VOLUME 1 ISSUE 1
$2.95

A+

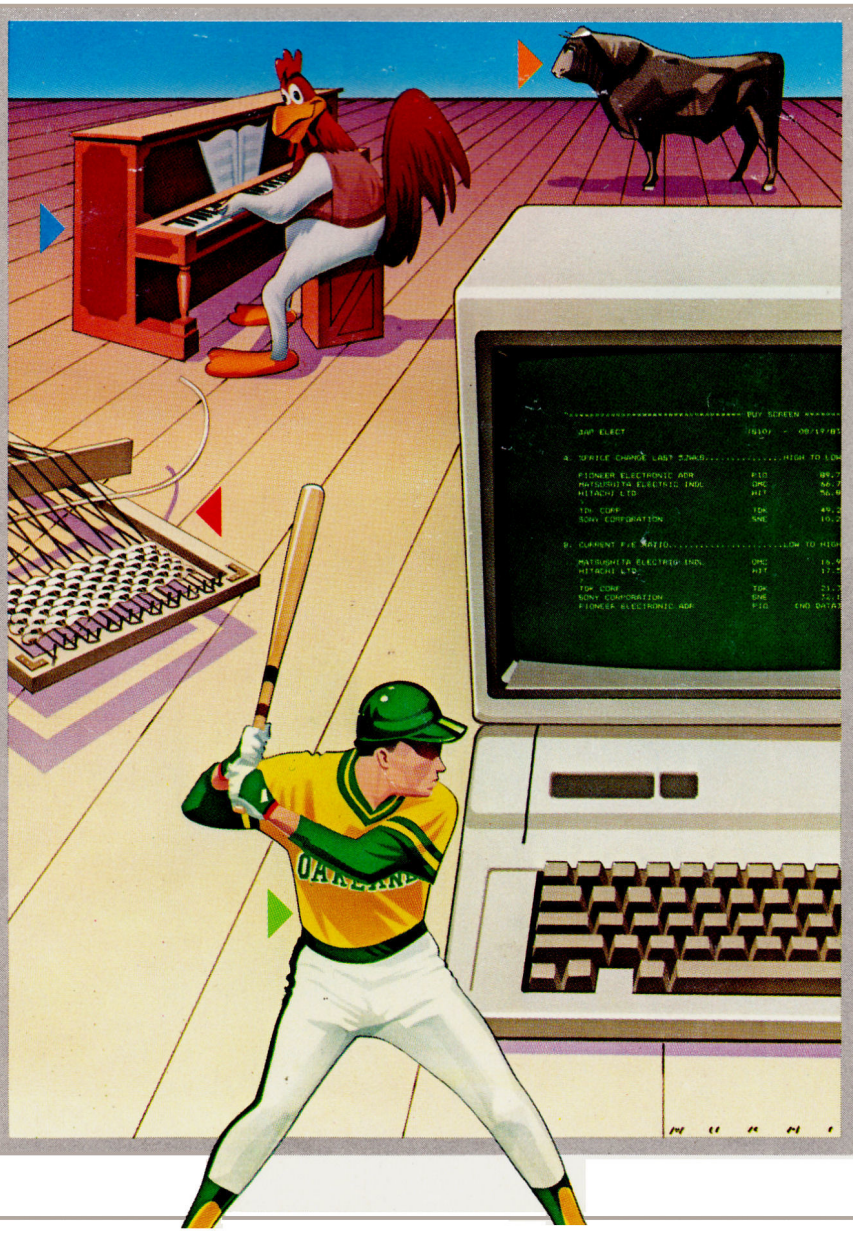
THE INDEPENDENT GUIDE FOR **apple** COMPUTING

THE APPLE AT WORK:

- CHARTING STATISTICS FOR THE OAKLAND A'S
- TECHNOLOGY PLANNING AT MERRILL LYNCH
- WEAVING BY COMPUTER
- MICROS BEHIND THE SCENE AT GREAT AMERICA PARK

REVIEWS OF PRODUCTS FROM:

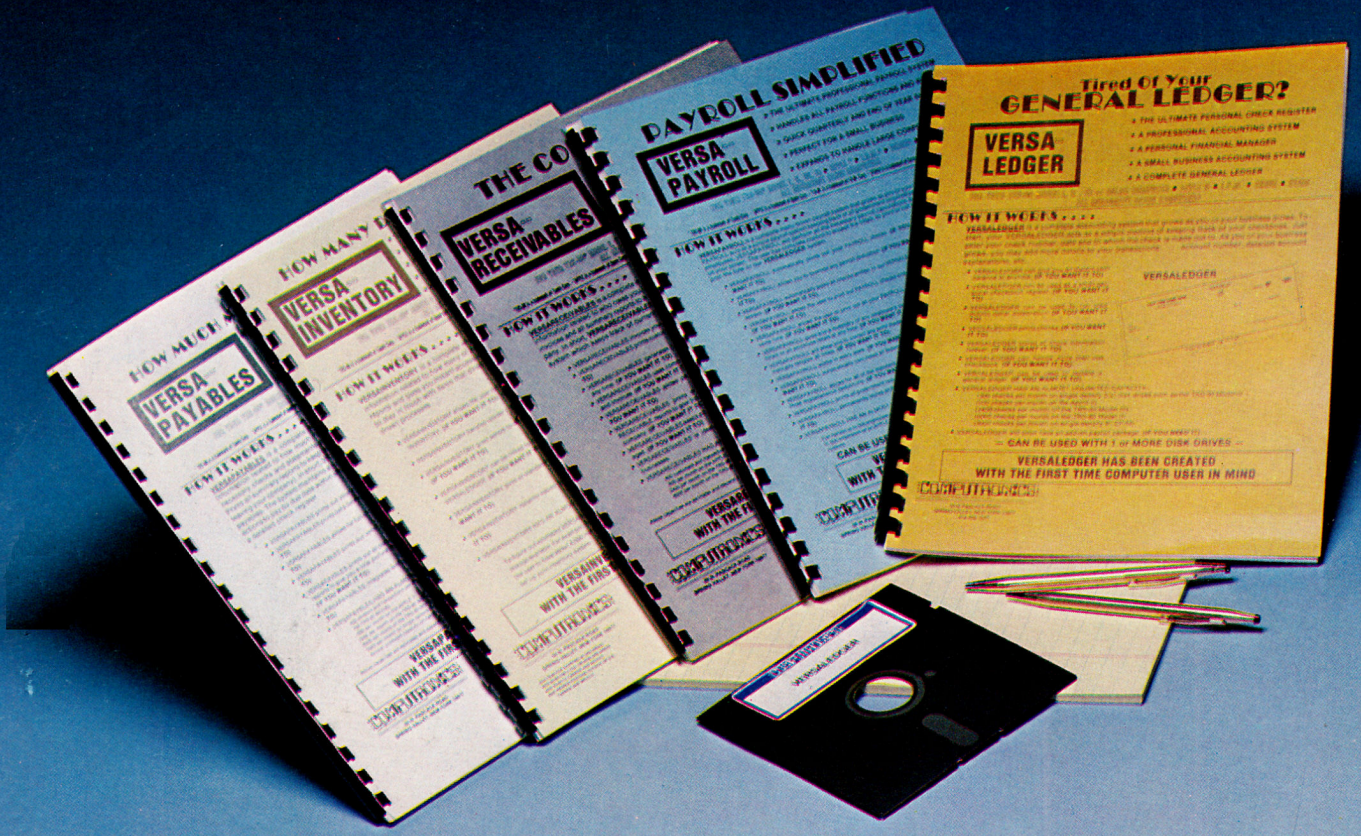
- APPLE
- EPSOM
- C. ITOH
- STAR MICRONICS
- LEADING EDGE
- MANNESMANN-TALLY
- DOW JONES
- ELECTRONIC ARTS
- EPYX
- SIERRA ON-LINE



0 08
14024 14289

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ $99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ $99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ $99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ $99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ $149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for $25 each, credited toward a later purchase of that module.

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

* add $3 for shipping in UPS areas
* add $4 for C.O.D. or non-UPS areas
* add $5 to CANADA or MEXICO
* add proper postage elsewhere

VISA AMERICAN EXPRESS

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS INC.

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. - *APPLE is a trademark of Apple Corp. - *IBM is a trademark of IBM Corp. - *OSBORNE is a trademark of Osborne Corp.
*CP/M is a trademark of Digital Research - *XEROX is a trademark of Xerox Corp.



Predictable.

A flawless future is in sight with 3M diskettes.

At 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

Apple® Compatible.

3M makes diskettes for use with Apple computers, including specially designed Fileware™ diskettes for the Lisa™ personal office system.

Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.



Apple, Apple logo, Fileware and Lisa are trademarks of Apple Computer, Inc.

3M hears you...

3M

CIRCLE 103 ON READER SERVICE CARD

CONTENTS

A+

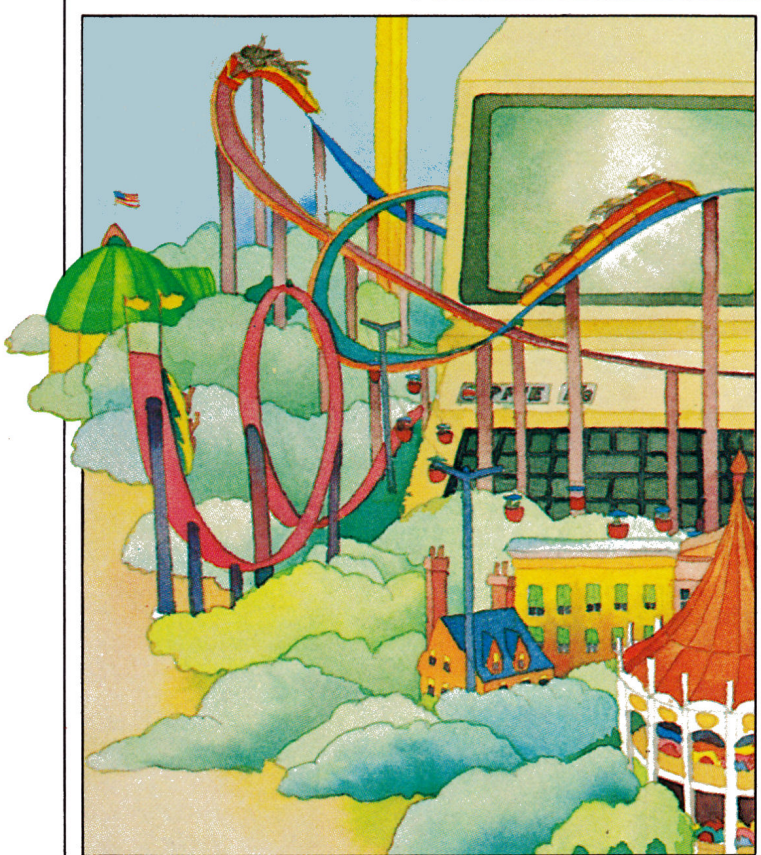
THE INDEPENDENT GUIDE FOR APPLE COMPUTING

APPLES AT WORK

50 The Great American Apple
From cinematic animation to recordkeeping in the personnel department, Apple computers lend a hand at Marriott's Great America amusement park.

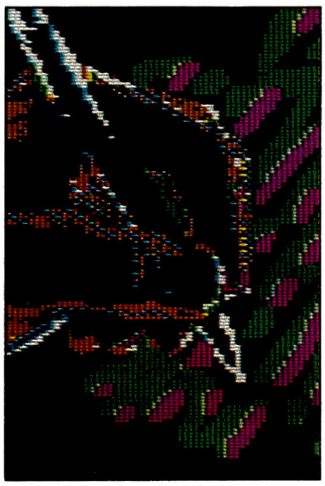
56 A is for Apple, Oakland, and Baseball
In the fight for a chance to play in the World Series the Oakland A's seek every advantage, including a computer that begins with the letter A.



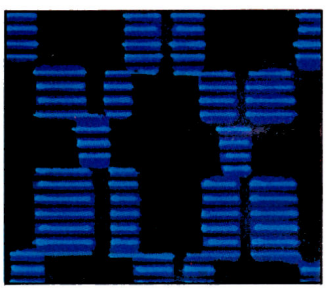


54 Technology at Merrill Lynch
Brokerage house Merrill Lynch conducts business with Apple computers and a stockbroker-specific applications package.

60 Modem Magic Conjures Up Information
The telecommunication powers of your Apple can cast a spell on these on-line information services that unearth vast worlds of facts, fun and conversation.



68 Elementary Graphics
An illustrator's foray into the world of graphics.



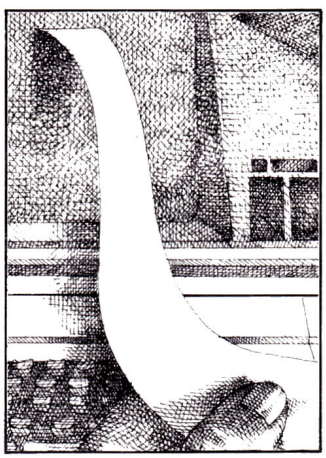
124 Appleweave
The industrial revolution revisited: weaving applications for the Apple.

HARDWARE REVIEW

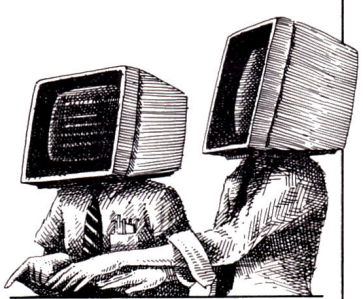
35 Seven Basic Apple-Compatible Printers
Seven contenders slug it out for the title, "Best of the Budget Matrix Printers." We'll let you be the referee.

SOFTWARE

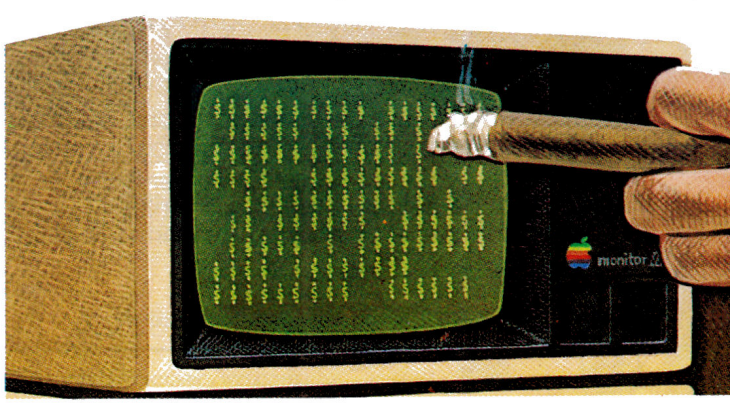
107 Mixing Words and Numbers
The Apple III Sophisticated Operating System (SOS) allows you to load VisiCalc files into Apple Writer reports—and more.



110 Dow Jones Market Analyzer
Reviews of three stock analysis programs from Dow Jones.



13 Thoughtware
On the road to integrated software.



Downloaded from www.Apple2Online.com

VOLUME 1, ISSUE 1 NOVEMBER, 1983





APPLICATIONS

102 An Apple A Day...
An Apple computer analyzes blood, measures medicine, helps teach medical students and more.

EDUCATION

132 The Father of Logo
Seymour Papert talks about the role of computers in education—and the role of education in computers.

PROGRAMMING

163 How to dBase II, Part I
A tutorial series on dBase II, the hottest program for database management.

BOOK EXCERPT

80 Investment Analyses with Your Microcomputer
Using your Apple computer to compare your investment options.

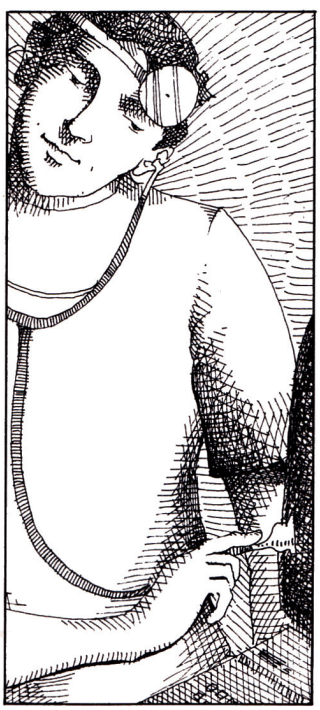
31 Rescue Squad
Questions about radio interference, using TVs as monitors, and controlling a printer are answered by the Rescue Squad.

9 Editorial



DEPARTMENTS

95 That's Entertainment



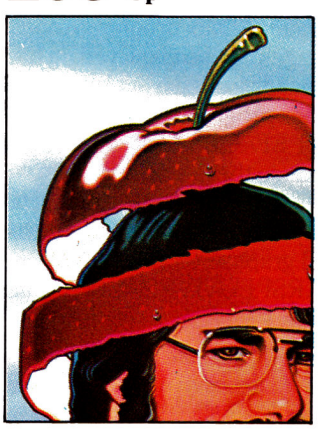
23 A+ Dispatches
Short items on gossip, helpful hints, and more.

154 Club News
The Society for the Prevention of Cruelty to Apples. Whether you are a "green" Apple user or an experienced programmer, your local user group can provide advice on computer operations and new applications.

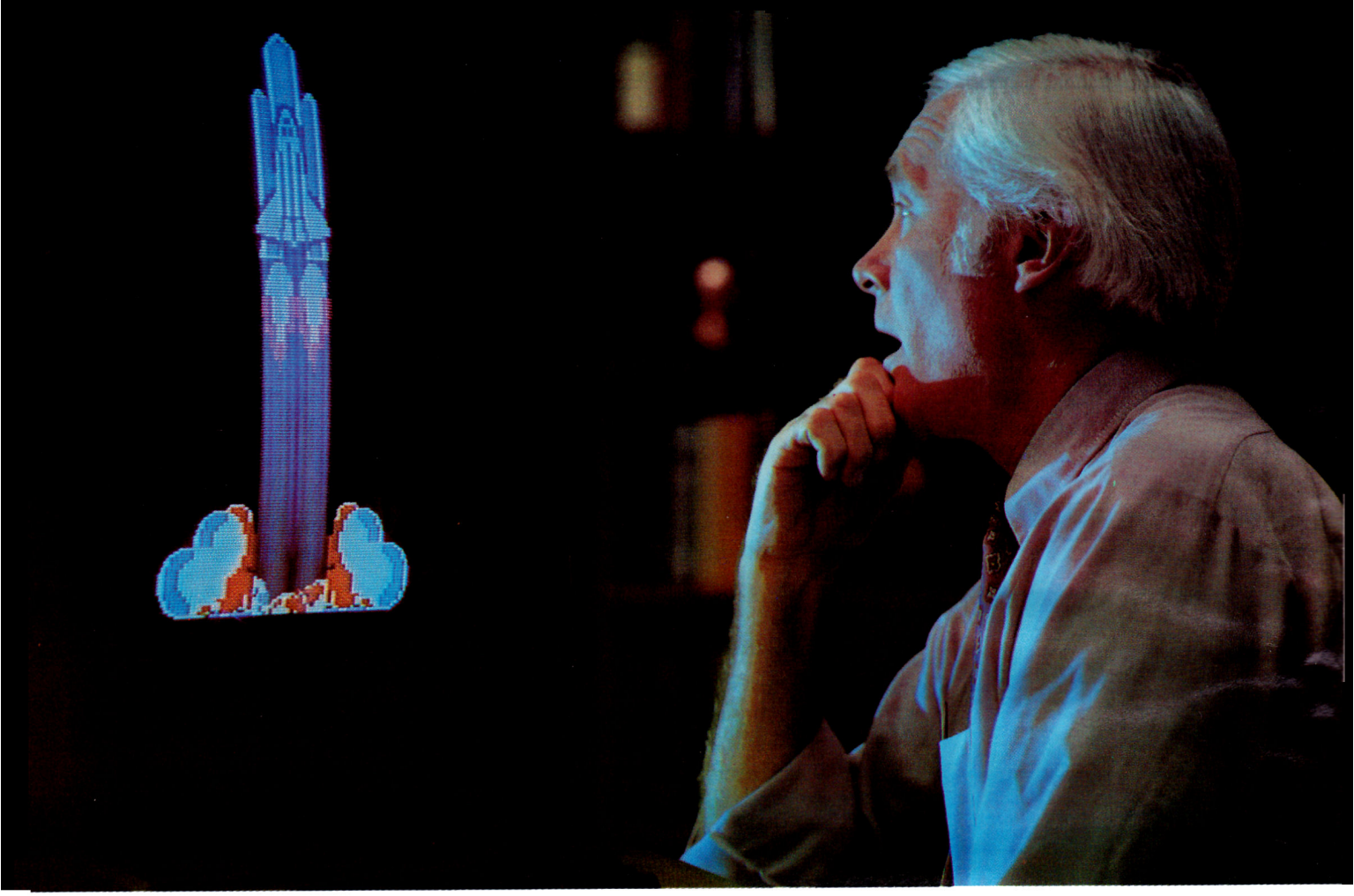
194 Product News

205 Index to Advertisers

205 Coming Up

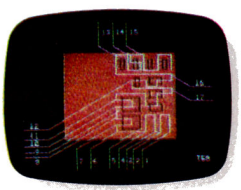






THE GRAPHIC SOLUTION

Solve your toughest communication problems with the Graphic Solution™, a sophisticated, new graphics package from Accent Software.



With precise, multi-speed ANIMATION create captivating sales presentations and product demonstrations that will both intrigue and inform your clients and customers. Watch their reactions; you'll see your messages getting through.

Develop educational materials and training aids that MIX TEXT AND GRAPHICS on the screen, breathing new life into abstract, hard-to-grasp concepts. Mix programs too. Images can be displayed on backgrounds loaded from any of your other programs. Construct custom TYPEFACES AND TYPESIZES to balance the visual elements.



Tired of run-of-the-mill business graphics? Change standard charts and graphs into colorful THREE DIMENSIONAL PERSPECTIVES. Add text and animate the data to show the relative rates of change for your most important information. Like cash flow projections. Or revenue estimates.



Plot flowcharts, time and motion studies, industrial process flows with COLOR-CODED ELEMENTS highlighting critical paths. Animate the sequences to show how flows actually progress.

Work with live action? Prepare film and videotape storyboards using the unique FRAME-BY-FRAME graphic sequencer that lets you create and animate a video story before shooting.

Whatever your graphic communication demands—in the business world, the arts, industry, education—The Graphic Solution™ at $149.95 has the answer. Take a hard look at The Graphic Solution. You'll like what you see.



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

Apple is a registered trademark of Apple Computer, Inc.

CIRCLE 104 ON READER SERVICE CARD

Publisher
Sydney H. Rogers

Editor
Maggie Canon

Senior Copyeditor
Eva Langfeldt

Managing Editor
Leslie Steere

Office Manager
Gae Brandon

Consulting Editor
Steve Rosenthall

Contributing Editors
Managing Editor-Susan Hurley
Chief Copyeditor-Anne Freed
Copyeditors-Jennifer de Jong, Barry Owen, James Langdell, Michelle Lodge, Barbara Noble, Bill Both

Editorial Assistants
Karen Cook, Eric Marcus

Art Direction
Don Menell Directions

Contributing Art Director
Michael Brock

Assistant Art Directors
Mariano Nicieza
Debra Vodhanel
Angelia Giglia

Illustrators: Doug Paulin, Cathrine Kanner, Donna Tarzian, Art Curtis, William Reiser, Stan Watts, Craig Calsbeek, Charles Shields, Tom Nikosey, James Hegedus, Dennis Mukai, Stan Gorman,
Photographer: Tom Keller

Subscription Director	Chet Klimuszko
Telemarketing Manager	Linda Rossiter
New Business Manager	Eric A. Bernhard
Renewal and Billing Manager	Shane Boel
Retail Sales Manager	Gerald Grossman
Advertising Coordinator	Leslie C. Phillip
Advertising Manager	Ted M. Welch
West Coast Manager	Denise M. Pilnak
East Coast Manager	Susanne M. Zellner
Account Representatives	EAST COAST Jeffrey L. Tompkins MID-WEST Kathryn J. Cumberlander WEST COAST Thomas E. Richardson, Cindy M. Silverman

Advertising Office
Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016, (212) 725-7947

CONSUMER COMPUTERS & ELECTRONICS MAGAZINE DIVISION

President	Larry Sporn
Vice President Marketing	J. Scott Briggs
Vice President Circulation	Carole Mandel
Vice President General Manager	Eileen G. Markowitz
Creative Director	Peter J. Blank
Editorial Director	Jonathan D. Lazarus
Promotion Manager	Robbie Sonnenberg

ZIFF-DAVIS PUBLISHING

President Richard P. Friese; President Consumer Magazine Division Albert S. Traina; Executive Vice President, Marketing and Circulation Paul H. Chook; Senior Vice President Phillip T. Heffernan; Senior Vice President Sidney Holtz; Senior Vice President Edward D. Muhfeld; Senior Vice President Sidney Holtz; Senior Vice President Edward D. Muhfeld; Senior Vice President Philip Sine; Vice President Baird Davis; Vice President George Morrissey; Treasurer Selwyn Taubman; Secretary Bertram A. Abrams

A+: The Independent Guide for Apple Computing ISSN (#0740-1590) is published for $24.97 one year, $43.97 two years, and $53.97 three years. Additional postage $12 for Canada, $12 other foreign by Ziff-Davis Publishing Co., One Park Ave., New York, NY 10016. Second-Class paid at New York, NY 10016 and at additional mailing offices. POSTMASTER: Send address changes to A+, P.O. Box 2965, Boulder, CO 80321.

Editorial and Business Office: One Park Ave., New York, NY 10016. Editorial (212) 725-4694, Advertising (212) 725-7947. For subscription inquiries and service, write to A+, P.O. Box 2965, Boulder, CO 80321.

A+ is an independent journal, not affiliated in any way with Apple Computer Inc. Apple is a registered trademark of Apple Computer, Inc. Entire contents Copyright © 1983 Ziff-Davis Publishing Co. All rights reserved; reproduction in whole or in part without permission is prohibited. The following are trademarks of Ziff-Davis Publishing Co.: A+, A+: The Independent Guide for Apple Computing, Dispatches, Resque Squad, Thoughtware, That's Entertainment.

Permissions: Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to Bette Amado, Ziff-Davis Publishing Company, New York, NY 10016.

A name to remember for memory in a hurry.

flashcard™

solid state disk for Apple® computers



Packaged with business software for lightning fast processing.

Or, *flashcard* is packaged alone with drive diskettes for DOS 3.3, CP/M® and Pascal for software compatibility with popular programs such as Word Star® and dBase II®.

Bonus Offer: For a tidy turnkey solution to boosting business output, *flashcard* also comes packaged with MagiCalc® spreadsheet software from Artsci. MagiCalc is a superior, state of the art program that is fast, friendly and filled with features. And it is fully compatible with VisiCalc files.

Why *flashcard*?: Plug *flashcard* into your Apple and enjoy fast, smooth, no-wait computing. No more "disk wait" messages. No mechanical delays. No more noise as the disk chatters and clatters through a file search. And no wear and tear on your program diskettes. Instead, *flashcard* displays your data the instant you ask for it.

Your computer store should have *flashcard* in stock. If not, ask him to order one for you.

***flashcard* with MagiCalc**	**$595**
***flashcard*, 147k disk**	**$349**
***flashcard*, 294k disk**	**$529**

Synetix, Inc.
15050 N.E. 95th St.,
Redmond, WA 98052
(206) 881-7110 **(800) 426-7412**

™Flashcard is a registered trademark of SYNETIX, INC.
® Apple is a registered trademark of APPLE COMPUTER, INC.
® MagiCalc is a registered trademark of ARTSCI, INC.
® CP/M is a registered trademark of Digital Research Inc.
® WordStar is a registered trademark of MicroPro.
® dBase II is a registered trademark of Ashton-Tate.

CIRCLE 150 ON READER SERVICE CARD

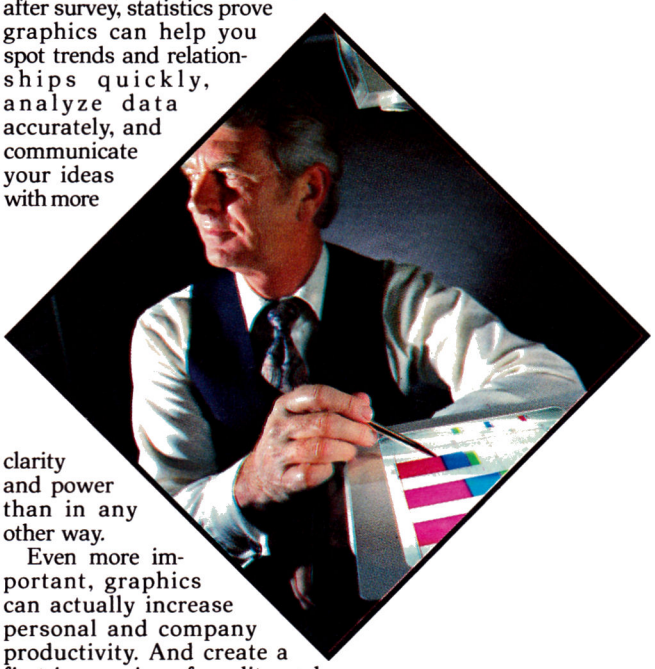
How HP business graphics



Enhance your reputation for being more professional, persuasive, credible and effective than your competition with the new HP 7475A Business Professional's Plotter.

Make a first impression that lasts

The vital importance of graphics to today's business professional cannot be overstated. In survey after survey, statistics prove graphics can help you spot trends and relationships quickly, analyze data accurately, and communicate your ideas with more clarity and power than in any other way.



Even more important, graphics can actually increase personal and company productivity. And create a first impression of quality and professionalism that lasts and lasts.

Graphics: the end to meetings that go nowhere

In a fascinating research project conducted by The University of Pennsylvania, 123 MBA candidates were involved in a study designed to test the effectiveness of business graphics in meeting situations. The results were startling. In the group where visual aids were used:

- **Meetings were shorter:** The study showed a 28% reduction in meeting length when transparencies were used.
- **Group consensus was faster:** Agreement was reached by 79% of the group using transparencies, compared with only 8% among the control group using no visual aids.
- **The decision process was accelerated:** 64% of study participants said they made their business decisions *immediately after the visual presentation.* When overheads were not used, the control group said they delayed decision-making until *some time after the group discussion following the presentation.*
- **Presenters with visual aids were perceived as being more professional, persuasive, credible and effective than those not using visual aids.**

Now, with the new HP 7475A Business Professional's Plotter, your meetings can have immediate and productive results like these.

How the quality look of HP graphics can help

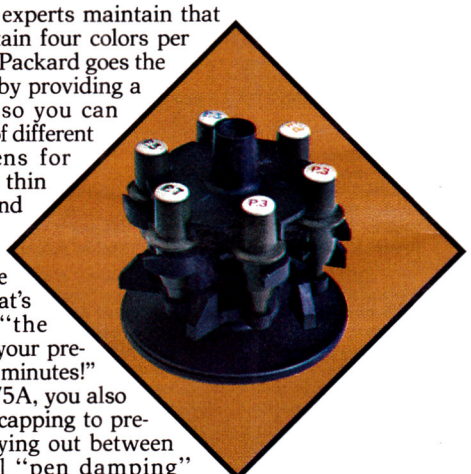
The way you present your information can be equally as important as the actual information you're presenting. And that's where the new HP 7475A Business Professional's Plotter lets your professionalism shine through.

Standards unsurpassed in the plotter business

The technical standards of the HP 7475A have no equal for producing quality graphics. With a resolution of one-thousandth-of-an-inch, curved lines are smooth, not jagged, and straight lines are *consistently* straight. Its exceptional repeatability (the ability of a pen to return *precisely* to a given point) assures that intersecting lines and circular shapes will meet *exactly.* The result is *high-quality* charts and graphs you'll be proud to present.

Why 6 pens when experts say 4 will do?

Graphics industry experts maintain that good graphics contain four colors per chart. But Hewlett-Packard goes the experts two better by providing a six-pen carousel, so you can store and use pens of different widths—thick pens for bold headings and thin pens for details. And with six pens, you won't have to waste valuable time changing them. That's important when "the boss wants to see your presentation in twenty minutes!"



With the HP 7475A, you also get automatic pen capping to prevent pens from drying out between uses, and special "pen damping" (gently lowering the pen to the paper or transparency) to increase pen life and ensure better line quality... use after use after use. You also get a rainbow of 10 colors to choose from, in two line widths.

Your choice: 2 paper sizes and today's most popular graphics software packages

While most professional business applications will be satisfied with standard 8½ x 11" paper or transparencies, the HP 7475A adds the

can be the key to your success.



capability of plotting on larger 11 x 17" media, too. The larger plots are especially well-suited for time lines, PERT charts, schematics and engineering drawings.

Best of all, you don't have to be a programmer to produce quality graphics on the HP 7475A. It's supported by a variety of professional graphics software packages for both HP and non-HP desktop and personal computers.

Naturally, speaking of software compatibility leads us to hardware compatibility....

Compatible with almost any personal computer in the marketplace today

With two interfaces available, the HP 7475A quickly "makes friends" with most models of today's most popular personal computers, including IBM,® Apple,™ Compaq,™ Osborne® and Commodore™ --as well as a host of HP computers.

The cost? Surprisingly affordable

The new HP 7475A Business Professional's Plotter is an amazingly affordable $1895. When you consider that a typical fee for a single five-color transparency from a graphics service is $50—and that the same transparency can be prepared for about $1 in materials on the HP 7475A—the return on your investment is almost immediate.

Another choice: HP's low-cost, high performance Personal Computer Plotter

For the "business on a budget," you may also want a look at our 2-pen Personal Computer Plotter, the 7470A. Its low cost (only $1095) is as remarkable as the quality of its plots. With many of the same features as the new HP 7475A, the HP 7470A plots on a single paper size (8½ x 11"). It stores and caps two pens, and you can easily change the pens yourself for multi-color plotting. Best of all, the HP 7470A 2-pen plotter lets you turn your personal computer into a personal graphics workstation for only $1095.

Send for your FREE "Better Presentations Package" today!

For a FREE sample plot, overhead transparency, and more details, mail the coupon below today. We'll also enclose a list of software packages you can use with the HP 7475A or HP 7470A.

For the name of your nearest Hewlett-Packard dealer call toll-free 800-FOR-HPPC.

HEWLETT PACKARD

1101303

CIRCLE 106 ON READER SERVICE CARD

YES! I'm ready to gain a reputation for being more professional, persuasive, credible and effective than my competition. Please send me your FREE "Better Presentations Package," so I can learn more about the new HP 7475A Business Professional's Plotter and the HP 7470A Personal Computer Plotter. I understand I will receive this valuable package without cost or obligation.

Name_____ Title_____

Company_____

Address_____

City/State & Zip_____

Phone Number (_____)_____

My computer is_____

Send to: Hewlett-Packard
16399 W. Bernardo Drive, San Diego, CA 92127
Attn: Marketing Communications 11303 APX



AMDISK YOUR COLOR COMPUTER®

Get 312 Kbytes* of on-line, formatted storage capacity for your Color Computer with the Amdisk-III. The Amdisk-III is a disk drive system that combines the capacity and compatibility of 5¼" floppies with the convenient size and ruggedness of the state-of-the-art in technology — the 3" microfloppy cartridge.

Join the move to maximize your Color Computer's power and "Amdisk" it. Many software vendors have joined, and will be providing software on Amdek's 3" cartridge upon request. These software suppliers are: Cognitec; Computerware; Frank Hogg Laboratories; The MicroWorks; Tom Mix Software; Moreton Bay Software; Nelson Software Systems; Petrocci Freelance Associates; Prickly Pear Software; Saguaro Software; Skyline Marketing; The Software Station; Spectrum Projects; Star-Kits and Sugar Software.

You can purchase the Amdisk-III from any of these fine dealers:

Computerware: (619) 436-3512
Delker Electronics: (615) 459-2636
DJR Micro: (800) 732-7323
Emerald Computer: (206) 778-9826
The JIB Company: (312) 952-0299
Saguaro Software: (602) 885-6508
Skyline Marketing: (312) 286-0762
Spectrum Projects: (212) 441-9357
The Software Station: (313) 532-2550

or ask for the Amdisk-III at your local computer dealer.

*An additional 312 Kbytes may be accessed by manually flipping the media over.

®Color Computer is a registered trademark of Tandy Corporation.

2201 Lively Blvd. • Elk Grove Village, IL 60007
(312) 364-1180 TLX: 25-4786

AMDEK

REGIONAL OFFICES: Calif. (714) 662-3949 • Texas (817) 498-2334

Amdek . . . your guide to innovative computing!

CIRCLE 107 ON READER SERVICE CARD

FROM THE EDITOR
A MESSAGE FROM MAGGIE

WELCOME TO A+



In the beginning Man created the computer. The computer was without proportion and filled with vacuum tubes; and the spirit of Man was moving towards making a smaller computer.
First day: Transistors.
And Man said, "Let there be transistors." And Man saw that the transistors were good; and Man separated the vacuum tubes from the transistors.
Second day: Microprocessors.
And Man said, "Let there be a microprocessor in the midst of computers, and let it separate the big computers from the small computers."
Third day: Kits.
And Man said, "Let the computer components be gathered together into one place, and let the personal computer appear in kits."

We have come an incredibly long way since those early days of personal computing in the mid-seventies.

Fourth day: Mass production.
And Man said, "Let there be pre-assembled personal computers to separate the hackers from the hobbyists."
Fifth day: Software.
And Man said, "Let the personal computers bring forth swarms of software packages, and let the software fly across to the world of business applications."
Sixth day: Competitors.
And Man said, "Let the personal computer revolution bring forth living competitors according to their kinds: Apple

and Commodore and IBM and Radio Shack and more.''
Seventh day: Magazines.
Thus the personal computers were finished. And on the seventh day Man finished his work and told publishers to create magazines in his image.

That is not exactly how the personal computer was created, but close enough for you to get the point. We have come an incredibly long way since those early days of personal computing in the mid-seventies, when only engineers and programmers could master the power behind the first personal computers. With the advent of mass-marketed hardware and software, personal computers are now used in all walks of life, by all kinds of people—people like you, who are using your personal computers for such diverse purposes as running your businesses, monitoring your investments, and educating your children. And as you know, because you had to make a choice among equipment, the personal computer market is intensely competitive. Industry analysts all concur that a ''shake out'' in the personal computer arena is imminent. With nearly a million units being used actively and new products in the offing, there is no doubt that Apple Computer will continue to be a leader in the personal computer field.

It is with this knowledge—that Apple Computer is a remarkably successful company that produces innovative products, attracts top-quality people, and has a vision for the future—that Ziff-Davis Publishing decided it was time to create a definitive magazine to serve the needs of

I am looking forward to the challenge of providing interesting and useful information on a monthly basis.

the ever-growing Apple computer community. Thus, I welcome you to A^+, the magazine for Apple computer users.

Some of you may know of me through my previous incarnation as the editor-in-chief of *Infoworld*, the newsweekly for microcomputer users. During my years there, I chronicled the growth of Apple Computer from a two-man, garage-based operation into a 4,000-strong Fortune 500 company. I met many of the main players at Apple, from Steve Jobs and Steve Wozniak to Mike Markula and John Scully. I was fortunate to get to know the people who designed, built, promoted, and delivered the products you use today. My overall impression was and still is of respect and admiration. That is not to say that Apple Computer has not had its share of flops and problems, but it is to say that Apple Computer is a company that embodies the American dream—an entrepeneurial dream come true. But equally important to financial success has been the vision that motivates the people who work for Apple. The energetic and youthful staff at Apple Computer fervently believes that the products it produces and sells are not only innovative, but that these products actually improve the world we live and work in, and enhance the meaning of the commonplace. Some might argue the merits of this mentality, however, I personally believe that this attitude will help Apple compete successfully against IBM. So, having covered Apple for years from the news point of view, I am pleased to join Ziff-Davis Publishing to create a new family of magazines for the Apple Computer user community.

As the editor of A^+, I am looking forward to the challenge of providing interesting and useful information on a monthly basis. I am targeting the editorial at the typical Apple user, whom marketing types like to refer to as an ''achiever.'' An ''achiever'' can be described as a man or woman in the age group of 18-45, who is using an Apple computer for professional purposes. (Marketing types also like to include the go-getter, risk taker, and sports enthusiast in this definition, but not many of us Apple users are all those things, so I prefer to leave that to the marketeers.) Professional uses span the entire spectrum of the working world, from writing a manuscript to keeping the books to forecasting markets, from working at home to working in a large corporation. We will concentrate on the Apple II and Apple IIe for the obvious reason that they are the most prevalent products. However, we will include regular articles on the Apple III and the Lisa, as well as new products, such as the Mackintosh, when they are introduced.

The emphasis of the articles will be on practical applications, from word processing to database management to telecommunications and so forth. Although we are not aiming at the neophyte computer user, we do aim to educate. The goal of each issue will be to provide you with information on new ways to use your Apple and teach you how to use the available software and hardware to its fullest extent. Product reviews will be an integral part of A^+. As the creator of the Report Card review section of *InfoWorld*, I am keenly aware of the importance of critically evaluating the myriad products you must try to choose from.

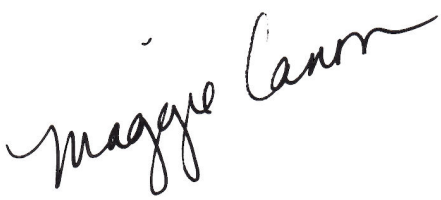
The emphasis of the articles will be on practical applications.

Although we will be emphasizing off-the-shelf software, we will also be running regular features on programming tips, what's new in languages, information on utilities, and such. Fun is not to be neglected either, and each issue will have numerous game reviews in our That's Entertainment section.

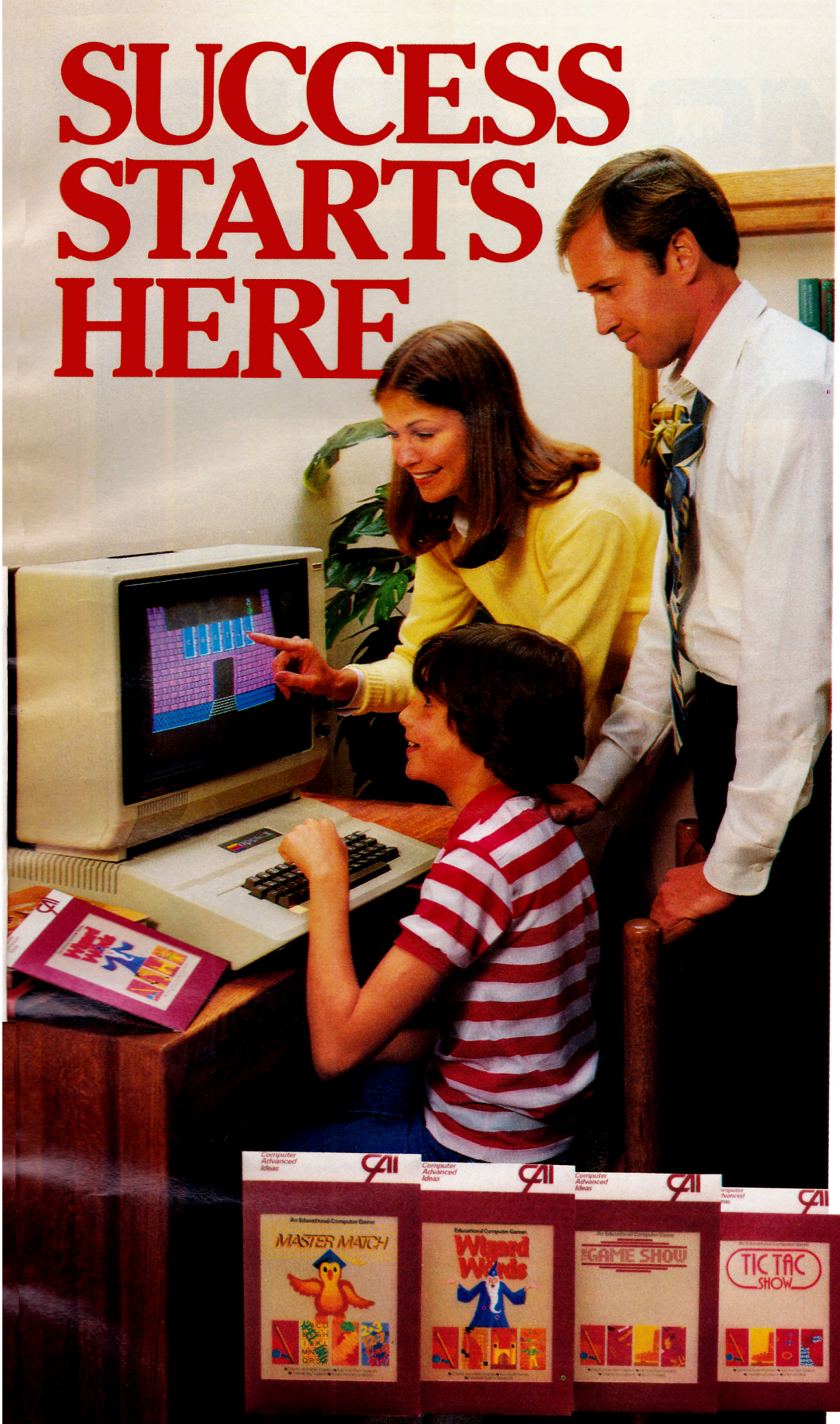
Besides monthly articles on how to use your Apple most effectively and hardware and software reviews, there will be regular departments on users' groups, new products, questions and answers (Rescue Squad), interesting tidbits (Dispatches), and education, as well as tutorials and columnists. This first issue will give you a taste of what is to come as we forge ahead with A^+.

Always, when you start a new project, you want to thank all the folks who helped you pull together what you thought was the impossible dream, but to thank all the individuals for their contributions in this project would take up half the magazine. However, I will take a little space to say thanks to the people in Ziff-Davis who worked so hard to produce the first issue of A^+. And I would also like to thank Kathleen Dixon, John Fenwick, and Rene Olson of Apple Computer and Steve Rosenthal for their invaluable assistance in this first effort.

Finally, I have a request for our new readers. This magazine is in existence to serve you, so let me know what you think by writing me letters with criticisms and, if you will, suggestions for articles that you would like to see in A^+. I am looking forward to hearing from you and making A^+ the best editorial product possible!!



SUCCESS STARTS HERE



The day you bring your first CAI™ learning game home and watch your child play, you'll know the excitement of a winning choice.

Active Family

Your family and CAI's growing family of animated, full-color programs have a lot to share —beginning with a willingness to reach beyond the ordinary to achieve the best.

At Your Command

You may meet a princess, a juggler or a dragon in *Wizard of Words.*™ You may appear as a guest on TV in *Master Match,*™ *The Game Show*™ or *Tic Tac Show.*™ Or, you may extend these programs still further with our *LearningWare*™ diskettes, offering hundreds of questions matched to the teaching strategies in the games. In every case, CAI puts a world of imagination and learning at your fingertips. And puts you and your child in control.

Unique Approach

Key features place CAI thinking tools in a class by themselves: Each program comes with its own *library of subjects.* But that's just the start. Our unique *authoring system* let's you or your child create your own lessons on any topic, tailoring the program to your family's needs —and no computer knowledge is required. Add the fact that we've kept the vital ingredient –*FUN*– in learning, and our *proven success* is no surprise. Over 2,000 school districts now use CAI programs to teach essential vocabulary and logic skills in a variety of subject areas.

CAI supports its products —and you —with an unconditional guarantee and a free backup disk. And provides compatibility with the most popular computers: Apple,® IBM® (and soon Commodore™).

Wise Choice

CAI is a group of experienced educators and programmers who believe that success begins with opportunities you create at home. Ask to see a demonstration of CAI programs at your local computer store, and see for yourself just how rewarding a good education can be.

Computer Advanced Ideas™

Bringing Ideas Home

1442A Walnut Street, Suite 341
Berkeley, CA 94709 (415) 526-9100

Apple is a registered trademark of Apple Computers, Inc. IBM is a registered trademark of IBM Corp. Commodore is a trademark of Commodore Business Machines, Inc.

MEMORABLE



CONCORDE

The new leader in the world of floppy disk drives introduces its new family of Apple® compatible peripherals! Combining the finest quality drives with their own advanced electronics, **CONCORDE** gives you proven reliability and superior performance at a dramatic cost savings.

- **CONCORDE** Model C-111, Single Sided Disk Drive, gives you as much as 163K bytes of data storage... form, fit and function compatible with the Apple Disk II.
- **CONCORDE** Model C-112, Double Sided Disk Drive, with double the storage capacity, up to 326K, is the perfect subsystem for your Apple or Apple compatible computer.

® Apple is a registered trademark of Apple Computers Inc.

Remember **CONCORDE**!
Check it out with your favorite computer dealer, or contact:

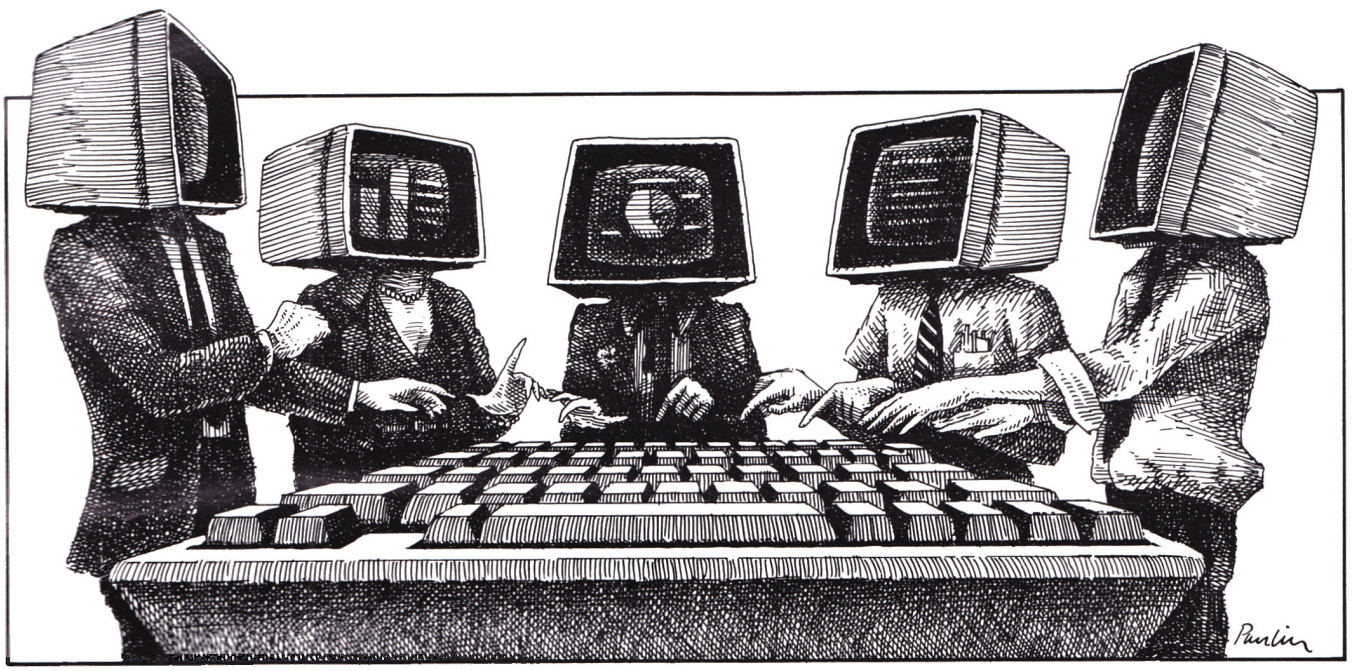
CONCORDE

CONCORDE PERIPHERAL SYSTEMS, INC.
23152 Verdugo Drive
Laguna Hills, CA 92653
[714] 859-2850

CIRCLE 109 ON READER SERVICE CARD

THOUGHTWARE/BY STEVE ROSENTHAL

How integrated are the software packages available on the Apple today? Though complete integration is still in the future, some current software is headed in that direction.



ON THE ROAD TO INTEGRATED SOFTWARE

The ideal computer software package would be like one of those private secretaries in English romance novels: efficient, cheery, helpful, understanding, and able to handle any task without so much as a murmur of complaint.

Developers of integrated software are striving for that goal, and though they aren't there yet, at least they're on the way. Aside from being just "user friendly," integrated software represents an attempt to make computers more "user helpful."

Because spreadsheets (the so-called "calcs" or "what-if" financial models) and word processing are the most common tasks done on personal computers, these functions form the core of most integrated software systems. The majority of systems also include some kind of graphics output, plus a database or mail-list mode.

However, when people talk about how "integrated" their package is, what they mean varies quite a lot from package to package. Before taking a look at some current products and what they can do, let's first explore the various aspects of integration and see what they can do for you.

When people talk about how "integrated" their package is, what they mean varies quite a lot.

Types of Integration

For some people, any set of programs designed so that one program can read the output of another is integrated. People at the other extreme say that in true integrated software, users cannot even tell where one program ends and the next begins.

A close look reveals that most claims revolve around two distinct facets: software can be integrated by passing data back and forth, or it can be integrated by sharing a common interface between users and programs. Furthermore, each of these facets can be implemented over a range of levels. Integration is a question of degree, not a yes or no issue.

Of the two types of integration, data integration is the easiest to implement and can be done even for programs that are written independently. Programs that are integrated by data exchange can be different in philosophy, style, and user interface. In some respects, you can consider even a package of programs designed for different machines to be an integrated series, if they all deliberately share data paths.

The lowest level of data integration is simply file or communications compatibility. If you are working one task, can

the data you enter or create be used by another task? For example, if you are working on a spreadsheet, is there a way to save your data in a disk file and then read the file with a word processor?

Three factors that might interfere with this level of integration are control character usage, number representation, and operating system file typing. Key differences in any of these areas can prevent one program from reading files produced by another.

In some programs, any bit pattern is legal output, including all 256-byte patterns. Byte values of 0 through 31 (0 to 20 in hexadecimal) may be used, for example, to indicate character string lengths and not to mean the ASCII control characters. Many text-handling programs, however, take byte patterns 0 through 31 to be control characters and react to them accordingly.

For numbers, most arithmetic programs store numbers as binary or binary-coded decimal values, both of which are ways of representing values by bits and not by printable digits. A program that produces binary values may also produce data files with bit patterns that a program that reads text refuses to accept.

Because bit patterns may not always be valid characters, some word processing programs refuse to accept input files that are marked as binary. Therefore, even if the actual bit patterns turn out to be printable, these editors will not read a file the operating system has noted as binary.

Consequently, you'll find that most integrated software packages that were written for an existing operating system exchange all their data as text files. Control characters are filtered out, and data is formatted in lines of reasonable length. Numbers generally are given as character strings rather than in binary or binary-coded decimal values.

Just because a file can be read, however, doesn't mean that it makes any sense. The next level of data integration addresses this key question: Can the receiving task make any sense of the data generated by the first task? To accomplish this level of integration, the graphics package, for example, must be able not only to read a spreadsheet file, but also to recognize the values to be plotted and separate them from formulas and headings. Similarly, a word processor must know which fields to read from a database file.

This level of data exchange requires that each program understand the output format of the others. With the knowledge of how the sending application structures a file, the receiving application can be programmed to recognize patterns such as the sender's data fields, number formats, and text separators.

On the Apple III, the furthest that integration has gone is the Catalyst program from Quark Incorporated.

Several programs can standardize on a single format for data exchange, making it easier for a wide range of applications to share data. Many of the plotting and graphing programs, for example, accept the DIF (data interchange format) used by *VisiCalc* and some similar programs.

Special Offers



EPSON

- RX 80, 10" 100cps $399.95
- FX 80, 10" 160cps 545.95
- FX 80, Tractor 34.95
- FX 100, 15" 160cps 699.95



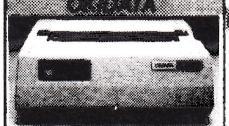
FRANKLIN

- Ace 1000, w color List $1100 $ 789.95
- Ace 1000 Pro, 1 Drive; 80x24 Video Card Acewriter; Acecalc; List $1695 $1229.95
- Ace 1200 List $1995 $1519.95
- Ace 1200 DMS, 2 Drives; 80x24 Video Card; Z80 cpm 2.2 6MHZ; Parallel & RS 232 Interfaces; Wordstar 3.3; MailMerge 3.3; Acecalc; List $2295 $1749.95

STAR MICRONICS
Delta 10, 160 cps $529.95
Gemini 10x 329.95
Gemini 15 439.95

C ITOH
Prowriter 10" 384.95
Prowriter 15" 669.95
F10, 40cps 1149.95
F10, 55cps 1449.95
Banana 229.95

OKIDATA



ML 82A 379.95
ML 83A 569.95
ML 84 969.95
ML 92 439.95
ML 93 709.95

MICROSOFT
Premium Systems
II + 459.95
II e 369.95
Multiplan 179.95

SILVER REED
500, 12cps 429.95
550, 16cps 649.95

TRANSTAR



315 Color 509.95

GRAPHIC INTERFACES
Grappler + 135.95
w 16 k 195.95
w 32 k 215.95
w 64 k 265.95
PKASO 135.95
w 8 k 184.95

EAST COAST
Wildcard II/IIe 114.95

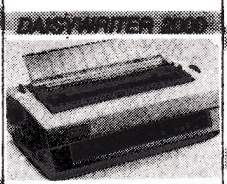
SATURN
32 k Ram 179.95
64 k Ram 269.95
128 k Ram 379.95
Accelorator II 399.95

USI
PI 2, 12"G 149.95
PI 3, 12"A 159.95

AMDEK
Color I 299.95
Color II 449.95
Color III 389.95

RANA DRIVES
Elite I, 163kb 289.95
Elite II, 326kb 449.95
Elite III, 652kb 574.95

DAISYWRITER 2000



33cps, w48k 1049.95

QUADRAM BUFFERS
8k 144.95
16k 159.95
32k 179.95
64k 194.95
128k 274.95
256k 619.95

BC HAYES



Micromodem
II 279.95
w term 309.95
Smart 300 219.95
Smart 1200 509.95

ALS
Z 80 cpm 2.2 139.95
Z 80 cpm 3.0 309.95
Smarterm II 139.95

MICROSCI DRIVES
A2, 143kb 259.95
A40, 164kb 299.95
A70, 286kb 359.95

VIDEX
Videoterm
WD/SS 199.95
W/SS 229.95
Ultraterm 289.95

ALL OF OUR CUSTOMERS RECEIVE A MONTHLY NEWSLETTER ABOUT THEIR APPLES. INCLUDES ARE GREAT BUYS ON SOFTWARE, BOOKS AND HARDWARE FROM CORVUS, CORONA, NEC, DIABLO, NOVATION, PERCOM AND APPLE.

BUSINESS COMPUTERS OF PETERBOROUGH

FREE SHIPPING in continental United States
APOs welcome

ORDERS ONLY: 800-845-3003
12 School Street • Peterborough, NH 03458
QUESTIONS: 603-924-9406

CIRCLE 110 ON READER SERVICE CARD

Data sharing is often a one-way street. In many current systems, most tasks can generate text output for inclusion in word processing documents. Few systems, however, allow text from a word processor to be used for any other task, because parsing (extracting information from a text string) is much more difficult to program than formatting (creating text output from data).

To reach the next level of data sharing, an integrated system first has to provide for data transparency: Any task in the integrated software package must be able to use data generated through any other task, and be able to make any required translation without explicit instruction from the user. For example, on the ideal system, you could make a list of cost data with the word processor and have it added to the database by the database portion of the package. You could also draw a chart with a graphing package, and the software would compute the values upon command and enter them into your spreadsheet.

Once equipped with data transparency, the system would then be able to go the final step to a single common database for the integrated package. A common data system keeps only one set of records for each set of files, allowing updates to be made from any authorized program. For example, if you create a database using a list program, then make a change in a name using the word processor, the next time you go back to the list mode you will see the new name instead of the old one. Similarly, if you use the graphics package and decide to change a value based on what a chart shows, that changed value will be used the next time you run the spreadsheet.

Although the goal of data sharing is clear, there is little agreement about how much integration of tasks and procedures is desirable.

Modes and Procedures

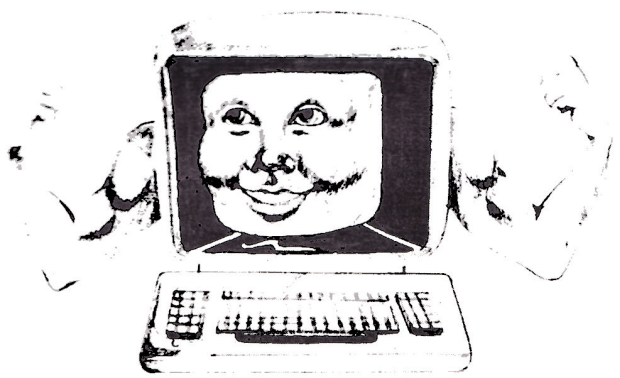
Although the goal of data sharing is clear, there is little agreement about how much integration of tasks and procedures is desirable. Two possible goals are modeless operation and parallel operations.

In modeless operation, the software would appear as a seamless web. Rather than look at where you are, you would have to know only where you wanted to end up. If you wanted to insert more text, it should be of no importance whether your previous act was defining a column of a spreadsheet, drawing a line on a chart, or typing in 20 straight pages. If you wanted to create a graph, you should have only to request one, and not first ask for the graphics package.

AI (artificial intelligence) fans say that modeless operation is what an intelligent system should provide. Just like the private secretary, a modeless system would be able to switch smoothly from one set of operations to another based on the combination of instruction and context.

Another view is that even if the software can understand what you want, a modeless system does not provide the essential contextual information to allow you to easily remember and understand your options. It would be like arriving halfway through a movie, with no sense of who the characters are, what they are doing, and how they got there.

According to this view, an essential



A Personal Tutor™ Will Awaken the Sleeping Giant in Your Computer

Whether you are a new user or experienced and looking to round out your expertise you will be impressed with Personal Tutor™ Training Tapes. Each package includes three detailed instructional tapes that will allow you hands-on-experience at your own pace. Our audio courses don't take control of your computer away from you, but gently guides you to master your system and the most popular software packages on the market. Now you will learn how to use the power of the system you have invested in.

FEATURES

- 3 audio-cassette tapes [No computer hook-up necessary]
- Effective step-by-step instruction in non-computerese language
- Quick reference summary card
- Sturdy vinyl protective case
- Written by technical consultants in coordination with an educational specialist
- Diskette with examples for Apple & IBM versions

ORDERING

Add $2.50 shipping each item
VISA/MC Accepted
Check (allow 2 weeks)
COD

Payable to:
Personal Tutor™ Associates
A Division of ExecSystems Corporation
P.O. Box 246
Clinton, MD 20735
(301) 856-2280

Specify system when ordering.

Note: Open packages not returnable.

PERSONAL TUTOR™ INSTRUCTIONAL TAPES

WORD PROCESSING:		DATA BASE:		SPREAD SHEET:		COMPUTERS:	
Apple Writer II®	39.95	dBase II®	59.95	VisiCalc®	49.95	Apple® //e	49.95
Screen Writer II®	39.95	DB Master®	49.95	TK! Solver™	49.95	IBM® PC	49.95
Bank Street Writer®	39.95	PFS®: File/Report	49.95	SuperCalc®	49.95	Commodore 64®	49.95
Super Text®	39.95	Easy Filer®	49.95	MultiPlan®	49.95	Vic 20®	39.95
Easy Writer II®	49.95	VisiFile	49.95	1-2-3®	49.95		
Letter Perfect®	39.95			Easy Planner®	49.95		

CIRCLE 192 ON READER SERVICE CARD

BUT IS IT MULTITASKING?

A number of strategies besides integration can make a computer system easier to use and more productive.

With a multitasking system, the computer seemingly works on more than one job at once. Especially when waiting for disk operations and input or output from the terminal, the CPU may not have anything else to do. In operations requiring mostly input and output and only short periods of actual computation, therefore, the computer can be given multiple tasks to do, and each one will run almost as fast as if it were running alone.

Each task in a multitasking system can be a part of one program, or it can be a different program. Some of the more sophisticated systems even automatically break long programs up into separate tasks, if it will speed execution.

Concurrent systems are multitasking computers that run more than one separate program at a time. They generally are designed for a single user with only one terminal. The operating system must therefore allocate one task access to the screen at a time, or divide the screen into windows. Programs can be run concurrently even if written for independent operation, but some require so much screen input and output that it is not worth trying to keep up with two at once.

Multiuser systems are set up for more than one person. Along with running several jobs concurrently, a multiuser system also keeps track of passwords and private file spaces, and routes the output of each running program to the appropriate terminal. Some systems even allow each user to run more than one task at a time.

A last concept that often is confused with integrated software is interactive software. While integrated means that two or more programs or applications share information and methods of operation, interactive simply means that the software solicits information from the user and responds to it. —*S.R.*

element of modes is their hierarchy of cues. In each mode, you have only to remember or choose from commands that are related to a particular task. You are not at every moment faced with the full range of every possible command or choice in the complete integrated package.

For example, if you want to draw a dotted line at an angle, you select the drawing mode, then select from a reasonable number of choices for how to draw a line. You don't have to remember every menu choice or command that might be useful for spreadsheets. There is no reason to add angled lines to spreadsheets, and the capability would just make operation more confusing.

Furthermore, the modes also provide the system with essential clues for interpreting ambiguous user commands. If you are in a word processing mode, for instance, and ask for a paragraph to be inserted at a point down the page, the system can reasonably expect that you want it lined up with the left margin of the existing text, unless you say otherwise. In this mode and operation, the exact horizontal position of the cursor can normally be ignored.

On the other hand, with a graphics package the system might reasonably conclude that if your cursor is a few spaces to the left or right of the margin, that's exactly where you want the text block to be positioned. Unless you ask for a textual or graphic element to be aligned on some edge or grid line, a move operation in a graphics package should pay attention to both horizontal and vertical positions.

Whether you prefer a modeless system or one with landmarks, one goal in software integration should always be to make instruction operation as consistent as possible. The instruction format for similar operations should be parallel across the full breadth of the integrated package.

The lowest level of procedural integration is simply to provide a master menu from which you can select various programs.

If there is a command in the spreadsheet to delete a row, it should be similar or identical to the word processing command to delete a line. If there is a database command to create a new file, it should closely model the graphics package command to create a new drawing.

Furthermore, if function or control keys are used, these should also perform similar operations. The key to move the cursor down in a text editor should do the same in a drawing package. A key to turn on the printer echo in a database program should do the same in a spreadsheet.

Parallel operations are important for integrated software packages, but they do not address the question of fluid movement from one application to another. In addition to similar commands, therefore, a desirable feature in an integrated package is procedural integration.

The lowest level of procedural integration is simply to provide a master menu from which you can select various programs. Like a command shell, this level substitutes for the usual method of telling of a particular program.

In an integrated system, only programs within the integrated family are listed in the main menu, and you can pick among them by code number, letter, or position, rather than having to name them completely. On systems with a mouse or light pen, you can simply point to your choice.

The next level of procedural integration lets you go from one application to another without returning to the main menu. You could, say, go directly into a data communications package from a word processing program without going back to the main menu. Or while running *WordStar* with a CP/M card, you can tell the system to run another program and return to where you are without leaving *WordStar*.

The highest level of procedural integration exists in systems that let you shift modes without worrying about which mode goes with which program. If you complete a spreadsheet, this type of system will let you go from that point to the plotting routines in the graphics package without explicitly leaving the spreadsheet and entering the graphics package. When you are done with the graphs, you can go back and make more corrections on the spreadsheet.

Integrated Software for the Apple II

There are two widely distributed software families for the Apple II that provide significant levels of integration. The first is the *pfs* series from Software Publishing Corporation, and the second is the VisiSeries from VisiCorp.

The *pfs* series started as a one-program product, now called *pfs:file*. But now there is a whole family of programs, with defined data paths between many and some similarity in operation (see Figure 1). So far, there is no spreadsheet

Introducing the first computer games that pay you to own them.

Virtually all computer games provide entertainment value.

These new games from Blue Chip also give you practical value—of the most rewarding kind.

They put you in high-powered, real-world environments. Where you create strategies. React to constantly changing conditions. And learn solid skills in competing for extraordinary payoffs:

Millionaire™ You build a portfolio of actual NYSE companies, whose fortunes are tied to a universe of plausible events and variables to consider. Over 300,000 possible combinations of events mean you can play a lifetime without a repeat.

Baron™ Buy and sell all manner of real estate nationwide as you strive to amass a personal empire. Factors include realistic property values, overall economy and local idiosyncrasies.

Tycoon™ If gold, silver, foreign currencies or other commodities quicken your pulse, play Tycoon and learn the ins and outs of this most volatile of financial arenas.

Squire™ The object here is to retire, financially set, in short order. Game is so realistic you can plug in your personal parameters, choose a lifestyle then follow the guidelines to attain it.

Entertain your brain. Sharpen your financial acumen. For both fun and profit. With these practical new games from Blue Chip.

BLUE CHIP SOFTWARE • (213) 881-8288

Available wherever finer software is sold. On disk for: DEC Rainbow 100, DECmate II, IBM PC, TI Professional, Apple, Commodore 64, Osborne, Atari, Kaypro and others.

CIRCLE 112 ON READER SERVICE CARD



© 1983 Blue Chip Software

product in the series; instead, the system is able to make use of files generated by VisiCorp's *VisiCalc* program.

Although the packages do not have any common procedural shell, any package can supply data to be read by the *pfs:write* word processor. The *pfs:graph* package can read *VisiCalc* files as well as files for *pfs:file*. The *pfs:report* program also reads *pfs:file* data.

One goal in software integration should always be to make instruction operation as consistent as possible.

Thus, data entered into the database can be shown as graphs, as formatted reports, and as merged data in letters or other text files.

VisiCalc files also can be transformed to graphs or text files (and the graphs can then be included in the text files as well). The word processing program, *pfs:write*, reads files from any member of the series, as well as *VisiCalc* files and external ASCII text files.

So far, at least, there are no reverse data paths. Data from the database cannot be routed to *VisiCalc*, nor can text files from *pfs:write* be added to *pfs:file*.

On the command level, there is some similarity between the four *pfs* programs. In general, function key usage is the same or parallel, as are many of the operational commands. But since the package uses a "foreign" spreadsheet, there is no special operational similarity there.

VisiCorp has also parlayed a single successful product into a complete line. From the highly successful *VisiCalc*, the company has added *VisiTrend, VisiTrend/Plot, Desktop/Plan, VisiLink, VisiWord,* and *VisiFile*.

Again, data from the file program can be read by the word processing and graphics packages, and the *VisiCalc* data can supply information to most of the others.

A significant number of the data exchange paths in the VisiSeries go both ways. For example, not only can the *VisiCalc* program supply information for *VisiFile*, but data from *VisiFile* data can be used in spreadsheets as well.

VisiCorp also has made an effort to keep program operation parallel. Although there are some differences, all of the programs have similar command interfaces and use mostly the same control characters.

VisiCorp is now hard at work on their *VisiOn* environment, which should provide a much higher level of procedural integration as well.

Integrated Software for the Apple III

On the Apple III, the furthest that integration has gone is the *Catalyst* program from Quark Incorporated. Like a supermenu, this program lets you display all the available programs on the hard disk and invoke any one without reloading from the floppy disk.

The *Catalyst* program originally was advertised as a mere "hard disk boot" program for keeping all your software on the Apple Profile hard disk. Among its virtues is that it allows you to move copy-protected software to the hard disk, but retains that level of protection against further duplication.

Now that users want integrated software, Apple is touting *Catalyst* as an integrated environment. But in the terms discussed above, *Catalyst* provided only file exchange and a master menu. Since the individual programs are unaltered, there is no guarantee that one program



ALL FOR THE UNBELIEVABLY LOW PRICE OF $660.00!!!

Available at computer stores everywhere.
Or order direct and receive a 10% Introductory Factory Rebate through January 1, 1984.

130 page manual only $20 prepaid.
Dealerships currently available.

Prices and specifications subject to change without notice.

RHINO® ROBOTS

from Rhino®

The Scorpion is a versatile robot designed especially for the serious robot enthusiast. By following the detailed instructions included in the kit, you can build this highly sophisticated and entertaining device. With 32 lines of I/O and complex machine intelligence capability, it is completely software programmable. Among the many talents of the Scorpion are its ability to see and read codes, to learn obstacle locations and avoid them, and to follow a tape on the floor at 99 different speeds.

LOOK AT THESE CHALLENGING AND EXCITING FEATURES:

RS-232 C serial interface allows the Scorpion to obey instructions and answer questions from any host computer with a serial printer interface.

6502 microprocessor on board with 8K of EPROM and 2K of RAM, expandable to a full 64K system.

The special Scorpion language with 30 instructions is explained in detail in the 130 page manual (8½ × 11) accompanying the kit.

The two axis optical scanner provides data for pattern recognition and camera experiments. Over a 300 degree scan in both vertical and horizontal planes. The visual patterns can be displayed in the computer CRT.

Order today:
Rhino Robots, Inc.
P.O. Box 4010, 2505 S. Neil St.
Champaign, IL 61820
217/352-8485
Telex: 3734731 RHINO ROBOTS C

CIRCLE 113 ON READER SERVICE CARD

can make sense of files provided by another, nor that the procedures used in one program will produce parallel results in another.

Apple is also trying to make its supported software for the Apple III data compatible. But thus far that effort extends only to the BPI accounting package and *AppleFile*, both of which share the RPS (record processing service) data format.

The Integrated Lisa

The Apple Lisa represents the most ambitious computer thus far by any personal computer maker to produce a truly integrated package. As released, the procedural and task integration set impressive standards, but data interchange is only slightly more advanced than several Apple II products (see Figure 2).

The striking feature of the Lisa is the icon and mouse system, and its image of the work space as an office desktop. With the icon and mouse system, most functions are represented by on-screen pictures, and a mouse is used to point to the desired choice. The mouse also is used to point to choices on menus, where selections are primarily identified by text instead of by picture.

The Lisa environment is strongly mode-oriented. Initially, the six modes provided are a word processor *(LisaText)*, a spreadsheet *(LisaCalc)*, a graphics package *(LisaGraph)*, a drawing package *(LisaDraw)*, a very limited database *(LisaList)*, and a project schedule program *(LisaProject)*. So far only a communications program *(LisaTerminal)* has been added, but more are in the works.

The Apple Lisa represents the most ambitious attempt thus far by any personal computer maker to produce a truly integrated package.

Although there are some functions that can be done in more than one program, you can operate in only one mode at a time, and only commands from that application are valid. For example, if you are working with the *LisaCalc* spreadsheet program, you can't draw pictures in the margins with *LisaDraw*.

If you want to go back and forth between applications, you can open a window on the screen and start a new task. But at any time, you can only stack tasks and work on the top one, rather than place them side by side and do both.

Some tasks can continue to operate even if they are not on the top of the pile. At present, this feature seems to be used mostly for demonstrations with moving images; it should turn out to be quite useful as more software is developed.

Among the nicest features is that the procedural parallelism on the Lisa is almost complete, a feature that greatly eases training and operation. Cursor movement works the same way in all modes many menus are the same, and the techniques of selection and activation are identical.

However, it is still early to tell what the possibilities are for the Lisa system. Apple has only recently released their Lisa Toolkit to outside program developers, and the results should start coming in fairly soon. If software developers use what Apple has provided in the desktop metaphor, the icon system, and all the operating parallels, the integrated domain of the Lisa could extend out in many additional directions. ✚

A REPORTING SYSTEM FOR A SPREADSHEET DATABASE
(for any VisiCalc© or Lotus 1-2-3™ User)

Most database systems consider rows of data fields as records. The 3-D concept promoted by Abacus says to consider an entire report as a record. Therefore, visualize "pages" of reports stacked-on or scattered-around your desk; these would constitute your database.

VIZ-A-MERGE™

With Viz-A-Merge (Namely-A-Merge System) you can "cut and paste" sections of spreadsheet reports together to form new reports - - - Electronically!!! As a spreadsheet utility Viz-A-Merge allows you to combine sections, rows, columns, or single cells from any number of spreadsheet pages into one new report, or into an existing report, then recalculate selected formulas. For example, you could "cut" total year end columns from Department reports and the consolidated reports, then "paste" them together for overall company analysis. Or, you could place a total sales row into an income statement and recalculate all formulas.

VIZ-A-CON™

With Viz-A-Con (Namely-A-Consolidation System) you can add 3-Dimensional capability to your spreadsheet program. As a Report Writer to your database, Viz-A-Con allows you to select records ("pages"), get sub-totals and totals for all number fields, and have customized labels on the final report. For example you can perform hierarchical consolidations (Dept., Div., Company) or time period roll-up (Day, Week, Month, Qtr., Year). You can consolidate up to 50 files in one process and you can tie together as many as 80 processes in one group. Then play "what if" with VisiCalc and regenerate all reports in one single step.

Each Product has a simple Question & Answer procedure to assist you in organizing your report processes. You can create a complete reporting network from a spreadsheet database. They have the ability to "remember" the steps they went through to create the final reports. You can use your spreadsheet program to recalculate new data, then use our products to regenerate all new reports in one single step. Also, you can set-up special formulas to calculate additional data fields within the new reports. You can customize titles, row and column headings, footnotes, etc. for each report.

Both products include sample sessions which are easy to understand, allowing the average person to learn them in only 15 minutes. They are both compatible with dBase II™ (IBM), PFS Graph® and a host of popular products.

Abacus Associates is dedicated to producing products that allow users to create customized reporting systems tailored to the way they manually organize their data.

Please order either Viz-A-Merge or Viz-A-Con directly from Abacus Associates. Send your check or money order to Abacus Associates, 6565 W. Loop South, Suite 240, Bellaire, TX 77401, or credit card customers may CALL TOLL FREE (800) 547-5995, ext. 170. In Nebraska, (800) 642-9606, ext.170.

Apple II, II+, IIe, TRS-80 I, III, IV ..... $ 99.95
Apple III, TRS-80 II/12/16, IBM-PC $139.95
Add $3.95 S & H per package.

VISA MasterCard AMERICAN EXPRESS

Look for forthcoming 3-D application templates

CIRCLE 114 ON READER SERVICE CARD



Datamost President out of mind.

At Datamost, we've got a president who knows the difference between "out of your mind" and having an "open mind."

So he's building a computer software company that knows how to get the most out of any mind.

Two years ago, when we began to publish the industry's first universally acclaimed system of computer software training books, we were told, "Datamost, you're crazy!"

So we published anyway.

Today, the hottest new software category is the computer Bookware market.

And guess whose books are the #1 best-sellers?

Yes, "crazy" Datamost.

Somehow, our craziness made good book sense. And good business sense. Because our book language is language that everyday people use when they talk everyday talk.

And Datamost talks Apple.* And we talk Atari.* And IBM.* And Commodore.* And Timex/ Sinclair.* And T.I.* and more.

For every level of computer literacy. From people who know nothing. To people who know everything.

But our president wasn't satisfied. "Who says there's a limit to our craziness?" he demanded.

"I want to see the Datamost name on the freshest, brightest, most mind-stretching arcade quality home computer games the industry has ever seen."

And once again, we were told, "Datamost, you're crazy!"

But this time, we said "you're right."

So get ready. For games with original music for Apple, Atari, Commodore and IBM home computers.

Coming to you. From Datamost.

Where the most open mind is alive. And well.

And crazy. Like a fox.

DATAMOST™

The most out of our minds.™

*Apple is a trademark of Apple Computers. *Atari is a trademark of Atari Computers. *Commodore is a trademark of Commodore Business Machines, Inc. *Timex/Sinclair is a trademark of Timex, Inc. *IBM is a trademark of International Business Machines. Corp. *T.I. is a trademark of Texas Instruments.

Datamost, Inc. 8943 Fullbright Ave., Chatsworth, CA 91311. (213) 709-1202

CIRCLE 115 ON READER SERVICE CARD

☐ APPLE ☐ EAGLE ☐ IBM, PC ☐ NORTHSTAR ☐ TRS-80 II 8" ☐ OSBORNE ☐ FRANKLIN ☐ STANDARD CP/M 8" ☐

☐ HEATH/ZENITH 89 8" ☐ INVENTORIES ☐ STOCK MARKET ☐ TAXES ☐ REAL ESTATE ☐ COMMUNICATIONS ☐ SPELLING ☐ MAILING ☐ ACCOUNTS PAYABLE

☐ XEROX 820 ☐ GAMES ☐ COMPILERS ☐ UTILITIES ☐ BUSINESS ☐ ACCOUNTING ☐ SPREAD SHEETS ☐ MEDICAL ☐ DENTAL ☐ PAYROLL ☐ GENERAL LEDGER

RENT SOFTWARE BEFORE YOU BUY!

from our

SOFTWARE RENTAL LIBRARY

You can now RENT the most popular software available for just 20-25%* of Manufacturers' Retail Price

- Eliminate the risk—rent first!
- 100% of rental fee applies toward purchase
- All purchases are 20% Off of Manufacturer's Suggested List
- Rentals are for 7-days (plus 3 days grace for return shipping)

SPECIAL INTRODUCTORY OFFER

There are now 2 different plans to choose from:

Join the **Game Group,** $25.00 per year and rent as many games as you like for only 20-25% of Mfrs. Sugg. Retail Price.* Minimum order, 3 game rentals	Join the **Business Group,** $50.00 per year and rent as many business application programs as you like for only 20-25% of Mfrs. Sugg. Retail Price.*

REMEMBER, THESE ARE NOT DEMOS, BUT ORIGINAL UNRESTRICTED SOFTWARE PROGRAMS

(complete with manuals in original manufacturers' packages)

To Immediately Order, or for more information:

UNITED COMPUTER CORP.
Software Rental Library
Culver City, California

Toll Free CALL 1-800 992-7777
In California CALL 1-800 992-8888
In L.A. County CALL 1-213 823-4400

Canadian Orders Welcome

MasterCard AMERICAN EXPRESS VISA

*Plus postage and handling.

☐ EDUCATIONAL ☐ ACCOUNTS RECEIVABLE ☐ WORD PROCESSORS ☐ DATA BASES ☐ LANGUAGES ☐ GRAPHICS ☐

CIRCLE 174 ON READER SERVICE CARD

TOTE THAT PRINTER, MOVE THAT DISK DRIVE!

Boxes of books litter the floor. "Helpful" friends lounge around with glasses of wine, saying, "I'll be with you just as soon as I finish this." You can't remember where you left the tape, the scissors, or the cat.

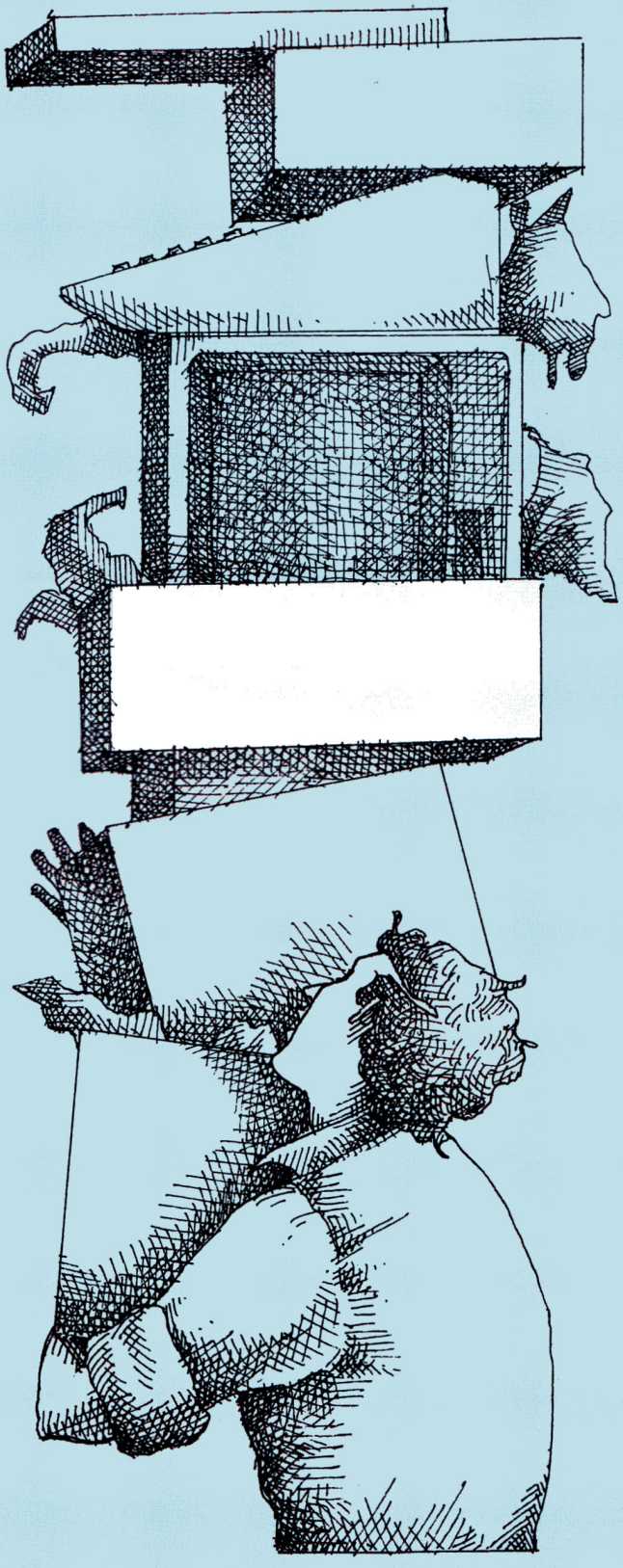
Yes, it's moving time. But this go-around you have a new worry: how to move this delicate piece of machinery that is your Apple without crushing or static-frying its innards.

The key is to immobilize your computer, says Bob Mullin of Office Movers, Inc. Damage comes with movement.

Ideally, of course, you saved the original packing cases your computer came in. Those specially-designed styrofoam molds really do an excellent job of shielding the crucial pieces. What, you threw them away or let the children turn them into forts? Okay, the next step is to buy styrofoam popcorn or bubble wrap, which are acceptable substitutes. Or you could wrap the computer in layers of cloth—if that's your choice, though, be sure the cloth won't attract dust. Avoid rugs.

If you have a professional mover lugging your stuff, check into extra insurance. Most firms insure on a per-pound rate, which isn't helpful with a 20 lb computer worth $3,000. Some more costly insurance plans include full replacement value.

And as for your floppy disks, those precious squares of priceless information: move them in your car yourself, says Mullin. Just keep them away from heat and metal, to avoid static discharges.



HARD TALK ON SOFTWARE COPYRIGHTS

Everyone talks about the widespread and sometimes flagrant violations of software copyrights in education, but nobody does anything about it.

Now, however, trying to stem the rush of unauthorized copies of educational software and documentation, the International Council for Computers in Education has stepped in.

The ICCE recently adopted a "Policy Statement on Network and Multiple Machine Software" to help educational organizations conform to software agreements and copyright laws. Written by a committee of educators, publishers, and vendors, the policy statement is aimed primarily at educators, but it also urges vendors to provide network-compatible versions of software and multiple-copy discounts at reasonable costs.

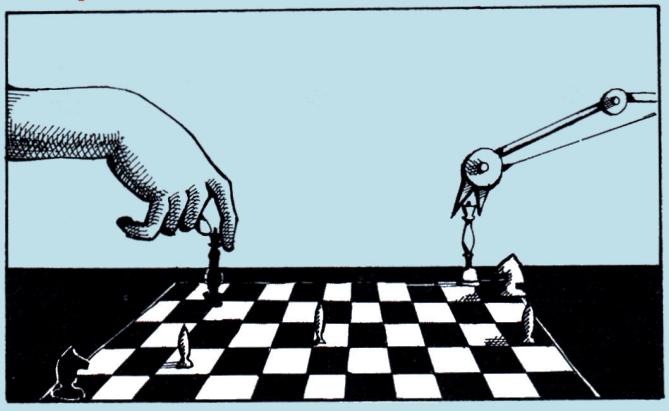
The statement suggests a district policy on software copyright, a software policy for a community college with a large microcomputer lab, and a format

for software licenses. It also offers some technical notes on software encryption for software/hardware vendors.

Copies of the statement are available from ICCE at the University of Oregon, 1787 Agate St., Eugene, OR 94703, (503) 686-4414.

ROBOTICS: FROM BLACK AND WHITE TO BLACK AND DECKER

The same machine that can pick up a knight and move it three spaces ahead, two to the right, can also check drill bits on an assembly line. That's what Microbot, developers of a robotic arm called the MiniMover-5, have found as academia and industry test the latest techniques in computer-controlled manufacturing.



Dr. K. K. Wang, professor of mechanical and aerospace engineering at Cornell University, paired an Apple II computer with the table-top arm of the MiniMover-5 to teach his students. The unit comes with a firmware card that slips into one of the Apple II's extension slots—this card lets users program the robotic arm using Microbot ARMBASIC.

One of Wang's students developed a chess program as a course project, "teaching" the arm to move chess pieces via the Apple keyboard. Simple enough. However, a more sophisticated application of the MiniMover-5 came from Black and Decker Manufacturing Company. Controlled by a multiple-loop ARMBASIC program more than 400 steps long, the robotic arm picks up partly-finished router bits, tests their diameters, and places them in the tooling chuck to complete the tooling process.

The Black and Decker project was planned from the outset as an example of what an inexpensive robot and an inexpensive computer can accomplish together, said a manager at Black and Decker. He said, "We chose an Apple because it's something everyone understands."

BUT WILL IT PLAY IN CUPERTINO?

The authors of "WarGames," the box-office smash film that may yet make data encryption a household word, visited Apple Computer to explain how it just couldn't happen that way. Really. They think.

Larry Lasker and Walter Parkes, who wrote the movie's screenplay, wowed the latest Apple Independent Developers Conference with film clips and funny stories about the flick. Lasker and Parkes said that although each security breakthrough depicted in the movie actually occurred as an isolated incident, that constellation of events has never happened together, and probably never could. They noted that the moral issues bandied about in "WarGames" didn't come up until after they'd started writing.

Strangely enough, neither Lasker nor Parkes had ever owned computers. After their boffo debut at the conference, Apple decided to remedy that by "Apple-izing" them with T-shirts, pens, paper . . . oh, and an Apple IIe for each. Now, if the password "Joshua" pops up on your screen. . . .

UNIVERSAL BAR CODE

Forget the Columbia School of Bartending. Become your own computer bartender with a home bar guide called "Drinks on a Disk."

This "computerbook" by Homemaker Software of Palo Alto, California is no dry tome—discriminating tipplers can drink in 110 plain or fancy recipes from 32 categories, from Old Favorites to Trendy Drinks to Calorie Conscious, even Non-Alcoholic.

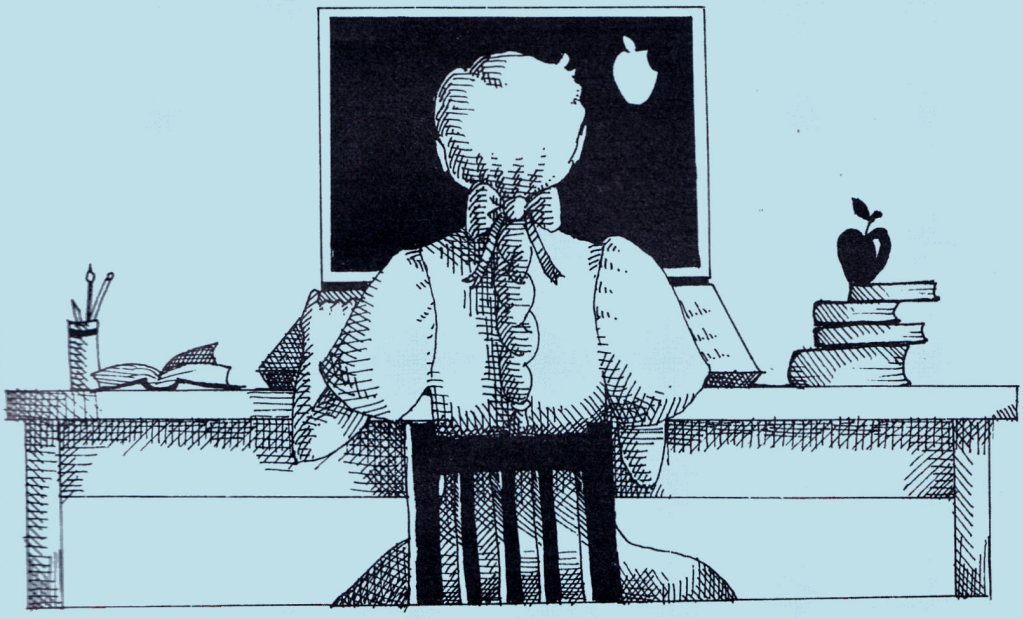
You can even punch up your bartending expertise with a quick review of liquor measurements, proper glassware, and bar equipment. No data input or technical knowledge is required, just enough sober reflection to push a button. Bottoms up!

A MATTER OF POLICY

Keep your computer in good hands—check to see whether your insurance policy protects your precious Apple IIe from theft, flooding, or electrical damage.

More than 1.4 million people have a personal business computer in their home, but few have taken advantage of some insurance companies newest gimmick: "scheduled personal electronic equipment endorsement." With the flick of a pen you can tack on coverage for your personal computer to your existing homeowner's or renter's policy to the tune of $2 per $1,000 in value.

The endorsement effectively circumvents the normal $1,000 limitation in value on business equipment in the home and raises that limit to



$20,000. That limit doesn't affect anyone who uses their computer only for personal matters, according to Donald L. Brown, agent for the Kemper insurance group. Unfortunately, no insurance firm appears to be offering a stand-alone personal computer insurance policy yet, but with the burgeoning number of requests for endorsements, individual coverage could be available soon. Take a gander at your own policy's fine print.

SHAKING THE LEARNING TREE

If you want your kids to really *learn* rather than merely parrot the teacher or play computer games, get them an Apple.

That's because the Apple is currently the only machine to run what some experts consider the best educational software, such as Logo and Bank Street Writer.

Marc Tucker of Annapolis, Maryland, who is currently studying the use of personal computers in education on a grant from the Carnegie Corporation, shies away from recommending a particular brand of computer (though he himself is an Apple owner).

He does recommend, however, that parents steer their children away from just drilling and practicing rote work with computers. You'll help your children most if you let them "study" with packaged programs like Logo on their own, he believes—that way they'll figure out how to record, to analyze, and to express themselves most comfortably.

And that, Tucker thinks, is the key to real learning.

YOUNG MR. LINKIN'

Ed Svoboda, Jr., may be one of the nation's youngest postmasters. At the age of 14, he already runs his own software network and electronic post office on an Apple II in his bedroom at home.

Svoboda's non-profit business, the Silicon Valley Interchange Remote CP/M Public Domain File Transfer and Electronic Mail Facility, has logged more than 3,000 calls from all over the United States. His system links CP/M users and users of specific languages and hardware systems, and allows immediate and wide use of public domain software.

Though he's only been studying computers for five years, Svoboda is already honing the tone of an expert. The one problem he cites with his Sunnyvale-based business is that his Apple overheats. Says Svoboda, "I believe the Apple is too small and needs a minimum of seven interface cards to implement a large full-fledged Remote CP/M System." Look out, Steve Jobs—the kids can't wait!

BYTE BAT BATTERS BETTER

Had one too many system crashes? Would you rather "Control-Y" *all* your software? Well, don't take it out on your family or your furniture—strike back at your recalcitrant computer with the new Byte Bat.

This "universally compatible foamware" is a 17-inch-long foam-rubber bat, similar to the "Bataca" bats used in encounter groups for humans. The Byte Bat looks tough and makes a satisfying but harmless thud against the surface of an errant Apple.



A+ DISPATCHES

It comes with a special user badge, a two-color poster demonstrating proper use of the bat, and a warning decal that proclaims "this computer-friendly liveware is protected by Byte Bat."

The Byte Bat, manufactured by MicroTie Systems Corporation of Albuquerque, New Mexico, has already sold out its test run of 10,000 bats. MicroTie plans to saturate the market with silicon swatters for the Christmas rush.

Can homes for battered computers be far behind?

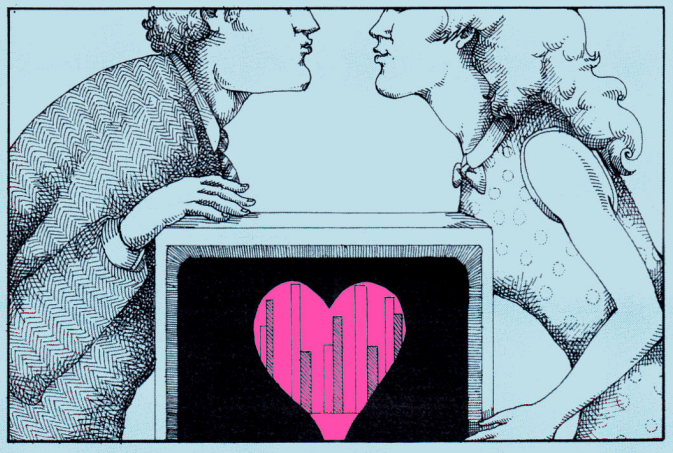
SQUEEZING BLOOD OUT OF AN APPLE

If you thought your doctor would never know you've stopped eating your health-giving bran muffin every morning, be warned that those days of ignorance are nearly over.

Dr. Ronald S. Lankford, M.D., of the Wilshire Medical Group in Des Moines, Iowa, reports that he's employed his Apple computers to check back on patients' appointments to make sure they're following instructions.

Lankford ordered his Apple II Plus to search his database of clinical records and locate patients diagnosed as having high blood pressure. Then he examined their appointment records to see who had missed appointments. The result: in 20 minutes he'd combed through 6 months of data to unearth 7 people who probably weren't taking their anti-hypertension medication. He followed up with a discreet phone call.





CHARTING TRUE LOVE'S COURSE

Today's egalitarian relationships require more fine tuning than in earlier, less divorce-prone times. It's hard to remember all the niggling entries in that giant double-entry book of relationship accounting. Is it your turn to indulge your domestic associate's quirky cravings, or should your mate give this time while you take?

Elizabeth Weal, who works in Apple Computer's publications department, proposes a modest solution to the endless trend analysis of today's twosomes—drag in the computer as scorekeeper.

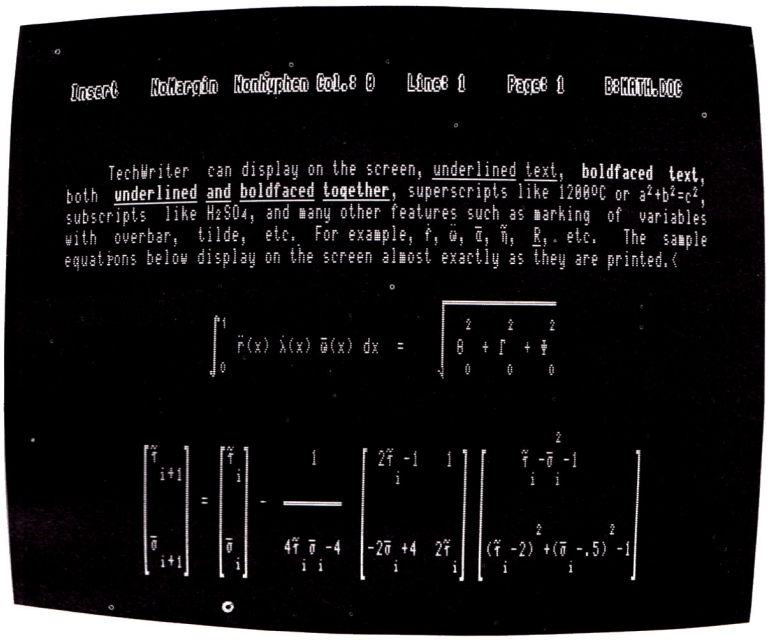
"A relationship is an objective entity," capable of being quantified and tallied like any business transaction, claims Weal. Just develop a database for your relationship to record information about each daily compromise, and consult the computer whenever conflict crops up. Did you pick the restaurant for three weeks in a row? Does your mate hold back on giving any gift more extravagant than a can of tennis balls? Your computer can log in all the data and present it in pretty (or damning) pie charts.

Weal recommends, by the way, that you purchase a portable computer for your recordkeeping. It's a real drag to schlep home to check out your stats.

A+ WANTS YOU

Do you have news, gossip, or unusual computer stories for the Dispatches section? We will pay up to $50 for each submission used. You must include your name, address, and telephone number with the item. We will preserve your anonymity if you wish. All submissions for Dispatches become the property of *A+* and are subject to editing. Please send submissions to the Dispatches department, at *A+*, 654 Bair Island Rd., Suite 212, Redwood City, CA 94063.

CAN YOUR WORD PROCESSOR DO THIS?



ACTUAL TECHWRITER™ SCREEN DISPLAY

TechWriter can display on the screen, underlined text, **boldfaced text**, both **underlined and boldfaced together**, superscripts like 1200°C or $a^2+b^2=c^2$, subscripts like H_2SO_4, and many other features such as marking of variables with overbar, tilde, etc. For example, $\dot{f}$, $\ddot{\omega}$, $\bar{\alpha}$, $\tilde{\eta}$, $\underline{R}$, etc. The sample equations below display on the screen almost exactly as they are printed.

$$\int_0^1 \ddot{r}(x)\ \dot{\lambda}(x)\ \bar{\omega}(x)\ dx = \sqrt{\theta_0^2 + \Gamma_0^2 + \Psi_0^2}$$

$$\begin{bmatrix} \tilde{\tau}_{i+1} \\ \bar{\sigma}_{i+1} \end{bmatrix} = \begin{bmatrix} \tilde{\tau}_i \\ \bar{\sigma}_i \end{bmatrix} - \frac{1}{4\tilde{\tau}_i\bar{\sigma}_i - 4} \begin{bmatrix} 2\tilde{\tau}_i - 1 & 1 \\ -2\bar{\sigma}_i + 4 & 2\tilde{\tau}_i \end{bmatrix} \begin{bmatrix} \tilde{\tau}_i - \bar{\sigma}_i^2 - 1 \\ (\tilde{\tau}_i - 2)^2 + (\bar{\sigma}_i - .5)^2 - 1 \end{bmatrix}$$

ACTUAL TECHWRITER™ PRINTOUT

TECHWRITER™ CAN!

TechWriter is the first full function scientific technical word processor ever developed for personal computers.

TechWriter is available for the APPLE II PLUS, APPLE IIe, IBM PC, NORTHSTAR ADVANTAGE, TELEVIDEO MODEL 803, and (soon) the TELEVIDEO GRAPHICS PORTABLE

Trademarks: TechWriter, Computer Mart, Inc.; Apple II Plus, and Apple IIe, Apple Computer, Inc., IBM PC, International Business Machines, Inc.

TECHWRITER™ IS AVAILABLE FROM **Computer Mart, Inc.**

1395 Main Street, Waltham, MA 02154
(617) 899-4540 Hours: Tues.-Fri. 10-5

CIRCLE 117 ON READER SERVICE CARD

Inside Apple

Vol. 1, No. 3

Apple's new Monitor II. A sight for sore eyes.

If you've been using a TV as a monitor, perhaps you can get a friend to read this for you:

Apple's brand new Monitor II will improve your vision.

It features all the latest ergonomic improvements in monitor technology.

For example:

Studies have shown that the leading cause of eye fatigue for computer users is lack of contrast between the displayed characters and their background.

So we designed the Monitor II around a high contrast green phosphor CRT that provides an extremely dark background. That means you can read text at a lower brightness. And that means you can be more productive — working longer and more comfortably.

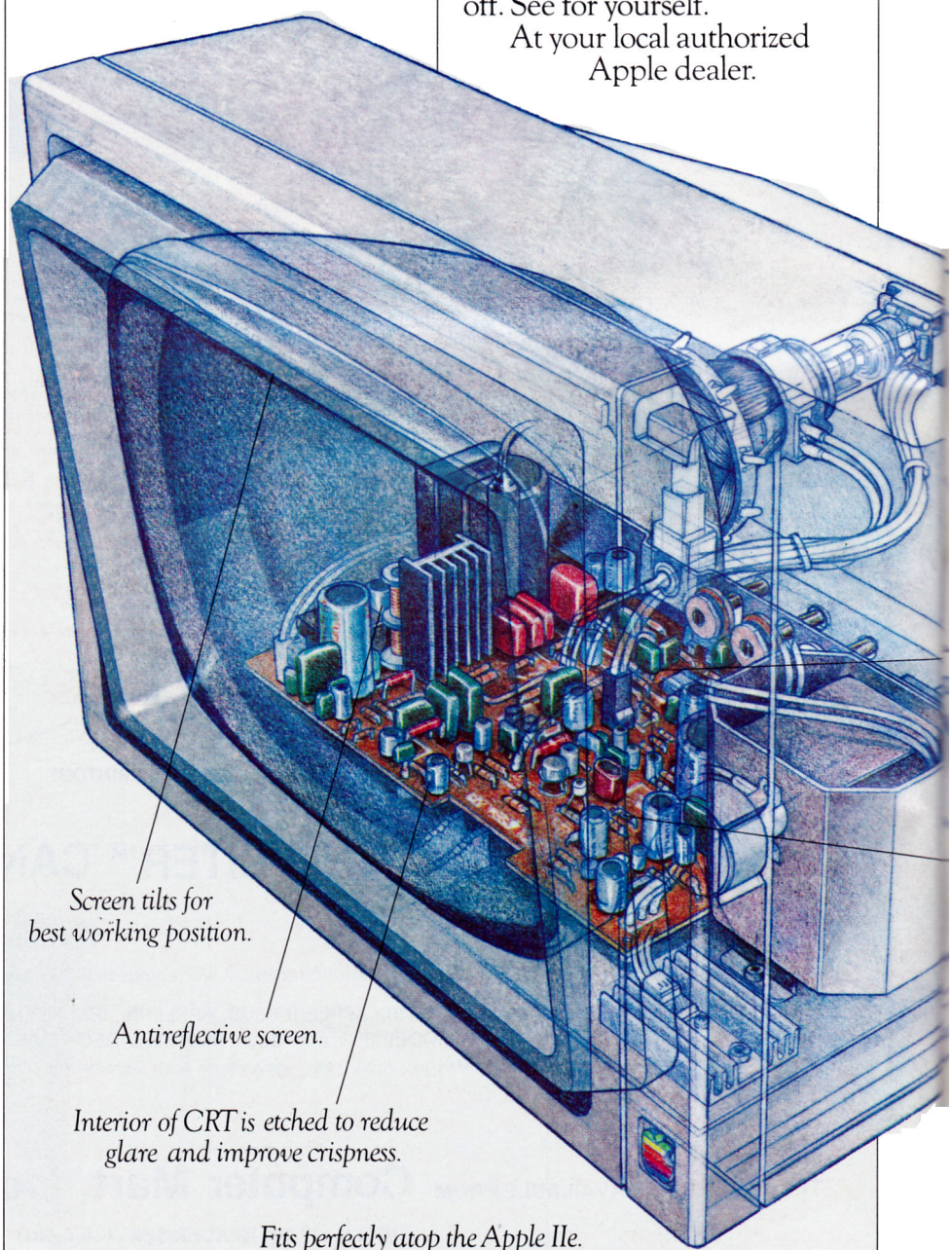
Toward that same end, we also gave Monitor II a tilt screen. So you can angle it perfectly for your working position, without scooting your chair around or sitting on phone books.

And we made that screen antireflective to reduce glare from ambient light.

Monitor II also features a high bandwidth video amplifier and a high tolerance linearity circuit. The former keeps characters from smearing on the screen and eliminates the annoying "ghosts" left by a fast moving cursor. The latter keeps characters crisp, legible and prevents "keystoning" right up to the edges of the display. Both add up to superior display of 80-column text and extremely accurate graphics.

Designed as the perfect system partner for the Apple® IIe Personal Computer, Monitor II requires no monitor stand. It's a perfect fit, aesthetically as well as technically. So it's pleasing to the eye even when it's turned off. See for yourself.

At your local authorized Apple dealer.



Now Apple plots color.

