

Creative Computing®

the #1 magazine of computer applications and software

**Emphasis
On Languages**

- Osborne Executive
- Olympus C-100
Tape Recorder
- Simon's Basic
For Commodore
- Lisp For Atari
- Word Perfect
- Wordcraft
- Zorlof II
- Incredible Jack
- Think Tank
- Instant Recall
- Electric Webster
- Learning Games
- Zork III
- Games for Apple
Commodore 64
VIC 20
Panasonic JR-200

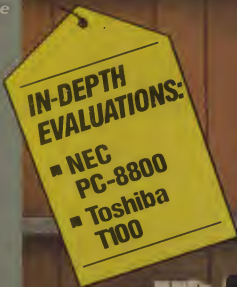
Ken Ustón:
Home Computers
And Wall Street

**The Graphics
Event Of The Year:**
Siggraph '83

CBasic Tutorial

**Assembly Language
Tutorial**

**Geosynchronous
Satellite Locator**



11*56

680516 5CU 8069098 1419 NOV83

TN 37211

**WHILE OTHER COMPUTER
COMPANIES ARE BUSY
SETTING NEW PRICES,
SPECTRAVIDEO IS BUSY
SETTING NEW STANDARDS.**



MSX™ and LOGO™: Two Spectravideo is in Personal

While price wars and confusion reign all around us, Spectravideo goes about its business, setting standards by which all other personal computers will soon be judged. MSX and LOGO are the two latest examples of how Spectravideo is rocking—and reshaping—the personal computer industry.

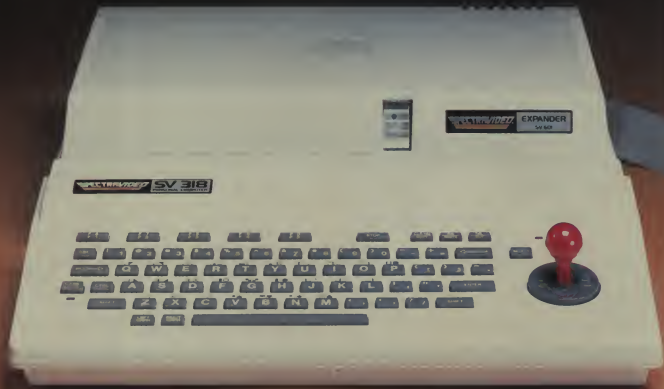
MSX AND LOGO.

It is now history that, on June 15 1983, Spectravideo, Inc. joined with most of Japan's largest electronics firms to launch MSX. The most far-reaching personal computer standard in history. MSX is the name given to a specific hardware/software configuration that makes product interchangeability possible. While Spectravideo is proud to participate in MSX, we are even prouder of this fact: It was our

own SV-318 computer that was used as a prototype for the MSX design! There are two important aspects to this.

First, all future MSX hardware—i.e., computers, peripherals, appliances—will be based on several key design elements of the SV-318. What does this mean to you, the consumer? A great deal, because when you buy an SV-318, you will not only be able to use all of Spectravideo's own software and hardware—you'll also be able to take advantage of all the remarkable new equipment that will be coming from other MSX participants.

In addition, the software aspect of MSX was largely inspired by the software built into the SV-318. From the outset, Spectravideo offered built-in Microsoft BASIC as its resident interpreter. Now, Microsoft



FOR UNDER \$300.
FOR KEYBOARD ONLY

32K ROM EXPANDABLE TO 96K 32K RAM EXPANDABLE TO 256K

more reasons why leading the way Computers.

also makes a LOGO program compatible with the SV-318. It was Spectravideo's Microsoft BASIC/LOGO that helped to make MSX possible.

Another standard that Spectravideo can take credit for is the built-in Joystick/Cursor Control. Built right into the SV console, this control is always at fingertips and is much easier and faster to use than external joysticks or conventional editing controls. Certain engineering elements that helped to make this built-in control possible have also been incorporated into MSX.

OTHER STANDARDS OF EXCELLENCE.

