer stores and ask questions that'll help you determine the competency of their sales staff.

- Ask what the difference is between a binary or text file. (If they answer that it's all a matter of personal preference, and there's no advantage to either one. . . .)

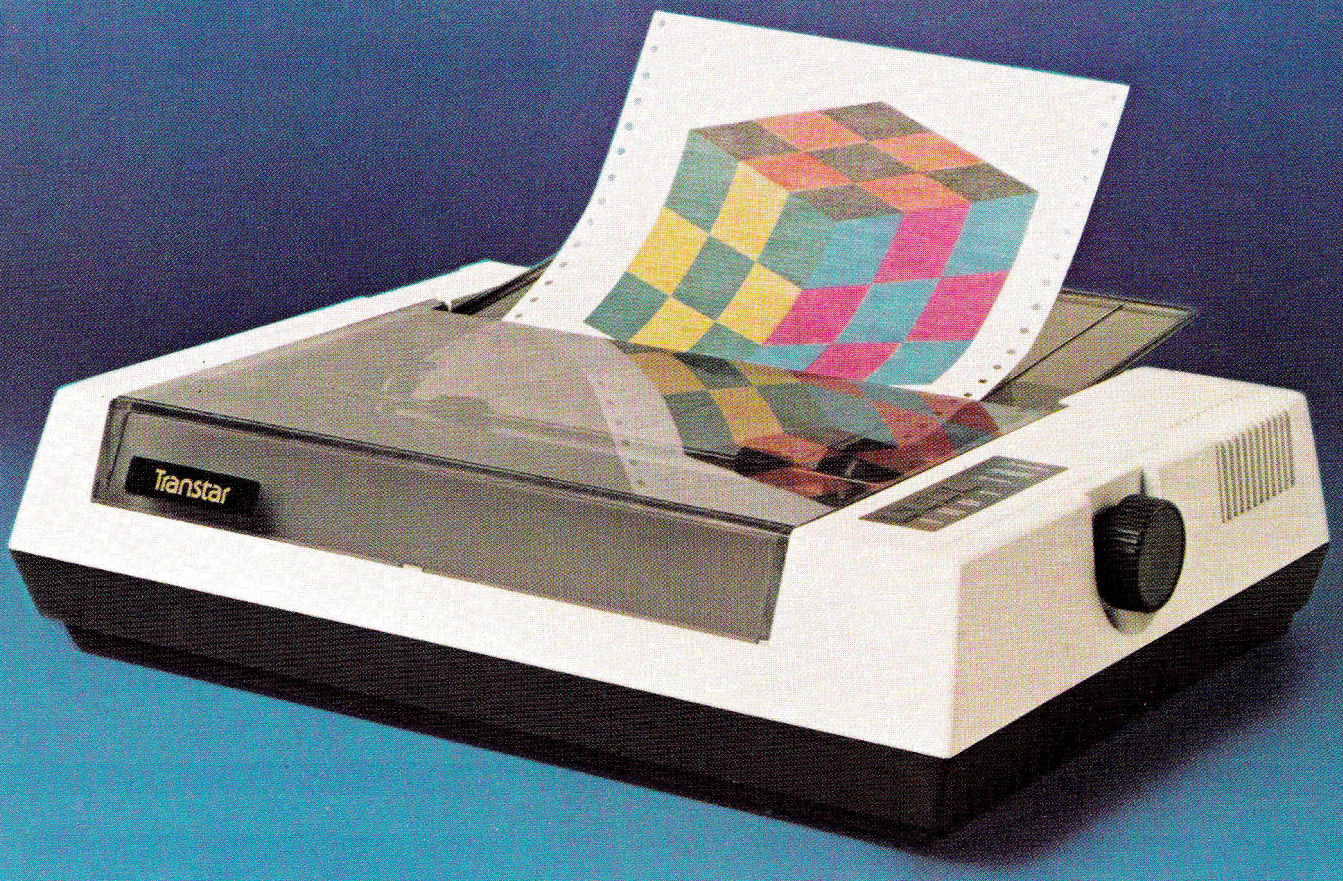
When walking by a computer store, see what kind of software is being displayed on the monitors both in the window and inside the store. If they're all games, the orientation is probably not business.

Walking into a store; if no one bothers to greet you, that might suggest their level of interest in helping you. If you enter a store and note that the salesperson is trying to program a ColecoVision machine, it might seem that s/he is really trying to impress you. Watch out if the salespeople are reading *Mad* and *Cracked*.

Try these approaches:

Feign ignorance, and ask the sales-

Color for the Price of Black and White



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Color Printer for only $599 suggested retail price

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Transtar · Box C-96975 Bellevue, Washington 98009

Circle 265 on Reader Service card.

person for a word processor. Several responses could tip you off:

- They only have one in stock, and it's the most expensive one on the market today.
- No one asks you what tasks you need to accomplish with the word processor, or whether you need one that's CP/M based.
- The salesperson grabs a software package off the shelf, seats you in front of a computer, and sits down next to you. . . balancing a cup of coffee on top of the monitor.

Inquire about the differences between the Apple II and Apple IIe. Hope the answer is not that the IIe won't be in stock for at least another month. (Avoidance of subject equals avoidance of sale). And hope none of the following befall you:

- Ask for information about Lisa, and be shown an assembler.
- Ask to see a good business machine, and be shown an Atari 800.
- Ask to see an excellent game system, and be shown an Apple III.
- Request a bid for an Apple II or IIe for use at home with your TV, and receive quotes for everything from drives to monitor, but no mention of an rf modulator.
- Buy two Apple drives, and *not* be asked if you need a controller card.
- Be told that it will take a week to fix the timing on your drives.
- Ask for a demo on a specific system, and find the salesperson unable to turn the blessed thing on.
- Ask for a software demonstration, which fails, with the salesperson explaining that the software is bad. (Actually, he or she forgot to turn the monitor on.)
- Ask what muffin means and have the salesperson smile and inquire whether blueberry or corn.
- Ask for repair estimates, and be told that such is against store policy.
- Have the salesperson unable to insert the printer ribbon into your brand new Epson MX-100.
- Ask for floppy disks for your Apple and have the salesperson bring you 8-inch disks.
- Be sold software that has been opened and is minus the registration card.

Avoid, at all costs, stores that smell like popcorn and stock pet supplies as well as cosmetics and garden furniture. This is no place to believe service comes first, nor is it a store to go to for the finest in software selection.

If the store doesn't stock *inCider*, leave immediately.

I would appreciate hearing your harrowing experiences. This could be your big chance to inject concern for quality control where it's badly needed. And don't forget to let us know about your *good* experiences too. ■

Circle 387 on Reader Service card.

WHEN THE CHIPS ARE DOWN . . .

"master diagnostics + plus"

It's reasonable to suspect that every Apple owner has wondered at some time or another, if all those chips are working up to par, or if it's time for Disk Speed Calibration, Head Cleaning or General Maintenance.

Master Diagnostics Plus is a comprehensive diagnostics package for the Apple computers. As a diagnostic set, it can save unhooking all the peripherals and carrying an Apple to the dealer every time a minor hardware problem is suspected or periodic maintenance procedures are required, such as DISK SPEED CALIBRATION, MONITOR ALIGNMENT, DRIVE HEAD CLEANING, etc., etc. Necessary maintenance is made easy by the routines and documentation provided.

For those without a service center nearby, the diagnostic routines can save travel or shipping and considerable downtime for minor problems. Anyone fighting glitches in a program would rest a little easier knowing the computer, at least, is working properly.

As quoted in NIBBLE magazine:
"**Master Diagnostics Plus** is an impressive collection of diagnostic routines for the Apple II and Apple II Plus. It is capable for supplying sufficient information so you know whether or not your computer is performing normally. Regular use of the maintenance routines and supplies will help to insure top-notch operation. The peace of mind afforded by being able to regularly monitor computer performance is well worth the price of the program. This package should be in the library of every Apple user . . ." Also received "AAA" reviews in every U.S. Micro Mag.

Specify Version II or //e
REQUIRES: 48K, FP IN ROM
1 DISK DRIVE, DOS 3.3
unlimited warranty
master diagnostics $55.00
master diagnostics + plus $75.00

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PADDLE DRIFT TESTS
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* APPLE //e

THE + plus
master diagnostics + plus provides everything needed to maintain your computer. The entire package is housed in our own molded case to protect against static electricity, x-ray and other contaminants.

Included in the kit is:
- THE DIAGNOSTICS DISKETTE
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Circle 234 on Reader Service card.

eRAM 80 takes a shine to Apple.
The eRAM 80 by Quadram is designed exclusively for the Apple IIe computer. It's an enhancement card that builds character and improves memory. Just plug into a special auxiliary slot in the back of the computer and eRAM 80 is ready to go to work.

Double your viewing area.
When the card is activated, see twice the amount of text on the screen. The eRAM 80 allows the monitor to display 80 characters per line with compatible software. Instead of the usual 40.

That uncomplicates things. Especially when it comes to word processing. And creating or editing documents.

Increase your storage space.
Besides improving character count, Quadram's eRAM 80 offers 64K of auxiliary memory. Whenever the Apple IIe's internal memory isn't enough to handle all data and programming needs, let eRAM 80 take over. Even double storage space, up to 128K, by combining eRAM 80 with some software.

When using compatible software, it's easy to switch from the main memory to eRAM 80. So you can store and retrieve information needed. Quickly. And easily.

What more could you ask for?
Quadram puts the same traditional quality into eRAM 80 as put into all its other products. It's the kind of quality you can count on. The kind of quality also found in Quadram's Apple II, IIe and III Parallel Interface Card (APIC) and Parallel Interface Card with Graphics (APIC/G).

More characters per line. More memory. More Quadram quality. That's eRAM 80. Look for it now at your nearest retailer. $159.

Add more character to your Apple IIe



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IMAGINE IT...



CAPTURE IT.

COMPLETELY REDESIGNED. NOW, THE GRAPPLER + .

The original Grappler was the first graphics interface to give you hi-res screen dumps from your keyboard. The new Grappler + with *Dual Hi-Res Graphics* adds flexibility with a side-by-side graphics printout of page 1 and page 2.

The Grappler + can now be used with the Apple® Dot Matrix, the Okidata 84, and is Apple III compatible.* In addition, the IDS Grappler + is currently available with color capability, including color graphics screen dumps.

UP TO 64K BUFFER OPTION

An optional Bufferboard can now be added to all existing Grappler and Grappler + interfaces. See your Apple Dealer for details.

*Requires additional software driver.
**Requires graphics upgrade.

Circle 5 on Reader Service card.

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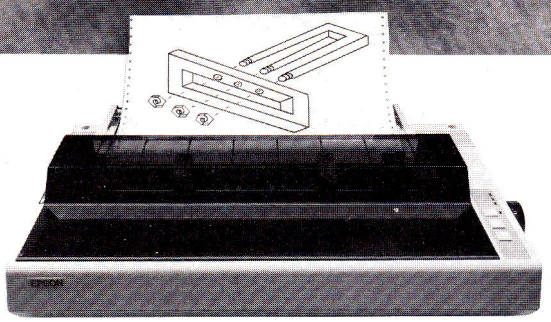
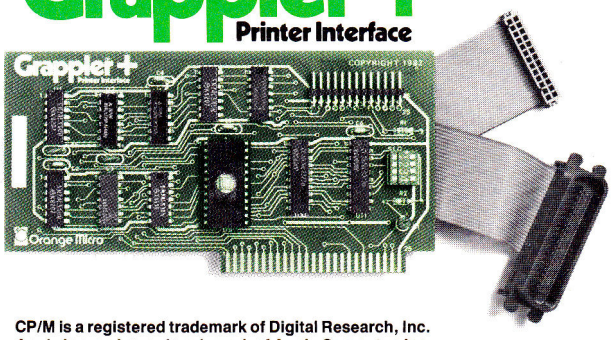


ACTUAL APPLE II PRINTOUT USING GRAPPLER AND EPSON MX100

With The Grappler™ + Printer Interface



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NOW AVAILABLE THE BUFFERED GRAPPLER +

The best of both worlds...the Buffered Grappler +

All of the popular Grappler + features with the time-saving benefits of a printer buffer.

- 16K of Buffer
- Expandable to 64K
- Interfaces with all popular dot matrix printers

Make the most of your Apple and printer, with the Grappler + or the Buffered Grappler + .

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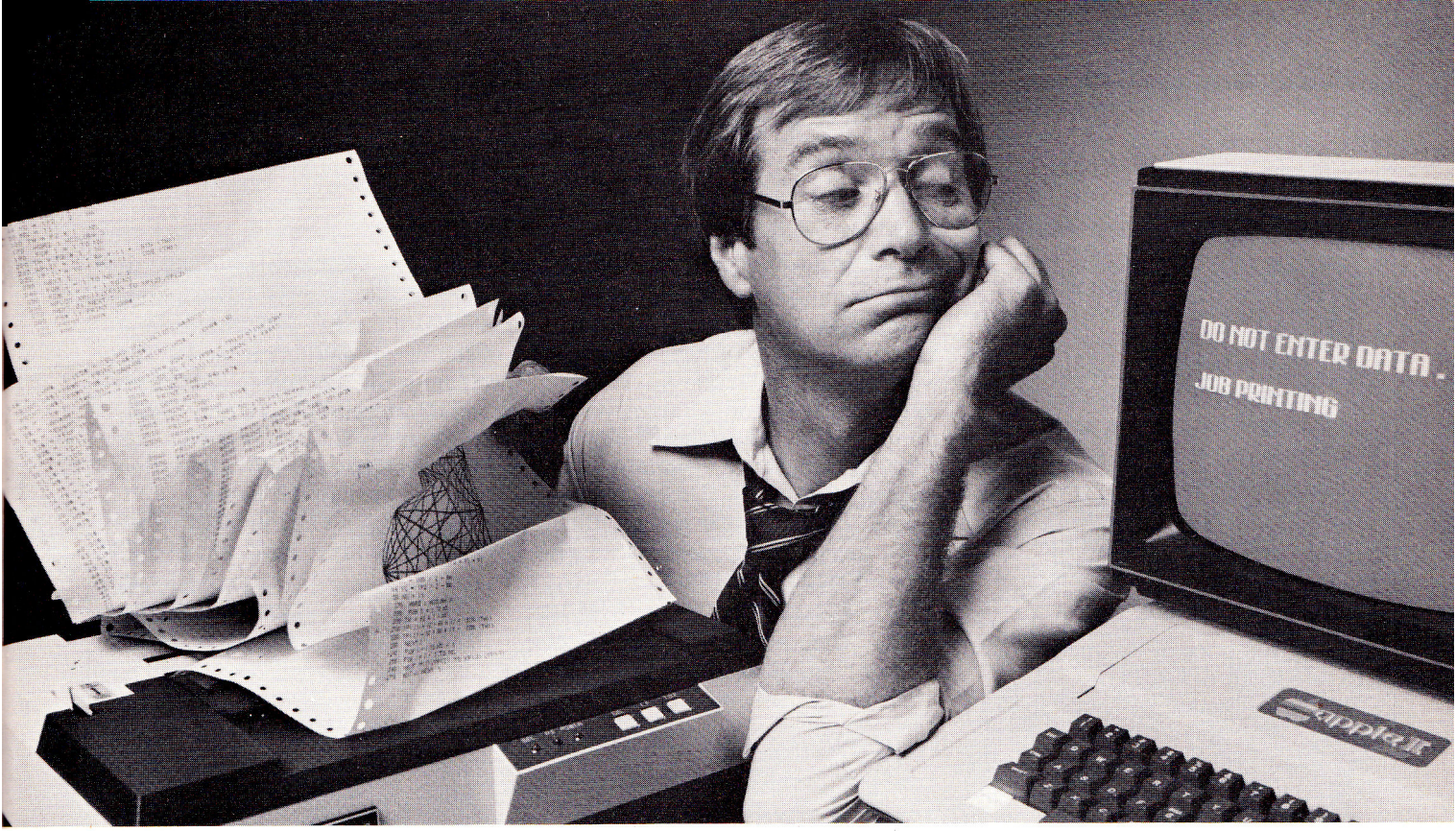
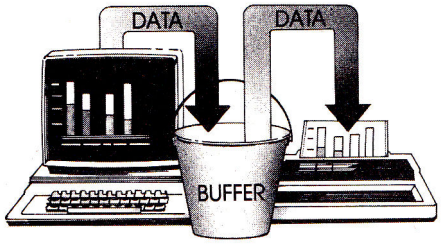


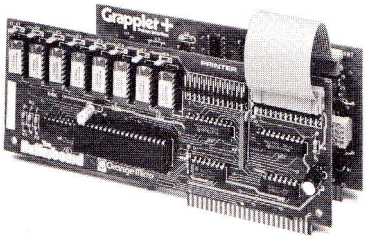
If your printer uses your Apple® more than you do, you need The Bufferboard™.

If your Apple is locked into the "PRINT" mode so much that you've taken up solitaire to kill the boredom, you need a buffer. And if your computer is the Apple II or III, the only buffer for you is The Bufferboard. Expandable to 64K of storage, The Bufferboard stores an instantaneous **bucketful** of print data from your computer. Then it feeds the data to your printer at its own printing rate. Your Apple is set free from driving your printer and is ready for more data from you.



Take your existing interface—and buffer it!

Only The Bufferboard has a simple Interface-Docking System. No bulky boxes or expensive power supplies are needed because The Bufferboard fits right into your Apple—and **docks** onto your existing printer interface. The result is convenient



and economical buffering of most popular printer interfaces, including the Grappler + ™ interface, Epson interface, and Apple printer interface. Thirty seconds and a single hook-up are all you need to end the printer waiting game forever.

Up to 20 letter-size pages stored at a time.

The Bufferboard comes standard with 16K, and is expandable to 32K or 64K of buffering capacity with the addition of memory chips. This "bucket" will hold up to 20 pages of a print job, allowing you freedom to use your Apple.

The Bufferboard—designed exclusively for the Apple Computer.

Specifications:

• Versions for Grappler + interface, Epson interface, Apple interface, and other popular printer interfaces • 16K buffer standard • Upgradeable to 32K or 64K • Automatic memory configuration • Automatic self test • Includes interface docking cable.

The Bufferboard is made by Orange Micro, Inc.; the same people who brought you the popular Grappler + printer interface. Both the Grappler + and The Bufferboard are now available at your local Apple dealer.

Apple is a registered trademark of Apple, Inc.
Epson is a registered trademark of Epson America, Inc.

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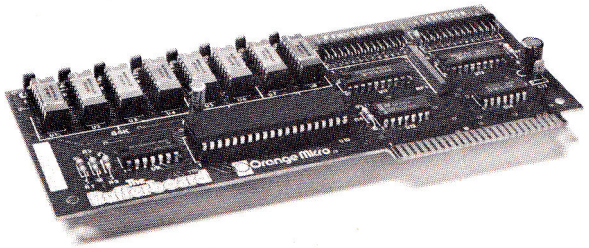
TELEX: TX 183511 CSMA



The Bufferboard™
For Apples and Printers

Circle 9 on Reader Service card.

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Letters

APO Irritations

Being in the Air Force and stationed in England, it is difficult to keep abreast of new developments in the States. I recently subscribed to *inCider* magazine. There are, however, three items that really irritate me. They are as follows:

1) Mail order ads which don't list prices but say "call." From England (or anywhere in Europe) this becomes an expensive proposition.

2) Companies that charge 10–15 percent of the price of the merchandise to ship to an APO/FPO.

3) Companies that will not ship to an APO. Why should we deal with a company when we return to the states when that company doesn't want to deal with us while we're overseas?

John R. West
PO Box 3004
APO NY, NY 09127

Insurance Software

Can you put me in touch with any Apple II Plus owners who have any experience with software designed for fire and casualty insurance agency applications other than rating? For example, customer profiling, word processing, accounts receivable, and diary/follow-up to name a few.

Gil Coan, Jr.
Brevard Insurance Agency Inc.
PO Box 668
Brevard, NC 28712

Program Flicker

I am using Applewriter with a Videx Videoterm 80-column board and a Videx pre-boot disk. The system works just fine except the display on our Apple Monitor III is unacceptable because it becomes streaked each time a key is pressed.

I called Videx on this and the expert there told me that this is the result of the way the Apple program is written. I believe the Videx man is correct and the problem is in the software and not the hardware.

My frustration with this problem is not so much that its solution will no doubt require money, although that doesn't exactly thrill me, but that, having read every software review of word processors for the Apple that I can get my hands on, I have never encountered any *mention* of problems with the display or comparisons of the extent to which the various programs "flicker" while typing. But I know this problem exists; I am looking at it right now. Help!

Lawrence S. Pratt
RFD 1 Box 40
Housatonic, MA 01236

Courseware Checklist

A big problem Bob and I, as educators, are having right now is finding an acceptable instrument (a checklist if you will) and other pertinent information regarding the evaluating of courseware. We would like to see articles of this nature in the *inCider*.

Mrs. Patricia Colp
RR 1, Box 32
Elkville, IL 62932

12 Volt Computer Power?

I live on a 37-foot motorsailor and it is not always possible to run my Apple on 110 power. Do you have a suggestion on how to run my computer on 12 volts?

Tatiana Horowitz
PO Box 1139
Port Salerno, FL 33492

Apple III Game Playing

I am a fluent Basic programmer and very much enjoy the power of Apple III Business Basic. However, sometimes I like to just relax and play a few computer games. But the Apple III doesn't play games, people say. Yes it does—in Apple II emulation mode. This mode allows the Apple III to run all Apple II programs not requiring a language card (for example, Pascal programs).

With one exception the Apple II emulation mode works perfectly. That one exception is when using joysticks—both Apple joysticks and TG joysticks. The joysticks work just fine on the Apple III in its native mode, but poorly with the current version of the emulation mode. The problem is the top button doesn't respond. Remember, this is only a software problem and can be solved in a future version of the emulation mode. Other than the joystick problem, the Apple II emulation mode works excellently.

Dan Kunesh
108 Marie Drive
Downers Grove, IL 60516

Don't Do It All

This is something that beginners might keep in mind. Decide what it is you want to do with your computer and learn that phase. If you want to learn to program in Basic, then devote your time to that. If you want to learn graphics or word processing for instance, master those areas and then move on to others. With all there is to do with computers these days, it's just not possible to master everything at once. I tried that a while back and ended up knowing a little about a lot of subjects, and not very much about any of them.

Walter J. Stall
USACIL-Pacific
APO SF 96343

Blank Lines

I wrote an Applesoft program which does direct access reads to disk (DOS 3.3) using PRINT CHR$(13) + CHR$(4) + "READ FILE.NAME,R";X where X is the record number, followed by an INPUT statement. After each read, I usually print a report line on my printer (a Microline 83A behind a serial 1200 baud C.C.S. 7710A interface card). All of this seems to be working fine until I put in program logic to exclude from printing some of the disk records—at which time I get a blank line printed for each disk record read, examined and skipped.

I have tried several things to eliminate this. I took out the CHR$(13) but DOS began to act strange. I tried a

PR#0 before the disk read and a PR#1 after. I played around with semicolons at the end of each print statement, etc. Any constructive suggestions would be appreciated.

Michael R. Bishop
PO Box 21730
Shreveport, LA 71120

Replacing Epson's MX100 Ribbon

When the ribbon on my Epson MX100 printer wore out, I thought I would buy a new one and replace it. The whole cartridge costs about $35.

I took the cartridge out of my printer and examined it. To replace the ribbon, all I needed was ½ inch by about 10 yards of ribbon with no ends (continuous). I bought a regular nylon typewriter ribbon for about $2.50 and, after cutting the ends off, spliced the ends together with an iron-on material used for patches and threaded it into my printer cartridge. Mission accomplished. $32.50 saved.

Jerry F. Mahaffey
2 Yeaton Place
Haverill, MA 01830

Joystick Problems

I recently bought a Kraft Precision Joystick for my Apple II Plus system. (Kraft Inc, 450 W. California Ave., Vista, CA 92083.) I expected the values given on the X and Y axes (i.e., PDL(0) and PDL(1)) to represent the relative position of the stick, with value ranging linearly from 0 to 255. However, this is not the case. When the joystick gets to the lower left side of the controller, things go haywire with the Y axis.

The values of the Y axis (PDL(1)) go berserk. They should increase to 255, but they mysteriously drop to 0 then return rapidly to 255. I took my joystick back to the dealer and got a new one which worked the same way. Do all joysticks work this way?

Dean G. Huffman
190 West Broad St.
Stamford, CT 06902

Documentation Research

We are currently collecting data in support of a Masters Degree research project involving documentation for computer systems. Our goal is to develop a method writers can use when they are preparing computer support documentation so the end product is easy to understand, simple to use and clear to the reader. We will be attempting to overcome the current problems of documentation that get in the way of the user rather than helping. If anyone can help us please send correspondence to:

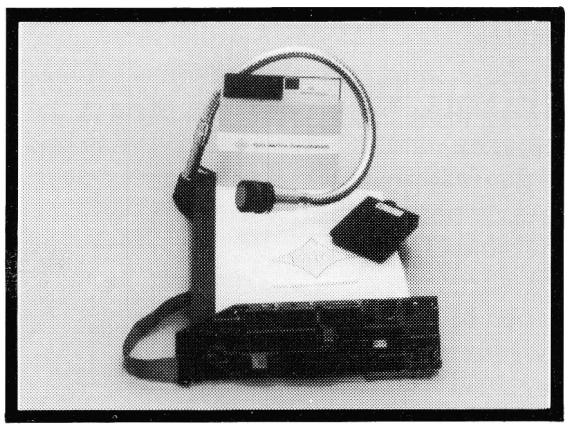
P.V. Callamaras or R. Beard
AFIT/LSH
Wright-Patterson AFB, OH 45344

Circle 373 on Reader Service card.

Voice Machine Communications Inc.

VOICE INPUT MODULE

for Apple II® & Apple II-E®



DESCRIPTION

The VIM converts spoken words to commands or data for your application programs. The Voice Input Module has unexcelled spoken word recognition accuracy at an unmatchable price.

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Recognizes anybody's voice
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APPLICATIONS

The VIM is designed to add voice input to **ANY** existing Apple II application:

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- Graphics
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- Aid for Handicapped

VIM FOR APPLE II CONTAINS:

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Voice Utility Diskette with:
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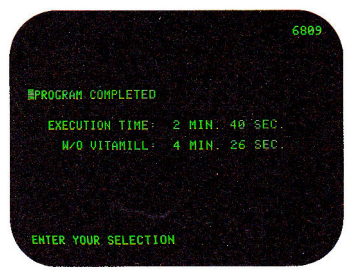

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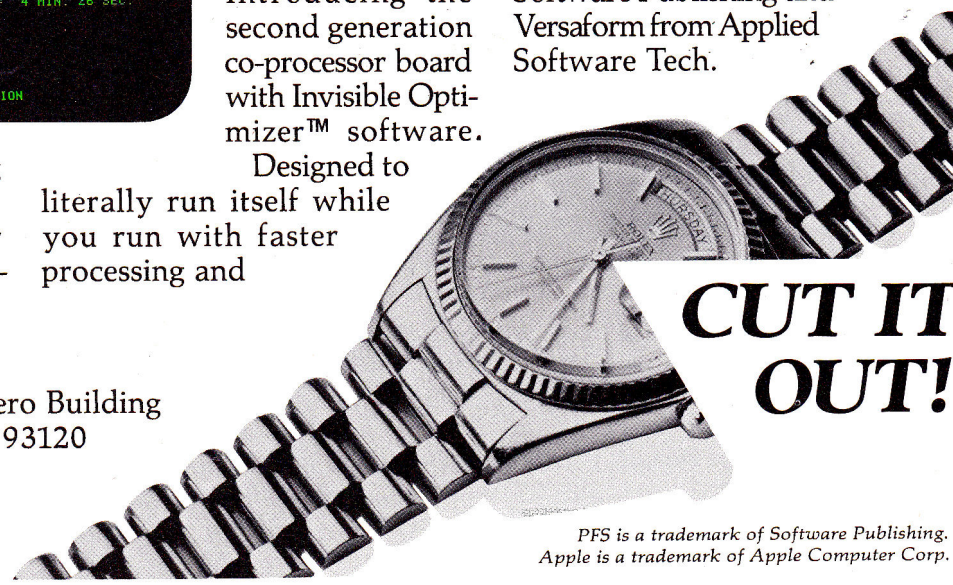

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Applewatch

edited by John P. Mello, Jr.

BUSINESS

The Few, the Proud

Lisa charges into business market with a few good dealers.



All it needs is a few good dealers. That's Apple Computer Inc.'s strategy for selling Lisas.

The Cupertino, CA, firm is taking a fine-tooth comb to some 1300 dealers to find about 130 of them to sell its highly-touted micro based on Motorola's 16-bit 68000 microprocessor.

According to *Computer Systems News*, many authorized dealers described the move as a switch from Apple's traditional method of selecting retailers.

While some dealers criticized Apple's program as too selective, the newspaper reported, others said it is essential for Apple to ensure quality sales and support for the system announced in January.

Company officials reportedly said the reduced dealer base will enable the firm to ensure top quality after-the-sale service, an element they believe is crucial to Lisa's success.

One industry observer noted the selective approach may be Apple's way of countering problems it experienced with its Models II and III. Those products were widely distributed and often fell into the hands of discounters, who slashed prices but offered no service. To compete with the discounters, authorized dealers cut their prices at the expense of providing follow-up service.

In addition to the "select 130," some 100 national sales representatives, who work directly from Apple's corporate headquarters, will be selling Lisas to companies earning more than $120 million. Apple doesn't expect the national sales people to interfere with sales by its select retailers, office market manager Joy McCully told *Iso World*.

During phase one of the selection process, Apple chose 130 to 150 dealers as "information centers." The centers, picked by Apple's regional field personnel, were asked to send Apple financial statements as well as business plans devised for the Lisa, McCully said. She added, both items will be evaluated before the final dealer selection is made.

Stores chosen to sell Lisa will be called Personal Office System dealers, McCully noted.

Candidates for the Lisa select, *Iso World* reported, must have an on-call sales force, on-site repair service, the ability to provide staff and end-user training, and a comprehensive business plan for Lisa—including selling to large corporations.

Many dealers supported Apple's decision to make a careful selection of Lisa dealers in order to safeguard Lisa's image within the corporate community and monitor its dealers' ability to support and service its needs.

"There are many computer stores which are not prepared or do not want to offer the kind of support service that a computer like Lisa demands," Michael Gronholm, president of New Day Computing Com-

pany of Portland, OR, told *Computer Systems News*.

He added, "Many would give the corporate customer asking for details about Lisa a blank stare."

Apple's McCully said one prerequisite of becoming a Lisa dealer is the ability to make outside sales calls to corporate professionals, with or without the assistance of the national accounts sales force.

Dealers, too, perceived this to be a vital element of their sales effort. One dealer told *Computer Systems News*:

"When we first opened stores, we thought we could use gentle persuasion and a little advertising to get the corporate customers to come into our stores. We have learned over the years that the kind of customer that will be interested in Lisa will expect us to go out to see them. Apple wants to make sure its Lisa dealers know how to communicate on that level."

McCully said Apple requires dealers carrying Lisa to designate people to sell the machine and recommends those employees undergo a three-day account penetration strategies course, which covers sales techniques for corporate accounts.

That would be in addition to the traditional three-day Apple retail seminars and product information classes already provided by Apple, McCully explained.

Two weeks ago, Apple held three-day seminars in Dallas, Cupertino and New York to provide product information training for personnel at the Lisa Information Centers.

In addition, as is standard operating procedure with Apple products, dealers are required to have service personnel undergo special service training.

McCully said that Lisa's spare-parts kit will most likely be more expensive than those provided for its other products, but that Apple is working on special financial programs to assist dealers in these purchases.

Dorothy Jablonka, president of Computer Madness in Englishtown, NJ, said she believes Apple is making a grave mistake.

"I think Apple is going the wrong route with Lisa," she said. "They are being selective because they think it's going to be a hard sell, but I think it's going to be an easy sell. I could readily take on the commitment. A lot of dealers may be saying negative things about Lisa, but I think it's just sour grapes. I would love to have it in my store."

Apple's view of what kind of sell Lisa will be is based more on studies done by industry analysts than the enthusiasm of dealers like Jablonka.

A study of 200,000 companies in the United States by Creative Strategies of San Jose, CA, showed corporate computer purchasers are unwilling to spend more than $5000 for a work station, including terminal, keyboard and software.

A similar study of Fortune 1000 companies by the Yankee Group indicated the majority of firms were unwilling to budget more than $7000 for an office computer system.

Lisa's $10,000 pricetag exceeds the maximum figures in both those studies. ■

HARDWARE

New Mother for IIe

Revised motherboard yields super hi-res graphics.

Initial Apple IIe buyers may soon be taking their new machine to a dealer for an upgrade.

All IIes shipped after February contain a revised "motherboard." With the revised board—called the Rev. B—plus a special card and some hardware modifications, IIe users can generate a "Super High-Res" graphics mode with twice the horizontal resolution of standard Apple hi-res.

According to *InfoWorld*, Apple is downplaying the upgrade, treating it as "routine." "Six months between revisions is par for the course," the newspaper was told by George Johnson, Apple IIe product manager. (Apple began cranking out the IIes in volume last October.) He added users may even see a Rev. C motherboard before the end of this year.

Initially, few people will want the upgrade, Apple contends, since there's no existing software for the new hi-res graphics. Johnson added: "We don't expect a big stampede because it's frankly a pain to go into your dealer and have to swap motherboards. Unless you really need some of this stuff you're not going to bother doing it."

"Over time we expect to see everybody end up with a Rev. B or higher, unless they're perfectly happy with their Rev. A," Johnson told *InfoWorld*. "What we're saying is, you were one of our first Apple customers, and we want to give you a feature if you need it, but we're not going to give it to you if you don't need it."

A user needs an extended 80-column card to run Super Hi-Res. Those cards cost $295 and have 64K more RAM than the $125 80-column card.

To use the card with Super Hi-Res, users must also attach an extra jumper connecting two pins on the card. That jumper is supplied with the extended card.

Johnson explained users with A boards will have to show dealers the extended 80-column card as proof they intend to use Super Hi-Res. Then Apple will replace the board free of charge. This policy will be in effect indefinitely.

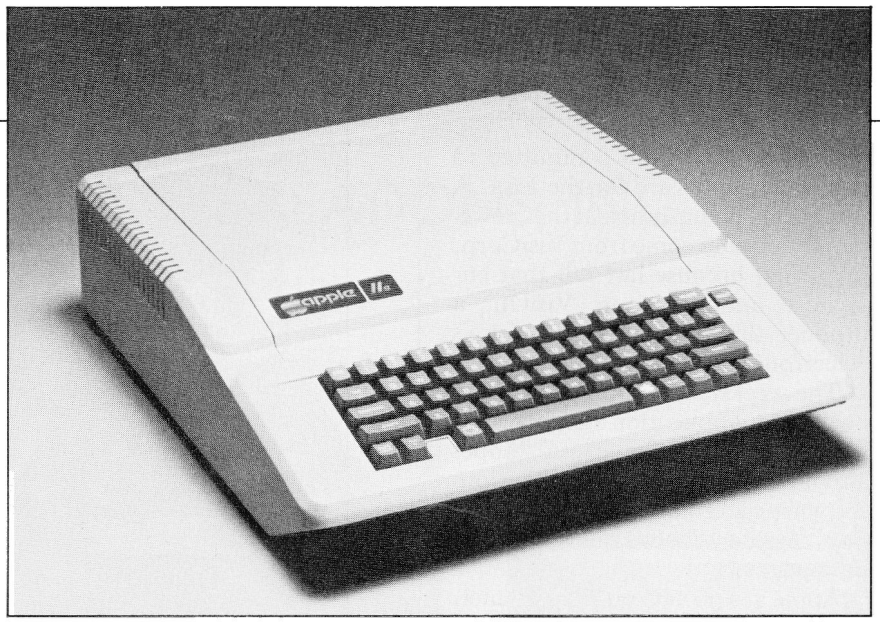
However, Johnson noted that after six months, if nobody's coming in with Rev. A's, Apple may charge $20 or $30 labor to replace the board.

Apple will also replace the A board free if it interferes with use of slot 7. Red-green-blue monitors using that slot won't work with an A board, Johnson explained, because of design differences between the Apple II Plus and IIe.

He explained Apple began production of the IIe at its Dallas, TX, facility while the B board was still in the testing stage. Apple decided to ship the first month's worth of IIes, he said, with the A boards in them, rather than delay introduction of the machine.

Apple would not disclose how many IIes it shipped with A boards. However, *InfoWorld* indicated the figure to be about 24,000.

Full-screen low-resolution graphics for the IIe are 40 blocks by 40 blocks. In normal hi-res mode, they are 200 by 192. Super Hi-Res, previously achieved only by fancy software, is 560 by 192.



Apple IIe
Standard four colors may become 16 with Super Hi-Res.

Johnson told *InfoWorld* Super Hi-Res improves the look of diagonal lines and other shapes on the screen that use "stair stepping" to simulate those lines.

A special toggle using the game-paddle port allows users to switch between normal and Super Hi-Res modes.

The new hardware may also support another desirable feature for the IIe. Johnson said software developers believe there is a way to expand the IIe's present four colors in normal hi-res to 16 colors using the expanded 80-column card. ■

SOFTWARE

Softscribes Spurning Lisa

Traditional writing corps looking for greener pastures.

Traditional writers of software for Apple computers may spurn Lisa, according to a report appearing in *Iso World*, but minicomputer and UNIX writers may pick up the slack.

Some Apple software writers told the newspaper they'd shy away from developing products for the firm's flagship machine. Factors in their decision included uncertainty over sales volume and competition with the Lisa's bundled applications. Many said they'd already made commitments to develop software for machines with large numbers of existing owners.

Uppermost in their minds is market size. Even by Apple's optimistic estimates, only 10,000 machines will be installed by the end of the year. For many firms writing Apple II programs, that figure has led to decisions to hold off—temporarily or permanently—on software projects for the Lisa.

The newspaper explained developers—geared to markets where machines are delivered in six-figure quantities—look at the projected sales for the Lisa with dismay.

To be profitable, Lisa applications packages would have to sell for considerably more than packages for mass-market machines like the IBM Personal Computer, software executives told *Iso World*.

Software prices, though, are coming down, causing some vendors to wonder if they will be able to convince the customer to pay top dollar for software.

"The market isn't tried yet, and I'd prefer not to take a bath," Bruce Hevert of Stoneware, San Rafael, CA, told one reporter. "IBM is out there and there are so many other computer companies out there.

"The industry is saturated with other manufacturers who provide the user better aftersale support than Apple. If they can sell between 8000 and 10,000 it might be okay, but the IBM has a mass market and is well-supported. The Lisa is not as big a market."

Ed Magnin, president of the Telephone Software Connection, a Torrence, CA, supplier of Apple II software, told *Iso World* programs selling for $500 to $1000 on the Apple II might cost "three to 10 times as much" if written for the Lisa. "And if the market is that small," he asked, "who is there to sell it to?"

Some traditional Apple software

houses, however, are committed to developing software for the Lisa. A surprising commitment, the newspaper said, has come from VisiCorp, surprising because last fall that enterprise announced its VisiOn, a product that competes with Lisa's "electronic desktop" front end.

The weekly said Apple is counting heavily on application support from independent developers. It hopes about 90 percent of the applications software will come from that source, one Apple executive told the newspaper.

Apple's expectations may be met, but by software writers for Lisa's two alternate operating systems, CP/M and Xenix.

And more applications are expected to filter down from an entirely new source—minicomputer, superminicomputer, and mainframe software suppliers.

Iso World reported the UNIX marketplace is expected to provide applications for the Lisa. Two versions of UNIX are available for the Lisa—Xenix from Microsoft Corp., and UniPlus+ from Unisoft—and applications already exist for those systems.

Microsoft's Mark Usino, Xenix product marketing manager, told the newspaper that the complexity of the Lisa native interface may cause developers to shy away from it, making the UNIX marketplace a logical source of software.

"I think that as far as traditional business applications are concerned, the vast bulk of them will come by way of the Xenix operating system, migrating from the Altos or Fortune machines," he said.

Other developers consider Lisa to be more in a minicomputer class than a microcomputer.

"It's definitely a product for our marketplace," John Carrington, marketing vice president for State of the Art Inc. in Costa Mesa, CA, told one reporter. "After ten years in the minicomputer environment, the Lisa has a lot of things we're used to."

Carrington said his firm will "support the Lisa" with accounting packages.



Apple's software stalwarts
Will they be turning their backs on Lisa?

Carrington also predicted marketers of minicomputer software would be able to bring software from environments like Digital Equipment Corporation or Data General Corporation to Lisa.

Development of packages running under the Lisa's own operating system will come more slowly, due to its complexity, and to a lack of machines in the hands of developers, software executives told *Iso World*. ■

LAW

Apple Asks Feds to Crack Down on Knock-Offs

Micro maker claims copy-cats will cut into IIe market.

Apple Computer Inc. has filed a complaint with the International Trade Commission urging it to ban computer imports Apple claims violate its patents and copyrights.

According to the *Electronic News*, the petition seeks to widen the authority of the U.S. Customs Service to seize computers at ports of entry. Customs has been confiscating alleged knock-offs since last summer on the basis of copyright violations (*inCider*, January 1983, p. 22).

The Apple petition claims the market for its Apple IIe will be "effectively destroyed" unless imports of counterfeit models are brought to a swift halt.

In Hong Kong and Taiwan, Apple said, counterfeit Apples caused sales of real Apples to become sporadic and Apple's market share deteriorated rapidly. The Cupertino, CA, enterprise argues it faces the same danger in the United States if work-alike imports aren't stopped.

"Respondents are able to charge low prices since they have copied and stolen Apple's technology and have made absolutely no investment of their own," the petition alleges.

"Foreign counterfeiters have the capacity to produce nearly 20,000 counterfeit Apple II computers per month," Apple explained in the petition.

Apple filed its charges under special provisions of the nation's trade laws. Those provisions allow the commission to ban imports it deems "unfair." Only a White House veto can reverse such a ruling.

Normally, a commission investigation takes up to a year to complete, but Apple urged the panel to conduct a preliminary probe and order an immediate temporary crackdown while its more detailed study is under way.

Cited as respondents in the Apple petition were a wide range of firms located in Taiwan and Hong Kong as well as several in this country and one in Switzerland.

Several of these companies already are being sued by Apple for alleged patent and copyright infringement,

3 TIMES THE EXCITEMENT

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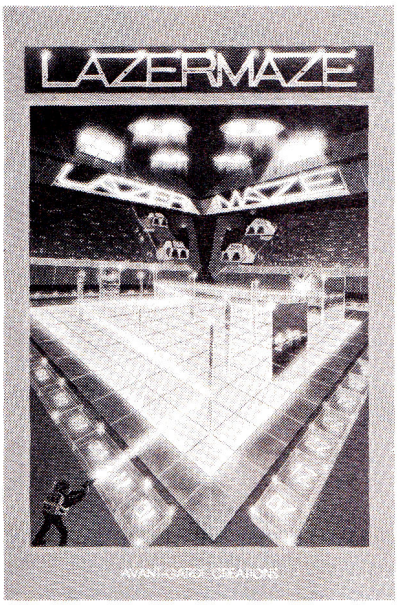

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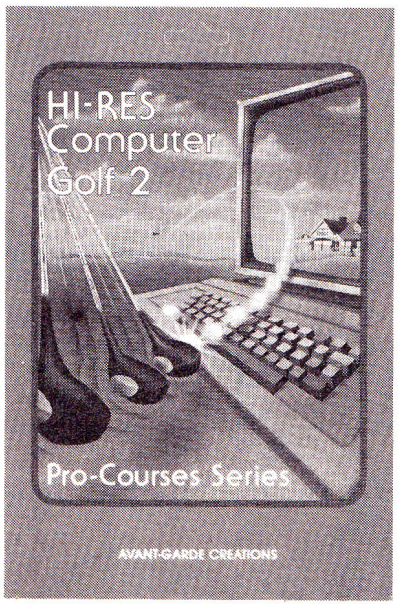

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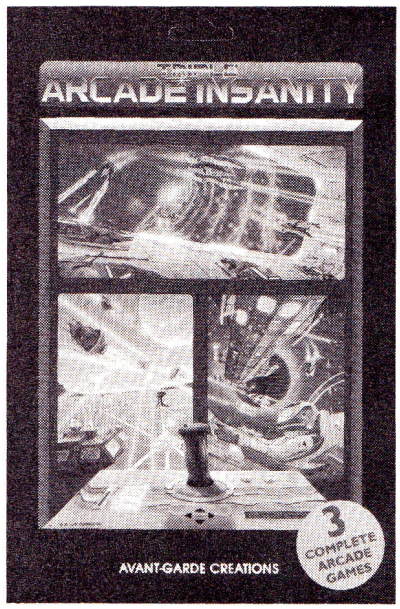

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and the brief submitted to the commission listed a string of further litigation both in the United States and in New Zealand, Australia, Holland, Switzerland, South Africa, Italy and West Germany.

Apple's brief noted its "close cooperation" with the U.S. Customs Service to track down copyright violators. Apple claimed at least 500 counterfeit computers and components have been "seized, detained or released" so far by Customs.

Meanwhile Apple imitators continue to introduce their products into the market.

Syscom Inc. of Provo, UT, announced a 64K Apple II work-alike for $869 with hi-res graphics and switchable 110/220 power supply.

The firm said the 6502 microprocessor in the micro allows it to run programs written for the Apple and Franklin computers.

And Computer Systems International of Arlington, VA, is marketing a $700 Taiwanese micro called the Mind II, which it claims is 100 percent compatible with the Apple II Plus.

The company claims its micro doesn't infringe on any Apple copyrights or patents. Michael Bahniuk, the firm's marketing manager, told *InfoWorld*: "We don't want to be confused with cheap Apple lookalikes from the Far East. Our product is manufactured exclusively for us, and we have strict quality control. And we have a different power supply and board design from the Apple computer."

At $695 for a 48K version, the Mind II undercuts a major Apple work-alike, the Franklin Ace 1000. ■

BUSINESS

Chains Complain

Is Apple ill-equipped to deal with chain stores?

Apple needs to fine-tune its dealer relations due to a recent trend allowing computer chain stores to gobble up more and more of the micro market.

According to a report in *Computer + Software News*, Apple's independent reps may be creating problems for chain stores that may cost the Cupertino firm retail outlets.

The reps work in geographic regions, visiting independent stores, the newspaper explained, and are unable to deal with a chain with stores all over the landscape.

"We haven't been able to talk to Apple," Warren Winger, chairman of CompuShop in Richardson, TX, told the industry weekly. "They aren't set up to communicate with chains.... And we're the only chain [not franchised] they have."

"We have stores in four geographic regions—Dallas, Houston, Denver and Chicago," CompuShop Vice President for Merchandising Joe Harmon said. "Apple has sales reps for each of those regions, but they call on store managers...our managers don't make decisions. We make decisions at headquarters. They're talking to the wrong people."



Dr. Portia Isaacson
"There's a shift to owned chains and franchise stores... The trend is accelerating."

The newspaper said CompuShop's inability to persuade Apple to deal with corporate headquarters may cost the chain Lisa.

The communications breakdown between Apple and CompuShop (currently carrying only Apple and IBM) has been so frustrating that Harmon quipped he may set up a staff designed solely to deal with Apple.

A seminar held by Future Computing—a Richardson, TX, market research firm—disclosed statistics showing single-location computer specialty stores declining in market share from 35 percent to 29 percent from the second quarter of 1982 to the first quarter of 1983.

And Future Computing's President and Chief Executive Officer Dr. Portia Isaacson observed, "There's a shift to owned chains and franchise stores... The trend is accelerating."

Can Apple afford to ignore this trend? the newspaper asked. The answer was clear to one industry observer: "Apple may be 30 percent or more of sales at a chain like CompuShop, but they may also be 80 percent of the chain's problem's.... With IBM and TI in the market, a retailer with those problems might look to put Apple out to pasture." ■

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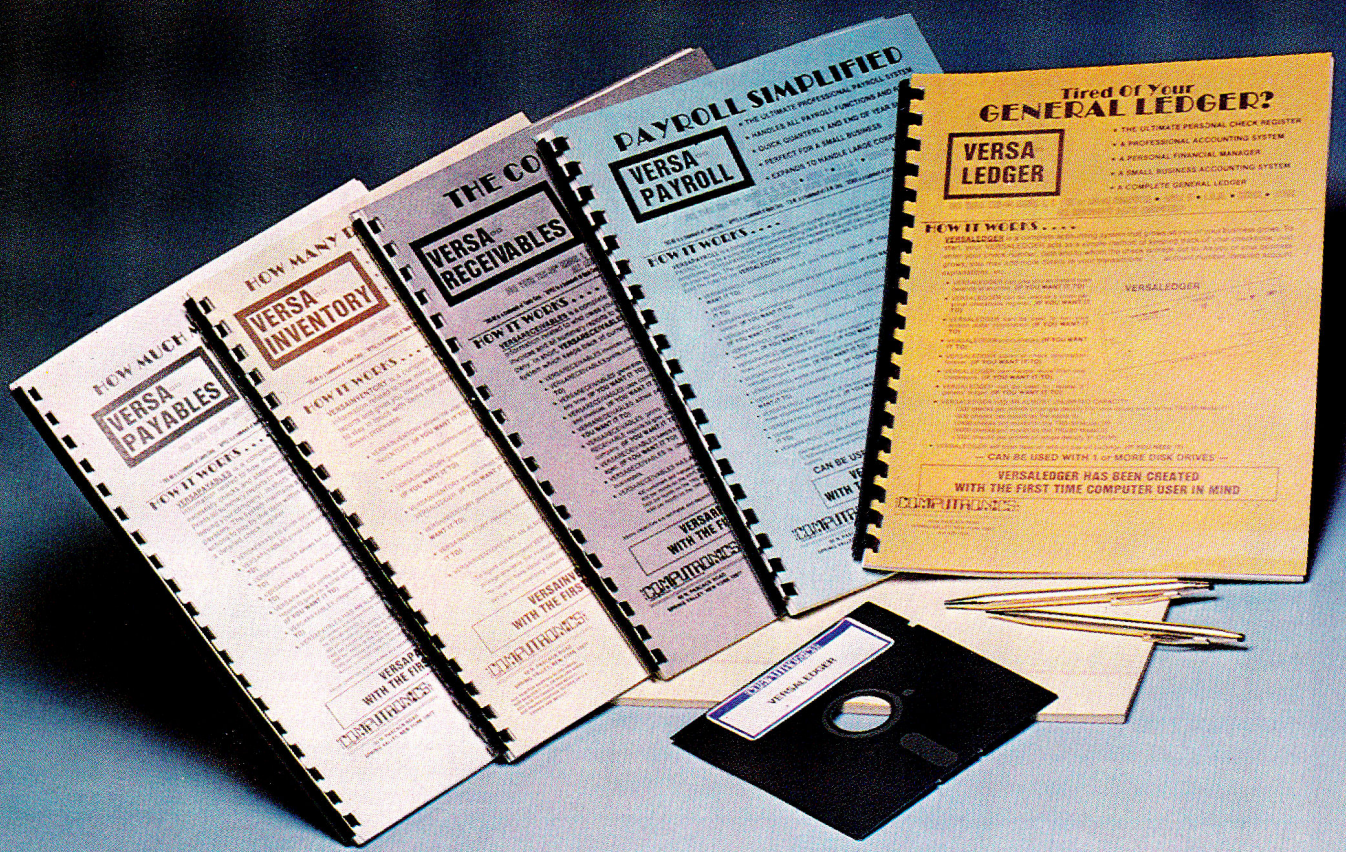

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The Applesoft Adviser

by Dan Bishop

Adding Special Effects

In this month's column, I will cover several commands and techniques that you can use to enliven your screen displays. Many of these you may already be using, but there are some tricks presented here that you may not have seen. In addition, I will pass on some useful tips that have been sent to me by readers of this column. Since I am writing this in mid-February, reader response has been limited to the first three issues of *inCider*, so you may wish to pull out your old issues for reference.

True, I did promise in my last column to deal with graphics. But judging from some of the letters I have received, I felt that the topics covered in this article might be more immediately useful to a majority of my readers now, and decided to postpone the graphics article until next month. (You see, I actually do read those letters you write!)

My first comment refers to the February issue and to the program listing that appears on page 148. This listing was not originally meant to serve as a complete program, but only as a subroutine to be used by a larger program. However, due to an editorial mix-up, the listing was converted to a program by including line 30, GOSUB 1000. Several readers responded that the program did not work properly. The reason, of course, is that after executing line 30, the data entry subroutine at line 1000 was executed, and on return from that subroutine call, the computer executed the line immediately following line 30, which was line 1000 again. That is, the computer re-entered the subroutine, but this time without a GOSUB command. The resulting RETURN WITHOUT GOSUB error is thus explained. Add the following line to your listing and this problem will no longer exist:

```
999 END
```

And if you think the display in that program seemed pretty plain, try adding some of the special effects that are included in this month's article. You'll be producing displays and menus that will put the professionals to shame!

My next comment is to present a short listing that was inspired by a letter from Kenneth Bryant of Eastern Nazarene College in Quincy, Maine. You may recall that the January issue carried a subroutine that could be used to format numeric data so that it could be used for screen display. Kenneth decided there had to be a better way, and after spending part of his Christmas vacation on the project, he came up with a subroutine that was more efficient and even included commas in large number strings. However, neither his program nor mine could deal with small numbers which the Apple automatically represents in exponential notation (for example, 4.58E-04). So, using his ideas and doing some further work on my own, I am pleased to present Listing 1. (Applause.)

As with the January listing, before executing a GOSUB 20, you must set X equal to the value that you are for-

```
1 REM LINES 19-37 CONTAIN SUBROUTINE TO CONVERT A NUMBER
2 REM       TO A STRING OF LENGTH L% AND HAVING D% DIGITS
3 REM       TO THE RIGHT OF THE DECIMAL.  tO USE 14 AND 2, DO A
4 REM       GOSUB 19; OTHERWISE PREDEFINE L% & D% AND GOSUB 20
5 REM
6 REM BEFORE USING THE SUBROUTINE, THE LENGTH OF THE STRING
7 REM       (L%) MUST BE DEFINED, THE NUMBER OF DECIMAL DIGITS
8 REM       (D%) MUST BE DEFINED, AND THE NUMBER TO BE CONVER-
9 REM       TED MUST BE ASSIGNED TO THE VARIABLE  X.  THE
10 REM      VARIABLE X$ IS RETURNED.  L% WILL ALWAYS BE AT
11 REM      LEAST 3 DIGITS LONGER THAN D%, TO ACCOMODATE
12 REM      THE SIGN, LEADING ZERO, AND DECIMAL POINT.
13 REM      D% MAY HAVE ANY VALUE FROM Ø TO 8. LARGER VALUES
14 REM      CANNOT MAINTAIN ACCURACY IN LAST PLACES DUE TO
15 REM      COMPUTER LIMITATION.  L% SHOULD BE <= 16.
18 GOTO 1000
19 D% = 2: L% = 14
20 X = INT(X*10 ^ D%+.5)/INT(10 ^ D%+.5):REM ROUND & TRUNCATE X
21 L$ = CHR$(32+13*(X(Ø)) + STR$(INT(ABS(X)))
22 REM L$ CONTAINS THE SIGN AND DIGITS TO LEFT OF DECIMAL PT.
23 IF L% < D% + LEN(L$) + 1 THEN L% = D% + LEN(L$) + 1
24 X = ABS(X) - INT(ABS(X)) + 10 ^ -(D%+1):REM X IS DEC. PART
25 X = -(X(Ø) + (X)Ø) + X: REM A + OR - 1 IS ADDED TO THE
26 REM          NUMBER TO PREVENT EXPONENTIAL FORMAT.
27 IF ABS(X)=1 THEN X$ = LEFT$("Ø.ØØØØØØØØ",D%+2):GOTO36
28 REM LINE 27 IS USED ONLY WHEN THE X'S VALUE IS ZERO.
29 X$ = MID$(STR$(ABS(X))+"ØØØØØØØØ",2,D%+1)
30 REM LINE 29 ADDS TRAILING ZEROES TO X$
31 R$=" ":IF D% <> Ø THEN R$ = "." + RIGHT$(X$,D%)
32 X$ = L$ + R$: REM X$ NOW CONTAINS BOTH PARTS OF THE NUMBER.
33 IF ABS(VAL(X$))>999 THEN X$=LEFT$(X$,LEN(L$)-3) + "," + RIGHT$(X$,LEN(R$)+4)
34 IF ABS(VAL(X$))>999 THEN X$=LEFT$(X$,LEN(L$)-6) + "," + RIGHT$(X$,LEN(R$)+8)
35 REM LINES 33 AND 34 PLACE COMMAS INTO X$.
36 X$ = RIGHT$("                "+X$,L%):REM 16 BLANKS
37 RETURN
1000 INPUT"NUMBER OF DEC. DIGITS:  ";D%
1010 INPUT"TOTAL LENGTH OF STRING: ";L%
1020 INPUT"ENTER NUMBER:  ";X
1040 GOSUB 20
1050 PRINT X$
1060 GOTO 1000
```

Listing 1. Program to illustrate the string formatting of numeric information for print purposes. (This listing is a revision of the one that appeared in the January column.)

Address correspondence to Dan Bishop, Custom Comp, PO Box 429, Buena Vista, CO 81211.

matting, using a simple assignment statement such as X = N, or some such. Then, unless you wish to use the default values in line 19 (in which case you execute a GOSUB 19 instead of GOSUB 20), you must provide values for D% (the number of digits to be kept to the right of the decimal point. . .0 to 8) and L% (the maximum length of the entire string to be returned, including commas, leading blanks and trailing zeros). This subroutine then returns X$ as the string that contains the properly rounded and formatted number string, right-justified and ready for printing.

```
10 GOTO 1000
15 REM *** SINGLE KEYSTROKE INPUT ROUTINE ***
16 REM     REQUIRES RR$ TO BE DEFINED AS A STRING THAT CONTAINS
17 REM     EACH OF THE ALLOWED RESPONSES.  THE ROUTINE USES R,
18 REM     RR, R$ AND RR$.  IT RETURNS R$, THE SPECIFIC RESPONSE,
19 REM     AND RR, A NUMBER CORRESPONDING TO R$'S PLACE IN RR$.
20 GET R$: POKE -16368,0
21 RR=0
22 FOR R=1 TO LEN(RR$)
23     IF R$ = MID$(RR$,R,1) THEN RR=R:  R=LEN(RR$)
24 NEXT R
25 IF RR=0 THEN 20
26 PRINT "** "R$" **": RETURN
27 REM  THIS ROUTINE CAN BE COMPRESSED INTO THREE LINES BY
28 REM  COMBINING  LINES 20-23 INTO LINE 20, LINES 24-25 INTO
29 REM  LINE 21, AND MAKING LINE 26 LINE 22.
35 REM *** CENTER LINE ON DISPLAY ROUTINE ***
36 REM     THIS ROUTINE WILL CENTER A GIVEN LINE OF MATERIAL,
37 REM     DEFINED AS L$, ON THE CURRENT CURSOR'S LINE.  IT
38 REM     WILL NOT ISSUE A LINE-FEED AFTER PRINTING.
39 REM     THE ROUTINE USES L$ AND L.
40 L = INT((40-LEN(L$))/2+.5): IF L<1 THEN L=1
41 HTAB L: PRINT L$;: RETURN
45 REM *** THIS ROUTINE CENTERS A BOX ON THE TEXT SCREEN. ***
46 REM    THE ROUTINE USES B$, B, BH, BV AND SUBROUTINE 40.
47 REM    BH DEFINES THE LENGTH OF THE BOX, INCLUDING EDGES.
48 REM    BV DEFINES THE HEIGHT OF THE BOX, INCLUDING EDGES.
49 REM    THE TOP EDGE OF BOX WILL BE AT CURSOR'S CURRENT LINE.
50 B$ = LEFT$("                                        ",BH)
51 L$=B$: INVERSE: GOSUB 40: NORMAL: PRINT
52 FOR B=2 TO BV-1
53     PRINTTAB(L);:INVERSE:PRINT" ";:NORMAL:PRINT SPC(BH-2);:INVERSE:PRINT" ":NO
RMAL
54 NEXT B
55 INVERSE: GOSUB 40: NORMAL: PRINT
56 RETURN
59 REM ***  TIMING LOOP SUBROUTINE  ***
60 FOR PAUSE = 1 TO 2000: NEXT PA: RETURN
1000 HOME
1010 VTAB 3: L$ = "PRESS THE KEY THAT CORRESPONDS": GOSUB 40
1020 PRINT: L$ = "TO YOUR SELECTION.": GOSUB 40: PRINT:PRINT
1030 BH = 28: BV = 10: GOSUB 50
1040 VTAB 8: L$ = "   (A)   ADD ACCOUNTS.      "
1050 GOSUB 40
1060 VTAB 9: L$ = "   (E)   EDIT ACCOUNTS.     "
1070 GOSUB 40
1080 VTAB 10: L$= "   (D)   DELETE ACCOUNTS.   "
1090 GOSUB 40
1100 VTAB 11: L$= "   (L)   LIST ACCOUNTS.     "
1110 GOSUB 40
1115 VTAB 12: L$= "   (S)   SELECT AN ACCOUNT."
1120 GOSUB 40
1130 VTAB 13: L$= "   (X)   END THE PROGRAM.   "
1140 GOSUB 40
1150 VTAB 17: FLASH: L$ = "CHOICE...": GOSUB 40: NORMAL
1160 RR$ = "AEDLSX": GOSUB 20
1170 ON RR GOSUB 2000, 3000, 4000, 5000, 6000, 1200
1180 GOTO 1000
1200 HOME
1210 VTAB 12: BH = 15: BV = 5: GOSUB 50
1220 VTAB 14: L$ = "*** E N D ***": GOSUB 40
1230 VTAB 20: END
2000 REM ADD ACCOUNTS SUBROUTINE GOES HERE.
2005 HOME: VTAB 12: L$ = "*** ADD ACCOUNTS ***"
2006 GOSUB 40: GOSUB 60
2010 RETURN
3000 REM EDIT ACCOUNTS SUBROUTINE GOES HERE.
3005 HOME: VTAB 12: L$ = "*** EDIT ACCOUNTS ***"
3006 GOSUB 40: GOSUB 60
3010 RETURN
4000 REM DELETE ACCOUNTS SUBROUTINE GOES HERE.
4005 HOME: VTAB 12: L$ = "*** DELETE ACCOUNTS ***"
4006 GOSUB 40: GOSUB 60
4010 RETURN
5000 REM LIST ACCOUNTS SUBROUTINE GOES HERE.
5005 HOME: VTAB 12: L$ = "*** LIST ACCOUNTS ***"
5006 GOSUB 40: GOSUB 60
5010 RETURN
6000 REM SELECT AN ACCOUNT SUBROUTINE GOES HERE.
6005 HOME: VTAB 12: L$ = "*** SELECT AN ACCOUNT ***"
6006 GOSUB 40: GOSUB 60
6010 RETURN
```

Listing 2. Program to illustrate special effects in screen displays and menu prompts.

The trick to retaining decimal format for small numbers is to add a + 1 or − 1 to the number (depending on its sign). This forces the computer to maintain decimal format. The resulting number is converted to a string, and then only the decimal portion is used. If these numbers are the only type you will encounter, Listing 1 may be shortened by deleting lines 21, 31, 32, 33, 34, and 35 and adding:

```
31 X$ = "0." + RIGHT$(X$,D%)
```

This changes the subroutine so that it deals strictly with numbers whose absolute value is less than 1.

Another comment needs to be added for the March article (where *do* these bugs come from!). Line 340 of the listing for the databook program has an extra comma. That line should read:

```
340 PRINT TM$, AP$
```

Also, by now you probably know that a POKE 33,33 will remove the left and right margins from a line that is displayed with the LIST command. If this is done before listing a line that needs to be edited, the problems I mentioned at the end of my article on Apple editing are taken care of. When you have finished editing, simply enter the TEXT command and the screen display returns to normal.

HTAB/VTAB

Knowing how to position the cursor in any desired location on the screen gives the programmer a degree of creative ability in designing screen display, menus, and games. Applesoft provides cursor control with two easily used commands, HTAB and VTAB. By using these commands, and placing a semicolon after the PRINT statements (so that automatic line feeds that may mess up a screen display are suppressed) the programmer can control screen displays with precision.

The screen display for an unmodified Apple consists of 40 horizontal positions, or columns, and 24 vertical positions, or rows. For the use of

HTAB and VTAB, the column positions are numbered from 1 to 40 and the row positions from 1 to 24. HTAB is used to position the cursor at a specified column on the screen, serving as horizontal tab. VTAB positions the cursor at a specified row on the screen, serving as a vertical tab. The syntax for the commands consists of the word HTAB or VTAB, followed by the column or row number desired. No equal sign or other punctuation is used.

Once the cursor is located at a given position on the screen, the next PRINT command will begin printing from that location. The INPUT command also functions from the cursor's current position. Try the following short program.

```
10 HOME
20 HTAB 20: VTAB 10: PRINT "X";
30 FOR H = 1 TO 40
40 VTAB INT(H/2 + .5): HTAB H: PRINT".";
50 HTAB 40 - H: print "*";
60 NEXT H
70 HTAB 30; VTAB 10: INPUT "???";X$
80 END
```

Note that the numeric values used with HTAB and VTAB may also be expressions that denote numeric values.

Another useful display control is the instruction CALL-958. Using the above example, insert line 75:

```
75 CALL-958
```

into the program and run it again.

You should note that as soon as you press the return key in response to the INPUT statement the bottom half of the display, from the cursor's position to the end of that line and everything below it, is erased. Using HTAB and VTAB, you can position the cursor wherever you wish, then execute a CALL-958 and erase everything that follows the cursor to the bottom edge of the screen.

A similar function is available with CALL-868. This command simply erases the rest of the line following the cursor. This is particularly useful if you wish to edit a data field that is displayed on the screen. Position the cursor at the beginning of that field, do a CALL-868 and then issue another INPUT command. The previous entry will be erased and the new entry will be displayed as it is typed into the same screen location.

At times it may be desirable to save a specific cursor location in memory for use later in the program. This can be done easily by peeking at the memory locations which contain the cursor's current horizontal and vertical positions. These are locations 36 and 37, respectively. Unfortunately, the numbers stored at these addresses count columns from 0 to 39 and rows from 0 to 23, so before using these numbers for HTAB or VTAB coor-

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```
10 DIM M$(4)
20 GOTO 1000
30 FOR J = 1 TO 30: NEXT J: RETURN
49 REM *** DRAW BOX ON SCREEN ***
50 GOSUB 52: HTAB 1:  GOSUB 53: HTAB 30: GOSUB 53
51 HTAB 1: VTAB 20: GOSUB 52: RETURN
52 INVERSE: PRINT SPC(BH): NORMAL: RETURN
53 INVERSE: PRINT" ";: NORMAL: RETURN
55 REM *** HORIZONTAL WINDOW SCROLL ROUTINE ***
56 REM         MESSAGE STRINGS MUST BE CONTAINED IN M$(I) ARRAY.
57 REM         M IS # OF ELEMENTS IN ARRAY TO BE DISPLAYED. ML
58 REM         IS LENGTH OF LINE ON DISPLAY; MH IS HORIZONTAL
59 REM         LINE POSITION; ROUTINE USES H, I, J, AND T.
60 FOR I = 1 TO M: H = 1
70     FOR J = 1 TO LEN(M$(I))
80         HTAB MH - H: PRINT MID$(M$(I), J-H+1, H);
90         H = H + 1: IF H ) ML THEN H = ML
100        FOR T = 1 TO 80: NEXT T
110        GOSUB 150
115        HTAB 2: PRINT SPC(ML);
120   NEXT J
130 NEXT I
140 GOTO 60
149 REM *** SINGLE KEYSTROKE KEYBOARD STROBE ***
150 R = PEEK(-16384): POKE -16368,0: R$ = CHR$(R)
160 IF R$ () "X" THEN RETURN
170 POP: RETURN
199 REM *** FINAL DISPLAY SEQUENCE ***
200 FOR I = 1 TO 10
210     HTAB 2: PRINT"                                  ";
220     GOSUB 30
230     HTAB 2: PRINT"        *** THE END ***        ";
240     GOSUB 30
250 NEXT I
260 RETURN
999 REM *** MAIN PROGRAM BEGINS HERE ***
1000 BH = 30: ML = 26: MH = 29: M = 4
1010 HOME
1020 B$ = "                                ": REM 30 BLANKS
1030 HTAB 32: VTAB 18: PRINT"PRESS ";:FLASH:PRINT"X":NORMAL
1040 HTAB 36:  PRINT"TO"
1050 HTAB 31:  PRINT"CONTINUE"
1060 HTAB 1: VTAB 18: GOSUB 50
1100 M$(1) = "THIS  MESSAGE  DEMONSTRATES  THE  HORIZONTAL  SCROLLING  TEXT  WIN
DOW." + B$
1110 M$(2) = "AS  YOU  CAN  SEE,  A  GREAT  DEAL  OF  INFORMATION  CAN  BE  DISPL
AYED  IN  A  VERY  SMALL  AMOUNT  OF  SCREEN  SPACE." + B$
1120 M$(3) = "THE  MESSAGE  MAY  BE  SCROLLED  A  SINGLE  TIME  ONLY  OR,  AS  I
N  THIS  CASE,  CONTINUOUSLY  UNTIL  A  SPECIFIC  KEY  IS  PRESSED." + B$
1130 M$(4) = "THIS  MESSAGE  WILL  SELF  DESTRUCT  IN  EXACTLY  TEN  SECONDS....
" + B$
1200 VTAB 19: GOSUB 60
1210 GOSUB 200
1220 HTAB 32: VTAB 18: PRINT SPC(7);
1230 HTAB 36: VTAB 19: PRINT "  ";
1240 HTAB 31: VTAB 20: PRINT SPC(8);
1250 VTAB 23: END
```

Listing 3. Program to illustrate the scrolling horizontal window display technique.

dinates, it is necessary to add 1 to them. The following line can accomplish this.

1150 MH = PEEK(36) + 1: MV = PEEK (37) + 1

Later in the program, when you want to reposition the cursor to that location, merely HTAB MH: VTAB MV and the cursor will be in the desired position.

Flash/Inverse/Normal

One very easy way to brighten up screen displays is to make use of the FLASH and INVERSE commands. Try this very simple program:

```
10 HOME: HTAB 19: VTAB 12
20 PRINT "P";: FLASH: PRINT"A";:
   NORMAL
30 PRINT "N"
```

There you have it, a "Flash in the pan!" Notice the use of the semicolons after each of the PRINT commands to suppress line feeds. This allows you to insert the FLASH, INVERSE, or NORMAL commands at will, anywhere in your displayed text.

Once the FLASH or INVERSE commands have been given, everything displayed on the screen from a PRINT or INPUT command will be displayed as flashing or inverse (black on white background) characters. The only way to get back to normal, non-flashing white on black is to execute the NORMAL command.

In addition to using FLASH and INVERSE to emphasize certain elements in your displayed text, the INVERSE command can be used to create boxes and borders on a text screen by printing a blank space while in INVERSE mode. Suppose you wish to underline the word "pan" in the above program. Add lines 40 and 50:

```
40 HTAB 19: VTAB 13
50 INVERSE: PRINT"   ": NORMAL
```

For a different effect, you might substitute "---" or " = = = " for the three blank spaces in line 50.

The example in Listing 2 presents a menu display that uses a subroutine to produce a box around the list of options. The word "choice..." is emphasized by making it flash on the screen. This draws the user's attention to that part of the screen. Some individuals might find such a display distracting, so use the FLASH command with due consideration for the person who is to use the program!

Listing 2 also contains a two-line subroutine (lines 40 and 41) which accepts any string containing less than 40 characters (assigned to L$) and centers the string horizontally on the screen. This can be particularly helpful when displaying short messages or prompts and adds a professional touch. Let the computer do the calculating!

Keyboard Input Routines

The most common Basic command for enabling information to be entered into the computer's data processing cycle from the keyboard is, of course, the INPUT command. In its simplest form, the INPUT statement consists simply of the word INPUT followed by the name of a string or numeric variable. Whenever information is then typed into the keyboard and the return key is pressed, that information is stored in the computer's memory under the name of the specified variable.

In cases where more than one data element is to be entered at a certain time, the INPUT command may be followed by a list of variables, separated by commas. The data entered at the keyboard must correspond in order of entry with the order of appearance of the variables in this variable list. In addition, in this situation it is not necessary to press the return key after each entry. As long as the individual data elements are entered consecutively at the keyboard and separated from each other by commas, the return key need be pressed only once after all of the data elements have been typed in.

For example, if the following INPUT statement were to appear in a program:

```
180 INPUT A, X, A$, M$, F
```



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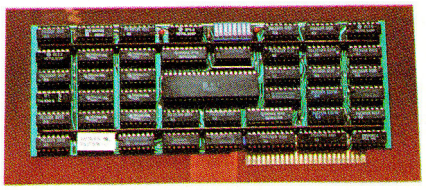

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then the user of the program could type in the five data elements (in the proper order) one at a time, pressing the return key after element has been typed in, or he could type them in as follows:

18,158,HARRISBURG,JASMINE,35625.8

and then press the return key. In fact, any combination of the two approaches would also work.

As you might imagine, the problem with multiple entry INPUT commands is being sure that the appropriate data element is being entered at the correct time so that it corresponds with its own variable name in the input list.

In such situations it is a good idea to include a prompt that will be displayed on the screen immediately before the INPUT statement is executed. A PRINT statement can do the job nicely. For example, with the above set of five data elements we might use the following statement to clarify what input elements were expected, and in what order:

```
170 PRINT "ENTER AGE, WEIGHT, HOME TOWN,"
171 PRINT "MOTHER'S NAME, AND AMOUNT EARNED."
```

On the other hand, simple prompts may be included in the INPUT statement itself, as long as the prompt consists of a single literal string (no variables or multiple strings). The following statement illustrates this function.