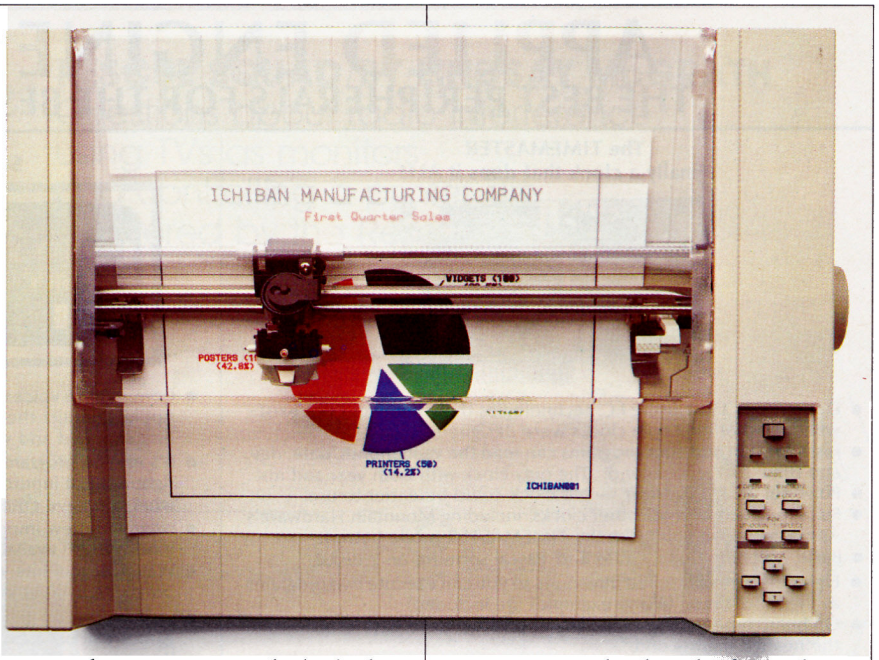
Since color graphics are becoming ever more important in business, we've been hearing more and more calls for a color plotter as reliable as an Apple.

Here it is:

Apple's new Color Plotter can generate all kinds of presentation graphics, engineering drawings or anything else you have to illustrate in up to eight brilliant colors.

And it can perform its art on any size paper up to 11" x 17". Or, with optional transparency pens, it can draw right on transparent film for overhead projection.

Measuring just 4.8"H x 16"W x 12"D, it's the smallest four-color, wide bed color plotter you can buy — about half the size of conventional flatbed plotters. So it takes up less space on your desk and can easily be moved to someone else's desk.

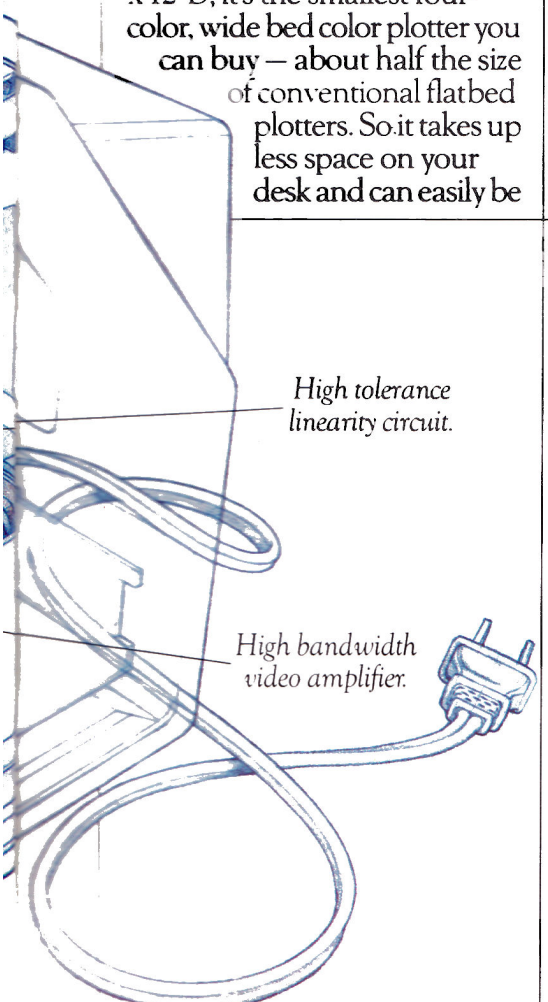


There are two color plotter accessory kits to choose from to assure a perfect marriage with your Apple II or IIe, or Apple III.

Each kit comes with eight color pens — red, blue, green, black, burnt orange, gold, violet and brown. Plus a starter package of plotter paper. Plus all the manuals, documentation and cables appropriate to your particular kind of Apple. So you can get up and coloring right away.

Apple also offers a complete selection of 24 different pen packages — so you can choose whatever colors you need in a variety of widths for a variety of applications and media types.

As you might expect, all of the above is available at many of our authorized Apple dealers.



Carry on with AppleCare℠ Carry-In Service.

No matter how long you've owned your Apple system, you can now get a long term service contract at a very reasonable cost.

AppleCare Carry-In Service is a service plan that will cover most Apple-branded components in your system for one full year.

It covers an unlimited number of repairs and is honored by over 1500 authorized Apple dealers nationwide.

Apple-trained technicians assure you of the highest quality service, fast — in most cases less than 24 hours.

AppleCare Carry-In Service is ideal for anyone who needs to know ahead of time the cost of maintenance for their system.

So check out the details — you'll find it's the lowest cost health plan an Apple can have.

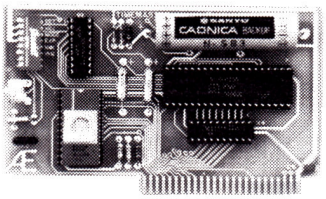
Apple Computer Inc., 20525 Mariani Ave., Cupertino, Calif. 95014. For the authorized dealer nearest you, call (800) 538-9696. *©1983 Apple Computer Inc.*

AppleCare is a service mark of Apple Computer Inc.

CIRCLE 118 ON READER SERVICE CARD

APPLIED ENGINEERING
THE BEST PERIPHERALS FOR THE BEST COMPUTER

The TIMEMASTER
Finally a clock that does it ALL!



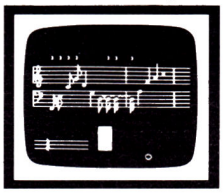
- Designed in 1983 using I.C. technologies that simply did not exist when most other Apple clocks were designed.
- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- Powerful 2K ROM driver — No clock could be easier to use.
- Full emulation of most other clocks, including Mountain Hardware's Appleclock (but you'll like the TIMEMASTER mode better).
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time. (Many examples are included)
- On board timer lets you time any interval up to 48 days long down to the nearest millisecond.

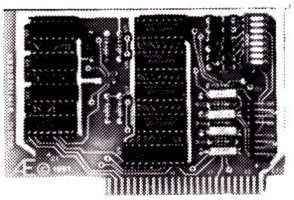
The TIMEMASTER includes 2 disks with some really fantastic time oriented programs (over 25) plus a DOS dater so it will automatically add the date when disk files are created or modified. This disk is over a $200.00 value alone — we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER.

If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER.

PRICE $129.00

Super Music Synthesizer

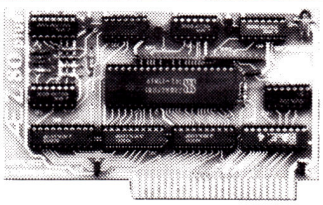




- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite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

PRICE $159.00

Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- All new 1983 design incorporates the latest in I.C. technologies.
- Red "CP/M WORKING" LED indicator, the Z-80 Plus does not interfere with non-CP/M programs.
- An on-card PROM eliminates many I.C.'s for a cooler, less power consuming board. (We use the Z-80A at a fast 4MHZ)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

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

PRICE $139.00

Viewmaster 80

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

- TOTALLY Videx Compatible
- 80 characters by 24 lines, with a sharp 7x9 dot matrix
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software — there are NO exceptions
- Low power consumption through the use of CMOS devices
- All connections on the card are made with standard video connectors, no cables are soldered to the board
- All new 1983 design (using a new Microprocessor based C.R.T. controller)

JUST COMPARE!

	PRICE	BUILT-IN SOFTSWITCH	SHIFT KEY SUPPORT	PASCAL COMPATIBLE	7X9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	**169**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUP'RTERM	375	NO	YES	NO	NO	NO	YES	YES
WIZARD80	245	NO	NO	YES	YES	NO	YES	YES
VISION80	375	YES	YES	YES	YES	NO	NO	NO
OMNIVISION	295	NO	YES	NO	NO	NO	YES	YES
VIEWMAX80	219	YES	YES	YES	YES	NO	NO	YES
SMARTERM	360	YES	YES	YES	NO	NO	YES	NO
VIDEOTERM	345	NO	NO	NO	YES	YES	NO	YES

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

PRICE $169.00

MemoryMaster IIe 128K RAM Card

- Expands your Apple IIe to 192K memory
- Provides an 80 column text display
- Compatible with all Apple IIe 80 column and extended 80 column card software (Same physical size as Apple's 64K card)
- Available in 64K and 128K configurations
- Bank select LED's for each 64K bank
- Permits your IIe to use the new double high resolution graphics
- Automatically expands Visicalc to 95K storage in 80 columns! The 64K configuration is all that's needed, 128K can take you even higher.
- Complete documentation included, we show you how to use all 128K.

If you already have Apple's 64K card, just order the MEMORYMASTER with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

MemoryMaster with 128K	**$249**
Upgradeable MemoryMaster with 64K	**$169**
Non-Upgradeable MemoryMaster with 64K	**$149**

Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products work in APPLE IIe, II, II+ and Franklin (except MemoryMaster). Applied Engineering also manufactures a full line of data acquisition and control products for the Apple; A/D converters and digital I/O cards, etc. Please call for more information. All our products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a no hassle **THREE YEAR WARRANTY.**

All Orders Shipped Same Day. Texas Residents Add 5% Sales Tax. Add $10.00 If Outside U.S.A. Dealer Inquiries Welcome.

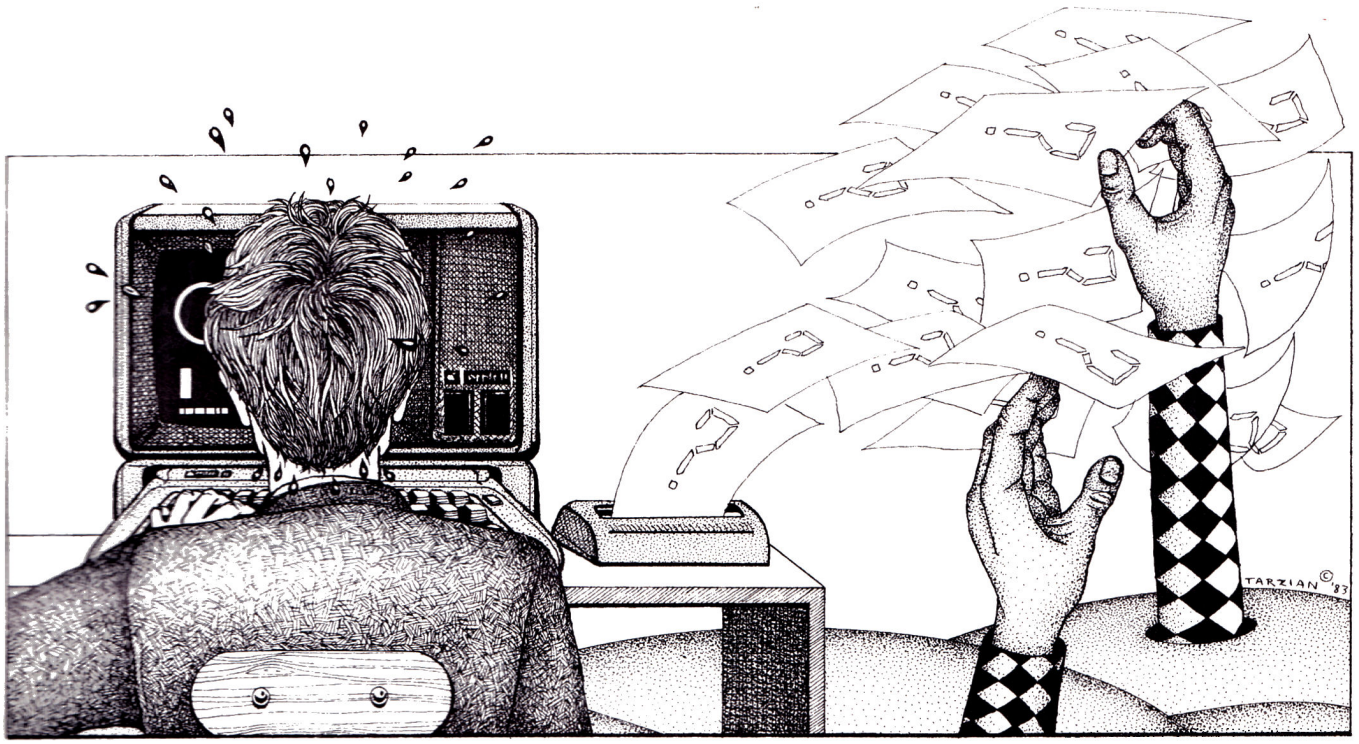
Send Check or Money Order to:
APPLIED ENGINEERING
P.O. Box 470301
Dallas, TX 75247

Call (214) 492-2027
7a.m. to 11p.m. 7 days a week
MasterCard, Visa & C.O.D. Welcome

CIRCLE 175 ON READER SERVICE CARD

RESCUE SQUAD/BY LINDSAY McGRATH

Questions about radio interference, using TVs as monitors, and controlling a printer are answered by the Rescue Squad.



Finding the Facts

Q: I have just purchased an Apple II+ computer. Who can I go to with my many hardware and software questions? Apple's manuals are very good, but don't contain all the information I need.

A: *Your Apple dealer can help with any questions you might have. There is also a user support line you can call for an answer directly from Apple. The telephone number is (408) 745-6731. Chances are your call will be recorded by an answering machine. Apple should provide you with an answer within 2 working days.*

Ruining Interference

Q: I have owned an Apple II since 1978. Recently, I tried to use it with a shortwave radio receiver to decode radio-teletype transmissions. However, the computer created so much interference that I couldn't pick up any stations.

My system has 64K RAM, two disk drives, two monitors, and I don't use a video RF monitor. Can you tell me how to reduce the level of RF radiation from my Apple?

A: *An Electromagnetic Interference (EMI) Suppression kit may be just the thing to reduce interference from your older Apple. The kit consists of a shielded housing and lid, a shielded disk interface cable with the necessary installation hardware, and instructions. The kit may be obtained from your Apple dealer for a suggested retail price of $100 without installation. You'll need an additional shielded cable for your other drive.*

Can you tell me how to reduce the level of RF radiation from my Apple?

Printing Problems

Q: I need some advice on how to implement all the wonderful features of the *Applewriter III* software I just received as a gift. My problem is, how can I get my NEC PC-8023A-C dot matrix printer to change font, type size, etc. through the *Applewriter III*?

A: *Sending instructions to your printer with* Applewriter III *is done through the Control-V command. To use this command, you need to know the instruction the printer is expecting. Let's say that an Escape-U made the printer print in bold face and Escape-D makes the printer print normally.*

If you were typing the words "little red hen" and wanted to have the word "red" in boldface, you would type the following: little [Control-V, the Escape Key, the U key, then Control-V] red [Control-V, the Escape key, the D key, then Control-V] hen.

Monitoring Your Apple

Q: Why can't I use a television as a monitor for my Apple II+? I've tried several different brands, and none performed well—text drifted or was completely unreadable! I finally broke down and bought a color monitor.

I have not found much information

PROFESSIONAL, MOLDED

PROTECTIVE CASE

- Dual Wall Construction. 1" Protective Spacing Between Inner and Outer Wall.
- Molded Cavity on Left for Apple II Plus or E and Two Cavities on Right for Apple Drives. Prevents Component Shifting.
- High Quality Foam Padding.
- Constructed of High-Quality Polyethylene. Rugged and Durable, Yet Lightweight.

FREE
With Each Case Ordered:
A-41 Dust Cover



$109.90

Protect Yourself From Lost Time, Data, and Money Associated With Accidents and Contaminants.

DUST COVERS

Antistatic, High Quality, Heavy Gauge Clear Vinyl

(A-41) Covers Apple II with Apple Monitor and One Disk Drive (Set of 2 Covers) **$19.90**

(A-42) Two Disk Drives, Stacked (1 Cover) **$10.90**

(A-43) One Disk Drive **$9.90**

Printers: Advise type and/or dimensions **$10.90**

All products in stock. Prices Include Freight. Satisfaction Guaranteed. Return within 30 days for full refund.

MasterCard and Visa call:
Toll Free 1-800-531-3122, Operator 27
In Washington State
1-800-227-7800, Operator 27
Send check, money order or credit card number and expiration date to:
P.C.A.
16625 Redmond Way, Suite 107
Redmond, Washington 98052
Phone (206) 882-0385
Washington State residents please add 7.8% sales tax

DEALER INQUIRIES WELCOME
Prices May Increase Without Notice

CIRCLE 120 ON READER SERVICE CARD

available regarding the compatibility of Apples and TVs. Can you tell me what went wrong?

A: *The problem you encountered is that some TVs with digital tuning will not work with Apple computers. Unfortunately, there is not a list of specific brands that are incompatible.*

Apple doesn't have any control over how companies manufacture the television sets, so it markets its own monitor to ensure compatibility and performance.

Junk Letters

Q: I am having trouble using my Apple II for word processing. Whenever I print out a file, the printer begins by typing several unwanted "junk" letters that are not in my text file.

My system is comprised of an Apple II with an Apple parallel card, a NEC 3530 Spinwriter, and the *Screenwriter II* word processing program. I've tried all the printer parameters and driver routines in the *Screenwriter II* program. I checked the parallel card and my printer tests out perfectly.

A: *Flush out the print buffer before starting any printout. The printer manual should have information on the procedure. If that doesn't solve the problem, write to the printer manufacturer, and ask for additional information on the printer's operation.*

Hot RAMS

Q: Recently, I added an Apple language card, a disk drive without controller, and DOS 3.3 upgrade kit to a system that already includes an Apple II, a disk drive with DOS 3.2 controller, and a C. Itoh Starwriter daisywheel printer with Centronics parallel interface. Adding the new equipment created a problem.

The 16-sector *Applewriter* printer program doesn't work consistently on hot days. After storing print constants, the system crashes and will only respond to a reset command. Other programs, including my 13-sector *Applewriter* program, drive the printer with no problem.

Maybe the installation of the hardware was faulty. Or would a fan help?

A: *It sounds like you might have an unreliable RAM chip. A fan might help cool things off, but it would be best to locate the bad chip, if there is one. A continuous RAM test by your dealer should pinpoint the problem.*

Differences in I/Os

Q: I've created a light pen for the Apple II and am seriously thinking of buying an Apple III. Can you tell me the difference between the game I/Os on the two machines? Also, is there any difference between the Apple II and the Apple III in its emulator modes?

A: *There are some differences between an Apple II and Apple II Emulation on the Apple III. The major difference is that you can't use Pascal or any Pascal-based language (Fortran, Pilot) or program while in Emulation. Apple Logo will not run in Emulation. The reason is that you have only 48K of user RAM in Emulation mode.*

Another difference is that Game I/O does not act the same. The Apple III has two paddle ports, A and B. Port A has paddles 0 and 2, while port B has paddles 1 and 3. This can make it tough to play some games written for the Apple II.

Listing Binary Files

Q: How can I list a binary file on the Apple II$^+$? Should I BLOAD the file at a certain memory location and list it? Or do I need to know the memory location where the program starts? I do not know the starting memory address.

A: *It is necessary to know the starting address in order to list a binary file from the memory of an Apple II$^+$. The information for a binary file on disk is saved with two items of information: first the starting address of the file in hex and then the length of the file in hex. This is how the system knows where to put the information when the file is loaded.*

If the binary file is for a high resolution picture, there are only two possible memory locations it can be loaded in. The first is the location of high resolution page 1 or (HGR), with starting hex location A$2000 and a length of hex L$2000. The second is high resolution page 2 or (HGR2), with starting hex location A$4000.

If the file is an assembly language program, there is no set place where it is loaded. The program is placed into memory from where it was saved. And, unless the starting address and length were saved as part of the name of the file, there is no way to find this out from the disk catalog. There are, however, some aftermarket disks that will list disk files and their locations. One of these is Recover 4.0, published by Computer House Division, 1407 Clinton Rd., Jackson, MI 44202, (517) 782-2132.

We would like to thank the technical support people at Apple Computer for their assistance in answering these questions. We are establishing this monthly column to help you solve problems you may have in using any Apple computer and related products. Please send your questions to Rescue Squad, A$^+$, 654 Bair Island Rd., Redwood City, CA 94063.

Do You Run Your Business or Does It Run You?

The biggest headache you may be facing these days is getting better control of your business. Tracking unpaid bills, sending out second billings, monitoring which salesman sold how much and to whom, keeping track of inventories, and on and on.

There's a remedy. It's called VersaForm... the business database.

VersaForm is a powerful database designed specifically for business, but based on the simplicity and convenience of your familiar business forms.

If you can fill out a business form, you can create a database.

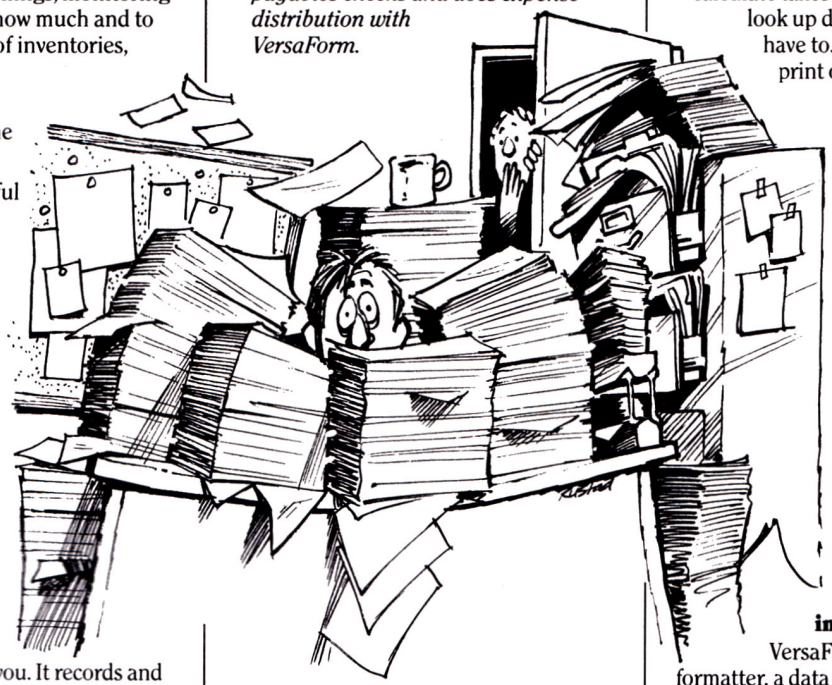
VersaForm starts with your existing forms and procedures. As you copy your forms onto the screen, VersaForm automatically creates a database for you. It records and saves information from Purchase Orders, Invoices, Job Estimates, Disbursement Ledgers... maybe even a few things you're not recording that you should be.

VersaForm is an electronic file cabinet that will store all this information, yet have it at your fingertips when you need it! It's designed with a non-technical user in mind, so you can concentrate on streamlining your business with none of the usual database headaches.

Adapts to your business... your way.

With VersaForm you don't have to completely re-orient your staff. It fits right into the way you're doing business now. Only now your operations will be completed more efficiently and with electronic speed.

- *A doctor in Moulton, Texas, posts his patient billing and completes his medical insurance forms with VersaForm.*
- *A small college in Wheaton, Maryland, uses VersaForm to create tuition invoices, class lists, accounts receivable, and accounts payable.*
- *A computer supplies company in Mountain View, California, writes payables checks and does expense distribution with VersaForm.*



- *A roofing company in Green Bay, Wisconsin, computes job estimates, contracts, invoicing, and tracks actual costs with VersaForm.*
- *A manufacturer in Beaver Falls, Pennsylvania, uses VersaForm to build his company's parts records, and generates "where-used" lists.*

VersaForm has the power to do these jobs and more because it's designed especially for business. It can also calculate taxes and prices, and can look up discounts, so you don't have to. VersaForm will even print on your own pre-printed forms.

Pull information together fast.

Pulling information together from paper files can be time-consuming and frustrating. Why make it tough? VersaForm puts vital reports like sales analyses, overdue payables, open purchase orders, and alphabetical employee lists at your fingertips. Minimum effort, maximum results.

All in one easy-to-use, integrated package.

VersaForm provides a screen formatter, a data entry program, a database, a report generator and a forms printer. And you can purchase predesigned Templates for standard jobs like Purchasing, Invoicing, and Expense Journals. VersaForm is the all-in-one business productivity tool. Ask for a demonstration at your computer dealer. Or contact us directly.



If you want to know more, send in this coupon. We've got a lot to tell you about.

Name

Company

Address

City State Zip

Type of Business

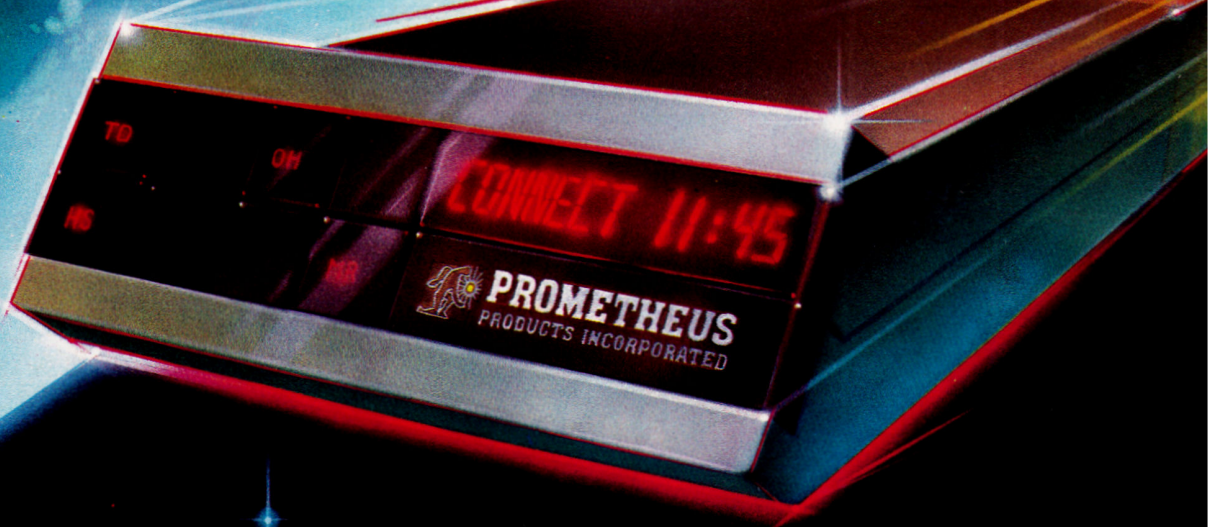
Mail to: Applied Software Technology
170 Knowles Drive
Los Gatos, California 95030
(408) 370-2662

133-D

For use with the Apple II, IIe and III, and the IBM PC and compatibles.

CIRCLE 121 ON READER SERVICE CARD

PRO-MODEM 1200



It's about time.

Time for your computer to make the telephone connection – with an intelligent, full 212A 300/1200 baud modem – with a real time clock/calendar – and with the capability to expand into a complete telecommunications system. It's time for PRO-MODEM 1200. Much more than just a phone modem.

When you're on-line, time is money. PRO-MODEM telecommunication systems help you save. By monitoring the duration and cost of your phone calls. And by sending and receiving messages, unattended, at preset times when the rates are lower. . . with or without your computer.

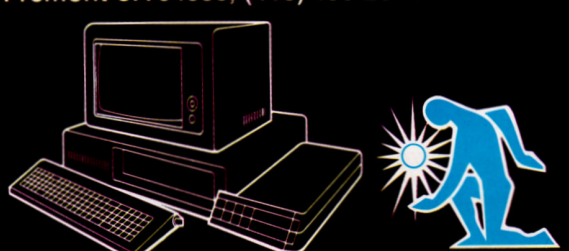
Compare the $495 PRO-MODEM 1200 with any other modem on the market. For example, you'd have to buy both the Hayes Smartmodem 1200 plus their Chronograph for about $950 to get a modem with time base.

PRO-MODEM 1200 is easy to use. A convenient "Help" command displays the Menu of operating command choices for quick reference whenever there's a question about what to do next. Extensive internal and remote self-diagnostics assure that the system is operating properly. Some of the other standard features include Auto Answer, Touch Tone and Pulse Dialing, and Programmable Intelligent Dialing.

PRO-MODEM does more. It lets you build a full telecommunications system with features like Auto Dialer, Incoming and Outgoing Message Buffering, Business/Personal Phone Directory, Programmable Operating Instructions, a 12-Character Alpha-Numeric Time and Message Display, and versatile PRO-COM Software. PRO-MODEM commands are Hayes compatible so you can use most existing telecommunications software without modification.

There's much more to the PRO-MODEM story. See your local dealer for complete details. He'll show you how to save time. And money.

Prometheus Products, Inc., 45277 Fremont Blvd., Fremont CA 94538, (415) 490-2370



PROMETHEUS

PRINTER COMPARISONS

GETTING IT ON PAPER WITH AN APPLE

Getting your hands on hard data is a lot easier when a printer has done its job. Hundreds of models will plug directly into the Apple. Here's how they work and how their mechanical processes differ.

By itself, the Apple is an actor without an audience. Although it can tell tales of dismay and delight about the future using mathematics and modeling, it keeps them a secret, privy to the select few who can see its monitor screen. Only by gathering a committee and having it huddle around the computer, like a powwow around a campfire, can the Apple share its electronic insights with a group.

A printer can change all that. A contrivance that's half electronic brain, half mechanical beast, the printer converts the computer's electrical impulses to the inky marks on paper that human beings obstinately prefer to read. The printer frees your computer's hidden secrets and makes them available to the rest of the world.

Printers are not a single kind of machine; as of yet none comes in a big white box labeled, "Generic hardcopy output device." Rather, they come in more flavors than ice cream—hundreds, possibly thousands of different models—and they are as different from one another as plain vanilla is from double-chocolate-mint chip.

Classifying printers takes more imagination and perseverance than naming a new flavor; some printer differences are slight and some of the classifications merge together. It's like trying to find exactly where the chocolate ends and the fudge begins. But printers can be divided into several stereotypical, overlapping categories based on the mechanical process used to get ink on paper (impact versus nonimpact printers, with various subclasses) and the volume of type (character, line, page) printed at a time (serial, line, or page printers, respectively). Other distinctions tend to be more fanciful or conjectural, such as the attempts to give objective classifications and names to the subjective appearance of the final characters on paper (letter quality, correspondence quality, draft quality, and data processing quality).

The printer frees your computer's hidden secrets and makes them available to the rest of the world.

The best way to find your favorite among printers is to try out each and every one. However, if your budget does not allow that luxury, the next best way is by making an informed choice, based on an understanding of how all printers work and which ones suit a particular application best.

Hitting the Paper

Probably the most popular type of printer is use today is the impact printer. Until recently nearly the only kind connected to personal computers, impact printers are direct descendents of office typewriters and work on exactly the same principle. A hammer of some kind strikes a ribbon (cotton or nylon) soaked in ink and a ribbon (film or Mylar) coated with ink then strikes the paper. The impact of the hammer against the ribbon forces ink onto the paper.

Like any mechanical impact, the hammer hitting the ribbon and paper makes noise; a sharp staccato rattle that's usually louder than normal conversation and obnoxious, at least when compared to the hushed whir of nonimpact printers.

Impact printers are popular because they're relatively cheap to make, straightforward to understand, and reassuringly familiar. They can print on anything a typewriter can, from plain paper to thin cardstock, and the impact is sufficient to make multiple copies at a time using carbon paper or carbonless multiple copy forms.

A list of nonimpact printers, which brings to mind the special effects used in a George Lucas movie, includes laser, electrosensitive, ion deposition, magnetic imaging, thermal, ink-jet, and photographic-based printers. The only generalization that can be made about them is that they don't strike the paper with a hammer to make images. The more accessible—that is, more affordable—nonimpact printers do, however, share some common characteristics: relatively quiet operation and inability to make carbon copies.

The more common nonimpact printers generate text by altering the surface characteristics of a specially treated paper either by heat (thermal printers), by electricity (electrosensitive), or by light (photographic). The more exotic nonimpact machines are designed for specialized applications: extremely high output or extremely high quality, for instance. They might be used in the data processing department of a major corporation or a phototypesetting plant. Generally speaking these printers are expensive.

Making the Most of the Matrix

Matrix, or, more commonly, dot-matrix, printers type the on-paper equivalent of a newspaper halftone photograph. They form printed characters out of dots. Each character is broken into a collection of dots, each one of which is positioned at a specific location in a grid array, or matrix, for each character. Like the newspaper halftone photographs, the printed characters are a little rough at the edges, and the on-paper printed quality varies with size and number of dots in a given area. More dots closer together yield a character with more detail and greater legibility. Unambiguous upper and lowercase characters can be printed in arrays as small as five horizontal dots by seven vertical dots, but seven dots is not enough to make the tails of the descending characters (lowercase *g, j, p, q,* and *y*) dip properly below the character line. Most popular inexpensive matrix printers use a 9-by-9 matrix today, although larger matrixes are not that unusual.

Though the rough character approximations of matrix printers are not as aesthetically pleasing as normally typed or printed characters, the dot-matrix printers have an advantage over other typing technologies. Because the dot patterns are computer controlled, the typeface or type font (what each individual character looks like) can be altered by changing the software. Characters can be made wider or narrower, italicized or boldface, just by changing the pattern coded into the printer's memory. Many newer matrix printers even allow the user to develop his own character fonts or other symbols and load them from his computer into the printer's memory. The matrix printer can type such downloaded characters as easily as any other lettering.

The most common matrix printers use an impact print mechanism, in which each dot is formed by a single tiny hammer, actually a wire, striking a ribbon to transfer ink onto the paper. Typically, a seemingly complex, but efficient mechanism controls the wire. While a spring constantly pushes the print wire toward the paper, most of the time the wire is held back by a strong permanent magnet. When a command from the host computer indicates that the wire should make a dot on the paper, an electromagnet is energized to generate a field that neutralizes the permanent magnetic restraining effect on the print wire. Released from magnetic restraint, the print wire is pulled by the spring's force to strike the paper.

A printhead consists of a number of these wires and their associated mechanisms. In a typical low-speed or serial matrix printer (speeds measured in up to hundreds of characters per second), seven or nine wires (or more, depending on the vertical height of the matrix) are arranged in a vertical column in the printhead. The printhead moves horizontally across the paper, and each wire fires as necessary to form the individual characters one nine-dot column at a time. For better image quality and more dots per inch, some machines send their printheads past the same typed line more than once, filling in the tiny blanks between dots and making the printed characters look closer to letter-perfect.

Impact printers are popular because they're relatively cheap to make, straightforward to understand, and reassuringly familiar.

One of the primary factors that determines how fast any impact matrix printer can create characters on paper is the time between successive strikes of the print wire. Physical laws of motion limit the acceleration of the wire and hence the speed at which it can move. Therefore, barring the repeal of the laws of Nature, a great speed increase is impossible. One way around this speed limit is by combining more print wires and by shortening the sweep of the printhead for each line. More wires firing within the same period means more characters can be formed.

High speed matrix line printers (with speeds of hundreds of lines per minute) typically use a horizontal row of 132 print wires that stretches across the entire width of a sheet of paper. For each full line of characters, the printhead moves only five or so dots (or increments) over, then the paper is advanced one full line, and the printhead starts typing the next line of text.

Matrix characters can also be formed without impact using ink-jet, thermal, laser, and related principles.

Although the first ink-jet printers were expensive, high-speed line printers that sprayed tiny drops of ink onto paper from a long horizontal row of nozzles, the latest serial ink-jet printers use a small, moving printhead and rival the serial impact matrix printers in both speed and cost. The individual jets of ink can be carefully controlled for high-quality printouts; however, the simpler mechanisms used in low-priced ink-jet printers create text that can only be classed as data processing quality.

Electrosensitive and thermal printers create matrix images by using special printheads with multiple styli arranged like the printwires of impact matrix printers. The styli physically contact a special paper treated to change color (usually darken) in response to the electrical or heat changes in the styli. Although inherently quiet, reasonably fast, and relatively inexpensive, these printers have not yet won wide favor because they require special, hard-to-obtain paper. In business applications the need for treated paper is a particular handicap because it precludes the use of preprinted forms and letterheads.

Pages per Minute

Luke Skywalker's laser technology has been adapted to high-speed printers. A laser beam is used in such machines to trace characters on a drum coated with light-sensitive selenium. The exposed areas of the drum can be electrostatically charged to attract pigment. When paper is wrapped around the drum, the pigment can be thermally bonded to it. The operating principle is exactly the same as a Xerox photocopying machine—and, as you might expect, the resulting hard copy looks just like it came from a Xerox machine.

TRANSEND.©

COMMUNICATIONS PACKAGES FOR IBM PC™ AND APPLE®.

THE WORLD JUST KEEPS GETTING SMALLER.



AND SIMPLER.

Electronic communications will change the way you see your world.

It has already changed the way you'll see SSM. Because the leading innovator in electronic communications—

SSM Microcomputer Products, Inc

is now

TRANSEND

Transend stands for innovative electronic communications for your personal computer. Quickly. Easily. Affordably. Transend. At computer retailers nationwide.

Apple is a registered trademark of Apple Computer Inc. IBM PC is a trademark of International Business Machines Corporation
© 1983 Transend Corporation

CIRCLE 123 ON READER SERVICE CARD

Laser printers resemble Xerox copiers, too, in size and cost—table-sized rather than table-top, with prices in the tens of thousands of dollars range. But just as photocopiers have been shrinking both in size and price, so have the latest laser printers. (One was announced last year with a $4,500 tag.)

Laser printers' photostatic process permits the use of nearly any paper (besides wax paper), including stationery and preprinted business forms. Legibility and print quality is high (although the characters are not fully formed, the matrix density is very high), and throughput is astounding—measured in *pages* per minute, rather than character per second or line per minute. Current machines average from 20 through 43 pages per minute. Laser printers cannot make carbons, but they're so fast it may not matter!

Ion-deposition printers work on a similar principle but substitute a stream of ions (electrically charged atoms or molecules) for laser beams. Though a fledgling technology, ions have a substantial advantage over lasers. They can be directed and modulated into the proper on-paper patterns using magnetic or electrostatic fields. Shifting a laser beam requires optics. Potentially, ion-deposition printers can be simpler (hence, less expensive) than laser machines.

The Electronic Linotype

Fully formed character printers make letters the old-fashioned way. Like old newspaper linotypes that cast the finest detail of every character by pouring lead into a negative mold, fully formed characters use a form of mold to create images with the finest detail. Each character is formed in one step from a negative single image, which can serve as a model for a nearly unlimited number of exact copies of the character.

Impact fully formed characters carry on the proud heritage of their typewriter forefathers. A raised, fully formed negative image of the final character is struck against a ribbon, which then transfers that exact image to the paper. Each character to be printed must be moved in sequence in front of a hammer, which will strike it against the ribbon.

Various schemes have been devised to move the characters into position. Ball mechanism printers are just refugee ball-mechanism typewriters. The character molds are arranged on the surface of a sphere or ball, which is shifted into the proper orientation so that a specific spot on its surface can strike the ribbon. Because the ball of type makes more gyrations than a disco dancer, most ball printers are relatively slow, below about 12 characters per second.

So-called "daisy-wheel" printers arrange their negative character images on the tips of petallike hubs of a wheel and rotate the appropriate character in front of the print hammer. Bend the petals of the daisy upward, and the result is a "thimble." This arrangement greatly simplifies the positioning process. And because the spinning wheels never need to change direction, they can be sped up.

To avoid smearing the images they make, however, every part of the printing mechanism must come to a halt before the hammer strikes—this means the daisy wheel must stop spinning, and the carriage mechanism must settle down before anything gets on the paper; then it must speed up again to get to the next character. Although fully formed character printers need make only one stroke to equal the dozen or so wire dots of matrix printers, their ultimate speed capabilities are lower, ranging from 12 to 55 characters per second.

For higher print speeds combined with high print quality, fully formed characters can be rearranged in another manner, embossed onto a continuous band that's driven between pulleys at very rapid rate, to create a "band printer." Another variation on the theme is the "chain printer," which has imprinting characters embossed on slugs linked together into a continuous chain.

SEVEN BASIC APPLE-COMPATIBLE PRINTERS

Seven contenders slug it out for the title, "Best Of The Budget Matrix Printers." We'll let you be the referee.

Unless your eyes are sensitive only to the color green (or whatever the hue of your monitor) the question of adding a printer to your Apple system is usually foregone. Today a printer is not so much an accessory as a necessity—for listing programs, unfurling spreadsheets, and materializing both memos and manuscripts.

The big question that arises after deciding to buy a printer—Which printer is best for you?—is not so easily answered. The variety of available Apple-compatible printers is, at best, bewildering and, more likely, mind boggling. Permutations of makers' names and model numbers mixed with the best of the buzz words—ink-jets, daisy-wheels, dot-matrixes, laser, and thermal are just the beginning—bring the total number up to the multiple hundreds.

The first step in narrowing your search is to decide exactly what your primary purpose is and match prospective machines to that purpose. For instance,

Unless you're allergic to ink, the style of ribbon should not be a major factor in choosing a printer.

if you want your printer to impress your neolithic friends, you can probably find a printer that's gold plated or blows smoke rings. If you want absolutely the most versatile machine available, don't be satisfied with anything less than one with a built-in bowling ball polisher and compost compiler. However, if by some chance, your goal—getting words and data down on paper as simply and cheaply as possible—coincides with that of most personal computerists, you'll find a number of candidates worthy of your choice. Among the possibilities you'll discover the seven matrix printers discussed here: the Apple Dot Matrix printer, Epson RX-80, Gorilla Banana, C. Itoh ProWriter II, Mannesmann-Tally Spirit-80, Star-Micronics Gemini-10X, and the STX-80.

These seven samurai (all hail from the Land of the Rising Sun) fit into the couple-of-hundred-dollar price range, typically near the bottom of their makers' printer price lists. All have one primary purpose: to get you printing for the lowest price and the minimum fuss and bother. All are matrix machines and handle normal 9½-inch wide continuous-form computer paper and plug directly into the Apple's accessory parallel interface. But as much as they are alike, they are also different; each is built with a varying degree of quality, range of speed, and array of special features.

Perhaps the only way to know which of them best matches your needs is to try

KEYS TO SUCCESS

Now available for IBM PC



The keys to success.

Whether you have a small retail company, manage a service agency or run a cattle ranch, you have to do something else well to build a business—*manage money.*

You've got to analyze cash flow, see trends and forecast profitability in a time and cost effective manner.

The right fit.

A computerized accounting system makes sense, but finding the right software is important. The "home checkbook" programs are easy to use but they don't have the advanced reporting capabilities you need. And many small businesses just don't need the complexity or the cost of the modular systems.

Practical Accountant™ is a single entry, small business accounting program that comes complete in one package. It's friendly enough to balance your checkbook, yet sophisticated enough to give you the kind of money management information you need for a successful business.

We could have called it "Accounting Made Easy."

Practical Accountant is designed around fundamental accounting procedures. Even if you don't know much about accounting it is an ideal program.

The manual explains basic accounting terminology and provides a comprehensive tutorial. It will take you step-by-step through the process of setting up a complete, single entry accounting system you can begin using right away.

It's quick to learn and convenient to use.

The program guides you with easy-to-use menus and provides on the screen prompting. Practical Accountant even does some of your work for you like organizing entries in date order—even if you don't.

It's very flexible. You set it up to fit your business.

Practical Accountant allows you to set up your "Chart of Accounts" (income and expense categories) with up to 50 categories, 300 sub-categories and with 20 tax type definitions—all defined by you. The manual shows you how to set up an accounting system for a small business, complete with samples.

Cash Flow Reporting— money management information.

Perhaps the most valuable feature of the program is the cash flow reporting capability. You can look at cash flow by category, by sub-category and by tax type to analyze profitability, tax consequences and general performance. All of your reports are professionally formatted and you have access to profitability information that leads to sound business management.

There is more to this success story.

If you would like to know more about Practical Accountant your dealer can give you a great demonstration and a brochure with a more complete story, or call Softlink TOLL FREE at 800 633-6300 (in CA 800 222-1244) and we will send you the brochure.

Practical Accountant™

Single entry, small business accounting for the Apple IIe, IBM PC and compatibles.

$149.95
suggested retail

SOFTLINK™
3255-2 Scott Blvd.
Santa Clara, CA 95051
408/988-8011

Practical Accountant is a trademark of Softlink Corporation
Apple is a registered trademark of Apple Computer, Inc.
IBM is a registered trademark of International Business Machines Corporation

CIRCLE 124 ON READER SERVICE CARD

out all of them. But that kind of selection process is expensive if you can't beg, borrow, or abscond with the whole array. So, here is an alternative: We've done the trying for you (including poking a hole in some ballooning print speed figures), and we'll share our thoughts and the features of each machine so you can match our findings to your needs.

This report is not without its limitations. To be honest, the number of matrix printers vying to be the best for your minimal budget is a bit larger than seven. In fact, over 100 printer models are available for less than $1000! Nevertheless, our selection of machines is representative of features you might expect from low-priced printers. We had to limit the number of printers in this review for practical reasons.

We used the same strangely skewed selection criteria that the typical first-time printer buyer might rely on.

We used a highly scientific method to narrow the field: arbitrary choice. Our selection is a mixture of things we've heard a lot about, the cheapest printers we could find, new machines that intrigued us, and the official minimal model from our favorite computer manufacturer. In short, we used the same strangely skewed selection criteria that the typical first-time printer buyer might rely on.

Examining our Examination

Reading our reports you may believe that our procedure was simple: We put all the printers in a room and let loose a trained chimpanzee to see if he could get them running, or as an alternative, see if he could destroy them. Close. We set our hardware reviewer free in a room containing all the printers and would not let him out until he had them all running. To simulate a typical office environment, we used a typical office. To simulate the normal response of other people sharing a room filled with chattering printers, we loaded the room with editors.

Not content with manufacturer's print speed ratings, we tested "throughput," or how fast the characters were actually formed on paper. We connected an Apple IIe individually to each printer in turn and tested speed with a simple loop in Applesoft BASIC (with the newsman's favorite teletype phrase, "The quick brown fox jumped over the lazy dog's back. 0123456789," which contains every letter of the alphabet). The throughput rating given on the accompanying chart is for the highest print speed we measured for each printer. In every case this was the standard 10-pitch typeface with no enhancements or special features. Note that although condensed or italic type doesn't slow down the speed by much, emphasized or double-width characters can cut speed in half. Note, too, that even these inexpensive machines have advanced speed-enhancing features like logic-seeking bi-directional printing (except the Banana, with which printing is a one-way job).

We tested sound level on two axis, about one meter away from the printer and averaged the readings, using slow meter response and "A" weighting. Taken individually these readings are meaningless, because there is no absolute standard of noisiness—such measurements can vary widely with technique and test conditions. Taken together, however, the figures allow you to compare how noisy each printer was in relation to the others we tested under identical conditions.

Printer manufacturers use an amazing variety of names for the characters their printers make: boldface, emphasized, double-width, expanded, headline type, to name a few. We've tried to sort through and use common names. Expanded and double-width characters are given in the chart by their equivalent character pitch (that is, how many of each will fit on a linear inch of paper). We've listed other added printing effects. If names alone don't suffice, we've included examples of the print quality (see print samples) for various typefaces and graphics from a selection of these printers.

Apple Dot Matrix Printer

If you don't want to look at what seems like a thousand printers and test each one for compatibility, the obvious choice is the official Apple Dot Matrix Printer.

Although you might choose it by default, it's a good choice. You get a top-quality printer with more features than most people will ever use, reasonably high print speed, and a cabinet with a color and name tag that match your computer. All you need do is plug it in and you'll be printing without having to tangle with DIP switches and make sense of escape sequences.

Of all the printers in this test, the Apple offers the widest variety of type sizes and styles, seven widths (condensed, ultracondensed, pica, elite, extended (9-pitch), and two that are proportionally spaced). Any of these can be underlined, bold-faced, or made into headline (double-width) type through the appropriate software command. Furthermore, it allows downloadable (design-your-own) character sets and provides a whopping big 16-by-8 dot matrix to hold each of the characters derived from the flights of your imagination. Normal character sets are formed by the Apple's nine-wire printhead in a 7-by-9 dot matrix. The printer can also handle dot-addressable graphics with nominal 72-by-72 dot-per-inch resolution. (Horizontal dot density can be increased, but little detail is gained by doing so.)

The controls, located in a recessed area on the front of the machine, allow normal paper handling (pushbuttons marked T.O.F. for Top-of-Form and L.F. for Line Feed) and selecting the machine on-line or off-line (SEL pushbutton). LEDs indicate that the power is turned on (green LED labeled POWER), that the printer is on-line (green LED labeled SEL) and if a fault should occur (red LED labeled P.E., possibly meaning Paper Error or Problem Erupting). The line feeds are rather slow but become faster and smoothly continuous if the L.F. button is held down for more than a second.

The Apple Dot Matrix Printer uses a small ribbon cartridge containing a fabric ribbon. It is not a continuous loop; it automatically reverses direction when it reaches its end—more like a typewriter's ribbon than a printer's. Installing and changing the ribbon is a snap. (Although the manual indicates only Apple ribbons will fit, C. Itoh ProWriter II ribbons proved to be interchangeable.)

Printer manufacturers use an amazing variety of names for the characters their printers make.

The paper handling abilities of the Apple allow use of either continuous-form paper from 4 to 10 inches wide or friction-fed single sheets. Continuous form paper is first fed from the rear of the printer through the tractor mechanism, then around a rubber platen, and past the printhead. The platen knob on the right side of the machine permits precision paper positioning and even allows you to roll the paper backwards. A red plastic lever on the right side of the printer

Your money saving Christmas list from Nonagon

SPECIALS

APPLE	
Wordstar with CPM Card (Micropro)	$ 360.00
16K Ramcard (RGB)	47.95
Disk Drive 5¼" (RGB)	224.95
Diagnostic Controller Card (RGB)	99.95
System Saver	62.95
Multiplan	185.95
TG Joystick for IIe	43.95
FOR ALL COMPUTERS	
5¼" Datalife Diskettes SSDD	25.95
5¼" Data life Diskettes DSDD	40.00
5¼" Head Cleaning Kit (Verbatim)	9.95
5¼" Verbatim Refills for Head Cleaning Kit	15.50

APPLE BUSINESS

	RETAIL PRICE	YOUR PRICE
ASHTON-TATE		
Friday	295.00	235.00
BRODERBUND		
Bank Street Writer	69.95	49.95
CONTINENTAL		
Home Accountant	74.95	52.50
Gen Ledger/AP/AR/Payroll	249.95	174.95
Property Management	494.95	346.50
EAGLE		
Money Decisions Vol I	199.95	149.95
Money Decisions Vol II	229.95	172.95
MICRO PRO		
Wordstar	495.00	346.50
Mailmerge	250.00	174.95
Spellstar	250.00	174.95
MICROSOFT		
MultiTool Financial Statement	100.00	80.00
MultiTool Budget Analysis	150.00	120.00
SIERRA-ON-LINE		
Screenwriter Pro	199.95	139.95
General Manager	229.95	160.90
SILICON VALLEY		
List Handler	39.95	27.95
Word Handler	59.95	34.95
SOFTWARE PUBLISHING		
PFS-File	125.00	83.50
PFS-Report	125.00	83.50
PFS-Graph	125.00	83.50
STONEWARE		
DB Mastery-40	350.00	245.0
Utility Pk #1	129.95	90.95
Utility Pk #2	129.95	90.95
Statistics Pk	129.95	90.95

APPLE EDUCATIONAL

BRAIN BANK		
Human Body	90.00	72.00
Skeletal System	70.00	56.00
COMPUTER ADVANCED IDEAS		
The Game Show System Disk	39.95	31.95
Subject Disk	19.95	15.95
Wizard of Words	39.95	31.95
EDU-WARE		
Algebra I, II, III, or IV	39.95	31.95
Algebra V & VI	49.95	39.95
Compu-Read	29.95	23.95
PSAT	49.00	39.95
SAT	49.00	39.95
Compu-Spell System Disk	29.95	23.95
Compu-Spell Data Disk (4, 5, 6, 7, or 8)	19.95	15.95
Hands on Basic Programming	79.95	63.95
KRELL		
Logo	89.95	72.95
SAT	300.00	250.00
LEARNING COMPANY		
Rocky's Boots	49.95	39.95
Mop Town Parade	39.95	31.95
LIGHTNING		
Master Type	39.95	31.95
MICRO POWER & LIGHT		
Proots & Properties	29.95	23.95
PDI		
New Step by Step 1	89.95	71.95
Step by Step 2	89.95	71.95
SCHOLASTIC		
Microzine	39.95	31.95
SPINNAKER		
In Search of Most Amazing Things	39.95	31.95
Delta Drawing	49.95	39.95
SYDNEY		
Evolution	39.95	31.95

APPLE GAMES

AVANT GARDE		
Hi Res Golf II	39.95	27.95
BRODERBUND		
Lode Runner	34.95	24.50
AE		
Gumball	29.95	20.95
BUDGECO		
Raster Blaster	29.95	20.95
Pin Ball Const	39.95	27.95
DATAMOST		
Zaxxon	39.95	27.95
EDU-WARE		
Prisoner II	32.95	23.50
Empire I or II	32.95	23.50
Rendezvous	39.95	27.95
HAYDEN		
Sargon II	34.95	24.50
INFOCOM		
Zork I, II, or III	39.95	27.95
Suspended	49.95	34.95
Witness	49.95	34.95
Deadline	49.95	34.95
MICROLAB		
Miner 2049er	39.95	27.95
High Rise	34.95	24.50
ODESSA		
Chess	69.95	49.95
ORIGIN SYSTEMS		
Ultima III D	54.95	44.95
PENGUIN		
Quest	19.95	15.95
Transylvania	19.95	15.95
SIERRA-ON-LINE		
Ultima II	59.95	41.95
Time Zone	99.95	69.95
Dark Crystal	39.95	27.95
SIR TECH		
Proving Grounds	49.95	34.95
Knight of Diamonds	34.95	24.50
Legacy of Llygamyn	39.95	27.95
Galactic Attack	29.95	20.95
Star Maze	34.95	24.50
STRATEGIC SIMULATION		
North Atlantic 1986	59.95	41.95
Germany 1985	59.95	41.95
Ring Side Seat	39.95	27.95
Cosmic Balance II	39.95	27.95
SYNERGISTIC		
Microbe	44.95	31.50
Bolo	34.95	24.50

APPLE HARDWARE

ADVANCED LOGIC SYSTEMS		
Z Card II	169.95	142.95
Smartterm II	179.95	151.95
ELECTRO HOME		
Hi-Res RGB Color Monitor with NTS/Interface	599.95	449.95
HAYES		
Micro Modem with Terminal Program	408.95	306.95
TG PRODUCTS		
Paddles	39.95	27.95
Select-A-Port	59.95	41.95
USI		
Hi Res Amber/Green Monitor	249.95	169.95

APPLE UTILITIES

BEAGLE BROTHERS		
Alpha Plot	39.95	27.95
Apple Mechanic	29.95	20.95
Doss Boss	23.95	19.50
Pronto Doss	29.95	20.95
Double Take	34.95	24.50
Tip Disk #1	19.95	15.95
Utility City	29.95	20.95
HAYDEN		
Apple Soft Compiler	99.95	69.95
PENGUIN		
New Graphics Magician	59.95	41.95
Complete Graphics System	69.95	48.95
PHOENIX		
Zoom Grafix	49.95	34.95
SOUTH WESTERN DATA		
Munch-A-Bug	49.95	34.95
Merlin	64.95	45.50
Assembly Lines	19.95	15.95
Printographers	49.95	34.95

You'll save money on Software from Nonagon. We're a mail order house with software from over 50 companies. Business, education, entertainment and utility applications with software for Atari, Commodore, Apple and IBM computers. Prompt delivery. Call us and order today.

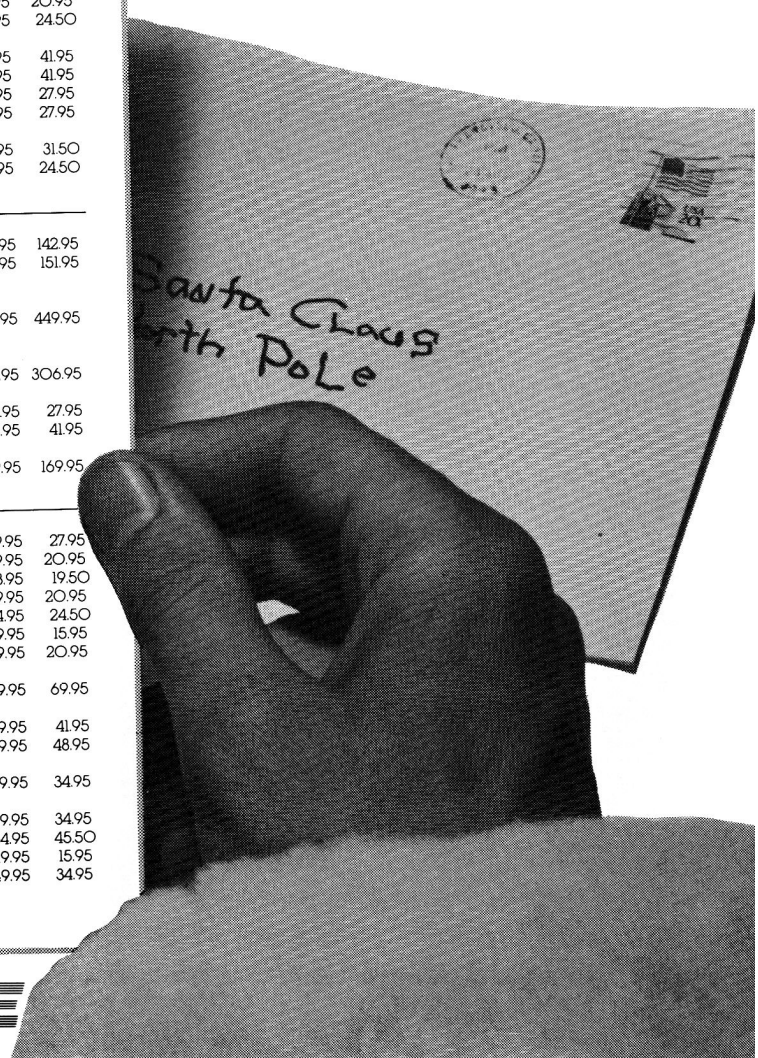
TOLL FREE **800-942-2058**

Or send your check, money order, or credit card number and expiration date along with your name, address and phone number, type of media and computer for which you are ordering product(s) to:

NONAGON SOFTWARE
P.O. BOX 1486
EL CERRITO, CA 94530
PH. (415) 237-4406

Add $3.00 for shipping and handling (foreign orders/hardware extra). California residents add 6½% sales tax.

CIRCLE 125 ON READER SERVICE CARD



NONAGONSOFTWARE

adjusts the head gap for optimum print intensity or for multiple copies (original and up to three carbons totalling 0.011 inch).

The Apple printer we used in our tests was borrowed from a Lisa system, so its documentation came in a binder to match the rest of the Lisa manuals. The setup instructions are among the clearest and

A-PLUS BASIC MATRIX PRINTER COMPARISON CHART

	APPLE Dot-Matrix Printer	**EPSON** RX-80	**GORILLA** Banana	**C. ITOH** ProWriter II	**MANNESMANN-TALLY** Spirit-80	**STAR-MICRONICS** Gemini-10X	**STAR-MICRONICS** STX-80
Claimed Top Speed*	120	100	50	120	80	120	60
Tested Throughput**	63	59	21	74	59	72	27
Tested Sound Level***	72.5	78.5	77	74.5	75	78.5	<60
Printer Type	Impact	Impact	Impact	Impact	Impact	Impact	Thermal
Character Pitches	4.5,5,6,7.5,8.5,9, 10,12,15,17 & 2P.S.	5,6,8.5, 10,12,17	5,10	5,6,8.5,10,12, 17 & P.S.	5,9,10,17	5,6,8.5, 10,12,17	5.5,11
Line Spacing****	6,8 or n/144", 1<n<99	6,8, or 7/72" n/72", n/216"	6	6,8 or n/144" 1<n<99	6 or n/72" or n/216"	6,8 or n/72" or n/144"	6,11 or 7/66" or 4/33"
# of Copies (incl. orig.)	4	3	2	4	4	Not Specified	1
Printhead Wires	9	9	1	9	9	9	[9 styli]
Italics?	No	No	No	No	Yes	Yes	No
Emphasized/Bold?	Yes	Yes	No	Yes	Yes	Yes	No
Superscript/Subscript?	No	Yes	No	No	Yes	Yes	No
True Descenders?	Yes	Yes	No	Yes	Yes	Yes	Yes
Downloadable Characters?	Yes	No	No	No	No	Yes	No
Block Graphics?	No	Yes	No	Yes	Yes	Yes	Yes
Dot-Addressable Graphics?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maximum Paper Width (in.)	10	10	10	10	10	NS (9.5" fits)	(uses special paper)
Minimum Paper Width (in.) (that fits tractors)	4.5	4	4.5	NS (4.5 okay)	4	NS (4.5 okay)	(uses special paper)
Friction Feed? (Single Shts.)	Yes	No	No	Yes	Yes	Yes	Yes
Tractor Feed?	Yes	Yes	Yes	Yes	Yes	Yes	No—use roll paper
Weight (pounds)	18.75	11.3	9.9	18.7	11	15.4	7.7
Size (W x D x H) (inches)	15.7x11.3x5.3	14.7x11.9x4.1	16.5x9.2x5.3	15.4x11.3x5.1	14.8x11.6x4.9	15.2x12.4x5.8	13.9x7.5x3.9

*(characters/second) **(characters/second at highest speed) ***(SPL in dB at 1 meter, A-weighted) ****(lines/inch or programmable interval)

APPLE® PRICE WAR!

PFS File™ $95	PFS Report™ $95	Home Accountant™ $55	VisiCalc® $169
Multiplan™ $199	**dBASE II™ $439**	**WordStar® $269**	**VersaForm™ $289**

ADVANCED LOGIC SYSTEMS™		FOX AND GELLER™		MICROSOFT®		Videoterm	$239
Z—Card	$129	Quickcode	$199	RAM Card™	$ 89	Ultraterm	CALL
CP/M Card	$359	dUtil	$ 69	Softcard™	$249	VISICORP®	
Smarterm II	$149	dGraph	$199	Videoterm (Videx™)	$239	VisiCalc®	$169
ALPHA™		HOWARDSOFT™		Premium Card	CALL	VisiCalc® Advanced Versions	CALL
Apple—IBM Connection	$150	Tax Preparer	CALL	Multiplan™	$199	VisiTerm	$ 85
APPLIED SOFTWARE TECHNOLOGY™		HUMANSOFT™		Other Products	CALL	VisiDex	$189
VersaForm	$289	DBPlus	$ 95	MICROSTUF™		VisiFile	$249
ATI TRAINING POWER™		IMSI™		Crosstalk	$119	VisiSchedule	$249
Training modules for WordStar, VisiCalc etc.	$ 65	All Products	CALL	OASIS™		VisiTrend/Plot	$249
ASHTON-TATE™		MICROPRO®		The Word Plus	$129	VisiWord	$249
dBASE II	$439	WordStar	$269	Punctuation and Style	$109	Business Forecasting	$100
dBASE II User's Guide	$ 20	WordStar/Mailmerge	$369	ORGANIC™		Other Products	CALL
ASPEN™		WordStar/Mailmerge/ SpellStar/StarIndex Professional Pak	CALL	Milestone	$269	FLOPPY DISKETTES (Boxes of Ten)	
Grammatik	$ 60	WordStar/InfoStar	$549	PBL™		MEMOREX™	
Random House Proofreader	$ 39	MailMerge	$149	Personal Investor	CALL	8"	$ 38
Random House Thesaurus	$119	InfoStar	$299	SOFTWARE PUBLISHERS™		5" (SS)	$28
COMPUTING!™		CalcStar	CALL	PFS File	$ 95	5" (DS)	$ 38
Power!	$119	DataStar	$179	PFS Report	$ 95	Larger Quantities	CALL
CONTINENTAL™		SuperSort	$149	PFS Graph	$ 95	ATHANA™	
Home Accountant	CALL	SpellStar	$149	SORCIM™		8"	$ 25
DIGITAL RESEARCH™		ReportStar	$229	SuperCalc	$129	5" (SS)	$ 25
CBASIC2	$109	Other Products and StarCard Specials	CALL	SuperCalc 2	$169	5" (DS)	$ 35
Other Products	CALL			SpellGuard	$129	Larger Quantities	
				VIDEX™		IN-HOUSE SPECIALS AND NEW PRODUCTS	CALL
				Enhancer II	$119		
				Function Strip	$ 69		

NOW, PAY LESS, AND GET GREAT SERVICE, TOO!

If you're looking for rock-bottom prices *and* fast, personal service, take a close look at 800–SOFTWARE.

Because we buy in volume, we're able to sell and service the products you want at prices that finally make some sense. But don't take our word for it. Compare and see for yourself.

OUR SERVICE CAN'T BE BEAT.

We take care of you like our business depends on it. Because it does.

When you call 800–SOFTWARE, you get the fastest delivery available anywhere. Which means that nearly every order is filled the day we get it. And that our unique Order Tracking System™ is on the job, keeping tabs on your order, every step of the way.

Our giant inventory—one of the largest in the United States—also assures you of the fastest possible service. Everything's in stock so you don't have to wait.

Technical support? Business software expertise? Customer service? We've got it—and it's the best you'll find *anywhere*.

But, put us to the test. Let us prove what we've proven to satisfied customers around the world.

That our prices *are* lower. That our service is better. That there really and truly is a difference.

We look forward to your call.

WRITE:
800-SOFTWARE, INC.
940 Dwight Way, Ste. 14
Berkeley, CA 94710
CA residents
add sales tax.

800-SOFTWARE

TO ORDER, CALL TOLL-FREE: 800-227-4587

or 415-644-3611

- ☐ Purchase orders accepted. Please call us in advance.
- ☐ Prompt UPS 3 day Blue Label.
- ☐ Call for shipping charges. *free catalog*, and other low software prices.
- ☐ Now open Mon. — Sat.
- ☐ International and national dealer requests welcome.
- ☐ Quantity discounts available.
- ☐ Prices may change.

©Copyright 800-Software 1983
Microsoft is a registered trademark, and Softcard, RAM Card, and Multiplan are trademarks of the Microsoft Corporation.

CIRCLE 126 ON READER SERVICE CARD

easiest to follow of any we have seen. Although the manual warns that the nonprogrammer may not want to get involved with them, a full list and description of all available command codes is given (including software-variable line spacing and vertical tabs). Most references in the manual, expectably, are to the Lisa system.

While we were testing the Apple Dot Matrix Printer and the C. Itoh ProWriter II, we were struck by the similarity between the two machines. Except for color, top plate, and label, they looked identical. In fact, we discovered the front and back covers were interchangeable between the two machines. It should be no surprise, then, that both printers began life in the same factory.

Appearances can be deceiving. Although two machines may look very similar, they can be very different inside, particularly because the "identity" of most printers (that is, how they work and how they react to the outside world) is determined by software programs contained in ROM chips. A printer can be changed into an entirely different machine merely by changing one integrated circuit.

Our tests demonstrated the subtlety of the differences. The mechanisms of the two machines look identical (at least to our eyes), but they don't work in the same way. The ProWriter actually dashed ahead of the Apple, with a speed about 15 percent higher. (We didn't believe it, either, and checked several times—the results were the same.)

When it comes to sound level, the Apple is noticeably quieter than the ProWriter. In fact, it was the quietest impact printer in this test. Note, too, that right from the box the Apple printer worked perfectly with our IIe. The ProWriter gave us double line feeds, which required DIP switch resetting (easy, once you know what you're doing), and the examples in its manual are written in Microsoft BASIC and require translation to Applesoft. The Apple also has a wider variety of character widths available on command, but the ProWriter allows block graphics.

Epson RX-80

The Epson RX-80 is an almost unremarkable printer that offers both a good selection of features and speed in a compact package. A few years ago, it would have been an amazing machine, but these days and in this review it's just another face in the crowd. Far from a condemnation, this assessment illustrates the high standard that can be expected from today's inexpensive matrix printers. The RX-80 is workmanlike rather than wonderful, but it's both competent and competitive.

It differs from the others in the group tested (except for the Banana) in that it has no typewriterlike rubber platen for friction feeding paper. Instead, a tractor pulls sprocket-fed paper past a fixed metal platen, an arrangement used on many very-high-speed, expensive matrix machines. Loading paper in can be tricky until you get the hang of it; you must slide the paper in from the rear of the printer until it magically appears in front of the printhead, and then pull it up and latch it into the tractor mechanism. A knob on the right side of the RX-80 (can we call it a platen knob even though it doesn't roll the platen?) helps in precision paper positioning, but beware. If you fail to line up the perforations in the paper perfectly with the top of the printhead, it is difficult to move the paper backward. (And doing so is not recommended by Epson.)

Of all the printers in this test, the Apple offers the widest variety of type sizes and styles.

Abandon all hopes of stuffing your impressive 100-percent rag copperplate-engraved personal stationery through the RX-80. It is incapable of friction feeding either individual sheets or roll paper. Nevertheless, if you need to impress, preprinted microperforated fanfold stationery will fill the bill. Or consider the RX-80's brother, the RX-80 F/T, which does offer friction feed.

The fabric ribbon used by the RX-80 is a continuous loop contained in a large cartridge that's wider than the 10-inch paper carriage. A length of ribbon nearly the full width of the cartridge is left exposed. Using a pencil to push the inked fabric past the printhead, the ribbon can be properly threaded in seconds, without discoloring your fingers. Then again, if like me, you try to put the ribbon in unaided by such a simple tool, you may end up signing your work with purple fingerprints as I did.

There must be some Japanese standard for the required minimum of matrix printer controls. Every machine in this sample (except the Banana and STX-80, which differ from the norm in other significant ways) has the same set of controls and indicators: line feed, form feed, and on-line/off-line pushbuttons; and LED indicator for power, on-line, ready, and fault (all green except for the last, which is red). The RX-80 conforms to that hypothetical standard perfectly.

The RX-80 will print in nine different type sizes or style combinations, including standard Pica characters (10 pitch), emphasized Pica (bold), condensed Pica (17-pitch characters), enlarged Pica (double-width or 5 pitch), emphasized enlarged Pica, condensed enlarged Pica (8.5 pitch), Elite (12 pitch), enlarged Elite (6 pitch), and superscript/subscript (roughly half height). Sorry, printing condensed or emphasized Elite characters is impossible, as are emphasized condensed enlarged Pica Elite subscripts. Besides the standard 96 printable ASCII graphic characters, 32 block graphic symbols; 11 international character sets; and 96 alternate characters are safely locked in the RX-80's memory chips. The printer will also handle dot-addressable graphics eight wires at a time.

The manual we received with the RX-80 left a lot to be desired: Thirty pages were omitted, including the specifications and interfacing information. The first call to Epson America brought a response that might be described as, "Go away and bother your distributor instead." When we finally were able to talk to a human being at Epson rather than an indoctrinated automaton, we got our missing pages. (We bothered so many people at Epson that we eventually got two copies!) Word is that a new version of the manual will soon be available. Actually the RX-80 manual we did receive was not nearly as awful as the company implied (it was characterized by Epson as "a Japanese manual," with derogatory connotations emphasized). It was complete and detailed, perhaps overly so. The bulk of it was a description of control codes in alphabetical rather than functional order—basically a programmer's reference guide.

Getting the RX-80 to work with our Apple IIe was simply a matter of plugging in a standard Centronics cable. It came to life and worked flawlessly without adjustment of the setup and default DIP switches. That's good, because accessing the switches requires digging into the machine.

The heading, "Number of Copies," on the comparison chart may be a bit misleading. We quoted the number straight from the manufacturers' specifications. Although most said four, Epson said three. However, in giving the maximum thickness of paper that the printers

80 COLUMN PRINTER SALE—$149.00*



*STX-80 COLUMN PRINTER—$149.00

Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal roll paper!

DELUXE COMSTAR T/F PRINTER—$219.00

The Comstar T/F is an excellent addition to any micro-computer system. (Interfaces are available for Apple, VIC-20, Commodore-64, Pet, Atari 400 and 800, and Hewlett Packard). At only $219 the Comstar gives you print quality and features found only on printers costing twice as much. Compare these features.

- **BI-DIRECTIONAL PRINTING** with a LOGIC SEEKING CARRIAGE CONTROL for higher through-put in actual text printing. 80 characters per second.
- **PRINTING VERSATILITY:** standard 96 ASCII character set plus block graphics and international scripts. An EPROM character generator includes up to 224 characters.
- **INTERFACE FLEXIBILITY:** Centronics is standard. Options include EIA RS232C, 20mA Current Loop.
- **LONG LIFE PRINT HEAD:** 100 million character life expectancy.
- **THREE SELECTABLE LINE SPACINGS:** 6, 8 or 12 lines per inch.
- **THREE SELECTABLE CHARACTER PITCHES:** • 10, 12 or 16.5 characters per inch. 132 columns maximum. Double-width font also is standard for each character pitch.
- **PROGRAMMABLE LINE FEED:** programmable length from 1/144 to 255/144 inches.
- **VERTICAL FORMAT CONTROL:** programmable form length up to 127 lines, useful for short or over-sized preprinted forms.
- **FRICTION AND TRACTOR FEED:** will accept single sheet paper.
- **224 TOTAL CHARACTERS**
- **USES STANDARD SIZE PAPER**

if you want more try —

Premium Quality COMSTAR T/F SUPER-10X PRINTER—$299.00

More Features Than RX-80

For $299 you get all of the features of the Comstar T/F plus 10" carriage 120 cps, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix. High resolution bit image (120 x 144 dot matrix), underlining, backspacing, left and right margin settings, true lower descenders, with super and subscripts, and prints standard, Italic, Block Graphics, special characters, plus 2K of user definable characters. For the ultimate in price performance the Comstar T/F Super 10" leads the pack!

Double Immediate Replacement Warranty

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

15 DAY FREE TRIAL

OTHER OPTIONS

Extra Ribbons	$ 5.95
Roll Paper Holder	32.95
Roll Paper	4.95
5000 Labels	19.95
1100 Sheets Fan Fold Paper	13.95

Add $17.50 shipping, handling and insurance. Illinois residents please add 6% tax. Add $40.00 for CANADA, PUERTO RICO, HAWAII, ALASKA orders. WE DO NOT EXPORT TO OTHER COUNTRIES. Enclose cashiers check, money order or personal check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail available!! Canada orders must be in U.S. dollars.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SUPER-10" ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

(GrafStar) Hi-Res Graphics Printer Interface for Apple Computer $69.00

CIRCLE 127 ON READER SERVICE CARD

SAVE THIS AD
IT IS YOUR CATALOG
AND CHANGES MONTHLY

The Choice of

apple supply center

HARDWARE for Apple II/II+/IIe

• OVERSTOCK SPECIALS •
WHILE THEY LAST

FOR APPLE II/II+/IIe	LIST PRICE	OUR PRICE
★ **ALS**, Synergizer - Scalc - Condor (II-)	$ 749	$199
★ **Axlon**, 320K RAM Disk System (+ or e)	$1000	$650
★ **CCS**, Serial Interface 7710A (Set Baud)	$ 150	$ 99
★ **ComX**, 16K RAM Card, 1Yr. Wty., for II-	$ 179	$ 39
Microsoft, 16K RAM Card for II-	$ 100	$ 69
Saturn Systems, 32K RAM Card for II-	$ 249	$169
64K RAM Card for II-	$ 425	$299
128K RAM Card for II-	$ 599	$399
Silicon Valley, Word Handler	$ 250	$ 39
★ List Handler	$ 90	$ 35
Videx, Videoterm, 80 column card for II-	$ 345	$229

DISK DRIVES for APPLE II+/IIe

★ **CENTRAL PT.**, Filer, Utility & Apple DOS		$ 20	$ 15
μ-SCI / MICRO-SCI	A2, 143K Disk Drive	$ 479	$ 219
	A2 Controller Card	$ 100	$ 79
	★A40, 160K, Drive	$ 449	$ 299
	★A70, 286K, Drive	$ 599	$ 299
	A40 A70 Controller	$ 100	$ 79
Rana	Elite 1, 163K, 40 TK	$ 379	$ 249
	Elite 2, 326K, 80 TK	$ 649	$ 399
	Elite 3, 652K, 160 TK	$ 849	$ 499
	Elite Controller	$ 145	$ 84
TEAC	✱143K Drive, 1/2 High	$ 379	$ 259
	Controller Card.	$ 89	$ 69
	✱Electronics by ComX		
VISTA	DiskPak V1200, 6MB Backup Sys.	$1549	$1049
	★V1000 Dual 8", Std. Format	$2195	$ 995

VIDEO CARDS

★ **ALS**, Smarterm II (+ or e)	$ 179	$139
ComX, 80 col./64K Adder (IIe)	$ 295	$145
Videx, Videoterm 80 col. (+ or e)	$ 345	$229
★ UltraTerm (+ or e)	$ 379	$279
Soft Video Switch (II+)	$ 35	$ 25
Enhancer II (II+)	$ 149	$ 99
Function Strip (II+)	$ 79	$ 59
We Have Full Videx Line.	Call.	Up to 35% off.
Vista, Vision 80	$ 289	$199

MISCELLANEOUS

ALS, The CP/M Card V3.0 (+ or e)	$ 399	$299
Z-Card (+ or e)	$ 169	$129
Color II (+ or e)	$ 179	$139
ASTAR, RF Modulator, to use TV	$ 35	$ 25
★ **CCS**, Serial Interface 7710A	$ 150	$ 99
★ **Central Point**, Alaska Card (copier, + or e)	$ 130	$ 99
Eastside, Wild Card (copier, + or e)	$ 130	$ 99
Kensington, System Saver	$ 90	$ 65
Key Tronic, KB200 keyboard (II+)	$ 298	$219
★ **Koala**, Graphics Pad	$ 125	$ 85
Market Microscope	$ 700	$525
Kraft, Joystick (Ap II/II+)	$ 65	$ 49
Paddle (Ap II/II+)	$ 50	$ 39
M&R, Sup R fan (+ or e)	$ 50	$ 39
★ **Microsoft**, Z80 Softcard (+ or e)	$ 345	$235
Z80 Softcard Plus (+ or e)	$ 645	$459
Softcard Premium Pack (II+)	$ 695	$495
Softcard Premium Pack (IIe)	$ 495	$395
Micro Tek, Dumpling 64, Buffer	$ 349	$269
★ **Orange Micro**, Grappler Plus (e or +)	$ 175	$119
16K Buffer Board for Grappler +	$ 175	$119
Buffered Grappler +, 16K	$ 245	$179
2 Chip Kit for above for 64K	$ 28	$ 19
Paymar, Lower Case Chip (II+)	$ 50	$ 39
Practical Peripherals.		
MBP IIe 64K Par. (Epson Internal) (+/e)	$ 279	$209
MBS IIe 32K Ser. (Epson Internal) (+/e)	$ 219	$169
Microbuffer II+, 16K, (+ or e) Par/Ser (specify)	$ 259	$199
Microbuffer II+, 64K, (+ or e) Par/Ser (specify)	$ 349	$259
★ **PCPI**, Appli-Card, 14 features 6Mhz	$ 375	$275
RH Electronics, Super Fan II	$ 75	$ 59
★ **Saturn Systems**, Accelerator II	$ 599	$449
SSM, A10 II, Serial/Para Interface	$ 225	$169
TG Products, Game Paddles (II+)	$ 40	$ 29
Joystick (II+)	$ 60	$ 45
Select-A-Port (II+)	$ 60	$ 45
Trak Ball (II+)	$ 65	$ 44
Videx, PSIO, Para/Ser Interface	$ 229	$169



APPLE IIe 128K, 80 COLUMN $1,295
APPLE IIe, STARTER SYS. BY APPLE (Sys. A)
64K and 80 column
Disk II with controller
Apple Monitor III
Monitor Stand $1,650
APPLE IIe STARTER SYSTEM BY CONROY-LA POINTE [SYSTEM B]
128K and 80 column
1 Micro-Sci Drive with controller
Filer, Utility and DOS 3.3 Diskette
Zenith 12" Green Monitor
RF Modulator (for color TV)
Game Paddles
Game w/color graphics and sound
20 Blank Diskettes $1,650

WARRANTY:
Limited warranty is 100% Parts & Labor for 90 days by us.

RAM EXPANSION

	LIST PRICE	OUR PRICE
★ **ComX**, for IIe, 80 col./64K Adder Card	$ 295	$109
★ **ComX**, RAM Card, 1 Yr. Wty. (II+) 16K	$ 179	$ 39
★ **ALS**, ADDRam (II+) 16K	$ 100	$ 59
★ **Microsoft**, RAMCard (II+) 16K	$ 100	$ 69
★ **Saturn Systems**, RAM Card (II+) 32K	$ 249	$169
RAM Card (II+) 64K	$ 425	$299
RAM Card (II+) 128K	$ 599	$399
★ **Axlon RAM Disk System** (+ or e) 320K	$1000	$650

SOFTWARE on disk for Apple II/II+/IIe

BUSINESS

Applied Soft Tech., VersaForm		$ 389	$259
Artsci, MagicWindow II	NEW!	$ 150	$ 99
Ashton-Tate, dBase II (Req CP/M 80)		$ 700	$395
Financial Planner (Req CP/M 80)		$ 700	$395
Friday (Requires CP/M 80)		$ 295	$199
BPI Systems, GL, AR, AP, PR or INV, each		$ 395	$295
Broderbund, Bank Street Writer		$ 70	$ 47
Continental, GL, AR, AP or PR ea		$ 250	$165
Home Accountant		$ 75	$ 49
FCM		$ 100	$ 68
Dow Jones, Market Analyzer		$ 350	$275
Market Manager		$ 300	$235
Fox & Geller, Quickcode (for dBase II)		$ 295	$185
dGraph (for dBase II)		$ 295	$185
dUtility (for dBase II)		$ 99	$ 66
Hayden, Pie Writer (Specify 80 col. board)		$ 150	$ 99
Howard Soft, Real Estate Analyzer II		$ 195	$129
Tax Preparer		$ 225	$149
LJK, Letter Perfect w/Mail Merge		$ 150	$ 99
★ **Micro Craft**, (requires Z80 CP/M-Card) Verdict or Billkeeper		$ 995	$469
Micro Lab, Tax Manager		$ 180	$119
Micro Pro, (all require Z80-CP/M Card)			
★ WordStar w/Applicard & CP/M	SPECIAL	$ 495	$325
WordStar™ - Training Manual	SPECIAL	$ 495	$239
MailMerge™	SPECIAL	$ 250	$129
SpellStar™	SPECIAL	$ 250	$129
★ WordStar Professional, 4 Pak	SPECIAL	$ 895	$429
Microsoft, Multi-Plan (CP/M or Apple DOS)		$ 275	$199
Financial, Multitool (CP/M or DOS)		$ 100	$ 75
Budget, Multitool (CP/M or DOS)		$ 150	$115
Osborne/C.P. Soft. (Disk and Book) (Stat., Bus. & Math)			
Some Common Basic Programs (75 each)		$ 100	$ 49
Practical Basic Programs (40 each)		$ 100	$ 49
Peachtree, Requires CP/M & MBasic, 40 columns.			
Series 40 GL & AR & AP, all 3		$ 595	$365
Series 40 Inv. or Payroll, each		$ 400	$275
Series 9 Text & Spell & Mail, all 3		$ 595	$395
Perfect, Perfect Writer		$ 495	$149
Perfect Speller		$ 295	$ 99
Perfect Writer/Speller 2 Pak		$ 695	$199
Perfect Filer		$ 595	$259
Quark, Word Juggler (IIe)		$ 239	$179
Lexicheck IIe (use w Juggler)		$ 149	$ 99
Sensible, Sens. Speller, specify 80 Col. Brd.		$ 125	$ 85
Sierra On-Line, ScreenWriter II		$ 130	$ 89
The Dictionary	NEW!	$ 100	$ 69
General Manager II	NEW!	$ 230	$155
★ **Silcon Valley**, Word Handler		$ 250	$ 39
★ List Handler		$ 90	$ 35
Sof./Sys., Executive Secretary		$ 250	$169
Executive Speller		$ 75	$ 55

BUSINESS

Software Publishing, PFS: File		$ 125	$ 84
(specify - or e) PFS: Report		$ 125	$ 84
PFS: Graph		$ 125	$ 84
Stoneware, DB Master Version 4.0		$ 229	$229
DB Utility I or II		$ 99	$ 69
Videx, Applewriter II preboot disk		$ 20	$ 15
Visicalc 80 col. preboot disk		$ 50	$ 39
VisiCorp/Personal Software.			
Visicalc 3.3		$ 250	$169
Visicalc Enhanced (IIe)	NEW!	$ 250	$169
VisiFile or VisiDex, each		$ 250	$169

UTILITY & SYSTEM

Beagle, Utility City		$ 30	$ 22
DOS Boss		$ 24	$ 18
Apple Mechanic		$ 30	$ 22
Central Point, Filer, DOS 3.3 and Utility		$ 20	$ 15
★ Copy II Plus (bit copier)		$ 40	$ 35
Einstein, Compiler, for Applesoft BASIC		$ 129	$ 85
Epson, Graphics Dump		$ 15	$ 9
Insoft, GraFORTH by Paul Lutus		$ 75	$ 59
Microsoft, A.L.D.S.		$ 125	$ 75
Cobol 80		$ 750	$559
Fortran 80		$ 195	$149
Complete Line in Stock			
★ **Omega**, Locksmith (bit copier)		$ 100	$ 75
Penguin, Comp. Grphcs. Sys.	NEW!	$ 70	$ 53
Graphics Magician	NEW!	$ 60	$ 41
Phoenix, Zoom Grafix		$ 40	$ 34
Quality, Bag of Tricks	NEW!	$ 40	$ 29
Saturn Systems, VC-Expand		$ 100	$ 49
VC-Expand 80		$ 125	$ 69
Sensible, Back it Up, (bit copier)		$ 60	$ 49

HOME & EDUCATIONAL

Broderbund, Choplifter	$ 35	$ 26
BudgeCo, Pinball Constr. Set	$ 40	$ 27
★ **Continental**, Home Accountant	$ 75	$ 49
Datamost, Aztec or Zaxxon, each	$ 40	$ 27
Edu-Ware, (Large Inventory)	Call	Call
Einstein, Memory Trainer	Call	Call
Hayden, Sargon II (Chess)	$ 35	$ 29
Infocom, Zork I, II, or III, or Starcross. each	$ 40	$ 27
Lightning, Mastertype	$ 40	$ 27
Micro Lab, Miner 2049er	$ 40	$ 27
Sierra On-Line, Ultima II	$ 60	$ 40
Sir-Tech, Wizardry	$ 50	$ 39
Spinnaker, Kindercomp	$ 30	$ 20
Sub Logic, Flight Simulation	$ 34	$ 25
Pinball	$ 35	$ 25
Terrapin, Logo	$ 150	$ 99

OTHER BRANDS AND PROGRAMS IN STOCK. CALL.

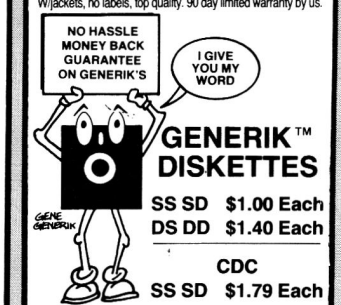
DISKETTES

CDC, 100 each, SS, DD, 48T (Apple, IBM)	$ 550	$ 179
10 each, SS, DD, 48T (Apple, IBM)	$ 55	$ 19
100 each, DS, DD, 48T, (IBM, H/P)	$ 750	$ 295
10 each, DS, DD, 48T (IBM, H/P)	$ 75	$ 35
DYSAN, 10 each, (Apple, etc.)	$ 69	$ 39
10 each, 48T (IBM, H/P, etc.)	$ 89	$ 49
MAXELL, 10 each, MD-1, SS, DD	$ 55	$ 29
10 each, MD2-D, DS DD	$ 75	$ 39
VERBATIM, 10 each, Verex, SS SD	$ 40	$ 21
10 each, MD525-01, SS SD	$ 49	$ 25
10 each, DD34, DS DD	$ 84	$ 45
10 each, Optima, DS DD	$ 121	$ 65

GENERIK™ DISKETTES – AS LOW AS $1

100 each SS, SD, 35 Track (Apple, Atari)	$ 415	$ 130
1000 each SS, SD, 35 Track (Apple, Atari)	$4150	$ 995
100 each DS, DD, 40 Track (IBM, H/P)	$ 626	$ 170
1000 each DS, DD, 40 Track (IBM, H/P)	$6260	$1400

W/jackets, no labels, top quality. 90 day limited warranty by us.



Minimum order quantities apply. See above. Money back guarantee is by COMX Corporation not us.

MONITORS AND ACCESSORIES

★ **AMDEK**, 12" Green, #300G	$ 200	$ 135
★ 12" Amber, #300A	$ 210	$ 149
★ 12" Amber, 310A for IBM-PC	$ 230	$ 159
★ 13" Color I, Composite	$ 379	$ 289
★ 13" Color II, RGB, Hi Res	$ 529	$ 439
★ 13" Color III, RGB, (Ap. II, III)	$ 479	$ 399
DVM, Color II or III to Apple II I/F	$ 199	$ 175
NEC, 12" Green, Model JB1201M	$ 249	$ 159
12" Color, Composite, JC1215M	$ 400	$ 299
12" Color, RGB, IBM Model JC 1203	$ 699	$ 569
PRINCETON, RGB Hi Res, HX-12	$ 795	$ 539
★ **QUADRAM**, Quadchrome 12" RGB Color	$ 795	$ 499
Quadrscreen 17", 968 x 512	$1995	$1595
SANYO, 9" Green, Model DM5109	$ 200	$ 139
12" Green, Model DM8112CX	$ 260	$ 199
ZENITH, 12" Green, Model ZVM121	$ 150	$ 89

MODEMS AND ACCESSORIES

ANCHOR, Signalman MK I Modem (RS232)	$ 99	$ 75
HAYES, IBM-PC Smartmodem 1200 B	$ 599	$ 439
IBM-PC Smartcom II Software	$ 119	$ 89
Stack Chronograph (RS-232)	$ 249	$ 189
Stack Smartmodem 300 (RS-232)	$ 289	$ 225
Smartmodem 1200 (RS-232)	$ 699	$ 535
Micromodem 100 (S-100 bus)	$ 399	$ 275
Micromodem II (for the Apple II)	$ 379	$ 275
Apple Terminal Program	$ 100	$ 65
IBM-PC to Modem Cable	$ 39	$ 29
NOVATION, Applecat II Modem, 300 BAUD	$ 389	$ 269
212 Apple Cat, 1200 BAUD	$ 725	$ 599
Cat	$ 189	$ 139
D-Cat	$ 199	$ 159
J-Cat	$ 149	$ 109
212 Auto Cat	$ 695	$ 579
Smart Cat 103/212	$ 595	$ 435
Apple Cat II	$ 389	$ 269
212 Apple Cat	$ 725	$ 595
SSM, Transcend 1 for Apple II Data Comm.	$ 89	$ 69
ModemCard for the Apple II	$ 299	$ 259
Transmodem 1200 (110/300/1200)	$ 695	$ 559

PRINTERS AND ACCESSORIES

DOT MATRIX PRINTERS:

EPSON, MX80F/T, 80 CPS, w/Graftrax +	$ 745	$ 485
FX80, CPS		Call
MX100F/T, 80 CPS, w/Graftrax +	$ 995	$ 639
FX100, CPS		Call
Apple II Graphics Dump Program	$ 15	$ 9
Graftrax Plus, MX80 or MX100	$ 95	$ 79
LEADING EDGE, Gorilla Banana	$ 250	$ 209
OKIDATA, 82A, 80 col., 120 cps, Para.	$ 549	$ 448
83A, 132 col., 120 cps, Para.	$ 899	$ 699
92, 160 CPS, 80 Col., Para.	$ 699	$ 559
93, 160 CPS, 136 Col., Para.	$1249	$ 969
ORANGE MICRO, Grappler +, for Apple	$ 165	$ 119
PRAC., Microbuffer In-Line 64K, Para.	$ 349	$ 259
Microbuffer In-Line 64K Serial	$ 349	$ 259
★ **STAR MICRO.**, Gemini 10"X, 120cps, 2.3K	$ 499	$ 289
Gemini 15", 100cps, 2.3K	$ 649	$ 389
Gemini 15" X, 100cps, 2.3K	Call	Call
IBM-PC to Epson or Star Micronics Cable	$ 60	$ 35
Apple I/F and Cable for Epson or Gemini	$ 95	$ 59

LETTER QUALITY – DAISY WHEEL PRINTERS:

JUKI, 6100, 17cps, 80 Col., Parallel	$ 700	$ 539
NEC, 3550 IBM Parallel, 33 cps, 136 Col.	$2350	$1995
★ **TTX**, 13 cps, Para. & Ser, Pin & Friction	$ 649	$ 499

SUPPLIES: Tractor Feed Paper, Ribbons, Daisy Wheels.

PLOTTERS

ENTER COMPUTER, Sweet-P	$ 795	$ 595
AMDEK, DXY-100, 10" x 14", Para	$ 749	$ 599
Amplot II, 10" x 14", 6 color, S/P	$1299	$ 999

CORVUS

6 Meg	$2395	$1895
11 Meg	$3195	$2695
Without Interface 20 Meg	$4195	$3495
IBM-PC Interface Manual & Cable Kit	$ 300	$ 239
Mirror built in for easy backup	$ 790	$ 595
Apple Interface, Manual & Cable Kit	$ 300	$ 239

Other Interfaces, Omni-Net, Constellation, Mirror, All in Stock

ATARI for the ATARI

RANA 1000 Drive, 320K	$449	$369
KOALA, Graphics Pad	$100	$ 75

ORDERING INFORMATION AND TERMS: **All Mail: P.O. Box 23068, Portland, OR 97223, Include telephone number.** All items usually in stock. We immediately honor Cashiers Checks, Money Orders, Fortune 1000 Checks and Government Checks. Personal or Company Checks allow 20 days to clear. No. C.O.D. Prices reflect a 3% cash discount so ADD 3% to above prices for VISA or MC. For U.S. Mainland, add 3% for shipping, insurance and handling (SI&H) by UPS with $5 minimum for SI&H. UPS ground is standard so add 3% more for UPS Blue with $10 minimum for SI&H. Add 12% total for SI&H for US Postal, APO or FPO with $15 minimum for SI&H. For Hawaii, Alaska and Canada, UPS is in some areas only, all others are Postal so call, write, or specify Postal. Foreign orders except Canada for S,I&H add 18% or $25 minimum for SI&H except for monitors add 30% or $50 minimum for SI&H. Prices subject to change and typo errors, so call to verify. All goods are new, include warranty and are guaranteed to work. Due to our low prices, ALL SALES ARE FINAL. Call before returning goods for repair or replacement. Orders received with insufficient S,I&H charges will be refunded. ORDER DESK HOURS 6 A.M. to 6 P.M. PST, Monday through Friday and 10 to 4 Saturday. 6 A.M. here is 9 A.M. in New York.

OUR REFERENCES: We have been in computers and electronics since 1958, a computer dealer since 1979 and in mail order since 1980. Banks: 1st Interstate Bank, (503) 643-4678. We belong to the Chamber of Commerce (503) 644-0123, Better Business Bureau (503) 227-0648 and Direct Marketing Association, or call Dunn and Bradstreet if you are a subscriber. Fastrak ™ and Generik ™ are trademarks of ComX Corporation. WordStar, MailMerge, StarIndex, InfoStar, are trademarks of MicroPro.

★ Means a BEST buy

AD #983

CASH & CARRY OUTLETS:
Over-the-counter sales only. Open Monday through Saturday 10:00 until 5:00.

PORTLAND, OREGON, 11507-D S.W. Pacific Hwy, Terrace Shopping Center, Tigard On 99W between 217 and I-5. Call 245-1020.

SEATTLE, WASH., 3540 128th Ave. SE, Bellevue, WA 98006, Tele.: 641-4736, between Lochmann's Plaza and Factoria Place, SE of Hwy. 405 & 90 and at SE 38th & 128th

Professionals T.M.

DEALERS WE BUY EXCESS INVENTORIES



IBM is a trademark of IBM Corporation.

IBM-PC
System Includes
Two 320K Disk Drives by CDC
90 Day Warranty By Us
Call For Details And Configurations

for the IBM-PC or XT HARDWARE

		LIST PRICE	OUR PRICE
MEMORY CHIP KITS	Add-on to your memory cards or mother board. 100% tested. With 90 day warranty.		
★	64K Kit. 200NS. 9 chips. 4164	$ 150	$ 45
	16K Kit. 200NS. 9 chips. 4116 (for PC-1 motherboard)	$ 30	$ 16
	4-IN-1 Multiple Board. Color Graphics. Mono. 128K	$ 599	$ 519
AST	Combo Plus. 64K w Ser., async para & clock calendar	$ 395	$ 279
	Above Combo Plus. 256K. S P C	$ 695	$ 475
	MegaPlus II. 64K. 2-S P C. and software	$ 495	$ 345
	256K. 2-S P C. and software	$ 795	$ 495
	Expand 256K MegaPlus II to 512K Kit	$ 395	$ 295
CCS	SuperVison. monochrome 132 Col. x 44 line video board	$ 850	$ 680
	7 Plus 64. fast Z80B. 64K (expand to 192K). para port	$ 875	$ 695
* ComX	256K RAM Card with Fastrak™ RAM disk emulator and printer spooler software. 2 Year Warranty	$ 695	$ 256
CURTIS	PC Pedestal * for Display on PC	$ 80	$ 65
	9 Foot Cable for IBM Keyboard (extends 3 to 9')	$ 50	$ 35
	Vertical "System Stand" for PC CPU	$ 25	$ 19
HERCULES	Hi Res Graphics Board	$ 499	$ 379
Key Tronic	KB5150. Standard Typewriter keyboard	$ 269	$ 199
Koala	Koala Pad *. Touch Tablet	$ 150	$ 109
	Programmer's Guide	$ 15	$ 12
MICROSOFT	256K RAM Card SPECIAL	$ 875	$ 495
	64K System Card. 4 Function	$ 395	$ 295
	256K System Card. 4 Function	$ 625	$ 465
ORCHID	PCnet *. Local Area Networking Starter System. 2.0	$1490	$1190
	Monochrome Graphics Adapter. 720H x 350V. w64K	$ 499	$ 379
PLANTRONICS/FREDERICKS	ColorPlus. 16 color brd. w Para Port	$ 475	$ 379
QUADRAM			
★	Quadlink. Apple II Emulator **NOW IN STOCK** NEW!	$ 680	$ 485
★	Quadboard. no RAM. expandable to 256K. 6 function NEW!	$ 295	$ 215
	Quadboard 64K. expandable to 256K. 6 function	$ 395	$ 279
★	Quadboard 256K. 6 function	$ 595	$ 395
	Quadboard II. 64K. 6 function	$ 395	$ 285
	Quadboard II. 256K. 6 function	$ 595	$ 395
	Quad 512 - . 64K plus serial port. expandable to 512K. 6 function	$ 325	$ 265
	Quad 512 - . 256K plus serial port. expandable to 512K. 6 function	$ 550	$ 420
	Quad 512 - . 512K plus serial port. 6 function	$ 895	$ 625
	Quadcolor I. board. 16 colors	$ 295	$ 225
	Quadcolor II. board. use with Quadcolor I. set 640 x 200	$ 275	$ 209
	Microfazer. w Copy. Par Par. 8K. #MP8 w Power Supply	$ 189	$ 129
	Microfazer. w Copy. Par Par. 64K. #MP64 w Power Supply	$ 319	$ 219
	Microfazer. w Copy. Par Par. 128K. #MP128 w Power Supply	$ 465	$ 295
	Microfazer. Snap-on. 8K. Par Par. Epson. #ME8 w Power Supply	$ 179	$ 145
	Microfazer. Snap-on. 64K. Par Par. Epson. #ME64 w Pwr. Supply	$ 319	$ 235
	All Microfazers are expandable (w copy to 512K) (Snap-on to 64K)		
Tecmar	1st MATE Board. 64K	$ 389	$ 295
	1st MATE Board. 256K	$ 589	$ 439
	Graphics Master Board	Call	Call
TG PRODUCTS	Joystick	$ 65	$ 49



$45 $40 Ten or more.
64K CHIP KIT
9 Each. 4164. 200 ns. MEMORY EXPANSION.
90 Day Warranty by us.

$256 $239 Two or more.
ComX 256K RAM BOARD
Fully Compatible. 2 Year Limited Warranty by ComX
With Fastrak RAM Disk Emulator and Spooler Software
Works on DOS 1.1 or 2.0

★ Means a BEST buy.
AD #983

SOFTWARE for the IBM PC or XT

BUSINESS

		LIST PRICE	OUR PRICE
ASHTON-TATE			
	dBase II. req. PC-DOS & 128K	$ 700	$395
	dBase II User's Guide	$ 30	$ 20
	Everyman's DB Primer (Book)	$ 15	$ 12
	The Financial Planner	$ 700	$449
	Friday	$ 295	$199
APPLIED SOFT. TECH.	Versaform	$ 389	$265
CONTINENTAL	Home Accountant +	$ 150	$ 95
	FCM (Filing, Cataloging, Mailing)	$ 125	$ 95
	Property Management	$ 495	$329
DATAMOST	Write-On (Word Processor)	$ 130	$ 89
DOW JONES	Market Analyzer	$ 350	$279
	Market Manager	$ 300	$239
	Market Microscope	$ 700	$525
EAGLE SOFTWARE	Money Decisions	$ 150	$129
EINSTEIN	Writer	$ 300	$199
	Memory Trainer	$ 80	$ 55
FOX & GELLER	Quickcode (MSDOS)	$ 295	$179
	dGraph (MSDOS)	$ 295	$179
	dUtil for IBM PC DOS	$ 99	$ 59
HAYDEN	IBM File Writer	$ 200	$135
HOWARDSOFT	Real Estate Analyzer II	$ 250	$189
INFOR. UNLIMITED	EasyWriter II (WP)	$ 350	$259
	EasySpeller II	$ 225	$149
	EasyFiler (a DBMS)	$ 400	$299
	Inventory Control	$ 595	$395
★ **INSOFT**	Data Design (to use DBMS)	$ 225	$169
	Data Base Made Easy (Book)	$ 17	$ 12
★ **LOTUS**	1-2-3	$ 495	$329
MICROCRAFT	Verdict or Billkeeper. each	$ 995	$469
MICRO LAB	Miner 2049	$ 40	$ 29
MICROPRO	WordStar®	$ 495	$239
	MailMerge™	$ 250	$129
	SpellStar™	$ 250	$129
★	WordStar Pro. 4 Pak	$ 895	$429
	StarIndex™	$ 195	$109
	InfoStar™	$ 495	$259
	ReportStar™	$ 350	$199
★ **MICROSOFT**	Multiplan	$ 275	$175
	Word	$ 375	$275
	Word with Mouse	$ 475	$339
	Financial Statement	$ 100	$ 69
	Budget	$ 150	$109

BUSINESS

		LIST PRICE	OUR PRICE
NORTH AMERICAN BUS.	The Answer	$ 250	$169
★ **OSBORNE COMX**	(Book & Disk: Business Statistics & Math Programs)		
	Some Common Basic Prog. (70)	$ 100	$ 69
	Practical Basic Prog. (40)	$ 100	$ 69
PBL CORPORATION	Personal Investor	$ 145	$ 94
PEACHTREE	Peach Pak 3 (GL. AR & AP)	$ 595	$239
	Peach Text 5000	$ 395	$239
PERFECT	Perfect Writer *	$ 389	$149
	Perfect Speller * or Perfect Calc *. each	$ 295	$ 99
	Perfect Filer *	$ 595	$199
SOFTWARE ARTS	TK! Solver	$ 299	$219
SOFTWARE PUBLISHING	PFS: File	$ 140	$ 94
	PFS: Report	$ 125	$ 84
	PFS: Write NEW!	$ 140	$ 95
	PFS: Graph NEW!	$ 140	$ 95
SORCIM	SuperCalc II	$ 295	$195
	SuperWriter	$ 295	$199
STONEWARE	D.B. Master (a DBMS)	$ 490	$329
SYNAPSE	File Manager	$ 100	$ 67
SYNERGISTIC	Data Reporter	$ 250	$169
T.MAKER	T Maker III	$ 275	$169
VISICORP	VisiCalc * 256K	$ 250	$179
	VisiDex or VisiSchedule	$ 250	$189
	VisiFile or Desktop Plan I	$ 300	$239
	VisiWord with VisiSpell (128K)	$ 375	$269

UTILITY & SYSTEM

		LIST PRICE	OUR PRICE
HAYES	Smartcom II	$ 119	$ 89
MICROCOM	Microterminal	$ 100	$ 65
MICROSOFT	muMath muSimp	$ 300	$225
	Business BASIC Compiler	$ 600	$450
	Pascal Compiler	$ 350	$255
	C Compiler	$ 500	$369
	BASIC Compiler	$ 395	$295
	Fortran Compiler	$ 350	$255
	COBOL Compiler	$ 750	$559
	BASIC Interpreter	$ 350	$255
★ **NAGY SYSTEMS**	Copy PC Backup	$ 35	$ 25
NORELL DATA	System Backup	$ 50	$ 39
NORTON	Norton Utilities. 14 programs	$ 80	$ 65

UTILITY & SYSTEM

1983 CE SOFTWARE AWARD:
"Copy II PC by Central Point Software is the best CE software buy of 1983. It will copy more copy protected software and, faster than any other backup system. Unlike other copiers it makes an exact duplicate of your original and it does 100% verification of copy. Documentation is excellent."

		LIST PRICE	OUR PRICE
★ **CENTRAL POINT**	Copy II PC Backup	$ 40	$ 35
★ **COMX**	Fastrak ™. RAM Disk emulator and printer spooler program. Works on any PC DOS version or RAM Card. Menu Driven NEW!	$ 100	$ 59
DIGITAL RESEARCH			
	Concurrent CP/M-86 *	$ 350	$225
	CBASIC 86 *	$ 200	$135
	CP/M86	$ 60	$ 40
	Pascal/MT+ (CP/M-86)	$ 400	$239
	Pascal/MT+ (MSDOS)	$ 600	$399
	PL/1 (MSDOS)	$ 750	$499
	Access Manager (MSDOS)	$ 400	$179
	Display Manager (MSDOS)	$ 500	$339
	Speed Prog. Pkg. (CP/M-86)	$ 200	$135

HOME & EDUCATIONAL

		LIST PRICE	OUR PRICE
EPYX Auto. Sim.	Temple of Apshai	$ 40	$ 29
	Oil Barons	$ 100	$ 75
★ **ARMONK**	Executive Suite	$ 40	$ 27
BLUE CHIP	Millionaire	$ 60	$ 39
BPI SYSTEMS	Personal Accounting	$ 195	$139
★ **BRODERBUND**	Apple Panic (Color)	$ 30	$ 19
COMPREHENSIVE	PC Tutor (DOS 1.1)	$ 60	$ 40
CONTINENTAL	Home Accountant	$ 150	$ 95
DATAMOST	Pig Pen or Space Strike. ea.	$ 30	$ 22
DAVIDSON	The Speed Reader II	$ 75	$ 55
INFOCOM	Deadline	$ 50	$ 33
	Zork I or Zork II or Zork III. ea	$ 40	$ 27
★ **INSOFT**	Word Trix or Quotrix. each NEW!	$ 35	$ 29
MICRO LAB	Miner 2049	$ 40	$ 29
MICROSOFT	Flight Simulator	$ 50	$ 33
PBL CORP.	Personal Investor	$ 145	$ 99
SPINNAKER	Snooper Troops (1 or 2)	$ 45	$ 35
	Story Machine or Face Maker	$ 35	$ 24
STRATEGIC	the Warp Factor	$ 40	$ 30
SUBLOGIC	Night Mission Pinball	$ 40	$ 27

for the IBM-PC or XT DRIVES AND ACCESSORIES



CONTROL DATA OR Tandon
320K/360K DS DD DISK DRIVE
With Detailed Installation Instructions
60 Day Warranty by Factory Authorized Distributor

Same as now installed by IBM. **$239** $229 Two or more.