While these are the computer standardizations that Spectravideo helped to initiate, they by no means represent the whole SV-318 story. This remarkable computer has also established many standards of excellence that other personal computers now aspire to:

- **Built-in Super Extended Microsoft BASIC**—Makes the SV-318 the first truly programmable affordable computer!
- **Extraordinary Memory**—32K ROM expandable to 96K, and 32K RAM expandable (via bank switching) to an amazing 256K.
- **Unparalleled Expandability**—A full supporting system of 14 peripherals, including our new Colecovision™ Game Adapter, 7-Slot Expander Unit, Floppy Disk Drive, Data Cassette, Interface Cartridges, etc.
- **More Available Software**—Built-in CP/M compatibility gives you immediate access to over 3,000 existing software programs. Plus, you can utilize Spectravideo's own fine software library.
- **Advanced Graphics Capabilities**—The SV-318 offers 16 colors in high resolution, and more importantly, 32 programmable sprites that allow tremendous control of movable screen objects.
- **Many other fine features**—Such as Z80A Microprocessor with fast (3.6) internal clock, top-loading cartridge slot, 10 user-programmable special function keys, 3 sound channels (8 octaves per channel), low profile and attractive styling.

SPECTRAVIDEO™

Computer systems you'll grow into, not out of.

SPECTRA VIDEO, INC. 39 W. 37TH STREET NEW YORK, N.Y. 10018



Spectravideo's personal computers are supported by a full line of high-quality peripheral products



SV-903 DATA CASSETTE



SV-601 SUPER EXPANDER



SV-902 FLOPPY DISK DRIVE



SV-600 SERIES EXPANSION CARDS

CP/M is a trademark of Digital Research, Inc.

MSX, Microsoft LOGO, and Microsoft Extended BASIC is a trademark of Microsoft Corporation. Colecovision is a registered trademark of Coleco Industries.

CIRCLE 239 ON READER SERVICE CARD

IF THE LEMON IS A "LEMON"



IT'S WORTH \$2,500

We're betting it won't be, and so is Lloyds of London. A million dollar blanket coverage policy insures your equipment against the same dangers that any EPD product protects you against.

Let those unpredictable surges, spikes, glitches and other powerline problems occur (and they will).

A wide range of causes, from lightning to on-off switching of electrical motors can produce

these destructive surges that endanger both hardware and software. But EPD will be standing behind you with unsurpassed technology and up to \$2500.

The Lemon, The Lime, The Orange, The Peach, The Grizzly and The Hawk are all protection devices that promise to carry out their assigned tasks or we will repair or replace your equipment for up to \$2,500.

This is our guarantee and we're

betting on it. No matter what happens, you win.

Electrical Protection Devices

EPD

P.O. Box 67, Waltham, MA 02254
(617) 891-6602 • 1-800-343-1813

CIRCLE 260 ON READER SERVICE CARD

DON'T BUY IBM SOFTWARE. (UNTIL YOU READ THIS BOOK.)



The Book of IBM Software 1984

Edited by
Robert P. Welts, Ph.D. Sandra Rochowatwsky Michael F. Mellin, Ph.D.

THE BOOK OF IBM SOFTWARE 1984

Your IBM PC is only as good as the software that runs on it. So it makes sense to have the most detailed, up-to-date soft-

ware review book there is. Especially when it can save you hundreds of dollars and hours of frustration.

The Book Company, the established authority in

the field of software review guides, is famous for its consumer report styled evaluations.

Our latest publication, **The Book of IBM Software 1984**, evaluates IBM PC/XT and IBM compatible software for such applications as Accounting, Database Management, Spreadsheet Modeling, Telecommunications, Word Processing, Education, Entertainment, Utilities and much more.

You get incisive, impartial evaluations written by experts. What's more, programs are reviewed and graded according to Ease of Use, Reliability and Value for Money. Plus you get all the hard facts such as price, system requirements, etc.

Don't settle for simplistic listings of available programs. Get ALL the information you need. Buy **The Book of IBM Software 1984** today.