```
350 INPUT"ENTER YOUR NAME AND AGE...";N$,A
```

Note that the prompt consists of a single message, enclosed by quotation marks, and that the message is separated from the variables list by a semicolon. The semicolon in this case is required.

In the earlier example in which PRINT statements were used for the prompts, a line feed will occur and the data entered at the keyboard will appear on the line below the displayed prompt with a question mark to elicit a response. In the example in which the prompt is part of the INPUT statement, the cursor will remain on the same line, immediately after the displayed prompt and with no question mark, so that the information typed in by the user appears on the same line on the display. This effect can be achieved using the PRINT statement as well, as long as the statement ends with a semicolon (which suppresses the linefeed) and the INPUT statement is modified to include a " "; (two quotes and a semicolon) between the word INPUT and the variables list.

By using HTAB and VTAB to position the cursor to a desired screen location just before your INPUT command, you can have the data being

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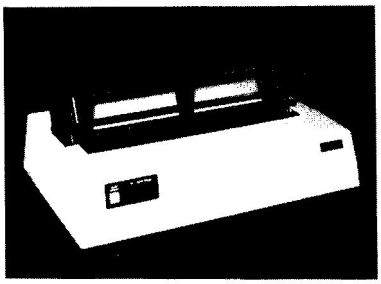

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- C.ITOH F10-55PU & F10-55RU ..... CALL
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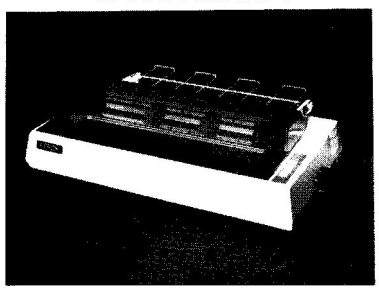

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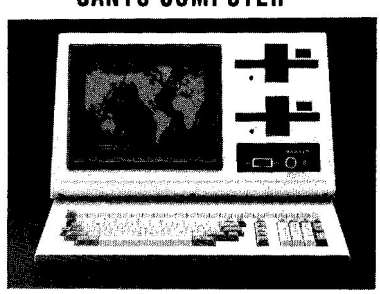

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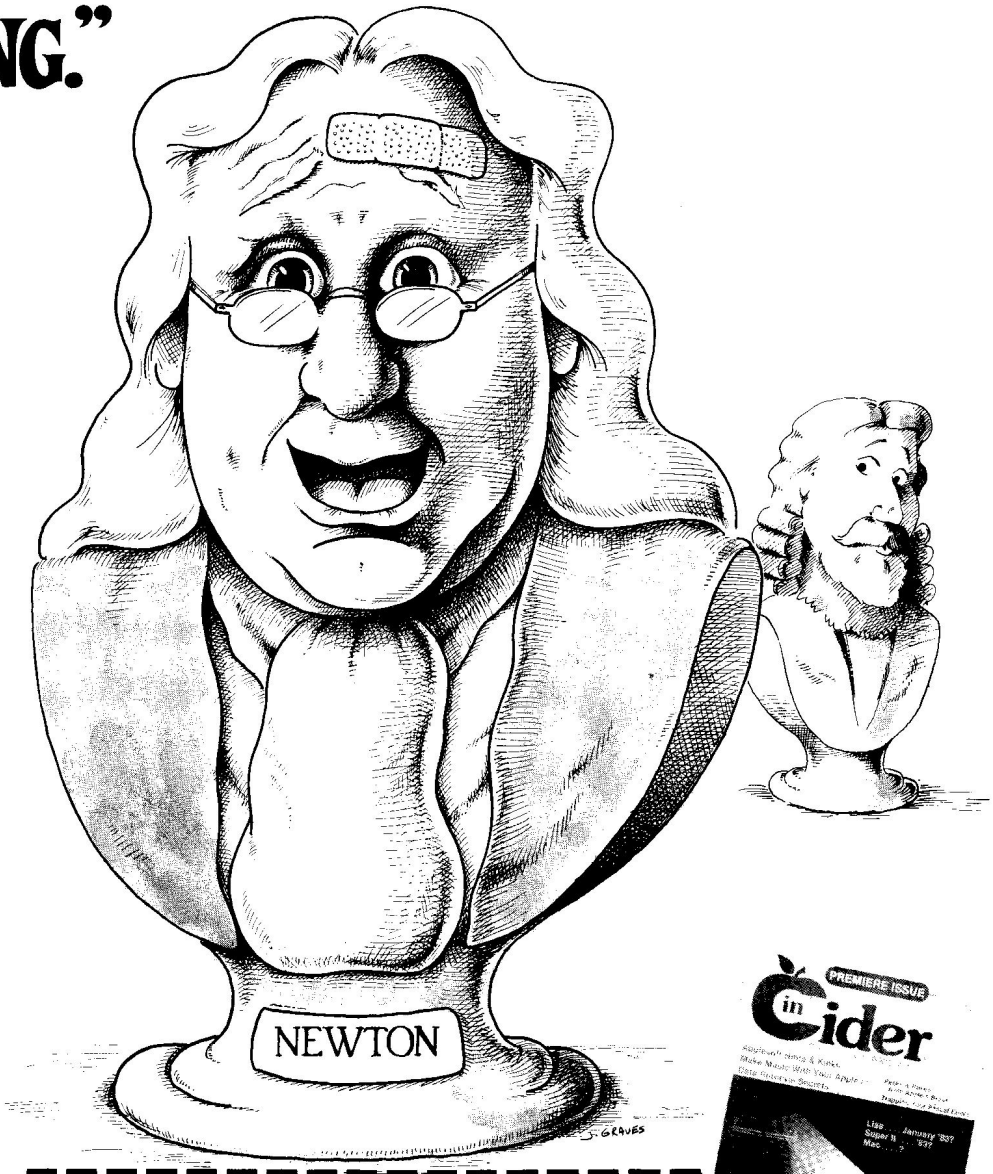

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entered appear at any desired location on the screen.

There are two other methods in Basic for keyboard entry of information that, when used, can give your program a very professional touch. These commands make the computer scan the keyboard to determine if any key has been depressed. In cases where the user responds to a question or command by pressing a single key, these commands have the advantage over the INPUT command in not requiring a press of the return key to signal the computer to continue.

This function is especially useful when the screen is displaying a menu or list of options for the user to choose from. It is also useful in educational programs that are geared toward true/false or multiple choice questions. As long as the user's response can be specified in terms of selecting and pressing a single key, there is no need to use the INPUT statement, and in most cases it should be avoided.

The first of these two functions is the GET command, followed by the name of a single string variable, such as

```
895 GET XZ$
```

With this command in your program the computer will stop executing your Basic instructions when it reaches line 895, and will not resume until some key on the keyboard has been pressed. The identity of the key pressed will be retained in XZ$.

In cases such as this, the programmer usually has in mind only a selected number of acceptable responses. Thus an error trap should be incorporated in the program that will automatically reject unwanted responses. The following short subroutine employs the GET command, and also includes an error trap. Before the subroutine can be used, the program must have assigned RR$ to contain the string of acceptable responses.

```
20 GET R$: POKE-16368,0
21 RR = 0
22 FOR R = 1 TO LEN(RR$)
23 IF R$ = MID$(RR$,R,1) THEN RR = R:
   R = LEN(RR$)
24 NEXT R
25 IF RR = 0 THEN 20
26 PRINT "** "R$" **":RETURN
```

This subroutine will return R$, the actual key that was pressed, and RR, which is the position number that R$ has in RR$. For example, suppose that the display prompt looked like this:

```
ARE YOU MARRIED?  (Y/N)
```

The program must assign the allowed response, Y or N, to RR$; that is, RR$ = "YN". The next instruction will be GOSUB 20. The computer will now accept only Y or N for user response. Any other key that is depressed will be ignored. However, if the user presses N, then the letter N is displayed on the screen and the program continues with the letter N assigned to R$ and the numeric value of 2 assigned to RR. The reason RR has a value of 2 is because N was the second character in RR$. Had the user pressed Y instead, RR would have the value 1.

The value of RR is significant because it can be used in an ON RR GOSUB... statement to get the program to branch to any one of numerous subroutines, depending on the value of RR—that is, depending on the specific key the user pressed. One further aspect of this function is that the menu prompts do not have to be restricted to numbers. They can be set up using letters or other characters which elicit a mnemonic relationship with each option's function—<E>for EDIT, for example. Listing 2 demonstrates the use of this subroutine with a menu display.

The third Basic command for keyboard input also provides response to pressing a single key. It differs from the GET command, however, in that the computer makes only a single keyboard scan and then continues processing, whether a key has been depressed or not. Such a command, when included in a timing loop, can

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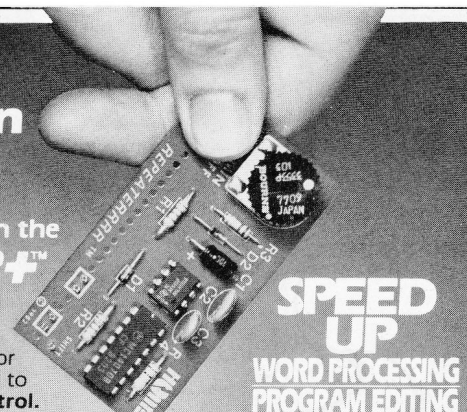

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be used in games or any type of program which requires a response to be made within a given period of time. The command is carried out by peeking at the keyboard input port.

```
1530 R = PEEK(-16284)
1540 POKE -16368,0
1550 R$ = CHR$(R)
```

The value of R will be between 0 and 126 if a key has been pressed, and R$ will have the actual keyboard character itself.

By placing these instructions within a timing loop, the computer will stop momentarily and wait for the user to respond by pressing a key, but will continue once the loop has been exhausted, whether a key has been depressed or not. The following example could be used for this purpose:

```
1530 FOR T = 1 TO 3000
1540 R = PEEK(-16384):POKE-16368,0:
     R$ = CHR$(R)
1550 IF R<127 THEN T = 3000
1560 NEXT T
```

Using this function in place of the GET statement, the programmer could get several menus to display on the screen in sequence, with each menu maintaining its display for a specified period of time before being replaced by the next menu. The cycle could repeat itself continuously until the user pressed a key on the keyboard, at which time the program would break out of the menu cycle and begin performing the chosen subroutine.

With both of these last two functions, the POKE-16368,0 instruction is essential to reset the keyboard strobe once the GET or PEEK instruction has been executed.

The Scrolling Horizontal Window

Listing 3 provides an interesting display technique that you might find useful, particularly in situations where most of the screen is filled with information that you want to keep on display but where you also have a fairly lengthy message or set of instructions to show. This technique could be very useful for "help" instructions in an application program. With this subroutine, it is possible to scroll a message of any length across the screen from left to right along a single line. The effect is similar to that produced by the dynamically updated news displays seen atop some buildings in major cities around the world.

The scrolling message subroutine appears in lines 60 to 140 in Listing 3. This sample program will continue to repeat the message until the X key is pressed (as indicated by the prompt). This single key response routine appears in lines 150 to 170. If you wished to have the message scroll through the display only once, then line 140 should simply be a RETURN and lines 150 through 170 would not be needed.

"The effect is similar to that produced by the dynamically updated news displays seen atop some buildings."

The subroutine expects that all of the message lines to be displayed are contained in the elements of the array M$(i), and that the total number of such messages is M. It also assumes that ML has been given the value that corresponds to the maximum length of that part of the message that will be visible on the screen at any given time (maximum value of 40), and that MH corresponds to the horizontal row on the screen (1 to 24) in which the message is to appear. In addition, the subroutine uses H, I, J, and T internally, while the single key response routine uses R and R$.

This program produces a box on the screen and displays the message inside the box. Of course, the box is purely optional. Line 60 initializes H, which will keep track of the number of characters currently allowed on the screen (starting with 1 and reaching a maximum value of ML) and the position on the line where the message display should begin. The specific part of the message on display at any moment is determined by the MID$ function in line 80. The timing loop in line 100 is necessary to slow down the scrolling rate so the letters are visible to the average reader. Finally, the POP command in line 170 makes the computer delete the RETURN address of the scroll subroutine. This makes the following RETURN go back to the main program, which occurs only when the X key has been pressed.

The speed at which the text scrolls across the screen is controlled by line 100. However, many video displays have a longer lasting phosphor image. On these displays, it may be that a comfortable rate of scrolling (for reading purposes) might be too fast for the phosphors to sufficiently recover. Another helpful hint is to double space between all words in the message.

Text windows can also be created on the screen using the POKE commands that specify window size and location. This allows you to set up a static screen display and then have instructions, data or other information scroll upward within a box or window set into the display. Basically, the computer thinks that the window you have defined is the extent of the available display for PRINT and INPUT statements. I will cover window use in a later installment.

Conclusion

Sorry about there being no graphics in this article, but I trust you have been reading *inCider* carefully and have already picked up some useful graphics routines. I really will try to get into elementary graphics concepts in the next issue.

For those of you who have written to me personally requesting reprints, I must ask you to direct your requests to *inCider*. They have the facilities and wherewithal to keep up with the demand. Besides, they hold the copyright. . . .

But please keep my in box full with your comments, hints and suggestions. I do try to answer each letter personally (eventually). I have yet to round-file anyone's correspondence. In the meantime, "Keep hackin'!" ■

Bent on Business

by Gregory R. Glau

Socrates lives!

When Socrates was still around, he asked so darn many questions that someone finally slipped him a cup of hemlock...

Well, okay, I'll admit that he wasn't done in just because he asked all those questions, but the fact remains, when we think of a question-and-answer way of doing something, his name comes to mind.

And it seems to me that in this computer business of ours we have all sorts of answers but perhaps not enough of the *right questions.*

Every software vendor—in his ads and his literature—proclams what he sells is the very best for almost every application under the sun. His literature lists speed and capacity and entry time and printing ability and character length—most everything but volume and remote control.

By the time we wade through all the product information and specification sheets, we just don't know what to buy.

The problem is we often don't know the proper questions to ask. And we simply can't expect the right answers unless we ask the right questions.

So I'd like to dedicate this month's column to that old Greek philosopher, and hope I can suggest some intelligent questions you might want to ask your software vendor, some ideas besides the usual ones, all to make sure you pick the right product before you sign the check.

With so many products available, I obviously can't know what you happen to need, so I'll break things down into a few categories along with their appropriate questions. By the way, if the guy at the computer store asks you any of these questions, stick with him: you've found a jewel!

Even if you can't use these suggestions, if they just get you to come up with some good questions that fit your specific situation, that's good. I'm concentrating on what the businessperson may consider peripheral programs—things over and above run-of-the-mill accounting systems (accounts payable, general ledger, accounts receivable, etc.). This other type of program is often more difficult to choose because, while you may understand (at least generally) your company's accounting methods, you may never have done a manual payroll, have never even used a card-file database system, and so on.

Of course, some questions fit any program you're considering, like, "Can anyone understand the manual?" You almost have to spend some time looking through the program documentation to answer that. Some manuals are terrific—with lots of easy examples to help you learn. Other manuals are complex and designed for the programmer.

Who'll use this software in your business? That person or persons will have to read—and grasp the information in—the instruction manual. Spend a half hour at your local store, browsing through the manual of any program before you buy it. Can you understand it? If not, why not?

This same concept applies to what you see on the screen during the program. Are the screen displays friendly? Nobody wants incomprehensible displays. An example of a poor menu is shown in Figure 1.

What you *should* see is a display anyone can understand, like Figure 2.

Obviously, you'll have to try the program to see what sort of displays you'll get. Run through the menus inside the system and see if you understand what they say.

Along this same line, it never hurts to ask for the names of a few businesspeople who've brought this program. Call them up. Ask them how the program works for their business. "Any problems? Any disasters? Is it easy? Hard? Good? Bad? Can anyone run it? Why/why not? Would you buy it again? Why/why not?" Don't a few phone calls make sense *before* you spend a couple of hundred dollars?

Now let's take a look at a couple of program categories and some pertinent questions.

Database Programs

These are among the hardest sys-

Address correspondence to Gregory R. Glau, PO Box 1627, Prescott, AZ, 86302.

```
(EC)  ESC WILL CREATE A NEW CODE 2 FILE
(CT)  CTRL+4 FORMATS PRINT FOR CMD. FILE
(RN)  RENUMBERING WILL OCCUR AT LEVEL 17
SELECT NOW....
```

Figure 1.

```
1. MAKE A NEW FILE, FOR NEW DATA
2. PRINT ANY OR ALL DATA
3. CHANGE KEY NUMBERS FOR FASTER ACCESS
SELECT HERE --->....
```

Figure 2.

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"But if you have done manual payroll you can appreciate what drudgery it is..."

tems to select, because you have to predict accurately what information you'll need, and how much data you'll want to have available, in the future. So you'll first want to ask, "Are the file records expandable? What's the procedure for doing this? Do I have to make a new file and merge the old data into it? How difficult is this process? How much time does it take?"

You should also ask, "Can I delete fields and/or records? How easily? How quickly?"

And the obvious: "How much information can the system hold? How long can the records be? How many per disk? Can I gather information for reports from disk-to-disk?"

Once you have this knowledge, you can judge how a particular program will fit your business, and if it will let you grow.

You'll also want to ask about error-trapping: "Can the data fields, where I'll keep information, be set up so whoever enters the data will be forced to put it into the right format? In other words, can I tell the program to accept only a number for this field and only a phone number for that field and only 7 digits for the next field? What happens if someone tries to enter too much information? Will the program reject it (right answer) or accept it and overwrite other data (wrong answer)?"

"How fast can errors be corrected? Is it easy to fix something? Is there an edit mode that helps this process? Are the error-checks for field length and data type still on-line when I edit?"

"Can the program do math and/or tabular reports if I need them?"

The end products of any database program are the reports you get from the system. In addition to the obvious questions about searching ability and individualized report printing, you may also want to ask, "Can I print an entire file?" That may seem silly, but some programs won't. "How hard are the reports to design? Can I search using multiple criteria? Can I search on more than one field at a time? How hard are the searches to set up? Can I save and reuse search patterns after I've designed them? Can I print the search criteria for reference? How flexible are the reports? How easy is it to put just one summary on a page? Will the software automatically skip page perforations as it prints?

Payroll

For the businessperson who's never computed payroll by hand, made sure everything balances, written the checks, and so on, a payroll program may not seem all that important. But if you *have* done manual payroll, you can appreciate what drudgery it is, and how your Apple can really help.

Some obvious questions associated with any payroll program are: "Can it handle the number of employees we're liable to have in the future? Will it compute state tax deductions correctly? Is it able to make all of the appropriate deductions (insurance, uniforms, tools, etc.)? Can it cope with special payroll situations (bi-weekly salary or commission payments)?"

"What about updates?" The tax laws are always changing, so you know you're going to need them. "How much do they cost? What's the procedure? Do I have to send our disks in to the company? Will we be able to do payroll in the meantime?"

"Has the software company been in business long enough so we feel confident they'll be around to update our program?"

The secret here is to list your own requirements and make sure any program you consider can handle them.

But there are also a lot of things connected with a payroll system that may not come to mind, and these are areas where you should look for really helpful questions to make sure a particular payroll system can do what you need it to.

What about those extra checks that pop up now and again? "Tony back in delivery starts his vacation tomorrow, and has to have his vacation pay today. Can this program handle that?"

"What if our Apple is printing statements, and I get really mad and fire someone on the spot? Could I write that final check by hand and enter just the data into the payroll system? Will the program produce duplicate checks if we need them?"

One question that must be asked is, "What if something doesn't balance? Does this program still accept and save the data? Does it indicate that something's wrong? Or will it reject any out-of-balance entries?" There needs to be some way to let you (or whoever does your payroll) know if a mistake's been made.

"Will this system give us all the reports our accountant needs, in a format he can use?" Take some sample printouts to your accountant and ask. "Can we change report formats? How hard/easy is it?"

Payroll, unlike, say, word processing, is pretty straightforward: it either can do what you need it to, or it can't. Period.

Make arrangements with your local computer store to bring in some (sample) payroll information and run the program(s) you're considering. You can use blank paper for the reports and checks—the idea is to see how the system works and if it will do what you need. Throw every deduction and unusual situation you can think of at the program(s). Plan to spend a couple of hours and actually do a payroll. You'll know then what system will work for you.

Word Processing.

My last topic. This software can be as simple or complex as you want.

Consider WP as a fancy term for better paper handling. And the first step is to think about—and list—the paperwork you do now.

Do you write specification sheets? Quotations? Letters? Long documents? Should the WP program interface with your database program and/or accounting system, so you can send sales letters or past-due notices to selected customers?

Who will use your Apple for word processing?

"Will a particular program work with any of the spelling-checker programs on the market?" Your spelling may be terrific, but on an important quotation, you want it perfect. A program to check your spelling will help ensure that.

As always, the first step is to examine the program manual. Most are

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"At least one program I can think of is almost unreadable in uppercase."

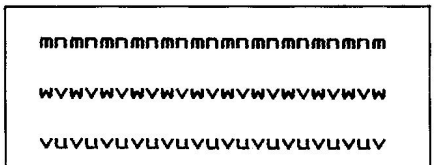

Figure 3.

in tutorial form now, with lots of examples to help us learn. And many come with practice text on their program disk, with instructions in the manual on how to fix it up as you learn the system. This is very helpful.

"How fast does the program load?" If you're writing a book, a minute to load doesn't mean much. If you want to knock out a brief memo, a slow-loading program will send you back to the typewriter.

And the basic question: "How easy is the system to use? Can anyone learn it?" The person at the computer store who helps you will be able to give you a pretty good idea. But remember that your dealer will have a particular program s/he is familiar with and likes best; it may or may not be ideal for you.

Coupled with that, "Is it menu-driven, at least in part?" Generally, programs with a lot of menus are easier to learn than command-driven programs, which require that you memorize (or refer to on a little card) any number of commands.

Almost any word processing program will have some commands you'll use inside your text. But the easier ones will have a series of menus that move you around inside the program, to guide you on how to save text, to print it, to change margin settings, adjust page length, and so on.

Once you look at the manual, you need to spend some time with any program you've got in mind, to try it.

"How easy is it to enter text? How fast? Can I overtype it? Does it have word-wrap, so that a word too long to get on a line will automatically move to the following line?"

A lot of how you approach a program depends on your own writing style. For instance, some programs are great when it comes to entering text, but make it difficult to edit. If you don't make a lot of changes and/or corrections in your work, they'll suffice. If you do edit heavily, a program that lets you move around the screen fast and easily is a blessing.

Other things to check as you work with the program are block moves and text insertion. "How easy/hard is it to move an entire block of text to another location? How large a block can I move? Does there have to be a blank spot in the text to accept the new paragraph? How easily and fast can I open up blank lines to insert more text? Does the text in front of the insertion move forward slowly, character-by-character?"

"Can I merge one file with another? Can I merge a file only onto the end of another, or can I insert it anywhere in the text? Can I merge just part of another file?"

"Where on the screen will text appear? At the bottom (characters are sometimes hard to read there)? Can I page through text quickly, both forward and backward?"

You already know your Apple will display only 40 characters across your screen. Apple word processing programs have to live with this limitation, unless you buy an 80-column board, or a program that *generates* its own upper and lowercase characters.

The best advice anyone can give you in this regard is to try any program before you buy it. Spend a half-hour entering text. Let the salesclerk at the computer store show you a few editing commands (how to delete a character, how to insert lines, etc.) and then just write.

If you use the regular Apple display, do you mind that everything is in uppercase? If you use one of the programs that generates its own characters, how do they look? Can you read them? Do you think you'll still be comfortable with them a month from now?

Especially check the difference between similar characters; write lines like those shown in Figure 3 and see what you think.

"Are these readable? Can you tell the *m* from the *n*, the *v* from the *w*? Are they hard on your eyes?" Some programs have better character generators than others. And look at a few lines in uppercase. At least one program I can think of is almost unreadable in uppercase.

"How much text, in pages, can a program store in memory at one time? Does it automatically put the text onto the disk? How often? Do I control these disk dumps, or does the program?"

"Can the program do a search and replace? Is it automatic or manual? Can it distinguish between a single word (like Pearl) and a part of *another* word (like Pearltown)?" Try search and replace a few times for any program you're considering.

Finally, ask if the program will work with an 80-column board. For any serious writing, you'll almost have to have one. And before you buy that, too, try it—see how you like its characters.

Apple, by the way, has two 80-column boards of their own just out on the market. However, they're only for the new Apple IIe system. But if you're about to buy your first Apple, check into the IIe and its 80-column cards.

The end result of all this is what you get on paper, of course. "Can I see on the video screen what the final printout will look like before I print it?

"Is it easy to get a printout? Will the program interface properly with the printer I have or want to buy? Do I have to load a separate program before I can print or is the printing section part of the main menu?"

"Can I print just one page at a time? How about a series of pages? Can I print more than one copy of a document? Can I stop the printer in midstride if I need to? How do I let the printer know that I want *italics*, or special characters?"

Tired of questions? Just remember the guy who had the reputation of always answering a question with a question. One day someone asked him why. He thought for a moment, looked at his questioner and said, "Well, why not?"

Keep the spirit of Socrates alive with your questions. Of course, once you're at your local store and start asking this and that, don't drink anything they hand you... ■

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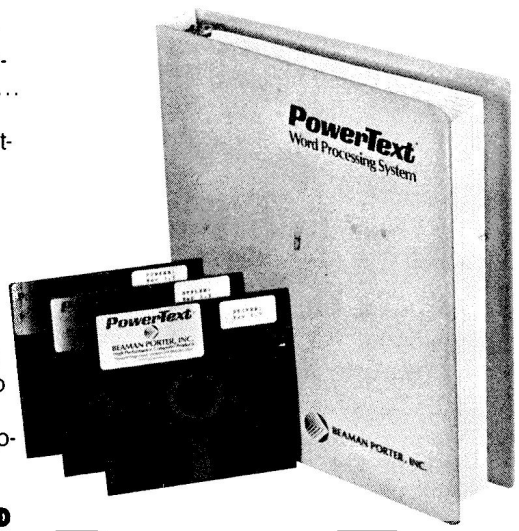

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The Assembly Advantage

by Randy Hyde

Instruction Primer

In order to write programs in 6502 assembly language a considerable amount of seemingly unrelated background knowledge is required. The major purpose behind the SPEED/ASM package is to reduce the amount of that knowledge necessary to write useful programs. Mind you I said reduce, not eliminate. With this third installment of my column I will finish up most of the necessary background material so you can begin writing reasonable machine language programs. This article should also help tie up loose ends from the first two articles.

An Introduction to 6502 Assembly Language

You cannot properly program using SPEED/ASM without at least a little understanding of 6502 machine code. SPEED/ASM's purpose, as stated above, is not to eliminate the need for machine code, but to make the more difficult tasks easier. With this thought in mind it's time to introduce you to the simpler 6502 instructions.

The LDA Instruction

The LDA (load accumulator) instruction is easily the most used instruction on the 6502. It copies the contents of one of the 65,535 memory locations the 6502 can address into a special memory location called the accumulator. This memory location is found *inside* the 6502 chip. Storage cells located inside the processor chip are usually called registers.

The accumulator in the 6502 is where most of the action takes place. Numbers are added together in the accumulator, strings are compared using the accumulator, logical operations are performed by the accumulator, and more. Typically, a value is loaded into the accumulator using the LDA instruction and then that data is operated on using one of the 6502's arithmetic or logical operations. Consequently, the LDA instruction is usually the first instruction of any computational sequence that is executed.

There are several ways the accumulator can be loaded: with a constant, from a variable, from a string, or indirectly through a pointer. For the time being we will concern ourselves with the first two *addressing modes*, loading the accumulator with a constant and loading it from a variable.

Constants are specified by prefacing them with the pound sign, #. For example, to load the accumulator with 55 you would use the instruction:

```
LDA #55
```

There is one limitation on a constant you load into the 6502 accumulator—it cannot be greater than 255 or less than 0. The range limitation is due to the 8-bit size of the 6502 accumulator. Attempting to load a value larger than 255 will yield the result <value> MOD 256. For example:

```
START   LDA   #"C"
        STA   CHR
        JSR   LOAD
        ADR   0,INT
;
; Print the character onto the screen
; as an ASCII character
;
        LDA   CHR
        JSR   PUTC
;
; Transfer the character to INT and
; print its ASCII code as a decimal
; value.
;
        LDA   CHR
        STA   INT
        JSR   PRTINT
        ADR   INT
;
; Load CHR with the value 204
; and then print CHR on the screen
; as an ASCII character.
;
        LDA   #204
        STA   CHR
        LDA   CHR
        JSR   PUTC
```

Listing 1. SPEED/ASM program segment demonstrating the relationship between characters and their standard ASCII codes.

```
EXIT      EQU   $FF59
;
READLP    JSR   GETC
          CMP   #CR        ;Constant declared in SPEED/ASM.EQUATES.
          BEQ   ALLDONE
          JSR   PUTC
          JMP   READLP
;
ALLDONE   JMP   EXIT       ;Return to Apple monitor.
```

Listing 2. Sample application of BEQ branch instruction.

Address correspondence to Randy Hyde, 925 Lorna St., Corona, CA 91720.

```
;
; To emulate the statement
;
;    C$ = CHR$(I)
;
     LDA   I
     ORA   #$80     ;Set the H.O. bit to one.
     STA   C
;
;
; To emulate the statement
;
;    I = ASC(C$)
;
     LDA   C
     AND   #$7F     ;Set H.O. bit to zero.
     STA   I
     LDA   #0       ;Clear the H.O. byte of the
     STA   I+1      ;integer variable.
```

Listing 3. Code sequences to implement Applesoft CHR$ and ASC instructions. Applesoft utilizes a non-standard 0–127 range for its ASCII codes.

LDA #305

loads the accumulator with 49 (305 MOD 256 is 49). If you need to handle numbers too large for 8 bits you have to split the operation into two segments, the first handling the *low order byte* of the computation and the second handling computation of the *high order bytes*.

The integer values used by the SPEED/ASM package require 2 bytes to represent values in the range 0 to 65535 or (more commonly) signed values in the range −32768 to 32767. The pound sign operator lets you load the low order byte of a constant into the accumulator. To get the high order byte of a constant into the accumulator the slash, /, operator is used. The instruction:

LDA /305

loads the high order byte of 305 (which is 1) into the accumulator.

To load a negative decimal value into the 6502 accumulator preface the negative number with an exclamation point (LISA 2.5 users only). For example, to load the accumulator with the low order byte of −465 you would use the instruction:

LDA #! − 465

To load the accumulator with the high order byte of −465 the instruction:

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LDA /! – 465

is used.

To load a character constant into the 6502 accumulator follow the pound sign with the character you wish to load, enclosed by quotes. To load the character c into the accumulator you could use the instruction:

LDA #"c"

Do not use a slash—that will always put 0 into the accumulator. Normally a character is enclosed by quote marks. If you enclose it in apostrophes the high order bit of the character will be set to 0. Since the Apple normally likes its characters to have the high order bit set to 1 you should always enclose a character in quotes.

Next to loading a constant into the accumulator, loading the contents of a memory location is the most important function. To load the accumulator with the contents of a memory location specify the address of that location after the LDA instruction. To load the low order byte of the variable I into the accumulator you would use the instruction:

LDA I

If you inadvertently type a pound sign in front of I, the low order byte of the *address* of I will be loaded into the accumulator. Likewise, prefacing the I with a slash loads the high order byte of the address of I into the accumulator. If you want to load the high order byte of the variable I into the accumulator the instruction:

LDA I + 1

is used.

The STA Instruction

The second most popular instruction is STA. It stores a copy of the accumulator into a memory location. To use the STA instruction follow STA with the address of the variable you wish to store the accumulator into. For example the instruction:

STA I

stores the contents of the accumulator into the low order byte of variable I. If I is an integer variable, you can store the accumulator into the high order byte using the instruction:

STA I+1

The LDA and STA instructions can be combined to move data around in memory. The SPEED/ASM MOVE subroutine copies a 2-byte integer value from one variable to another. The calling sequence for MOVE is:

```
JSR  MOVE
ADR  VAR1,VAR2
```

MOVE transfers the 2 bytes at address VAR1 to the 2 bytes at address VAR2.

This action is easily simulated using the 6502 assembly sequence:

```
LDA  VAR1
STA  VAR2
LDA  VAR1+1
STA  VAR2+1
```

This short piece of 6502 code loads the 2 bytes at addresses VAR1 and VAR1+1 and stores them at addresses VAR2 and VAR2+1. Note that the accumulator contains the value in VAR1+1 (and VAR2+1) at the end of this code sequence.

Incidentally, the LDA/STA sequence above doesn't *exactly* duplicate the operation of the MOVE subroutine. A call to MOVE requires only 7 bytes of program memory space, while the LDA/STA sequence uses up 12 bytes. Furthermore, MOVE doesn't affect the contents of the 6502 accumulator, whereas the LDA/STA sequence does. Whatever value the accumulator contained before the execution of the sequence is lost, replaced by the same value as VAR1+1. Finally, MOVE executes quite a bit more slowly than the straight LDA/STA sequence.

If speed is the overriding consideration *and* the call to MOVE is deeply buried within a loop, you should recode the JSR MOVE instruction using the LDA/STA sequence. For most purposes, however, the call to MOVE is better since it is shorter and it doesn't affect the accumulator. The speed difference is usually insignificant, unless, as mentioned, MOVE is buried deep inside nested loops. After all, few humans can tell the difference between 16 and 100 microseconds.

Although the MOVE routine should be used to copy the contents of one integer variable to another, copying a character variable is best handled with the LDA/STA sequence. If you recall the discussion in the first part of this series, I mentioned that character variables only require 1 byte of storage. Since the 6502 accumulator is 8 bits wide it can easily accommodate a character value. If you want to copy the contents of character variable CH1 to character variable CH2 you should use the code:

```
LDA  CH1
STA  CH2
```

While on the subject of character and integer variables, I should mention two functions in Basic that everyone seems to love: CHR$ and ASC. SPEED/ASM has no equivalent for these functions because they aren't needed. The 6502 treats *everything* as an integer. Only the programmer distinguishes between character and numeric data. The SPEED/ASM program segment in Listing 1 demonstrates this relationship. It prints the string C195L on the screen. Since the high order bit of all character values is set, characters are represented by the decimal values 128–255. As you can see, the interpretation of data stored in the 6502's memory space is left to the user. At any one time the value in a memory cell could contain character, numeric, Boolean or some other data representation.

The CMP Instruction

The CMP instruction is used to *compare* the accumulator to a memory location or to a constant. It affects bits within another register inside the 6502 chip called the *processor status register* (or PSR). The exact definition of these bits is unimportant for now. What is important is that these bits can be tested with a set of 6502 *branch* instructions. The CMP instruction, combined with the branch

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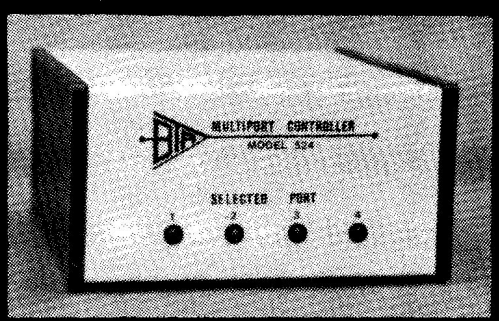

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instructions, simulates the IF..THEN ..ELSE statements found in high level languages.

To compare the accumulator to a constant value, use the pound sign or slash operator after the CMP instruction. A code segment to compare the value in CHR to the character value X is:

```
LDA  CHR
CMP  #"X"
```

This fetches the value in CHR, loads it into the accumulator and then compares the accumulator to the character X.

To compare two character variables load the accumulator with the first and compare it to the second by specifying the address of the second after the CMP instruction—for example:

```
LDA  CHR1
CMP  CHR2
```

What you do after a comparison is next on the list...

The Branch and JMP Instructions

Once a comparison is performed, a program typically wants to execute one section of code if the condition was met, and execute a second section (or just skip over the first) if the condition was not met. Transfer of control after a CMP instruction is handled by the branch instructions on the 6502.

"JMP unconditionally transfers control to the address specified in the operand field—almost exactly like the GOTO statement in Basic."

The first instruction to consider, however, is not a branch at all, but the JMP (jump) instruction. JMP *unconditionally* transfers control to the address specified in the operand field—almost exactly like the GOTO statement in Basic. The only difference is that you must specify a statement label rather than a line number in the operand field. The following program segment continually writes the character A to the screen:

```
LOOP  LDA  #"A"
      JSR  PUTC
      JMP  LOOP
```

The branch instructions transfer control to a target label if and only if a certain condition exists. Although, under certain circumstances, a branch instruction may appear almost anywhere in a program, for now you should only place branch instructions *immediately* after a CMP instruction.

The BEQ/BNE Instructions

The BEQ (branch if equal) and BNE (branch if not equal) instructions are used to test for equality and inequality. If a BEQ instruction follows a compare instruction, then control is transferred to the target label if the accumulator equals the value it was compared to. If the value in the accumulator is not equal to the value specified after the CMP instruction, then the BEQ instruction is ignored and control is transferred to the next

Listing 4. Sample program demonstrating several character variable manipulations using SPEED/ASM.

```
0800              1          TTL "SPEED/ASM Sample Program
0800              2  ;
0800              3  ;
0800              4  ;
0800              5  **********************************
0800              6  *                                *
0800              7  *       SPEED/ASM Equates        *
0800              8  *                                *
0800              9  **********************************
0800             10  ;
0800             11  ;
0800             12  ;
0800             13  ;
0800             14  ;
0800             15  ;
0800             16  ;
0800             17  ;
0800             18  ; GENERAL PURPOSE EQUATES
0800             19  ;
0800             20  ; The following variables are used
0800             21  ; by the SPEED/ASM package and
0800             22  ; shouldn't be used by the SPEED/ASM
0800             23  ; programmer.
0800             24  ;
0800             25  ;
0800             26  ;
0800             27  ;
0000             28  FORASAV  EPZ 0
0001             29  FORXSAV  EPZ FORASAV+1
0002             30  FORYSAV  EPZ FORXSAV+1
0003             31  FORZPG   EPZ FORYSAV+1
0005             32  DESTADR  EPZ FORZPG+2
0007             33  PTRADR   EPZ DESTADR+2
0009             34  ISIMMED  EPZ PTRADR+2
000A             35  OP       EPZ ISIMMED+1
000C             36  MAXLEN   EPZ OP+2
000D             37  VALUE    EPZ MAXLEN+1
000F             38  DIGIT    EPZ VALUE+2
0010             39  LEAD0    EPZ DIGIT+1
0011             40  JMPADR   EPZ LEAD0+1
0013             41  COUNT    EPZ JMPADR+2
0014             42  GOTLN    EPZ COUNT+1
0015             43  LINEINDX EPZ GOTLN+1
0016             44  SIGN     EPZ LINEINDX+1
0017             45  ACL      EPZ SIGN+1
0018             46  ACH      EPZ ACL+1
0019             47  XTNDL    EPZ ACH+1
001A             48  XTNDH    EPZ XTNDL+1
001B             49  AUXL     EPZ XTNDH+1
001C             50  AUXH     EPZ AUXL+1
0800             51  ;
0033             52  PROMPT   EPZ $33
004E             53  RNDL     EPZ $4E
004F             54  RNDH     EPZ $4F
0100             55  STACK    EQU $100
0200             56  INPUT    EQU $200
0800             57  ;
0800             58  ;
0800             59  ;
0800             60  ;
0800             61  ;
0800             62  ;
0800             63  ;
0800             64  *************
0800             65  * CONSTANTS *
0800             66  *************
0800             67  ;
0800             68  ;
0800             69  ;
```

Listing continued.

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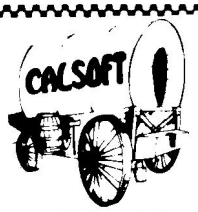

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BEQ DEST ;(BFL)	BNE L1 (BTR) JMP DEST L1:
BNE DEST ;(BTR)	BEQ L2 (BFL) JMP DEST L2:
BMI DEST	BPL L3 JMP DEST L3:
BPL DEST	BMI L4 JMP DEST L4:
BCS DEST ;(BGE)	BCC L5 JMP DEST L5:
BCC DEST ;(BLT)	BCS L6 JMP DEST L6:
BVS DEST	BVC L7 JMP DEST L7:
BVC DEST	BVS L8 JMP DEST L8:

Table 1. Long branch code sequences.

instruction sequentially following the BEQ instruction in the source file. The program in Listing 2 reads a character from the keyboard and prints it until a carriage return is read.

The BNE instruction branches to the target location if the contents of the accumulator is *not* equal to the value being compared to.

The BCS (BGE)/BCC (BLT) Instructions

The BCS (branch if carry set) and BCC (branch if carry clear) instructions are used after a comparison to see if the value in the accumulator is greater than or equal to the value in the CMP operand field, or if the accumulator is less than the CMP operand. As a mnemonic aid, the LISA assembler lets you substitute BGE and BLT (branch if greater than or equal and branch if less than) for BCS and BCC.

The BVS and BVC Instructions

The BVS instruction branches to the target label if the 6502 overflow

Listing continued.

```
0800            70  ; The following symbols are constants
0800            71  ; for the values "FALSE", "TRUE", and
0800            72  ; Carriage Return (respectively).
0800            73  ;
0800            74  ; These symbols should only appear
0800            75  ; as immediate operands to a 6502
0800            76  ; instruction or in the operand field
0800            77  ; of a pseudo-opcode like BYT.
0800            78  ;
0800            79  ;
0800            80  ;
0800            81  ;
0800            82  ;
0000            83  FALSE     EQU 0
0001            84  TRUE      EQU 1
008D            85  CR        EQU $8D
0800            86  ;
0800            87  ;
0800            88  ;
0800            89  ;
0800            90  ;
0800            91  ;
0800            92  ; "IF" STATEMENT EQUATES
0800            93  ;
0800            94  ; The following symbols should only
0800            95  ; be used in the ADR pseudo-opcode
0800            96  ; following a call to the SPEED/ASM
0800            97  ; IFx routines.
0800            98  ;
0800            99  ;
0800           100  ;
00BD           101  EQ        EQU "="
00A3           102  NE        EQU "#"
00BE           103  GT        EQU ">"
00BC           104  LT        EQU "<"
BDBE           105  GE        EQU ">"|"="*256
BDBC           106  LE        EQU "<"|"="*256
0800           107  ;
0800           108  ;
0800           109  ;
0800           110  ;
0800           111  ;
0800           112  ;
0800           113  ;
0800           114  ************************
0800           115  * SPEED/ASM ENTRY POINTS *
0800           116  ************************
0800           117  ;
0800           118  ;
0800           119  ;
0800           120  ;
0800           121  ; NOTE: THE EQUATE OF PUTC MUST
0800           122  ; BE CHANGED IF YOU RELOCATE
0800           123  ; SPEED/ASM TO SOME LOCATION
0800           124  ; OTHER THAN $7800
0800           125  ;
0800           126  ;
0800           127  ;
7800           128  PUTC      EQU $7800
7803           129  GETC      EQU PUTC+3
7806           130  SAGL      EQU GETC+3          ;FOR USE BY S/A ONLY- SEE DOC.
7809           131  SAPC      EQU SAGL+3          ; "  "  "  "  "  "  "  "
780C           132  HOME      EQU SAPC+3          ;HOME AND CLEAR
780F           133  READLN    EQU HOME+3
7812           134  INIT      EQU READLN+3
7815           135  FOR       EQU INIT+3
7818           136  FOR0      EQU FOR+3
781B           137  NEXT      EQU FOR0+3
781E           138  IFI       EQU NEXT+3
7821           139  IFI0      EQU IFI+3
7824           140  IFS       EQU IFI0+3
7827           141  IFS0      EQU IFS+3
782A           142  MOVE      EQU IFS0+3
782D           143  LOAD      EQU MOVE+3
7830           144  MOVS      EQU LOAD+3
7833           145  LDSTR     EQU MOVS+3
7836           146  PRINT     EQU LDSTR+3
7839           147  PRTSTR    EQU PRINT+3
783C           148  PRTINT    EQU PRTSTR+3
783F           149  RDSTR     EQU PRTINT+3
7842           150  RDINT     EQU RDSTR+3
7845           151  ONXGOTO   EQU RDINT+3
7848           152  CASE      EQU ONXGOTO+3
784B           153  CASEI     EQU CASE+3
784E           154  INSET     EQU CASEI+3
```

Listing continued.

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Listing continued.

```
7851            155  NOTINSET EQU INSET+3
7854            156  ABS      EQU NOTINSET+3
7857            157  NEG      EQU ABS+3
785A            158  MUL      EQU NEG+3
785D            159  DIV      EQU MUL+3
7860            160  MOD      EQU DIV+3
7863            161  RND      EQU MOD+3
7866            162  SUBSTR   EQU RND+3
7869            163  INDEX    EQU SUBSTR+3
786C            164  LENGTH   EQU INDEX+3
786F            165  CONCAT   EQU LENGTH+3
7872            166  GETWZPG  EQU CONCAT+3        ;USED BY SPEED/ASM
7875            167  RDFP     EQU GETWZPG+3
7878            168  PRTE     EQU RDFP+3
787B            169  PRTF     EQU PRTE+3
787E            170  FADD     EQU PRTF+3
7881            171  FSUB     EQU FADD+3
7884            172  FMUL     EQU FSUB+3
7887            173  FDIV     EQU FMUL+3
788A            174  FLT      EQU FDIV+3
788D            175  FIX      EQU FLT+3
7890            176  FNEG     EQU FIX+3
7893            177  FADDTN   EQU FNEG+3
7896            178  FSUBTN   EQU FADDTN+3
7899            179  FTIMES   EQU FSUBTN+3
789C            180  FINTO    EQU FTIMES+3
789F            181  IFF      EQU FINTO+3
78A2            182  MOVFP    EQU IFF+3
0800            183  ;
0800            184  ;
0800            185  ;
0800            186  *********************************
0800            187  *                               *
0800            188  * SPEED/ASM Sample program #3:  *
0800            189  *                               *
0800            190  *   This program demonstrates   *
0800            191  * some 6502 code that is neces- *
0800            192  * sary for writing SPEED/ASM    *
0800            193  * programs.  In particular it   *
0800            194  * demonstrates how one handles  *
0800            195  * character variables in a      *
0800            196  * SPEED/ASM program.            *
0800            197  *                               *
0800            198  * Assembler: LISA 2.5           *
0800            199  * Requires SPEED/ASM package.   *
0800            200  * Randall Hyde                  *
0800            201  *                               *
0800            202  *********************************
0800            203  ;
0800            204  ;
0800            205  ;
0800            206  ;
0800            207  ;
FF69            208  EXIT     EQU $FF69           ;Entry point to Apple monitor
0800            209  ;
0800            210  ;
0800            211  ;
0800 20 12 78   212           JSR INIT            ;Initialize SPEED/ASM
0803            213  ;
0803            214  ;
0803 20 0C 78   215           JSR HOME            ;Clear the screen
0806 20 36 78   216           JSR PRINT
0809 8D 8D B6   217           BYT CR,CR,"6502--SPEED/ASM test program"
080C B5 B0 B2
080F AD AD D3
0812 D0 C5 C5
0815 C4 AF C1
0818 D3 CD A0
081B F4 E5 F3
081E F4 A0 F0
0821 F2 EF E7
0824 F2 E1 ED
0827 8D 8D      218           BYT CR,CR
0829 C1 D3 C3   219           BYT "ASCII Character Set table",CR
082C C9 C9 A0
082F C3 E8 E1
0832 F2 E1 E3
0835 F4 E5 F2
0838 A0 D3 E5
083B F4 A0 F4
083E E1 E2 BC
0841 E5 8D
0843 AD AD AD   220           BYT "------------------------"
0846 AD AD AD
0849 AD AD AD
084C AD AD AD
084F AD AD AD
0852 AD AD AD
0855 AD AD AD
0858 AD AD AD
```

Listing continued.

flag is set. The BVC instruction branches to the specified location if the 6502 overflow flag is clear.

The overflow flag is set and cleared by arithmetic operations in the 6502. Certain SPEED/ASM routines also pass an error status back in the overflow flag. The BVS or BVC instruction can be used after a call to such a routine to test for an error.

The addition and subtraction instructions set or clear the overflow flag depending on the status of the result produced. If an overflow occurred, then the overflow flag is set; otherwise it is cleared.

The BMI and BPL Instructions

Unlike the branches discussed up to this point, the BMI (branch if minus) and BPL (branch if plus) instructions aren't usually executed after a CMP instruction. They should be used after an LDA instruction. BMI specifies a branch if bit 7 of the value in the accumulator is 1; BPL branches if bit 7 of the accumulator is 0.

To test an integer quantity to see if it is positive or negative use the following code:

```
LDA   INT+1
BMI   ISNEG
```

or

```
LDA   INT+1
BPL   ISPOS
```

Note that you must test the high order byte of the integer quantity. Bit number 7 of the high order byte is the sign bit for an integer quantity in SPEED/ASM.

Suppose you wanted to set an integer variable negative. As discussed last time, SPEED/ASM supports two routines for changing the sign of an integer variable: ABS and NEG. ABS takes the absolute value of an integer variable. After execution the specified variable will contain a positive value.

The NEG routine negates (that is, changes the sign of) the specified variable. If the variable originally contained a positive value, the result will be negative; if the variable contained a negative value, the result will be positive.

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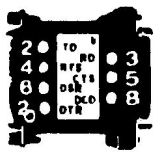

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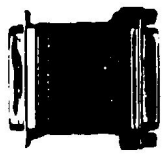

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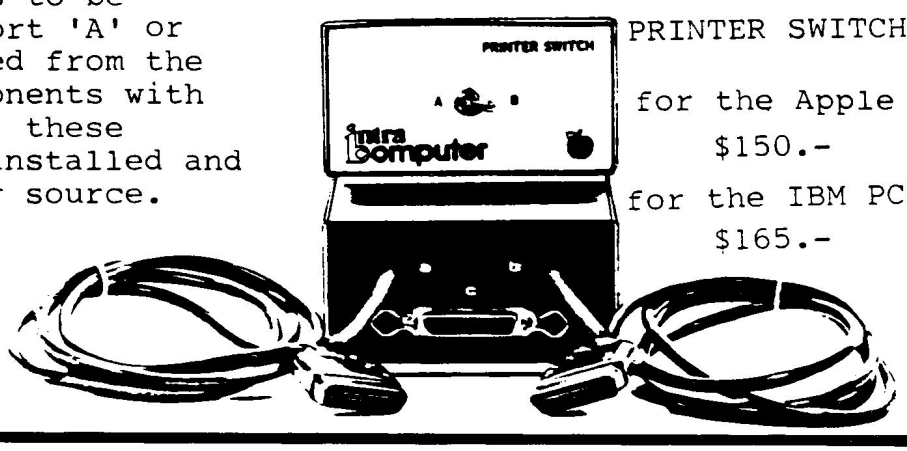

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Listing continued.

```
085B AD
085C 8D 8D      221           BYT CR,CR
085E C3 B8 E1   222           BYT "Character   ASCII Code",CR
0861 F2 E1 E3
0864 F4 E5 F2
0867 A0 A0 A0
086A C1 D3 C3
086D C9 C9 A0
0870 C3 EF E4
0873 E5 8D
0875 AD AD AD   223           BYT "---------   ----------",CR,CR,0
0878 AD AD AD
087B AD AD AD
087E A0 A0 A0
0881 AD AD AD
0884 AD AD AD
0887 AD AD AD
088A AD 8D 8D
088D 00
088E            224 ;
088E            225 ; Init CH to space
088E            226 ;
088E A9 A0      227           LDA #" "
0890 8D DA 09   228           STA CH
0893            229 ;
0893            230 ; Loop to print the ASCII values
0893            231 ;
0893 AD DA 09   232 PRTASC    LDA CH              ;Emulate the BASIC
0896 8D DB 09   233           STA I               ;statement "I=ASC(CH$)"
0899 A9 00      234           LDA #0
089B 8D DC 09   235           STA I+1
089E            236 ;
089E 20 36 78   237           JSR PRINT
08A1 A0 A0 A0   238           BYT "    ",0
08A4 A0 00
08A6 AD DA 09   239           LDA CH              ;Print the character
08A9 20 00 78   240           JSR PUTC
08AC 20 36 78   241           JSR PRINT
08AF A0 A0 A0   242           BYT "   ---   ",0
08B2 AD AD AD
08B5 AD AD A0
08B8 A0 00
08BA 20 3C 78   243           JSR PRTINT          ;Print the ASCII code
08BD DB 09      244           ADR I
08BF            245 ;
08BF            246 ;
08BF            247 ; Print a carriage return to
08BF            248 ; move to the next line.
08BF            249 ;
08BF A9 8D      250           LDA #CR
08C1 20 00 78   251           JSR PUTC
08C4            252 ;
08C4            253 ; Add one to the CH value
08C4            254 ;
08C4 EE DA 09   255           INC CH              ;6502 Instruction to increment a byte
08C7            256 ;
08C7            257 ; See if we're done
08C7            258 ;
08C7 AD DA 09   259           LDA CH
08CA C9 FF      260           CMP #$FF            ;Last ASCII value plus one.
08CC 90 C5      261           BLT PRTASC
08CE            262 ;
08CE            263 ;
08CE            264 ;
08CE            265 ; Read characters from the keyboard
08CE            266 ; until a "#" character is pressed.
08CE            267 ;
08CE 20 36 78   268           JSR PRINT
08D1 8D 8D C5   269           BYT CR,CR,"Enter any text terminated",CR
08D4 EE F4 E5
08D7 F2 A0 E1
08DA EE F9 A0
08DD F4 E5 F8
08E0 F4 A0 F4
08E3 E5 F2 ED
08E6 E9 EE E1
08E9 F4 E5 E4
08EC 8D
08ED E2 F9 A0   270           BYT "by a pound sign (""#"")",CR,CR
08F0 E1 A0 F0
08F3 EF F5 EE
08F6 E4 A0 F3
08F9 E9 E7 EE
08FC A0 A8 A2
08FF A3 A2 A9
0902 8D 8D
0904 BA 00      271           BYT ":",0
0906 20 03 78   272 READLOOP  JSR GETC            ;Read the character
0909 20 00 78   273           JSR PUTC            ;and print it.
```

Listing continued.

What happens if you want to ensure that a variable contains a negative value regardless of its original sign? This problem could easily be handled using two SPEED/ASM calls:

```
JSR     ABS
ADR     VARIABLE
JSR     NEG
ADR     VARIABLE
```

The first SPEED/ASM call, to ABS, makes sure that VARIABLE contains a positive number. The second JSR, to NEG, negates this positive number to yield a negative number. Although this sequence is clever, a better way to accomplish the task is the following:

```
        LDA     VARIABLE+1
        BMI     ISNEGTV
        JSR     NEG
        ADR     VARIABLE
ISNEGTV:
```

This code checks VARIABLE to see if it is negative (by loading the high order byte of VARIABLE and branching if it is negative), and branches around the call to NEG if VARIABLE is already negative. If VARIABLE is positive NEG negates it.

The BTR and BFL Instructions

BTR (branch if true) and BFL (branch if false) are actually synonyms for the BNE and BEQ instructions (respectively). LISA 2.5 emits the same object code for BTR and BNE; likewise the same opcode is emitted for BFL as for BEQ.

The SPEED/ASM package uses the value 0 to represent false and 1 to represent true. After a value is loaded into the accumulator, the BTR and BFL instructions can test whether or not the value is zero (false). If so, BFL branches to the specified location. If not, BTR transfers control to another specified location. BFL and BTR are used extensively by SPEED/ASM IF routines (to be discussed in a future installment).

There is one problem with the branch instructions that I haven't mentioned yet: the branch range is somewhat limited. A 6502 branch instruction uses a special addressing

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Listing continued.

```
090C C9 A3      274          CMP #"#"          ;Check for "#" character.
090E D0 F6      275          BNE READLOOP      ;If not "#", repeat.
0910            276  ;
0910            277  ;
0910            278  ; The following code prompts the
0910            279  ; person at the keyboard to enter
0910            280  ; "Y" or "N".  If something else
0910            281  ; is entered then the code is
0910            282  ; repeated.
0910            283  ;
0910 20 36 78   284  GETYORN  JSR PRINT
0913 8D 8D 8D   285          BYT CR,CR,CR
0916 C5 EE F4   286          BYT "Enter Yes or No (Y/N): ",0
0919 E5 F2 A0
091C D9 E5 F3
091F A0 EF F2
0922 A0 CE EF
0925 A0 A8 D9
0928 AF CE A9
092B 8D
092E 20 03 78   287          JSR GETC
0931 C9 D9      288          CMP #"Y"
0933 F0 04      289          BEQ GOODANS
0935 C9 CE      290          CMP #"N"
0937 D0 D7      291          BNE GETYORN
0939            292  ;
0939            293  GOODANS:
0939            294  ;
0939            295  ;
0939            296  ;
0939            297  ; This code prompts the user to enter
0939            298  ; a decimal value.  Once the value
0939            299  ; is entered the ASCII character
0939            300  ; corresponding to that code is
0939            301  ; printed on the screen.
0939            302  ;
0939            303  ;  Entering zero terminates the
0939            304  ; loop.
0939            305  ;
0939 20 36 78   306  PRTCHR   JSR PRINT
093C 8D         307          BYT CR
093D 8D C5 EE   308          BYT CR,"Enter a decimal value in the"
0940 F4 E5 F2
0943 A0 E1 A0
0946 E4 E5 E3
0949 E9 ED E1
094C EC A0 F6
094F E1 EC F5
0952 E5 A0 E9
0955 EE A0 F4
0958 E8 E5
095A 8D F2 E1   309          BYT CR,"range 0..255: ",0
095D EE E7 E5
0960 A0 B0 AE
0963 AE B2 B5
0966 B5 BA A0
0969 00
096A 20 42 78   310          JSR RDINT
096D DB 09      311          ADR I
096F 70 C8      312          BVS PRTCHR        ;If an error occured.
0971            313  ;
0971            314  ; Force integer value into the
0971            315  ; range 0..255 by zeroing the high
0971            316  ; order byte.
0971            317  ;
0971 A9 00      318          LDA #0
0973 8D DC 09   319          STA I+1
0976            320  ;
0976            321  ; Print the decimal value (in case
0976            322  ; they entered too large a number.
0976            323  ;
0976 20 36 78   324          JSR PRINT
0979 8D C4 E5   325          BYT CR,"Decimal value: ",0
097C E3 E9 ED
097F E1 EC A0
0982 F6 E1 EC
0985 F5 E5 BA
0988 E8
098A 20 3C 78   326          JSR PRTINT
098D DB 09      327          ADR I
098F 20 36 78   328          JSR PRINT
0992 A0 A0 C1   329          BYT "  ASCII Character: """,0
0995 D3 C3 C9
0998 C9 A0 C3
099B E8 E1 F2
099E E1 E3 F4
09A1 E5 F2 BA
09A4 A0 A2 00
09A7 AD DB 09   330          LDA I                          Listing continued.
```

mode called the *relative addressing mode*, in which the branch opcode is followed by a single address byte. Such a 2-byte instruction saves some memory (normally 3 bytes would be required) but branches can jump only to a location within a 256-byte range centered at the instruction following the branch instruction. Therefore, a branch instruction can branch 129 bytes forward (from the beginning of the branch instruction) or 126 bytes backwards.

Normally branches occur within this range and there's no problem. Occasionally, however, a program needs to branch to a location outside this +129/−126 byte range. To accomplish this use the opposite-type branch to jump around a 6502 JMP instruction to the intended address. For example, if you want to branch if true to location ISTRUE but the assembler gives you a branch-out-of-range error, substitute the following code:

```
        BFL   ISNTTRUE
        JMP   TRUE
ISNTTRUE:
```

Table 1 lists the instruction sequences to use if a branch-out-of-range error occurs.

Working with Character Variables Through SPEED/ASM

This subtitle may seem somewhat of a misnomer, since the SPEED/ASM package provides absolutely no character handling routines. All character handling must be performed by pure 6502 code. However, character variables are still, in essence, manipulated.

Declaring character variables was described in part 1 of this series. As a review, to reserve space for a character variable you specify the name of the variable followed by a pseudo opcode that reserves at least 1 byte of storage. I usually use the DFS instruction to reserve a single byte. For example, to reserve 1 byte for a variable named CHAR use the definition:

```
CHAR DFS 1
```

This statement instructs LISA to reserve 1 byte at the current location for the variable CHAR.

Listing continued.

```
09AA 20 00 78   331          JSR PUTC
09AD A9 A2      332          LDA #"""
09AF 20 00 78   333          JSR PUTC
09B2            334  ;
09B2            335  ; Check the L.O. byte of I to
09B2            336  ; see if it is zero.
09B2            337  ;
09B2            338  ; (On the 6502 BEQ and BNE can
09B2            339  ;  be used immediately after a
09B2            340  ;  LDA instruction to see if zero
09B2            341  ;  was loaded into the accumulator
09B2            342  ;  or not)
09B2            343  ;
09B2 AD DB 09   344          LDA I
09B5 D0 82      345          BNE PRTCHR
09B7            346  ;
09B7            347  ;
09B7            348  ; Quit and return to the Apple monitor
09B7            349  ;
09B7 20 36 78   350          JSR PRINT
09BA 8D 8D 8D   351          BYT CR,CR,CR
09BD C5 EE E4   352          BYT "End of sample program #3",CR,0
09C0 A0 EF E6
09C3 A0 F3 E1
09C6 ED F0 EC
09C9 E5 A0 F0
09CC F2 EF E7
09CF F2 E1 ED
09D2 A0 A3 B3
09D5 8D 00
09D7            353  ;
09D7            354  ;
09D7 4C 69 FF   355          JMP EXIT            ;Return to Apple Monitor
09DA            356  ;
09DA            357  CH      DFS 1               ;Char
09DB            358  I       DFS 2               ;Integer
09DD            359          END
***** END OF ASSEMBLY
!
SPEED/ASM  (C) 1981, LAZER SYSTEMS

DOES YOUR APPLE SUPPORT LOWER CASE
```

Listing continued.

As is the case with integer variables, character variables must be defined at a point in your code where they will not get executed *as* code. The best place to put variable definitions is after the JMP EXIT that terminates the program.

Initializing a character variable with a constant was briefly discussed earlier in this article. To do so load the accumulator with the desired constant (using the immediate addressing mode—that is, preface the character constant with a pound sign) and store the accumulator into the character variable. For example, to load CHAR with the character constant ? execute the code:

```
LDA   #"?"
STA   CHAR
```

Incidentally, any value can be loaded into CHAR. It doesn't have to be a character constant. You could initialize CHAR to contain the carriage

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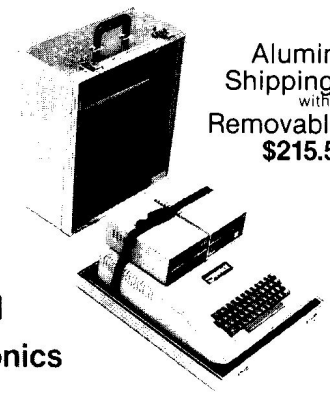

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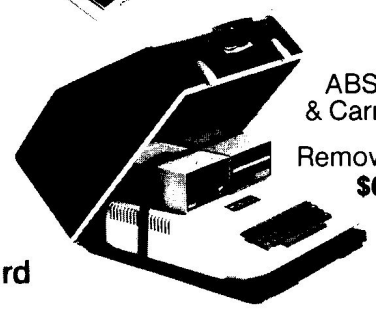

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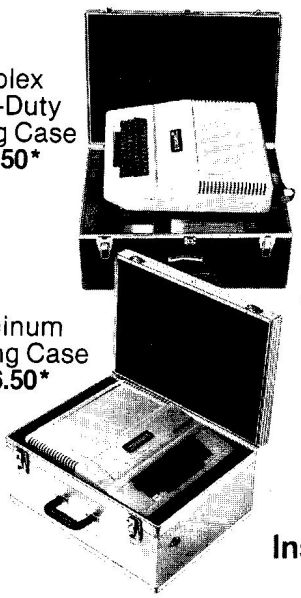

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return character by using the code:

```
LDA   #CR      ;CR is defined in
               ;SPEED/ASM.EQUATES
STA   CHAR
```

Any other numeric or symbol value could be loaded into CHAR in a similar fashion.

Copying one character variable to another (also previously mentioned) is a trivial exercise. Load the accumulator with the source variable and then store the accumulator into the destination variable. To copy CHAR1 into CHAR2 you could use the code:

```
LDA   CHAR1
STA   CHAR2
```

I mentioned before that the CHR$ and ASC functions are handled by simple loads and stores. In certain cases this is true. But if you're translating Applesoft code into SPEED/ASM you will run into a few problems. Most noticeably, Applesoft uses a version of the ASCII character set wherein the ASCII codes occupy the range 0–127. To truly implement the CHR$ and ASC functions you should use the code sequences in Listing 3. The AND and ORA are special 6502 logical instructions that I'll describe in a future article. For now just copy this code sequence verbatim any time you want to simulate a CHR$ or ASC function.

Comparing character variables is simply a matter of loading one character value into the accumulator using the LDA instruction and comparing it to another using the CMP instruction. This month's sample program (Listing 4) demonstrates several character variable manipulations that should help answer any questions you have about character handling.

Notes of a Commercial Interest

The LISA assembler and the SPEED/ASM programming package are available from your local computer store and many mail order software houses. If you cannot locate a copy of either of these packages, you can order directly from Sierra On-Line Inc., 36575 Mudge Ranch Road, Coarsegold, CA 93614. The LISA assembler, SPEED/ASM, and Datamost's *Using 6502 Assembly Language* book are all available in a special LISA Educational Package available where LISA is sold. ■

Listing continued.

```
DISPLAY? (Y/N):
SPEED/ASM  (C) 1981, LAZER SYSTEMS

DOES YOUR APPLE SUPPORT LOWER CASE
DISPLAY? (Y/N):

   6502—SPEED/ASM test program

   ASCII Character Set table
   ____________________

   Character   ASCII Code
   _________   __________

          ——— 160
     !    ——— 161
     "    ——— 162
     #    ——— 163
     $    ——— 164
     %    ——— 165
     &    ——— 166
     '    ——— 167
     (    ——— 168
     )    ——— 169
     *    ——— 170
     +    ——— 171
     ,    ——— 172
     -    ——— 173
     .    ——— 174
     /    ——— 175
     0    ——— 176
     1    ——— 177
     2    ——— 178
     3    ——— 179
     4    ——— 180
     5    ——— 181
     6    ——— 182
     7    ——— 183
     8    ——— 184
     9    ——— 185
     :    ——— 186
     ;    ——— 187
     <    ——— 188
     =    ——— 189
     >    ——— 190
     ?    ——— 191
     @    ——— 192
     A    ——— 193
     B    ——— 194
     C    ——— 195
     D    ——— 196
     E    ——— 197
     F    ——— 198
     G    ——— 199
     H    ——— 200
     I    ——— 201
     J    ——— 202
     K    ——— 203
     L    ——— 204
     M    ——— 205
     N    ——— 206
     O    ——— 207
     P    ——— 208
     Q    ——— 209
     R    ——— 210
     S    ——— 211
     T    ——— 212
     U    ——— 213
     V    ——— 214
     W    ——— 215
     X    ——— 216
     Y    ——— 217
     Z    ——— 218
     [    ——— 219
     \    ——— 220
     ]    ——— 221
     ^    ——— 222
     _    ——— 223
     `    ——— 224
     a    ——— 225
     b    ——— 226
     c    ——— 227
     d    ——— 228
     e    ——— 229
     f    ——— 230
     g    ——— 231
     h    ——— 232
     i    ——— 233
     j    ——— 234
     k    ——— 235
     l    ——— 236
     m    ——— 237
     n    ——— 238
     o    ——— 239
     p    ——— 240
     q    ——— 241
     r    ——— 242
     s    ——— 243
     t    ——— 244
     u    ——— 245
     v    ——— 246
     w    ——— 247
     x    ——— 248
     y    ——— 249
     z    ——— 250
     {    ——— 251
     |    ——— 252
     }    ——— 253
     ~    ——— 254

Enter any text terminated
by a pound sign ("#")

:This is a test of SPEED/ASM
 #

Enter Yes or No (Y/N):

Enter a decimal value in the
range 0..255: 250

Decimal value: 250  ASCII Character: "z"

Enter a decimal value in the
range 0..255: 145

Decimal value: 145  ASCII Character: ""

Enter a decimal value in the
range 0..255: 174

Decimal value: 174  ASCII Character: "."