HALF $199 HEIGHT

MAYNARD
Floppy Drive Control Brd. for up to 4 drives $ 195 $ 165
same with Parallel Port $ 275 $ 205

VISTA IBM-PC XT 64MB Backup for Hard Disk. V1200 $1549 $1049

8" CP/M-80 SOFTWARE

		MUCH MORE IN STOCK	
ASHTON-TATE	dBase II	$ 700	$ 395
MICROCRAFT	Verdict or Billkeeper. each	$ 995	$ 469
MICROPRO	WordStar®	$ 495	$ 239
	MailMerge™	$ 250	$ 129
	WordStar Prof. 4 Pak	$ 895	$ 429
MICROSOFT	Multiplan	$ 275	$ 199
	COBOL-80 Compiler SPL	$ 750	$ 450

THE WORLD'S LARGEST COMPUTER MAIL ORDER FIRM

CONROY-LA POINTE™

Formerly **Computer Exchange™**

SHOWROOMS AT:
11507D SW PACIFIC HWY.,
PORTLAND, OR. OPEN M-SAT 10-5
SEATTLE, WA OPEN M-SAT 10-5

master charge VISA

ALL MAIL: P.O. Box 23068. Portland, OR 97223

NATIONAL ORDER DESK **TOLL FREE (800) 547-1289**

Order Desk Hours: 6AM to 6PM PST

Oregon TOLL FREE [800] 451-5151 Portland: 245-6200	Hot Line For Information On Your Order [503] 245-1030

© 1983 by Conroy-LaPointe, Inc.

CIRCLE 128 ON READER SERVICE CARD

can handle, the four-rate printers spec sheets uniformly said 0.011 inch. The three-rated Epson's specs said 0.012 inch.

Also note that although the RX-80 was among the noisiest printers in this review, Epson allows a software command to slow the machine down to half speed, which also cuts the noise by 3 decibels.

Gorilla Banana

Maybe it's not the cheapest printer in the whole wide world, but at about $250, the Gorilla Banana is undoubtedly the cheapest one most people will try to plug into their Apples. You could buy two of them for the price of other so-called budget printers.

By strange coincidence, we ended up receiving two of them. One had a charcoal gray plastic case with a glued-on label that proudly announced "Gorilla/Banana," and the other was decorated in off-white and labeled "Leading Edge GX-100." In fact, except for color scheme the two machines are very much the same (GX-100 is the Banana's official model number.) Earlier machines were in fact labeled GX-100.

The biggest lesson the Banana taught us was not to make up our minds too soon. Certainly we could ignore the ridiculous name, but we could not ignore the fact that our first Banana came without screws holding the case together. We opened the box and got handfuls of pieces rather than a printer. Our reaction was the same one you'd have if you grabbed a banana without its skin—Yuk!

The kit-form printer gave us our first view of its mechanism; many of the parts looked familiar, as if rescued from a child's toy or radio controlled model.

In fairness to Leading Edge, its manufacturer, our operating timetable evidently caused it to steal the printer away from either trolls who were teasing it or another magazine that had been testing it with a hacksaw rather than software, then to rush it to us. Obviously an abused rather than used machine, it seemed to have lost touch with the world. The control codes listed in the manual baffled it entirely. After an instruction to print expanded characters, it suddenly became capable only of line feeds. Upon being told to return to normalcy, it would wind itself up and whir ominously, cough, and totally lose consciousness. The only way to revive it was by switching off and back on.

Banana #2/GX-100 arrived the next day, completely equipped with screws, which made it feel quite solid and filled us with a little more confidence. It was completely operational, except that its ribbon was dry and printed very faintly.

The ribbon on the Gorilla Banana is a good example of how cutting all the little extras keeps printer costs down. Most inexpensive printers have large ribbon cartridges that stretch the full width of carriage travel. The Banana uses a quasicartridge, two half cartridges that mount on either side of the full carriage width with nothing but a length of ribbon in between them. The quasicartridge is easier to load than a noncartridge ribbon and won't turn your fingers purple, but it's not as easy to use as a cartridge. Nevertheless, it works. Though, unlike noncartridge ribbons, it cannot be turned over to increase its life.

Another thing you won't get with the Banana is controls. It has only one—an on/off switch. There are two indicators: a pilot light LED that indicates that the solitary switch is turned on and power is indeed seeping into the machine, and an error LED that lights up when something has gone wrong. The Banana is always on-line when properly plugged into your Apple, so no "select" or "on-line" switches or LEDs are used.

The Banana is painfully slow; it ran through our test at 20 characters per second.

In lieu of line-feed and form-feed switches, and even the platen knobs, the Banana has a thin, knurled wheel called a "paper feed dial," the upper edge of which protrudes slightly from the top of the case. To advance paper, spin the dial with your finger or thumb. It clicks in increments of 1/18th of an inch, locating the printed line on paper reasonably precisely. Trying to form feed paper with the dial, however, is apt to wear a hole through your thumb. Because the dial turns only in one direction, there is no way to move paper backward.

A unidirectional tractor handles fanfold continuous form paper, adjustable for any width between 4.5 and 10 inches. Do not even think of using individual sheets of paper without feed sprockets. The feed mechanism is not very strong. In fact, the manual recommends that paper be fed from a stack level with the printer—lifting paper from the floor might be too much for the miniscule mechanism. The warning was well-founded.

Another limitation of the Banana is that it doesn't print descenders. Letters that normally droop below the general line of text won't when printed with the Banana. Instead, lowercase *g*'s, *j*'s, *p*'s and *q*'s all protrude higher than they ordinarily should, and lowercase *y*'s are just plain squashed. The reason is that the Banana prints a 5-by-7 matrix—seven dots vertically, probably the minimal size required to make upper and lowercase letters decipherable. Normally, true descenders require 8 or 9 vertical dots.

The limitations of the 5-by-7 matrix are readily apparent when you want the printer to underline. The Banana does not even recognize a standard escape code instruction to underline. If you want to underline, you must instruct it to backspace and print an underscore character (_). But when you see how it looks, you may not want to do that: The underscoring prints right over the bottom dot of each letter and makes lowercase *b*'s and *h*'s indistinguishable.

Actually printing with a 5-by-7 matrix is a genuine technical achievement because it has a one-wire printhead. Rather than having to race past a character seven times to form those seven vertical dots, however, it uses a clever mechanism. The platen, normally the round rubber roller that the print wires strike against, is a spinning cylinder with raised ridges. The relative position of each ridge when the printhead fires determines the vertical location of the dot on the paper. The position of the printhead itself determines the horizontal location of the dot. The mechanism saves many moving parts—about six finicky print wires—and replaces them with one reliable rotating platen.

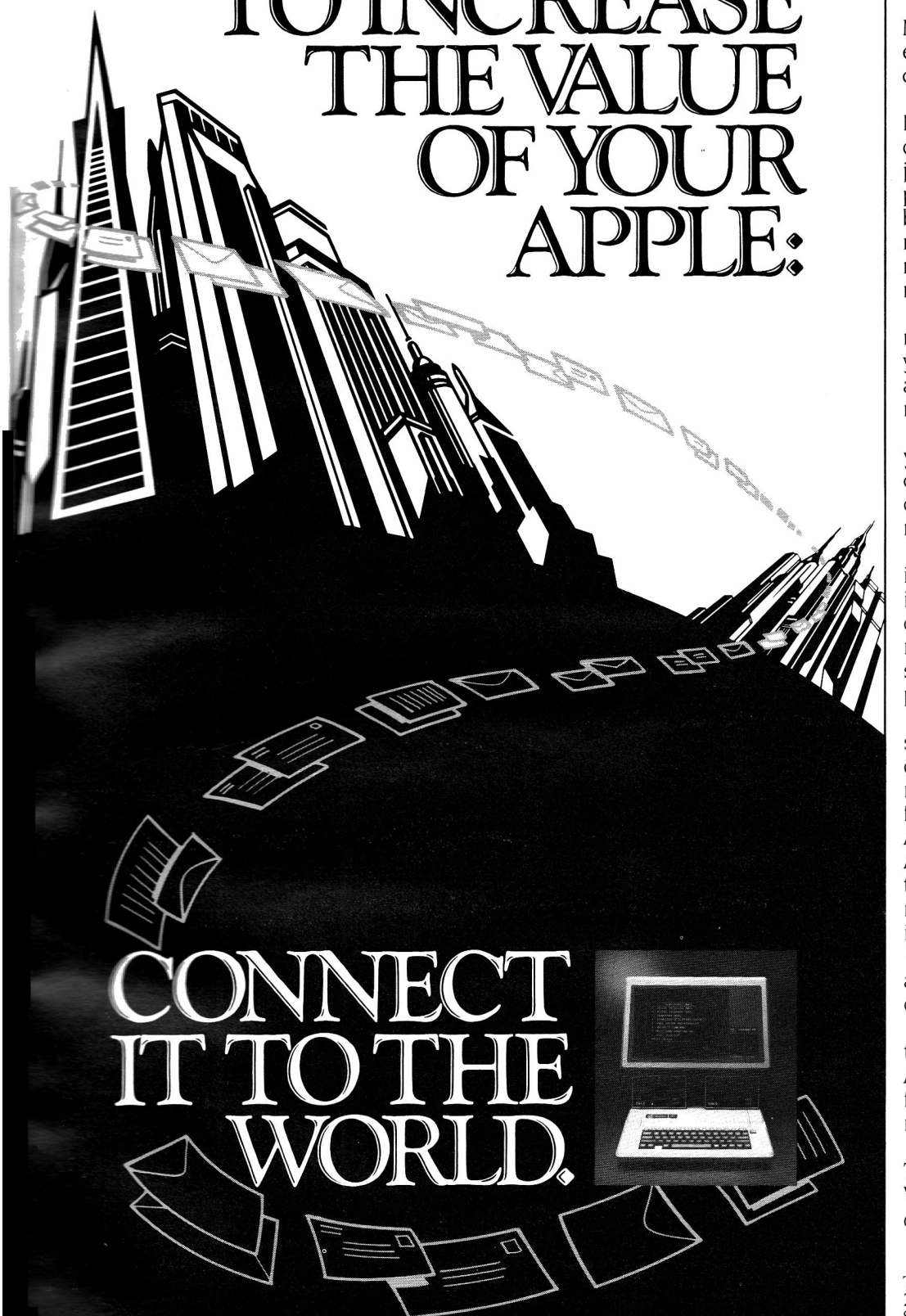
The penalty, however, is speed. The printhead must fire up to seven times for each horizontal position it advances. Further, the printhead is unidirectional—it only moves from left to right. Net result: the Banana is painfully slow; it ran through our test at 20 characters per second. Nor is it a very mighty print mechanism—two-part forms are the thickest it can handle.

Banana's manufacturer also cut corners in the special printing features department. The Banana prints with only one character height and style and two character widths: 10 pitch and double-width 5 pitch. It has only one other print mode—dot-addressable graphics.

When we attached it to our Apple IIe, the Banana gave us double-line feeds; no

Continued on page 174

THE BEST WAY TO INCREASE THE VALUE OF YOUR APPLE.



CONNECT IT TO THE WORLD.

Transend electronic communications software for the Apple is now faster and easier to use.

For the beginner: Menus guide you through each step. Hit a key to choose an option.

Once you've started: New HANDS-OFF macros do complete routines with just one command (or by pushing the "Power-On" button.) You can create macros of up to 33 commands, including terminal mode commands.

A HANDS-OFF command line can perform all your menu selections such as dial, receive, and print messages.

Choose the package you need: Transend 1™ connects you instantly to other computers and information services.

Transend 2™ sends information error-free. It's ideal for sending sensitive data with complete accuracy. And Transend 2 can send multiple files in one phone call.

Transend 3™ lets you schedule electronic mail deliveries with a minimum number of phone calls, from your unattended Apple to other unattended Apples. A built-in text editor lets you write and send messages without switching software.

Every Transend package includes a subscription offer to THE SOURCE℠.

Money-back guarantee. Try Transend on your Apple. If you're not satisfied, return it for a full refund.

To learn more, ask for *The Who, What, Why, How and When of Electronic Communications* from Transend.

TRANSEND

THE WORLD JUST KEEPS GETTING SMALLER.

Transend Corporation
2190 Paragon Drive
San Jose, CA 95131
(408) 946-7400 SourceMail ST1422

Transend 1, Transend 2 and Transend 3 are trademarks of Transend Corporation. Apple is a registered trademark of Apple Computer, Inc. THE SOURCE is a service mark of The Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc.

CIRCLE 129 ON READER SERVICE CARD



THE GREAT AMERICAN APPLE

From cinematic animation to recordkeeping in the personnel department, Apple computers lend a hand at Marriott's Great America amusement park.



His name is Foghorn Leghorn, and he's a seven-foot-tall chicken who hangs out in front of the Snowshoe Saloon.

Foghorn, who has a five-foot-long tail, a two-foot beak and feet like something out of a movie called "Chickens Take Over the World," is run by an Apple computer.

An attendant opens the doors to his ramshackle saloon. Foghorn sits at an old upright piano that is wrapped in chicken wire. Straw hangs from the room's exposed rafters and a mock wood stove is off in a corner. The chicken dominates the small room. With the help of the Apple, Foghorn starts his show. He bellows comic patter and sings old barroom songs appropriately tailored to the tots who stare up at him. They think he's real, and most of his monologue is aimed at them. His head moves up and down and from side to side as one eye rolls down to look at the children while his over-stuffed fingers plink out tunes on the piano.

Foghorn seems to be a hit.

Overwhelming Numbers

He is part of a multi-million dollar business called Marriott's Great America, a theme park in Santa Clara, California. Foghorn is a small part of the amusement available to the approximately 30,000 people who wander through the 65-acre park on a good day. Marriott's business is to give its customers a good time with little inconve-

nience. Marriott's employees must keep the customers satisfied.

The job of hiring an efficient staff starts in the personnel office, a small, temporary-looking building located near the park. Inside, thirty chairs are arranged in neat rows facing the windows. On a recent day about half were occupied by teenagers filling out applications or waiting to be interviewed.

The slow season has set in; twenty-five to thirty applications come in each day. Starting in January the office will be inundated by about 300 applications daily, a pace that will continue through the end of March before the park opens. In one year the personnel office here processes about 10,000 applications.

It's a large task that was once done manually. It took a lot of time, a lot of people, and was cumbersome.

Then, 4 years ago, Tony Scott, Marriott's manager of employment and manpower utilization, bought two Apple IIs for the office. Those two, the 9 Apples subsequently purchased, and the 7 or 8 Apples employees brought from home have changed the way business is done at Marriott's in marketing, rides and admissions, cash control and especially in personnel. Computers keep track of applicants and the 2,500 employees in what is essentially a small city between Memorial Day and Labor Day and a ghost town the rest of the year.

During Marriott's small city phase, some employees work 18 major rides, 23 shops, 26 restaurants, 15 food kiosks, 26 game centers and 15 arcades. Others help major song-and-dance reviews, minor shows, roving bands and magicians, minstrels, and strolling cartoon characters. Additionally, there are maintenance people, programmers, accountants, secretaries, carpenters, medical people, clerks and all the other people necessary to Marriott's business.

Tracking Details

Scott is in his office next to the personnel waiting room. He talks about the Apple that sits on a desk in the waiting area.

"We do all the personnel stuff, manpower utilization, park productivity, labor-hour control, and a lot of reports that use the database to track developments on that Apple. It has been a phenomenal tool," he says.

Scott supplements the usual general information kept in the Apple about employees with data on special skills, foreign languages, and training in running rides or other park-related jobs.

"We have people visiting the park who speak only Japanese or Swahili," Scott says, leaning back in his chair and lighting a cigarette. "With an Apple, you just punch in the language and up come the people who speak it.

"We're working on a financial project. It involves every area of the park and ranks sales, labor hours, and labor costs. We threw it on the Apple and, presto, whamo, we had the information. We couldn't do that before. We had the information but it wasn't formulated to be useful," he says.

The second Apple II in personnel is tucked into a four-by-six foot cubbyhole. Scott takes a seat and then looks embarrassed. Loose papers, pencils, and odds and ends festoon the tiny place. An ashtray, half-filled, identifies this Apple as the one where Scott does most of his work. He hastily sweeps aside the litter.

Less Paperwork

Scott is at the Apple to demonstrate how he and others schedule fluctuating shifts for the 240 workplaces in the park, which he describes as a monumental task. He punches up the program and gives an example. According to Scott, many of the restaurant managers are college students who may have little or no experience beyond the general knowledge that more people are needed at dinner and lunch than at other times.

"So we wrote out a program to help them out," Scott says.

A manager keys in the number of people he or she thinks will be needed at various times, say, five at dinners and lunches and two in other periods. It's broken into 15-minute segments. The program allows for lunches and breaks and the 15-minute walk to get to some of the restaurants. In the final schedule, when five people are needed, five people are there—not at lunch, not on a break, not getting there—but at their jobs, according to Scott.

The program also aims for long shifts. It takes about ten minutes from the time a manager walks into the cubbyhole, sits down, gets comfortable, calls up the program, punches in what he or she needs, says good morning to passersby, and checks the final results to when the manager leaves the cubbyhole with a schedule for each employee.

"The problem before the Apple was the paperwork. It was a disincentive," Scott says. It was easier for managers not to keep fiddling with the shifts trying to optimize efficiency, while wearing holes in the schedule with their erasers. "This program and the Apple maximize a person's shift and minimize the number of people needed. If some kid for some reason has to work 10:00 a.m. to 4:00 p.m. on Fridays, we can put that in and the computer works around it. It's an interesting, unique program that we have here. I don't know anyone else who does this."

Beyond Scheduling

The Apples in personnel also print employee identification cards, track equal opportunity employment data for government reports, do some word processing, and run financial modeling for special events to help determine profitability.

Scott says the Apple is particularly good for details. For example, if the drink stand near the dolphin show temporarily loses one employee to the flu, that's half the workforce at that station. The computer flags it. "The small ones are where the worries are. It's critical to keep tabs on those. Keeping track of openings could be monumental if it weren't on a computer."

Someone pokes his head around the corner of the cubbyhole, sees that the Apple is in use, then disappears. Scott grins and explains that while all departments have access to mainframe computers, not all have the small Apples. He finds people regularly wandering in to use his, especially finance people, who have taken to running weekly capital expenditures on the Apple in the cubbyhole.

Scott gets up, checks his cigarette supply, and strides through the waiting area and down a side hall to the marketing and sales department, where another Apple is in use. He points to a dark-haired young woman, who keeps track of the "tens of thousands" of clients contacted yearly by Marriott's account executives, who sell various group ticket

The Santa Clara Park led all Marriott divisions in the use of microcomputers.

People tend at first to stare strangely at the newly-installed computers.

plans to corporations and other organizations.

Before Apple, when a group ticket plan was sold to, say, Intel, she logged in manually, in three different places, the name of the group, when they would visit, the name of the salesperson, and which group ticket plan was sold.

"Now, she types it into the computer once, and when we want to know something we just punch it up," Scott says.

The group sales data are used in projecting attendance at the park. "The individual days are fairly predictable based on past stuff, but if Intel has 5,000 coming over, then you have to staff up." The Apple in marketing and sales was introduced last year. The company is still experimenting with it.

Fears Evaporate

Scott is the in-house programmer, and he says that once an Apple is installed, he doesn't have the time to do all the things people want done when they realize the computer's potential.

"It's getting better though. We have to bring people up to speed on how to use them. You have to hold their hands at first," he says.

People tend at first to stare strangely at the newly-installed computers.

"Now, people are running their own stuff. Their curiosity is so great, they overcome any uncertainty quickly. Once they're exposed to it, they want to do twenty things with the information, they want me to develop the report for them, and they want me to do it tomorrow."

Scott takes people through the programming and reporting step-by-step so they learn to do it themselves. Most are proficient, or nearly so, now.

Cash Flow

He leaves the small marketing, personnel and costume-changing building to head toward the cashier's office inside the park. It is another office that uses Apples. On the way, he stops briefly to point out Foghorn Leghorn, looks satisfied, and ducks out a gate marked "Employees Only." He rounds a corner and enters a small, one-story building. It's the cash control center.

Scott explains that attendants pick up their cash at the center in the morning and return with it at the end of the day. Runners are sent to pick up cash at the work areas as the day passes. Behind heavy mesh screens, across an open office area, is the room where the incoming and outgoing cash is tracked. Employees use two Apples to reconcile the cash at the end of the day, a major undertaking, according to Scott, who, without giving a figure, says that "a whole lot" of money goes through the system.

"Without a computer, you're talking about reams and *reams* of adding machine tape," he says.

Ride Control

The front doors of the cash control center face the end of a lane that cuts through the park but is not open to the public. It allows Marriott employees to get to work without getting stuck in park crowds. Shifts of workers come and go throughout Marriott's eleven- and thirteen-hour days as 10,000 to 30,000 customers roam the premises. Donald Duck walks into the company cafeteria, looking for lunch. A furry, doglike creature climbs the steps to the back door of an auditorium, where shows are performed every few hours. A saxophonist with his bowler hat pushed back on his head works on a riff under a shade tree.

The rides and admissions office is at the far end of the lane near a ride that sends customers into upside-down loops. As the open cars hurtle down the ramp, joyful terror is plastered on grinning faces and eyebrows seem determined to find new resting places. The twenty or so people who flash by scream, but it looks like fun.

The rides and admissions people, who are responsible for that and other rides, project and track attendance. They use data from previous years as well as the number and size of groups scheduled for the park that day.

Scott climbs the stairs to rides manager Kent Mitchell's second-story office. Mitchell stands at his desk, and an Apple sits on a small table in the corner.

"I use the Apple for budgets, attendance projections, attendance summaries and ride analysis—that's a ride's potential capacity measured against what it is actually doing," Mitchell says. He also does six reports daily on the Apple and has nearly completed a computer program for guest comments.

For example, the park opens at 10 a.m. At 11 a.m., the park attendance projection is reforecast and staffing adjusted if needed. Scott says it would take much longer if the admissions people didn't have the Apple.

The department must also keep track of its personnel. When the Log Run operator calls in sick the rides people have to know immediately who has been cross-trained in that ride. The Apple tracks who has passed the written and practical tests for the rides under their jurisdiction, and the computer can produce the list almost immediately.

Sharing Information

Rides and admissions, sales and marketing, cash control, and personnel overlap to some extent. In addition to shared sales data, basic information on employees is available to rides from personnel, and the rides people work with cash control on the cash overages and shortages at the gates.

It is a complicated, fluctuating system, in which scheduling must be flexible and managers fast on their feet.

Marriott's second park, about an hour's drive from Chicago, has followed Santa Clara's lead in the use of Apple computers. According to Scott, the Santa Clara park led all Marriott divisions in the use of microcomputers. The two parks keep each other up to date and compare results by transferring information via the Apples—a method Scott describes as timely and cost-effective.

Goodnight, Foghorn

Scott is on his way back to the personnel office, but detours to the video game arcade. The games interest him, and he is developing a program on the Apple to keep daily records of each of the arcade's several hundred machines.

He pauses to look at a game, then heads toward another employee gate. The personnel waiting room is empty of teenagers as Scott enters the building. The Apple computers sit unattended. For most people the work day is ending.

But at Marriott's Great America theme park, it is early. Rides will be ridden, games will be played, shows will be seen and food will be eaten until late into the night.

Some shifts are just beginning. A large rabbit walks down a lane between the buildings toward the park.

And somewhere, in a small saloon in Marriott's Great America, Foghorn Leghorn is still singing his songs. ✚

TECHNO MERRIL

Brokerage house Merrill Lynch is conducting business with Apple computers and a stockbroker-specific applications package, but this is just the beginning of a brave, new office world.

Ritch Gaiti is bullish on computers. And, when Ritch Gaiti talks, people listen; he is the vice president of Advanced Office Systems for Merrill, Lynch, Pierce, Fenner and Smith, the giant Wall Street brokerage and investment house.

Gaiti oversees the automation for all of Merrill Lynch's retail office systems, including on-line system development, neighborhood processing, office automation, and office technological development. The Apple Computer is an integral part of the system he is developing. Gaiti, and others like him, are taking the initial steps that may revolutionize the running of large office systems.

Broker's Edge allows the users to collect and sort the data according to numerous categories.

"Around 1980," he recalls, "account executives started fooling around with personal computers and trying to figure out how to make money with them. Before then, the additional hardware and software just weren't available.

"We're a prime market—we're affluent; we have the need and the entrepeneurs," says Gaiti. At the outset Merrill Lynch surveyed its account executives and found that very few of them actually had personal computers. Most of them were what Gaiti refers to as technicians—people deeply involved in account analysis. Seeing the potential to create a powerful new tool for its account executives, Merrill Lynch hired a team of experts and told them to develop a system that would support the needs of its account executives.

"At that time," Gaiti says, "there were 40 to 50 personal computers (in our offices) in the country. Most were Radio Shacks. But this changed quickly; Apple took over primarily because of its business appeal and the wide range of software it offered."

Specific Software

Software was specifically developed and licensed by Merrill Lynch for its account executives and was further supported by a newsletter and telephone hotline. Today, the system, *The Broker's Edge*, has been licensed to about 400 account executives.

The Broker's Edge is an excellent example of program development aimed at solving specific job-oriented problems, while remaining flexible enough to adapt to individual requirements and needs.

Essentially the problem was to create a package for the account executives, which would allow them to know where their customers were, to sort through the names for appropriate matches, and to assist in contacting customers quickly. Perhaps it was a stockbroker who came up with the saying "Time is money." It well expresses the stockbroker's ability to sink or swim in today's investment world.

The key to *The Broker's Edge* is that it allows each account executive to modify the package. Says Gaiti, "We told our account executives that if the information given doesn't suit your needs, here's a simple way to modify it."

In addition to storing and maintaining customer information, *The Broker's Edge* also allows the users to collect and sort the data according to numerous categories. It also will create contact and mailing lists and can even mail the envelopes for the account executive.

Gaiti further explains the application: "Say the firm has a new offering in municipal bonds, which an account executive knows would appeal to doctors in a particular tax bracket. The software would provide a list of those people who fall into this category. The account executive can send them a note, which the computer will automatically generate. It can also generate a contact list or flash the information right on the screen for the account executive's immediate use.

"It gives him a way to target, to zero in on clients. It enables him to look at clients he might have missed."

Learning Requires Perseverance

Gaiti says the reaction to the system has been extremely positive. "There's such an obvious need—the account executives love it, especially because it's customized for their needs."

However, he cautions account executives who expect to reap immediate benefits from their Apples. "My key goal is to make them successful users. First,

L O G Y · A T
L·LYNCH

The computer can generate a contact list or flash the information right on the screen for the account executive's immediate use.

they have to make a commitment. Then, they have to lower their expectations. Some of them expect to turn on the machine and have dollars come out the other end. This doesn't happen. New users must commit themselves to spending lots of weekends and nights learning the computer.

"They're getting a powerful tool that requires a considerable investment in time and learning. The real investment begins after the user takes the computer out of the box." As if to prove his point, Gaiti adds, "I have an Apple at home, and I still have a lot of learning to do—it takes a lot of perseverance."

Gaiti is well aware of the problems of the layman first confronting the complexities of the computer. He credits Apple with being very clever: "It wrote its manuals in a talky, down-to-earth style. This was the key to its success."

The use of the Apple in Merrill Lynch offices throughout the country only approaches the horizon of the brave new office world that Gaiti envisions. "In the current environment, the personal computer is a stopgap," he says. "In the long run, we have to integrate it. If we're smart, we leverage it and integrate it and plug it into our network. There will be a personal computer, or some source of computer power, at every account executive's desk. Personal computers are the way everyone will go."

The system in which he hopes to integrate the personal computer is already underway at Merrill Lynch. In its final stage, Gaiti envisions the total integration of all office functions: Word processing, communications with clients through the on-line system, which, alone, is a 14,000-terminal network on the mainframe, linked to over 400 branches throughout the world.

"I'm working toward the ultimate integration of all automation, because it makes sense economically," Gaiti says. "If we don't do this, what would result would be disparate, divergent, unintegrated systems."

Already, Merrill Lynch has taken the initial steps under Gaiti's guidance by standardizing the office environment to create a common, uniform base.

In the future the personal computer will become the management work station, no longer merely the collector and sorter of data. At such a time, experimentation will take place with what Gaiti calls "customer PC interaction."

Says Gaiti, "Right now technology is way ahead of our ability to make full use of it. Anything can be done. Just think about it, and write out the check." The result, Gaiti believes, is much more profound than merely saving time and effort by using Apple computers and other tools of the new technology. Office automation has brought about a fundamental change in how we approach business and the way it is conducted.

"From a management point of view," he says, "we've been in automation forever; we had to be just to survive. But did I ever think office automation would get where it is now? No, I never envisioned it.

"The rate of change is obviously increasing dramatically; we're conditioning ourselves to this pace and building a much more dynamic operation."

The dynamism Gaiti speaks of is not unique to the corporate world. With a smile, he tells of his own change in attitude toward the field he has worked in for 17 years.

"I've always enjoyed this field," he says, "but 6 or 7 years ago I was considering leaving it because I was bored and felt I had nothing left to do.

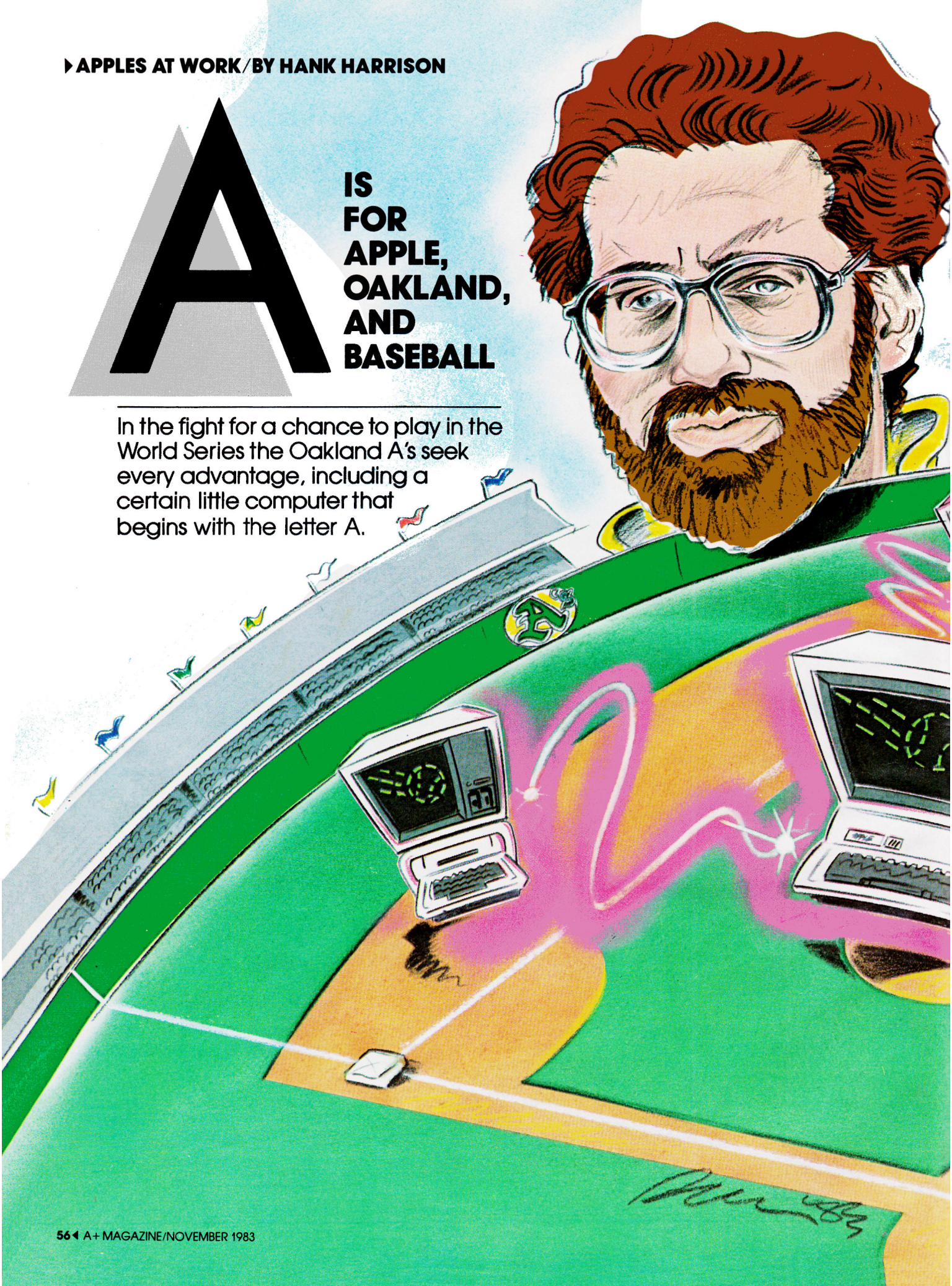
Apple wrote its manuals in a talky, down-to-earth style. This was the key to its success.

"And now, a mere 7 years later—this is a genesis. I've never been as busy, as thrilled, as motivated as I am right now. To me it's the rebirth of a whole industry."

And that feeling of rebirth explains why Ritch Gaiti, the man who buys Merrill Lynch's computers, is bullish on the future. ✚

A IS FOR APPLE, OAKLAND, AND BASEBALL

In the fight for a chance to play in the World Series the Oakland A's seek every advantage, including a certain little computer that begins with the letter A.



Wally Haas and his brother-in-law Roy Eisenhardt own the Oakland Athletics baseball team. To the cheers of thousands of Oakland fans and dozens of players, they took over from Charlie Finley in November, 1980.

The new owners are from the Bay Area, and though they said little about their plans, everyone sensed that a bright and progressive local management would replace Finley's absentee style.

The new owners have not just ushered in a new era in Oakland, they are part of a growing trend in baseball. They have had the temerity to introduce technology into this tradition-bound game. There is an Apple in Oakland's future.

Oakland isn't the only team with a computer and, to some extent, the Apple's presence is the result of a series of coincidences. Two years ago Haas and Eisenhardt hired a computer literate manager looking for a machine to give him an edge. A local software house had just designed a major league database management system, which they offered to the A's, who had hired a computer and baseball enthusiast to set up a system. Finally, Apple Computer's corporate headquarters is nearby, in Cupertino. Now, every player and interested party in the A's organization has data windows at his finger tips, before, during, and after any game.

Many other ball clubs are following suit. What is now a trend may become an avalanche over the next two years as computers such as the Lisa, which can be operated without typing skills, and the portable and rugged Mackintosh are phased in. Haas says the A's will never use a computer in the bull pen, but some teams seem to be moving in that direction.

The Computer Wave

Only a few teams now use an on-line Apple to help make important decisions, including the A's, the White Sox and the



Yankees, but many teams use some kind of computer to aid in secondary decision-making or are evaluating the addition of a system at this time.

Steve Boros, the A's manager, makes final decisions himself, but has the Apple II$^+$ and its sophisticated software available to him.

Boros says the Apple is particularly valuable for scouting new players. The system gives him data instantly that would take years to accumulate by hand.

He hasn't been in the league long enough to know all of the players' statistics by memory, but with an Apple he can get figures on any player's performance over the past two seasons.

Tony LaRussa, who manages the White Sox, uses the same system, with impressive results. The White Sox were at the top of the American League West through most of the 1983 season.

LaRussa says he can set up a game before it is played and can get a clear picture of prior performance and a pitcher's likely choice of throws by placing any theoretical pitcher up against any theoretical batter.

One major league baseball manager occasionally uses a home computer on his own time. The club doesn't know he uses it, but he has had great success in pin-pointing opponents' fielding weaknesses by putting the tip of a light pen

PLAYERS WERE LOATHE TO ADMIT THE "DREADFUL BOX" EVEN EXISTED.

mounted in an Apple IIe with a Z-80 card at two points on the screen for each hit in each inning.

By the third inning a pattern starts to form and, by pressing a button, he can replay the entire game in fast motion. He takes the information from a simple paper score card.

This manager, who prefers not to be identified, gives some background on his system: Chewing an immense cud of tobacco, he says, "Yeah, my son wrote the menus and graphics in *GraForth* and we hooked it to a Pascal database. It's in the experimental stages now. This baby never travels with me." His face broke into a grin. "It's my secret weapon."



The Nature of Statistics

Baseball may be the most statistical of modern games. Many fans are drawn to the sport, not for love of the game, but out of lust for numbers.

For many fans the day does not start properly without a complete analysis of the box scores of yesterday's games. Some diehards resent the competition between computers and their own photographic memories, but computers will never replace gray matter. They simply provide a way to expand statistical speculation.

Baseball isn't the only spectator sport using computers. To understand just how dynamic these off-field applications can be in almost any sport, it is important to distinguish between "fan statistics" and "game-time-decision statistics."

Fan statistics are numerical tallies that are entertaining. They tell newscasters and fans how a batter, runner, quarterback, forward, or team is doing relative to a career or compared with other teams and past performances.

Game-time-decision statistics provide details useful to managers and players, such as players' health and recent workout reports.

A detailed and precise player status analysis could reveal a weak spot in a defense, and any team with current data could be coached to exploit weaknesses.

The A's Apple

The Oakland Athletics Apple II$^+$ system is operated by a baseball wizard called Jay Alvez. Alvez works directly with Boros and will also consult with any player who desires access to his data banks. On request, Alvez can hook up to the mainframe in Philadelphia and get almost any current performance printout.

Originally from Half Moon Bay, California, Alvez was an early baseball fanatic. At the age of five, in the days before the A's came to Oakland, he astonished his parents by memorizing the names, numbers, and daily statistics of the San Francisco Giants. After high school, Alvez went to Arizona to play baseball and attend college, in that order. He got a degree in radio and television media and studied computer sciences. He hoped to be a professional ballplayer, but instead discovered his talent for computers and became a systems designer. His heart belonged to baseball.

Alvez joined the A's in 1981 after working for a few years in the Bay Area news media. His first goal was to set up a computer database that would provide

instant box scores for various news people, but quickly expanded the idea to encompass team statistics. Alvez says his new system can create an entire box score, with several added statistics, ready for release to the newspapers six minutes after a game ends.

The A's use an Apple II+ system that is directly tied to a Digital mainframe on the east coast by way of a Hayes Smart Modem running at 1200 baud. It runs a software package called *EDGE 1.000,* which was developed by Pacific Select Corporation of San Francisco.

The computer itself is not unusual. The Apple II+ runs an 80-column board and operates on normal Apple DOS, but it does have an odd triple disk drive arrangement.

The three disk drives are cleverly set up. Drive A is the boot and program disk, which holds all program material. The disks are write-protected.

Drive B holds material on the A's pulled from the mainframe and is updated after each game. Alvez says this comes in handy during a doubleheader, when it is difficult to update material from the last game on such short notice.

Drive C holds updated material on the opposing team. This material can be inaccurate, since new updates are always harder to get on the opposition than on your own squad.

All requests from players and managers are printed as hard copy before the game, but during the game, the system is occupied with tracking the real-time events.

Alvez says players at first were loathe to admit the "dreadful box" even existed. "But lately many players have seen the light and have been requesting reports of all kinds. I think they're coming around," he says.

In its current state, the system can tell a player when he is performing above or below par at bat and in the field and can give a complete graphics printout of every hit or pitch in the last game or any number of past games. A pitcher can see where he went wrong. A coach can see holes or overlaps in a defense and can make adjustments accordingly.

These reports are valuable for training batters and trouble shooting, but they can also boost player morale because they reduce anxiety. The computer can identify one real problem out of a thousand worrisome possibilities.

With the Apple and the *Edge 1.000* software, Steve Boros and other managers around the leagues can keep track of hundreds of cross references. Batter-pitcher correlations are a snap to do, and it's easy to find a hitter's zone of effectiveness, or a base runner's base-stealing effectiveness against a particular catcher, or an outfielder's position effectiveness against a particular batter.

THE APPLE IS PARTICULARLY VALUABLE FOR SCOUTING NEW PLAYERS.

The Computer Ball Paradox

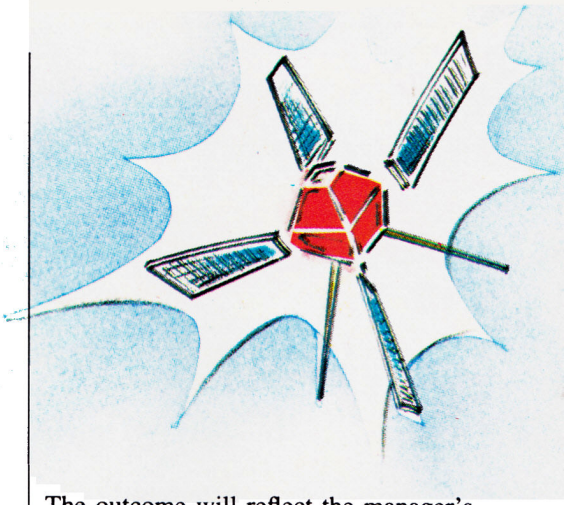
Oakland A's fans, who suffered first with Finley, then with "Billyball," stay loyal, though some worry that their game will soon turn into "computerball." The idea of computerball is as ridiculous as Billyball turned out to be, but the fear of computers as applied to baseball presents a problem. Will the fear and loathing of computers, especially of the innocent Apple, eventually divide the fans into two camps? Will seats in the stadium be reserved in two sections, one for computer lovers and one for computer aliens?

People who fear computers distort their importance and portray them as evil giants designed to take the fun out of a game, but anyone with any practical experience realizes that computers are rarely more than electronic file cabinets or housekeeping tools.

The *EDGE 1.000* program is an excellent example. It is a database that houses some sophisticated graphics routines, but it isn't magic. The A's and the White Sox use virtually identical programs, yet the A's have trailed the White Sox most of the season.

If the software and the computers that use it were as important as people fear, the two clubs would always be tied for first place. But they are not.

When two teams use an identical system, the overall outcome will rely on the human reactions to computer suggestions. Two managers may make two different decisions based on the same data.



The outcome will reflect the manager's baseball philosophy and depend on the player's raw talent, not on the computer. The computer can make suggestions, but it can't turn Jerry Lewis into Willie Mays.

Billy Martin, currently the manager of the New York Yankees, may be able to keep those statistics in his head, as he claims, but most of us can't. The computer helps managers and players not quite as gifted as Martin who may want to keep information organized or document a day's batting practice.

The Future

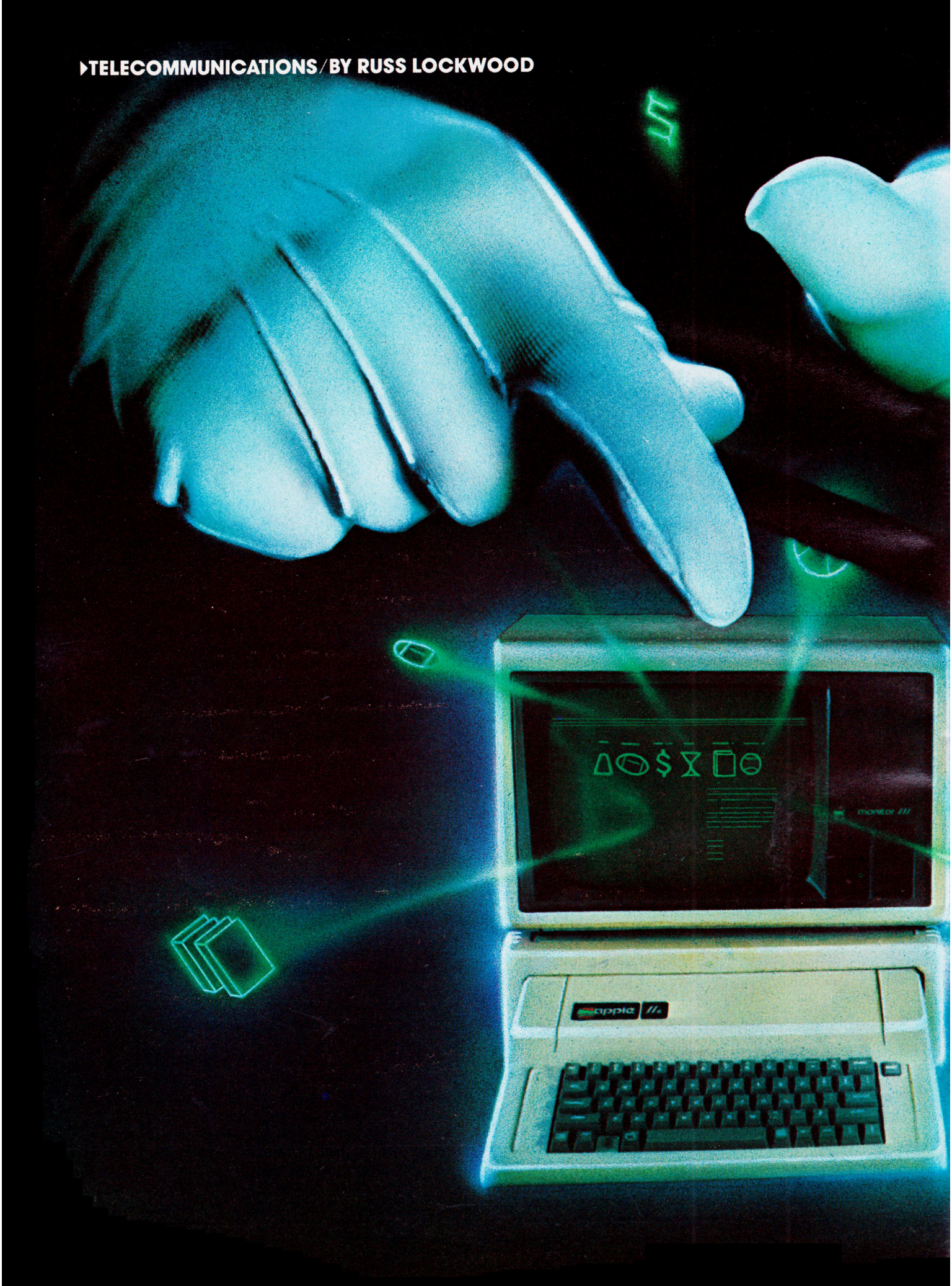
The computer is only one form of technology currently invading sports. Lasers are used to clock the speed of pitches and runners in the Olympics and they can also determine the exact point where a ball went foul. Sports medicine, which depends on sophisticated electronic equipment, is rapidly expanding our understanding of the body. Baseball does not need space-age technology to survive, but, like most traditional institutions, it can adapt. Perhaps an Apple a day will keep injuries away.

Sports software and hardware grows increasingly complicated and sensitive. Within two years it will be possible to plug any player into a sensory network using radio telemetry to monitor heart rate and measure any number of other physical exertions. A team manager on the road might have data on his players feeding into his wristwatch from a satellite, which would be in communication with the Apple and the mainframe back home.

Though some of these ideas are pure science fiction, high technology is invading baseball, and it's probably for the good of the sport. The computer has had a positive influence in other areas of modern life, so why not in baseball? The sport should not be immune to growth and change.

Technophobes have nothing to fear. The post-game bar bet will never die. ✚

▸TELECOMMUNICATIONS/BY RUSS LOCKWOOD





MODEM MAGIC CONJURES UP INFORMATION

The telecommunication powers of your Apple can cast a spell on these on-line information services that unearth vast worlds of facts, fun, and conversation.

Reaching out and touching an information service with my Apple computer shouldn't appear all that mystical. I hook up the modem, punch a few keys, and I'm on-line. I'm positive the whole process is grounded in scientific fact. But I'm also sure that once you start exploring the array of computer services that timesharing networks offer, the wealth of information, convenience, and enjoyment will continue to amaze you long after you hang up.

Four services—CompuServe, The Source, Knowledge Index, and Bibliographic Retrieval Services (BRS) After Dark—cater mainly to personal computer owners and charge fairly low prices during evening and weekend hours. A fifth service, Dow Jones News/Retrieval, is directed primarily toward businesses, so its rates are higher, but still reasonable. Others serve only business customers and charge accordingly—often more than $100 per hour.

These five companies offer a variety of services for the subscriber. Home budgeting, games, stock quotes, encyclopedias, news reports, electronic mail, and even shopping at home are all available through the magic of the modem.

Although all services may be ordered directly from the individual companies, you can sign up for CompuServe and The Source over-the-counter at retail computer stores. You can also buy Dow Jones' software programs, which include access to its News Retrieval service, at selected computer stores.

Since checks seem to be an almost unheard-of exchange medium in the information business, I suggest you ready your credit card. The Source reviews your application to determine the risk of billing. BRS After Dark requires you to establish a one-time, $250 noninterest-bearing account before it will start billing you. Knowledge Index offers only credit-card billing and CompuServe charges a fee for direct billing. Only the Dow Jones service bills directly without a fee. In fact, it doesn't even accept credit-card payments.

Each service charges a registration and start-up fee, then supplies you with an ID number, password, user's manual, and subscription to newsletters and updates. The services' manuals are three-ring, looseleaf notebooks except for Dow Jones', which is a paperback book. The manuals provide easy, step-by-step instructions on how to access and use their service. All are well-written, packed with examples, and designed for the telecommunications neophyte.

Calling on the Services

All the services can be accessed by dialing into either of the local communications networks—Tymnet or Telenet—which in most cases save you long-distance telephone charges. CompuServe, however, operates its own network, CompuServe Network Services, and will charge extra if you access its services via Tymnet or Telenet.

The Source, CompuServe, and Dow Jones can be used 24 hours a day, but their services sometimes may be taken off-line for maintenance and updating. BRS After Dark is available any day from 6 p.m. to midnight (local time). Knowledge Index operates from 6 p.m. to 5 a.m. Monday through Thursday, 6 p.m. to midnight on Friday, 8 a.m. to midnight on Saturday, and 3 p.m. to 5 a.m. on Sunday.

To gain access (otherwise known as *logging in*) to a service, dial the local Tymnet, Telenet, or CompuServe Network phone number, wait for a high-pitched tone, and place the receiver into the modem. The network will ask you to specify a computer terminal type, which for most home computer owners will be an A for CRT terminals. You then log in by typing the name of the service you want; for example, KI for Knowledge Index. The service will ask for an ID number and password. Providing the correct information will reward you with a welcome message and the log-in time. For those who bristle at the thought of having yet another number attached to their name, the services will allow you to change the password into something a little more personal, like RUSSELL or GANDALF or ABRA*CADABRA.

Once you're on-line, a main menu appears listing general topics. Selecting a topic—for example, 1 HOME SERVICES on CompuServe—generates a new menu of subtopics. Choosing a subtopic—for instance, 7 GAMES AND ENTERTAINMENT—calls up a listing of the programs available. Choosing a program from this list—for example, 1 ADVENTURE—begins the program. A faster method of navigating around the service is to bypass the menus by typing in commands. For example, typing GO GAM-11 gets you to the Adventure game. Each service supplies an extensive list of commands. The menu-driven approach works well, but with an on-line meter ticking away, you'll save time and money by learning the commands.

Before delving into all the electronic wonders that the advertising wizards promise, check the "latest news" section—//INTRO in Dow Jones, for instance. It describes the service's new features and changes and gives other important customer information.

Dow Jones News/Retrieval

Dow Jones & Co. Inc., which also publishes *The Wall Street Journal* and *Barron's,* operates the largest of the information services, with 85,000 subscribers. As to be expected, Dow Jones concentrates on providing a solid selection of business services.

The Dow Jones News database provides business and economic news from *The Wall Street Journal, Barron's,* and the Dow Jones News Service (The Broad Tape) dating back 90 days. It lists the recent articles first and allows you to

BULLETIN BOARD SERVICES

Your computer can contact electronic bulletin boards with free information, messages and jokes.

Like information services, bulletin board services (BBS) are accessed over the phone lines with a modem. Unlike information services, they require no password, no manuals, and no fees outside the cost of a long-distance phone call. They are usually run by users groups, clubs, and individuals. Some are available 24 hours a day, but most are not. Some BBS can only connect one user at a time, so busy signals are common.

The BBS lack the mystique of the on-line information services; after all they're mainly electronic message boards. Interested computer operators dial in and either read or leave news items, taunts, or gems of wisdom. I placed a call to Ohio into the Apple BBS of the Akron Digital Group. While scanning the numerous messages, I came across the subject heading "Can beer make you smart?" I expected a dissertation on the relationship between alcohol and the right and left hemispheres of the brain. But all I got for my request was "It made Bud Weiser."

Some BBS provide more than a message service. They offer unprotected programs that can be downloaded—that is, be read from the BBS' computer and stored on your own disk. Although any computer can access a BBS, the programs they may offer are like regular software, which will only work on certain machines. Sometimes, they don't work at all. I downloaded a terrific clock and calendar program that was 2 hours slow and 1 day behind. Maybe it missed daylight savings time during a leap year.

I liked the Apple BBS of the Akron Digital Group. It can be reached by calling (216) 745-7855. This bulletin board also listed other BBS and their phone numbers.

—R.S.L.

scan the headlines before selecting stories. Searching is accomplished by entering a company's stock symbol or the industry or government code. For a much higher cost per hour, you can use free-text searching to find articles dating back to 1979.

Similarly, *The Wall Street Journal* Highlights database provides summaries of major stories appearing in the last five issues. The Weekly Economic Update database gives a review of the week's top economic news and a glimpse of the month ahead.

Dow Jones offers several financial and investment services. The Corporate Earnings Estimator, compiled by Zacks Investment Research Inc. from the research of top analysts at 50 major brokerage firms, provides earnings forecasts for 2,400 of the most widely followed companies. Disclosure II holds just about everything you ever need to know about a publicly held company, including its subsidiaries, 5-year financial summary, and other information filed with the Security and Exchange Commission. Media General Financial Services offers detailed corporate financial information on 3,200 companies and 180 industries, and the Weekly Economic Survey provides commentary and analysis of current economic trends.

Dow Jones delivers current and historical quotes on common and preferred stocks and bonds, mutual funds, and federal treasury issues and options. Daily, monthly, and quarterly Dow Jones averages for industrials, transportation, utilities, and 65 stock composites are also available.

Dow Jones also furnishes information that is less business oriented. The service offers general national and international news, sports and weather, the Academic American Encyclopedia, movie reviews dating back to the 1930s, an electronic shopping service called Comp-U-Store, and transcripts of Louis Rukeyser's PBS television show, "Wall Street Week."

CompuServe

Consider CompuServe to be a thick electronic tome designed to keep you spellbound hour after inexpensive hour. Information on all subjects (from AMEX price quotes to yachts) by all sources (from Associated Press to the National Well Water Association) appears with each computerized incantation.

CompuServe provides general, financial, and sports news from *The Washington Post, The St. Louis Post-Dispatch, The Middlesex Daily News,* and the Associated Press. The *World Book Encyclopedia* is available on-line, as are movie and restaurant reviews, airline schedules, weather information, computer hardware and software reviews, stock reports, a complete guide to wine tasting, and many more general reference sources. And if you can't pinpoint the information you're seeking, write to Aunt Nettie, CompuServe's on-line Dear Abby. She may not be able to tell you where to search, but will soothe your soul with timeless advice and wisdom.

CompuServe lists about 40 games, most of which are rather simple, but some are absolutely frenetic. *Megawars* is a souped-up *StarTrek* played in real time versus real opponents—other CompuServe subscribers. You have to be not only clever, but dexterous, too. I was hit so many times while piloting the starship Nimrod that a fellow starship captain beamed in a message: U OK? Evidently not, for shortly thereafter, the Nimrod exploded like a supernova. A more sedate challenge is *Adventure,* a game of searching through an underground labyrinth to find treasure. This problem-solving game is already a classic and can easily become addictive.

Aunt Nettie, CompuServe's on-line Dear Abby, will soothe your soul with timeless advice and wisdom.

CompuServe lists about 50 special interest groups (SIGs) that operate over the computer lines. Game addicts can consult the SIG for games to learn tactical tips. The SIG for Apple computer users, called MAUG, provides a forum for trading hardware and software information.

Communication is via CompuServe's electronic mail, which allows you to use the computer lines to send private messages to someone's ID number. Live conversations, in which you're connected directly with someone else's computer, is possible with CB Simulation. Public messages can be displayed on the National Bulletin Board, which is often treated as a swap shop.

One of the nicest customer support services is Feedback, a free, on-line message service providing you with the opportunity to make suggestions to CompuServe, pose questions, report problems and order game rulebooks, SIG manuals, and other documentation. Responses are made via electronic mail, usually within 48 hours.

The Source

The Source can also be thought of as a thick, electronic tome packed with the same general information and communication and entertainment services as CompuServe, only it costs more. You can access CompuServe on apprentice's pay, but for The Source, you need the salary of, well, a sorcerer.

The Source is likely to enchant you upon first glance. Its manual is well organized, descriptive, and attractive, and the meticulous instructions and examples make everything crystal-ball clear. The computer commands are in English, not runes, and the entire system is as user-friendly as a guardian angel.

One feature of The Source that could be helpful to job seekers is a career network called Employ, which is like a Help Wanted section in a newspaper. (As could be expected, it listed plenty of opportunities for computer programmers, but none for writers.)

The Source also offers a network called Barter, which allows users to exchange goods and services; also an electronic bulletin board called Post, which does about the same thing. The Source provides an incredibly easy-to-use electronic mail service called Mail, and a live conversation service called Chat.

The Source's game selection is similar to CompuServe's, but it does not have *Megawars.* Like CompuServe, it has *StarTrek, Adventure,* expanded *Adventure,* and *Hunt the Wumpus,* a children's version of *Adventure.* Unlike CompuServe, it has a very serious and thorough I Ching fortune-telling program.

Knowledge Index

Knowledge Index is like a wizard's convention—it concentrates the wisdom of the ages within the space of one room. This powerful research tool is the offspring of Dialog, one of the over-$100-per-hour databases.

Knowledge Index contains 18 different databases, including three on computers and electronics. Inspec, produced by the Institution of Electrical Engineers in London, contains abstracts from 2,300 journals, conference proceedings, technical reports, and books. International Software Database describes 11,000 microcomputer and minicomputer programs. Microcomputer Index provides abstracts from over 40 popular microcomputer publications.

Corporate News, produced by Standard & Poor's News, offers tabular

information on over 9,000 publicly held U.S. companies. Business Information, by Data Courier Inc., discusses all aspects of business management and administration.

General news appears in Newsearch, which summarizes 1,100 newspapers, magazines, and journals, and in Magazine Index, which abstracts 435 popular American magazines. Government News lists documents currently for sale by the U.S. Government Printing Office and also indexes federally produced research and technical reports.

Other databases cover education, psychology, engineering, medicine, pharmacology, agriculture, and books in print.

Knowledge Index is the simplest system to learn and operate. All commands are in English, even if some of the abstracts are not. For example, in the Agriculture database, the first abstract under "Geese" describes the secretory function of the pancreas in geese (feeding experiments). The text of the abstract starts like this: "Ratsional'noe kormlenie osnova povysheniia. . . ." The language? Russian.

Knowledge Index is adding three more databases for trade and industry, the legal field, and biology. These additions will increase the total number of citations contained in all the databases to about 15 million.

BRS After Dark

BRS After Dark, an evening offshoot of the daytime Bibliographic Retrieval Services, is another brew of reference databases offering abstracts of articles. Although its corporate symbol is the night owl, users should prepare to be early birds: BRS After Dark does not offer any service past the witching hour.

BRS After Dark provides many of the same services as Knowledge Index, but at half the cost per hour. The agriculture, biology, pharmacology, business management and administration, medicine, government-produced technical reports, books in print, education, and psychology databases are exactly the same.

In addition, BRS After Dark offers other interesting and innovative databases. Patdata holds information about all patents registered with the U.S. Patent Office since 1975, including a description of what the patented object actually does. Family Resources, produced by The National Council on Family Relations, abstracts articles concerning marriage and family relations. PAIS, produced by the Public Affairs Information Service, indexes articles from all areas in the social sciences.

INFORMATION SERVICES AT A GLANCE

	CompuServe	*The Source*	*Knowledge Index*	*Dow Jones*	*BRS After Dark*
Registration	$40	$100	$35	$50	
Free Hours with Regist.	5	0	2	0	0
Cost Per Hr.					
Weekday[a]					
300 baud	$22.50	$20.75	No	$36–$72	No
1200 baud	$35.00	$25.75	Service	$72–$144	Service
Evening[b]					
300 baud	$ 5.00	$ 7.75	$24	$ 9–$54	$ 6–$16.50
1200 baud	$17.50	$10.75	$24	$18–$128	$ 6–$16.50
Graveyard[c]					
300 baud	$ 5.00	$ 5.75	$24	$ 9–$54	No
1200 baud	$17.50	$ 8.75	$24	$18–$128	Service
Extra Costs for some Services?	Yes	Yes	No	Yes	No
Minimum Monthly Charges	None	$10	None	None	$12
Monthly Memory Storage Costs					
128K	$ 0	$15.80	No	No	No
256K	$32	$27.15	Service	Service	Service
Billing					
Credit Card	M/V	M/V/AE	M/V/AE	None	M/V
Direct	$42/yr.	None	None	Free	$250 acct.
Toll-Free Customer Hotline?	Yes	Yes	Yes	Yes	Yes

[a]Weekdays 7 a.m. to 6 p.m. (local time) Monday through Friday.
[b]Evenings 6 p.m. to midnight weekdays, and all weekends, and designated holidays.
[c]Midnight-7 a.m. daily.
M: Mastercard. V: Visa. AE: American Express.

However, BRS After Dark virtually ignores general information. It has nothing comparable to any of the other services and certainly not to Knowledge Index's extensive Newsearch. BRS After Dark tends to ignore information about computers, too. Its DISC, which contains only the table of contents of microcomputer magazines, pales next to Knowledge Index's three extensive computer-oriented databases.

Although its corporate symbol is the night owl, BRS After Dark does not offer any service past the witching hour.

BRS After Dark also suffers from a higher than average number of typos. It's not BRS' fault, but rather the fault of the individual databases. BRS serves primarily as a conduit of information and cannot exercise editorial control over the content. However, these typos leave a general impression of haste and sloppiness.

BRS After Dark plans to add communications services starting with an on-line electronic newsletter. A bulletin board, listing computer hardware and software for sale or swap, and an electronic mail system are scheduled to start operating.

Rates and Charges

So what does all this electronic necromancy cost? If you use the services judiciously, a reasonable amount. If you don't, plenty.

Dow Jones News/Retrieval costs $50 for registration and from $9 to $54 per hour, depending on which service you use. Connections to its News, *The Wall*

Street Journal Highlights, and Weekly Economic Update cost $12 per hour; free-text searching for news costs $36 per hour. Dow Jones charges $9 per hour for stock quotes and $18 per hour for general news, sports and weather, the encyclopedia, movie reviews, "Wall Street Week" transcripts, and shopping service. Its Corporate Earnings Estimator, Disclosure II, and other financial and investment services cost a whopping $54 per hour. Disclosure II also carries a $2 surcharge for each company you request. Double these rates if you use a modem at 1200-baud. During the prime daytime periods, rates run from $36 to $72 per hour.

CompuServe charges a $40 registration fee and $5 per hour; it is the least expensive of all the services. Registration includes 5 free hours on the service. Some of the financial services have a surcharge attached to them. Using a 1200-baud modem will escalate the rate to $17.50 per hour. Prime daytime usage is $22.50 per hour with a 300-baud modem, $35 per hour with a 1200-baud modem. CompuServe charges an extra $2 per nonprime hour and $10 per prime daytime hour if you log in via Tymnet or Telenet rather than its own network. CompuServe charges an excessive $42 per year for direct billing, but does not charge a monthly minimum. CompuServe gives 128K of storage space free and charges $4 per week for each additional 64K.

The Source has an exorbitant $100 registration fee and costs $7.75 per hour from 6:00 P.M. to midnight and $5.75 from midnight to 7:00 A.M. Add $3 per hour for 1200-baud service. Prime daytime usage costs $20.75 per hour for 300-baud, $25.75 per hour for 1200-baud service. The Source charges a $10-per-month minimum. Storage rates depend on size, but 128K costs $15.80 per month and 256K, $27.15 per month. Some financial services cost $14.75 per hour during evenings and $9.75 per hour from midnight to 7:00 A.M. Add $5 per hour for 1200-baud service. Prime daytime service costs $29.75 per hour for 300-baud modems and $34.75 per hour for 1200-baud modems.

Knowledge Index charges a $35 registration fee and a flat $24 per hour. Registration includes 2 free hours on the service. Knowledge Index does not charge extra for 1200-baud service and does not charge a monthly minimum.

BRS After Dark charges $50 for registration and from $6 to $16.50 per hour, depending on the database. BRS After Dark does not charge extra for 1200-baud service, but does charge a $12-per-month minimum.

Reflections on Electronic Magic

Even after learning their price, I still say these services contain powerful magic. Merlin himself could not call up the collective wisdom of millions of pieces of information within a few seconds, or allow thousands to communicate coast to coast. A modem and a password turn your computer into a powerful research tool, communications hub, and entertainment gizmo.

But unless a budding alchemist has discovered the secret of turning lead into gold, these services could empty your wallet while enriching your mind. Choosing which service to use depends on your purpose.

Businesspeople and investors can do no wrong by signing up for Dow Jones News/Retrieval. They'd find that not only does it provide timely business and financial news—the high price per hour is essentially tax deductible.

CompuServe and The Source are like newspapers and telephones. Many of their features can be found on the front page, sports page, puzzle page, and in the yellow pages. They also give you access to a town library—not very large or extensive, but adequate through high school. Chatting over the computer lines is interesting, but I think Ma Bell or MCI is livelier and cheaper.

In a contest between CompuServe and The Source, I'd recommend CompuServe. The Source charges more for the same services and has a monthly minimum billing. I personally feel that a monthly minimum somehow indicates a company's lack of confidence that the customer will be satisfied enough to continue using the service.

If CompuServe and The Source are town libraries, then BRS After Dark is a county library and Knowledge Index a university library. BRS After Dark and Knowledge Index do not offer communications or games yet, but they do have a wealth of information. Although they have some services in common, BRS After Dark seems to emphasize the sciences and education, while Knowledge Index concentrates on computers, business, and general information. The key to using these two reference services is to plan ahead. You can save time and money by narrowing your search before logging in. Remember, these reference services only provide summaries of articles and publications. Their value is in identifying sources, not in providing full texts. Although you still must do the legwork at the library, the services at least provide an excellent jumping-off point for research.

In a contest between BRS After Dark and Knowledge Index, I'd give the edge to Knowledge Index. Even though it costs about twice as much per hour, it offers the types of information home computer operators can use most. BRS After Dark could do much better by offering a more diversified selection of databases—and by dropping its monthly minimum.

I'm not Nostradamus, but let me offer some predictions. Hooking up to an information service will someday be as common as hooking up to Ma Bell. The best students will be the best information managers. New competitors and a larger base of customers will drive the price per hour down. Are these flights of fantasy? I think not. All things are possible through the magic of the modem. ✚

Editor's note: New on-line services are coming out every day. Upcoming issues of A+ will include information on these services.

SERVICE INFORMATION

The following information services are mentioned in this article. Please contact them for further deails.

Bibliographic Retrieval Services
1200 Route 7
Latham, NY 12110
(800) 833-4707

CompuServe Inc.
Subsidiary of H&R Block Co.
5000 Arlington Centre Blvd.
Columbus, OH 43220
(800) 848-8990

Dow Jones News/Retrieval Service
Subsidiary of Dow Jones & Co., Inc.
P.O. Box 300
Princeton, NJ 08540
(800) 257-5114

Knowledge Index
Service of Dialog Information Services Inc.
Subsidiary of Lockheed Aircraft Corp.
3460 Hillview Ave.
Palo Alto, CA 94304
(800) 227-5510

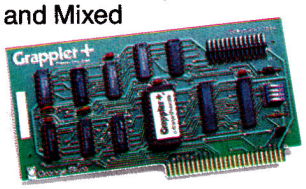
Source Telecomputing Corp.
Subsidiary of The Reader's Digest Association, Inc.
1616 Anderson Rd.
McLean, VA 22102
(800) 336-3366

Satisfying Over With Innovation



Grappler™ + Printer Interface

The Original Apple® graphics printer interface. Since its introduction three years ago, the Grappler has been imitated by many, but never matched. Now with Dual Hi-Res Graphics for side by side reproductions and Mixed Mode screen dumping, the Grappler + remains the most intelligent interface available. Over two dozen commands give Apple users full control over any graphics or text on the Apple screen, including a new 80 column text dump. Performance, reliability and support have made the Grappler + the #1 selling intelligent Apple interface.



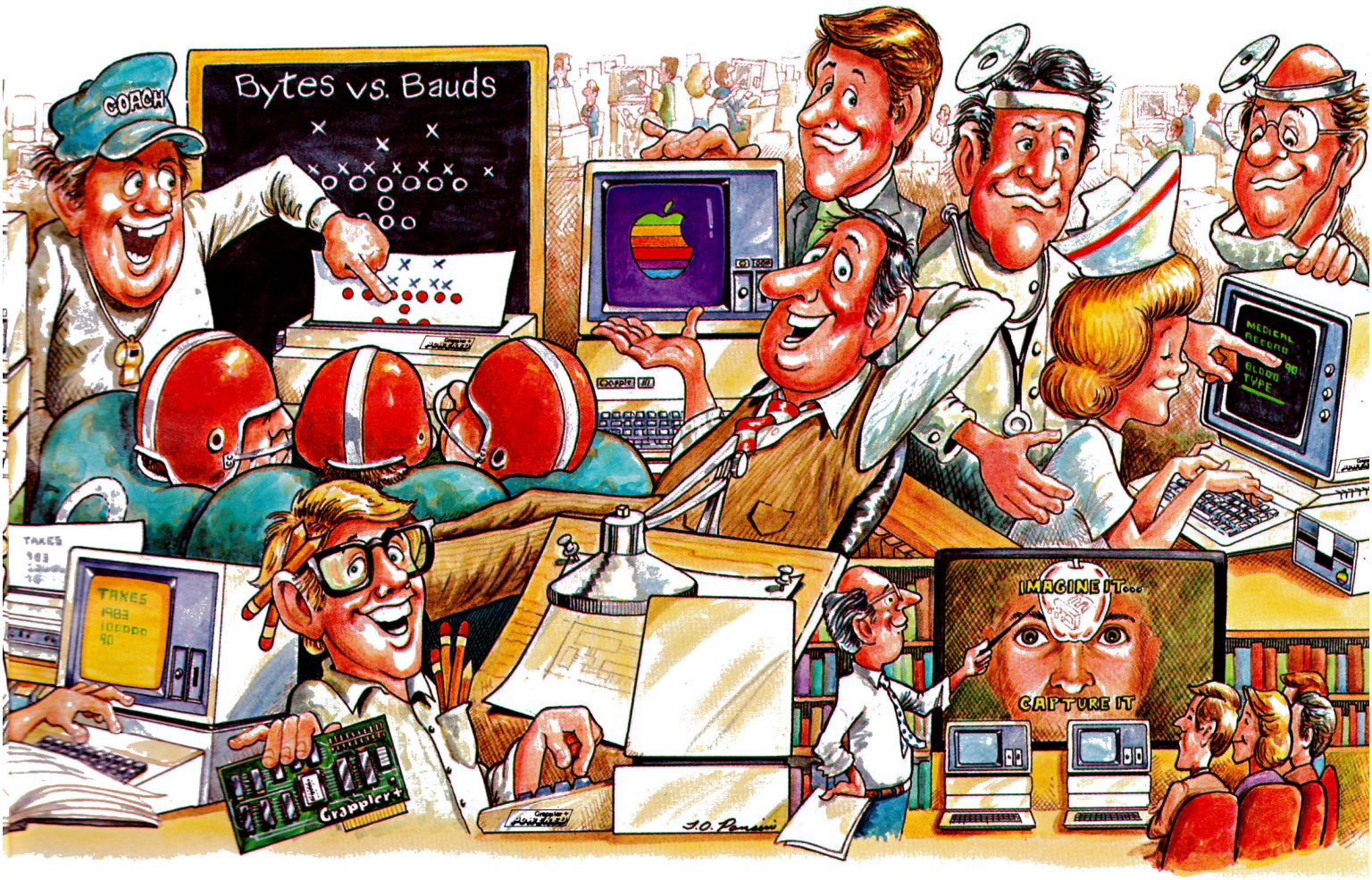
Bufferboard™ For Apples and Printers

The economical way to add printer buffering. The Bufferboard easily adds memory to your current Apple interface system, freeing your computer for additional input. Easily upgradable from 16K, the Bufferboard can store up to 20 pages of text. It fits neatly inside your Apple, "docking" onto your existing printer interface.* No clumsy boxes or cables, no external power supplies…just convenience and economy. With the Bufferboard, you might never wait for your printer again.



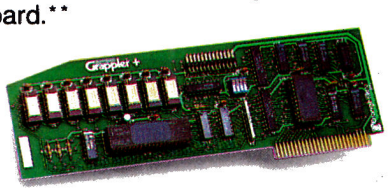
*Versions for standard Grappler + , Epson APL and Apple Parallel Interfaces.

90,000 Apple® Owners And Excellence.



BUFFERED Grappler™ +

The most sophisticated buffered Apple printer interface available. The New Buffered Grappler + combines the industry leading features of the Grappler + with the time saving economies of the Bufferboard.**



With this much interface power, you'll never need anything else. And the price will surprise you, too.

**Not available for IDS printers.
Apple is a registered trademark of Apple Computers, Inc.

Over 90,000 Apple computers are using Orange Micro products. Innovation and excellence have made us the #1 manufacturer of intelligent printer interfaces. The top selling Grappler + has become an industry standard, recommended by more software houses and Apple dealers. To meet the users' latest needs, Orange Micro will continue to introduce new products. Recent innovations include the Grappler + for IDS color printers and the new Orange Interface, with text screen dumps and formatting at a low price. There is an Orange Micro product designed for your application.
For a complete demonstration, see your Apple dealer today.

Orange Micro inc.

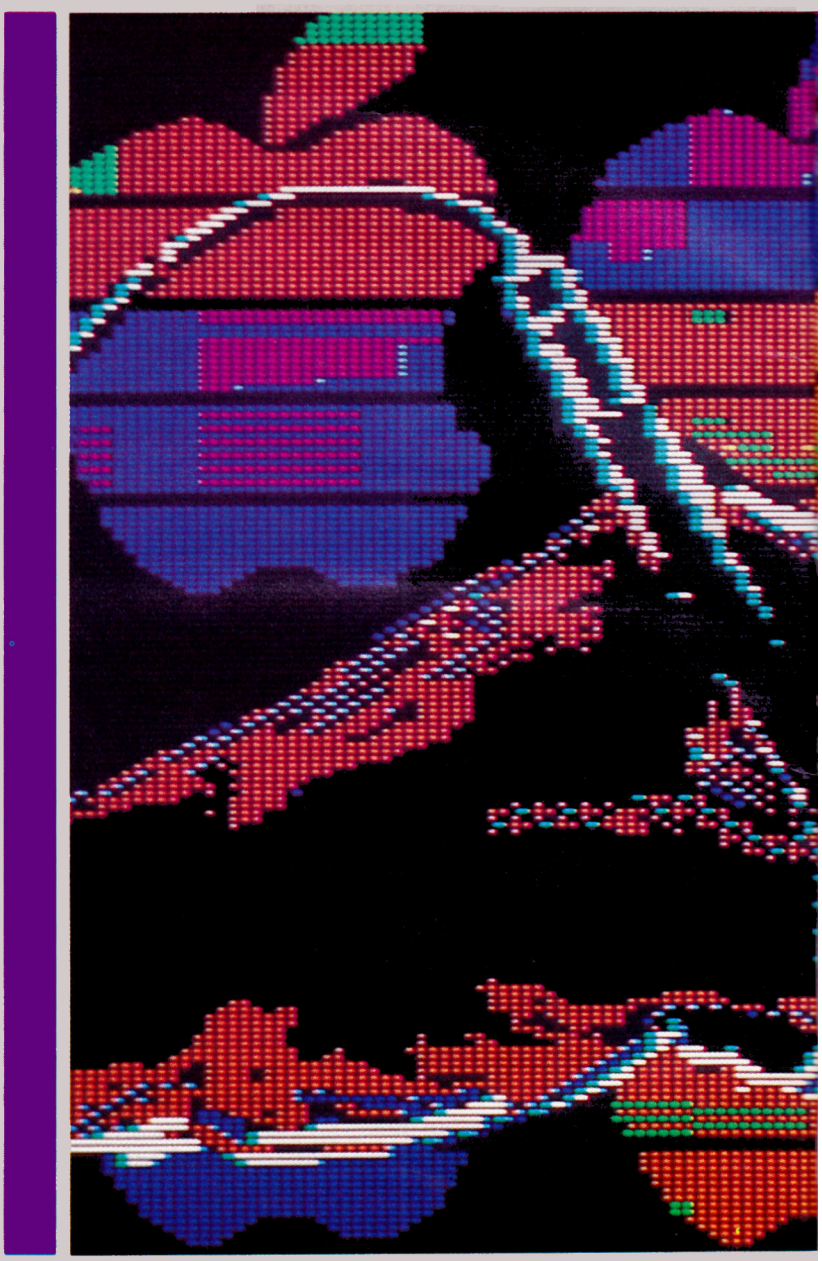
1400 N. Lakeview Ave., Anaheim, CA 92807 U.S.A.
(714) 779-2772 TELEX: 183511 CSMA

©Orange Micro, Inc., 1983

CIRCLE 130 ON READER SERVICE CARD

ELEMENTARY GRAPHICS

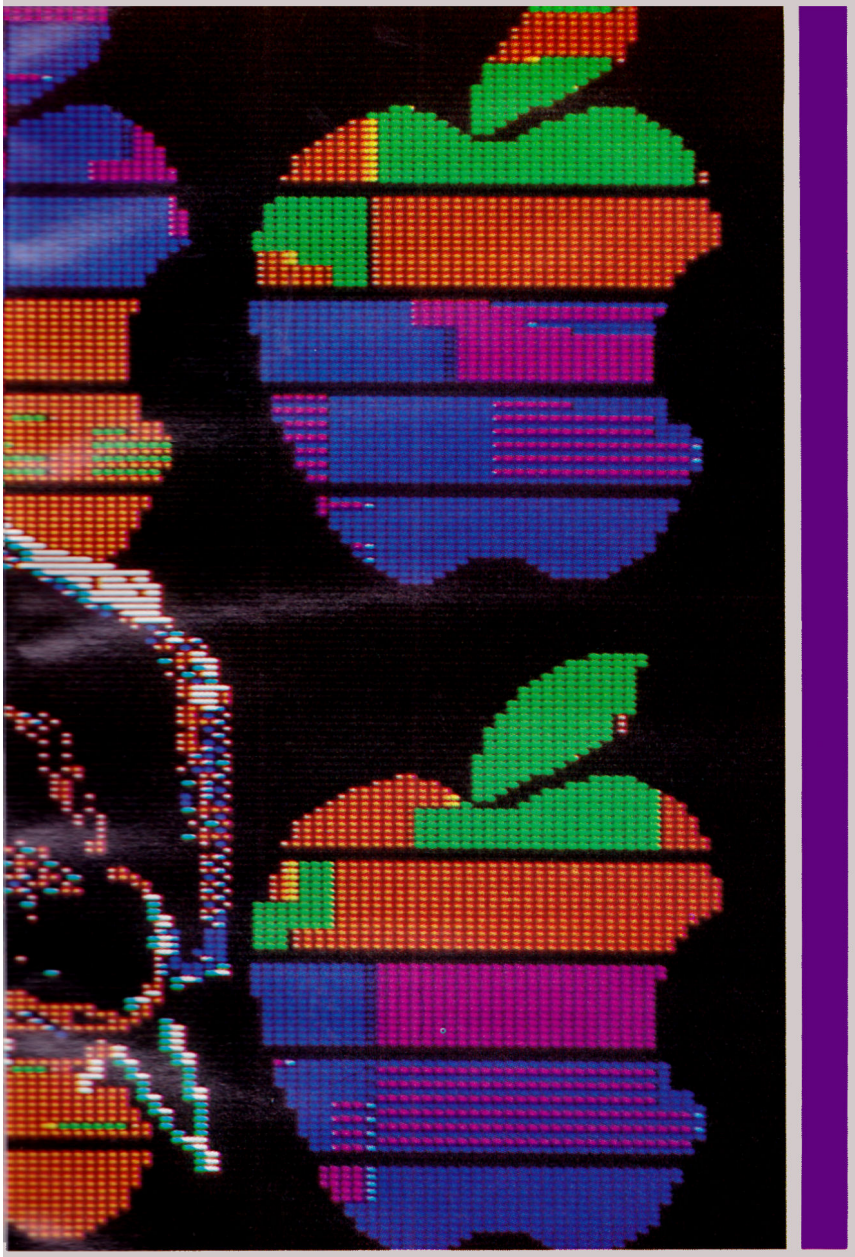
An Illustrator's Foray into the World of Graphics.



With the vast amount of hardware and software now available, the personal computer has many uses. It is a word processor, an accountant, an electronic file cabinet—and it can even treat you to a rousing game of *Zaxxon*. Yet despite its down-to-earth functions, computers tend to intimidate the uninitiated.

I have found that color graphics ease some of the fear the first-time user has when approaching this newly ubiquitous feature of everyday life. The comforting glow from the screen, so similar to the very familiar television set, can be a link between you and this often-misunderstood machine.

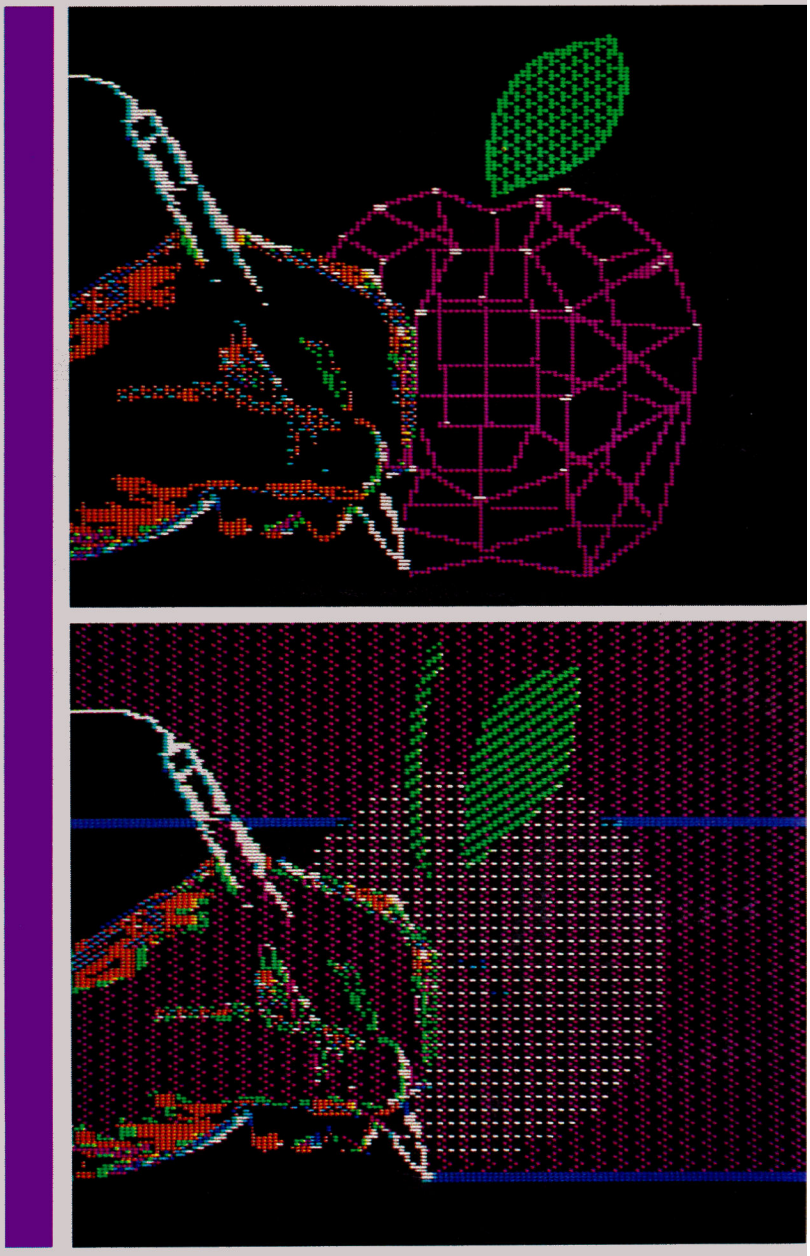
Apple Computer, under the direction of Steven Wozniak and Steven Jobs, foresaw the great importance these features would have in making the computer accessible to the home and small-busi-



ness market. They were the first to offer a personal computer with color capabilities. They were right, and their computer may be the second-most-influential apple in history.

The development of color graphics is one of the main reasons for the overwhelming popularity of video games in the last couple of years. The intense colors and designs, enveloping sound, and spine-tingling situations make a visit to a video arcade a hypnotic experience.

Most of the technology that now allows people to draw pictures was developed by the Defense Department under the auspices of the U.S. government. The technology evolved as a training aid for the testing of subjects in simulated war maneuvers. The project was called Sketchpad, and it was installed under a military contract at the Lincoln

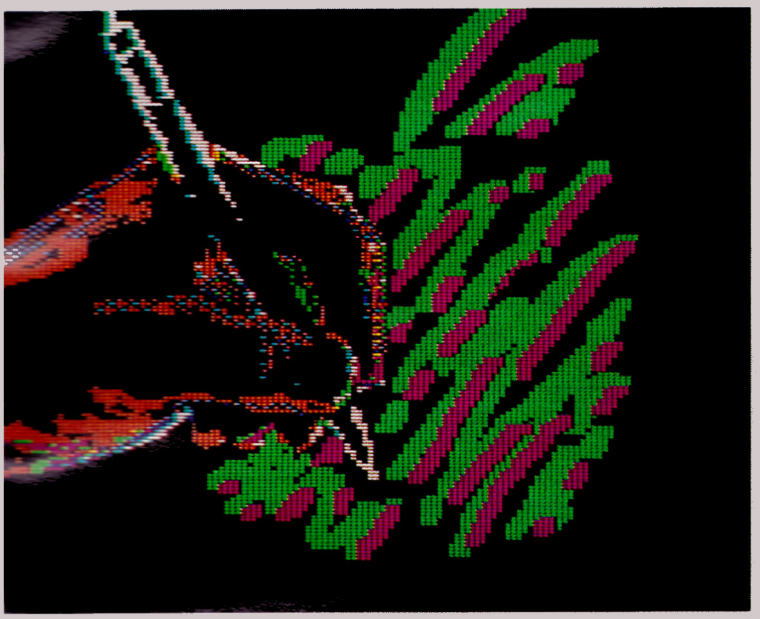


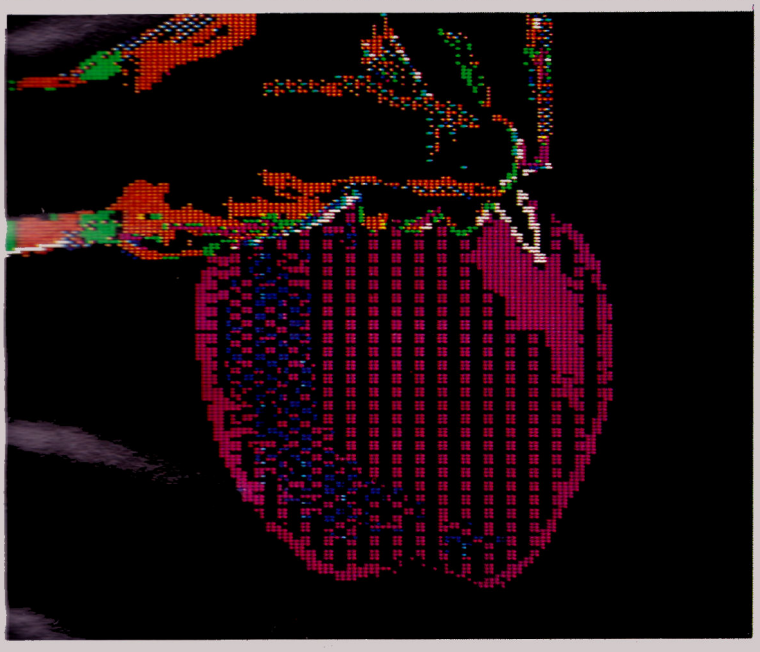
Laboratory at M.I.T. in Boston. It used the facility's TX-2 computer, a cathode ray tube (CRT) display, and another development, the light pen. Ivan Sutherland's software created a powerful engineering design tool.

Until recently, exorbitant prices have limited color graphics technology to large corporations and institutions like the military. But now the rapid evolution of hardware, software, and complete graphics systems is revolutionizing the entire graphics arts industry. New developments are making possible the creation of graphics by artists, students, business people, architects, and engineers at modest costs.

As a commercial artist, I spend much of my time formulating concepts for different projects. I present pencil or marker comps to the client for discussion and

There is more room for experimentation and a wider scope of choices.





approval. This means physically creating mock-ups of finished products like logos, brochures, advertisements, or illustrations. Extreme schedule constraints and tight deadlines force me to use my time judiciously.

My ideas are more quickly realized with the aid of a computer. I've found there is more room for experimentation and a wider scope of choices. Since the images can be stored at any time during the creative process and easily recalled, there is less possibility of wasting time on one image, only to have to go back and start over.

The idea that artists are intimidated by technology is slowly fading, as knowledge replaces misinformation. The introduction of the camera in the nineteenth century worried some artists. They thought the new image-producing won-

der would end their commissions. It did not. Instead the camera had a profound impact on the expansion of the graphic arts. The integration of the computer—like the camera years ago—into the graphic arts industry as a fully productive and accepted tool is inevitable.

Uses of Computer Graphics

Computer graphics are solving the problems facing engineering and architectural firms. Computer-aided drafting/design and computer-aided manufacturing (CAD/CAM) systems were some of the first uses of the computer in a creative environment in the 1960s and 1970s. Although these systems were powerful and sophisticated, they were limited to large corporations and institutions. With these systems the designer can actively participate in the creation of a drawing. Electronic, automobile, and product design are a few of the available applications.

The computer has become the star of trade shows and is a logical choice for training films, because it can illustrate difficult ideas visually, step-by-step.

The business graphics field is being revolutionized by the new technology. In 1982 experts estimated that the marketplace bought $500 million worth of business graphics. Industry watchers indicate that this figure will increase to over $6 billion by 1990.

The computer has become the star of trade shows and is a logical choice for training films, because it can illustrate difficult ideas visually, step-by-step. Graphics have also become an asset in the production of training aids, sales presentations, and product demonstrations.

With the proliferation of computer and software manufacturers, costs are coming down. Educational institutions have received the benefits of this development, as more and more schools and universities try to make their students "computer literate." Now students are being trained on the equipment they will use when they graduate, and the need for more educational material is rapidly expanding.

Through the media, computer graphics have invaded our cultural and personal environments. Television graphics, commercials, and magazine advertisements rely heavily on these flashy neon-like images. In publishing, *Time* magazine is experimenting with a system that will allow art directors and editors to assemble words and images electronically on a video monitor at their desks for later transmission to the printer miles away.

The need for special effects in motion pictures has created a group of wizards who blend computer-generated images with live action to advance the "credibility" of modern-day fiction. JEX FX of San Rafael, California, used an Apple and a Gibson Light Pen to create unearthly images. A five-watt argon laser was used to create the liquid effects for "Star Trek I," "Raiders of the Lost Ark," and "Poltergeist."

For the cloud effect, the desired movement is first drawn with the pen on the video monitor and then stored to disk. With a program written by Gary Leo, the Apple is coupled with the laser motion control, and the pattern is then played back directly into the camera to be filmed. The laser beam can be mixed with a variety of gasses and dyes to produce any color in the spectrum. The results are stunning. Headed by Gary Platek, JEX FX has assembled a crew whose credits include "Star Wars," "Return of the Jedi," "E.T.," "The China Syndrome," and "Dragonslayer."

To date, the most extensive use of computer-generated images in a motion picture has been in the film "Tron." Its crisp, geometric world was produced with state-of-the-art computers to give us images that the advertisements promised would remind us of something we had never seen before. You can't sit down with an Apple and get those kind of graphics . . . yet.

Patrice Wagner, associate editor of *Computer Graphics World* magazine, considers computer graphics the first art form that combines the talents of artists and scientists. She thinks the concurrence of art and science is rare in history, and that the results should prove exciting. Under her direction, *Computer Graphics World* has devoted space to the microcomputer and its graphic advancements. There is also a monthly Gallery section, highlighting computer artists and their work.

Configuration of Hardware

There are far more sophisticated computer systems than the ones I am about to discuss. These graphic workstations, however, can range in price from $10,000 to over $100,000. The major advantages of the larger systems, aside from more computing power, are larger storage spaces, better image resolution, and an extremely fast speed of function. The disadvantages are that these systems are specialized in their functions, require a tremendous amount of knowledge to operate them, and are expensive. Complicated systems have complicated, costly problems. Also, because so many manufacturers are entering the field, it is difficult to predict which ones will remain over the long run to back up their products.

To start, you need an Apple II, II$^+$, or IIe with at least 48K of RAM. I will be limiting the scope of this discussion to these computers. The Apple is capable of producing low- and high-resolution graphics unassisted by outside software, but I won't go into detail here. (Refer to your Apple tutorials if you're interested in exploring the subject.)

Built-in high-resolution graphics are available only in Applesoft. The Apple II$^+$ and IIe have Applesoft built-in, and the Apple II requires an Applesoft firmware card or Apple language card. There are no intrinsic commands of this kind in BASIC. With *any* language you use on the Apple, the capability for high-resolution graphics exists.

You will need at least one 5.25 disk drive with a 16-sector controller card. A second disk drive is recommended, not only for general uses but for storage retrieval as well. Although a color monitor is preferred, a television set can be adapted with a simple switch.

The integration of the computer into the graphic arts industry as a fully productive and accepted tool is inevitable.

A graphics tablet is an electronic drawing board. Game paddles or a joystick can be used, but a graphics tablet has its own interface card and allows more control.

The Apple Graphics Tablet was introduced in 1979, and an updated version is on its way. The tablet is a square, flat device that converts the position and movement of its spring-loaded pen into

"THE COMPUTER-LINE"™

"Committed to bringing computers within the reach of all Americans"

Visit us in Los Angeles CALIFORNIA • Denver COLORADO

DISKETTES

Dysan SS/DD	31.00
Dysan DS/DD	42.95
Verbatim SS/DD	23.95
Verbatim DS/DD	39.00
Elephant SS/DD	22.95
Elephant DS/DD	29.00

DISKETTE STORAGE

5 1 4" Mini Plastic Case	1.95
5 1 4" Protector (50 Disk)	16.50
8" Protector (50 Disk)	18.50

MONITORS

NEC 12" Hi-Res Green	158.00
NEC 12" Econo Green	115.00
Sanyo 9" B/W	139.00
Sanyo 9" Green	149.00
Sanyo 12" Green	139.00
Sanyo 13" Color	399.00
USI 12 Amber (Gold)	159.00
Amdek Color I	326.00
Amdek Color II	739.00
Electrohome 13" Hi-Res	699.00

PRINTERS

NEC 8023	473.00
NEC 7710	2399.00
Okidata Microline 92	499.00
Okidata Microline 93	873.00
Smith Corona TPI	545.00
Star Micronics Gemini 10X	269.00
Star Micronics Gemini 15	375.00

PRINTER BUFFERS

Microbuffer 8K	129.00
Microbuffer 16K	209.00
Microbuffer 32K	224.00
Fuse 32K	224.00

MODEMS

Novation AppleCat II	279.00
Novation 212 AppleCat	569.00
Novation 212 Add On	335.00
Novation J-Cat	119.00
Hayes Micromodem II	279.00
Hayes Smartmodem	209.00
Hayes 1200B	489.00

DISK DRIVES

Micro Sci A40 W O Cont	350.00
Micro Sci A40 W Cont	429.00
Micro Sci A70 W O Cont	488.00
Micro Sci A70 W Cont	569.00
Rana Drive W O Cont	339.00
Rana Drive W Cont	409.00
Rana Disk Controller Card	95.00
Tandon TM-100-2	229.00
Tandon TM-55-2	229.00
Rochester 602	776.00
Rochester 603	873.00
Rochester 603E	971.00

HARDWARE

ABT Keypad (New)	98.00
M&R Superterm 80 x 24	248.00
M&R SuperMod RF Modulator	23.00
TG Game Paddles	26.50
TG Joysticks	39.00
TG Select A Port	39.00
Adam & Eve Game Paddles	26.50
Videx Keyboard Enhancer II	115.00
Videx Function Strip	69.00
Videx Soft Switch	27.50
MicroSoft Ram Card	79.00
MicroSoft Z-80 C/PM Card	244.00
MicroSoft Permium Pack	489.00

CALIFORNIA COMPUTER SYSTEMS

7710A Asyn.S. Interface	126.00
7712A Syn S. Interface	146.00
7721A P. Interface Std.	99.00

MOUNTAIN COMPUTERS, INC.

CPS Multi Function Card	130.50
Music System w/Software	309.00
ROM Plus w/Keyboard Filter	155.00

SOFTWARE

Magic Window	74.00
DBase II (Z-80 Card Req.)	424.00
Home Accountant	55.00
Easy Writer Pro	129.00
Easy Mailer Pro	107.00
Lisa 2.5	55.00
Screenwriter II	95.00
PFS Report	74.00
PFS Filing System	79.00
PFS Graph	79.00
Z-Term (Z-80 Card Req.)	79.00
Z-Term Pro (Z-80 Card Req.)	124.00
ACCII Express	65.00
ASCII Pro	90.00
Transend II	105.00
DB Master	154.00
DB Master Utility I or II	65.00
DB Master Graphic Process	69.00
SuperCalc	127.00
SuperCalc II	172.00

VISI CORP.

VisiPlot	155.00
VisiTerm	74.00
VisiTrend/Plot	219.00
VisiDex	184.00
VisiCalc	184.00
VisiLink	184.00

MICROPRO

Desk Top Plan II	184.00
Wordstar	257.00
Mailmerge	169.00
Spellstar	169.00
Calcstar	104.00
Datastar	195.00
Supersort	169.00

APPLE GAMES

Raster Blaster	20.50
Swashbuckler	23.00
Snack Attack	19.75
Deadline	32.75
Zork I or II	26.50
Pool 1.5	23.00
Frogger	23.00

MUSE SOFTWARE

Robot Wars	29.75
Three Mile Island	29.75
Castle Wolfenstein	19.75
A.B.M.	19.00

BRODERBUND

Bandits	24.00
Chop Lifter	24.00
Midnight Magic	24.75
Apple Panic	22.75
Galaxy Wars	19.25
Space Quarks	19.75

ON-LINE SYSTEMS

Frogger	24.00
Crossfire	24.00
Wizard & Princess	26.50
Missile Defense	19.75
Softporn Adventure	23.00
Threshold	28.75
Time Zone	65.00
Ultima II	39.00
Jaw Breaker	21.75
Sabotage	16.50
Cannon Ball Blitz	23.00

SIRIUS SOFTWARE

Speakers	22.75
Space Eggs	22.75
Gorgon	29.50
Bandits	23.00
Jellyfish	19.75
Fly Wars	19.75
Beer Run	19.75
Lemmings	19.75
Cyclods	19.75

MICRO SOFT

Typing Tutor II	19.75
Olympic Decathlon	24.95

EDU-WARE

Algebra	27.95
Compu-Read	21.95
S.A.T. Work Skill	34.00
Fractions	34.00

Open 7 Days a Week

CIRCLE 131 ON READER SERVICE CARD

California
21054 Sherman Way
Canoga Park 91303 (Warner Center)

Colorado
1136 S. Colorado Blvd.
Denver 80222

THE COMPUTER-LINE™

1-800-255-4659
1-213-716-1812

1-800-525-7877
1-303-279-2848

TERMS All prices reflect a 2.9% cash discount. All goods acknowledged faulty on receipt by the customer will be repaired or replaced at our discretion. Customers must call for an RMA number before returning any goods. This facilitates our quick attendance to faulty goods. We reserve the right to repair or return to the manufacturer for repair all goods becoming faulty within the specified warrranty period. Any goods (hardware or software) returned for restocking are subject to a 15% restocking fee at our discretion. The charge for cancellation of orders is 20% at our discretion. No returns on software. We accept no responsibility for any false claims made by manufacturers. Prices quoted for stock on hand and subject to change without notice. Specialists in APO and international deliveries. Please add 3% (minimum $3.00) for shipping. APO add to all prices 5% for shipping (minimum $5.00). We will calculate exact freight. Please allow a minimum of 2 weeks plus mail time (if an order is mailed in) for receipt of all UPS delivered goods. All goods (other than APO or international) delivered UPS ground.

ALL BRANDS ARE REGISTERED TRADEMARKS

numbers the computer can understand and manipulate.

A strange eye-hand coordination problem occurs in the beginning for users unfamiliar with working flat on the tablet and seeing the results on the screen. It takes getting used to, but becomes second nature with practice. Software is supplied with the tablet, and most of the more sophisticated graphics software are, in fact, best used with the aid of the tablet. The Apple Graphics Tablet and some of the better digitizers on the market range in price fom $500 to $1,000. If this price range is not within your budget, never fear.

Koala Technologies Corporation of Los Altos, California, has developed a low-cost touch tablet called the Koalapad Touch Tablet. This hand-held unit is small and light-weight. With the accompanying software, *The Micro-Illustrator,* written by Steve Dompier, it serves as a sketchpad. The user draws on the chalkboard-like surface with a finger or stylus.

A software menu is provided to help the user to select points, lines, circles, and rectangles as well as colors and "paint brushes" to create images on the screen. It also functions as a game controller and, with custom overlays, can be programmed to be a custom keyboard for combinations of characters and graphics. The Koalapad is expected to expand computer-generated graphics to personal computers. It's a bargain at $125.

The Gibson Light Pen is a high-resolution light pen system that lets you realize your images on the monitor by drawing directly on the screen. Developed by Gibson Laboratories in Laguna Hills, California, the pen comes with an interface card and software that allow it to perform many of the same functions as a graphics tablet. The heart of the system is PenTrak, a powerful machine language driver that allows individuals to write their own programs to enhance the built-in functions. The Gibson Light Pen costs $350.

Software

Apple has increased the variety of software available to both amateurs and professionals. Most of the software is menu driven. Users can select a function by placing the cursor over the desired listed item with the pen or joystick and pressing down. Menus are sometimes three and four layers thick, consisting of options that can slow the process—but which provide quite a selection.

Some of the current software offers the user a visual treat with the manipulation modes that are available. Loaded with a full set of brushes and an option to design your own, programs can store images on a separate disk for later recall.

The brush functions include such words as smear, airbrush, finger paint, and pixel dry brush. The working area is called the canvas. The choice of words is an obvious attempt to bring the language of computer graphics closer to the realm of traditional art.

These programs also allow you to create pie charts and graphs, insert text, paint with letters and numbers, and digitize for area and distance. They include a function to store pictures.

Another form of graphic input is video digitizing. By placing copy on a flat surface and pointing a video camera down at the image, the computer changes the video camera input into a form the computer can understand. Colors can be manipulated to extraordinary effects.

Many manufacturers are developing entire systems using the Apple as the base for performing functions that were once the domain only of the larger systems.

Prints and Printers

Once you and the Apple have created your masterpiece, the simplest technique to save it for posterity is to photograph the scene directly from the screen. Although this method has its drawbacks, people have had good results, and you may want to try it. The slide can be easily projected once the image is in 35mm slide form.

There are expensive computer cameras that can produce high-quality 35mm slides or instant prints. Designed to interface with most computers, these light-weight portable devices produce an image directly from your terminal. The display quality is excellent.

If you want to videotape your graphics, there are companies that make video boards. A video board cleans up the signal from the Apple before reproducing the images on videotape.

A myriad of printers are out on the market. A printer with graphics capabilities can serve as a satisfying way to make hard copies of your work, whether for presentation or for reproduction.

The image produced with black and white dot matrix or letter-quality printers is composed of graphic symbols. By overlapping and varying the density of these symbols, you can create values of black, thus simulating the original.

Color printers come in many forms. There are multicolor pen plotters, and ink-jet and impact printers. Most of these printers are extremely expensive and are difficult to interface with the Apple at this time.

Many manufacturers are developing entire systems using the Apple as the base for performing functions that were once the domain only of the larger systems. T&W Systems in Huntington Beach, California, is offering a CAD/CAM system for the Apple II family called the CADAPPLE. It provides computer-aided drafting for the architectural, civil, mechanical, electrical, and graphic arts industries.

The CADAPPLE is used to create drawings using a tablet, a joystick, or the keyboard for input, and an X-Y plotter for output on bond, vellum, or mylar. It is menu driven and features a "help" function, which displays a condensed portion of the reference manual on the screen for easy understanding.

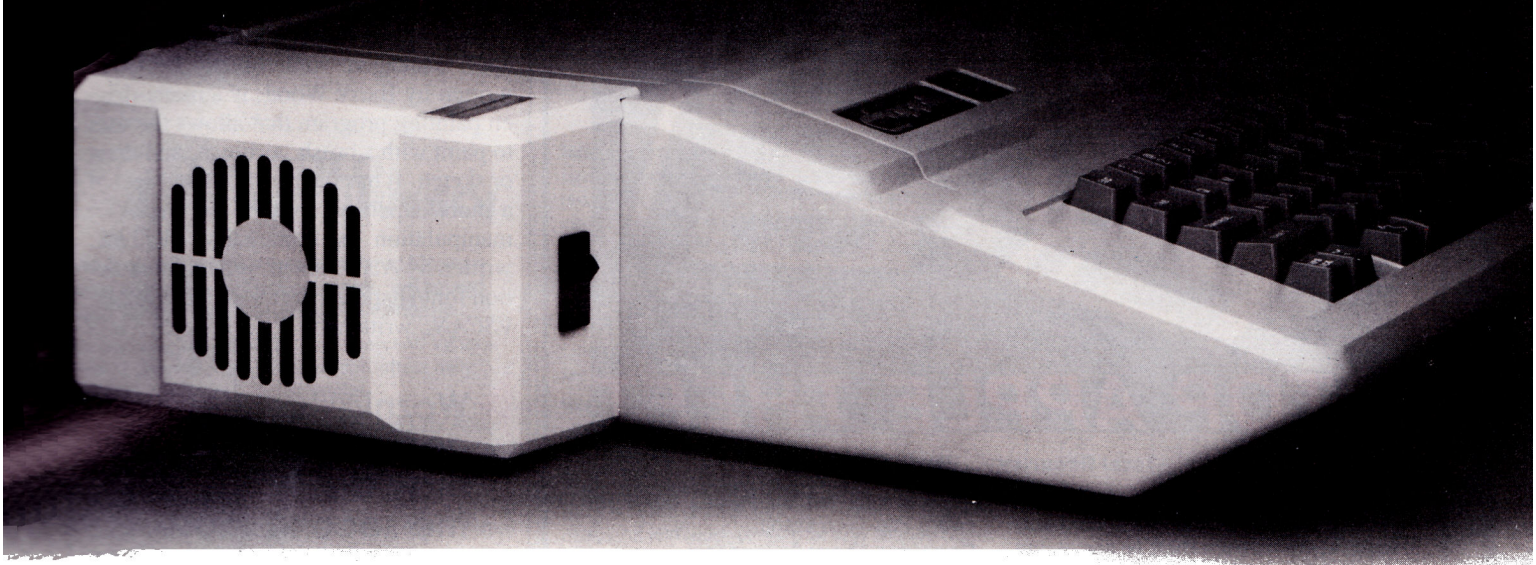
All the basic geometric shapes are provided and text can be placed on the drawing for identification and labeling. Individual objects can be moved, copied, rotated, scaled, and deleted simply by touching the object with the cursor. All the levels of an architectural drawing, for example, can be stored and displayed separately or together (i.e., floor plan, electrical wiring, air-conditioning, etc.). The entire system can also be speeded up to make it more competitive with larger systems. The package, which includes four diskettes, all the reference manuals, and the CADAPPLE interface card, costs about $2,000.

One of the drawbacks of using personal computers in the production of graphics in the past was their low image resolution. Now the hardware available can increase the resolution dramatically, and the quality is much closer to that of an expensive work station.