THE BIG BONUS

When you send in the coupon and order **The Book of IBM Software**



1984, we'll send along, free of charge, our popular book on financial modeling, **WHAT IF...? A Guide to Computer Modeling** (retail value \$19.95).

If you buy **The Book of IBM Software 1984** from your dealer, send us proof of purchase and we'll send you the financial modeling book. Free

TIPS ON BUYING SOFTWARE

Send for our free 64 page booklet, **Tips on Buying Software**. You'll learn how to evaluate your software needs and find out what's available. Plus much more.

THE BOOK COMPANY
A Division of Arrays, Inc.

Available at computer stores everywhere or directly from The Book Company.

Title	Qty	Price	Total
The Book of IBM Software 1984 (includes WHAT IF...? A Guide to Computer Modeling)		\$19.95	
Tips on Buying Software		N/C	

Mail to: THE BOOK COMPANY, Dept. CC, 11223 S. Hindry Avenue, Los Angeles, CA 90045. Or call toll free in California 800/441-2345, ext. 518. Outside California in the continental U.S. call 800/556-1234, ext. 518.

Name	
Address	
City	State Zip
<input type="checkbox"/> Visa <input type="checkbox"/> MasterCard <input type="checkbox"/> Check or Money Order accepted.	
Card #	Exp. Date
<input type="checkbox"/> Visa <input type="checkbox"/> MasterCard	Signature
Total Amount Enclosed \$	California residents add 6% sales tax
Postage will be paid by The Book Company.	

IBM PC/PC XT are registered trademarks of International Business Machines Corp.

IBM-A Division of Arrays, Inc.

In This Issue

Evaluations & Profiles

- 10 **Toshiba T100** Ahl
An exceptionally capable business system
- 28 **NEC PC-8801** Ahl
Superior graphics and an excellent Basic
- 48 **Osborne Executive** Arrants
A substantial improvement over its predecessor
- 55 **Olympus C-100 Microcassette Recorder** Hart
A pocket recorder for your pocket computer
- 60 **Simon's Basic** Onosko
A new standard for Commodore computers?
- 69 **Lisp For Atari** Litkowski
- 74 **WordPerfect** Beavers
Not quite perfect, but certainly superb
- 85 **Instant Recall** Murphy
A free-form filing system for Apple
- 88 **Wordcraft For Vic 20** Devlin
Word processing on a budget
- 96 **Incredible Jack and Think Tank** Arrants
Two unusual programs in Pascal
- 104 **Zork II** Johnson
Word processor extraordinaire
- 108 **Electric Webster** Robinson
Much more than a spelling checker
- 114 **Hi-Res Learning Games** Staples
- 120 **Apple Games** Linzmayer & Williams
The latest and greatest
- 134 **Arcade Action For The Commodore 64** Hurdidge
Crossfire, Frogger and Kickman
- 141 **Zork III** Townsend
A classic adventure
- 142 **Four Games For The Vic** Murphy & Williams
- 152 **Games For The Panasonic JR-200** Grosjean & Grosjean
Six educational and recreational packages

November, 1983
Volume 9, Number 11



Creative Computing (ISSN 0 097-8140) is published monthly by Ahl Computing, Inc., a subsidiary of Ziff-Davis Publishing Company. David Ahl, President; Elizabeth B. Staples, Vice President; Selwyn Taubman, Treasurer; Bertram A. Abrams, Secretary. P.O. Box 799-M Morristown, N.J. 07960. Second Class postage paid at New York, NY 10001 and at additional mailing offices.

Copyright ©1983 by Ahl Computing, Inc. All rights reserved.
Editorial offices located at 39 East Hanover Ave., Morris Plains, NJ 07950 Phone (201) 540-0445.
Domestic Subscriptions: 12 issues \$24.97; 24 issues \$43.97; 36 issues \$57.97.
POSTMASTER: send address changes to Creative Computing, P.O. Box 5214, Boulder, CO 80321. Call 800-631-8112 toll-free (in New Jersey call 201-540-0445) to order a subscription.