Enter a decimal value in the
range 0..255: 199

Decimal value: 199  ASCII Character: "G"

Enter a decimal value in the
range 0..255: 232

Decimal value: 232  ASCII Character: "h"

Enter a decimal value in the
range 0..255: 23456

Decimal value: 160  ASCII Character: " "

Enter a decimal value in the
range 0..255: 0

Decimal value: 0  ASCII Character: " "
```

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GraForth, A Grand Graphics Language

A graphics package that does more than draw... it teaches as well!

by Hartley G. Lesser

Frustration need no longer harry your understanding of Apple graphics. Author Paul Lutus, in 210 pages, presents GraForth in a most pleasing manner, and reveals the power of this graphics language. However, if you're prone to laziness, don't bother to spend your $75 on this product. The only path to successful mastery of this graphics language is study and practice.

But don't let that frighten you away—GraForth is fun! After all, you could master all of the GraForth capabilities—Turtlegraphics, plotting and line graphics, character graphics, text display, three-dimensional graphics and even music synthesis.

The documentation is artfully crafted, no small feat in itself. Technical writing seems a lost skill these days, yet Insoft has produced a manual that communicates ideas successfully to even the novice. I would have preferred a darker type and larger printing, though, to help prevent eye strain.

Save
Get
Insert
Delete
Program
Memory
List
Write
ERase
Autonum
Bye
ConTRol – D = DOS

Table 1. Text editing commands.

The manual is structured in three parts: Chapters 1 and 2 are introductory; the GraForth language tutorial comprises chapters 3 through 9; appendices are in back.

GraForth's development is examined in chapter 1, entitled Preview. Comparisons with standard Forth are presented: The general structure of the parental language was maintained, but was implemented differently by GraForth. The manual points out that using GraForth is easy, and that the language can exist within current Apple environments. Use any DOS text file editor to manipulate GraForth's stored "words."

After reading through the author's advice on how to use the manual, and noting the conventions used throughout the text, the reader is advised to make two backup disks of the single program disk that accompanies the manual. The COPYA program from the DOS 3.3 System Master disk is recommended.

Your appetite for graphics is whetted immediately. A program entitled Play is presented after yet another reminder to duplicate the program disk. All GraForth instructions are easily recognizable throughout the tutorial, as follows:

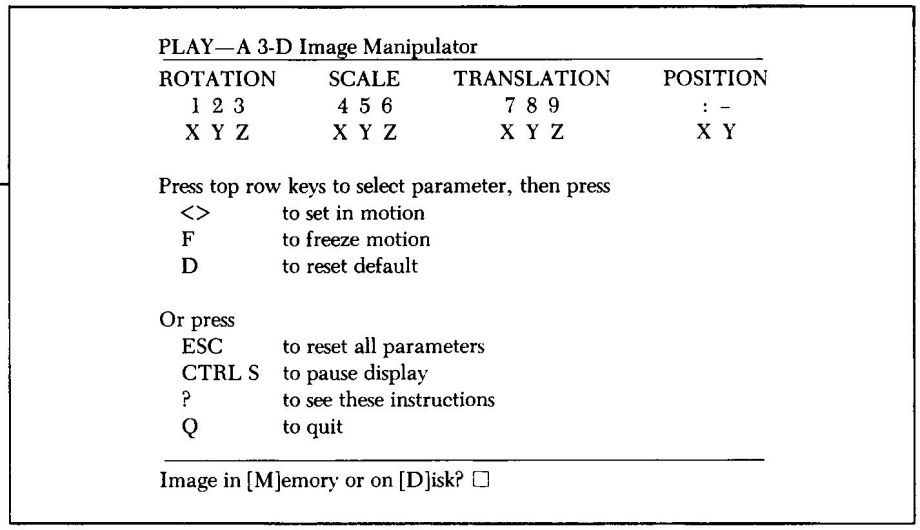
READ "PLAY" (return)

However, to enter this program, you must decline GraForth's opening invitation to run a demonstration program. I find myself at odds with the text here. Curiosity took me into the demo program, and I found myself with a selection of graphics displays—all well worth the viewing time. If the demonstration programs don't instill even greater desire to learn GraForth, you should question your motivation in booting the disk.

The Play program lets you manipulate a three-dimensional image. You enter a 3-D Image Manipulator (Figure 1), where Rotation, Scale, Translation and Position are managed through key presses, and a final product example is revealed on the following page. By following the instructions, you can see how easily three-dimensional images are managed with GraForth.

Chapter 2 starts the reader with the basic hardware and software requirements necessary for GraForth operation. If you have a language card, almost 10K bytes of additional main memory will be available for your program development, as the Disk Operating System will be loaded into the

Figure 1.
A 3-D image manipulator.



card. Instructions for deleting unwanted files, thereby creating even more room on your disks, follow. The chapter ends with a short discussion of how to enter other DOS commands and how to care for disks. It insists that little prior knowledge of programming, graphics or music is needed to operate GraForth's environments, and advises you to plunge in.

The learning process begins with chapter 3. GraForth is divided into two main parts, one being the compiler and low-level system routines, the other the *word library*, containing a large number of GraForth *words*. Each word is a command that accomplishes a specific task. For example, *bell* toggles the Apple speaker; *draw* draws a three-dimensional image on the screen. These words can be seen at any time simply by entering *list*. Variables, strings, subroutines, programs . . . all can be words. You'll not find program lines in GraForth, but you will find programs that are words strung together. ASCII characters, not including spaces or carriage returns, constitute the names of GraForth words.

Everything you do in GraForth will be either a word or a number. There's something called a Data Stack, which is simply a stack of numbers, one on top of another. The author states this is like a "deck of cards, or a stack of dinner plates." Words can either remove numbers from, or place them on, this stack. For example, a + sign removes two numbers from the stack, adds them together, and then places the sum onto the stack. Also explained is that GraForth is an integer language with a range of −32768 to +32767.

The best method of learning is trying, so the user is immediately put to work programming in GraForth. Numbers are placed on, removed, and added together in this first tutorial. Such GraForth words as *dup*, *swap*, *drop*, *over*, and *pick* are also demonstrated. All of the learned arithmetic words are then outlined, and the user is again required to operate hands-on.

Through the power of word definition, a single word can define several words or operations. As an example:

```
Ready : SUM1 (the new word that contains the
following operations)
Ready OVER OVER PRINT " THE SUM
 OF " .
Ready PRINT " AND " .
Ready PRINT " IS " + .;
```

The word *sum1* is added to the GraForth word library, and when called will perform all of the operations that exist between *over* and the final semicolon. The latter is an indication to GraForth that the definition of *sum1* is concluded at that point. This operation adds together the first two numbers on the stack, and prints the result to screen.

Useful commands to remove (*forget*) words from the library are then covered. Looping structures are discussed, and number comparisons, decision and word branching, program structure and other miscellaneous niceties of the language are explained. By the time you arrive at the end of chapter 3, you'll realize that your initial apprehension was uncalled for.

Text manipulation is covered in chapter 4, as well as the upper- and lowercase capabilities resident in GraForth. Cursor movement is simple, and some of the special characters, such as the left and right brackets, are demonstrated. A powerful text editor is introduced, which is accessed simply by requesting *edit* after loading GraForth. (See Table 1.)

Use line numbers, as in Basic programming, to enter text into the editor; text can then be changed through deletions and insertions. Automatic line numbering is also available, including automatic line numbering of an unplanned text insertion. Files from disk can be retrieved through *get*, and also printed directly from the editor. However, caution is advised. If the GraForth word library grows, or if the text entry becomes too great, memory allocation for either can be overwritten by the other. A command of *M* elicits the number of bytes, or characters, left in memory.

The amount of memory used by the text editor may be adjusted to avoid any GraForth conflict. A language card is useful when allocating memory for your work. Even without the language card, files of up to 16,384 bytes

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"Programs can load and run other GraForth programs, and can even free up memory by deleting themselves."

may be adjusted.

Chapter 5 digs deeper into GraForth, and formatting text through GraForth words starts the tutorial. Windows, data storage and retrieval, and strings (after their definition) are carefully introduced and practiced. You can use binary, decimal or other number bases although the latter could produce unexpected results. DOS usage is similar to that of Basic, called from keyboard or in a word definition. Peripheral card use is examined.

One of the more powerful features is the GraForth overlay. Programs can load and run other GraForth programs, and can even free up memory by deleting themselves. This is accomplished by using a word in a first file that reads the overlay file, with the first word in the overlay file *forget*ting the words already in memory. The last line in the overlay file should Close Run (close the DOS file) and then start executing the new top word in the word library. Perhaps such an operation sounds difficult at first, but it's a marvelous tool: You can run long, segmented programs without memory allocation concern.

By the time you're halfway through the manual, you should have a good, basic understanding of GraForth. And what comes next? The very material all have desired to dive into—the graphics.

Chapter 6 commences with two-dimensional graphics, explaining about Apple graphics in general (what is a pixel?), and what constitutes GraForth graphics. The GraForth screen is 0 to 255 (screen left to right), and 0 to 191 (top to bottom). *Windows* are established, garbage within *erase*d, points are *plot*ted, *lines* drawn, shapes *fill*ed with *color*, *inverse* and *normal* graphics backgrounds are demonstrated, as well as *unplot*, *unline* and *empty*.

Two different drawing modes, *or-mode* and *exmode*, are discussed. If one fills a rectangle as white, and then a white *line* drawn through the rectangle were *unline*d, the rectangle would show the background color where the line had been erased. If the overlapping line were drawn with or-mode, it could then be drawn again with *exmode*, which actually erases the *ormode*d line without marring the *fill*ed area.

Turtlegraphic capability is revealed, with those familiar commands such as *penup*, *pendown*, *move*, *turnto*, *turn* and *moveto* activating the Turtle. Again, word definition allows for several Turtlegraphic commands to be contained within a single GraForth word. Example:

```
: SQUARE
  40 DO
    50 MOVE
    90 TURN
  LOOP ;
```

This example creates a loop that will

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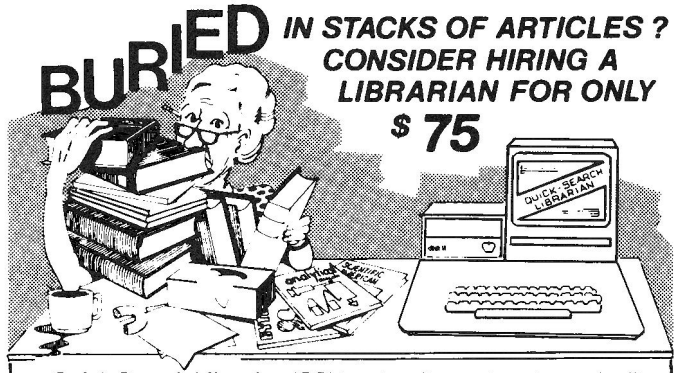

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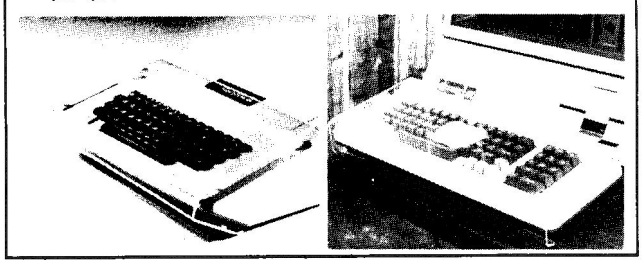

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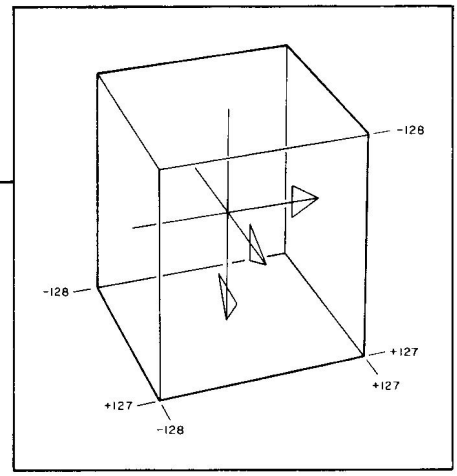
Figure 2.
Parameters of 3-D graphics.



cycle four times; each iteration produces a move of 50 pixels, then a turn of 90 degrees. This forms the square referred to in the defined word *square*. When *square* is called, that's exactly what you'll get.

The next chapter deals with character graphics. Different "fonts" may be selected, and characters can be displayed or animated in variable screen sizes and colors. Seven font selections are possible from the GraForth disk, and you can also use the *chareditor* to create your own sets. By manipulating character blocks, sophisticated animation can be composed. Character graphics may also be drawn using the *exmode* command, so that one character could appear briefly on top of another, then be *exmode*d away, leaving the initial character intact.

Three-dimensional graphics still your main concern? Here they come—chapter 8. The reader is reminded how to bring the screen back to its normal state, and shown how to set a text window so text won't spill into the 3-D image. A free area of memory is then loaded with an image from the disk, and the internal 3-D graphics array is initialized. *Objerase* is used when starting all three-dimensional programs.

The object is assigned a number. We now want the shape automatically drawn onto the screen. But this won't occur unless the memory address for the object has been specified. Once this is done, *autodraw* will draw the object onto the screen. The object can then be manipulated for better viewing. Just as two-dimensional images use Cartesian coordinates X and Y, three-dimensional graphics use the same system, only with three axes, X, Y and Z. X is the horizontal axis, Y is the vertical axis, and Z is directed from rear to forward, pointing at you, the viewer. Figure 2 shows the limits for each of the three coordinates. These spaces may be overlapped by other objects which have their own 3-D area.

Rotation on any axis is obtained through *xrot*, *yrot* and *zrot*. Angles are specified in units between 0 and 256 instead of degrees. Scaling changes the height or width of the image through *scalx* and *scaly*. Here, reverse scaling is also useful. Say that you had an image of a bird. One wing image would suffice, as the second wing is simply the first wing with one negative scale number to reverse the image. *Scalz* changes the perspective of the image. If you enter a positive number, the ob-

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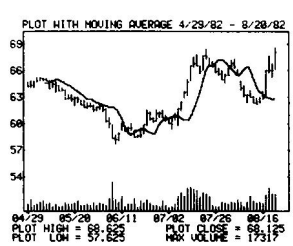

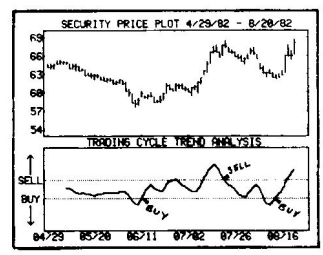

"All in all, this is an impressive package, from documentation to program application, and it's priced lower than most graphics packages."

ject's front will be larger than its back. This algorithm closely approximates true perspective. Placement on the screen of the image is accomplished through *xpos* and *ypos*, while Translation deals with the movement of the image within its own three-dimensional space, and not the video screen itself. *Objcolor* sets the color of the image.

The Image Editor allows you to create your own images. This is a large program and, again, use of a language card would be of great benefit. You can *move*, *draw*, – (delete) and *CR* (quit) in this mode. Points aren't plotted here, only lines, so the line values must be entered and then followed with a return. Once you're satisfied with your object, it can be saved to disk. Redrawing without change, erasing individual objects, overlapping objects and *undraw* are all demonstrated through the hands-on approach. For objects that are cylindrical, use a program called Profile.

The ninth chapter deals with GraForth music, which features nine distinct voices, though these voices cannot be used simultaneously. *Note*, *voice*, *pitch*—all control the synthesizer. Expect different qualities of sound, some very different from what was previously available with the Apple.

A final wrap-up, chapter 10, graces a single page, and is followed by the appendices. A library listing of GraForth words is extremely useful, and you'll find yourself referring to it on many occasions. This is followed by a word library compiled by subject group, such as Numeric Operator Words and Text Display Function Words, to name just two.

Appendix B contains the technical data that would be of interest to the more advanced programmer. Such items as a memory map, with and without language card, a Page Zero map, and an explanation of the word library structure and compilation round out this appendix. Appendix C contains the disk file directory, followed by the ASCII characters and equivalent numbers chart. An index ends the book.

All in all, this is an impressive package, from documentation to program application, and it's priced lower than most graphics packages. Yet this product cannot really be called a graphics utility. This is a language, one that will require study before you can implement it in your own programs.

I heartily recommend GraForth for either the novice or the experienced programmer. There is value indeed—graphics (two- and three-dimensional, as well as Turtle), a text editor, character editors, shape creator and a music synthesizer. What more could you expect for $75? GraForth is from Insoft Inc., 10175 Barbur Blvd., Suite 202B, Portland, OR 97219. ■

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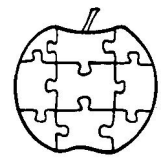

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Telecommunications Adviser

Look to this and future articles from a telecomm expert for the answers to your questions.

by Ed Magnin

Five years ago few people had even heard of a personal computer. Now, not only have we all been sold the computer but many of us have run out and bought many extra attachments for that computer. And in the past few years a growing number of us have experienced the most exciting peripheral to come along so far—the modem, a device that makes the entire worldwide telephone network an extension of our own computer.

Prior to the introduction of modems to the personal computer market, those of us who were exploring new ways to use our own personal computers often did so in a vacuum. The traditional support systems weren't available to encourage us. Our coworkers seldom shared our excitement about having figured out some new way to out-fox our new computer into doing some special new task. Now all of a sudden, through electronic bulletin board systems, users can share their hobby with many others. We can now go on-line with a question or problem, and usually find some other Good Samaritan to describe his solution to the same problem.

Rather than being just another add-on to the computer, modems actually began to sell computers. A whole new group of modem purchasers emerged —those who bought their computers *because* of the modem, to take advantage of the many new services that were accessible via a simple modem call. Current data on almost any topic was now as close as a phone call, and, best of all, without any retyping.

In the past few years I have watched a relatively new telecommunications industry change not only itself but the way the rest of us do our business. We are going through a period of rapid and significant change on many different fronts. Whoever imagined competitive long distance services? The separation of the local operating companies from AT&T? Telephones for sale in department stores and even supermarkets? Pay TV's revival and reemergence as cable TV? Using a personal computer to call up and retrieve stock quotes and the latest news, or to send electronic mail? And who knows where we will be just a few short years from now?

Through *inCider*'s pages, I'll do my best to keep you all posted on the latest developments in this exciting field. First I'll try to answer some of the questions I've been asked often by those considering their first modem.

Q & A

What is a modem anyway? Modem is short for modulator and demodulator, which describes the modem's role of converting electrical impulses from your computer into sound and from sound back into electrical impulses; thus you can connect your computer to the analog worldwide telephone network.

Why connect a computer to the telephone network? As more and more businesses started setting up large in-house computer systems, their authorized employees could access that data only from terminals that were actually hard-wired to the system. If a company had a branch office across town or across the country, you can imagine the problems in getting the right-of-way and the expense in running lines to each location.

So why reinvent the wheel? The phone company already had such a network of lines—the only problem being that it worked on sound and not digital impulses. A terminal in the branch office just needs a few feet of cable to connect to a modem, which then uses a normal telephone line to connect with another modem at the other end, which is connected to the computer itself. Later, as companies added more and more terminals, different branch offices could take turns

Ed is president of his company and developer of their unique Teledelivery software vending system. Send your telecommunication-related questions/comments to Ed Magnin, Telecommunications Adviser, Telephone Software Connection Inc., PO Box 6548, Torrance, CA 90504. Or leave a brief message at 213-516 9432, via modem of course! He will respond i your communications in future articles.

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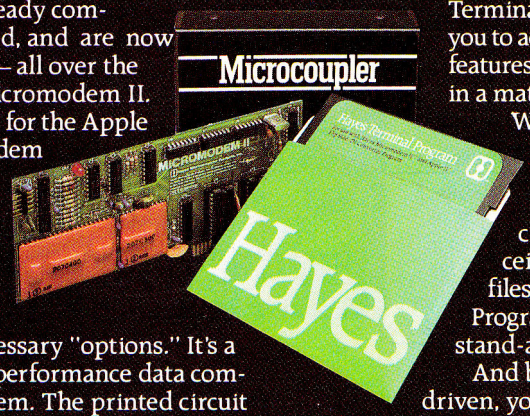

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And because it's menu driven, you can choose from a wide variety of options to set your communication parameters — as well as change hardware configuration — directly from the keyboard. It even allows you to generate ASCII characters that are normally not available from Apple keyboards, further extending your capabilities. Incoming data can be printed (on serial or parallel printers) as it's displayed on your screen.

Micromodem II is available with or without the Terminal Program. Buy your modem by itself, or optionally packaged with the Terminal Program disk and user manual at extra cost. The software is also sold separately, for those who already own a Micromodem II.

If you're ready to communicate with other computers, to access information utilities, time-sharing systems, or use bulletin boards, then you're ready for Micromodem II. Come on. Compare. Consider. Then buy.

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"Some direct-connect modems can automatically answer the phone or dial another computer under program control."

$$
\begin{aligned}
\text{N Baud} &= N \ \frac{\text{bits}}{\text{second}} \\
&= N \ \frac{\text{bits}}{\text{second}} \times \frac{1 \text{ character}}{10 \text{ bits}} \\
&= \frac{N}{10} \ \frac{\text{characters}}{\text{second}} \\
&= \frac{N}{10} \ \frac{\text{characters}}{\text{second}} \times \frac{60 \text{ seconds}}{1 \text{ minute}} \\
&= 6N \ \frac{\text{characters}}{\text{minute}} \\
&= 6N \ \frac{\text{characters}}{\text{minute}} \times \frac{1 \text{ word}}{6 \text{ characters}} \\
&= N \ \frac{\text{words}}{\text{minute}}
\end{aligned}
$$

Figure 1. Just what exactly is a baud (alternate definitions notwithstanding)?

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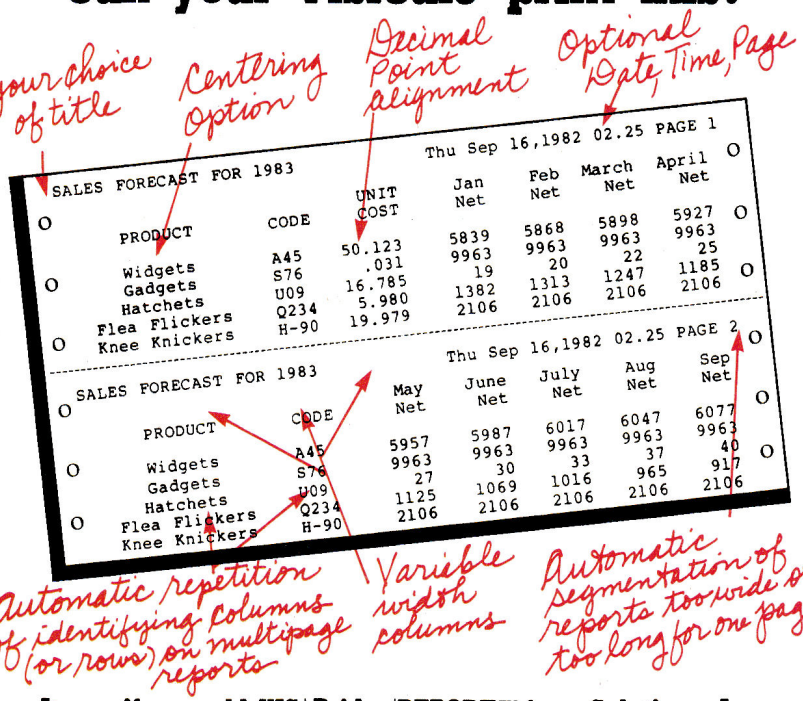

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calling into the same dial-up line. Also, with the invention of portable terminals, the same user could call in from anywhere he might go.

I've heard of "acoustic" and "direct-connect" modems. Which is better? A direct-connect modem, because it's directly connected to the phone line, gives a better signal-to-noise ratio. Some direct-connect modems can automatically answer the phone or dial another computer under program control. Acoustic couplers are needed when no phone jacks are available, such as with pay phones or in motel rooms.

Where does a direct-connect modem connect? Most direct-connect modems plug into a normal modular phone jack, although some plug into the somewhat smaller handset jack on the side of some phones. While most draw their power from the computer's power supply or from the phone line itself, some modems come with a small dc converter that plugs into a normal 110 V outlet. You can ask your phone company to install an extra jack where you want it or you can use a simple Y adapter to plug the modem into the same jack as the telephone.

On many office phones connected to PBX systems you'll find the modular connectors on the back of the phone, which is another place to use the Y connector. Most "key" systems (the type with the hold button and several lines) use a larger connector, but several adapters are available. The adapters, which were designed for answering machines, differ in their features. Some would connect your modem to "line one" only. Others allow for either moving the plug from line to line or dialing a switch to select a particular line.

Do I need permission of my telephone company? No! For a direct-connect modem, prior to connecting it you need to tell them the modem's FCC registration number and ringer equivalence. While many communications workers are more modern in their thinking (many have modems at home themselves), I have run into a few from the old school who think it is their right and responsibility to protect *their* telephone network from any non-Bell equipment. Recent court cases

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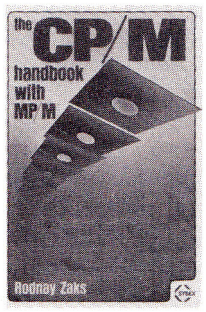

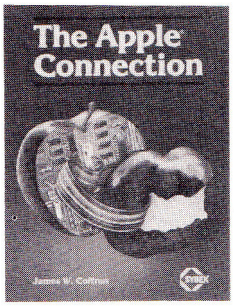

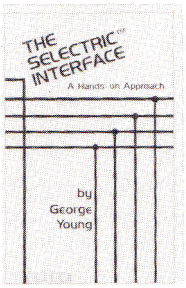

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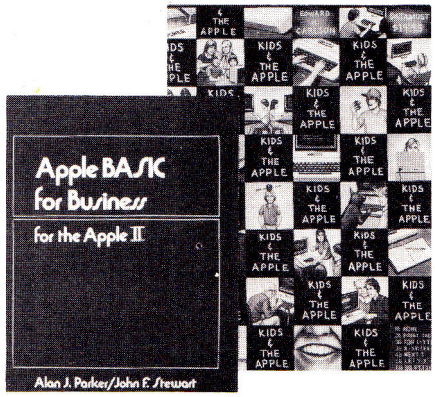

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What about modem speeds? Most systems use 300 baud (or sometimes 110 baud). Baud approximates words per minute. Some skeptics say it can't be that simple, "or everyone would just say words per minute instead of baud." Assuming that one word equals six characters (based on the five character average typing word plus a space), and that one character equals ten bits (one start, eight data and one stop bit), then using multiplication by expressions where the numerator and denominator are equal (multiplication by one), we can prove it as shown in Figure 1.

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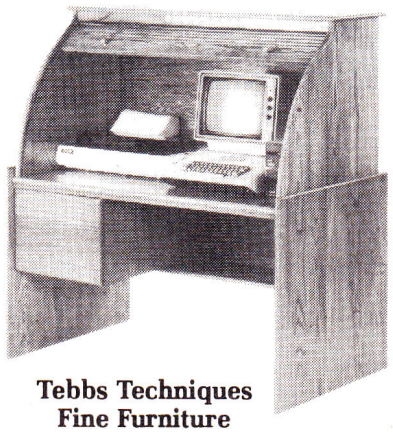

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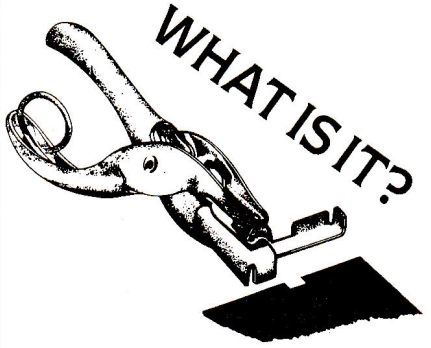

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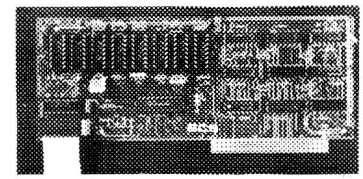

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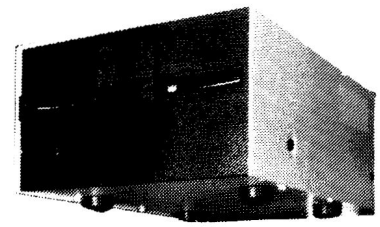

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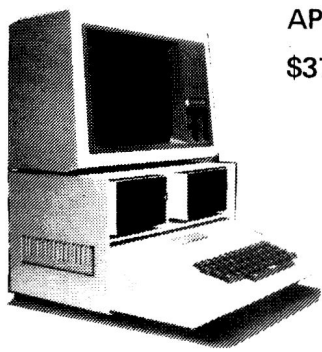

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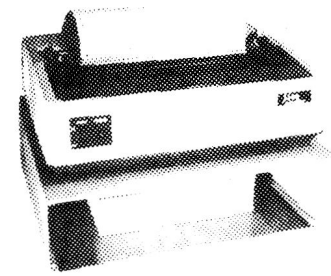

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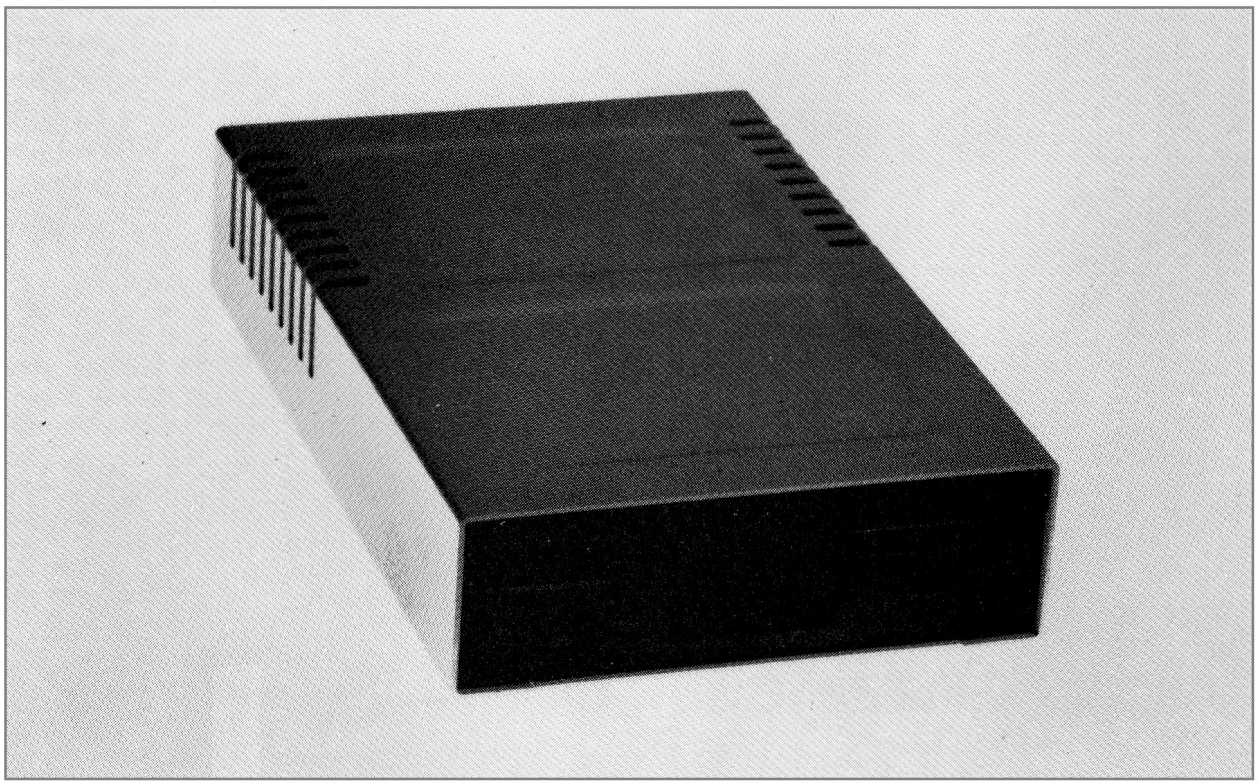

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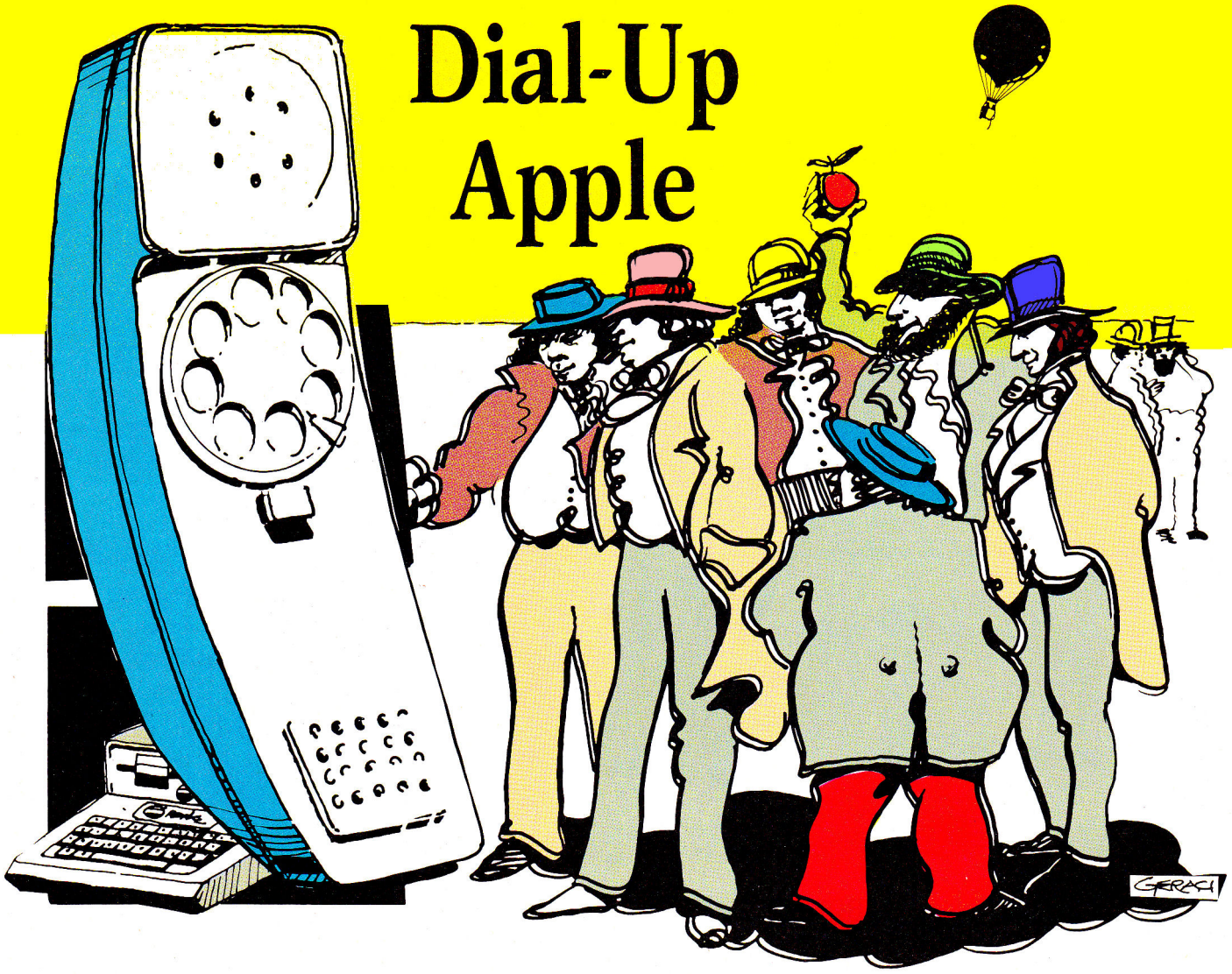


A Communications Sampler

by Frank J. Derfler, Jr.

The Apple II can make a fine data communications device, but you need to add both hardware and software to give it the power to communicate. This article will briefly describe the types of hardware combinations you can use to give your Apple a communications capability and what some of the advantages and disadvantages of the different approaches might be. Then we will discuss what you should look for in data communications software. We will examine some specific programs to see what they do and to help you judge how well they might meet your needs.

Hardware Combinations

The data signals used inside your Apple couldn't travel more than a few feet without becoming noisy and losing their form. The concept behind data communications hardware is that it provides some way to connect the relatively weak direct current signals on the Apple's data bus to the outside world.

If you are going to use your Apple for communications, the distance you are going to push your data determines the kind of hardware you need. If you are interested in exchanging data with a local computer less than 50 feet away, you can connect your Apple to the other device through a cable with parallel wires using the RS-232C signaling scheme. If you need to exchange data between machines within a building or an office, you might connect them together with coaxial or fiber optic cable in the form of a local area network. Almost all data communications systems spanning distances over a half a mile use a device called a modem.

Modems translate between the low level signals in your Apple and the relatively hostile environment in the outside world. Some modems may translate your Apple's data into light or radio waves, but the most common modems communicate over telephone lines using audio signals.

Many Apple II users have chosen modems that insert into an Apple expansion slot and directly code and decode signals to and from the data bus. The Hayes Micromodem II and Novation Apple Cat-II are the best known modems in this category. Reviews of these two modems appear in this issue. In their most elementary form, these bus-decoding modems only provide audio signals in and out. You are not given any other kinds of input/output

Frank Derfler is a well-known author in the telecommunications field. Write to him at PO Box 691, Herndon, VA 22070.

signals. Some of the other communications methods described above may require the use of an electrical signaling scheme called RS-232C.

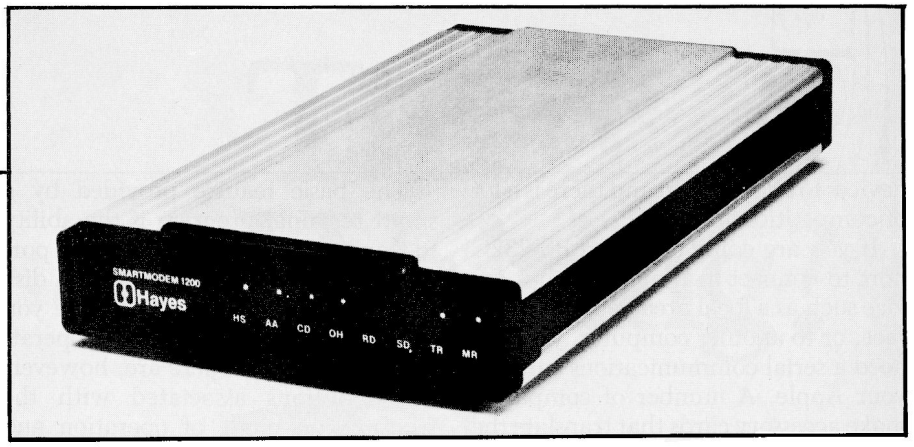
The RS-232C standard describes the voltages and currents used on a multiwire connecting cable and the functions these signals perform. It provides a common way of connecting together two computers or peripheral devices. You can use an RS-232C serial port card and cable to connect directly between two microcomputers or you can use it to connect your Apple to a stand-alone modem.

Stand-alone modems that connect to their local system through an RS-232C port are the kind of modems most commonly used in the industry. Until about two years ago, the most popular stand-alone modem among microcomputer users was the Novation CAT. The basic CAT uses a connection to the telephone system called acoustic coupling.

An acoustically coupled modem places the telephone handset over a small speaker and microphone. The two devices then exchange audio tones. Because an acoustically coupled modem has no electrical connection to the telephone line, it cannot automatically answer or dial the telephone. Another kind of modem with a direct connection to the telephone line is needed to do that.

In mid 1980, Hayes Microcomputer Products released their Smartmodem. This is a stand-alone direct connection modem that uses an RS-232C connection to the computer or terminal it serves. The Smartmodem has an onboard microprocessor and ROM program that responds to simple letter commands it receives over the RS-232C line. In response to these commands, it can automatically dial a number, answer the phone, and change between the originate and answer tone sets.

This modem has gained great popularity because of its quality and ease of use. Manufacturers such as U.S. Robotics have released competitively priced devices able to use the same commands. The use of an RS-232C modem should be considered by any Apple owner who might need to connect the modem to more than one terminal or computer. There are many



The Hayes Smartmodem 1200 is a modem that connects to its local computer or terminal through an RS-232C serial port. It takes commands through that port for automatic dialing and answering of the telephone line. The Smartmodem 1200 can operate at either 300 or 1200 baud and sells for $699.

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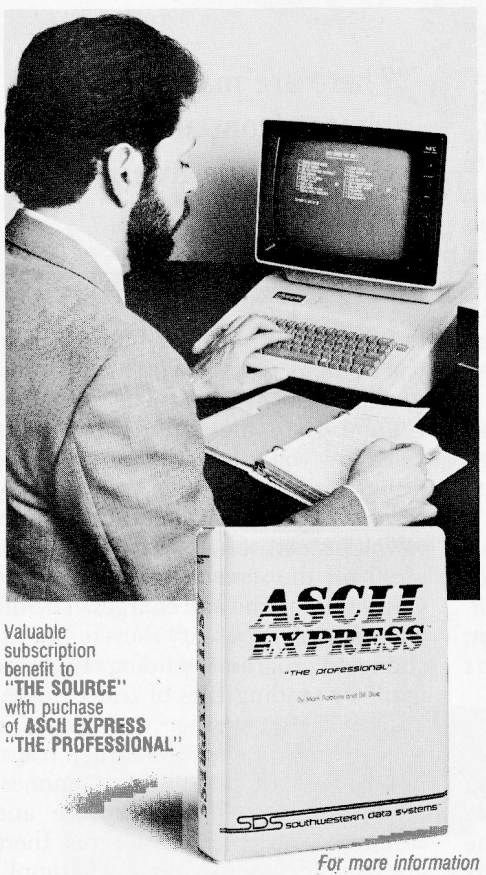

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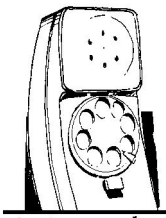

devices to choose from and there is a lot of competition in price.

If you are going to use an RS-232C port to connect to a modem, to a device such as a local area network interface, or to another computer, you will need a serial communications card for your Apple. A number of companies make accessory cards that translate the parallel data on the Apple bus into the serial stream of bits used by the RS-232C port. Apple makes both a Communications Interface Card and a Super Serial Interface Card. SSM Microcomputer Products has several serial port cards and both California Computer Systems and Mountain Computer make suitable cards.

Whether you use a telephone modem to communicate around the world or use an RS-232C serial port to move data around a room, you need communications software to give your Apple a full communications capability. Let's examine what that software should do for you.

Terminal Software

The simplest kind of data communications software moves data from the serial port (or integrated modem) to the display screen and routes data from the keyboard to the serial port. This kind of software makes your computer into a "dumb terminal" or "glass Teletype." Both of these phrases describe a terminal that can only display data on the screen as if it were being typed onto a piece of paper in a teleprinter. A dumb terminal can only transmit characters as they are entered through the keyboard. This kind of program may be adequate for casual use, but it certainly does not use the real power of your computer. A smart terminal program can put the microprocessor in your Apple to work to provide you with useful communications capabilities.

Smart Terminal Software

Many companies are marketing smart terminal software for the Apple II. All of these programs provide some common capabilities, but the differences come in the ease of use, added features, and flexibility of the programs. Let's first examine the standard features you should expect in smart terminal programs.

The basic feature provided by a smart terminal program is the ability to transmit disk files out the serial port and to capture received data in a disk file. This single feature can save you time and money and improve operating convenience. There are, however, many options associated with the transmission mode of operation and we need to examine them more deeply.

Other smart terminal features include the ability to emulate a specific commercial terminal and to control the technical data communications parameters. Functions allowing you to review the data in the capture buffer, to access the disk directory commands, and to effectively interface with a printer are found in many smart terminal programs.

File Transmission and Capture

The ability to transmit disk files and to capture data in disk files can help you in many ways. If you use an information utility such as The Source or CompuServe, the capture capability can allow you to save the data from the utility for later review. You can capture and keep information that comes to you instead of helplessly watching it scroll off the screen. This can reduce your on-line time and charges. The file transmission capability is useful for exchanging programs, sending electronic mail, or sending files of text or data. You can create messages and text using a local word processor and then transmit the files out in an efficient manner.

"There are many devices to choose from and a lot of competition in price."

The concept of file capture and transmission sounds simple, but there are technical factors that can complicate the process. A smart terminal program can have several features that make file exchanges simple and more accurate. In the area of file capture, it is useful to be able to quickly suspend the capture process and to easily turn it back on. This capability allows you to pre-edit the incoming data and it prevents the capture of miscellaneous prompts and commands that may be exchanged with the host system.

It is also useful to have the ability to automatically filter the incoming data for certain characters. This filtering can catch characters such as control codes that may have a strange effect on your disk system or printer when the file is read. The filtering subroutine can usually either eliminate the offending character or replace it with the command that works correctly on your system.

The transmission of disk files is complicated by the limitations found in many remote host systems. Simply stated, many host systems cannot accept a full-speed uninterrupted transmission of data from a disk file. Either because of limitations in the transmission path or in the host program itself, you will often find a need to throttle back or control the transmission of file data. There are several ways that transmission can be controlled.

One method of slowing down the output of your terminal program is to command the program to insert a slight pause between each transmitted character. This form of throttling is usually effective in dealing with large host systems that need to simultaneously monitor the input from several terminals. A variation on this mode of transmission will put a user-selectable pause between each line.

An interactive form of transmission control uses a prompt to call for the next line. This form of control is often used by host systems using Basic programs that must collect the data into strings. During the time string collection is taking place, the host program cannot accept new characters. If your terminal program cannot use either a timed pause or a pause waiting for a prompt, the host will probably drop several characters in each line. If you select a prompted line transmission option, you will have to specify the prompt the program is to recognize. You can get this information from one trial run with the host system.

A more complex form of prompted transmission tells your Apple both when to pause and when to start

again. This is known as an X-ON/X-OFF protocol. Under this arrangement, the host system will send you a special command (usually control-S) when it has all the data it can digest. It will send a different control code (usually control-Q) when it is ready to receive more data. A good terminal program should have the capability to respond to these commands and provide a smooth flow of data to the host.

Another form of transmission control takes advantage of the full-duplex transmission commonly used in systems that host microcomputers acting as terminals. When the term full-duplex (or echo-plex) is used to describe a data communications system, it means that the host system is echoing all of the terminal's transmitted characters back to the terminal. This echo serves as a positive check on the operation of the host system and the data communications link.

Some smart terminal programs have a character-checking mode of operation for file transmission. In this mode, the echoed characters are compared with the transmitted characters to ensure that they are the same. This type of transmission provides a very positive check of the file transfer, but the waiting and checking slows the transmission speed of the system by more than half. Character checking is a useful way to transmit data only if you have either short files or a lot of time.

Protocol File Transmission

Many users of data communications systems need to perform a highly accurate exchange of files. Object code files for programs, files with many numbers, and files with a lot of text all require an exchange that must be right. A file transfer system called protocol file transfer has been developed to provide a high degree of confidence in the accuracy of a received file.

A protocol file transfer requires that the systems at both ends of the link have software able to perform very specific recognition and acknowledgement tasks. This means that you can't do a protocol file transfer with an information utility like The Source or CompuServe. You need to have identical or at least compatible software at both ends of the link to do a protocol transfer.

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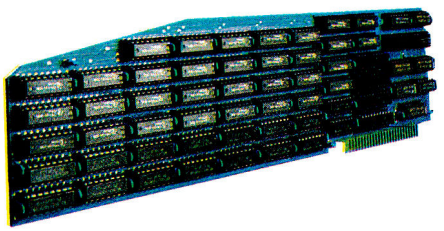

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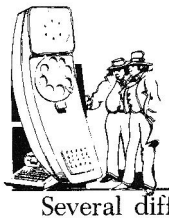

Several different transfer protocols exist, but they all function in the same general way. The transmitting station collects all data into blocks of a specified length. A block of 256 bytes is common. The software then performs an arithmetic calculation based on the number of binary 1s in the block and sends the result of the calculation out with the block. The formula used in this calculation may vary between software designers.

The receiving station performs the same calculation on the block of data it receives and checks to see if the results match the figure sent by the transmitting station. If it matches, the receiver calls for the next block. If it does not match, the receiver tells the transmitter to send the same block again. The block can be retransmitted several times until the parity checks match or until some preset abort point is reached. This kind of file checking and retransmission can guarantee nearly 100 percent accuracy in the transfer of disk files.

Several different protocols exist, but the Ward Christensen XMODEM (also called Modem7) protocol is the most widely used in microcomputer systems. It is particularly popular in CP/M systems. If your smart terminal program has the ability to use this protocol, you can download programs from the special CP/M electronic bulletin board systems located around the country.

A protocol file transfer system is particularly useful in business and professional programming applications. Not everyone needs it, but the capability doesn't add much to the cost of the software and may be useful in the future.

Terminal Emulation

Terminal emulation is another smart terminal function that may not be useful to everyone, but if you need it, it can be indispensable. Many mainframe computer systems have programs written to take advantage of the capabilities of specific commercial terminals. These capabilities include the movement of the cursor anywhere on the screen, reverse video highlighting of specific screen areas, blinking letters, other visual effects, and the presence of special function keys on the keyboard.

In a typical program, a business form may be presented on the screen and the user asked to fill in the highlighted blanks. As the user makes entries, the cursor jumps to the proper place on the form. The user may take advantage of special function keys to enter repetitive data, send special commands, or transmit the data on the screen. Obviously a dumb terminal would not be able to respond to this kind of powerful program. Your Apple is, however, up to the task if you have the right software. Various degrees of terminal emulation are available in the products from several software distributors.

Control and Interface Options

In a few years, communications programs will be fully integrated with other programs under a master operating system. Establishing a telephone connection and exchanging files will appear to be a simple integrated function just as adding numbers on a spreadsheet or inserting a character in a word processing program is now. But for now, communications software is interactive and even a little demanding. You have to know all sorts of things about baud rate, word length and parity setting and specify these factors for the software. In exchange, communications software should give you good flexibility and control over your system. I will briefly list some of the most useful control and interface functions.

"In a few years communications programs will be fully integrated."

A good communications program should allow you to access at least some of the commands related to disk files. You need to be able to see a disk directory so you can find the name of a file you might wish to send. You should be able to delete files to make room on a disk and possibly to rename files to keep things orderly.

It is useful to be able to review the data contained in your system's capture buffer without going off-line. This feature can improve the use of electronic mail because you can review what the other person said while you are composing your reply. The ability to use a simple editor on the data in the capture buffer will allow you to clean up a file before it is written to disk.

You can usually use an editor or word processor to print a file once it has been saved on a disk, but it is sometimes useful to have the printer provide a copy of the information as it is coming in. However, some printers cannot keep up with a constant flow of data at 300 baud. If your smart terminal software allows you to interface to a printer, it should provide a buffer to hold data until the printer can catch up. The size of this buffer is limited and you can't expect the program to hold enough data for some of the slow daisywheel printers to catch up to a 300 baud circuit, but a print buffer able to hold several hundred characters can be useful.

The ability to store frequently used data and to make it easily available can be an important feature. Some programs store lists of phone numbers that can be automatically dialed with one or two keystrokes. Special files that store the proper word length, baud rate and configuration commands for various host systems are also a common feature of data communications software. Many programs allow you to store strings of characters called macros. These macros are transmitted out the communications port with a single keystroke. This capability is useful to store complex system sign-on codes and frequently repeated phrases.

The ability to communicate at speeds faster than the common 300 baud is a useful feature in a communications program. The prices of 1200 baud modems are coming down rapidly and more people are discovering the joys of higher speed operation. Even if you don't have a 1200 baud modem, you may want to communicate with another local system and there is no

"Some programs store lists of phone numbers that can be automatically dialed with one or two keystrokes."



reason to limit yourself to 300 baud in the local mode. But many software packages, particularly those written in Basic, cannot support speeds higher than 300 baud, so you should examine any prospective purchases for this capability.

Some or all of these features must be combined with an easy-to-use command structure, easy installation, and good documentation to make a good communications program. Let's look at some examples of real communications software to see what you can get for your money.

SDS Software

Southwestern Data Systems has produced a family of excellent communications software for the Apple II. Their "Professional" software series has different programs for users of Apple DOS, Pascal or CP/M. ASCII Express was one of the first Apple terminal programs on the market. It was good when the author, Bill Blue, originally released it, and subsequent revisions have made it better. ASCII Express is an Apple DOS program that is available in two versions.

The program called simply ASCII Express provided a good file transfer and file capture capability. It has many loyal and faithful fans and will give you all of the data communications power a casual user could want. ASCII Express has a list price of $80.

A more powerful program, ASCII Express Professional, provides every one of the smart terminal features described above. It has very strong file exchange capabilities and uses the Christensen protocol. It has good terminal emulation capabilities, but the user is left to determine the best way to configure the Apple's limited keyboard to match the capability of a commercial system. ASCII Express Professional lists for $130.

Z-Pro Professional is an SDS product for CP/M users, and P-Term Professional is designed for those operating with Pascal. They can provide you with all of the desirable smart terminal features. All of these products are well documented and easy to use. They all support a wide variety of communications and display accessory boards. Z-Term Professional has a list price of $150 and P-Term Professional costs $129.95. You can contact Southwestern Data Systems at 10761-E Woodside Ave., Santee, CA 92071. Their telephone number is 714-562-3670.

Softerm

While the SDS Professional series includes powerful general purpose packages, other developers have produced programs with specialized features. Softronics distributes a program called Softerm that has many good file transfer and disk utility features, but it specializes in making your Apple II behave exactly like one of several commercial terminals. Among the terminals that Softerm can emulate are the popular Digital Equipment Corporation VT100 and VT52, the Lear Siegler ADM-5, the Hazeltine 1400, 1410,



and 1500, and the Televideo 910. Softerm tackles the difficult job of making the limited Apple II keyboard perform like those on terminals with nearly 100 keys and switches.

The file transfer options in Softerm are controlled by the use of 22 different commands. The command verbs actually make up a high-level control language unique to the Softerm program.

Softerm requires at least 48K of RAM and one disk drive to run. If you are going to take full advantage of the capabilities of Softerm, you should equip your Apple with an 80-column board and a video monitor. The program can be used with a wide variety of modems and display cards. The manual for Softerm is excellent, but the program has many options and you will probably have to study and practice before you are completely familiar with it.

Softerm carries a list price of $150. Contact Softronics, 6626 Prince Edward Place, Memphis, TN 38139. Phone 901-755-5006 for more information.

Transend

SSM Microcomputer Products markets a family of programs they call Transend. Transend 1, 2 and 3 provide an assortment of communications capabilities that go from the simplest form of smart terminal to automatic electronic mail.

The Transend family operates from menu-driven commands. The programs contain chains of menus that lead the user through the various options. Transend 1 can support 1200 baud communications and file transmission and capture. It has a retail price of $89. Transend 2 can transfer files using an error detection protocol. This is, however, a protocol unique to Transend, so it can only be used to exchange files with another Transend equipped Apple. Transend 2 carries a price tag of $149.

Transend 3 adds an electronic mail system able to automatically transmit information from one Apple to any other number of Transend-equipped Apples. Transend can answer incoming data calls and accept and file incoming "mail" automatically. The program can refer to an internal date/time clock and automatically dial remote systems and transmit files that are specified on a command list. The system can even address messages to different specific users at one mailbox location. An integrated modem such as the Hayes Micromodem II and a hardware clock are required to use the full capabilities of Transend 3. The program retails for $275. For more information on the Transend line, contact SSM Microcomputer Products Inc., 2190 Paragon Drive, San Jose, CA 95131. Phone 408-946-7400.

Any Which Way...

There are many ways to provide an Apple II with a communications capability. The choice of modems and software must be driven by your needs and pocketbook. But the flexibility built into the Apple II can provide you with a wide choice of power and capability. ■

Worlds of Information

Vast reservoirs of information can be yours in the time it takes to dial a telephone.

by Peter Ferrand and John Davidson

One of the simplest and most useful computer services is a local bulletin board. In its most basic form, this is a computer with a modem that you call and sign on to, and then get a chance to look at a list of messages others have left. The messages can be almost anything, but in general they run heavily to the purchase and sale of computer hardware and software, and to questions and answers on computer related problems.

Most bulletin boards are privately run by a computer hobbyist (called a SYSOP, for SYStem OPerator) on a microcomputer. SYSOPs frequently arrange the bulletin board to suit their individual personalities, so one can't make too many generalizations about the details of bulletin board operations. Many bulletin boards are specialized, designed to serve the interests of those owning a certain type of computer (Apple bulletin boards—ABBSs—are abundant) or special interest, including such developments as a dating service.

Since the bulletin board may be operating on the SYSOP's only machine, it may have restricted hours, outside which time your telephone call won't be answered. Some SYSOPs keep a register file of all users, and require that you apply for membership by answering questions at the time of your first call. They often check for your listing in the phone book, then give you a password when you call in a day or two later.

Traditionally, all these services are free, although a few SYSOPs have been asking users to subscribe in order to get a password. Whether this will become a trend or not is still to be seen.

Some SYSOPs take an active part in the bulletin board, frequently issuing messages and comments; others are more reticent. Just remember that it's entirely run as a private service, so the SYSOP can do just about anything s/he wants to. Most, for instance, will quickly delete any messages that are in bad taste, and some will delete any from those with obviously phony names. People lose patience with too many Darth Vaders on a system.

One step up from the simple bulletin board is the system capable of uploading and downloading files, a capability most bulletin boards have. Uploading and downloading means the transfer of files—programs, text, whatever—to the other system, where they are stored, generally on a disk, so that they may be retrieved later.

A note on basic terminology is in order—your computer (the local computer) talks to another computer at some distance (the remote system, or the host computer system, or just the host). Uploading and downloading then, and other similar terms, are expressed with respect to the host. You upload to the host, and download from the host, and then everyone will know what you're saying.

Since programs which run on one type of computer are apt not to run on another, most of the bulletin boards which support uploading and downloading specialize in programs for one type of computer.

One of the most universal of remote systems having upload and download capabilities is the remote CP/M (RCP/M) system. The biggest advantage of the CP/M operating system is that it can be used on many different types of computers. In theory, a CP/M program written on one machine could run easily on another.

For the Apple II series, one or two plug-in cards are required for CP/M compatibility. Since CP/M is written for an 8080, 8085 or Z-80 series processor, the adapter card must provide such a processor, as well as other inter-

Peter Ferrand is a computer consultant specializing in computer communications and readable documentation. Pete answers to WB2QLL, and receives mail at 355 Lake Street, Nashua, NH 03060. John Davidson is a physicist and engineer with a bent for writing. He is based in Marlow, NH. Readers are encouraged to tell the authors of any unusual open databases they encounter.



face electronics. CP/M usually assumes a video screen capable of 24 horizontal lines 80 characters wide, so the adapter electronics must support this.

CP/M version 2.2 is used by every RCP/M system we know of. However, with changing times and ever larger machines, other CP/Ms, such as CP/M-86 (runs on an 8086 microprocessor), have surfaced. Programs for these will no doubt appear on remote systems. Hardware adapter cards to run those programs are also beginning to appear.

In lists of bulletin boards system phone numbers (and nearly every bulletin board has a list of other system telephone numbers) other names for classes of systems appear—CONN-80, PCCS, PMS, etc. These are not necessarily the names of computers they specialize in, but denote the name of the software used by the remote system. The software used implies such things as the display format, protocol, on-line procedure, etc. Once you get familiar with one type of system, you can't go too far wrong by just calling. Most systems are similar enough to let you figure out most of what's going on, and there usually are on-line help files available. You can, of course, always leave the SYSOP a message asking about features you can't understand.

We've been using the terms "software" and "programs" rather loosely to describe what may be available on these systems. What you're going to find on most of the systems is public domain stuff of various types and lengths, frequently written by individuals for their own use. Putting it up on the system for the world to use frequently is an afterthought. You will find a number of good utilities, such as the modem and disk inspection programs available on most RCP/Ms. Once written, these have been modified, put back on the board, then modified by someone else, until they become debugged and useful. The trail of those who've modified the program is usually placed in the header of the assembly-language program listing.

Don't expect to find copies of the $500 copyrighted programs you see advertised in the magazines; most SYSOPs are scrupulous about potential copyright violations and would never allow a copyrighted program on their system. And the available programs are not guaranteed to work—a good number of them don't really do what you'd expect them to do. You might get some help by contacting the author, but you should view these shortcomings as starting points to hone your own software skills.

If you do contact the author, do it gently, and if s/he's busy, take no for an answer. People put stuff on the machine out of the goodness of their hearts; if you bug them you may dissuade them from doing it again.

In addition to programs, text and document files are common on these systems. These run the gamut from documentation needed to run one of the programs available on the system to long sad tales of someone's problems with a piece of hardware or software. Some systems, such as the ABBSs, provide a short description of what each downloadable file is. Others are more cryptic, leaving you to figure out from an eight-letter name what it's all about. The basic RCP/M system falls into the latter category; many, however, have a catalog file appearing in the directory to provide the descriptive function.

One thing that confuses some newcomers—the difference between a bulletin board and an RCP/M. While most RCP/Ms have a bulletin board service, that portion of the program is called a CBBS, or just BBS. The RCP/M means, as it always does, the operating system, and all you're sure of when signing in to an RCP/M is access to a remote computer system with upload and download capability. When you sign into an RCP/M, you sign in to the bulletin board (if there is one), and when you exit the bulletin board, you can, if you select the proper menu option, be dumped into the RCP/M and get the usual A prompt.

RCP/M systems implement one kindness to your time and phone bill; many programs are stored in squeezed form, to take up less transmission time. If you don't have USQ.COM, the unsqueezer program, you download it (it's not in squeezed form) together with its documentation USQ.DOC. Having that, you can get any squeezed program you want from the host, then unsqueeze it later on your machine.

As a newcomer, you will probably do more downloading than uploading. The upload process is really quite simple. Once you have a program suitable for a particular host, your software documentation will tell you how to send it out from your system. Instructions on what to tell the remote system vary substantially from system to system, and are available from the system help files or the SYSOP.

One problem that ticks SYSOPs off

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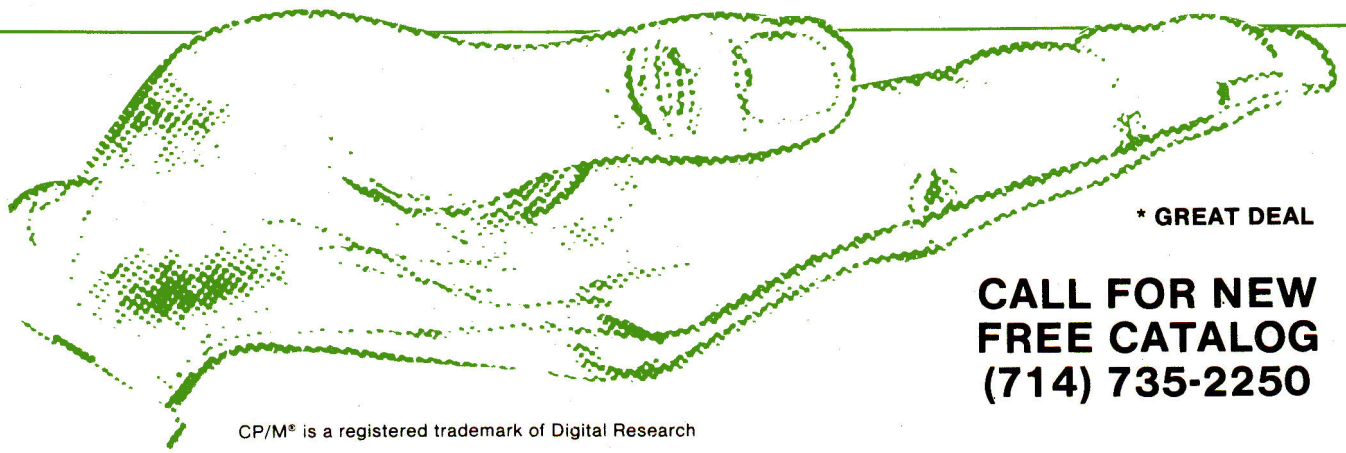

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Sources for information on public domain facilities:

Because remote telecomputer facilities can be so easily created (you only need a small microcomputer, a modem, and a bit of software) they come up fast, and disappear even faster. Thus any published list will be obsolete before it is written. Take any list as a starting point for experimentation and consider yourself lucky if one third of the numbers work. Most on-line facilities maintain directories or listings of other facilities.

An excellent hard-copy source is *The On-Line Computer Telephone Directory* from OLCTD, PO Box 10005, Kansas City, MO 64111. This periodical is available by subscription at $9.95 for one year and $15.95 for two years. Compiled and edited by Jim Cambron, the January 1983 issue—the latest issue of OLCTD we've seen—contains listings of about 330 various facilities, as well as tutorial and review material.

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is that of "takers." A taker is one who checks into a facility, downloads everything in sight and then departs, often without even logging off. On your first few trips to the well, you may not have much to contribute, but this should be a two-way street. Try to contribute something useful for every thing you get.

Big Systems

A major step up, both in size and complexity, from the local bulletin boards are the large multipurpose timesharing nets—CompuServe MicroNet and The Source, plus others of less ambitious scope. These networks are aimed squarely at the small business and personal computer user, and aim to provide almost every conceivable service that would meet a relatively large market.

There is one other major difference—they charge by the hour. To en-

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courage personal computer users, the nighttime rates are low—on the order of $5 per hour, but the daytime rates are four or five times that. The reason, of course, is that business demand is very much higher during the day, and the personal user fills in the rest of the time.

Once you sign up with a service, you're deluged with information to teach you how to use the hundreds of services and databases. MicroNet's index has about every service you can think of, and many that you never would have.

The services are of different types—you can read the news from wire services and newspapers, have casual chats using the CB simulation, look through a national classified listing, and send mail electronically. Some of the services—like the store for consumer goods and financial reports—are available at extra cost.

A sampling of on-line databases and accessible computing facilities:

Prices, where shown, are meant as general indications, are subject to change, and do not show charges for other services, such as data storage.

Dow Jones News Retrieval Service
PO Box 300
Princeton, NJ 08540

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National Library of Medicine
8600 Rockville Pike
Bethesda, MD 20209

Medical databases intended primarily for physicians and available either direct or through other services such as Dialog. Medline, *Index Medicus* from 1966 to the present. Chemline, a chemical dictionary with about half a million chemical names and synonyms. Toxline, information on poisonous drugs and chemicals. Catline, an electronic "card catalog" of the books and periodicals in the National Library of Medicine collection. NLM also has several more specialized databases pertaining to specific illnesses.

Continued on page 86

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Continued from page 84.

On-line Computer Library Center
6565 Frantz Road
Dublin, OH 43017

OCLC provides a number of bibliographic services, both on-line and off-line, primarily for municipal, college and private libraries.

Dialog Information Services Inc.
3460 Hillview Avenue
Palo Alto, CA 94304

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NewsNet Inc.
945 Haverford Road
Bryn Mawr, PA 19010

NewsNet specializes in business information, electronically reprinting periodicals before they are published in hard copy. There are nearly 100 different publications on NewsNet—most are available to subscribers of the hard copy edition at the regular rate of $24 per hour. Most newsletters are available to

Continued on page 88.

The mail and file transfer facilities open up all sorts of interesting possibilities. As we all know, the 5¼-inch disk format is often incompatible between different brands of computers. But if one person having an Apple writes, say, a CP/M program for someone else, the first person can upload the program to the timeshare system. The second person can then download the program on his machine, simplifying file transfer.

This is one of the advantages of electronic mail in general, and is available on just about every large timeshare operation. Electronic mail and its derivatives offer benefits beyond casual letters. A data file, for example, can be loaded into the system by one person, say a salesman on the road, and retrieved later by the regional office, which could in turn leave the information for the home office on the system. Because of the way the database rates and the telephone company rates are structured, as well as the flexibility provided by a service available nearly 24 hours a day, it could be as fast and as cheap as direct communications.

A glance at some of the services in the sidebar should start your mind working on some of the possibilities. A detailed explanation of the individual elements of these services would take far too much space to go into here (that's why the services flood you with information) but a few of the more popular ones include the following:

Special Interest Groups: Revolving around bulletin board type formats, questions and answers, items wanted or for sale, and equipment reviews are the staple of most of the SIGs which concern themselves with such things as types of equipment or software. Some of these SIGs also sport newsletters from the manufacturers themselves. Still other SIGs concern themselves with other aspects of hobbies or business, such as sports or gardening. The advantage of the SIGs over the local bulletin boards is that of having a national forum for like minded individuals.

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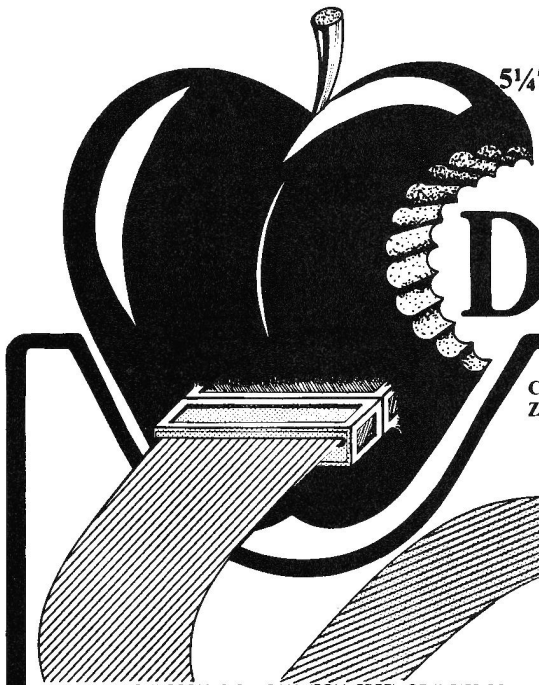

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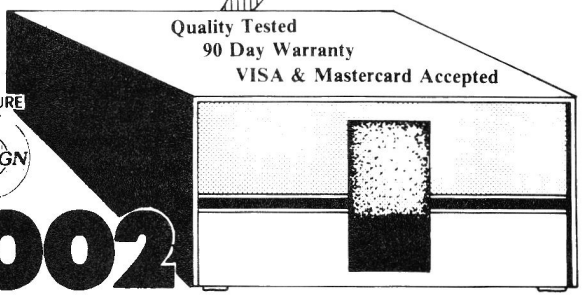

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Continued from page 86.

nonsubscribers for $48 per hour. No initiation fee; $15 per month minimum.

The Source
1616 Anderson Road
McLean VA 22102

A wide spectrum of services from electronic mail through many consumer databases to a range of specific purpose applications programs and Basic, Fortran and Pascal, along with word processing. On-line user program and data storage available. Financial news and travel information can be had, as well as "participate," a discussion group where round table messages are sent involving special interests, such as software, travel and networking. Initiation fee of $100, hourly fees range from $20.75, prime time, to $5.75 between midnight and 7 am. Extra fees for using certain databases.

CompuServe—Micronet
PO Box 20212
Columbus, OH 43220

Another broad-spectrum facility, CompuServe lists a number of information services as well as languages and cross assemblers. Some of the more popular features include a citizen's band radio simulation, special interest groups for different computers, software, and hobbies, and interactive games. CompuServe also has several news services, both newspapers and wire services available, as well as financial and commodity reports. Special purpose services include marine and aviation weather, the Official Airline Guide (a monthly nationwide schedule), and updates on governmental developments. Initiation fee is $24.95, with an off hour rate of $5, and business hour rate of $20 per hour, with extra fees for certain services.

Delphi
General Videotex Corporation
377 Putnam Avenue
Cambridge, MA 02139

A brand new comprehensive system started in February, Delphi features electronic mail and banking, a UPI

Continued on page 90.

term "electronic publishing." Though it would be much more expensive to go through an entire paper by computer, there are two big advantages: speed and selectivity. This is a point we'll be seeing in other aspects of computer communications, but here we'll say that in many cases, news can be had faster via computer. The databases also sort the newspapers out, so you could read what three or four different newspapers have to say about one subject on a given day. In addition to general news, news on special subjects, such as sports, movie reviews, financial, farm, and new products, is available. So too are special services such as marine and aviation weather. Information in the form of several magazines and newsletters is available, and even an occasional whole book. Grolier's and World Book Encyclopedia have also made appearances on the display screens.

Games: Lots of people use computers primarily for entertainment, so the computer services have lots of the games on hand, although having to transfer data by modem means high speed interactive assaults on alien beings are awkward. So too are games involving complex screen graphics, since the games have to be compatible with a variety of displays. Compensating for this are interactive multiuser games, such as CompuServe's Space Wars, which can be played by up to 20 people at a time, playing against each other, as well as the computer.

Also in the entertainment category are gossip columnists and personal-problem solvers, personality tests, IQ tests, biorythms, etc. And since people like to talk to each other, the services have an on-line conversation mode so you can type to one person, or a lot of people, just like a big party line.

Miscellaneous: Really, there are many services which are hard to categorize, but you could find them handy. It's possible to inspect airline and train schedules, make reservations, and plan trips. Household hints, coupon clipping news, and special games and tutorials for children also on line.

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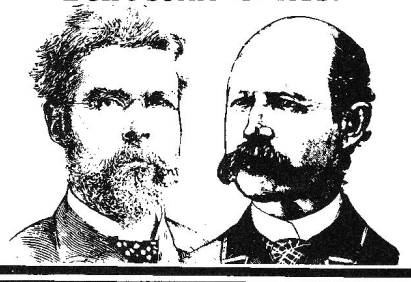

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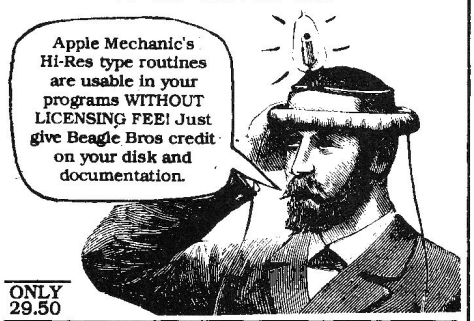

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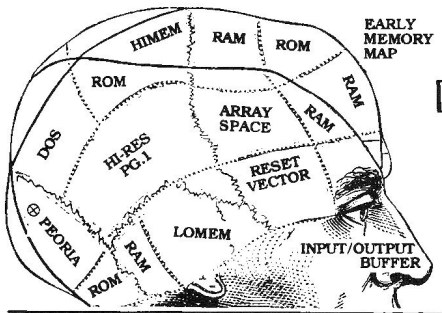

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SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
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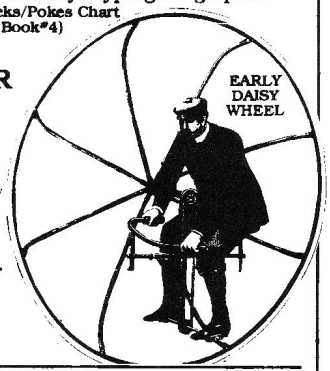

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Circle 179 on Reader Service card.

Continued from page 88.

newswire, Comp U Store, airline information, and a bulletin board. On-line data includes the Kussmaul 20,000-entry encyclopedia and access to Dialog and ITT Dialcom, a library of business and technical computation programs. Initiation of $49.95, $5 per hour evenings; free telephone lines to a few major cities and access through Tymnet at extra cost elsewhere.

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Medical Information Net
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American Medical Association-sponsored MED/MAIL is a new physicians' electronic mail service and bulletin board displaying schedules of continuing education courses and upcoming AMA meetings. AMA/NET is a collection of (at this time) four databases of medical information for education and treatment: drug information—1200 drugs listed; disease—edited information on 3500 diseases; medical procedures and coding—common practices and nomenclature; and socio/economic literature—on medical practice management and costs. Open to the public. Initiation $100 ($75 for AMA members). Hourly rates: MED/MAIL, $16 prime time, $8 non-prime; AMA/NET databases, $27.

everything? Here's a group of databases and database service gateways where you'd be hard pressed to think of a subject you can't quickly get information on. There are essentially two types of databases, those operated directly by the firms which have gathered the data, the other, sometimes known as "gateways," which collect databases prepared by others into one central computer facility. Information is thus available through one number and with one subscription, and may be cross-referenced.

Probably the best known and largest of the gateways is Lockheed's Dialog, based in Palo Alto, CA. Beginning in 1969, as an in-house service with a single database, it now has more than 150 different databases, with half a million subscribers. In contrast to the general interest systems described above, most of the databases are aimed at a high level professional in the various fields covered, although with the variety available, almost anyone could find something of interest from time to time.

Tele-Typesetting

Many years ago, economic conditions and unions forced telegraphic typesetting on many of the newspapers of the country. A special shifted six-level code was used in conjunction with paper tape. While this technology was pretty much restricted to specific networks such as newspaper wire services, the transfer of ASCII files for typesetting is on the rise. The main problem is one of keys and commands.

Put simply, typesetting has many more variables, controls and characters than a typewriter or computer printer. This means that you must find out from your composing room service the specific commands to signify particular things—non-ASCII print characters (for example, Greek letters), change of type face, leading (the vertical distance between lines), and so forth. Then you have to make sure that you can insert these characters into the file and transmit them without their affecting either your system or the transmission link. (For instance, an ASCII EOT, control-D frequently will close a file.) Alternately, you can "spec" the file externally (in words), and the typesetter then goes through and inserts the proper commands for the typesetting equipment manually.

Either way, there may be a savings of time if the typesetter is beyond visiting distance, but the big savings is in the avoidance of one more labor-intensive and error-prone manual keyboarding of the manuscript. If you (and the typesetter) are using an error-correcting protocol such as XMODEM, there should be no errors introduced in the typesetting process. If your original transmission was well proofread and clean, further proofreading can be minimal with few "do over" corrections (requiring another mail trip delay).

"The big savings is in the avoidance of one more labor-intensive and error-prone manual keyboarding."

The Nuts And Bolts

The on-line operation of all the large services is based on the time honored principle of timesharing—the host computer divides its attention among all those who call. Operation of the local bulletin board is usually limited to a single user at a time who takes control of the entire computer operation. With both of these, the access method—the telephone and modem—is transparent; that is, it would make no difference if you were in the same room with the host, and your computer were connected to the host with a direct cable.

This means that your computer, in order to talk to one of these hosts, must appear to the host to be one of its terminals. Terminals, in this case, are defined as devices with keyboard input and visible output. Everything typed will be sent directly to the host, which will return processed information to the operator in visible form. The origins of this use go back to the days when teleprinters were the primary terminal in use. In an attempt to come up with some sort of standard, the lowest common denominator was established as the simple teleprinter, so that, with only a few augmentations, your computer must appear to the host to be such a basic device.

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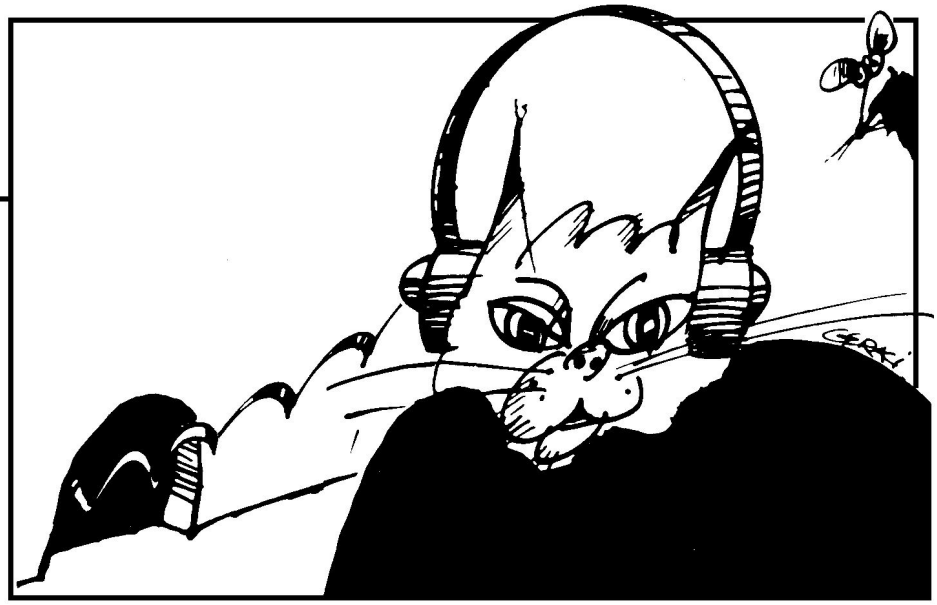

Recognizing that teleprinters are now the exception rather than the rule, most hosts will allow for some options designed to make the video screen display look better, and provide for more editing features. Timesharing systems, and nearly all bulletin boards, have configuration options, where, by answering questions, you tell the host what kind of a system you have to optimize your video display. Most of the timeshare systems go to some lengths to make sure that whatever system you have, as long as it's capable of meeting minimum standards, you can be in communications.

Also associated with the timesharing systems are general purpose networks such as Tymnet, Telenet, Data-Pac and Uninet. These networks are owned by firms apart from the timesharing computer owner. The host system has an agreement with one or more of the networks, and if you call on these networks, the network will generate an additional charge. Who pays that charge varies by which service you are accessing. For instance, with CompuServe, an additional charge of $2 an hour is imposed (in the U.S.A.); Dow Jones pays the bill if you use its service.

It's hard to generalize about the rate structure of the timeshare services, but the systems prefer that all your charges get billed to one of the popular credit cards, although some will agree to send you bills.

Armed with some basic equipment, the sampling of sources in the sidebar, and your plastic money, you can explore a whole new world. ■

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Softlights

By Barbara Huntington

Aha! Fred has to go to a school meeting, the ad is due, and I get to write Softlights! We just returned from the Computer Faire in San Francisco where our 3½ year old daughter, Melody, again saw her heartthrob, Rainbow (the mime from Silicon Valley Systems). She fell in love with him at the San Francisco Applefest and keeps his autographed picture on the wall of her room. In honor of Rainbow who is so gentle and kind to Melody, we're offering the **Word Handler** wordprocessor (#6320) for **$159** ($40 off list).

While I was writing, Dave Carmen, who is the TV weatherman for the Central Valley of California walked in. In keeping with the new trend to lower software prices, and to help me come up with something special for my first Softlights column, he authorized a special sale on his **Computer Almanac** for **$17.99.** This is our program that shows sunrise, sunset, weather forecasts, loan amortization, biorhythms, birthstones, anniversary gifts, and more.

Speaking of gemstones, we have genuine tiger's eye apple necklaces for $10. I fell in love with these at Applefest and conned Fred into carrying them. They're great for female computer freaks as well as computer widows who want an Apple, too (!!?)

I'm really the computer novice compared with Fred, but I have played with Visicalc to do financial statements at which I am equally a novice. That's why I'm eager to see the new CDEX **Training for Visicalc** (#2600) which we will sell for **$50.69.** (The first ones zoomed in and out of here so fast I didn't get to look at them.) We also will be carrying all the learning aids for dBase II. By the way, we now have **dBase II** itself for only **$479.**

Don't forget we have **Great Grandma Huntington lower case chips** (Rev. 7, later) at **$15** and **Shift Key adaptors** at **$9.99.**

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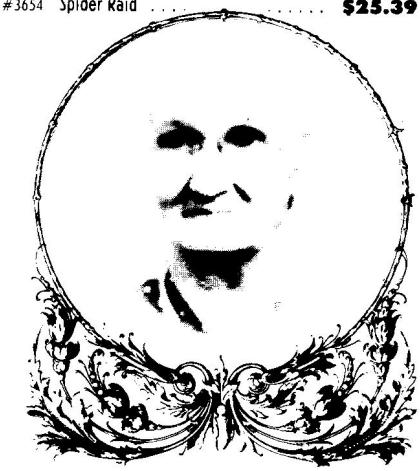

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Get On-Line with Apple-Cat II

This is more than just a modem—our reviewers insist Novation offers a flexible communications system.

by Albert A. Alexy, Jr. and Darrell L. Zwemke

If you have always wanted a modem for your Apple II, but wondered if you really wanted to spend all that money on "just a modem," then maybe it's time you looked at the Apple-Cat II by Novation Inc., 18664 Oxnard St., Tarzana, CA 91356. (Price: $389.) The Apple-Cat II not only gives you a Bell 103 and 202 series compatible modem with full auto-answer/auto-dial capabilities, but Novation also includes an RS-232 serial bidirectional I/O port, sockets for TouchTone receiver and 2716 EPROM chips, relay control for an external tape recorder, BSR remote module control and provision for an external handset for voice communications. The Apple-Cat II, with the optional 212 upgrade module, is also compatible with 212 series 1200 baud full duplex modems, yet comes standard with 1200 baud half duplex.

The CAT (aka Apple-Cat II) modem is really a versatile piece of equipment. For those users interested in getting their CAT up and running as fast as possible, Novation supplies, with the modem, an excellent program called COM-WARE II on disk. COM-WARE II is a binary program that directs the user into the various operating modes by simply pressing a single key selected from an on-screen menu. More on this later.

For those of you who enjoy either writing your own programs, or maybe just changing things around a bit, the CAT allows you almost total access to its control registers and lines, baud rates, a D/A (digital to analog) converter, and many other hardware implemented functions. This is possible due to the CAT's unique design.

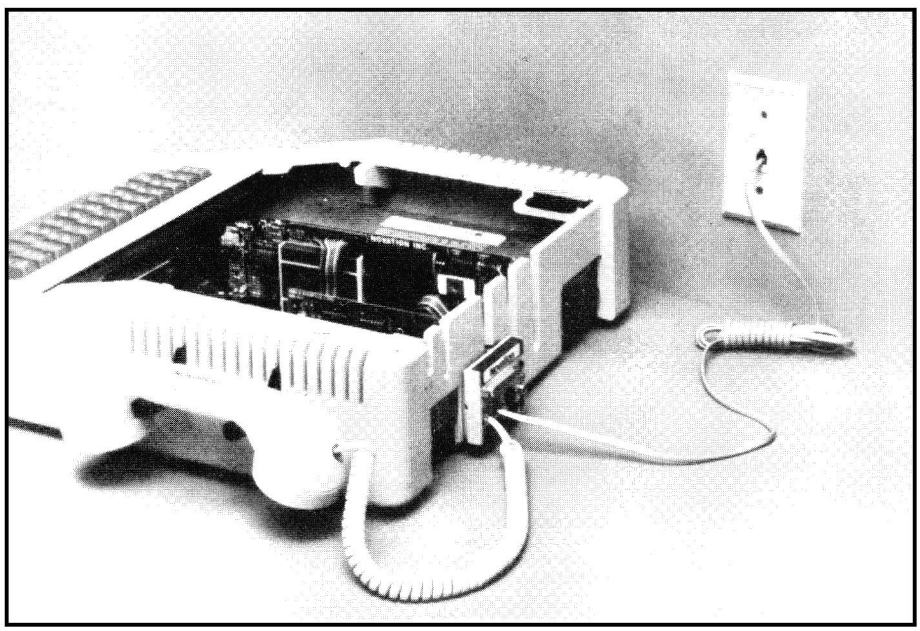

Photo 1. Novation Apple-Cat II modem installed in Apple computer (courtesy Novation Inc.).

Hardware

A single on-board module contains the Novation Phone Line Interface (PLI), which allows FCC-approved direct phone line connections to be made. Two custom LSI (large scale integration) integrated circuits perform most of the hardware functions on the CAT. One IC contains all the soft-

Address correspondence to Albert A. Alexy, Jr., 1230 Palisades Way, Rock Springs, WY 82901, or to Darrell L. Zwemke, 1010 Bridger, Green River, WY 82935.

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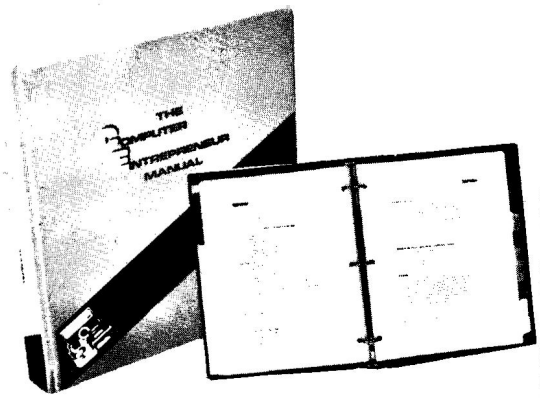

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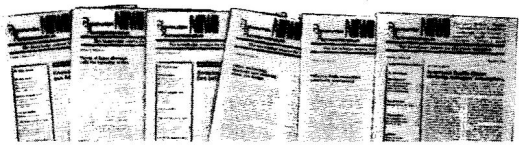

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Table 1.
Keyboard commands for the COM-WARE II program.

(P)ick Up—takes the phone off hook for use with the optional handset. The keys 0–9, # and * generate their respective TouchTones.

(H)ang Up—hangs up the phone.

(A)uto Dial—the last number entered in this mode will be auto dialed. A (R)e-dial subcommand is available to dial the number again.

(C)hat—configures the Apple II as a dumb terminal.

(M)emory—configures the Apple II as a smart terminal. All characters received by the CAT also go to a 27,000-character memory buffer (using a 48K Apple), as well as to the screen.

(U)nattended—Unattended Answer Mode. The CAT waits for the phone to ring. At the end of the first ring, the CAT will answer, send a short message, then wait for the user's reply, which will be stored in memory. Upon loss of carrier the CAT will hang up.

(F) Hi-Speed—Hi-Speed Transfer. This is our favorite mode of sending data. Its 1200 baud rate is *four times* faster than the conventional 300 baud found on most modems and will send about 25 sectors of data per minute. In this mode the CAT is running half duplex with a protocol unique to Novation.

(I) Echo Toggle—toggles between local and remote echo.

(L)oad—loads binary or text files from the disk.

(S)ave—saves binary or text files to the disk.

(X) Send—transmits the data in memory, using the parameters set in the configuration file.

(B) Print—prints the data in memory to whichever output device has been selected.

(K)eyboard—the Keyboard to Memory mode allows a message to be composed in the buffer and transmitted later in one continuous high-speed stream, saving telephone time and charges.

(R)econfigure—sets up the configuration files for both the terminal and printer. It allows the user to change terminal characteristics such as speed, TouchTone or pulse dialing, internal or external I/O, originate or answer mode, number of data bits and stop bits, parity and a self test function. Printer characteristics such as types of handshaking (X-on/X-off; ctrl-Q/ctrl-S), baud rate, line feeds and delay after a return.

(D)os—accesses DOS through the main menu to check a catalog or change the default slot or drive number.

(V)erify—generates a CRC-16 (cyclic redundancy check) checksum to verify the integrity of any data that has been sent or received to memory. We have *never* found any errors in any transfer that had a verified checksum.

(N) Serial Number—generates a CRC-16 checksum on the COM-WARE II program itself. COM-WARE II will generate an error message if this checksum is not correct.

ware-selectable UART (universal asynchronous receiver/transmitter), RS-232 and modem control functions. The other 40-pin chip is a programmable option selector and 8-bit D/A converter, which handles all the I/O control lines, TouchTone receiver latches and interrupts for the CAT. Audio frequencies are decoded using a single LSI multimode modem chip, controlled by the second IC.

The optional TouchTone receiver chip is easily installed by plugging the single IC into the appropriate socket. No jumpers or straps are required. Addressing for the 2716 EPROM is memory mapped into the Apple's $C800 ROM expander area with the first 256 bytes also decoded into the slot driver area.

Connection to the "outside world" is easy using Novation's Interface Expansion Module (Part #490403) (see Photo 1). This module conveniently groups an RS-232 connector for printer connections, modular telephone jack, BSR I/O and telephone handset connectors, phone jacks for tape recorder audio output and motor control, and an LED to indicate when the phone is off the hook. While use of this interface makes connections easy, it is not absolutely essential, since there are no active components within the interface. Therefore, direct connection to the appropriate pins on the CAT board will be electrically equivalent. For those of you not so inclined, Novation does supply with the CAT the two connectors necessary for connection to the phone line and handset.

Software

The Apple-Cat II does not come supplied with any firmware, but at least two programmed ROMs are available now. One from Novation, which configures the CAT for Baudot code, is for use by the hearing impaired person on the Deaf Network. The second is from Rak-Ware and emulates the controls of the Hayes Micromodem II. Neither chip would allow full remote control of the Apple, so we have written our own EPROM to fill this need.

COM-WARE II is a 43-sector machine code program supplied on disk, along with several other necessary utility programs, which leads the user into the various operating modes. Pressing a single key selected from a menu displayed on the screen gives the user complete control of the modem. While COM-WARE II is a fine piece of software, what impressed us most was that Novation chose to include it at no extra cost. A brief description of COM-WARE II commands is listed in Table 1.

Applesoft or Integer programs can be readily exchanged, but they must first be converted to their binary equivalents using the A-convert or I-convert utility programs supplied on the COM-WARE II disk. Binary or Text files can be sent directly with no modification.

We feel the software supplied is adequate to start logging on to one of the data services or local bulletin boards, and to exchange Apple programs or data with other CATs. Using the Memory On command, data can easily be extracted from most other modems, such as the D.C. Hayes Micromodem II. Sending data from a CAT to a Hayes is much more difficult, since Hayes does not supply a similar Memory On mode. This can usually be overcome by the Hayes user buying a commercial program that would be comparable to the one supplied free with the CAT.

Our only complaint with COM-WARE II is the lack of a Remote Terminal function so we could call the Apple and run it as a remote computer. This was probably left out intentionally as it would be hard to keep it from being overwritten in RAM. This has, however, been circumvented by writ-

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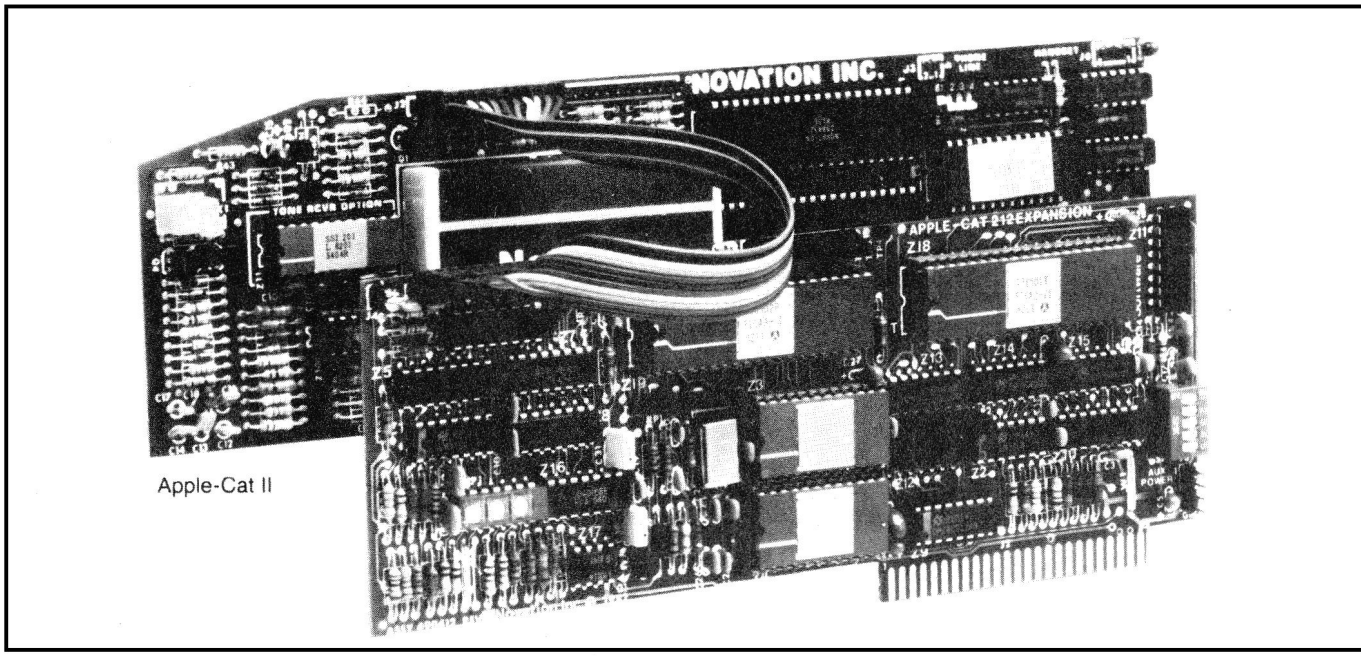

Photo 2. Apple-Cat II and 212 Upgrade card (courtesy Novation Inc.).

ing the appropriate firmware into a 2716 EPROM.

Additional Uses

The CAT provides both audio input and logic control for an external speech synthesizer. We have put together, with a simple program, either a Type 'N' Talk or a John Bell speech synthesizer, along with a cassette tape recorder to form a "FREE" telephone answering machine. It can also be programmed to dial any number you choose to let you know you have just received a call. A comparable answering machine would cost over $130.

Being amateur radio operators, we have used another audio port to connect our FM two-way radios through the CAT board onto the telephone line. Using the TouchTone receiver option, we are able to "tell" the CAT to pick up the phone, dial a number, and converse with the called party, while still having complete control of the phone via the CAT tone chip. A commercially available Simplex Auto-Patch can cost as much as $170.

A BSR controller interface is also provided on the CAT, and with the appropriate software it is possible to computer control any BSR remote control device. No BSR controller is required, because the CAT directly modulates the control data onto the ac power line through an optional ac adapter (Part #490405). We have not yet been involved with this aspect of the CAT, but some of its possible uses could be an intelligent burglar deterrent, or perhaps a sophisticated house controller.

What we are trying to say is that the uses for the Apple-Cat II are limited only by your imagination.

Documentation

The Apple-Cat II comes with a 35-page Installation and Operation manual that gives directions to the user on how to install the board, get it plugged in and up and running. The manual contains a full schematic diagram but does not include any real technical information. The operating instructions are nicely laid out, although in a few cases they are a little confusing. One of the problems we encountered was, when using the High-Speed Transfer mode, we were not aware of the fact that the High-Speed mode actually uses the Low-Speed mode to establish the initial connection. This was not made clear in the manual. After several attempted transfers and much decoding of the COM-WARE II program, we arrived at the above conclusion. Once we configured the low-speed modem for the proper bits, parity, speed and answer/originate mode, subsequent High-Speed transfers were successful.

The operation manual contains *no* programming information. You must purchase the *Advanced Programming Information* booklet (Part #800155), which gives the register usage and addressing necessary for programming along with a few sample machine code programs, if you intend to write any programs for the CAT. This manual is an *absolute must* if you intend to do any programming.

Conclusions

The CAT gives the user an excellent modem with which to communicate. What makes it different, though, is the CAT's ability to do so much more than just send and receive data. It is this flexibility with which we were most impressed. You don't just get a single function black box.

We may have glossed over some of the more conventional uses for a modem, such as bulletin boards, databases and just straight data transfers. We don't mean to say that the CAT is not capable of these. In fact the COM-WARE II software makes the CAT a powerful and simple-to-use modem.

The CAT has performed very well for us, although we have both had to return our boards for repair. Novation has a very fast (48-hour turnaround) repair station, and with their one-year warranty, any problems will generally show up before the warranty runs out.

We both use our CATs several hours each week. We have found writing programs (or articles) much more enjoyable and productive since we've started sending them back and forth for updates or corrections. This review, in fact, was composed using a word processor and sent back to Wyoming from Oklahoma several times with no data errors or retries. We can only conclude that anyone not owning an Apple-Cat II is unnecessarily limiting the full potential of his or her Apple. ■

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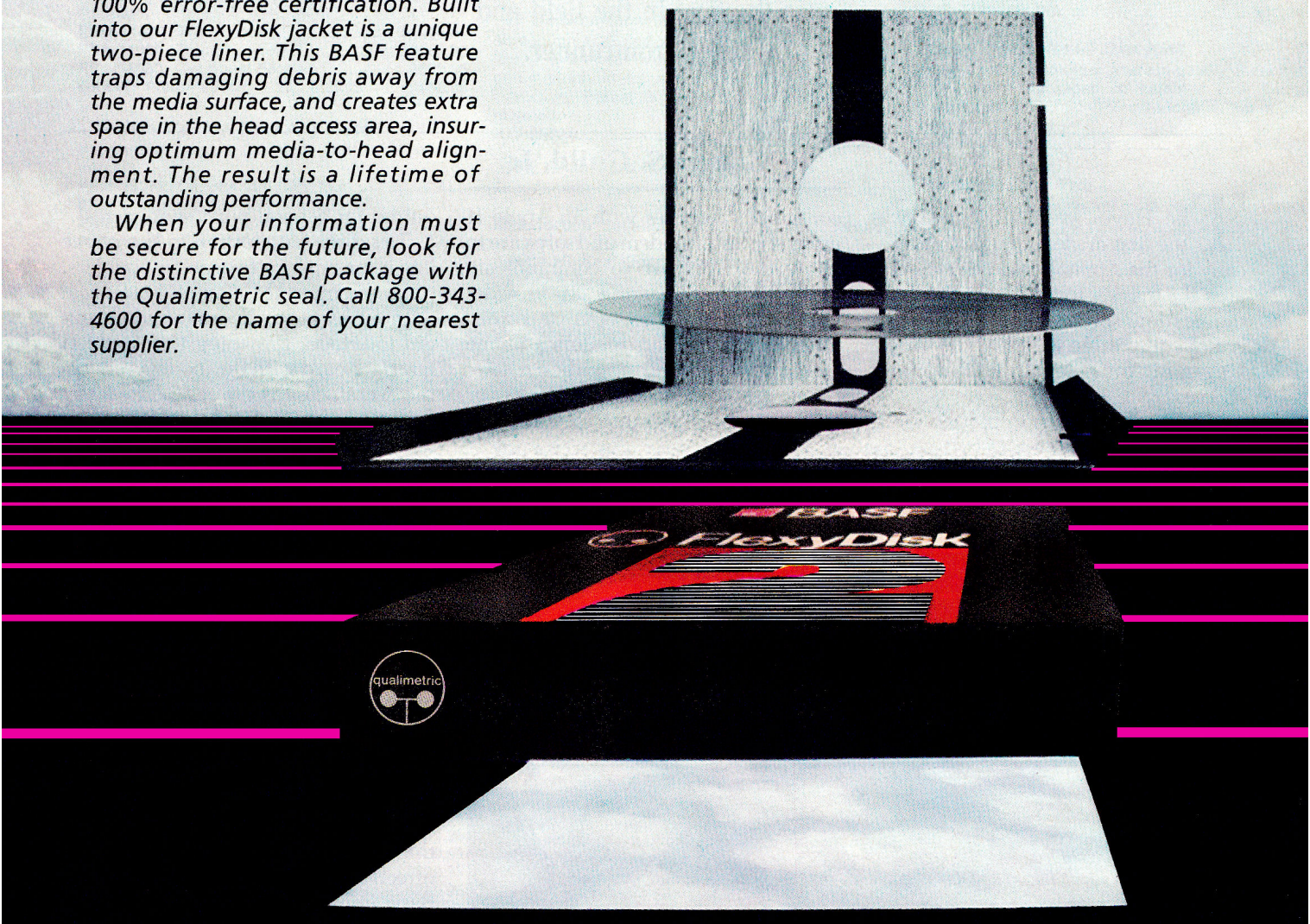

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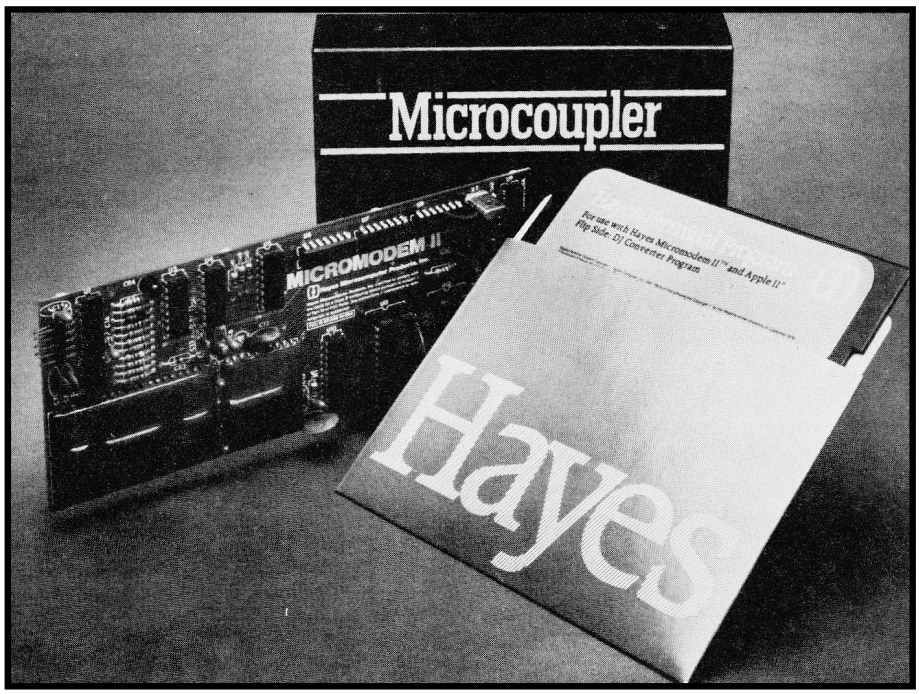
Micromodem II
The Pacesetter

The Hayes modem for the Apple II was the first in the field and is still a frontrunner.

by George S. Guild, Jr.

The Hayes Micromodem II was the first modem designed specifically for the Apple II, and as such created the market for modems and communications software for the Apple. It is also compatible with the new Apple IIe, and thus remains a popular choice.

The system is completely self-contained; it comes with an Apple II interface card, modem and software to allow the Apple II to communicate with the outside world. It provides direct connections between your computer and a regular (modular) phone jack without requiring either a telephone (as with acoustic couplers) or separate Apple II interface card (required for general purpose modems).



The Hayes Micromodem II is a self-contained system. It includes an Apple interface and smart terminal software.

The direct connection to the phone line is far superior to acoustic couplers, since the interface is purely electrical without requiring an intermediate audio interface. Providing the Apple II interface card with the modem reduces the overall cost by the cost of the interface card, usually a serial RS-232 interface card such as the $165 Apple II Communications Card.

The Micromodem II is Bell 103 compatible: It operates at the standard 300 baud data transmission rate. It does not support the much faster Bell 212A standard, although it does support a slower 110 baud rate used for the TWX or Telex communications. See the sidebar for a quick comparison of the Micromodem II and Novation's Apple CAT-II.

Support Software/Firmware

The Micromodem II is supplied with firmware on the interface card that makes the modem's capabilities directly available to the user in the Basic immediate mode.

It comes with a disk of sample programs to illustrate the modem's capabilities, but most users are limited to using the modem only in the immedi-

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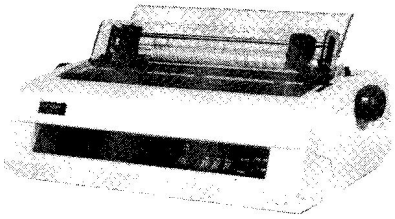

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CABLE *Please specify* — **$50.00**

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PRM-43084 *Oki 84 200 CPS parallel* — **CALL**
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160 CPS standard printing, correspondence quality printing,dot-addressable Graphics, and alternate downline loadable character sets.

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PRM-43193 *ML93 serial* — **CALL**
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Economically priced, high quality, Epson-compatible 100 CPS, 9 x 9 dot matrix, 2.3K buffer, friction & tractor feed, bit-image Graphics.

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Interfaces any Centronics parallel printer to Apple II/+/e

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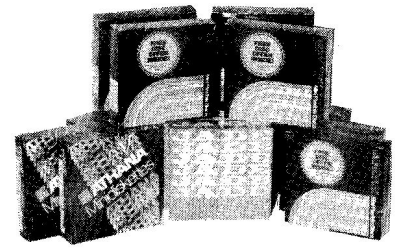
IOM-2430A *300b ModemCard* — **$299.95**



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Major manufacturer, lowest prices 5¼" SS SD soft sector w/hub rings

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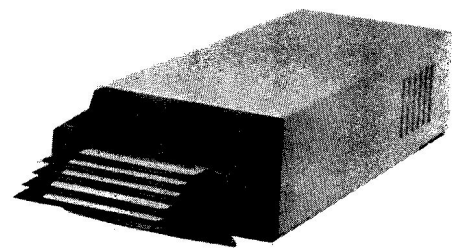

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Features	Micromodem II	Apple CAT-II
300 baud	Bell 103	Bell 103
List price	$379	$389 without options
Firmware ROM	Yes	Optional ($29)
Compatible with Basic, Pascal, CP/M	Yes	Yes
Half/Full Duplex	Yes	Yes
Auto dialing	Pulse	Pulse or TouchTone
Hangup automatically on loss of carrier and/or manually	Yes	Yes
Exit Terminal Mode	Yes	Yes
Remote Console Mode	Yes	Yes
Optional baud rates	110	45.5 (Baudot optional) 50, 75, 110, 150 600 (to external port only) 1200 (Bell 202) 1200 (Bell 212) ($389*)
Phone connection	Direct	Direct
TouchTone detect	No	Optional ($99)
Voice option with direct connected headset	No	Yes
Expansion Module	No	Optional ($39)
Cassette voice record		Yes
RS-232 connector		Yes (printer or external modem)
BSR remote control		With optional ROM
Program interrupts	Resolder	Switch setting

*If bought separately. Total cost for both the Apple CAT-II and 212 Upgrade bought at the same time is $725.

Table.
Comparison of features offered by two of the modems reviewed in this issue.

ate mode until they figure out how to program their own application.

Hayes offers an optional Hayes Terminal Program for $99 that provides a complete smart terminal package with most if not all the features you may need. It will create data disks in Apple DOS, Pascal or CP/M format from *one* program! This solves the problem of capturing or creating text for whichever operating system is desired.

Datacomm is a Pascal based program in the public domain available from the International Apple Corp. This program is no longer supported by Hayes but the price is right—free.

Major Features

The Hayes Micromodem II has most of the features you'll want. Modems can talk to each other simultaneously in both directions only if different pairs of audio frequencies are used to repre-

Circle 328 on Reader Service card.

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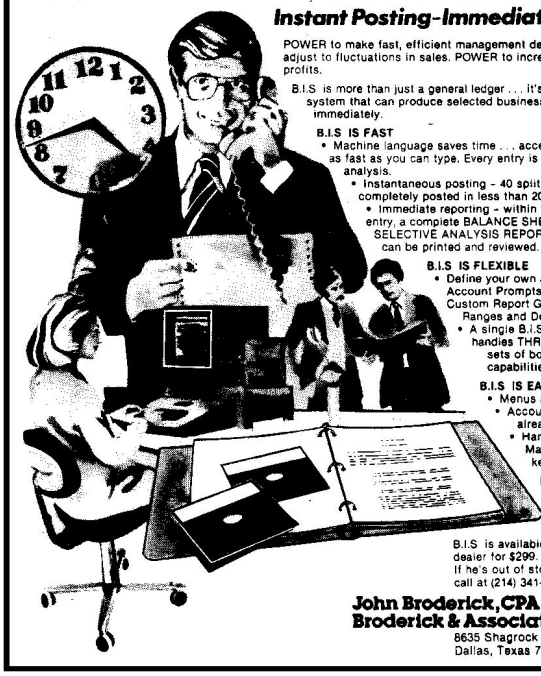

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B.I.S IS EASY TO USE
- Menus are simple.
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- Hand-holding Tutorial Manual outlines every key stroke.

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B.I.S is available from your local Apple dealer for $299.
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Circle 53 on Reader Service card.

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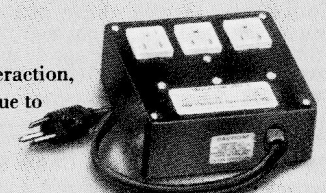

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Circle 40 on Reader Service card.

Which One For You?

The Micromodem II is excellent and capable of satisfactorily supporting the basic functions of a smart terminal for most users. The decision you must make is the classic one of price versus benefits. If you are satisfied with an excellent 300 baud modem that is supported by almost all related software, the Hayes Micromodem II may be the best purchase for the money.

If your goal is upward compatibility with the newer 1200 baud requirements, or if the bells and whistles or the special features mentioned in the Micromodem review are important to your present or future application, the Novation Apple CAT-II may be the way to go.

Check out the comparison chart in the table to see what each offers. ■

sent binary data (1s and 0s). This is accomplished by assigning one pair of frequencies to one modem (designated the Originate mode) and the other pair of frequencies to the other modem (Answer mode). Most host computers use modems in the Answer mode so originally most personal-use modems offered only the Originate mode. Since you may wish to communicate with other personal computers, you'll need both modes, and this feature is standard on the Micromodem II.

The Micromodem II lets you dial outgoing numbers under computer control (either manually from the keyboard or under program control for automatic dialing). The modem provides only pulse dialing—which is compatible with any phone line even if TouchTone service is available. TouchTone dialing is not possible with the Micromodem II. This would be a desirable feature since some non-Bell phone utilities require TouchTone for access even if your basic phone service is rotary dial.

Carrier detection refers to the ability of the modem to notify the local computer when an audio connection has been established with a remote modem. With simpler modem systems you have to listen for a modem tone with the phone headset, or simply assume a fixed time delay and hope the connection has been made. With carrier detection your Apple II will be notified when the carrier has been detected at the modem. This feature is standard on the Micromodem II.

Similarly, you'll want your Apple to know when your phone is ringing if you wish to have the Apple automatically answer the phone and enter some sort of automated digital communication process. This might take the form of an Apple Bulletin Board Service, which would provide a service to other computerists who dial your Apple II for information. It also lets you operate your Apple II from a remote terminal. This feature is standard.

Your modem can be modified to interrupt whatever the computer is doing in order to capture and temporarily save incoming characters. This is useful so that the Apple II can continue to do other functions such as screen formatting and outputting to a printer without losing incoming characters. The Micromodem II must be soldered to reverse the default interrupt disable condition. To use this feature you'll either have to do some sophisticated machine language programming or buy any of several smart terminal programs on the market. Otherwise you will lose characters, especially following a control-C (bell). ■

Circle 108 on Reader Service card.

WHAT ARE YOU WAITING FOR???

Are you tired of waiting for DOS to load and save files? Are you tired of waiting for DOS to finish so you can type again? Are you tired of waiting for your printer? When you buy **Diversi-DOS**™, you won't have to wait any more! Here's why:

1. DOS speed-up: Apple DOS 3.3 takes 18 disk revolutions to read a single track, whereas **Diversi-DOS** reads or writes a track in just 2 revolutions. This speeds up file processing tremendously (see table).

2. Keyboard Buffer: **Diversi-DOS** allows you to type at any time, as fast as you can, without missing a single character.

3. Print Buffer: **Diversi-DOS** can use a RAM card (16K-128K) to temporarily save characters before they are printed. Thus, your computer won't have to wait for your printer to finish.

4. DDMOVER: **Diversi-DOS** can now be moved to a RAM card for increased memory with BASIC programs.

Diversi-DOS, the QUADRUPLE utility, requires a 48K Apple II or II+ with DOS 3.3. A simple, menu-driven installation program is included on the un-protected disk. So what are your waiting for?

	APPLE DOS	DIVERSI-DOS
SAVE ‡	27.1 sec.	5.9 sec.
LOAD ‡	19.2 sec.	4.5 sec.
BSAVE*	13.6 sec.	4.1 sec.
BLOAD*	9.5 sec.	2.6 sec.
READ**	42.2 sec.	12.4 sec.
WRITE**	44.6 sec.	14.9 sec.
APPEND**	21.3 sec.	2.3 sec.

* Hi-res screen ‡ 80-sector BASIC program
** 52-sector text file

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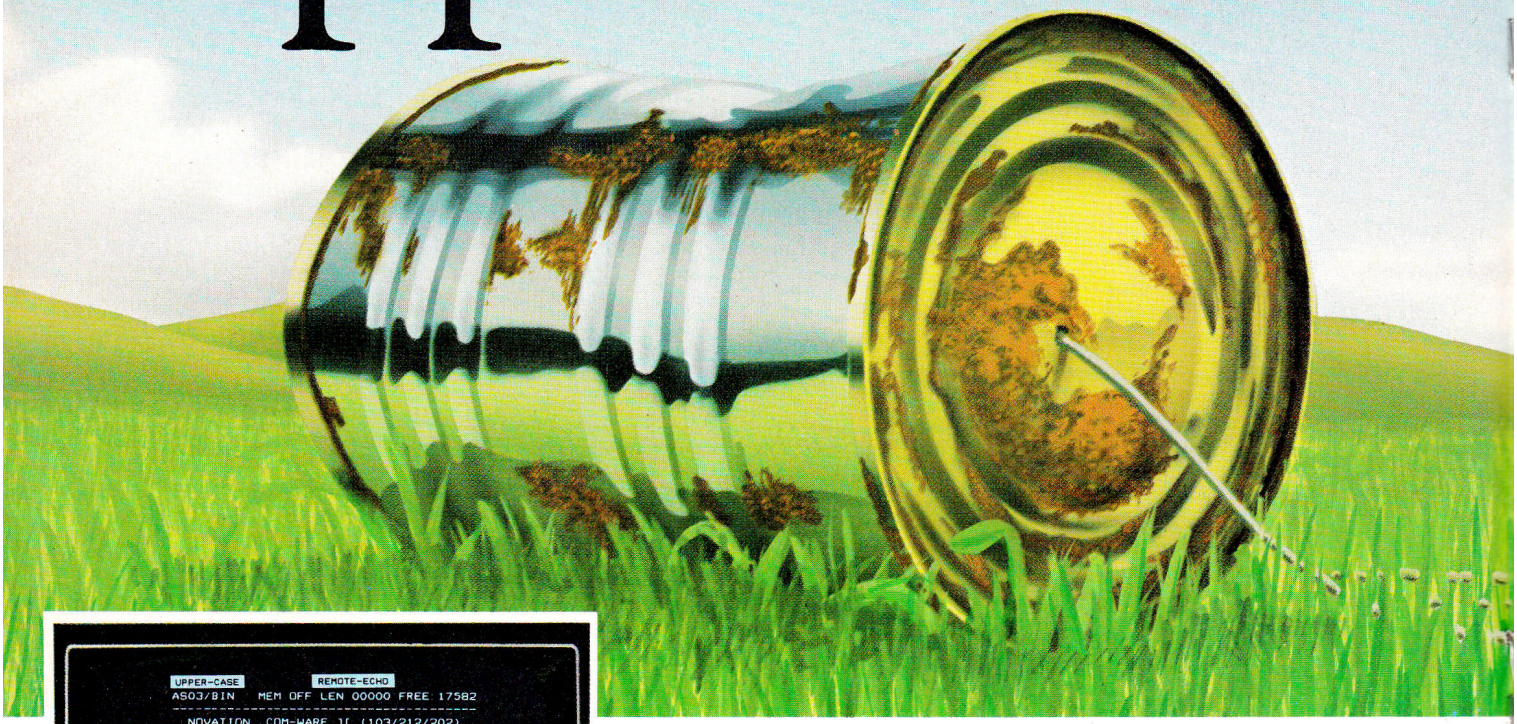
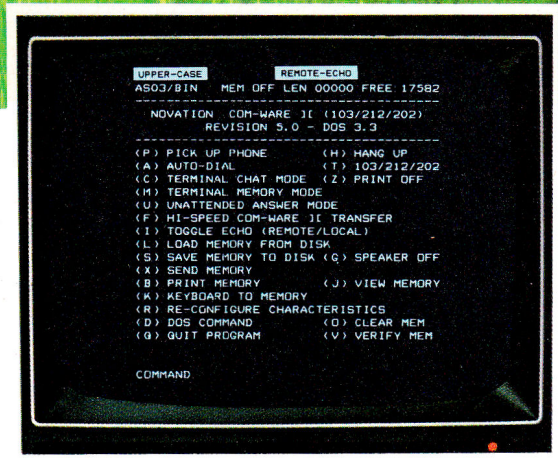
Circle 158 on Reader Service card.

Apple®-Cat™ II





The Cat system lets you slip something into your Apple II no other modem offers—a complete range of speeds from 110, 300 and 202 half-duplex—to full duplex 212 .

Either way, you have state-of-the-art LSI technology. And it means you can start right off with the most advanced system available. Or you can trim your investment, yet always have the option to move up at any step with absolutely no compromises in quality.

Com-Ware™ software is part of the package.

Five minutes after you've booted up the Novation Com-Ware you'll have a good notion of what it's like to work with the best, most accurate, most convenient personal communication system designed for your Apple.

It makes all of the moves you need to work with another computer, swap programs, access data, whatever.

And it's simple to operate. Just follow the menu. No programming, no fussing. It's all there.

New—telephone directory.

Our engineers have done it again. They've expanded our Com-Ware. Now included: a time-saving directory of 26 telephone numbers with terminal configurations all selected and stored for auto dialing. Handy.

And some nice extras. Print-out during communication, a non-destructive memory mode, a changeable "welcome" message for automatic answer. There's more.

If you have an Apple-Cat II and our earlier Com-Ware (4.4 or earlier), you should really have the new one (5.0). As always, it's free.

It's the modem/communication system you grow into, not out of.



Just send us your old diskette and we'll send you the new one.

It can make all the moves you want.

Start with 110, 300, 202 half-duplex. *Or*—add 212 full duplex and move data four times faster with accurate, block by block verification. / Automatically send and receive anytime—including the middle of the night when line charges are lowest. / Use 80 or 40 column format. / Set for local or remote echo. And more.

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Packed with every Apple-Cat II is a list of options. You get your choice of any one—and save up to $40.

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Circle 272 on Reader Service card.

Ding-A-Ling, Ding-A-Ling!

**Data entry may never be fun—
but this utility will take the $!##!
out of the job.**

by M. Max McKee

Program listing. Telephone number entry system utility.