Visual Data Enterprises of Los Angeles, headed by Nick Pavlovic, chairman of the Los Angeles chapter of ACM SigGraph, has developed the *V Series* of high-resolution graphics software using the Number Nine Graphics System. The system is for high-quality, relatively low-cost graphic capabilities. It doubles

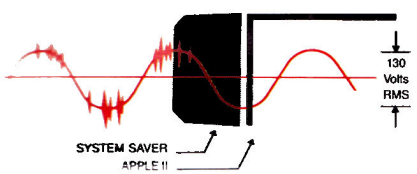
System Saver™

The most important peripheral for your Apple® II and IIe.®



For Line Surge Suppression

The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

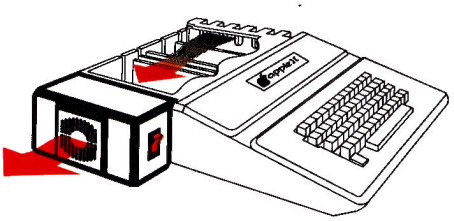


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise 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.

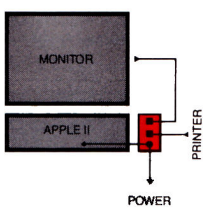
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.

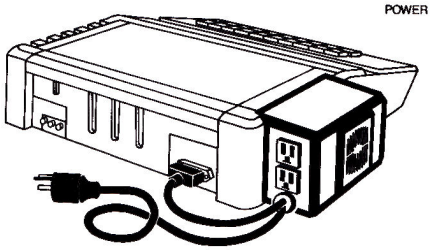


SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.

For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. As shown in the diagram, the SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer.

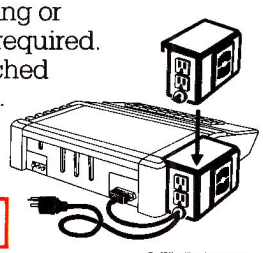




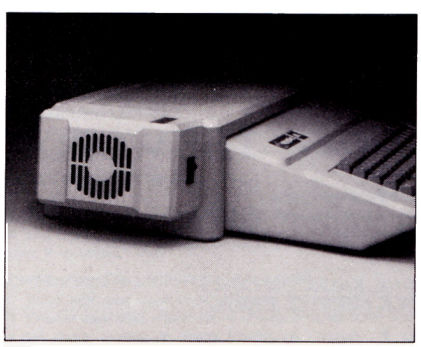
The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again!

Easy Installation

Just clips on.
No mounting or hardware required.
Color matched to Apple II.



Compatible with Apple Stand



$89.95 at your local dealer or order direct by phone or mail.
For phone or mail orders include $2.50 for handling. New York State residents add sales tax. VISA and MASTERCARD accepted. Dealer inquiries invited.

Kensington Microware Ltd.
919 Third Avenue, New York NY 10022
(212) 486-7707 Telex: 236200 KEN UR

KENSINGTON MICROWARE

CIRCLE 132 ON READER SERVICE CARD



Total Security . . . Made Easy!

Our Pro-Tech II® & Pro-Tech ///® Locking Stands completely secure your Apple systems from theft or tampering. Just slide in your Apple II or ///™, up to 3 drives or Profile, lock it and you're done. The supplied 21" cable secures any type monitor and for maximum security, hardware is included for bolting down the entire Pro-Tech stand.

Consider these features:
- ✲ 16 gauge steel construction
- ✲ Multiple units can be keyed the same
- ✲ School P.O. & Qty. Discounts Available
- ✲ **10 Day Money Back Guarantee**

Endorsed by Schools and Colleges Nationwide.

Segull Enterprises - Mario Mattia - P.O. Box 2142, Taunton, MA 02780
(617) 823-9684

CIRCLE 176 ON READER SERVICE CARD

For Those Who Seek.



Bible study aids from Bible Research Systems include the complete KJV Bible text on disks. THE WORD processor can search the Scriptures for any word or phrase. Any portion of the Bible can be printed or displayed. Create your own library of research materials or use ours, called TOPICS. TOPICS contains cross-reference indexes on over 200 of the primary subjects discussed in Scripture.

Bible Research Systems applies computer technology to personal study of the Scriptures.

TOPICS $49.95

Bible Research Systems
9415 Burnet, Suite 208
Austin, TX 78758
(512) 835-7981

THE WORD processor $199.95
Plus $3 postage/handling

Requires APPLE II+, IBM-PC, TRS80-III, OSBORNE, KAYPRO, or CP/M 8"
CIRCLE 134 ON READER SERVICE CARD

the line resolution to 512 × 512 and expands to sixteen colors using the NEC CDC 128K board, which also increases the memory storage capacity. This high-resolution system costs $895.

A series of software packages is sold and packaged individually. *VPAINT*, written by Barry Wood, is a menu-driven painting program that allows the user to paint with a brush, airbrush, and draw or sketch. It has the functions and feel of a more expensive system and the color manipulation is remarkable. *VTYPE*, written by Alan Somen, is a high-resolution font/shape generator and test writer. *VSCAN*, written by Eric Popejoy, is a high-resolution camera digitizing package. *VPRINT*, written by Joe Silva, is a picture printing system for black-and-white and color printers. All the programs can be run through a reasonably priced RGB monitor, which provides excellent color and resolution and uses an Apple Graphics Tablet for input. This is the most impressive system for the Apple I have seen.

Wozniak's computer may be the second-most-influential apple in history.

We are in the midst of a technological revolution. Sales of personal computers are expected to triple to $5 billion this year and $7.5 billion the next. The attention the personal computer has received for its graphic capabilities has been overwhelming and is certainly a clue to the diversity we can expect in the future.

Next month I will be reporting on some of the best graphics-producing software available for your Apple. Some of the products are currently on the market, and others are just around the corner. ✚

A native of Los Angeles, California, Craig Calsbeek is a graduate of the Art Center College of Design and has worked as a freelance illustrator since 1976. His award-winning work has appeared in numerous magazines and on book covers and record jackets, and he has done work for major advertising agencies. As a principal in Nexus Graphics, a graphic design firm based in Los Angeles, he divides his time between illustration assignments and various design projects.

CUT TAXES • CONTROL EXPENSES • SAVE ON ACCOUNTING

Money Street™

CHECKBOOK FINANCIAL SYSTEM

For Apple® II, II+, IIe, III emulation, and Apple look-alikes - 48K DOS 3.3

724 SOLD ONLY 7 RETURNED!

We were astounded! When we offered Money Street with a money back guarantee, we figured about 10% would be returned. That's normal.

But our returns run less than one percent! What's more, customers write enthusiastic letters daily about Money Street. For example:

- Glen Rodkin, president of Oklahoma City Apple Users Group: "Tremendous! It's fast, reliable and covers all the contingencies a checkbook program should."
- Chris Bayha, Portland, OR: "I use it for my rental properties and for my business. It performs beautifully and is a great value."
- Dan Thomas, Elgin, IL: "The program has proved the hype of the Money Street as really too modest. How many programs are there that you can't think of one thing you would do differently?"

One reason for this enthusiasm is that Money Street lets customers do their own books. Keeping records has always been a bother, and an expensive one, especially for small one-person business or the independent professional. But Money Street solves the problem. Here's what Weston Cotten of Highlands, Texas says:

"I am an attorney with several business interests I run out of my office. I use nothing more complex than my checkbook to keep my financial records in shape for tax time. Your program has helped me to be a better record keeper and has allowed me to look forward to tax time with a better outlook."

$$$ For a checkbook program? Money Street isn't cheap, in fact it's one of the more costly checkbook programs. But with software, as with everything else, you get what you pay for:

- Money Street is fast! Example: 9 seconds from boot to data entry. Example: 5 seconds from the main menu to any sub-section. Example: 18 seconds start-up-to print time.
- Money Street is easy to use! There are no complex set-ups; no monthly cut off. Gary Ronninger of Sacramento, CA wrote: "Your claim of 30 minutes to learn it is fully justified."
- Money Street saves income taxes! It tracks deductions, credits, and income. Michael Salesin of West Bloomfield, MI wrote: "When next year's tax season rolls around my accountant will send love and kisses."

Saves money eight ways:

1. Finds tax deductions and credits.
2. Saves CPA write-up fees.
3. Allows "before year-end" tax planning.
4. Saves accounting time; provides input for journals, ledgers, and reports. The program also doubles as a mini-accounts receivable, inventory keeper, and job cost system.
5. Saves interest expense by keeping exact balances.
6. Saves NSF charges.
7. Saves credit card interest charges.
8. Changes your financial attitudes; puts you in control.

Who can use it? Anyone using a checkbook: Lawyers, investors, doctors, general partners, professionals, small business, mini-corporations. It's ideal for people with multiple sources of income, trustee accounts, pension and profit sharing plans, and owners of real estate.

Take farmers, for example: they can treat each crop or herd as a separate profit center. Stan Vasa of Lincoln, NE, says: "I use Money Street to keep my farm records and find the program to be excellent."

Why not get the best? Sure, you can buy a cheap program just as you can buy a cheap clock. But is it really worth it?

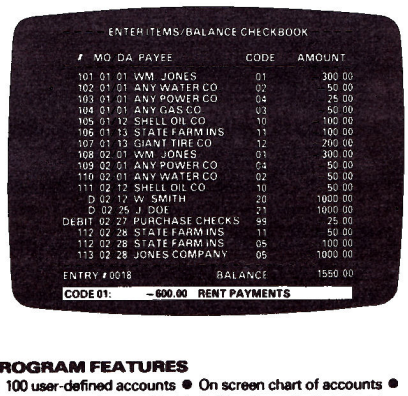
Many customers report that "home accounting" programs are difficult to learn, clumsy to use, and obsessed with budgeting; that only Money Street gives the speed, the ease of use, and the many reports needed.

Bill Sampler, Fairfax Station, VA puts it this way: "One way I judge a program's worth is how easy it is to use after you have been away from it for a couple of weeks. Money Street is no problem, it runs like a fine jeweled watch."

So, Money Street pleases customers just as a Porsche pleases drivers. Top quality costs more; that's a fact of life. But isn't quality always worth it?

One of our customers, Buzz Buggerman of Orlando, FL said: "We use Money Street in our law office. We figure it's not the cost of the program that's important, but how much time it takes to set it up, learn it, and run it. Money Street's a breeze."

How it works. On your computer screen, you create a facsimile of your checkbook. You see 17 items per screen, and can scroll for more. As the computer balances your checking account, you give each check or deposit its own category code.



PROGRAM FEATURES

● 100 user-defined accounts ● On screen chart of accounts ● Account sub totals, grand totals ● Handles unlimited checking accounts ● Three minute year-end rollover ● Credit card accounting ● Full editing, even after entry ● Check search and scan screen ● Help screen ● Wildcard searches

PROGRAM LIMITS

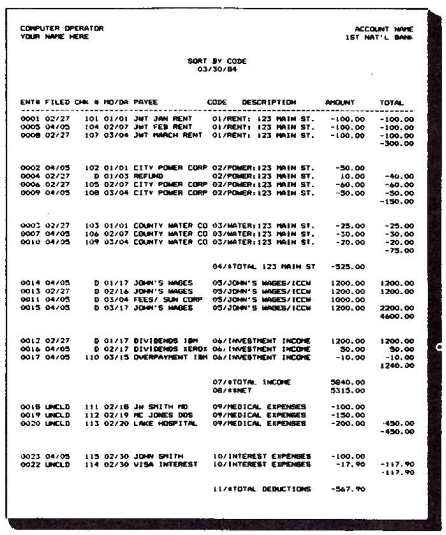
● 2400 checks per data disk ● 200 uncleared items ● Scan speed: 6 per second ● Amount limit: $999,999.99 ● 100 account categories

DOES MANY JOBS

● Finds tax deductions ● Single entry accounting ● Job costing ● Budgets and estimates ● Mini accounts receivable ● Mini inventory ● Tracks personal loans ● Real estate rentals ● Stock purchases/sales ● Increases "float"

CHECKING ACCOUNT MANAGER

● Prints trial reconciliation ● Balances checkbook and statement ● Creates cancelled check file ● Prints detailed audit trail ● Includes check register ● Prints checkbook "history" ● Captures monthly income ● Easy to use



COMPUTER OPERATOR
YOUR NAME HERE

ACCOUNT NAME
1ST NAT'L BANK

SORT BY CODE
03/30/84

ENTR	FILED	CHK #	MO/DA	PAYEE	CODE	DESCRIPTION	AMOUNT	TOTAL
0001	02/27	101	01/01	JWT JAN RENT	01/RENT:	123 MAIN ST.	-100.00	-100.00
0005	04/05	104	02/07	JWT FEB RENT	01/RENT:	123 MAIN ST.	-100.00	-100.00
0008	02/27	107	03/04	JWT MARCH RENT	01/RENT:	123 MAIN ST.	-100.00	-100.00
								-300.00
0002	04/05	102	01/01	CITY POWER CORP	02/POWER:	123 MAIN ST.	-50.00	
0004	02/27	D	01/03	REFUND	02/POWER:	123 MAIN ST.	10.00	-40.00
0006	02/27	105	02/07	CITY POWER CORP	02/POWER:	123 MAIN ST.	-40.00	-50.00
0009	04/05	108	03/04	CITY POWER CORP	02/POWER:	123 MAIN ST.	-50.00	-50.00
								-150.00
0003	02/27	103	01/01	COUNTY WATER CO	03/WATER:	123 MAIN ST.	-25.00	-25.00
0007	04/05	106	02/07	COUNTY WATER CO	03/WATER:	123 MAIN ST.	-30.00	-30.00
0010	04/05	109	03/04	COUNTY WATER CO	03/WATER:	123 MAIN ST.	-20.00	-20.00
								-75.00
					04/$TOTAL	123 MAIN ST	-525.00	
0014	04/05	D	01/12	JOHN'S WAGES	05/JOHN'S	WAGES/ICCH	1200.00	1200.00
0013	02/27	D	02/16	JOHN'S WAGES	05/JOHN'S	WAGES/ICCH	1200.00	1200.00
0011	04/05	D	03/04	FEES/ SUN CORP	05/JOHN'S	WAGES/ICCH	1000.00	
0015	04/05	D	03/17	JOHN'S WAGES	05/JOHN'S	WAGES/ICCH	1200.00	2200.00
								4600.00
0012	02/27	D	01/17	DIVIDENDS IBM	06/INVESTMENT	INCOME	1200.00	1200.00
0016	04/05	D	02/17	DIVIDENDS XEROX	06/INVESTMENT	INCOME	50.00	50.00
0017	04/05	110	03/15	OVERPAYMENT IBM	06/INVESTMENT	INCOME	-10.00	-10.00
								1240.00
					07/$TOTAL	INCOME	5840.00	
					08/$NET		5315.00	
0018	UNCLD	111	02/18	JW SMITH MD	09/MEDICAL	EXPENSES	-100.00	
0019	UNCLD	112	02/19	MC JONES DDS	09/MEDICAL	EXPENSES	-150.00	
0020	UNCLD	113	02/20	LAKE HOSPITAL	09/MEDICAL	EXPENSES	-200.00	-450.00
								-450.00
0023	04/05	115	02/30	JOHN SMITH	10/INTEREST	EXPENSES	-100.00	
0022	UNCLD	114	02/30	VISA INTEREST	10/INTEREST	EXPENSES	-17.90	-117.90
								-117.90
					11/$TOTAL	DEDUCTIONS	-567.90	

15 Ready-to-print reports! Press four keys and the program will print any of 15 different reports. Just select from the Report Menu, and the program does the rest. Start-up to print time is usually 20 seconds. Reports include:

● Monthly code totals ● To-date code totals ● Sort by amount ● List code dictionary ● Sort by payee ● List deposits ● List uncleared checks ● List uncleared deposits ● List all entries ● Sort by date cleared ● Print check registry ● Print selected month ● Print selected code ● List code totals ● List monthly totals

Money Street..It's totally new. If you own real estate, Money Street tracks rents, tallies repair costs, and helps establish "cost basis" for capital gain tax treatment. It's also ideal for trust accounting, retail stores, and home budgeting.

Money back no matter what. Why not give us a try? If you aren't delighted, we'll give you a full refund on any mail order purchase from us.

Includes tutorial, map, and reports. Money Street includes Program Map, complete documentation, on-screen demo, plus tutorial. For Apple® II, II+, IIe, III emulation, and Apple look-alikes. Requires 3.3 DOS, 48K. Money Street works with one drive, but two are preferred. It's also okay without a printer, but you'll miss a few reports. Master Charge, Visa, COD okay. Add $2.50 on all orders for postage and packing. To order or get additional information: call 24 hours and leave your name with our answering machine.

The program is copy protected. We sell back-up disks for $10. We also offer a special utility disk that makes two back-up copies, makes quick copies of data disks, and allows fast sorts of selected months or code categories. Price is $25.

Computer Tax Service
P.O. Box 7915
Incline Village, NV 89450
(702) 832-1001

$99.95

Money Street is a Trade Mark of Bullseye Software. Apple is a registered trade mark of Apple Computers, Inc.

Dealers: Write or call for price list.

TK!SO
EXPLA

TK!Solver does for equations what word processing did for words. The first thing you should know about the TK!Solver™ program is that it is not a spreadsheet. Instead, it does something completely unheard of (until now)—it turns your personal computer into a voracious equation processor.

The next thing you should know is that if the TK!Solver program can't make life with your personal computer easier (and pay for itself), even if you use it only 15 minutes a week, you are a very rare person.

And finally, you should know exactly what equation processing is, and how it works. If you keep reading this, you will.

Equation processing with TK!Solver, or problem solving made easy. The best way to understand what the TK!Solver program *is*, is to understand what it *does*. The following simple example is designed to do just that.

Begin by setting up your problem. The TK!Solver program lets you do it quickly, easily, and naturally. For example, a car costs $9785. What would be the monthly payment on a three-year loan if the down payment is 25% and the interest rate is 15%?

STEP 1. Formulate the necessary equations to solve your problem and enter them on the "Rule Sheet" simply by typing them in (see screen photo). For example: "price−down = loan."



STEP 2. Enter your known values the same way on the "Variable Sheet." For example: "9785" for price. You may also enter units and comments, if you want.*

STEP 3. Type the action command ("!" on your keyboard) to solve the problem.

STEP 4. TK!Solver displays the answer: the monthly payment is $254.40.

Backsolving, the heart of TK!Solver. Now that you've defined the problem and solved it, TK!Solver's unique backsolving ability also lets you think "backwards" to solve for any variable, regardless of its position in the equation. For example, if you can only afford a monthly payment of $200, you can re-solve the problem in terms of that constraint. The TK!Solver program will solve the problem, displaying your choice of a higher down payment, a longer loan term, or a lesser interest rate. This unique backsolving capability forms the basis of TK!Solver's remarkably flexible problem-solving ability.

*You can easily define appropriate unit conversions on the unit sheet at the same time.

OLVER™
AINED:

Also, as you can see from the example on the screen, TK!Solver deals not only with single variables, but with entire equations and sets of simultaneous equations. It also deals with much more complicated problems than this one. How complicated? That's up to you. What kinds of problems? That's up to you, too, but popular applications include finance, engineering, science, design, and education.

Other extremely useful and interesting things TK!Solver does. Aside from its basic problem-solving abilities, the TK!Solver program performs a number of pretty fancy tricks. Like: *Iterative Solving;* in which TK!Solver performs successive approximations of an answer when confronted with equations that cannot be solved directly, (like exp (x) = 2 – x • y and sin (x • y) = 3 – x – y). Like: *List Solving;* in which TK!Solver attacks complete lists of input values and solves them all, allowing you to examine numerous alternative solutions, and pick the one you like best. Like: *Tables and Graphs;* using the values you produced with the List Solver, the TK!Solver program will automatically produce tables and graphs of your data. You can look at your formatted output on the screen or send it to your printer with a single keystroke. And like: *Automatic Unit Conversion;* in which TK!Solver lets you formulate problems in one unit of measurement, and display answers in another. Very convenient what with all this talk about going metric.

The TK!Solver program also provides a wide variety of specialized business and mathematical functions like trig and log and net present value.

Then, there's TK!Solver's on-screen Help facility that provides information on commands and features any time you want it. Just type "?" and a topic name.

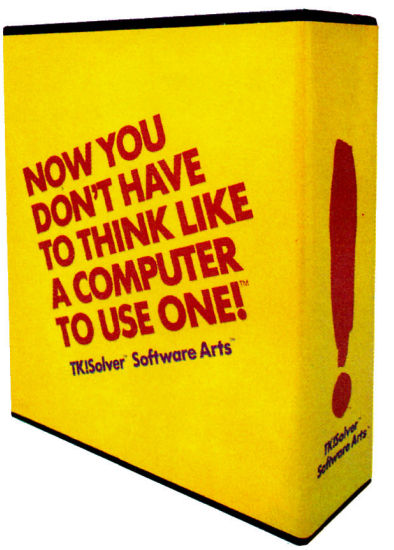
And of course the TK!Solver program combines all these features in one *integrated program.*

TK!SolverPacks make problem-solving a picnic. TK!SolverPack™ application packages are specially developed by experts in specific fields. Each package contains a diskette with about a dozen models that include the necessary equations, values, and tables for solving a particular problem. The models are usable as-is or you can easily modify them.

TK!SolverPack application packages available from Software Arts include Financial Management, Mechanical Engineering, Building Design and Construction, and Introductory Science. Additional TK!SolverPacks are on the way from Software Arts, McGraw-Hill,™ and others.

We know they're out there. No matter who your customers are, or what they do, if it involves using equations, the TK!Solver program is an indispensable tool for them. In fact, they'll be reading this ad in leading consumer and computer publications.

Contact Cathy Brown today at (617) 431-6600 for the name of your nearest Software Arts distributor.



Software Arts™
The inventors of VisiCalc®

27 Mica Lane, Wellesley, Massachusetts 02181
617/237-4000

CIRCLE 205 ON READER SERVICE CARD

TK, TK!, TK!Solver, TK!SolverPack, The Problem Cruncher, the stylized ! and the slogan "NOW YOU DON'T HAVE TO THINK LIKE A COMPUTER TO USE ONE!" are trademarks or registered trademarks of Software Arts, Inc. SATN, TK!SATN and DIF are trademarks or registered trademarks of Software Arts Products Corp. Software Arts is a trademark of Software Arts, Inc. and Software Arts Products Corp. The TK!Solver program and the TK!SolverPack applications packages are products of Software Arts, Inc. which is solely responsible for their contents. VisiCalc is a registered trademark of VisiCorp.
Copyright © 1983 Software Arts, Inc. All rights reserved.

P/N 100-092 P 8/83

BOOK EXCERPT/BY LESLIE E. SPARKS

INVESTMENT ANALYSES WITH YOUR MICROCOMPUTER

You must understand the various forms that money can take before using your Apple to compare investments that differ as much as apples and oranges.



Microcomputers can be useful tools in making investment decisions since a considerable number of calculations must be done when applying financial theories. However, radically different conditions in each investment situation—involving taxes, cash flow, risk, and whether profit is expected only when an asset is sold—require an investor to understand which theories are appropriate when evaluating a particular opportunity. Good judgment must be used before numbers are sent through a computer to make a meaningful choice of investments.

In his book, Leslie E. Sparks addresses both the computer and the investor; the text includes numerous listings of BASIC programs that execute financial theories, as well as discussions that inform the reader of the meaning and appropriate use of these theories.

The programs in this book are written in Microsoft BASIC; an appendix explains how to convert the listings to run properly with other versions of BASIC. The three longest programs each require a computer with 48K RAM. These three are INVEST1, to analyze investments that generate income; INVEST2, to analyze investments where most profit would come as capital gain when the investment is sold; and INVEST3, a version of INVEST2 that includes risk analysis.

This book excerpt includes none of the program listings. Instead, it focuses on teaching the basic principles and methods of investment analysis.



Steps in Investment Analysis

Investment analysis is a multistep process that ends with the selection of the investment or investments that are best for you. The steps are:

- Define your investment objectives. Remember that your objectives are not the same as someone else's investment objectives.
- Determine the types of investments that meet your objectives. Because investment analysis is a time-consuming task, you want to limit the analysis to those investments that meet your objectives.
- Determine the cost and return for all investments that meet objectives. This is a crucial step.
- Analyze cost and return to find the best investments. This step is closely related to the preceding step. It may be efficient to loop between these two steps: first make optimistic assumptions about cost and income, then analyze cost and return; reject unsatisfactory investments, refine costs and returns, and repeat the analysis.
- Analyze risk, which always is present in investments. Analysis of risk must be one of the steps in investment analysis. Computer assistance in analyzing risk is discussed later.
- Select the investments you prefer based on the preceding quantitative analysis, together with qualitative analysis that determines if you are comfortable with the investments.
- Manage the investment to make sure costs and returns are as projected. This is not a step in the analysis procedure, but it is important if you are to meet investment objectives.

The emphasis of this book is on the analysis of projected costs and returns to determine whether the investment is a good one. The basic thrust of this analysis is based on the concepts of time value of money. Because the analysis is most objective and because it requires a considerable amount of computation, the computer is especially helpful in this step. Most of the other steps involve at least some subjective judgment, which is not susceptible to computer analysis. The analysis of projected costs and returns, on the other hand, is basically objective and involves some tedious methematics; but this is what computers are good at.

The second area receiving emphasis is projection or forecasting of expected returns and expenses. A computer can be of assistance here; several programs for forecasting are provided. However, this area requires considerable subjective analysis. Thus it does not yield as gracefully to computer analysis.

Although these two areas are to receive the most emphasis, other steps are not totally neglected. Discussions are limited but do point out where the computer can help; in some cases computer programs are provided.

INVESTMENT OBJECTIVES

The first step in investment analysis is to define the objectives of the investment. Any investment that does not meet your personal investment objectives should be rejected. If you properly define your objectives, you will be able to eliminate several possible investments with little or no additional analysis.

Although you may have several objectives for investing (such as retirement or a vacation), you must realize that the first objective of any investment is to increase your future wealth. Unless the investment meets this objective, nothing else matters. You are better off spending the money now, not investing it for future gain.

Although it seems obvious that an investment must increase future wealth, people often make investments that aren't designed to do so. People forget the primary objective of investment and as a result make poor investment decisions.

The emphasis of this book is on the analysis of projected costs and returns to determine whether the investment is a good one.

In order to meet this primary objective you should choose investments that increase your future purchasing power, i.e., investments that keep ahead of inflation. The only way this can happen is if your investments make money.

Yet many investments don't meet this objective. Many so-called tax shelters, sold with the promise of reduced income tax, are good examples. At some levels of income the only way to reduce taxes is to increase expenses or losses. Since at best, a dollar lost only gives fifty cents in tax savings, you can cut your taxes and end up broke.

Again, the objective of investment is to increase future wealth. The only way this can happen is for the investment to earn money. Thus find the investments that earn the most money and pay the extra taxes. And enjoy the extra wealth you have earned.

If you cannot find investments that meet these objectives, spend your money now and enjoy it.

You may find it useful to make up a work sheet to help you define your investment objectives. Remember that you may have conflicting objectives—don't worry about that. You are the only person who can resolve the conflicts.

Total amount to invest is $100,000.

	A	B	C
CAPITAL	$70,000	$100,000	$30,000
DCFROI	15%	14.5%	10%

Fig. 1

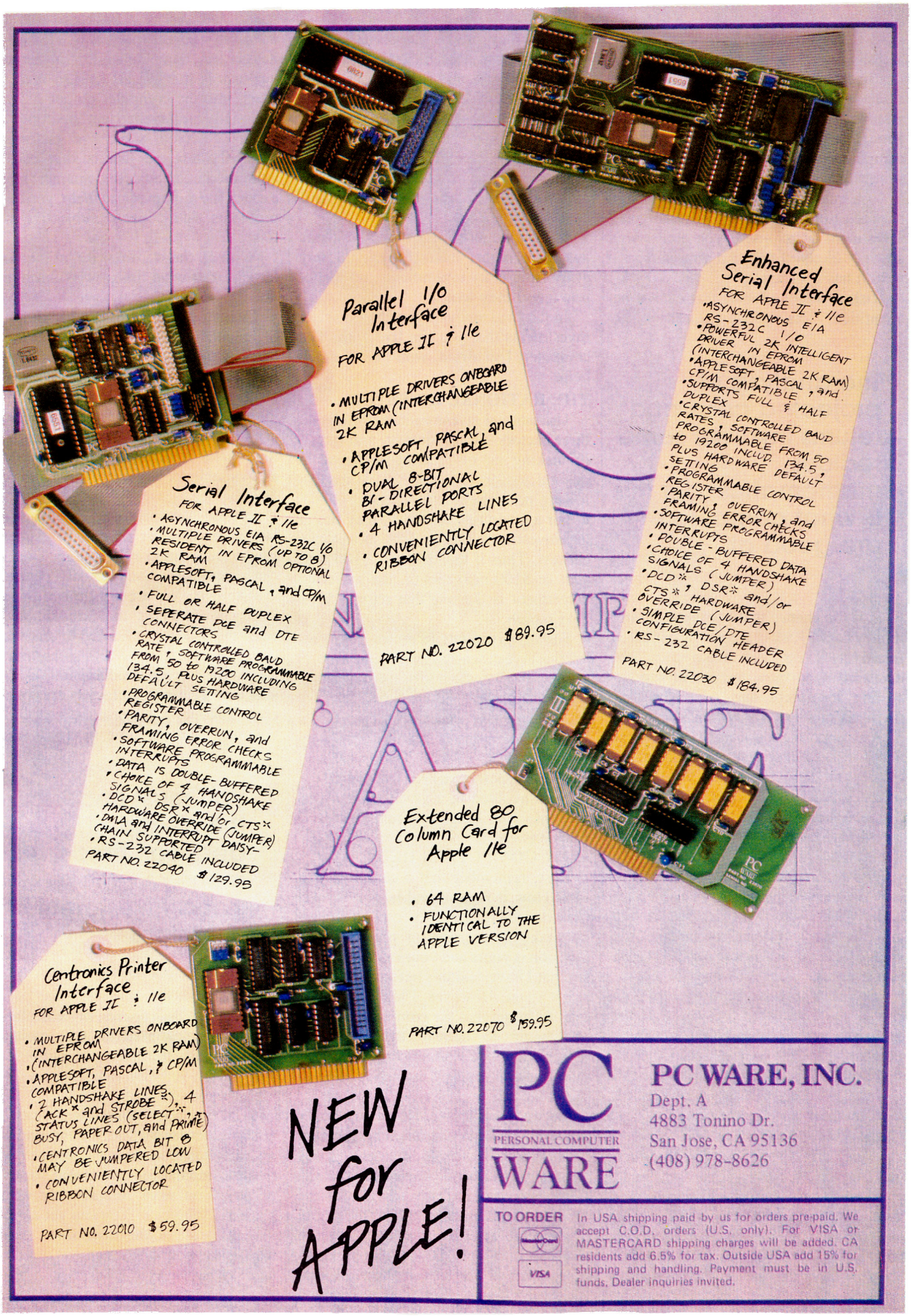
ELEMENTS OF INVESTMENT ANALYSIS

"Does this investment increase my future wealth?" is the question that must be answered by a rational investor. If more than one investment is being analyzed (as should be the situation), an additional question, "Which investment increases my future wealth the most?" is introduced.

The answers to these questions require analysis of three factors: money, time, and risk. All investments, whether in the stock market, gold, real estate, or comic books, involve consideration of these three factors.

The money factor is the easiest to analyze and is often the only factor considered. The essential questions are how much does the investment cost, and how much money does it return. The main thing to remember in analyzing the money factor is to be sure that all costs are included in the analysis.

The time factor is harder to analyze than the money factor—mainly because the mathematics involved is tedious. Yet careful consideration of the time factor is the heart of investment analysis. It is the factor that determines whether you will increase your future wealth. The essential questions are when must the investment be paid for, and when is the income



CIRCLE 137 ON READER SERVICE CARD

from the investment paid.

Because all investments involve giving up present wealth or spending in exchange for future wealth, consideration of the time factor is essential to good investment decisions. A personal computer removes most of the hard work from time factor analysis.

You must understand the relationship between time and money to make good investment decisions. If you don't, you are very likely to find that your personal wealth has decreased.

Risk is the one factor that cannot be quantified. The essential question is, what is the chance that I will not get my money back? Risk is generally evaluated intuitively. You must make your own decisions about how much risk you are willing to accept and what the risk involved in a given investment is.

The analysis of projected costs and returns involves some tedious mathematics; but this is what computers are good at.

An important point to remember about risk is that risk and return are closely related. Low risk means low return and high risk means high return. There is basically no way to get high investment returns without accepting risk.

The amount of risk that you are willing to accept depends on the objective underlying a given investment. If you are investing for your retirement, you should accept less risk than if you are investing for a need which is not as important. You should only accept high risk if you can afford to lose all of the money invested. Be sure that you know how much risk you can accept before you proceed too far with an investment. But don't expect to find an investment with low risk and high returns.

OTHER FACTORS

Money, time, and risk are the three main factors that every investor should consider. These factors can be more or less quantified, and a computer can help in analyzing them. However, there are numerous other factors to consider. Most of them depend on the individual investor.

Most of the other factors are intangible, yet they are as important, if not more important, than the tangible factors of time, money, and risk. It is often the intangibles that determine whether a given investment will actually pay off for you. For example, if you don't want to be a landlord, then an investment in rental real estate will probably not work out—no matter what the quantitative analysis indicates.

If the thought of risk makes you stay awake at night, then you should stay away from risky investments, no matter how good they look.

In the final analysis you should select investments that you can live with. The computer, I'm afraid, won't be of much help.

THE RATIONAL INVESTOR

The rational investor must consider all three factors—time, money, and risk—in making an investment decision. In general, rational investors have the following preferences:

- For a given rate of return, they prefer the investment that returns money the earliest. Thus if the choice is $100 next year or $100 next month, the preferred investment is the one that returns $100 next month.
- For any given rate of return, they prefer the investment with the least risk.
- For any given degree of risk, they prefer high returns to low returns.

The last two preferences state that a high rate of return is required for risky investments.

The computer can help you sort all the factors involved in a given investment, and thus can help you make rational decisions.

HOW COMPUTERS HELP

First, remember that a computer is a tool. How it is used and how well it is used depend on you. The computer cannot make the decision for you. The final decision is yours and yours alone. (I realize that I have said this before, and I will say it again. However, I feel that we all tend to forget that the computer is a tool and begin to believe the calculated results too much. We must always be on guard against putting too much faith in the computer.)

Second, remember that no matter how impressive computer output looks—and it does look impressive—the analysis depends completely on the data and programs you provide for the computer. Often this is the hardest thing to remember. The computer printout tends to blind us to the fact that the computer is using the information we supplied, and the calculations are all based on our assumptions, some of which may be built into the program. The major danger of computer-aided investment analysis is that we all tend to read too much into the computer output.

Finally, remember that the computer cannot calculate subjective factors. It can only analyze factors that can be quantified in an objective manner. Don't expect the computer to help you with problems that concern subjective factors.

With all the warnings out of the way, let's look at what this powerful tool can do.

First, it can do a tremendous amount of calculation quickly. This fact alone has persuaded large companies to use their computers to help make investment decisions. Speed of computation is also the main justification for using a personal computer for investment analysis. The time factor is so important that we need all available tools to meet this issue adequately.

Second, the speed and ease of calculations means that several investments can be analyzed in a short time. Thus we can carefully analyze all pertinent investments. We are not limited to analyzing investments that are simple to analyze, nor are we limited to analyzing only a few factors affecting the investment. We can use the computer to make sure that all important factors are considered; that alone is worth the cost of the computer and the time we must spend working with it.

You must understand the relationship between time and money to make good investment decisions.

Finally, the speed of calculation allows us to estimate the risk involved. We can study the effects of various factors such as inflation rate, interest rates, higher expenses, etc.

After you have worked with a personal computer for awhile, I think you will find that it is more powerful than a mainframe computer for investment analysis, because you work interactively with a personal computer. You can get an intuitive idea about the investment that is impossible with other methods of investment analysis.

Of course if the programs are not written to allow interactive use of the

Apple® à la Modem



$159.95 a slice

Here's a tasty addition to sweeten your Apple® and put you in touch with the world.

It's an amazing modem called **THE OPERATOR™**.

All of its sophisticated ingredients are tastefully tucked into one single circuit board to offer you the ultimate in simplicity as well as efficiency.

No costly add-ons or external boxes to complicate our easy recipe for instant telecommunications.

Just plug it directly into the slot of your Apple II, II+, IIe, the Franklin Ace® 100 or 1000, or the Basis 108, and you're ready to communicate.

THE OPERATOR comes to you with complete and easy documentation plus start-up software programs on disks.

This system is compatible with: ASCII Express Pro, Data Capture, Modem Magic II, TermExec, Transcend I, II, and III, VisiTerm, Z-Term, and many more.

So top off your Apple with this tempting delight at the very easy to swallow price of $159.95 for a simple touch of perfection.

THE OPERATOR has these added features: • 110/300 baud • full & half duplex • auto answer with disconnect • rotary, touch- tone™, key set compatible • totally self-contained (no RS-232 required) • single modem chip reliability • interfaces with most communications packages.

YES, I want to spice up my Apple®
Send Me **THE OPERATOR.**

Name _____
Company _____
Address _____
City _____ State ___ Zip _____
Phone _____
☐ Check enclosed ($159.95* each)

For MasterCard and Visa orders only! Call now!
Toll free 1-800-824-7888, ask for Operator 52!

*Mass. residents add 5% sales tax
Shipping and handling included for continental U.S.

The Operator is a trademark of T•I•M•E•C•O•R.
Apple is a registered trademark of Apple Computer, Inc.
Franklin Ace is a trademark of the Franklin Computer Corp.
Touch-Tone is a trademark of American Telephone & Telegraph.

T·I·M·E·C·O·R
REACHING PEOPLE THROUGH TECHNOLOGY
The International Modem Exchange Corporation
P.O. Box 8928, Boston, MA 02114

T·I·M·E·C·O·R
REACHING PEOPLE THROUGH TECHNOLOGY
The International Modem Exchange Corporation
Four Longfellow Place, P.O. Box 8928, Boston, MA 02114 Voice: (617) 720-4090 MODEM: (617) 720-3600
For MasterCard & Visa orders only! Call now! Toll free 1-800-824-7888, ask for Operator 52!

CIRCLE 131 ON READER SERVICE CARD

computer, you'll miss most of the benefits of using a personal computer.

To make most effective use of a computer, whether it be mainframe or micro, you have to build a computer model of the investment in which you're interested. A computer model allows you to simulate the performance of the investment for several years using different assumptions about income, expenses, inflation, and other important factors. Thus you will be able to see the effects of a 10 percent increase in expenses without actually having to make the investment.

Once the basic model is built, you can use the computer to help manage your investments. This is done by updating the information supplied to the computer and by changing the model if necessary. For example, if an investment is not working as well as you hoped, you can see what has to be done to make it work better, whether you should terminate the investment as soon as possible.

The key questions have four parts:

1. How much does the investment cost?
2. How much does it cost to obtain the money necessary to purchase the investment?
3. What are the ongoing expenses and income from the investment?
4. Finally, and perhaps most important, what is the timing of future income and expenses?

Risk is the one factor that cannot be quantified.

In this chapter we will look at the first three of these questions.

HOW MUCH DOES IT COST!

You may think this an obvious or a trivial question. No one, you might say, would make an investment without knowing how much it costs. Yet we often do.

It is generally easy to determine what the selling price of something is. For example, if you purchase a stock you know what the selling price of the stock is. But the selling price is not the total cost of the investment. There are often other expenses that must be paid before you can purchase an investment. For example, there may be commissions, taxes, finder's fees, advertising costs, and numerous other costs that must be paid in order to purchase a given investment, and these costs are often hidden. Thus the first step in investment analysis is to determine the total cost of acquiring the investment. Using a worksheet is a good way to insure that all costs are considered.

THE COST OF MONEY

There are two sources of money for investment: yours and someone else's. In theory and in the absence of taxes, an investment decision is independent of the source of money. However, in the real world taxes exist, we cannot always borrow as much as we'd like, and so on; hence the source of funds does influence the investment decision.

BORROWED MONEY

The cost of borrowed money is easy to determine. It is the interest rate you must pay for money. The interest rate is specified in the loan agreement and can be calculated. If the interest rate is variable, you can still estimate it.

Because interest expense is an allowable business expense, the true cost of borrowed money is less than the interest rate on the loan. For example, if you are in the 50 percent tax bracket, the after tax cost of a 20 percent interest rate is 10 percent. Of course if you are in a lower tax bracket, your after tax cost of borrowing money is closer to the pretax interest rate.

YOUR OWN MONEY

The cost of using your own money is somewhat more difficult to determine. You might think there is no cost in using your own money. After all it's your money; you don't have to pay interest if you want to spend it.

It is important to remember that if you use your money for one investment, it is not available for other investments, nor is it available to earn interest. For example, if you decide to purchase stocks, then your money is not available to purchase a term certificate of deposit. In other words, you have lost the chance to purchase a certificate of deposit and gain the interest it would pay.

Suppose that you have the choice of investing $1,000 in Sam's get-rich-quick scheme or putting your $1,000 into an all-savers' certificate that pays 12 percent interest tax free. If you invest in Sam's get-rich-quick, you pass up the all-savers' certificate and it costs you 12 percent (the amount you have forfeited by not collecting interest).

The loss of money for other investments is called *opportunity cost*. In our example, the numerical value of the opportunity cost is the return on the cer-

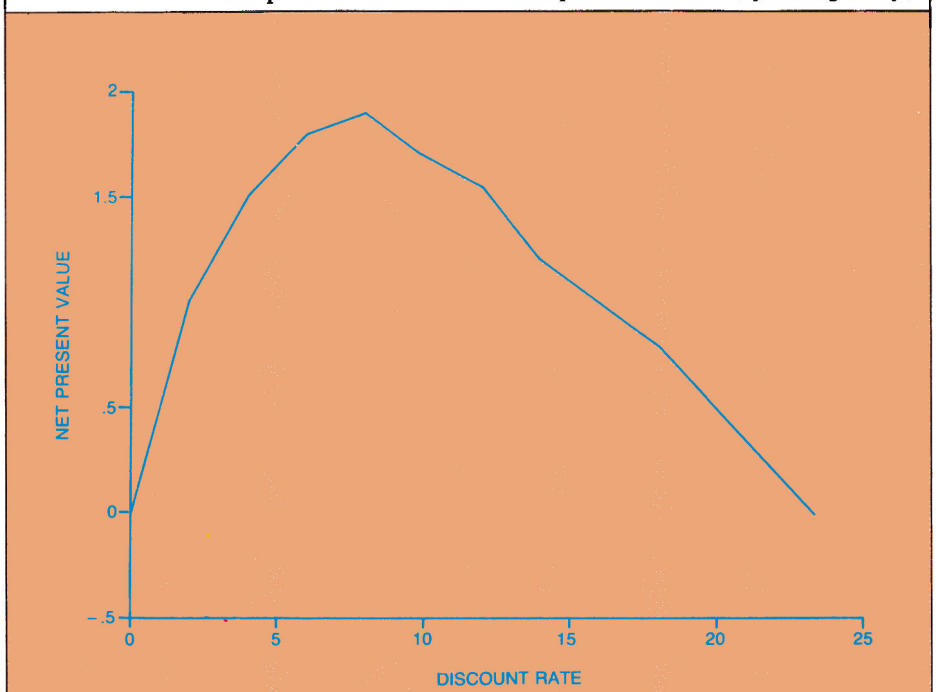


Fig. 2

I think you will find that the personal or microcomputer is a useful tool for investment analysis. And you will soon wonder how you ever managed to get along without one.

The Money Factor

The key questions about any investment are how much does it cost and how much does it return. These are the only questions that really matter. All other investment questions are primarily aimed at answering these questions.

tificate of deposit or 12.0 percent of the cost of the certificate.

In general a good value for the opportunity cost is the return that can be expected from a risk-free investment. If you are considering a risky investment, you should add a slight amount to the opportunity cost to compensate for the risk.

Although the opportunity cost and the interest rate on a loan may be close, their true after-tax costs may be quite different. Tax laws that allow deduction of interest reduce the real cost of borrowing and thus favor the use of borrowed funds.

EQUITY AND BORROWED CAPITAL

Most investments are composed of a combination of borrowed money and equity (a fancy way of saying your money). The cost of using such a combination of funds is given by:

$$C = (BI + EV)/T$$

where C is the total cost of capital (given as a percentage), B is the amount that must be borrowed, I is the interest rate that the funds are borrowed at, E is the amount of equity, V is the opportunity cost, and T is the total amount of the investment.

For example; suppose you have an opportunity to buy real estate. Assume the cost of the property is $100,000 and includes all commissions, closing costs, etc., and assume you can borrow $80,000 at 20 percent (so you need $20,000 equity). You can invest in tax free government bonds that pay 8 percent interest. And your marginal tax rate is 40 percent. The after tax cost of borrowing is 12 percent. The average cost of capital for the investment is

$$C = (80{,}000 \times 12 + 20{,}000 \times 8.0)/100{,}000 = 11.2\%$$

This means that an investment must have an after tax return of 11.2 percent to recover the cost of making the investment.

As you will see later, it is important to know the cost of capital. The cost of capital combined with the concepts of time value of money tell us whether an investment has made a profit.

CASH FLOWS

The flow of money into and out of an investment is called the *cash flow*. Cash flow is made up of income, called cash *inflows*, and expenses, called cash *outflows*, and depreciation. The sum of the cash inflows, depreciation, and cash outflows determines the overall cash flow. If the cash inflows exceed the cash outflows, you have a positive cash flow and might have a good investment. If the cash flow is negative, you have a loss and a bad investment.

One major problem you face in investment analysis, and the one most books on investment analysis discuss is projecting cash flows for the life of the investment. Once you have made an investment, you have the problem of insuring that the cash flows actually occur. We will examine the problem of forecasting; however, the problem of how to make sure cash flows actually occur is outside the scope of this book.

Remember that no matter how impressive computer output looks the analysis depends completely on the data and programs you provide.

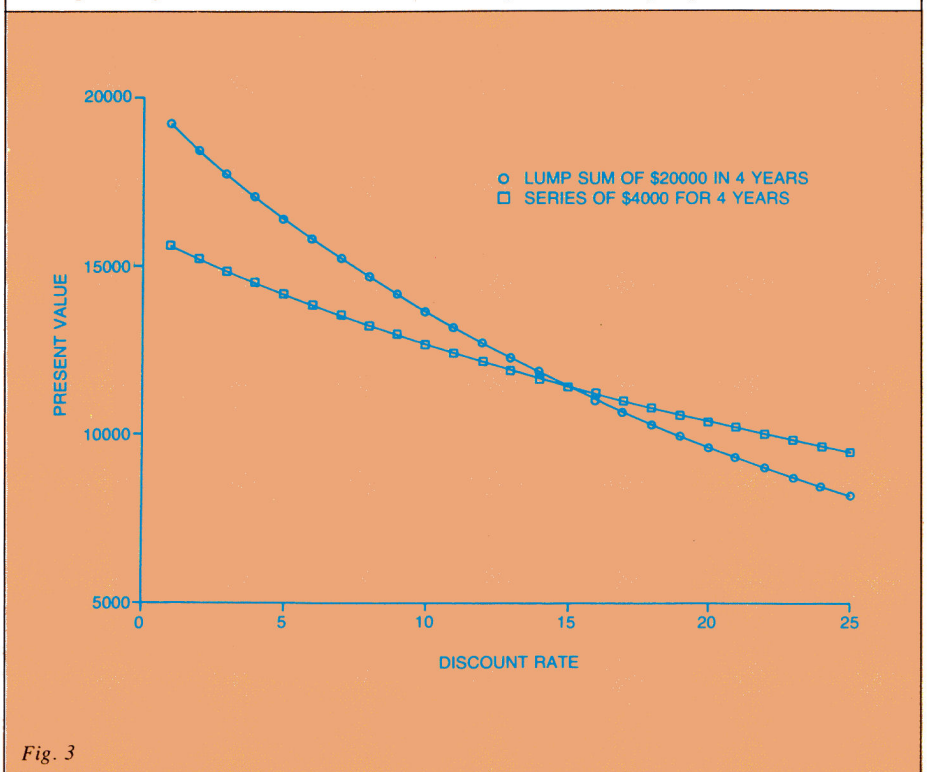


Fig. 3

Cash flow can vary from year to year. For many investments cash flow in the first years of the investment is negative, meaning expenses exceed income. (Of course this difference must be accounted for, which usually is done by borrowing additional funds.) After several years of operation cash flow becomes positive. For the investment to be a good one, the final total of yearly cash flows must be positive. Otherwise, you will have lost money.

There are two important types of cash flow: spendable cash flow and taxable cash flow. It is possible for an investment to produce negative spendable cash flow and positive taxable cash flow, which is not a very good idea. The reverse is also possible and is more desirable.

These two types of cash flow are not the same. Spendable cash flow is the money that we actually have to spend. Taxable cash flow is the money that the IRS wants to tax.

The tax laws are the reason for the differences between spendable and taxable cash flow. The tax laws allow us to deduct certain expenses from income that are not out of pocket expenses, and prohibit us from deducting other out of pocket expenses from income. The worst possible situation is when the IRS says you made a profit (so you have to pay taxes) and yet you have lost out of pocket money.

Depreciation is the major tax law expense that is not an out of pocket expense. That is, you do not write a check for depreciation. Although depreciation can reduce our taxable income, it does not necessarily reduce our spendable income. (If we set aside funds for replacing depreciated equipment, then depreciation can also reduce our spendable cash. However, this is not often done.) This is why cash flow is usually defined as after tax profit plus depreciation. In this book I will call the taxable

cash flow "cash flow." I will always use the term "spendable cash flow" when I'm talking about the spendable cash flow. This should avoid confusion.

Principal payments on a loan are the major spendable expense that is not an expense for tax purposes. An investment that is financed with borrowed money must produce enough income to make both the interest and principal payments. Otherwise, you would have to find additional funds to make the required loan payments.

In mathematical terms the two cash flows can be described as:

Taxable cash flow = income − expenses + depreciation − taxes

Spendable cash flow = income − expenses − principal paid − taxes

SPENDABLE AND TAXABLE CASH FLOWS

Suppose you have an investment that produces $1,000 income per year. The allowable depreciation on the investment if $600, the interest payment is $200 and the principal payment is $400. Your tax rate is 50 percent. The tax paid on the investment is calculated by determining the net taxable income, which is $1,000 (gross income) − $200 (interest) − $600 (depreciation) = $200 taxable income. The tax paid is $100. The net after tax profit is $100. The after tax cash flow is $100 (net profit) + $600 (depreciation) = $700. The after tax spendable cash flow is given by $1,000 (gross income) − $200 (interest payment) − $400 (principal payment) − $100 (tax paid) = $300. Note that the investment yielded $300 for your pocket.

In general over the life of an investment, spendable cash flow and taxable cash flow from a profitable investment are both positive. However, it is important to realize that for individual years of the life of the investment, you may find that you did not earn enough to make the principal payments on your loan. In such situations, you should carefully examine the investment. Principal and interest payments must be made, so if you keep the investment you will have to find additional funds to make the necessary payments. Such funds will increase the cost of the investment.

ESTIMATING CASH FLOWS

Estimating the future cash flows from an investment is a critical step in investment analysis. This step is discussed by most books on investment analysis. The methods used to make estimates vary with the type of investment. Only a general discussion will be given here.

The first cash flow that must be estimated is the initial cost of the investment, composed of the cost that the seller is asking and the cost that the investment is worth.

It is fairly easy to determine the price the seller is asking. It is somewhat more difficult to determine the price that you should pay for an investment. Techniques for estimating the value of an investment vary with the type of investment. For example, a technique that works for estimating the value of common stock or a business probably would not work for determining the value of rental property.

A computer model allows you to see the effects of a 10 percent increase in expenses without actually having to make the investment.

No matter what you're buying, the first step is to determine the price of similar investments. If the asking price for your investment is out of line with that of similar investments, be careful.

Once you've determined that the selling price is reasonable compared to similar investments, then you refine your estimate of the appropriate price. The steps you should go through depend mostly on the type of investment.

The next step is to estimate expenses and income for the life of the investment. Income can be of two types: income from the investment and income from the eventual sale of the investment. Many investments have income from only one source. For example, an investment in a new piece of equipment for a business would be expected to produce income from increased business. But it would not normally be resold for a profit. On the other hand, many common stocks do not produce income; they do not have dividends, but are expected to be resold at a profit.

There are two questions that must be answered in order to project the income and expenses from an investment. First, what are the expected first year income and expenses from the investment? These can best be determined by careful analysis of the income and expenses of similar investments. The basic idea is that income and expenses from similar investments should be about the same. Any investment that has projected income or expenses different from those of similar investments should be examined with great care, as something is probably wrong.

Once first year income and expenses have been estimated, the next step is to estimate the growth of income and expenses over the life of the investment. You should begin by looking at past trends in the particular investment you're considering. Also look at past trends for the type of investment you're interested in.

The techniques used to make cash flow estimates depend on the type of investment. You should carefully study the techniques available for a given type of investment and then use the techniques best suited for you. A brief discussion of estimating cash flows for rental property followed by a short discussion of common stock have been chosen because they are two of the most common forms of investment.

ESTIMATING CASH FLOW FOR RENTAL PROPERTY

First let's look at rental property investments. The first step is to examine the expense and income history of the particular property you're interested in purchasing. Analyze pertinent books for the past several years. Use forecasting techniques to determine data trends. Verify whether some expense, for example maintenance, is too low or too high. A low value for an important expense may overstate the profit from the property. A high value may indicate a problem with the property.

Next, evaluate the past income and expense history of rental properties near the units you're considering. Start with properties in the neighborhood of your units, then look at property throughout the rest of the city. If you see that your units are out of line with the competition, find out why. Otherwise, you may have a serious problem. You should use forecasting techniques to estimate the trends for these properties too. The trends should be similar to those of your property. If they are not, look at all the figures to determine the reasons for discrepancies.

It is important to remember that if you use your money for one investment, it is not available for other investments.

How to make your Apple run 3½ times faster.

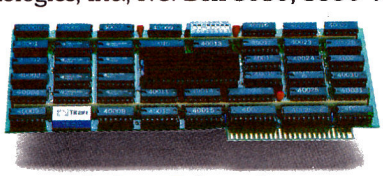


Just plug in the Accelerator II® and watch your Apple® II or II Plus take off.

Imagine running VisiCalc,® DB Master,® Applesoft, Apple Fortran or Pascal without long delays. With the Titan Accelerator II, your Apple II or II Plus runs these programs a true 3½ times faster. The Accelerator II also runs your Franklin, Basis and other Apple II compatibles 3½ times faster. This faster computer response time means less waiting for you and an increase in your productivity.

This Titan exclusive has its own fast 6502 processor, 64K of high-speed memory, and built-in fast language card. It is transparent to your software and is hardware compatible with most standard peripherals. And you can turn if off from the keyboard to run your Apple at regular speed.

Find out how to run faster and increase your productivity without breathing hard. For information on the Accelerator II and other Titan microcomputer products, see your computer dealer or contact: Titan Technologies, Inc., P.O. Box 8050, 3990 Varsity Dr., Ann Arbor, MI 48107; Telephone (313) 973-8422.



Titan
TECHNOLOGIES, INC.
FORMERLY SATURN SYSTEMS OF MICHIGAN

Attention dealers. Ask us about our special demonstrator unit offer.

Sales and marketing by The MARKETING RESOURCE GROUP, Costa Mesa, CA.

Apple is a registered trademark of Apple Computer, Inc. VisiCalc is a registered trademark of VisiCorp, Inc. DB Master is a registered trademark of Stoneware, Inc.

CIRCLE 179 ON READER SERVICE CARD

Examine the age and condition of the various rental units. Compare with the age and condition of the property you're interested in. Remember that rental income can be expected to decrease as the age of the units increase, especially if the condition of the units falls below that of the competition. Also note that expenses for many properties can be expected to increase as a property ages.

Several techniques have been developed to help estimate income and expenses for real estate investments. You should be familiar with these if you are to take maximum advantage of the help you can get from a computer.

The final projection for real estate investment is the estimation of the future selling price. There are several techniques for making the projection; all give you an expected appreciation that can be used with the programs in this book.

The final step in estimating the future price of a property is to put yourself in the place of the buyer. Ask yourself if you would purchase the property. If you wouldn't, then why would someone else?

You should remember that the value of an investment is closely tied to the income and expenses produced by the investment.

CASH FLOW FROM COMMON STOCK

The cash flow from common stocks is the dividend paid by the stock and the capital gain from the eventual sale of the stock. Generally there are no expenses to estimate other than commission due when the stock is sold.

There are two basic techniques for estimating the future price of common stock, fundamental analysis and technical analysis. Fundamental analysis is based on the idea that careful study of the present and future prospects of a business can tell you the present and future value of the business' common stock. If the present price is less than the future value the stock is a good investment.

Technical analysis is based on the assumption that the present price and past price trends of a stock contains all the information necessary to determine the future price. If the future price is projected upwards, then the stock may be a good investment. If the future price is projected downwards, then the stock should be sold.

You should consult one of the many books on common stock evaluation to determine which method is best for you. Probably the best idea is to pick a method and stick with it.

SUMMARY

Estimating future cash flows can be a lot of work. Much information is needed and a considerable amount of study is required. The only way to reduce the effort required is to lower the number of investments that must be studied. An efficient way to do this is to make a best case study of all the investments you're considering. The information for this type of study is easy to obtain. Then use programs to analyze the investments. Reject all investments that the analysis shows are poor. If the investments are poor under best-case assumptions, there is little to be gained by making more realistic assumptions.

Go back and refine the projections for the investments that remain. Take considerable care in making the projections for these investments. Then rerun the analysis programs and select investments that meet your needs.

The worst possible situation is when the IRS says you made a profit and yet you have lost out of pocket money.

Methods of Investment Analysis

Several methods of analyzing investments have been developed. Some have been found useful and have survived; others have not. Some of the more common methods of investment analysis and their advantages and disadvantages are presented in this chapter.

SIMPLE RETURN ON INVESTMENT

Simple return on investment, or ROI, is one of the more common methods for evaluating an investment. Simple return on investment is the sum of all profits from the investment, divided by the capital cost of the investment times the number of year of the investment.

Example: Simple ROI

For example, let's assume that the total cost of the investment is $50,000. The profits from the investment are $10,000 the first year, $20,000 in both the second and third years, and $5,000 the fourth and final year. The return on investment is:

ROI = ($10,000 + 20,000 + 20,000 + 5,000) / (4 × 50,000)
= 55,000/(200,000) = 0.275 or 27.5 percent

The advantages claimed for the simple ROI method are:

- The calculation of simple ROI is easy.
- Simple ROI involves profit, and investors are used to thinking in terms of profit.
- It considers all profits in the life of the investment. (The payback method discussed below does not do this.)

The major disadvantages of the method are:

- There are no universal definitions of invested capital or profits so there is no assurance that everyone is talking about the same things.
- The method provides for a single initial investment followed by a series of yearly profits or losses. It does not provide for additional investment during the life of the investment.
- It does not include the time value of money. Profits earned during the early years are given the same weight as profits earned later. This is a poor way to treat cash flows for two reasons. First, future cash flows are more uncertain than near-term cash flows and thus are riskier. Second, the time value of money shows that near-term cash flows are more valuable than long-term cash flows.

Because the simple ROI method neglects the timing of the cash flows, it must be considered a very crude tool for investment analysis and decision making.

PAYBACK PERIOD

The *payback method* is a popular way of analyzing investments. You simply ask how soon the income from an investment equals the cost of the investment. Investments with the shortest payback period are selected.

The payback period is calculated from the annual cash flows for each year of the investment. The annual cash flow is given by:

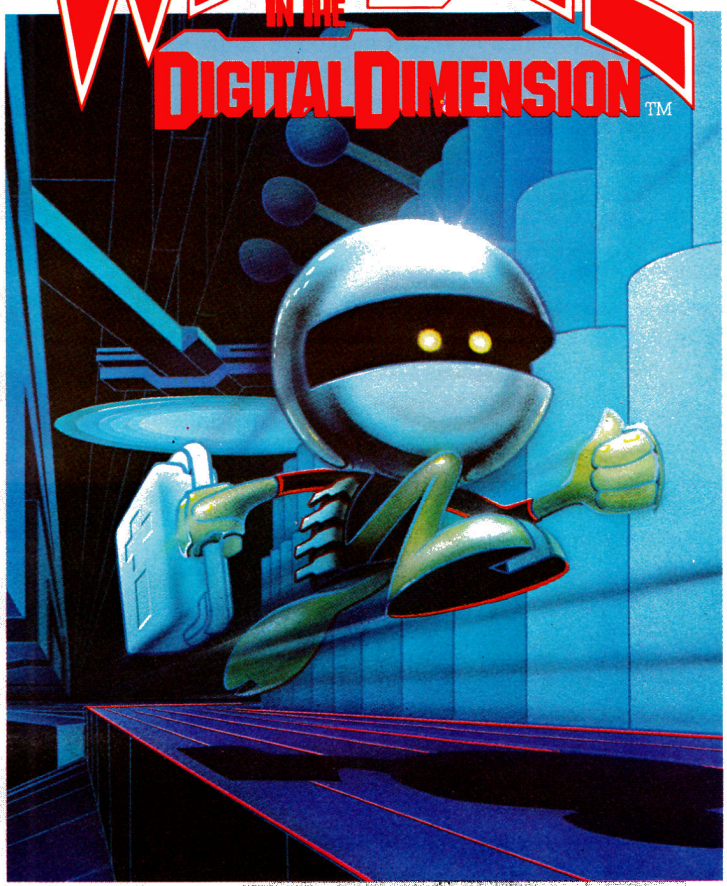
profit for year + depreciation − tax paid.

For example, assume you have a chance to invest $10,000 in a new business. The investment will earn $2,000 a year. The payback period is then five years.

The main advantage of the payback period is that it tells you how soon you will get your money back. The main disadvantages of the payback period method are:

- It does not identify the profitability of an investment, which is what really matters. I don't know anyone who invests to minimize payback time.
- It ignores the timing of cash flows.
- It completely ignores all cash flows that occur after the payback period. Thus

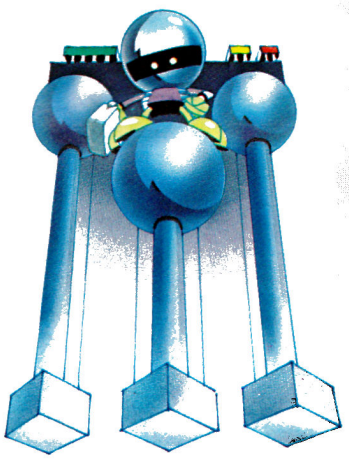
WILLY BYTE IN THE DIGITAL DIMENSION™



CHARACTERS

Willy Byte: electronic hero
Hex Luthor: digital archvillian
Cybil Nibble: 13 year-old player of Willy Byte in the Digital Dimension
Sidney Nibble: 16 year-old brother

Scene — A suburban home in the 1980's on a late Sunday evening. A teenager, Cybil Nibble, has been playing (for the umpteenth time) Willy Byte in the Digital Dimension, the newest creation in computer software from Data Trek, Inc. She decides to go to bed and quickly enters into a deep sleep that plunges her into the Digital Dimension. She finds herself on the ground gazing at eight towering electronic circuit poles, each emitting an orange glow that consumes the entire sky. Fascinated and perplexed by the sudden change in



environments, Cybil notices an animated object, high in the heavens, swinging from pole to pole.

Cybil (whispering to herself): The lightning speed, the energetic response, the total commitment, it must be Willy Byte!

(At that moment the game's charismatic electronic hero, Willy, sees Cybil and slides gracefully down the pole to meet his newest acquaintance.)

Willy Byte (cheerfully): Greetings, Cybil! Welcome to the Digital Dimension.

Cybil: The Digital what?

Willy: You know my home, the inside of your computer. Watch this!

(Off he scampers about the keyboard room, pulling and tugging on each bit while dodging the stinging sensation of static charges. As soon as Willy completes his task and the byte has safely left the keyboard room, a pale expression comes over Willy's face.)

Cybil: Are you alright?

Willy Byte (concerned): Problems in the Power Room.

Cybil (confused): What problems?

Willy Byte (assertive): Follow me!

(As Willy and Cybil sprint toward the I/O port, a sinister laugh is heard from above — the laughter of Hex Luthor. Suddenly a bolt of static charge is seen thundering its way toward Willy Byte.)

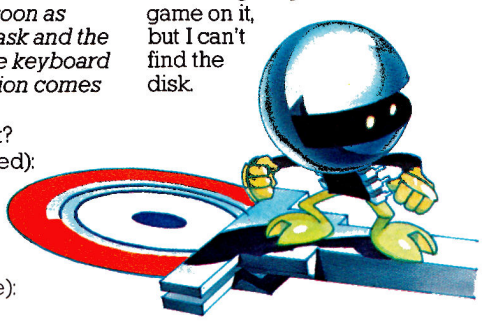
Cybil: Watch out, Willy!

(Cybil awakens from her dream to find her brother Sidney standing in her doorway.)

Sidney (concerned): Cybil, are you alright?

Cybil: I guess I was dreaming.

Sidney: As I was walking to the kitchen I noticed that the computer was left on. The screen's got a picture of a new game on it, but I can't find the disk.



Cybil (animatedly): Yeah, it's Willy Byte in the Digital Dimension. Mom and Dad bought it for us. I'll show you.

Sidney (sarcastically): They did what!?

Cybil *(on a sudden upsurge of emotion)*: Dad says that when I play Willy Byte I **learn** all kinds of stuff about computers.

Sidney: Like what?

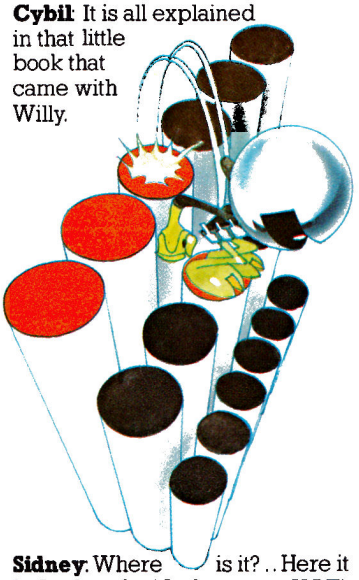
Cybil: First you jump into the CPU room. And then there are lots of other game rooms to explore, and each is a part of the computer.

Sidney: Oh really?

Cybil: Yeah! And in **this** game you guide Willy on his wild adventures while he skydives into the Power room, operates a crane in the RAM room, bounces in and out of the CPU, and zips around the Disk Drive room. I got extra points for flowcharting Willy's . . .

Sidney (perplexed): Flowcharting? What's flowcharting?

Cybil: It is all explained in that little book that came with Willy.



Sidney: Where is it? .. Here it is. Look at that! Is that cover HOT! It looks like an album cover. From the looks of all these pictures, . . . This looks great . . . Got to Play! Where's the disk? . . . Cybil!

Cybil (dashing to the computer): Mom and Dad will let us play as long as we want and I'm first.

Sidney (impatiently): Go for it!

Look for Willy Byte in the Digital Dimension at your nearest dealer or call DTI Data Trek toll-free at **(800) 654-SOFT.** In California, call toll-free **(800) 652-DATA.**

Suggested Retail: **$39.95**

dti data trek

121 West E Street
Encinitas, California 92024
(619) 436-5055

Available for the Apple II, Atari 400, 800, and 1200

Apple is a trademark of Apple Computer, Inc.
Atari is a registered trademark of Atari, Inc.

CIRCLE 187 ON READER SERVICE CARD

an investment with a two-year payback period followed by no income would be preferred to an investment with a three-year payback period followed by three years of high profits. This doesn't sound like a choice most people would make.

- It does not apply to many types of investments in which the main profit is from capital gains, for example a real estate investment.

Despite all its disadvantages, the payback period method is favored by many investors. It is useful as a rough screening method. However, the fact that it totally ignores the time value of money must be considered a fatal flaw.

DISCOUNTED CASH FLOW RETURN ON INVESTMENT

The discounted cash flow return on investment or *the internal rate of return method* is one of two methods of investment analysis which considers the time value of money. The idea is to find the discount rate that makes the present value of total cash flows for the life of the investment equal to the present value of the cost of the investment. The method requires trial-and-error calculations, but these are easy with a computer. Without a computer the calculations would be tedious and probably make the method unusable, especially if several investments must be examined.

A personal computer is more powerful than a mainframe computer for investment analysis, because you work interactively.

The major advantage of the discounted cash flow return on investment method is that you don't have to assume a discount rate. The method produces a number that has real meaning and is useful for decision making. To use the discounted cash flow return on investment method to rank investments, choose the investment with the highest discounted cash flow return on investment.

The major problems with the discounted cash flow return on investment method are:

- Good investments might be missed when funds are limited. To see how this might happen consider the case shown in Figure 1. Note that investment A has the highest internal rate of return. You want to invest all available funds, so you will select investments A and C. However, an examination of the combined rate of return from A and C shows that investment B is best for all your money. There are ways to modify the discounted cash flow rate of return method to allow for the case shown in Figure 1. However, these make the computations even more difficult.
- The method can produce two values of discounted cash flow return on investment. This is a serious problem if some of the cash flows during the life of the investment are negative and some are positive. Figure 2 shows this.

NET PRESENT VALUE

The final method is the *net present value method*. This is the other method that considers the time value of money. In the net present value method, all future cash flows from the investment are discounted with a predetermined discount rate. If the net present value of all future cash flows is greater than the present value of the cost of the investment, the investment is considered profitable.

The biggest problem with the method is in determining the value of the discount rate to be used. The general advice is to use the larger of the cost of capital and the maximum risk free return. The investment criterion is that an investment with a present value greater than or equal to the cost of the investment will be accepted. If more than one acceptable investment is found, then the investment with the greatest net present value will be selected.

When the present value of future cash flows is less than the cost of the investment, the earnings from the investment were less than you would receive, had you put your money into the investment represented by the discount rate. If you consistently find that your investments are not producing a high present value, you should be sure that you are using the correct discount rate.

THE EFFECT OF DISCOUNT RATE CHOICE

The value used for the discount rate has a large effect on the calculated net present value. The effect of this on investment decision making is discussed in this section.

The *net present values* (present value of all cash flows less present value of cost of investment) for two investments are plotted as a function of discount rate in Figure 3. At low discount rates investment A is superior; at high discount rates investment B is superior. Investment B's ranking improves as the discount rate increases because investment B has higher early cash flows than does investment A. At low discount rates, the value of investment A's later year cash flows is still high. However, as the discount rate increases, the value of future year cash flows greatly decreases.

This example is meant to show the importance of selecting the correct discount rate. To do this you must know the cost of capital and the available returns on risk free investments.

The major advantage of the discounted cash flow return on investment method is that you don't have to assume a discount rate.

HIDDEN ASSUMPTION

There is one significant assumption made in the discounted cash flow methods that needs to be discussed. This assumption is that incoming cash flows from the investment can be reinvested at the discount rate. For the discounted cash flow return on investment method this means that you are assuming you can invest all profits at the discounted cash flow return on investment rate.

For the net present value method the assumption is that one can reinvest at the cost of capital. This should be fairly close to the truth, which means that in the long run the assumption in the net present value method is not as radical as the assumption in the discounted cash flow return on investment method.

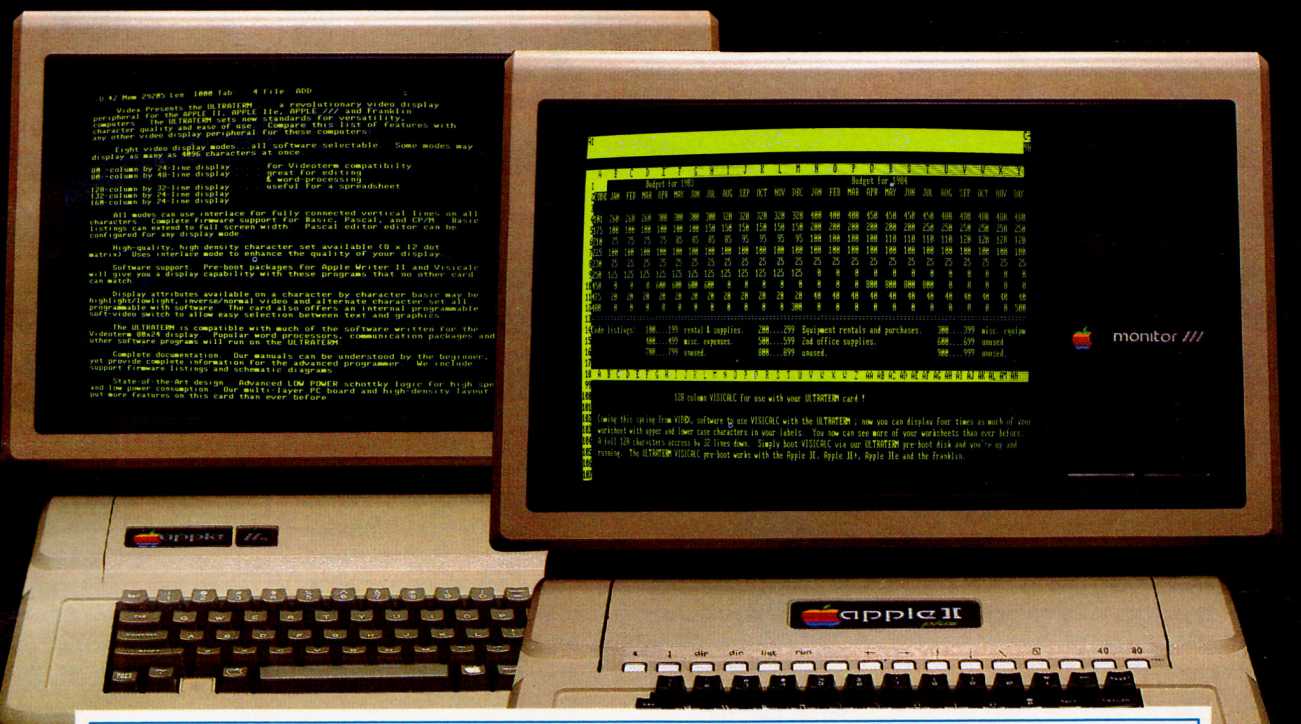
The main danger of using the discounted cash flow methods of investment analysis is that you can be so confident of the details of the calculations that you forget other important factors.

Leslie E. Sparks is involved in utility research and development. He has published numerous articles in technical journals and microcomputing magazines. He has a Ph.D. in engineering from the University of Washington.

Reprinted with permission from *Investment Analysis With Your Microcomputer* (book no. 1479), copyright 1983, published by TAB BOOKS, Inc., Blue Ridge Summit, PA 17214.

CIRCLE 761 ON READER SERVICE CARD

INTRODUCING ULTRATERM™



YOU'LL LOVE THE VIEW!

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

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

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



Photo of actual-size characters on Apple Monitor III.

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

Videx INC.™

897 NW Grant Ave. • Corvallis, Oregon 97330
(503) 758-0521

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

Apple and the Apple logo are registered trademarks of Apple Computer, Inc.

CP/M is a registered trademark of Digital Research, Inc.

CIRCLE 141 ON READER SERVICE CARD

apple discount software

CALSOFT

Personal—Entertainment—Business SOFTWARE



We have all the latest software—ASK US!

Low Discount Prices/Check Our Super Sale Prices
Fast Convenient Service/Same day shipping on most orders
Large Selection of Software/Call or Write for our FREE Catalog!



Call Toll Free: *(800) 423-5290* ***In California:*** *(213) 991-9641*

BEAGLE

	List Price	Our Price
DOS Boss	24.00	20.40
Utility City	29.50	25.05
Apple Mechanic	29.50	25.05
Pronto DOS	29.95	25.45
★ **Double Take**	34.95	26.20

BPI SYSTEMS

General Ledger	395.00	316.00
Accounts Receivable	395.00	316.00
Accounts Payable	395.00	316.00

BRODERBUND

The Arcade Machine	59.95	50.95
Choplifter	34.95	29.70
AE	34.95	29.70
★ **Bank Street Writer**	69.95	52.45
Gumball	29.95	25.45
★ **Lode Runner**	34.95	26.20
Spare Change	34.95	29.70
Questron	44.95	38.20

HOME ACCOUNTANT
~~74.95~~ 56.20

CONTINENTAL

★ **CPA Modules #1-4 (each)**	250.00	187.50
FCM	99.95	84.95

DECISION SUPPORT

The Accountant	129.00	109.65
★ **The Business Accountant**	255.00	191.25

EDU-WARE

Prisoner 2	32.95	28.00
★ **Algebra 1-4 (each)**	39.95	29.95
Algebra 5 & 6	49.95	42.45
Fractions/Decimals (each)	49.00	41.65
PSAT/SAT Word Skills (each)	49.00	41.65

HAYDEN

Orca/M	149.95	127.45
Pie Writer 2.2	149.95	127.45
Sargon II	29.95	25.45

INFOCOM

★ **Zork I, II, III (each)**	39.95	29.95
Deadline	49.95	42.45
Starcross	39.95	33.95
Suspended	49.95	42.45
★ **Witness**	49.95	37.45
Planetfall	49.95	42.45

MICROSOFT

★ **Multiplan**	275.00	206.25
Typing Tutor II	24.95	21.20
★ **Applesoft Compiler**	175.00	131.25

PENGUIN

	List Price	Our Price
Complete Graphics System	69.95	59.45
★ **Graphics Magician**	59.95	44.95
Transylvania	19.95	16.95
The Quest	19.95	16.95

SIERRA ON-LINE

Ulysses	34.95	29.70
★ **Dark Crystal**	39.95	29.95
Cross Fire	29.95	25.45
★ **Screen Writer Professional**	199.95	149.95
★ **Ultima II**	59.95	44.95
Frogger	34.95	29.70
The Artist	79.95	67.95
★ **General Manager**	229.00	171.75
Jawbreaker	29.95	25.45
Learning with Leeper	34.95	29.70
Dragon's Keep	29.95	25.45
Bop-a-Bet	27.95	23.75
Troll's Tale	29.95	25.45
Sammy Lightfoot	37.95	28.45
Mr. Cool	37.95	32.25
Apple Cider Spider	33.50	28.45

SIRIUS

Type Attack	39.95	33.95
Repton	39.95	33.95
Critical Mass	39.95	33.95

SIR-TECH

Wizardry	49.95	42.45
Knight of Diamonds	34.95	29.70
★ **Legacy of Llylgamyn**	39.95	29.95

SOFTWARE PUBLISHING

★ **PFS**	125.00	93.75
★ **PFS: Report**	125.00	93.75
★ **PFS: Graph**	125.00	93.75

SPINNAKER

★ **Snooper Troops #1, #2 (each)**	44.95	33.70
Story Machine	34.95	29.70
The Most Amazing Thing	39.95	33.95

DB MASTER
~~229.00~~ 171.75

STONEWARE

★ **DB Master 4.0**	350.00	262.50
DB Master Utility Pak #1	129.00	109.65
DB Master Utility Pak #2	129.00	109.65

SOUTHWESTERN

★ **Merlin**	64.95	48.70
★ **Ascii Express Professional**	129.95	97.45
Routine Machine	64.95	55.20
Munch-a-Bug	49.95	42.45
SDS Combo	119.95	101.95

STRATEGIC SIMULATIONS

		Our Price
Computer Quarterback	39.95	33.95
Napoleon's Campaigns	59.95	50.95
★ **Guadalcanal Campaign**	59.95	44.95
Cosmic Balance II	39.95	33.95
★ **Germany: 1985**	59.95	44.95
Galactic Adventures	59.95	50.95
Bomb Alley	59.95	50.95
Epidemic	34.95	29.70
Fighter Command	59.95	50.95
RDF: 1985	34.95	29.70
★ **North Atlantic '86**	59.95	44.95
Knights of the Desert	39.95	33.95
Geopolitique 1990	39.95	33.95
Ringside Seat	39.95	33.95
Broadsides	39.95	33.95

SCREENWRITER
~~129.95~~ 97.45

VISICORP

★ **Visicalc**	250.00	193.75
★ **Visitrend/Visiplot**	300.00	225.00
Visifile	250.00	199.95

MISCELLANEOUS

Accounting Plus G/L	395.00	316.00
Chess 7.0	69.95	59.45
Incredible Jack	179.00	143.20
Ken Uston's Blackjack	69.95	59.45
★ **Mastertype**	39.95	29.95
Maze Craze Const. Set	39.95	33.95
Microterminal	84.95	72.20
★ **Sensible Speller**	125.00	93.25
Super Text	99.00	84.15
Terrapin Logo	149.95	127.45
Visicalc 80 Col. Preboot	49.00	41.65
★ **Zaxxon**	39.95	29.95

HARDWARE

Amdek Color I Monitor	379.00	303.20
Enhancer II	149.00	126.45
EZ Port II	34.95	29.70
Gemini Star 10X Printer	499.00	399.20
Koalapad Touch Tablet	124.95	106.20
★ **Kraft Joystick**	64.95	48.70
LPS II (Light Pen)	349.00	279.20
Microbuffer II (16K)	199.00	159.20
Micromodem II	379.00	299.00
RAMCARD (16K)	99.95	84.95
SOFTCARD	345.00	276.00
Supermod	69.95	59.45
System Saver	89.95	76.45
★ **TG Joystick**	64.95	48.70
Ultraterm	379.00	303.20
Videoterm	279.00	223.20

CALSOFT
346 N. Kanan Rd. #103
Agoura, CA 91301

Call Toll Free: *(800) 423-5290* ***In California:*** *(213) 991-9641*

We accept Mastercard & Visa (include # and Expiration Date), check, COD $2.00 extra), or Money Order. California residents add 6% sales tax. Include $2.00 for shipping (UPS Blue Label $3.50, Canada $6.00, other foreign countries 10% of order - minimum $10.00).

★ **Sale prices are through December only! Prices subject to change without notice.**

CIRCLE 142 ON READER SERVICE CARD

A+ THAT'S ENTERTAINMENT

HARD HAT MACK

Hard Hat Mack
Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403
List Price: $35.00
Requires: 48K, IIe II+ II
one disk drive.

CIRCLE 796 ON READER SERVICE CARD

Hold on to your hard hats and make way for Mack, a bona fide blue-collar construction worker fueled by cupcakes and an unshakable belief in the work ethic. Mack works on a skyscraper, but loose rivets, swinging girders, vicious vandals, nosy OSHA inspectors, and an open furnace threaten to turn his project into a towering inferno. This man of steel leaps five stories in a single bound, tosses girders around like beer cans, scambles up and down hanging chains, and wrestles runaway riveters to the ground floor.

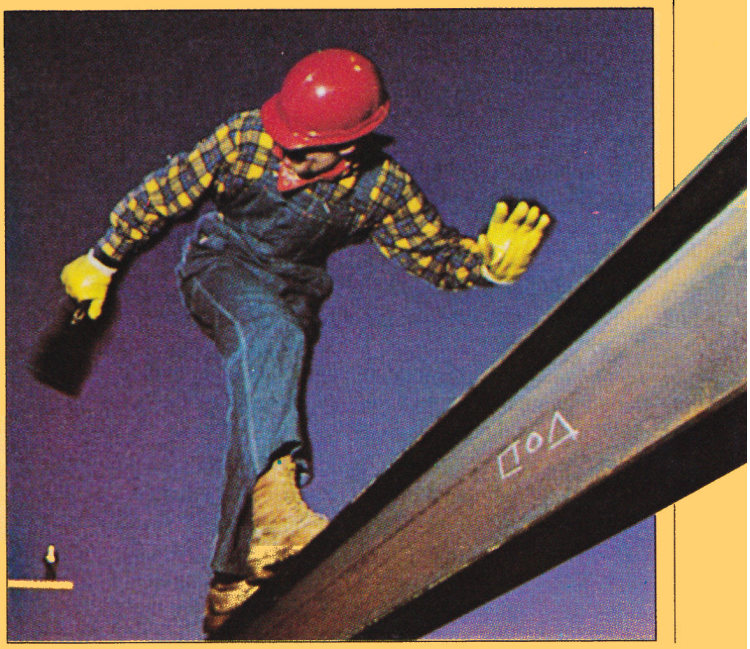
Hard Hat Mack, a frenetic arcade-style game, puts you in Mack's steel-toed shoes. You maneuver him across three sequential screens of feverish activity, each more challenging than the last. Each structure is graphically superb. Mack, the good guy, wears a white hard hat. Vandals look like inmates in a punk rock asylum and Office of Safety and Health Administration (OSHA) inspectors appear to place their thumbs in their ears and wiggle their hands to taunt him. Steam engines puff up and down, exposed wiring crackles with blue and orange electricity, and deadly flames flicker from a furnace. A catchy, driving beat accompanies Mack as he tiptoes between blobs of concrete and scurries out from under stamping machines.

If he fails to negotiate a fast-moving conveyor belt, he's promptly electrocuted by the exposed wiring.

Handles Vandals

In the first screen, Mack must install four sections of steel beams on four floors, grab the runaway riveter, and rivet the beams into place. He moves from floor to floor by dashing up and down chains, taking an elevator, or bouncing off a trampoline. Outwitting the OSHA inspector or the vandal is fairly easy, but loose rivets present a real danger as they bounce down through the structure. These random rivets are like guided missiles fixed on Mack's head. A direct hit from one of these steel beanballs and Mack enters a graceful death pirouette.

On the second screen, Mack must collect six tool boxes. He starts by darting between cement blobs and onto a conveyor belt, which brings him to a central girder that rises and descends three floors. Mack must be very careful jumping from girder to floor and back, for a mistimed leap can cause him to fall to an inglorious death in the cement mixer. The most diabolical obstacle of the game are the pliers of death. They open and close rapidly, obligating Mack to hop in and out only when the pincers are wide open. When the tool





boxes are collected, Mack leaves the screen by leaping onto a conveyor belt, which whisks him to a moving electromagnet that picks him up by his hard hat. If he miscalculates the speed of the magnet, the belt tosses him into a furnace, where he bursts into a fireball before plummeting to his doom.

On the third screen, Mack must collect six steel boxes from four floors and toss them into a rivet-making machine. He can again move from floor to floor by a central escalator, chains, or by bouncing off a pair of trampolines. Should Mack bungle a leap, he falls through the roof of a port-a-potty and lands with a splash. Vandals or OSHA inspectors keep Mack on his steel-clad toes, and if he fails to negotiate a fast-moving conveyor belt, he's promptly electrocuted by exposed wiring.

If he completes the third task, Mack returns to the first screen, where he faces more vandals and OSHA inspectors and faster-falling rivets.

Learn by Falling

Hard Hat Mack can be played with joysticks or from the keyboard. Keyboard controls are very responsive, and the game allows you to choose which key performs a given action. The game also allows you to start at a higher level screen, which is good for mastering the sinister pliers of death.

My complaint is the lack of instructions. Designers Michael Abbot and Matthew Alexander tell you how to move, but provide only sketchy details on overcoming obstacles. They apparently prefer to let you learn from experience. Many a less-than-dexterous Mack fell during the learning process.

Hard Hat Mack is a fast and exciting game that will keep you riveted to your seat. Its apparently simple tasks challenge your reflexes constantly. *Hard Hat Mack* towers over most arcade games and rates a full 100 stories.

FROGGER

Frogger
Sierra On-Line Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614
List Price: $34.95
Requires: 48K, Apple II, Apple II+, Apple IIe DOS 3.3, joysticks optional.

CIRCLE 795 ON READER SERVICE CARD

Ah, the trials and tribulations of being a peace-loving frog these days. It's safer back home in the swamp.

Consider this: Why would a frog cross the road? There are rampaging trucks and out-of-control cars zooming every which way, and not a CHiPs patrol in sight. Why, for that matter, would a frog want to cross the river? Oh, sure, there are some hospitable logs on which to hitch a ride and even a few friendly turtles willing to offer a floating platform. But watch out—there are snakes on the logs, the turtles sometimes decide to dive below the water, and there are carnivorous otters and hungry crocodiles.

What frog would go through all this to get to a lily pad on the other side?

Well, never mind the whys and wherefores. This is another dumb arcade game that defies explanation. It also happens to be a whole frog pond full of fun. *Frogger* is a first-rate translation of an arcade favorite, complete with music, sound effects, and clever graphics. It has survived its transition to the small screen of an Apple II.

Frog No Chicken

The point of the game is to maneuver your frog from the bottom of the screen to one of 5 lily pads at the top. In the first challenge you have to zig-zag across five lanes of traffic. The lanes alternate direction and move at varying speeds. Halfway across the screen is the bank of the river. Here you must shift gears and have your frog jump onto passing logs and turtles en route to the lily pads.

The game is not easy and should appeal to all age levels. Perhaps best of all, *Frogger* is not a shoot-em-up or a beat-em-down game. The frog zigs and zags to a nice little hopping sound; a mishap with a truck yields a splat noise, and a bounce into the river produces an audible splash. There is also a clock; you get extra points for completing a round quickly. The frog even has his own theme music to signal his first appearance on screen, the transition to a higher level of play, and his final passing. (I did, though, play the game enough to get tired of the music and I sorely missed a control to shut off the sound—a feature available on the IBM PC version of the same game. The absence of a silent mode also makes it difficult to make the boss think you're pounding away busily at a *VisiCalc* spreadsheet instead of negotiating the swamp.)

Perhaps best of all, Frogger is not a shoot-em-up or a beat-em-down game.

Keyboard or Joystick

The game can be played from the keyboard, with user-selectable keys for up,



down, left, and right, or from a joystick. I tested the *Frogger* with the Apple IIe joystick and found the response sluggish and unpredictable. From the keyboard, response was quick and sure. I used the up and down cursor keys on the IIe for those movements and the Z and X keys under my left hand for left and right movement. On Apple II machines without cursor keys, the user may choose whatever combinations are comfortable, perhaps even an adaptation of a diamond arrangement like *WordStar's* E-S-X-D combination.

The game can be stopped during play by using the Esc key, and play can be slowed by the shift and 1 combination. There is no choice of game levels or background colors—two options available on other machine versions of *Frogger*. The program is copy-protected and uses its own operating system. A registry of high scores on the disk is missing. You can retain only the top rating for the day, until the power is shut off.

These small problems notwithstanding, a hopping good time can be had by all. *Frogger* has a leg up on most games brought down from the arcades to the home computer.

CHAMPIONSHIP GOLF

Championship Golf
Hayden Software
600 Suffolk St.
Lowell, MA 01853
List Price: $24.95
Requires: 48K, Apple II with Applesoft, disk drive.

CIRCLE 799 ON READER SERVICE CARD

It is an experience that tries the mettle of even the strongest person. It probes deeply into the core of your consciousness and deeper still into the hidden passages of your subconscious, relentlessly seeking unsuspected weaknesses and character flaws that it can expose suddenly to a disapproving world. It can be a scourge, but it can also bring dreams of glory vividly to life. It can take you to the heights of ecstasy, where you will feel godlike, but it can also torture you as if you were a soul in the pit of Hades.

I am, of course, referring to golf.

Golf is a hard subject to write about unemotionally. It is a game you either hate or love and, though if you have the good sense to hate it from the very start, it is a game you can try once or twice and walk away from. For the rest of us, hating or loving the game is immaterial. Once you are hooked on the game you play it, whether it is a delight or a torment.

Hayden Software's *Championship Golf* manages with remarkable accuracy to capture those aspects of fun and frustration that characterize the game as it is actually played. Even more remarkable is that it is a simulation that is strictly strategic and requires no eye-hand skills.

Championship Golf begins with a screen prompt that offers to display the rules. If you use this option, ten screens that explain how the game is played follow. As in real golf, the object is to get your ball from the tee to the hole in as few strokes as possible. Sounds simple, doesn't it? It sounds even simpler when you consider that there is only one penalty situation in the entire game: one stroke is assessed when you hit your ball out of bounds.

In your computer golf bag you have twenty clubs, including woods numbering from 1 to 9, nine irons, a pitching wedge and a sand wedge. To select any of



these clubs you use a simple code. For example, if you want to use a 1 wood, you key in the code 1W. To make an approach shot with your 7 iron, you key in 7I. In the booklet that comes with the game disk there is a handy chart that calculates the average distance each club will send the ball when swung at full strength.

Once you have read the rules you are prompted to select the number of players—you can have as many as four in your party—and your handicap, which is really a skill level rating of from one to eighteen. You are now ready to stride up to the first tee.

Actually, the computer does the striding by bringing the first hole to you on the video screen in a high-resolution graphic showing the hole from the top and in profile. The in-bounds area is indicated by a green outline. When you shoot a ball that hits the line, you incur the extra stroke penalty. The tee is marked by two orange dots; your ball, which is not marked on screen as you tee off, lies between those dots. At the other end of the hole is a small green circle with a little dot in the center marking the cup; this, of course, is the green. Flanking the green will be one or more irregular orange blots, denoting the sand-trap. Once you know where you are, it's just a matter of figuring out how to get your electronic club out of your electronic golf bag, size up the shot and hit the ball.

To do this you look at the bottom of the screen, where a text window gives the number of the hole you are on, the length of the hole in yards, and the number of strokes you have used so far. You will also see the prompt, "Player 1, it is your turn. Player 1, what club will you use?" If you key in a "C" you will be taken to a command menu. Options on that menu allow you to flash the ball on the graphic display, display the club performance chart, display the scorecard, and end the game.

With the ball flashed and spotted, the next task is to decide how hard you want to hit it. Text window prompts offer you from 1 to 10 factors of strength. This choice will determine how far the ball will fly when it's been hit. Study the layout of the hole carefully. Sometimes it is wiser to use less strength to keep the ball in bounds.

Now that you know what club you are using, where the ball is, and how hard you want to hit it, you must decide which way to hit it. If you remember high school geometry, you'll recall that a circle is divided into 360 degrees. So is the display. The ball is at the center of the circle, north is at 360 degrees, east at 90 degrees,



south at 180 degrees, and west at 270 degrees. To answer the prompt "Which direction? (0-360)," you decide where you want the ball to land, calculate the direction from the location of the ball, and key in the value in degrees.

In play it can be surprisingly difficult to figure out in degrees the exact direction that the ball must travel to reach the pin. On the other hand, it is not at all difficult to land the ball out of bounds. If you do, the computer will courteously place the ball where it went out and assess you an extra stroke. When you are in the command mode you can opt for a current total of your strokes, broken down by individual holes, back and front nines and match totals. This can be a real advantage because for some golfers addition is the hardest part of the game. There is, by the way, no way you can cheat on your scorecard, a feature that may win only faint praise from real golfers.

Assuming you've managed to get within a short iron's distance from the green, say from 14 to 25 yards, you must select an iron to chip onto the green with. Picking, for example, a 9 iron or your pitching wedge (coded 10I on the selection chart), you have to decide how strong your swing must be. Recall that a pitching wedge is rated at an average of 110 yards at full strength and you may decide that a force of 5 points out of 10 will be sufficient. Fine. You set the direction and the ball arcs gracefully on the video display . . . right over the green and out of bounds. You have to remember that the distances quoted on the charts are averages and that the club may perform under or over rated levels.

A new screen displays the green as a green circle, the cup as a black square and the ball as a black dot. The computer has already selected the putter; you have to select the force level and direction. If you hit the ball too hard, too soft or slightly off course, you will see it lip the cup and roll away.

In *Championship Golf* Hayden has created a simulation which, though it calls for no athletic or eye-hand skills, has captured the feeling of the actual game. Every hole is laid out differently, for variety, and details like the sand-traps, the potential of chipping out or making a hole-in-one add to the sensation that you are really playing golf.

Perhaps the final test is whether or not you can be hooked on the simulation as you might be on the real game. The answer, I'm afraid, is yes. It was very hard to get away from the game long enough to write this profile. In fact, I think I'll drop what I'm doing right now and try to fit in a quick nine holes before lunch. Fore!

COSMIC BALANCE

The Cosmic Balance
Strategic Simulations Inc.
465 Fairchild Ave., Suite 108
Mountain View, CA 94043
List Price: $39.95
Requires: 48K, Apple II+, Apple II with Apple soft, disk drive.

CIRCLE 798 ON READER SERVICE CARD

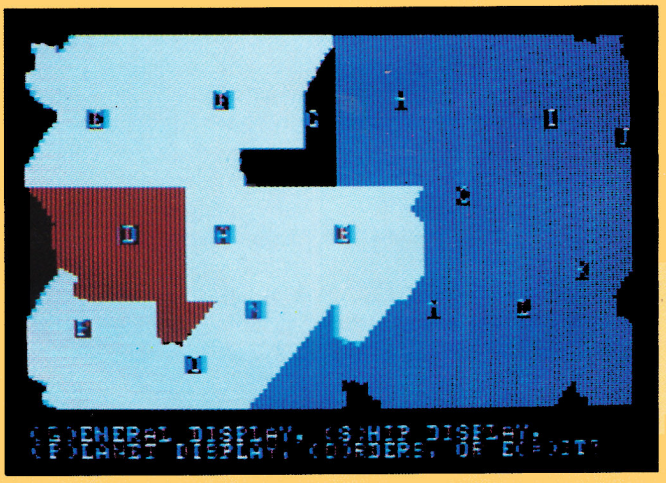
If humans ever take their wars into space, battles will be fought at mind-boggling speed. A commanding officer will have only a split second to make judgements that will decide the fate of his ship and of his crew. All that's in the future. Today's space battles are all fought in simulation—may it ever be so—and even a game designed for fast play like *The Cosmic Balance* moves along at a stately pace. Good thing, because this rapid fire game takes time to master.

Cosmic Balance is a wargame from Strategic Simulations Inc., set in the distant future. The scenario is a conflict between two star empires, the Alliance and the Brotherhood. Four ship-to-ship battles, a planet bombardment, and an invasion are simulated. In each of the scenarios, the computer can play the Brotherhood role.

The game begins with a menu that allows you to select a two player or solitaire mode and one of six scenarios. Once you've chosen the game you want and indicated the level of difficulty (from 1 to 4), you begin one of the most enjoyable aspects of the game, the ship's design, in which you tailor a warship to meet your specific needs. You start with the hull, picking from 5 sizes ranging from corvette to dreadnought. The larger the size you select, the more space you have inside the ship to install weaponry, star drive, marines, robot fighters, and so on.

Limitations and Compromise

Building a starship is a real exercise in compromise. Ideally, you would want a ship that is very fast and fully-armored, that can launch every conceivable type of weapon, and that has plenty of room for marines in case you feel like beaming a platoon over to the enemy's bridge in the middle of the battle. Unfortunately, you will never have enough space, no matter what size ship you decide to build, to pack in all the weapons and extras that you'd like. You must sacrifice speed for weapons, the number of weapons for cargo, and



so on. The best designs for each scenario will emerge after you've had practice designing ships and trying them out against the computer opposition.

Play begins with the orders phase, in which you set the course and speed of the ship.

The range of weaponry is wide. There are light and heavy seekers, guided bombs that home in on enemy ships; fighters, robot crafts that also home in, attacking over and over until they or the enemy are destroyed; three grades of phasers, energy beam weapons; photon torpedoes, plasma torpedoes and disruptors, which are long range weapons. Your main defensive weapons are belts, the small craft that orbit your ship to intercept seekers and fighters, and electronic countermeasure systems.

Ship design can be the longest part of the game because the tempation to tinker is irresistable. Eventually, when you have the perfect ship, you can save that design for recall in future games by using a scratch disk, which the *Cosmic Balance* program will initial for you.

Making Your Moves

With the ship design set, the next phase is the game itself. Play begins with the orders phase, in which you set the course and speed of the ship (it always begins with your ship facing the oncoming enemy at a speed of zero), activate electronic countermeasures and fire weapons. Using commands from a special menu, you can refer quickly to maps showing your position relative to the enemy's and calculate your future position based on your latest course changes. The move you plan is divided into 16 time points. You can begin a course change at any one of those points and fire your weapons at any time point. During the orders phase you can also transport marines or launch guided weapons. You may also use this phase of the game to repair damage to the protective screens by recharging them with energy.

When you've completed your move, the computer displays a graphic of the battle scene. You select the ship to attack and the attack's scale. Manuevers of the opposition ships and the firing are represented one time point at a time. If there is no firing during a specific time point, the following points will be displayed immediately, giving the graphic an animated look. If there is firing, the graphic will pause until your next keystroke, allowing you time to evaluate what has happened.

After each weapon is fired a message will appear on the screen announcing results, including destruction of enemy targets. Victory points are displayed at the end of the game. If one side has been wiped out, the winner is obvious, but victory points are handy when the game ends with both sides still operating but damaged. Points are calculated on the basis of damage inflicted and, if the battle was in an unfriendly sector, the ability of the invading ship to escape.

SSI promotes *Cosmic Balance* and the other games in the Rapid Fire series as action-oriented, fast-playing games. The company claims that a complete game of *Cosmic Balance* can be played in just ten minutes. I was able to play just that fast a game, but only by using saved ship designs from a scratch disk, playing a computer opponent, and bringing several hours of prior experience with *Cosmic Balance*.

The key is experience. Luckily, *Cosmic Balance* is an engrossing game that will permit you to acquire so much experience that you soon will be dashing off fast, action-packed games with skill and daring of a steel-nerved starship captain.

HOW TO WIN THE DECATHLON

Microsoft
Bellevue, WA 98004
(206) 828-8080
Price: $29.95
Requires: Apple II or IIe. Uses 48K or 64K respectively. Color monitor optional.

CIRCLE 760 ON READER SERVICE CARD

As the world sports community gears up for next year's Olympics in Los Angeles, armchair athletes may find their niches in *Decathlon*, a game based on the rigorous, 10-event track and field competition originated by the ancient Greeks.

The popular game has been on the market since 1980 and is an ingenious suite of 10 computer games patterned after the original decathlon. As we will see in next year's Olympics, the decathlon competition is among the most illustrious events and, like the original, the modern event takes two full days to complete. The computerized simulation condenses the decathlon into a game which can be played within one or two hours.

The publisher of *Decathlon*, Microsoft Corporation of Bellevue, Washington, has adopted all the events of the decathlon for its simulated version—everything from the 100-Meter Dash to the 1,500-Meter Run. The other competitions are the Long Jump, the Shot-Put, the High Jump, the 400-Meter Dash, the 110-Meter Hurdle, the Discus Throw, the Pole Vault, and the Javelin.

As in the real-world situation, *Decathlon* must be played against actual opponents, and, as in the Olympics, brute strength and physical skill will not, by themselves, produce a winning score. In addition to agility, the player must have a series of strategies and be especially keen in eye-hand coordination.

Although the demands of the game are high, it is designed for the entire family. To accommodate different abilities, the opening menu offers the beginner means of practicing without an opponent. And, to fit into the family budget, it retails for $29.95. The game requires strong keyboard skills and quick thinking as well as paddle and joystick dexterity. To win, the player must push buttons, twirl knobs and press keyboard selections appropriate to the 10 different events.

Physical Education and Otherwise

In keeping with ethical game design, *Decathlon* draws on many skills. By exercising eye-hand coordination, the game provides a comprehensive computer



orientation, a valuable by-product for educators.

When trying *Decathlon* in a schoolroom full of 12-year-olds, I noticed that children normally reluctant to use a computer were eager to participate.

I also have noticed that *Decathlon* promotes increased participation from students who have had computer arcade and joystick experience, but no actual keyboard skills. Instead of the usual zapping of bugs and shooting down of Martians, the children using the keyboard for the first time were, for the first time, playing a game applicable to their world.

The game is a two-dimensional simulation of real track and field skills, and it does approximate the human dimension within the restrictive confines of the programming art for the 6502 chip, the BASIC language, and the Apple.

The designer actually consulted texts and reference books on education, sports, medicine, and related issues while writing the game.

Decathlon seems best played on a high-resolution color monitor. And, although it can be used on many systems, my family plays it on an Apple II$^+$ which has a color monitor.

Knowing the Field

The high quality of the color graphics is one of the many pluses of the simulated game. They first show up after booting the system. Then the manufacturer's logo and product banner appear on the screen and later the traditional five-ring Olympic insignia shows up. The graphics are accompanied by a synthesized music sequence of the Olympic theme song. You'll get used to the tune soon enough. Because it plays each time you boot the system and it can't be shut off, the jingle can be annoying to listen to.

After the music stops, you and your opponents can then select from the log menu whether you want to play or practice. If you decide to play a game, you then select the number of players and type their names.

Ideally, the game is set up for two players but the software is written to handle statistics and scores for as many as six. If there are more than two players, be warned that the game becomes increasingly lengthy and complex. The program accepts only two players at a time and eliminates competitors for each event as the session progresses. Additionally, because of the pace of the game, playing with three or more people sometimes can create an aggravating situation.

Next, the game's name must be selected. The name will be the one used by the system to keep scores and to move players around. It cannot be changed after the competition begins. Selection of the name is up to the players, of course. Examples used in recent games are: David and Goliath, The Vatican and Bulgaria, Apple and IBM and, for a three-way match, Ireland, Canada, and Holland.

After the players are logged on, the program tells them what they need to perform each sequence.

And They're Off!

On the 100-Meter Dash, the first event, an oval track appears and each player takes a position as designated by the screen. The word READY then flashes on the screen and, after a momentary pause, the image of a firing gun indicates the game has begun. The computer's speaker emits a slight burping noise as the gun sounds a bang.

To move the athletes along the computer track, the player must press the designated cursor keys in rapid, rhythmic up-and-down motions. After an event ends, scores and standings are compiled and the game automatically moves on to the Long Jump, the next event.

From the Inside

Rather than review each event as it occurs, it may be more helpful to look at the game as programmers see it.

In both the game and the real Olympic event, the 10 parts can be broken down into three groups. They are running, jumping, and throwing events.

Because of this breakdown, the programmers needed to design three subprograms rather than 10. Using the three fundamental environments, they fit each of the events into the broader Olympic categories of throwing, running and jumping.

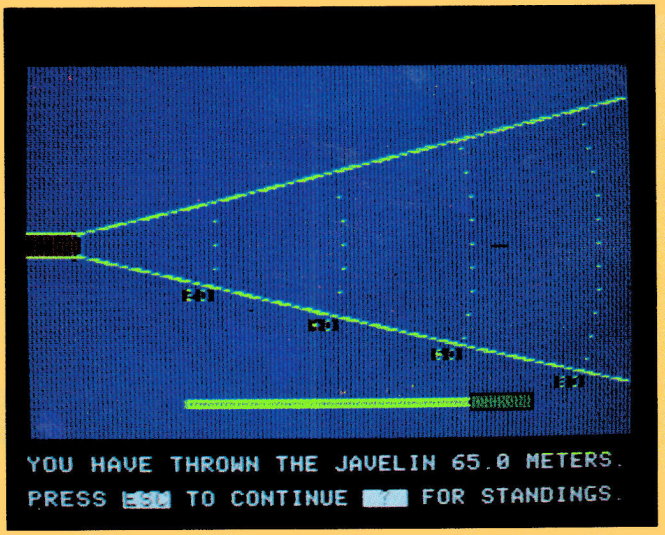
The three basic environments in place, the programmers simply wrote overlays to modify each event in keeping with its appropriate length, geometry, and velocity.

The running events use a track and preset parameters, but the throwing and jumping are set up from individual factors determined by the competitors. When a player sets an option, such as run-up speed in the Long Jump, the program executes accordingly. The player is actually programming the system indirectly.

Running Blues

The running events have the fewest options and demand very little strategy. With the exception of the 110-meter High Hurdle, which requires 2 paddles and 2 buttons, the running games can be tedious. And yet, like running, the simulated sequences demand the most physical exertion.

Generally, smooth, alternating keystrokes at the designated cursor keys usu-



ally win the race. This is fun in the 100-Meter Dash and acceptable in the 400-Meter Run. But because the 1,500-Meter Run is at the end of a 10-event sequence, it soon becomes a finger-stubbing marathon. This can drain the enjoyment from the game.

Unlike running, which taxes the legs and lungs the most, *Decathlon* can cause fingers and the keyboard to poop out after four full laps at the cursor controls.