Articles

- 169 **Report From Siggraph** Onosko
The graphics event of the year
- 186 **Home Computers And Wall Street** Uston
Observations and predictions
- 196 **Personal Robots** McComb
How useful are they, really?
- 206 **The History Of CP/M** Hogan
From backyard to big time
- 214 **The CBasic Clinic** Libertine
First in a tutorial series
- 220 **Logic And Recursion** Heines, Briggs & Ennals
Basic vs. Pascal vs. Lisp vs. Prolog
- 228 **APL** Stanford
A language of pleasant surprises
- 234 **Assembly Language** Leedham
A coward's introduction
- 240 **The Joy Of Lex** Paikeday
A program for word lovers
- 248 **The Making Of A Small Computer** Ahl

Applications & Software

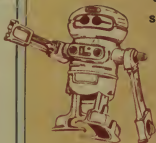
- 251 **Deciphering The "Protected" Code Of MBasic** Lesser
- 259 **Benchmark Comparison Test** Ahl
Evaluating speed and accuracy
- 264 **Plotting On The Model 100** Ahl
- 270 **The Satellites Are Out Tonight** Biresch
Setting up a private ground station
- 278 **Graphics Fun With The Epson HX-20** Munro
- 282 **Best Little Cat** Bergstrom
Creating an efficient disk cataloging program

Departments

- 6 **Input/Output** Readers
- 8 **Street Price Index** Ahl
- 290 **Print About Printers** Ahl
The Seikosha GP-100A in its many incarnations
- 296 **Outpost: Atari** Leyenberger
- 303 **IBM Images** Glinert-Cole
- 312 **Notebook Computing** Ahl
A new feature for notebook computer users
- 314 **Apple Cart** Arrants
- 320 **Commodore's Port** Anderson
- 324 **TRS-80 Strings** Gray
- 332 **Book Reviews** Gray, et al.

Staff

Founder/Editor-in-Chief	David H. Ahi
Editor	Elizabeth B. Staples
Managing Editor	Peter Fee
Associate Editors	John Anderson StephenARRANTS
Editor-at-Large	Ken Uston
Contributing Editors	Dale Archibald Charles Carpenter Will Fastle Susan Gilnart-Cole Danny Goodman Stephen B. Gray Glenn Hart Stephen Kimmel Brian Murphy Ted Nelson Peter Paycock Alvin Toffler
Staff Writer	Owen Linzmayr
Copy Editor	Sherrie Van Tyle
Editorial Assistants	Andrew Brill Laura Gibbons
Secretary	Diane Koncur
Art Director	Patrick Calkins
Assistant Art Director	Chris DeMills
Artists	Diana Negri Rudlo Eugene Bicknell Paul Krasner
Typesetting	Karen K. Brown
Advertising Director	Claude Sheer
Creative Computing Press	Laura Conboy
Operations Manager	Patricia Kennelly
Comptroller	Jennifer H. Shaler
Accounting	Joanne Saplo Alfred Nardi
Retail Marketing	Susan DeMark
Customer Service	Renee Cole Cross
Fulfillment	Frances Mikovich Rosemary Bender Linda Blank Pat Champion Elsie Graff Linda McCatharn Carol Vita Jim Zecchin Diane Moran Barbara Carnegie Lisa Dicklason Maurs Russell Donna Sittelfel Cheryl Schauble Valerie Gaddis
Shipping & Receiving	Ronald Antonaccio Strawvey Montgomery



Advertising Sales

Advertising Director
Claude Sheer
Creative Computing
Ziff-Davis Publishing Company
One Park Avenue
New York, NY 10016
(212) 725-3577

Advertising Coordinator
Ruth Darling
Creative Computing
Ziff-Davis Publishing Company
One Park Ave
New York, NY 10016
(212) 725-3446

Northern California, Northwest
Jeff Miller
Ziff-Davis Publishing Company
3030 Bridgeway Blvd
Sausalito, CA 94965
(415) 331-7133