```
0  REM PHONE SUBROUTINE*******
25  GOSUB 5900
30  GOTO 5000
150  VTAB V: HTAB H: PRINT "(...) ...-....";: HTAB H: PRINT P$;: HTAB H
151 PP$ = P$:P$ = "": IF  LEN (PP$) <  > 8 AND  NOT  VAL ( LEFT$ (PP$,1)) THEN P$ = "(": HTAB H + 1: GOTO 170
152  VTAB V: HTAB H + 6: PRINT "...-....";
153  HTAB H: PRINT "      ";PP$;: HTAB H + 6
160  GET PD$:X = 1: IF  LEN (P$) = 8 AND PD$ =  CHR$ (13) THEN 166
161  IF PD$ =  CHR$ (8) THEN  PRINT PD$;: GOTO 180
162  IF PD$ =  CHR$ (27) THEN P$ = "": GOTO 150
163  IF  ASC (PD$) = 21 THEN  IF  LEN (P$) <  > 8 THEN  GOSUB 198
164  IF PD$ > "9" OR  LEN (P$) = 8 AND  LEFT$ (P$,1) <  > "(" THEN  PRINT  CHR$ (7);: GOTO 160
165  GOSUB 195
166  PRINT PD$;: IF  ASC (PD$) = 13 THEN  HTAB H + 6 +  LEN (P$): VTAB  PEEK (37): CALL  - 868: PRINT : RETURN
167 P$ = P$ +  CHR$ ( FN BY(Z)): IF  LEN (P$) = 3 THEN P$ = P$ + "-": PRINT "-";
168  GOTO 160
170  GET PD$:X = 2: IF PD$ =  CHR$ (27) THEN 162
171  IF PD$ =  CHR$ (8) THEN  PRINT PD$;: GOTO 180
172  IF  ASC (PD$) = 21 THEN  IF  LEN (P$) <  > 14 THEN  GOSUB 198
173  IF PD$ > "9" OR  LEN (P$) = 14 AND  ASC (PD$) <  > 13 THEN  PRINT  CHR$ (7);: GOTO 170
174  GOSUB 195
175  PRINT PD$;: IF  ASC (PD$) = 13 AND  LEN (P$) = 1 THEN PP$ =  RIGHT$ (PP$,8):P$ = "": GOTO 152
176  IF  ASC (PD$) = 13 THEN  CALL  - 868: RETURN
177 P$ = P$ +  CHR$ ( FN BY(Z)): IF  LEN (P$) = 4 THEN P$ = P$ + ") ": PRINT ") ";
178  IF  LEN (P$) = 9 THEN P$ = P$ + "-": PRINT "-";
179  GOTO 170
180  IF  LEN (P$) < 2 THEN P$ = PP$: GOTO 150
181 P$ =  LEFT$ (P$, LEN (P$) - 1)
182  ON X GOTO 160,170
190  IF  LEN (P$) =  LEN (PP$) THEN  RETURN
191 P$ = P$ +  MID$ (PP$, LEN (P$) + 1,1): PRINT  MID$ (PP$, LEN (P$),1);: RETURN
195 OH =  PEEK (36):OV =  PEEK (37): IF PD$ =  CHR$ (13) THEN  RETURN
196  IF PD$ < "0" THEN  PRINT  CHR$ (7);: POP : GOTO 182
197  RETURN
198  HTAB  PEEK (36) + 2:OV =  PEEK (37):OH =  PEEK (36) - 1: POP : ON X GOTO 166,177
199  RETURN
5000  REM MAIN
5010  TEXT : HOME
5020  VTAB 19: PRINT "ESC = RESTART INPUT": PRINT : PRINT "RTN = BYPASS AREA CODE"
5030 V = 10:H = 9
5040  VTAB V: PRINT "PHONE #";
5050  GOSUB 150
5060  VTAB 11: CALL  - 958
5070  VTAB 19: PRINT "<A> ALTER CURRENT PHONE #": PRINT "<N> NEW PHONE #": PRINT "<Q> QUIT"
5080  INVERSE : HTAB 9: PRINT " SELECT ";: GET PD$: PRINT PD$: NORMAL
5090  IF PD$ = "Q" THEN  END
5100  IF PD$ = "A" THEN 5000
5110  IF PD$ = "N" THEN P$ = "": GOTO 5000
5120  GOTO 5060
5900  REM DEFINE FUNCTION********
5910  DEF  FN BY(Z) =  PEEK ( INT (OV / 8) * 40 + 1024 + (OV - ( INT (OV / 8) * 8)) * 128 + OH)
```

Listing continued.

That's not the telephone. That's your brain after entering phone numbers into an address system. Left parenthesis, number, number, number, right parenthesis, space, number, number, number, dash, number, number, number. All that reaching for "(" and ")" and "-" turns *you* into a ding-a-ling!

And there's no need for it. Why type all those extra characters? Every telephone number has ten digits plus a space, a dash, and parentheses that are always located in the same places.

Phone Subroutine (lines 150 through 199) lets you enter just the numbers and automatically adds all of those frustrating extra characters as you go along. If your phone numbers are all local or you don't remember the area code, pressing return once at the beginning of input eliminates the extra brackets. A numeric keypad could be used for input since all input is numbers.

Your Apple will ding-a-ling whenever you press keys that are not numbers or when you try to type too many digits into the phone number. At the same time, it will allow you to use the left and right arrow keys to edit and

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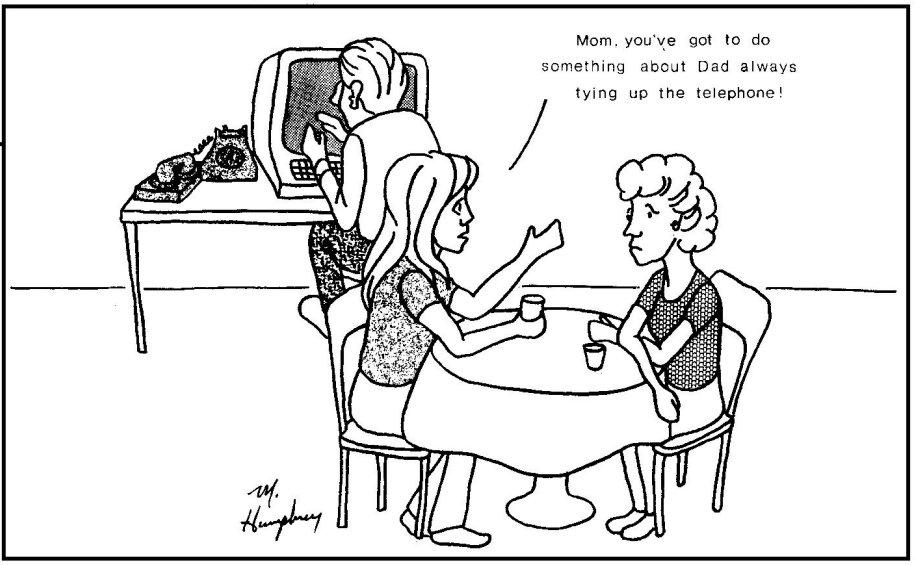

the escape key if you want to restart input.

The short program at line 5000 demonstrates a possible way to use the subroutine. Line 5030 sets the vertical (V) and horizontal (H) positions of (. . .) . . .-. . . . In 5040 PHONE # is printed at the proper VTAB just prior to the GOSUB to the phone subroutine at 150. The other lines between 5000 and 5120 make it possible to continually re-edit a phone number contained in the string P$ or put in a new one each time.

If you'd like to retrieve phone numbers from disk file for editing, just place each number in P$ before a GOSUB 150. If you want the entry line to be empty when you GOSUB 150, just set P$ to null: P$ = "" (no space between the quotes).

You'll soon find that this type of telephone input puts the ding-a-ling back where it belongs. ■

Listing continued.

```
5999  RETURN
6000  REM VARIABLE NAMES********
6010  REM
6020  REM V  =VTAB (PRESET)
6030  REM H  =HTAB (PRESET)
6040  REM OV =OLD VERTICAL
6050  REM OH =OLD HORIZONTAL
6060  REM X  =BRANCH FLAG
6070  REM P$ =PHONE #
6080  REM PP$=PREVIOUS PHONE #
6090  REM PD$=PHONE DIGIT (GET)
6100  REM
6110  REM CHR$(8) =LEFT ARROW
6120  REM CHR$(21)=RIGHT ARROW
6130  REM CHR$(7) =BELL
6140  REM CHR$(13)=RETURN KEY
6150  REM CHR$(27)=ESC KEY
6160  REM
6170  REM FN BY(Z)=DEF. FUNCTION
6180  REM READS SCREEN CHARACTER
```

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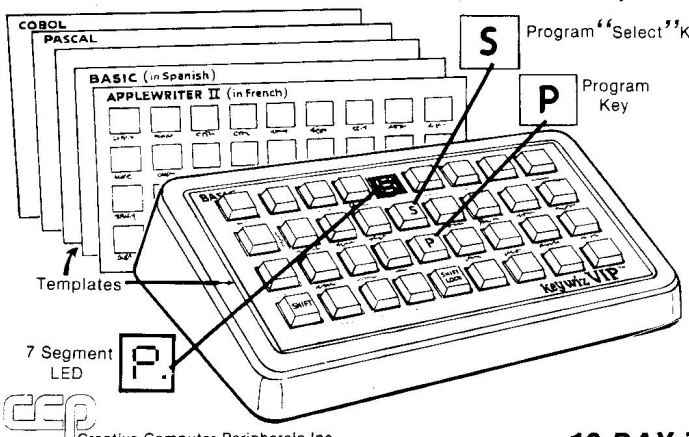

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G. TOUCH PROGRAM KEY ON VIP and repeat steps B-E.
H. TOUCH PROGRAM SELECT KEY
I. REPEAT STEPS A-G, H till all 4 keyboards in memory are programmed.

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Magic Window II
Magic - almost!

New features, plus the speed and eminent usability of the original Magic Window, make the new version of this word processor a worthy choice for your writing tasks.

by Gregory R. Glau

Is Magic Window II really *magic*? Why did they ever choose a name like that, anyway? After all, the word processing business is important and they shouldn't use funny names when they want to sell us a program.

Seriously, the idea of the original Magic Window was neat; since your Apple only displays 40 characters across, the program creates a "magic window" through which to view your text. You scroll this window side-to-side to see the total page. The original version (which is still available) uses lines of dashes to indicate the top, bottom and sides of each page.

Magic Window has always had the philosophy that what you see on the screen is what will be printed. From a writing standpoint, this is terrific; you *want* to see your work as it will look in print.

I have used the original Magic Window for about a year now, not only for writing assignments (like this review), but also in our heating and air conditioning business, for quotations, specification sheets, letters, and so on. I like it. My feelings on Magic Window II are influenced by my familiarity with the original program—I may be more critical of the *new* program, just because I like the old one so much.

New Features

I looked forward to upgrading to Magic Window II, since it promised a 70-column display without any hardware modifications. It still works like the original at 40 columns, or with an 80-column board if you have one, but the main attraction has to be the 70-column display. Imagine! To see all the way across the page!

Magic Window II also promised a few features that had been left out of the original. The new version has a search and replace function, where the original could search, but was not capable of automatic replacement. The program can only search in one direction (forward from where you are in your text), so you need to jump to the start of your file and search from there to be sure you find everything. Control-E takes you there instantly.

A warning sounds and is displayed on the screen if you try to exit the program before you save your file, and you will be warned if you try to save a file where one with the same name already exists on the disk in use. This makes sure you don't stop before you save your work, or overwrite a file you want to keep.

Magic Window II can link files together for printing too. This is a great idea; you simply create a file list showing the order in which you want things printed, and it's done automatically.

A large amount of information is displayed on the page (the file name, available disk space, etc.) yet you still have almost the entire screen to work with. It's almost as if you're writing on a blank piece of paper; the program doesn't intrude as you create.

Speed is a major benefit of Magic Window II. I'm a fast typist (using only two fingers, yet) and when I sit down to type a manuscript, a quotation or a letter, I want to do it then! Both versions of Magic Window load fast and work fast; you can get started in seconds and once you're typing, you can get around the screen super-fast.

Moving around the screen is done with combinations of the control key and one other key. Control-Q, for instance, moves you up one line; control-W moves you up half a page. Control-Z moves you down a line, while control-X moves you down a half page. Control-E goes to the start; control-C goes to the end of your text. These keys are logically arranged; Q, W and E are at the top of your keyboard, while the others are on the bottom.

Compare Programs

A word of caution about other, similar word processing programs (like ScreenWriter II, Super-Text 40/56/70

Greg Glau is proprietor of a heating and air conditioning business. He also writes inCider's *Bent on Business column. Address correspondence to him at PO Box 1627, Prescott, AZ 86302.*

and the Word Handler) that have a built-in full-screen display without requiring an 80-column board. These programs use the high-resolution graphics capability of your Apple to create their characters. If you do a lot of writing, even with a good monitor, the character display can be tiring on the eyes. Stop at your local computer store and take a look at them and try them. Spend a half hour with each program you're considering and see how the letters feel to you. For someone used to the large capital letters on the Apple, the smaller, hard-to-read characters produced by these programs may be a bother. Naturally, if you can afford it, an 80-column board will generate terrific characters for your word processor. If you do a lot of writing, it's worth the extra cost.

Loading Speed

Magic Window II loses loading speed when you choose its 70-column display. You first insert the main program disk, wait until it loads, then answer if you want to use the 70-column driver. If so, you have to insert another disk, and wait a couple more seconds. The whole loading process takes perhaps 15 seconds—still much faster than the 45+ of ScreenWriter II. There are certain letters, quotations, etc., that I can type in less time than it takes some programs to load. Again, before you buy, check it out.

Extensive Manual

Magic Window II's 132-page manual is written in a tutorial style. Each section of the manual, from filing to editing to changing the page sizes, uses exercises so you can actually work with the program. There is no index, but the table of contents is seven pages long. Sample files are provided on the driver disk for you to practice with.

Menu Selections

The program uses a menu type of approach, rather than commands. You can move around in the program by making selections from a menu on your screen. For instance, here's what you see when Magic Window II is ready for you to use:

```
MAGIC WINDOW II SYSTEM MENU
1. EDITOR SUBSYSTEM
2. FILER SUBSYSTEM
3. PRINTING SUBSYSTEM
4. FORMAT SUBSYSTEM
5. CONFIGURATION SUBSYSTEM
5. EXIT TO BASIC
SELECT NUMBER OR LETTER,
PRESS RETURN
```

One bone of contention I have with Magic Window II is its use of terms. The Editor Subsystem is simply a blank screen where you write. The option should be Press #1 to Write, or Writing Area, or something. The word

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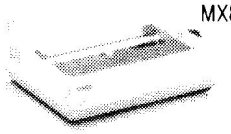

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"It searches fine, and replaces fine, but it replaces everything in sight."

"subsystem" is out of place in a user-friendly word processing program. It scares people.

Basically, you select what you want to do by entering the number and pressing return, or by using the arrow keys to move a white bar over the selection you want. The original Magic Window uses only the white bar, but the new system is faster with its numbers.

While the **Editor** is where you do your actual writing, here's a brief run-down of the other selections:

- **Filer Subsystem** lets you file your documents onto disk, or load them from disk to print or edit.
- **Print Subsystem** prints your material and allows you to select the number of copies you want, whether to print all pages or just one, whether you're using individual sheets of paper, and so forth. It's important to note that Magic Window II lets you print a single page, a group of pages, or all pages. If you want numbers printed on your pages, you select the starting number.
- **Format Subsystem** allows you to define the size of your paper. On your screen, the paper size is shown with a dotted line marking the top and bottom of a sheet. The sides are indicated by ! marks. The file name and disk free space are also displayed, although the free space is slightly overstated. When you get down to three sectors left, you have to save the text you're working on. You can also select double-spacing, if you wish.
- **Configuration Subsystem** is where you designate the slot your printer card is in, and where you let Magic Window II know if you have a lowercase adaptor, if you've made the modification on your shift key (if not, the escape key is used for uppercase letters), and so on.

More Features

Another nice feature of Magic Window II is its ability to insert text. Control-I opens a blank line for you; the repeat key held down at the same time opens as much space as you want. The existing text moves down to make room for your new entries. It's quick and simple and easy. There is no shifting between editing and insertion modes, as some programs require. Magic Window II really lets you write easily.

Magic Window II handles two types of files: formatted and unformatted. A formatted file is what you'd expect—it is formatted with your tab marks, margins, and so on. An unformatted file is one where each line is considered separate, almost like a little individual file. This means you can load all or part of an unformatted file, merge it into another file, add names to form letters, and so on.

The program also has DOS (Disk Operating System) commands included; you can INITialize a disk, CATALOG a disk, DELETE a file, and LOCK or UNLOCK files, all without leaving Magic Window II.

Magic Window II lets you jump to any page, or to the start or end of a file quickly and easily. It has word wrap so you can just type away and it will take care of your carriage returns. A new feature is the Paragraph Glue function. This will glue a whole paragraph together with one command (the original program only glued things one line at a time).

Weak Areas

One weak area is titling; only one title line is allowed. You can put it anywhere in the margin area (top or bottom), but one line means you cannot have both a title and footnotes.

I also had problems with the search and replace part of the program. It searches fine, and replaces fine, but it replaces everything in sight! If you search for "in," it will replace the word, the last two characters of "within," and the first two characters of "*in-Cider.*" Unfortunately, there's no way to instruct Magic Window II just to replace your search word where it's *not* included inside another word. This function will probably be used to replace names in form letters. If you ask it to replace every "Green" with "Miller," Magic Window II will handle each "Green," but will also change "Greenhaul" to "Millerhaul," and "Greenriver" to "Millerriver." Perhaps not a major problem, but it makes more sense to let the program find the words for you, then let you decide if you want to make the change.

Another disappointing spot is the amount of memory the program uses. With a 48K Apple, if you use the 70-column driver program to see the full lines of text on your screen (which is probably why you bought the program), you can enter only about three and a half double-spaced pages before the program beeps and insists that you SAVE your file. For letters, quotations and spec sheets, this isn't a problem; but for anything longer, you really need 64K of memory to use Magic Window II effectively. The 64K allows about 13 double-spaced pages before you have to save your work.

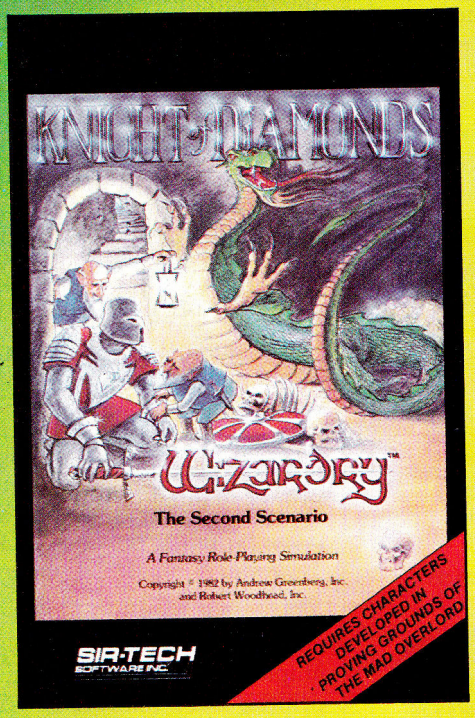
While you can link your files together and the program prints them automatically, it won't do this with large files. I threw one of those 13-page manuscripts at Magic Window II as the last of five files to be printed (the others were shorter) and it simply filled my screen with white and stopped.

When you load a file created with the original Magic Window, the new program doesn't pick up the tab settings. You must clear all tabs and then reset them. When you save the file again, the tabs will be saved as they should be. The people at Artsci told me they did this to make old files compatible with the new program. No major problem, but it is annoying.

In the middle-ground area of the program, Magic Window II has a limited justify mode. It has an instruction that tells it to do its Glue and Justify functions a paragraph at a time. As we noted above, the Glue part will put your paragraphs back together for you just fine, but the Justify part is only partly paragraph-oriented.

There are four things you can do to justify a sentence: justify it to the right, to the left, expand it to fill an entire line, or pack it to eliminate any extra space. In the entire paragraph mode, Magic Window II will work with a whole paragraph at once for the expand and pack modes, but to right or left justify you still have to do it one line at a time. This sounds worse than it is. After all, if you're justifying your text, you want both sides to be even. The Expand command does just that, and it does it a whole paragraph at a time. So the fact that right justify and left justify are still done on a single-line basis isn't a major black mark against

Wizardry



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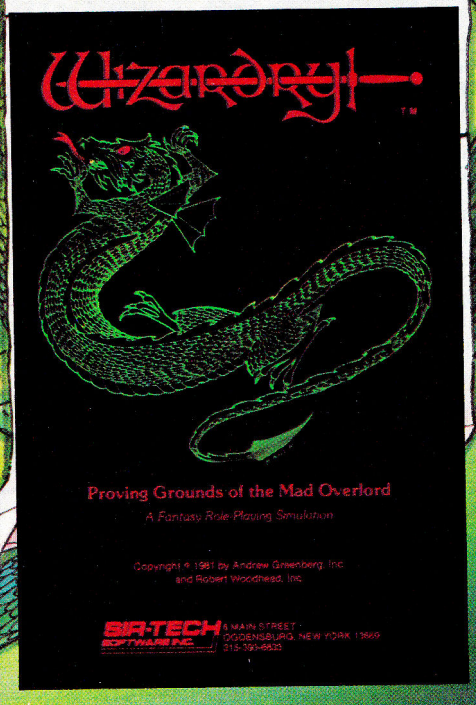

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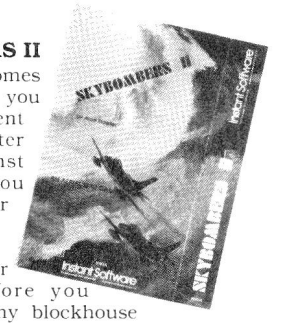

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the program.

But Magic Window II still doesn't move entire blocks of text. Instead, you can kill up to 16 lines at one time, move the cursor where you want to insert the lines, then recover them, one at a time. This doesn't create a problem for me because I don't move paragraphs around a lot. But many people do, and it remains a significant weakness of the Magic Window system.

The manual gives you limited information about formatting inside text with control characters to make changes, for instance, to *italics*. You'll need to spend a bit of time with your printer manual to learn this well.

Program Pluses

On the positive side, the program will accept control characters, so it's easy to put them into your text. For example, the popular Epson series of printers has a number of printing options available that can be accessed inside your text. Contrast this to some programs that require a separate Basic routine to tell your printer that you want emphasized printing, etc.

Another plus, already mentioned, is that Magic Window II is super-fast, from loading to entering text, to inserting lines. Its cursor movement ability to go where you want to correct or delete a word or letter is terrific.

Magic Window II's character set, (the letters its driver program produces) is readable and much better than in similar programs I am familiar with. Check this with a demonstration at your local computer store.

The program is also compatible with Magic Words, Artsci's spelling-checker program. Magic Words is versatile and lets you add your own dictionary entries; but, like Magic Window II, you really need 64K of memory to get the most out of it. Magic Window II is also usable with Magic Mailer. They interface to create and send customized form letters.

The manual, as also mentioned previously, is good and makes the program easy to learn. It comes with a number of exercises for each section that help explain directions, and a color-coded chart showing all the editing commands.

"The entire program is fast. You may not appreciate this until you try one or two of the others..."

Another plus for Magic Window II that's worth noting again is the glue paragraph mode, where you can edit to your heart's delight, and it will instantly put the whole paragraph back together for you.

Conclusions

Is Magic Window II worth $149.95? Can the first-time computer user get effective word processing from the system? Is it reasonably easy to use? I think so.

Any good word processing program should be transparent to the user. You should be able to type away and not worry about carriage returns or page changes or anything else. A good program won't stand between you and your finished product; it should assist you in creating it. Magic Window II does help you, both with its speed and its ease of use.

Magic Window II's character set is definitely readable and better than many comparable programs. An 80-column card will obviously help with the eyes, and you can always upgrade to one in the future. Files are easily linked for printing, and these print lists with which you tell the system in what order to print your files, are saved for future use, too.

The entire program is *fast*. You may not appreciate this until you try one or two of the others, only to sit and wait while it loads. And then, to change anything, you have to enter insert mode, only to change that to edit mode when you're done inserting new text. Then you find you cannot print until you save your file, then load a print program, and then reload your file. Magic Window II does it all from one program.

On the negative side, if you work with anything longer than a couple of pages, you'll need 64K of memory. The program doesn't support block moves. You have to right and left justify line-by-line. You're allowed only one title line. While its search and replace will do what it says, you will probably use it as an automatic search with a manual replace because it can't discriminate between an individual word and the character string inside another word.

Magic Window II will do what it claims. If you have 64K of memory, its only limitations are minor; depending on the type of writing you do, perhaps you won't even bump into them. Magic Window II's character set, speed and the easy way it has of moving around your screen will make you smile.

Even though it has its limitations, I guess it's almost, but not quite, *magic*. It's available from Artsci Inc., 5547 Satsuma Ave., North Hollywood, CA 91601; (213) 985-2922. The price, once again, is $149.95. ■

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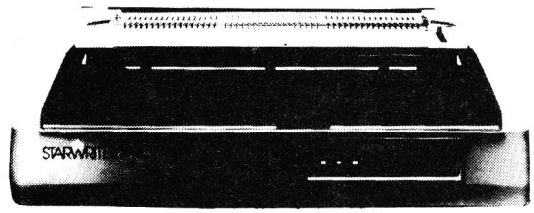

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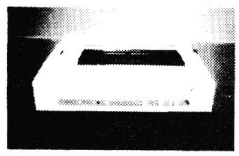

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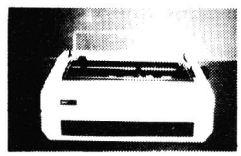

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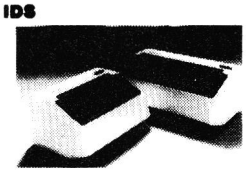

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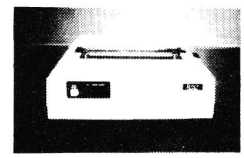

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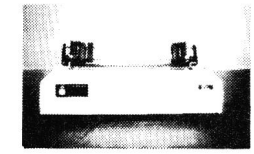

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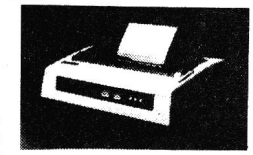

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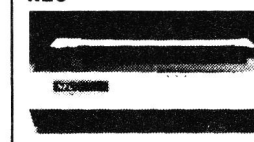

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Poking Perfection Part III

The lo-resolution saga continues as the VLIN'S true identity is revealed and the PLOT thickens. Warning: Material contains graphics language.

by A. E. Doughty

Do you often forego the low-resolution graphics screen on the Apple II because of the difficulty of using the HLIN, VLIN and PLOT coordinates? Do you sometimes VLIN when you should PLOT? How often have you selected COLOR = 5 when you really wanted COLOR = 9? Or, worse still, have you not yet discovered how to use low-resolution screen 2 to create animation in the low-resolution screen? Fear not, relief is at hand.

The Apple II Graphics Screen Formatter (see Figure 1) has been designed to assist both beginner and advanced programmer alike, and to help you over some of the hurdles involved in composing both low-resolution graphics screens.

Programming *both* screens (!) you say? Yes, Apple has provided two screen areas that can be used to display either text or low-resolution graphics to the screen. The primary screen area (screen 1) occupies the area of RAM from 1024 to 2047 (with some space used for other things), and the secondary screen area (screen 2) occupies RAM starting at 2048.

Selecting the Screen

The low-resolution graphics screen can be selected with the Basic GR statement, which causes the Apple II Plus to use the default values—that is, select primary screen 1, clear the screen to black, and provide four lines of text at the bottom of the picture.

Another method of selecting the graphics mode is to toggle various RAM locations. We can also toggle these memory locations to change the screen parameters.

Figure 2 shows the memory locations that must be toggled to select the resolution, page, mix and mode that output to the screen. Thus to select low-resolution graphics, primary screen 1, in graphics mode with a mix of four lines of text at the bottom of the display, it is necessary to POKE 49238,0 : POKE 49236,0 : POKE 49235,0 : POKE 49232,0.

In practice any value may be poked into these RAM locations, or an X = PEEK(n) may be used instead of a Poke statement. It's not the value contained in these memory locations that is important—the toggling of these soft switches executes the change. Thus the statements:

```
100 FOR K = 6 to 0 step -2
200 X = PEEK(49232 + K)
300 NEXT K
```

will toggle RAM locations 49238, 49236, 49234 and 49232, respectively, and convert to the low-resolution graphics screen 1 with no text lines at the bottom of the display.

Notice you toggle the RAM location 49232 last. Although it is somewhat academic, this causes the setup (resolution, page and mix) to occur invisibly and then flash to the graphics screen.

The screen display can be selected using either the GR statement or by peeking or poking the RAM locations. One advantage of using the RAM toggle method is that the screen does not automatically clear to black as it does using the GR statement; thus the screen display can be composed while it is invisible to the user, then by executing the RAM toggles the new screen can be displayed in a flash. This is the technique that would be used to perform limited scale animation (such as a happy face blinking its eyes rapidly and wiggling its ears) by switching between screen displays.

Selecting the screen in this way is not without some difficulties however. Selecting primary screen 1 in this manner does not prevent the display from scrolling in the usual manner, so you must set the top of the screen window to row 20 (POKE 34,20) when using four lines of text on the display, or to row 23

Address correspondence to A. E. Doughty, 11715 145 Ave., Edmonton, Alberta, Canada. T5X 1M2.

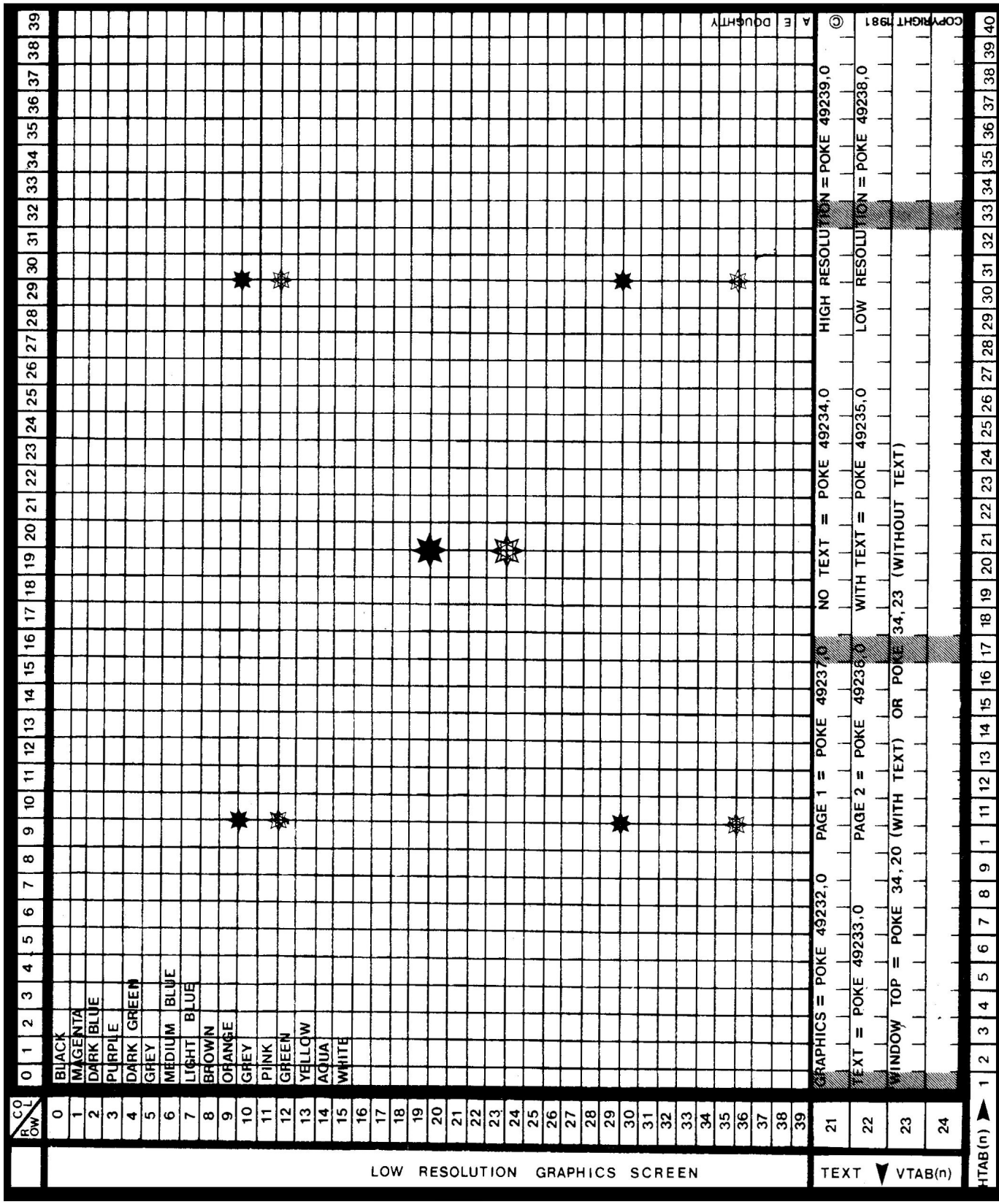

Figure 1. Apple II Graphics Screen Formatter.

(POKE 34,23) when using full screen graphics.

Using no text on screen 1 of low-resolution graphics will cause one row of text to appear at the bottom of the display in graphics mode.

To clear the screen to black a CALL 63542 will erase the top 20 lines (the graphics rows 0 to 39), and a CALL 63538 will erase the entire screen to black (graphics rows 0 to 47).

Screen 2 (secondary low-resolution graphics area) occupies the area of RAM from 2048 to 3070. This is the same area occupied by the start of a Basic language program loaded into RAM, and it is not possible to use this secondary area of low-resolution graphics to store a picture and a Basic program at the same time. (Actually if page 2 of low-resolution graphics is

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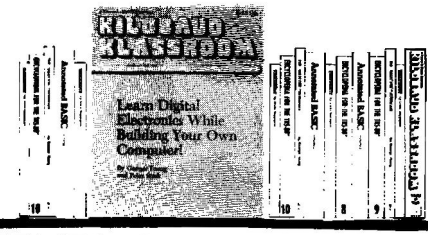
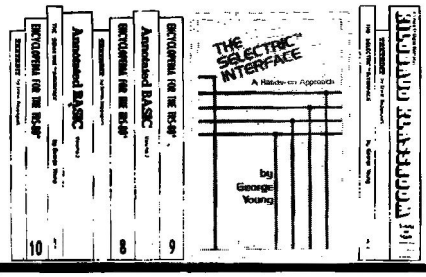


THE SELECTRIC INTERFACE by George Young



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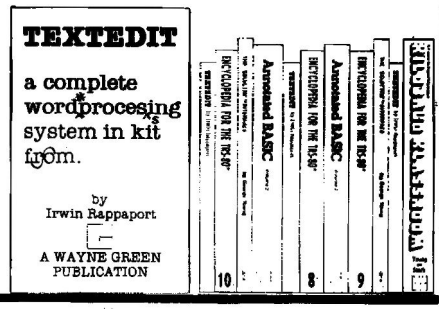

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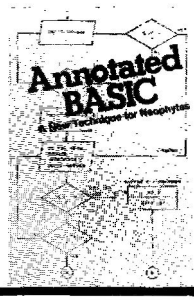

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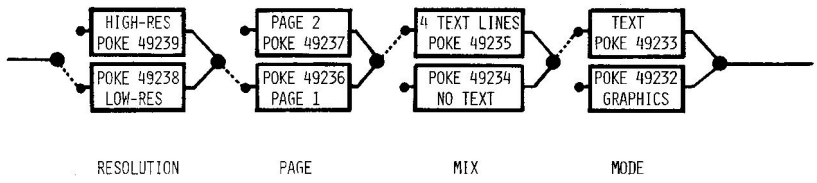

Figure 2. Showing the RAM locations that must be toggled to select the screen output combinations.

displayed to the screen and a Basic language program is loaded into memory, the video displays an interesting color kaleidoscope.)

To use the secondary screen 2 of low-resolution graphics you must change the loading point of the Basic program to locate above RAM 3070. This is done by issuing the following statements in immediate mode:

```
POKE 103,0
POKE 104,12
POKE 3071,0
```

These statements tell the Apple II that the program starts at memory location 3071, and frees the area of RAM from 2048 to 3070 for use by the machine as the low-resolution screen 2 area.

Next the entire screen 2 area must be cleared to black. Unfortunately the Basic commands and statements cannot access this secondary display area directly, thus it is necessary to poke the screen to black. The following statement, used in either immediate or in deferred mode, will do this:

```
FOR K = 2048 TO 3070:POKE K,0:NEXT K
```

Screen 2 of low-resolution graphics is now ready for use, but alas, the Basic statements VLIN, HLIN and PLOT cannot access the secondary display area. There are three ways this may be overcome.

First, screen 2 can be composed from screen 1 by peeking screen 1 and poking to screen 2. The following statement, used in either immediate or deferred mode, will execute this:

```
FOR K = 1024 TO 1999 : POKE (K + 1024),
PEEK(K) : NEXT K
```

This will transfer all but the bottom line of the screen 1 display to the screen 2 area. To transfer the entire screen simply change the 1999 to 2039.

Second, the display can be composed on screen 1, then saved to the disk and subsequently loaded into the secondary screen area. This can be achieved by using the following routines:

To save the picture

```
BSAVE name of picture, A1024,L976
```

To load the picture to page 2

```
BLOAD name of picture, A2048
```

This will again transfer all but the bottom line of the screen display, which, remember, displays a single line of text in graphics mode at the bottom of screen 1. To display all 24 lines on the secondary page, change L976 to L1016 in the BLOAD statement above.

Third, the secondary screen 2 area can be composed using the Poke statement. To use this method it must be understood that when the Apple II is converted to display the low-resolution graphics mode, each text character is divided into two half characters horizontally (see Figure 3). Also, it is not possible to access any half row without also accessing the corresponding adjacent half row—that is, the Apple II still operates as if it had a screen of alphanumeric characters (see Figure 4).

Any value between 0 and 255 can be poked to the graphics screen (both the primary and secondary areas, although I'm referring specifically to the secondary page area). Any value poked to the graphics screen will produce a split color combination of the 16 standard Apple II colors; the generalized formula for determining the color combination is that the top half of the graphics character is controlled by the standard color values (0–15), and the bottom half of the character is controlled by 16 times the standard color value.

For example, to select yellow in the top half of the character and black in the bottom half, the Poke value would be:

```
(yellow = 13) + ((black = 0)*16) = 13
```

Similarly, to select black on the top half of the character, and yellow on the bottom half, the Poke value would be:

```
(black = 0) + ((yellow = 13)*16) = 208
```

Obviously you can achieve some interesting color combinations using this method of poking to the screen. Pink above purple would be obtained by a Poke value of:

```
(pink = 11) + ((purple = 3)*16) = 59
```

and a light blue, dark blue combination by a Poke value of:

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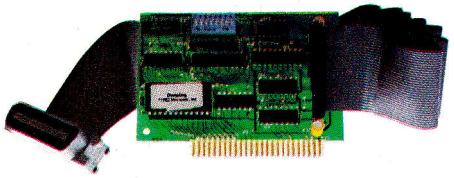

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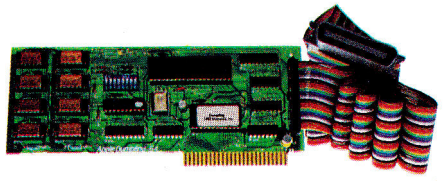

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IC

(light blue = 7) + ((dark blue = 2)*16) = 35

or

(dark blue = 2) + ((light blue = 7)*16) = 114

These same color combinations and calculated values can be used on the primary (screen 1) low-resolution graphics area, but instead of a Poke directly to the screen, a POKE 48 (calculated color value will produce the same effect by making the color combinations available to the VLIN, HLIN and PLOT statements. However, when using the HLIN command, the color will only be printed to the screen in the half row accessed by the HLIN command. To display both colors you must draw an HLIN in both the even-numbered half row and the adjacent odd-numbered half row, either above or below the even-numbered line.

To determine the RAM locations to poke into on either screen 1 or screen 2 display areas, refer to Figure 3. The

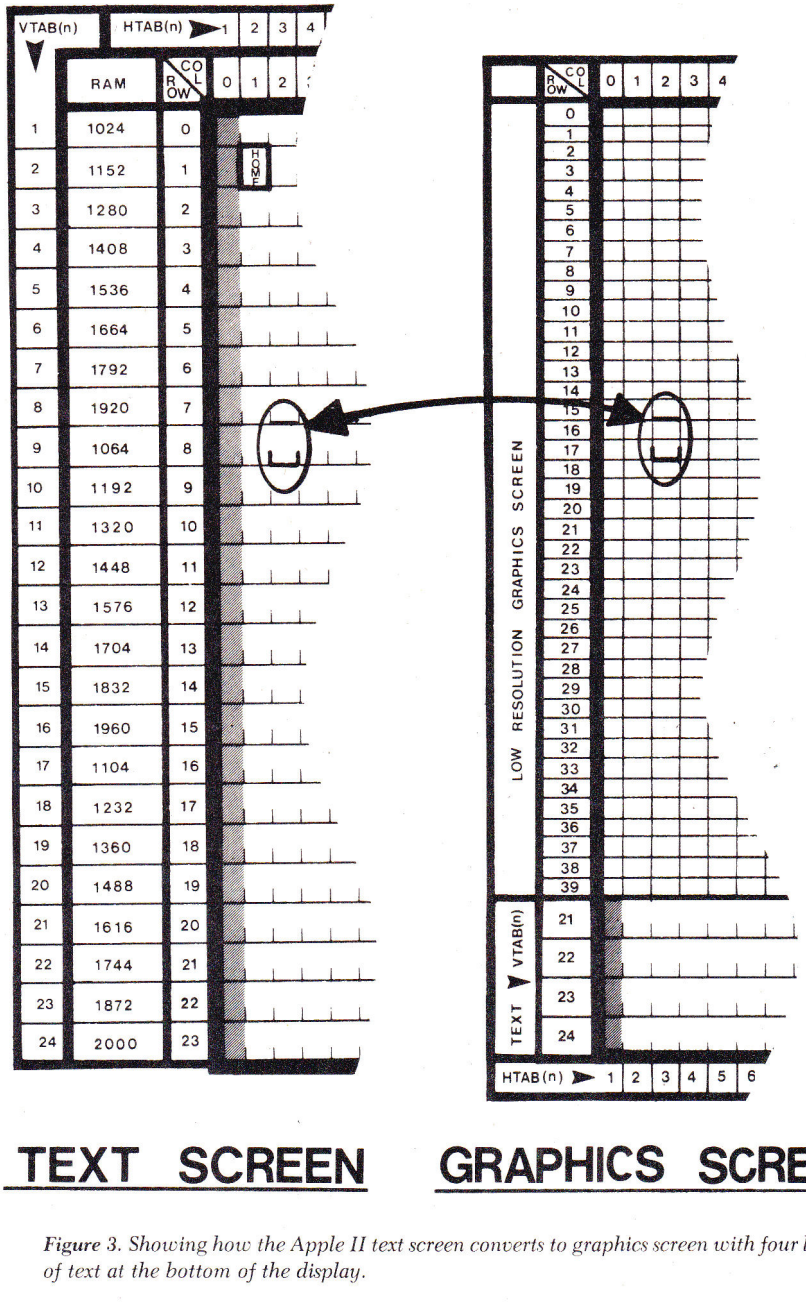

Figure 3. Showing how the Apple II text screen converts to graphics screen with four lines of text at the bottom of the display.

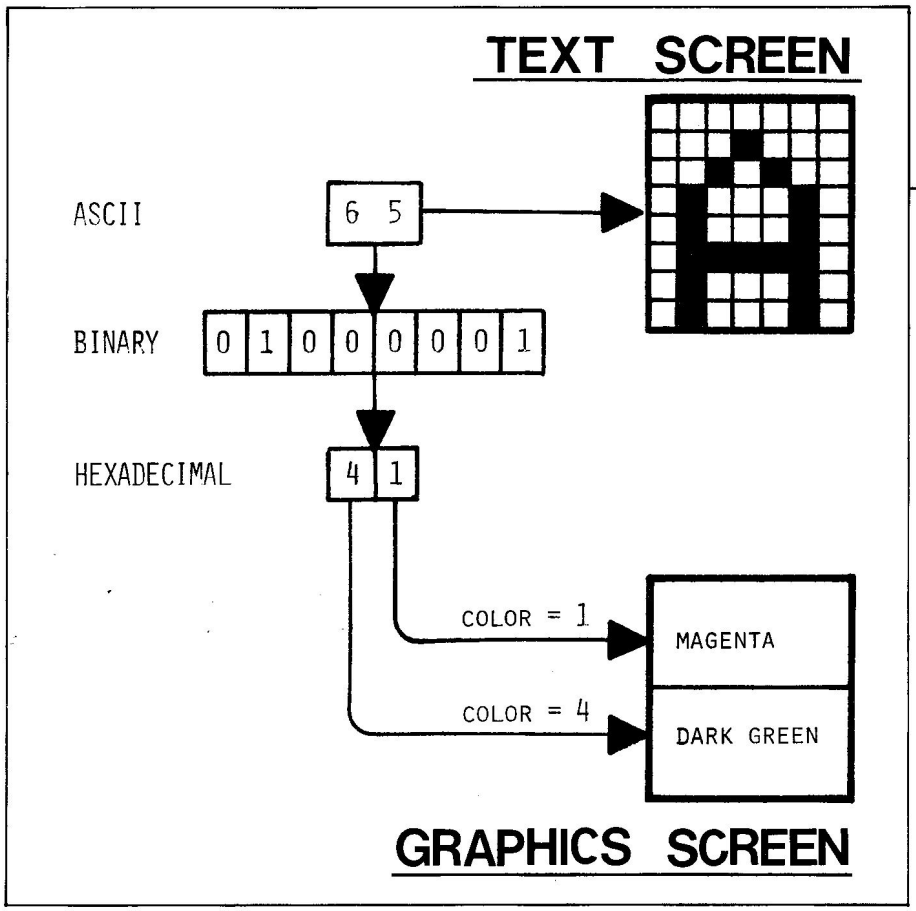

Figure 4.
The ASCII code 65 produces an A character on the text screen, but in the graphics mode will produce magenta in the top half line and dark green in the lower half of the character.

column headed RAM in the text screen mode represents the RAM address of the column 0 in either text or graphics mode. To access adjacent RAM locations on the same line on screen 1, simply add the column number to this RAM address, and to access screen 2, add 1024 to the RAM address shown on screen 1.

The Apple II Graphics Screen Formatter

On the Apple II Text Screen Formatter (Figure 1), the large solid star represents the geometric center of the graphics screen, and the small solid stars indicate the geometric center of each quarter of the screen, with the standard four lines of text at the bottom of the screen.

When the full screen is used in graphics mode, the large open star represents the geometric center of the screen, and the small open stars represent the center of each quarter. You can obtain full screen graphics with a POKE 49234,0 and part text with a POKE 49235,0.

The screen formatter shows the screen in part text mode; the four lines at the bottom of the screen can be accessed by using the VTAB values shown in the column headed ROW, while the HTAB values can be determined from the row at the bottom of the chart. The three shaded columns represent the automatic Tab positions when using the comma (,) separator between variables in a print statement.

In the text area the various Poke locations have been listed for quick reference. Colors listed in the low-resolution graphics area are adjacent to the number that must be used to set the COLOR = value to obtain that color; again, these colors have been listed for quick reference.

The numbers shown in the row marked COL and in the column marked ROW represent the values that have to be used in the VLIN, HLIN and PLOT statements on the low-resolution graphics screen.

Figure 1 represents a worksheet that can be used in designing the low-resolution graphics before programming is started. Once the design layout of the screen is satisfactory to the programmer, then the coding can be started and the appropriate statements written with the least amount of difficulty. ■

The Apple II Graphics Screen Formatter is copyrighted by the author, but original purchasers of this magazine may photocopy this chart for personal use. The Apple II Graphics Screen Formatter may not be copied, by any means, for distribution or sale to third parties.

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The Black Box

An Apple-80 Conversion

A straightforward Apple-80 conversion brings you an exact copy of a TRS-80 game of pure logic and delight.

by Hap Gaylord

The January 1983 *inCider* presented a method for converting TRS-80 programs into Applesoft programs. It utilized a shape table for printing upper- and lowercase, as well as all 64 TRS-80 graphics characters, and supplied three machine language subroutines to speed execution. While translation of the common cases of TRS-80 syntax was covered in that account, many variations, intricacies, and tricks used in programs were not discussed. This article will detail some of those oddities and present an interesting and valuable Apple-80 program for your use.

The July 1981 issue of *80 Micro* included "The Level II Black Box" by Morris Jones, a game of pure logic and delight. For those unfamiliar with the rules, three to five balls are hidden behind an 8-by-8 grid. The player launches rays into the grid, with three results possible. A ray may hit a ball squarely and be absorbed; it may approach within one diagonal square of a ball and be deflected 90 degrees; or it may pass straight through without interference. Each ray's outcome is noted on the edge of the grid. The player must deduce the hidden positions of the balls. Examine Figures 1, 2, and 3 for all three examples, as well as tricky combinations.

This Apple-80 version is an exact copy of the TRS-80 program. You must have the binary file APPLE-80 from the January 1983 *inCider* on disk when this program is run. (If you're using tape, load that file first and remember to alter the program pointers, as in line 1 of this conversion, before loading and running this program.)

Lines 0–5 of this conversion are required overhead. (Tape users should eliminate lines 1 and 3.) Line 0 establishes M$ and H8% as the first two variables in the Apple's table; machine language routines use those variables to print to the hi-res screen. Line 1 relocates the program above the hi-res screen, which leaves space for the shape table and machine language below the hi-res screen. Line 2 sets pointers, etc., while line 3 loads the binary file. Line 4 jumps over the subroutine in line 5, whose function is to simulate the TRS-80's CLS instruction. The original program's line numbers have been maintained.

ELSE Conversions

The numerous ELSE conversions are varied and complex. Usually they require splitting the IF. . . THEN. . . ELSE into two separate Applesoft lines. For example, the original line 1000 was

```
1000 FOR I=1 TO 8:FOR J=1 TO 8:IF
     G%(I,J) THEN W=W+1:NEXT J,I
     ELSE NEXT J,I
1010 program continues
```

If the condition is true, two steps are to be executed; if false, only the second one is done. In Applesoft this becomes

```
1000 FOR I=1 TO 8:FOR J=1 TO 8:IF
     G%(I,J) THEN W=W+1
1005 NEXT J,I
1010 program continues
```

Here the NEXT J,I is executed whether the condition is true or false and may be combined in the next program line.

A more common variety of ELSE involves taking separate actions. Line 590 read

```
590 IF B%(HV,VV) THEN 580 ELSE
    B%(HV,VV)=-1:NEXT
600 program continues
```

This can be converted into

```
590 IF B%(HV,VV) THEN 580
595 B%(HV,VV)=-1:NEXT
600 program continues
```

Here the TRS-80's ELSE would be executed should the IF condition prove false. Applesoft moves to the next program line if false, so the ELSE is made the next program line.

We must frequently jump over the ELSE to avoid its being executed when Applesoft automatically moves on to the next program line. The original line 1140 was

```
1140 IF B%(I,J) AND NOT G%(I,J) THEN
     D%=VI+65+64*I+3*J ELSE 1210
1150 program continues
```

Address correspondence to Hap Gaylord, Box 222, Bedford, NY 10506.

Program listing.

```
0 M$ = "":H8% = 0
1 D$ =  CHR$ (13) +  CHR$ (4): IF  PEEK (104) <  > 64 THEN  POKE 103,1: POKE
    104,64: POKE 16384,0: PRINT D$;"RUN BLACK BOX"
2  HCOLOR= 3: ROT= 0: SCALE= 1: POKE 232,0: POKE 233,8
3  PRINT D$;"BLOAD APPLE-80
4  HOME : GOTO 10
5  HGR : POKE  - 16302,0:H8% = 0: RETURN
10  GOSUB 5
30  DIM N1$(32),B%(8,8),N2$(16),G%(8,8),N3$(16)
50 SC = 0:IM = 1:W = 0
55  FOR I = 1 TO 8: FOR J = 1 TO 8:B%(I,J) = 0:G%(I,J) = 0: NEXT J,I
60  FOR I = 1 TO 32:N1$(I) =  RIGHT$ (" " +  STR$ (I),2): NEXT
70  FOR I = 1 TO 7:N2$(I) = "^" +  CHR$ (64 + I) + "^" +  CHR$ (64 + I): NEXT
    : FOR I = 8 TO 16:N2$(I) = "^" +  CHR$ (65 + I) + "^" +  CHR$ (65 + I
    ): NEXT
80  FOR I = 1 TO 8:N3$(I) = " " +  STR$ (I): NEXT : FOR I = 9 TO 16:N3$(I)
     =  CHR$ (56 + I) + " ": NEXT
85  IF C THEN 110
90  GOSUB 5:H8% = 86:M$ = "^BLACK ^BOX ^VERSION 2.0": CALL 4200:H8% = 216:
    M$ = "^BY ^MORRIS ^JONES": CALL 4200
92 H8% = 341:M$ = "(^ALTERED TO AN ^APPLE-80": CALL 4200:H8% = 406:M$ = "P
    ROGRAM BY ^HAP ^GAYLORD)": CALL 4200:H8% = 531:M$ = "^DO YOU NEED INS
    TRUCTIONS? " +  CHR$ (95): CALL 4200
95  GET Y$
100 H8% = 557:M$ = "^" + Y$: CALL 4200: FOR I = 1 TO 200: NEXT : IF Y$ = "
    Y" THEN C =  - 1: GOTO 8000
105  IF Y$ <  > "N" THEN H8% = 557:M$ =  CHR$ (95): CALL 4200: GOTO 95
110 C = 0: GOSUB 5
500  FOR VV = 1 TO 8: FOR HV = 1 TO 8:D% = 65 + 64 * VV + 3 * HV:H8% = D%:
    M$ =  CHR$ (143) +  CHR$ (143): CALL 4200: NEXT HV,VV
510  FOR I = 1 TO 8:H8% = 65 + 3 * I:M$ = N1$(I): CALL 4200: NEXT
520  FOR I = 9 TO 16:H8% = 156 + 64 * (I - 9):M$ = N1$(I): CALL 4200: NEXT

530  FOR I = 17 TO 24:H8% = 665 - 3 * (I - 17):M$ = N1$(I): CALL 4200: NEXT

540  FOR I = 25 TO 32:H8% = 577 - 64 * (I - 25):M$ = N1$(I): CALL 4200: NEXT

550 H8% = 99:M$ = "^CHOOSE:": CALL 4200:H8% = 163:M$ = "^DEGREE OF DIFFICU
    LTY,": CALL 4200:H8% = 227:M$ = "^NUMBER OF BALLS (3-5)?": CALL 4200
560  GET Y$:H =  VAL (Y$): IF H < 3 OR H > 5 THEN 560
565 H8% = 252:M$ = Y$: CALL 4200
570  FOR I = 1 TO H
580 HV =  INT ( RND (1) * 8 + 1):VV =  INT ( RND (1) * 8 + 1)
590  IF B%(HV,VV) THEN 580
595 B%(HV,VV) =  - 1: NEXT
600  FOR I = 1 TO 700: NEXT
610  GOSUB 8410
620 H8% = 99:M$ = "^CHOOSE:": CALL 4200:H8% = 163:M$ = "1) ^STOP AND SCORE
    ": CALL 4200:H8% = 227:M$ = "2) ^LAUNCH RAY": CALL 4200:H8% = 291:M$ =
    "3) ^PLACE BALL GUESS": CALL 4200
630 H8% = 355:M$ = "4) ^REMOVE BALL GUESS": CALL 4200:H8% = 419:M$ = "5) ^
    REDRAW BOX": CALL 4200:H8% = 773:M$ = "^POINTS USED " +  STR$ (SC): CALL
    4200
640 H8% = 803:M$ = "^CHOICE?                                    ": CALL 4200
650  GET Y$:XO =  VAL (Y$): IF XO < 1 OR XO > 5 THEN 650
655 H8% = 811:M$ = Y$: CALL 4200: FOR I = 1 TO 200: NEXT
660  ON XO GOTO 1000,2000,3000,4000,5000
1000  FOR I = 1 TO 8: FOR J = 1 TO 8: IF G%(I,J) THEN W = W + 1
1005  NEXT J,I
1010  IF W > H THEN H8% = 803:M$ = "^TOO MANY GUESSES": CALL 4200:W = 0: FOR
    I = 1 TO 700: NEXT : GOTO 610
1020  IF W < H THEN H8% = 803:M$ = "^NOT ENOUGH GUESSES": CALL 4200:W = 0:
    FOR I = 1 TO 700: NEXT : GOTO 610
1025  GOSUB 8410:GI =  - 1
1030  FOR I = 1 TO 8: FOR J = 1 TO 8
1040  IF G%(I,J) AND  NOT B%(I,J) THEN D% = 65 + 64 * I + 3 * J:GI = 0: GOTO
    1050
1045  GOTO 1140
1050 H8% = 803:M$ = "^WRONG GUESS                       ": CALL 4200
1060  FOR L = 1 TO 5
1070 H8% = D%:M$ =  CHR$ (143) +  CHR$ (143): CALL 4200: FOR K = 1 TO 250:
    NEXT
1080 H8% = D%:M$ =  CHR$ (133) +  CHR$ (138): CALL 4200: FOR K = 1 TO 250:
    NEXT
1090  NEXT L
1100 H8% = D%:M$ =  CHR$ (143) +  CHR$ (143): CALL 4200:SC = SC + 5
1110 H8% = 773:M$ = "^POINTS USED: " +  STR$ (SC): CALL 4200
1120  NEXT J,I
1130  GOTO 1220
1140  IF B%(I,J) AND  NOT G%(I,J) THEN D% = 65 + 64 * I + 3 * J: GOTO 1150

1145  GOTO 1210
1150 H8% = 803:M$ = "^CORRECT LOCATION                  ": CALL 4200
1160  FOR L = 1 TO 5
1170 H8% = D%:M$ =  CHR$ (133) +  CHR$ (138): CALL 4200: FOR K = 1 TO 250:
    NEXT
1180 H8% = D%:M$ =  CHR$ (143) +  CHR$ (143): CALL 4200: FOR K = 1 TO 250:
    NEXT
1190  NEXT
1200 H8% = D%:M$ =  CHR$ (133) +  CHR$ (138): CALL 4200
1210  NEXT J,I
```

Listing continued.

which becomes

```
1140 IF B%(I,J) AND NOT G%(I,J) THEN
     D% = 65 + 64*I + 3*J:GOTO 1150
1145 GOTO 1210
1150 program continues
```

The missing variable VI will be explained later.

Another use of ELSE is to choose which line to jump to depending on the value of a variable.

```
8000 IF X1 = 2 THEN 8340 ELSE IF X1 = 7
     THEN 8310 ELSE IF X1 = 14 THEN 8280
     ELSE . . . ELSE CLS:PRINT@89,
     "BLACK BOX"
```

which converts to

```
8000 IF X1 = 2 THEN 8340
8001 IF X1 = 7 THEN 8310
8002 IF X1 = 14 THEN 8280
. . . .
8009 GOSUB 5:H8% = 89:M$ = "↑BLACK
     ↑BOX":CALL 4200
```

Line 8009 uses the standard conversions for the TRS-80's CLS and PRINT@.

Missing THENs

A more difficult conversion evolves from

```
2130 IF E = 1 IF HV = 8 THEN 2290 ELSE IF
     B%(HV + 1,VV) THEN 7010
2140 program continues.
```

First, THEN is often optional on the TRS-80, but not in Applesoft, so we need to fill in the missing THEN. Second, the ELSE modifies the second IF (HV = 8). Thus we change it to

```
2130 IF E = 1 THEN IF HV = 8 THEN 2290
2135 IF E = 1 THEN IF B%(HV + 1,VV)
     THEN 7010
2140 program continues
```

where we must repeat the test for E = 1 in order to proceed to either of the second IF . . . THENs.

Complex Changes

The most complex conversion in this program involves switching the logic (AND to OR) and reversing the comparisons (< and >). This creates a double negative and results in no net change. Consider

```
2010 . . . IF ASC(Y0$)>47 AND ASC(Y0$)<58
     PRINT Y0$;:ELSE 2010
2015 program continues.
```

This could be done

```
2010 . . . IF ASC(Y0$)>47 AND ASC(Y0$)<58
     THEN PRINT Y0$:GOTO 2015
2012 GOTO 2010
2015 program continues
```

Listing continued.

```
1220  GOSUB 8410: IF GI THEN H8% = 739:M$ = "^ALL CORRECT": CALL 4200
1230 H8% = 803:M$ = "^PLAY AGAIN? ": CALL 4200
1240  GET Y0$
1250  IF Y0$ = "N" THEN H8% = 815:M$ = Y0$: CALL 4200: TEXT : END
1255  IF Y0$ <  > "Y" THEN 1240
1256 H8% = 815:M$ = Y0$: CALL 4200: FOR I = 1 TO 200: NEXT
1260  GOSUB 5:C =  - 1: GOTO 50
2000  GOSUB 8410:H8% = 99:M$ = "^LAUNCH RAY": CALL 4200:H8% = 227:M$ = "0
     RETURNS TO MENU": CALL 4200:H8% = 803:M$ = "^CHOOSE VECTOR (01-32)?":
      CALL 4200
2010  GET Y0$: IF  ASC (Y0$) < 48 OR  ASC (Y0$) > 57 THEN 2010
2012 H8% = 826:M$ = Y0$: CALL 4200
2015  GET Y1$: IF  ASC (Y1$) = 8 THEN H8% = 826:M$ = " ": CALL 4200: GOTO
     2010
2016  IF  ASC (Y1$) = 13 THEN Y1$ = "": GOTO 2025
2017  IF  ASC (Y1$) < 48 OR  ASC (Y1$) > 57 THEN 2015
2018 H8% = 827:M$ = Y1$: CALL 4200
2020  GET Y$: IF Y$ =  CHR$ (8) THEN H8% = 827:M$ = " ": CALL 4200: GOTO 2
     015
2025 X1 =  VAL (Y0$ + Y1$): IF X1 = 0 THEN 610
2026  IF X1 > 32 THEN 2000
2030  IF X1 < 9 THEN E = 1:HV = 1:VV = X1: GOTO 2070
2040  IF X1 < 17 AND X1 > 8 THEN E = 2:HV = X1 - 8:VV = 8: GOTO 2070
2050  IF X1 < 25 AND X1 > 16 THEN E = 3:HV = 8:VV =  - X1 + 25: GOTO 2070
2060 E = 4:HV =  - X1 + 33:VV = 1
2070  IF B%(HV,VV) THEN 7010
2080  IF E = 1 OR E = 3 THEN  IF VV <  > 1 THEN  IF B%(HV,VV - 1) THEN 700
     0
2090  IF E = 1 OR E = 3 THEN  IF VV <  > 8 THEN  IF B%(HV,VV + 1) THEN 700
     0
2100  IF E = 2 OR E = 4 THEN  IF HV <  > 1 THEN  IF B%(HV - 1,VV) THEN 700
     0
2110  IF E = 2 OR E = 4 THEN  IF HV <  > 8 THEN  IF B%(HV + 1,VV) THEN 700
     0
2120  IF C THEN D% = 65 + 64 * HV + 3 * VV:H8% = D%:M$ =  CHR$ (133) +  CHR$
     (138): CALL 4200: FOR I = 1 TO 100: NEXT :H8% = D%:M$ =  CHR$ (143) +
      CHR$ (143): CALL 4200
2130  IF E = 1 THEN  IF HV = 8 THEN 2290
2135  IF E = 1 THEN  IF B%(HV + 1,VV) THEN 7010
2140  IF E = 2 THEN  IF VV = 1 THEN 2290
2145  IF E = 2 THEN  IF B%(HV,VV - 1) THEN 7010
2150  IF E = 3 THEN  IF HV = 1 THEN 2290
2155  IF E = 3 THEN  IF B%(HV - 1,VV) THEN 7010
2160  IF E = 4 THEN  IF VV = 8 THEN 2290
2165  IF E = 4 THEN  IF B%(HV,VV + 1) THEN 7010
2170  IF E = 1 THEN  IF VV <  > 1 THEN  IF B%(HV + 1,VV - 1) THEN E = 4: GOTO
     2120
2180  IF E = 1 THEN  IF VV <  > 8 THEN  IF B%(HV + 1,VV + 1) THEN E = 2: GOTO
     2120
2190  IF E = 2 THEN  IF HV <  > 1 THEN  IF B%(HV - 1,VV - 1) THEN E = 1: GOTO
     2120
2200  IF E = 2 THEN  IF HV <  > 8 THEN  IF B%(HV + 1,VV - 1) THEN E = 3: GOTO
     2120
2210  IF E = 3 THEN  IF VV <  > 1 THEN  IF B%(HV - 1,VV - 1) THEN E = 4: GOTO
     2120
2220  IF E = 3 THEN  IF VV <  > 8 THEN  IF B%(HV - 1,VV + 1) THEN E = 2: GOTO
     2120
2230  IF E = 4 THEN  IF HV <  > 1 THEN  IF B%(HV - 1,VV + 1) THEN E = 1: GOTO
     2120
2240  IF E = 4 THEN  IF HV <  > 8 THEN  IF B%(HV + 1,VV + 1) THEN E = 3: GOTO
     2120
2250  IF E = 1 THEN HV = HV + 1: GOTO 2120
2260  IF E = 2 THEN VV = VV - 1: GOTO 2120
2270  IF E = 3 THEN HV = HV - 1: GOTO 2120
2280 VV = VV + 1: GOTO 2120
2290  IF E = 1 THEN X2 = 25 - VV: GOTO 2330
2300  IF E = 2 THEN X2 = 33 - HV: GOTO 2330
2310  IF E = 3 THEN X2 = VV: GOTO 2330
2320 X2 = 8 + HV
2330  IF X2 = X1 THEN 7000
2340 N1$(X1) = N2$(IM):N1$(X2) = N2$(IM):SC = SC + 2:IM = IM + 1: GOTO 702
     0
3000  GOSUB 8410
3010 H8% = 99:M$ = "^PLACE A GUESS BALL": CALL 4200:H8% = 227:M$ = "0 RETU
     RNS TO MENU": CALL 4200: GOSUB 6000
3020 G%(HG,VG) =  - 1:D% = 65 + 64 * HG + 3 * VG
3030 H8% = D%:M$ =  CHR$ (133) +  CHR$ (138): CALL 4200
3040  GOTO 7020
4000  GOSUB 8410
4010 H8% = 99:M$ = "^REMOVE GUESS BALL": CALL 4200:H8% = 227:M$ = "0 RETUR
     NS TO MENU": CALL 4200: GOSUB 6000
4020 G%(HG,VG) = 0:D% = 65 + 64 * HG + 3 * VG
4030 H8% = D%:M$ =  CHR$ (143) +  CHR$ (143): CALL 4200
4040  GOTO 7020
5000  GOSUB 5: FOR I = 1 TO 8: FOR J = 1 TO 8:D% = 65 + 64 * I + 3 * J:H8%
      = D%:M$ =  CHR$ (143) +  CHR$ (143): CALL 4200: NEXT J,I
5010  FOR I = 1 TO 8: FOR J = 1 TO 8: IF G%(I,J) THEN D% = 65 + 64 * I + 3
      * J:H8% = D%:M$ =  CHR$ (133) +  CHR$ (138): CALL 4200
5015  NEXT J,I
5020  GOTO 7020
6000  FOR I = 1 TO 8:H8% = 1 + 3 * I:M$ = " " +  STR$ (I): CALL 4200:H8% =
     94 + I * 64:M$ = " ^" +  CHR$ (64 + I): CALL 4200: NEXT
6030 H8% = 803:M$ = "^ENTER GUESS (^EX: ^E6)? ": CALL 4200
6035  GET Y0$: IF Y0$ = "0" THEN H8% = 825:M$ = "^" + Y0$: CALL 4200: FOR
     I = 1 TO 200: NEXT : GOTO 6075
6040  IF  ASC (Y0$) > 64 AND  ASC (Y0$) < 73 THEN H8% = 825:M$ = "^" + Y0$
     : CALL 4200: GOTO 6050
6045  GOTO 6035
6050  GET Y1$: IF Y1$ =  CHR$ (8) THEN H8% = 825:M$ = " ": CALL 4200: GOTO
     6035
```

Listing continued.

but it's cleaner to avoid the two GOTOs as in

```
2010 . . .IF ASC(Y0$)<48 OR ASC(Y0$)>57
     THEN 2010
2012 PRINT Y0$
2015 program continues.
```

Test the logic to be certain it's equivalent by trying values of ASC(Y0$) = 40, 50, and 60.

Inputting Key Presses

One final variety involves the difference between the TRS-80's INKEY$ and Applesoft's GET for inputting key presses. INKEY$ does not stop to verify that a key is being pushed. If no key is being held down, it returns an empty string. If a character must be obtained, a common practice is to test immediately for a null string as in

```
6035 Y0$ = INKEY$:IF Y0$ = " " THEN 6035
     ELSE IF Y0$ = "0" THEN. . .
```

GET, however, halts program flow until a key is pressed. This line can be simplified to

```
6035 GET Y0$:IF Y0$ = "0" THEN. . .
```

eliminating the ELSE altogether.

Additional Alterations Needed

There are several alterations necessary to satisfy Applesoft and complete this conversion. I mentioned previously that variable VI in line 1140 was omitted. The original program poked labels onto the screen at the edge of the game grid. Since we're not using the text screen, we can't poke; therefore we must print. Every Poke address and PRINT@ number differs by 15360. Since VI = 15360, we need to

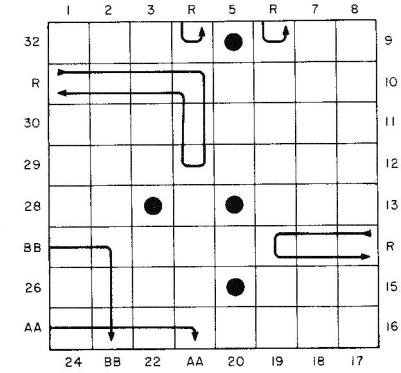

Figure 1. Examples of hits.

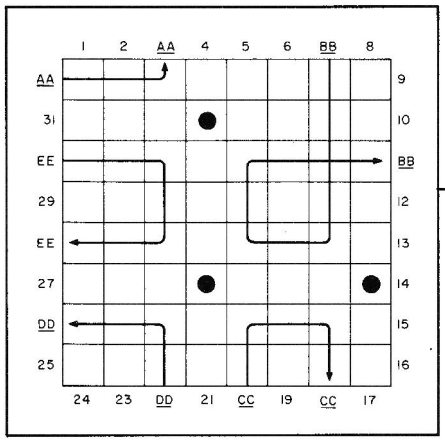

Figure 2.
Examples of deflected rays.

eliminate the VI and the numbers are exactly the values we need for printing with H8%. For example:

```
5000 . . . :D% = VI + 65 + 64*I + 3*J:POKE
     D%,143: POKE D% + 1,143: . . .
```

becomes

```
5000 . . . :D% = 65 + 64*I + 3*J:H8% = D%:
     M$ = CHR$(143) + CHR$(143):CALL
     4200
```

STRING$ is a TRS-80 function not available in Applesoft. It creates a string of a given number of a specified character. In line 1150, a string of 29 spaces is created to erase old text before printing a new message.

```
1150 PRINT@ 803,STRING$(29," ");:
     PRINT@ 803, "CORRECT
     LOCATION";
```

In Applesoft we must specify 29 spaces between quotes. Notice, however, that the new message prints over the first 16 spaces. If we combine them we get

```
1150 H8% = 803:M$ = "↑CORRECT LOCA-
     TION          ": CALL 4200
```

where 13 spaces fill the right portion of M$.

As a final note, any number or numerical variable must be changed to a string before printing. Thus

```
1110 PRINT@ 773,"POINTS USED: ";SC;
```

becomes

```
1110 H8% = 773:M$ = "↑POINTS USED: " +
     STR$(SC): CALL 4200
```

That's all there is to converting Black Box and adding another program to your Apple collection. Note that no attempt has been made to streamline the logic or enhance this program by using hi-res, color or sound. I wanted to demonstrate a straightforward conversion and leave to you the fun of dressing up Black Box in all of Applesoft's fanciest trappings. ■

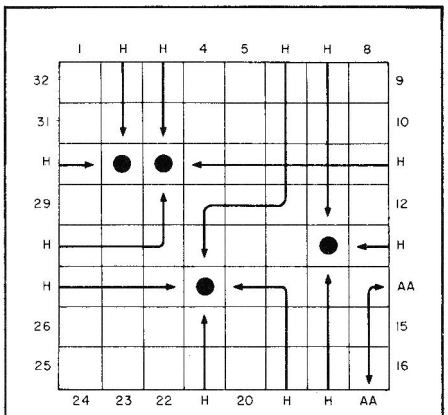

Figure 3. Examples of reflections.

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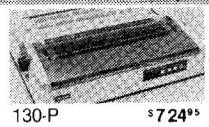

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Listing continued.

```
6052  IF  VAL (Y1$) < 1 OR  VAL (Y1$) > 8 THEN 6050
6055 H8% = 826:M$ = Y1$: CALL 4200
6060  GET Y$: IF Y$ =  CHR$ (8) THEN H8% = 826:M$ = " ": CALL 4200: GOTO 6
     050
6070 H6 =  ASC (Y0$) - 64:VG =  VAL (Y1$)
6075  FOR I = 1 TO 8:H8% = 1 + 3 * I:M$ = "  ": CALL 4200:H8% = 94 + I * 6
     4:M$ = "  ": CALL 4200: NEXT : IF Y0$ = "0" THEN 610
6080  RETURN
7000 N1$(X1) = " ^R":SC = SC + 1: GOTO 7020
7010 N1$(X1) = " ^H":SC = SC + 1
7020  FOR I = 1 TO 8:H8% = 65 + 3 * I:M$ = N1$(I): CALL 4200: NEXT
7030  FOR I = 9 TO 16:H8% = 156 + 64 * (I - 9):M$ = N1$(I): CALL 4200: NEXT

7040  FOR I = 17 TO 24:H8% = 665 - 3 * (I - 17):M$ = N1$(I): CALL 4200: NEXT

7050  FOR I = 25 TO 32:H8% = 577 - 64 * (I - 25):M$ = N1$(I): CALL 4200: NEXT

7060  IF C THEN 8000
7070  GOTO 610
8000  IF X1 = 2 THEN 8340
8001  IF X1 = 7 THEN 8310
8002  IF X1 = 14 THEN 8280
8003  IF X1 = 15 THEN 8270
8004  IF X1 = 13 THEN 8260
8005  IF X1 = 30 THEN 8220
8006  IF X1 = 28 THEN 8180
8007  IF X1 = 31 THEN 8140
8008  IF G%(2,5) THEN 8120
8009  GOSUB 5:H8% = 89:M$ = "^BLACK ^BOX": CALL 4200
8010 H8% = 195:M$ = "^THE OBJECT OF THE GAME IS TO LOCATE THREE, FOUR, OR
     FIVE": CALL 4200
8020 H8% = 256:M$ = "RANDOMLY HIDDEN BALLS IN AN EIGHT BY EIGHT FIELD.  ^Y
     OU WILL": CALL 4200
8030 H8% = 320:M$ = "LOCATE THEM BY SENDING RAYS INTO THE FIELD FROM THE S
     IDES.": CALL 4200
8040 H8% = 384:M$ = "^A BALL WILL ABSORB A RAY THAT STRIKES IT DIRECTLY, O
     R DEFLECT": CALL 4200
8050 H8% = 448:M$ = "A RAY THAT COMES WITHIN ONE SQUARE.": CALL 4200
8060 H8% = 515:M$ = "^FOLLOWING ARE SEVERAL EXAMPLES OF HOW RAYS WILL ACT
     WHEN": CALL 4200
8070 H8% = 576:M$ = "LAUNCHED INTO THE FIELD.  ^A RAY WILL EITHER BE A HIT
     , A": CALL 4200
8080 H8% = 640:M$ = "REFLECTION, OR BE DEFLECTED TO LEAVE THE MATRIX AT AN
     OTHER": CALL 4200
8090 H8% = 704:M$ = "POINT.  ^PRESS ^R^E^T^U^R^N EACH TIME FOR THE NEXT EX
     AMPLE.": CALL 4200
8100  GOSUB 8420
8110  GOSUB 5:B%(2,5) =  - 1:B%(4,5) =  - 1:B%(6,8) =  - 1:G%(2,5) =  - 1:
     G%(4,5) =  - 1:G%(6,8) =  - 1: GOTO 5000
8120 H8% = 99:M$ = "^HERE IS A TYPICAL BALL": CALL 4200:H8% = 163:M$ = "AR
     RANGEMENT.  ^A VECTOR SENT": CALL 4200:H8% = 227:M$ = "IN FROM 31 WOU
     LD BE A HIT.": CALL 4200
8130  GOSUB 8420:X1 = 31: GOTO 2030
8140  GOSUB 8420
8150  GOSUB 8410
8160 H8% = 99:M$ = "^A RAY FROM 28 WOULD": CALL 4200:H8% = 163:M$ = "DEFLE
     CT TO 21, AND": CALL 4200:H8% = 227:M$ = "THE COMPUTER WOULD GIVE": CALL
     4200:H8% = 291:M$ = "BOTH NUMBERS A DOUBLE": CALL 4200:H8% = 355:M$ =
     "LETTER MARKER.": CALL 4200
8170  GOSUB 8420:X1 = 28: GOTO 2030
8180  GOSUB 8420
8190  GOSUB 8410
8200 H8% = 99:M$ = "^A RAY FROM 30 WOULD BE": CALL 4200:H8% = 163:M$ = "RE
     FLECTED BACK TO 30": CALL 4200:H8% = 227:M$ = "AND MARKED WITH AN ^R.
     ": CALL 4200
8210  GOSUB 8420:X1 = 30: GOTO 2030
8220  GOSUB 8420
8230  GOSUB 8410
8240 H8% = 99:M$ = "^RAYS SENT IN FROM 13 AND": CALL 4200:H8% = 163:M$ = "
     15 WOULD ALSO BE": CALL 4200:H8% = 227:M$ = "REFLECTIONS, AND MARKED"
     : CALL 4200:H8% = 291:M$ = "WITH AN ^R.": CALL 4200
8250  GOSUB 8420:X1 = 13: GOTO 2030
8260 X1 = 15: GOTO 2030
8270 X1 = 14: GOTO 2030
8280  GOSUB 8420
8290  GOSUB 8410:H8% = 99:M$ = "^A RAY FROM 7 WOULD": CALL 4200:H8% = 163:
     M$ = "BE DEFLECTED TWICE,": CALL 4200:H8% = 227:M$ = "AND MARKED WITH
      A": CALL 4200:H8% = 291:M$ = "DIFFERENT DOUBLE LETTER.": CALL 4200:H
     8% = 355:M$ = "^WATCH THIS ONE.": CALL 4200
8300  GOSUB 8420:X1 = 7: GOTO 2030
8310  GOSUB 8420
8320  GOSUB 8410:H8% = 99:M$ = "^RAYS ENTERED AT 1, 2,": CALL 4200:H8% = 1
     63:M$ = "OR 3 WOULD FALL ALL THE": CALL 4200:H8% = 227:M$ = "WAY THRO
     UGH.  ^HERE IS": CALL 4200:H8% = 291:M$ = "2, FOR EXAMPLE.": CALL 420
     0
8330  GOSUB 8420:X1 = 2: GOTO 2030
8340  GOSUB 8420
8350  GOSUB 5:H8% = 131:M$ = "^YOUR SCORE IS THE TOTAL NUMBER OF MARKERS T
     HAT YOU USE": CALL 4200
8360 H8% = 192:M$ = "TO LOCATE THE BALLS.  ^THE OBJECT IS TO HAVE THE LOWE
     ST TOTAL": CALL 4200
8370 H8% = 256:M$ = "SCORE.": CALL 4200:H8% = 387:M$ = "^YOU MAY PLACE BAL
     L GUESSES AND REMOVE BALL GUESSES AT ANY": CALL 4200
8380 H8% = 448:M$ = "TIME.  ^WHEN YOU THINK YOU HAVE A CORRECT LAYOUT, STO
     P AND": CALL 4200
8390 H8% = 512:M$ = "SCORE.  ^AN INCORRECT BALL LOCATION COSTS FIVE POINTS
     .": CALL 4200
8400  GOSUB 8420: GOSUB 5: GOTO 50
8410  FOR I = 1 TO 12:H8% = 35 + I * 64:M$ = "
      ": CALL 4200: NEXT : RETURN
8420 H8% = 803:M$ = "^PRESS ^R^E^T^U^R^N": CALL 4200: GET Y$: RETURN
```

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Counting on Your Apple

Here's a Basic program that offers computer fun and learning for even the preschooler.

by Gary E. Leonard



Here is a simple game that will help children learn to count. From one to nine colorful square shapes are displayed—with sound. When "How many?" appears on the screen, the child answers by pressing the appropriate key. A green curtain indicates a correct response; a red curtain means an error. The player's score is revealed after ten responses.

Lines 200 to 440 contain the main program loop. Line 220 picks a random number of squares. Lines 270–280 display these squares in random colors and with sound. Line 290 gets the response. Line 320 jumps to the number subroutine at line 800. Finally, line 340 determines if the answer is right or wrong and jumps to the appropriate line for reward or (gulp!) punishment. See Table 1 for the program variables.

I think this game will add to your young ones' joy of learning. Maybe it will be fun for you, too. ■

RI, WR	Right/wrong counters
D, DD, N	General loop variables
SN	Sound data variable
H(N), V(N)	Permanent horizontal/vertical coordinates of square shapes
T1, T2, T3, T4, T5, T6	Sound parameter variables
QN	Number of square shapes
CL	Random color variable
AN$, AN	Answer/answer value
S	Sound variable
X,Y	Temporary horizontal/vertical coordinates of square shapes and numbers
SP	Text spacing variable
ST$	Restart variable

Table 1. Program variables.

Gary Leonard is a teacher and enjoys bicycling and chess in his spare time. Address correspondence to him at Box 1A, Piper Road, Ashby, MA 01431.

```
10  REM      ************************ INITIALIZATION ************************

20  TEXT : HOME : NORMAL : SPEED= 255:RI = 0:WR = 0
30  FOR N = 1 TO 23: READ SN: POKE 769 + N,SN: NEXT
40  FOR N = 1 TO 9:: READ H(N),V(N): NEXT
100  REM     ************************ TITLE DISPLAY ************************

110  GOSUB 910: FOR N = 1 TO 7: GOSUB 920: NEXT : PRINT "*" SPC( 15)"COUNT
     ING" SPC( 15)"*";: GOSUB 920: PRINT "*" SPC( 10)"BY GARY E. LEONARD" SPC(
     10)"*";: FOR N = 1 TO 8: GOSUB 920: NEXT : GOSUB 910
120 T1 = 90:T2 = 90:T3 = 1:T4 = 4:T5 = 6:T6 = 1
130  FOR D = 1 TO 2000: NEXT : FOR D = 1 TO 24: GOSUB 710:T1 = T1 - 3:T2 =
     T2 - 3: PRINT : NEXT
200  REM      ****************** MAIN BODY OF PROGRAM ************************

210  IF RI + WR > 9 THEN 1010
220 QN =  INT ( RND (1) * 9) + 1
230  FOR D = 1 TO 1000: NEXT
240  GR : HOME
250  IF RI + WR > 9 THEN 1010
260 T1 = 150:T2 = 150:T3 = 1:T4 = 30:T5 = 30:T6 = 1
270  FOR N = 1 TO QN:CL =  INT ( RND (1) * 4) + 1: ON CL GOSUB 510,520,530
     ,540
280 X = H(N):Y = V(N): FOR D = 1 TO 1000: NEXT : GOSUB 610: GOSUB 710: NEXT
     : RESTORE
290  POKE  - 16384,0: POKE  - 16368,0: HOME : VTAB 23: HTAB 15: PRINT "HOW
      MANY ?";: GET AN$
300  IF  ASC (AN$) < 49 THEN 290
310  IF  ASC (AN$) > 57 THEN 290
320 AN =  VAL (AN$):X = 18:Y = 25:CL =  INT ( RND (1) * 4) + 1: ON CL GOSUB
     510,520,530,540: ON AN GOSUB 810,820,830,840,850,860,870,880,890
330  FOR D = 1 TO 1000: NEXT
340  HOME : IF AN = QN THEN 400
350 WR = WR + 1
360  COLOR= 1: FOR D = 1 TO 20: VLIN 0,39 AT D: VLIN 0,39 AT 40 - D: NEXT

370  FOR D = 1 TO 8:S =  PEEK ( - 16336): NEXT : FOR D = 1 TO 25: NEXT : FOR
     D = 1 TO 8:S =  PEEK ( - 16336): NEXT
380  COLOR= 0: FOR D = 1 TO 20: VLIN 0,39 AT 21 - D: VLIN 0,39 AT 19 + D: NEXT

390  GOTO 240
400 RI = RI + 1
410 T1 = 100:T2 = 100:T3 = 1:T4 = 10:T5 = 10:T6 = 1
420  COLOR= 12: FOR D = 1 TO 20: VLIN 0,39 AT D: VLIN 0,39 AT 40 - D: GOSUB
     710:T1 = T1 - 2:T2 = T2 - 2: NEXT
430  COLOR= 0: FOR D = 1 TO 20: VLIN 0,39 AT 21 - D: VLIN 0,39 AT 19 + D: NEXT

440  GOTO 220
500  REM      ****************** COLOR SUBROUTINE ************************

510  COLOR= 1: RETURN
520  COLOR= 2: RETURN
530  COLOR= 6: RETURN
540  COLOR= 12: RETURN
600  REM      ****************** SQUARE SHAPE SUBROUTINE ****************

610  HLIN X,X + 3 AT Y: HLIN X,X + 3 AT Y + 5: VLIN Y,Y + 5 AT X: VLIN Y,Y
      + 5 AT X + 3: RETURN
700  REM      ************************ SOUND SUBROUTINE ********************

710  FOR T = T1 TO T2 STEP T3: FOR TT = T4 TO T5 STEP T6: POKE 768,T: POKE
     769,TT: CALL 770: NEXT : NEXT : RETURN
800  REM      ********************** NUMBER SUBROUTINE **********************

810  VLIN Y,Y + 10 AT X + 2: RETURN
820  PLOT X,Y + 1: VLIN Y + 6,Y + 9 AT X: VLIN Y + 1,Y + 4 AT X + 4: HLIN
     X + 1,X + 3 AT Y: HLIN X + 1,X + 3 AT Y + 5: HLIN X + 1,X + 4 AT Y +
     10: RETURN
830  PLOT X,Y + 1: PLOT X,Y + 9: VLIN Y + 1,Y + 4 AT X + 4: VLIN Y + 6,Y +
     9 AT X + 4: HLIN X + 1,X + 3 AT Y: HLIN X + 1,X + 3 AT Y + 5: HLIN X +
     1,X + 3 AT Y + 10: RETURN
840  VLIN Y,Y + 4 AT X: VLIN Y,Y + 4 AT X + 4: VLIN Y + 6,Y + 9 AT X + 4: HLIN
     X + 1,X + 3 AT Y + 5: RETURN
850  PLOT X,Y + 9: VLIN Y + 1,Y + 4 AT X: VLIN Y + 6,Y + 9 AT X + 4: HLIN
     X + 1,X + 4 AT Y: HLIN X + 1,X + 3 AT Y + 5: HLIN X + 1,X + 3 AT Y +
     10: RETURN
860  VLIN Y,Y + 4 AT X: VLIN Y + 6,Y + 9 AT X: VLIN Y + 6,Y + 9 AT X + 4: HLIN
     X + 1,X + 3 AT Y + 5: HLIN X + 1,X + 3 AT Y + 10: RETURN
870  VLIN Y + 1,Y + 10 AT X + 4: HLIN X,X + 3 AT Y: RETURN
880  VLIN Y + 1,Y + 4 AT X: VLIN Y + 6,Y + 9 AT X: VLIN Y + 1,Y + 4 AT X +
     4: VLIN Y + 6,Y + 9 AT X + 4: HLIN X + 1,X + 3 AT Y: HLIN X + 1,X + 3
      AT Y + 5: HLIN X + 1,X + 3 AT Y + 10: RETURN
890  VLIN Y + 1,Y + 4 AT X: VLIN Y + 1,Y + 4 AT X + 4: VLIN Y + 6,Y + 9 AT
     X + 4: HLIN X + 1,X + 3 AT Y: HLIN X + 1,X + 3 AT Y + 5: RETURN
900  REM      ****************** TEXT SCREEN SUBROUTINE ******************

910  FOR N = 1 TO 40: PRINT "*";: NEXT : RETURN
920  PRINT "*" SPC( 38)"*";: RETURN
1000  REM     ************************ SCORING DISPLAY **********************

1010 T1 = 96:T2 = 96: GOSUB 710: GOSUB 710
1020  TEXT : HOME : GOSUB 910: FOR D = 1 TO 3: GOSUB 920: NEXT : PRINT "*"
      SPC( 15)"SCORE :" SPC( 16)"*";
1030  FOR D = 1 TO 3: GOSUB 920: NEXT :SP =  INT (RI / 10): PRINT "*" SPC(
     16 - SP)RI" RIGHT" SPC( 15)"*";
1040  FOR D = 1 TO 3: GOSUB 920: NEXT :SP =  INT (WR / 10): PRINT "*" SPC(
     16 - SP)WR" WRONG" SPC( 15)"*";
1050  FOR D = 1 TO 4: GOSUB 920: NEXT
1060  PRINT "*   PRESS SPACE BAR TO TRY AGAIN....   *";
1070  GOSUB 920: GOSUB 920: GOSUB 910: POKE  - 16384,0: POKE  - 16368,0
1080  GET ST$: IF  ASC (ST$) <  > 32 THEN 1080
1090 RI = 0:WR = 0: GOTO 220
1100  REM      ************** MACHINE LANGUAGE SOUND DATA ****************

1110  DATA    173,48,192,136,208,5,206,1,3,240,9,202,208,245,174,0,3,76,2,
     3,96,0,0
1200  REM      ****************** GRAPHICS POSITION DATA ******************

1210  DATA    2,2,10,2,18,2,26,2,34,2,2,13,10,13,18,13,26,13
```

Program listing.

Circle 379 on Reader Service card.

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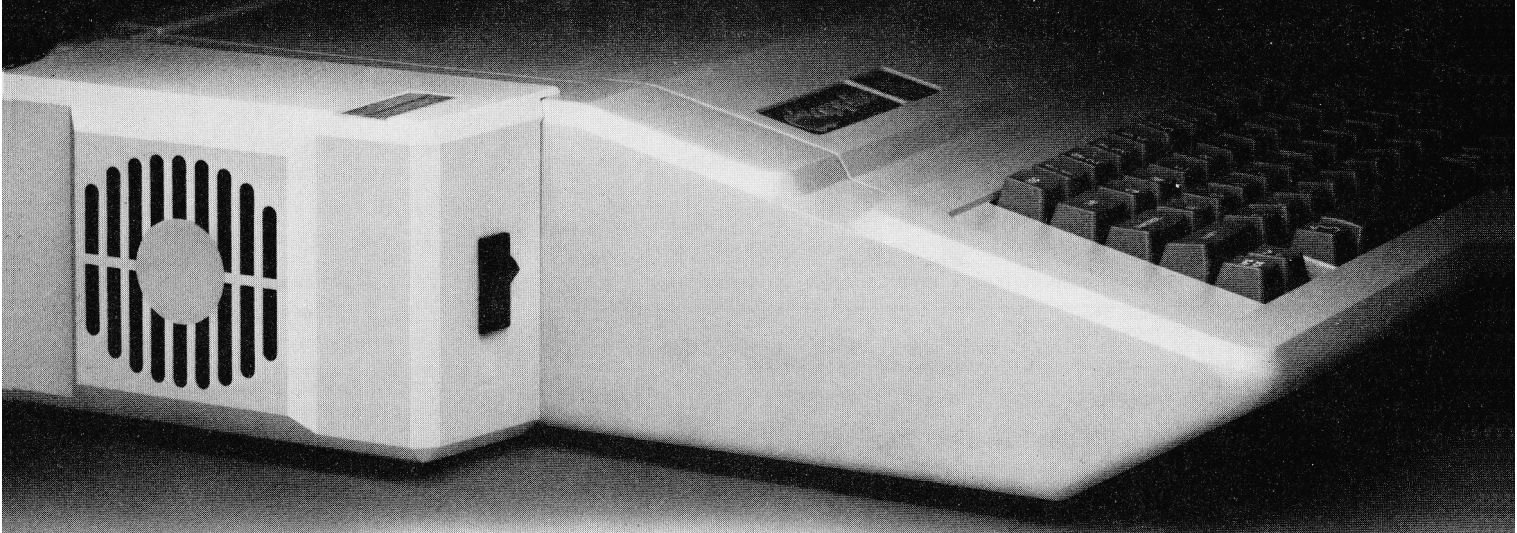
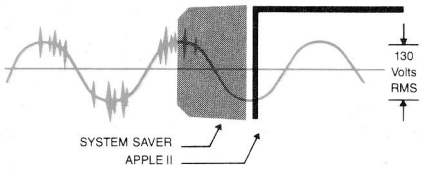


For Line Surge Suppression

The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

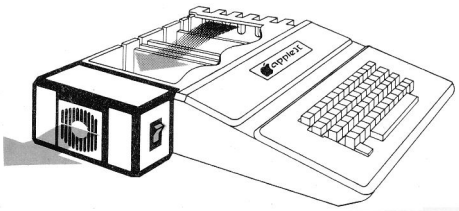


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise signals by a minimum of 30 dB from 600 khz to 20 mhz, with a maximum attenuation of 50 dB.

For Cooling

As soon as you add 80 columns or more memory to your Apple II you need SYSTEM SAVER.

Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.



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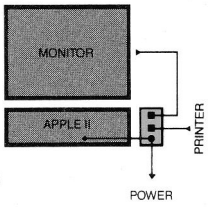
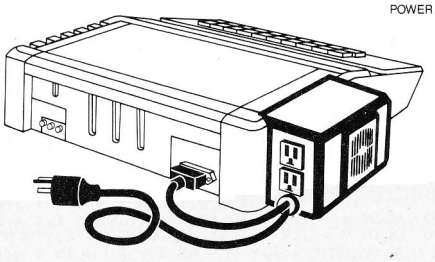


Available in 220/240 Volt. 50 Hz



The heavy duty switch has a pilot light to alert when system is on.You'll never use the Apple power switch again!

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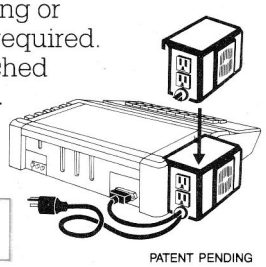

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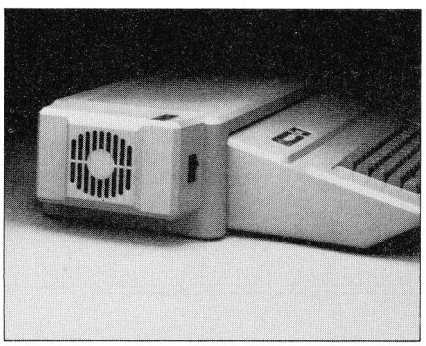

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Do It Right!

For those who demand the very best in peripherals, here's the lowdown on what's out there for the truly discriminating computer junkie.

by Paul Raymer

I never realized until I started looking through the various computer magazines that a great share of the computer market was being ignored.

I had assumed, in error, that the best of all new items available for my Apple were being advertised, but regrettably this was not the case.

For those of you who wish to add peripherals and want the very best, the following items are presented for your consideration.

Printer

If you are not too concerned with things like parallel and/or serial and instead are more interested in a device that can reproduce your information in something more than just the usual 40 or 80 columns, then the Heidelberg is suggested. It requires 220 V 3-phase and weighs more than your usual desktop printer, but is able to produce printouts in full color, 400 columns wide. Graphics are certainly no problem.

The configuration may be difficult for the novice, but an excellent instruction manual is provided. Knowledge of hex or machine language is not needed, but familiarity with German can be helpful. (See Photo #1.)

Database

The ads abound with databases, and most of them are quite good. The use of the phrase "user friendly" has certainly been overworked (see the article by this auther, "Let Me Tell You What FRIENDLY Can Cost You!"), but if you feel limited by a database with only several hundred files, try the S.I. Database. This product has apparently an unlimited amount of information available; the records and files (I never could figure out which was which) are readily accessible. The cost of this database is very modest, and although you cannot copy the database (unless you have the world's biggest Xerox

Paul Raymer, 3464 Townhouse Drive, Las Vegas, NV 89121, offers this panoply of must-have peripherals for your information and enjoyment. To place an order, you're on your own.

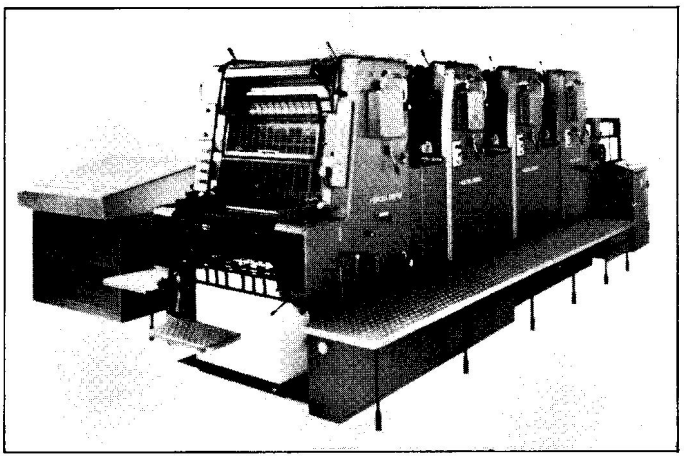

Photo #1.

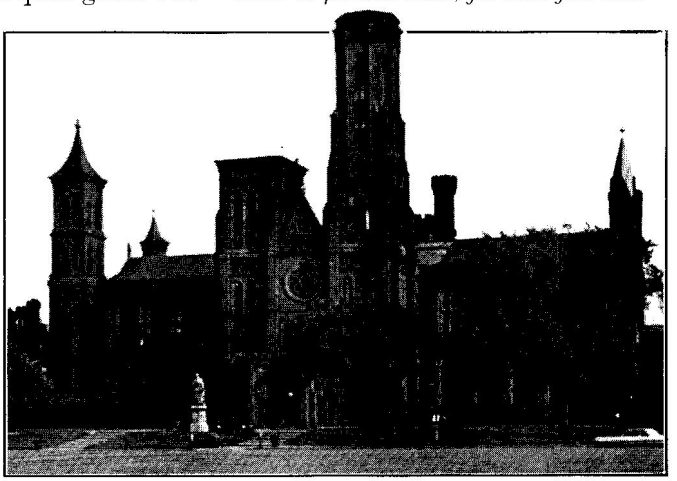

Photo #2.

machine), the information is easy to access. This *is* a protected database. (See Photo #2.)

Storage

Most publications are now advertising double-density disks, hard disks and things like that. I have found the old tried and true methods are most reliable and, with the help of the Boulder/Hoover Storage system, I have been able to keep all my records, files, old magazines, past due invoices, partially written programs and rejection slips from America's leading magazines where they belong, so that I can better concentrate on good sensible computer applications. Like Beer Run, for example. (See Photo #3.)

Video

Certainly the advent of the color TV has been a blessing to the computer industry. For several years I used a black-and-white television to display many of the hi-res programs I had. I thought it was a great improvement on my AM radio and found great enjoyment in looking at Winston Churchill.Pic and Sexy Lady.Pic and accepted the miracle of modern day technology.

Then I accidentally discovered that the same programs could be displayed on a color TV set! After discovering that GR was a command for color, not a comment by the management of the Apple Computer Company to the letters I had written them (still unanswered, of course), I decided to get the best video set available.

Because of the confusion of such terms as RGB, high-resolution, color graphics and monitor, I explored the use of a high-powered electrical energy source and found that system most reliable. (See Photo #4.)

Samples of several original hi-res designs created by the author are depicted in Photos #5 and #6.

Games

Certainly no one can overlook the value of the Apple for game playing. As much as one might appear to be a snob and state that his/her computer is used solely for business, commercial and/or educational functions, there certainly must be a time when game playing is called for.

A study of best-seller charts in many of the publications reveals pretty much the same general listings. Apparently the games are much the same; the characters change from one software company to another, from one program to another—a little yellow dot becomes a caterpillar or a worm, a can of beer or a naked girl, a dragon climbing a ladder, a cupcake with chocolate frosting, or a bowl of chicken soup laced with matzo balls.

It is the opinion of the author, who once wrote a game program, that if you are going to play games—*play games*. The illustration gives a good idea of the author's idea of a good game. The program is easy to play, quite user friendly, requires very little previous experience, and, although protected (note security guard in left rear of photo), can be played as long as one is interested and one's "bankroll" (a term indigenous to the game) holds out.

Some of the more astute readers will note that games of this type are limited to certain areas, such as Nevada, New Jersey and certain military installations. (See Photo #7.)

Music

The last frontier for computing may well be the startling results that can be accomplished with digital synthesizing of music.

Peripheral devices are becoming increasingly available, which will allow one to learn, compose, teach, entertain,

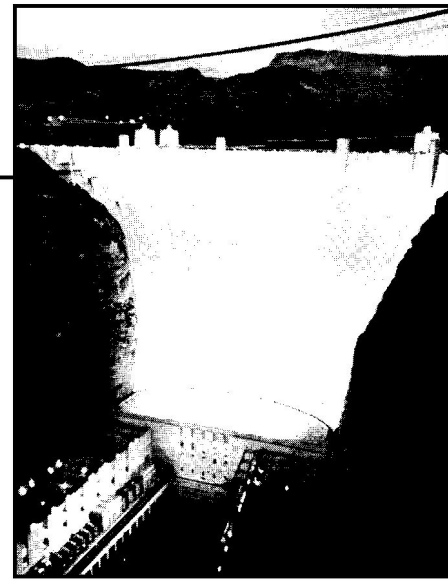

Photo #3.

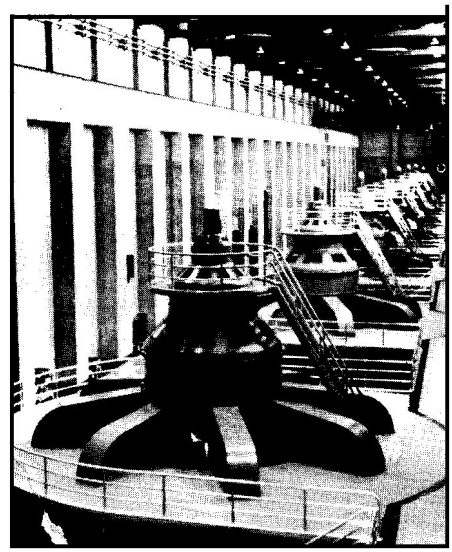

Photo #4.



Photo #5.

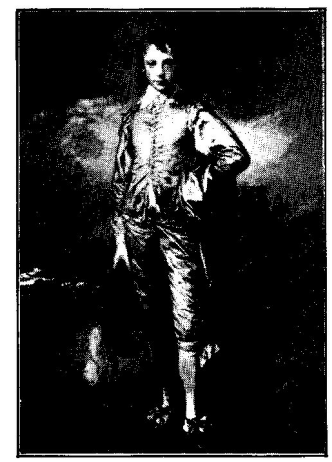

Photo #6.

Circle 215 on Reader Service card.

NEW FOR APPLE II AND IIe

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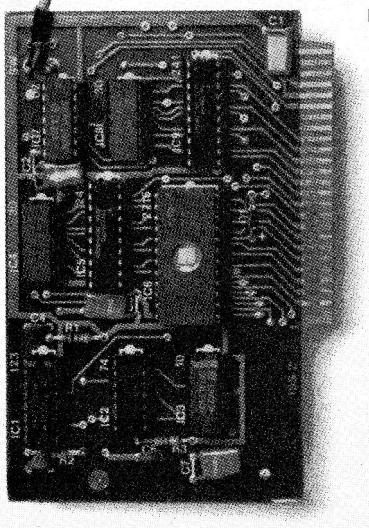
MAKES BACK-UP COPIES OF PROTECTED SOFTWARE QUICKLY, EASILY, WITH JUST A PUSH OF A BUTTON.

New software locking schemes have rendered even the latest generation of copy programs virtually unusable. Locksmith™, Nibbles Away™ and other "Nibble copiers" require complicated parameter settings, much patience and great effort to use. More often than not, the results are disappointing. WILDCARD is different. Rather than copying disks track by track, WILDCARD ignores the disk and any copy protection encrypted on it. Instead, WILDCARD takes a snapshot of memory in your Apple® II. Now you can make back-up copies of protected software with the push of a button.



Software is not copy protected. System requirements: Apple II Plus with 64K and DOS 3.3 or Apple *IIe*. Franklin Ace also supported.
*Wildcard does not operate with CP/M® or other microprocessor based software.

FEATURES

- □ Hardware copying device... push button operation.
- □ Copies 48K memory resident software, most 64K software.
- □ No programming experience or parameters necessary.
- □ Backs up DOS 3.2 and DOS 3.3 disks.
- □ Creates DOS 3.3 unprotected and autobooting disks.
- □ WILDCARD lives in any slot. Undetectable by software.
- □ Produces autobooting disk in 2 minutes.
- □ Copies are DOS 3.3 compatible.
- □ Copies become accessible for alterations.
- □ Simple, easy-to-use software included.

WILDCARD ***Utility Disk 1*** also included, featuring:

- □ Automatic program compression and BRUN file maker.
- □ Multiple programs can be placed on the same disk.
- □ Recreates basic files to load and save.
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WILDCARD $139.95

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Photo #7.

Modems

The marketplace abounds with good, practical modems, and software available for telephonic transfer of information is only exceeded by the number of "hangman" games written by aspiring authors.

Since the sole function of a modem is to permit transfer of information over telephone lines, and to perform this operation in a simple, rapid and accurate manner, the value of the modem is immediately apparent.

The example displayed is provided so that you can see the ultimate in direct connection and rapid information transfer without worrying about baud rates, speed recognition and Bell compatibility. Single, duplex and condo are utilized, and any language may be used, although English is preferred. (See Photo #10.)

Retreat

The devices described above may in some cases be quite expensive for the new owner of a computer. The author, whose summer retreat is pictured here (see Photo #11), suggests you save up and buy the best. Don't wait until a "newer" version comes out—you'll miss all the fun of computing now!

I hope this article has been helpful in understanding peripherals for your computer, what they do, and what is now available. ■

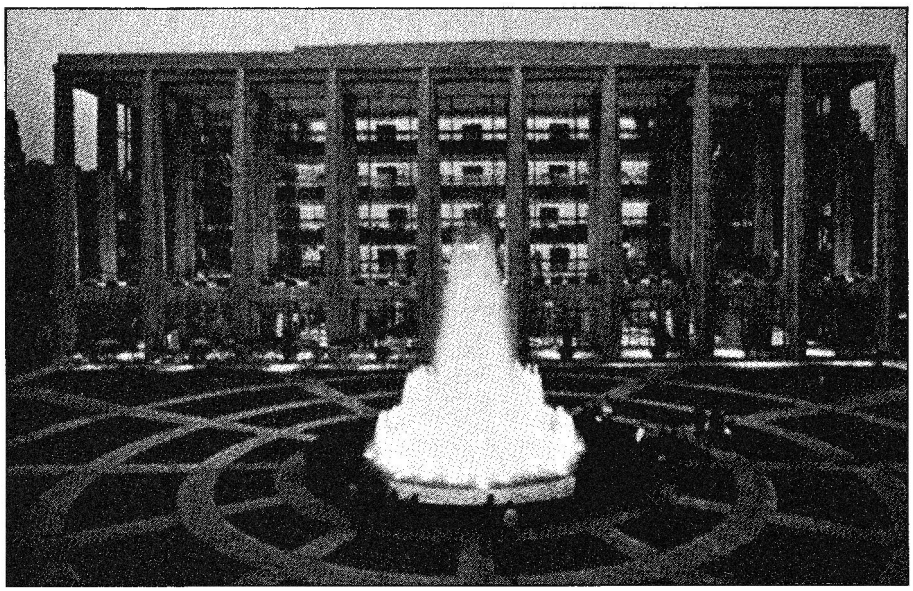

Photo #8.

play, dance, sing and write music with various degrees of professionalism.

Suffice it to say that the music system illustrated has proven to be effective and is quite noteworthy in that it has a 490-note, 6-octave range, with a capacity for 375 voices. Music may be played in real time and can be rock, jazz, pop, punk or real music. (See Photo #8.)

Clock

Several excellent clocks are available to the computer owner. The concept of a battery on board, so that the clock continues to operate even if the computer is not operating, is amusing. The device depicted, proven after many years of excellent service, does not require batteries and is another good example of fine British technology. (See Photo #9.)

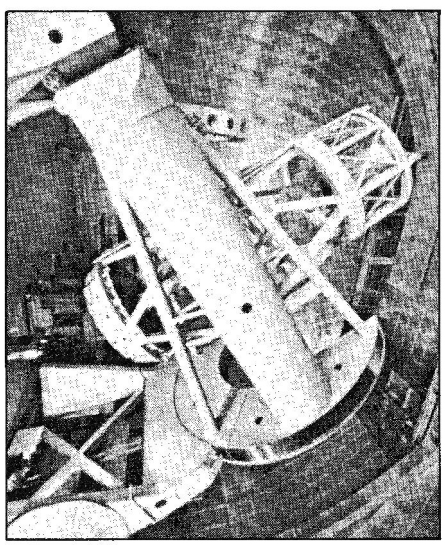

Photo #10.

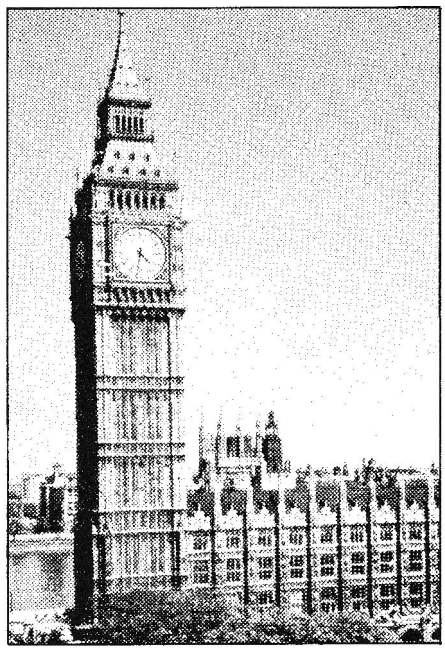

Photo #9.

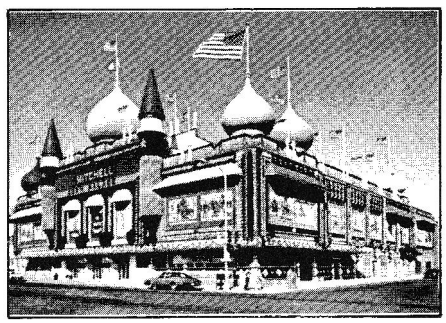

Photo #11.

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The Grizzly™, EPD's uninterruptable power system is as tough as the animal it was named after. Like its namesake, don't let its looks deceive you. This compact system plugs directly into any standard outlet and is ready to go. All you need to do is plug what needs protection into it, flip The Grizzly on and proceed with your normal routine. In the event of a power-line problem such as a brownout or blackout, The Grizzly will take over instantly delivering power at full load for up to twenty minutes. Simultaneously, its sonar alarm will sound signaling you to close out files and shutdown or giving you the option of allowing line power to return.

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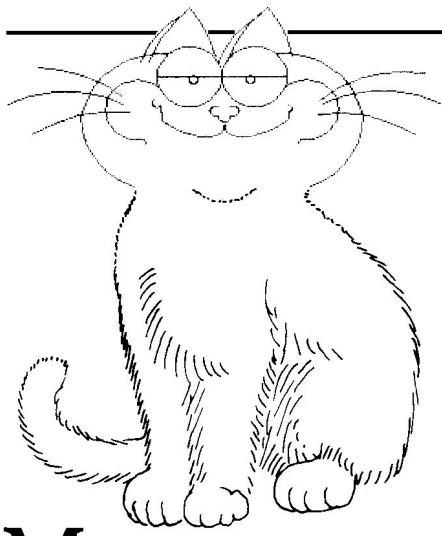
Circle 25 on Reader Service card.

Of Cats and Turtles in Mathland

Creating a grinning cat may draw the artist into an alternate geometry.



by Greg Stone

My wife came home one day and told me her sixth-grade students were using Apple Logo to draw Garfield—the cat, not the President.

That sounded like fun, and although I'm wise enough to know I'm no match for sixth-graders, I went to the computer and began fumbling about. It would be too presumptuous to call the result Garfield, so I'll use the more generic "CAT.FACE." However, the esoteric titles for some of the components are lifted from Jim Davis' book, *Garfield Bigger Than Life.* Instructions on how to draw Garfield are on the first page.

The program, written in Apple Logo, is included here for those interested in the results. See Program Listing 1. Other versions of Logo may call for some small changes. Commands are spelled out for ease of understanding, but it's better to learn and use the following abbreviations. (They are given in the order they appear in the program.) HIDETURTLE = HT, PENUP = PU, SETHEADING = SETH, ARCRIGHT = ARCR, FORWARD = FD, RIGHT = RT, ARCLEFT = ARCL, LEFT = LT, PRINT = PR.

When drawing in Logo the first question one asks is, where do I start? The most obvious answer is wherever you—or the Turtle—happen to be. Let's say you've just finished an eye and are sitting on the left edge of a pupil. An ear is next on the drawing agenda. Lift the pen up and move to where you want to be. But one move is seldom enough. There probably will be several short moves, as well as changes in heading, before you decide to put the pen down and begin drawing an ear. No problem. Just write each move down as it's made so it can be included in the program.

Granted, this gets the job done, but there are two problems. First, Turtles wandering about the screen leave enough twists and turns behind them to make a belly dancer envious. If you go back to the program a few days (or hours) later and attempt to modify it, you may find the logical sequence of steps has become a meaningless list of numbers. Second, it doesn't lend itself to the basic problem-solving technique of breaking down each large problem into several smaller problems.

My first response to this was to send the Turtle HOME when part of a drawing was finished. Then he always started from the same spot on the screen, which at least helped my orientation a little. However, I was still going through contorted, pen-up maneuvers to get him to a new spot.

I then decided that these homing instincts were just an unnecessary detour. A starting point was needed that could be located in a subjective (and aesthetic) manner. I no longer had to write these wanderings down and put them in the program. Instead I simply stopped at the spot and took advantage of two Logo primitives:

- PRINT POS gives the X and Y coordinates of the Turtle.
- PRINT HEADING gives the heading in degrees.

Now all that was needed was a procedure to take advantage of this information, and BEGIN is that procedure.