Of the 4 running events and the 3 exclusive jumping competitions, only the 100-Meter Hurdle combines both activities. In the game simulation, the 110-Meter High Hurdle is played with 2 paddle accessories. Either the joystick or rheostat part of the paddle is used. Only the buttons, which control one of the runner's legs, are pressed. To propel the simulated Olympic athlete along the course, as depicted on the screen, the player must press the buttons smoothly and in proper running sequence. Simultaneously, he must hit both buttons as the screen athlete encounters each hurdle. Pressing both buttons causes the simulated runner to leap from stride and fly over the hurdles. By using the back-and-forth pumping motion, the runner will resume stride. If the player hits both buttons too soon, the runner leaps too quickly, often landing on top of a hurdle. If the player triggers the leap too late, the runner can hit a hurdle and knock it down. Three hurdles down means disqualification from that event with a null score.

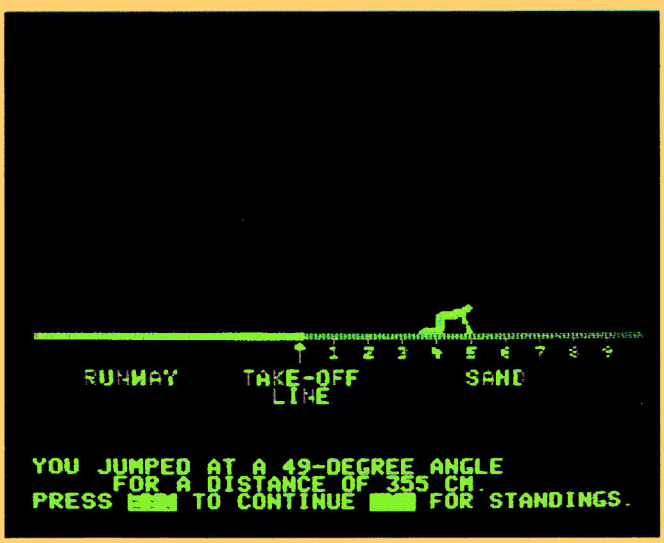
Sky's the Limit

The Long Jump, High Jump, and Pole Vault are the three jumping events. To set a jumping event in *Decathlon,* the player must estimate his run-up velocity and set the jumping point and angle, accordingly. Many prompts on the screen aid this.

When setting the velocity, the computer runner pauses. Then, when the player hits the key, the athlete's image enters the field of view. To then create a jump, the player must plant the athlete's foot by manipulating one key and send the Olympian into the air using another key.

To achieve this simulation, the game designers have included a fast-moving protractor module as a subroutine. In each jumping event, the player must judge angle and velocity. In so doing, he gets a lesson in practical physics.

The best tip here is always to use maximum run-up speeds and be sure to know where to set the jumper's foot or the pole.





Also, be sure to pause between the set foot signal and the protractor thrust. The length of the pause will allow the protractor to unwind a few more degrees. Too long a pause will cause the jumper to crash into the bar. One too short will send the jumper flying straight up in the air without clearing the bar, only to fall flat on the hard, cold runway.

In all events, each player gets three chances. But in the jumping events, the top player can set the bar at any height to challenge the others.

Three Throws

The three throwing events also call on the protractor but require the special degrees of adjustment found only on paddles.

In the Shot-Put, two screens are used. The set-up screen shows a close-up of a male figure preparing for the event. The program commands the player to set the two paddles to zero and explains that the event will start after one or both of the knobs are rotated.

The player must then estimate an x–y axis, which simulates the upper forearm action of the graphically reproduced athlete on the screen. The trick here is to start the upper arm in motion slowly, then move to the forearm. This will cause the angle to set and the arm to unwind. The player must then return to the upper arm motion for a final thrust.

Once the final thrust is made, the screen switches to a wider view, and the player sees the actual path of the shot-put relative to the pit.

Many funny things can go wrong here. The most frequent blunder is to drop the shot-put either behind the athlete or directly on his toe. More embarrassingly is to throw the shot straight up, only to watch it fall on the athlete's head.

The Javelin requires the player to set a foot and use the protractor to judge distance, while controlling the spear and setting the angle before the throw.

The Discus event is based on the same simulation principle, but the field of view is longer, and the player is required to turn the athlete's body on the screen.

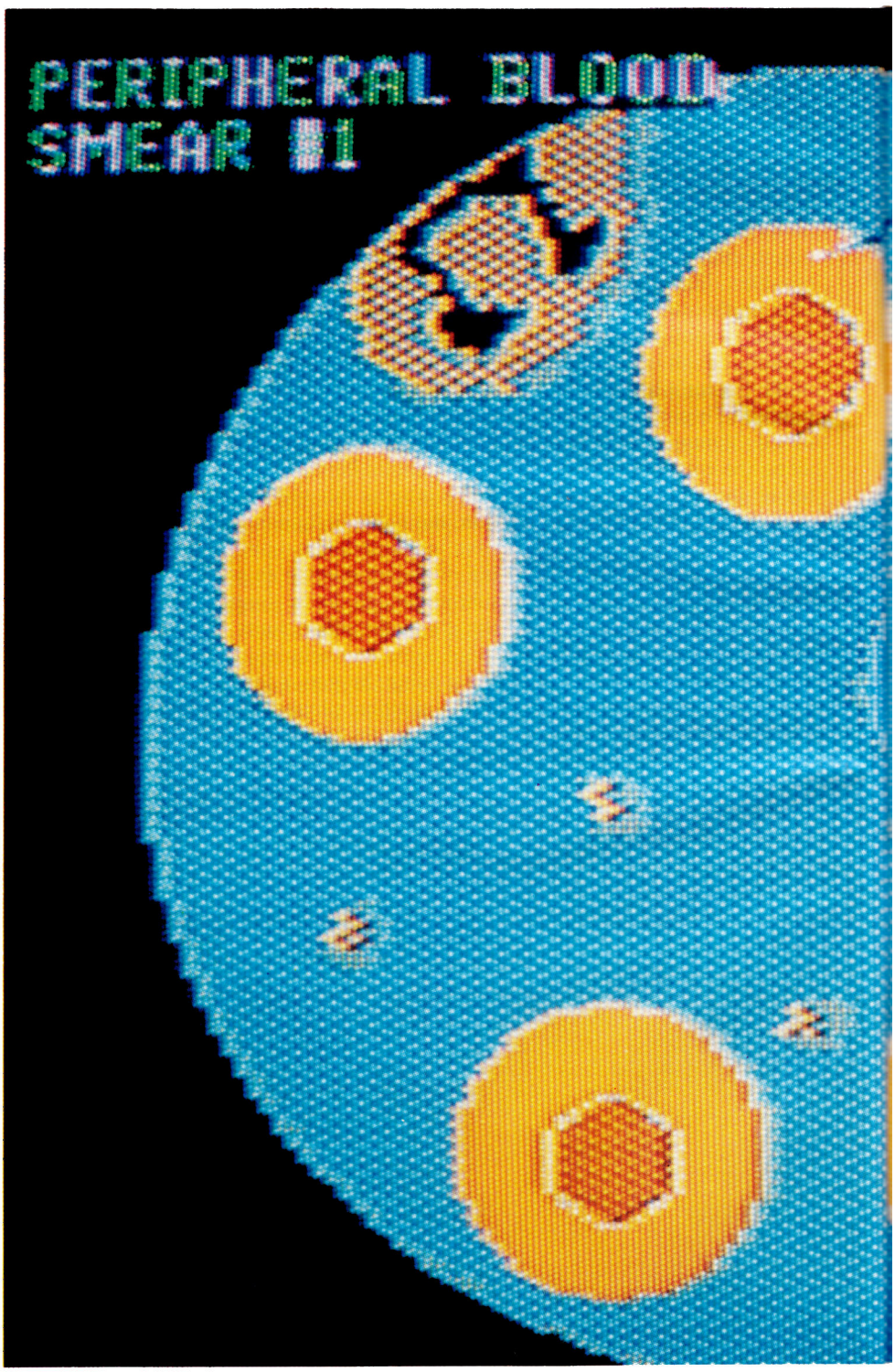
At the Scoreboard

Remember that the computer game tries to stay within the scoring parameters of the true Olympic event. Like the sport, the player can win the decathlon without being the high scorer in any of the individual competitions.

Aside from the game's few flaws, *Decathlon* is well designed, educational, and fun to play. ✚

AN APPL

An Apple computer analyzes blood, measures medicine, helps teach medical students and more



The Apple II had just hit the market when Dr. Ronald Bash caught his first glimpse of it. The pale plastic typewriter-like gadget fascinated most people, but Bash had trouble taking it seriously.

"I thought it was just a game with a keyboard, and a very unprofessional keyboard, at that. They had *Little Brick Out* running and the graphics capability was nice, but it's all bells and whistles, I thought; lots of icing on the cake and really not much substance," he said with a smile during a recent interview.

Bash entered the home computer scene with serious intentions, but was not adverse to a bit of recreation on the tube. Still, spending several hundred dollars on a glorified pong game made little sense to him.

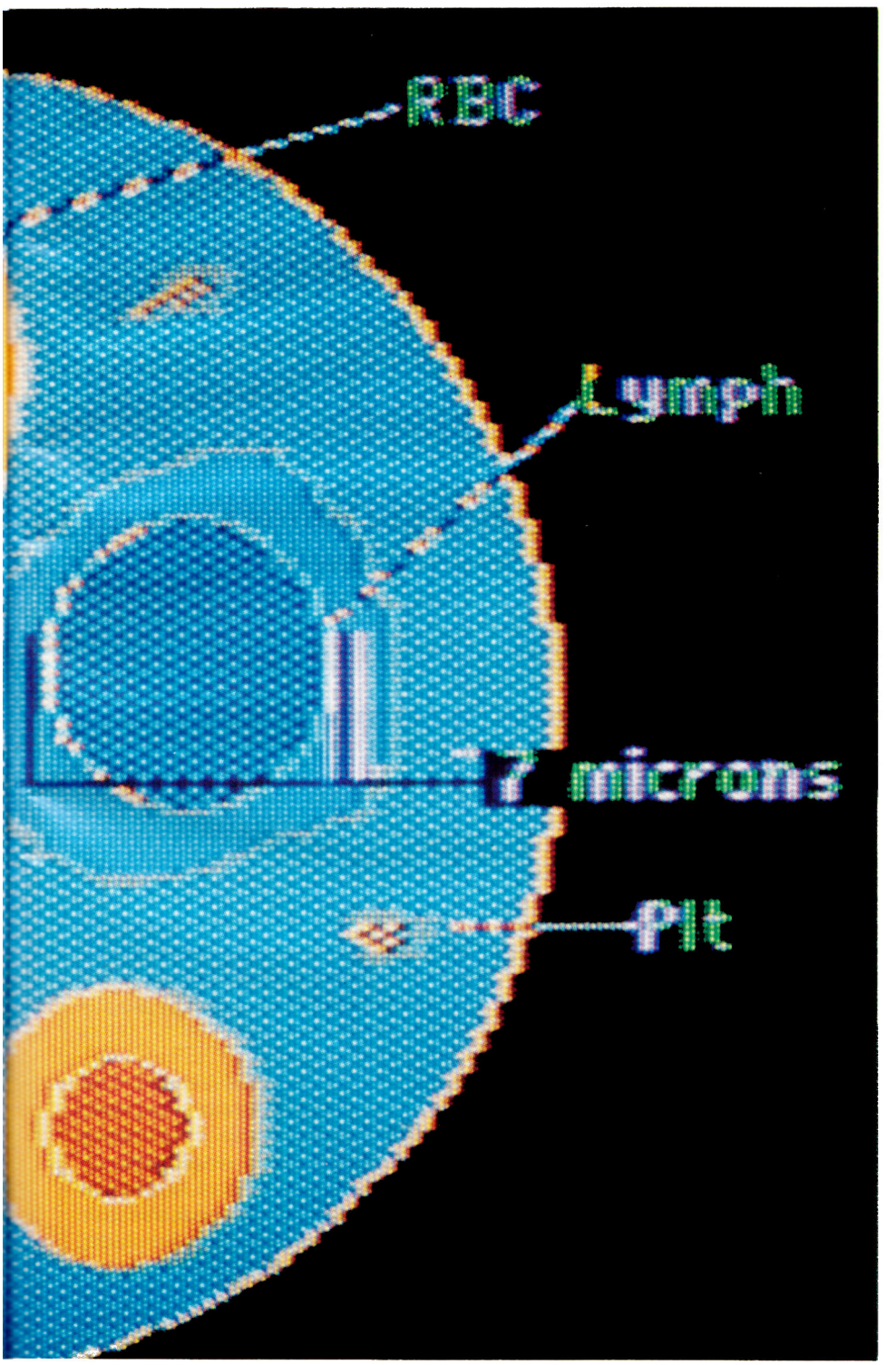
SOL Brother

The New York-born doctor's love affair with computers began some 9 years ago when his interest was sparked by a couple of pioneering computer publications. He took the plunge and bought a 32K SOL 20 that boasted an 8080 processor and was "solidly built, clearly something one could do very serious things with, if one wanted to, and so I bought it for doing very serious things." Today, the SOL 20 is an extinct species, but Bash, who collects fossils and has a passion for dinosaurs, keeps it around and affords it as much reverence as he would a favorite protoceratops.

"It's still a nice machine. I used the SOL for a long time, and this is absolute heresy, but I used it primarily as one would a bicycle with training wheels," he said as he nodded affectionately toward the machine.

In the mid-1970s there was virtually

E A DAY...



no software for microcomputers on the market, but early home computer owners soon found themselves probing the mysteries of programming. It was not long before Bash learned BASIC well enough to communicate with his SOL.

"The programs I use don't require any gigantic speed so I continue to write in BASIC. I have a fleeting acquaintance with Fortran, and an absolutely peripheral acquaintance with Pascal, which I just can't seem to get into, but BASIC remains my primary language," he said.

Bash practices internal medicine at Albert Einstein College of Medicine. Hematology and oncology are his subspecialties, so his first program was not *Wumpus* or *Tic-Tac-Toe*, but a more practical effort that diagnoses the symptoms of patients with anemia. It worked well on the SOL, but, ironically, it was on the "game with a keyboard" that it later became even better.

Bash likes to recall his near-accidental switch from the SOL to the Apple.

"Feeding one's computer new features is a never-ending task, and when I happened to be passing a computer store in Manhattan, I walked in with the intention of buying something for my SOL. That was when I saw the Apple and made a quick decision to buy it. I still thought of it as a toy, and I purchased it as such," he said.

After playing around with his Apple II for about a week, Bash decided to put it to a test and see if it was capable of real computing. There was no Applesoft BASIC yet, so he experimented with Integer and was so pleased with the result that his SOL soon started to gather dust. Not long after he transformed his Apple II into an Apple II$^+$ by replacing the Integer ROMs on the motherboard with Applesoft ROMs. Then Bash created an enhanced Applesoft version of his anemia diagnostics program, (see Figure

Figure 1: Digitized image of a blood smear taken through a microscope.

For recreation Bash also occasionally creates images of dinosaurs on his Apple.

2). Introduction of an Apple disk system made more improvements possible, and the process of upgrading continues.

"It is still a very simple diagnostic program, and its purpose is not so much to diagnose as it is to help the user develop a logical approach to diagnosis," he pointed out.

Medical Diagnostics

Since then, Bash, who recently traded in his Apple II+ for a IIe because, he says, it has a serious keyboard, has written more complicated programs to help in his work as a practitioner and teacher of medicine.

"I've written programs to use as teaching tools, but I am particularly interested in creating programs that allow me to do things that help my patients, tasks that I would not have done myself, only because it would have been very difficult. There is one particular program for patients with a particular type of malignancy called myeloma that I use occasionally. It allows me to quantitate the size of a tumor by inputing certain data from their blood tests, (see Figure 3). I could have done it another way, with a lot of time, patience, and a big calculator with all kinds of functions on it, but it would have taken very long, we would not have had hard copy, and we would not have been able to graph out a trend to see if my therapy is working. With the Apple, it's a question of just putting in the data—to a certain extent, it is really a simple-minded program that floats data into some regression equations, but it allows me to use another measurement to gauge my patient's response to chemotherapy."

While there are thousands of commercial programs that will run on an Apple, most medical programs are still written for larger computers. Bash is appalled by the high prices that such fundamental programs as Harvard's MEDUS/A command.

"*SuperCalc* or *Visicalc* they ain't," he says. "In terms of the expertise required to write them, these are incredibly trivial programs. One such program that I know of is designed for people in medical research. It stores and prints out data in a coherent form, and does very simple-minded statistical manipulations. The amazing thing about this is not the program itself, but the price they ask for it—thousands and thousands of dollars."



Figure 2

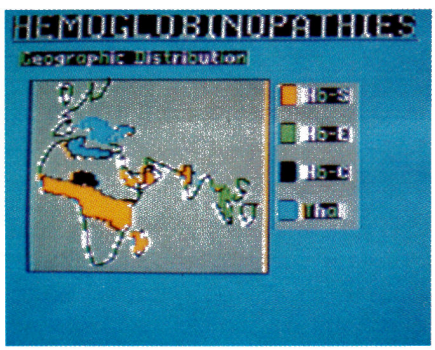


Figure 3

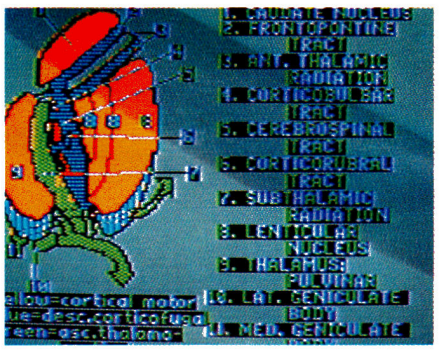


Figure 4

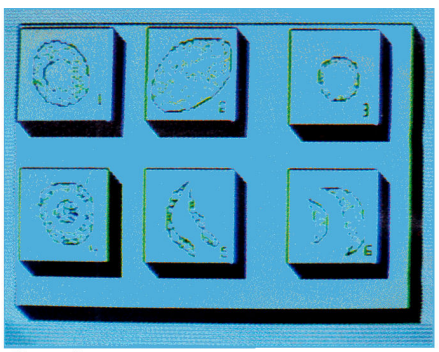


Figure 5

Figure 2: An anemia diagnostic program written by Dr. Bash.

Figure 3: Myeloma program written by Dr. Bash. The program quantitates the size of a patient's tumor.

Figure 4: An illustration taken from a medical textbook by use of a Dithertizer.

Figure 5: Conceptual drawings of formed elements in the blood drawn with a Gibson LPS II light pen and a Koala Pad.

Figure 6: Examples of dinosaur images produced on Bash's Apple.

Even more amazing, of course, is that such demands are met, and if it proves anything it is that some people still have a lot to learn when it comes to computers. Bash told how he was contacted recently by a clinical researcher of the Clinical Research Center at Albert Einstein.

"He had already budgeted $250,000 and wanted advice on what would be reasonable to buy, so I said 'Listen, why don't you just go out and buy an Apple II or an Apple III, or an IBM PC, and tell me what you want—I'll write the software.' People have no conception of these things at all. They really get suckered into buying these extraordinary machines for relatively simple tasks.

"Though it's considered heretical to admit, there is some cookbook medicine in oncology, to the extent that if a patient comes in with a malignancy, you have a bunch of recipes you can choose from. With the Apple, I have been able to call up a menu and decide on the recipe I

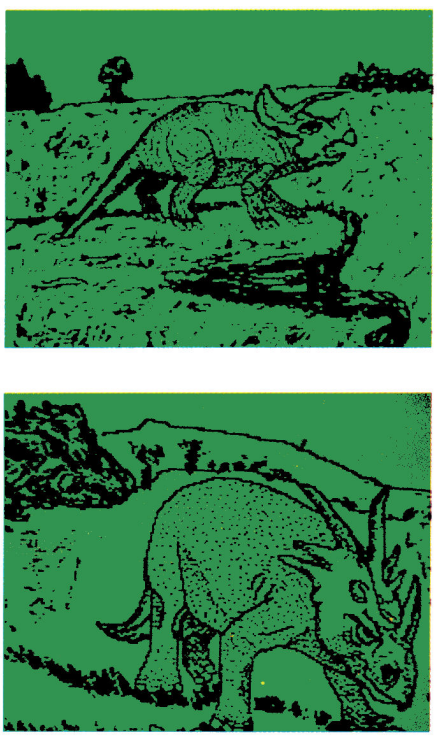


Figure 6

want to apply to the patient. After I input my data, the Apple calculates the dosages of medication required by the patient, the frequency with which that medication is to be given, and what modifications in dosage are necessary when the inevitable toxic reactions to chemotherapy occur. That is not a gigantically sophisticated or helpful thing in the vast scheme of things, but I think it may be useful for training students so that they can compare their clinical judgement with what is reasonable and accepted as correct—as much as anything is ever correct, as much as there is ever one answer to any medical question. Thus, it may ultimately be a learning tool, but the other nice thing about a program like that is that it allows you to generate and print out a complete therapeutic plan for a patient.''

Medical Education

It is not surprising to find that Bash has a special interest in the Apple as an educational tool. He spends some of his time teaching at Albert Einstein and at the New York State University at Stonybrook.

''I am working on an educational program that prompts you but, as yet, doesn't test you. I've actually been working on it on and off for several years and, again, the program is very trivial, but something like this is useful as a teaching tool, though I am not suggesting that we replace medical educators. This is where the Apple's graphics capability becomes particularly useful. Right now this is a bare bones program, but when it becomes more elaborate, it will elicit data, ask questions and make inferences based on the student's answers. Then it will tell why it made that inference, what it means, and how it relates to the medical problem that is being worked through. Ultimately, when I have the time, I am going to integrate this kind of thing with graphics. Hematology, the study of blood, is a visually-oriented science. Essentially, it's a lot of microscope work, and at one point I thought about simply attaching something to a microscope, focusing on a patient's blood, and digitizing the image (see Figure 1). I tried it, but the images weren't very good, because the Apple's resolution just isn't good enough to give you an accurate idea of what the microscope sees.''

For his experiment Bash used the Dithertizer II (it cannot be employed with the IIe, ''but they're working on it''), a peripheral he otherwise praises. He said the peripheral is great for snapping very elaborate illustrations from medical textbooks because the image can be stored or modified, (see Figure 4).

Living Color

Bash gets most excited about two new graphics tools that will yield color illustrations, the Gibson LPS II light pen and the Koala Pad, (see Figure 5). ''The Apple is well-suited for creating educational materials requiring illustrations. I'm pleased and taken by these two devices because they really work and with a little bit of patience you can create very acceptable conceptual drawings of what formed elements in the blood are supposed to look like. Until recently it was very difficult for someone like me to do this sort of thing. A small guy not working for an outfit with a zillion Apples and all kinds of expensive peripherals had a hard time creating graphics acceptable for education but that is no longer true. Now I can sit down and grind out quality graphics.''

Good pictures, even on a computer, require artistic talent, and Bash has his share of that. He is an amateur potter who has a wheel and kiln in a workshop at home. He refers to ceramics as his abiding passion. For recreation Bash also occasionally creates images of dinosaurs on his Apple, (see Figure 6). But mostly the new graphics devices will be used to create visual aids.

Package Polishing

Has he thought of marketing any of his programs?

''Yes, that is something I would consider seriously, but they are not as polished as I would wish them to be before inflicting them on the world,'' he said.

He can recall hearing about but not seeing an oncology package written for the TRS-80 Model III.

''Other than that, there is, to my knowledge, no microcomputer program commercially available that would help people in an oncology or hematology practice. I suppose there must be other doctors out there writing programs. I know that there are probably hundreds of doctors with Apples, and I often recommend them to my colleagues. One recently responded 'No, what do I need a computer for?' He just bought one a month-and-a-half ago and now he is also totally hooked. It's difficult not to become hard-core about your computer—there are people who can, but I've never met one.'' ✚

Instant one-button color printing.



Press here.

It's just that easy! Any time you want to print what's on your Apple's screen just hit the copy button on your Transtar 315 color printer with our PICS card installed, and it's done! No special programming, no lengthy code sequences, no need to exit your program! Just press the button and it prints!

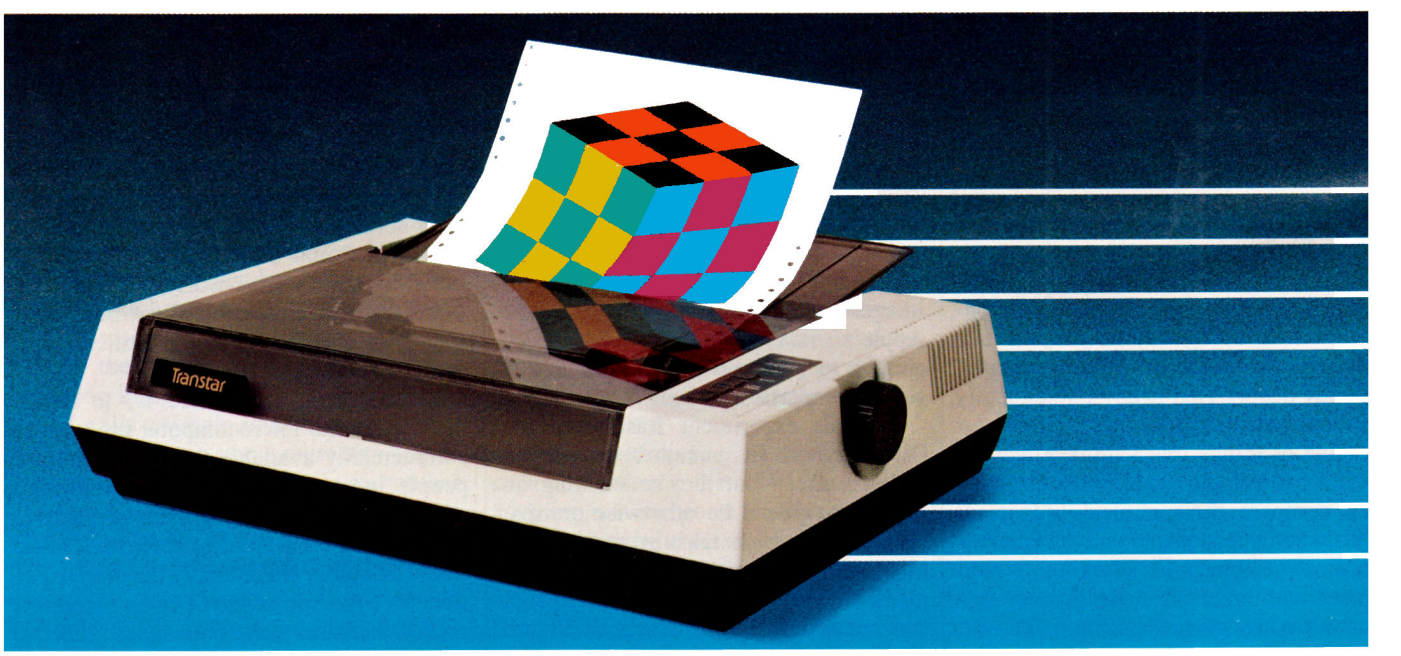
By adding the optional PICS card to your $599 Transtar 315 color printer, you've opened up a whole new world of easy color printing. For the first time ever, our PICS parallel interface card enables you to screendump virtually any program -- graphics, charts, games -- even copy-protected software! Specially designed only for the Apple II, II+, IIe, and Franklin computers, the Transtar 315 PICS card does the work of a parallel card and a lot more and costs only $119.95.

At the push of a button, Transtar's innovative new 4-color diagonal ribbon will print up to 7 colors and more than 30 shades in a single pass.

The 315 is precision-built to exacting standards by Seikosha, the most experienced company of the famous Seiko group--recognized worldwide for quality and dependability. In fact, one of the nicest things about Transtar's 6-month warranty on parts and labor is that you'll probably never use it!

Innovative, inexpensive, dependable, easy: the Transtar 315. Color printing has never looked so good!

Only $599.



*PICS cards are currently available for Apples and Franklins. PICS cards for other computers will be available in the future.

Transtar
A **Vivitar.** Computer Product

P.O. Box C-96975, Bellevue, WA 98009

CIRCLE 143 ON READER SERVICE CARD

MIXING WORDS AND NUMBERS

The Apple III Sophisticated Operating System (SOS) allows you to load VisiCalc files into Apple Writer reports—and more.

You bought your Apple III to save time and effort, but are you taking full advantage of its capabilities? If you are entering information into three different programs to have it output in three different forms, you are wasting the resources the computer is designed to help save.

Many Apple III programs are equipped to work together to prevent needless repetition. This article will show you how to bring financial data from *VisiCalc* into a report created with *Apple Writer*, and how to use *Quick File* information along with an *Apple Writer* form letter to produce completely personalized direct-mail letters. Pay attention to the phrase "completely personalized": it means that the body of the letter can make reference to the person's name, company, title, department, favorite ice cream and whatever else you want to highlight. It's up to you.

This time-saving wizardry is brought to you courtesy of the Apple III Sophisticated Operating System (SOS). SOS can convert a data file from one program into a format compatible with another. In our examples, SOS converts the *VisiCalc* and *Quick File* files into standard *Apple Writer* text files.

To do these experiments, you'll need six different diskettes. (Assuming that you're already comfortable with the operation of these three individual programs, here are the diskettes.

- *Apple Writer III* Program Diskette
- *VisiCalc III* Program Diskette
- *VisiCalc Sampler* (included with *VisiCalc III)*
- *Quick File III* Boot and Program Diskettes
- *Quick File III* Sample Files Diskette (included with Quick File III)
- A blank SOS-formatted diskette.

To keep the instructions simpler, assume that you have an external disk drive with your Apple III system. If you don't you'll have to pay close attention as to which disk is in the drive.

VisiCalc into Apple Writer

This demonstration shows how to move a very short *VisiCalc* file into a brief *Apple Writer* letter. The letter could just as easily be a complex report; and the *VisiCalc* file could be much longer.

- Boot the *VisiCalc* Program Diskette on your Apple III's built-in disk drive.
- Insert the *VisiCalc* Sampler into Drive 2.
- If the *VisiCalc* screen has any data on it, clear it.
- Load the file "Sample.Budget" from the Sampler Diskette.
- When the file is loaded, clean up some unnecessary information on the sample by erasing the following cells: A4, B4, K5, E6, F6, G6, B10, and C10.
- Move the cursor to cells F6 and G6 and enter the date JULY 1, 1981.
- Enter some reasonable numbers into cells E14-J14, E15-J15, and E16-J16. You don't need to fill in every one. The totals will automatically recalculate as you progress.
- Remove the Sampler Diskette, and insert the blank formatted diskette.
- Place the cursor in cell A1. This will be the upper left corner of your printout.
- Give *VisiCalc* the "Print" command. In response to the prompt "Printer, File", type "F". When prompted for a file name, type ".D2/VCTEST". This is a totally arbitrary name which will be used for consistency's sake throughout this demonstration.
- Set cell K20 as the lower right hand corner of the printout.
- Since you commanded ".D2" as the print destination, the *VisiCalc* file will now be printed to the blank diskette.
- Leave *VisiCalc*, and boot *Apple Writer*, using the built-in drive. Leave the work diskette in Drive 2.
- Write a short letter or report segment that might logically include the *VisiCalc* file you have just transferred.
- Move the *Apple Writer* cursor to the location within the report/letter where you want the *VisiCalc* information to appear. Then, simply give *Apple Writer* the "Load" command, and load the file ".D2/VCTEST". The *VisiCalc* test file will be inserted into your letter or report.
- Congratulations! You now have a completed *VisiCalc/Apple Writer* document! You may save it on your work disk if you wish. Remember to assign it a new file name. If you want to print it out, be sure to set the page width to 80 columns so that the *VisiCalc* portion will print properly without wrapping around.

▶ The Maillist program requires that both your form letter and your information file be on the same diskette.

A note on large *VisiCalc* files: It's the width of a *VisiCalc* file that's apt

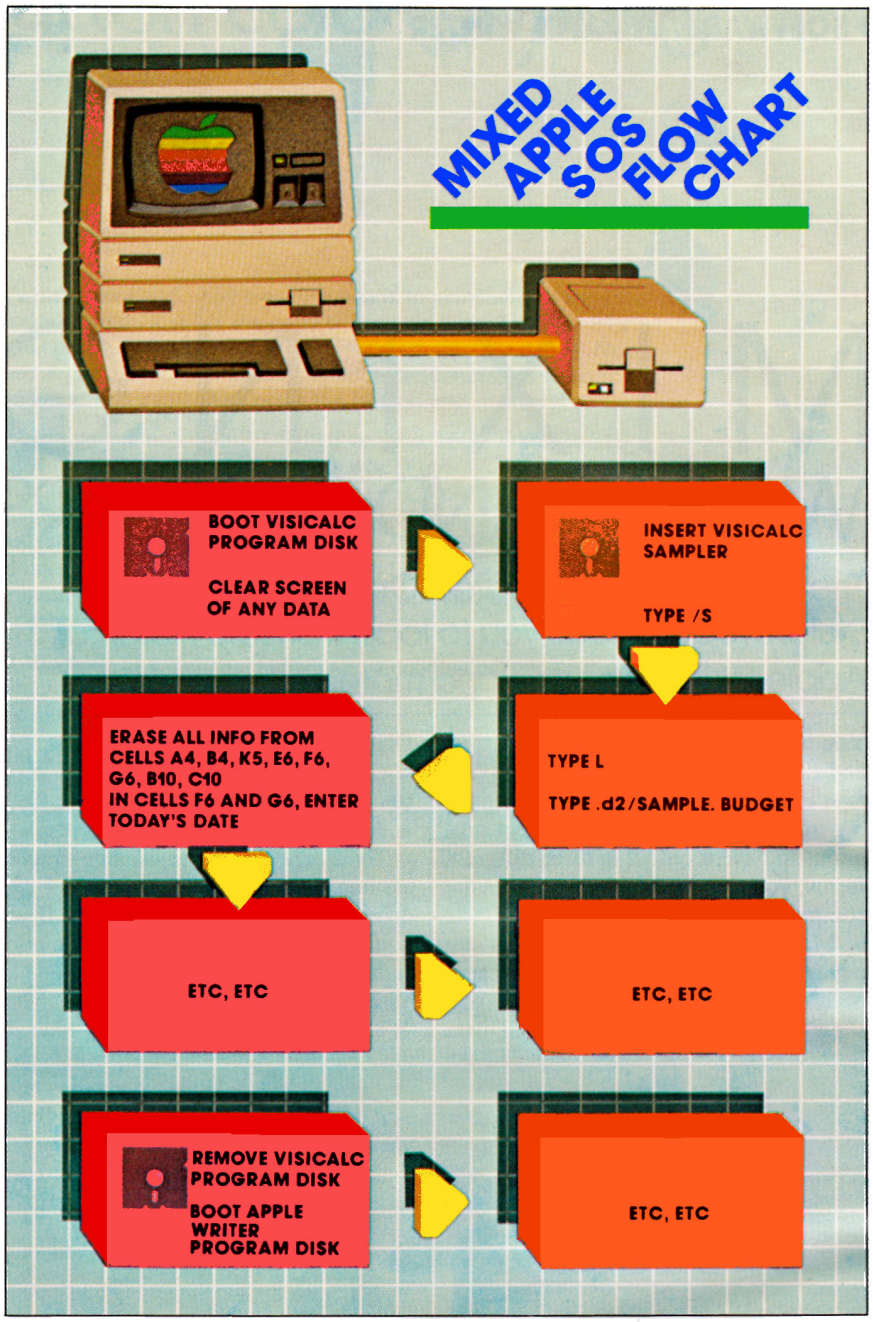
to cause more problems rather than its length. Be aware of how many columns your printer can handle, and never set the right hand limit of the *VisiCalc* file to more than this number of columns.

Quick File into Apple Writer

One of the exciting possibilities of *Quick File* is its ability to create truly personalized form letters. Even small businesses can create efficient, effective direct-mail marketing programs. Since each *Quick File* entry can contain up to 15 different information categories, you can personalize the letters with much more than just a name and address.

Even small businesses can create efficient, effective direct-mail marketing programs.

- Place the *Quick File* Boot Diskette in the built-in disk drive of your Apple III, and the Sample Data Files Diskette in Drive 2. Boot the program, inserting the Program Diskette when prompted.
- Load the file called "PRESS LIST" from the Sample Files Diskette.
- Go into the Report feature of *Quick File,* and select the "Create a New Labels Format" option. Do not use the existing Mailing Labels format. Enter any name you like when prompted for the report name.
- Delete the categories "Phone", "Specialty", and "Media Type". We'll be using all the others in the finished letter to demonstrate *Quick File's* flexibility. When you create your own form letters, you may want to transfer all 15 categories, just so you'll have them available if you need them. Don't change the order of the categories.
- Remove the Sample Files Diskette from Drive 2, and insert your working diskette. The one that has "VCTEST" if you did the preceding experiment, or is still blank if you didn't.
- Print the report, using print option 4 "Print to a special *Apple Writer* file on disk." When prompted, assign the name ".D2/QFTEST" to the file. Note that the message "Writing .D2/QFTEST.ASCI" will appear on the screen. Quick File adds the suffix ".ASCI" to these special files, so you must use it in all future use of the file.
- Leave *Quick File,* and boot *Apple Writer,* using Drive 1. Type in the form letter and save it to your working disk in Drive 2 under the name, ".D2/MYLETTER".
- On your *Apple Writer* Program Diskette is a WPL Word Processing Language, program called *MAILLIST*. Use this program to merge the *Quick File* information with the form letter. But first, a couple of changes must be made. So load it into the computer's memory (".D1/MAILLIST") and look at it.
- About 15 lines from the top of MAILLIST, you will see the program line "L $D/MLMLETTER". Change this to "L $D/MYLETTER". This tells the program to use your form letter instead of a sample Mail List Manager letter.
- A few lines further down is the line "L $D/MLMDATA!<(X)>!<!". Change this to "L $D/QFTEST.ASCI!<(X)>!<!". Now the program will use your *Quick File* information list instead of the Mail List Manager address list it was originally written for.
- You have now made the changes necessary to have the MAILLIST program merge MYLETTER with QFTEST.ASCI. Save this revised program to your working diskette, using the file name "NEW.MAIL" so you'll know it's not the original MAILLIST. Incidentally, the



MAILLIST program requires that both your form letter and your information file be on the same diskette.

- Almost there! Enter the "Print/Program" mode of *Apple Writer*, (CTRL-P), and check the print constants, (particularly the Print Destination. If you don't your form letters will print into the ether). Then type "DO .D2/NEW.MAIL". "DO" is the command which initiates running of a WPL program, which NEW.MAIL is.
- When prompted for the name of your Apple III volume, enter ".D2". Since your data diskette is already in the proper drive, you can ignore the next statement on the screen.
- Sit back and watch your printer. Your Apple III will create 10 copies of MYLETTER, personalizing each one for someone on the PRESS LIST. When NEW.MAIL runs out of names, it will stop.

You probably wouldn't want a form letter to read, "How are things in good old Dogwood, CA 94930?"

A Few Hints

Since this has only been a demonstration, the computer was set up to print the letters continuously. To change NEW.MAIL so it stops between letters and allows you to change paper, two program lines must be added. Near the very end of NEW.MAIL is a section starting with "L8 PNP". The next line reads "PSX +1". After that, add the line "PIN Insert new sheet of paper and press RETURN." This causes the program to stop until you press the return key. Then add the line "PPR (CTRL-V) (CTRL-backslash) (CTRL-V)". Control-V is an *Apple Writer* command that allows the entry of control characters; in this case, the control-backslash. This line will clear the screen each time, so you can see the "new sheet' prompt when it appears. Don't forget to save this new version of NEW.MAIL.

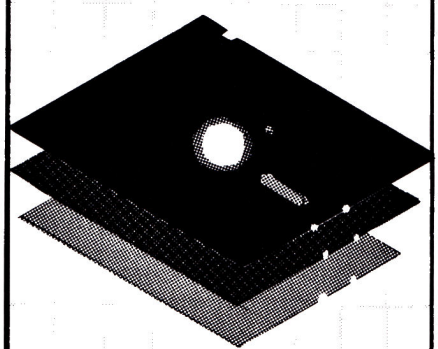
"PRESS LIST" has the city, state, and zip code together in one category. This makes it very difficult to separate the information when using it in a form letter. If you think you may need to separate pieces of information, set up your initial *Quick File* file to do so. (For instance, you probably wouldn't want a form letter to read, "How are things in good old Dogwood, CA 94930?"

As the old computer adage goes, "Garbage In/Garbage Out." Beware of poorly worded information in a *Quick File* category — such as seen in the sample "PRESS LIST" letter in which Eleanor Porter is addressed as the "Asst." Editor. Also, watch out for missing information. In the Steven McMurray letter, where no column or program title was entered in his *Quick File* listing, the result was a few blank spaces and an odd sounding sentence. Remember, they don't call them form letters for nothing — you do have to follow the form exactly and give it the information it wants.

```
⟨1⟩
@1@Johnson
@2@Milton
@3@Producer
@4@Moments in Business
@5@WBXZ
@6@223 73rd Ave.
@7@Chicago IL 99987
[1]⟨2⟩
@1@Callahan
@2@Sarah
@3@Assignment editor
@4@Book Corner
@5@KPYA
@6@2354 Golden Ave.
@7@Fast River OR 66544
[2]⟨3⟩
@1@Underwood
@2@Thomas
@3@Editor
@4@Business Pages
@5@Kansas Clarion
@6@556 Swan Way
@7@Topeka KA 22254
[3]⟨4⟩
@1@Theill
@2@Helen
@3@Editor
@4@Telling Time
@5@The Antique Journal
@6@568 Roseberg Ave.
@7@Willville MD 22147
[4]⟨5⟩
@1@McMurray
@2@Steven
@3@Features Editor
@4@
@5@The Weekly Palm
@6@2036 Sand St.
@7@Orlando FL 88542
[5]⟨6⟩
@1@Porter
@2@Eleanor
@3@Asst. Editor
@4@Ask Eleanor
@5@Watsonville Daily News
@6@5698 Lark Ave.
@7@Watsonville TX 55412
[6]⟨7⟩
@1@Perota
```

Program listing printout

When you need competitive prices on Verbatim® diskettes, you need SJB Distributors.



We're SJB. One of the fastest growing distributors in the country. And the reasons are simple. Our prices are competitive and we deliver fast.
SOFTWARE HOUSES:

Verbatim Datalife® available labeled or blank 'n bulk, with or without envelopes.
Call today about our quantity pricing.

Dealer inquiries invited.
C.O.D.'s accepted.

SJB Distributors, Inc.
10520 Plano Rd., Suite 206
Dallas, Texas 75238
(800) 527-4893 or
(800) 442-1048 in Texas

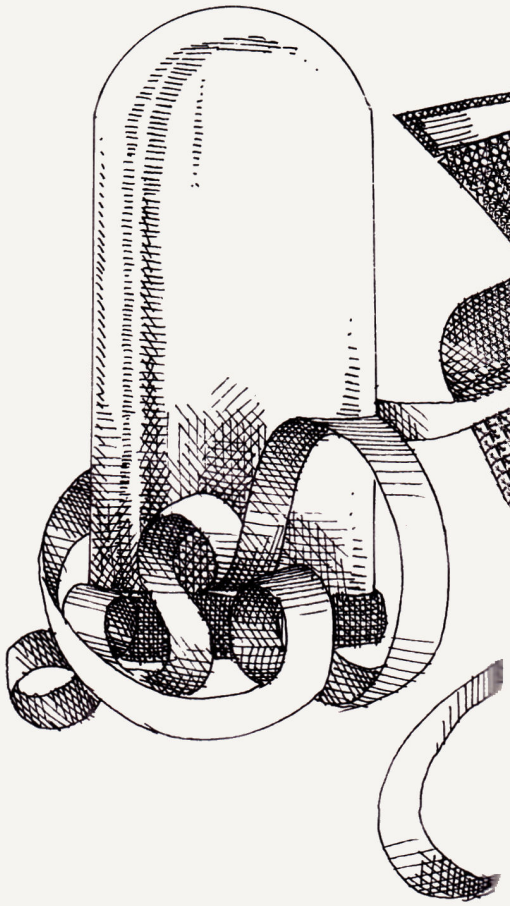
CIRCLE 144 ON READER SERVICE CARD

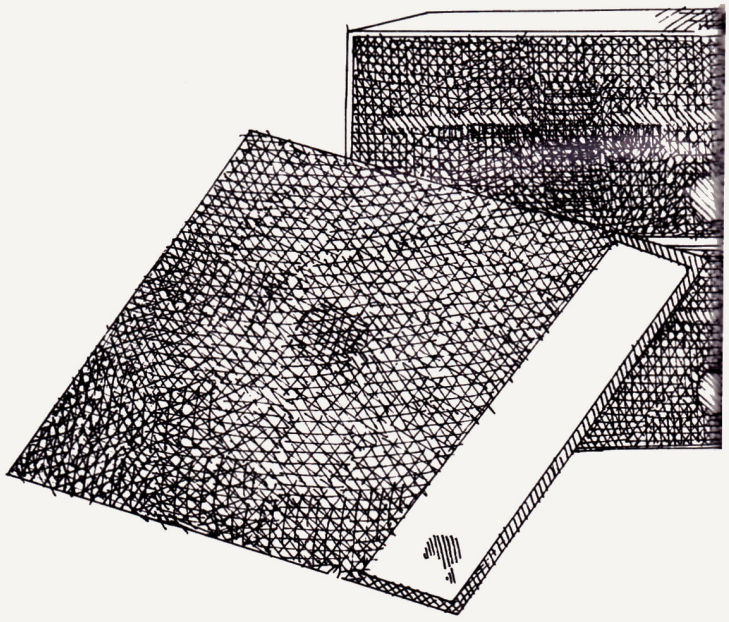
SOFTWARE/BY JARED TAYLOR

REVIEW

DOW JONES MARKET ANALYZER

Stock analysis packages from the company that brought us *The Wall Street Journal* and the Dow Jones News/Retrieval service are a great idea. The execution is something else.





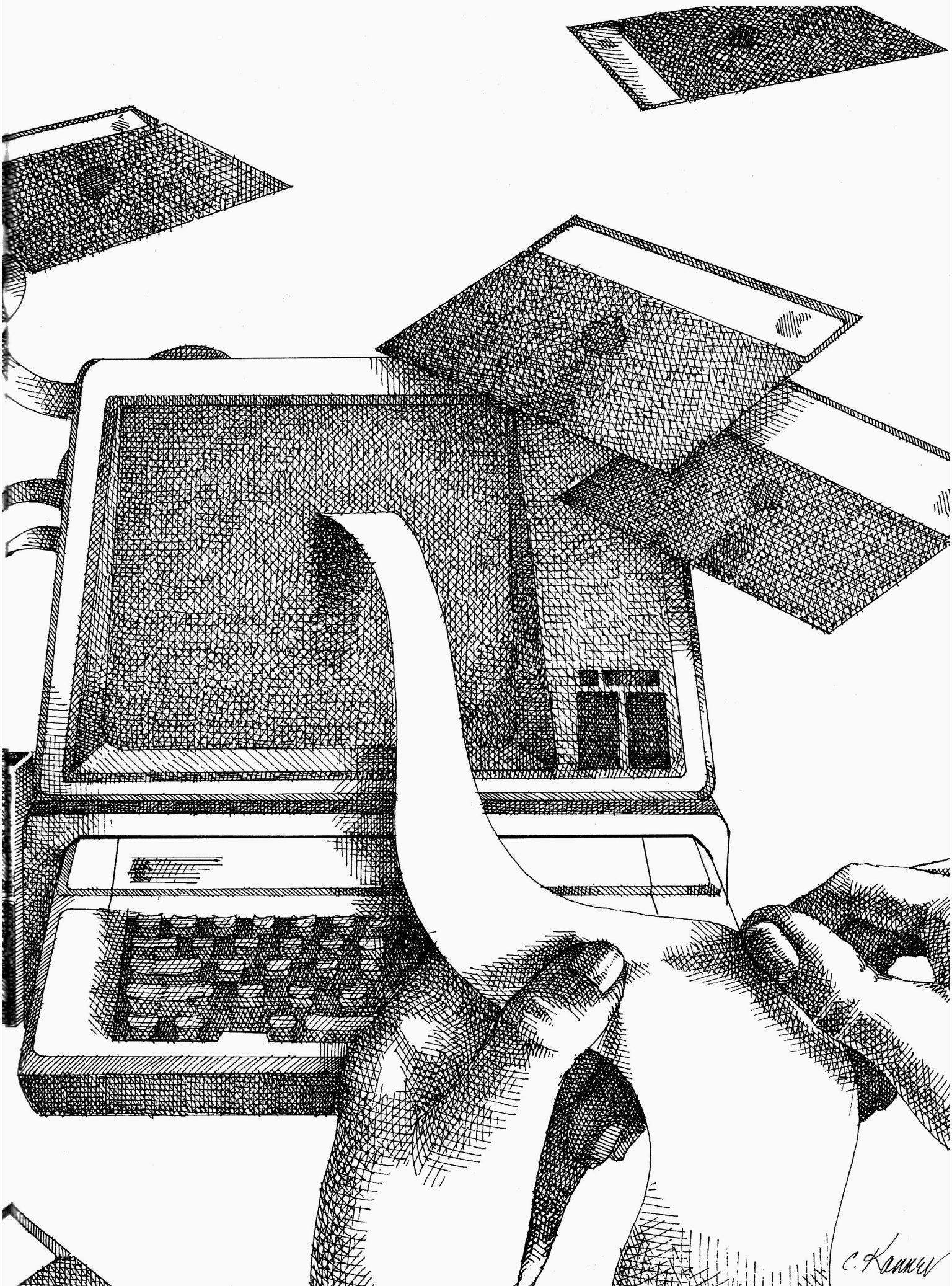
MARKET MICROSCOPE
Requirements: Two Drives, Serial Card and Modem
List Price: $699

MARKET ANALYZER
Requirements: One Drive, Serial Card and Modem, Graphics-capable Printer Interface, Printer, Color Monitor Recommended
List Price: $349

MARKET MANAGER
Requirements: Two Drives, Hayes Micromodem II
List Price: $299

All three programs are distributed by Dow Jones. Call (800) 257-5114 for further information.

Dow Jones, the company that brings you the stock market trading indexes and the *Wall Street Journal,* has entered into the software business. It has recently released three separate stock analysis packages for the Apple: two that track stocks and give trading advice, and one that keeps detailed records of transactions. All three are designed to tap into the Dow Jones


C. Kanner

News/Retrieval (DJN/R) network.

These programs were not written for penny-ante speculators. They are aimed at brokers, professional money managers, and sophisticated private investors—and are priced accordingly. But even if you are only a small trader, it's interesting to take a look at the kinds of tools Dow Jones now offers the big boys.

You would expect only slick, top quality programming to get the Dow Jones imprint. Surprise: These packages are quite uneven and some are littered with clumsy features that have no place in good business software. For the most part, these flaws don't prevent the programs from doing their jobs; they just make it needlessly difficult for the user to do his.

Despite their identical gray packaging, the programs were not all written by the same people. Dow Jones farmed out each one to a different software house. The overall menu-oriented design philosophy is thus the same, but the details of implementation are annoyingly inconsistent. In some cases, not even the hardware requirements are the same.

Of the three packages, *Market Microscope* and *Market Analyzer* are the most interesting because they are supposed to help you make better trades and, consequently, make more money. *Market Manager* is no doubt useful for anyone who has to keep track of large holdings in numerous portfolios, but it is really nothing more than a specialized filing system with a direct line into Dow Jones News/Retrieval.

Microscope and *Analyzer* use two entirely different approaches to help you make buy/sell decisions. *Analyzer* (which I would have called "*Microscope*") takes the infinite minutiae of price/trading volume, exponential moving averages, regression analysis and a host of other mathematical relationships to produce strictly technical analyses of securities. *Microscope* (which I would have called "Analyst") analyzes what are called "fundamentals": such things as corporate earnings, return on assets, and price/earnings ratios.

Close Look at Microscope

Microscope, the newest and best-designed of the three, comes on one disk, which contains all program modules. Lists of stocks and associated information are kept on separate data disks, of which there may be any number. For initial setup, the program asks for some information about your computer (which interface cards are in which slots), lets you initialize a data disk or two, and

```
                    ALPHABETICAL LISTING                    08/24/83

SYMBOL  STOCK OR INDUSTRY NAME          LIST   PRICE    TRADING RANGE
-------------------------------------------------------------------
HIT     HITACHI LTD                     S10    36.00    35.50  -  50.00
OMC     MATSUSHITA ELECTRIC INDL        S10      ND
PIO     PIONEER ELECTRONIC ADR          S10    22.38    19.00  -  20.00
SNE     SONY CORPORATION                S10    13.63    14.00  -  17.00
TDK     TDK CORP                        S10    45.63    30.00  -  46.00

5 ITEMS ON DISK
```

Figure 1: Abbreviated alphabetical list of stock data as printed out from Microscope.

```
?================================ BUY SCREEN ======================:

   JAP ELECT                          (S10)  -  08/19/83

A. %PRICE CHANGE LAST 52WKS.............HIGH TO LOW   LIMIT: 50

   PIONEER ELECTRONIC ADR              PIO          89.7
   MATSUSHITA ELECTRIC INDL            OMC          66.7
   HITACHI LTD                         HIT          56.8
   >
   TDK CORP                            TDK          49.2
   SONY CORPORATION                    SNE          10.2

B. CURRENT P/E RATIO....................LOW TO HIGH   LIMIT: 20

   MATSUSHITA ELECTRIC INDL            OMC          16.9
   HITACHI LTD                         HIT          17.5
   >
   TDK CORP                            TDK          21.3
   SONY CORPORATION                    SNE          32.1
   PIONEER ELECTRONIC ADR              PIO      [NO DATA]

C. %CHANGE IN REVENUE YR TO DATE.......HIGH TO LOW   LIMIT: 5

   HITACHI LTD                         HIT           9.3
   MATSUSHITA ELECTRIC INDL            OMC           5.5
   >
   PIONEER ELECTRONIC ADR              PIO          -0.2
   SONY CORPORATION                    SNE          -1.9
   TDK CORP                            TDK          -3.5

D. %PROFIT MARGIN.......................HIGH TO LOW   LIMIT: 2.5

   TDK CORP                            TDK           9.6
   MATSUSHITA ELECTRIC INDL            OMC           4.3
   HITACHI LTD                         HIT           3.7
   >
   SONY CORPORATION                    SNE           2.0
   PIONEER ELECTRONIC ADR              PIO          -1.6

E. EST EPS %GROWTH PRESENT FY...........HIGH TO LOW   LIMIT: 10

   HITACHI LTD                         HIT         26.50
   TDK CORP                            TDK         10.14
   >
   SONY CORPORATION                    SNE        -18.52
   MATSUSHITA ELECTRIC INDL            OMC      [NO DATA]
   PIONEER ELECTRONIC ADR              PIO      [NO DATA]


   RANK MATRIX

   SYMBOL  A  B  C  D  E  ABCDE
   HIT     3  2  1  3  1  !!!!!
   OMC     2  1  2  2  *  !!!!.
   PIO     1  *  3  5  *  !....
   SNE     5  4  4  4  3  .....
   TDK     4  3  5  1  2  ...!!

   #>LIM   3  2  2  3  2
   #COMP   5  4  5  5  3
```

Figure 2: Ranking of Japanese electronic company stocks according to limits set by the author.

ACCOUNTING SOFTWARE

for Portable, Personal and Desktop Computers

Available for these popular 8-bit and 16-bit microcomputer formats:

All CP/M® 8" Computers (SD)
All IBM PC Compatibles
TRS-80 Model 2 (with CP/M)
TRS-80 Model 4 (with CP/M)
Apple II (with CP/M)
Apple IIe (with CP/M)
Franklin ACE (with CP/M)
Morrow Micro Decision
Northstar Advantage
Corona PC & Portable
Corona Portable
COMPAQ Portable
Hyperion Portable
Seequa Chameleon
TI Professional
Columbia MPC
Osborne Executive
Osborne I (SD)
Osborne I (DD)
DEC VT-180
CompuPro
Xerox 820
IBM PC
IBM XT
KayPro II
KayPro 10

Call about other formats



"...for several years the defacto standard for microcomputer software, and still a good example of some of the better thought-out software on the market." —Interface Age

SATISFACTION GUARANTEED or Your Money Back

Complete Package of Software, Training Aids, Manuals, and Users' Newsletter

ONLY
$395
CP/M format

$495
IBM format

Desktop Accountant™

FULL-FEATURE, FULLY-INTEGRATED ACCOUNTING SYSTEM

Everything you need to keep the books...at a price you can afford!

Your Bookkeeper, Accountant, and Banker will love you for installing this fine system!

Check these features:

This remarkably-valued Accounting System will manage your company's business records and **automate your entire bookkeeping process**—from the posting of individual transactions to producing up-to-the-minute Income Statements, Balance Sheets, and other important management reports. Desktop Accountant™ gives you a "Big Company," professional image with **printed** invoices, statements, and checks. It is **user-friendly, completely menu-driven,** offers **system-prompted data entry,** and is compatible with both floppy and hard disks. Feature-for-feature, and dollar-for-dollar it is **the best software value on the market!** But don't let the **low price** fool you. Desktop Accountant™ is **not a "cheap" accounting system, only inexpensive.** That's because original development costs were recovered years ago allowing us to sell **an excellent product** in high volume at low prices and still earn a fair profit. This **high-quality, reliable software** was designed and written in 1975 for small-to-medium sized businesses. Since then, **it has successfully proven itself in well over 10,000 companies** in all 50 states and in 13 foreign countries. It is also used and recommended by **hundreds** of bookkeepers, accountants and CPA's, including the regional offices of several famous "Big Eight" accounting firms! No other Accounting System offers you so many features, benefits, and valuable extra services. You can pay more but you can't buy more! Desktop Accountant™ is backed by our 30-day, no-risk, **money-back guarantee** of 100% customer satisfaction! Call for **free literature** or order now with complete confidence.

Read What Users Say...

"Two hours after receiving the Desktop Accountant I was up and running live data, and generated an entire month's work and financial statements the following day."
—J.C. Bartels, President
(accounting firm) Gonzales, Texas

"To get anything better we would have had to spend multiple thousands of dollars. I think it's a dynamite package for the money."
—Bob Cox, V.P. General Mgr. *LETTERS ON FILE*
(manufacturing company) San Antonio, Texas

Here's what you get:

1. A professional-quality, full-feature, fully-integrated accounting system. **2.** Six-to-fourteen diskettes (depending on your system's disk storage capacity). **3.** Four easy-to-follow, self-teaching User's Manuals (over 540 pages!) that are **highly rated by satisfied users. 4.** An exclusive, new **audio cassette tape** with **step-by-step instructions** for quick installation and start-up. **5.** "Read Me First" a unique 40-page system guide and start-up aid. **6. Complete sample data and sample reports** for practice and training...a big help to new users. **7. FREE 1-year subscription to Users' Newsletter,** "Debits and Credits." It's full of tips, ideas, news, and useful suggestions from us and other users. Recent issues have run over 20 pages long! **8. FREE complete Source Code** in popular MBASIC so you can easily customize *any* program to suit your special needs. **9.** Telephone "Hot Line" service for helpful Installation support, Start-up support, Technical support, and Training support. The quality of our cheerful customer support has been acclaimed **"excellent," "first-rate,"** and **"very courteous and professional"** by our users. **10.** Access to our growing network of **Experienced User Consultants**™ in both the U.S. and Canada. These qualified, knowledgeable businesspeople themselves own this fine software and are available to assist you with almost any aspect of installation, training, operation—or even customization, if desired. You'll receive the latest **Directory** of these helpful Consultants.

Look who's using it:

Here is a sample (taken from our customer files) of the wide variety of businesses successfully using this time-tested, solidly-established, user-proven software:

• Bookeeping services • CPA/Accounting firms • Construction companies • Wholesale Florists • Retail Florists • Printers • Insurance Agencies • Shopping Centers • Machine Shops • Engineering firms • Software Companies • Computer retailers • Publishers • Financial services companies • Investors • Appliance service firms • Dairies • Boilerworks • University Business School • Catholic Diocese • Baptist Ministeries • Sail Maker • Convalescent Hospital • Car Wash • Public Library • Cement Plant • Industrial products manufacturing companies • Mortuary • Coal Company • TV/Film producers and distributors • General Store (in Alaska!) • Health services organization • Government Agencies • Record and Tape stores • Trade Association • Graphics firms • Office products companies • Real Estate firms • Oil Products distributor • Instrument Company • Hydraulic Products company • Outdoor Expeditions company • Many types of schools • Chiropractors • Physicians • Landscapers • Law firms • Restaurants • Plumbing Companies • Railroad • Farmers • Banks • Consultants • and many, many, more!!

A Complete System!

includes all four standard general accounting programs:

GENERAL LEDGER is completely integrated to automatically post end-of-month transactions from A/R, A/P and Payroll. It **prints 13 detailed reports** for the entire company, and optional **Income Statements for up to 99 departments.** It produces up-to-the-minute **comparative financial statements** with current, year-to-date, budget, and last year (month and YTD), showing **both dollar amounts and percentages,** and presents everything you, your bookkeeper, and your accountant need to know about the company • G/L **automatically reconciles all accounts,** and maintains extensive, **detailed audit trails** showing the source of each G/L entry for quick, easy, tracing • Trial Balance includes all transactions • **Flexible Chart of Accounts** • True double-entry bookkeeping • Master File capacity: 400 Accounts • Monthly Transactions capacity: 1,000 with 200K diskette; 3,500 with 500K diskette; 7,000 per Megabyte with a Hard Disk.

ACCOUNTS RECEIVABLE provides **instant, on-line customer account information (both current and aged),** with complete, timely invoicing, including open-item (or balance forward) and statement capabilities. It makes the entire billing process fast, easy, and efficient. It quickly identifies your overdue accounts, **helps speed collections,** helps control your cash flow, and assists you in making better financial decisions. Both detailed and summary **customer activity and aging reports** are instantly available • Preprinted forms available for **invoices and statements** • **Detailed audit trail** • Maintains comprehensive customer data files • **Produces 8 reports and documents** • Includes automatic periodic customer/client billing option which is ideal for service businesses • **Itemized monthly transactions** • Master File capacity: 400 Customers • Monthly Transactions capacity: 800 with 200K diskette; 3,500 with 500K diskette; 7,000 per Megabyte with a Hard Disk.

ACCOUNTS PAYABLE maintains complete vendor/voucher history and includes **check-writing** capabilities. **Current and aged payable reports** are available upon command. It prepares an extremely useful **cash flow/cash requirements report** that greatly improves management control of your most valuable resource—cash! It prints checks (on commercially available forms on which **your company name, address and logo can be imprinted**) with comprehensive check stubs that your vendors will appreciate • **Produces 11 reports and documents** • Automatic pay selection program allows payment by due date or by discount date • **Manual and automatic checkwriting** • Check register • **Detailed audit trail** • Itemized monthly transactions • Master File capacity: 400 Vendors • Monthly Transactions capacity: 800 with 200K diskette; 3,500 with 500K diskette; 7,000 per Megabyte with a Hard Disk.

PAYROLL is a complete, **easy-to-use** professional-quality payroll system. Be the office hero each week when the checks come out on time! This program **calculates payroll for every type of employee** (hourly, salaried, and commissioned) and **prints payroll checks** (with popular, comprehensive check stubs) with an absolute **minimum** of input. **Your company name and logo** can appear on these, too. • Stores and reports comprehensive employee and payroll information. • Maintains monthly, quarterly, and yearly totals for reporting purposes in **multiple states**(!) • Offers **user-maintainable Federal, State, and local tax tables**(!). • W-2 printing • 941 Reporting • **Produces 10 reports and documents** • Master File capacity: 400 employees. An **outstanding** Payroll package!

Produces 42 Reports & Documents:

General Ledger 1. Chart of Accounts **2.** Chart of Accounts with summary dollar amounts **3.** Chart of Accounts with prior year comparisons **4.** Daily Transactions Report **5.** Itemized Monthly Transactions **6.** Balance Sheet **7.** Balance Sheet with prior year comparison **8.** Income Statement **9.** Income Statement with prior year comparison **10.** Departmental Income Statement(s) **11.** Departmental Income Statement(s) with prior year comparison **12.** Detail report for individual accounts **13.** Trial Balance Statement

Accounts Receivable 1. Daily Transactions Report **2.** Invoices (with or without preprinted forms) **3.** Statements (with or without pre-printed forms) **4.** Summary Aging Report **5.** Detailed Aging Report **6.** Itemized Monthly Transactions **7.** Detailed Customer Activity Report **8.** Summary Customer Account Report

Accounts Payable 1. Daily Voucher Report **2.** Daily Credit Report **3.** Checks with Detailed stubs **4.** Check Register **5.** General Ledger Transfer Report **6.** Cash Requirements Report **7.** Transaction Register **8.** Open Voucher Report **9.** Aged Payables Report **10.** Detailed Vendor Activity Report **11.** Summary Vendor Account Report

Payroll 1. Federal Tax Tables **2.** State Tax Tables **3.** Payroll checks with stubs **4.** Payroll Check Register **5.** Monthly Payroll Summary **6.** Quarterly Payroll Summary **7.** General Ledger Transfer Report **8.** Detailed Employee File Listing **9.** Produces 941 Worksheet **10.** Prints annual W-2 Forms

System Requirements: Either CP/M® or MS-DOS (PC-DOS) • Microsoft BASIC • 64K RAM • Two disk drives or hard disk • 132 column wide carriage printer, *or* an 8½"x11" printer with compressed print mode (an Epson MX-80 or similar printer).

100% SATISFACTION GUARANTEE

No-Risk, 30-day Money-Back Guarantee

Order Desktop Accountant and evaluate it yourself for 30 days. Test the performance of each program using our comprehensive *Sample Data Files* to enter and process data, query accounts, print checks and reports, and more. Review the five User's Manuals, hear the Training Tape, read the users' Newsletter, even call our Technical Support Group with your questions. ***You must be completely satisfied*** with Desktop Accountant or you may return it in good condition *with the Sealed Master Disk UNOPENED* (it installs *your* live data) for a prompt, courteous, complete refund!

Call for ***FREE LITERATURE****, including sample reports, comparison chart, user letters, etc.*
Not sold in stores • Order today by Mail or Phone • Phone Orders Filled Promptly

Orders, Questions, and Literature Requests CALL NOW, TOLL-FREE

MasterCard VISA ☎ **1-800-832-2244**

Please mention Ad #120-Y

In California call 1-800-732-2311

Technical Support Hotline (8 AM to 5 PM, Mon.–Fri.): (415) 680-8378

Send Orders To: 1280-C Newell Avenue, Suite 147-Y, Walnut Creek, California 94596

• When ordering please mention or include the Ad number appearing near our telephone number • Orders shipped within 48 hours via UPS • Add $5.00 for faster 2-day Rush Air Service • California residents add 6½% Sales Tax • Payment by VISA/MasterCard/COD/MO/Cashier's Check • All Brand Names are manufacturers' registered Trade Marks • No sales to Dealers • Foreign orders please call or write before ordering • ©1983 Rocky Mountain Software Systems.

ROCKY MOUNTAIN SOFTWARE SYSTEMS
Specialists in Accounting Software

BYTES & PIECES

Holiday Specials!

All programs below on Special.

$1.00 credit for all phone orders over $100.00

	List	Ours
NEW RELEASES		
Axis Assassin	34.95	26.76
BurgerTime	34.95	23.48
Caverns of Callisto	34.95	24.86
Enchanter	49.95	35.46
Exodus (Ultima III)	54.95	39.66
Gorf	39.95	28.56
Gumball	29.95	21.36
Hard Hat Mack	34.95	26.76
Lock 'n' Chase	34.95	23.48
Night Stalker	34.95	23.48
Planetfall	49.95	35.46
Spare Change	34.95	24.86
Stellar 7	34.95	24.86
Sticky Bear Opposites	39.95	28.56
S.B. Basket Bounce	39.95	28.56
Wizard of Wor	39.95	28.56
GAMES • EDUCATIONAL		
AE	34.95	24.86
Creature Creator	39.95	28.56
Crossword Magic 2.0	49.95	35.46
In Search of...	39.95	28.56
Legacy of Llygamyn	39.95	28.56
Lode Runner	34.95	24.86
Math Blaster	49.95	35.46
Microbe	44.95	32.26
Police Artist	34.95	24.86
Snooper Troops 1 or 2	44.95	32.26
Type Attack	39.95	28.56
Witness	49.95	35.46
Wizardry	49.95	35.46
Zaxxon	39.95	28.56
Zork 1, 2, or 3	39.95	28.56
UTILITIES • BUSINESS		
Bank Street Writer	69.95	49.96
Bookends	124.95	90.46
FCM	99.95	65.96
General Manager 2.0	229.95	165.16
Graforth	75.00	53.49
Home Accountant	74.95	53.46
Incredible Jack	179.00	130.46
List Handler	49.95	35.46
Magic Window II	149.95	108.96
Megawriter	60.00	42.36
Micro Cookbook (II+ or IIe)	40.00	28.56
New Step by Step	79.95	57.16
Nibbles Away II	69.95	49.76
PFS File, Rept. or Graph	125.00	90.49
Sensible Speller	125.00	90.49
Think Tank	150.00	108.96
Word Handler	59.95	42.86
HARDWARE		
Koala Pad	124.95	90.46
Kraft Joystick	64.95	45.96
Replay II (II + or IIe)	130.00	107.19
Select-a-Port	59.95	42.39
16K Card (Microsoft)	99.95	75.96
Super Fan w/Zener Ray	109.00	78.66
T.G. Game Paddles	39.95	28.56
Verbatim Disks (Library Case)	49.00	29.50
Wildcard	139.95	110.19

Ask us about our full line of educational software.

C.O.D. • Money Orders • Certified Checks • Personal Checks Allow 2 Weeks • N.Y.S. Res. Add Sales Tax

U.S.-Orders Under $150, Add $2.00 P&H
All Canadian, U.S. Funds $3.00 P&H
Foreign, Charges Only, Min. P&H $6.00

• **SEND FOR FREE PRICE LIST #500** •
Source TCP 637

BYTES & PIECES (516)751-2535

Box 525 Dept. B • E. Setauket, N.Y. 11733

CIRCLE 116 ON READER SERVICE CARD


```
= ================================ BUY SCREEN ======================
   FOOD CHAIN STORES                  (400)  -  08/19/83

A. %CHANGE VS S&P 500 LAST 52WKS.....HIGH TO LOW    LIMIT: ICF
                                                    ICF: 114
   STOP & SHOP COMPANIES              SHP              287
   SHOPWELL INCORPORATED              SH               201
   >
   GREAT ATLANTIC & PAC TEA           GAP              113
   WINN-DIXIE STORES                  WIN              106
   SAFEWAY STORES  INC                SA                99
   KROGER COMPANY                     KR                76

B. CURRENT P/E RATIO.....................LOW TO HIGH   LIMIT: ICF
                                                    ICF: 10.7
   SAFEWAY STORES  INC                SA               4.3
   KROGER COMPANY                     KR              10.0
   SHOPWELL INCORPORATED              SH              10.3
   >
   WINN-DIXIE STORES                  WIN             12.5
   STOP & SHOP COMPANIES              SHP             16.2
   GREAT ATLANTIC & PAC TEA           GAP             20.6

C. %CHANGE IN REVENUE YR TO DATE.....HIGH TO LOW    LIMIT: ICF
                                                    ICF: 6.3
   STOP & SHOP COMPANIES              SHP             14.9
   GREAT ATLANTIC & PAC TEA           GAP             10.9
   SHOPWELL INCORPORATED              SH               8.2
   WINN-DIXIE STORES                  WIN              6.6
   >
   SAFEWAY STORES  INC                SA               5.9
   KROGER COMPANY                     KR               0.6

D. DEBT TO EQUITY RATIO %.....................LOW TO HIGH   LIMIT: ICF
                                                    ICF: 77
   WINN-DIXIE STORES                  WIN              20
   >
   GREAT ATLANTIC & PAC TEA           GAP              79
   KROGER COMPANY                     KR               83
   SAFEWAY STORES  INC                SA              110
   STOP & SHOP COMPANIES              SHP             118
   SHOPWELL INCORPORATED              SH              129

E. %CHANGE IN EPS LAST QTR.....................HIGH TO LOW   LIMIT: ICF
                                                    ICF: -0.3
   STOP & SHOP COMPANIES              SHP             90.9
   GREAT ATLANTIC & PAC TEA           GAP             50.0
   WINN-DIXIE STORES                  WIN             14.7
   >
   SHOPWELL INCORPORATED              SH              -4.7
   SAFEWAY STORES  INC                SA             -15.0
   KROGER COMPANY                     KR             -29.0

   RANK MATRIX

   SYMBOL   A  B  C  D  E  ABCDE
   GAP      3  6  2  2  2  ..!.!
   KR       6  2  6  3  6  .!...
   SA       5  1  5  4  5  .!...
   SH       2  3  3  6  4  !!!..
   SHP      1  5  1  5  1  !.!.!
   WIN      4  4  4  1  3  ..!!!

   #>LIM    2  3  4  1  3
   #COMP    6  6  6  6  6
```

Figure 3: Buy screen for six supermarket stocks.

```
                        PRICE ALERT REPORT                    08/24/83

REC  STOCK NAME                  SYMBOL   PRICE   CP   %>CP  VOL(100)  %PF
-------------------------------------------------------------------------

S10 JAP ELECT                    08/23/83
 B   HITACHI LTD                 HIT       36.00   S     1.4       316    34
 B   PIONEER ELECTRONIC ADR      PIO       22.38   R    11.9        28     5
 S   TDK CORP                    TDK       45.63   R    -0.8         9    42
```

Figure 4: Price alert for Japanese stocks.

you're ready to go.

The next step is to assemble lists of the stocks you want to track and put them on your data disk. Each list is given a three-character name, usually the number of the industry group to which the stocks on a list belong. Computer software companies, for example, are industry group 505. Waste management and janitorial services are group 508. If you want to track a special group of stocks that do not fall handily into an industry group, you must give it a two-digit number preceded by the letter *S* for "special." Stocks are entered onto a list by their trading symbol—Apple Computer is AAPL, Control Data is CDM. Each list can contain up to 50 stocks and you can store 20 separate lists on each disk.

From the same list-making menu you can now pick another item and enter the trading range for your stocks. Some of the program features will run without this data, but the full benefit of the *Microscope* depends on it. A stock's general trading range is defined by its support and resistance prices, on the theory that market forces will keep most stocks from varying too wildly in price. The upper limit of the range, the resistance price, is the value at which there should be more sellers than buyers. When the stock reaches that level, it should go down. The support price is the lower limit of the trading range; when a stock reaches this level, it should begin heading back up. Trading range is, of course, only a best guess, based on a stock's behavior in the past.

When your stock lists and trading ranges are ready, you can select the fundamental indicators that you wish to track for the stocks on that disk. You can choose up to 20 from a list of 68 different indicators that include just about any information about a company that could be useful to investors. These indicators include such conventional data as debt/equity ratio, dividend rate, short interest ratio, and betas up or down, to more exotic fare such as insider net trading, volume/liquidity ratio, and volume-on-balance index. You choose your preferred indicators from a menu and write them to your data disk.

Now you are ready to dial up DJN/R and get the latest values for the indicators you plan to track. Depending on how many stocks you are following and how many indicators you need, this can be a lengthy process. It takes 10 minutes to track nine values for 5 stocks at 300 baud. This is because *Microscope* must fetch each of the 68 indicators stored by

Now a professional CAD system for $1,095!

For Apple II and //e

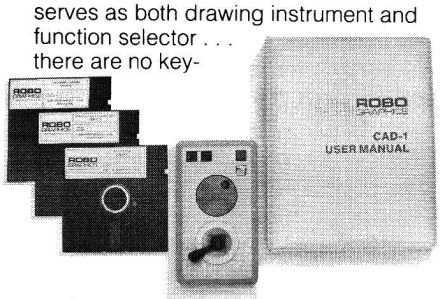
Finally, there is a breakthrough in computer aided drafting and design that makes this work-saving technology affordable for every school, architect, engineer, designer and draftsperson.

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



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

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



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

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



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

Major credit cards accepted.

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

ROBO GRAPHICS

CHESSELL-ROBOCOM CORPORATION
125 Pheasant Run, Suite 2B
Newtown, PA 18940 (215) 968-4422

*A registered trademark of Apple Computer, Inc.

CIRCLE 183 ON READER SERVICE CARD

Dow Jones and then pick out only the ones you want to track, a clumsy, time-consuming procedure.

When the program finally finishes talking to DJN/R, you can call up the information retrieved for each stock, or send it to the printer. Stock data on disk can also be printed out in a more abbreviated form (see Figure 1). This is a simple alphabetical list of every stock on the disk. In this case, we have only five stocks, all of them members of a special list (any group that doesn't fall into one of Dow Jones' categories) named S10, which consists of Japanese electronics companies. The ND in the line for Matsushita means that "no data" was available.

Beyond Retrieval

So far, all we have done is retrieve selected information from DJN/R. In order to put that information to work, we switch to a menu called "Customize the Software." One of the useful things this menu allows us to do is to set cut-off values for the indicators we are tracking, and to rank each stock in the list according to that value. We can rank stocks in a "Buy Screen" if we think they are going up, or we can rank them in a "Sell Screen" if they look like they might drop.

Creating a Buy Screen for our list of Japanese electronics stocks requires entering of a cut-off value for each of the fundamental indicators we wish to include as buy or sell indicators, and then specifying whether they are to be ranked in high-to-low or low-to-high order.

In Figure 2, all the Japanese stocks are ranked according to the limits I specified. For the first indicator, I assumed that stocks that have risen quickly in the past will keep on rising, so I set that indicator to a high-to-low ranking. I also set an arbitrary limit of a 50 percent stock price increase over the last year, which tells the program to separate my list at the specified break-point with a "greater than" (>) sign. All my indicators are ranked high-to-low except the P/E ratio; I would rather buy low P/E than high P/E stocks.

The rank matrix at the bottom of the figure is a quick reference to compare stocks in a list. It indicates that Hitachi (symbol HIT) ranked third according to indicator A, second according to indicator B, first according to C, etc. The column of periods and exclamation marks reveals whether a stock was above or below the > sign.

According to this matrix, Hitachi gets an exclamation mark on every count,

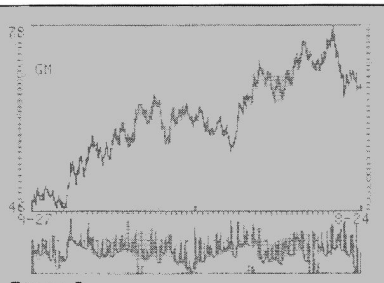


Figure 5.

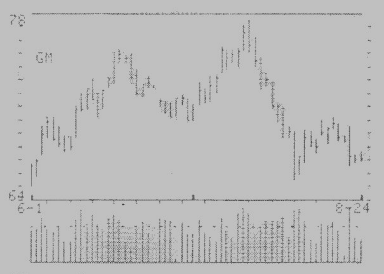


Figure 6.

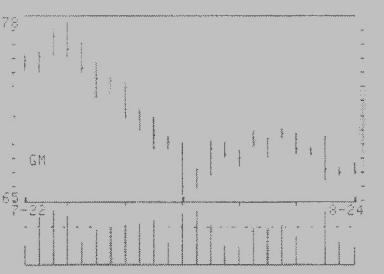


Figure 7.

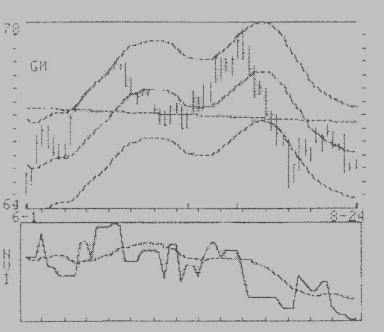


Figure 8.

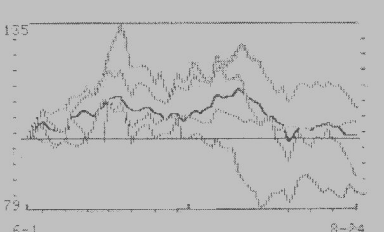


Figure 9.

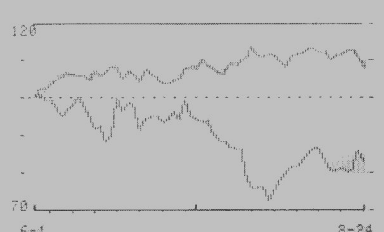


Figure 10.

and Sony (SNE) gets a solid string of raspberries. The last two lines of the matrix tell how many stocks were above the cut-off value, and how many were included in the comparison. (When there is no data for a stock, it drops to the bottom of the heap and is not counted in the number compared.) If you are in a hurry to size up the performance of your stocks, you can print out only the rank matrix.

Figure 3 is another buy screen, this time for a list of six supermarket stocks. In this case, I specified the industry composite figure (ICF) as the cut-off value. This way, the stocks that appear above the > sign are doing better than the industry average and those below the > sign are doing worse. ICFs are the lazy man's way to rank a list of stocks because he doesn't have to enter them; the program fetches ICFs from DJN/R. They are the default value for the cut-off figure when you are "customizing the software." Sell screens can be set up in exactly the same way. The only difference is that you rank the stocks you are tracking according to whether they seemed more likely to go down rather than up.

Tracking fundamentals and specifying buy and sell screens is very useful business, but *Microscope* goes about it in a slightly rigid way. When you choose the indicators to be tracked, or set the cut-off values for a buy or sell screen, these parameters are written onto the data disk and apply to every stock list on the disk. Parameters cannot be customized to each list. Thus, our lists of supermarket and electronics stocks had to be on separate disks because the cut-off values are different for the two lists.

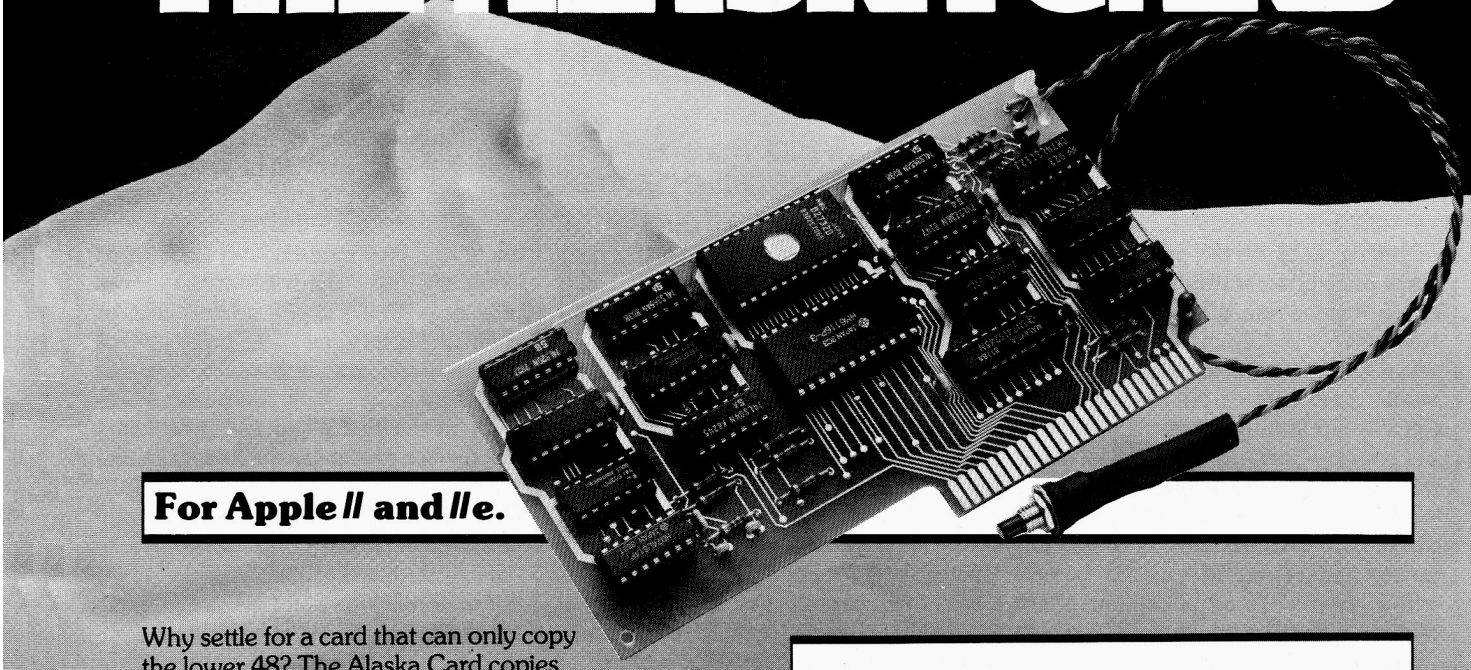
This problem could be solved by specifying only ICFs as cut-off ranking values for every stock list on a disk. This would work fine because when you log on to DJN/R, the program is smart enough to fetch a different ICF for each list. Unlike customized cut-off values, ICFs are regularly computed by Dow Jones and are fetched from DJN/R just like any other value. However, ICFs may not always be what you want to use as cut-off values and are not available for special lists anyway.

Alert! Alert! Alert!

The "customization" section of the program includes a buy/sell alert routine that is implemented more smoothly. This feature also applies to an entire diskful of stocks, but it is not a handicap because the data that trigger a price alert are keyed to the individual trading range of each stock.

Disk Utility Systems

THE ALASKA CARD



For Apple *II* and *IIe*.

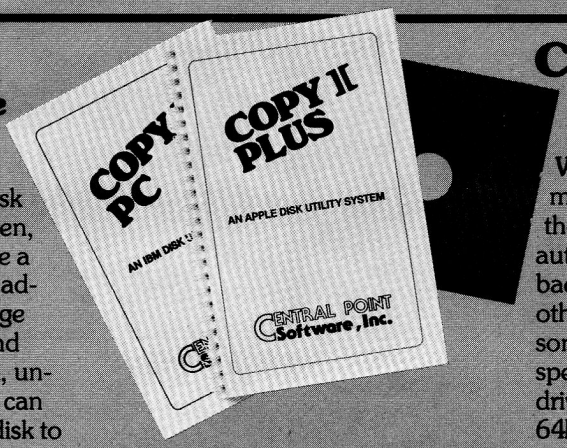
Why settle for a card that can only copy the lower 48? The Alaska Card copies 48K, 64K and 128K memory-resident software with a simple press of a button. It is the fastest, easiest to use, most powerful copy card you can buy.

Unlike other cards, The Alaska Card requires no 16K memory card or utility disk. Your copied disks autoboot in as little as 10 seconds, and can be transferred to a hard disk in standard DOS 3.3 format. This card is the perfect companion product to our best seller, Copy II Plus, for Apple *II* and *IIe*. **$129.95** complete.

Time to make backup	12 sec.	60 sec.
Time to boot backup	10 sec.	18 sec.
Utility disk required?	No	Yes
Language card required?	No	Yes
One-step 64K save	Yes	No
One-step 128K save*	Yes	N/A
	$129.95	**$139.95**

*Requires a 128K Apple *IIe*.

Copy II Plus: the ultimate Apple utility program.



Copy II Plus is the last utility disk you will need. Fully menu driven, the Copy II Plus utilities include a catalog display with binary file addresses and lengths, a disk usage map and the ability to verify and compare files. It can copy, lock, unlock and delete files, and DOS can be copied or removed from a disk to free up space. You can change the greeting program on a DOS disk or initialize a disk from scratch. The Copy II Plus sector editor will allow you to view and modify data in either hex or ASCII format.

Copy II Plus is the most sophisticated copy program available. It handles synchronized tracks, half tracks, nibble counting, bit insertion, spiral tracks and other non-standard formats. It also includes a comprehensive discussion of disk format and recording techniques. A disk system and speed check assure your drives are running in top condition and a nibble editor will allow you to repair damaged diskettes or analyze disk formats. For Apple *II* and *IIe*, **$39.95.**

Copy II PC: the IBM answer.

Without using complicated parameters, Copy II PC copies disks on the IBM PC quickly, reliably and automatically. In fact, Copy II PC backs up more software than any other copy program for the IBM Personal Computer, period. A drive speed utility is included to keep your drives in top condition. For IBM PC 64K, 128K, **$39.95.**

CENTRAL POINT Software, Inc.

The Backup Professionals

P.O. Box 19730-203
Portland, OR 97219
503/244-5782

Add $2.00 for shipping and handling on all orders.

CIRCLE 184 ON READER SERVICE CARD

Alerts are set up by specifying relationships between the current stock price, the support price, and the resistance price. For example, if the stock has a broad but consistent trading range, but has drifted toward one of the extremes, *Microscope* can be customized to alert you to the possibility of an imminent correction. Again, the theory is that if a stock moves too high, sellers will outnumber buyers and the price will drop. If the stock moves too low, the reverse should happen.

A support level buy recommendation might be made by the program when a stock price drifts within a small percentage of the bottom of its trading range. However, the normal range should be wide enough so that a routine correction would give the stock price enough room to move up into for an investor to come out with a worthwhile profit. You might therefore specify that the current price would have to come within 5 percent of the support price (bottom of the trading range) and yet be at least 35 percent below the resistance price (top of the trading range) before a buy alert was triggered.

By playing with these percentages and adjusting the trading range, you can configure the program to flash a price alert whenever current prices meet certain conditions you set. *Microscope* lets you set conditions for two different buy and two different sell conditions. It will also notify you, if you wish, when prices have broken so far out of normal patterns that the trading range should be updated. When you run the price alert routine, the program will scan an entire disk of stocks to see if any meet your pricing criteria.

Microscope can be customized to alert you to the possibility of an imminent correction.

A price alert for our list of Japanese electronics stocks is shown in Figure 4. The trading ranges and percentage parameters for price alerts were tinkered with to give results that are not realistic, but the program followed our instructions and duly recommended that we buy Hitachi and Pioneer, and sell TDK. The column in the printout labeled CP stands for "Critical Price" and indicates whether the alert was triggered by a critical relationship with the support (S) or resistance (R) price. %>CP indicates the percentage (positive or negative) by which the current price exceeds the critical price. %PF stands for "Percent Price Fluctuation" and indicates the relative breadth of the trading range.

We have now seen everything *Microscope* can do. A trader or broker who was following hundreds of stocks would probably use the program to update the fundamentals indicators every week or so, and to update current price/volume every day. He might also run a price alert every day to see if any stocks had moved into a critical range. Alerts are, of course, only as good as the trading range and alert parameters that he enters into the program, and Dow Jones takes pains to point out that it "make(s) no claim that the use of this software package will increase profits or reduce losses." Still, if you are a smart trader, it could make you even smarter.

Analyzing Market Analyzer

For investors who don't believe in tracking fundamentals, or who want to supplement that information with a lot of graphs and charts, Dow Jones offers *Market Analyzer*. This program is easily the most awkward to use and the most

WHEN YOU'RE BAN



poorly documented but is perhaps the most powerful.

Basically, *Analyzer* takes nothing but historical trading data—high, low, close and volume—and runs it through a mathematical meat grinder. The idea is to look for consistent relationships between numerical variables and price changes. There may be no clear cause-and-effect relationship between any of this data and changes in stock price, but, as the manual points out, "the fact that a particular method works need not be explainable, however strong the urge to do so."

The first step, after an installation procedure very similar to that for *Microscope,* is to establish a list of securities to track—stocks, bonds, options, mutual funds, or treasuries—and get the necessary historical data for them. To do that, you need to initialize a data disk, specifying whether you want to be able to store information for a maximum of 128 or 256 periods. The manual tells you that periods can be days, weeks, or months, but as we will soon see, this is only technically correct. These periods are going to be days.

After you have decided which securities to analyze, you tell the program you want to enter them. Immediately you're hassled: *Analyzer* wants to know exactly how many securities you want to put on the disk. It needs to know this because it will not leave the input mode until it has received exactly as many stocks as you told it you would supply, and as soon as it gets them it whizzes off on other business. You had better be sure about what you enter, too, because there is no backing up for corrections. To fix things you have to finish the entry procedure, go to a different menu, and go into correction mode. A polite program would let you fix things as you go along and would let you stop entering stocks whenever you liked.

You can configure the program to flash a price alert whenever current prices meet certain conditions.

Analyzer allows you to enter historical data on your securities in two different ways: electronically with DJN/R, or manually. The manual option means that you can analyze obscure Tasmanian debentures or anything else Dow Jones doesn't bother to track. Also, it is the only way to enter weekly or monthly data; consequently, those 252 periods are very likely to be days. That *Analyzer* offers a manual option means that it could conceivably be used without a subscription to DJN/R, but it's hard to imagine anyone wanting to enter all those data points by hand.

I took the easy route. I dialed DJN/R for my historical data and immediately ran into trouble: I was prompted to enter how many "pages" of information I want for my list of securities. Nowhere does the documentation tell me what "pages" are, but it turns out that one page represents 12 days of data. This is *Analyzer*'s clumsy way of asking how much data I want to collect.

Once you're on the phone with DJN/R, get ready for a long wait while the program reads in your data. If you ask for high, low, close, and volume for the maximum number of periods (252), it will take you 7 minutes at 1200 baud to get the facts on one security. If you've got more than one, walk the dog or make yourself a ham sandwich.

When this marathon procedure is over, you discover that in order to add the latest day's trading information to

ANAS ABOUT APPLE:



You'll go crazy over the new Apple Gift Catalog. Stuffed with 148 varieties of Apple. The catalog is free. So call us toll-free.

apple

(800) 227-6703.
In CA (800) 632-7979.
Or write Apple Gift Catalog,
20525 Mariani Avenue, Dept. G.C.,
Cupertino, CA 95014

© 1983 Apple Computer Inc.

CIRCLE 119 ON READER SERVICE CARD

your historical data, you must go through yet another cumbersome procedure. This is apparently because DJN/R stores historical and current information in different databases, but *Analyzer* goes out of its way to make things difficult. The most recent day's quotes have to be collected on yet another "temporary work diskette" and then—oh my God!—transferred to the original data disk. You are compelled to shuffle disks and twiddle your thumbs until that's finally done.

Charts 'n' Things

At this point, you have up-to-date historical info on your stocks. You can either print this out in long, boring lists of numbers or in any number of exciting graphs. You hit the menu selection, "Individual Charts," and wait for 35 seconds while the graphing module loads: time enough to scratch every itchy spot on your whole body. Finally, the program decides to roll up its sleeves and do some real work. It prompts you for the security you want to chart and for the number of periods.

Since you just spent 7 minutes collecting historical information on General Motors, let's see how it did over the last 252 trading days (see Figure 5). The graph is designed to give you high, low, and close for each trading day, but there are so many data points breakdowns run together. The vertical bars below the graph are relative trading volume; they represent the natural logarithm of each day's volume figure minus the natural log of the smallest volume figure. Thus, the smallest volume day is shown as zero. The tick marks along the vertical axis are discrete dollar amounts. If GM stock had split at some point during the charting period, *Analyzer* has a routine that would let you correct for the change in price.

You can display the GM data in smaller chunks, say, 60 days (see Figure 6) or 24 days (Figure 7). These charts look very good indeed. If you like, you can chart the natural logarithm of the price on a semi-log chart so as to get a better illustration of percentage price variation at different stock prices. Also, *Analyzer* will let you stretch out or reduce either vertical or horizontal axes so you can zero in on any part of the data you like.

Most impressive, however, is *Analyzer*'s ability to draw curves through the data on your charts. To do this, you key in a few commands, and the new lines appear on the screen. In Figure 8, the plain, 60-day historical data shown in Figure 6 has been reconstituted using the program's special graph curve feature. The three parallel, curving lines in the upper chart are 12-day moving averages of closing prices. The middle curve is the moving average for the actual data points, and the curves above and below it are plotted at plus and minus 5 percent of the actual moving average. If you prefer, you could choose any number of days for your moving average, an exponential rather than simple moving average, and high or low prices for your data points rather than the close. The gently downward-sloping straight line through the middle of the chart is a linear least-squares fit of closing prices that gives the directional trend of the stock price throughout the period.

The lower chart in Figure 8 (where daily trading volume was first displayed) plots GM's negative volume indicator (NVI) over the 60-day period and then smooths that curve with a 12-day moving average. The NVI relates a drop in a stock's daily trading volume to a change in closing price. Whenever volume decreases from one day to the next, the NVI is adjusted by the percent change in the close. When volume increases, NVI remains the same. In this lower graphing space, you could choose to plot the stock's positive volume indicator, cumulative volume indicator, volume line chart, price volume trend, or daily volume indicator.

In the upper graph, there are yet more varieties of curves you may plot. You can draw straight lines between any two points, plot 1/3-2/3 spreed-resistance lines, or design oscillator bar or line charts. You may even stretch out the horizontal axes any distance into the future to project a continuation of any of the curves. Once again, the use to which you put this information is entirely up to you. If you find a relationship that seems to translate into trading profits, *Analyzer*

YEAR-TO-DATE TRANSACTIONS

TODAYS DATE 08/29/83

DATE	CODE	TRANSACTION	DESCRIPTION			AMOUNT
3/07/83	X	CASH	INITIAL DEPOSIT			12176
3/07/83	X	BUY	200 GM	@	60.88	12176
5/06/83	X	BUY	200 C	@	28.50	5700
6/13/83	X	SELL	150 GM	@	70.75	10612
6/23/83	X	SHORT SELL	100 GM	@	74.88	7488
8/24/83	X	SELL	100 C	@	23.00	2300
8/24/83	X	SHORT SELL	200 C	@	23.00	4600
8/29/83	X	DELETE	200 C	@	23.00	4600
7/27/83	X	SHORT SELL	200 F	@	62.88	12576
6/23/83	X	BUY/COVER	100 GM	@	68.25	6825

Figure 11: Record for hypothetical portfolio (Portfolio X) as generated by Market Manager.

REALIZED GAINS/LOSSES

C O D E	SYMBOL	QTY	PURCHASE DATE	PRICE	$COST	SALE DATE	PRICE	PROCEEDS	GAIN/LOSS	L / S
X	GM	150	3/07/83	60.88	9132	6/13/83	70.75	10612	1480	S
X	C	100	5/06/83	28.50	2850	8/24/83	23.00	2300	-550	S
X	GM	100	8/29/83	68.25	6825	6/23/83	74.88	7488	663	S
TOTALS:		350			18807			20400	1593	

Figure 12: A second report for Portfolio X showing the results of all sales and purchases.

HOLDINGS BY PORTFOLIO

TODAY'S DATE 08/29/83

C O D E	SYMBOL	T Y P E	B SS	TRANSACTION DATE	QUANT	$COST	PRICE	08/29/83 $VALUE	PRICE	UNREALIZD GAIN/LOSS	L / S
X	C	S	B	5/06/83	100	2,850	28.50	2,538	25 3/8	-312	S
X	F	S	SS	7/27/83	200	12,576	62.88	10,825	54 1/8	1,751	S
X	GM	S	B	3/07/83	50	3,044	60.88	3,413	68 1/4	369	S
VALUED SECURITIES LONG					150	5,894		5,951		57	
VALUED SECURITIES SHORT					200	12,576		10,825		1,751	

CASH BALANCE = 20451

Figure 13: Current holdings report for Market Manager.

will chart it for any stock you like.

In its second graphing mode, *Analyzer* creates comparative charts for up to five stocks at a time. Figure 9, for example, shows the relative performance of five different automotive stocks during the 60-day trading period. The information along the bottom of the chart (which appears on the computer screen but was inexplicably dropped from the printout) indicates which stocks are being compared, and what a $100 investment in each stock, made on June 1, 1983 would be worth on August 24. If, on the last trading day, the stock's curve is above the base-line, there has been an overall profit; if the curve ends up below the line there has been a loss.

On a color screen these lines would all be easily distinguishable, but in monochrome it's hard to tell them apart. The end point of each line can be determined from how much the $100 investment was worth at the end of the period, but in the middle of the chart it's easy to get lost. Only the plot for the first stock, which happens to be GM, is printed out in boldface and can be distinguished throughout.

If, on the last trading day, the stock's curve is above the baseline, there has been an overall profit.

Figure 10 is a slightly different kind of comparative chart. Here, the baseline is not $100 but the GM stock price, with those of Ford and American Motors plotted against it. Since I have chosen only two stocks to compare with GM and the two diverge immediately, there is no confusion, even in monochrome, over which curve is which. This kind of chart could be printed out using an industrial composite as the baseline, to show which stocks were performing better or worse than the industry as a whole. Unfortunately, *Analyzer* can't fetch composite figures from DJN/R, so those data points would have to be entered by hand.

Analyzer is, all told, quite a razzle-dazzle charting machine. It makes good use of Apple's high-resolution graphics and sends complex graphs to both screen

VISICALC* FORMATTING AIDS 4.5

A B C

1 Print VisiCalc models with variable-width columns!
2 Print selected rows and columns!
3 Insert commas in large numbers!
4 Replace 0/0.00 with -0- or other options!
5 Add local or global $ signs!
6 Add spaces between columns!
7 Add centered, multi-line report headers!
8 Print or display formulas etc. arranged in columns!
9 Much more!
10
11 VisiCalc Formatting Aids is easy to learn and use, with
12 plain English promptings. For added flexibility and
13 professional-looking reports, buy your copy today!
Apple II + /IIe, or Apple ///. 54.95 (+1.00 postage).

DATA SECURITY CONCEPTS

VISA MasterCard

P.O. Box 31044, Des Peres, MO 63131 (314) 965-5044

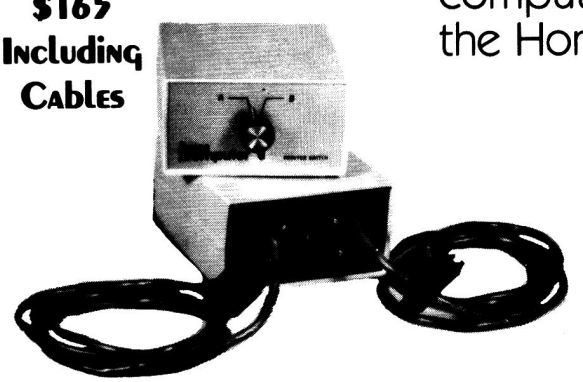
*VisiCalc is a trademark of VisiCorp Apple is a trademark of Apple Computer Co.

CIRCLE 185 ON READER SERVICE CARD

WHAT A SWITCH!

Intra's **Printer Switch** for all Personal and Business Computers lets your **W**ord**P**rocessor's copy be easily directed to either a **D**ot **M**atrix or **L**etter **Q**uality **D**aisywheel Printer. Compatible with all Centronics Parallel type interfaces, the **Printer Switch** is styled to match computer hardware in the Home or Office.

$165 Including Cables



master charge VISA

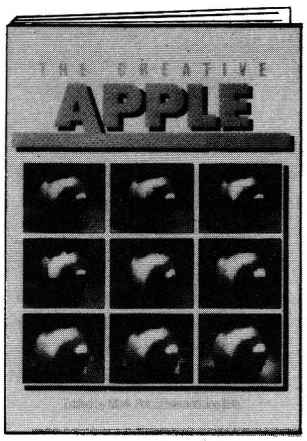
intra computer

101 W. 31st Street
New York, N.Y. 10001
(212) 947-5533

CIRCLE 186 ON READER SERVICE CARD

ATTENTION APPLE® FREAKS!

Here's the book you've been looking for!



THE CREATIVE APPLE

The Creative Apple brings you the best articles and features on the Apple to appear in the past four years of *Creative Computing.* Revised and updated, this wealth of material gives you dozens of ways to tap the tremendous potential of your Apple, improve your programming skills, and expand your computing knowledge. Graphic utilities, animation, digitized images, music editing, educational software and applications, telecomputing, home control systems, VisiCalc and many other timely topics are thoroughly examined and discussed. Ready-to-run programs give you immediate use of this informative and stimulating collection, while a chapter on tips and tricks for easier programming lets you unlock the versatility of the Apple computer—and your own resourcefulness.

Whether for business, personal budgeting, the thrill of computer games or the development of educational applications, you'll find plenty here to help you get the most out of your Apple.

The Creative Apple, edited by Mark Pelczarski and Joe Tate. 8½ x 11", softcover, illustrated. $15.95.

Apple is a registered trademark of Apple Computer, Inc.

CREATIVE COMPUTING PRESS Dept. NG8C
39 East Hanover Avenue, Morris Plains, NJ 07950

Please send me _____ copies of *Creative Apple* at $15.95 each* plus $2 postage and handling. **#18R.**

Outside USA add $3 postage and handling charge.

*CA, NJ and NY State residents add applicable sales tax.

☐ **PAYMENT ENCLOSED** $_____

☐ **CHARGE MY:**
☐ American Express ☐ MasterCard ☐ Visa

Card No._____ Exp. Date_____

Signature_____

Mr./Mrs./Ms._____
(please print full name)

Address_____ Apt._____

City_____

State_____ Zip_____

For faster service, **PHONE TOLL FREE: 800-631-8112**
(In NJ call 201-540-0445)

and printer with only moderate delays. For technical stock analysts it will save an enormous amount of time that might otherwise have gone to doing the same work by hand.

Sadly, access to this powerful graphics package is gained only through an aggressively unfriendly front end. It's not all that difficult to learn how to enter a list of securities, but while you're learning, *Analyzer* is not patient with mistakes. The program assumes you are going to do everything right the first time. If you must make a correction and enter the module that allows you to change a list of securities, you could still be in for surprises. It's tempting to think that by blanking out the symbol for a security, you have removed it from your list. Wrong. The program thinks the security is still on your list and stupidly rings up DJN/R for a symbol composed of a string of blanks. Of course there is no such security, so *Analyzer* bleeps out a cryptic error message that is not explained in the error message appendix. To actually delete a security from your list, you have to go through an entirely separate "deletion" module. This sort of thing is thoroughly bush-league; one wonders how such a slick graphics routine got mixed up with such a clumsy user interface.

Sadly, access to this powerful graphics package is gained only through an aggressively unfriendly front end.

Myopic Market Manager

Market Manager, Dow Jones' portfolio maintenance program, is not a model of elegant programming either. It does a reasonable job of keeping track of trades in up to 26 different portfolios, but suffers from several eccentricities that limit its flexibility.

After a simple setup routine, *Manager* lets you initialize a data disk. Then you are ready to start entering the data for transactions in stocks, bonds, options, mutual funds, or treasuries. The program lets you enter buy, sell, short-sell and buy-to-cover orders, and also keeps track of cash. Aside from dialing up DJN/R for current quotes, such cash or securities entries are the only data the program needs. *Manager* will thus track holdings by portfolio, record gains and losses, and keep a cumulative record of all trades.

Entering transactions is a straightforward procedure. A data-entry screen prompts you for the name of the portfolio (identified by a single letter), the date of the transaction, its nature (buy, sell short, etc.), the Dow Jones symbol, the type of security, and the transaction dollar amount. On successive entries, all but the quantity and amount will default to the values of the previous entry at the touch of the Return key. This makes it easier to enter a series of similar trades.

Unfortunately, the entry screen does little error-checking. It will allow you to enter a strictly numerical security symbol (there can be no such thing) and will record a zero for the transaction amount if you hit the Enter key by mistake. *Manager* thus lets you buy or sell stocks at a price of zero. However, so long as you catch your error before you move on to the next transaction, the program will let you return to any line in the screen and make corrections. The same module of the program allows you to delete earlier transactions or make changes in the cash account.

One clever feature of the program allows you to match closing transactions with any appropriate open position. For example, you may have bought the same stock on different occasions at different prices. When you decide to sell, the program will cycle through the portfolio and show you the various long position you could close against. Your profits (or losses) will vary acccording to which position you choose to close out, and *Manager* records the appropriate results. Whenever you buy or sell, *Manager* also reduces or increases your cash account by the appropriate amount.

Market Manager can generate three kinds of report on the portfolios it is maintaining. Figure 11 is a record of all the transactions entered for a hypothetical portfolio I have identified as X I started on March 7, 1983 with a cash injection of $12,176 to buy 200 shares of GM, and then went on to play with several other automotive stocks.

Note that a deletion from this report does not result in a true deletion; both the original error and the correction are listed. Note also that this report does not sort transactions by date; it prints each one out precisely in the order in which it was entered, no matter what date was

specified for that transaction. For example, the short sell order for Ford (next-to-last transaction) is not listed in chronological order because the entry was not made until after the fact. Also, the buy-to-cover order is listed as occurring on the date of the original short sell order, not the date on which it was actually put through.

This sort of thing would not be too great a problem if the program were being used every day for real transactions; it would be unlikely that buy/sell orders be entered in anything but chronological order. Still, any entry that was made to patch up a past error or omission would appear in the wrong order and buy-to-cover transactions would be easier to understand if the program provided both short-sell and buy dates.