Southern California, Southwest
Tom Whiteley
Ziff-Davis Publishing Company
3460 Wilshire Blvd
Los Angeles, CA 90010
(213) 367-2100

New England
CEL Associates, Inc
27 Adams Street
Braintree, MA 02164
(617) 646-9306

Midwest
Jeff Edman
William Bill Fairclough
The Patts Group
4761 W Touhy Ave
Lincolnwood, IL 60846
(312) 679-1100

Mid-Atlantic
Larry Levine
Ziff-Davis Publishing Company
One Park Ave
New York, NY 10016
(212) 725-7666

Southeast
Browning Publications
P O Box 61306
Atlanta, GA 30386
(404) 455-3430

Canada
The Patts Group
1623 Young St
Toronto, Ontario M4T 241
(416) 462-6286

Ziff Davis Consumer Computers & Electronics
Magazine Division
President: Larry Sporn
Vice President/
General Manager: Eileen G. Markowitz
Vice President Marketing: J. Scott Briggs
Vice President Circulation: Carole Mandel
Creative Director: Peter J. Blank

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, One Park Avenue, New York, New York 10016.

Where To Send It

All editorial material, including article submissions, press releases, and products for evaluation should be sent to:
Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07950

Correspondence regarding other Creative Computing products and publications should also be sent to the Morris Plains address.

Correspondence related to advertising, including ad copy, questions on billing, and requests for rates, should be sent to:

Advertising Department
Creative Computing
Ziff-Davis Publishing Co.
One Park Ave.
New York, NY 10016

Correspondence regarding subscriptions, including orders, changes of address, and problems should be sent to:

Creative Computing
P.O. Box 5214
Boulder, CO 80321

Your help in choosing the correct address for your correspondence is appreciated. An incorrectly addressed letter or package can take as long as several weeks to reach its proper destination.

Subscriptions

All subscription orders and other correspondence related to subscriptions should be addressed to:

Creative Computing
P.O. Box 5214
Boulder, Colorado 80321.

Foreign subscriptions must be accompanied by payment in U.S. currency.

Subscription prices:

U.S.	Canada	Foreign
1 year \$24.97	1 year 29.97	1 year 34.97
2 years 43.97	2 years 53.97	2 years 63.97
3 years 57.97	3 years 72.97	3 years 67.97

Airmail delivery on foreign subscriptions is available for a one-year period only at \$75.00 additional for mail to Asia and Australia, and \$50.00 additional for all other foreign.

Subscribers in the United Kingdom may send payment in sterling to:

Hazel Gordon
10 Bishops Way
Sutton Coldfield
West Midlands B74 4XU

Please allow at least eight weeks for change of address, include old address as well as new—enclosing if possible an address label from a recent issue.

Attention Authors

Creative Computing will not be responsible for the return of unsolicited manuscripts, cassettes, floppy disks, program listings, etc. not submitted with a self-addressed, stamped envelope.

This One Decision Saved our Business and Grossed over \$1,000,000. in Sales

In 1979, our recreational manufacturing business was booming. And we had developed a new product that looked like a real winner. The new product was extremely important, in that it appeared to be the answer to a seasonality problem associated with our other product lines.

By early summer, our order book was bulging. It really looked as if our off-season sales and production problems were over. Then just as quickly the roof fell in. Gas shortages devastated the recreational vehicle market overnight. And our order book for over two million dollars worth of the new product disintegrated. Faced with a fall and winter of virtually no sales, many thousands of dollars of unneeded parts and excess production staff, I had no choice but to shut down the production lines. And if a solution to our problem couldn't be found, the business itself was in jeopardy.

A life saving decision

I spent many sleepless nights trying to come up with a solution to this nightmarish situation. Then I remembered a course I had taken in decision analysis. I spent the rest of that night reviewing course material and other books I had bought on the subject. The next day, I called an emergency meeting. Using the decision making techniques I had learned, we spent the rest of the week searching for and analyzing potential solutions. The net result was that not only was the company pulled back from the brink of destruction, but we added over \$1,000,000.00 in gross sales during that off-season.