```
TO BEGIN :COORDINATES :HEADING
PENUP
SETPOS :COORDINATES
SETHEADING :HEADING
PENDOWN
```

It's important to note that COORDINATES, the first input to BEGIN, is a list of the two numbers that are the X and Y

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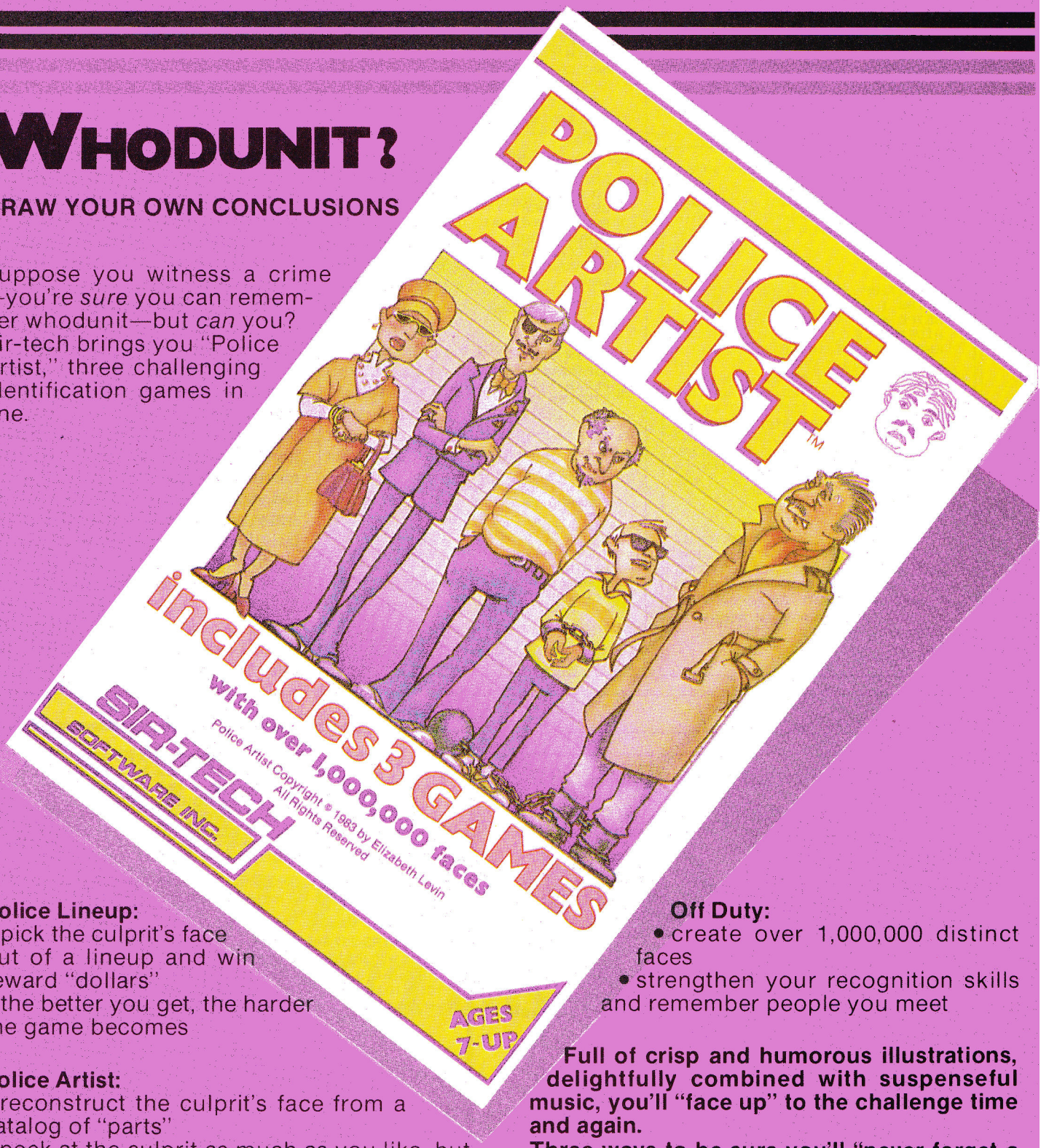

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```
TO CAT.FACE
SET.UP
RIGHT.SIDE
LEFT.SIDE
EYES
PUPILS
LIDS
SNIFFER
SMIRK
SMIRK.RETAINERS
EARS
WHISKERS
MESSAGE
END


TO SET.UP
SETBG 1
SETPC 4
HIDETURTLE
END


TO BEGIN :COORDINATES :HEADING
PENUP
SETPOS :COORDINATES
SETHEADING :HEADING
PENDOWN
END


TO RIGHT.SIDE
BEGIN [33 15] 85
ARCRIGHT 50 45
FORWARD 10 RIGHT 10 FORWARD 10
  RIGHT 20 FORWARD 20 RIGHT 20
ARCRIGHT 50 75
END
```

```
TO LEFT.SIDE
BEGIN [-33 15] -85
ARCLEFT 50 45
FORWARD 10 LEFT 10 FORWARD 10
   LEFT 20 FORWARD 20 LEFT 20
ARCLEFT 50 75
END


TO EYES
SETSCRUNCH .7
BEGIN [0 0] 0
CIRCLER 20
CIRCLEL 20
SETSCRUNCH .8
END


TO PUPILS
BEGIN [20 -2] 0
CIRCLEL 2.5
BEGIN [-20 -2] 0
CIRCLER 2.5
END


TO LIDS
BEGIN [-40 0] 90
FORWARD 80
END

TO SNIFFER
BEGIN [-1.5 -20] 270
FORWARD 3 ARCLEFT 3 180
FORWARD 2 RIGHT 90
```

Listing continued.

Program listing.
CAT.FACE, using Logo to draw a familiar—face.

coordinates. Thus in CAT.FACE, when the eyes are complete and you wish to move to the ears, the move is accomplished with BEGIN [−5 12] 15. The pen then goes up, the Turtle moves to the listed position and assumes the commanded heading, and then the pen is put down ready to draw.

The second advantage of this procedure is that it allows a program such as CAT.FACE to be broken into manageable parts for easy creation, editing and reuse.

As with other Logo procedures, some of those in CAT.FACE are worth entering in your library. BEGIN is one, but you may also wish to save EYES and SNIFFER for use elsewhere. I particularly like EYES because it's so easy to modify.

Notice that the first command in EYES is to SETSCRUNCH .7. If you haven't met SCRUNCH yet, do so now. It is a Logo primitive that outputs the aspect ratio, a number that is the ratio

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"It's easy to miss the point about Logo graphics."

of the size of a vertical Turtle step to a horizontal one. If you SETSCRUNCH .5, each vertical Turtle step would be half the length of a horizontal one. (You can find this in the reference manual.) Although the correct aspect ratio can vary with your screen, the normal ratio is .8. With SCRUNCH set at .8, squares should look like squares and circles like circles. If they don't on your screen you should fool around with the setting until things do look normal.

SCRUNCH is fun to play. With EYES at a SCRUNCH of .7, each vertical step is a little less than the horizontal steps, and thus, the eyes are flattened from circles to ellipses. Run EYES with different SCRUNCH settings to see what you get. In fact, take the SCRUNCH settings out of EYES and run the whole program at different SCRUNCH settings.

The SET.UP procedure at the start of CAT.FACE merely chooses a background color and a pen color. If you're using a black and white monitor, set the background at 0 or 6 and the pen color at 1. It also hides the Turtle, which makes him draw faster. Circles go slowly in Logo. While it's handy to have the Turtle around (to show position) when actually drawing, it's nice to get rid of him once something is programmed.

The message at the end of the program takes advantage of another Logo primitive, WAIT. This command delays an action in units of a 60th of a second. Thus WAIT 60 will give a delay of one second and WAIT 600 will delay ten seconds. I thought the message was in character:

SO YOU DREW A CAT FACE.
BIG HAIRY DEAL!

It's easy to miss the point about Logo graphics. After all, most of the hoopla surrounding Logo focuses on its Turtle graphics. With this in mind, one might innocently approach Logo

Listing continued.

```
ARCLEFT 4 180
RIGHT 90 FORWARD 2
ARCLEFT 3 180 FORWARD 3
END


TO SMIRK
BEGIN [1.5 -32] 180
ARCRIGHT 10 40
RIGHT 35 ARCRIGHT 37.5 60
RIGHT 45 FORWARD 5 LEFT 45
ARCRIGHT 3.5 80 LEFT 180
ARCRIGHT 3 185
BEGIN [1.5 -32] 180
ARCLEFT 10 40
LEFT 35 ARCLEFT 37.5 60
ARCLEFT 3.5 80
RIGHT 120 ARCLEFT 2.5 170
END


TO SMIRK.RETAINERS
BEGIN [39 -7] 50
ARCRIGHT 20 235 LEFT 90 FORWARD 3
BEGIN [-39 -7] 310
ARCLEFT 20 235 RIGHT 90 FORWARD 3
END
```

Listing continued.

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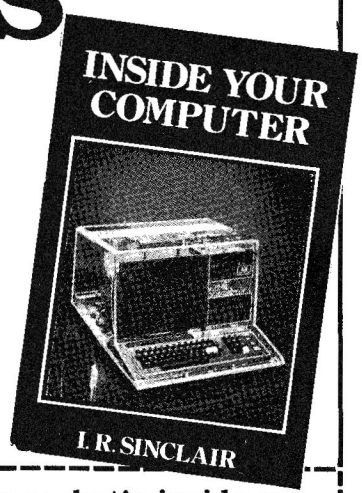

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"Remember that Logo simply provides an environment where one can play comfortably with basic mathematical concepts."

expecting a beautiful drawing system.

But if you're looking for a beautiful graphics language, try GraForth or another of the various packages designed to make high-resolution Apple graphics relatively easy. The beauty of Logo graphics is that it provides a simple, instantaneous feedback device that reveals the logic of a particular course of action.

Don't expect mind boggling pictures out of Logo or you'll be disappointed. Remember that Logo simply provides an environment where one can play comfortably with basic mathematical concepts. But in a culture where people tend to shudder at the word mathematics, Logo is an extremely powerful tool.

With this in mind look at CAT. FACE again. Disguised under that innocent bit of play are several mathematical terms and concepts. Using the procedure BEGIN introduces one to Cartesian coordinates without even mentioning the word. Similarly, one deals with the concept of a heading defined in degrees of a circle.

As you begin to examine the program more carefully, you'll notice that several lines in the face, most notably in the ears (smirk, smirk retainers, and whiskers), have to be defined in terms of arcs of a circle. Numbers representing the circle's radius and the number of degrees one wishes to cover have to be juggled.

Finally SETSCRUNCH has you playing with the complexities of aspect ratio. You don't have to really understand all these things to use them in Logo graphics; but as you use them, they become a part of your environment. ■

Listing continued.

```
TO EARS
BEGIN [2.7 10] 20
ARCRIGHT 85 30
RIGHT 90 ARCRIGHT 70 30
BEGIN [-2.3 10] 20
ARCRIGHT 60 45
BEGIN [-45 10] 20
ARCRIGHT 85 30
RIGHT 90 ARCRIGHT 70 30
BEGIN [-50 10] 19
ARCRIGHT 60 45
END


TO WHISKERS
BEGIN [59 -25] 83
ARCRIGHT 90 45
BEGIN [60 -16] 50
ARCRIGHT 80 50
BEGIN [62 -18] 65
ARCRIGHT 85 55
BEGIN [-57 -24] 277
ARCLEFT 90 44
BEGIN [-62 -13] 311
ARCLEFT 79 49
BEGIN [-60.5 -18] 295
ARCLEFT 84 54
END


TO MESSAGE
WAIT 180
PRINT [SO YOU DREW A CAT FACE]
PRINT [BIG HAIRY DEAL!]
END
```


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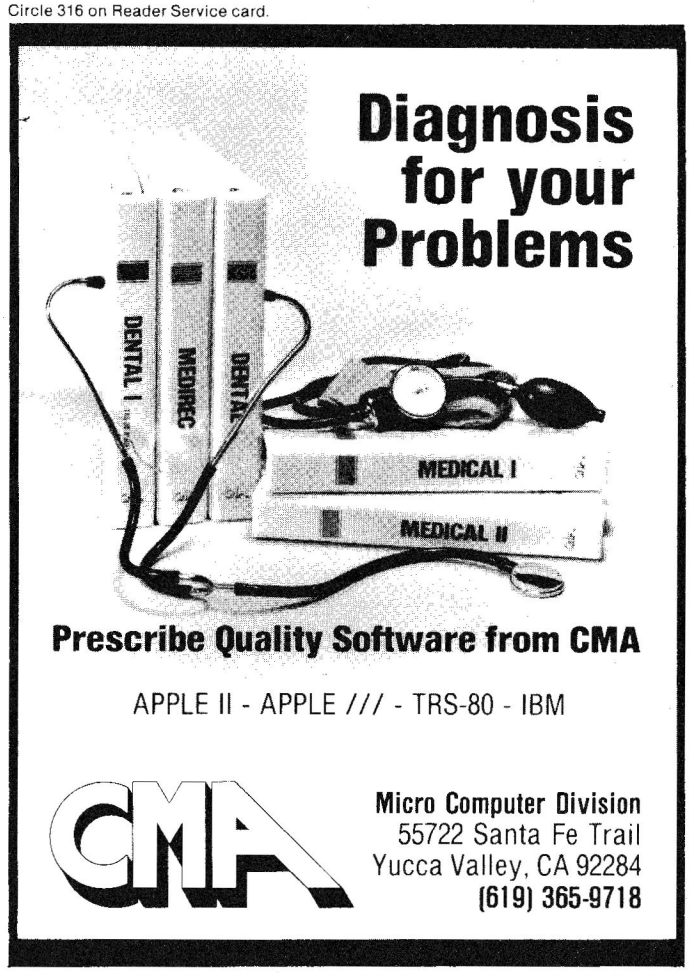

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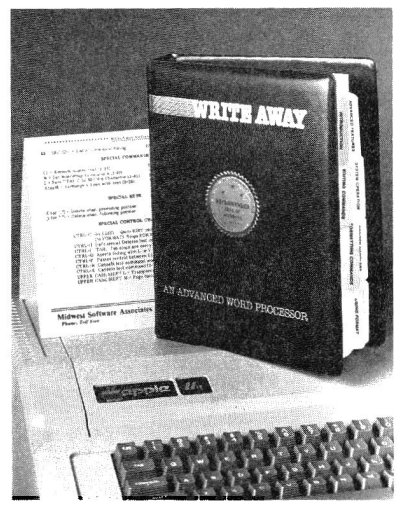

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The Word Handler

Sophisticated features abound in this state-of-the-art word processor. Its flaws are not fatal.

by Jerry Brieger

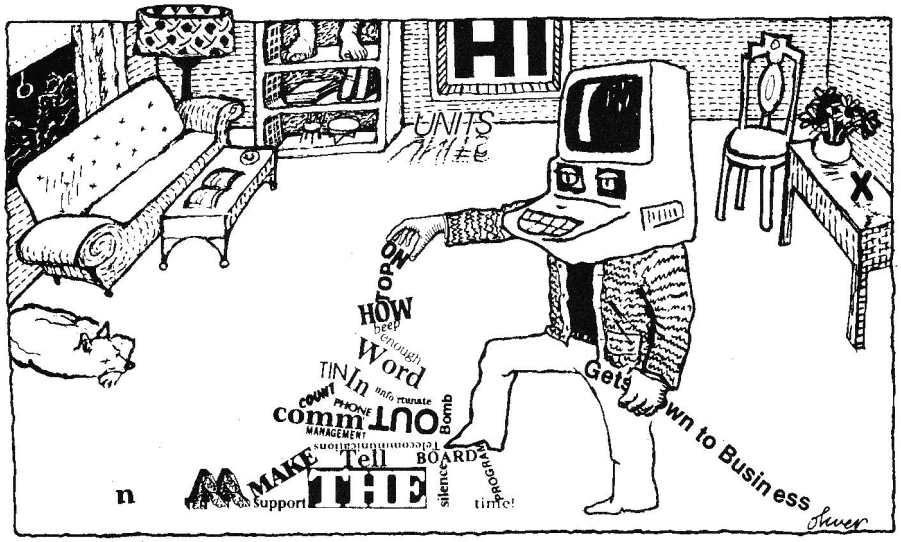
What you see is what you get. But Flip Wilson's punch line rarely applies to word processors. Instead you have to visualize how the finished document might look, unless you print your text or switch to preview. You are then liable to discover that you cannot edit in the preview mode.

The Word Handler is a relatively new product. Maybe it should be considered a second generation text editor. It has numerous excellent features, the outstanding one being that you see, on the screen, *exactly* what the final printout will look like. This includes centering, bold face, underlining and superscript. Other sophisticated functions, such as virtual memory storage, are included. Files can be as long as you like (within the limits of prudence and disk storage), since the program automatically transfers data to disk when RAM is full. And yet features normally expected are lacking, almost as if the programmers had never seen another word processor.

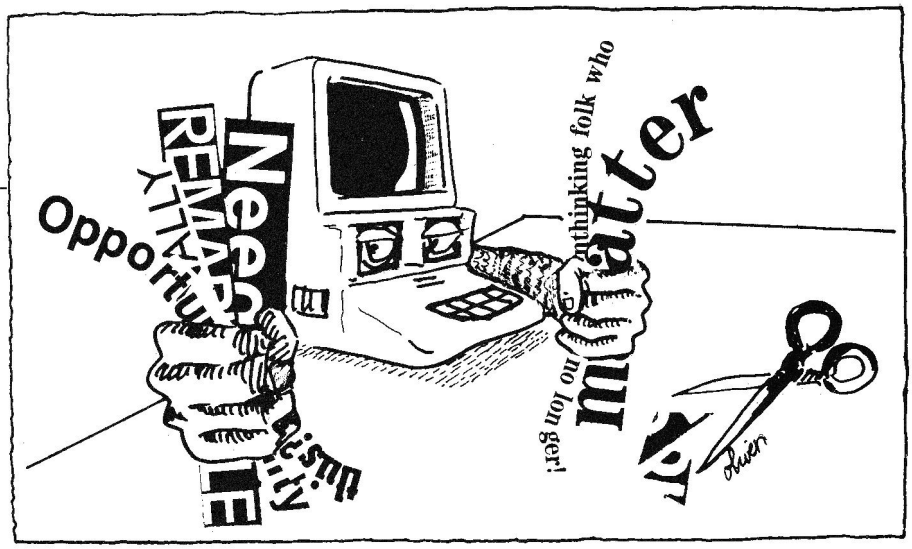
Word Handler is structured to be operated simply and quickly. It makes the Apple II work like a typewriter, only better. The documentation is written in an easily absorbed humorous style. It comes in a neat brown vinyl three-ring binder, roughly 7×9 inches, which will fit right in with your books and most other Apple software manuals.

The instructions are printed on heavy yellow paper, and are easy on the eyes. The 65-page tutorial is an absolute must to digest, and when you finish it, you should be able to use all the functions Word Handler offers. A few more illustrations, here and there, would have been helpful. In general, the program engineers kept commands at a minimum. No extra hardware is required for upper/lowercase and full page viewing. This is a friendly program.

Word Handler will function well with one disk drive. Start out by booting the program disk. The first time this is done, configuration for your particular type of printer is required. You simply pick the appropriate number from a menu. No special skills are needed. Word Handler should interface with any of the printers presently available. Once printer configuration has been accomplished, you have a single load program. There is no repeated accessing of the program disk for editing, formatting or printing. You may remove it, and insert your data disk. If you have more than one drive, you can have multiple data



Address correspondence to Jerry Brieger, 2716-174th NE, Redmond, WA 98052.



disks on line. This is handy for copying files, saving extra backups while editing, and for other document housekeeping.

Besides the manual, you are supplied with two program disks; no worrying about a backup here. Send in the registration/warranty card, and you will receive *free* updates, as revisions and additions become available. At this writing the most recent version is No. 3.5.

High-fidelity screen display is accomplished by two sets of hi-res graphics characters, called compact and non-compact formats. In compact mode you get up to 66 characters on one line. This is the ideal format for typing on standard 8½ by 11-inch sheets. The compact font is a bit hard to read, and bold face becomes a blur. The character set is acceptable when viewed on a green phosphor monitor. If you prefer, use the non-compact mode. The letters are spread out, but line breaks are still clearly indicated. Depending on how long you want your lines, each will be broken into two or three fractions without separating words.

Underlining, bold face and superscript are accomplished each by a control sequence. You can combine any two or all three of these extra print functions, and they appear that way on the monitor as you type the commands. Other print commands, such as compressed or italic fonts with dot matrix printers, or switching red/black ribbons for daisy wheels, are not possible.

At the bottom of the screen is a command line which keeps you informed at all times of which functions are active. These include justification (on or off) and tab settings.

Tabbing is done just like on a typewriter. Tabs can be entered anywhere on the line, and are removed as quickly as they are placed. If you have a single-wire shift key modification, you tab from one stop to the next by pressing escape. No shift key modification? Hit escape twice.

Cursor movement is almost anything you might need. You can move by character, word, line, paragraph or page. This function is bidirectional, except for the paragraph move, which is forward only. A command for getting to the beginning or end of file is lacking. I found an undocumented way to get around this limitation. Use the search function to find any single character that does not exist by itself in the document—you will promptly find yourself at one end or the other of your file. Word Handler is unable to find any string not preceded by a space.

Printing

Page formatting is done in inches instead of by line length. You'll get the hang of this quickly. Page numbers can be placed anywhere outside the text area, and this is also the case with one-line headers or footers. But the program lets you print one page at a time and *one page only*. Then your presence at the computer is required

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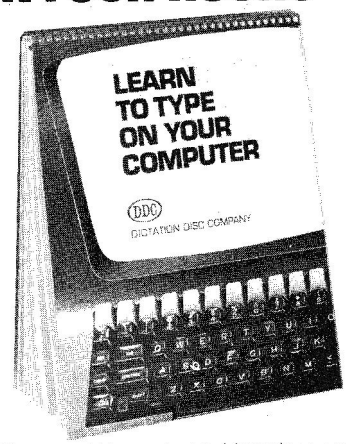

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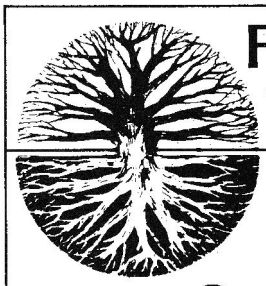

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to print the next page. If you write lengthy articles, a manual or a book, you will find printing operation of Word Handler annoying. Obtaining multiple copies of the same text is even worse. You have to go through the routine of loading the file to be printed every time you make one copy of a page. I could fall in love with this word processor, it works so well, but I cannot afford the time it takes for printing.

There's even a facility for fancy work like mirror margins or folded sheet printing. Orphan and widow lines are avoided automatically. An orphan line would occur when the last line of a paragraph ends up on the next page; WH takes care of this by adding an extra line to the page. Nor will the first line of a paragraph appear at the bottom of a page by itself (a widow); it's transferred to the next page. You can override this feature.

File handling is well designed and interesting. A file name can be as long as 30 characters. If you place a semicolon anywhere after the first character, the file can later be recalled by simply typing the letters (or digits) before the semicolon. The catalog is called the index, and you do not delete a file, you *erase* it. Files are saved on a standard DOS 3.3 initialized disk, but they end up in a nonstandard form. This happens because of the copy protection scheme. Too bad.

If you want to use a spelling checker, be sure to get the latest version of The Sensible Speller. Even then there is an annoying limitation. TSS can read WH files and mark your typos and misspellings. Your mistakes have to be located manually for correction after WH is rebooted. As mentioned above, you cannot look for single characters to locate the *marked* words. Word Handler files cannot be read by other spellers.

A companion program called File Handler contains a utility which converts WH files to standard text files. The publishers have promised to include this utility with the next version of the word processor. A well designed program will save data in a standard format.

Word Handler has search-and-find a string and global replace functions. They operate in either direction, and when you replace a string, you have the choice of replacing some or all occurrences of the string.

Deleting, copying and moving of text is elegant. The text to be operated on is clearly highlighted in inverse video. If you make a mistake, the function is easily abandoned. Once deleted, text is gone for good. On the other hand, text to be moved or copied is first saved on disk. One of the advantages of this is that a block move isn't limited by available memory. Just leave space on your data disk. It is possible to obtain an abstract of your text by concatenation, a feature usually reserved for dedicated word processors. I tested this feature carefully, and was surprised at the ease with which it works.

There's a feature called Fill-in, which is sort of a semi-automatic mail merge utility. It works, but is very slow. File Handler plus WH give you full mail merge capability. Fill-in could be useful in a law firm for wills and other standard legal documents. I found an undocumented use for Fill-in—it can be used to make quick backups of files as you edit them.

Word Handler is one of the few word processors that works properly with the Franklin Ace computers. You can use both its shift key and shift lock. WH would probably work equally well with the Basis-80 computer, although I did not have one available to test this.

To use the Word Handler you need an Apple II, II + , IIe or Franklin Ace; a monitor or TV (although a monitor is almost a must), one disk drive and a printer. The shift key modification is highly recommended for the Apple II or II + . Word Handler costs $199, from Silicon Valley Systems Inc., 1625 El Camino Real #4, Belmont, CA 94002. ■

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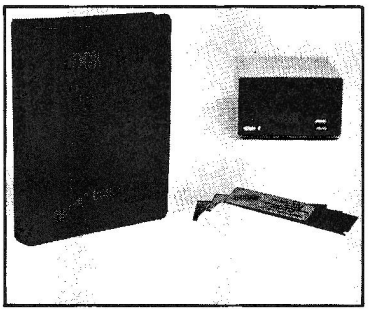

DOS VERSION:

- Any standard DOS 3.3 diskette can be protected.
- DOS command names can be changed and/or deleted.
- Autorun can be used to prevent the listing of a program or the use of any basic commands outside of a program.
- A faster DOS can be used in order to decrease disk access time by up to 50%!

REQUIRES: 48K Apple II or II+ with Applesoft in ROM or language system and at least two disk drives.

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- Files may be transferred to a standard Pascal diskette, but they will not run unless they are on the protected diskette.
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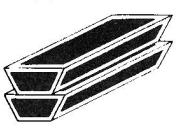
- Compatible with Apple Fortran.

REQUIRES: Apple Pascal and at least two disk drives.



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Blaising Bibliographies
Part III

Our three-part series on creating bibliographies culminates in a program to print a finished product—the way your editor wants.

by James R. Florini

This article presents REFPRINT, the final program of three that work together to create bibliographies. It prints (and stores on disk) the list of references cited in the textfile(s) analyzed by the REFCITED program discussed in the March, 1983 *inCider*. From my point of view, a particularly attractive feature of REFPRINT is the flexibility of printout format it provides. See procedure Choose_Format for some examples. Although science is supposed to be organized and systematic, scientific journals aren't. They defy mathematical probability in seeing that no two journals specify the same format for bibliographical listings. Perhaps the variation is intended to test the alertness of authors who submit manuscripts.

At any rate, it is a real headache to change the format of reference listings when sending papers to different journals. But the Apple is such a clever little thing that it has almost caught up with the editors in this matter. The five possible formats presented here can be expanded easily to incorporate virtually anything dreamed up in the darkest moments of editorial conspiracy. It is not necessarily true that these five formats will fit your needs, but the general approaches used in Form_Lines may suggest ideas on how to handle the problem.

Like its predecessors, REFPRINT starts with segment procedures, which prompt the initial choices and provide instructions to ensure that the right diskfiles are available at the right times. It then makes sure (in procedure Get_Storefile) that there is space available for the bibliography textfile, reads the CITELIST.TEXT file that was created by REFCITED, and then seeks the references listed there.

As shown in the ENTERREF program (*inCider*, May 1983), the listings are separated into files on the basis of the first letter in the first author's name. This provides a reasonably efficient method for searching for citations while keeping the files reasonably small. If the desired file is not present, the user is prompted to put the correct disk in a disk drive. Note that an approach slightly different from ENTERREF is used here to search for the files; both methods work, and the difference shows that no programming solution is necessarily "right."

```
Florini, 1983
Fry, 1979
Franklin, 1982
Florini et al., 1982
Fink et al., 1974


                Bibliography will be stored as #5:BIB.TEXT[15].

Florini, J. R.   (1983) A Series of Articles and Programs which Allow Analyses
of Reference Citations and Generation of Bibliographies using Apple Pascal
Textfiles.  InCider, in press.

Fry, F. F.   (1979) A Short Paper on Important Things.  Essential Information,
1: 1-4.

Franklin, J. J.   (1982) Studies on a Specially Boring Topic.  Stultifying
Reports, 123: 100-800.

Florini et al., 1982

Fink, F. F., Anderson, A. A., Smith, S. S., Johnson, J. J., Jones, J. J.
Clark, C. C., Thomas, T. T., Williams, W. W., and James, J. J.   (1974) One of
Those Reports with an Absolutely Incredibly Long Title which Tells You a Great
Deal More than You Want to Know about the Article: All Possible Considerations
of All Possible Aspects of the Subject.  J. Nonsuccinct Reports, 111: 1-10.
```

Figure 1. Sample Citelist (above) and the bibliography it produces (below).

Address correspondence to Dr. James Florini, Biology Department, Syracuse University, Syracuse, NY 13210.

After the matching citation is found, it is formatted according to the whims of the specified journal. In most cases, book references are treated about the same, so if the Boolean variable BOOK is true in a record, the general formatting instructions are overridden to avoid a bunch of dangling periods, commas, or colons at the end of the reference. To make sure it doesn't miss a second listing with exactly the same citation (many people publish more than one paper a year), the program continues to the end of the file, searching for other matches. When it's all done, you can edit the BIB.TEXT file to remove unwanted duplicates. If a citation is not found, a message appears on the screen and the listing for the missing citation is printed out and stored in the textfile.

Program Listing. REFPRINT.

```
(*$V-*)  {Allow passing of string parameters of various lengths}
PROGRAM REFPRINT;
{Using the CITELIST.TEXT file prepared by the REFCITED program, this
 program prepares a complete bibliography from diskfiles prepared using
 the ENTERREF program}

CONST MAXLIST=125; MAXLINE=80; CITELENGTH=50; SCREENCLEAR=12; HOME=19;
TYPE RIGHTSET=SET OF CHAR;  {FOR GET-ENTRY}
   LONGSTRING=STRING [250];
   REFERENCE = RECORD    {!!!DO NOT CHANGE DIMENSIONS OF THESE STRINGS!!!}
      KEY: STRING;
      BOOK: BOOLEAN;
      AUTHORS1: STRING;
      AUTHORS2: STRING;
      YEAR: STRING [6];
      TITLE1: STRING;
      TITLE2: STRING;
      TITLE3: STRING;
      JOURNAL: STRING;
      VOL: STRING [4];
      PAGES: STRING [15];
   END;

VAR
   FOUND, NUMBERED: BOOLEAN;
   CHOICE, CH, FORMAT: CHAR;
   CITENUM, I, K, L, RECNUM, RESULT: INTEGER;
   INITIAL: STRING[1];
   FILENAME: STRING[18];
   LINE1, LINE2, LINE3: STRING [243];
   DISKFILE, PRINTOUT: TEXT;
   CITATION: PACKED ARRAY [1..MAXLIST] OF STRING[CITELENGTH];
   SOURCEFILE: FILE OF REFERENCE;

FUNCTION GET_CHAR (FIRST, SECOND: STRING; GOODSET: RIGHTSET): CHAR; FORWARD;
PROCEDURE CLEAR_SCREEN; FORWARD;

{Initial "one-time" procedures are needed in memory only a short time, so they
 are declared as SEGMENT PROCEDURES to maximize memory for the main program.}
SEGMENT PROCEDURE CHOOSE_PRINTOUT;
BEGIN
  WRITELN; CHOICE:=GET_CHAR('Will this bibliography be P)rinted out',
    '  or just shown on the C)onsole? ',['P','C']);
  CASE CHOICE OF
    'C': REWRITE (PRINTOUT, 'CONSOLE:');
    'P': REWRITE (PRINTOUT,'PRINTER:');
  END;
END;  {CHOOSE_PRINTOUT}

SEGMENT PROCEDURE FIRST_INSTRUCTIONS;
BEGIN
   CLEAR_SCREEN;
   WRITELN
   ('===>  DO NOT REMOVE THE PROGRAM DISKETTE UNTIL INSTRUCTED TO DO SO  <===');
   WRITELN; writeln
('First, the program will read the list of citations prepared by the REFCITED');
   writeln
   ('program.  It can be on any diskette in any drive, but it MUST be labeled');
   writeln ('"CITELIST.TEXT":30); writeln;
   CHOICE:=GET_CHAR
   ('If this list is now in the system, press <SPACE>;',
     'or enter <ESC> to exit the program at this point.',[' ']); CLEAR_SCREEN;
  NUMBERED:=GET_CHAR ('Shall numbers be printed (and included in the textfile)',
  'at the beginning of each reference listing? ',['Y','N'])='Y';
END;  {SECOND-INSTRUCTIONS}

SEGMENT PROCEDURE CHOOSE_FORMAT;

  PROCEDURE MAKE_CHOICES;
  BEGIN
    FORMAT:=GET_CHAR
    ('Choose the number corresponding to the desired printout format.','',
      ['1'..'7','B']);
      CLEAR_SCREEN; WRITELN (
  '===>>  NOW you can remove the program disk, and insert the diskettes (in');
      WRITELN ('any drive) bearing the reference files.  <<===');WRITELN;
     CHOICE:=GET_CHAR('When that is done, press <SPACE> to continue','',[' ']);
  END;

  PROCEDURE DRAW_LINE;
  CONST DASHES='----------------------------------------';
  BEGIN
```

Listing continued.

> **"...it is certainly a lot better than a pile of 3-by-5 cards."**

An example of a not-so-typical bibliography and the Citelist that produced it is presented in Figure 1. Obviously, in the real world the titles and journal names are a bit stuffier. The most important product of the program is the BIB.TEXT file, which can now be edited, expanded to include any citations not in the diskfiles, and generally treated like any other Pascal textfile. In this respect, the system is not completely automatic, but it is certainly a lot better than a pile of 3 by 5 cards! And each complete listing need be entered only once, no matter how many times you use it. ■

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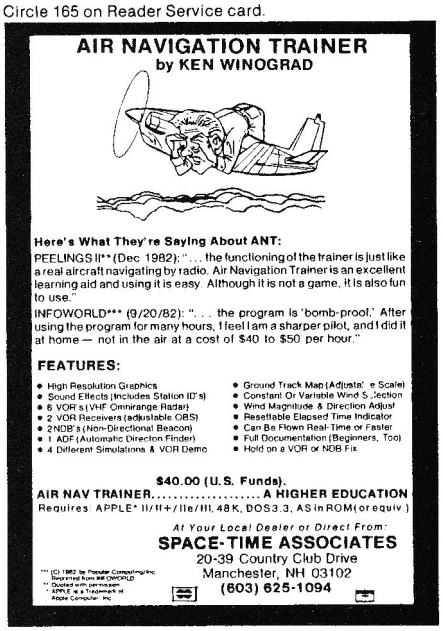

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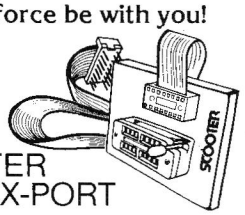

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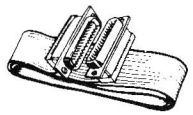

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Listing continued.

```
    WRITE (DASHES); WRITELN (DASHES);
  END;

BEGIN
  CLEAR_SCREEN;writeln('This program prints reference citations (up to ',
   MAXLIST,') in the chosen format.'); WRITELN;WRITELN
('Which of the following will be used?');DRAW_LINE;
WRITELN
('#       Journal                              Format');
DRAW_LINE;
  WRITELN
  ('1.    Am J Physiol    Authors.  Title.    Journal.  Vol: page-page, year.');
  WRITELN
 ('2.     Develop Biol    Authors  (year).    Title.  Journal  Vol. page-page.');
  WRITELN
  ('3.    J Biol Chem    Authors. (year)      Journal   Vol,  page-page');
  WRITELN
  ('4.    J Cell Biol    Authors.  year.      Title.  Journal. Vol: page-page.');
  WRITELN
  ('5.    J Cell Phys    Authors  (year)      Title.  Journal, Vol: page-page');
  DRAW_LINE;WRITELN; MAKE_CHOICES;
END;  {CHOOSE FORMAT}
SEGMENT PROCEDURE READ_CITELIST;

PROCEDURE GET_CITELIST;
VAR PRESS: CHAR;

  PROCEDURE LOOK_UP (VOLUME: INTEGER);
  VAR NUMBER: STRING[2];
      THISFILE: STRING[18];
  BEGIN
    {$I-} UNITCLEAR (VOLUME); IF IORESULT<>0 THEN EXIT (LOOK_UP);
    STR (VOLUME, NUMBER); THISFILE:= CONCAT ('#',NUMBER,':CITELIST.TEXT');
    RESET (DISKFILE, THISFILE);
    {$I+} IF IORESULT=0 THEN
    BEGIN
      FOUND:=TRUE; EXIT(GET_CITELIST);
    END;
  END;  {LOOK-UP}

BEGIN  {GET-CITELIST}
  REPEAT
    FOUND:=FALSE; LOOK_UP(5); LOOK_UP(4); LOOK_UP(10);
    LOOK_UP(9); LOOK_UP(11); LOOK_UP (12);
    IF NOT FOUND THEN
    BEGIN
      CLEARSCREEN; WRITE (CHR(7)); CHOICE:=GET_CHAR
      ('Insert a diskette with "CITELIST.TEXT" on it, and then press <SPACE>',
      'to continue, or <ESC> to quit.',[' ']);
    END;
  UNTIL FOUND;
END;  {GET_CITELIST}

BEGIN {READ-CITELIST}
  CLEAR_SCREEN; GET_CITELIST; CITENUM:=1; WHILE NOT EOF (DISKFILE) DO
  BEGIN
    READLN (DISKFILE, CITATION[CITENUM]);
    IF CITATION[CITENUM]<>'' THEN
    BEGIN
      WRITELN (CITENUM:2,'. ',CITATION[CITENUM]); CITENUM:=CITENUM+1;
    END;
  END;
  CITENUM:=CITENUM-1; CLOSE (DISKFILE);
END;  {READ-CITELIST}

PROCEDURE GET_RECORD;
BEGIN
  SEEK (SOURCEFILE, RECNUM); GET (SOURCEFILE)
END;

PROCEDURE CLEAR_SCREEN;
BEGIN
  WRITE (CHR (SCREENCLEAR), CHR(HOME));
  WRITELN ('MEMORY AVAILABLE IS ':35,MEMAVAIL,' WORDS.');
  WRITELN; WRITELN
END;
FUNCTION GET_CHAR; {FIRST, SECOND: STRING; GOODSET: RIGHTSET forward decl.}
VAR RESPONSE: CHAR;
BEGIN
  REPEAT
    WRITE (FIRST); IF SECOND<>'' THEN
    BEGIN
      WRITELN; WRITE (SECOND);
    END;
    READ (RESPONSE); WRITELN; IF RESPONSE=CHR(27) THEN EXIT (PROGRAM);
    IF RESPONSE IN ['a'..'z'] THEN RESPONSE:=CHR(ORD(RESPONSE)-32);
    IF NOT (RESPONSE IN GOODSET) THEN WRITELN (CHR(7),
      '"',RESPONSE,'" IS NOT AN APPROPRIATE RESPONSE TO THE QUESTION.');
  UNTIL RESPONSE IN GOODSET; GET_CHAR:=RESPONSE;
END; {GET-CHAR}

PROCEDURE TOP_PAGE;
VAR I: INTEGER;
BEGIN
  FOR I:=1 TO 4 DO WRITELN (PRINTOUT); L:=4;
END;

PROCEDURE BOTTOM_PAGE;
BEGIN
  WRITE (PRINTOUT, CHR(12)); TOP_PAGE;
END;

PROCEDURE GET_STOREFILE;
VAR FOUND: BOOLEAN;
    PRESS: CHAR;
    NAME: STRING[15];
```

Listing continued.

Listing continued.

```
      PROCEDURE FIND_ONE (VOLUME: INTEGER);
      VAR NUMBER:STRING[2];
      BEGIN
        (*$I-*) UNITCLEAR(VOLUME); IF IORESULT <> 0 THEN EXIT (FINDONE);
        STR (VOLUME, NUMBER); FILENAME:=CONCAT('#',NUMBER,':',NAME);
        REWRITE(DISKFILE,FILENAME); (*$I+*) IF IORESULT = 0 THEN
        BEGIN
          CLOSE(DISKFILE,LOCK); RESET(DISKFILE,FILENAME);
          WRITELN (DISKFILE,'BIBLIOGRAPHY':35); WRITELN (DISKFILE);
          TOP_PAGE; WRITELN (PRINTOUT,'Bibliography will be stored as ':50,
             FILENAME,'.'); WRITELN (PRINTOUT); L:=L+2;
          FOUND:=TRUE; EXIT (GET_STOREFILE);
        END;
      END;

  BEGIN  {GET-STOREFILE}
    FOUND:=FALSE;
    NAME:='BIB.TEXT[15]';  {Make sure enough space available}
    IF CITENUM>50 THEN NAME:='BIB.TEXT[20]';
    IF CITENUM>75 THEN NAME:='BIB.TEXT[25]';
    IF CITENUM>100 THEN NAME:='BIB.TEXT[30]';
    REPEAT
    FIND_ONE(5); FIND_ONE(4); FIND_ONE(11);
    FIND_ONE(12); FIND_ONE(9); FIND_ONE(10);
    WRITELN (CHR(7),'INSUFFICIENT SPACE ON ANY DRIVE FOR THE OUTPUT FILE.');
    CHOICE:=GET_CHAR (
    'Insert an appropriate diskette, and press <SPACE> to continue.','',[' ']);
  UNTIL FOUND;
END;  {GET_STOREFILE}

PROCEDURE FIND_REF; FORWARD;  {To allow exit if diskfile not present}

PROCEDURE GET_REFERENCE;
VAR FOUND: BOOLEAN;
    N: INTEGER;

  PROCEDURE FIND_FILE (INITIAL: STRING);
  VAR SPACE,CH: CHAR;
      LETTER: STRING[1];

    PROCEDURE LOOK_UP (VOLUME: INTEGER);
    VAR NUMBER: STRING[2];
        THISFILE: STRING [6];
    BEGIN
      (*$I-*) UNITCLEAR (VOLUME);
      IF IORESULT <> 0 THEN EXIT (LOOK_UP); CLOSE (SOURCEFILE); {BANDAID}
      STR (VOLUME, NUMBER); THISFILE := CONCAT ('#',NUMBER,':',LETTER);
      RESET (SOURCEFILE, THISFILE); (*$I+*) IF IORESULT = 0 THEN
      BEGIN
        FOUND:=TRUE; EXIT (GET_REFERENCE);
      END;
    END;   {LOOK_UP}

  BEGIN  {FIND-FILE}
    FOUND:=FALSE; LETTER:=' '; LETTER[1]:=INITIAL[1];
    LOOK_UP(10); LOOK_UP(5); LOOK_UP(11); LOOK_UP(4);
    IF NOT FOUND THEN
    BEGIN
      WRITELN (CHR(7),
        'PLEASE INSERT THE DISKETTE WITH FILE ',INITIAL,' ON IT,');
      CASE GET_CHAR ('AND PRESS <SPACE> TO CONTINUE THE PROGRAM.',
      '(or enter "C" to continue without this file.)',[' ','C']) OF
        ' ': FIND_FILE (INITIAL);
        'C': BEGIN
               WRITELN (PRINTOUT, CITATION[K]); WRITELN (PRINTOUT);
               L:=L+1; EXIT (FIND_REF);
             END;
      END;  {CASE}
    END;
  END;  {FIND-FILE}

BEGIN    {GET-REFERENCE}
   IF CITATION[K]='' THEN CITATION[K]:='BLANK';
   INITIAL:=COPY(CITATION[K],1,1);  {GIVES FIRST LETTER IN FIRST AUTHOR}
   FIND_FILE(INITIAL);
END;
PROCEDURE FORM_LINES;
VAR HYPHEN: INTEGER;
    THISFORM: CHAR;

  PROCEDURE TEST_SPACES (VAR NAME: LONGSTRING);
  VAR TEST: STRING [2];
  BEGIN  {Put double space at end of names}
    TEST:=COPY (NAME,LENGTH(NAME)-1, 2);
    IF (TEST<>'  ') THEN NAME:=CONCAT (NAME,' ');
  END;
{NOTE - for all formatting, LINE1 is the authors' names, LINE2 is the
 title, and LINE3 includes the journal, volume, etc.}

  PROCEDURE GET_LINES;
  BEGIN
    GET_RECORD; WITH SOURCEFILE^ DO
    BEGIN
      IF AUTHORS2<>'' THEN LINE1:=CONCAT (AUTHORS1,' ',AUTHORS2)
        ELSE LINE1:=AUTHORS1;
      IF TITLE2<>'' THEN LINE2:=CONCAT (TITLE1,' ',TITLE2)
        ELSE LINE2:=TITLE1;
      IF TITLE3<>'' THEN LINE2:=CONCAT (LINE2,' ', TITLE3)
    END;
  END;  {GET-LINES}

  PROCEDURE FORM_ONE (REF:REFERENCE);    {Am. J. Physiol.}
  BEGIN
    WITH REF DO
    BEGIN
```

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```
        GET_LINES; TEST_SPACES (LINE1); LINE2:=CONCAT (LINE2, '.  ');
        IF PAGES<>'in press'
          THEN LINE3:=CONCAT (JOURNAL, '.  ', VOL,': ',PAGES,', ',YEAR,'. ')
            ELSE LINE3:=CONCAT (JOURNAL,', in press. ')
      END;
    END;

    PROCEDURE FORM_TWO (REF: REFERENCE);          {DEVELOP. BIOL.}
    BEGIN
      WITH REF DO
      BEGIN
        GET_LINES; TEST_SPACES (LINE1); LINE1:=CONCAT (LINE1,' (',YEAR,').  ');
        LINE2:=CONCAT (LINE2,'.  ');
        IF PAGES<>'in press'
          THEN LINE3:=CONCAT (JOURNAL,' ',VOL,'. ',PAGES,'. ')
            ELSE LINE3:=CONCAT (JOURNAL,', in press. ')
      END;
    END;

    PROCEDURE FORM_THREE (REF: REFERENCE);     {J. BIOL. CHEM.}
    VAR I: INTEGER;
    BEGIN
      WITH REF DO
      BEGIN
      GET_LINES; TEST_SPACES (LINE1); LINE1:=CONCAT (LINE1, ' (',YEAR,') ');
      LINE2:='';
      IF PAGES<>'in press'
        THEN LINE3:=CONCAT(JOURNAL,' ',VOL,', ',PAGES,' ')
          ELSE LINE3:=CONCAT (JOURNAL, ', in press. ');
    END;
  END;

  PROCEDURE FORM_FOUR (REF:REFERENCE);          {J. CELL BIOL}
  BEGIN
    WITH REF DO
    BEGIN
      GET_LINES; TEST_SPACES (LINE1); LINE1:=CONCAT (LINE1,YEAR,'.  ');
      LINE2:=CONCAT (LINE2,'. ');
      IF PAGES<>'in press'
        THEN LINE3:=CONCAT (JOURNAL,'. ',VOL,'. ',PAGES,'. ')
          ELSE LINE3:=CONCAT (JOURNAL,', in press. ')
    END;
  END;

  PROCEDURE FORM_FIVE (REF: REFERENCE);         {J CELL PHYSIOL}
  BEGIN
    WITH REF DO
    BEGIN
      GETLINES; TEST_SPACES (LINE1); LINE1:=CONCAT (LINE1,'  (',YEAR,') ');
      LINE2:=CONCAT (LINE2,'.  ');
      IF PAGES<>'in press'
        THEN LINE3:=CONCAT (JOURNAL,', ',VOL,': ',PAGES,'. ')
          ELSE LINE3:=CONCAT (JOURNAL,', in press. ')
    END;
  END;

  PROCEDURE FORM_BOOK (REF:REFERENCE);
  BEGIN
    WITH REF DO
    BEGIN
      GET_LINES; LINE1:=CONCAT (LINE1,' '); TEST_SPACES (LINE1);
      LINE2:=CONCAT (LINE2,' ');
      LINE3:=CONCAT (JOURNAL,'. ',YEAR,'. ')
    END;
  END;

BEGIN {MAIN FORM-LINES}
  GET_RECORD; WITH SOURCEFILE^ DO
  BEGIN
    IF BOOK THEN THISFORM:='B' ELSE THISFORM:=FORMAT;
    CASE THISFORM OF
     '1': FORM_ONE(SOURCEFILE^);
     '2': FORM_TWO(SOURCEFILE^);
     '3': FORM_THREE(SOURCEFILE^);
     '4': FORM_FOUR(SOURCEFILE^);
     '5': FORM_FIVE(SOURCEFILE^);
     'B': FORM_BOOK(SOURCEFILE^);
    END;  {CASE}
  END;  {WITH SOURCEFILE}
END;  {FORM-LINES}

PROCEDURE PRINT_LINES;
VAR WHOLELINE: STRING [255];
    THISLINE: STRING [100];
    NUM: STRING[3];

  PROCEDURE PRINT_WORDS;
  VAR LEN, HYPHEN, SPACE: INTEGER;
      WORD: STRING;
  BEGIN
    REPEAT
      HYPHEN:=POS ('-', WHOLELINE); SPACE:=POS (' ',WHOLELINE);
      IF (HYPHEN<>0) AND (HYPHEN < SPACE) THEN SPACE:=HYPHEN;
      WORD:=COPY (WHOLELINE,1,SPACE); DELETE (WHOLELINE, 1, SPACE);
      LEN:=LENGTH (WORD);
      IF (LENGTH (THISLINE)+LEN)< MAXLINE THEN
      THISLINE:=CONCAT (THISLINE, WORD) ELSE
      BEGIN
        WRITELN (PRINTOUT, THISLINE); WRITELN (DISKFILE, THISLINE);
        THISLINE:=WORD; L:=L+1
      END;
    UNTIL SPACE=0;
  END;  {PRINT WORDS}

BEGIN {MAIN PRINT-LINES}
  FORM_LINES; THISLINE:=''; WHOLELINE:=LINE1;
```

Listing continued.

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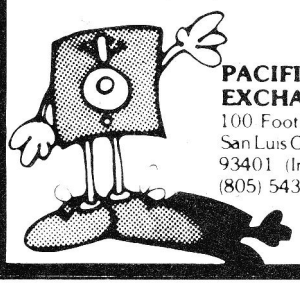

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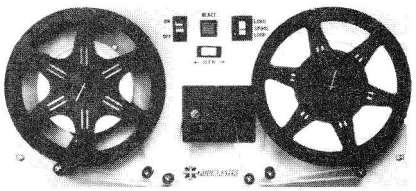

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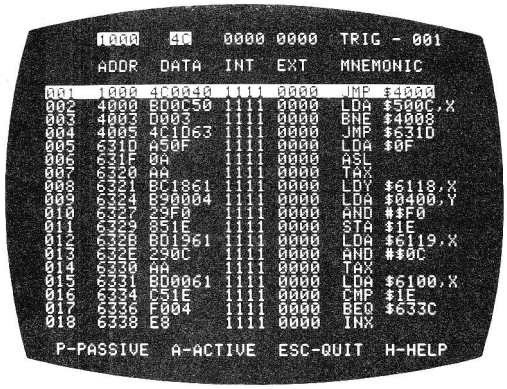

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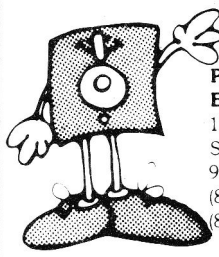

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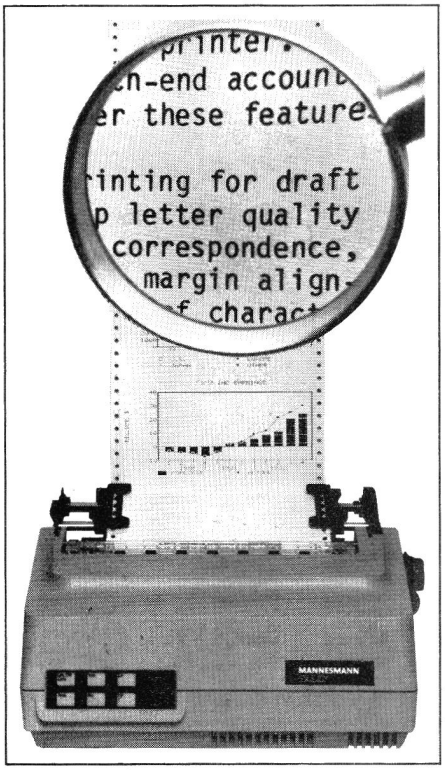

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Listing continued.

```
      IF NUMBERED THEN
      BEGIN
        STR(K,NUM); WHOLELINE:=CONCAT(NUM,'. ',WHOLELINE);
      END; PRINT_WORDS;
      WHOLELINE:=CONCAT (WHOLELINE,LINE2); PRINT_WORDS;
      WHOLELINE:=CONCAT (WHOLELINE,LINE3); PRINT_WORDS;
      IF LENGTH (THISLINE)<>0 THEN    {INCOMPLETE LINE AT END OF REFERENCE}
      BEGIN
        WRITELN (PRINTOUT, THISLINE); WRITELN (DISKFILE, THISLINE); L:=L+1
      END;
      WRITELN (PRINTOUT); WRITELN (DISKFILE); L:=L+1;   {LINE BETWEEN REFERENCES}
      IF L>58 THEN BOTTOM_PAGE;
    END;   {PRINT LINES}

    PROCEDURE FIND_REF;
    VAR FOUND: BOOLEAN;
        SYMBOL: CHAR;
    BEGIN
      FOUND:=FALSE; GET_REFERENCE; RECNUM:=0;SYMBOL:='-';
      WHILE NOT EOF(SOURCEFILE) DO
      BEGIN
        GET_RECORD; WRITE (SYMBOL);
        IF SOURCEFILE^.KEY=CITATION[K] THEN
        BEGIN
          WRITE (': '); FOUND:=TRUE; SYMBOL:='+';
          WRITELN (CITATION[K],' in  #',RECNUM,'  '); PRINT_LINES
        END;
        RECNUM:=RECNUM+1;    {CONTINUE FOR ADDITIONAL IDENTICAL CITATIONS}
      END; IF FOUND THEN WRITELN (')');
      IF NOT FOUND THEN
            BEGIN
              WRITELN('*'); WRITELN (DISKFILE, CITATION[K]); WRITELN (DISKFILE);
              L:= L + 2; WRITELN (PRINTOUT, CITATION[K]); WRITELN (PRINTOUT);
              WRITELN ('THERE IS NO REFERENCE CORRESPONDING TO ',CITATION[K]);
              WRITELN (' ON THE DISKETTES NOW IN THE DRIVES. ')
            END;
    END;                {FIND_REF}

    BEGIN {MAIN PROGRAM}
       FIRST_INSTRUCTIONS; CHOOSE_FORMAT; CHOOSE_PRINTOUT;
       READ_CITELIST; GET_STOREFILE;
       L:=1; FOR K:=1 TO CITENUM DO
       BEGIN
         FIND_REF; CLOSE(SOURCEFILE)
       END;    {FOR K..}
       CLOSE (DISKFILE, LOCK); WRITELN;
       WRITELN (
    '************************** BIBLIOGRAPHY COMPLETED **************************');
    END.
```


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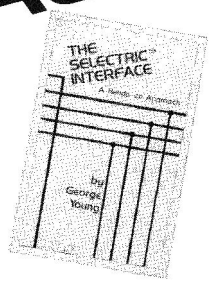

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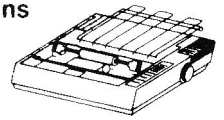

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by Bill O'Brien

Driver Lessons

All of the peripherals connected to the Apple III—the screen, the keyboard, the disk drives and any printers or modems—are devices that can be addressed by opening files whose names are the device driver names. It's a very simple solution to what, in most cases, is a complex problem. Anytime you add a different device you add the driver to deal with it. You can call the driver anything you want, and to use it you open it by typing, for instance, OPEN#1,".PRINTER". All of these drivers are located in one file on any bootable disk called SOS.DRIVER.

The first driver routine I ever played with was the printer driver. I had to do it. My Apple was connected to an Okidata 80, back when neither one of them was too popular. Needless to say, I failed miserably. To cover my ineptitude, I grumbled excessively about the abomination that was the manual.

Later on things changed a little. They had to—an Apple III barged into my home and made a place for itself, and the only printer I had was a Teletype KSR 43 (no, not a 33, bless its noisy little head). I knew for sure that the 1200 baud driver that Apple provided for the Qume would *not* work. Modifications were needed.

I popped the SOS Utilities disk into the internal drive, crossed my fingers and hoped for the best. What happened was enlightening, to say the least. So grab your *Standard Device Driver Manual* (*SSDM*) and your SOS Utilities disk and let's take a good look at how to alter a driver.

Open the manual to page 99, then put the disk in the internal drive and either turn the machine on or boot the disk with the control and reset keys. Whirr, click, zzbit. Up comes the UTILITIES menu looking a lot like Figure 1.

First we must make a copy of the disk whose driver we want to modify. For our purposes, I'm going to assume that it's Business Basic.

Imitation Is. . .

Press D for DEVICE HANDLING commands, the next menu. When it appears, press F to FORMAT A VOLUME. When the drive stops whirring and the red light goes out, *take the SOS Utilities disk out of the internal drive*, and insert a blank.

At the bottom of the screen you'll see

```
Format the Volume: [.D2]
```

Change the .D2 to .D1 (if it does indeed say .D2, or anything else but .D1) and press return.

Next the program will request the new volume name, leaving you the option of accepting the default, BLANKxx (where xx is a random number from the III's imagination). You can accept the default or change it, as the mood dictates. In either case, press return after you've made your decision. As if by magic, the III will begin to format the blank disk in the internal drive. (What I wouldn't give to access the format driver from Basic!)

When it's done, replace the Utilities disk in the internal drive, and press the escape key to reaccess the DEVICE HANDLING menu.

Now press C (copy one volume to another). You'll be prompted to specify where the source disk and destination disk can be found. But, before you enter anything, remove the Utilities disk and replace it with the Business Basic disk.

When the program asks

```
Copy the Volume [          ]
```

insert .D1 between the brackets and press return. The program will check for a valid disk in the internal drive and, finding one (you did insert the Business Basic disk, didn't you?), it will continue with

```
To the Volume [          ]
```

Remove the Business Basic disk, replace it with the disk you just formatted and fill in the brackets with .D1.

Again the program will check the disk, then come back with a volume name for this new creation. Make sure the name is BASIC. Put the Business Basic disk back in the internal drive and press return.

A brief side note is appropriate here. Having two drives is monumentally easier than one. If you haven't gotten a second yet, stuff your loose change into a jar and start saving. There are one or two companies that make III-compatible drives by now, and chances are their products are cheaper than the genuine article. (Actually, I waited until my third drive to get a non-Apple, and it wasn't bought, per se, from anybody. I had an old TRS-80 drive lying around, purchased an Apple III analog board to go with it and had a cable made up especially—I am cheap!)

At various times during the copying process, you'll have to swap disks and press the alpha-lock key, but persevere. Eventually you'll be done and

```
D—Device Handling Commands
F—File Handling Commands
S—System Configuration Program (SCP)
Q—Quit
```

Figure 1. Utilities menu display.

Address correspondence to Bill O'Brien at WABASA Consulting & Management, 111 Brook St., Scarsdale, NY 10583.

find yourself back at the volume entry stage of the format utility. Take the Basic disk out of the internal drive and replace it with the Utilities disk. Press escape to return to the DEVICE HANDLING menu, and escape once more, to access our old friend Figure 1, the UTILITIES menu.

Whew! And that was only the start.

Divining the Driver

Select the System Configuration Program (SCP) by pressing the S key. The drive will whir a little to reveal the menu in Figure 2. Your only choice is option R, since you haven't loaded any drivers yet. Press it and the screen will display

Current Driver Configuration:
No Drivers are Loaded

At the bottom find

Enter Pathname of Driver File
[.D1/SOS.DRIVER]

Once again you must remove the Utilities disk and replace it with the copy of the Business Basic disk. Press return (it's getting to be our favorite key) and soon the message at the top of the screen changes to a list of drivers. Figure 3 is the list of drivers on my Business Basic disk. Whether this is exactly what's on yours isn't important. What we're looking for is a driver for a serial printer called .PRINTER.

There's no need to read in any more drivers, but before we go on I would like to delete .SILENTYPE. I will never own a Silentype printer, and its driver is just taking up disk space and memory. I replace the SOS Utilities disk in the internal drive and press escape to return to the SCP menu. (With the exception of getting out of the SCP menu itself, "escape" returns you safely from harm at any level.)

If it were only memory I was worried about, I could press the E key, select driver number 5 and change its status from ACTIVE to INACTIVE. That would leave the driver on the

R—Read a Driver File
D—Delete a Driver File
E—Edit a Driver File
G—Generate New System
Q—Quit to Main Menu

Figure 2. System Configuration menu display.

Current Driver Configuration:
1 .GRAFIX
2 .AUDIO
3 .CONSOLE
4 .PRINTER
5 .SILENTYPE

Figure 3. Driver list display.

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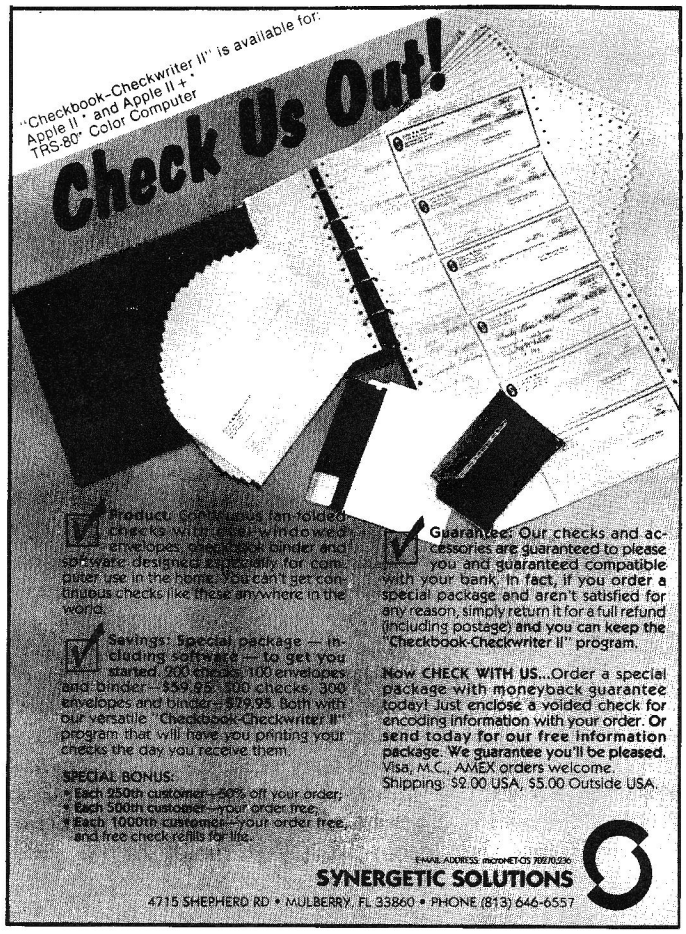
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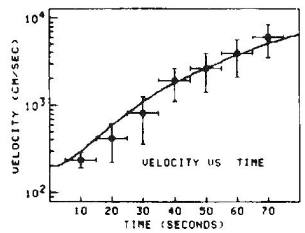
Unlike most other plotting systems for the Apple II which are stand-alone systems, the AMPERGRAPH utility provides extended BASIC graphics language macros that you can use directly in your own Applesoft programs. The additional commands are &SCALE, &LIMIT, &AXES, &GRID, &FRAME, &LOG X, &LOG Y, &LABEL AXES, &LABEL, &VLABEL, &CENTER LABEL, &CENTER VLABEL, &DRAW, &PENUP, &CROSS, &OPEN SQUARE, &CLOSED SQUARE, &OPEN CIRCLE, &CLOSED CIRCLE, &ERROR BARS, &DUMP (to dump the graph on a Silentype printer) and &*DUMP (to link with AMPERDUMP, see below).

AMPERGRAPH uses the Applesoft ampersand machine language jump vector to link to a relocatable 9K routine which normally resides above the second page of high-resolution graphics in the Apple II Plus.

SAMPLE AMPERGRAPH PROGRAM LISTING:

```
10 &SCALE, 0, 80, 80, 13000
15 LX$ = "TIME (SECONDS)":LY$ = "VELOCITY
   (CM/SEC)"
20 &LOG Y:&LABEL AXES, 10, 10
25 LABEL$ = "VELOCITY VS. TIME":&LABEL, 30,
   200
30 FOR T = 0 TO 80:&DRAW, T, 150 + T!2:NEXT T
35 FOR T = 10 TO 70 STEP 10
40 &CLOSED SQUARE, T,
   (150 + T!2)*(.8 + .4*RND(3))
45 &ERROR BARS, 5, T!2/2
50 NEXT T:&DUMP
```



AMPERDUMP

AMPERDUMP is a high-resolution graphics dump utility which was written specifically to take advantage of the graphics features of the Epson MX-80 and MX-100 printers (MX-80 must have the Graftrax conversion). AMPERDUMP offers many features which are not available in other graphics dump routines:

- Three horizontal magnifications (2.33, 4.66 and 6.99 inches wide)
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- Normal / Inverse dumps
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- Compatible with AMPERGRAPH
- Relocatable

The AMPERGRAPH and AMPERDUMP graphics utilities require and Apple II Plus (or Apple II with language card) with 48K and DOS 3.3. The AMPERDUMP utility requires and Epson MX-80 with Graftrax, or an MX-100, and one of the following interface cards: Epson, Apple, Grappler, Interactive Structures, or Mountain Computer.

AMPERGRAPH and AMPERDUMP are available from your dealer for $30.00 each, or order direct. Include $1.50 for shipping and handling; Wisconsin residents add 4% sales tax.

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Item	Field	Value		
1	Device Name		.PRINTER	
2	Device Type	$04	Char, Write	(range:00..FF)
3	Device Subtype	$01		(range:00..FF)
4	Driver Status		ACTIVE	
5	Comment			
6	Configuration Block Data			
	Slot Number		n/a	
	Unit Number	$00		
	Manufacturer ID	$0001	Apple	
	Block Count		n/a	
	Version ID	1.10		

Press: Escape to exit to top Edit menu

Figure 4. Device data display.

disk, just in case, but since SOS doesn't load inactive drivers, I'd save on memory.

As I said, though, I'll never own a Silentype. So, I'm going to press D (DELETE A DRIVER). The same screen display as in Figure 3 appears but with

```
Select Driver to be deleted : 1
Delete .GRAFIX [Y/N]
```

added at the bottom.

Then the EDIT option of the SCP comes up asking if I want to delete the first driver in the list. Using either the arrow keys or the number of the driver (5, in this case), I descend to .SILENTYPE. Now the bottom two lines read

```
Select Driver to be deleted : 5
Delete .SILENTYPE [Y/N]
```

This is the last chance to change my mind. Press N and I'll be back in the first stage of the DELETE option. Press Y and the driver will be gone, now and forever, amen. I'm going to press Y. Bye.

With an escape I rejoin the SCP menu already in progress. Now comes the big moment—editing a driver! Quick, before you lose heart, press E.

Changing. . . Everything Around

The first task is to get the list of drivers back, in my case sans the dear departed .SILENTYPE. After my last operation, the .PRINTER driver is already selected for me. If not the case for you, use the driver number or arrow keys to access .PRINTER, then press return. Get ready for mass confusion—you'll be greeted by Figure 4.

That's a lot to swallow so fast, so if you'd like to take a break and get a soft drink or something, I'll understand. You have 63 seconds.

You made it! Great. You show a lot of promise.

The bottom of the screen sports a convenient display:

```
Edit Driver Parameters
Select an Item to be Edited : Device Name
```

Use the ITEM number (*not* from the keypad—it doesn't work) or the arrow keys to select the item you want. The display at the bottom will update itself as you move along. You need ITEM 6, CONFIGURATION BLOCK DATA—another maze of seemingly undecipherable numbers. See Figure 5.

Of the 15 possible positions you'll notice that only five of them are filled. We'll modify all five. Check Table 1 to determine what they are and what they're used for. Don't get frightened off now; this is really the easy section. You just need to match up the numbers with the parameters you want your driver to contain.

The cursor keys select which parameter to modify. Why not start with the first, 0—how fast the printer is willing to receive data. In the case of my Teletype 43, it's 300 baud maximum. Okay, that means that I would change the first parameter from 08 (1200 baud) to 06 (300 baud), press return and move the cursor over to the right with the ar-

row key. It's really that simple.

As for the word length, the easiest one for my 43 (since I can switch select it) is 8 bits with no parity. So, I type in 00 for the second value, and once again press return. Check your printer manual to see if you need a different value.

Time Waits for No Man

The third, fourth and fifth values are a bit more difficult to decide on. You may have to use the old reliable, trial and error. These values specify how long the Apple waits before it sends another character after a carriage return (CR), a line feed (LF) or a form feed (FF).

There are a lot of different printers out there and they're not all alike. Some of them print bidirectionally—that is, they print left to right, and then right to left on the way back. Some of them do it on their own; others do it only under software control. In either case, if they do print in both directions, then the waiting time after sending a CR should be small. You must type in numbers between 00 and FF (162* 15 + 16*15).

Software plays a hand in these parameters. Most software sends a LF with the CR, so any delay specified for either of these is cumulative. For instance, a 16-character-time CR delay and a 6-character-time LF delay would add up to a total 22-character-time delay, possibly longer than needed.

The last parameter tells the Apple how long to wait after it's told the printer to go to the top of the next form. Unless your machine can really hop to it, you might want to set this a little high.

These delay times are especially important if your printer doesn't have a buffer area to hold incoming characters when it's doing something besides printing. Without the correct times, you'll find that the printer buzzes along very nicely until, all of a sudden, garbage and miscreatia run rampant on the printout sheet.

Once all the values have been entered, press the escape key to return to Figure 4. Then press it two more times until you're back at the SCP menu.

The scary part is next. Press G for GENERATE A SYSTEM. The screen will flash SYSTEM VALIDATION IN PROGRESS. The III is checking to make sure you have a keyboard layout and a character set selected, and also, if any of the drivers require slots, that there are slots assigned to them. (It doesn't check whether the slots are right or not, just that they're there.)

If you don't get an error message (and assuming you've done only what we've discussed, you shouldn't), *that's it!* You'll see a message at the bottom of the screen asking where you want the renovated SOS.DRIVER to be stored. Slip the Business Basic disk copy into whatever drive you have available, change the destination if necessary, and let 'er rip. (That means press return for all you non-computer types.)

When the bell goes off the III asks you FILE SOS.DRIVER ALREADY EXISTS. O.K. TO ERASE IT? You see, the III's not a dumb machine. It's checking up on you. It wants to know if that's *really* what you want to do. Since it is, press return.

The only other message you might see (aside from a disk-write error message) is one that queries FILE IS LOCKED, DELETE ANYWAY? It's just another safety check. For this particular application, if it appears, ignore it by pressing Y.

You've done it! You've modified a driver, generated a system and placed it on your disk. What more could you ask? Keep reading—next month you just might find out. ■

Parameter	Description	Value(s)	
0	Baud rate	03	110
		04	134.5
		06	300
		07	600
		08	1200
		09	1800
		0A	2400
		0C	4800
		0E	9600
1	Word Length	22	7 bits, odd parity
		26	7 bits, even parity
		2A	7 bits, mark parity
		2E	7 bits, space parity
		00	8 bits, no parity
		42	6 bits, odd parity
		46	6 bits, even parity
		4A	6 bits, mark parity
		4E	6 bits, space parity
2	Waiting time	xx	Number of character-times after a carriage return
3	Waiting time	xx	Number of character-times after a line feed
4	Waiting time	xx	Number of character-times after a form feed

Table 1. Driver parameter options.

	1	2	3	4	5	6	7		8	9	A	B	C	D	E	F
	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—
Ox –	08	22	00	00	00											

Figure 5. Driver parameters.

Fudge It!

by Don Fudge

A renowned expert shares his expertise in graphics scrolling.

Animation: Scrolling

Before I discuss animation routines, I want to note that some computers handle this area differently than others. For instance, if you want to scroll the background while a shape remains stationary or moves only in a direction perpendicular to the scrolling, you must take a very different approach with the Apple than with the TI-99A with extended Basic, a Commodore 64, or the Atari. With the Apple, the background and shapes will interfere with one another in the worst way possible, while with the other three machines you can make your shapes be sprites (programmable objects) and have no unwanted interference between them and the background. Apple owners have learned to go through rather elaborate rituals (which tend to further slow down already slow animation) to preserve scene/shape integrity. Sprite users, on the other hand, merely define a sprite's screen position with X, Y coordinates and nothing the background can do will ever change the sprite's appearance. The sprite may well be *on* the background, but it's not *in* the background. The sprites are separate entities from the background, but an Apple's shapes are part of the background—they get drawn *into* the hi-res screen addresses ($2000–$3FF8 or $4000–$5FF8).

There's only one level of video plane on the Apple, but sprites are supported by video display chips that often give many video plane levels. Each level has a priority status over the level under it, but is transparent to lower-priority video planes *if no sprite is present at a given screen location* on that sprite plane. This means that many sprites might be traveling under and over each other at a given location and no interference or color-clash would result either through sprite/sprite interaction or sprite/background interaction.

Address correspondence to Don Fudge at Avant-Garde Creations, PO Box 30160, Eugene, OR 97403.

"The sprites are separate entities from the background, but an Apple's shapes are part of the background—they get drawn into the hi-res screen addresses."

Block Shapes on the Apple

With the Apple the fastest type of animation is with block shapes, which use bit-mapped graphics. To move such a shape, you take all of the shape bytes in the block shape table that correspond to the desired shape and copy them, one at a time, to the hi-res screen. These bytes *replace* the ones on the background at that position, so your background loses its integrity at this point. You may have to redraw it totally once the shape is removed, or you might wish to save the block of hi-res bytes your shape is replacing. With the latter method you put the original screen bytes in place once you remove your shape from the screen. You may keep a convenient copy of your screen on the other hi-res graphics page so that redrawing is relatively easy; or you might even do *page flipping*, where you alternate between viewing page 1 while you change page 2 and then viewing page 2 while you change page 1.

An alternative to the above methods is XDRAW. This command allows you to DRAW on the screen in a color opposite to the one already there. With Applesoft shapes (vector) the XDRAW routine is at $F65D. I've already dealt with this in previous columns in *inCider*. XDRAWing with block shapes has also been discussed already, and merely involves adding an EOR instruction to your normal drawing algorithm. Refer to Figure 1 for a representation of how EOR works.

As you can see, XDRAW (whether from Basic or machine language, and whether with block shapes or vector shapes) is perfect for drawing and erasing during animation in a way that leaves the background totally in-

(XDRAW)	0100111	(byte on screen)
(place shape)	1010101	(EOR with shape byte)
(on screen)	———	
	1110010	(result on screen)
(XDRAW)	1110010	(screen with shape)
(erase shape &)	1010101	(EOR with shape byte)
(restore screen)	———	
	0100111	(original screen)

Figure 1. How EOR works.

tact and unaffected. So why doesn't everyone use it? What's the problem?

XDRAWing Problem

There's a hitch. The drawing and erasing work fine, though they're not nearly as fast, smooth, and efficient as sprite animation. But the way the shape looks on the screen once you've XDRAWn it there often leaves much to be desired. You see, if you're drawing on a black screen and will not ever be superimposing shapes upon background objects, then all is well—go with XDRAW methods. But once you're moving over a varicolored background, XDRAW is likely to be about as viable as a 1984 Nixon presidential campaign.

A green turtle, when XDRAWn over a white background, will be violet; a violet flower will have green petals; the orange sun will come out blue; and so on. If surrealism is your bag, go with XDRAW over multicolored backgrounds!

You might cure the problem by DRAWing the turtle and then *refreshing* either the entire screen, or the turtle's block bytes, with original bytes. Apple users have become so used to such contortions that many are surprised to find the relative ease with which sprite-based animation is programmed and effected. I personally find sprite graphics much easier and faster to do and much more inspiring to view. But, is that a reason to look at other machines besides the Apple to buy? No! Just be patient, keep your eyes and ears open, and remember the old adage "all things come to he who waits."

Scrolling

Above, I mentioned scrolling a background behind a shape. Suppose you have a rocket ship taking off and you want clouds to scroll by downwards to make it appear that the rocket is moving upwards. How might you do this? What type of algorithm are we after here? Well, if the action can be slow and take up little room in memory, a base-address calculator-type scroller would be good. But if more speed is needed, go with straightforward load and store methods, which will take about $492

Listing 1. SCROLL!