A second report records realized gains and losses by portfolio. Figure 11 gives the results for Portfolio X. The last report (see Figure 12) lists the current holdings in the portfolio, showing the results of all sales and purchases. It is the only report that requires latest securities prices, which can be entered either manually or via Dow Jones. Unless *Manager* were running very large portfolios, manual updating might be a realistic option; thus this program could conceivably be used without a DJN/R subscription. The current holdings report (see Figure 13) carefully nets out sales against long positions and distinguishes nicely between long and short securities.

Unfortunately, *Manager* suffers from omissions that prevent it from being the true broker's tool it was meant to be. The

The lack of a date sorting means that the program cannot tell when one year ends and the next begins.

lack of a date-sorting routine means that the program cannot tell when one year ends and the next begins. This means you must close out the files on each portfolio at the end of the year and start over. It also means that the program doesn't recognize a long-term gain or loss when it sees one. It would be a great help if *Manager* could flag long-term transactions. Alas, it can't.

It would also be useful if *Manager* were able to factor a commission into every transaction price automatically. As the program is now designed, it is possible to adjust each transaction manually to account for commissions, but why not let the user specify commission rates and let the program do the math?

Another shortcoming is *Manager*'s inability to handle margin transactions. It would be enormously useful to a broker to be alerted by his software whenever he needed to make a margin call. Also, if the program allowed him to input periodic changes in the loan rate, it could figure margin interest charges for him. Changes such as these need not be difficult to implement and would greatly improve the program.

Finally, *Manager* has some awkward features that could surely have been avoided. It is, for example, the only package of the three that makes you shuffle between two different program disks depending on what procedure you need to perform. *Manager* is the least complex of the three programs; it's got no business coming on two disks. At the same time, it is the only program that requires you to put DJN/R log-on information on each data disk rather than putting it once and for all on the program disk: more senseless bother.

An additional annoyance, *Market Manager* can't tell the difference between single- and multiple-key input. The other two programs respond immediately when they prompt you for a single-digit or single-letter response; *Manager* loafs around until you hit Return—even after a Y/N prompt.

Perhaps it's significant that, according to the manual, parts of the program were copyrighted by the University of California back in 1979. One wonders which parts. Programming for micros has traveled light years since then.

What, then, are we to make of this trio of offerings from the mighty Dow Jones organization? Frankly, not all that much. In effect, each is nothing more than a specialized database with stock market information for input. Databases now come in all degrees of elegance and sophistication; these, unfortunately, weigh in pretty low on the list. Each program manages to get the job done but none is likely to win a user-friendliness contest.

Microscope is the most straightforward of the three. Its menus load a little too slowly, but the program does its job without too many surprises. *Analyzer*, it must be admitted, creates very fancy graphs, but only after it has snarled at you for not inputting a list of stocks perfectly the first time around. *Manager*, in spite of its clumsiness, does nothing more spectacular than match transactions, make tables, and do four-function arithmetic.

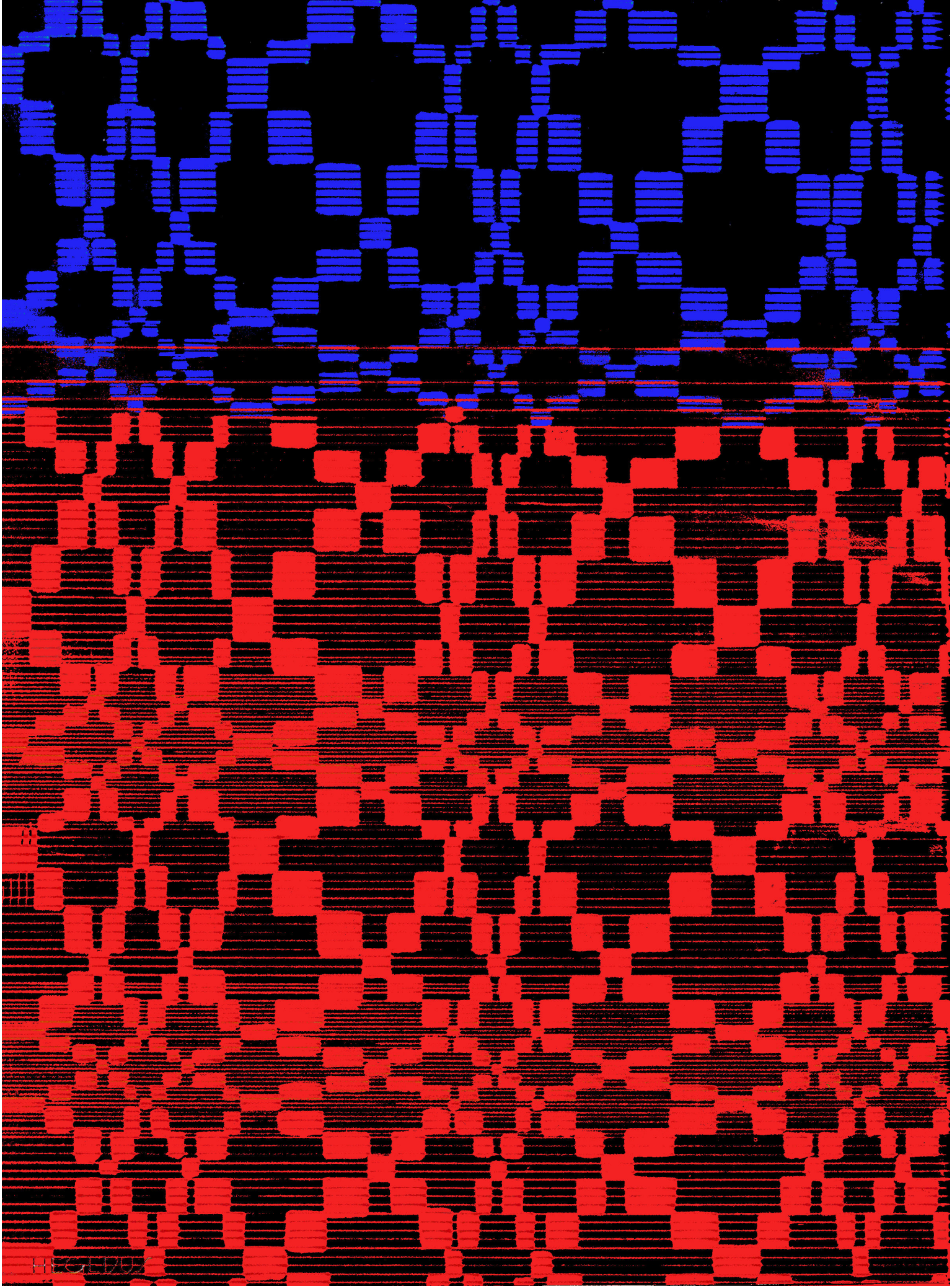
It is just as disappointing to find that these programs are not even consistent among themselves. When you store telephone numbers for automatic dialing,

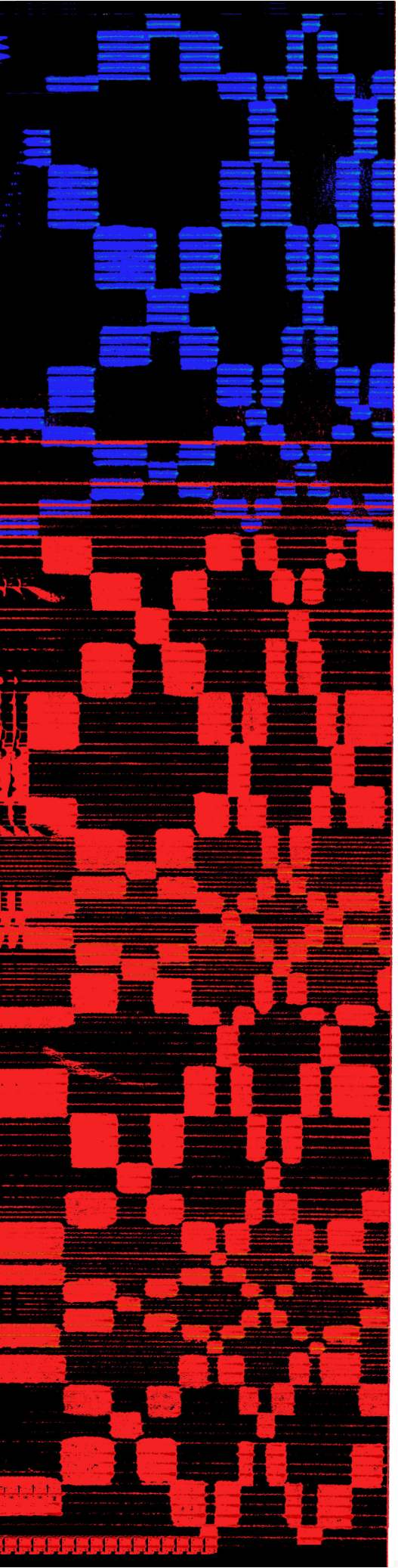
In effect, each is nothing more than a specialized database with stock market information for input.

each has a different system for specifying a pause when dialing 9 to get out of a PBX system. The hardware requirements for the three programs are not even the same. *Manager* will not work with anything but the 300-baud Hayes Micromodem II. The other two programs can be tinkered with so as to let you use a 1200-baud modem, but then you lose the auto-dial, auto-log-on features of the Micromodem. As an added eccentricity, *Microscope* will allow you to access DJN/R at 1200 baud to retrieve the specific indicators you wish to track, but will not let you leaf through the other Dow Jones databases at that speed. You need to drop down to 300 baud to use E-Z terminal mode. Only *Analyzer* will consistently let you operate at 1200 baud.

One respect in which these programs are consistent is their strict copy protection. Not only are the programs supposed to be impossible to copy, but anyone who tries will disable the original. At least that's what the manuals say, but sadly, they are at about the same level as the programs. Only the *Analyzer* manual entirely ignores a significant feature of the program (the "pages" feature) but none of the manuals is a model of clarity. All suffer from minor omissions and typographical errors.

Some day Dow Jones will no doubt smooth out the kinks in these three programs; for now, it looks as though the company was in one tearing hurry to get into the software market. ✚





APPLEWEAVE

The industrial revolution revisited: weaving applications for the Apple

Computing and weaving have a natural and historical affinity. Weaving, like computing, is dependent on precise mathematical relationships; threads are woven repetitively onto the vertical matrix of the warp, much as a program runs through a series of loops. Exactness of design and execution is required; a tiny variation in either will affect the outcome of the entire piece.

Apple owner and part-time weaver Arnold Edelstein recognized this connection and created a simple program called AppleWeave to aid home weavers in the design and production of their art. By removing the hard work and leaving only the joy of creation, the program gives artisans the flexibility and economies of scale usually available only to large-scale manufacturers.

Besides being chairman of the English Department at the University of Hawaii, Edelstein is also an accomplished home weaver whose work has been shown at the annual Art Academy Exhibits in Honolulu. His work is sold through various local stores.

Charles Babbage: Programming Pioneer

Through his work, Edelstein without realizing it pays homage to Charles Babbage, the nineteenth-century designer of the first computer. Curiously, Babbage was inspired by the then newly mechanized British textile industry. He was especially impressed with the automated Jacquard loom, which debuted at the Paris exhibition of 1801. Its creator, Joseph Maria Jacquard, had improved on the earlier attempts of the Frenchmen Bouchon and Vaucansons to increase the efficiency and decrease the human drudgery involved in weaving silk—a delicate, skilled, but repetitive task.

The Jacquard breakthrough was brought about by the use of stiff cards with holes punched through them. These cards controlled the weaving pattern, making the Jacquard loom the first programmable machine. It was immensely successful, and within 11 years of its introduction, over 11,000 were in use in France.

Babbage was also impressed with the mathematical predictability and precision of the new cotton spinning factories springing up all over England. He envisioned a world where the tremendous efficiency of the power loom enabled weavers to have greater autonomy and creativity in the production of their work.

Factory production, the keystone of the Industrial Revolution, led to the development of larger businesses than had previously existed. Keeping track of the sheer volume of information involved in the operation of these new large businesses meant that some people would be required to spend their entire lives dealing with the drudgery of routine, repetitive calculations. Improvements in manufacturing were intimately linked with the evolution of calculating machines.

By 1833, Babbage began applying

the punched card concept of the Jacquard loom to an invention he called the "Analytical Engine." This machine would perform any mathematical operation. It would have memory that could store numbers, and it would be able to make comparisons with the results of various operations. In short, Babbage envisioned the modern computer.

The poet Byron's daughter, Lady Ada Lovelace, was an accomplished mathematician and a contemporary of Babbage's. She followed the progress of Babbage's machine and was also aware of its textile heritage. She wrote: "We may say most aptly, that the Analytical Engine weaves algebraical patterns just as the Jacquard loom weaves flowers and leaves."

Babbage spent 4 decades working on his idea, but the Analytical Engine was never built. It was impossible to manufacture the parts for the machine precisely enough. What Babbage lacked was electronics. He was ahead of his time.

Edelstein without realizing it pays homage to Charles Babbage, the nineteenth century designer of the first computer.

Bigger and Better

About 150 years later, Arnold Edelstein returned the computer to its origins in weaving and textiles. Edelstein took up weaving after finishing the writing of a book during his sabbatical. His work followed the weaving tradition brought to Hawaii by New England missionaries in the nineteenth century. Starting with their traditional blue-and-white star patterns, he moved into his own style of earth-toned, free-flowing abstract designs. He progressed from a simple two-harness tapestry loom, similar to the ones the Navajo use for weaving rugs, to an eight-harness floor loom.

He worked out his designs for rugs and wall hangings on a grid formed by the intersection of two dimensions. The boxes so created represented design blocks. By varying the order of anywhere from two to eight design blocks, different patterns could be created. The pattern was then translated into a threading diagram and a treadling diagram, controlling the order in which threads were entered onto the loom and raised

```
                1     ********************************
                2     *          WEAVE PROGRAM       *
                3     *       by Arnold Edelstein    *
                4     *                              *
                5     *   NOTE: The PLOT routine was *
                6     *    bagged from the very old  *
                7     *    INTEGER HIRES routines.   *
                8     *                              *
                9     *                              *
                10    *                              *
                11    ********************************
                12
                13
                14    HBASL   =   $26
                15    HBASH   =   $27
                16    X0L     =   $0328
                17    X0H     =   $0329
                18    Y0      =   $032A
                19    HCOLR   =   $032C
                20    HNDX    =   $032D
                21    HPAG    =   $032E
                22    XLBUFF  =   $4000
                23    XHBUFF  =   $4100
                24    YBUFF   =   $4200
                25    TXTCLR  =   $C050
                26    MIXCLR  =   $C052
                27    MIXSET  =   $C053
                28    HIRES   =   $C057
                29
                30            ORG $6000
                31
                32    * The somewhat bizarre manipulations here all
                33    * accomplish one purpose: to keep track of
                34    * two arrays, one of which is longer than a
                35    * a single page. I should probably rewrite
                36    * it now that I know more about assembly-language
                37    * programming, but it works and I'm lazy.
                38
6000: 00 00 00
6003: 00 00 00  39    DATA      HEX   000000000000
6006: 20 90 60  40              JSR   GRAPHIC
6009: AD 52 C0  41              LDA   MIXCLR
600C: A9 FF     42    INIT      LDA   #$FF
600E: 8D 2C 03  43              STA   HCOLR
6011: A9 00     44              LDA   #$00
6013: 8D 00 60  45              STA   DATA
6016: 8D 02 60  46              STA   DATA+2
6019: 8D 03 60  47              STA   DATA+3
601C: 8D 04 60  48              STA   DATA+4
601F: A9 C1     49              LDA   #$C1
6021: 8D 01 60  50              STA   DATA+1
6024: A9 01     51              LDA   #$01
6026: 8D 05 60  52              STA   DATA+5
6029: 4C 5E 60  53              JMP   COMPARE
602C: A9 00     54    NEXT      LDA   #$00
602E: 8D 00 60  55              STA   DATA
6031: EE 02 60  56              INC   DATA+2
6034: AD 03 60  57              LDA   DATA+3
6037: CD 02 60  58              CMP   DATA+2
603A: D0 17     59              BNE   BEGIN
603C: A9 01     60              LDA   #$01
603E: CD 05 60  61              CMP   DATA+5
6041: F0 01     62              BEQ   NEXT1
6043: 60        63              RTS
6044: A9 00     64    NEXT1     LDA   #$00
6046: 8D 05 60  65              STA   DATA+5
6049: A9 18     66              LDA   #$18
604B: 8D 03 60  67              STA   DATA+3
604E: A9 01     68              LDA   #$01
6050: 8D 04 60  69              STA   DATA+4
6053: EE 00 60  70    BEGIN     INC   DATA
6056: AD 01 60  71              LDA   DATA+1
6059: CD 00 60  72              CMP   DATA
605C: F0 CE     73              BEQ   NEXT
605E: AE 00 60  74    COMPARE   LXD   DATA
6061: A9 01     75              LDA   #$01
6063: CD 05 60  76              CMP   DATA+5
6066: D0 0E     77              BNE   COMP1
6068: AC 02 60  78              LDY   DATA+2
606B: BD 00 42  79              LDA   YBUFF,X
606E: D9 00 40  80              CMP   XLBUFF,Y
6071: D0 E0     81              BNE   BEGIN
6073: 4C 81 60  82              JMP   MATCH
6076: AC 02 60  83    COMP1     LDY   DATA+2
6079: BD 00 42  84              LDA   YBUFF,X
607C: D9 00 41  85              CMP   XHBUFF,Y
607F: D0 D2     86              BNE   BEGIN
6081: AD 00 60  87    MATCH     LDA   DATA
6084: AE 02 60  88              LDX   DATA+2
6087: AC 04 60  89              LDY   DATA+4
608A: 20 0C 61  90              JSR   HPLOT
608D: 4C 53 60  91              JMP   BEGIN
6090: A9 20     92    GRAPHIC   LDA   #$20
6092: 8D 2E 03  93              STA   HPAG
6095: AD 57 C0  94              LDA   HIRES
6098: AD 53 C0  95              LDA   MIXSET
609B: AD 50 C0  96              LDA   TXTCLR
609E: AD 2E 03  97              LDA   HPAG
60A1: 85 1B     98              STA   $1B
60A3: A0 00     99              LDY   #$00
60A5: 84 1A     100             STY   $1A
60A7: 98        101   GRAPH1    TYA
60A8: 91 1A     102   GRAPH2    STA   ($1A),Y
60AA: CB        103             INY
60AB: D0 FB     104             BNE   GRAPH2
60AD: E6 1B     105             INC   $1B
60AF: A5 1B     106             LDA   $1B
60B1: 29 1F     107             AND   #$1F
60B3: D0 F2     108             BNE   GRAPH1
60B5: 60        109             RTS
60B6: 8D 2A 03  110   HPOSN     STA   Y0
60B9: 8E 28 03  111             STX   X0L
60BC: 8C 29 03  112             STY   X0H
60BF: 48        113             PHA
60C0: 29 C0     114             AND   #$C0
60C2: 85 26     115             STA   HBASL
60C4: 4A        116             LSR
60C5: 4A        117             LSR
60C6: 05 26     118             ORA   HBASL
60C8: 85 26     119             STA   HBASL
```

```
60CA:  68          120           PLA
60CB:  85  27      121           STA  HBASH
60CD:  0A          122           ASL
60CE:  0A          123           ASL
60CF:  0A          124           ASL
60D0:  26  27      125           ROL  HBASH
60D2:  0A          126           ASL
60D3:  26  27      127           ROL  HBASH
60D5:  0A          128           ASL
60D6:  66  26      129  ROR           HBASL
60D8   A5  27      130           LDA  HBASH
60DA:  29  1F      131           AND  #$1F
60BC:  0D  2E  03  132           ORA  HPAG
60DF:  85  27      133           STA  HBASH
60E1:  8A          134           TXA
60E2:  C0  00      135           CPY  #$00
60E4:  F0  05      136           BEQ  HPOSN2
60E6:  A0  23      137           LDY  #$23
60E8:  69  04      138           ADC  #$04
60EA:  C8          139  HPOSN1   INY
60EB:  E9  07      140  HPOSN2   SBC  #$07
60ED:  B0  FB      141           BCS  HPOSN1
60EF:  8C  2D  03  142           STY  HNDX
60F2:  AA          143           TAX
60F3:  BD  0C  60  144           LDA  INIT,X     ; Offset to MASK
60F6:  85  30      145           STA  $30
60F8:  98          146           TYA
60F9:  4A          147           LSR
60FA:  AD  2C  03  148           LDA  HCOLR
60FD:  90  03      149           BCC  HPOSN3
60FF:  0A          150           ASL
6100:  69  00      151           ADC  #$00
6102:  85  1C      152  HPOSN3   STA  $1C
6104:  60          153           RTS
6105:  01  02  04
6108:  08  10  20
610B:  40          154           HEX  01020408102040 ; This is the MASK
610C:  20  B6  60  155  HPLOT    JSR  HPOSN
610F:  51  26      156           EOR  (HBASL),Y
6111:  25  30      157           AND  $30
6113:  51  26      158           EOR  (HBASL),Y
6115:  91  26      159           STA  (HBASL),Y
6117:  60          160           RTS

-END ASSEMBLY-

ERRORS: 0

280 BYTES


SYMBOL TABLE - ALPHABETICAL ORDER:

BEGIN   =$6053   COMP1   =$6076   COMPARE =$605E   DATA    =$6000
GRAPH1  =$60A7   GRAPH2  =$60A8   GRAPHIC =$6090   HBASH   =$27
HBASL   =$26     HCOLR   =$032C   HIRES   =$C057   HNDX    =$032D
HPAG    =$032E   HPLOT   =$610C   HPOSN   =$60B6   HPOSN1  =$60EA
HPOSN2  =$60EB   HPOSN3  =$6102   INIT    =$600C   MATCH   =$6081
MIXCLR  =$C052   MIXSET  =$C053   NEXT    =$602C   NEXT1   =$6044
TXTCLR  =$C050   XOH     =$0329   XOL     =$0328   XHBUFF  =$4100
XLBUFF  =$4000   YO      =$032A   YBUFF   =$4200


SYMBOL TABLE - NUMERICAL ORDER:

HBASL    =$26     HBASH   =$27     XOL    =$0328   XOH     =$0329
YO       =$032A   HCOLR   =$032C   HNDX   =$032D   HPAG    =$032E
XLBUFF   =$4000   XHBUFF  =$4100   YBUFF  =$4200   DATA    =$6000
INIT     =$600C   NEXT    =$602C   NEXT   =$6044   BEGIN   =$6053
COMPARE  =$605E   COMP1   =$6076   MATCH  =$6081   GRAPHIC =$6090
GRAPH1   =$60A7   GRAPH2  =$60A8   HPOSN  =$60B6   HPOSN1  =$60EA
HPOSN2   =$60EB   HPOSN3  =$6102   HPLOT  =$610C   TXTCLR  =$C050
MIXCLR   =$C052   MIXSET  =$C053   HIRES  =$C057


Applesoft Driver

1  ONERR GOTO 10000
2  DIM A(279)
5  FOR I = 0 TO 279
10  READ A(I): NEXT
12  FOR I = 0 TO 191
15  POKE 16384 + I,A(I): REM "X" buffer
20  POKE 16896 + I,A(I): REM "Y" buffer
30  NEXT I
40  FOR I = 192 TO 279
45  POKE 16384 + I,A(I): REM "X" buffer
50  NEXT I
70  IF PEEK (24582) + PEEK (24583) + PEEK (24584) < > 272 THEN PRINT
      CHR$ (4)"BLOAD WEAVE"
80  CALL 24582
90  REM

The numbers refer to pattern blocks

100  DATA 4,3,2,1,1,1,8,7,6,5,6,7,8,1,1,1,2,2,3,3,3,4,3,3,4,3,3,4,3,4,3,3,
     4,3,3,4,3,3,3,2,2,1,1,8,7,6,5,6,7,8
110  DATA 1,1,1,2,3,4,3,2,1,2,3,4,4,4,3,2,1,2,3,4,3,2
120  DATA 1,1,1,2,3,4,3,2,1,2,3,4,4,4,3,2,1,2,3,4,3,2
130  DATA 1,1,1,2,3,4,3,2,1,2,3,4,4,4,3,2,1,2,3
9000  END
9999  REM

The error routine makes sure the "X" array will cover the screen by repeating
the pattern.
10000  IF PEEK (222) < > 42 THEN PRINT "ERROR #"; PEEK (222):" IN LINE";
       PEEK (218) + PEEK (219) * 256: END
10010 N = I
10020  FOR I = N TO 279
10030 A(I) = A(I - N)
10040  NEXT I
10050  GOTO 12
```

and lowered during the weaving process.

His works grew in size and complexity; he began to make 9-foot-long linen and silk weavings. Working with costly materials on such a grand scale required careful calculations.

Edelstein also liked working on the concrete problems of developing good design and technique and of combining color and texture to achieve the effects he desired. It was a welcome change from grappling with the vagaries of teaching the American novel. Each work represented a tangible aesthetic problem. According to Edelstein: "When the piece is finished, so is the problem.

Before and After

This same interest in practical problem solving led him to computers. He became interested when his wife took a statistics class involving computers. Intrigued, Edelstein began using her access number to experiment with the University's Hewlett Packard and became hooked. He purchased an Apple, particularly because of its high-resolution graphics.

Before getting the Apple each design took about 45 minutes. With the Apple, he could write a simple program to speed up the process.

Before getting the Apple, he designed weaving patterns with graph paper and felt-tip pens. Each design took about 45 minutes. With the Apple, he could write a simple program to speed up the process.

Using the Applesoft handbook as his guide, he wrote a simple program representing the vertical and horizontal dimensions of his loom. He would enter the pattern in data statements, read it into an array representing the x-dimension, restore and then read it into a second array representing the y-dimension. A double loop would compare the two arrays and plot a point where the values were equal. If they were not equal, a blank was left. The program generated 28-inch × 19-inch pattern drafts on cross-section paper set at 10 units per inch.

This was a tremendous improvement over the old method. Each design now

PERSUASIVE PERIPHERAL

Creative Computing not only sells itself at a nice profit, it creates awareness of the hardware and software in your store. It's like having another salesperson on your staff—one who *pays you.* One who goes home with customers and continues to influence buying decisions long after you're closed for the day. If you're interested in a low-ticket item with top-of-the-line sales power, let's talk now.



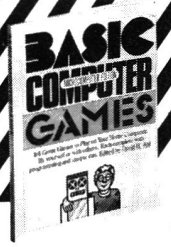
ZD

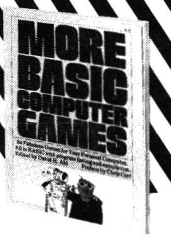
CALL COLLECT: (212) 725-7679

Or write: Ziff-Davis Publishing Company
Computers and Electronics Publications
Retail Sales
One Park Avenue
New York, NY 10016

Minimum order, 10 copies. We pay all shipping costs to your store.

GAMES! GAMES! GAMES!





Action books from *Creative Computing*

Basic Computer Games, edited by David Ahl, is a great collection of 101 fascinating game programs, all written in easy-to-use Microsoft® BASIC. Play Craps, Combat, Lunar LEM Rocket, Boxing, Bowling—and 96 others. With introduction, notes on Microsoft BASIC, and conversion table for other BASICs.

More Basic Computer Games, edited by David Ahl and Steve North, is a challenging sequel with 84 exciting new games. Complete with sample runs, program listings and illustrations. All games run in Microsoft BASIC (conversion table included).

More Basic Computer Games also available in TRS-80® edition. Each volume is 8¼" x 11", softcover, illustrated.

Only $7.95 each!

Registered Trademarks: Microsoft: *Microsoft Consumer Products, Inc.*; TRS-80: *Radio Shack Division of Tandy Corp.*

For faster service,
PHONE TOLL FREE:
800-631-8112
(In NJ only: 201-540-0445)

Also available at your local bookstore or computer store.

Creative Computing Press
Dept. **NG7C** 39 East Hanover Avenue
Morris Plains, NJ 07950

Send me _____ **Basic Computer Games** at $7.95* plus $1.50 postage and handling each. #6C

Send me _____ **More Basic Computer Games** at $7.95* plus $1.50 postage and handling each. #6C2

Send me _____ **More Basic Computer Games, TRS-80 Edition** at $7.95* plus $1.50 postage and handling each. #6C4

☐ **PAYMENT ENCLOSED** $_____
*Residents of CA, NJ and NY State add applicable sales tax. Outside USA add $3.00 per order.

☐ **CHARGE MY:** (Charge and phone orders $10 minimum.)
☐ American Express ☐ MasterCard ☐ Visa

Card No. _____ Exp. Date _____

Signature _____

Mr./Mrs./Ms. _____
(please print full name)

Address _____ Apt. _____

City/State/Zip _____

☐ Send me a FREE Creative Computing Catalog.

took about only 7 or 8 minutes. But the process still seemed inefficient to Edelstein because it took too long to generate each design possibility. As he said, "I could still go out and have a beer" in the time it took for each pattern to appear on the screen. It occurred to him that he might get faster results if he rewrote his BASIC program in assembly language.

On to BASICs

Assembly language is one step closer than BASIC to the actual operation of the computer. It is one step above machine language because it is the language the computer "thinks" in. BASIC actually is a program driven by assembly language.

Rewriting the program in assembly language would increase processing efficiency. To do this, he had to manipulate how the computer went about executing the tasks he assigned it. He would be able to dictate at a more fundamental level how he wanted the machine to perform the programmed task.

A mini-assembler would have enabled him to write instructions in assembly language and would, in turn, have translated his instructions into machine language. However, Edelstein didn't own the only mini-assembler on the market at that time. He found it primitive and was not tempted to buy it. He would have to use other means to attack the problem.

In short, Babbage envisioned the modern computer . . . What Babbage lacked was electronics. He was ahead of his time.

As he soon discovered, there were few available books or manuals on the use of assembly language with the Apple. Edelstein checked with the store where he bought his Apple, to no avail. He and his local user group struggled to teach themselves assembly language. "It was awful," he said. "It took us about 4 hours to learn how to add."

Finally, he was able to get some information from *CALL-A.P.P.L.E.*, the publication of the Puget Sound Users' Group. He came across a book on the PET 6502, the Apple's microprocessor. These guides enabled him to translate his BASIC program into assembly language.

The program began as before, with two arrays and Applesoft data statements. Instead of comparing the arrays in BASIC, they were poked into two buffers. Assembly language then ran the

He could now look at an entire series of design variations in the time previously required to map out a single design.

loops, indexing one array with the x-register and the other with the y-register. When a match was made, the program did a subroutine to a plot routine that Edelstein copied from the graphics package accompanying the Apple. The results were satisfying; it now took 7 seconds to fill the screen with a pattern of his design.

He could now look at an entire series of design variations in the time previously required to map out a single design by hand. Studying the images, he could quickly pick designs for production or save each one for future reference as it came up. The EXEC command allowed him to switch back and forth between two or three variations. He could develop a central pattern that he liked and put three alternative borders on a loop. He could then decide which of the three combinations represented the best design solution.

After settling on a pattern, he used another program he developed to convert the pattern draft into a threading list. The list could either be copied from the terminal screen or printed out on hard copy that could be taken directly to the loom. After creating a threading list, he could use still another program to determine the amount of yarn needed for both warp and weft (fixed threads and cross threads). The width or number of thread, the kind of yarn, and the yarn size would be entered, and the amount of yarn he needed would be computed in both ounces and grams.

Because he also exhibited and sold many of his pieces, he used his Apple for the business management of his craft. He created a small general ledger program for Edelstein Eccentricities, the name he gave to his business. He wrote a yarn inventory prgram that calculated the amount and cost of yarn by type and by piece of completed work, and a finished work program that kept track of each

MA T.M. MARKET ANALYST

THE LEADER FOR WISE INVESTORS

The Complete Investment Analysis Package, Including:

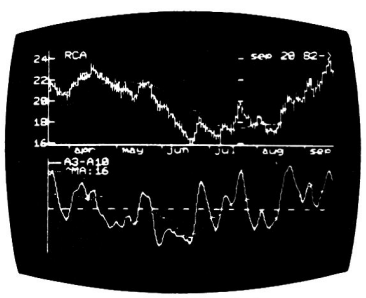
Technical Analysis — Fastest charting • Dynamically changeable time scales • Daily, weekly, and monthly charts • Moving averages • Trend lines • Price/volume • Volume indicators • Oscillators • Custom formulas • Compare issues or indicators • Search for and select desired chart formations • Up to five years of daily data per file • Automatic data capture from two databases

Portfolio Management — Advance warning of positions about to go long • Reports to screen or printer • Estimates out commissions for net unrealized gain/loss • Tax accounting

Telecommunications — Access news, market commentary and quotes • Holds 20-30 pages of dialog for off-line review and printing

MARKET ANALYST...
Available from selected dealers or from Anidata. Includes WCS Password and sample stock database.

Apple II/II+/IIe
IBM PC ...$495
Apple is a registered t.m. of Apple Computer, Inc.



ANIDATA
(609) 228-3034

distributed by
STRSOFT
The best business software in the business.

Call 800-882-8000
In California, (415) 965-8000.

Dealer inquires invited

CIRCLE 188 ON READER SERVICE CARD

the universal test system™

A Dramatic Breakthrough In "Personal Instrumentation" For All Apple* Users, Offering Low Cost & Ease of Use.

- **MEASURE** 1. Voltage 2. Current 3. Resistance 4. Capacitance 5. Temperature. Each channel can be configured to measure any one of these five values . . .
- **1 to 4 CHANNELS** of input may be viewed and/or recorded to disk simultaneously with optional expansion to suit your needs . . .
- **MENU DRIVEN** for ease of operation . . .
- **AUTO RANGE/AUTO POLARITY** simplifies use to unburden the user . . .
- **GRAPHIC, NUMERIC & AUDIBLE** output with upper/lower limit presets . . .
- **INTERFACE** to clock card for time controlled readings (Sec, Min, Hour, Day) . . .
- **GRAPH MODE** gives oscilloscope display of parameters vs. time . . .
- **FAST RESPONSE TIME & HIGH ACCURACY** . . .
- **USES SINGLE I/O SLOT** software supplied on unprotected disk . . .
- **ISOLATED INPUT STAGE** allows differential readings to 1500 volts common mode . . .

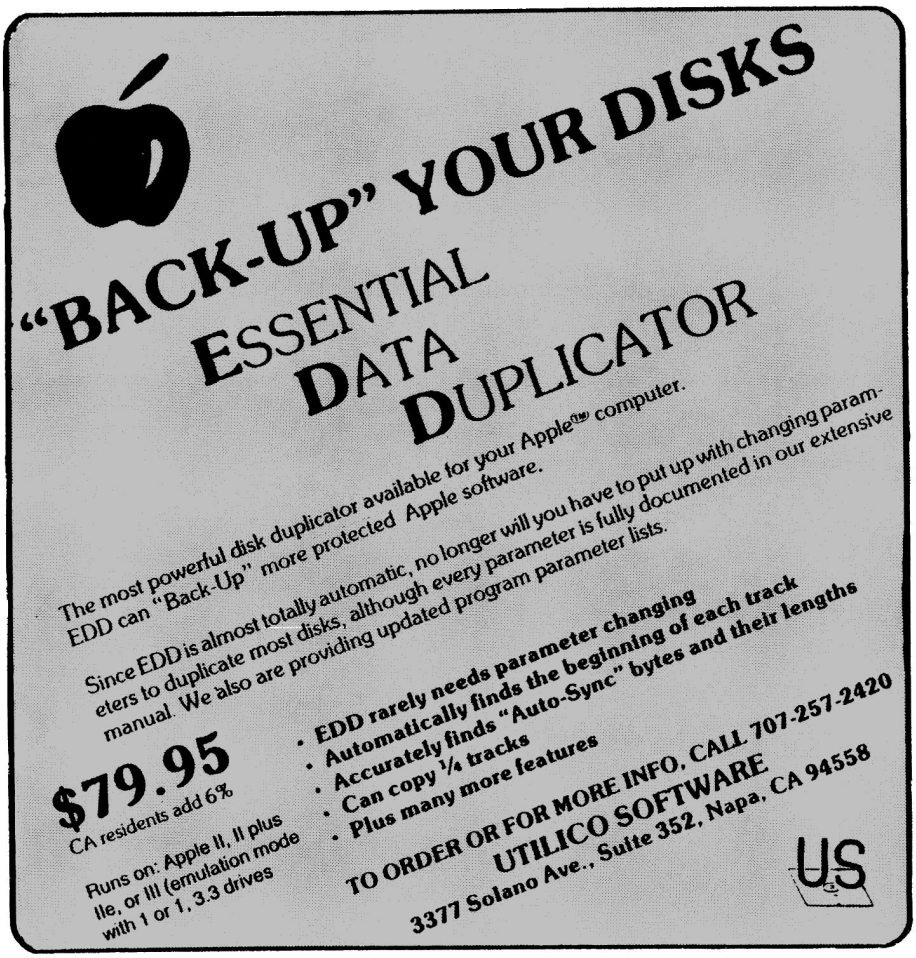
USEFUL FOR:
ELECTRONICS REPAIR & CONSTRUCTION (Replaces Digital Multimeter)
DATA LOGGING (Eliminates Need For Chart Recorders & Oscillographs)
PRODUCTION TESTING (Parts Sorting, Component Screening, GO-NO GO)
BURN-IN TRACKING (Activate Alarm If Component Fails)
PROTOTYPING • HOBBY

*APPLE is a registered trademark of APPLE COMPUTER INC.

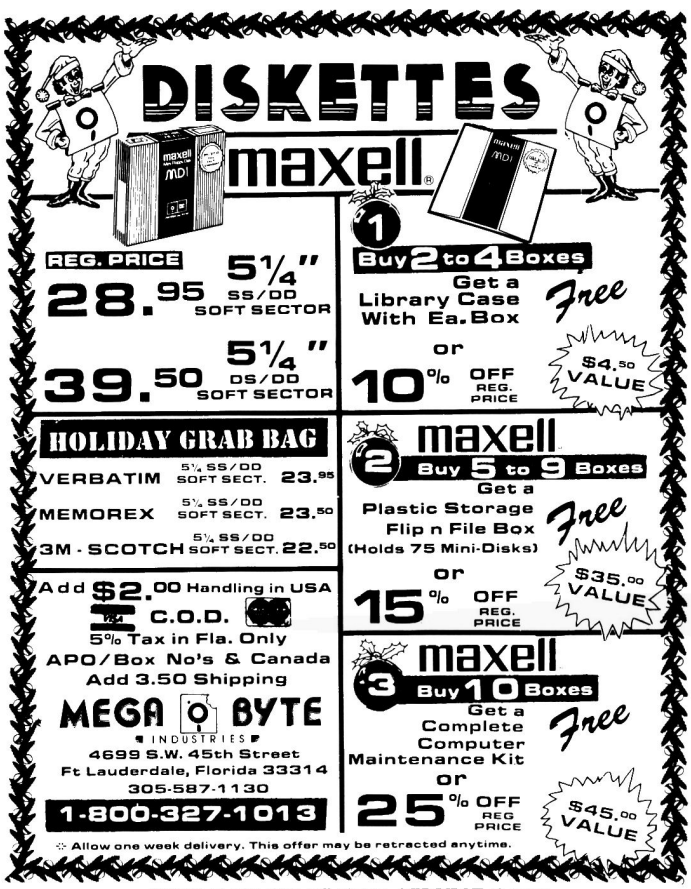
Dealer Inquiries Invited

FAST FEEDBACK TECHNOLOGIES
4009 Pacific Coast Highway, Torrance, Ca. 90505 • *213/540-7705*
©1983 FFT

CIRCLE 189 ON READER SERVICE CARD



CIRCLE 190 ON READER SERVICE CARD



CIRCLE 168 ON READER SERVICE CARD

piece by status, title, and description.

Eventually, he acquired a black-and-white monitor, which gave him better resolution than his terminal screen. He became aware that the colors available on the Apple were not true to the colors of his yarns, if only because spectroscopic light cannot have the same qualities as reflected light. He felt that the effects of color and texture created when yarns are twisted together and intermingled could not be simulated on the screen. Edelstein now relies on his native color sense to determine color choice, once he has chosen one of his computer-aided designs.

Babbage's Dream Come True

Recently, a commercial manufacturer of looms for craftspeople developed software for its semiautomatic loom. The Macomber Company has two programs for its Dobby loom; one is for design purposes, much like Arnold Edelstein's. The other actually runs the loom. It is reminiscent of Charles Babbage's dream of skilled home weavers empowered by automation.

"I could still go out and have a beer" in the time it took for each pattern to appear on the screen.

In spite of the efficiency gains that this package represents, Edelstein is not interested. He enjoys the entire process, from conceptual work to the actual weaving, and he has no interest in automating himself out of the picture. His goal has never been to fully automate his weaving, but to enhance the creative aspects and minimize the routine ones. The results of his decision to rely on his intuition instead of the Apple generated colors in designing tapestries, for example, greatly pleased him.

AppleWeave is merely a tool. It is different from computer-generated art in that it is not a demonstration of intellectual virtuosity or technical expertise. It is, instead, a vehicle that fosters the artist's creativity.

Edelstein's Eccentricities has suffered a bit during the last 2 years, due to Edelstein's decision to tour China. When the time came for his trip, he unplugged his Apple and took it with him. "But," he says, "that's another story." ✚

1984 Business Activity Planner



IT'S A GREAT GIFT IDEA, TOO!

Imagine! A complete Appointment Book, Financial Record Keeping System, Travel Information Guide, Health and Fitness Aid and Directory... All in one book!

No matter how organized and successful you are today, our Planner will make you even better in the future... or your money back!

IT'S AN APPOINTMENT BOOK!
SEE-A-WEEK CALENDAR
■ A full week... at a glance! Time planning becomes easy when your appointments, meetings, luncheon and dinner engagements and special activities are in front of you.

HALF-HOUR TIME SCHEDULING
■ Convenient scheduling... seven days a week.

THINGS TO DO TODAY
■ Keep track of important follow-ups, telephone calls and correspondence.

SEVEN SNAP-LOCK RINGS
■ The seven ring format insures that your pages won't pull out... unless you want them to!

BEAUTIFUL, SOFT, LEATHER-LIKE BINDER
■ Padded front and back, your 9½ x 11½ Planner is comfortable to carry. You can take it with you wherever you go. The sturdy, permanent bookmark always keeps you in the right week and the two inside pockets enable you to keep all your important papers in your **1984 Activity Planner.**

YOUR CHOICE OF IMPRINTS
■ Order the 1984 Business Activity Planner for everyone in your office ... and select the cover imprint for each person! Available with Business Activity Planner, Chairman of the Board Activity Planner, Executive Woman Activity Planner, or Executive Activity Planner.

IT'S MUCH MORE!
■ Each Section is Index-Tabbed for Instant Retrieval of Information.

FINANCIAL RECORD KEEPER
■ 12 Income and Expense Reports
■ 1984 Business Tax Calendar
■ Executive Compensation Checklist
■ Personal Investment Portfolio

HEALTH AND FITNESS AID
■ Fat - Cholesterol - Calorie Charts
■ Value of Various Exercises
■ Substitution Chart for Better Health
■ First Aid Tips

TRAVEL INFORMATION
■ Average Temperatures for Most Major Cities
■ Rank and Population of the Top 100 U.S. Cities
■ Traveling Distances
■ Toll-Free Telephone Numbers for Major Airlines, Auto Rentals, Hotels, Motels and much more!

MISCELLANEOUS
This section is filled with valuable information including Principal Holidays, French and California Wine Vintage Charts and more.

DIRECTORY
Places all emergency and important telephone numbers at your fingertips.

ZIFF-DAVIS ACTIVITY PLANNER P.O. Box 16-2354, Miami, FL 33116
Please send me the following 1984 Activity Planners at $38.95* each plus $5 per copy postage and handling. Outside U.S.A. add $10 per copy postage and handling.

Specify quantity for each cover imprint ordered:
____ Business Activity Planner(s)
____ Chairman of the Board Activity Planner(s)
____ Executive Woman Activity Planner(s)
____ Executive Activity Planner(s)

QUANTITY DISCOUNTS
(on total number of Planners)

6-20	10% off	($4 P&H each)
21-50	15% off	($3 P&H each)
51-or more	20% off	($2 P&H each)

☐ Payment enclosed. ☐ American Express ☐ Visa ☐ MasterCard ☐ Purchase Order enclosed.
Card No. _____ Exp. Date _____
Signature _____
Name _____ (please print)
Company _____
Address _____
City/State/Zip _____

*Florida residents add 5% sales tax.
SATISFACTION GUARANTEED or return AP11 within 10 days for a prompt refund!

FOR FASTER SERVICE CALL TOLL FREE
800-327-1969
(In Fla. and Canada call (305) 595-8744.)

EDUCATION / BY A. RICHARD IMMEL

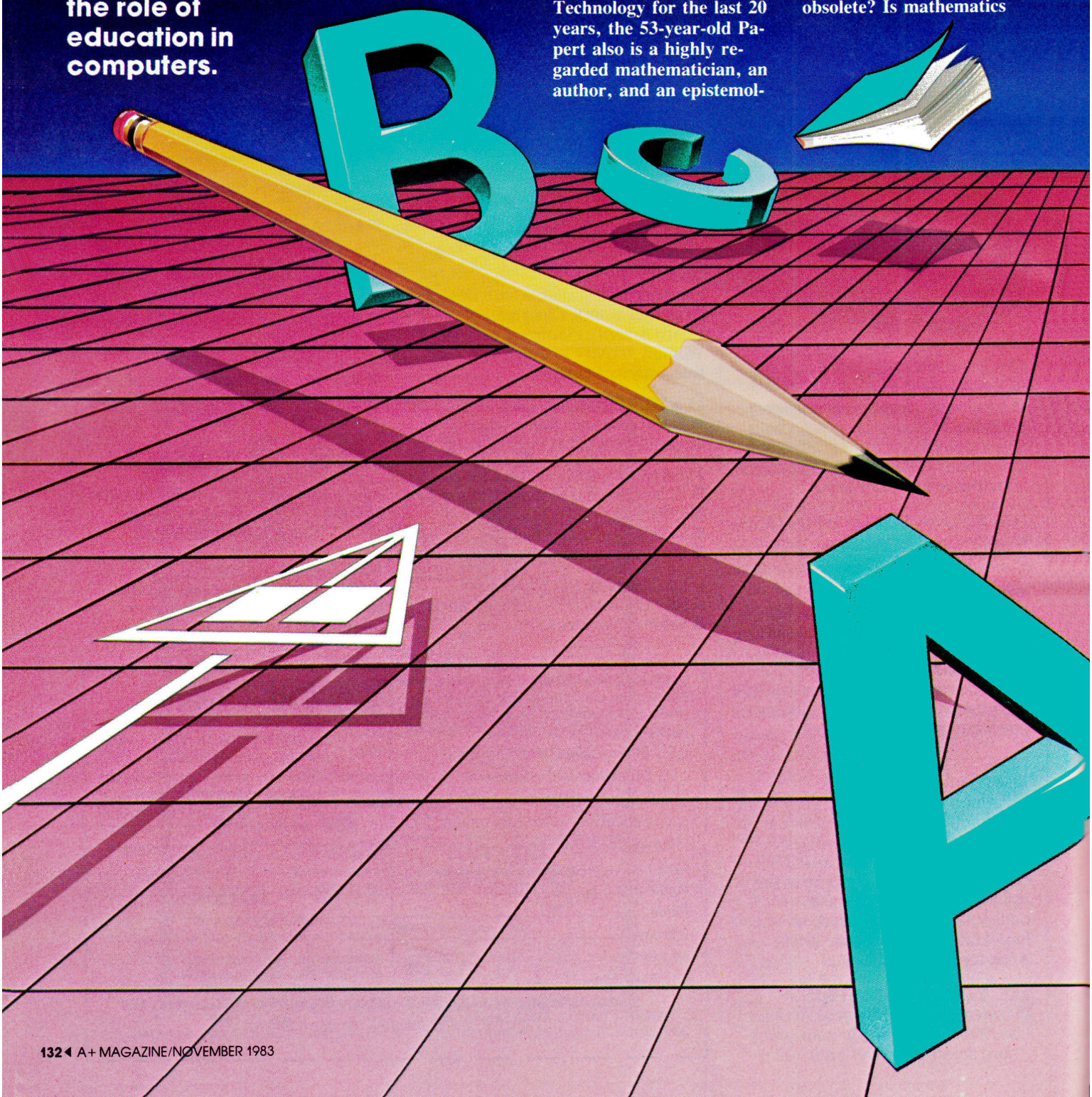
THE FATHE

Seymour Papert talks about the role of computers in education—and the role of education in computers.

As the debate over the true worth of microcomputers in the classroom brews, experts on both sides likely will find themselves faced with the controversial ideas of Seymour Papert, a computer scientist best known for his theories on the role of computers in education and society.

A professor at the Massachusetts Institute of Technology for the last 20 years, the 53-year-old Papert also is a highly regarded mathematician, an author, and an epistemologist.

In his career, Dr. Papert, who holds a Ph.D. in the mathematics field, has focused on such weighty issues as: Are schools as we know them obsolete? Is mathematics

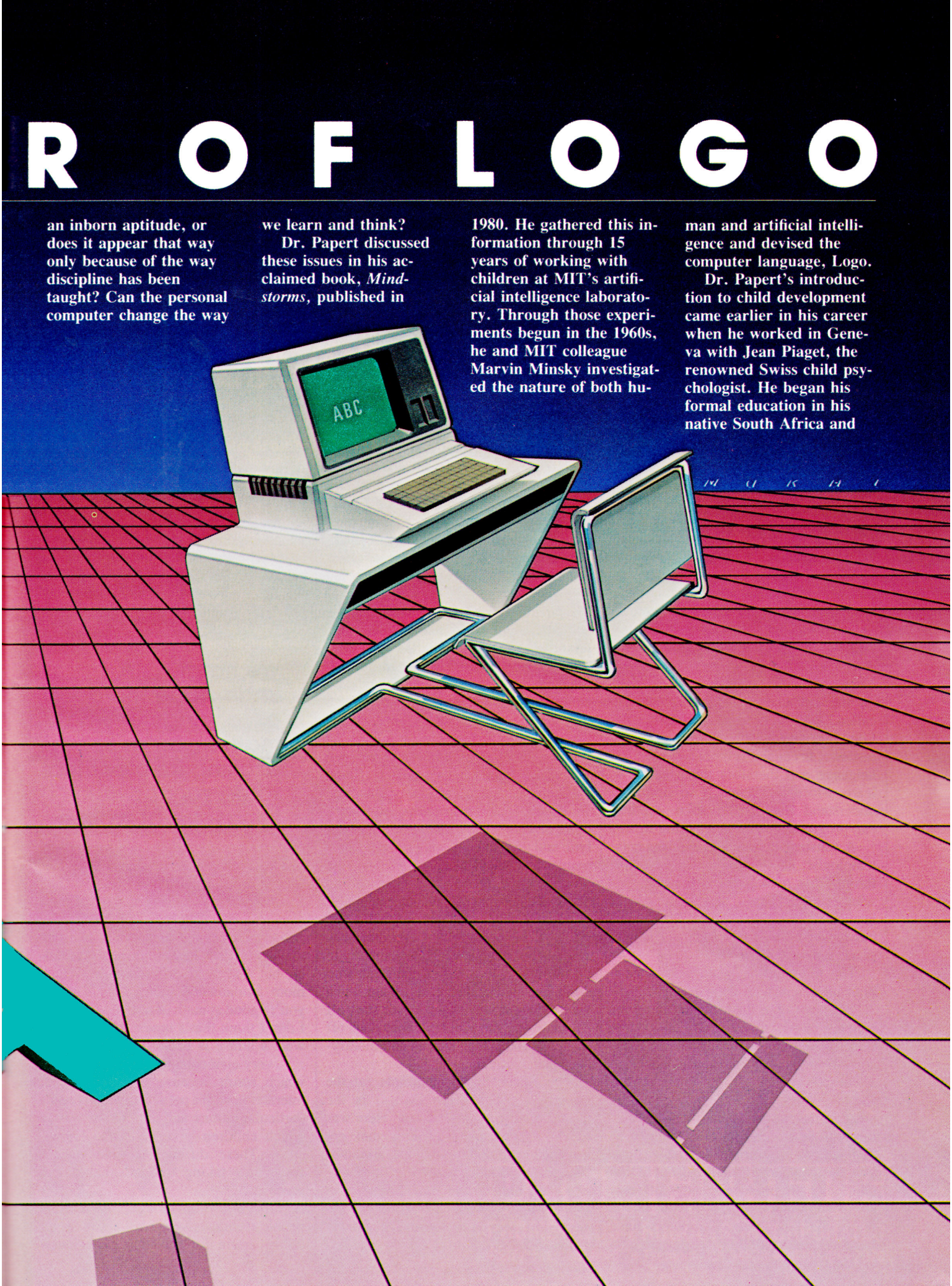


R OF LOGO

an inborn aptitude, or does it appear that way only because of the way discipline has been taught? Can the personal computer change the way we learn and think?

Dr. Papert discussed these issues in his acclaimed book, *Mindstorms,* published in 1980. He gathered this information through 15 years of working with children at MIT's artificial intelligence laboratory. Through those experiments begun in the 1960s, he and MIT colleague Marvin Minsky investigated the nature of both human and artificial intelligence and devised the computer language, Logo.

Dr. Papert's introduction to child development came earlier in his career when he worked in Geneva with Jean Piaget, the renowned Swiss child psychologist. He began his formal education in his native South Africa and



then went on to Cambridge and Paris.

Although Dr. Papert and his colleague developed Logo more than 15 years ago, it wasn't until the late 1970s that the language gained recognition. Texas Instruments Corp. (TI) first adapted Logo for use on personal computers. Later, TI financed an experimental program using Logo at the Lamplighter School in Dallas. Today, the language is found in many different versions, applicable to other personal computers, including several for the Apple II. Dr. Papert is a founding principal in Logo Computer Systems, Inc., a Canadian firm that develops the version of the language sold by Apple Computer, Inc.

I've criticized the educational world today not because it's got schools, but, because it's stuck in the rut.

Logo is interpreted through a turtle, a triangular-shaped cursor on the computer monitor which draws geometric shapes and complex designs on the screen in response to receiving simple commands. The language itself is based on the artificial intelligence language called LISP. Proponents contend that the Logo language is better than BASIC, for instance, because it is more like a natural language and therefore much easier to learn. Moreover, Logo is so simple to understand that kindergarten children can program the computer using it.

A constant student and ever the epistemologist, Dr. Papert continues to test through his own pursuits the study of what knowledge is and how people acquire it. In his spare time, Dr. Papert has taught himself to juggle, fly an airplane and read Chinese.

The following is taken from a two-hour interview with Dr. Papert:

A+: In a world of the future what sort of changes in our culture and in our educational system do you see, or hope to see, come from the widespread use of personal computers?

Papert: What I think is most critical is whether the computer and computer culture will be continuous with the kind of computers and computer culture we have now, or whether we will break out of that continuity and produce a totally different set of computer cultures. I think this is really the key issue. Computers have been made essentially by engineers who invented them, with some input from mathematicians. And I think that everything about them, the form that they have, and the way that you interact with them, the languages and metaphors and the way people think about them, represent a coherent projection of a certain subculture in our society. It's technically oriented and very male. In America, it's very white. On a world scale, it's very Euro-American, and it's very white, too.

People whose approach to reality is more oriented towards people, those who are more psychological, who are less analytic, are excluded from this computer culture. Now I don't think the role of the computer culture is to bring them into it. This is often said to be the importance of the computer, that it will teach the nonanalytic people to think analytically. Of course, it will do that, but that's not the important thing. What I would like to see in the world of the future is not the computer changing people into something that they aren't, making everybody like a computerist, rather I would like to see the computer being able to let everybody be more of what they are. In order for that to happen the computer has to be remade in many different images. I think that's really what I'm most hopeful of. I call that *appropriation* of the computer by individuals, by cultures.

A+: What do you mean by remaking the computer in different images?

Papert: Well, for example, I've seen how children use Logo computers. Some children use them in a way that you would expect from a computer science point of view. They like to be very analytic and they like thinking of linear programs and they like subdividing the problem, and so on. I've been calling that the "hard style" of computer programming. But I also noticed that if you create a situation where children can really get enough access to a computer to do what they want with it, children who don't like to think like that can use it in a very different way. They don't start off by analyzing the problem, they start off by doing something simple and modifying it interactively.

The Space Shuttle example (at the Lamplighter School in Dallas) is the most dramatic example I saw. Here was a whole community of kids that got involved in something that had a kind of sense of importance to them. *(Interviewer's note: the children had seen the first space shuttle go up on television and the next day they spontaneously started drawing space shuttles on their classroom computers.)*

There were the "hard" ones who did it in the way you would expect a traditional computer scientist to do it: you imagine what you'd like to have—that's your plan—and then you translate this plan into sub-plans and you write subprocedures and you hope it gets straight in your head and then you type it into the machine and it runs. That's the idea of it.

The other kid puts a blob on the screen and sort of likes it. Then he modifies it a little and gradually builds it up into something much more complicated. He's not doing a simpler job; he's not learning less. Much that he's learning is the same stuff. But he's interacting with reality in a profoundly different way, in a way that corresponds with *his* personality.

A+: Are these differences cultural or biological?

Papert: I think you've got to say nobody knows. But the presence of computers, which is going to allow many different approaches to thinking about the same problem to flourish, is going to allow us for the first time to really understand how many of these things are cultural and how many of these things have biological roots.

We hardly understand the deep psychology of what makes games so exciting it's clear that some very powerful things are at work.

Obviously, there's some sort of mixture of both and how much of each nobody can say. I'm inclined to think that people just are very different initially, but that these differences are much more fundamental things than whether you're good at math or not good at math; I don't think that's innate at all. I think what's innate is personality differences . . . very elemental kinds of differences which result because of a process of interaction with a particular society and a particular culture and the kind of way in which children have access to knowledge. These differences give rise to some kids taking to mathematics and some not.

A+: Isn't it true, though, that certain people seem to have natural aptitudes for doing certain things well, such as music

P/S™ Buffer Card

The ONLY BUFFER that let's your Apple II™ & IIe™

ALL AT THE SAME TIME

ALL FOR $125

PRINT PARALLEL!
PRINT SERIAL!
PROCESS/COMPUTE/ENTER DATA!

EXPANDABLE TO 64K

No more waiting for your printer or other peripherals to finish with your Apple before you can use it again. Just plug the P/S Buffer Card into any slot and cable-connect to your parallel output card. After transfering your data to buffer (it takes only seconds), you'll be able to continue using your Apple in a normal fashion while printing parallel, or serial . . . or both parallel and serial – all at the same time.

In the dual printing mode, data to be printed parallel and serial are stored separately in the buffer memory. The memory is divided between them by intelligent firmware, proportional to the storage requirements of each. The memory is expandable to 64K maximum in increments of 16K with plug-in RAM modules available from your dealer.

P/S Buffer Card has both a parallel output port and an RS-232C standard serial output port. When you need to change from parallel to serial, serial to parallel, or output both simultaneously, you don't have to physically change cards. The intelligent firmware lets you do it by either software command or (optional) hardware switch.

P/S Buffer Card interfaces with most popular parallel printer cards including Apple,™ Epson,™ Grappler,™ Graphitti,™ PRT-1,™ and Tymac.™ If you don't already have a parallel card, order the P/S Buffer "Stand-Alone" Card. It includes a built-in parallel interface. An optional graphitti plug-in ROM allows you to dump the Apple hi-res graphic screens with a few simple keyboard commands.

Many applications programs and operating systems such as CP/M™ and Apple Pascal™ require that the parallel interface be in a specific slot. So, leave it there. When you wish to print parallel, or serial, or both at the same time, just "tell" P/S Buffer Card what to do. It's that easy.

See your local dealer for details.

SUGGESTED RETAIL PRICES:

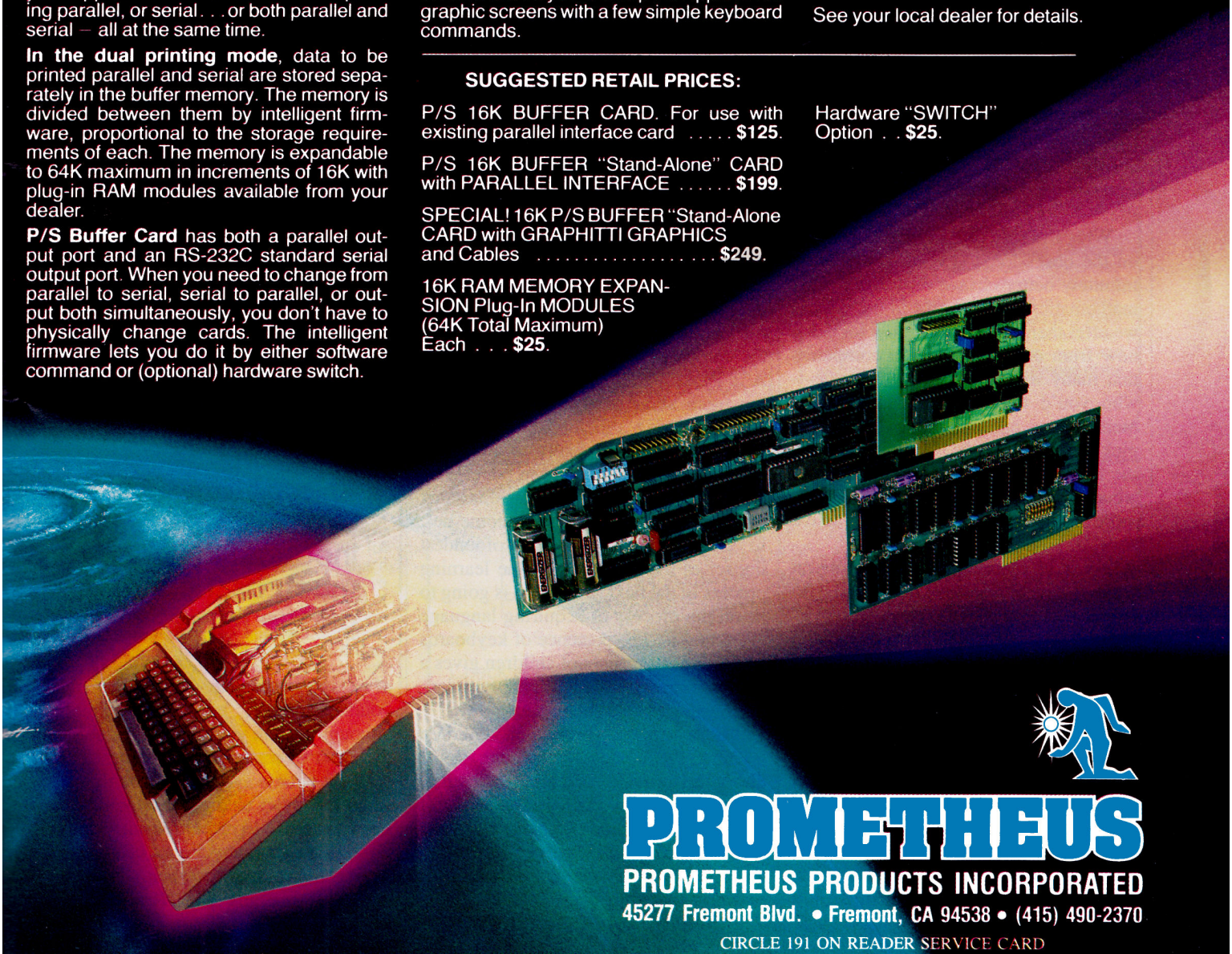
P/S 16K BUFFER CARD. For use with existing parallel interface card . . . . . **$125.**

P/S 16K BUFFER "Stand-Alone" CARD with PARALLEL INTERFACE . . . . . **$199.**

SPECIAL! 16K P/S BUFFER "Stand-Alone CARD with GRAPHITTI GRAPHICS and Cables . . . . . **$249.**

16K RAM MEMORY EXPANSION Plug-In MODULES (64K Total Maximum) Each . . . **$25.**

Hardware "SWITCH" Option . . **$25.**



PROMETHEUS

PROMETHEUS PRODUCTS INCORPORATED

45277 Fremont Blvd. • Fremont, CA 94538 • (415) 490-2370

CIRCLE 191 ON READER SERVICE CARD

or mechanics?

Papert: Well, I can mention my favorite example from *Mindstorms,* if you were to judge from looking at America, people who were born on this side of the Atlantic, unless they happen to be in Quebec, somehow systematically have a poor aptitude for French. Obviously people have aptitudes that are different, but before we can conclude that this is an aptitude for French, or for mathematics, we've got to understand a lot more about how that child or that person would have developed under different circumstances.

I think there's a very powerful personality difference that shows itself in the difference between obsessionality and hysteria in personality types. And, I'm prepared to believe that it's very deeply rooted in biological things. In any case, it gets established very early in life.

Will the major effect of the computer be a greater presence of mathematical and scientific and technological thinking?

What I'm sure of is that those who are on the obsessional side of life have an infinitely better chance of doing well in mathematics in our world in the culture we offer them. And I also know for a fact now from our experience in computers that many who are on the other side—who you'd think had no aptitude for mathematics and simply don't do it—pick it up very easily if you put them in the right sort of computer environment where they can pick up mathematics in a more hysterical style, a more active style.

A+: Would you elaborate a bit more on what you mean by obsessional and hysterical personalities?

Papert: The obsessional is the one who likes writing little details, is concerned with detail, who likes to see things in a fine sort of way, who likes to concentrate on detail. So a person who will sit down happily putting numbers on squared paper tends to be obsessional. Whereas the other one (hysterical) likes to see the results, is more attracted to the broad brush, to respond to the activity—to not defer the emotional response but to do things that have it mixed up in them a high degree of excitement.

A+: Is this "creativity" versus something else?

Papert: No. Obsessionals can be extremely creative.

A+: Are you talking about the notion of left brain-right brain influence on thinking and problem solving?

Papert: That's one division I think is more complicated. There are many more dimensions in which people differ than that. I think it's a fair rule that whenever anyone says there are two kinds of anything, it might be true in a sense but it must be oversimplified.

A+: Might one be more analytical and the other more intuitive?

Papert: I don't believe those categories are very good for (describing it). For that matter, when I say obsessional and hysteric I think that we're beginning to see a very systematic difference in people, but we're *just beginning* to see it. It's a very intuitive concept. I don't know yet how to spell it out in detail.

A+: In your book *Mindstorms,* you focus mainly on math and physics in your examples of how the computer can change attitudes. Do you feel these subject areas will be the most fruitful areas in which to use computers?

Papert: Will the major effect of the computer be to cause a greater presence of mathematical and scientific and technological thinking? It might very well be because in the nature of the world, in the nature of the fact that industry and production and getting things to happen depends on technology and harnessing the physial sciences, there's a great need for that and so it might be that's the way the computer is used.

A+: Those are applications. I was thinking more about math and the physical sciences being the undiscovered aptitudes that are most likely to come out through use of computers in education.

Papert: No, I don't think so. I think that the literary is just as likely to come out. In fact I think that the profoundest impact of the computer on the learning process in the next generation is going to be on the process of acquiring language and using it. The presence of keyboards in the lives of preschool children gives a new approach to the alphabetic language, the written language.

We're seeing preschool children learning the alphabetic language as a direct instrument of controlling their work. This is a profoundly different route into the written language than that which is practiced in our education system today. The written language is seen as a way of coding the spoken language and we are seeing three- and four-year-old children beginning to master the keyboard and beginning to master the alphabet through the keyboard.

A+: But does it really matter if they do it at an earlier age or later? If children are going to develop these skills anyway, does it really make any difference if this development is speeded up?

Papert: I think what matters is the tremendous psychological boost this gives a child. I emphasize this more with mathematics in *Mindstorms* but I'd say the same about writing. The major effect of bad mathematics education on society is not that there are fewer people who can do mathematics but that there is the psychologically destructive effect of when it (mathematics education) fails. The schools are just not very good for getting people into mathematical thinking. It might be okay for children who have acquired somehow an intuitive sense of mathematics for them to acquire more formal detail, but it's not for those who come in not being able to think mathematically. They very seldom acquire that in school.

So they're put in this frustrating "put-down" situation that's enormously destructive psychologically. Same thing about writing. So I think the major question is not the age at which it happens but protecting the children from the frustrating and psychologically damaging effects of society's clumsy attempts to force unnatural modes of learning and teaching on them.

A+: In your writings and speeches you've been quite critical of existing school structures saying that the schools of today are obsolete. You've described yourself as an educational utopian although I think you might even be said to be an educational anarchist. In any case, in what ways do you see the personal computer changing schools?

There's no question in my mind that the computer could enormously exacerbate inequality just as much as it could bridge it.

Papert: I have to make two corrections. First, there are many senses of the word "critical." In one sense being critical is somehow blaming it, "It did a bad

7 Good reasons why you should subscribe to *Creative Computing.*



It's the Number One magazine of computer applications and software!

There's one place you can always be sure of learning more about microcomputer software and applications: *Creative Computing.*

Every month *Creative Computing* provides you with a continuing education on everything related to microcomputers and computer equipment. Useful articles, "how to" tutorials, exciting new applications, games and "no holds barred" reviews of the latest software and equipment make up a major part of *Creative Computing*'s editorial content.

We give you probing features on programming breakthroughs and important news. Plus in-depth articles on elementary, intermediate and advanced software and applications topics—to help you develop your knowledge and skills, save hundreds (perhaps thousands) of dollars in unneeded software, discover uses for your personal computer that you might never have considered. Articles that increase your overall "computer consciousness." Here's how:

1 *Creative Computing* gives you things to actually do with a computer.

Just owning a computer isn't enough. You've got to know what to do with it. That's why applications are our primary focus. Text editing, animation, graphics, business simulations, data base and file systems, music synthesis, control of household devices, communications, games—some of the applications and software you'll learn about in *Creative Computing.*

2 *Creative Computing* discusses business applications in simple, nontechnical language.

If you're a business person who needs to know about the latest developments in word processing and office applications, turn to *Creative Computing.* We clarify such business applications as investment analysis, futures evaluations, data base management, mailing list programs, text editing, word processing and simulations. And all the software available for business people.

3 *Creative Computing* helps you decide which computer equipment is best for you.

Our tough, no-nonsense equipment profiles arm you with the facts before you walk into a computer store. You'll know the right questions to ask and how to cut through the jargon and sales hype. We give you authoritative guidance in deciding what you need, what you don't need—and what's right for you and your pocketbook.

4 *Creative Computing* covers computer education in depth.

We started out as a computer education publication, and we're still committed to the educational community. We regularly carry articles on designing educational software, evaluating educational software, teaching concepts and terminology in computer education, text editing applications for literature and computer simulations in the classroom—plus a great deal more.

5 *Creative Computing* brings you hours of mind-expanding game entertainment.

We've got a soft spot for the computer game addict—and computer game software. We know you want to understand more about the new computer games flooding the market: which ones are easiest to learn? Require the most skill? Offer the most surprises? Give you the best graphics? Provide the most challenge? Contain a new twist? *Creative Computing* brings you the answers.

6 *Creative Computing* features the state of the art.

Columns on the most popular personal computers, a "software legal forum," letters to the editor. Reviews of books, games, organizations, dealers and events. Fascinating interviews with leading innovators, equipment designers, program developers and game inventors—men and women who'll give you a real glimpse of the future!

7 Our price is right.

By subscribing to *Creative Computing* now, you can save as much as 33% off the full subscription price. To learn elsewhere what you'll learn from *Creative Computing*, you might spend hundreds of dollars in course fees and books. Then you'd have to winnow out what you could use from all that you'd learned. But *Creative Computing* does that for you, so you'll have time to enjoy your own computing interests. And that saving of time makes this offer very inexpensive indeed.

Join over 150,000 *Creative Computing* readers by subscribing today! Just use the coupon at right.

SAVE UP TO 33%!

Creative Computing · P.O. Box 5214 · Boulder, Colorado 80322

YES! Send me *Creative Computing* for:

- ☐ One year (12 issues) for $19.97—I save 20%!
- ☐ Two years (24 issues) for $36.97—I save 26%!
- ☐ Three years (36 issues) for $49.97—I save 33%!

Savings based on full one-year subscription price of $24.97.

Check one: ☐ Payment enclosed. ☐ Bill me later. 8H625

Mr. / Mrs. / Ms. _____
(please print full name)

Address _____ Apt. _____

City _____

State _____ Zip _____

Offer valid in U.S. and possessions only. Please allow 30 to 60 days for delivery of first issue.

thing.'' I'm not critical in that sense. I think that school as we know it didn't happen like that because people were bad or stupid, it happened like that because it had to. I don't think we had choices, ''we'' being society.

I think if you look back at the history of educational criticism it's been like criticizing the waves for beating on the shore and making a lot of noise. You can't stop it. You recognize a natural process.

I think what the computer opens up is the possibility of changing, of offering us a greater choice of how we can introduce children into our culture. So I'm critical in the sense that to continue the school after it's become anachronistic due to material conditions (i.e., computers) that make it possible to do something else, that's bad. I've criticized the educational world today not because it's got schools, but, because it's stuck in the rut and finds itself hard to break out of being able to think. You've got to have school as we've known it.

I don't know what you mean by anarchist, either. I'm not against a structured environment for children, but what I am against is the idea that thinking happens and can be imposed in a structured way. I think there probably isn't a single educational theorist in the world who really believes that—that you can impose structure on a growing mind—as opposed to creating the conditions where the structure will grow.

A+: Do you advocate doing away with classrooms and/or emphasizing education at home?

There will be new ways of thinking, new kinds of theoretical analysis in anthropology and logic and the relationship of people to knowledge and to culture.

Papert: I think it would be a social disaster if we moved into a situation where children spend most of their time in the home and in the family. If children did not come out and interract with other children in different environments, and with other adults, I think there is every reason to believe it would be something catastrophic.

People say I criticize classrooms and say we shouldn't have them, and that I forget about all the things that happen in the class besides learning arithmetic. There's spelling and all this social interaction and learning to deal with people. This I've found the most infuriating criticism because—I don't suppose it's really made in bad faith—but it just shows how deeply rooted people's minds are in the assumption that the way things have always been is the way they have to be.

Let's ask the question a little differently: Suppose you were to set out and say, ''I'd like to design the ideal kind of conditions for children to learn social skills, how they think of one another and how to interact with children and adults.'' When you think of socialization as the goal, I think the chance that you would decide to put them into groups of 30 where they're going to learn the multiplication tables—is very unlikely.

Obviously, you've got to think about how children should enter society in social ways, but in the school that goal is systematically deformed by being mixed up in the need to teach them the multiplication tables, for example, and a lot of other needs of this sort. I think what the computer presence is going to allow us to

SCRG PRESENTS

For Your Apple][, Apple][+, Apple //e, Apple /// & Franklin

switch-a-slot

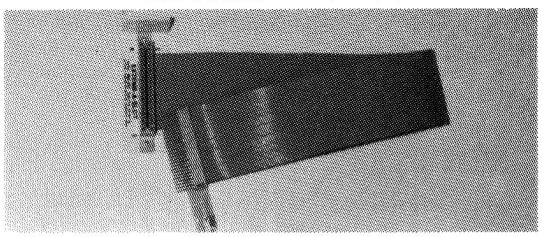


The **switch-a-slot** connects to any peripheral slot of the computer through an 18" cable. The user can plug up to four cards in the **switch-a-slot**. The desired card is chosen by using a switch on the front, and only the selected card draws power. This product is suitable for most peripheral cards. The **switch-a-slot** is perfect for selecting between different printer cards.

- **Holds 4 peripheral cards**
- **Saves wear and tear on delicate connectors**
- **All connectors are gold plated for reliability**
- **Only selected card draws power**
- **Works with most cards**

$179.50

Extend-A-Slot



The EXTEND-A-SLOT brings a slot outside your APPLE™, allowing an easy change of cards. The 18" flex cable is long enough to allow placement of the card in a convenient location. The high quality connectors are gold plated for reliability. **$34.95**

These products work well with all slow to medium speed cards, such as Modems, Printers, Clock, Music, etc. They are not recommended for high speed data transfer devices such as alternate processor and disk drive controller cards.

These fine products come with a 6 month warranty
Available at your local dealer or direct from:

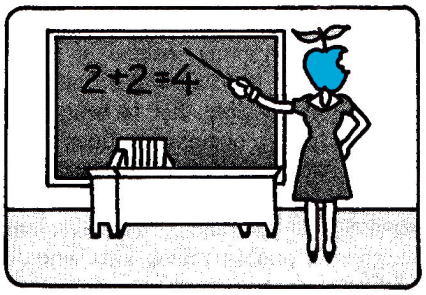
SOUTHERN CALIFORNIA RESEARCH GROUP
Post Office Box 2231 P
Goleta, CA 93118
(805) 685-1931
VISA, MASTERCARD accepted

Add $2.50 for shipping, $5.00 outside U.S.A. & Canada. CA add tax.

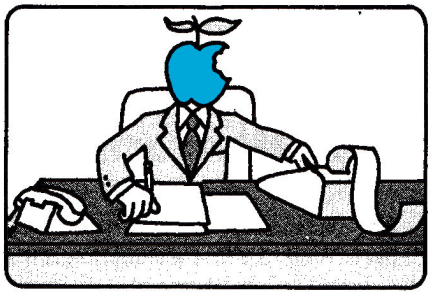
Apple is a trademark of Apple Computers. Franklin is a trademark of Franklin Computers.

CIRCLE 198 ON READER SERVICE CARD

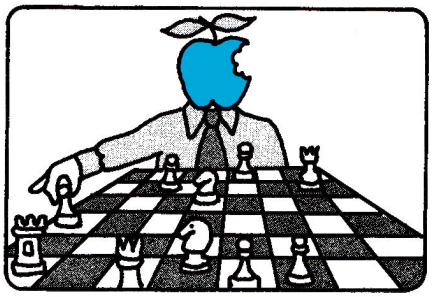
How can you turn your Apple into



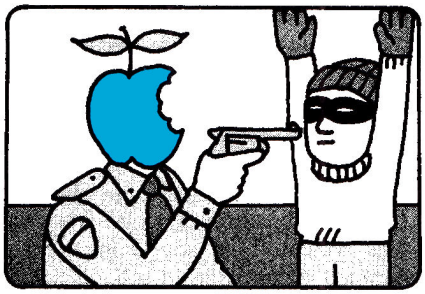
A schoolteacher?



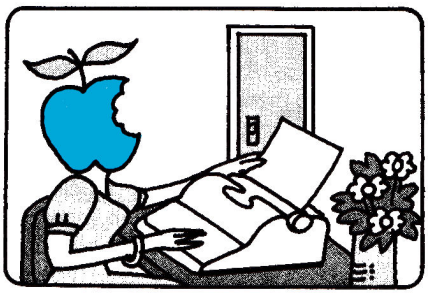
An accountant?



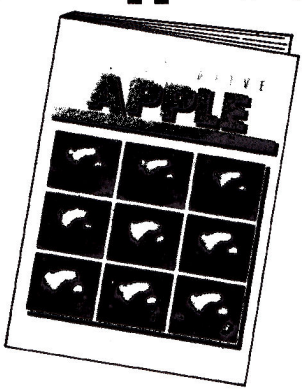
A game opponent?



A security guard?



A secretary?



Let The Creative Apple show you how–for only $15.95!

Your Apple computer is one of the most versatile instruments ever invented ...if you know its potential and how to tap it. Now there's a new book that brings you the most useful, most innovative applications for your computer—and tells you how to run them on your Apple!

The book is *The Creative Apple*, from *Creative Computing*. In ten chapters and hundreds of pages, *The Creative Apple* gives you the important Apple-oriented articles from the past several years of *Creative Computing*, along with vital updates.

You'll discover how to use your Apple for graphics, including animation, kaleidoscope effects, hi-resolution text, the Apple Picture Packer, the Apple Graphics Tablet, and integrating CAI and videotape.

You'll learn how to play music on your computer (and you'll appreciate the reviews of synthesizer peripherals)...how to use computers in the classroom for teaching (as well as for computerizing your gradebook)...using the Apple Writer software...understanding word processing by computer...solving the lower case mysteries...three programs for investors ...VisiCalc...computer-generated forms ...VisiPlot, VisiTrend and other software for business uses.

The Creative Apple includes software reviews of games, business programs—even a flight simulator program...hardware reviews of peripherals for your Apple...14 ready-to-run game programs ...tips and tricks for easier programming (including how to bombproof data entry).

You'll also find three years' worth of the popular "Applecart" column from *Creative Computing*, a guide to data banks, instructions on using your Apple for a time-sharing terminal, as a home appliance controller (and burglar alarm), and scores of programming tips.

The Creative Apple is an important reference. If you own an Apple computer, it's vital that you read it. You'll be amazed at how much time, trouble and money *The Creative Apple* will save you.

To get your copy of this great new book, just complete and return the coupon below!

Also available at your local bookstore or computer store.

CREATIVE COMPUTING PRESS Dept. NH2F, 39 East Hanover Avenue Morris Plains, NJ 07950

YES! Please send me *The Creative Apple* for $15.95 plus $2 postage and handling. (Outside U.S.A., add $3 additional postage.

☐ **Payment enlcosed $** _____. (CA, NJ and NY State residents add applicable sales tax.)

Card No._____ Exp. Date_____

Signature_____

Mr./Mrs./Ms._____
(please print full name)

Address_____ Apt._____

City/State/Zip_____

For faster service, PHONE TOLL FREE 800-631-8112.
(In NJ only, 201-540-0445.)

Apple is a registered trademark of Apple Computer Inc.

do is to disassociate these so that society can think about, experiment with new forms of social environments for children without it being constantly weighed down and deformed by a particular set of rote learning that has to be imposed on the children.

A+: I don't suppose there's much indication that anyone is going to do this kind of experimentation?

Papert: Oh, there's absolutely every indication. This idea of the School of the Future, this idea of making experimental schools in which we go as far as we can towards simulating the future is catching on. It's hardly a mass movement, there hasn't been one created yet, but the number of people in a position to do it who have begun to manifest an interest is quite impressive.

I believe what is (happening) in New York City will be the beginning. I believe in three or four other cities in the U.S. and in some in other countries we will see at least a half a dozen such experiments in the next year or two. If there are 6 or 10, between the 6 or 10 there will be enough variation so that it'll become apparent at least some of the ways in which very dramatic, unexpected results can be obtained. As soon as that happens I think the people of the world will start demanding something better for their children. People accept school because they haven't seen an alternative.

The computer is going to allow us to experiment with new forms of social environments for children.

A+: Would you describe the New York school experiment?

Papert: Well, the first assumption is that all children will have free access to quite a lot of computer power. You could say it's like every child having a computer. This computer will be integrated into everything a child does, as a writing instrument, as a music-making instrument, and so forth. In writing, for example, it'll be used as a word processor, as a dictionary, as a way of keeping a filing system for doing a research project and as a communication system between kids and kids, and between kids and teachers.

There *is* a sense of anarchism in the concept that I don't think we should sit back and redesign the school curriculum first. We'll start off by introducing the computer in those ways that it can be picked up. For example, writing takes a large part of a child's time and is one of the big blocks in elementary schools, especially in the areas we're working, the disadvantaged areas of urban New York. That's a very big issue and just having a computer instead of a pencil immediately makes a big difference.

A+: Is it possible that in bringing out certain hidden positive qualities in some kids it may turn off others? That we might end up replacing a math elite with a computer elite and perhaps even create computer phobia among kids who can't relate to a computer?

Papert: Yes, all of these things can happen. I think that our job shouldn't be to predict whether it will happen or not but to be aware of all the positive things, and all the negative things, that could happen, and work as hard as we can to . . .

A+: But have you seen any *evidence* of this happening?

Papert: Oh, absolutely. It's very clear that typically the way computers are dumped on children in schools you see very clearly a polarization there. There's

DIVERSI-DOS IS THE BEST

CRITICS AND USERS AGREE:

"Of all the DOS enhancement packages reviewed in Peeling II to date, **DIVERSI-DOS** is the most powerful in terms of its capabilities coupled with its price. **DIVERSI-DOS** is the only product to speed up all areas of DOS—LOAD/BLOAD, RUN/BRUN, SAVE/BSAVE, as well as the READ and WRITE of text files...The documentation is superb. (Rating AA)" — Peelings II Magazine

"The program is worth 10 times the selling price." — Apple Orchard Magazine

"By far the best 'Fast-DOS' I have tried." — J.N.

"The product is the most useful Apple utility I have." — E.W.

"Not only is your product the most versatile of its type on the market, it is also the quickest." — J.P.

"The product has lived up to its advertising claims, and the support I have received has been phenomenal." — H.S.

"A lot of people gripe about poor support from software developers and marketers. I want to go on record to say that Bill Basham has been absolutely tremendous." — C.B.

"....., I must buy by mail. Yours has been the nicest reply I have received. I am now a walking, talking ad for your product." —G.C.

"You have produced a terrific product which has done everything I expected and more." — L.S.

These nationally-known publishers have licensed DIVERSI-DOS to use with their commercial programs:
Continental Software, Datamost, Southwestern Data Systems, Phoenix Software, Quinsept, Howard Software, Spectrum Software, Howard W. Sams, Passport Designs, Gourmet Software, Harper & Roe Publishing, Sky Software.

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™**, by Bill Basham, 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 ahead, 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 to increase the available memory in a BASIC program.

DIVERSI-DOS, the QUADRUPLE utility, requires a 48K Apple II, II+ or //e with DOS 3.3. A simple, menu-driven installation program is included on the un-protected disk. So what are you 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

ORDER TOLL-FREE

Call NOW: 800 835-2246 ext. 127 (orders only)
For information, call 815 877-1343
Disks normally shipped within 24 hours.
Only $30: Includes 1st class or foreign airmail.
Sold by mail order only.
Return in 30 days for full refund, if not totally satisfied!

FREE — with your order — **FREE**
DOGFIGHT® II — By Bill Basham
— A special mail-order version of the arcade game for 1 to 8 players, recently listed #6 on the best seller list!

Send $30 (U.S. funds) to:
Diversified Software Research, Inc.
5848 Crampton Court
Rockford, Illinois 61111

dsr

Name: _____

Address: _____

City _____

State: _____ Zip Code: _____

Visa/Mastercard, C.O.D. or personal check accepted.

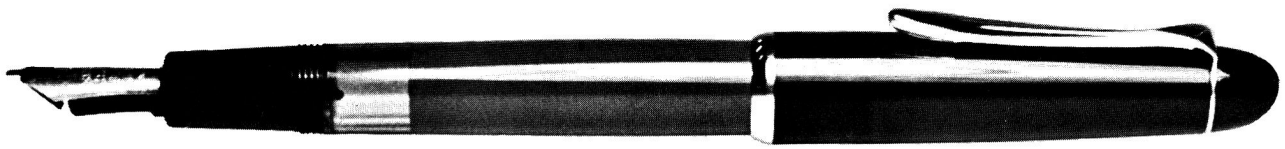
Card #: _____

Exp. Date: _____

A11

CIRCLE 196 ON READER SERVICE CARD

Business letters to go.*



*(or, how to write effective business letters without really writing.)

Often, when it comes to business letter writing, it's difficult to find the time. Or even the right words.

Add the routine business letters you should write during each busy day, and writing becomes an endless chore.

Even if you use a personal computer.

So you end up *not* writing all the letters you should. Or working overtime just to catch up.

Now there's help.

Business letters at your fingertips.

With The Business Letter Library™, you get hundreds of concise, unique business letters, on disk. Superbly written by a leading business communications expert.

They're ready to go. And ready to use with your personal computer and most any popular word processing software.

All *you* have to do is select the letter you need; customize, print, and mail. To clients, customers, business associates, vendors; *anyone* you do business with.

You get letters to start a business deal. Set up a meeting. Make a point. Close a sale. And *more*.

It's your choice.

For routine correspondence, you can make quick changes to any letter in The Business Letter Library.

Or use the on-screen KeyStyle™ mode to write a custom, highly personalized version of each letter.

Either way, The Business Letter Library can help you write effective business letters to fit almost any business situation.

You're done!

By the time you've read this ad, you could've written a great business letter. It's really that easy.

And it's really that good: Whether you need to write many routine letters, or that single, very important one, you'll get *results*.

So turn business letter writing into a quick, easy, productive part of your day with The Business Letter Library.

For a full demonstration of The Business Letter Library, see your Dealer. Or call us at **(714) 642-1827.**

The Business Letter Library can be used with the IBM Personal Computer, Apple II or IIe, DEC Rainbow, and many other microcomputers. Compatible with most popular word processing software packages.

The Letter Library Series™

711 West 17th St., Unit B10, Costa Mesa, CA 92627

Look for future products in the Letter Library Series to meet your business, professional, and social letter-writing needs.

KeyStyle, The Business Letter Library, and The Letter Library Series are trademarks of the Delta Point Corporation. Apple Computer, Inc. © 1983, Delta Point Inc. All Rights Reserved.

CIRCLE 201 ON READER SERVICE CARD



WE'RE VERY HARD ON OUR SOFTWARE

You might even say we're perfectionists. Because at Softsmith,™ we give our software the hardest workout, the toughest testing, the most rigorous evaluation. The result is software that has earned our confidence, and will justify your trust.

In particular, we do three things that make Softsmith software the most dependable you can buy.

1.

We're picky. Out of the hundreds of programs Softsmith evaluates every month, we choose to publish very few. A lot of good programs are rejected; but we think you can't be too picky when it comes to personal computer software. Our selectivity is your best assurance of quality.

2.

We complain a lot. If you were a programmer, and Softsmith accepted your program, you would have a right to be proud. But you shouldn't go on vacation yet. Because no matter how good that program may be, Softsmith evaluators will suggest some improvements; politely, but firmly. We may complain a lot, but people thank us later.

3.

We insist on plain English. After we've made the best program better, we're still not finished. Because we know that even the best program is no good if it's too hard to use. So we put a lot of time and effort into translating our instructions from computerese into plain English.

We publish software you can trust. Yes, we pick our programs carefully. And complain a lot to make them better. And insist on plain English instructions. The result is a library of personal computer software you can depend on. Even if you don't know a Pascal compiler from an emulation subroutine.

Softsmith has programs you can trust for all the most popular personal computers. Programs for Education, Home Management, Entertainment, Word Processing, Business, Communications and Programming. Ours is the largest library of quality software under one brand name.

So before you choose a software package for your computer, make sure someone's taken the time to be hard on it. Make sure it's Softsmith, the software you can trust.

Ask for Softsmith brand software wherever computers or software are sold. Or call us TOLL-FREE at **(800) 341-4000** for the name and location of your nearest dealer.

Softsmith Corp., 1431 Doolittle Dr., San Leandro, CA 94577. A company of The Software Guild.™

SOFTSMITH™

SOFTWARE LIBRARY



LOGOMOTION™ MAKES LEARNING THE NAME OF THE GAME

Can a computer think? This question has intrigued people since the very beginning of the Computer Age.

With Logomotion, from Softsmith™ Corporation, anyone from young children to adults can use the personal computer to answer that question. Through its power to draw pictures, make music, and create programs, Logomotion allows you to explore the exciting intellectual potential of your computer. Along the way you'll gain valuable insights into the way your own thinking works, and create an environment where learning computer programming is fun.

Like most Logo-based programs, Logomotion starts children out with turtle graphics. By "teaching" a computer turtle how to draw shapes and pictures, children learn the basics of geometry and programming. Logomotion even lets them print out their drawings or save them on disk, to be changed later, or included in other programs.

Softsmith's Logomotion goes far beyond turtle graphics, to include music synthesis, file handling, text editing and even a game called "Animal."

Logomotion runs on the Apple® II, II + and IIe; Franklin Ace®; Commodore 64™ and IBM PC® computers with 64K RAM and one disk drive.

Like the other programs in the Softsmith library of quality software, Logomotion has been tested, improved and clearly documented to make it the most dependable, easy-to-learn Logo-based program you can buy. The Softsmith library also includes software for the most popular personal computers — programs for Education, Home Management, Entertainment, Business, Word Processing, Communications and Programming.

Ask for Softsmith brand software wherever computers or software are sold. Or call us Toll-Free at (800) 341-4000 for the name and location of the dealer nearest you.

Dealer inquiries are invited.

Apple II, II + , and IIe are registered trademarks of Apple Computer, Inc. Franklin Ace is a trademark of Franklin Computer Corp. IBM PC is a registered trademark of International Business Machines, Inc. Commodore 64 is a trademark of Commodore Business Machines, Inc.

CIRCLE 204 ON READER SERVICE CARD

SOFTSMITH™

SOFTWARE LIBRARY

a small group of usually boys, a certain aggressive personality type, somewhat mathematical already. The boys take over this computer and the girls get excluded and this undoubtedly colors their (the girls) perception of the computer; it's associated for them with a put-down and inferiority and they seem to find themselves saying 'That's not for me,' or 'I'm not for that.' There's no question you have that.

This goes back to the question of whether the computer will have the effect of reinforcing the structures already with us or changing them. For example, the split between those who can have access to knowledge and those who don't. There's no question in my mind that the computer could enormously exacerbate inequality just as much as it could bridge it and be the instrument for democratization. It could go either way.

A+: Most of the examples in your book *Mindstorms* come from your work at MIT where children have been able to use powerful computing equipment that's very different from what's commonly available. This would seem to limit the universality of your conclusions.

Papert: This is changing because the book (published in 1980) was written just about the time when the micro revolution started happening. So during most of that formative period of my thinking, with those experiments it was very hard to have a computer that was sufficiently flexible to be appropriated by the individual. So we only saw interesting phenomena where we especially set up situations where children had access to very expensive, very special purpose equipment.

We're now seeing all those things happening on quite a large scale because there are many thousands of computers out now where children can do all that stuff. We're also seeing phenomena that we never saw when it was more of an individual relationship between the child and the computer.

A+: Can you give an example of that?

Papert: I think the Lamplighter school experience for me was an eye-opener because the amount of computing that happened there got so far beyond what the adults could keep track of. That it really was a child takeover. So many different children had access to computers and there were enough computers so the usual people who capture them didn't exclude anyone else.

A+: What is the ratio of children to computers there?

Papert: There are 50 or 60 computers and some 300 children; 5 or 6 children to a computer. But it's not just the ratio. The school is fairly open, children can come in before school and stay after school, and they're not watched. They can get the computers without any adults around. I've come to learn that's very important. Children will do different things when there is no adult around.

A+: What kinds of things?

Papert: Well you see, for example, take that hard and soft style of programming. There's no question that adults systematically favor the hard and the children know it. This is partly because the adults who do become involved with the computers tend to be hard, because the computer culture is hard, and partly because they have to be an *official* model of what it is to program.

And so I think that the children, being aware of this when there's an adult who's likely to see what they're doing—even if the adult is careful not to give signals, and that's fairly impossible—if the child feels that that adult prefers certain directions, that changes the child's approach.

The major question is protecting the children from the frustrating and psychologically damaging effects of society's clumsy attempts to force unnatural modes of learning and teaching on them.

A+: How do you feel about video games, computer games, and children?

Papert: You mean games like Space Invaders?

A+: Yes.

Papert: I think we hardly understand the deep psychology of what makes games so exciting and what they're doing. It's clear that some very powerful things are at work and we don't know how to channel that, we don't know what conditions make it go one way or the other way.

I think it dramatizes the situation I touched on a few times in this conversation and in *Mindstorms*: That people are always concerned with trying to predict the computer future and the point isn't to *predict* it, it's to *make* it. It could be made in very different forms and how it gets made depends on the social process, the political process, how much energy and scientific research there is and which talented people become involved.

One could imagine a world in which children grow up hypnotized by highly interactive, highly structured kinds of game situations and we have a whole generation of psychotics on our hands. That's possible. Very possible. There's as much of a danger that the power of this thing gets out of hand as the danger that there's been more talk about, that genetic engineering gets out of hand, somebody makes a horrible new disease that ravages the world. I think that psychological diseases could also ravage the world.

On the other hand, one can also see enough continuity between these games and intellectual development so that it could go in that direction too. One could imagine all children being involved in kinds of game activities that will lead to enormous intellectual development.

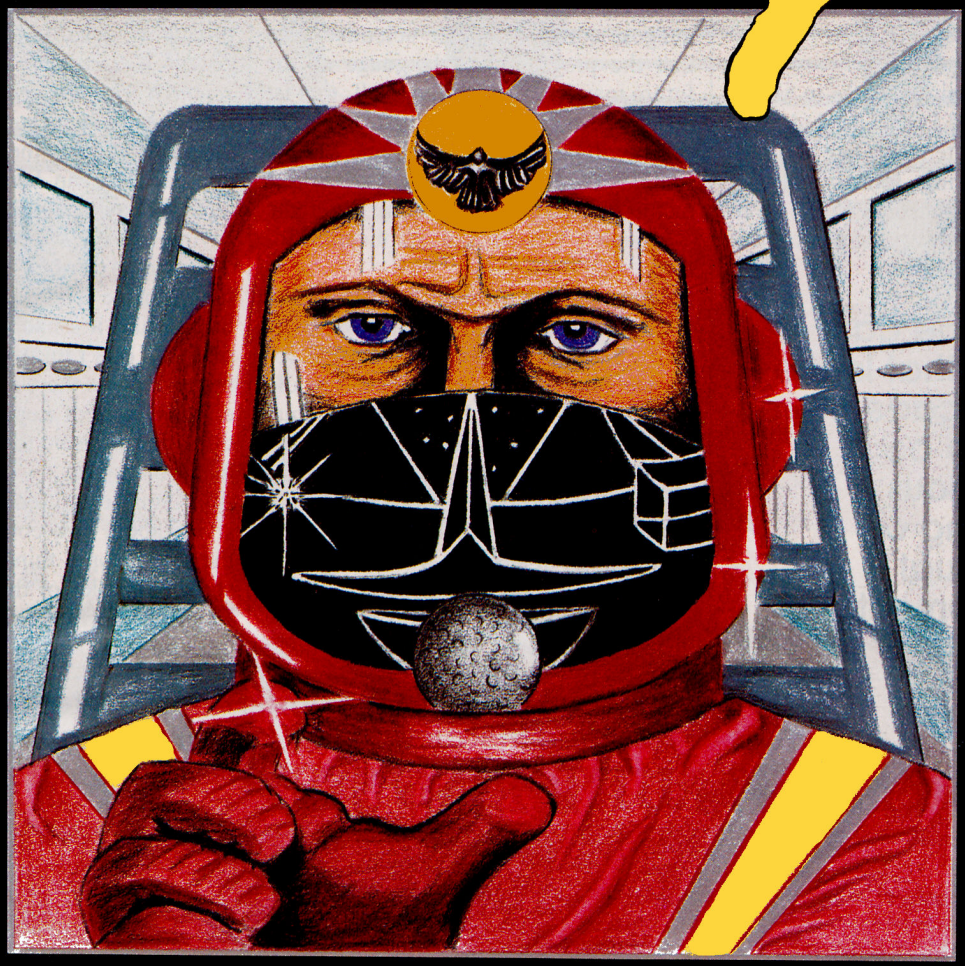
If we look at children and the present games you see elements of both tendencies. You see, unquestionably, intellectual development, learning things. Take a little example. It used to be a little tricky when we did turtle geometry to explain to children when the turtle went off the screen how it came back again on the other side. That's a complicated little piece of topology you don't have to explain today anymore. Everybody knows. It's a piece of geometry that they've picked up from the games. That's a very simple example, but there are a lot of examples of this sort, examples of geometric and strategic knowledge.

I think there's also knowledge about the learning process, which fascinates me. I think that a lot of children seem to have become very aware of 'strategies for learning strategies' because whenever a new game comes out they have got to learn the new game very fast. We haven't often had a situation where there's been as much incentive, as much opportunity for quick learning of new things. Children have always known how to learn. That's their business. This gives them extra opportunity to learn new strategies. So there's that positive side.

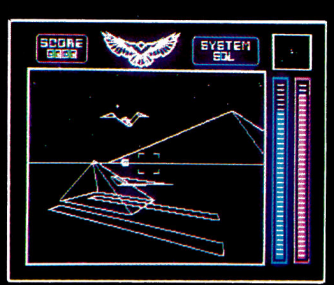
On the other hand you could make a list of negative things, kids who get hypnotized by it, almost addicted. . . . and there are all sorts of things that we don't know about, like as much as you might be afraid of overanalytic thinking in having children program too much, with the

STELLAR 7

by Damon Slye ™



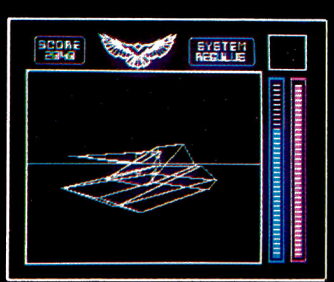
RAVEN, an experimental Agrav Unit, is Earth's only defense against the Imperial Arcturan Armada. Commanding RAVEN, you will face Arcturan laser tanks, pulsars, sandsleds, assault batteries, prowlers, skimmers, seekers, guise mines, and the rest of the rampaging Arcturan assault. Your wits and RAVEN's biphasal thunder cannon are all that stand between a helpless Earth and the wrath of the Arcturan Armada.



Sandsled and Skimmer

SOFTWARE ENTERTAINMENT COMPANY introduces ***STELLAR* 7,** the ultimate 3-D strategy arcade game by Damon Slye. ***STELLAR* 7** features smooth HI-RES animation, a colorful instrument panel, and 7 unique levels, each more challenging than the last.

For ordering send $34.95 plus $2.00 shipping and handling to: SEC, P.O. Box 10854, Eugene, Oregon 97440. (503) 342-3495
Dealer inquiries invited.



Stalker Agrav Unit

Requires Apple II, II plus, or IIe • Apple II is a trademark of Apple Computer, Inc. • copyright 1983 SOFTWARE ENTERTAINMENT COMPANY

CIRCLE 133 ON READER SERVICE CARD

games there's a kind of emphasis on a pre-analytic thinking, immediate response, immediate gratification. I mean, you have it *right now*. Looking at them you can see they're going in all sorts of directions.

If you look at the amount of attention and resources being devoted by humanity to really try to understand these things it's scandalous, it's nothing. Just drops in an enormous ocean.

A+: Do you play games?

Papert: I had a summer house in Maine (two years ago) and I often used to drive up from Boston, often very late at night, which was very tiring. Exactly halfway there's a Howard Johnson's with a lot of computer games. I always stopped there and played Asteroids. My score at Asteroids tells me more about if I'm in a fit state to be driving and at what speed I should let myself drive than my intuitive feelings. If my score is disastrously low, if I can't play Asteroids to my usual standards, I shouldn't be driving a car because my reaction times have slowed down.

I think one can predict that in the next decade there's going to be a tremendous flourishing of intellectual development.

A+: Getting back to computer languages, some computer scientists feel that the programming language of the future may be no language at all, that is, instead of being programmed, the computer will use an artificial intelligence routine that will respond to simple instructions from the person using the computer. What's the implication of that?

Papert: Indeed it might be that all the thinking we're doing now about how using the computer might be good for people's intellectual development would be out the window. In fact, intellectual development itself might be out of the window. This is really the scary thing around the corner. If you think about artificial intelligence seriously you should think in terms of what it might be like in a hard core vision, which is (the idea that) machines will do everything better than people. So then you might say what's the point of intellectual development under those conditions?

A+: But wouldn't you still have some sort of programmer "elite" who writes the artificial intelligence routines?

Papert: If you really believe the hard core vision of AI then the machines will do that too. I don't know how you start thinking about what you should do about that. Clearly the Joe Weizenbaum approach is absurd. *(Interviewer's note: Joseph Weizenbaum is an MIT computer scientist who has criticized the artificial intelligence movement for being anti-humanistic.)* By the Joe Weizenbaum approach I mean Joe Weizenbaum realizes one day what this hard core vision is saying and he's driven by this to say: "No, that's terrible. Let's tell everybody how terrible it is and stop it." Well, I don't think it's had any effect on stopping it. I don't think that predicting how many dangers there are going to be is an effective way of stopping it. I don't even think that we want to stop it . . . or that *I* want to stop it.

A+: You've written and spoken extensively about how computers can change the way people think. Would you give some examples of that?

Papert: This in the context of putting in question the established assumptions

Now YOU can write professional quality interactive Computer-Assisted Instruction materials and simulations. . . .

EnBASIC AUTHORING SYSTEM™ can help YOU

Authors Paul Tenczar, Stanley Smith, and Allen Avner have produced CAI and similar user-oriented software for more than 20 years. Here are routines and authoring aids critical to preparation of high-quality, user-friendly materials.

EnBASIC adds to Applesoft* BASIC. All features of BASIC are still present.

A flexible display design allows for:

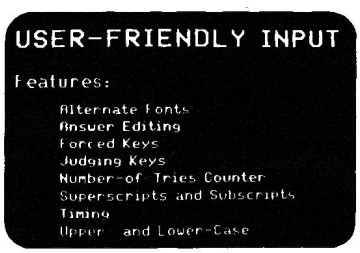
- Proportional spacing, superscripts, subscripts, underlining, and automatically backspaced diacritic marks in text
- Double or standard size characters displayed anywhere on the High Res screen
- Lower-case characters on the Apple II plus*

Advanced input handling affords you:

- State-of-the-art answer-judging
- Automatic indication of spelling and typing errors
- Character-by-character error feedback for missing, extra, or wrong letters, inverted letter order, errors in accenting, capitalization, sub- or superscripting
- Synonym lists allowed as part of expected responses

For the Apple II plus* and //e*, with at least 48k of memory and 3.3 DOS.

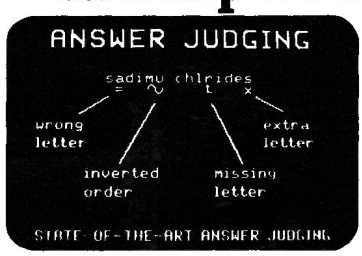
COMPress
A Division of Van Nostrand Reinhold Company



You get all these features simply by specifying a correct response and including an EnBASIC command that implements spelling checks with feedback.

The Package

A 94-page manual containing a tutorial on use of EnBASIC with examples, implementation hints, and technical details (available separately for $20.00 which may be applied to the full purchase price of $150.00).



A **pocket guide** to **EnBASIC** commands
A master and back up diskettes containing: the EnBASIC augmentation program, six ready-made character sets (four sizes of English letters plus Cyrillic and Greek) together with editors which allow you to design your own character sets and redefine key set functions.
A sample program diskette

*Registered trademark of the Apple Computer Company
™ A trademark of Computing Teaching Corporation

EnBASIC Package . . . $150

COMPress, Department H,
P.O. Box 102, Wentworth, NH 02282
(603) 764-5831/5225

Yes! Send me ___ copy(ies) of EnBASIC package at $150.00 each.
☐ Check or Money Order enclosed.
☐ Charge me
___ Visa ___ Mastercard ___ AmEx
Card # _____
Expires _____

Ship to:
Name _____
Affiliation _____
Address _____
City, State, Zip _____
Signature _____
☐ Request for catalog. ST583

CIRCLE 194 ON READER SERVICE CARD

INFAX



We make apples grow!

See us at
AppleFest SAN FRANCISCO
Moscone Center
San Francisco
Friday-Sunday
October 28-30, 1983

INTRODUCING THE INFAX 101A

The Infax 101A disk drive subsystem has been designed specifically for Apple* owners interested in added storage. Floppy disks are a thing of the past.

The Infax 101A features a removable 10 megabyte data cartridge. Your Apple* can have almost infinite storage capacity with the new Infax 101A.

Look at the features the Infax 101A offers:

- ★ Microprocessor-based error correction.
- ★ User transparent error detection and correction.
- ★ Automatic start-up diagnostics, idle drive shutdown, error recovery procedures.
- ★ Host adapter/controller and software supports up to 4 drives simultaneously.
- ★ Cartridge write protect switch.
- ★ Highest performance, reliability of any removable disk drive.
- ★ Lowest cost 10 megabyte (formatted) data cartridge.
- ★ More resistant to shock and vibration than any other fixed or removable disk drive.
- ★ Fastest start/stop (cartridge replacement) time of any high performance disk drive.
- ★ Non-contact head to disk interface.