A way of life

From that point on, almost every critical decision (and there were many) regarding new products, marketing channels, pricing, advertising, production equipment, engineering projects, received this same type of analysis. Although the process was very time consuming and clumsy, because it had to be done by hand, our decisions were much improved. And there were some real benefits that we had not anticipated.

1. Our understanding of each problem was greatly increased.
2. We uncovered opportunities that we would not have thought of in any other way.
3. Our decisions were documented, preventing us from slipping off the selected path or 'reshaping' the same things over and over.
4. Consensus became easier because we were forced to focus and resolve each part of the problem, one piece at a time.

The birth of Decision-Analyst™

Decision-Analyst was created because the process of evaluating complex decisions with multiple alternatives and many criteria is very tedious and time-consuming if you do it on paper. And doing it in your head is virtually impossible.

Any complex decision usually requires multiple revisions to criteria, alternatives, weights and values assigned to them. If done

manually, the ordeal of rewriting, recalculating and redocumenting tends to discourage revisions, thus producing poor results.

Decision-Analyst overcomes these problems by asking for the minimum input possible from you, in the correct sequence. It leads you step by step through the decision making process. Then does all the necessary calculations and produces polished reports without any further effort. And all of your input is stored on your disk so that revisions and updates can be made easily at any time.

Comprehensive but easy to use

Decision-Analyst is probably the easiest program you'll ever use. You can literally learn to operate the program using only the 'help' screens. But it comes with a thoroughly indexed manual which includes many pages of examples plus a step by step guide to the decision making process.

And Decision-Analyst is no fly-weight. It uses over 100,000 bytes of fast compiled code and a 40,000 character help file. The program is extremely 'bullet proof' and does all the work...you do the thinking. And there is no danger of missing a critical step because your analysis is guided through each of the eight menu-driven sections.

Endless opportunity for use

If you're saying to yourself that you really don't have any earth shattering applications for

Decision-Analyst... then consider this. If you're in business, chances are that the most important thing you do is make decisions.

Decision-Analyst can help you select key personnel, decide on new machinery or equipment, prioritize major projects and allocate resources, choose a new product or a better price strategy, select new offices or plant locations, select the most profitable marketing channel or the best piece of computer hardware or software. Use it to analyse any decision which has more than one viable alternative.

In your personal life, it can help you choose the best job, select the right business, career or franchise, determine the best field of investment or even the right home, boat or car. In fact, improving your decisions is probably the most rewarding thing you can do.

Let us help you make a \$139⁰⁰ decision

If there's a chance that Decision-Analyst could help you improve even one decision, would it pay for itself? Chances are it would. In fact, it's likely that it could save you the price many times over!

So why not take advantage of this special \$139.00 introductory price (plus \$5.00 shipping) by calling us today? We'll even refund your money, within 30 days, if you're not completely satisfied.

Available for virtually every make of micro-computer using CP/M, CP/M-86, MS-DOS or PC-DOS operating system. Requires an 80 column screen and an 80 column printer for reports.



Executive Software Inc.

Call Collect
(705)722-3373

DA6

U.S.A.
Executive Software Inc.
Dept # 1040
Two North State St.
Dover, Delaware
19901

Canada
Executive Software Inc.
Dept # 1040
14 Green Pine Ave.
Barrie, Ontario, Canada
L4M 4S5

Great Britain & Europe
Microcomputer Products
International Ltd
Central House
Cambridge Rd. Barking
Essex, England IG11 8NT

* Decision Analyst is a Trademark of Executive Software Inc.
* MS-DOS is a Registered Trademark of Microsoft Corp * CP/M * CP/M-86 Registered Trademarks of Digital Research Inc. * PC-DOS is a Registered Trademark of IBM

Input/Output

Summing It Up

Dear Editor:

Many programming texts challenge programmers to write a program for the Fibonacci sequence 1 1 2 3 5 8 13 21 ... in which each number in the sequence is the sum of the two immediately preceding numbers. I have come across this exercise several times, but have never seen in print an actual program to accomplish this task.