```
]L
    1 TEMP      EPZ $6
    2 START     LDY #$0
    3 LOOP      LDA $3FD0,Y
    4           STA TEMP
    5           LDA $3BD0,Y
    6           STA $3FD0,Y
    7           LDA $37D0,Y
    8           STA $3BD0,Y
    9           LDA $33D0,Y
   10           STA $37D0,Y
   11           LDA $2FD0,Y
   12           STA $33D0,Y
   13           LDA $2BD0,Y
   14           STA $2FD0,Y
   15           LDA $27D0,Y
   16           STA $2BD0,Y
   17           LDA $23D0,Y
   18           STA $27D0,Y
   19           LDA $3F50,Y
   20           STA $23D0,Y
   21           LDA $3B50,Y
   22           STA $3F50,Y
   23           LDA $3750,Y
   24           STA $3B50,Y
   25           LDA $3350,Y
   26           STA $3750,Y
   27           LDA $2F50,Y
   28           STA $3350,Y
   29           LDA $2B50,Y
   30           STA $2F50,Y
   31           LDA $2750,Y
   32           STA $2B50,Y
   33           LDA $2350,Y
   34           STA $2750,Y
   35           LDA $3ED0,Y
   36           STA $2350,Y
   37           LDA $3AD0,Y
   38           STA $3ED0,Y
   39           LDA $36D0,Y
   40           STA $3AD0,Y
   41           LDA $32D0,Y
   42           STA $36D0,Y
   43           LDA $2ED0,Y
   44           STA $32D0,Y
   45           LDA $2AD0,Y
   46           STA $2ED0,Y
   47           LDA $26D0,Y
   48           STA $2AD0,Y
   49           LDA $22D0,Y
   50           STA $26D0,Y
   51           LDA $3E50,Y
   52           STA $22D0,Y
   53           LDA $3A50,Y
   54           STA $3E50,Y
   55           LDA $3650,Y
   56           STA $3A50,Y
   57           LDA $3250,Y
   58           STA $3650,Y
   59           LDA $2E50,Y
   60           STA $3250,Y
   61           LDA $2A50,Y
   62           STA $2E50,Y
   63           LDA $2650,Y
   64           STA $2A50,Y
   65           LDA $2250,Y
   66           STA $2650,Y
   67           LDA $3DD0,Y
   68           STA $2250,Y
   69           LDA $39D0,Y
   70           STA $3DD0,Y
   71           LDA $35D0,Y
   72           STA $39D0,Y
   73           LDA $31D0,Y
   74           STA $35D0,Y
   75           LDA $2DD0,Y
   76           STA $31D0,Y
   77           LDA $29D0,Y
   78           STA $2DD0,Y
   79           LDA $25D0,Y
   80           STA $29D0,Y
   81           LDA $21D0,Y
   82           STA $25D0,Y
   83           LDA $3D50,Y
   84           STA $21D0,Y
   85           LDA $3950,Y
   86           STA $3D50,Y
   87           LDA $3550,Y
   88           STA $3950,Y
   89           LDA $3150,Y
   90           STA $3550,Y
   91           LDA $2D50,Y
   92           STA $3150,Y
   93           LDA $2950,Y
   94           STA $2D50,Y
   95           LDA $2550,Y
   96           STA $2950,Y
   97           LDA $2150,Y
   98           STA $2550,Y
   99           LDA $3CD0,Y
  100           STA $2150,Y
  101           LDA $38D0,Y
  102           STA $3CD0,Y
  103           LDA $34D0,Y
  104           STA $38D0,Y
  105           LDA $30D0,Y
  106           STA $34D0,Y
  107           LDA $2CD0,Y
  108           STA $30D0,Y
  109           LDA $28D0,Y
  110           STA $2CD0,Y
  111           LDA $24D0,Y
  112           STA $28D0,Y
  113           LDA $20D0,Y
  114           STA $24D0,Y
  115           LDA $3C50,Y
  116           STA $20D0,Y
  117           LDA $3850,Y
  118           STA $3C50,Y
  119           LDA $3450,Y
  120           STA $3850,Y
  121           LDA $3050,Y
  122           STA $3450,Y
  123           LDA $2C50,Y
  124           STA $3050,Y
  125           LDA $2850,Y
  126           STA $2C50,Y
  127           LDA $2450,Y
  128           STA $2850,Y
  129           LDA $2050,Y
  130           STA $2450,Y
  131           LDA $3FA8,Y
  132           STA $2050,Y
  133           LDA $3BA8,Y
  134           STA $3FA8,Y
  135           LDA $37A8,Y
  136           STA $3BA8,Y
  137           LDA $33A8,Y
  138           STA $37A8,Y
  139           LDA $2FA8,Y
  140           STA $33A8,Y
  141           LDA $2BA8,Y
  142           STA $2FA8,Y
  143           LDA $27A8,Y
  144           STA $2BA8,Y
  145           LDA $23A8,Y
  146           STA $27A8,Y
  147           LDA $3F28,Y
  148           STA $23A8,Y
  149           LDA $3B28,Y
  150           STA $3F28,Y
  151           LDA $3728,Y
  152           STA $3B28,Y
  153           LDA $3328,Y
  154           STA $3728,Y
  155           LDA $2F28,Y
  156           STA $3328,Y
  157           LDA $2B28,Y
  158           STA $2F28,Y
  159           LDA $2728,Y
  160           STA $2B28,Y
  161           LDA $2328,Y
  162           STA $2728,Y
  163           LDA $3EA8,Y
  164           STA $2328,Y
  165           LDA $3AA8,Y
  166           STA $3EA8,Y
  167           LDA $36A8,Y
  168           STA $3AA8,Y
  169           LDA $32A8,Y
  170           STA $36A8,Y
  171           LDA $2EA8,Y
  172           STA $32A8,Y
  173           LDA $2AA8,Y
  174           STA $2EA8,Y
  175           LDA $26A8,Y
  176           STA $2AA8,Y
  177           LDA $22A8,Y
  178           STA $26A8,Y
  179           LDA $3E28,Y
  180           STA $22A8,Y
  181           LDA $3A28,Y
  182           STA $3E28,Y
  183           LDA $3628,Y
  184           STA $3A28,Y
  185           LDA $3228,Y
  186           STA $3628,Y
  187           LDA $2E28,Y
  188           STA $3228,Y
  189           LDA $2A28,Y
  190           STA $2E28,Y
  191           LDA $2628,Y
  192           STA $2A28,Y
  193           LDA $2228,Y
  194           STA $2628,Y
  195           LDA $3DA8,Y
  196           STA $2228,Y
  197           LDA $39A8,Y
  198           STA $3DA8,Y
  199           LDA $35A8,Y
  200           STA $39A8,Y
  201           LDA $31A8,Y
  202           STA $35A8,Y
  203           LDA $2DA8,Y
  204           STA $31A8,Y
  205           LDA $29A8,Y
  206           STA $2DA8,Y
  207           LDA $25A8,Y
  208           STA $29A8,Y
  209           LDA $21A8,Y
  210           STA $25A8,Y
  211           LDA $3D28,Y
  212           STA $21A8,Y
  213           LDA $3928,Y
  214           STA $3D28,Y
  215           LDA $3528,Y
  216           STA $3928,Y
  217           LDA $3128,Y
  218           STA $3528,Y
  219           LDA $2D28,Y
  220           STA $3128,Y
  221           LDA $2928,Y
  222           STA $2D28,Y
  223           LDA $2528,Y
  224           STA $2928,Y
  225           LDA $2128,Y
  226           STA $2528,Y
  227           LDA $3CA8,Y
  228           STA $2128,Y
  229           LDA $38A8,Y
  230           STA $3CA8,Y
  231           LDA $34A8,Y
  232           STA $38A8,Y
  233           LDA $30A8,Y
  234           STA $34A8,Y
  235           LDA $2CA8,Y
  236           STA $30A8,Y
  237           LDA $28A8,Y
  238           STA $2CA8,Y
  239           LDA $24A8,Y
  240           STA $28A8,Y
  241           LDA $20A8,Y
  242           STA $24A8,Y
  243           LDA $3C28,Y
  244           STA $20A8,Y
  245           LDA $3828,Y
  246           STA $3C28,Y
  247           LDA $3428,Y
  248           STA $3828,Y
  249           LDA $3028,Y
  250           STA $3428,Y
  251           LDA $2C28,Y
  252           STA $3028,Y
  253           LDA $2828,Y
  254           STA $2C28,Y
  255           LDA $2428,Y
  256           STA $2828,Y
  257           LDA $2028,Y
  258           STA $2428,Y
  259           LDA $3F80,Y
  260           STA $2028,Y
  261           LDA $3B80,Y
  262           STA $3F80,Y
  263           LDA $3780,Y
  264           STA $3B80,Y
  265           LDA $3380,Y
  266           STA $3780,Y
  267           LDA $2F80,Y
  268           STA $3380,Y
```

Listing continued.

Listing continued.

```
269             LDA $2B80,Y
270             STA $2F80,Y
271             LDA $2780,Y
272             STA $2B80,Y
273             LDA $2380,Y
274             STA $2780,Y
275             LDA $3F00,Y
276             STA $2380,Y
277             LDA $3B00,Y
278             STA $3F00,Y
279             LDA $3700,Y
280             STA $3B00,Y
281             LDA $3300,Y
282             STA $3700,Y
283             LDA $2F00,Y
284             STA $3300,Y
285             LDA $2B00,Y
286             STA $2F00,Y
287             LDA $2700,Y
288             STA $2B00,Y
289             LDA $2300,Y
290             STA $2700,Y
291             LDA $3E80,Y
292             STA $2300,Y
293             LDA $3A80,Y
294             STA $3E80,Y
295             LDA $3680,Y
296             STA $3A80,Y
297             LDA $3280,Y
298             STA $3680,Y
299             LDA $2E80,Y
300             STA $3280,Y
301             LDA $2A80,Y
302             STA $2E80,Y
303             LDA $2680,Y
304             STA $2A80,Y
305             LDA $2280,Y
306             STA $2680,Y
307             LDA $3E00,Y
308             STA $2280,Y
309             LDA $3A00,Y
310             STA $3E00,Y
311             LDA $3600,Y
312             STA $3A00,Y
313             LDA $3200,Y
314             STA $3600,Y
315             LDA $2E00,Y
316             STA $3200,Y
317             LDA $2A00,Y
318             STA $2E00,Y
319             LDA $2600,Y
320             STA $2A00,Y
321             LDA $2200,Y
322             STA $2600,Y
323             LDA $3D80,Y
324             STA $2200,Y
325             LDA $3980,Y
326             STA $3D80,Y
327             LDA $3580,Y
328             STA $3980,Y
329             LDA $3180,Y
330             STA $3580,Y
331             LDA $2D80,Y
332             STA $3180,Y
333             LDA $2980,Y
334             STA $2D80,Y
335             LDA $2580,Y
336             STA $2980,Y
337             LDA $2180,Y
338             STA $2580,Y
339             LDA $3D00,Y
340             STA $2180,Y
341             LDA $3900,Y
342             STA $3D00,Y
343             LDA $3500,Y
344             STA $3900,Y
345             LDA $3100,Y
346             STA $3500,Y
347             LDA $2D00,Y
348             STA $3100,Y
349             LDA $2900,Y
350             STA $2D00,Y
351             LDA $2500,Y
352             STA $2900,Y
353             LDA $2100,Y
354             STA $2500,Y
355             LDA $3C80,Y
356             STA $2100,Y
357             LDA $3880,Y
358             STA $3C80,Y
359             LDA $3480,Y
360             STA $3880,Y
361             LDA $3080,Y
362             STA $3480,Y
363             LDA $2C80,Y
364             STA $3080,Y
365             LDA $2880,Y
366             STA $2C80,Y
367             LDA $2480,Y
368             STA $2880,Y
369             LDA $2080,Y
370             STA $2480,Y
371             LDA $3C00,Y
372             STA $2080,Y
373             LDA $3800,Y
374             STA $3C00,Y
375             LDA $3400,Y
376             STA $3800,Y
377             LDA $3000,Y
378             STA $3400,Y
379             LDA $2C00,Y
380             STA $3000,Y
381             LDA $2800,Y
382             STA $2C00,Y
383             LDA $2400,Y
384             STA $2800,Y
385             LDA $2000,Y
386             STA $2400,Y
387             LDA TEMP
388             STA $2000,Y
389             INY
390             CPY #!40
391             BEQ PAGEDONE
392             JMP LOOP
393 PAGEDONE    JMP START
394             BRK
395             BRK
396             END
```

Listing 2. SCROLL.

```
*800.C92

0800- A0 00 B9 D0 3F 85 06 B9
0808- D0 3B 99 D0 3F B9 D0 37
0810- 99 D0 3B B9 D0 33 99 D0
0818- 37 B9 D0 2F 99 D0 33 B9
0820- D0 2B 99 D0 2F B9 D0 27
0828- 99 D0 2B B9 D0 23 99 D0
0830- 27 B9 50 3F 99 D0 23 B9
0838- 50 3B 99 50 3F B9 50 37
0840- 99 50 3B B9 50 33 99 50
0848- 37 B9 50 2F 99 50 33 B9
0850- 50 2B 99 50 2F B9 50 27
0858- 99 50 2B B9 50 23 99 50
0860- 27 B9 D0 3E 99 50 23 B9
0868- D0 3A 99 D0 3E B9 D0 36
0870- 99 D0 3A B9 D0 32 99 D0
0878- 36 B9 D0 2E 99 D0 32 B9
0880- D0 2A 99 D0 2E B9 D0 26
0888- 99 D0 2A B9 D0 22 99 D0
0890- 26 B9 50 3E 99 D0 22 B9
0898- 50 3A 99 50 3E B9 50 36
08A0- 99 50 3A B9 50 32 99 50
08A8- 36 B9 50 2E 99 50 32 B9
08B0- 50 2A 99 50 2E B9 50 26
08B8- 99 50 2A B9 50 22 99 50
08C0- 26 B9 D0 3D 99 50 22 B9
08C8- D0 39 99 D0 3D B9 D0 35
08D0- 99 D0 39 B9 D0 31 99 D0
08D8- 35 B9 D0 2D 99 D0 31 B9
08E0- D0 29 99 D0 2D B9 D0 25
08E8- 99 D0 29 B9 D0 21 99 D0
08F0- 25 B9 50 3D 99 D0 21 B9
08F8- 50 39 99 50 3D B9 50 35
0900- 99 50 39 B9 50 31 99 50
0908- 35 B9 50 2D 99 50 31 B9
0910- 50 29 99 50 2D B9 50 25
0918- 99 50 29 B9 50 21 99 50
0920- 25 B9 D0 3C 99 50 21 B9
0928- D0 38 99 D0 3C B9 D0 34
0930- 99 D0 38 B9 D0 30 99 D0
0938- 34 B9 D0 2C 99 D0 30 B9
0940- D0 28 99 D0 2C B9 D0 24
0948- 99 D0 28 B9 D0 20 99 D0
0950- 24 B9 50 3C 99 D0 20 B9
0958- 50 38 99 50 3C B9 50 34
0960- 99 50 38 B9 50 30 99 50
0968- 34 B9 50 2C 99 50 30 B9
0970- 50 28 99 50 2C B9 50 24
0978- 99 50 28 B9 50 20 99 50
0980- 24 B9 A8 3F 99 50 20 B9
0988- A8 3B 99 A8 3F B9 A8 37
0990- 99 A8 3B B9 A8 33 99 A8
0998- 37 B9 A8 2F 99 A8 33 B9
09A0- A8 2B 99 A8 2F B9 A8 27
09A8- 99 A8 2B B9 A8 23 99 A8
09B0- 27 B9 28 3F 99 A8 23 B9
09B8- 28 3B 99 28 3F B9 28 37
09C0- 99 28 3B B9 28 33 99 28
09C8- 37 B9 28 2F 99 28 33 B9
09D0- 28 2B 99 28 2F B9 28 27
09D8- 99 28 2B B9 28 23 99 28
09E0- 27 B9 A8 3E 99 28 23 B9
09E8- A8 3A 99 A8 3E B9 A8 36
09F0- 99 A8 3A B9 A8 32 99 A8
09F8- 36 B9 A8 2E 99 A8 32 B9
0A00- A8 2A 99 A8 2E B9 A8 26
0A08- 99 A8 2A B9 A8 22 99 A8
0A10- 26 B9 28 3E 99 A8 22 B9
0A18- 28 3A 99 28 3E B9 28 36
0A20- 99 28 3A B9 28 32 99 28
0A28- 36 B9 28 2E 99 28 32 B9
0A30- 28 2A 99 28 2E B9 28 26
0A38- 99 28 2A B9 28 22 99 28
0A40- 26 B9 A8 3D 99 28 22 B9
0A48- A8 39 99 A8 3D B9 A8 35
0A50- 99 A8 39 B9 A8 31 99 A8
0A58- 35 B9 A8 2D 99 A8 31 B9
```

Listing continued.

bytes of memory. They are so fast that no screen "ripple" is seen and no need arises for page flipping to increase smoothness.

In Listing 1 you'll find the source for the most straightforward code I know of for scrolling. There are two main ways to improve on the speed of this algorithm: by moving all screen bytes down more than one line at a time (it's presently one line per move), or by scrolling less than an entire 40-byte-wide screen (presently the entire screen width is scrolled). Let's look at the way SCROLL! works, after first seeing how the files are set up.

Assembly

SCROLL! is the source code (assembled with LISA 2.5G) for the scrolling routine SCROLL, which is located at $800 (2048 decimal) and has a length of $492. To change SCROLL you use LISA to EXEC SCROLL! into memory and then change this assembly language routine with LISA commands like M (modify), D (delete), I (insert), and so on. Next you WRITE SCROLL! to resave the source and do <control-D> BSAVE SCROLL, A$800, L$ <length> to resave the routine. I find length by looking at the last assembly address used after the A (assemble) command is used and subtracting the assembly starting address from it. If you don't have a SCROLL! source file to begin with, you boot LISA, hit I (insert) and start keying instructions.

Those of you not familiar with assembly and machine language should know that only the machine language object code (SCROLL) in Listing 2 is needed to make this program work. The source SCROLL! is used only if you plan to modify the scrolling routine in some way. Assembly is for writing, fixing, and inventing code; machine language is for *using* it. Assembly is in unusable text or binary source files, machine language is in usable binary files you can CALL from Basic, JSR to (from another machine language program), or *800G to from the monitor. Remember that a JSR (assembly instruction) does nothing until you assemble it into machine language and it turns into $20, the object code for the 6502 instruc-

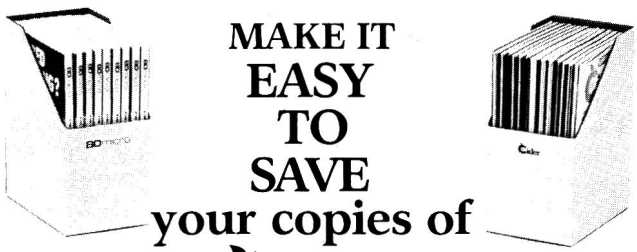
Listing continued.

```
0A60- A8 29 99 A8 2D B9 A8 25
0A68- 99 A8 29 B9 A8 21 99 A8
0A70- 25 B9 28 3D 99 A8 21 B9
0A78- 28 39 99 28 3D B9 28 35
0A80- 99 28 39 B9 28 31 99 28
0A88- 35 B9 28 2D 99 28 31 B9
0A90- 28 29 99 28 2D B9 28 25
0A98- 99 28 29 B9 28 21 99 28
0AA0- 25 B9 A8 3C 99 28 21 B9
0AA8- A8 38 99 A8 3C B9 A8 34
0AB0- 99 A8 38 B9 A8 30 99 A8
0AB8- 34 B9 A8 2C 99 A8 30 B9
0AC0- A8 28 99 A8 2C B9 A8 24
0AC8- 99 A8 28 B9 A8 20 99 A8
0AD0- 24 B9 28 3C 99 A8 20 B9
0AD8- 28 38 99 28 3C B9 28 34
0AE0- 99 28 38 B9 28 30 99 28
0AE8- 34 B9 28 2C 99 28 30 B9
0AF0- 28 28 99 28 2C B9 28 24
0AF8- 99 28 28 B9 28 20 99 28
0B00- 24 B9 80 3F 99 28 20 B9
0B08- 80 3B 99 80 3F B9 80 37
0B10- 99 80 3B B9 80 33 99 80
0B18- 37 B9 80 2F 99 80 33 B9
0B20- 80 2B 99 80 2F B9 80 27
0B28- 99 80 2B B9 80 23 99 80
0B30- 27 B9 00 3F 99 80 23 B9
0B38- 00 3B 99 00 3F B9 00 37
0B40- 99 00 3B B9 00 33 99 00
0B48- 37 B9 00 2F 99 00 33 B9
0B50- 00 2B 99 00 2F B9 00 27
0B58- 99 00 2B B9 00 23 99 00
0B60- 27 B9 80 3E 99 00 23 B9
0B68- 80 3A 99 80 3E B9 80 36
0B70- 99 80 3A B9 80 32 99 80
0B78- 36 B9 80 2E 99 80 32 B9
0B80- 80 2A 99 80 2E B9 80 26
0B88- 99 80 2A B9 80 22 99 80
0B90- 26 B9 00 3E 99 80 22 B9
0B98- 00 3A 99 00 3E B9 00 36
0BA0- 99 00 3A B9 00 32 99 00
0BA8- 36 B9 00 2E 99 00 32 B9
0BB0- 00 2A 99 00 2E B9 00 26
0BB8- 99 00 2A B9 00 22 99 00
0BC0- 26 B9 80 3D 99 00 22 B9
0BC8- 80 39 99 80 3D B9 80 35
0BD0- 99 80 39 B9 80 31 99 80
0BD8- 35 B9 80 2D 99 80 31 B9
0BE0- 80 29 99 80 2D B9 80 25
0BE8- 99 80 29 B9 80 21 99 80
0BF0- 25 B9 00 3D 99 80 21 B9
0BF8- 00 39 99 00 3D B9 00 35
0C00- 99 00 39 B9 00 31 99 00
0C08- 35 B9 00 2D 99 00 31 B9
0C10- 00 29 99 00 2D B9 00 25
0C18- 99 00 29 B9 00 21 99 00
0C20- 25 B9 80 3C 99 00 21 B9
0C28- 80 38 99 80 3C B9 80 34
0C30- 99 80 38 B9 80 30 99 80
0C38- 34 B9 80 2C 99 80 30 B9
0C40- 80 28 99 80 2C B9 80 24
0C48- 99 80 28 B9 80 20 99 80
0C50- 24 B9 00 3C 99 80 20 B9
0C58- 00 38 99 00 3C B9 00 34
0C60- 99 00 38 B9 00 30 99 00
0C68- 34 B9 00 2C 99 00 30 B9
0C70- 00 28 99 00 2C B9 00 24
0C78- 99 00 28 B9 00 20 99 00
0C80- 24 A5 06 99 00 20 C8 C0
0C88- 28 F0 03 4C 02 08 4C 00
0C90- 08 00 00
```

tion JSR. And monitor G commands relate to hex starting addresses. If I'd assembled the routine at $F00, I'd have to use *F00G to run it.

The Scroll Routine

So use CALL-151 and *800: to begin entering code in order to have SCROLL to use as a subroutine in your programs. BSAVE it at A$800, L$492 and CALL it from Basic (with CALL 2048)as I do in the DEMO program (Listing 3). I suggest that you POKE 103,1: POKE 104,64: POKE 16384,0 in your Hello program that runs before the DEMO program so DEMO loads at $4000, up out of the way of hi-res screen 1 ($2000–$3FF8). Only hi-res page 1 will be scrolled with the program as it is. It wouldn't be too hard to change all the $2000–$3FD0 addresses to $4000–$5FD0 addresses so hi-res page 2 would be scrolled. I'd use the following line additions and



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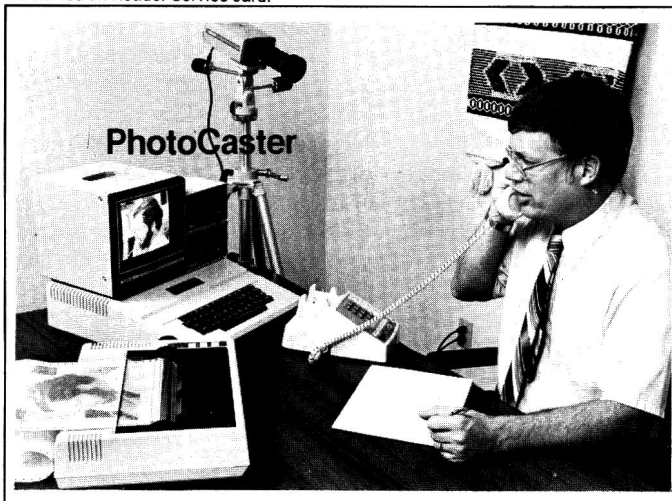

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```
]POKE-12528,7

]LIST

0 D$ =  CHR$ (4): PRINT D$"BLOADSCROLL"
1  TEXT : HOME : PRINT : PRINT "HIT SPACE TO GET RANDOM LINES..OTHERWISEYO
     U'LL GET SLANT-LINES:"s: GET A$: IF  ASC (A$) <  > 32 THEN  GOSUB 100
     : GOTO 32
8  HGR : POKE  - 16302,0: HCOLOR= 1:OX = 0:OY = 0
10  FOR A = 0 TO 100:HC =  INT ( RND (1) * 8): HCOLOR= HC:X =  INT ( RND (
     1) * 280):Y =  INT ( RND (1) * 192): REM    GET LINE ENDPOINT VALUES

20  HPLOT OX,OY TO X,Y:OX = X:OY = Y: REM  LINE
30  NEXT : REM     DO THE REST OF THE LINES
32  HOME
35  TEXT : VTAB 9: FLASH : PRINT "HIT RESET TO QUIT SCROLLING SCREEN": NORMAL
     : FOR Q = 1 TO 3000: NEXT
38  POKE  - 16304,0: POKE  - 16297,0: REM  SEE SCREEN
40  CALL 2048: REM   MACHINE LANGUAGE SCROLLING ROUTINE WILL BE CALLED...I
     T WILL DO AN INFINITE LOOP UNTIL RESET IS HIT
100  HGR : POKE  - 16302,0:X = 0:Y = 0
110  HCOLOR= 3
112 B = 191:A = X + 70: IF A > 279 THEN A = A - 279
114 Y = 0:X = X + 7: IF X > 279 THEN  RETURN
120  HPLOT X,Y TO A,B
130  GOTO 112
```

Listing 3. DEMO.

changes to effect a page 2 scroll:

1) At the end of line 1, change GOTO 32 to F = 1.
2) ADD: 4 FOR A = 2051 TO 3205: IF PEEK (A) < > 40 AND PEEK (A)>31 AND PEEK (A)<64 THEN POKE A, PEEK (A) + 32
3) ADD: 6 NEXT: DATA 2369, 2378, 2417, 2426, 2753, 2762, 2801, 2810, 3137, 3146, 3185, 3194
4) ADD: 7 FOR B = 1 TO 12: READ C:POKE C,72: NEXT:RESTORE: IF F = 1 THEN 32
5) ADD: 39 POKE-16299,0
6) Change HGR in line 8 and line 100 to HGR2.
7) Change the Hello (boot) program POKEs from POKE 104,64 to POKE 104,96 and from POKE 16384,0 to POKE 24576,0. (This lets you start DEMO above $6000, which is out of the way of hi-res page 2.)

These alterations change such sequences as LDA$3B00,Y and STA $3F00,Y to LDA $5B00,Y and STA $5F00,Y.

Now, to admire the incredible simplicity (which is why it's fast) of SCROLL!, see Listing 1. You'll need only one temporary address to stick data in; choose $6 in line 1. Next load the Y register with 0; the Y register will be the offset counter value. The offset I'm referring to must be in the range of 0 to 39. The address to offset will be the Y coordinate's base address; you'll offset it with the byte column number you're at.

Let me explain. There are 40 horizontal byte columns; the left edge of the screen is column 0 and the right edge is column 39. A shape can be on any of the 192 Y coordinates from 0 to 191 and on any X coordinate from 0 to 39. To get the address of a byte to load the accumulator with (LDA), or store into *from* the accumulator (STA), you add the Y register value, which contains the horizontal offset, to the base address (the leftmost address) of the Y coordinate you're at. So LDA base address, horizontal offset and STA base address, horizontal offset gives exact screen addresses to manipulate data within, while LDA $21A8, Y and STA $25A8, Y are examples.

"Now, to admire the incredible simplicity of SCROLL!..."

Hi-Res Mapping

Now, notice that $25A8 is $400 (decimal 1024) greater than $21A8. This is the usual step value between horizontal lines in your Apple's hi-res mapping scheme. See your white *Apple Reference Manual* for further hi-res map details. The point, however, is that the hi-res screen is mapped sequentially only in the horizontal direction. Vertically the lines are from 1024 to 8024 addresses apart—a real can of worms.

Anyway, in SCROLL! you take the lowest and leftmost screen byte (at offset 0) and store it in TEMP. Then you take the leftmost byte from the line above it and copy it into the lowest line's leftmost byte. Then the third line from the bottom puts its leftmost byte into the second line from the bottom's leftmost byte. And so on, until 0 line's leftmost byte goes into the leftmost byte of line 1 and TEMP goes into line O's leftmost byte. This creates the vertical *wraparound* phenomena you'll see. To have scroll without wraparound, replace the TEMP with a #$0. But only byte column 0 is scrolled, so now you scroll columns 1–39 as well, before starting all over again to continue scrolling.

To scroll up rather than down, change all STA instructions to LDA and all LDA instructions to STA and put the line 0 byte into TEMP until the line 191 byte has been loaded into line 190. Finally, the TEMP byte goes into line 191's byte. Again, wraparound may be prevented by putting a #$0 where the TEMP is.

Scrolling sideways will be seven times as fast as scrolling vertically, if the byte-by-byte load and store method is used, since each hi-res byte contains 7 visible bits, and moving all bytes sideways 1 byte is a 7-dot (not 1-dot) move.

In effect, a column of bytes moves down, in SCROLL, and then the next column to the right does likewise, and so on, until byte column 39 has been done. Notice the INY (increment the Y register by one) and CPY #!40 (compare Y to 40), as well as the BEQ PAGEDONE (branch to 393 if all 40-byte columns have been scrolled, meaning the entire screen has moved down by 1 dot). If all columns are not done, jump up to *loop* and do another column at your new Y-register offset.

So, type in Listing 2's SCROLL routine and save it as previously advised. Then type in the short DEMO program (Listing 3). Make sure POKE 103,1 and POKE 104,96 (or 64 if you won't be doing page 2 scrolling) and POKE 24576,0 (or 16384 if you won't be doing page 2 scrolling) are in effect from your boot program. Then RUN DEMO and choose either screen display for scrolling. The POKE–16302,0 yields a hi-res full-screen display. The OX and DY mean OLD X and Y values. Hit reset to stop.

Next month I'll discuss shape sequences animation and how to make a stick figure "walk." ■

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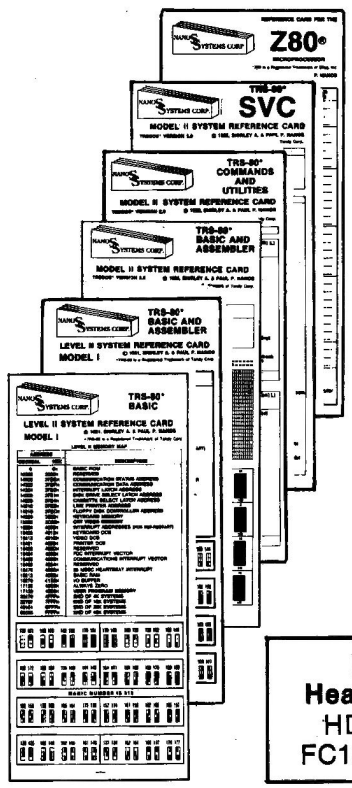

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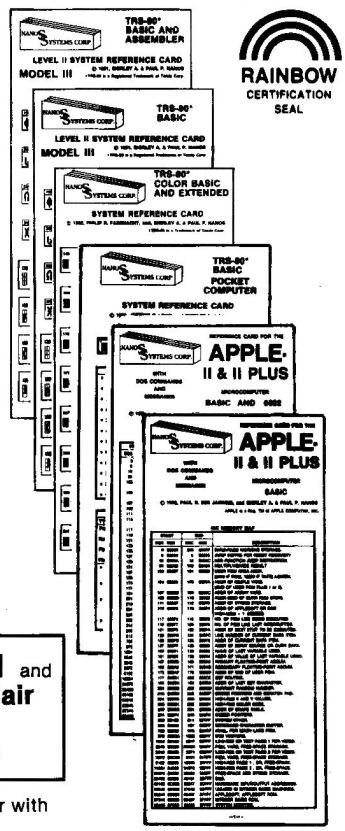

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Smith-Corona TP-I

It's not ugly...in fact, the compact appearance is quite appealing. The packing is first rate. And best of all, the documentation is excellent. So why does this 20-pound letter-quality printer cost less than $600? Could this really be the printer bargain everyone hopes to find? I suppose the answer depends on the trade-offs you're willing to accept. But perhaps I'm getting ahead of myself here. Let's start at the beginning.

The Smith-Corona TP-I is packed snugly in a molded styrofoam container. The manufacturer provides illustrated unpacking instructions, so there's no excuse for destroying the printer during the unpacking process. Everything you need to turn out letter-quality printing is supplied, except for the interface cable, which can be either parallel or serial.

The location of the power off and on switch is inconvenient. Until you are familiar with the printer, you'll find the small vertical power-on switch hard to locate by feeling along under the fan case at the rear of the printer. The power cord connector sits next to this switch, and the interface connector is located on the rear left side of the printer.

The only other external switch, the top-of-form switch, is on the front of the printer within an area outlined with a red pinstripe. It can be switched to either Clear or Set. The power light, which lights up when the printer is turned on, is on the left side of this switch. The Clear or Set designations for the switch refer to the paper handling mode selected by the user.

In normal mode, the TP-I will print continuous lines of text. However, in top-of-form mode it will print 58 lines of text and then do eight line feeds to center the next page of text on an 11-inch page of paper. You cannot adjust TOF for paper of nonstandard length. And the TP-I accepts only friction feed paper. If you're using tractor feed, you'll have to contend with the perforated edges of the paper. You can either tear them off and treat the paper like a standard piece of 8½ by 11-inch paper, or you can keep the perforated edges and set your margins to allow for the extra paper width. The latter method is best, expecially if you're using fan-folded paper. It's a real hassle to remove the perforated borders and then refold the paper prior to use in the printer. Paper wider than 13 inches won't fit.

Initially I had problems with alignment of the paper. Granted, the printer fed the paper nicely onto the platen; but after five or six sheets had been run through, the centering was out of kilter. Through trial and error, I learned to align my paper correctly by rolling an entire sheet through the printer and then matching the top holes of the form-fed sheet to the top holes of a subsequent sheet of paper. I found that printing on forms consisting of more than four layers was unsuccessful.

The documentation graphically demonstrates how to put your paper into the printer, by showing the paper support panel, and also demonstrates how the paper is inserted behind the platen.

Four linespace settings are accessed by a chrome-lever left of the platen. The 1 setting puts the spacing at 6 lines-per-inch and the 1½ and 2 settings put the spacings at 4.5 and 3 lines-per-inch, respectively. The setting is used for free platen movement. These settings are visible on a dial below the selection lever, and a red line indicates which setting is selected. However, when the ribbon cassette unit is to the far left, the O selection is hidden from view. Even though you know the desired setting is available, care must be taken when pushing the lever down to the last position. You don't want to damage the ribbon cassette or print wheel unit.

A variable line spacer knob lets you properly position preprinted forms. You can select impression control with a lever on the lower left side of the daisywheel unit. This can be comfortably accessed by lifting up the hinged printer case top. If the print quality is unacceptable, try adjusting this lever to compensate for the local voltage level. Five settings are possible. You may need to readjust the dial if you move the printer to another area.

A print point indicator, which shows exactly where the next character will print on the paper, is found on the daisywheel unit.

The TP-I contains a diagnostic mode, which will prevent the printer from operating if there is irregular motor operation. Also, if the top cover is raised, the printer won't function. When powering up the TP-I, initialization occurs—the print wheel moves to the left side of the platen, then to the right, and ends at position O on the left side. You can then enter data for printing.

Special operations, such as underscoring, are possible with the TP-I. You can manually underscore one character by first transmitting the character to be printed, then a backspace character, and then the underscore character. If you don't know what the underscore character is, Smith-Corona has supplied a character set table on pages 26 and 27 of the manual. Normally it is hex 5F. This table lists the decimal, hexadecimal and ASCII codes for specific printer responses.

For automatic underscore, the ASCII em character, or hex 19, is sent to the printer. This puts the TP-I in auto-underline mode, and all characters following the em will be underlined. To turn off this mode, simply send another em character.

For tabbing and margins, the user sets and releases all settings. There are no preset tabs with the TP-I. If you want a left margin setting, forward or back space characters must be sent to the printer to place the printing point at the margin position desired. An ASCII DC1 or hex 11 sets the left margin. The same method is used to position the right margin, except that an ASCII DC3 (hex 13) is transmitted. You can't really clear a set margin, but sending an ASCII CAN (hex 18) to the printer allows the carrage to travel beyond whatever margin has been set. Tab settings are handled similarly; however, once the printer point has reached

the desired setting, ASCII DC3 (hex 12) is relayed to the printer. Sixteen tab positions can be set, with an ASCII DC4 (hex 14) removing a single tab setting.

Several different types of print wheels can be used by the TP-I. Film ribbon cassettes are recommended for superior print quality. Either a parallel interface (36-pin D connector) or a serial interface can be used with the TP-I. A 1200 bit-per-second data rate, even parity, 8-bit word length and DTE selected interface protocol are preset by the factory on the RS-232C serial interface board. Data rates that may be used by changing the DIP switch positions on the interface board are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600 and 19,200.

So, what are the drawbacks? The noise is terrible! The machine-gun staccato could drive you mad. I highly recommend earphones for those working close to the TP-I. And be prepared to purchase an efficient buffer board of some kind—the TP-I prints only 12 characters-per-second. Yet, the print quality is excellent. Each character is perfectly formed. So if inexpensive letter-quality printing is your main concern, the TP-I certainly does the job.

The TP-I is manufactured by Smith-Corona at 65 Locust Ave., New Canaan, CT 06840. ■

Hartley Lesser
inCider staff

Bytewriter

Sooner or later serious computerists yearn for a printer, if only because printed copies of programs are easier to debug than copies on a TV monitor. Until recently, these computerists have had to choose from three printer types: thermal printers, costing about $500; dot matrix impact printers, costing between $1000 and $1500; and correspondence quality printers, costing $1500 and up.

These prices reflect a real difference in quality: thermal printouts look cheap, fade and crack with age; dot matrix printouts also look cheap and sometimes do not duplicate well on copying machines; and correspondence quality printouts look good but are extremely expensive.

The choice is a difficult one for computerists who produce printouts to be read by others. Thermal printers and dot matrix printers use small dots to form their characters. Many people dislike these dot matrix characters, perhaps because so much junk mail uses dot matrix mailing

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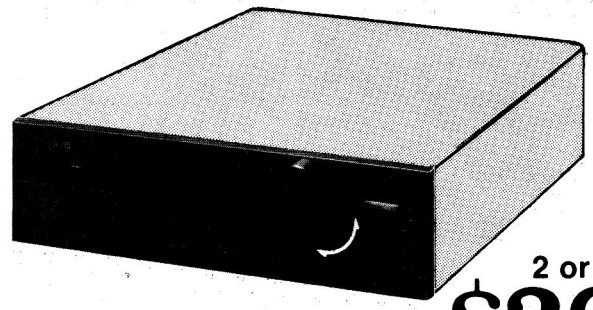

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labels. The characters are not fully formed, and on some machines, the descenders—parts of letters like lower case p and y that are supposed to fall below the line—do not descend below the line.

But now, the serious computerist has a fourth choice: correspondence quality printers that cost under $1000 and are based on electronic portable typewriters. If you're interested in these printers read the October, 1982 review in *Consumer Reports*. It discusses the Olivetti Praxis 30 and a number of other machines. Naturally, it discusses them only as typewriters; but almost everything it says is relevant to printer applications. And besides, you will probably want to use the machine separately as a typewriter in its own right.

The Bytewriter, based on the Olivetti Praxis Model 30, is an early entry in the electronic-portable-as-printer class. Its characters are fully formed; with some of the available type fonts, it would take a real expert to distinguish between the printing of a Bytewriter and an IBM Selectric.

The Bytewriter is a daisywheel printer with a selection of several type styles in three sizes: 10, 12 and 15 characters per inch. Although the Olivetti Praxis 30 itself allows the use of only one size print, the added electronics of the Bytewriter allow the use of all three sizes.

The carriage is 11 inches wide, so standard 8½-by-11-inch sheets can be typed sideways; this is wide enough for output intended for standard 14-inch wide mainframe printout paper, provided a 15-characters-per-inch print wheel is used. This is handy, of course, if you use your computer as an intelligent terminal.

The Bytewriter has a second keyboard that produces optional characters such as brackets and the British pounds sterling symbol. But these are awkward to use in most computer applications because they are activated by a hand switch which locks out such symbols as the percent sign. In a crunch, though, these symbols could be typed in by hand, which is better than lettering them in by hand.

Also, it is fairly easy to hook up the Bytewriter to your Apple II, provided you have a Centronics-compatible parallel interface card. You simply buy the Apple II cable offered by Bytewriter and hook it up. The main problem is matching the pins and plugs correctly. The directions are not completely clear. Pin one is at the bottom edge of the Bytewriter plug, and is color-coded on the cable; the printer end of the cable is smooth, while the computer end has wires that cross over other wires.

The Bytewriter has reasonably accurate vertical and horizontal spacing, even though it does not have a tractor feed. I have used it with up to 15 pages of fan-fold paper without problems on the vertical spacing. I think it would do equally well typing on fan-fold forms, but I did not test this feature.

The Bytewriter's typewriter functions can be serviced by any local Olivetti Praxis dealer. Unfortunately, the computer interface functions must be serviced at the Bytewriter factory in Ithaca, New York. You do not have to ship the entire machine. Simply unplug the circuit board and ship it.

"I had to use a mirror to check and change the settings."

The Bytewriter is not necessarily the answer to every computerist's dream. Some people will be delighted with it, as I was; but other people will find some of its features annoying.

Like almost all correspondence quality printers, the Bytewriter cannot produce graphics. In general, only dot matrix printers—and not all of them—can do that.

The typing speed is relatively slow, an advertised eight to twelve characters per second. That works out to 90 to 125 words per minute, an excellent speed for a skilled typist but slow for some computer applications. As a typewriter, the keyboard has a sluggish feel that annoys fast (50 wpm and up) touch typists, who type two or three characters ahead of the machine.

The lid that covers the typing element is thin plastic and could break easily. The settings for single space, space and a half, and double space are not aligned very well; I had to work them out by trial and error.

The typewriter manual written by Olivetti is difficult to follow. It took me about twenty minutes to figure out how to change the print wheel, for example. Both the language and the diagrams are confusing.

The most irritating problem I found was the placement of the four DIP switches used to change the pitch (characters per inch) and line feed settings of the printer. They are almost underneath the keyboard. I had to use a mirror to check and change their settings. To set the line feed switch, it helps to know what a line feed is, but about five minutes of trial and error will teach you better than any explanation I could give.

You will also have to get in the habit of setting the typewriter's margins to suit particular programs. With my word processor, for example, I set the left margin at zero and let the word processor set the actual margin internally. But with VisiCalc, I had to set the actual left margin for the program. With both programs, I set the right margin at its maximum value and let the program handle the margin internally.

Who could use a Bytewriter? Not casual computerists interested mainly in computer games. And not office managers who have several users and thus require fast output. But someone like myself, a single user who needs correspondence quality output, would be perfectly satisfied. Such users might be lawyers who want word processors to prepare boilerplate legal documents; statisticians who want to prepare reports; or writers writing Bytewriter reviews for magazines like *inCider*. Bytewriter's address is 125 Northview Rd., Ithaca, NY 14850. ■

Brownlee Elliott
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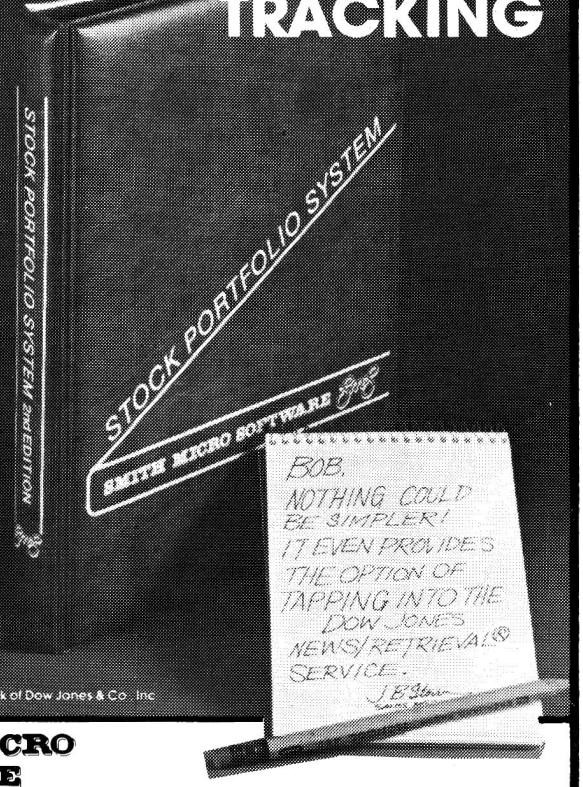

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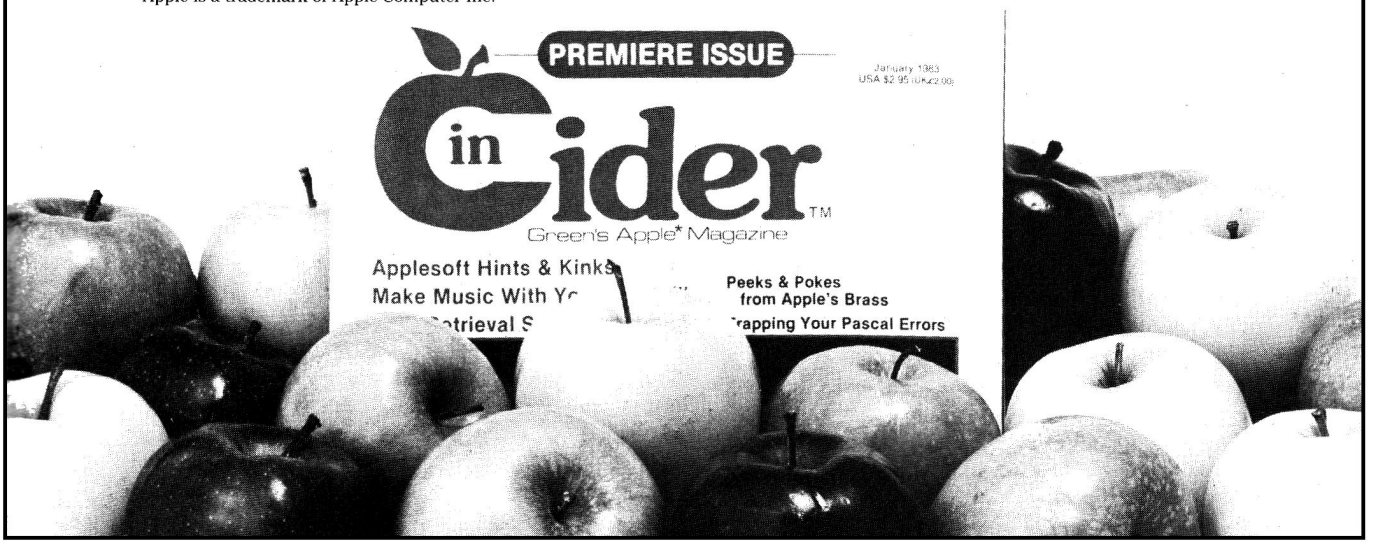

Reviews

PDQ Database

Recently, I overheard someone voice the need for a database that was fast, low-cost and could search anywhere in its files. I tried out PDQ; the description fits it exactly!

PDQ is a new package written by Charles R. Landers for Howard W. Sams & Co., 4300 West 62nd, Box 558, Indianapolis, IN 46206. Though it won't fill all needs, what it does, it does well. It boots up quickly enough, although this is almost the slowest part of the program. Saving or loading a file takes five seconds or less—even for the maximum file size of 28,672 characters. A search is done before your finger leaves the return key.

Learning PDQ is easy. There are three modes: Command, Text Entry, and Search. Command mode controls disk initialization and catalog access (to one or two disk drives). Text Entry mode has the most commands and seems almost like a simple type of word processor. Search mode is simple and is extremely fast.

Command Mode

Data disk initialization and duplication, handled through Command mode, take only one minute with two disk drives. With a single drive, duplicating a disk requires five passes, and thus 10 swaps of the old and new disks.

A data disk holds four files, which may be named (maximum length one line) and may have a three line description in the disk catalog. Search and Text Entry modes are accessed through the Command mode. All Command mode keys are single keystrokes with the exception of control-J, which joins records together; control-shift-M, which clears memory; and control-Q, which quits the program. Files may be joined to each other with Append if space permits; and this allows for retrieval of an accidentally erased file, providing no further additions have been made and saved to disk.

Text Entry Mode

I decided to use PDQ like a simple word processor. To begin, I created a tab for paragraph indentation. Tabs can be set up in any screen column and removed when no longer needed. The tabs are not saved as part of the file; if you want to keep track of where they are for future use, the first page can be used to store a pattern. No fields need to be set up; 21 lines comprise a record, and you may write anywhere within the screen. Word wrap may be turned on or off; on, bumps words of 12 characters or less down to the next line when they reach the right edge of the screen. Turning word wrap off may allow a few more characters per screen if you follow the Apple's habit of chopping words in half.

Text editing is possible, though it is clumsy at times. You can add spaces into a line, but are stopped when the right-most character hits the edge of the screen. A new empty line may be inserted between any two lines, and text may be added anywhere in the screen—as long as there is room. Adding to a line in the middle of the screen will move the lines below it down, until the screen is filled. The cursor may be moved one at a time with the arrows, control-A and control-Z, or may be moved more quickly with the escape key and the I, J, K and M diamond.

Once a screen contains what you want, it must be saved before you continue. Control-S adds your data to the end of the file, and your record numbering goes from "10 of 10" to "11 of 11". Alternatively, it may be inserted before any other record with control-I. Or using control-R, you can replace another record. Control-B and control-N flip pages backward and forward, respectively. But beware of using them before you have saved the current page!

Once saved, the contents of the page still appear on the screen. Control-W wipes the screen clear and control-E erases it line by line. The same screen may be saved again and again, and there is no indication that you have saved it. At one point, I grew over-cautious because I had been interrupted frequently and I saved the same page several times!

It is, however, possible to "kill" or delete a record and clear that space. A killed record retains the same record number, so that the other record numbers need not be changed. If the record numbers are important in your filing system, they will remain the same. This might be handy if you use PDQ as a monthly appointment book. If you wish, you may join records together from the Command mode; this packs the file and saves two characters per deleted record.

Space use is generous. I used 15 screen pages of notes and roughly a fifth of the space available. For comparison, this is about twice the space available in a Super-Text 40/80 file.

Printing can be done from either the Text Entry or Search modes. Control-P prints out the current screen. From the Text Entry mode, escape-control-P allows you to dump consecutive files or all files to the printer. On my printer, with elite type and six lines-per-inch, a full screen printout could almost fit sideways on a 3-inch by 5-inch card. A row of dashes separates each record, with empty lines above and below, for neat record division. If a record is less than a full screen, the printout is shorter. There is no waste of space or of time printing out blank lines!

Search Mode

The PDQ package contains a sample data disk with a Howard W. Sams Microcomputer Books File, which is nearly the maximum file length (as well as file name length—though you never have to type it out). It gives the new user, who has not built up a large file, a chance to see the impressive search speed. If you search for the word "APPLE", for example, you will find numerous Apple-related books. It looks like simple page flipping but the page numbers are not consecutive. If you print out from Search mode, you remain in Search mode and a press of the space bar will find the next record you want.

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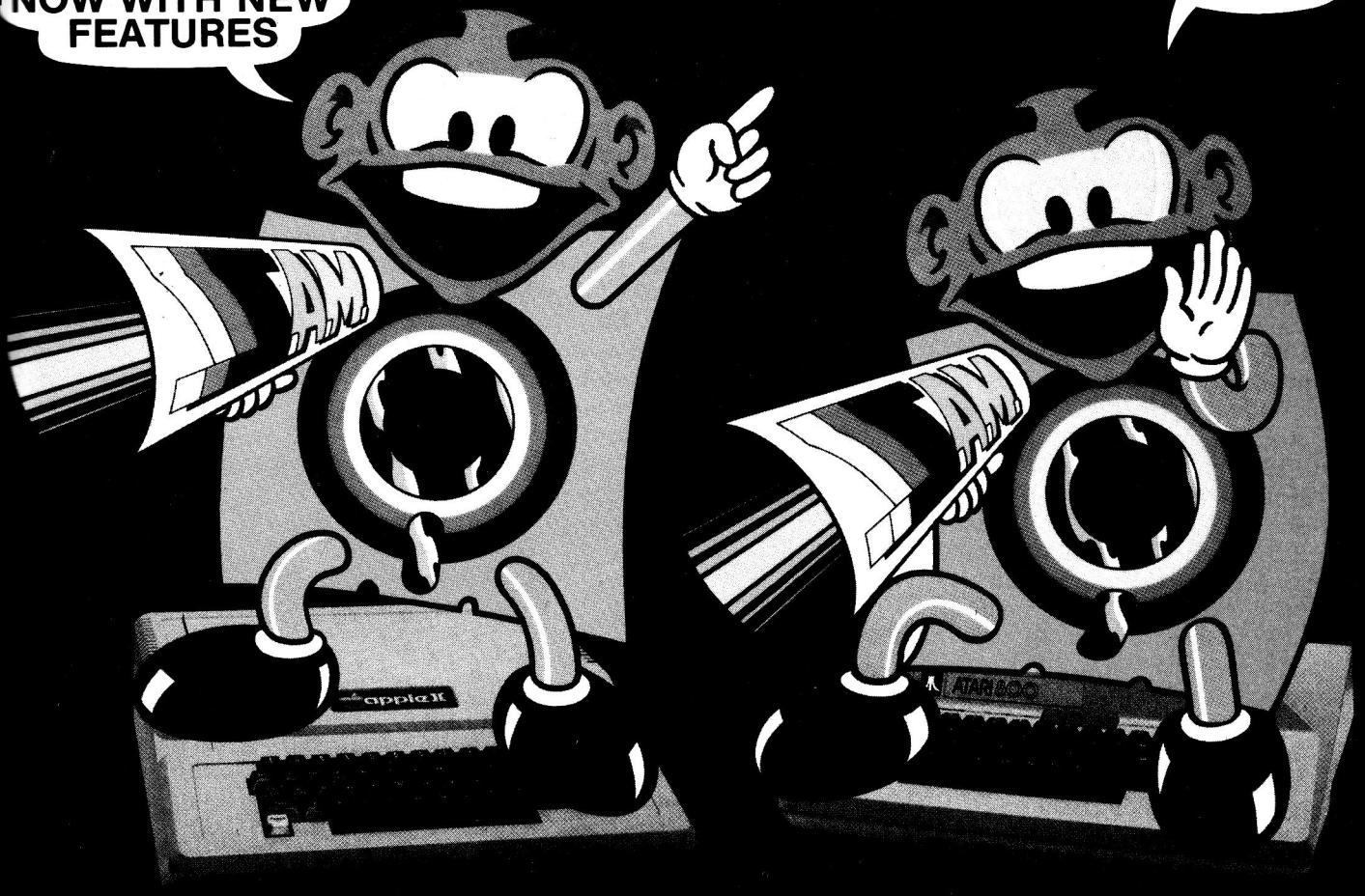

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pre-specified fields do not exist. If the keyword is in your file, it will be found. Boolean searches are possible. Instead of giving a single keyword, you enter two words separated by a slash. Only records containing both words will be brought up, but still, the search seems as fast as before.

The manual is a short 50 pages and is well laid out. Although the index is a single page with a single column, it covers everything you need. For each mode a keyboard diagram is given to explain the keys, and every command is amply described. The tutorial, about a quarter of the manual, starts you out using PDQ and leaves out very little. It is very readable, clear and is sometimes humorous. A single reading of the manual was all I needed to go ahead full-steam.

A reference card that summarizes the commands is provided. The same set of references appears in the back of the manual and can be brought on to the screen or printed out in hard copy each time you boot the program.

Applications

PDQ won't fill everyone's needs. It can't be set up to automatically type all records with dates between June 30 and July 30, nor is it possible to set up different formats for printouts of some data and not others. It will not perform additions or keep totals, and it will not sort entries either alphabetically or numerically. For these purposes, you need a fancier package, and you'll need to go through a longer learning period in order to use them.

What PDQ can do, and do well, is to create a file in which anything, no matter what, can be referenced, no matter where it is. It is like a simple card file. Records are limited to a certain amount of information per card, though nothing stops you from grouping records together as "page n of 35." It is easy to use, quick, and is practically foolproof. (The only time it seemed to hang was when I gave it a control-P and forgot to turn the printer on!)

After writing my notes for this review, I decided a practical use for PDQ would be as an index of articles in my growing magazine collection. Using one page per issue, I entered the titles of any articles that might be of future interest to me. If the title was too cute to provide a good idea of the contents of the article, I added another comment. With a quick keyword search, I can now reference the program listing that I typed in a year ago last spring. It's like an index that does not need to be alphabetized!

A PDQ file can be used for recipes, a correspondence index, an appointment book, or an idea file. It can keep records for paying bills or sending Christmas, birthday and anniversary cards. In short, it's a plain vanilla database that is, indeed, pretty darned quick!

Tobi Hoffman
Ashland, MA

Apple-Aids

Apple-Aids are a set of 12 utilities for the Apple II and II Plus. They help to develop or diagnose other programs, data files, or disk files.

The manual contains well-written instructions in a small ring binder. Each utility is illustrated with a picture of the monitor screen, and several such screens for the more complex programs.

All programs are called from the menu that is displayed after booting the disk or by typing RUN APPLE AIDS. A description of each of the the 12 programs follows:

Format Blank Disk

This utility does an INIT with a twist. It doesn't put DOS on disk. Therefore it saves two extra tracks for additional storage. That is equivalent to 32 sectors (24 sectors for DOS 3.2). The Hello program is stored as usual, but you cannot boot from this disk. I found this program to be very useful for making data disks for some programs.

Kill DOS

Kill DOS is similar to Format because it removes DOS from tracks 1 and 2 on a disk already containing data and programs. It doesn't disturb other information already on the disk. This program gives you 32 more sectors (24 with DOS 3.2) in which to store your precious data. You can restore DOS to the disk by using Master Create—but you will lose any data stored on tracks 1 and 2.

Disk Map

Disk Map gives a graphical representation of the used sectors on a disk. On a vertical bar graph it shows tracks on the horizontal axis and sector number on the vertical axis. Also displayed is the disk-free space and volume number.

Improved Directory

This program reads a directory sector and displays the information on the screen. Included is the file name (first ten characters), type (Applesoft, Integer, binary, text, S type, relocatable or ? for who knows), unlocked, locked or deleted. For binary files the length and beginning address is shown in decimal notation. While not giving much more infomation than a standard DOS catalog, this utility will help you locate the directory track and sector that holds a particular file name. The program can be handy when you want to find that file you saved using invisible control characters.

Sector Listings

The track-sector list of every file on the disk is displayed in this program with all numbers given in decimals. Also shown, in inverse characters, is the sector that contains the track-sector list. This utility can save a lot of tedious work when you need to find the exact track and sectors that contain a file.

Undelete Files

This program is for those "Oops" situations. You have just squashed the last bug in your latest game program, saved it to disk and started deleting the old, bad copies. Oops! You deleted the wrong one. Undelete Files will rescue the program intact

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as long as you have not tried to save anything to the disk. DOS does not erase a file. It only changes one byte on the disk that says the file isn't here. Undelete Files changes this byte to say the file is here. A short, well-written explanation in the Appendix describes how this is done.

Disk Editor

Disk Editor is by far the most useful to me of the utilities in this package. You can read, display in hex, decimal or ASCII, and edit and write any sector on a DOS 3.3 or 3.2 disk. The commands are easy to use and there are a variety of formats to display the sector information. As an added bonus, the sector information can be disassembled to the screen or printer. By pressing ? you get a help screen that has a brief list of all the commands.

Disk Copy

In my opinion this program could have been left out of the package. It will only copy standard DOS formats and is very slow; it copies only one track at a time. If you have one disk drive you have to swap the disks for each track.

Create Exec Files

Much of the pain of creating text files is avoided with this program and the next one (Edit Exec Files). You can input any characters from the keyboard. As you type in lines of commands the program numbers them for reference, but the numbers are not stored in the file. When you are finished, type QUIT at the beginning of a line and the file is stored under your choice of name. Lines in this program cannot be edited.

Edit Exec Files

To edit existing text files you use this program. Using Edit Exec Files you can delete a line, add a line to the end of the file, or change a line. To change a line you must retype it all. While I found this program rather crude, it does work for short text files. The biggest shortcoming was the inability to add lines in the middle of the file.

Text Dump

Text Dump will load a machine-language program on page 3 of memory to send the Apple screen to the printer. The printer card can be in any slot. To print the screen, press control-P when the blinking cursor is present. This feature will be available as long as you do not press reset, boot DOS or write anything in page 3 of memory. This is a handy feature when you are using the editor and track-sector lister.

Base Convert

This program will convert a number from binary, octal, decimal or hexadecimal to binary, octal, decimal and hexadecimal equivalents. I found it would work for up to 36-bit binary and 6-place hex numbers. Now, if it could only do math in those number bases.

Overview

All the above programs are written in Basic. The disk is not copy protected, so you can modify them for your own use. They use short machine-language routines to interface to the disk. No information is given about these routines.

The programs work with DOS 3.3 and, with some precautions, DOS 3.2. I have also used them with success on 40-track drives after modifying the Basic portions.

Besides the very useful glossary, the manual contains sections discussing VTOC (Volume Table of Contents), the directory, track-sector lists, deleted files and significant locations on a disk. Included is an Apple ASCII chart and a helpful index. While not a complete description of every topic, enough information is included to aid in using the programs. The manual is top notch in my judgement.

The manual warns that some of the programs can destroy data on a disk or make a disk unbootable. Do not play around with a disk that contains good data until you learn what not to do. Back up any disk before you try even minor surgery. I speak from experience.

This package is not for the casual Apple programmer. It takes some thought and careful work to use the utilities effectively and safely. But in the long run, they can save you time and frustration. You can obtain Apple-Aids from Advanced Operating Systems, 450 St. John Rd., Suite 792, Michigan City, IN 46360. Price is $69.95.

Lee E. Sumner, Jr.
Dallastown, PA

MCAT2

If you have owned your Apple for awhile, you have undoubtedly amassed quite a collection of programs. Have you ever had the unpleasant experience of trying to find that *one* special utility or game but not being quite certain which disk it was on? Would you like a list of just your text files, Integer Basic programs, or programming utilities? How about an alphabetized list of every program you own? These are just a few of the many MCAT2 functions.

MCAT is run entirely from two menus. The main menu offers the following choices:

- A Add Catalog
- D Delete Catalog (volume number)
- R Replace Catalog of Disk in Drive
- S Save Master Catalog
- G Get Master Catalog
- L List (by type, using string search, specific volume number, with sectors used indicated, all files, or catalog of current disk in drive)
- P Print (same options as List)
- N New (initialize/restart)
- E Exit Program
- O Options Menu

If you want to add disk volumes to your new master catalog, just insert the disk you wish to add, press A and return. If your disks were initialized with volume 254 or you have other duplicate numbers, MCAT allows you to indicate that the disk has a volume number other than its actual one (refer to the Options menu). Also, a

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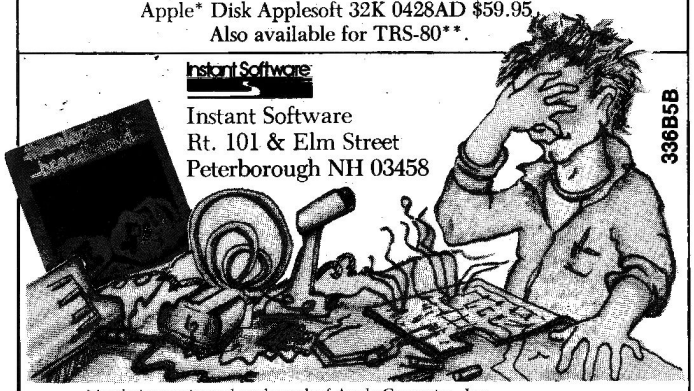

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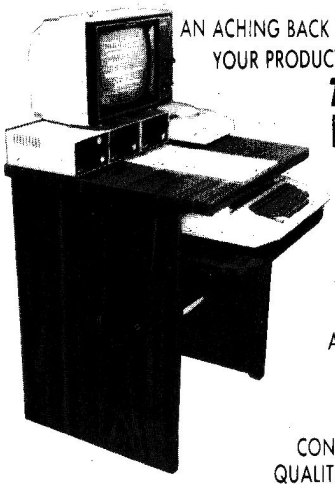

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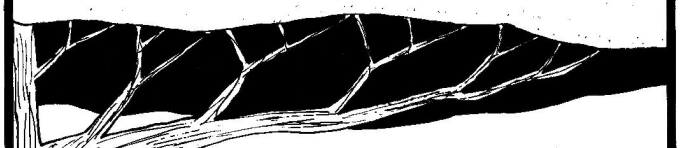

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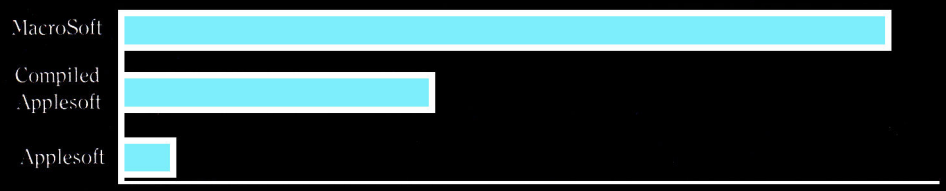

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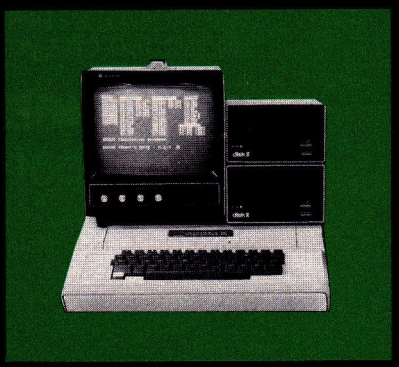

MACROSOFT and THE ASSEMBLER are available from your local Apple dealer. If he does not yet stock them, add $1.50 shipping/handling and send your order to Micro-SPARC Inc., Systems Division, P.O. Box 639, Lincoln, MA 01773. (617) 259-9710. (MA resident add 5% sales tax). We accept Visa and Mastercard.

MacroSoft requires an Apple II with Applesoft in ROM or an Apple II Plus with 48K memory, a disk, DOS 3.3, and THE ASSEMBLER.

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single character extension (like A, B, *, and so on) may be used to distinguish two disks with identical volume numbers.

The Replace command is very useful. Any time you add or delete a program from your collection, insert each disk that has been changed and press R. The old catalog with that volume will be deleted and the new one will take its place.

The List command lets you list your master catalog to the screen, while Print dumps your filenames to the printer. In the printer option, the list may be single or double column width. List alphabetizes your file and optionally lists: (1) the entire contents of the master catalog, (2) only certain types of files—binary, for example, (3) the catalog for a specific disk volume, (4) the sectors used in each volume, (5) the catalog of the disk in the drive, and/or (6) files containing a specific string. Using the string search, you can ask to see all files that contain the indicated string as the initial part of the filename or files that contain the string anywhere within the filename. If you consistently use a three-character extension when naming files (e.g., .DAT to indicate all data files), the command L/.DAT/A will list all such files. This command is particularly useful when you can remember a portion of the filename you are searching for. Rather than hunting through all your disks, use MCAT to limit your search to a few likely disk volumes.

The Get and Save commands put your master catalog in memory and save the current master to disk. If you would like several different master catalogs, the program also lets you name the MCAT file rather than using the system default. Beneath the main menu are hexadecimal numbers that show the amount of memory left for your master catalog as well as a list of up to 16 of the most recent volume numbers added to the master catalog.

The Options menu is used mainly to set up your printer (select one- or two-column reports, number of columns to indent, how to handle pagination, and so on). You may also instruct MCAT to read disk volume numbers as they appear on the disk or that *you* will indicate all disk volume numbers—as in A23 to add volume 23. If no volume number is included with the A(dd) command, the program will use the existing number on the disk.

In testing the program, I had difficulty using it with my printer. MCAT allows you to configure it to accept special printer controls (as an option at start-up and within the options menu). After trying for several hours to get MCAT to print listings using the MX-80's compressed print mode and to take advantage of the 106-column limit of the program, I gave up. Whenever file titles were a bit too long, the printing wrapped around and overprinted a volume number. The solution was to shorten the offending filenames.

Although I am familiar with the Epson control codes, I suspect that the program wants them in a form I never quite discovered. In this area and others, the manual does not offer an overwhelming number of examples. A few more would be appreciated.

Error-trapping appears to be restricted primarily to catching duplicate volume numbers and accepting commands with Input statements rather than Gets. In most cases, this is sufficient. The only major error a user can make is exiting the program before saving the master catalog. It would be nice if the Exit command automatically checked this or reminded the user of the importance of saving the master catalog.

Two small changes would improve MCAT substantially. First, the double-column listings would be easier to use if they were alphabetized as:

ALPHABET	BETA TEST
APPLE GUNNER	CARD SHARK
ARTICLE.DOC	DOGFIGHT

They are organized as:

ALPHABET	APPLE GUNNER
ARTICLE.DOC	BETA TEST
CARD SHARK	DOGFIGHT

It also would be very helpful if MCAT would allow selective deletion of unwanted filenames. It is a waste of disk space and printout to, for example, include 34 programs named Hello. This would also be useful in eliminating dummy filenames that certain programs—like MCAT—use to create a catalog header.

The problems MCAT has are of little consequence and do not detract from its utility. The program is fast and lets the user, for a reasonable fee ($24.95), make some sense of a large program collection. It is distributed by Highlands Computer Services, 14422 SE 132nd, Renton, WA 98055. If you have an overpowering urge to get organized, this one's for you. ■

Steven Schwartz
Pittsburgh, PA

Nibbles Away II

Nibbles Away II is one of the best software backup utility systems available today. This program is much more than just a copier. Let's take a brief look at what you can do with this program.

Nibbles Away II can make a copy of another disk even if it is copy protected. The mechanics of copying are simple. You load the Nibbles Away II disk, then insert your original disk in one drive and a blank in the second. (If you have only one drive, like most of us, you just shuffle the original and copy disks in and out of the drive in response to the appropriate prompts.)

Some programs may require changes in the Nibbles Away II internal parameters. There is a list of current parameter changes included with the NAII. If your program is not on the list, the program and the manual will allow you to get a line on the copy protection scheme used on a protected disk. You can modify any of the Nibbles Away II internal parameters to compensate for the protection and end up with an identical copy. The copied disk is still protected, and all the original identification, such as the serial number, is present. You have an identical copy of your original program. Now you can put your original(s) away safely and use the copy. To make NAII even easier

to use, you can save the parameter changes as a special file on a disk. If you have to make another copy, just load the parameters from the disk file; you don't have to type them in again.

The manual explains how to make backups and gives you a short tutorial about making necessary parameter modifications to copy a program. Since the publishers have a habit of introducing new protection schemes, the parameter lists are often out of date. Rather than forcing the NAII owner to figure out what parameters need to be changed, the publishers of NAII offer a newsletter that gives you updated parameters each month. The initial newsletter also comes with a disk that contains all current parameter changes. These parameter changes can be automatically loaded into the NAII program and the copy process is ready as usual. The newsletter also contains handy hints on how to make backups. The best feature of the newsletter, though, are the articles on using NAII as a utility program.

The utilities available on NAII are rarely mentioned. The speed/media test and the degaussing feature are handy. The speed media utility allows you to check disk drive speed (and adjust it if you feel brave) and test a disk for defects in the media itself. Degaussing is an extended method of erasing the disk to insure that it is devoid of information.

NAII also contains utilities that allow you to read and modify information anywhere on the disk. You can read any track or sector on the disk, edit the information, and then write the edited information back to the disk. The more experienced user can resurrect a blown disk, and the novice can become an expert on the disk and its storage methods.

There is a set of track editor utilities that allow you to search a disk for a particular string of information and then print it out. You have the ability to analyze the data and to move the data to a special buffer area and work on it. The analysis feature can also be used while in the edit mode, and there is a special utility function to look for added synchronization in the protection scheme. Another set of track/sector utilities allows you to read, edit or write in either DOS 3.2 or 3.3. You also have a disassembler available that can list any sector in assembly language.

The documentation is well done. The users manual is comprehensive. All the utilities are covered individually, and a beginners guide is included, as is an advanced section for the more knowledgeable user. The appendixes are also very handy; they include a decimal to hexadeci-

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mal conversion chart. The most valuable appendix is actually a tutorial that leads you through a set of parameter changes step-by-step.