The Infax 101A comes with disk drive, data cartridge, power supply, cables and personal computer adapter. Software included supports Apple* DOS 3.3, Pascal and CP/M.** Also included are support software for quick copying, backup and file management. Slot independent. Supports auto-boot capability.

Infax is a registered trademark of D² Products *Apple is a registered trademark of Apple Computer, Inc. **CP/M is a registered trademark of Digital Research, Inc.

INFAX®

For additional information and the name of the dealer nearest you call (800) 241-1119 — in Georgia call (404) 981-6778. Or write: VUFAX, INC., 5301 Covington Highway, Decatur, Georgia 30035

CIRCLE 135 ON READER SERVICE CARD

about the order in which children learn and acquire knowledge and behavior—particularly, I think, Piaget's very insightful classification of what he calls *concrete* operations versus *formal* operations.

A+: What would be an example of concrete knowledge?

Papert: There is a certain slice of arithmetic knowledge. For example, knowing that if I've got a bunch of objects, that changing their arrangement doesn't change their number. This is what Piaget calls conservation of number. It's a fundamental piece of understanding without which you couldn't get very far using numbers. We see from Piaget's work that children are not taught this and they're not born knowing it, either. But they come to understand it spontaneously at about the age of five or six in the normal course of development.

A+: And formal knowledge?

Papert: A typical kind of *formal* knowledge is systematically manipulating the permutations and combinations of the (number) set, but this doesn't happen often until the age of 10 or 12.

Now the question is: Is this central to or accidentally dependent on cultural things? My thesis, which we're seeing already in this case, is that when you're used to using procedural programming, the systematic manipulation of combinations of things becomes quite as concrete as lining up objects. So something that could only be handled abstractly before can now be handled very concretely and can be acquired by children at a very early age.

So our concept of *what* gets learned *when* is totally reshuffled. We're seeing children of five or six beginning to learn things spontaneously that children wouldn't discover in their own development until twice that age, without the computer.

A+: What's the implication of this?

Papert: I think the implication is that one thing leads to another: The roots into adult knowledge available to children are now totally different so that our whole concept of who should learn what, when has to be thoroughly revised. Now that's, I suppose, the *practical* implication.

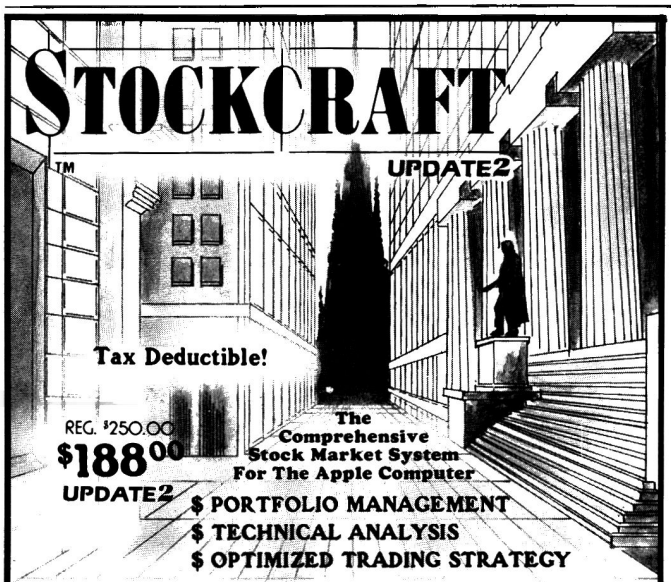
The implication for *theoretical* psychology is another story. There are extremely subtle and deep questions raised about whether we need a different kind of theory now for intellectual development.

Which relates to all these other questions about the effect of games, what kind of language is good for children, if there's early imprinting what is it's effect, are there really aptitudes. During this conversation there have been many obviously important questions about the psychology of thinking and learning and intellectual development that we've not been able to answer in the past. In order to answer them it's not enough to put

We're seeing children of five or six learning things spontaneously they wouldn't discover on their own, without computers, until twice that age.

computers out in the world, we also need theoretical constructs. So I think one can predict that in the next decade there's going to be a tremendous flourishing of intellectual development. There will be new ways of thinking, new kinds of theoretical analysis in anthropology and logic and the relationship of people to knowledge and to culture. ✚

STOCKCRAFT™ UPDATE2



Tax Deductible!

REG. $250.00 $188.00

The Comprehensive Stock Market System For The Apple Computer

UPDATE2 $ PORTFOLIO MANAGEMENT
$ TECHNICAL ANALYSIS
$ OPTIMIZED TRADING STRATEGY

- Tracks Stocks, Options, Bonds, Mutual Funds, Money Market Funds
- Compatible with Compu Trac, Micro Log, CSI, Visicalc
- Modem Portfolio Updates with Dow Jones, CompuServe, The Source
- Fast DOS • Auto-Run Feature for the Multi-Portfolio User
- Prints Profit & Loss Statements • Relative Performance
- Schedule D Tax Data • Price Trend Analysis
- Buy & Sell Signals • Modem Data Capture
- Maximized After-Tax Rate of Return • Hi-Res Plots
- User-Modifiable Routines • Visicalc™ Interface
- Professional Documentation • Verify Market Advice
- Starter Set of Market Indicators • Weekly Prices
- Technical Support Via Bulletin Board
- Discount at Stockcraft Seminars • Generates Over 20 Reports

VISA MasterCard

DEALER INQUIRIES INVITED

See Your Dealer or Send Order to:

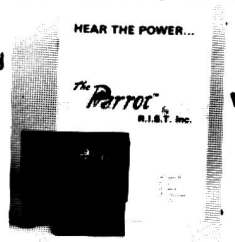
DECISION ECONOMICS, INC.
14 OLD FARM ROAD, SUITE T, CEDAR KNOLLS, N.J. 07927 • (201) 539-6889

ALL TRADEMARKS ACKNOWLEDGED COMPATIBLE WITH APPLEII+, APPLE IIe, AND APPLE III IN EMULATION MODE

CIRCLE 152 ON READER SERVICE CARD

R.I.S.T. Inc. ANNOUNCES
SPEECH SYNTHESIZER SALE
$59.95

*ACT NOW: Receive
Exclusive Phrase Finder Program "$5. VALUE FREE"
Speech Synthesis Instruction Manual "$10. VALUE FREE"
ORDER NOW



Regularly $89.95 Now Only $59.95

HOW YOU CAN MAKE YOUR COMPUTER TALK.

The PARROT newly introduced by R.I.S.T., gives the power of speech to APPLE II, II+ Computers. This simple to use plug-in speech module is capable of generating all the sounds in the English language. The combination of these sounds, in the order of your choice, will generate an unlimited vocabulary of words, phrases, and sentences as well as an array of sound effects.

Paul Donnelly had this to say in the April issue of Syntax:
"Documentation is professional..."
"Overall, R.I.S.T.'s Parrot is an excellent unit and performs up to and behond my expectations."

SALE

Send To: R.I.S.T. Inc. Dept. 4 214 (Fomerly Voicetech)
P.O. Box 499, Ft. Hamilton Station
Brooklyn, N.Y. 11209 - (212) 259-4934

Please send me #_____ Parrot(s) Speech Synthesizers for my Apple II ☐ II plus. ☐ at $59.95 ea. plus $4.00 sh/hd.

I will also receive an exclusive phrase finder program and a 40 page instruction manual, FREE.

15 DAY MONEY BACK GUARANTEE/C.O.D. ORDERS ADD $1.75
PAY BY BANK CHECK OR MONEY ORDER
N.Y.S. RESIDENTS ADD 8¼% TAX.

CIRCLE 200 ON READER SERVICE CARD

Look, Ma, no hands!



If you don't type, you've probably longed for the day when you could simply talk to your computer. It's here.

Your voice can set you free.
With the Voice Input Module from VMC, you can "train" your Apple II, IIe,® or Franklin® to perform as many as 80 different spoken commands, in unlimited subsets, with near-perfect recognition.

So where you used to type "/P return — " /\ CO return N39 return" you can just **say** "print."

Command performance.
The Voice Input Module works parallel to the keyboard with all existing applications software. So you can type if you need to, or do anything from electronic spread sheets to word processing to games with voice control alone. Either way, you'll increase your productivity and have fun doing it.

Demand a demonstration.
You won't believe it until you see it. So see the Voice Input Module at your nearby computer store today.

And find out how little you'll miss typing.

Apple II and IIe are registered trademarks of Apple Computer, Inc. ■ Franklin is a registered trademark of Franklin Computer, Inc.

VIM **YOUR VOICE CAN SET YOU FREE.**

VOICE MACHINE COMMUNICATIONS

1000 South Grand Avenue ■ Santa Ana, California 92705 ■ Telephone (714) 541-0454 for the dealer nearest you.

CIRCLE 138 ON READER SERVICE CARD

Announcing

SuperSprite™





Plug arcade excitement into your Apple computer

Super Sprite is an amazing peripheral card that plugs easily into the Apple's expansion slot. It magically transforms your Apple into an exciting entertainment center for colorful and dramatic animation, realistic sound effects and actual speech.

Sprites Galore

Only Super Sprite has multi-plane graphics for life-like 3-D animation. Watch your screen come alive with animated characters (sprites) that flit and fly, intersect and interact, and never get in the way of each other. **And sprite action can join standard Apple graphics on the screen at the same time.**

Software Support

Every Super Sprite package includes the Ampersprite™ software language that lets you devise sprites in seconds from the keyboard. Plus sound effects and speech! Or, simpler yet, you can buy a commercial game that's already written around the Super Sprite.

Your computer store should have Super Sprite in stock. If not, ask him to order one for you. Suggested retail is only $395.



Super Sprite package includes operator's manual, Ampersprite programming utility and demo diskettes.

Synetix Inc.

15050 N.E. 95th, Redmond, WA 98052, (206) 881-7110 **1-800-426-7412**

™ Super Sprite is a registered trademark of Synetix Systems, Inc., 1983.

™ Ampersprite is a registered trademark of Avant-Garde Creations, Inc. *Apple is a registered trademark of APPLE COMPUTER, INC.

CIRCLE 139 ON READER SERVICE CARD

ANNOUNCING A REVOLUTION IN APPLE GRAPHICS AND SOUND



THE MAGIC BEHIND THE MIRACLE

There is no question that the new SUPERSPRITE BOARD from Synetix is something of a miracle.

Suddenly, the Apple's graphics capabilities have been pulled from mediocrity and launched into the forefront of today's state-of-the-art graphics explosion. SPRITE GRAPHICS, 16 HI-RES COLORS, 35 VIDEO PLANES, APPLE & SPRITE GRAPHICS TOGETHER, EXTENDED SOUND EFFECTS, VOICE AND MUCH MORE . . . NEVER POSSIBLE ON THE APPLE BEFORE NOW.

Equally amazing are the three special software packages created especially for this board by Don Fudge, aptly titled THE STARSPRITE SYSTEM. The board, without STARSPRITE, would be much like the Apple without any programming language -- STARSPRITE is the key.

By the end of the first sitting with the STARSPRITE SYSTEM, you'll not only be able to perform functions once reserved only for seasoned programmers, you'll also be able to create graphics and animation that, until now, weren't even thought possible on the Apple.

STARSPRITE I is included at no extra charge with the SuperSprite board. This software and extensive manual teaches you how to take command of the board's graphics, sound, music and voice capabilities and includes three exciting, alterable arcade games.

STARSPRITE II is designed for intermediate programming and contains utilities and tutorials for animation, sound effects, music, scene creation and much more.

STARSPRITE III is a professional programmer's dream-come-true, providing the entire system's source codes, machine language routines, pokes, buffers, collision paths, Ampersprite™ information, etc.

The STARSPRITE SYSTEM is unlike anything yet created for the Apple. For more information dial (503) 345-5202 for a special two-minute recording. Our order number is (503) 345-3043. Call us now to experience the future.



SPRITEWARE™ FROM AVANT-GARDE

(503) 345-3043 P.O. Box 30160 EUGENE OREGON 97403

CIRCLE 140 ON READER SERVICE CARD

THE SOCIETY FOR THE PREVENTION OF CRUELTY TO APPLES

Whether you are a "green" Apple user or an experienced programmer, your local user group can provide valuable advice on computer operations and new applications.

Dusk settles over a small city in northern California. At a local junior high school, members of the town's S.P.C.A. are arriving for their regular monthly meeting. Friendly chatter subsides as the meeting begins. The picnic chairman brings the crowd up to date on plans for the annual cookout. The treasurer says income is up. Another member stands to give an announcement of the "D.O.M."

D.O.M.? It doesn't stand for "Dog of the Month," as one might suspect, and this S.P.C.A. isn't the well-known animal rights group that its name suggests. This is a meeting of the Society for the Prevention of Cruelty to Apples, a computer user group. And its D.O.M.—Disk of the Month—is a floppy disk containing a variety of software programs made available to members at a low cost.

Apple user groups similar to this one are springing up all over the country. Organized by computer owners to discuss how to operate, modify, and upgrade their computers, the groups attract everyone from "green" Apple users to experienced programmers and engineers.

Wherever they meet—a member's living room, a local computer store, or a public auditorium—their purpose is to stimulate the education and enjoyment of their members.

Most groups run entirely on volunteer energy. In return for yearly dues ranging from $5 to $30, members have access to software libraries and receive newslet-


S.P.C.A.
POST
WELCOME
Stan Fenman

ters containing club news, programming tips, and product announcements. Monthly public meetings usually feature guest speakers.

Apple user groups are growing rapidly to accommodate the increasing number of computer owners. In the Midwest, a group that began with a gathering of 20 people in a Chicago-area founder's den in 1978 has mushroomed to 800 members. In New England, more than 2,000 members of the Boston Computer Society (BCS) have indicated an interest in one of the group's many offshoots, the Boston Apple User Group.

The World's Apple Core

The Santa Clara, CA-based International Apple Core (IAC), is an umbrella group for more than 450 user groups around the world, counting 75,000 Apple computer buffs among its far-flung affiliates. Apple computer owners are gathering to exchange tips on computer operation in Zagreb, Yugoslavia; Osaka, Japan; and Dublin, Ireland.

User groups are groups of people "who have pooled their ignorance for the purpose of gaining intelligence;" quips David M. Alpert, president of the IAC. Alpert, who donates his time to the IAC, said he joined his first group as a "dumb member," but now describes himself as a "commodity trader turned software vendor."

User groups have been successful because, according to members, they bring together a wide assortment of knowledge, experience, and resources that then become available to all members.

"People join user groups for the same reason people join antique auto clubs or model railroad clubs," Alpert said. "Computer owners can learn a lot from the manual or their dealer, but it's also nice to work with people who share the same interests."

Ken Silverman, executive director of the IAC and one of the group's nine paid staff members, oversees the day-to-day operations of the organization. For Silverman, the IAC's goal is simply stated: "We are here to support the machine we love."

In this case, "support" refers to the variety of services offered to member groups. Silverman estimated that last year the IAC delivered $482 worth of educational materials to each club, a sizable return on each group's $50 membership fee.

The IAC serves as a consultant to fledgling groups, giving advice on how to create a successful user group. It keeps sample constitutions on file, guides members through the legal requirements needed to gain nonprofit status, and suggests fund-raising ideas to struggling clubs.

In its software library, the IAC houses more than 1,000 disks containing public domain programs, software made available to the general public for copying without charge. Each month the IAC puts together a "Disk of the Month," which it distributes free to member groups. The disks usually contain a variety of programs, from games to business and educational programs and utilities. The IAC also makes the disks available to the public for an $8 cover charge.

Silverman stresses that the nonprofit IAC doesn't intend to compete with computer stores, however. "We don't want to sell products," he said. It's primarily a resource center, dedicated to filling the needs of computer owners.

"Computer stores are not educational centers," Silverman said. "They don't have the time or the staff to teach buyers how to learn to use their computers. But owners have to learn somewhere." The responsibility to educate computer owners shouldn't fall on the shoulders of computer companies, either, Silverman remarked. "Car dealers don't teach people how to drive when they sell a car, although they will repair them if something goes wrong. The same is true with Apple Computer."

Although the membership rolls are predominantly male, the number of women members is growing.

What is the IAC's relationship with the company? "Strictly at arm's length," Silverman stated. The IAC accepts Apple's help when it is offered, but it has also criticized company policies that hurt users, such as the firm's decision to stop mail-order sales.

The IAC also publishes a monthly magazine for Apple computer users, called *Apple Orchard*, featuring reviews, programs, product announcements, and club notes.

A Diverse Membership

User groups are a relatively new phenomenon, dating from the mid-1970s, when microcomputers first became commercially available. According to IAC's Alpert, early user groups were citadels of "hobbyists, tinkerers, and the like" who wanted to find out how the computer worked.

But the typical computer owner has changed since those days. "Five years ago, about 75 percent of the microcomputers sold were bought by hobbyists," he said. "Today, more than 80 percent are purchased by business people and educators."

User group members are now so diverse that many have organized special interest groups, or "sigs", which allow members of the group to focus on more narrowly defined interest areas or pursue specialized applications.

A member of the San Francisco Apple Core, for instance, can participate in a subgroup whose focus might be telecommunications, operating systems, programming, or machine languages. Like many groups, it also has incorporated a beginner's group, known as the Green Apples.

In fact, as user groups continue to grow, they must meet the challenge of welcoming new members, according to Jonathan Rotenberg, president of the Boston Computer Society.

The BCS, for instance, schedules time for beginners before each general meeting. It also takes steps to combat excessive use of technical jargon that could leave novices bewildered, Rotenberg said. The organization gives a handout to guest speakers on how to address the group, cautioning against too much computer lingo.

"We try to cut through the garbage people have to put up with in computer stores and manuals," Rotenberg said.

User groups try to fight the mystique that surrounds personal computers and try to make them technically accessible to the average person. User groups cater to people who "don't want to become computer nerds" in order to enjoy their machines, he said.

But many groups still rely on these hard-core hobbyists, people who know their computers inside and out, to help solve members' technical problems. Sometimes these computer "gurus" are still in high school; often they work in the computer industry itself. Most important, however, is their eagerness to share their expertise with novices.

Since a typical meeting brings together new users as well as experienced ones, the groups try to strike a balanced approach. "We target groups at a certain level," Rotenberg explained, "but it's not the absolute beginner's level."

Smaller user groups also focus on ways to weave new members into the fabric of the group. The S.P.C.A. in Fre-

APPLE® MODEM. WITH EVERYTHING.

Your best buy in modem history. The **Networker**™ a plug-in single-slot direct connect modem for your Apple II, II+, and IIe (or Franklin, Albert, or other Apple compatible computer). You are immediately linked to the vast network of computers — data bases like the Source,® Compuserve,® or Dow Jones,® friends, banks, businesses, and hundreds of local "bulletin boards." For only $129. There's absolutely nothing else to buy. And it even comes with software.

$129

This is the modem that does it all, and does it for less. The Apple Communications Card is on board, so you won't need to buy one. That will save a bunch. It's 300 baud, the most commonly used type of modem. It comes complete with its own communications software on Apple compatible disk, giving you features ***no*** modem offers.

Like "data capture" to lock the messages into your Apples' RAM, and then move the information onto a disk for easy reference and review. A terminal program that turns your computer into a communications command center, displaying on-screen "help" menus, continuous updates of memory usage, carrier presence, baud rate, communications status, all while taking in and displaying information from any computer.

The **Networker** supports both originate and answer modes, so you can send and receive information, in full or half duplex modes. And its all easily programmable right from the keyboard of your Apple computer. All you do is plug **Networker** into any slot (except 0) in your Apple computer. It'll even ask you what slot it's in. It's that easy to use.

NETMASTER™ COMMUNICATIONS SOFTWARE

For $179 we include the even more incredible **Netmaster** software for advanced users. **Netmaster** is a "communications freeway" that lets you speed any Apple file to another Apple through noisy phone lines, without errors. **Netmaster** even includes its own Disk Operating System to control the flow of information and leave you over 40K of "buffer" memory from your 64K RAM. And there's always help when you want it. On screen. Status indicators keep you fully updated.

Netmaster will let you transfer games, computer graphics, programs, sales reports, documents, any DOS 3.3 file, all directly from disk to disk, all with computer (not telephone) accuracy. **Netmaster** is completely configurable to understand any computer, even mainframes. File size is unlimited.

But **Netmaster** is not stuffy. It will talk to the other communications packages like Visiterm® or ASCII Express.® Of course they don't support **Netmaster's** superb error checking, that guarantees you won't miss even a comma. It doesn't only talk to the Networker either. It will also talk to those more expensive modems from Hayes and Novation.

And **Netmaster** is fast. It transfers information disk to disk three to five times faster than the others. Of course **Netmaster** is fully compatible with them. But if you want things to happen really fast, talk to another Netmaster.

We sell **Netmaster** by itself for $79, and even if you have another modem for your Apple, **Netmaster** is an outstanding value. It will even support auto dial and auto answer. **Netmaster** requires 48K of Apple memory, disk drive and DOS 3.3, and ZOOM's **Networker** modem or another modem. It can also be used without a modem when two Apples are hardwired together, using a 6850 or 6551-based interface card.

Networker, **Netmaster**, and **Networker/Netmaster** combo are all produced in the USA by ZOOM Telephonics, producers of the popular **DEMON DIALER.** The Networker is FCC registered, and all products come with a one-year warranty.

HOW DO I GET ONE? OR TWO?

Check with your computer dealer. Or call us direct at 1-800-631-3116, and we'll let you know where to get them in your area.

Massachusetts residents call 617-423-1288.

The following are trademarks: Apple by Apple Computer, the Source servicemark by Source Telecomputing, Compuserve by Compuserve, Dow Jones by Dow Jones & Company, Visiterm by Visicorp, ASCII Express by Southwestern Data Systems, DEMON DIALER by ZOOM Telephonics. ©1983 ZOOM Telephonics, Inc.

ZOOM Telephonics, Inc.
207 South Street, Boston, MA 02111

CIRCLE 195 ON READER SERVICE CARD

mont, California, for instance, appointed one of its members to be a "beginner's ombudsperson."

A typical user group meeting includes guest speakers and time for members and guests to ask questions. Discussions can cover a variety of issues, from where to get the best price on printer paper, to how to get the Apple to "talk" to a printer, to critiques on the latest developments in hardware and software.

These question-and-answer sessions are the heart of user groups and provide a public forum for members to ask questions and make contacts. A common refrain during these sessions is: "See me after the meeting." Following the general meeting, members mill around to exchange information in what many groups refer to as "random access" sessions.

The meetings often include demonstrations of new products. At a recent meeting of Apple P.I.E. (Programming and Interfacing Enthusiasts), a standing-room-only crowd filled the Saratoga, California community center library for a demonstration of Apple Computer's Lisa. Viewing a large screen in the center of the room, members watched with great interest as John Fenwick, the club vice-president demonstrated the system's office application programs, bit-mapped graphics, and mouse, a pointing and drawing device.

User Sisters and Swashbucklers

Although the membership rolls are predominantly male at present, the number of women members is growing. Three years ago, Carol O'Connell joined Apple P.I.E. because she wanted to find out how a computer could help her train her autistic child. "I've taken BASIC now and turned into a hardware freak," she admitted with a smile.

O'Connel, now a student at San Jose State University, says women teachers and computer-related business operators are now attending Apple P.I.E. meetings.

Other user groups have noticed increased interest from women. In the beginning, women members were almost exclusively engineers or programmers. "In the spring of 1980 when the Boston Apple User Group was formed, it was almost a rarity to have a woman involved in the group," said Allen Sneider, director. But as personal computers moved into classrooms and offices, students, teachers, secretaries, and professional women began tapping into user groups for advice and support. According to Sneider, women now make up about 25 percent of the Boston group.

As mentioned earlier, most Apple user groups offer members access to a library of public domain software. Many of these programs are contributed by members. One group holds a yearly software programming contest soliciting new library entries.

But software copying can present problems for many groups. In some cases, members have been accused of being software "pirates," who meet only to copy commerical software. Most groups take a public stand against piracy, however, and actively campaign against the practice. As a preventive measure, the librarians of many groups review the library and throw out any copyrighted software they find. "We don't condone piracy, we condemn it," said IAC's Alpert. "For one thing, the only computer allowed in the meeting room is the one to be used for that meeting's demonstration . . . If there is piracy, it is not going on with the knowledge or consent of the group's officers," he continued. "Almost every user group takes an editorial and political stand against piracy."

Origins

User groups trace their history from a

DISKETTES, ANYONE?

Datalife™
MD 525-01-18158
single sided/double density
soft sectored, cert. 40 tracks
disk no: Verbatim®

10 DISKS
(with PLASTIC BOX)
$24.95*
or LESS!
With Special Offer*

*Special Bonus Discount Offer: Return this ad with your order and you will receive an additional $2.00 discount ($22.95) with bonus. Limit one box per ad at BONUS price. 5 or more boxes $23.95.

Almaly Trading Corporation
7801 Coral Way
Suite 116
Miami, FL 33155
Telex: 51-9602
800-327-2251
In FL (305) 261-8737

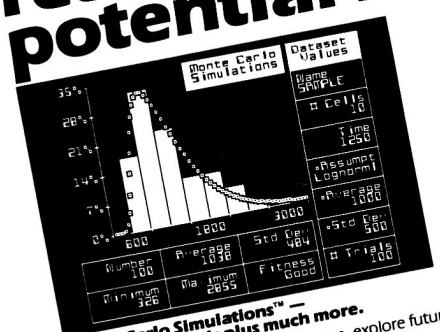
Terms: Cash, MO, Cashier's Check, Personal check (allow 10 days), School P.O. Accepted, C.O.D. (add $1.65), Open Account on approval. VISA/MC AX add 3%, Shipping and Handling: 1 Box 2.50,2-3 Box 2.75, 4-5 Box 3.85, 6 + Call. FLA add 5% Retail Prices may vary. References Dun & Bradstreet.

■ Please send me your free catalog of products for Apple II/IIe

Name_____
Company_____
Address_____
City_____State_____Zip_____

CIRCLE 203 ON READER SERVICE CARD

Know the real odds of potential risk.



Monte Carlo Simulations™ — statistical analysis plus much more.

Now you can analyze past experiences, explore future possibilities and plan for seemingly unpredictable occurrences ranging from normal daily expenses to such catastrophic disasters as nuclear meltdowns.

User-friendly with non-technical approach, understandable graphics, color and sound, this general purpose statistical analysis software can be used in many statistical models.

Fully functional by itself or VisiCalc compatible, Monte Carlo Simulations uses the Chi-Square Goodness of Fit Test in its analysis process and the Monte Carlo method based on your choice of assumed probability distribution. Requires 48K Apple with one or two disk drives (DOS 3.3). Printer optional.

$60 disk & manual/$90 with source code.
Visa and MasterCard accepted.

Actuarial Micro Software
3915-A Valley Court
Winston-Salem, NC 27106
919/765-5588

CIRCLE 202 ON READER SERVICE CARD



Plug 3,000 new applications into your Apple®.

The CP/M CARD™ plugs CP/M Plus™ (3.0) into any Apple II series computers.
The CP/M CARD gives you the option of running your Apple II with the speed and capability of a professional Z-80® system with CP/M-compatible software. Just plug in the CP/M CARD. Then choose CP/M or your standard Apple software at your option.

Plug into a big, new world of software.
The CP/M CARD gives you instant access to the world's largest selection of microcomputer software—more than 3,000 CP/M-compatible applications, languages and programming utilities. So, you, too can use professional business programs such as WordStar,® SuperCalc,™ Condor,™ and other high-performance software starting today!
And, you still have access to your present library of Apple Software.

Plug into incredible performance.
Together, the super-fast CP/M CARD and CP/M Plus run applications up to 300% faster than your Apple system! The CP/M CARD is the only Apple II performance package that offers the speed and efficiency of CP/M Plus.

Why just keep plugging along?
The CP/M CARD provides everything you need—including 64K of additional on-board memory, CP/M Plus version 3.0, CBASIC® language, along with appropriate installation and reference guides. And, we have the CP/M CARD Programmer's Kit available for the serious-minded programmer. See your local microcomputer dealer today. Or contact Advanced Logic Systems' Sales Headquarters, 2685 Marine Way, Mountain View, CA 94043, 800-ADLOGIC or 415-964-5670 in California.

Advanced Logic Systems

The CP/M CARD for your Apple II+ or //e.

CP/M, CP/M Plus, the CP/M CARD and CBASIC are either trademarks or registered trademarks of Digital Research Inc. Z-80 is a registered trademark of Zilog, Inc. WordStar is a registered trademark of MicroPro International Corporation. SuperCalc is a trademark of Sorcim Corporation. Condor is a trademark of Condor Computer Corporation. Apple is a registered trademark of Apple Computer, Inc.

rainy night in 1975, when the Homebrew Computer Club conducted its first meeting in a Menlo Park, California garage. A small group of hobbyists and engineers met to discuss the Altair computer, a personal computer built from a kit.

One of the people who crowded into that garage was Steve Wozniak, later a cofounder of Apple Computer with Steve Jobs. "I was there because I thought people interested in video terminals would meet," he said. "I didn't know anything about microprocessors then."

But he had always wanted a computer, and Homebrew's biweekly meetings led to the development of the first Apple computer. "It became a big thing for me," he remembers. "Every 2 weeks I had to worry about what I was going to show off at the next meeting." Wozniak said he never thought he would eventually have a job designing computers. He feels Homebrew's meetings provided a strong impetus to his computer design work.

Homebrew also attracted Chris Espinosa, now Apple's publications manager. Espinosa was a 14-year-old high school student when he began attending Homebrew meetings for fun. "It was not that much different than school," he said. "The fact that most of the people there were 10 to 40 years older than me didn't matter."

Espinosa frequented Byte Shop Computer Stores, the first computer store franchise, and for the price of a bus pass had managed to get "thousands of hours of programming time" writing demonstration programs for the busy owners.

User groups are a relatively new phenomenon, dating from the mid-1970's, when microcomputers first became available.

Since Espinosa was too young to drive, Wozniak drove him to the meetings. He remembers the night Wozniak arrived with the prototype Apple II in a cigar box.

During a break at another Homebrew meeting, Espinosa met Steve Jobs, who offered him a job. Espinosa spent an "entire Christmas vacation, from six in the morning until eight at night," putting Apples together in Jobs' garage.

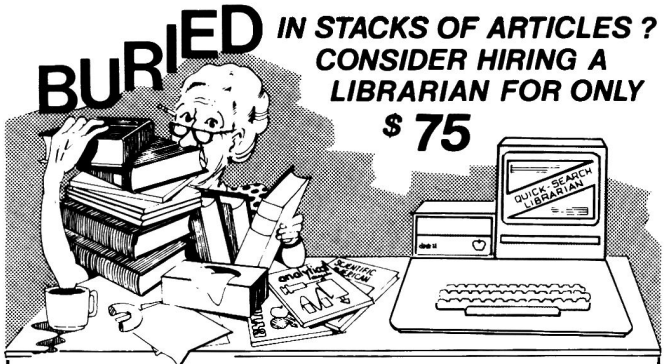
Espinosa built a computer for his high school out of spare parts from the job. When it broke down after 5 years, Apple offered to exchange it for a new one and discovered that Espinosa's model was the earliest existing prototype of the Apple II. The company then donated it to the Smithsonian Institution in Washington, D.C.

User groups have come a long way from the Homebrew days. The first Applefest—a computer show devoted entirely to the hardware and software accessories available for the Apple computer—was organized by BSC's Rotenberg and its Apple User Group. New Apple products sometimes make their first public appearance at user group meetings.

Keeping Pace

The basic purpose of Apple user groups, large or small, hasn't changed. They try to keep pace with rapidly changing computer technology and give support and encouragement to both novice and expert computer owners.

To find the Apple user group in your area, check computer stores, look for magazine or newspaper announcements of meetings, or call the International Apple Core, at (408) 727-7652. ✚



Quick Search Librarian (QSL) makes it easy to enter and edit your journal references, search for articles, and print or sort a list of articles using the 48K APPLE* II + computer. Important QSL features include:

- Two keystrokes select any one of 255 keywords or any one of 255 journal titles.
- Four lines available for listing authors, title and/or comments.
- Powerful data base screen editing, copying and merging features.
- Average search speed is 50 articles/second with multiple criteria; average sorting speed is 40 articles/second when sorting on 3 fields.
- Typically, 1000 articles can be stored on a single disk.
- Includes sample data base and tutorial for *Scientific American*, 1981.

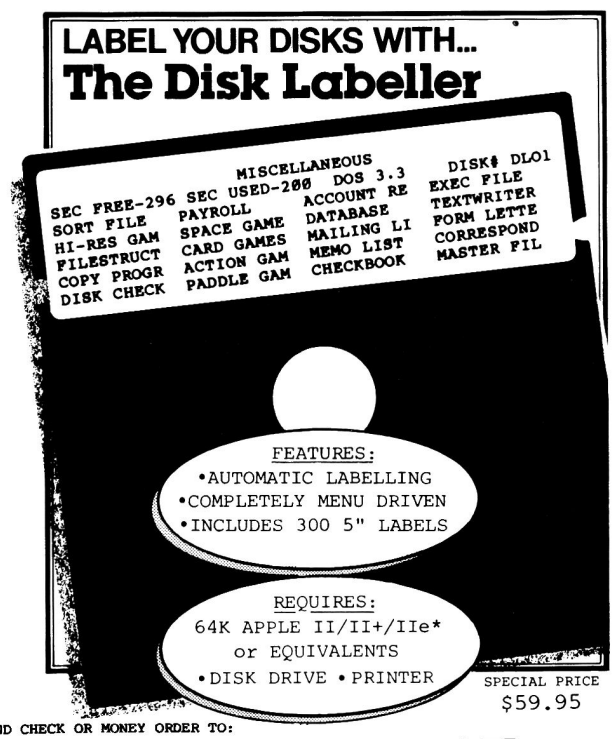
VISA or Mastercard orders accepted. QSL manual available separately for $5. (Price of manual deductible later with purchase of QSL software.) Add $1.50 for shipments made in U.S.A.

* Trademark of Apple Computer, Inc.

INTERACTIVE MICROWARE, INC.
P.O. Box 771, Dept. 209
State College, PA 16801, (814) 238-8294

CIRCLE 145 ON READER SERVICE CARD

LABEL YOUR DISKS WITH...
The Disk Labeller



SPECIAL PRICE
$59.95

SEND CHECK OR MONEY ORDER TO:

PRACTICAL SOFTWARE LTD.
P.O. Box 3000 Dept. A Pomona, N.Y. 10970
Phone: 914-425-1158

ADD $3.00 SHIPPING & HANDLING - N.Y. RESIDENTS PLEASE ADD SALES TAX
*APPLE II/II+/IIe ARE REGISTERED TRADEMARKS OF APPLE COMPUTER, INC.

CIRCLE 146 ON READER SERVICE CARD

Finally, a 6502 Assembler that doesn't require a genius to operate.



LISA v2.6

You don't need an I.Q. of 200 to learn assembly language on your Apple II or Apple*IIe*. All you need is the best 6502 assembler around: **Lazer's Interactive Symbolic Assembler (LISA v2.6)**. LISA is the easy-to-learn and easy-to-use system that will have even the absolute beginner up and running in a matter of minutes. In addition to LISA's clearly written 240-page manual more tutorial material is available for LISA than any other assembler *(including books by D. Fudge, R. Hyde, W. Mauer, and R. Mottola)*. LISA is the beginner's best choice.

Even if your I.Q. is 200, you'll appreciate LISA's speed, power, and ease of use. At 20,000 lines/minute it's 20 to 30 times faster than ORCA/M or Apple's own Toolkit assembler. That's why people like Bill Budge, Ken Williams, Brian Fitzgerald, Don Fudge, and Steve Wozniak use it every day. LISA is very usable. That's why it's the most often used assembler ever created for the Apple II.

LISA v2.6 is available for $79.95 at computer stores everywhere. If your local computer store doesn't have a copy you can order directly from:

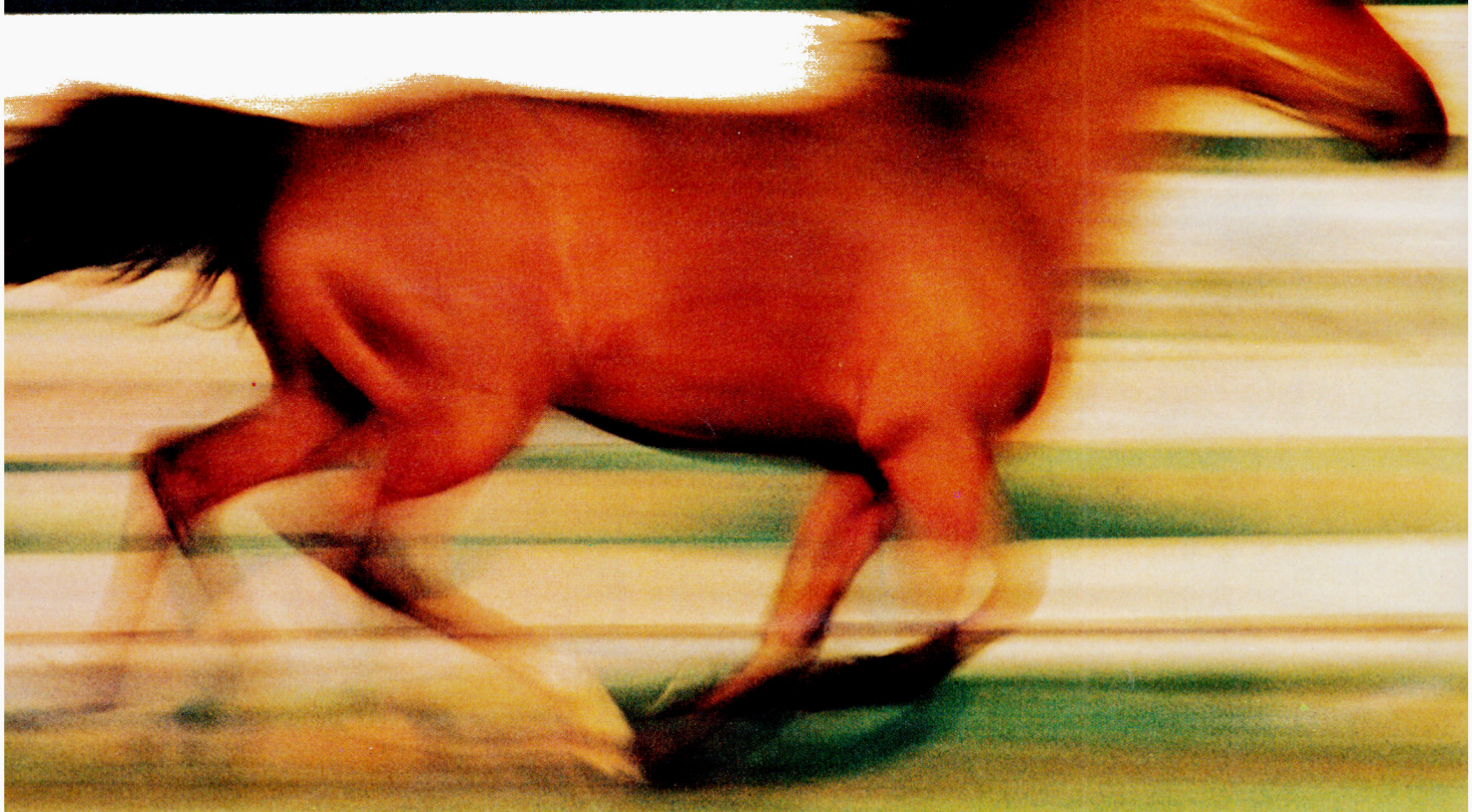
Lazerware, 925 Lorna St., Corona, California 91720. (714) 735-1041

LAZERWARE

CIRCLE 147 ON READER SERVICE CARD

The Champion of Data Base Management Systems...

Thoroughbred™ IDOL®



Thoroughbred IDOL is the leader in program development software for only one reason . . . it's the best!

A true application generator, Thoroughbred IDOL will help you design screens, build data files to any size desired, establish records in formats of your choice, and generate customized reports. Using Thoroughbred IDOL's complete data dictionary system, you will be able to define data, records and files, all using simple English commands.

If you need a powerful, yet easy-to-use tool for developing software applications, run with the champion . . . Thoroughbred IDOL from SMC Software Systems.

For immediate information, call us toll-free at 800-526-3968.

CIRCLE 148 ON READER SERVICE CARD

Run with the best...

Thoroughbred™ SOFTWARE

SMC Software Systems
A Division of Science Management Corporation
1011 Route 22, Bridgewater, NJ 08807
In New Jersey (201) 685-9000
800-526-3968

Now Available on the Apple Lisa™

HOW TO dBASE II

PART I

In a tutorial series on dBase II, the hottest new program for database management

Even Apple users who have not yet delved into the world of CP/M are by now probably aware of the versatile and powerful product called *dBASE II*. If you are one of the many Apple owners running a Softcard with CP/M, *dBASE II* is a program not to be overlooked.

With a list price of $700, *dBASE II* is not inexpensive, but its usefulness in a wide range of applications could easily justify its cost. And if sheer numbers hold any meaning, the public seems to agree.

Marketed by Ashton-Tate, *dBASE II* has already sold over 120,000 copies. If you consider that there are over 700,000 CP/M systems in the field and that, as with audio and video recordings, copyright infringements do occur, then no doubt there are a few more than 120,000 copies in actual use.

dBASE (as it is often referred to by enthusiasts) has attained such popularity in the 3 years of its existence that many users believe *dBASE* has established a de facto standard for CP/M database management, joining the ranks with the likes of *WordStar*. The widespread acceptance of *dBASE II* has spawned an enormous following of aftermarket products and services, not to mention imitations. *dBASE II* utility programs, books, tutorials, user groups, training classes, consultants, and programmers are springing up all over the country, inspiring many microcomputer users to purchase a copy of *dBASE II*. Unfortunately, after the initial excitement of the new purchase wears off, the task of learning an extensive new program with scores of unfamiliar commands can seem overwhelming. New *dBASE II* users typically find themselves confused and floundering, pondering such points as: "What *is* a database?" "Where should I start?" or "What is the most efficient design for my database?"

In order to tackle the details of *dBASE II* with greater ease, consider the following concepts first.

What Is a Database, Anyway?

Databases are nothing new, but as often occurs in the computer world, a cryptic pseudonym has replaced the common term. Actually, most of us use at least one database every day, but we just don't call it by that name. Encyclopedias, dictionaries, phone books, and shopping catalogs are examples of common household databases. These are nothing more than lists of information, some more detailed (encyclopedias) than others (phone books). But what qualifies these lists as databases? Isn't a book or a magazine a database, too? No. A database provides a way of finding information quickly and easily based on one reference point. However, an unorganized collection of information, like a novel, does not.

Another way to think of a database is like this: The most common databases are really nothing but a series of "rows" and "columns" filled in with informa-

The widespread acceptance of dBASE II has spawned an enormous following of aftermarket products and services, not to mention imitations.

tion. But they must be laid out in such a way that any specific piece of information is easily available. Typically, each column is headed by a title describing the type of information in it, and each row contains the information itself. In database lingo, the columns are called "fields" and the rows are called "records."

For example, consider your checkbook register, another household database. The categories ("check number," "description," "charges," "credits," "balance") comprise the fields of the database. Each check entered is a record (see Figure 1).

	Record				
Field	check	description	charges	credits	balance
	#1				
	#2				
	#3				

Figure 1: Example of checkbook register fields.

	Record			
Field	name	address	city	phone
	Marengo, Lily	8065 Toyler Dale	Hill Town	555-1212

Figure 2: Example of telephone directory fields.

	Record		
Field	item	subheading	page
	Pets	aardvark	3
		chuckwallah	25
		ibexe	27
		lemur	483
		platypus	19

Figure 3: Example of catalog fields.

Another example: Suppose you want to look up the phone number of your friend, Lily Marengo, in the telephone book? Your reference point (sometimes called a "key") is her name. From this one piece of information you should be able to find Lily's phone number, and possibly even her address (if it is listed) (see Figure 2).

A telephone book is useful only because it allows rapid access to desired information. The same is true of a catalog, assuming it includes an alphabetical index of its contents. The key in the case of the catalog is the item name, which leads you to the correct catalog page number (see Figure 3).

In contrast, a magazine or a novel may contain lots of information, but it is not usually stored in a manner designed for instant random access. No novel contains a "plot" or "quotation" index. Who would want one?

The next question is: "So who needs a computer? I can make lists like this easier and cheaper on paper!"

A good point. In some cases, it would be foolish to use a computer to create and maintain a database. Consider the telephone book example. As long as you want to look up Lily Marengo's phone number based on her name, you are better off with a book rather than a computer. However, what if you already knew Lily's phone number but had forgotten her last name? Or you needed a list of everyone whose phone number started with "527"? With its inexhaustible capacity for drudgery, a computer is the perfect tool for this type of work.

Not only could it allow you to find the desired information easily, it would allow you to add more people to the phone book, and keep it up to date as phone numbers and addresses changed.

Of course, all this could be (and sometimes still is) done by hand, but human-being hours are better spent in creative and intuitive pursuits than in memorizing or searching through lists.

Besides, another advantage of computerization is speed. A good computerized database system can extract information much faster and more cheaply than humans can.

What Is dBASE II?

Sophisticated database management systems have been available on large computers for at least a decade now. But until recently, squeezing much capacity or flexibility out of a microcomputer has proved difficult due to the limitations of the computers and the primitive state of microcomputer database software. This is precisely where *dBASE II* comes in.

dBASE II is a CP/M-based relational database management system. With *dBASE II* you can:

- Create a wide variety of small- to medium-sized databases using English-like commands.
- Update and edit databases using a format on your screen that lets you see exactly what data is being added. You just fill in the blanks.
- Display information in an almost endless variety of ways, either on screen or on paper.
- Generate printed reports, mailing labels, form letters, and so on in any visual arrangement, with *dBASE II* automatically doing mathematical calculations for you.
- Do all of the above either manually or under program control, using the complete database-oriented programming language included with the system.

Many of these capabilities result from the relational design of *dBASE II*. *Relational* refers to flexibility in database design. For instance, say you decided to create a telephone directory database. To start, you want to search for phone numbers based only on names. Later, if you want to use another key for the search (perhaps the company names of people listed in the phone book), you can. In some other types of databases, all this must be prearranged.

However, although flexible, *dBASE II* is not particularly easy to learn, especially if you want to take full advantage of its capabilities. To complicate matters more, *dBASE II* is actually two programs in one: a database *filing system* and a *programming language*.

The tasks of creating and gaining access to *dBASE II* databases are relatively simple, and this simplicity, to a large degree, accounts for the program's success. Simple English words like *create, append, list,* and *edit* can be entered from the keyboard for immediate results. However, mastering the subtler points of command syntax and developing automated programs definitely require more time and diligence. The advantages you gain from *dBASE II* are proportional to the time you spend learning its quirks.

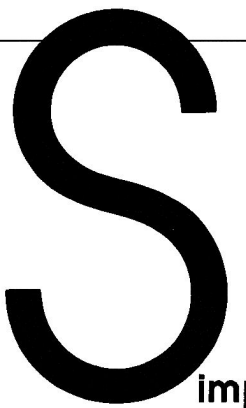
The following pages contain the first part of a series of tutorials that will walk you through the basics as well as some of the nuances of *dBASE II*. The series requires an experimental inclination on the part of the reader, an Apple running CP/M, and *dBASE II*. Before starting, however, look over the following notes and suggestions.

All Apple IIs require 56K RAM, CP/M, and a Z-80 card in order to run *dBASE II*.

The current version of *dBASE II* is 2.4. Operating systems earlier than CP/M 2.0 will not run *dBASE II* revision 2.4 properly. If you do not have these revisions, contact the appropriate sources to obtain the updated versions before continuing. Incidentally, the new features in version 2.4 are well worth your while.

Make sure you run the "install" program on your *dBASE II* disk before starting. And when prompted to indicate if you want "full-screen" editing, say YES. This way, the examples in the tutorial will make sense, and you will be able to enter and edit data more easily.

You may find that a 40-column display is a bit of a nuisance for data display of complex files. If you do have an Apple II with a 40-column display, you



Simple English words like create, append, list, and edit can be entered from the keyboard for immediate results.

might consider obtaining an 80-column upgrade. This accessory is available through most Apple dealers. If you do have an 80-column display, run the install program twice. The first time, choose "Apple II 40 column." The second time you run the install program, select Y for modification of existing installation. Indicate D for decimal input; then choose parameter 9 (screen size). Change the 40 to 80. Leave the 24 as is by hitting the Return key, and save the changes. Now you will be running an 80-column *dBASE II*.

In the following interaction, the words in lowercase are the ones you type. *dBASE II* always (except in the case of the North Star version) responds in uppercase. The <CR> sign after a command indicates that you should press the Return key.

Creating Your First Database

Assuming your system is up and running, and you have DBASE.COM, DBASEOVR.COM, DBASEMSG.COM, AND DBASEMSG.TXT and some spare room on drive A:, follow along.

Since the telephone book example is something everyone can relate to (and use), it's a good place to start. An electronic phone book is easy to keep up to date, and for those with a printer, you can produce a hard copy in alphabetical order, too. Since the database will include addresses, you will be able to generate mailing labels and form letters. Once you have the A> prompt, type:

```
A>dbase <CR>
```

When *dBASE II* asks for the date, you can either type it in or just hit Return. In either case, your date is:

- Temporarily stored in a **memory variable** (more about these in a future installment) in your computer, so that you can use it later.
- Permanently stored on any database you happen to update during this session, so that you can find out when the last update occurred.

Just pressing Return fills in the date as 00/00/00. For purposes of illustration later, type in today's date this time.

Now you should have the *dBASE II* prompt, which is a DOT. This means *dBASE II* is waiting for a command from you. Next, type in:

```
create <CR>
```

This tells *dBASE II* that you want to build a new database. In response, the program prompts you for more information:

```
ENTER FILENAME: phonebk
<CR>
```

It's a good idea to use a name that will remind you of the file's contents. *dBASE II* will now create a CP/M file on your disk called PHONEBK.DBF. (You don't have to specify the extension "DBF" unless you want to.) Now *dBASE II* responds with:

```
ENTER RECORD STRUCTURE AS
FOLLOWS: FIELD
NAME,TYPE,WIDTH,DECIMAL
PLACES001
```

Creating the Structure

If the last message seems a little confusing, the following explanation should help clear things up.

The first thing that *dBASE II* asks you to do is to indicate the *structure* of your database. In other words, the program wants to know the names, types, and sizes of the columns (or fields) in your database. The term *structure* should not be confused with the term *data*. Structure refers to the framework, data to the actual content. Thus, the next few steps are very important, as they will determine the way your database stores information. The following explanation of the screen message will help you understand the next steps in creating your database.

- **NAME** What is the name you want to give to the first field (column)? A name can be up to 10 letters wide (either upper or lowercase), and may contain only colons (:) for punctuation.
- **TYPE** What kind of information is going to be stored in this field? There are three choices (C, N, or L):

C refers to *characters* (including all printable letters as well as any numbers that are not going to be mathematically manipulated).

N refers to those *numbers* that will later require mathematical manipulation.

L refers to *logical* (true/false or yes/no).

- **WIDTH** How many letters, numbers, etc. do you plan to put into this field? That is, how wide should it be? If you choose L for the TYPE category, the width will be 1.
- **DECIMAL PLACES** If you enter N (meaning "numerical") for the TYPE category, you must indicate the number of decimal places in the field (e.g., for monetary figures, type 2 to indicate that there are 2 decimal places.)

If you enter C or L for the TYPE category, simply ignore the DECIMAL heading by leaving it blank.

Careful thinking at this stage will pay off in the long run. Revert to a little low technology for a minute by pulling out a piece of paper and a pencil. Ignore your computer. Now, make a list of what you want your database to do for you. Then consider how many columns you need, what they should be named, what type (C, N, or L) they will be, and how wide each column should be. Imagining what it would look like on paper is the best approach. See Figure 4 for a structure model. For the time being, use this structure. We'll change it later on as part of the tutorial. That way you can practice adding your own finishing touches to meet any specific needs you have.

Since you will not be doing mathematical calculations on any of these fields (such as asking *dBASE II* to find the sum of all your friends' ZIP Codes), you can categorize all the fields as C (character). (Both you and *dBASE II* will find it easiest to use character fields whenever possible.)

Now, how long should each field be? Do a little research. Pull out a phone book and get an idea of how long people's last names are. How long is the average street address? Count the letters in a few city names.

The advantages you gain from dBASE II are proportional to the time you spend learning its quirks.

Imagining what it would look like on paper is the best approach.

field #	1	2	3	4	5	6	7
	FIRST:NAME	LAST:NAME	PHONE:NO	STREET	CITY	STATE	ZIP

Figure 4: Working model structure for dBASE II telephone directory database.



Locksmith 5.0™. . . Before It's Too Late.

If something can go wrong, it will. At the worst possible moment.

That's why you can count on a vital disk failing just when you need it most. Maybe it simply wore out . . . or was damaged by static electricity . . . or spilled cola rendered the disk unusable. Without a backup copy, you'll quickly find yourself at the end of your rope.

Fortunately, there is the new, state-of-the-art **Locksmith 5.0.**

Two years of research went into this updated version of the undisputed leader in software backup programs. The new **Locksmith 5.0** deciphers the latest, most sophisticated copy protection devices. So you can make backups of virtually **all** Apple-compatible programs*—more than any other nibble copier now available.

And, with the **Locksmith 5.0**, backups will be **easy** to make. It offers you a new, highly detailed owner's manual that clearly takes you step-by-step through each operation.

The cost? **Locksmith 5.0** retails for just $99.95. And the deal is even sweeter if you own an earlier Locksmith version. Locksmith 4.X owners can upgrade for only $24.95—3.X owners for only $39.95 (direct from Omega).

When your disks fail, don't be left hanging. Back them up with **Locksmith 5.0.** It's available from your nearest dealer **now**. If he's out of stock, order direct from Omega MicroWare, Inc. by calling toll free:

1-800-835-2246

(Kansas residents call 1-800-362-2421). Or simply send $99.95 plus $3.50 for shipping and handling charges to OMEGA MICROWARE INC.

Apple IIE-compatible!

OMEGA MICROWARE, INC.

222 S. RIVERSIDE PLAZA CHICAGO, IL 60606

(312) 648-4844

*Note: Locksmith 5.0 copies **everything** from your original program, including all copyright notices and serial numbers.

Locksmith is a trademark of Omega MicroWare, Inc.

Apple Computer is a registered trademark of Apple Computer, Inc.

© Omega MicroWare, Inc. 1983

CIRCLE 149 ON READER SERVICE CARD

MICROTEK
COMPUTER PRODUCTS

IF YOU HAVE A GRAPHICS PRINTER YOU MUST HAVE A GRAPHICS INTERFACE.

DUMPLING-GX
GRAPHICS PRINTER INTERFACE

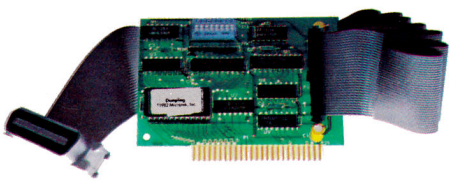
The Dumpling-GX is a DIP Switch Selectable Dual Hi-Resolution Graphics Screen Dump parallel interface card for Apple computers and most popular printers.

At the flick of the DIP switch, The **Dumpling** will interface with: **APPLE ■ EPSON ■ NEC ■ IDS* ■ ANADEX ■ C-ITOH ■ PMC ■ CENTRONICS ■ OKIDATA ■ MANNESMANN TALLEY**

Selectable Strobe and Acknowledge polarities allow use with **any** 8-bit parallel printer in text and block graphics mode.

Microtek's proprietary on-board firmware enables the **Dumpling-GX** to establish intelligent communication between your Apple computer and your printer. Simple commands allow:

- Selection of your printer by DIP switch.
- Selective Dump Page 1, Page 2, or both in either text or graphics mode.
- Chart Recorder Simulation.
- Left & Right Margin Control.
- Line Length/Page Length Selection.
- Block graphics via 8th bit Control.
- Printer bell Control.
- Skip over Perf.
- 90 degree Rotation.
- Double Size Graphics.
- Emphasized Graphics Print.



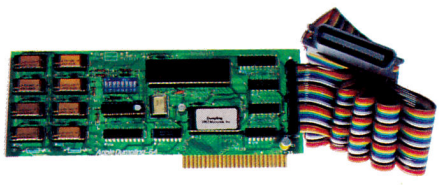
*With special PROM and cable.

DUMPLING-64
GRAPHICS PRINTER SPOOLER

The **Dumpling-64** is the next logical extension to the industry standard Dumpling-GX parallel interface card, allowing the computer to DUMP vast quantities of data into the **Dumpling-64** for later printing, thus freeing up the computer for additional tasks.

The **Dumpling-64** allows full use of all **Dumpling-GX** features. In addition to the standard graphics features, the **Dumpling-64** offers:

- Buffer sizes from 0 K to 64K. User upgradable.
- Graphics Dumps to Buffer. Page 1 and/or 2.
- Multiple Consecutive Screen Dumps to Buffer.
- Software reset to clear Buffer.
- "Space Compression" saves valuable memory taken up by 'spaces' in text or spread sheets.
- Automatic Buffer Size Recognition.
- Pause while printing-immediate.
- Pause while printing-delayed.
- Resume printing.
- REMOTE pause-immediate: hooks up to telephone, switches—etc.
- Buffer ON/OFF control.
- INSERT text editing capability with Pause and Buffer ON/OFF control.



MICROTEK inc.

TECHNOLOGY UPDATE

MORE MICROTEK COMPUTER PRODUCTS THAN EVER BEFORE.

FOR APPLE/FRANKLIN & other "look-a-likes" (APPLE IIe Compatible)

DUMPLING-GX	Hi-Resolution Graphics Parallel Printer Interface Card with Graphics Features for all major printers
DUMPLING-64	64K Spooler Buffer for Text, Block and Dot Addressable Graphics. Works with all major printers
BAM-128	64K/128K Memory Card
Q-DISC	128K Disc Emulation System
MAGNUM-80	80 Column Video Card
VISI-PAC	A BAM-128, a MAGNUM-80, and Software for maximum use of your VISICALC Spreadsheet
RV-611C	7 or 8 BIT Parallel Printer Interface Card
RAINBOW-256	RGB Board with 256 Output Colors to monitor
BAM-16MM	16K Card with Memory Management System (MOVE-DOS)
VIZ-E-EXPAND	Visicalc Expansion Software
VIZ-E-EXPAND 80	Adds 80 Column Features to VIZ-E-EXPAND

FOR THE IBM PC

The **HAL** Series of IBM compatible memory boards:
HAL-64, 128, 192, 256 Memory Expansion without Parity
HAL-64P, 128P, 192P, 256P Memory Expansion with Parity
The **HAL Parallel Printer Cables**
The **HAL Utility Software Package**

THE VIC-20 and COMMODORE 64

VIM-8/16	8K or 16K Memory Expansion Module
VIM-0	EPROM/RAM User Definable Module
CC-2064	Parallel Printer Cable & Software for the VIC-20/64

FOR ATARI 400 and 800 COMPUTERS

AMB-16	16K Memory Card for Atari
AMB-32A	32K Slot Independent Memory Card
ATC-P	Atari Parallel Printer Cable
ATC-S	Atari Serial or Modem Cable

ALSO

SCAMP SERIES	RS-232C Serial Interface Cables 6', 10', 25'

NEW!

- Stand-alone Printer Buffers with Auto Serial/Parallel Conversion up to 256K!
- Serial Dumplings—with and without Buffer.

MICROTEK products carry a 2 Year Warranty and are available from your local Dealer. For your Dealer's name or for further details call MICROTEK.

MICROTEK inc.

4750 Viewridge Avenue
San Diego, California 92123-1690
(619) 569-0900
Toll Free Outside CA **(800) 854-1081**
TWX 910-335-1269

BAM-16, DUMPLING-GX, DUMPLING-64, HAL, MAGNUM-80, Q-DISC, RV-611C, and SCAMP are trademarks of Microtek, Inc. APPLE and APPLE II are registered trademarks of Apple Computer, Inc. ATARI 400 & 800 are trademarks of Atari, Inc. CP/M is a registered trademark of Digital Research, Inc. IBM P.C. is a trademark of IBM. VIC-20 is a trademark of Commodore Business Machines. VISICALC is a trademard of VisiCorp. Z-80 is a trademark of Zilog, Inc. © Microtek, 1983

Keep in mind that blank spaces take up room on your disk just as letters do. You want your fields to be long enough for all relevant data, such as phone numbers and zip codes. But don't make your fields so long that the shorter ones end up getting half filled with blank spaces. You know your field length is correct when only an occasional name or address won't fit in the field. You can usually abbreviate part of the entry in these cases.

From experience I suggest that the lengths indicated in Figure 5 work best. The PHONE:NO field is 12 spaces long to allow room for an area code and the hyphens between the numerals. Since none of your fields are going to be numerical, the reference to DECIMAL PLACES can be ignored this time. Now, proceed to enter the structure as follows. But beware. If you get a BAD NAME FIELD or other error message, check to see that you put the commas in the right place and that you separated multiword field names with colons only. And remember, the <CR> sign means Return.

field #	1	2	3	4	5	6	7
FIRST:NAME	LAST:NAME	PHONE:NO	STREET	CITY	STATE	ZIP	
type-C	C	C	C	C	C	C	
size-10	15	12	22	13	2	5	

Figure 5: Recommended maximum number of characters (width) for each field in the telephone directory database.

dBASE II is not particularly easy to learn.

```
ENTER RECORD STRUCTURE AS
FOLLOWS:
FIELD NAME,TYPE,WIDTH
DECIMAL PLACES
001    first:name,c,10  <CR>
002    last:name,c,15  <CR>
003    street,c,22  <CR>
004    city,c,13  <CR>
005    state,c,2  <CR>
006    zip,c,5  <CR>
007    h:phone,c,12  <CR>
008    <CR>

INPUT DATA NOW (Y/N)? n <CR>
```

Assuming everything went smoothly, you have successfully created your database structure.

Verifying the Structure

Just to be safe, it is a good idea to verify that *dBASE* recorded the structure properly by typing a few commands:

```
use phonebk <CR>
```

This command "opens" the database file that you just created. You must always open a file with the Use command before *dBASE II* will allow you to do anything with it.

Type the following (for DATE OF LAST UPDATE, enter the date you typed in earlier):

```
display structure <CR>

STRUCTURE
FOR FILE:        A:PHONEBK.DBF
NUMBER OF RECORDS:        00000
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE

FLD  NAME        TYPE WIDTH DEC
001  first:name   c    010
002  last:name    c    015
003  street       c    022
004  city         c    013
005  state        c    002
006  zip          c    005
007  phone        c    012
** TOTAL **            00079
```

Notice that aside from the structure, you will also see some other information, like the date that your database was last updated and the number of records or entries you have added thus far. Since you have not yet added data, this field should read 00000.

In order to "close" your file and exit from *dBASE II*, use the following command:

```
quit <CR>
```

You should now see the message:

```
***END RUN DBASE II***
```

This means that the *dBASE II* program has relinquished control back to CP/M. You should now see the familiar

```
A>
```

prompt once again.

Coming Soon . . .

In the next issue of *A+* we will explore techniques for entering and storing data into your newly created *dBASE II* structure. ✚

Robert Cowart, a former Technical Support Specialist for North Star Computers, is a free-lance writer living in Berkeley, California.

CIRCLE 151 ON READER SERVICE CARD

A NEW BREAKTHROUGH

SAVE UP TO 50% WITH OUR CHARTER SUBSCRIPTION OFFER!





Introducing A+, the Most Significant Advance in Apple History!

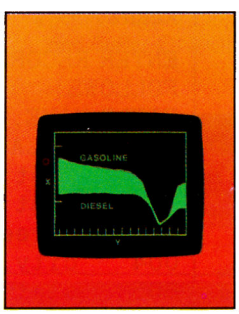
It's here! Big, bold and bursting with page after page of the latest in hardware, software, programming—and more! **A+** is the monthly magazine written exclusively for your Apple microcomputer. Each issue gets you involved with a host of fascinating features, probing updates, unique departments—and reaches to the depths of your imagination to challenge you with daring new strategies and adventures!

Here's just a sampling of what A+ is all about:



HARDWARE: From the latest advances in telecommunications and networking...to new ways to augment memory and access a wider variety of peripherals with greater ease...each issue of **A+** gets you involved.

SOFTWARE: What's new on the market and how you can make your system more powerful...plus full reviews and programming information.



UTILITIES AND DIAGNOSTICS: In addition to language utilities, **A+** helps you troubleshoot problems... makes you faster and more efficient...with utilities ranging from record processing to data transfer.

BUSINESS AND FINANCE AIDS: Software for financial forecasting and analysis...general accounting programs...financial news retrieval services...and business graphics so you can see just where your money is going.

GAMES: Take the **A+** challenge—with hoards of innovative brain teasers...from games to help you learn spelling and arithmetic...to games that provide fun and adventure!

FOR YOUR APPLE...™



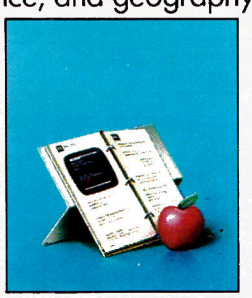


PROGRAMMING TOOLS: Speed up program development with Apple text editors, testing and debugging aids and data base management systems. Since your Apple can speak many languages—from Cobal to Basic and Pascal—**A+** gives you a wide range of utilities for each language so you can create your own exciting programs.



HOME/PERSONAL PROGRAMS: covers it all...from basic processing...to helping you draw with Apple graphics...to speed reading...music theory and composition... even a course on cooking with your Apple... and then how to monitor your diet easily and accurately...along with many educational programs to learn math, science, and geography.

DATA FILES: Let **A+** probe new data base management systems so you'll be able to organize, store and retrieve information in ways you never thought possible.



YOUR TURN: Speak up with your ideas and innovations and network with other Apple users near and far.

Plug into Savings of Up to 50% with Our Limited Time Charter Offer, Good Until Nov. 30, 1983

YES! I want to subscribe to **A+** for:

- ☐ One year (12 issues) only $15.49—38% off
- ☐ Two years only $26.49—47% off
- ☐ Three years only $37.49—50% off

Savings based on full one-year subscription price of $24.97.

Name_____

4D008

Address_____

City_____

State_____ Zip_____

Check One: ☐ Payment enclosed. ☐ Please bill me.

Please charge my:
☐ MasterCard ☐ VISA ☐ American Express

Card No._____ Exp. Date_____

Would you like to receive special offers from qualified users of our mailing list? ☐ YES ☐ NO

MAIL TO: **A+**, P.O. Box 2964, Boulder, CO 80322

Continued from page 48

matter what the computer said, printed lines were double-spaced. The solution to the problem was to remove the top cover (no problem for us since the unit came without screws) and flip an internal DIP switch by turning switch three to the OFF position. Although the manual says that the factory setting is to have all four of the internal DIP switches "off," both the machines we received had switch number three set to "on." The other switches control international character sets; besides the United States character set, you can choose British, German, or Swedish. And another switch puts the printer through a self-test. Although we would normally disparage a self-test buried inside the machine, it has two saving graces. It is primarily aimed at servicemen who use it for diagnosis, and it can be elicited by a control code.

The documentation (our copies were marked GX-100) is scanty and may be confusing if you have never confronted a printer before. On the other hand, the manual gives the dedicated hobbyist more information than he might ever need to handle its Centronics-compatible parallel input port. Then again, with the Banana not much of the manual is needed. Just plug one cord into the wall and another into your Apple, spin some paper in, and you're in business.

Although it may not inspire faith, the Banana does do what it was designed for: It prints. Output is actually legible. It may be the ultimate no-frills printer. And for some users the Banana will make some of those frills on other machines look more worthwhile than they did before.

While we were testing the Apple Dot Matrix Printer and the C. Itoh ProWriter II, we were struck by the similarity between the two machines.

People first laughed at the name *Apple,* but when the machine proved itself as a well-built, versatile, reliable machine, the laughter changed into respect. The Banana has a funny name, too. Although the Apple overcame it's handicap with excellence, there's no such quality to change your opinion about the Banana. You'll probably keep laughing about that ridiculous name all the way to the bank, as you deposit the money you saved by buying the least expensive printer.

C. Itoh ProWriter II

Put the ProWriter II and the Apple Dot-Matrix printers side by side and odds are that an illiterate, color-blind witness could not see the differences between them. Except for color and the names on the fronts, the machines look the same. Hopefully you are neither color-blind nor illiterate because there are important underlying differences between these machines which may make one more useful and valuable to you than the other. We won't go so far as to say that one printer may be better than the other, but only that the differences may make one of them personally preferable to you.

Like the Apple, on the ProWriter normal character sets are formed by a nine-wire printhead in a 7-by-9 dot matrix. Although only scanty information about dot-addressable graphics is given in the manual, apparently vertical dot spacing is 72 to the inch, and horizontal dot density can be varied (be selecting different character widths) at 80, 96, 136 or 160 per inch.

Operator controls on the ProWriter II

Micro Co-op

the microcomputer software co-operative

Over 4 thousand Apple owners already belong to the largest software co-operative in the world. In Micro Co-op's bi-monthly newsletter our experts review and compare the latest software packages available for the Apple, keeping you up to date on the newest developments in applications, simulations, utilities, education, and gaming. The co-op has also just installed a toll-free ordering number for members.

To join Micro Co-op, we charge only a $5 membership fee; we support our services primarily through the software that members buy through the co-op. Our goal is to get you the information you need to make software decisions you won't regret.

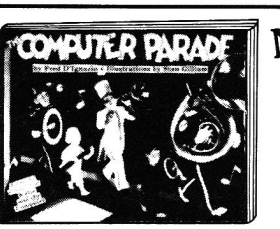


610 E. Brook Drive
Arlington Heights, IL 60005

(312) 228-5115

prices Currently 15% to 25% below retail

CIRCLE 199 ON READER SERVICE CARD



NEW!
Let Colonel Byte take your child on a trip through Cybernia

They'll learn all about computers along the way!

Growing up in the computer world will be easier if your child understands computers. And there's no better place to start than with the computer that's in your home—and with the help of this delightful book.

Computer Parade traces the adventures of Katie and her brother after they fall into the family computer. It reads like a story book. Yet it actually teaches the basics of computer operation.

Any youngster age 4-10 will delight in *Computer Parade.* It's easy to read and richly illustrated in full color.

Help your child grow up computer literate by ordering your copies now.

MAIL TODAY TO: **CREATIVE COMPUTING PRESS**
Dept. NC4Q 39 East Hanover Avenue, Morris Plains, NJ 07950
Please send me_____ copies of *Computer Parade* for $9.95 each, plus $2.00 shipping & handling per book. Total Amount $_____ #9P
☐ Payment Enclosed. (CA, NJ and NY State residents please add applicable sales tax.)
☐ Charge my: ☐ American Express ☐ MasterCard ☐ Visa

Card #_____ Exp._____

Signature_____

NAME_____
(please print)

ADDRESS_____

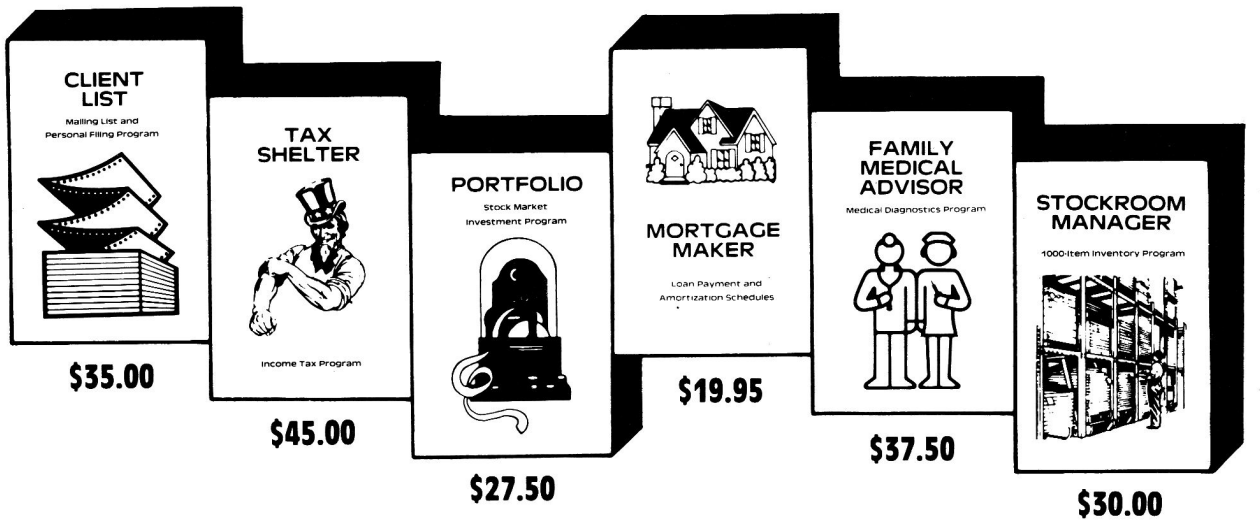
CITY_____ STATE_____ ZIP_____

*Outside U.S., add $3 for shipping and handling.
☐ Check here to receive a FREE catalog of computing books, magazines and guides.
Also available in your local bookstore or computer store.

For Faster Service,
PHONE TOLL FREE: 800-631-8112
(In NJ only: 201-540-0445)

NAVIC SOFTWARE

HOLIDAY 3-PAK
— $49. —



CHOOSE ANY 3 OF NAVIC'S MOST POPULAR APPLE II PROGRAMS — PAY ONLY $49 FOR ALL 3!

EACH PROGRAM SEPARATELY PACKAGED WITH INDIVIDUAL DISKETTES, OPERATING INSTRUCTIONS AND REGISTRATION — VALUES UP TO $117 IF PURCHASED SEPARATELY.

CLIENT LIST

Personal Filing and Mail List Program

This program sorts and prints alphabetized lists with optional categories. It records Name, Address, Affiliation and Phone No. and prints labels up to 3-across arranged by zip code. Its applications are limited only by the users imagination. It accommodates up to 250 names.

Keep track of dues payments, and sort names by active or non-active membership status. Print alphabetical lists for fund raising activities and mailing labels for monthly bulletins.

Lists customers and prospects which are sorted by product interest and territory.

TAX SHELTER

Personal Income Tax

This program is based on the 1983 Federal Income Tax Rate tables. It accepts entries for each of the IRS specified income categories, adjustments, deductions, credits and payment methods, and projects "bottomline" tax liability.

This program makes subsidiary calculations on income averaging, alternate taxes, capital gains, exemptions etc. before displaying a summary of the various categories of income and expense.

Separate data bases can be stored by varying situations or for different individuals.

TAX SHELTER is an invaluable tax planning and estimating tool. It is not intended for printing IRS forms.

PORTFOLIO II

Stock Market Investments

Price information entered on a daily, or weekly basis is compared with the purchase price to establish gains and losses for up to 40 individual securities and for the whole portfolio.

The program accumulates the history of each security's price flutuations. Trends are then presented as line graphs, with the stop-loss and profit-taking limits an integral part of the video screen display.

Portfolio II also has flexible routines for additions, changes, and deletions.

Printouts of portfolio contents, and lists of designated sell-offs are preformatted and selectable from the main menu.

MORTGAGE MAKER

Installment Payments & Amortization Tables

This program is useful for accountants, attorneys, brokers and others who are in business or arranging financing on monthly payment plans.

There are 2 separate routines included. The first routine quickly calculates the amount of the monthly payment required for a loan of any value, term and interest rate. The user simply enters the essential data, and the computer responds with the exact amount of the monthly payment.

The computer then prints out the schedule of payments, detailing the allocation of principal and interest, as well as the principal balance for each monthly payment.

MEDICAL ADVISOR

Diagnose Common Illnesses

FAMILY MEDICAL ADVISOR is a program to analyze overt symptoms and identify the most probable causative medical condition. It uses the power of the computer to diagnose common ailments, obscure diseases, or simple childhood illnesses using nearly 10,000 possible combinations of symptoms.

Simple "yes' or "no" answers to a series of questions prompted by the computer establish a unique data pattern. A special algorithm then enables the computer to analyze the accumulated data, and diagnose the most probable medical condition from a data base of nearly 200 common (and some not-so-common) illnesses.

STOCKROOM MANAGER

1000 — Item Inventory Program

There are 5 separate files of 200 items each recorded on the diskette. Each entry is classified by its own part number and description up to 14 characters long. The item no. includes a file designator, and each entry also carries a location code, unit price and minimum stock level number.

Items may be retrieved from the files by searching for part number or description.

Printout routines are included for -(1) listing the entire inventory, (2) listing lowstock items below the preset minimum levels, and a separate routine for calculating the dollar value of the entire inventory.

ALL PROGRAMS RUN ON APPLE II PLUS OR APPLE IIe WITH SINGLE DISK DRIVE AND PRINTER

ORDER TOLL FREE 1-800-327-2133

IN FLORIDA CALL (305) 627-4132 OR SEND YOUR CHECK TO:

NAVIC SOFTWARE • BOX 14727 • NORTH PALM BEACH • FLORIDA • 33408

OFFER VALID THRU DEC. 1983 • APPLE II IS A REGISTERED TRADEMARK OF APPLE COMPUTER, INC.

CIRCLE 154 ON READER SERVICE CARD

are located in a recessed area on the front of the machine and allow all the normal paper handling functions—top-of-form, line feed, and selecting on-line or off-line. Two green LEDs indicate that the power is turned on (labeled POWER) and that the printer is on-line (labeled SEL). If a fault should occur, a red LED labeled P.E. lights up. Holding the line-feed button down speeds up the slow feeding.

The ProWriter II uses a snap-in fabric ribbon cartridge that mounts on the moving printhead assembly and is smaller than most matrix printer cartridges. (We found the cartridge to be interchangeable with that of the Apple Dot Matrix Printer.) More like a typewriter ribbon than that of a typical printer, it automatically reverses when it reaches its end instead of continuing in an endless loop.)

The ProWriter II can handle all kinds of paper, provided they are single sheets; roll paper; or fanfold, continuous-form paper from 4 to 10 inches wide. Single sheets and roll paper are friction-fed. Continuous-form paper is first fed from the rear of the printer through the tractor mechanism, then around a rubber platen, and past the printhead. The platen knob on the right side of the machine permits precision paper positioning, including some backward movement. The printhead to paper gap can be adjusted for dying ribbons or for multipart forms (up to 0.28 millimeters or 0.011 inch thick, an original and roughly three copies) by a plastic lever on the right side of the printhead chamber.

Learning to use the Apple printer with your Apple computer is easier than getting a handle on the ProWriter.

Basic mechanicals and physical appearances aside, there are significant differences between the ProWriter and Apple Dot Matrix printers. As mentioned before, we were most surprised that the ProWriter II is appreciably faster than the Apple. It is noisier as well; it sounds a bit like a dentist's drill. While the ProWriter II gives you block graphics, the Apple allocates its memory to downloadable characters, different character widths, and two proportionally spaced character widths (instead of ProWriter's one).

If you're a computing novice, the Apple printer will be quicker to get up and running. The ProWriter II gave us double line-feeds when connected to our Apple IIe and ran it through Applesoft BASIC. No big deal if you know what you're doing; just flip one DIP switch located conveniently on the bottom of the printhead chamber. Contrary to the illustration in the manual, the DIP switch should not be set to automatically give a line feed with every carriage return. (If you encounter this problem, ignore the drawing on page A1-4 of the manual and move switch 1-8 to its OPEN position.) Note, too, that if you have problems getting the ProWriter's standard parallel interface to work with your Apple, this manual will be no help. It states: "PARALLEL INTERFACE: Depends on printer interface used."

As you might expect, learning to use the Apple printer with your Apple computer is easier than getting a handle on the ProWriter. The Apple manual is excellent. The ProWriter manual is medi-



THE ULTIMATE COMPUTER COVER

In Ultrasuede®.
A luxurious and functional cover for your Apple IIe PC.
Protect your investment with machine washable, soil-resistant Ultrasuede fabric. Add style and elegance to your home or office. Three designer colors: Camel, Smoke Grey and Ebony, $99. Matching disc drive covers: $24. Embroidered monogram available (3 initials), $6.

Call Toll Free 800-437-4400 with Visa or MasterCard or Order by Mail: **Designs in Fabric,** 32 Marwood Road South, Port Washington, New York 11050.

☐ Computer Cover ☐ Disc Drive
Color: _____ ☐☐☐ Monogram
New York residents please add area sales tax. Please add $3 per cover for shipping and handling. Allow 6-8 weeks for delivery.

☐ Visa ☐ MasterCard ☐ Check
Card No. _____ Exp. Date _____
Name _____
Address _____
City _____ State _____ Zip _____
Ultrasuede® is a registered trademark of Springs Industries, Inc.

CIRCLE 156 ON READER SERVICE CARD

BOOK KEEPER II

One of the most Versatile and user Friendly Personal bookkeeping systems on the market Today for Apple!! It is designed for PERSONAL OR SMALL BUSINESS USE.

ONLY $99.50

IT IS A BOOKKEEPER
- Up to 300 user Defined General Ledger Accounts and Description
- Process 1000 Entries per data Diskette
- Maintain Monthly and Year To Date Totals
- Batch process 200 Entries at a Time
- UNLIMITED BACK DATING
- UNLIMITED ACCOUNT RETRIEVAL AND CHANGING
- UNLIMITED MONTHLY ENTRIES
- Use it as a SINGLE or DOUBLE entry Bookkeeper
- Add or Subtract to all Ledger Accounts

IT IS A CHECK WRITER
- Permanently store 300 Payable Vendors with FULL ADDRESS and a 30 char identification line
- Batch process 100 checks in MINUTES
- Write Checks up to $99,999.00
- Uses LOW COST CHECK with window envelopes
- Process a check for a single amount or up to 10 single entried with discounts
- MAINTAIN UP TO 10 CHECK BOOK BALANCES
- UNLIMITED LEDGER ACCOUNT distribution of check Amount

- Complete Utility programs to Alter or Change all data files
- All reports printed on standard 9½ x 11 paper
- 24 Hour User Hot Line

Mark Donn Assoc.
Box 1589
Marietta, Georgia 30061
(404) 422-8169

MONEY BACK GUARANTEE
VISA OR MASTER CHARGE
DEALER INQUIRIES INVITED

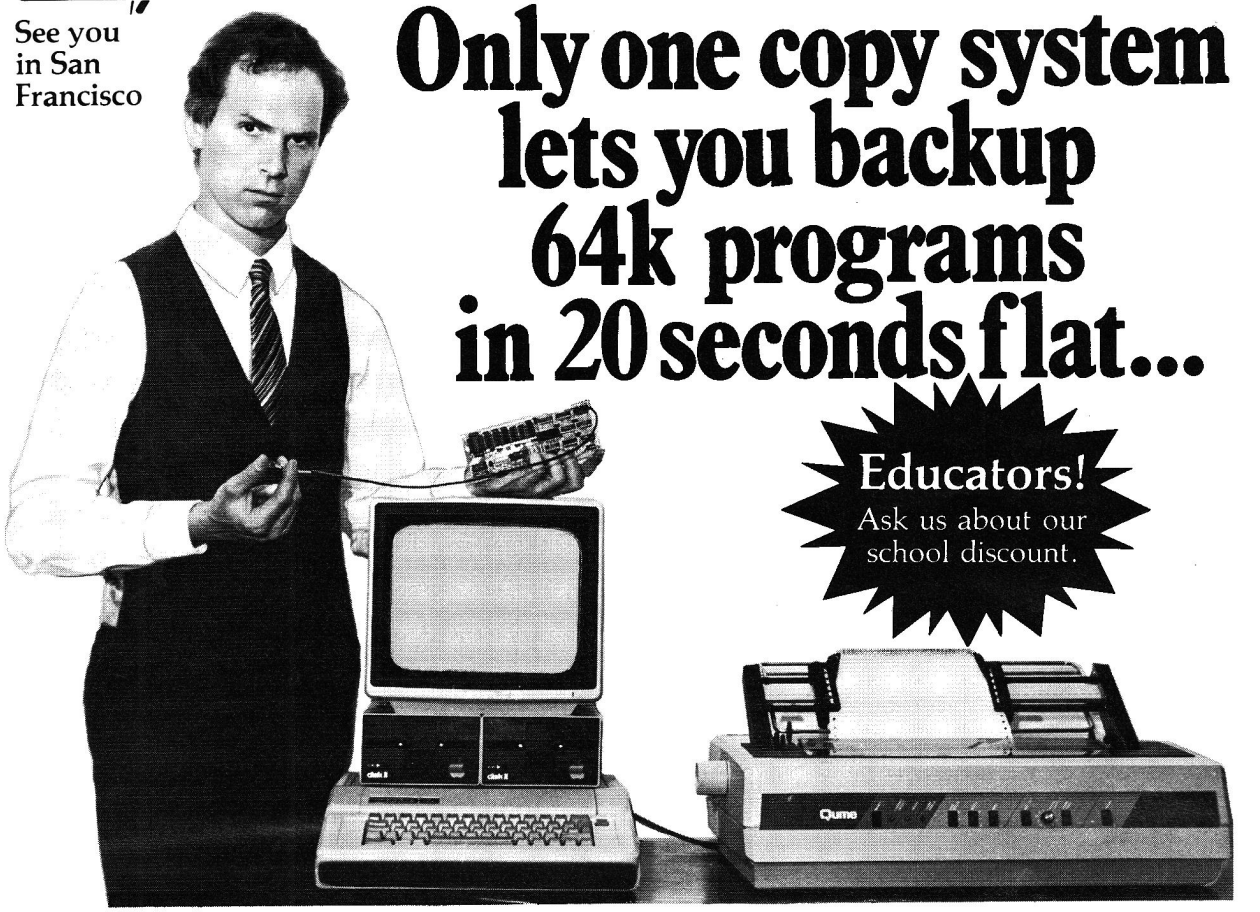
APPLE IS A TRADEMARK OF APPLE COMPUTER, INC.

CIRCLE 153 ON READER SERVICE CARD

applefest 1983

See you in San Francisco

Only one copy system lets you backup 64k programs in 20 seconds flat...



...the Snapshot Copykit™ for Apple IIe and II+

While other manufacturers have been making wild promises, we've been quietly developing the superior copy system you've been waiting for: the SNAPSHOT COPYKIT.

THE FLEXIBLE CARD — The SNAPSHOT COPYKIT is a board for all systems. It sits in any slot on the Apple IIe, II+ and II as well as software-compatible machines like the Basis 108 and the Franklin Ace. So, you can upgrade your system without paying for another card.

Although **NO LANGUAGE CARD/16K CARD IS REQUIRED,** the SNAPSHOT COPYKIT can be used with any memory card and all peripheral cards.

The SNAPSHOT COPYKIT is the only copy card that stays up-to-date. Because all its software is in RAM, rather than inflexible ROM, the new enhancements we continually develop are made available to you at nominal cost — immediately.

THE USER-FRIENDLY CARD — We refined backup techniques for two years to make the SNAPSHOT COPYKIT just right for you, whether you're new to the Apple or a seasoned pro.
Other copy cards force you to use complex, unreliable procedures and repeated booting of 'utility disks' to copy programs larger than 48K. Outdated 'nibble copier' programs involve frustrating trial-and-error parameter changes. Only the SNAPSHOT COPYKIT backs up all 64K memory-resident programs (and most larger programs too) with one simple menu and one press of the trigger.

THE POWERFUL CARD — The SNAPSHOT COPYKIT gives you back the power over your computer that some programs try to take away. You can interrupt a running program, make a backup, list the program (even if it's 'unlistable'), disassemble it, step and trace it, modify it and resume running it. The program is not disturbed in any way and never knows it was interrupted. You can view its graphics, print them (if you have a graphics card) and much more. You can even temporarily suspend one program while you use another.
All backups are automatically BRUNnable files that you can move to hard disk. Our state-of-the-art compression facility lets you put a number of backups on one floppy.
With powerful features like these, it's no wonder that BYTE magazine called SNAPSHOT "The Ultimate Unlock System".

The SNAPSHOT COPYKIT has many more features for programmers, gamesters and others. Write for our info packet or leave your address and questions with our 24-hour answering service at (413) 584-7600. All SNAPSHOT owners receive our 'Technical Hot-Line' number for instant technical guidance.

PRICE: $139.95

(Snapshot Two is still available for the Apple II+ and Franklin Ace at $119.95. 16K Card required; please specify brand when ordering).

TO ORDER: Mail check payable to Dark Star Systems. Add $3 for shipping in the U.S. ($7.50 to Canada, $15 elsewhere). Mass. residents add 5% tax. COD costs $5 extra (not available outside U.S.).

DarkStar SYSTEMS

R39A South St., Dept. A , Williamsburg, MA 01096
Office (413) 268-7351

Apple is a reg. trademark of Apple Computer.

CIRCLE 157 ON READER SERVICE CARD

ocre. Although clearly written, it's shipped without a binder, and its numerous programming examples are written in a language different from Applesoft BASIC.

Apparently no one has ever tried the tutorial in the ProWriter manual about special typeface features. The instructions help you turn on and off various "enhancements," alternate pitches and the like. Take a look through it, and you'll discover that no one ever tells you how to cancel the "proportional space" mode. Consistent with this omission, all the examples given for the proportional space mode are shown combined with the other feature. If you want to get rid of the proportional spacing, you'll either have to turn the printer off and reset it or go hunting for the proper escape code. Sure, it's a minor point, but someone should have noticed when the manual was being produced. It makes you wonder what else might have been missed.

Mannesmann-Tally Spirit-80

If you are familiar with Mannesmann-Tally's other printers, the sleek, wedge design of the Spirit-80 may seem foreign in comparison to its other no-nonsense, heavy-weight machines. Unlike Tally's more expensive, European-crafted printers, the Spirit-80 is manufactured in Japan. Of course, this country of origin is now the norm among inexpensive matrix printers.

The performance of the Spirit-80 is about what you would expect from a printer in its class. We measured a throughput of 59 characters per second virtually the same speed as that of the Epson RX-80, for instance. And as should be expected from Tally and Japan, it's both solidly and precisely built. Notably, a profusion of plastic gears hides inside the Spirit near its rubber platen roller, much like in Tally's more expensive printers. Other printers in the Spirit's class either lack such mechanical wonders, or keep them further from sight.

The sleek, wedge design of the Spirit-80 may seem foreign in comparison.

The Spirit-80 offers a variety of print modes and typefaces including normal, reduced, enlarged (double-width), emphasized, italic, reduced-size superscript and subscript print, all of which can be mixed and matched to your heart's content. Both block graphics and dot-addressable graphics (in two horizontal densities, 80 and 160 dots per inch) can be printed. All of these features can be selected through software command using escape sequences. Other escape codes allow setting line spacing, horizontal tabs, and skipping over perforations in continuous-form paper.

The carriage of the Spirit-80 is more than wide enough to handle 9½ inch, sprocket-fed paper and can print 80 characters across it in normal mode, 142 in the compressed mode. A lever on the printhead assembly allows adjustment of printhead force for multiple copies or fading ribbons. The Spirit-80 will handle an original and up to three copies (maximum 0.01 inches).

The Spirit-80 uses a nine-wire printhead and forms characters out of a 7-by-8 array of dots. Although it uses the same standard pitch and line spacing (in normal mode) as most printers in its class do, letters formed by the Spirit appear

The computer-age storybook for kids!

KATIE AND THE COMPUTER

By Fred D'Ignazio
Illustrated by Stan Gilliam



This wonderful storybook teaches young children how a microcomputer works. Katie ends up inside her dad's new micro...and has an adventure with Colonel Byte and the other characters who make a computer work. Her journey follows the path of a computer command; her experiences are technically accurate yet easily understandable, right down to her encounters with a program bug. Additional material is included to help you relate the story to actual working parts of the computer. With truly exceptional color illustrations, this is an excellent first computer book for youngsters.
Hardcover
11" x 8½", illustrated.

For faster service,
PHONE TOLL FREE: 800-631-8112
(In NJ only: 201-540-0445)

Also available at your local bookstore or computer store.

CREATIVE COMPUTING PRESS
Dept. NE5H, 39 East Hanover Avenue
Morris Plains, NJ 07950

Please send me _____ *Katie and the Computer* at $8.95* plus $2.00 postage and handling each. Outside USA add $3.00 per order. **#12A**

☐ **PAYMENT ENCLOSED $_____**
*Residents of CA, NJ and NY State add applicable sales tax.

☐ **CHARGE MY:**
☐ American Express
☐ MasterCard ☐ Visa

Card No._____

Exp. Date_____

Signature_____

Mr.
Mrs.
Ms._____
(please print full name)

Address_____

Apt._____

City_____

State_____

Zip_____

☐ Send me a FREE *Creative Computing* Catalog.

ADVERTISEMENT

Educational News

Orange Plus Educational News located at 23801 Calabasas Road/Suite 2050/Calabasas, CA 91302/(213) 999-5210

Legal Apple[Type] Compatible

New Computer runs CP/M & Apple[Type] Software

CALABASAS — Now instructors can teach Apple-type programs such as LOGO in one class and professional-style word processing in another without any hardware changes. Dual microprocessors (Z80-A & 6502, two computers in one case), with the radical new Orange Plus development the "EuroROM", allows the machine to read/write/work with Apple-type software as well as CP/M programs and access either CPU via the keyboard.

The ***"ORANGE+TWO"***™ is a brand new direction in the evolution of the personal computer. ORANGEFORTH-83, a derivative of Fig-FORTH — a readily available public domain language, is resident in the ROM*. Also included is CP/M 3.0, Digital Research's latest CP/M version. There is also a built-in disk drive controller for two Apple-type drives, a cassette interface, joystick port, color graphics and ASCII keyboard with numeric keypad. For expert word processing, the keyboard features upper and lower case (lower case characters are true descenders) with auto repeat.

This new breed of computer is a breakthrough for educators and school systems throughout the world. The ability to run both Apple-type and CP/M software on the same machine relieves financially-pressed educators from expensive equipment burdens, allowing them to spend more money where it counts...**on the teachers.**

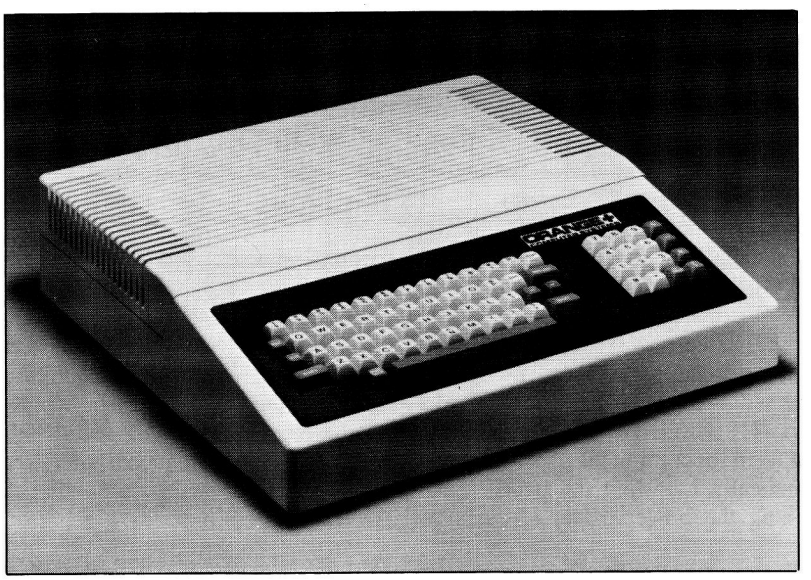
*Available on disk at extrta cost.

THE LEASING ALTERNATIVE

CALABASAS — Through select leasing companies, Orange Plus Computer Systems will offer the following lease programs to qualified corporations and educational institutions: An ***"ORANGE+TWO"***™ computer with a green monitor and one disk drive for only $59.55 per month...36 month closed end lease. Also included is a full maintenance program and all revisions and upgrades that may be available during the term of the lease. Subject to credit approval. Call for additional information.

DISTRIBUTORS: CALL (213) 999-5210

CALABASAS — Due to the tremendous amount of individual inquiries and dealer applications, qualified stocking distributors are needed. Select areas available!



MORE FOR LESS

The ***"ORANGE+TWO"***™ 64K computer includes these standard features:

Built-in CP/M 2.2 compatibility	**no charge**
Digital Research's CP/M 3.0	**no charge**
Built-in disk drive controller for two Apple-type drives	**no charge**
Numeric keypad with separate return key	**no charge**
110/220 volt switch selectable power supply, 50-60 Hz	**no charge**
Full function ASCII keyboard with auto repeat	**no charge**
Cassette interface	**no charge**
Fully grounded metal base plate	**no charge**
Adjustable audio volume control	**no charge**
ORANGEFORTH-83, Z80-A FORTH language, resident in ROM	**no charge**
Z80-A CPU, a second computer	**no charge**
6 slot double sided logic board	**no charge**
Bank switchable RAM, fully socketed, expandable to 256K	**no charge**
Programmable 2764 EPROMs	**no charge**
TOTAL: *"ORANGE+TWO"*™	**$1095.00**

Compare these features included on the ***"ORANGE+TWO"***™ *with the competition's over $2000 for equivalent product.*

MORE PRODUCTS FROM ORANGE PLUS COMPUTER SYSTEMS TO ENHANCE YOUR *"ORANGE+TWO"*™, APPLE II/II PLUS, OR FRANKLIN ACE 1000

Disk-based ORANGEFORTH-83 language with full documentation	**$99.95**
Digital Research's™ CBASIC with disk and documentation	**$49.95**
Orange Plus KoalaPad™ Touch Tablet w/Micro Illustrator™	**$124.95**
Orange Plus Joystick (works on "ORANGE+TWO", Apple II, II+, & //e)	**$29.95**
Orange Plus self-centering joystick	**$39.95**
10MB (Formatted) 5¼" half-height Winchester Hard Disk Drive	**$1495.00**
Controller & Interface for Hard Disk**	**$395.00**

Includes everything necessary to be installed in* ***"Orange+Two"*, Apple or Franklin Computer*

The above are suggested retail prices. Prices may vary from state to state.

Collins International Trading Corporation,
23801 Calabasas Road, Suite 2050, Calabasas, CA. 91302
(213) 999-5210

CIRCLE 160 ON READER SERVICE CARD

noticeably smaller.

We received a film ribbon with the Spirit-80 instead of the fabric ribbon used on most matrix printers. According to Mannesman-Tally, the ribbon is a continuous loop and is good for 1,000,000 characters—a point we did not test. The difference in quality using the film ribbon was minor. The printout was a slightly darker black, and the individual dots of each character blended together better than with the other printers in this test.

The ribbon must be the easiest to install and remove of any that we have encountered. In fact, we were able to remove and install the ribbon cartridge while the Spirit-80 was printing! (We don't recommend you follow in our footsteps, however, as operating without a ribbon can damage any printer.)

Controls on the Spirit-80 fit the *de facto* standard for printers in this price range: four LED indicators, green for Power On, On-Line, and Ready, and a red one for Paper Out; three pushbutton switches for putting the Spirit-80 On-Line, Line-Feed, and Form-Feed. Again, like most printers in our test, the top of form for continuous paper is set by mechanically adjusting the paper, then switching the power off and back on. The power switch is located on the right side of the machine which is fairly convenient. The Spirit-80 assumes you will be using sheets 11 inches (66 lines) long. Setting other form lengths requires escape code programming.

Continuous-form paper is fed into the Spirit-80 from the rear, through a unidirectional tractor, then around a rubber platen. A knob on the left side of the printer allows fine adjustment of vertical paper position. With this paper-feeding arrangement, a limited amount of "backing-up" of continuous-form paper is possible. A wire paper-guide/separator keeps ingoing and outgoing sheets from interfering with one another. The Spirit-80 will also friction feed single sheets.

We were able to remove and install the ribbon cartridge while the Spirit-80 was printing!

Default settings of typefaces, character sets, and other functions (slashed zero, buzzer on, automatic line feed with carriage return) are controlled by two DIP switch banks. Adjusting them, however, requires delicate surgery. They are located on the main circuit board of the machine and getting to them requires unscrewing the top cover and balancing the pieces. A short wire ties the two pieces together—one false move and it's straight to the repair shop. You may never need to tangle with these switches—our Spirit-80 worked fine with our Apple IIe without having to dig out the screwdriver. Anyway, most of the DIP switch functions are duplicated by escape codes. However, if you do need to make a permanent change in a default setting, it may be best to have your dealer do it.

The *Operator's Manual,* which accompanies the Spirit-80 is a thin, but complete, pamphlet that provides setup, programming and parallel interfacing instruction, and reference material. The setup instructions assume you know how to read, but that's about all. The programming section assumes you know what to do with escape codes. The interfacing instructions assume that you are



ISOBAR... the most complete computer protection!

More features to prevent errors, false printout, disc skips! *Only ISOBAR has 3-way spike protection, noise suppression for RFI PLUS isolated filter banks!* Individual filter banks isolate each load from other loads minimizing data errors of *any* kind. MOV surge suppressors arrest both common mode and differential mode surges. L/C filter network rejects radio frequency noise at any amplitude. Torroidal coils for greatest efficiency! All-metal housing.

Indus-Tool, 325 W. Huron, Dept. A
Chicago, IL 60610 • Call 1-312-642-6871
Enclosed is $ _____ or charge on
☐ MasterCard or ☐ Visa *Expires* _____
Card no. _____
Name _____
Signature _____
Company _____
Address _____
City _____ State _____ Zip _____

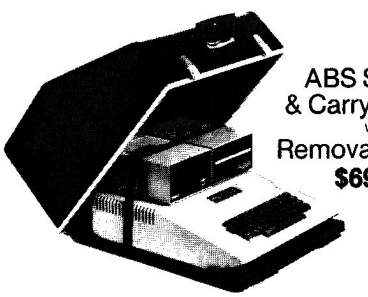
Model IBAR 4-6
(4 outlets,
6 ft. cord)
Only $79.95

Model IBAR 2-6
(2 outlets,
6 ft. cord)
Only $54.95

Model IBAR 8-15
(8 outlets,
15 ft. cord)
Only $97.95

CIRCLE 161 ON READER SERVICE CARD

Travel With Your Apple... Call (800) 847-4176!



ABS Storage
& Carrying Case
with
Removable Cover
$69.50*

*UPS Shipping Included.

Apple • IBM • Epson

Call for Complete Computer Case Catalog. Credit Card Customers Call Toll Free

Fiberbilt
Ikelheimer-Ernst, Inc.
601 West 26th Street
New York, New York 10001-1199
(212) 675-5820 (N.Y. State)

VISA master charge
AMERICAN EXPRESS
Gladly accepted

CIRCLE 159 ON READER SERVICE CARD

SOFTERM

DOS, CP/M,® PASCAL

The only communications software you'll ever need!

Softerm 1
The Complete, Upgradeable Package for Home or Business Use

Softerm 1 is a powerful and flexible terminal emulation program that operates on an Apple® II, II Plus, or IIe to provide basic terminal communications to a variety of host computers, timesharing services, and information services such as *The Source*℠, *CompuServe*® *and the Dow Jones News/Retrieval*® It operates full or half-duplex at speeds up to 9600 bps using either a direct connection or any standard manual or auto-dial modem. Features include user-defined keyboard macros, built-in phone book for automatic dialing, terminal mode line capture simultaneously to print or disk, copy screen to print or disk, and terminal status display.

DOS, CP/M, and PASCAL File Compatibility Combined In a Single Program

Softerm 1 incorporates an advanced file manager which provides compatibility with DOS 3.3, CP/M, and Pascal disk formats for all file operations including file transfers. And at speeds up to 5 times faster than standard Apple DOS! Built-in disk utilities provide *INIT, CATALOG, RENAME,* and *DELETE* commands for all disk formats. Wildcard match characters can be used whenever filenames are entered.

Local file transfers allow DOS, CP/M, or Pascal files to be displayed, printed, or even copied to another disk. For example, a file on a CP/M formatted disk in Drive 1 could be copied to a Pascal formatted disk in Drive 2 providing a complete format conversion capability. Numerous editing options such as tab expansion and removing unwanted characters allow easy reformatting of data to accommodate the variations in data formats used by host computers.

Multi-Protocol File Transfer Capability

Softerm 1 offers file transfer methods flexible enough to match any host computer requirement. These include the *character* protocol with user-definable characteristics to provide maximum flexibility for text file transfers to any computer. The CP/M User's Group standard *XMODEM* protocol may be used for binary file transfers with systems using the CP/M operating system. The intelligent *Softrans* protocol can be used to transfer *any* type file and provides automatic binary encoding and decoding, error detection and automatic retransmission, and data compression to enhance line utilization. A FORTRAN 77 source program is supplied with Softerm 1 which is easily adaptable to any host computer to allow communications with Softerm using the Softrans protocol. Specific host computer versions of the Softrans FORTRAN program are available on request.

Softerm file transfer utilizes an easy to use *command language* which may be executed interactively or from a *macro* command file which has been previously entered and saved on disk. Twenty-three high-level commands include *DIAL, CATALOG, SEND, RECEIVE, ONERR, MONITOR, HANGUP,* and others. A *SCHEDULE* command even allows file transfers at a specific date and time.

Softerm 2
The "Choice of Professionals"

Softerm 2 includes all features of Softerm 1 and provides an *exact* terminal emulation for a wide range of conversational and block mode CRT terminals. Special function keys, sophisticated editing features, even local printer capabilities of the terminals emulated are fully supported. In fact, your host computer won't know the difference! *All* of the following emulations are included in Softerm 2 and the list is growing...

ADDS Regent 20, 25, 40, 60 • ADDS Viewpoint • Data General D200 • Datapoint 3601 • DEC VT102, VT52 • Hazeltine 1400, 1410, 1500, 1520 • Honeywell VIP7205 • IBM 3101 Model 10 and 20 • Lear Siegler ADM-3A, ADM-5 • TeleVideo 910, 925

You'll Never Outgrow It

For the latest program enhancements, you can access the Softronics Online Update Service 24 hours a day, 7 days a week. New hardware support or terminal emulations are immediately available to all Softerm users.

Softerm 1—$135 Softerm 2—$195

Available now from your local dealer or Softronics, Inc.

*Apple is a registered trademark of Apple Computer, Inc., CP/M is a registered trademark of Digital Research, Inc., Dow Jones News/Retrieval is a registered trademark of Dow Jones, Inc., The Source is a service mark of Source Telecomputing Corporation, CompuServe is a registered trademark of CompuServe, Inc.



SOFTRONICS

6626 Prince Edward, Memphis, TN 38119, 901-683-6850

CIRCLE 163 ON READER SERVICE CARD

an electrical engineer, and you want to design your own system. But you need not worry about all this technicalese. The Spirit-80 came to life without a hitch immediately after we plugged in a standard Centronics interface cable into the connector in the back. (Serial interface is optional.)

Star Micronics Gemini-10X

Overall, it's difficult to fault the Gemini-10X when compared to the other machines in this group. It was a close second in print speed and tied for first in noisiness. It has one of the widest varieties of type widths in the group and worked flawlessly throughout our brief test period. When we start nitpicking, there's still something good to be said about even its worst features. They hardly interfered with performance.

For instance, the Gemini-10X was the only printer in this group that does not use ribbon cartridges. Consequently, we started our second day of testing with fingers that had turned purple from threading its inked fabric spools. No doubt that with practice the job can be mastered. And discolored fingertips every million or so characters deserves no major penalty. Proponents of noncartridge ribbons will be quick to point out that the old-fashioned way is more economical. A noncartridge ribbon can be turned over for extra printing life and is generally cheaper. Unless you're allergic to ink, the style of ribbon should not be a major factor in choosing a printer.

Similarly, the transparent plastic cover to the Gemini-10X can be spurned or praised. It is not hinged; both its front and rear edges snap into place. And if you're used to hinged covers, you'll probably end up snapping off the tabs that lock the back edge down. The first time we lifted the lid, we snapped off the left tab. Twenty minutes later, after having learned to be more careful with the left-hand side, we snapped off the right tab.

Similarly, the transparent plastic cover to the Gemini-10X can be spurned or praised.

On the positive side, however, the lid on the Gemini-10X completely covers the entire printhead chamber and prevents anything from paper clips to spilled coffee from dropping into and possibly damaging the mechanism.

The Gemini-10X uses a rubber platen roller with a paper-feed tractor on the input side. This arrangement permits the use of either friction-fed single sheets or roll paper (a roll holder is included with the printer) or sprocket-edged continuous fanfold paper. Paper can be rolled backward (carefully) when initially positioning the "top of form" with continuous paper—a small, but welcome convenience.