The last feature I'll mention is the ability to take parameter changes from the other premier nibble copier and use them with NAII! This gives you a second source of information if a particular program isn't currently listed with NAII. The publishers of NAII have not tried to force their views of the copy controversy on the user. They publish all current parameters—regardless of the cost or backup policy of the publisher of the original program. You are warned, however, that the use of NAII is only for the archival backup of software.

NAII also comes with a backup disk that is received after you send in the warranty registration card. Oddly enough, NAII itself is copy protected, but that's another story!

In sum, NAII is both flexible and reasonably priced. The ease of use and backup ability make NAII one of the best software investments you can make. Price is $69.95 from Computer Applications, 13300 SW 108 Street Circle, Miami, FL 33186. ■

Peter Callamaras
New Carlisle, OH

Copy II Plus

How many times have you wanted an extra copy of your favorite software and couldn't get it? Neither the FID nor the COPYA Apple II/II Plus routines are able to back up copy protected software. With the Copy II Plus system, most of your valuable and fragile software programs can be copied for backup.

Don't worry about Copy II Plus being a fragile program. One of the first utility exercises calls for making a backup Copy II Plus disk. A list of some of the more popular programs that can be copied is included with the documentation and a more extensive list is mailed to registered owners.

Usually a neat trick has been employed on disks to prevent them from being copied. The most popular protection schemes use some method of changing the track address headers, the self sync fields, or the synchronization (positioning) of the data tacks themselves. Writing small amounts of data on the track boundaries, known as half-tracking, and adding an extra track, bit insertion, nibble counting, or track arcing are also popular methods of copy protection. For disks that use the track arcing protection scheme your drive speed is critical. Be sure to try the disk speed verification option if you have trouble copying one of these disks.

Some of the most difficult disks to copy use gang protection schemes that combine the methods previously listed. In the case of these disks, you may have to rely on a trial and error method to determine exactly which protection schemes are being used. It is common practice for two or three different schemes to be in use; they may vary from track to track, or at least from one group of tracks to another. There is a more systematic way to analyze which of the various protection schemes is in use on any given disk, but more on that later.

The real trick in successfully using the Copy II Plus bit copy routine lies in its 54 adjustable parameters. These parameters give the bit copy routine its flexibility and power. When attempting to back up a new disk, the default parameters are usually tried first. If this proves to be unsuccessful, several modifications of the bit copy routine parameters may be in order. During the course of modification and copying, you will get various error messages that indicate an improper choice of copy parameters. At this point, you will want to alter the parameter(s) that caused the error and try again. Also, you should be aware that it is possible to read and copy a disk, with no errors indicated, that won't function. This means that the disk has been read and written without any mechanical errors, but that one or more of the copy parameters doesn't provide an accurate analysis of the protection scheme. Unless an accurate analysis is obtained, the copy will not be written exactly as the original. Helpful hints and examples of exactly what to look for to identify the various protection schemes are included in Copy II Plus' documentation.

Copy II Plus also includes a nibble editor that can be very helpful for determining which type of protection scheme is being used. The nibble editor may be entered through the bit copy routine or through a special disk scan mode.

Learning to use this powerful tool is best accomplished by scanning and nibbling a disk of known content. This is the best way of learning the capabilities and the format of the nibble editor. Even if you ease into the nibble editor slowly, however, you should be aware of the complexity of the procedure. Not everyone will care to learn.

Copy II Plus' disk utility package allows you to manipulate DOS files and disks quickly and easily. Either DOS 3.2 or DOS 3.3 may be used and the program is completely menu driven. Any incorrect choice from the menu can be safely retracted by hitting the escape key. This will bring you back to the main menu for a retry, another option, or for exiting from Copy II Plus via a boot disk option.

Cataloging with a normal listing, file lengths, deleted files, and nonprinting characters such as control characters are some of the most useful capabilities of Copy II Plus. You can also copy or delete using the options of files, disks, and/or DOS. Don't worry if you have only one disk drive. Copy II Plus understands and will tell you when to switch disks. Of course, you can also lock/unlock files, rename files, and verify disks, files, identical files, and drive speed.

There is also a format option that works like the INIT command of DOS, except that no basic program is written and there is no DOS image placed on the disk. I have found this option to be especially useful, since my Apple occasionally refuses to obey an INIT command. The formatting and DOS copy routines of Copy II Plus have worked every time.

Other useful features include: a track/sector map that shows what

tracks/sectors are free or in use and by what programs, file viewing, file size fixing and boot change program. For those of us with a quick trigger finger, there is even an undelete option that allows deleted files to be recovered. However, the tracks and sectors used by the deleted files must not have been overwritten with new information from a different file. If even one track of the deleted file has been used to write new data, its's goodbye file!

Programs for booting a new disk and sector editing round out the utility options. Like the nibble editor, the sector editor is a powerful tool best used by experienced or dedicated programmers.

Copy II Plus requires an Apple II/II Plus with 48K of memory and at least one disk drive. Two disk drives are certainly recommended for reduced wear and tear on a single drive and on the disks themselves. Extra memory is also useful—but not mandatory—for speeding up data track reading and analysis subroutines. After you have worked into this program and feel more comfortable with it, a printer is useful for comparing the printed data tracks of the original disk with those of the copy. On a 40-column printout, the data from a single track will require about seven pages of paper. While this volume of information can be edited and analyzed on the monitor's screen, it's a lot easier with a hard copy and a pencil.

Copy II Plus is available from most software dealers or directly from Central Point Software Inc., PO Box 19730-203, Portland, OR 97219. For about the same price as many microcomputer game disks, $39.95, you can have a powerful utility manipulator and a sophisticated bit copier. Copy II Plus may well be one of the best software buys available today. ■

E.E.Brown
Vancouver, WA

Pig Pen

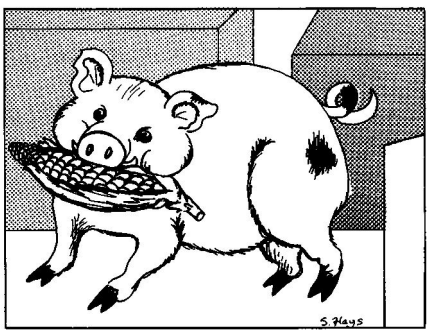
Watch out! The oinkers are on the loose. Better act quickly unless you enjoy being perforated by the pig's tusks. Not a very pleasant thought, is it?

What's coming down the corridor? A pig is heading your way; another one is coming at you from the opposite direction. Quickly, turn your joystick to the right. Think you're safe? Uh-uh. You forgot to look down the third corridor!

Pig Pen operates on Apple II, II Plus or Apple IIe computer. The game is similar to a famous dot-eating arcade game, but with a different twist. Instead of digesting the dots, you lay them down in the maze.

After you boot the disk, the main title is displayed on the screen. An option screen is shown next. This screen shows the score of previous games, as well as the current high score for Pig Pen.

You type in the number of pigs you want in the game. There can be from one to eight, and if you press the spacebar, you'll have the standard number of porkers, which is 4. Next, you're asked if you want to use a joystick or keyboard. If you pick the keyboard, you'll be asked what keys you want to use for moving up, down, left and right. I preferred using the keyboard for play in Pig Pen



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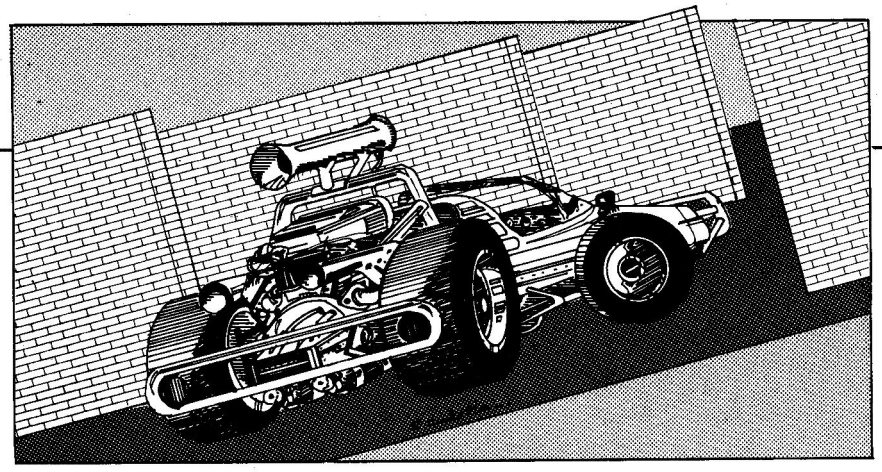

because it reacted faster than the joystick.

The screen changes from the option menu to the game itself. You see a maze of corridors in the middle of the game area, and the pigs enter the maze through a box. There are a bunch of dots flashing on and off. These dots must be laid down in the maze by your playing piece, which appears on the left side of the screen. You'll see a rather big dot with pointed sides, a potent pig pill, that is somewhat reminiscent of the power pills from another game. When your playing piece crosses over this pill, the pigs can then be destroyed by your on-screen representative.

The first pig you get rid of is worth 200 points. The second pig is worth 400, and all of the other ones are 800 points. Occasionally, an ear of corn, worth 1000 points, will show up in the middle of the playing area. A bonus playing piece is earned once you reach 10,000 points, which is no small task.

The escape key freezes the game. Any other keypress returns you to the game. If you play Pig Pen on the new Apple IIe, make sure you have the caps lock key pushed down when using the keyboard.

Pig Pen is made by Datamost, 9748 Cozycroft Ave., Chatsworth CA 91311 and is priced at $29.95. I liked this game. Now if I could only get my parents to buy it for me. I always wanted to see what it was like to "pig out". ■

Kirk H. Lesser
Hancock, NH

Death Race '82

This is a difficult game to classify. It's not really a shoot 'em up, an adventure, or an arcade game. The basic premise is that you've just escaped from a dungeon in the year 2082. You have to drive your turbocar through ten different road mazes loaded with killer robots in death squad cars to escape.

This 3.2/3.3 protected disk is full of surprises. The opening instructions are informative; they can be bypassed once you've played once or twice. After reading the instructions, you enter the game with the James Bond theme music. The theme sounds great on an amplifier, although it's a little fast on the tempo and loses something on the Apple speaker.

The road mazes require quite a bit of practice and manual dexterity with the paddles or joystick. Don Fudge, the creator of the game, obviously anticipated this and allows you to start off at speed levels 1 through 10. Trust me! Start off at level 1. After you master the feel of the car, you can change speeds during play, using the number keys like a 10-speed manual gearbox. I'd need six more arms, like an octopus, to accomplish this feat. My son does it quite easily though.

The death squad cars emerge from hiding when their audio sensors detect you passing by. Unfeeling, uncaring robots are ready to blow you apart. Your turbocar is not entirely helpless though. You have two defense mechanisms. I say "defense" because your bazooka is rear-mounted on your car and can't be rotated. That means, my friends, you have to put yourself directly in line with the robot's forward-firing laser. And everyone knows that lasers are faster than bazookas. It's like playing Russian roulette with an automatic. You can get around this by leading your shots, like in duck hunting. Watch him drive into your bazooka shell and boom!

Your other defense is the oil slick thrower. Be careful how you expend it. You only have enough for 20 squirts. When your pursuers hit this they go off in all directions and explode. More points for the good guys. Luckily, your turbocar has special tires and defense against oil splash-back.

But those nasties have another trick up their sleeves: Their lasers can shoot through walls, while your bazooka shells can't. But Don Fudge must be clairvoyant. He allowed your turbocar the chance to ram through walls. My son did this to bull his way through all ten mazes, making shortcuts of his own. He also used this technique to come up behind the baddies and ram them, causing them to lose control, spin out and crash.

My only complaint about this game is that after blasting your way through ten different road mazes, you're really hyper and expect some kind of reward. But... there is no saving of high score to disk, no sense of recognition or achievement. Granted, you're not dead, but not even a smile, a simple fanfare?

The best compliment for this game is that my wife, the Lady Arlene, who hates shoot 'em ups, became very absorbed in it. She commented that it "isn't a shoot 'em up... well, not really." My comment exactly.

This game, adventure, shoot 'em up or whatever, is by Avant-Garde Creations, Box 30160, Eugene, OR 97403 for the low price of $29.95. Definitely worth looking at. ■

George M. Engel
Seymour, CT

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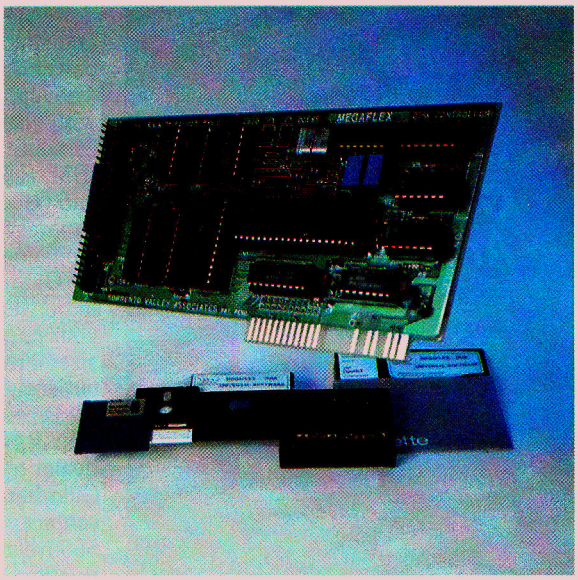

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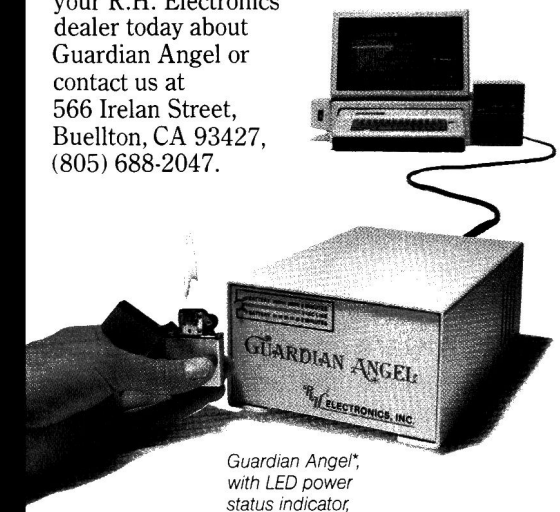

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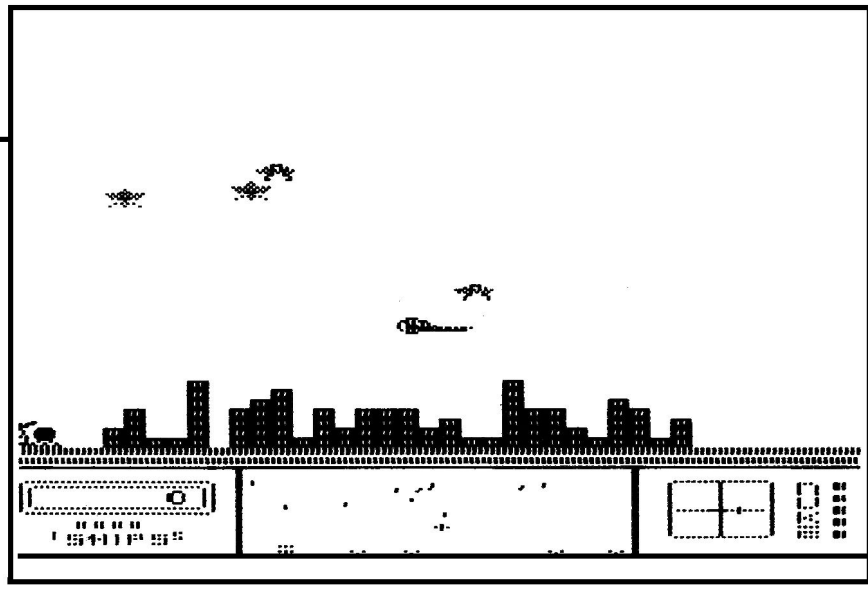


with your advanced model Armageddon spacecraft. Your armory includes five nuclear bombs, a shield, and a unlimited supply of missile fire. Enemies will be attacking you from all directions. Your mission is to destroy them before they complete the bomb. Points are earned through the destruction of the enemy craft, both above and below ground.

In the middle of the screen will be a spacecraft, surrounded by enemy ships—Nova Cruisers, Spyes, Drayns and Dynes. Drayns make light beams that drain the energy level of the planet. If you fly through their light beams, you recapture lost energy. The Nova Cruisers, when shot, turn into four small but deadly ships. Dynes also shoot laser beams to destroy you if you fly through their paths. Collision with any of these enemy ships destroy your spacecraft.

SAM-type missiles fly up from the enemy base whenever you cruise over it. They are easy enough to avoid as long as you fly fast and high enough.

The shield, one of your highest technological advances, allows you to ignore enemy spacecraft, but prevents you from shooting and moving.

The nuclear bombs you carry destroy everything that's on the radar screen at that particular time. They are best saved for a multitude of otherwise uncontrollable attacking aliens.

While you are flying through the air, the enemy will be building their base and stealing power from your city. This base is actually the Armageddon Bomb that will destroy everything on the ground, sending it to a lower level. The game is not over yet—you still have a chance before you meet the death rays.

A joystick is almost a necessity though the keyboard still provides a satisfactory game. The sound is continuous throughout the game, but can be turned off for late-night addicts. The graphics are top quality, even on a green screen. In advanced levels the enemy armada is eliminated, which means that more and harder-to-shoot enemy craft try to complete their base. It takes practice to gain an extra ship and nuclear bomb every 5000 points. A nice feature is the use of the escape key for a pause, in case the phone rings.

Repton is geared more to kids than adults, although any arcade addict will enjoy it. It is available from Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. Price is $39.95. ■

Adrian Hoffman
Ashland, MA

Grapple

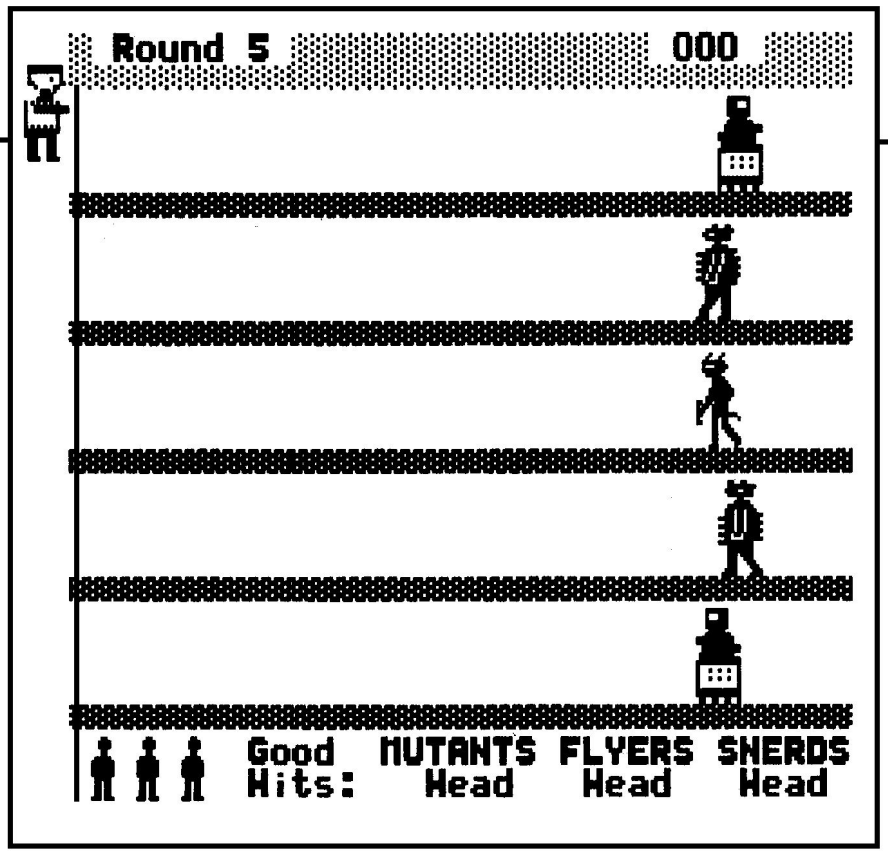
Take a dash of Paul Lutus' Electric Duet, a heaping tablespoonful of GraForth, a squeeze of color, and a lot of berserk enjoyment—shake them all together and you've got Grapple, a new arcade from Insoft, 10175 S.W. Barbur Blvd., Suite 202B, Portland, OR 97219. "Not another arcade game," you moan to yourself. "That's all I need. Give it half an hour and I'm bored to tears."

Perhaps with some arcade games this statement might ring true. But certainly not with Grapple. Just look at the game's format. You are a prison warden of sorts and have been assigned the meanest, the most secure extraterrestrial lockup ever constructed. You're stationed on the planet Squelchem. Mutants beyond your wildest nightmares are sent to this prison for permanent incarceration. It's your duty to ensure that these reprobates will never again inflict their presence upon the universe. This is managed through the use of four android guards, known as Alpha, Beta, Gamma and Clyde (your only reserve officer).

Well, wouldn't you know it? There's a jailbreak, Just like in a good old grade B movie. But this time it isn't James Cagney or Raymond Burr running amok among the populace. Oh no! On this occasion you've got Deviloids, Robotesques and Horrible Hoppers to neutralize. And the two local life forms, Flippant Flyers and Sneaky Snerds, also are part of the jailbreak. You've got yourself more than can be handled. Seems the jailbirds have trained the local population to be more than just friends; they actually relish helping the prisoners in their attempt at freedom.

Your guards are armed with stun guns. Only one guard is on duty at a time. The prison itself is designed in layers, like a cake, with a total of five floors. A stone floor separates each level. The right side of the screen shows the prisoners secure behind their bars. The left side of the screen reveals your guard on duty. All is quiet. . . at first. Suddenly, a raucous blare fills the Apple speaker, and the bars on the right side of the screen disappear. The reprobates are free!

The guard's duty is to halt all escapees. This is accomplished by aiming the stun gun at the fleeing prisoners and firing enough shots to force the jailbirds backwards until they are forced to the right end of their floor. The prisoner then tumbles backwards over the edge and falls to an excruciating end. The stun gun does not kill, but merely knocks the mu-



tants backwards a few steps. The poor guard has more than just one escapee to worry about, though. So, the guards must move up and down floors, firing at the advancing prisoners.

A slight problem arises as the game progresses. For each wave that advances upon the guard, the effectiveness of the stun gun decreases. As the game wears on, several stun gun shots may be needed to force a prisoner back just a few inches.

Fortunately, Flippant Flyers and Sneaky Snerds may be cut down with a single shot from the guard's stun gun, but their disappearance from a specific prison floor won't bring too much happiness. No sooner is one done away with than another takes its place. And the natives are a darned sight quicker than the fleeing prisoners. You'll be concentrating on one Deviloid, glance away at the floor two stories higher, and then see the Sneaky Snerd which had just started to enter the floor suddenly about to turn your guard into cracked crab salad. All the enemy has to do is reach the wall on the left side of the screen—the wall that separates the guards from the prisoner—and the barrier is destroyed. This causes a fatal change in pressure for the guard, who disintegrates right before your eyes.

Each level gets progessively harder. Mode of play is selected from an option menu presented at the start of each game. You can choose to use the keyboard or joystick, decide whether you wish to play an (E)asy, (A)verage or (H)ard game, designate what level you'd like to begin play at, and decide whether or not you want sound while playing. Keyboard play is accomplished by using the A and Z keys for up and down and the spacebar for firing the guard's stun gun. If you select Easy play and manage to survive through round 8, the play mode automatically advances to Average.

In order to progress through the levels, your guards must eliminate all escapees and natives that fill your screen. Their values differ, depending upon the round being played. One hundred points are awarded for each elimination during rounds 1, 2 and 3; and 2000 points are awarded in rounds 10 and above. I have yet to find out how nice it is to receive 2000 points for a kill.

Three Flippant Flyers will appear each round after round 5. Because they're so easy to kill, they're only worth half as much as a prisoner. But just because they lack the point value doesn't mean you can afford to ignore them. They will nip you in the bud if you don't take care of them. Also, during the first four rounds of play, you can score a hit with a stun gun by hitting the escapees in either the head or body. Not so after round 5—only head shots count, so the guards' aim had best be true!

The extra man is sent into the game only after you've scored 20,000 points. Needless to say, I've never met my extra guard. The escape key halts and continues game play, and control-R allows you to restart the game at any point. Insoft's policy of providing a duplicate program for all copy protected disks holds true with Grappler. The backup version is on the back of the game disk.

I became frustrated sometimes when I fired at an escapee on one level, then moved my guard to a lower level to prevent another shiftless psycho from gaining the wall. The escapee's body had to fall over the edge of the floor and disappear into the nebulous pit below the screen before my keypresses had and effect on the guard's movement or firing.

Grapple is highly enjoyable, with sound and graphics brought to you by GraForth. When you consider that a backup copy is included with the price of the game ($29.95), it's a fine buy for any armchair warden. ■

Hartley G. Lesser
***inCider* staff**

Sea Dragon

The goal in Sea Dragon is to pilot your submarine to the end of a fortified, undersea tunnel and free a sea dragon without shooting him. There are mines, electric eels, a laser-shooting base or two and force fields in your way. No one said it was going to be easy! Luckily, you have a choice of controls: joystick, keyboard or joyport.

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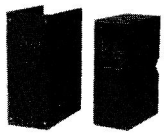

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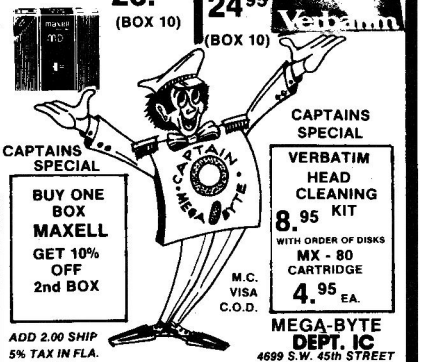

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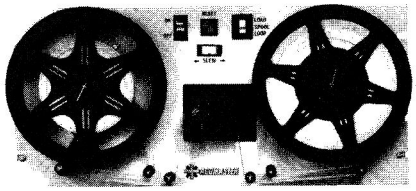

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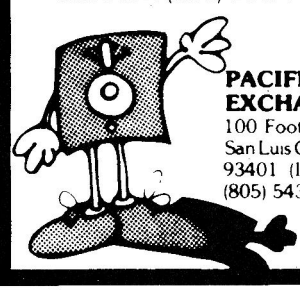

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tion, hit the control selection key and you'll hear the message, "Okay, Captain, the ship's computer is now ready. Please wait while I initialize the system." The main program is then loaded into memory. A beautiful human touch, isn't it?

You start out with an unlimited supply of torpedoes. Button 1 fires the torpedoes and Button 2 fires a sonic deflector. When you hit the latter, all the nasty things explode. But every time you hit the deflectory button, you use up 500 units of air supply. You start out with only 6000 units of air, so every shot is expensive—especially when you have a long way to go.

If you're lucky and free the dragon, you'll automatically get a refill of air for the long trip back.

A good feature of the game is that you don't die immediately after getting hit. You can take 100 percent damage on your submarine before the game ends. For every wall, mine, or laser hit you are assessed damage points. When you reach a critical point, or certain check points, you'll be notified. Verbally!

As you play a real-time map is displayed in the upper portion of the screen. It shows your location at all times during the game. Don't be upset if you don't appear to move in the early part of the game. As I told you before, it's a *long* trip to reach the dragon on the far right side of the map.

The only problem with this game is that it can't be saved at intervals during the trip. Once you start, be prepared to finish. At this time, Sea Dragon is my favorite sea arcade shoot 'em up game, pulling ahead of Seafox. The colors are rich, the explosions are good, and the talkies are different. Sea Dragon is produced by Adventure International, Box 3435, Longwood, FL 32750. It is a fine value for $34.95. ■

George Engel
Pittsburgh, PA

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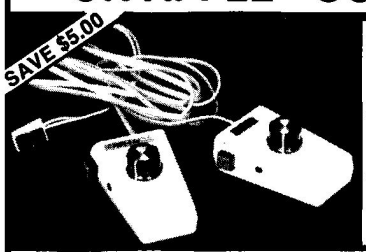

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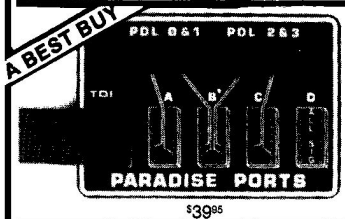

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Book Reviews

How to Repair the Apple

Data-Line
2961 S. Las Palmas
Mesa, AZ 85202

$39.95

I am an average computerist with two years experience with the Apple. After reading the ad for *How to Repair the Apple*, I wondered if someone had finally taken all the technical material from the *Reference Manual* and put it into logical order. With a rather high price tag of $39.95, it must be a necessary book to buy—I thought. But I was wrong!

How to Repair the Apple Computer consists of 56 numbered pages (8½ by 5½ inches) of which four are blank, two list names and addresses of recommended magazines, one lists names and addresses of a few recommended mail order firms, one is an introduction, one is a table of contents, and another is a disclaimer of warranty and liability. Chapter 7 (three pages) appears to be an advertisement for Data-Line, as it lists their charges for fixing your computer and instructions for mailing to them.

The introduction explains why software is not provided. Their reasoning is that if your computer is not functioning, you cannot load software. If this is the case, I don't know why I bought Nukrom's Brain Surgeon (a diagnostic package for the Apple computer) that provides many valuable maintenance tests.

Chapter 2 guides you step by step from a powered-up computer to a dismantled one and then to reassembly again. This is comprehensive as claimed in their ad. However, I cannot imagine anyone not being able to unplug their computer, lift the cover, and unscrew the bottom and back screws. But, this book has just set you back $39.95!

There is a troubleshooting chart in Chapter 4 that lists 17 problems and associated integrated circuits (ICs) to be replaced if that particular problem should occur. I was provided with similar information, without charge, by an Apple dealer.

If you tremble at the thought of replacing an IC in your computer, then perhaps this guide will provide encouragement. If your problem is one of the 17 listed and you successfully replace the IC(s), then the labor charges saved might justify the cost of the guide. That's your decision. I've made two long distance calls to Data-Line to see if they provide refunds. Although their answering service said they would return my call, I've heard nothing from them.

Another two pages list the IC chips that are on the motherboard, their locations and price range. This list is invaluable for IC replacement. However, the same information (without prices) is readily available in your *Reference Manual*, or just look on the motherboard where the IC numbers are printed.

Perhaps the title is misleading. A better title might be *Replacing IC(s) in Your Computer to Save Money*. In my opinion, for the effort and uniqueness, I wouldn't mind paying $5.95. It's yours now for $39.95 from Data-Line. ■

Louis Wilson
Limestone, ME

Apple BASIC: Data File Programming

Leroy Finkel and Jerald R. Brown

John Wiley & Sons Inc. 1982
New York, NY
$12.95

Thank you Messrs. Finkel and Brown. Your book, *Apple BASIC: Data File Programming*, helped me so much that I am recommending it to others. It's a good book from two perspectives. It is both an excellent self-teaching guide and a good example of how to write self-teaching books. This is one of the very few times that I, an instructional developer by profession, have benefited from the efforts of others to produce good, self-teaching instructional material.

I had resigned myself to learning to program data files just as I learned to write fileless Basic programs—studying programs in books and magazines and on unprotected disks, and talking to people who could already program. The learning process was slow and inefficient. Knowing nothing about computers, or good programming practices, or writing programs, made trying to piece unrelated bits of information together tiresomely slow.

File handling seemed especially complex, so I made do with data statements. Eventually, self-respect demanded that I learn to program data files. Nothing to do, I feared, except plod through the same process of self-teaching from diverse sources. Then by happenstance, I saw a copy of *Apple BASIC: Data File Programming* in my computer store. The book's preface promised to teach me to write data file programs for my Apple, providing I could already write simple Basic programs. Rather skeptical, I bought the book because it seemed to have a large number of program listings. I figured I could at least learn something from these examples.

Well, I did learn from them, but mostly I learned by following the well-designed sequence of instruction in the book. The Finkel and Brown book is also remarkably free of the errors that so often lead beginners astray. You know the kind—missing program lines, switched variable names and so on. The few errors I did find caused me little difficulty.

Instructional Method

Each chapter begins with concise statements, or performance objectives, telling you what you will be able to do by the end of the chapter. This is a particularly good practice in self-instructional texts. The feeling that you really will be able to do something specific by the end of the chapter makes it easier to stick to the work of learning—and you must work.

Instruction is presented in small steps, starting with tasks performed over and over in writing any data file program. Each step builds on previous ones and is, in turn, incorporated into succeeding steps. Anyone conscientiously working

through the book gets lots of practice programming the routine parts of most data file programs.

Equally important, concrete examples are used freely throughout the book. These help make the instruction clear. Later, these examples serve as handy models to follow in writing our own programs.

Questions interspersed throughout each chapter help you recall and review information recently presented.. Answers immediately follow the questions. Often, the authors explain why a particular answer is the correct one. Furthermore, answers are provided for *all* the self-test exercises at each chapter's end. I think this feature is a must in this type of self-instructional material. After all, many of us teaching ourselves to program have no one to turn to for help if the solution to an exercise eludes us. If the answers are provided, we can learn from them.

Content

Chapter 1 covers top-to-bottom programming and modular program design. A handy review of Basic follows in chapter 2. Chapter 3 introduces techniques for programming data files, focusing on writing data entry routines that incorporate good error-checking routines. Chapters 4 and 5 discuss creating and editing sequential files, as well as writing utility programs to copy, merge and otherwise manipulate these files. Chapters 6 and 7 cover random access files. A final self-test (again with the answer) allows you to pull together material learned throughout the book.

Appendix A lists the ASCII Character Codes. Appendix B not only lists the file programs from the book, it even briefly describes each program, specifies the file type, and names the variables. Thus Appendix B is a handy reference, making it easy to find programs and program parts you want to use as patterns.

You can buy a disk containing the programs used in the book. I did not, nor have I examined it. Typing the programs in myself was not exactly fun. I do, however, feel that I learned a lot this way because of having to pay attention to details while entering the programs.

After working my way through this book, I designed and am writing a data file program. Sure, I have to refer back to the book over and over. After all, it is my first file program. It is also the first modular program I have ever designed. Perhaps I will find errors in the book as my data file program gets larger. Even if so, the fact will remain that before followng the instruction in this book, I had little idea as to how to write data file programs. Now I do. Once again, thank you Messers Finkel and Brown.

Barbara M. Florini
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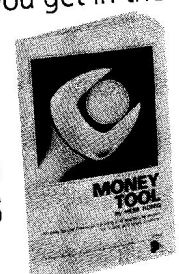

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National Computer Shows
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June 6–8
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(301) 589-8142

June 11–12
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June 13–15
16th Annual Association of Small Computer Users in Education (ASCUE) Conference
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Department of Information Science
Taylor University
Upland, IN 46989
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June 19–22
12th Annual Computer Elements Workshop
Vail, CO
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Corona Del Mar, CA 92625
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June 26–29
Design Automation Conference
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June 20–July 15
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July 10–11
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July 25–28
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SoftFair
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Silver Spring, MD 20901
(301) 589-3386

Cider Vinegar

Downgrade Your Apple, February

There was an inaccuracy in my article "Downgrade Your Apple" that I did not mean to imply or convey. Shortly after the article appeared, I received a letter from J. Morton Stong, President of MPC, the company whose 32K Memory Card I had purchased and used as part of the article. Without quoting the article, I implied that when an F8 ROM was plugged into the card, it did not work. Mr. Stong reminded me that the instructions clearly state that a 2716 EPROM is required and that a standard ROM will not work.

I apologize for this error and want to say that I have been extremely satisfied with the MPC 32K board. As it has turned out, I did get a 2716 EPROM with the old monitor ROM burned into it. It all works. In fact, I recently saw an advertisement for an MPC Memory Utility for the 32K card that would allow both DOS and Integer to be relocated onto the 32K card and remain active at the same time! This had not been available when I bought my card two years ago. I called MPC and asked how I might obtain this wonder of memory management. Instead of the typical, "Send us $25 because you bought the card before this software was offered," I was treated to, "Give us your name and address and we will be happy to send it to you at *no charge*."

MPC manufactures a quality product that does exactly what it is advertised to do. The MPC 32K board is a reasonable way to expand memory and provide for a different monitor routine for the truly adventurous. In addition, they continue to support their customers.

David T. Shaffer
4124 Ridgeview Road
Harrisburg, PA 17112

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If you are organizing, or otherwise know of, an event important to Apple users, and would like it listed in the **inCider** *Calendar, please drop us a line at Pine Street, Peterborough, NH 03458. Include the name of the event, the date, the location, and the name of a contact for further information.*

—the editors

Super Stereo, January

An errant copyright bug crept into lines 320, 340 and 350 of the program listing on page 41 of my article "Super Stereo." The copyright bug should actually be a superscript symbol, ^, because it's indicating the squaring of the associated variable. For example, in line 320 where it shows S1=R1©2, what it really means is S1 equals R1 squared (S1=R1^2).

Phil Roybal
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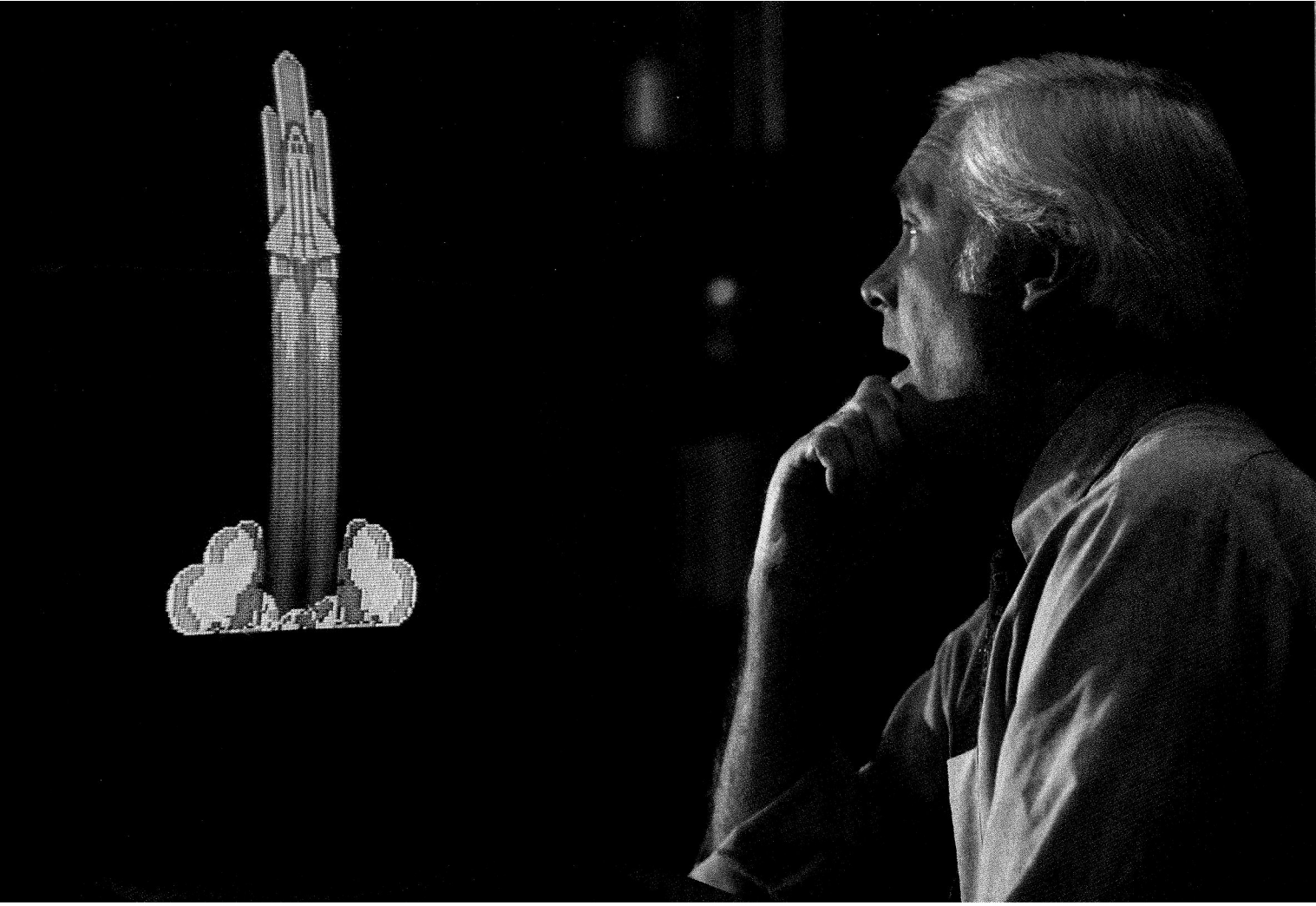

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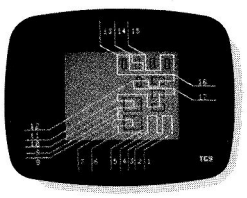

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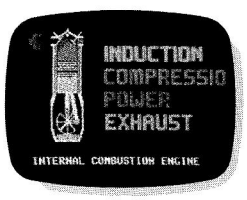

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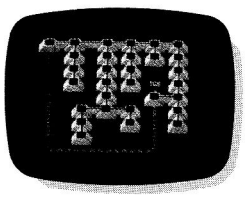

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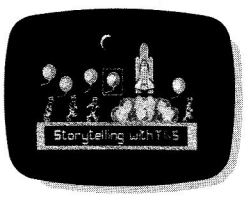


The Graphic Solution requires a 48K Apple II with ROM Applesoft and DOS 3.3.

See your local dealer or send $10.00 for a demonstration diskette to:

ACCENT SOFTWARE, INC.

3750 Wright Place, Palo Alto, Calif. 94306 Telephone 415-856-6505

Circle 251 on Reader Service card.

Apple is a registered trademark of Apple Computer, Inc.

commodities. Tycoon also includes a built-in program generator that allows the user to create new scenarios of the simulation. Price is $79.95. Reader Service number 444.

Basic Tutor

Supersoft Inc., 1713 S. Neil St., Box 1628, Champaign, IL 61820, offers Basic Tutor, a self-instructional course that teaches the user to program in Basic. Basic Tutor contains graphics illustrations, summaries and a printed manual. Price is $99. Reader Service number 440.

Quik-Vis

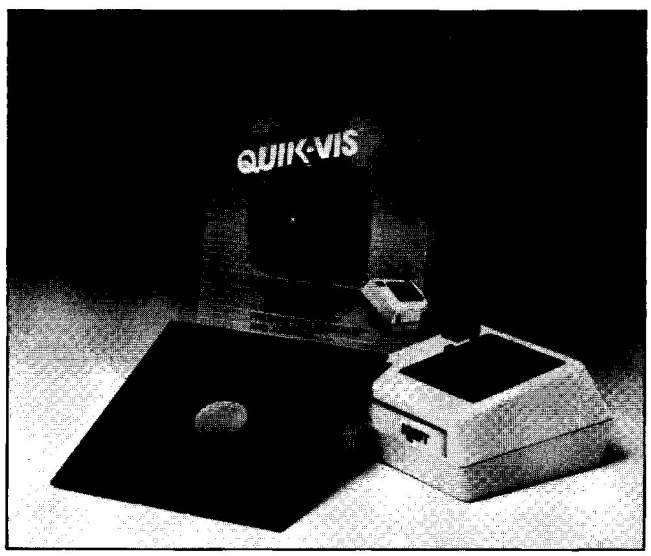
Quik-Vis, a quick-revision subroutine that adds joystick control to VisiCalc, is offered by Kraft Systems Company, 450 W. California Ave., Vista, CA 92083.

When prebooted prior to the Apple version of VisiCalc, Quik-Vis allows the user to move the cursor anywhere on the spreadsheet by means of a joystick. Four to six separate procedures required to move the cursor with the standard Apple keyboard are eliminated. The cursor movement provided by Quik-Vis saves time when updating entries, reviewing spreadsheets and adjusting data. Price is $22.95. Reader Service number 441.

Market Analyst

Market Analyst, a software package for the stock market investor, features three major sections—Technical Analyst, Portfolio Manager, and News, Views, and Quotes.

Technical Analyst charts high-low-close bar charts and volume histograms and calculates and charts such technical studies as on-balance volume, accumulation/distribution, volume indicators, moving averages and oscillators. Portfolio Manager keeps track of multiple portfolios, making the holdings available for current gain/loss evaluations, yield evaluations, short term flags and market appraisals. News, Views, and Quotes is a teleprocessing section that provides access to database services. Price is $395. Contact Anidata, 613 Jaeger Court, Sicklerville, N.J. 08081. Reader Service number 447.



Quik-Vis from Kraft Systems Company.

Knowledge Master

Knowledge Master is a series of programs that contains over 18,000 questions in American and world history, government, literature, the earth and physical sciences, math, mythology, geography and the language arts. Individual disks contain 400 questions and cost $27. Contact Academic Hallmarks, Box 998, Durango, CO 81301. Reader Service number 448.

VIS/Bridge/DJ

Solutions Inc., Box 989, Montpelier, VT 05602, offers VIS/Bridge/DJ, a software program that downloads data from the Dow Jones Retrieval directly into a VisiCalc spreadsheet. Information from Dow Jones can be analyzed with the power of VisiCalc without a manual entry of data. Price is $445. Reader Service number 449.

Health-Aide

A new nutrition and diet analysis program, Health-Aide, is offered by Knossos Inc., 422 Redwood Ave., Corte Madera, CA 94925.

Health-Aide helps plan meals and keeps track of daily, monthly and yearly consumption. Thirty-three nutrient values for over 300 foods are stored. The user may set up his/her own nutrient requirements. The recommended RDA is automatically computed and may then be modified. Monthly and yearly graphs may be plotted, all nutrient totals and personal values are saved on disk. An average daily intake of each nutrient is also calculated. Health-Aide runs on the Apple II and III. Price is $79.95. Reader Service number 452.

Step by Step

Step by Step Two is a program that teaches Apple II users intermediate programming in Basic. It includes voice narration, quizzes, practice problems and a workbook. Subjects covered in the program include default values, bits and bytes, string arrays, memory maps, binary numbers and hi-res graphics. Price is $89.95. Contact Program Design Inc., 95 Putman Ave., Greenwich, CT 06830. Reader Service number 453.

SmarTelex

SmarTelex, a software program that runs on CP/M, allows your Apple to communicate with telex terminals around the world. SmarTelex uses a word processor for message creation, editing, deletion and printing. Messages received and stored by smarTelex can be edited, printed and then forwarded. Price is $449.95. Contact Cappcomm Software Inc., One World Trade Center, Suite 1043, New York, NY 10048. Reader Service number 450.

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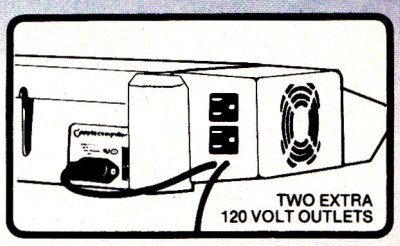
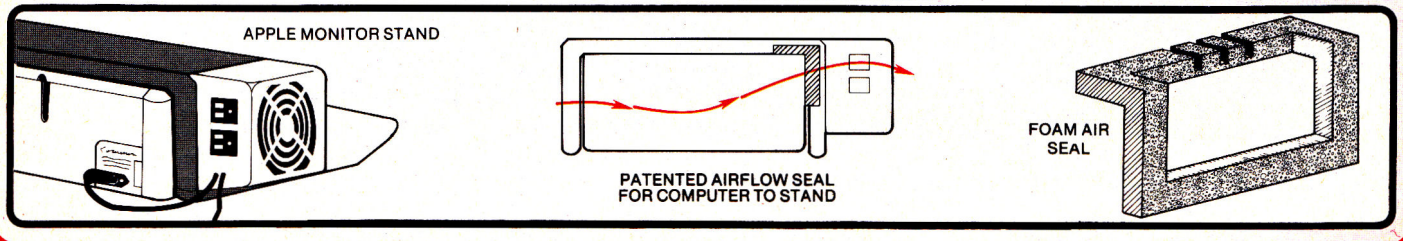




New Products

edited by Tom Woods

Ace 1100

Franklin Computer Corporation, 2138 Route 38, Cherry Hill, NJ 08002, offers the Ace 1100, an add-on disk drive assembly for the Ace 1000 personal computer.

Offered with a controller and one or two drives, the new unit replaces the cover of the Ace 1000. The controller may be used with both DOS 3.2 and DOS 3.3 and includes a built-in disk drive exerciser. The Ace 1100 is Apple II compatible. The single drive Ace 1100 is $699 and the two drive unit is $1098. Reader Service number 462.

Work Center

Valley Craft, South Highway 61, Lake City, MI 55041, offers a microcomputer work center. The upper shelf is positioned to place the monitor in optimum viewing position; the lower shelf holds manuals and is slotted to accommodate dividers. The disk drive rack keeps drives out of the way but accessible. Price is $189.95. Reader Service number 465.

Microline 92

The Microline 92 is a new dot matrix printer that provides multispeed print modes: bidirectional data processing printing jobs are completed at 160 cps; emphasized and enhanced mode printing is completed at 80 cps; and high-resolution correspondence quality printing is completed at 40 cps.

The ML 92 prints up to 136 columns with condensed characters and also offers dot addressable graphics and an alternate downline loadable 96-character set that allows users to create their own characters and symbols. Contact Okidata Corporation, 11 Gaither Drive, Mt. Laurel, NJ 08054. Price is $699. Reader Service number 469.

TSK Monitor

TSK Electronics Corporation, 18005 Cortney Court, City of Industry, CA 91748, offers a new 12-inch amber monochrome monitor, the model KG-12NUY. The KG-12NUY features 800 lines at center, 18 MHz bandwidth and a glareproof screen. Price is $179. Reader Service number 473.

VisiCalc Worksheets

A new book published by dilithium Press, *32 VisiCalc Worksheets*, is a compilation of 32 home, game, and business and statistical applications that can be used with VisiCalc.

Programs described in the book include: Accounts Receivable, Monthly Rental Income, Balance Sheet and Net Worth, Checkbook Balancer, Calorie Charts, Energy Use in Heating, Teacher's Gradebook, Bowling Scores and Fruit Canning Aid. Price is $19.95. It is sold in local book stores or contact dilithium Press, 11000 SW 11th St., Suite E, Beaverton, OR 97005. Reader Service number 471.

Omnilink 1200

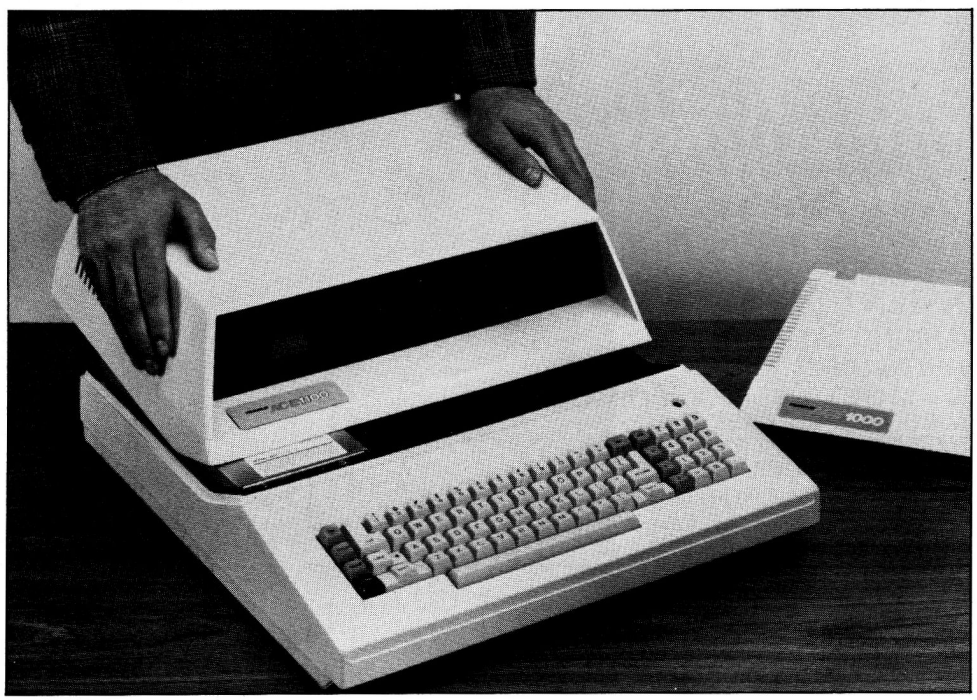
The Omnilink 1200 communications package consists of an Omnitec 300/1200 baud full duplex modem, a telecommunications card and Softlink software. The package turns the Apple II, II Plus or IIe into a high speed intelligent terminal.

The package communicates at either 300 or 1200 baud and operates in full duplex asynchronous serial format that is compatible with all packet switching networks and regular telephone lines. Contact Texas Microdata Systems Inc., 1414 Texas Building, Seventh St. at Houston Ave., Fort Worth, TX 76102. Price is $775. Reader Service number 474.

Learn CP/M

How to Operate Your Computer Under CP/M is a six-hour audio cassette course that guides the learner through the most common CP/M commands.

Commands for formatting and copying disks, copying and erasing indi-



The Ace 1100 from Franklin Computer Corporation is an add-on disk drive assembly.

Disk Storage Needn't Double The Cost Of Your Apple III*™



Expanding disk storage on your Apple III*™ can be an expensive proposition.

But Micro-Sci has a better proposition for you, because our disk drives for the Apple III give you greater capacity and performance for every dollar spent.

And no compatibility problems. The A3 is a direct replacement for Disk III drives, and the 70-track A73 and 140-track A143 are supplied with a driver that is easily added to the SOS driver module, affording extra storage and fast seek rates for all of the programs that run under that operating system.

All three are the same 5¼" size as your built-in drive and use the same diskettes.

They also use your Apple III's controller and power, saving an expansion slot and no AC power cord. And they can be mixed in any combination on the daisy-chain. At 572 KBytes, the A143 makes a truly viable backup device for the ProFile Hard Disk.



At 286 KBytes, the A73 gives you a lot more capacity than a Disk III drive.

The A3 offers identical capacity — and is an excellent choice for second drive compatibility in the Apple II emulation mode.

So see your Micro-Sci dealer today.

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Circle 220 on Reader Service card.

What's eating your Apple®?

Find out with Apple-Cillin II™

If you use your Apple for your business or profession, you probably rely on it to save you time and money. You can't afford to guess whether it is working properly or not. Now you don't have to guess. Now you can find out with Apple-Cillin II.

Apple-Cillin II is the comprehensive diagnostic system developed by XPS to check the performance of your Apple II computer system. Apple-Cillin II contains 21 menu driven utilities including tests for RAM memory, ROM memory, Language Cards, Memory Cards, DISK system, Drive Speed, Keyboard, Printer, CPU, Peripherals, Tape Ports, Monitors and more. These tests will thoroughly test the operation of your Apple, and either identify a specific problem area or give your system a clean bill of health. You can even log the test results to your printer for a permanent record.

Apple-Cillin II works with any 48K Apple system equipped with one or more disk drives.

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The Tasman Turtle robot interfaced to an Apple II.

The Tasman Turtle

The Tasman Turtle, a programmable robot, is offered by Flexible Systems of Hobart, Australia. Tasman Turtle can move and turn, toot its horn, blink its eyes, draw with a pen and "feel" with touch sensors. The robot also helps users develop computer awareness and basic programming concepts, draw geometric designs and learn elements of mathematics and artificial intelligence.

Flexible Systems also offers a talking turtle robot that comes with a vocabulary of 150 words, expandable to over 600 words. Other optional features include an electric compass, which as the robot moves, indicates its directional change. Prices begin at $999.95. The Tasman Turtles are marketed in North America by Harvard Associates Inc., 260 Beacon St., Somerville, MA 02143. Reader Service number 466.

vidual files, creating and editing documents and using batch processing to run a series of application programs are included in the course. The course also includes an operator's guide that lists the special CP/M characteristics of 25 popular computer brands, including Apple. Contact Fliptrack Learning Systems, 526 N. Main St., Box 711, Glen Ellyn, IL 60137. Price is $49.95. Reader Service number 467.

Clock Card

A new dat•a•clock multi-function card is offered by P & B Research Consultants, 231 East Grand Blvd., Detroit, MI 48207.

The clock card has date, month and year capabilities, and its onboard memory has a 2 to 3-year life. Price is $85 (assembled) or $55 (in kit form). Reader Service number 478.

MicroSpooler

Compulink Corporation, 1840 Industrial Circle, Longmont, CO 80501, offers the MicroSpooler buffer. MicroSpooler holds information until a printer

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Introducing SooperSpooler's™ Little Brother

Who knows spoolers better than Consolink?* We pioneered this industry with our revolutionary SooperSpooler, the Intelligent Printer Interface.

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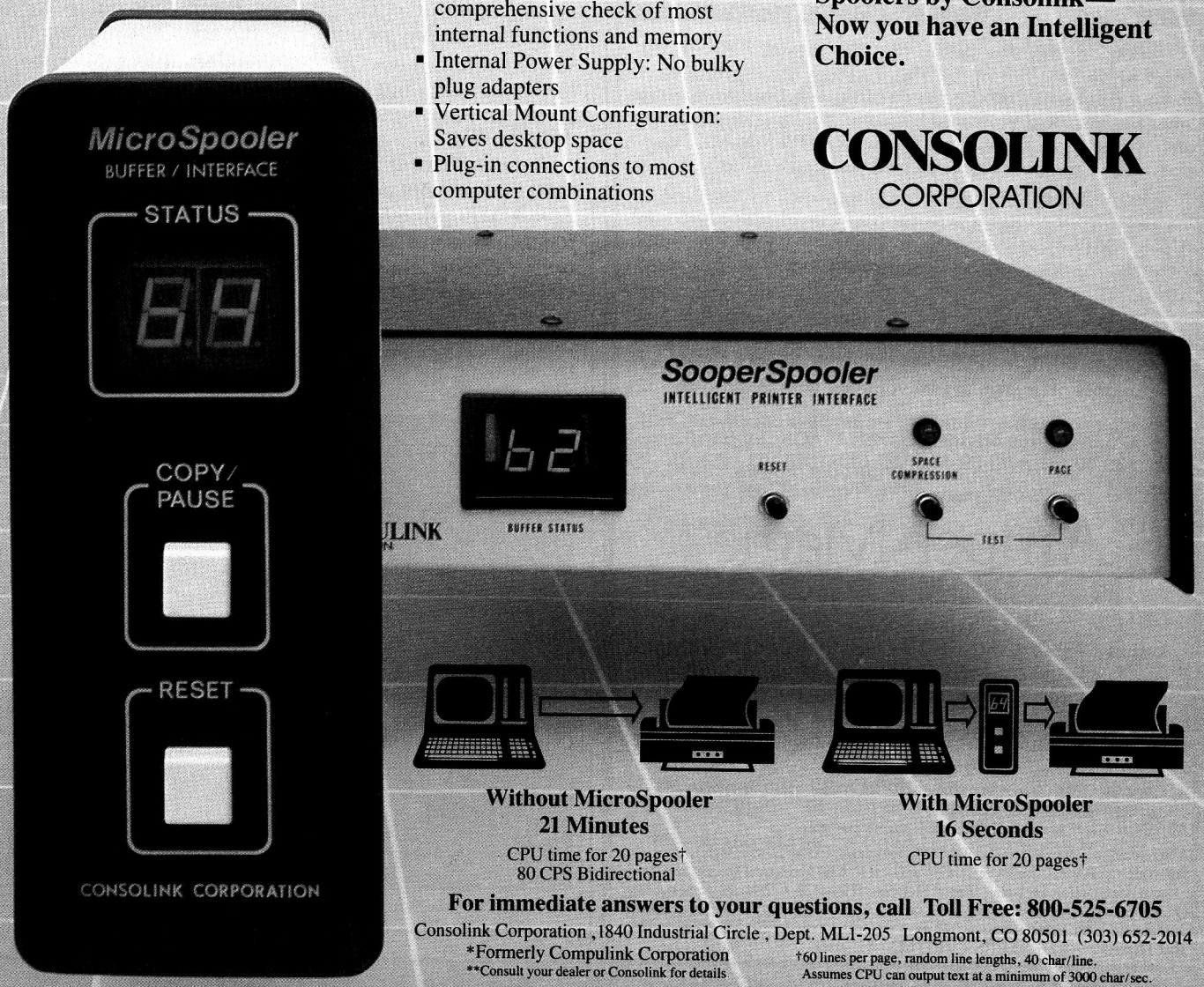

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21 Minutes
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†60 lines per page, random line lengths, 40 char/line. Assumes CPU can output text at a minimum of 3000 char/sec.

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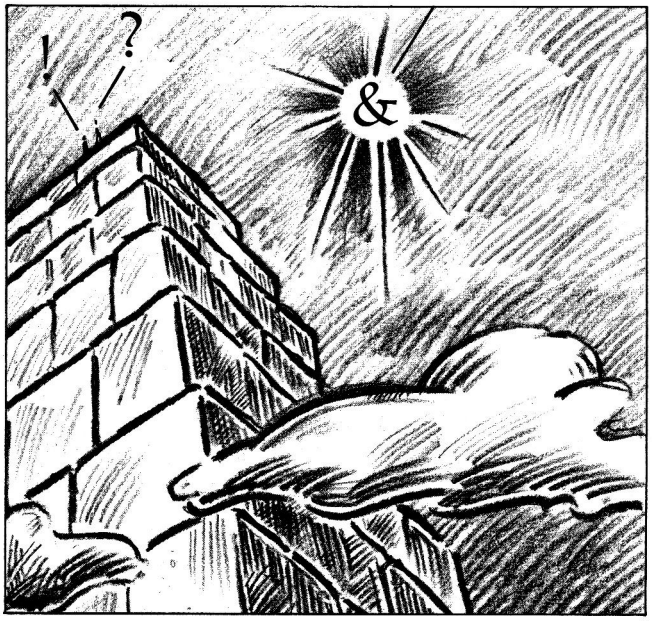

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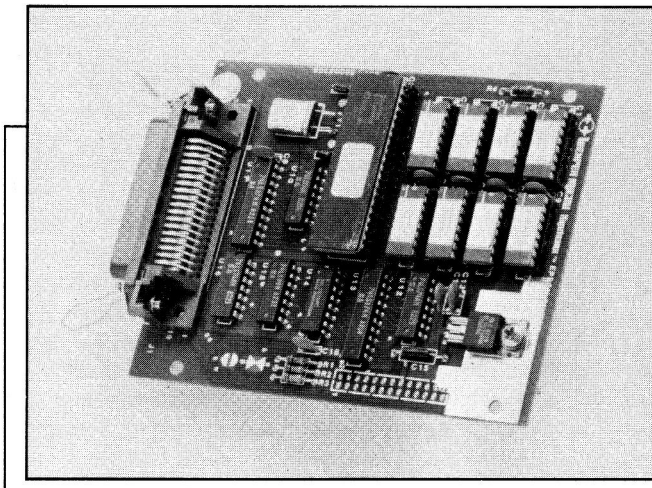
New Products



A new printer buffer card, the Wizard-EBI, from Wesper Microsystems.

is ready to accept it—freeing the computer for other uses. It features 16K bytes of memory, multiple copy functions, vertical mount configuration and status readout. Price is $199. Reader Service number 477.

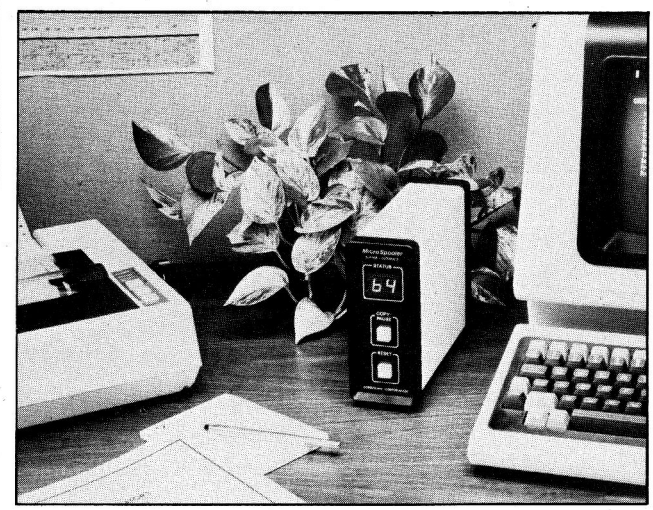
The Wizard

A new printer buffer card that mounts inside all Epson MX printers is offered by Wesper Microsystems, 3188 Pullman St., Costa Mesa, CA 92626.

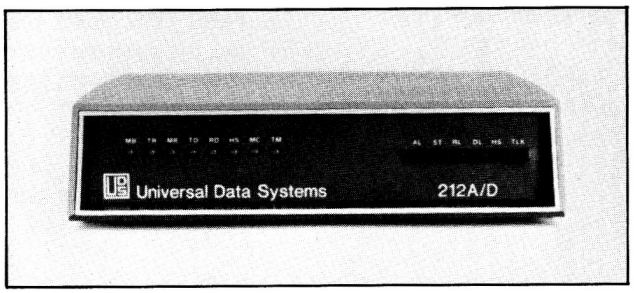
The Wizard-EBI improves system efficiency by allowing the computer to dump its print data into the buffer quickly—freeing up the computer. The printer, meanwhile, continues to print at its own rate of speed while the computer goes on to the next task. The buffer is available with 8K, 16K, 32K or 64K characters, depending upon the number of RAM chips plugged into sockets provided on the card. Price ranges from $139 to $336. Reader Service number 461.

212A/D Modem

The UDS 212A/D is a



The MicroSpooler buffer from Compulink Corporation.



The 212A/D is a new modem from Universal Data Systems.

new modem offered by Universal Data Systems, 5000 Bradford Dr., Huntsville, AL 35805.

The built-in firmware of the modem allows entry and storage of up to five 30-digit numbers or operatives that can be recalled and executed with keyboard commands. Both pulse and tone dialing modes are standard. The on-board battery-packed memory will retain the stored numbers after power down for three to five years. The UDS 212A contains such features as 0–300 bps and 1200 bps rates and asynchronous or synchronous full duplex operation. Price is $795. Reader Service number 472.

Auto Dial

A new auto-dial modem, the Auto Dial 212A, automatically dials, answers and transmits at 300 or 1200 baud and operates at full or half duplex. It contains an audible phone line signal monitoring system and is Bell 103/113/212A compatible. The Auto Dial's self-test system, when used in conjunction with a system of multiple dip switches, permits users to install and adapt the modem to virtually any computer. Contact U.S. Robotics Inc., 1123 West Washington Blvd., Chicago, IL 60607. Price is $599. Reader Service number 475.



The Auto Dial 212A from U.S. Robotics Inc.

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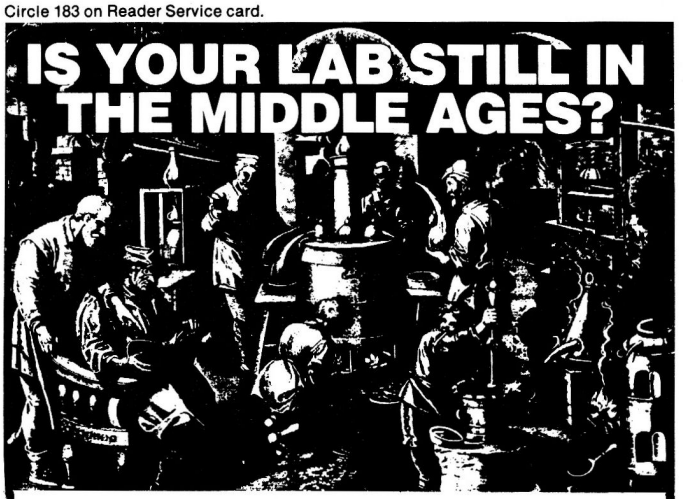
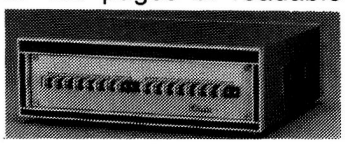


Your secretary types reports and revises project budgets on an Apple microcomputer. Why should you be stuck with the same pen and ink used by medieval alchemists? An ALIS automation system together with your Apple II can eliminate manual recording and setting of instruments. ALIS systems can work with pH meters, strain gauges, timers, positioners, microbalances, flow meters, BCD devices — in short almost ANY device which accepts or generates an analog or digital signal.

ALIS makes automation easy

Each ALIS system is complete with preassembled hardware, from Apple interface to cabling, terminal box and test switches — as easy to install as a printer. ALIS' interface software lets your Applesoft programs talk directly with the real world at up to 10,000 data points per second. You can display your results immediately or off-line with ALIS' modifiable hi-res graphing system. Each ALIS system is thoroughly documented with over 150 pages of readable manuals, including sample programs and application notes to assist in automating your lab.



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  (16 channels, 0.024% Prec., 8 ranges, 100mV min)
- **Analog Input: ALIS/A08** **$1149**
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- **Analog Output: ALIS/AO** **$841**
  (2 channels, 0.39% Prec., 10 Volts Full Scale)
- **Digital Input/Output: ALIS/DIO** **$1600**
  (32 bi-directional channels, quad timers, interrupts)

Available soon: ALIS/MX256 — 256 channel analog input.

ALIS systems require a 48K APPLE, APPLESOFT, DOS 3.2/3

For detailed specifications and complete price schedule, contact:

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Dealer inquiries invited.

Logic Analyzer

Total Logic Corporation, Box 416, Fort Collins, CO 80526, offers the LA-100 hardware/software system that converts the Apple II into a logic analyzer.

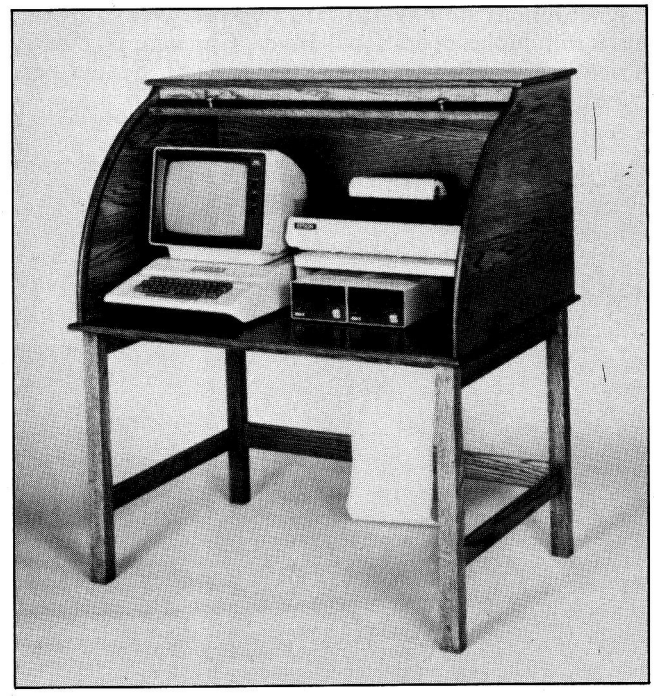
Capabilities include a 16-bit wide data path, 1024-word memory, qualified clock inputs, 16-bit trigger word (that allows data collection to begin or end on the trigger without a programmable delay), and the ability to store and recall both data and instrument setups using the Apple disk system. Price is $795. Reader Service number 464.

Rolltop Desk

Tebbs Techniques, Box 817, Pleasant Hill, OR 97401, offers a rolltop desk designed to house a microcomputer. The solid oak desk has the room to house a terminal, monitor, keyboard, two disk drives and a small printer. Price ranges from $350 to $400 plus shipping. Reader Service number 463.

Data Bases for Business

Data Bases for Business is a 178-page book that lists over 400 computerized databases designed to meet the needs of business. The first section of the book explains how to use a database and how to find the right one for particular needs. The second section of the book profiles 399 databases, from ABI/Inform to Zip Code Demographic Data Base. Each profile contains 13 entries, including subject, class, maintenance and applications. Section three indexes the profiles by subject and vendor.



The computer rolltop desk from Tebbs Techniques.

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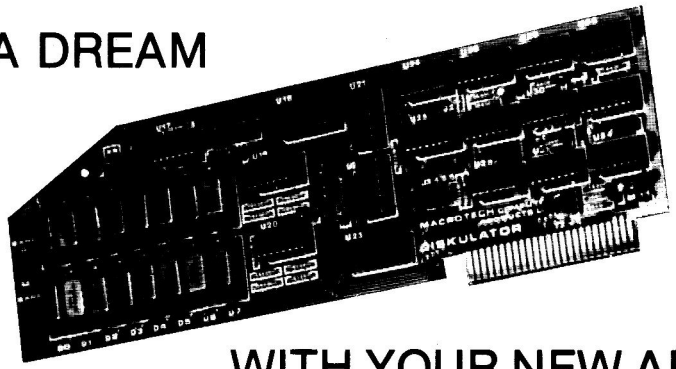

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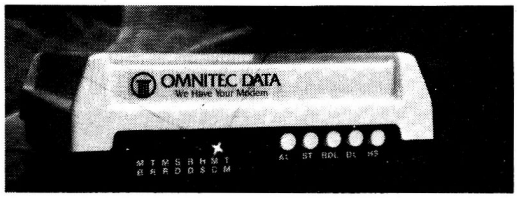

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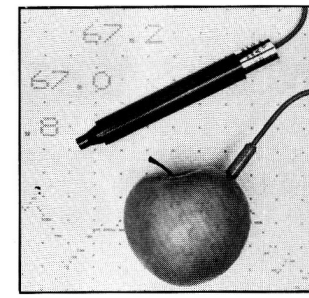
Nth Degree

The Nth Degree is a new temperature measuring control system available for the Apple II. It measures between −60 and 105 degrees Celsius. Changes of temperature as small as 1/100th of a degree can be detected.

The system uses a handheld probe the size of a pen and attaches to the Apple II with a six foot cable. Temperature readings are made by placing the probe against the surface to be measured. When not in contact with a specific material, the probe measures the temperature of the air.

Temperatures can be displayed in Celsius, Fahrenheit or Kelvin. The probe can measure reaction rates and reactant temperatures and monitor heating and cooling apparatus. The Nth Degree contains a model 551A probe, software, Apple II interface adapter and a user's manual. Contact American Data Cable Inc., 2864 Ray Lawyer, Placerville, CA 95667. Price is $129. Reader Service number 476.

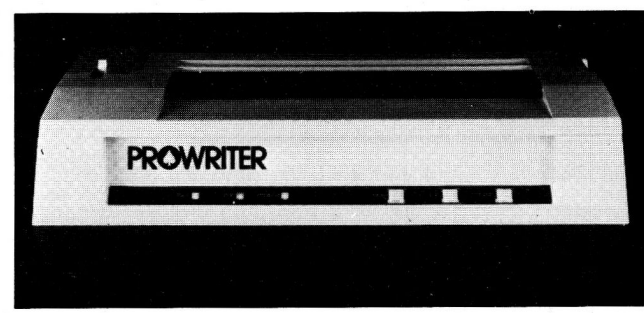


The 551A Digital Temperature Probe is part of the Nth Degree temperature measuring control system.

Prowriter

The Prowriter is a new dot matrix printer that includes 120 cps bidirectional printing, logic seeking and proportional spacing. Graphics capability is built in and includes shape and high-resolution features.

It has a 1K buffer in parallel and a 2K buffer in serial and also has incremental printing ability. Vertical and horizontal tabbing is automatic. Price is $595 for the parallel model and $745 for the serial version. Contact Leading Edge Products Inc., 225 Turnpike St., Canton, MA 02021. Reader Service number 460.



The Prowriter dot matrix printer from Leading Edge Products.

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