The cover must be removed to load paper, and the off-and-on-again routine may become cumbersome when friction feeding individual sheets. Of course, you can always leave the cover off for sheet feeding. For continuous fanfold paper, however, we found the Gemini-10X to be one of the quickest and easiest printers to load of all those reviewed here. On the other hand, the feed mechanism seemed a bit more sensitive than most to the condition of the feed paper. Although our observations were purely subjective, the Gemini-10X seemed

Set Up Your *DOT MATRIX PRINTER*
With a Touch of a KEY!

PCP™ **PRINTER CONTROL PROGRAM**

- ☑ BOLD PRINT
- ☑ COMPRESSED PRINT
- ☑ VARIABLE LINES
- ☑ ELONGATED PRINT
- ☑ AND MUCH MORE!

No longer do you have to enter long "set up strings" to take advantage of your DOT MATRIX PRINTER's capabilities. Just select from the MENU...let your computer do the rest! Comes complete with PROGRAM DISKETTE and an OPERATING MANUAL. Easy to use.



VERSIONS:
Apple II+, Apple //e and Apple ///
with
APPLE DOT MATRIX
EPSON RX, MX*AND FX SERIES
C.ITOH PROWRITER I&II
& NEC DOT MATRIX PRINTERS

Please Specify Computer and Printer

See Your Dealer or Write or Call Us!

a "professional" software package from:

PRO/PAC™

14925-A Memorial Drive, Suite 207
Houston, Texas 77079
(713) 496-1179

NOW ONLY $29.95

plus $2.00 shipping and handling USA

VISA and MasterCard Credit Cards

* Requires Graftrax Plus™ For Full Features

PRO/PAC™ is a trademark of PRO/PAC, INC
PCP™ is a trademark of PRO/PAC, INC
APPLE® is a registered trademark of Apple Computer, Inc

CIRCLE 164 ON READER SERVICE CARD

℞ Prescribed Treatment

MEDICARD — A small office medical office billing system designed to work with your spread sheet program. Complete private patient billing, instant account status display and AMA universal claim form preparation. For the IBM PC, the Apple II, or the Apple ///. Requires Visicalc (other spread sheet versions soon.) Specify machine. $249.95 (plus $4.00 shipping).

MEDICAL BILLING TRAINING SYSTEM — Demo version of our popular standard medical billing, appointment and claim form system. Learn why more offices use CMA medical systems in the comfort of your office. Versions for the Apple II, Apple /// or IBM PC. Versions for hard disk or floppy based systems. Demo cost $100.00 and include two $50.00 dollar coupons you may use to purchase CMA goods and services. Call for details on the right system for your sized practice.

CLIENT BILLING SYSTEM — A complete medical billing system you can use to set up a multi practice billing service. Bill for yourself and/or other doctors. Includes private billing, Superbill, claim form preparation and complete reporting. For the Apple II with Smarterm or the Apple //e with 80 column card.

(619) 365-9718

CMA
MICRO COMPUTER DIVISION
55722 SANTA FE TRAIL
Yucca Valley, Ca. 92284

CIRCLE 165 ON READER SERVICE CARD

WRITE YOUR OWN APPLE GAMES

Includes 40 exciting pre-programmed games to get you started!

Write Your Own Apple Games is your ticket to thousands of hours of solid game fun.

But it's more than just a game book.

While you're enjoying more than 40 exciting new programs, you'll be learning—quickly and easily—the most advanced techniques of computer game design.

In ***Write Your Own Apple Games,*** Stuart Anstis explains each game to you in logical, step-by-step subroutines. You'll see crucial game graphics exactly as they should appear on your screen.

Then you'll learn how to rearrange the basic subroutines to create countless game variations.

If you know BASIC, you're ready to learn state-of-the-art game techniques, including how to:

- Create smooth, flicker-free screen movement
- Generate flashing "neon-sign" graphics
- Keep game scores
- Use random number in game design—and make your computer come alive as an opponent
- Zero in on random time delays—a challenge to even the most sophisticated arcade player

And much more.

Write Your Own Apple Games gives you all the skills you need to start designing your own original computer games for fun—and profit!

And because writing your own games gives you greater control of your Apple's numerical and graphic capabilities, you'll be opening the door to fantastic new possibilities for using your computer.

Write Your Own Apple Games should sell for over $1,000—the cost of 40 pre-

Action Games
Tank • Sprint • Bomber
Wait For It • Painting
Race • Weight Lifters
Target • Helicopter
Tiddler • Pingpong
Diddle • Space Zapper
Craps • Cross Porpoises

Strategy Games
Zigzag • Bridge-It • Stock Market • Gold Auction
Tictactoe • Turnover
Chomp

Word Games
Hangman • What's My Word? • Birthdaywish
What's Your Name?
Any Messages?

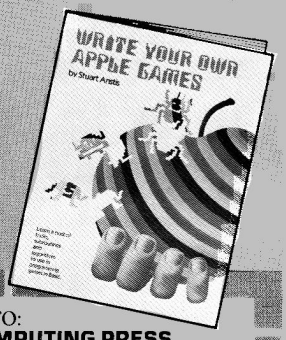
Graphics Subroutines
Butterfly • Firework
Electric Field • Stopwatch
Lissajou

Solo Games and Puzzles
Simon • Organ • Elithorn
Running On Empty
Guess A Number
Buried Treasure
Jumpers • Peggy

Educational and Scientific Games
Arrow • Random Walk
Scatter • Curve
Magic Squares

But you can get ***Write Your Own Apple Games*** for only $12.95. That's less than 32 cents a game—and every game you write yourself is virtually free!

Start having some serious fun with your Apple computer. Send for your copy of ***Write Your Own Apple Games*** today.



MAIL TODAY TO:
CREATIVE COMPUTING PRESS
Dept.NG4F, 39 East Hanover Avenue
Morris Plains, N.J. 07950

Please send me ____ copies of ***Write Your Own Apple Games*** for only $12.95 each, plus $2.00 shipping & handling per book. #2W.

Total amount $_____

☐ **Payment Enclosed.** (CA, NJ and NY State residents please add applicable sales tax).

☐ **CHARGE MY:**
☐ American Express
☐ MasterCard ☐ Visa

Card No._____ Exp. Date_____

Signature_____

Name_____ (please print)

Address_____

City_____

State_____ Zip_____

*Outside the U.S.A. add $3 for shipping and handling.

☐ Check here to receive FREE catalog of computing books, magazines and guides.

For faster service,
PHONE TOLL FREE
800-631-8112
(In NJ only: 201-540-0445)

more likely to have feed problems; a misplaced cord running across the paper path required more than normal force to pull the paper through the printer.

Front panel controls on the right side of the top of the Gemini-10X are typical of the printers in this group. It has three pushbuttons, one each for on-line/off line selection, form feed, and line feed. As you might expect, form feed and line feed function only when the printer is off-line. Four LED indicators complete the controls: POWER, READY, ON LINE, and PAPER OUT. A lever on the left side of the printhead chamber adjusts the printhead gap for multipart forms or failing ribbons.

Two DIP switches control printer set-up and defaults. One of them is buried inside and the other is accessible from the rear of the machine. Changing the defaults settings (international character sets, pitch line spacing, and type style at power-on) requires disassembly of the machine. The only redeeming aspects to this inconvenience are that all of these settings can be software controlled, and that the Gemini-10X defaults were already set to the most likely specifications (10 pitch, 6 line per inch spacing, U.S. character set, and standard typeface). The easily adjustable rear panel DIP switches control the functions that are most likely to need changing when the Gemini-10X is shuffled between computers and programs. These include selection of automatic line feed with carriage return (or not), data word length (7 or 8 bits), and so on. We pulled the Gemini-10X out of the box, plugged it into a standard parallel interface cable from our Apple IIe, and everything worked fine—no adjustments or switch flicks needed. (An optional serial interface version is available but was not tested.)

The Gemini-10X sports more special features than any of the other printers in this test group.

The Gemini-10X sports more special features than any of the other printers in this test group (though Apple allows more character widths), including an italic typeface, reduced-size superscripts and subscript characters, and the ability to download character sets. Both block graphic characters and dot-addressable graphic abilities are standard.

One final note: The Gemini-10X and its sibling, the STX-80, both arrived packed with a spare fuse. Far from hinting that the printers would somehow need the spare, the extra fuse gives you a second chance to get the machine running before you run up a repair bill. Alas, you must disassemble the printer to replace the fuse.

Star Micronics STX-80

The STX-80 was the only printer in the group we tested that drew a crowd to ooh and aah over it. All the other machines were impact printers that, at best, sounded like friendly dentists' drills. The STX-80 is a nonimpact thermal printer and was so quiet we couldn't measure its contribution to the general chaos of the room. The crowd gathered to watch its nearly silent, magic work as the print-head quickly scooted across the paper and words appeared magically.

Otherwise the STX-80 is not particularly amazing. It's quite slow, about 27 characters per second in our tests, notwithstanding its bidirectional and logic-seeking virtues, and has no exclusive features except its silence. On the posi-

KNOW-DRIVE™

The smartest 128K card for the APPLE®

VISICALC® users: Use with either **Super Expander Plus**™ from Omega MicroWare, or **VC-Expand/80**™ from Saturn Systems, or **V-Calc 80 Mem/Expand**™ from Videx to expand spreadsheet memory, 80 columns support, and fast loads. **Optional add-on available soon — will upgrade to 512K with insertion of 256K Rams.**

PROGRAMMERS: **KNOW-DOS**™ drive simulation software included. Plus fast **ABCDOS**™ Plus **Source Code** to all machine language drivers (we're a very friendly company).

HACKERS: Oncard **WRITE** protect hardswitch. New!!! **PLAY-BACK**™ remote option offers **RESET** vector RAM/ROM plus via **NMI**: interrupting, analyzing/modifying and **saving all memory to disk.** (Play-back option includes powerful NMI software — $39).

Featuring —][,][+, //e and Franklin™ compatible. Fully socketed; slot independent; gold edge connectors. Selectable hardware compatibility with 128K cards from **Legend Industries, Saturn Systems, Omega MicroWare, Prometheus**, etc. 24 hr. modem support **(RAM BOARD 313-524-0238)**. 2 Year Warranty.

New!! PLAY-BACK program interrupts

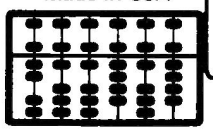
KNOW-DRIVE 128K — $335 **PLAY-BACK — $39**

KNOW-DRIVE, ABCDOS, KNOW-DOS, PLAY-BACK are trademarks of ABACUS Enterprises, Inc. Apple is a registered trademark of Apple Computer, Inc., VisiCalc is a registered trademark of VisiCorp, Inc., Franklin is a trademark of Franklin Computer Corporation. Other trademarks used are credited to manufacturers as shown. Price and specifications are subject to change without notice. Revision D.

Cash, Check, and VISA accepted. ■ Add $5.00 for shipping ■ Michigan residents add 4% sales tax ■ Dealer inquiries welcome
Call (313) 524-2444 or write P.O. Box 1836, Detroit, Michigan 48231

ORDERS ONLY **Call Toll Free** National: **1-800-835-2246, ext. 277** In Kansas: **1-800-362-2421, ext. 277**

Made in USA



ABACUS Enterprises INCORPORATED

μ peripherals ©1983

CIRCLE 167 ON READER SERVICE CARD

Some Very Good Reasons to Buy an Echo Speech Synthesizer.

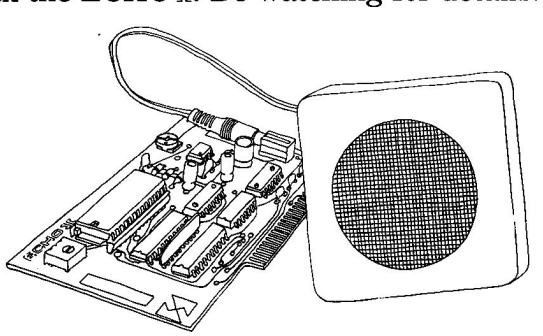
We're confident we have the most intelligible, versatile, and economical speech synthesizer on the market. Once you hear it, we're sure you'll be convinced too. All ECHOs are capable of speaking in four different voice modes which range from a robotic machine voice to natural female speech. (The fixed speech and custom modes are optional.)

It's Easy To Use

Unlike other speech systems, the ECHOs are very simple to use. It only takes a minute or two to get the ECHO talking. Any text which can be printed to the screen can be spoken. If you've written a BASIC program you can add speech with simple modifications.

Software Compatibility

Not only can you add speech to the programs you write yourself, over 25 top educational and adventure software manufacturers are currently designing programs to be compatible with the ECHO II. Be watching for details.



Value

Each ECHO comes ready to use with a speaker and tutorial-style manual. The ECHO II, priced at $149.95, also comes with a variety of demonstration and utility programs. The new ECHO GP (General Purpose), priced at $199.95 is a stand-alone unit with its own on-board microprocessor; it will interface with any computer through the serial port. All ECHOs have a one year warranty.

Bells And Whistles

If you want bells, whistles, music and sound effects, plus state-of-the-art sprite graphics capabilities, the ECHO technology is available on Synetix Systems' new Supersprite Board.

Check It Out

Most Apple dealers have the ECHO II available for demonstration as part of Street Electronics/ Orange Micro's unique Grappler+™, Bufferboard™, ECHO II™ Talking Demonstration.

Street Electronics Corporation
1140 Mark Avenue Carpinteria, CA 93013
Telephone (805) 684-4593

The Echo II is a registered trademark of Street Electronics Corporation. The Grappler+ and Bufferboard are registered trademarks of Orange Micro.

CIRCLE 166 ON READER SERVICE CARD

tive side, however, it's quite compact—smaller than a breadbox and most loaves of bread—and feels quite solid.

Like any other thermal printer, the STX-80 requires a special diet of treated paper to print, and it is mandatory the paper be fed from a roll. Unlike most roll-fed printers, however, the paper roll used with the STX-80 is not mounted on a spindle but instead lies inside a special chamber at the rear of the printer. Unlike many thermal papers, the paper the STX-80 uses is white (instead of silvery) and only belies its temperature sensitivity with occasional blemishes and its too-slick feel.

With no spindle to contend with, loading a roll of this paper is simple. You slide the free end that trails off the roll under the friction-feed platen, spin the platen to move the paper up past the printhead, then drop the rest of the paper roll inside the paper chamber. The paper on the roll has no sprocket holes on its edges to guide it through the machine, and it is not perforated into separate sheets. Neither is apparently necessary. During our tests the paper never skewed, and the rear edge of the STX-80's top cover has molded plastic teeth that serve as a cutoff bar.

Printouts on slippery and glossy paper with rough edges and no fixed length are obviously from a cheap thermal printer and may not be presentable. However, once run through a Xerox copier, memos and program listing will be as professional-looking and long-lasting as any made by a more expensive impact printer. The STX-80's thermal dots are more sharply defined than most impact dots, and the printed characters appear darker and denser than those made with most inexpensive impact matrix printers. Moreover, ASCII characters on the STX-80 are formed in a 5-by-9 dot matrix that allows for full descenders.

The STX-80 is a nonimpact thermal printer and was so quiet we couldn't measure its contribution to the general chaos of the room.

Like the Banana, the STX-80 is essentially a minimalist printer. It has two type sizes and/or faces, a slightly skinnier than usual "normal" 11-pitch and enlarged 5.5 pitch. The enlarged control code (SO to those who speak ASCII) only remains in effect until the printer receives a carriage return command (CR). Enlarged printing can also be canceled before encountering a carriage return by a special code (DC4). In other words, the STX-80 will only enlarge type one line at a time without being reinstructed to enlarge. This condition should not be a problem unless you have already existing software that assumes enlarged characters remain in effect until canceled.

The STX-80 handles graphics in two modes, 64 different block graphic characters or dot-addressable graphics using seven or eight of the nine dots in its printhead matrix, in columns 480 dots wide.

Front panel controls on the STX-80 include two square pushbuttons—ON LINE and LF—and two green LEDs—POWER and ON LINE. The platen knob on the right side allows manual paper positioning.

A DIP switch in the bottom of the paper well allows selecting a form length of 11 or 12 inches (although there is no form-feed pushbutton, the STX-80 does recognize a form-feed software com-

This Prescription Will save the life of your VISICALC !

— Don't Buy a New Machine to Run it On

— Don't Buy a New Spreadsheet Program



BUY VISICALC ENHANCERS from SOLUTIONS

"Saves me many hours, every time I run long reports"
October 1983 Popular Computing

"Sort does exactly what it promises"
InfoWorld September 5, 1983

SYMPTOM: Desperate need to sort the rows or columns of a VisiCalc spreadsheet

Rx: SORT™ from SOLUTIONS

SYMPTOM: Bleary Eyes from trying to print a good looking report from VisiCalc

Rx: REPORT™ from SOLUTIONS

SORT

- Sort the rows or columns of your VisiCalc spreadsheet
- Formulas and values move with each row or column
- Sort alphabetically or numerically
- Sort in ascending or descending order
- Use up to four additional keys to break ties or specify secondary sorts

REPORT

- Print with variable width columns
- Segment large spreadsheets into multipage reports
- Repeat columns and rows and multipage reports
- Eliminate unwanted columns
- Align decimal points
- Center or justify labels and values
- Add titles and page numbers to your report
- Write reports to disk for later printing or transmission

Both are Available for TRS-80® Models I/III/12/16, III, Apple® II +, IIE, III and for the IBM PC™ and compatibles.

Solutions, Inc.

13 State Street, Box 989, Montpelier, Vermont, 05602. Telephone (802) 229-0368

☐ Send me a Free Brochure

PLEASE SEND ME THE FOLLOWING SOFTWARE

☐ SORT $89.00 ☐ REPORT $79.00

☐ Send me BOTH SORT and REPORT for $158.00 (SAVE $10)

ALSO AVAILABLE:

☐ Dow Jones Spread Sheet Link $279.00

☐ GL Bridge $195.00

Include $4.00 for U.S. shipping and handling.

Payment Method Preferred:

☐ Check or Money Order Enclosed

☐ Charge My Credit Card ☐ Visa ☐ MasterCard

Card no. _____ Exp. Date___/___

Signature _____

Name _____

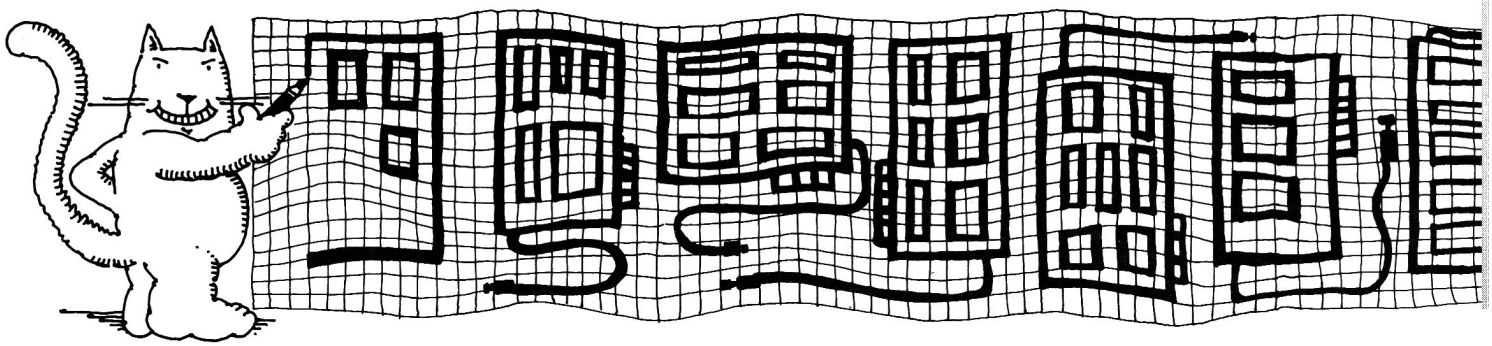
Address _____

City _____

State_____ Zip_____

VisiCalc® is a trademark of VisiCorp. TRS-80® is a trademark of Tandy Corp. IBM PC™ is a trademark of IBM Corp. Apple® is a trademark of Apple Computers, Inc.

CIRCLE 170 ON READER SERVICE CARD



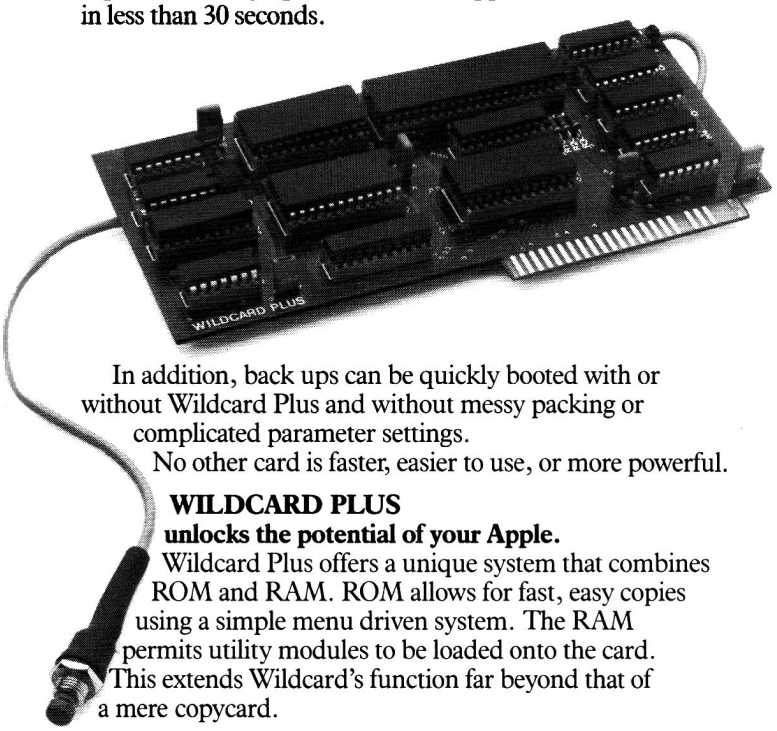
INTRODUCING WILDCARD PLUS.™ THE COPYCARD THAT'S MORE THAN A COPYCAT.

Manufacturers protect their software.
WILDCARD PLUS protects yours.

You have invested a lot of money in software for your Apple® Wildcard Plus makes sure that this investment is protected by making invaluable archival copies.

Rather than copying disks track by track, Wildcard Plus copies your total load programs right from the computer's memory. This creates an accurate and undetectable copy of the original program.

Now you can back up twice as much in half the time. Because Wildcard Plus doesn't stop at 48K or even 64K, but copies all the way up to 128K on an Apple® IIe. And does it in less than 30 seconds.



In addition, back ups can be quickly booted with or without Wildcard Plus and without messy packing or complicated parameter settings.

No other card is faster, easier to use, or more powerful.

WILDCARD PLUS
unlocks the potential of your Apple.

Wildcard Plus offers a unique system that combines ROM and RAM. ROM allows for fast, easy copies using a simple menu driven system. The RAM permits utility modules to be loaded onto the card. This extends Wildcard's function far beyond that of a mere copycard.

WILDCARD PLUS.
A name that speaks for itself.

Wildcard is the name that stands for uncompromising quality. Which is not surprising when you consider that Wildcard is the runaway leader in the field.

Others compare themselves to the Wildcard, some even copy us. But other copycards can't match the Wildcard's capabilities and reputation.

When you're looking for a copycard you can rely on, look to Wildcard and Wildcard Plus. They are the back up cards that stack the deck in your favor.

Wildcard Plus is available for $189.95. Wildcard for $139.95. Order by phone, (212) 355-2860 or complete the coupon below and send your check, money order, Visa or Mastercard No. to East Side Software Co., 344 E. 63 Street, Suite 14-A, New York City 10021. Dealer inquiries welcome.

Please send _____ **WILDCARD PLUS(S), $189.95 each. Total** _____
Please send _____ **WILDCARD(S), $139.95 each. Total** _____
Include $4.00 for shipping and handling. Outside continental U.S. add $10.00 for shipping and handling. New York State residents add applicable sales tax.
☐ Check enclosed ☐ Visa ☐ Master card

Card No. Expires

Name on Card

Name

Address (UPS delivery)

City State Zip Phone

East Side Software Co.
344 E. 63 Street, Suite 14-A
New York, NY 10021

WILDCARD PLUS

IMPORTANT NOTICE: The WILDCARD is offered for the purpose of enabling you to make archival copies only. Under the Copyright Law you, as the owner of a copy of a computer program, are entitled to make a new copy for archival purposes only and the WILDCARD will enable you to do so. The WILDCARD is offered for no other purpose and you are not permitted to utilize it for any other use, other than specified. Software is not copy protected. System requirements: Apple II, II Plus or Apple IIe and DOS 3.3. Franklin Ace also supported.

Wildcard and Wildcard Plus are trademarks of East Side Software Co.

© 1983 East Side Software Co.

CIRCLE 169 ON READER SERVICE CARD

ANNOUNCING

A LIBRARY OF SOFTWARE PROGRAMS FOR **APPLE II & IIe** COMPUTERS

A+DISK MAGAZINE

Now you can build a library of programs for your Apple™ at a fraction of the usual cost

Each issue of A+ Disk Magazine provides you with up to 12 programs for as little as $2.00 each.

A+ DISK MAGAZINE is making it easier than ever before to build a library of computer software for your Apple II Microcomputer. Because now you can save 34% on the programs you need to expand the use of your personal computer. Issue after issue, **A+ DISK MAGAZINE** gives you business and finance aids, utilities, subroutines, games, home and personal applications... all for as little as $2 per program.

And when you consider that many of today's most popular programs sell for $50, $60, $80 and more, your savings can be *enormous*... much more than the cost of your subscription to **A+ DISK MAGAZINE**.

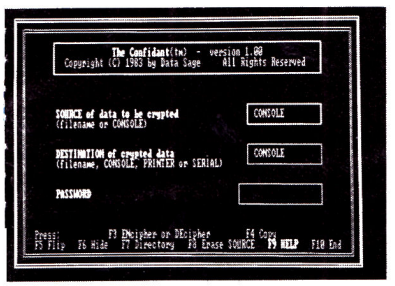
Along with your subscription to **A+ DISK MAGAZINE**, you'll receive



up to 12 thoroughly-tested, ready-to-run programs and files on a floppy disk. Complete with comprehensive, illustrated User Manual, **A+ DISK MAGAZINE** is easy, efficient, and very economical.

Here's just a sampling of what you can expect in every issue:

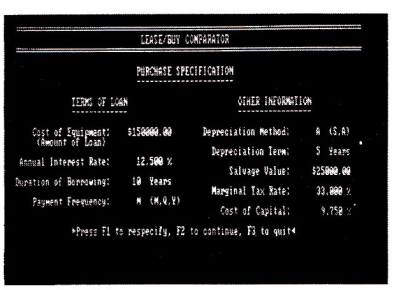
Programming tools: Create cross-reference listings for your



BASIC programs. Convert MBASIC™ program files to CBASIC™ format or reverse. Use your text editor on your BASIC programs. Convert data between BASIC and VISICALC® formats.

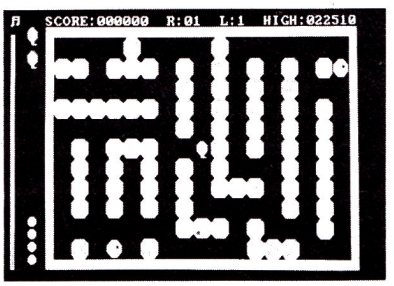
Business and finance aids: Compute loan payment tables. Calculate the Present Value and Internal Rate of Return for your investments. VISICALC templates for Real Estate, Lease/Purchase and Tax Shelter analysis. Create advanced pie, bar and line chart graphics.

Home/personal applications: Whether you need your own income tax return helper... a personal cash flow analyzer... a speed reading trainer... proven ways to maintain a mailing list... or SAT test preparation aids, **A+ DISK MAGAZINE** has it all.



Utilities and diagnostics: **A+ DISK MAGAZINE** shows you how to use your Apple to simulate a conversational terminal with function key control of disk or printer logging... print graphics, screen images on your printer... backup, copy, delete, un-delete or type files with simple menu commands... plus more.

Data files: From tax tables, to population statistics, from dictionaries to economic times series, **A+ DISK MAGAZINE** involves you as never before.



Games: Adventures! Strategies! Test your skill, intelligence and luck.

The latest software developments at your fingertips for a fraction of the cost.

There's no need to type listings into your computer. With **A+ DISK MAGAZINE**, all you do is boot the disk and go! The accompanying User Manual explains everything in clear, easy-to-understand terms. So you'll be able to run the programs as soon as you receive your first issue of **A+ DISK MAGAZINE**.

Save $60 with this Introductory Offer. Get 6 issues of A+ Disk Magazine and save 34%

Program Submissions

If you wish to submit a program for inclusion in future issues, please write to: **A+ DISK MAGAZINE**, Attn: Editor, One Park Avenue—Dept. 732, New York, N.Y. 10016.

Guarantee

- All programs are fully tested and guaranteed to run. Damaged or faulty disks will be replaced at no charge.
- If you wish to cancel a subscription, simply return the most recent disk in its sealed package and you will receive a full refund for this copy and all unmailed issues.

Product Specifications

Programs will run on Apple II computers using Apple DOS 3.3 and require a minimum of 64K. Most programs will be written in Applesoft Basic—however some machine language code may be used.

Most programs will be written to run on both monochrome and color displays; however, some games and utilities may be specifically developed for color displays.

Programs and documentation are copyrighted by Ziff-Davis Publishing Company. All rights of reproduction in all forms and media strictly reserved.



A+DISK MAGAZINE

P.O. Box 2469
Boulder, Colorado 80322

YES. Please accept my subscription to **A+ DISK MAGAZINE** for 6 issues at the Special Introductory Price of just $119 (less than $20 per issue, as little as $2 per program). I save 34% off the full price of $179.

Check one: ☐ I enclose $_____. (Residents of CA, CO, CT, DC, FL, IL, MA, MI, MO, NJ, NY State, and VT add applicable sales tax.)
☐ Please bill me.

Please charge to my credit card. ☐ American Express ☐ Visa ☐ MasterCard

Credit Card No._____ Exp. Date_____

Name_____

Address_____

City_____ State_____ Zip_____

8H005 **MAIL NO-RISK COUPON TODAY—AND SAVE 34%!**

mand), automatic line-feed with carriage return, 7-or 8-bit data format, and one of eight international character sets. Straight from its box, these switches were set so that the STX-80 worked perfectly with our Apple IIe.

The manual we received, marked "preliminary," is a scant 24 half-sized pages long. It is sparsely written but contains sufficient information to hook up and operate the machine. The contents are a strange mixture of detail (it shows waveforms of control timing signals in case you want to haul out your oscilloscope and make sure everything is all right) and nebulous, nearly meaningless generalities (such as an explanation of the printer's "structure"—it has mechanical parts, electronic parts and a power supply).

Note that the STX-80 has a brother, the STX-80T. They differ only in the block graphic characters stored in ROM. The STX-80 has symbols (clubs, hearts, diamonds, spades, and so forth) and lines, while the "T" features various shapes of blocks.

Conclusion

If you go looking for conclusions, you'll be disappointed. We did not rate the machines, because each one excels in some areas and fails in others. As you might expect, the least expensive printers have the fewest features. In other words, you'll have to ask yourself how much boldface printing and high speed are worth. Certainly the Apple printer is the most compatible and most convenient. But, again, that is for you to decide.

We've done the easy part. We tested the machines and found out what they can do. The hard job—choosing a printer—is yours. ✚

Product Information

Apple Computer, Inc.
10260 Bandley Drive
Cupertino, CA 95014
(408) 996-1010
Price for the Apple dot matrix: $695

CIRCLE 754 ON READER SERVICE CARD

Epson America, Inc.
3415 Kashiwa Street
Torrance, CA 90505
(213) 539-9140
Price for RX-80: $494

CIRCLE 755 ON READER SERVICE CARD

Leading Edge Products, Inc.
225 Turnpike Street
Canton, MA 02021
1-800-343-6833
617-828-8150
Price for Banana: $249
Price for Prowriter: $495

CIRCLE 756 ON READER SERVICE CARD

Mannesmann-Talley Corp.
8301 South 180th Street
Kent, WA 98032
(206) 251-5500
Price for Spirit: $399

CIRCLE 757 ON READER SERVICE CARD

Star Micronics
P.O. Box 612186
Dallas-Fort Worth Airport,
TX 75261
or 2803 E. 12th Street
Dallas-Fort Worth Airport,
TX 75261
(214) 456-0052
Price for Gemini 10x: $399

CIRCLE 758 ON READER SERVICE CARD

The computer-age storybook for kids!

KATIE AND THE COMPUTER

By Fred D'Ignazio
Illustrated by Stan Gilliam



This wonderful storybook teaches young children how a microcomputer works. Katie ends up inside her dad's new micro...and has an adventure with Colonel Byte and the other characters who make a computer work. Her journey follows the path of a computer command; her experiences are technically accurate yet easily understandable, right down to her encounters with a program bug. Additional material is included to help you relate the story to actual working parts of the computer. With truly exceptional color illustrations, this is an excellent first computer book for youngsters.
Hardcover
11" x 8½", illustrated.

For faster service,
PHONE TOLL FREE: 800-631-8112
(In NJ only: 201-540-0445)

Also available at your local bookstore or computer store.

CREATIVE COMPUTING PRESS
Dept. NE5H, 39 East Hanover Avenue
Morris Plains, NJ 07950

Please send me _____ *Katie and the Computer* at $8.95* plus $2.00 postage and handling each. Outside USA add $3.00 per order. **#12A**

☐ **PAYMENT ENCLOSED $_____**
*Residents of CA, NJ and NY State add applicable sales tax.

☐ **CHARGE MY:**
☐ American Express
☐ MasterCard ☐ Visa

Card No._____

Exp. Date_____

Signature_____

Mr.
Mrs.
Ms._____
(please print full name)

Address_____

Apt._____

City_____

State_____

Zip_____

☐ Send me a FREE *Creative Computing* Catalog.

SAVE UP TO 40%

TOLL FREE ORDER LINE

No Hidden Charges
No Charge for Credit Cards
No Shipping Delay for Personal Checks

SAVE!

AVANT-GARDE CREATIONS
HIRES Computer Golf $21.00
HIRES Computer Golf 2 ..... 25.00
Jump Jet 21.00

BEAGLE BROTHERS
Alpha Plot $28.00
Aplle Mechanic 21.00
Beagle Bag 21.00
DOS Boss 20.00
Double Take 25.00
Flex Text 21.00
Frame Up 21.00
Pronto DOS 21.00
Tip Disk #1 ..... 15.00
Typefaces 15.00
Utility City 21.00

BRODERBUND
AE $25.00
Arcade Machine 42.00
Bank Street Writer 48.00
Choplifter 25.00
Gumball 21.00
Lode Runner 25.00
Maze Machine 42.00
Midnight Magic 25.00
Questron 32.00
Sea Fox 21.00
Serpentine 25.00
Spare Change 25.00
Star Blazer 23.00

BUDGECO
Pinball Construction Set $28.00
Raster Blaster 21.00

CALIFORNIA PACIFIC
Ultima $28.00

CONTINENTAL SOFTWARE
The Home Accountant $53.00

DATAMOST
Aztec $28.00
Bilestoad 28.00
Casino 28.00
Conquering Worlds 21.00
Mating Zones 21.00
Missing Ring 21.00
Pig Pen 21.00
Snack Attack 21.00
Swashbuckler 25.00
Thief 21.00

DATASOFT
Canyon Climber $21.00
Micropainter 25.00
Zaxxon 28.00

DATA TREK
Maze Craze $28.00

EDU-WARE
Algebra 1-4 ..... $28.00
Algebra 5 & 6 ..... 35.00
Compu-Read 21.00
Decimals 35.00
Fractions 35.00
Prisoner 2 ..... 25.00
Rendezvous 28.00

EPYX
Crush, Crumble & Chomp $21.00
Hellfire Warrior 28.00
Temple of Apshai 28.00

H.A.L. LABS
Sheila $20.00
Super Taxman 2 ..... 20.00

HAYDEN SOFTWARE
Go $25.00
ORCA/M 70.00
Sargon II 25.00

INFOCOM
Deadline $35.00
Starcross 28.00
Suspended 35.00
The Witness 35.00
Zork I, II, & III ..... ea. 28.00

INTELLIGENT STATEMENTS
Ken Uston's Professional Blackjack $49.00

LIGHTNING SOFTWARE
Master Type $28.00

MICROLAB
Miner 2049er $28.00

MICROSOFT
Adventure $21.00
Olympic Decathalon ... 21.00
Typing Tutor II 20.00

MUSE
Castle Wolfenstein ... $21.00
Caverns of Freitag 21.00
Robot War 28.00
Three Mile Island 28.00
Titan Empire 28.00

ODESTA
Checkers $35.00
Chess 7.0 ..... 49.00
Odin 35.00

OMEGA MICROWAVE
Inspector $45.00
Locksmith 4.1 ..... 75.00
Night Falls 21.00
Watson 35.00

ORIGIN SYSTEMS
Exodus: Ultima III $40.00

QUALITY SOFTWARE
Ali Baba $25.00
Bag of Tricks 35.00
Beneath Apple Manor . 21.00
Fastgammon 18.00

SENSIBLE SOFTWARE
Sensible Speller $100.00
Super Disk Copy 21.00

PENGUIN SOFTWARE
Complete Graphics System $49.00
Coveted Mirror 15.00
Crime Wave 15.00
Graphics Magician 45.00
Minit Man 15.00
Pensate 15.00
Pie Man 15.00
(The) Quest 15.00
Short Cuts 35.00
Special Effects 28.00
Spy's Demise 15.00
The Spy Strikes Back.. 15.00
Thunderbombs 15.00
Transylvania 15.00

SIERRA ON-LINE
Adv. #1 Mission Asteroid $15.00
Adv. #2 Mystery House 18.00
Adv. #3 Wizard & The Princess 25.00
Adv. #4 Ulysses 25.00
Adv. #5 Time Zone 70.00
Adv. #6 Dark Crystal .. 28.00
Apple Cider Spider 21.00
Bop-A-Bet 21.00
Cannonball Blitz 25.00
Crossfire 21.00
Dragon's Keep 21.00
Frogger 25.00
Jawbreaker (new) 21.00
Learning w/Leeper 25.00
Marauder 25.00
Sammy Lightfoot 21.00
Softporn Adventure ... 21.00
Threshold 20.00
Troll's Tale 21.00
Ultima II 42.00
The Artist 60.00
Screenwriter II 99.00
General Manager 175.00

HARDWARE DEALS

MODEMS
Apple Cat II ..$299.00
Micromodem II 265.00
Micromodem w/terminal prog. 295.00
212 Apple Cat . 580.00

MONITORS
Amdek
Color I $299.00
Color II RGB ... 599.00
Color III RGB .. 399.00
RGB Card 149.00

USI
Pi1 9" Green .$119.00
Pi2 12" Green . 149.00
Pi3 12" Amber. 159.00
Pi4 9" Amber .. 129.00
Color 1400 .... 299.00

PRINTERS
C. Itoh
GX-100 .....$229.00
Prowriter 399.00
Okidata
Microline 80 ... 349.00
Microline 82A . 449.00
Microline 92 ... 549.00

SILICON VALLEY SYSTEMS
Word Handler/List Handler package $149.00

SIRIUS
Critical Mass $28.00
Epoch 25.00
Gorgon 28.00
Repton 28.00
Plasmania 25.00
Type Attack 28.00
Wayout 28.00

SIR-TECH
Galactic Attack $21.00
Knight of Diamonds ... 25.00
Legacy of Llylgamyn .. 29.00
Police Artist 25.00
Star Maze 25.00
Wizardry 35.00

SOFT IMAGES
Blackjack Strategy ... $49.00
Pandemonium 28.00
Single's Night at Molly's 21.00

SOFTWARE PUBLISHING
PFS: File $95.00
PFS: Graph 95.00
PFS: Report 95.00

SPINNAKER
Delta Drawing $35.00
Face Maker 25.00
Hey Diddle, Diddle 21.00
Kindercomp 21.00
Most Amazing Thing .. 28.00
Rhymes & Riddles 21.00
Snooper Troops 1 & 2 ea. 32.00
Story Machine 25.00

STRATEGIC SIMULATIONS
Bomb Alley $42.00
Computer Ambush 42.00
Computer Baseball 28.00
Computer Quarterback 28.00
Cosmic Balance 28.00
Cosmic Balance II 28.00
Galactic Adventures ... 42.00
Geopolitique 1990 .... 42.00
Germany 1985 ..... 42.00
Knights of the Desert .. 28.00
North Atlantic '86 ..... 42.00
RDF '85 ..... 25.00
Tigers in the Snow 28.00
Warp Factor 28.00

SUB-LOGIC
Flight Simulator $25.00
Pinball: Night Mission . 21.00
Road Block 21.00
Saturn Navigator 25.00
Space Vikings 35.00

SYNERGISTIC
Atlantis $28.00
Crisis Mountain 25.00
Bolo 25.00
G.P.L.E. 49.00
Microbe 32.00
Odyssey 21.00

SYDNEY DATA PRODUCTS
Evolution $28.00

ULTRASOFT
Mask of the Sun $28.00
Serpent's Star 28.00

VISICORP
VisiCalc 3.3 ..... $175.00
VisiCalc IIe 175.00
VisiDex 175.00
VisiFile 175.00
VisiLink 175.00
VisiPlot 150.00
VisiSchedule 210.00
VisiTerm 75.00
VisiTrend/Plot 225.00

HARDWARE

JOYSTICKS AND PADDLES
Hayes Mach II $32.00
Hayes Mach IIe 35.00
Hayes Mach III 40.00
Hayes Mach IIIe 44.00
Kraft Joystick 45.00
Kraft Paddles 35.00
Sirius Joyport 36.00
TG Joystick 42.00
TG Paddles 29.00
TG Trackball 48.00

MISCELLANEOUS HARDWARE
Grappler + ... $125.00
16K Ram 75.00
SoftCard 275.00
System Saver 65.00

BLANK DISCS (box of 10)
Elephant (SS/SD) $22.00
(SS/DD) 25.00
Maxell (SS/DD) 30.00
Verbatim (SS/SD) 25.00
(SS/DD) 28.00
Diskette File Box (holds 60) 20.00

DISK DRIVES
Rana Elite 1 ..... $289.00
w/controller 389.00
Rana Elite 2 ..... 479.00
w/controller 559.00
Rana Elite 3 ..... 629.00
w/controller 699.00

VIDEX
Videoterm $239.00
Ultraterm 279.00

ADVANCED LOGIC SYSTEMS
CP/M Card $299.00
Dispatcher 104.00
Z-Card II 129.00

OTHER ITEMS
Gibson Light Pen $249.00
Koala Graphics Tablet . 99.00
S.A.M. 89.00

RISING SUN SOFTWARE
4200 PARK BLVD.
OAKLAND, CALIFORNIA 94602
(415) 482-3391

Ordering Information: We'll accept any form of payment—cash, personal check, money order, VISA/MasterCard, or C.O.D. Send cash at your own risk. Add $2.00 for UPS shipping; $3.00 for Blue Label Air. California residents add applicable sales tax. ALL orders shipped same day received. If we are out of stock on a particular item we will include a special bonus with your order when shipped.

master charge

CALL TOLL FREE 24 HOURS (ORDERS ONLY)
(800) 227-1617, ext. 114 (Outside California)
(800) 772-3545, ext. 114 (Inside California)

VISA

HARDWARE

Soundtrap Stretch

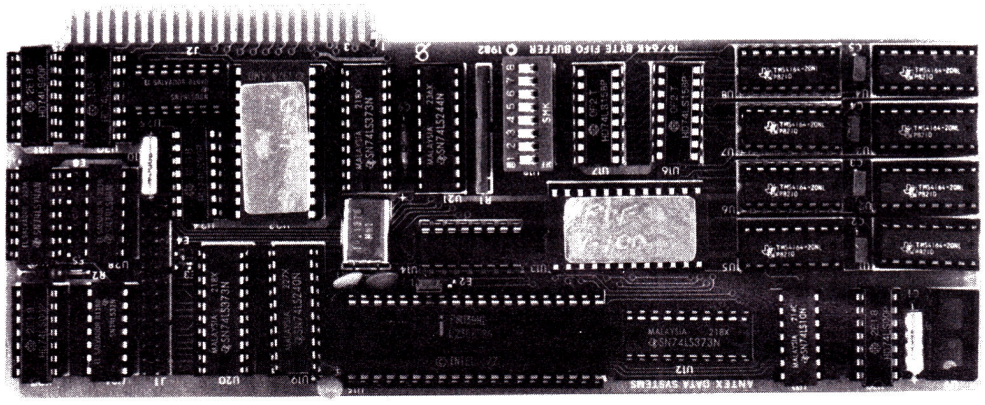
A 26-inch wide acoustical printer housing that reduces noise to an average of 44dBA level for popular 136-column dot matrix and small daisywheel printers. Inside dimensions of the housing are 26 inches across by 17 inches deep.

The Soundtrap Stretch features a "peel out" slot for bottom feed printers and new louvers in the back panel for ventilation. An extra option package includes electrical power-surge protection outlets, a cooling fan, and a pilot light on/off switch.

The housing reduces noise from office printers, including: Apple Letter Quality, Brother HR-15, C. Itoh Starwriter, Epson MX 100, Mannesmann Tally MT 160/180, NEC, Okidata 83A, Qume Sprint 11, Smith Corona, Transtar 315 Color Printer, and Toshiba TH 2100 H/G. *(List Price: $189. Option package $49)*

Trace Systems, Inc.
1928 Old Middlefield Way
Mountain View, CA 94043
(800) 248-7223,
(415) 964-3115

CIRCLE 792 ON READER SERVICE CARD



ADS-8211 Grafax Spooler/64, parallel printer interface from Antex Data Systems.

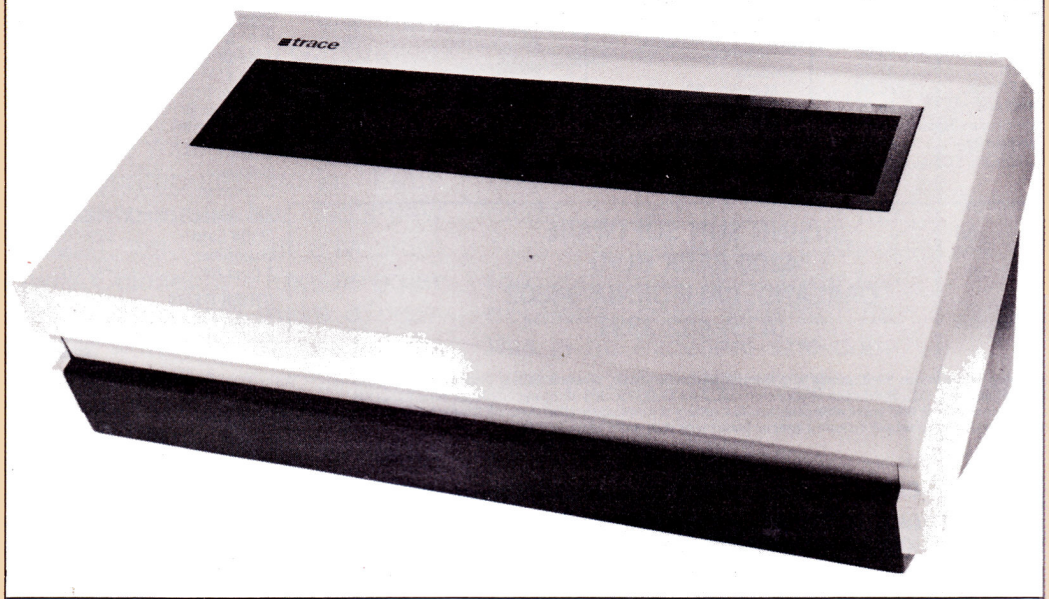
ADS-8211 Grafax SPOOLER/64

A parallel printer interface with 64K RAM buffer and an 8039 microprocessor. The internal RAM can hold approximately 20 pages of text, freeing the user's system for other applications.

The ADS-8211 includes a screen dump feature, holding a screen's display in memory for hard copy reproduction. It will copy and dump "HIRES" graphics screens as well as text. Graphic dumps can be of normal or inverse video, can be straight or rotated 90 degrees, and can be printed in either of two sizes.

The device includes a six-foot length of flat cable with a 36-pin Centronics-type parallel connector. *(List Price: $229)*
Antex Data Systems
2630 California St.
Mountain View, CA 94043
(415) 941-7914

CIRCLE 791 ON READER SERVICE CARD



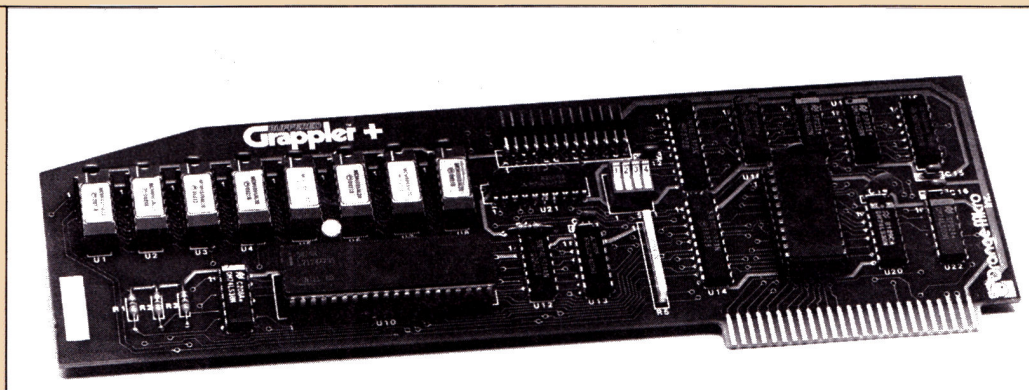
***Soundtrap Stretch,** acoustical printer cover from Trace Systems, Inc.*

SuperSprite

A plug-in graphics board allowing a user to program several animated objects on a display simultaneously. The board synchronizes background graphics, animated "sprite" graphics (characters capable of independent movement), sound effects and synthesized speech. Each sprite occupies space on a separate video plane, allowing the characters to move over and past each other.

The SuperSprite board offers 16 colors for sprites and background patterns, and additional colors can be created by mixing two or more standard colors. To add actual speech, the board incorporates the ECHO II speech synthesizer, providing a user's system with an unlimited vocabulary from typed input.

Software offered with the SuperSprite board includes *Ampersprite,* a programming language for use with *Applesoft,* allowing the user to assemble sprites of various sizes, shapes,



Grappler, a graphics interface board from Orange Micro.

and colors, to sequence their movements, and to program sound. *Amper-sprite* allows up to 32 different sprites to move on a display at the same time. Sound generation is independent of sprite operation, and can be programmed with simple commands to synchronize with the animation without pause for sound to occur. *(List Price: $395)*
Synetix, Inc.
15050 N.E. 95th
Redmond, WA 98052
(800) 426-7412
(206) 881-7110

CIRCLE 790 ON READER SERVICE CARD

Half Track Disk Drive
A 5¼ inch floppy disk drive that provides 160K bytes of dual density storage. The drive is only one-half the height of an Apple disk drive.

The Half Track Disk Drive features half high design, contemporary slimline styling, cooling louvers, auto-eject of diskette for operator convenience, a quick-release controller cable, and 12 millisecond head access time.

The drive is rated at 8000 MTBF and comes complete with filer DOS 3.3, controller, and cable. *(List Price: $399.95)*
Requires: Apple II, Apple II+, Apple IIe, DOS 3.2 or 3.3.
Wholesale Technology, Inc.
1530 South Sinclair
Anaheim, CA 92806
(714) 978-9820

CIRCLE 793 ON READER SERVICE CARD

Bufferboard
A print buffer for the Apple II and Apple III computers that will hold up to 64K of memory and feed it to the printer at its own rate. This frees the computer for other uses while the printer is working.

The Bufferboard comes with 16K memory standard, which holds about five pages of text, and can be expanded to 32K or 64K. With the full 64K installed the Bufferboard stores up to 20 pages of text.

The Bufferboard comes with Orange Micro's Interface Docking System. This eliminates the need for a new interface; the Bufferboard fits into the Apple and "docks" onto all popular parallel printer interfaces, including the Grappler/Grappler+ interfaces, Epson interface, and the Apple printer interface.

All Bufferboard features are controlled by an on-board micro-controller. A built-in self-test automatically reads the number of memory chips installed while testing the board's components. The Bufferboard's automatic memory configuration eliminates the need to change switches and settings when additional memory chips are installed. The Bufferboard comes with its own interface docking cable and manual. *(List Price: Not available.)*
Requires: Not available.
Orange Micro, Inc.
1400 N. Lakeview Ave.
Anaheim, CA. 92807
(714) 779-2772

CIRCLE 789 ON READER SERVICE CARD

SOFTWARE

Geopolitique 1990
A new game that simulates international diplomacy and military confrontations. The player assumes the role of a President of the United States in the 1990's caught up in a power struggle with the Soviet Union and facing an economically troubled world.

Geopolitique has two phases, the diplomatic phase and the military phase. "Geopol" is a peaceful struggle for world domination between the U.S. and the Soviet Union. Raw materials, military alliances, capital, and economic concessions are all traded. The player's political savvy in international haggling will determine whether dominance can be gained without a shot being fired.

The "Geowar" phase simulates conventional warfare and has realistic features such as air strikes, amphibious landings, air superiority, and terrain considerations.

There are seven scenarios a player can choose from, ranging from today's volatile global situation to a number of hypothetical settings. *(List Price: $39.95)*
Requires: 48K, Apple II, Apple II+, Apple IIe, or Apple III, one disk drive.
Strategic Simulations, Inc.
883 Stierlin Rd., Bldg. A-200
Mountain View, CA 94043
(415) 964-1353

CIRCLE 788 ON READER SERVICE CARD

Apple-IBM PC File Transfer Program
A new system allowing transfer of files from the Apple to the IBM PC and XT. The product includes a communications program for the IBM PC and an adapter that enables the two systems to connect. The program contains several utilities that assist in program conversion and help prepare files for editing.

The Apple-IBM PC File

Transfer Program supports transfer of random files, text files, data files, binary files, and high level language programs such as BASIC, Pascal, Fortran, and Cobol. The program also supports *VisiCalc* electronic spreadsheet data, word processor files, CP/M, and more.

File concatenation is provided as well as the ability to send files of any length. Supported baud rates are 110, 150, 300, 600, 1200, 2400, 4800, and 9600. The user's manual contains tips on program conversion. *(List Price: $94.95)*
Requires: 64K, Apple II, Apple II+, or Apple IIe, with Apple serial card, one disk drive, DOS 3.3, IBM PC, or XT, one disk drive, MS or PC-DOS.
Personal Computer Products
1400 Coleman Ave.,
Suite C-18
Santa Clara, CA 95050
(408) 988-0164

CIRCLE 787 ON READER SERVICE CARD

Navette

A software pattern design tool for handweavers. *Navette* allows the user to create warp and weft drawdowns which can be stored on diskette and combined to produce new and unusual block patterns. In the program's analysis mode, the user can edit a pattern and its threading, treadling, and tie-up are produced automatically.

Navette uses high resolution graphics permitting 16 harness patterns with warp repeats to 66 threads and weft repeats to 48 picks. Two pattern display sizes are available: 140 x 96 inches and 70 x 48 inches. The software's color-effect capability means that individual warp and weft threads may be designated as light or dark, significantly increasing pattern possibilities.

Combined with a printer, *Navette* can produce full pattern drawdowns simulating tight or open weave effects. Any graphics character may be used to represent dark threads in the drawdown printout. *(List Price: $39.95)*
Requires: 64K, Apple II, Apple IIe, one disk drive, printer.
Opcode Software
1909½ Vine St.
Berkeley, CA 94709
(415) 525-6997

CIRCLE 786 ON READER SERVICE CARD

CodeWriter

Software that allows users to design unique application programs without knowledge of computer programming. A user can write a program by simply typing the screen layout form and the calculations onto the computer's screen in plain English. *CodeWriter* automatically translates that plain English and writes the computer-language "code" which actually does the work in the computer.

The program generates software applications that use the computational power of the computer as well as its ability to store, organize, sort, calculate, and search collections of data. Applications including payables and receivables, sales analysis, customer and personnel files, mailing lists, invoicing, inventory and production tracking, order entry, and many others can be developed.

Once the application is produced, *CodeWriter* itself is put aside and the new application program is used. When a new application program is needed, the *CodeWriter* disk can be brought out again to write it. The software can also be used to modify programs originally generated with it.

CodeWriter is self-prompting and rejects improper or illogical input, giving the user a new chance to enter the proper information. *(List Price: $399)*
Requires: 64K, Apple II+ or Apple IIe, 2 disk drives.
Dynatech MicroSoftware, Inc.
7847 N. Caldwell Ave.
Niles, IL 60648
(800) 621-4109,
(312) 470-0700

CIRCLE 785 ON READER SERVICE CARD

Automated Mental Health Systems

A microcomputer-based office management system designed for mental health practitioners, including psychiatrists, psychologists, and psychiatric social workers. The program automates the business aspects of a mental health practice by maintaining client history and performing billing tasks.

A user can maintain information on 225 active accounts on the system that can be used in private offices, clinics, or hospitals. Features include customized service descriptions, posting of services, account history recall, account billing, and generation of printed reports. A billing option that uses standard American Medical Association insurance forms is available.

The program is password protected and provides hard copy of ledger data in concise formats with full-year financial reporting capability. *(List Price: $695)*
Requires: 48K, Apple II, Apple II+, or Apple IIe, two disk drives, monitor, 80 column printer.
Medical Office Systems
615 S. Frederick Ave.,
Suite 308
Gaithersburg, MD 20877
(301) 840-0440

CIRCLE 784 ON READER SERVICE CARD

GradeCalc

A grade and attendance management software package designed to work well with any teacher's existing grade format.

Users can keep all raw grades and assignment information on file. The file can average grades using a variety of methods ranging from percentage scores to letter grades. In addition to averaging, numerous reports can be generated, including a cumulative listing of missing assignments, grade totals, averages, grade book listings, and assignment summaries.

GradeCalc can also manage attendance records. Reports include cumulative totals of all attendance records and problem reports based on excessive absences or other problems. *(List Price: $29.95)*
Requires: 32K, Apple II, Apple II+, or Apple IIe, one disk drive.
Tamarack Software, Inc.
Water St.
Darby, MT 59829
(406) 821-4595

CIRCLE 783 ON READER SERVICE CARD

Mineral Cave
An educational adventure game for elementary through high school students that provides practice in identifying various minerals using scientific testing procedures.

The player becomes an adventurer who, armed with a sword and carrying a sack of gold pieces, goes off to explore a cave. It is the adventurer's mission to travel through the cavern and correctly identify 10 different minerals, including malachite, azurite, topaz, feldspar, and others. A key of properties gives the explorer clues about what each mineral is like. *Mineral Cave* also calls on players to use mapping skills during their trek. *(List Price: $34.95)*
Requires: 48K, Apple II$^+$ or Apple IIe, one disk drive.
Teck Associates
P.O. Box 8732
White Bear Lake, MN 55110
(612) 429-5570

CIRCLE 782 ON READER SERVICE CARD

Lode Runner
Software that offers users 150 different game screens and a generator for creating original games.

Each of *Lode Runner's* 150 game screens features its own unique puzzles and challenges. Each level requires strategic problem solving and quick thinking in addition to lightning fast reflexes. A game generator lets users, unfamiliar with programming, design and save their own game screens. *(List Price: $34.95)*
Requires: 48K, Apple II with *Applesoft*, Apple II$^+$, or Apple IIe.
Broderbund Software
1938 Fourth St.
San Rafael, CA 94901
(415) 456-6424

CIRCLE 781 ON READER SERVICE CARD

Robographics CAD-1
A computer aided drafting and design system that produces scaled, technical drawings and custom graphics. Designers, illustrators, educators, and other business professionals can use this system to create building plans, mechanical drawings, schematics, flowcharts, and business graphics.

The *CAD-1* uses a high precision hand-held controller to draw lines, circles, arcs, and tangents to exact dimensions. Once completed, commonly used symbols and finished drawings are stored on library diskettes, and can be displayed in miniature for easy recognition and reuse through a graphic index system.

For professional quality output from the *CAD-1* system, two Robographics drafting plotters are availalbe to produce line-perfect drawings of up to 22 x 34 inches. For proof copy, any dot matrix printer with graphics dump capability can be used. *(List Price: $1,095)*
Requires: 64K, Apple II$^+$ or Apple IIe, two disk drives.
Chessell-Robocom Corporation
125 Pheasant Run,
Suite 2B
Newtown, PA 18940
(215) 968-4422

CIRCLE 780 ON READER SERVICE CARD

Fast Point Pen
A light pen and controller that can be used for cursor control and menu picking applications as well as low-resolution graphics tasks. Applications can be accomplished with software peaks at memory locations, and the pen is adaptable to existing software and new programs.

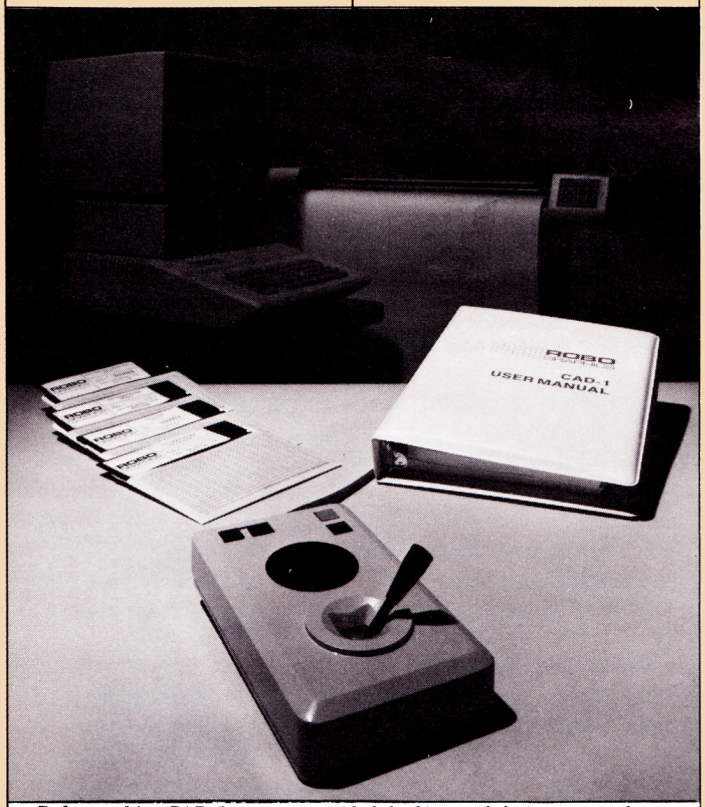
The Fast Point pen comes supplied with a controller card intended for slot 5 on the mother board, and a small extension board which plugs into IC sockets which normally house video multiplexer IC's. Those IC's plug into the extension board.

The light pen has a touch-sensitive switch which generates a signal when the tip is placed against an unblanked spot on the CRT. Minimum sensitivity is 7 FL spot brightness. *(List Price: $240)*
Requires: Apple II$^+$.
HEI, Inc.
1495 Steiger Lake La.
Victoria, MN 55386

CIRCLE 779 ON READER SERVICE CARD

Decimals
An interactive software program designed to help elementary through high school students understand and use fractions. The program's emphasis is on applying mathematical concepts to real life situations, not on rote recall of facts.

The eight topics covered in *Decimals* each contain two programs. The "A" programs let the student give the computer problems to solve, and then presents practice problems given by the computer.



***Robographics CAD-1**, computer aided drafting and design system from Chessell-Robocom Corp.*

The "B" programs are enrichment extensions of the concepts covered in the "A" programs, often presented in game format. The final "B" program is a review test for the entire series. *(List Price: $120)*
Requires: 48K, Apple II+, Apple IIe, one disk drive.
Quality Educational Designs
P.O. Box 12486
Portland, OR 97212
(503) 287-8137

CIRCLE 778 ON READER SERVICE CARD

Grappler+
A universal graphics interface which works with most popular printers. It combines on-board firmware for Apple HI-RES graphics with many new features, including an on-board dip switch for printer selection. There are 23 software commands available through the keyboard or user program.

The Grappler+ is compatible with the following printers: Anadex, Apple Dot Matrix, Centronics, C. Itoh Prowriter, Epson Series, NEC 8023, Okidata Series, PMC DMP-85, Star Gemini Series, and future printers. The interface allows all color features to be accessed when using the Prism 80 or 132 printers. The interface is also compatible with Apple hardware and with Pascal, CP/M, and Logo.

Simple control commands enable the Grappler+ to print graphics inversed, centered, double-sized, and rotated 90 degrees. Block graphic capability is available on the Epson Series, Okidata Series, and Star Gemini Series. Text commands include screen dumps, setting of margins and page lengths, auto-skip-over perforation, and word wrap-around with breakpoint at the nearest space. No software is needed to execute these commands. *(List Price: $175)*
Requires: Apple II, Apple II+, or Apple IIe, printer.
Orange Micro, Inc.
1400 N. Lakeview
Anaheim, CA 92807
(714) 779-2772

CIRCLE 777 ON READER SERVICE CARD

Amper-Magic
Software that allows users, with no knowledge of machine language, to add new commands to *Applesoft* BASIC. The menu-driven utility uses the ampersand function to access any number of machine language routines without knowing their addresses. The BASIC program can then pass variables back and forth to the routines. No pokes or peek are required.

Amper-Magic will attach the routines with names of the user's choice, and the program can be edited without regard to addresses. There is no interference with DOS, page zero, or the "scratchpad" area at hex 300. The new commands become part of the BASIC program. There is no need for separate Bload instructions.

Amper-Magic Vol. 1 offers 23 machine language routines. The user can also add original, relocatable routines from disk or copy them in directly from a decimal or hex listing. *Amper-Magic* Vol. 2 contains 27 additional commands. *(List Price: Vol. 1 $75, Vol. II $35)*
Requires: 48K, Apple II with *Applesoft*, Apple II+, Apple IIe, one disk drive.
Anthro-Digital, Inc.
P.O. Box 1385
Pittsfield, MA 01202
(413) 448-8278

CIRCLE 775 ON READER SERVICE CARD

Net-Works II
An electronic bulletin board for business, home, or hobby. Users can send messages to individuals, distribute memos to local and remote office locations, and call in for messages 24 hours a day.

The software automatically answers and records each phone call and asks for the caller's password or assigns a password to a first-time caller. The *Net-Works II* operator may screen the caller prior to password validation, and even charge a membership fee, if desired. Eight general interest bulletin board topics can be customized by the *Net-Works II* operator.

Net-Works II provides a "welcome" message and "Help" information for new callers. "Expert" callers see fewer menus and instructions. Callers may send private mail to each other, post or read public bulletins, receive programs or text files, and view the membership list. *Net-Works II* automatically notifies the caller if there is mail waiting. The bulletin board has an editor and other utility programs. *(List Price: $99.99)*
Required: 48K, Apple II, Micromodem II, one disk drive.
High Technology Software Products, Inc.
P.O. Box 60406
1611 N.W. 23rd
Oklahoma City, OK 73146
(415) 524-4359

CIRCLE 776 ON READER SERVICE CARD

Rhyming
An educational program for young children and others who need practice in rhyming.

Teachers can design custom lessons using relevant word combinations for their students and can replace the demonstration word pairs delivered in the program with up to 50 pairs of their own.

The computer randomly selects two words from the list prepared by the teacher. The words are flashed on the screen, and the student must decide if they rhyme or not. Students choose the number of problems per game. Average score and time are reported.

Because word pairs are teacher or user selectable, the program can be used for lessons in English, reading, foreign languages, and other areas. *(List Price: $19.95)*
Requires: 8K, Apple II, Apple II+, Apple IIe, one disk drive.
School and Home Courseware, Inc.
1341 Bulldog La., Suite C
Fresno, CA 93710
(209) 227-4341

CIRCLE 774 ON READER SERVICE CARD

Dollars & $ense
A family financial management program, featuring ease of use and a tutorial diskette. The program establishes and maintains a personalized financial database, useful in maintaining family budgets, keeping records of income and expenses, and in providing information needed to pre-

pare income taxes. *Dollars & $ense* allows a user to prepare graphs and reports which can be displayed or printed in color with appropriate hardware.

The program can be used on an individual level to reconcile checkbooks, to manage investments such as real property or stock portfolios, or to analyze personal expenses. Professionally, *Dollars & $ense* allows a user to calculate net worth, manage budgets for a small business, or project business profit or loss. In all, the user can identify up to 12 accounts of five types: assets, liabilities, expenses, income, and checking.

The *Dollars & $ense* package includes a demonstration/tutorial diskette, the program diskette, and a user's manual. *(List Price: $165)*

Requires: 48K, Apple II or Apple IIe; one disk drive.

Tronix Publishing, Inc.
Monogram Div.
8295 S. La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529

CIRCLE 773 ON READER SERVICE CARD

Buzzard Bait

A game program that pits the player against up to three pairs of birds who prey on humans in order to feed their young. The player is on a rescue mission to save people from the attacking predators. The game can be played with either a joystick or keyboard. *(List price: $39.95)*

Requires: Not available.

Sirius Software Inc.
10364 Rockingham Dr.
Sacramento, CA 95827
(916) 366-1195

CIRCLE 772 ON READER SERVICE CARD

First Categories

An educational program aimed at children who are just beginning to read and handicapped youngsters who have difficulty with categorization. The program uses graphics, speech, and text to train children in six noun categories on three levels of difficulty. The first level features graphics, speech, and text while the second and third levels use text and speech only. The categories are animals, body parts, clothes, food, utensils, and vehicles. *(List Price: $120)*

Requires: 64K, Apple II^+ or Apple IIe, one disk drive, DOS 3.3, Echo II speech synthesizer.

Laureate Learning Systems, Inc.
1 Mill Street
Burlington, VT 05401
(802) 862-7355

CIRCLE 771 ON READER SERVICE CARD

Seven Program Package

Seven software packages to help users keep track of addresses, schedules, and mailings.

The *Little Black Book* keeps track of names and notes electronically and indexes them by name and date. The correct spelling of the name is not required to find an entry. The package is available for hard disks as well as single floppy-drive systems.

The *Scheduler* organizes events and will review events or print out a daily schedule.

Roll-a-File and *Print-a-File* serve as an electronic card file that will search for clients according to specific criteria such as name, age, account number, ZIP Code. *Print-a-File* will print mailing lists or phone lists using the information retrieved with the *Roll-a-File* package.

Micro-Mass-Mailer eliminates the need for envelope stuffing by printing a message inside the envelope and printing the address on the outside.

The *Labeller* will design and print custom labels using either normal or large type and allows for automatic line centering.

Le Menu will access any DOS 3.3 program with only two keystrokes and is compatible with floppy and hard disk drives. *(List Price: Little Black Book, $249; Scheduler, $99; Roll-a-File, $79; Print-a-File $99; Micro-Mass-Mailer, $129; Labeller, $19.95; Le Menu, $49.95)*

Requires: 64K, Apple II, II^+, IIe, one disk drive. Printer optional.

Sophisticated Software
650 Foothill Boulevard
La Canada, CA 91011
(213) 790-9054

CIRCLE 770 ON READER SERVICE CARD

Aural Skill Trainer

A series of three programs that introduce students to music concepts. Program lessons are Intervals, Basic Chords, and Seventh Chords. The programs generate instructor reports on a printer. Discounts are available to schools for multi-copy purchases.

(List Price: Three-lesson series, $99.95, Individual lessons, $39.95 each.)

Requires: 48K, Apple II or Apple IIe, one disk drive. Printer optional.

Electronic Courseware Systems, Inc.
309 Windsor Road
Champaign, IL 61820
(217) 359-7099

CIRCLE 769 ON READER SERVICE CARD

BLAST Communications Utility

A communications program that transfers both binary and text files between microcomputers, minicomputers, and mainframes. *BLAST* (BLocked ASynchronous Transmission) programs use a high-level, SDLC/HDLC-type protocol that allows for reliable file transfers in both directions simultaneously over standard telephone lines at up to 4800 baud.

BLAST works with low-cost asynchronous modems, standard serial ports, and regular dial-up telephones. *BLAST* allows computers to perform efficiently over noisy phone lines, hard-wired circuits, satellite links, packet-switched nets such as Telenet, and local area networks such as Ethernet.

Either site may send and/or receive any files, programs, or commands error-free and convert text file formats to the format of the other system. Microcomputer versions of *BLAST* include terminal emulation facilities for accessing any host computer; text file uploading and downloading; and support for auto-dial/auto-answer modems. *(List Price: $250)*

Requires: 48K, Apple II, one or two disk drives, and any modem. CP/M version requires Z-80 board and 64K RAM.

Communications Research

Group Inc.
8939 Jefferson Hwy
Baton Rouge, LA 70809
(504) 923-0888

CIRCLE 768 ON READER SERVICE CARD

Data Transforms

Two programs from Data Transforms which allow Apple II users to expand the high-resolution graphics capabilities of the computer. The *Graphtrix Matrix Graphics System* allows users to insert high-resolution graphics into *Applewriter* text files. The system also adds footnoting, superscripting, and chaptering capabilities to *Applewriter* 1.0 and 1.1.

The other program, *Fontrix*, allows Apple users to create and print up to 16 high-resolution screens as a single graphic. *Fontrix* also allows the creation of special character sets that can be typed directly onto the extended graphics screen, either with proportional or non-proportional spacing.

Both *Graphtrix* and *Fontrix* support more than 200 combinations of dot-matrix printers and interface cards. *(List Price: Graphtrix, $65; Fontrix, $75*

Requires: 48K, Apple II, one disk drive, DOS 3.3 with *Applesoft* in ROM.
Data Transforms
616 Washington St., Suite 106
Denver, CO 80203
(303) 832-1501

CIRCLE 767 ON READER SERVICE CARD

Market Analyst

A menu-driven software package for stock market investors that charts data, maintains portfolios, and provides access to remote data bases for news and stock quotes.

The package features three sections; a Technical Analyst for computerized charting, the Portfolio Manager to monitor holdings, and News, Views and Quotes for online information access.

The 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 user-specified formulae. All charts are created interactively on the high-resolution screen and can be printed on a graphics printer.

The Portfolio Manager keeps track of multiple portfolios, making the holdings available for current gain/loss evaluations, yield calculations, short-term flags, and market appraisals. All reports are available on the screen or printer.

News, Views and Quotes is the teleprocessing section that provides access to remote data bases. It stores up to 30 pages of text for off-line viewing. *(List Price: $495)*

Requires: Apple II, Apple II$^+$, or Apple IIe, one disk drive, color or B&W monitor. Supports printer (graphics capability preferred) and modem.
Anidata, Inc.
318 South Black Horse Pike
Blackwood, NJ 08012
(609) 228-3034

CIRCLE 766 ON READER SERVICE CARD

More Magic

Two business programs for creating a directory/database and a spreadsheet which stores DIF files. *Magic Memory* is a directory/database system that creates a video address book on the monitor screen. Tabs on the screen designating alphabetic entries help locate names, addresses, and phone numbers. Entries can be deleted and transferred. In addition to the lettered tabs are 24 other tabs that can be labeled by the user to indicate anniversaries, birthdays, deadlines, etc. Each tab can store up to 255 entries. *Magic Memory* can also print out the complete address book.

Magicalc is a spreadsheet program that can use up to 512K bytes additional RAM. *Magicalc* includes individual column widths, 40- or 70-columns, or 80-columns with an 80-column video card. *Magicalc* uses the same keyboard commands as *VisiCalc* and it can load and save *VisiCalc* and DIF format files. *(List Price: Magic Memory, $99.95; Magicalc, $149.95.)*
Artsci, Inc.
5547 Satsuma Ave.
North Hollywood, CA 91601
(213) 985-2922

CIRCLE 765 ON READER SERVICE CARD

Teleminder

A communications program that allows a user to access and retrieve data from the Dow Jones News/Retrieval Service automatically in unattended operation. The program will connect with the commercial database, retrieve selected data, load it onto a diskette, and disconnect from the service. In addition, it can print the news and stock quotes.

With the optional *Tele-Pak I* utility, *Teleminder* can also transfer retrieved data directly into such applications programs as the *Dow Jones Market Manager, the Dow Jones Market Analyzer,* and to spreadsheet programs such as *VisiCalc, 1-2-3,* and *Multiplan. Tele-Pak I* can also transfer *Dow Jones Market Manager* data to *Dow Jones Market Analyzer* files, and vice versa. This allows users with both software packages to access the News/Retrieval service only once to obtain identical data in each program. *(List Price: Teleminder $195; Tele-Pak I $30 additional)*

Requires: 64K, Apple II, Apple II$^+$, two disk drives, 40-col. display, Hayes Micromodem or Super Serial-Card, and Hayes Smartmodem. For the Apple IIe an 80-column display card is also required.
Teleware Inc.
P.O. Box 729
Pine Brook, NJ 07058
(800) 225-0076
(201) 882-0466

CIRCLE 764 ON READER SERVICE CARD

The Media Director I & II

A program designed for radio stations, advertising and marketing agencies, and other businesses with an interest in maintaining data on radio time and comparative values. *The Media Director* software allows a user to enter basic data obtainable from rating services, such as Arbitron and Birch, and to calculate and compare the following indices: Average Persons Rating, Cume Persons Rating, Share of Audience, Gross Rating Point, Cost



UNLEASH THE POWER

Having been in the microcomputing industry for 10 years, V R Data Corporation has earned its reputation for microcomputing excellence. For over a year we have been making solid deliveries of the PANTHER establishing ourselves as THE SOURCE for proven, premium quality Winchester Disk Subsystems. The PANTHER satisfies the most demanding mass storage needs with capacities of up to 30 megabytes or more.

Utilizing 5 ¼" Winchester disk drive technology, and microprocessor based error correcting controller boards, the PANTHER continues to be the #1 choice of discerning professionals. Available with one or two drives in one enclosure, the PANTHER can support many combinations of fixed and removable drives.

Now V R Data Corporation proudly introduces the newest member in the Panther family of Winchester Disk Drives, the "CUB". The CUB is a sub-mini Winchester Disk Subsystem, representing the latest in innovative technologies. With advances such as 100mm thin film plated media with embedded digital servo, and switch mode power, the CUB placed V R Data well out ahead of the pack. Available in single (master) and dual (master/slave) drive configurations, the CUB provides the user with capacities up to 10 megabytes of fixed or removable storage media.

The CUB's sleek low profile design totally eliminates that overcrowded work area problem and adds a professional appearance to your system. The CUB removable media drives are ideal for 5 megabyte on-line storage as well as 5 megabyte backup for your fixed media drives. Adapter modules are availalbe for the most popular microcomputers. The PANTHER family of drives are availalbe at quality Computer Stores everywhere. If your dealer does not yet carry PANTHER Drives from V R Data, tell them the future has arrived.

VR data

777 Henderson Blvd. • Folcroft, PA 19032 • (215) 461-5300

CIRCLE 187 ON READER SERVICE CARD

Per Gross Impression, Cost Per Thousand Net Reach, Average Frequency, Average Time Spent Listening, and Turnover Rate.

The program can create the indices reports for an unlimited number of radio stations within a given market for each report. Each version of *Media Director* will create a file, and display, edit, print, and store a database for any market, time-of-day, and demographic group. *Version II* can also generate Reach + Frequency and Station Analysis by Daypart reports.

The software includes documentation and a walk-through tutorial. *(List Price: Version I $350; Version II $500)*

Requires: 48K, Apple II, Apple+, one disk drive, Z-80 card.

Anderson Associates
4 Irvine Row
Carlisle, PA 17013
(717) 245-2662

CIRCLE 794 ON READER SERVICE CARD

Charts Unlimited

A graphics program, enabling users to create drawings such as flowcharts, floor plans, engineering drawings, schematics, and similar charts. The program provides 36 predefined objects and 36 predefined symbols. Users may create their own alternate objects, up to 26 per file, with an unlimited number of files possible.

The *Charts Unlimited* program includes help screens and is menu-driven. Charts or drawings are created on a worksheet grid of 123 columns by 90 rows (equal to an 8½ x 11 inch sheet of paper). Users can mix text with graphics, in both upper and lower case, and in boldface. *(List Price: $195)*

Requires: 64K, Apple IIe or Apple II+.

Charts Unlimited
5084 Mosiman Rd.
Middletown, OH 45042
(513) 424-6733

CIRCLE 763 ON READER SERVICE CARD

The STARSPRITE System

A software system created for the SuperSprite Board which allows the board to produce background and animated graphics, sound effects and synthesized speech. It is made up of three packages the first of which is included with the SuperSprite Board. STARSPRITE I contains 2 two-sided disks that explain the features of the board and the entire software system. With this system the user can coordinate sprites and Apple graphics, create mazes and patterns and use the Echo II speech board from Street Electronics.

STARSPRITE II is designed for intermediate programming and stresses the use of the AmperSprite language from within the BASIC language. It contains utilities, tutorials and demonstrations on combining animation, sound and backgrounds. The most advanced program, STARSPRITE III, was created for the assembly programmer. It provides detailed information on all aspects of programming using the SuperSprite Board, including VDP high speed machine language, lazer algorithms, and Sprite painting merge routine. In each of its packages Avant-Garde has included an offer to review users' creations for possible publishing. *(List Price: $79.95 each)*

Avant Garde Creations, Inc.
1907 Garden Avė.
Eugene, OR 97403
(503) 345-3043

CIRCLE 795 ON READER SERVICE CARD

Word Attack!

A vocabulary building program for ages 8 through adult. Four separate exercises offer 600 words, their meanings and usage. *(List Price: $49.95)*

Requires: Apple II.

Davidson & Associates
6069 Groveoak Place #12
Rancho Palos Verdes, CA 90274
(213) 378-7826

CIRCLE 796 ON READER SERVICE CARD

Letterbank

A word processing applications package which provides more than 200 business letters. The letters can be modified and three different version of each subject are included. *(List Price: $99)*

Requires: Apple II

The Wyndham Group Ltd.
125 Mirona Rd.
Portsmouth, NH 03801
(603) 431-4800

CIRCLE 797 ON READER SERVICE CARD

Solving the Mysteries of Science

A science program designed for students in grades 7-9. The package is made up of ten general subjects, each covered in 24 lessons. Features include high resolution graphics and positive reinforcement for all answers. *(List Price: $39.95, $850 for 24 lesson series)*

Requires: Apple II or IIe.

Visual Materials Inc.
4170 Grove Ave.
Gurnee, IL 60031
(312) 249-1710

CIRCLE 798 ON READER SERVICE CARD

Epidemic

An adventure game based on the premise that a virulent disease is ravaging the world. The user is named director of the Center for Disease Control, and has at his disposal clean suits, X-rays, interferon, vaccines, gene splicing, and microwaves. If all these fail, an area in which the disease is totally beyond control can be destroyed. *(List Price: $39.95)*

Requires: Apple II+ or Apple III.

Strategic Simulations Inc.
Suite 108
465 Fairchild Dr.
Mountain View, CA 94043
(415) 964-1353

CIRCLE 799 ON READER SERVICE CARD

Calcu-Plot

A program providing users with mathematical utilities for converting complex equations into graphics formats. The software can solve a range of equations and accept data from the keyboard, disk files, or print-format VisiCalc files. Solved equations can be plotted singly or in sets of two or three, all on the same graph.

Users may enter their own equations or select from 16 Cartesian or Polar equations with unlimited choice of constants and limits.

Human Systems Dynamics
9010 Reseda Blvd., #222
Northridge, CA 91324
(213) 993-8536

CIRCLE 800 ON READER SERVICE CARD

Apple II

CP/M

IBM PC

SPECTRUM

Professional Software Products

MATHEMATICS SERIES

The Series Includes These 4 Programs:

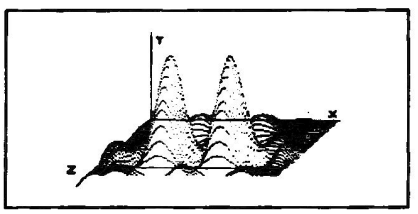
STATISTICAL ANALYSIS I: This menu driven program performs LINEAR REGRESSION analysis, determines the mean, standard deviation and plots the frequency distribution of user-supplied data sets.

NUMERICAL ANALYSIS: HI-RES 2-Dimensional plot of any function. Automatic scaling. At your option, the program will plot the function, plot the INTEGRAL, plot the DERIVATIVE, determine the ROOTS, MAXIMA, MINIMA and INTEGRAL VALUE.

MATRIX: A general purpose, menu driven program for determining the INVERSE and DETERMINANT of any matrix, as well as the SOLUTION to any set of SIMULTANEOUS LINEAR EQUATIONS.

3-D SURFACE PLOTTER: Explore the ELEGANCE and BEAUTY of MATHEMATICS by creating HI-RES PLOTS of 3-dimensional surfaces from any 3-variable equations. Hidden line or transparent plotting.

For APPLE II (48K) and IBM PC (64K) $50.00



BUSINESS SOFTWARE SERIES

Both Programs $250.00

A user-friendly yet comprehensive double-entry accounting system employing screen-oriented data input forms, extensive error-trapping, data validation and special routines for high speed operation. The series includes these two modules:

GENERAL LEDGER: A complete accounting system with these features:

- Up to 500 accounts and 500 transactions per month.
- Interactive on-screen transaction journal.
- Produces these reports:
  - Transactions Journal
  - Balance Sheet
  - Account Ledgers
  - Account Listings
  - Income Statement

For APPLE II and IBM PC $150.00

ACCOUNTS RECEIVABLE

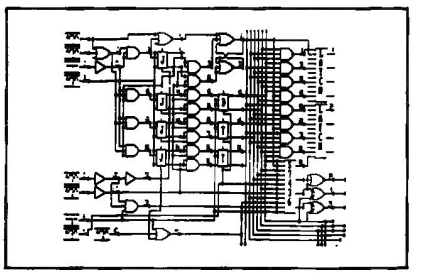
A flexible system with these features

- Up to 500 accounts and up to 500 invoices per diskette.
- Prints invoices, customer statements & address labels.
- Interfaces to General Ledger.
- Interactive screen-based invoice work sheet.
- Produces these reports
  - Aged Receivables
  - Sales Analysis
  - Account Listings
  - Customer Balances

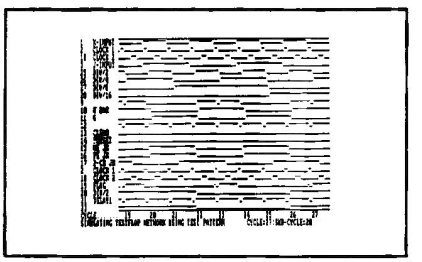
For APPLE II and IBM PC .... (2 DRIVES) .. $150.00

MICRO-LOGIC

An interactive graphics program for designing and simulating digital logic systems. Using the built-in graphics module, the user creates a logic diagram consisting of AND, OR, NAND, NOR, EX-OR, D, T, JK FLIP FLOP and powerful 16 pin user-defined MACRO functions. A typical page of a logic diagram looks like this:



The system provides on-screen editors for NETWORKS/MACROS DATA CHANNELS, CLOCK WAVEFORMS and GATES. GATE attributes include DELAY, TRUTH TABLE, NAME and I/O clocking.



The system is available for Apple II and IBM PC computers. A non-graphics version is available for CP/M 2.2 It uses the network editor to create netlists and text printer plots to display simulation results. All versions require 2- 5 1/4" disk drives.

For APPLE II, IBM PC (192K) and CP/M (70K) $450.00
MANUAL & DEMO DISKETTE $50.00

PERSONAL FINANCE MASTER

The premier personal and small business financial system. Covering all types of accounts including check registers, savings, money market, loan, credit card and other asset or liability accounts, the system has these features:

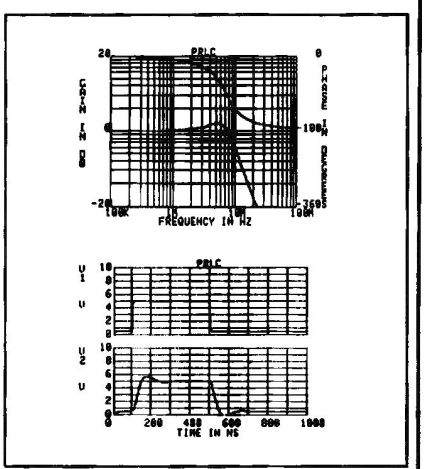
Handles 25 Asset/Liability Accounts
Monthly Transaction Reports
Budgets Income & Expense
Reconciles to Bank Statements
Prints Checks & Mailing Labels
Automatic Year-End Rollover
Prepares a Net Worth Reports
Searches for Transactions
Handles Split Transactions
User-Friendly Data Entry Forms
Fast Machine Language Routines
Extensive Error Trapping
HI-RES Expense/Income Plots

For APPLE II and IBM PC $75.00

MICRO-CAP

Microcomputer Circuit Analysis Program

Tired of trial & error circuit design? Analyze and debug your designs before you build them. With MICRO-CAP you simply sketch your circuit diagram on the CRT screen and run an AC, DC or TRANSIENT ANALYSIS. Your circuit may consist of RESISTORS, CAPACITORS, INDUCTORS, DIODES, BATTERIES, BIPOLAR or MOS TRANSISTORS, OPAMPS TRANSFORMERS, and SINSUSOIDAL or USER-DEFINED TIME DEPENDENT VOLTAGE SOURCES. MICRO-CAP can analyze any such network containing up to 40 separate nodes. Includes a user controlled MACRO library for modelling complex components such as OPAMPS and Transistors.



For APPLE II and IBM PC computers. A non-graphics version using an on-screen editor to enter networks and text printer plots to display simulation results is available for CP/M (2.2- 5 1/4" SSSD) systems. Requires 2 disk drives.

For APPLE II, IBM PC (192K) and CP/M (70K) $475.00
MANUAL and DEMO DISKETTE $50.00

ORDERING INSTRUCTIONS: All programs are supplied on disk and run on Apple II (64K) or IBM PC (128K) with a single disk drive unless otherwise noted. Detailed instructions included. Orders are shipped within 5 days. Card users include card number. Add $2.50 postage and handling with each order. California residents add 6 1/2% sales tax. Foreign orders add $5.00 postage and handling per product.

SPECTRUM SOFTWARE

690 W. Fremont Ave., Suite F
Sunnyvale, CA 94087

VISA

FOR PHONE ORDERS:
(408) 738-4387
DEALER INQUIRIES INVITED.

CIRCLE 171 ON READER SERVICE CARD

Now for //e

YOUR KEYS TO . . .

POWER

. . . on the Apple][

zardax

Word processing at its finest. Powerful and versatile, yet easy to use and natural. Designed for the business and professional environment (or for anyone who wants the best). Simple control commands. Typewriter-style shift and lock. Glossary. Form letters and mailing lists. Menus for disk access and printing. DOS 3.3 compatible text files. 40 or 80 column display. Modifiable drivers for most interface cards and printers. **$210.**

ZIP-COMM

Communications add-on for ZARDAX. Turns ZARDAX into a communicating word processor, to send and receive text files. Talk to other Apples, mainframes, information services, typesetters. Includes terminal mode. 300 or 1,200 baud. Works with serial, modem, and popular 80 column cards used by ZARDAX. Log-on files and X-on X-off supported. $80.

AIDA

"Apple Interactive Data Analysis." **Statistical analysis** package for production research work with large survey data files. Full range of analysis — from descriptive statistics to multiple regression. Complete data manipulation, transformation and case selection. Fast and accurate calculations. Up to 4,000 cases and 255 variables per file. $235.

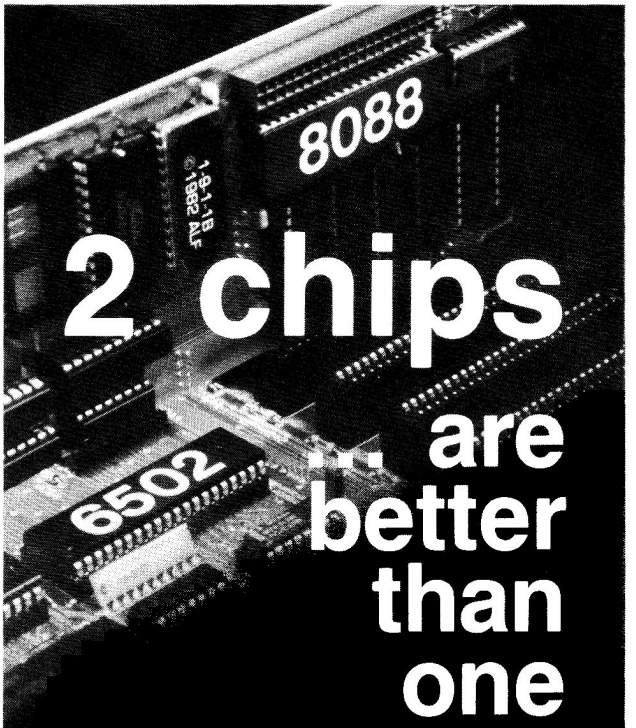
Just push our button . . .

Action-Research Northwest
11442 Marine View Drive, SW.
Seattle, WA 98146
(206) 241-1645 Source: CL2542

Apple][is a trademark of Apple Computer, Inc.
ZARDAX is a trademark of Computer Solutions, Pty., Australia.

Dealer inquiries invited.

CIRCLE 172 ON READER SERVICE CARD



2 chips ... are better than one

Is your Apple's 6502 processor chip a little overworked lately? Have you been eyeing one of those new, 16-bit systems? But you don't want to give up all your Apple programs ...

Add the powerful 16-bit 8088 processor to your Apple with ALF's Processor Card. Let the 6502 and 8088 work together to tackle your toughest problems—like speeding up your Applesoft and Apple Pascal programs. With the Processor Card, you can use the CP/M™ 86 or MS-DOS™ operating system to run the latest 16-bit software, including many IBM PC programs.

64K or 128K of high-speed memory is available for ALF's Processor Card. Use the Processor Card with 128K as a fast disk emulator or to view sixteen hi-res images in under a second. Or run Basic, C, COBOL, or Pascal with 16-bit performance!

The ALF Processor Card is just $395 (Applesoft speed-up software included). See your Apple dealer today, or contact ALF for more information.

Trademarks: "Apple": Apple Computer, "CP/M": Digital Research, "MS-DOS": Microsoft.

ALF

ALF Products Inc.
1315F Nelson St. Denver, CO 80215
(303) 234-0871 Telex: 4991824

COMING UP



Steve Wozniak interview

Business Graphics
Fine Arts Graphics
Lisa Draw

128K RAM Board comparison review

Sensible Speller review

Koala Pad review

Making Hi-Res characters

d-BASE tutorial, part II

Game reviews:
Pinball Wizard
Star Warrior
Axis Assassin
Temple of Apshai

Crime Fighting with Apples

Computers in Education

INDEX TO ADVERTISERS

READER SERVICE NO.	ADVERTISERS	PAGE
114	Abacus Associates	19
167	Abacus Enterprises Inc.	184
104	Accent Software, Inc.	4
172	Action-Research Northwest	204
202	Actuarial Micro Software	158
180	Advanced Logic Systems	159
**	ALF Products	204
203	Almaly Trading Corp.	158
107	Amdek Corp.	8
188	Anidata Inc.	129
118	Apple Computer Inc.	28-29
119	Apple Computer Inc.	118-119
175	Applied Engineering	30
121	Applied Software Technology	33
140	Avant-Garde Creations	153
134	Bible Research Systems	76
112	Blue Chip Software	17
110	Business Comp. of Peterborough	14
116	Bytes & Pieces	114
142	Calsoft	94
184	Central Point Software	117
165	Charles Mann Associates	182
160	Collins International Trading	179
194	COMPress	148
108	Computer Advanced Ideas	11
129	Computer Exchange	46-47
131	Computer Line, The	73
117	Computer Mart	127
177	Computer Tax Service	77
109	Concord Peripheral Systems, Inc.	12
129	Conroy-Lapointe	46-47
157	Dark Star Systems	177
115	Data Most	20-21
185	Data Security Concepts	121
152	Decision Economics, Inc.	150
201	Delta Point Software	143
101	Designware Inc.	Cover 3
156	Designs In Fabric	176
196	Diversified Software Research	142
111	Double-Gold Software Inc.	192
181	DTI Data Trek	91
169	East Side Software	187
126	800 Software	43
173	Enhancement Tech. Corp.	206
158	Entelek	178
189	Fast Feedback Technologies	129
159	Fiberbilt	180
**	H & E Computronics	Cover 2
106	Hewlett Packard	6-7
161	Indus-Tool	180
145	Interactive Microware, Inc.	160
186	Intra Computer	121
132	Kensington Microware	75
147	Lazerware	161
102	Leading Edge	Cover 4
153	Mark-Donn Associates	176
168	Mega-Byte	130
199	Micro Co-op	174
151	Microtek, Inc.	168-169
154	Navic Software	175
125	Nonagon Software	41
149	Omega Microware, Inc.	167
130	Orange Micro	66-67
137	PC Ware, Inc.	83
120	Personal Computer Accessories	32
192	Personal Tutor Assoc.	15
146	Practical Software, Ltd.	160
164	Pro/Pac	182
122	Prometheus Products, Inc.	34
191	Prometheus Products, Inc.	135
127	Protecto Enterprizes	45
200	Researchers In Speech Tech	150
113	Rhino Robots	18
197	Rising Sun Software	193
183	Robo Graphics	115
182	Rocky Mountain Software Sys	113
198	S. California Research Group	140
176	Segull Enterprises	76
144	SJB Distributors, Inc.	109
148	SMC Software Systems	162
124	Softlink	39
163	Softronics	181
204	Softsmith	144-145
133	Software Entertainment Co.	147
170	Solutions Inc.	186
171	Spectrum Software	203
166	Street Electronics Corp.	185
155	Synergetic Solutions	174
105	Synetix Systems, Inc.	5
139	Synetix, Inc.	152
103	3M Data Record Products Div.	1
131	Timecor	85
179	Titan Technologies, Inc.	89
123	Transend SSM	37
129	Transend SSM	49
143	Transtar	106
174	United Computer Corp.	22
190	Utilico Software	130
141	Videx, Inc.	93
143	Vivitar	106
138	Voice Machine Communications	151
187	VR Data	201
135	Vufax	149
195	Zoom Telephonics	157

PDQ II MAKES YOUR APPLE MICRO PERFORM LIKE A MINICOMPUTER

PRODUCTIVITY INCREASE

PDQ II will make your Apple II or IIe outperform itself. It will fly through tasks which used to take hours. It will perform multiple tasks at the same time. Most Apple software programs will exhibit a 200 to 2,000 percent increase in speed, without reprogramming.

NEXT GENERATION CAPABILITIES

That's not all—when you plug a PDQ II into your Apple, it will provide the advanced features of the 16/32 bit MC68000 microprocessor. Your Apple will be capable of utilizing sophisticated, "next generation" software products.

ONE SIMPLE SOLUTION

PDQ II eliminates the need for numerous add-ons — it includes an integrated high speed pseudo-disk, printer/communicatons buffer, memory extension capability and a powerful 16/32 bit processor. PDQ II consists of two system boards which simply plug inside your Apple, making your Micro think it's a Mini.

INSURANCE FOR THE FUTURE

PDQ II provides a powerful p-System run time environment, making it possible for your Apple to take advantage of many of the hundreds of high-quality p-System applications...the same applications available for Digital, IBM, HP, and other computers.

PDQ II technology makes your current investment in software and training more productive, while providing an almost unlimited growth path.

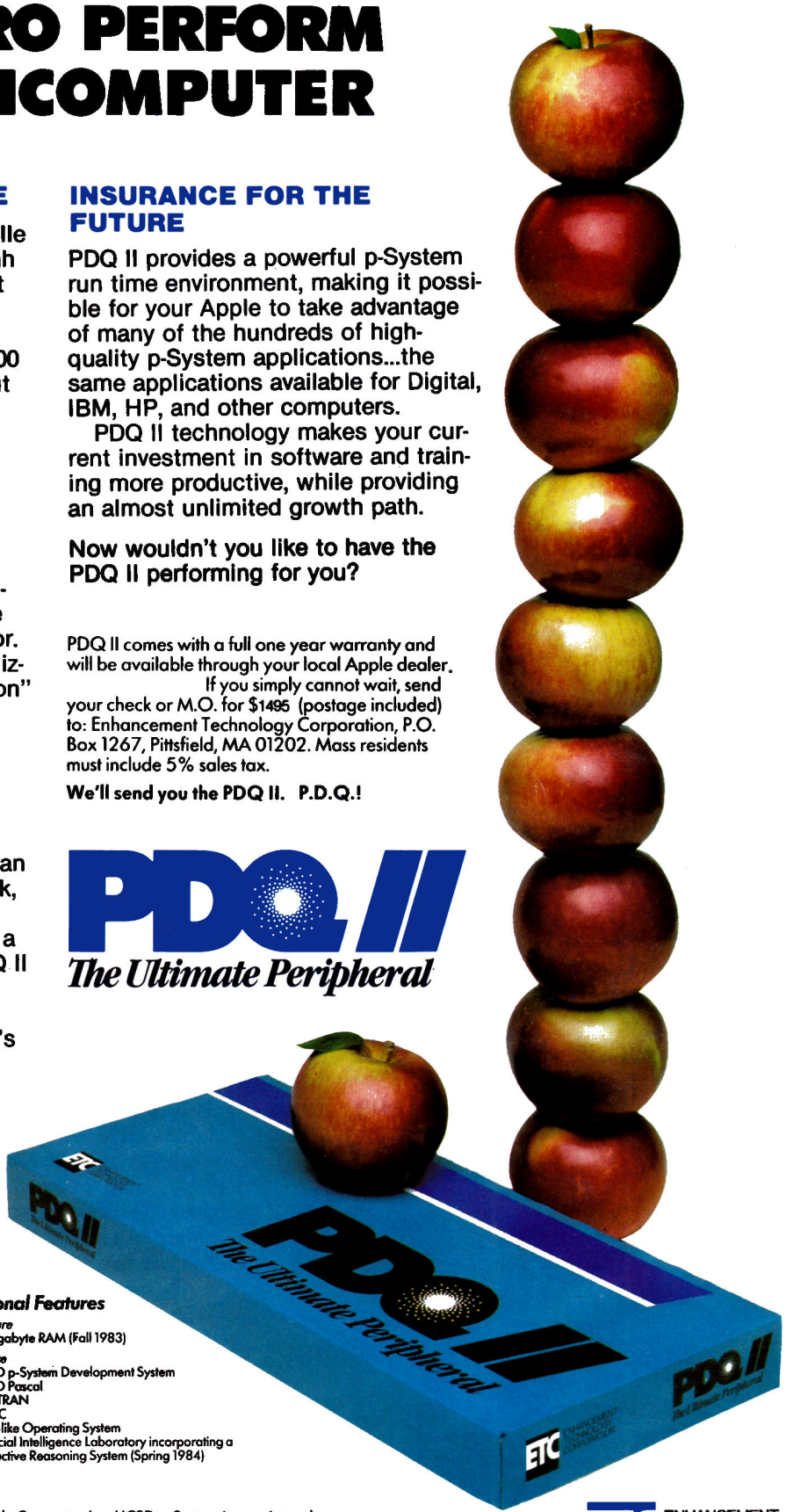
Now wouldn't you like to have the PDQ II performing for you?

PDQ II comes with a full one year warranty and will be available through your local Apple dealer.

If you simply cannot wait, send your check or M.O. for $1495 (postage included) to: Enhancement Technology Corporation, P.O. Box 1267, Pittsfield, MA 01202. Mass residents must include 5% sales tax.

We'll send you the PDQ II. P.D.Q.!

PDQ II
The Ultimate Peripheral



PDQ II SYSTEM SPECIFICATIONS

Standard Features

Microprocessor
- 16/32 bit MC68000
- 10 MHZ

User Memory
- 256K Bytes RAM

Integrated Functionality
- Multiple printer/communications buffering
- Pseudo-disk operations
- Track buffering (p-System)

ETC Software
- ETC MC68000 Assembler
- ETC MC68000 System Monitor
- ETC p-System (version IV) to Apple DOS Interface Utility

Languages and Software Systems Supported
- Applesoft BASIC Compatibility & Speed up
- Apple DOS 3.3
- UCSD p-System (version IV) Interpreter—executes UCSD Pascal, FORTRAN-77 and BASIC P-Code

Optional Features

Hardware
- 1 Megabyte RAM (Fall 1983)

Software
- UCSD p-System Development System
- UCSD Pascal
- FORTRAN
- BASIC
- Unix-like Operating System
- Artificial Intelligence Laboratory incorporating a Deductive Reasoning System (Spring 1984)

Apple II and Apple IIe are registered trademarks of Apple Computer, Inc. UCSD p-System is a registered trademark of the Regents of the University of California. Digital is a registered trademark of Digital Equipment Corporation. IBM is a registered trademark of International Business Machines Corporation. Osborne is a registered trademark of Osborne Computer Corporation.

ETC ENHANCEMENT TECHNOLOGY CORPORATION

CIRCLE 173 ON READER SERVICE CARD

HELENA ON CREATIVITY.



Name:	Helena Paoli
Age:	9
Home:	Belvedere, California
School:	Bel Aire
Hobbies:	Drawing, playing with dolls, reading, swimming
Ambition:	To be a fashion designer
Favorite software:	Creature Creator™ by DesignWare

"I like *Creature Creator* because it's kinda like drawing—only the pictures are alive! I can make different creatures, and then make them do lots of different dances.

"Lots of games—well, you just keep shooting or dodging things until you learn the pattern. Then you can beat it easily, and you get bored.

"*Creature Creator* lets me use my imagination. Now a couple of kids have it, so we get together to compare the creatures and monster dances we've made."

DESIGNWARE ON CREATIVITY. Children learn the most through creative problem solving. That's why *Creature Creator,* like so many DesignWare games, is an open-ended exercise that challenges and nourishes young minds. In a way that's a lot of fun.

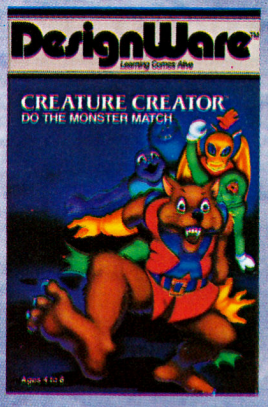
DesignWare programs go far beyond putting a sugar coating on rote drills; they encourage kids to draw on something they just happen to have an unlimited supply of—imagination!

SPELLING, MATH, OR LANGUAGE. Games like *Creature Creator, Spellicopter*™ and *Math Maze*™ inspire youngsters to tap into that fertile idea-field. To actively become part of the program, in effect creating "new" games as they go along. And all the while building up solid skills in the basics. And all the while having a lot of plain old fun.

DesignWare. We make learning come alive. On Apple II,® IBM® and Atari® computers.

Ask for DesignWare products at your local software retailer. Or call us at 800-572-7767 or 415-546-1866 and ask for our free catalog.

As Helena Paoli says, "Mom, Dad—look what I've created now!"



DesignWare™

LEARNING COMES ALIVE

Apple II is a registered trademark of Apple Computer, Inc.
IBM is a registered trademark of International Business Machines.
Atari is a registered trademark of Atari, Inc.

THE SECRETS OF PERFECT MEMORY: ONE AND ONE HALF EARTH DOLLARS

AT LAST: THE WHOLE TRUTH ABOUT FLOPPIES.

Amazing book reveals all!

How to keep from brainwashing your disk so it never loses it's memory.

How fingerprints can actually damage disks. Unretouched Kirlian photographs of UFO's (Unidentified Floppy Objects)! The incredible importance of making copies: the Department of Redundancy Department—and what goes on when it goes on! Powerful secret methods that scientists claim can actually prevent computer amnesia! All this, and much more . . .

In short, it's an 80-page plain-English, graphically stunning, pocket-sized definitive guide to the care and feeding of flexible disks.

For The Book, ask your nearest computer store that sells Elephant™ disks, and bring along one and one half earth dollars.

For the name of the store, ask us.

ELEPHANT MEMORY SYSTEMS® Marketed exclusively by Leading Edge Products, Inc., Information Systems and Supplies Division, 55 Providence Highway, Norwood, MA 02062. Call toll free 1-800-343-8413, In Massachusetts, call collect (617) 769-8150, Telex 951-624.



CIRCLE 102 ON READER SERVICE CARD