For interested readers I submit the program in Listing 1.

The upper limit of Y can be the limit of the range of your computer. I would appreciate hearing from readers about other approaches.

Konrad H. Kossmann
39 Chatham Rd.
Columbus, OH 43214

Your program is overkill for a simple problem. The program can be written in three lines (see Listing 2). A somewhat more elegant approach is shown in Listing 3. —DHA

Listing 1.

```
10 FOR Y=1 TO 1000:Z=X+Y
20 PRINT Y;
30 T=Y:Y=Z:Z=X:X=T
40 T=Z:Z=Y:Y=T
50 T=Z:Z=X:X=T
60 NEXT
```

Listing 2.

```
10 X=1:Y=1:PRINT 1;1;
20 Z=X+Y:PRINT Z;
30 X=Y:Y=Z:GOTO 20
```

Listing 3.

```
10 DIM N(30):PRINT 1;1;
20 N(1)=1:N(2)=1
30 FOR I=3 TO 30
40 N(I)=N(I-1)+N(I-2)
50 PRINT N(I);
60 NEXT
```

Price Fix

Dear Editor:

The New Product listing you ran on our DTC 380Z in your July 1983 issue (p. 230) quoted an incorrect price (\$1199).

We have added a number of new features and capabilities to the machine and the suggested list price of the 380Z has been set at \$1359.

Roy M. Worthington
President
Data Terminals & Communications
590 Division St.
Campbell, CA 95008

How About Meese?

Dear Editor:

Re: Your comments concerning *mouses* vs. *mice*, "dateline: tomorrow" column, *Creative Computing*, July, 1983.

During much of the nineteenth century railroads were the growth industry that data processing is today. Some time before 1840 an unknown railroad freight train conductor decided that he could better inspect his train from the roof of the last box car. Being industrious, probably as a result of a less than well padded bottom, he installed a chair on that final car and called the invention a *caboose*.

A serious problem arose when a second conductor similarly modified a box car. What are two of these things called? Some railroads call them *caboosees*, others *cabesees*, still others *caboose* (singular and plural being the same). Webster, at least in my version, is silent. Only the singular is shown.

The then "Standard Railroad of the World," the Pennsylvania, solved the problem neatly by referring to their rear end conductor's office as a "cabin car." Now, that's a phrase you can't mess up. Unfortunately, other railroads didn't get the message and the problem of more than one caboose exists today. But it won't tomorrow—the Federal Railroad Administration has decreed that railroads can, through complicated negotiations, rid themselves of that little red (or blue, or orange, or yellow, or green, or whatever) thing at the end of the train and move the conductor to the engine(s). No problem with plural there.

So what's the message? History tends to repeat itself. The new growth industry, computers, seems to have a mouse by the tail. Let's hope it does not take some future FCC, FTC or XYZ to decide the issue. Let's hope some "Standard Computer Company of the World" comes forth with a better name, that all will accept.

Carl D. Bossard
Superintendent Hazardous Materials
Illinois Central Gulf Railroad Company
Chicago, IL

ELAN™ From TECMAR

The Most Powerful Local Area Network for the IBM PC

- Networking using Ethernet protocol
- Telephone support — autodial/autoanswer modem
- Voice recognition of commands and voice response
- Voice mail and messages
- Dictating system using Pearicorder X-02 or XR from any telephone in the U.S.
- Complete software for written/voice mail, time management and audio/visual clock, calendar, and calculator functions
- Three ELAN Systems; the Secretary, the Manager and the Executive



The Executive

ELAN is designed to meet your total communications needs, including computer-to-computer (i.e., networking), person-to-computer, and person-to-person communication requirements for data and voice. The industry-standard high speed Ethernet network protocol is employed in ELAN, permitting many IBM Personal Computers to be linked together by ordinary thin coaxial cable. In addition to his own computer, an ELAN system user can access the other devices attached to the cable — such as printers and large disks.

All versions of ELAN include an Ethernet Interface with equipment to convert voice into data and back again. This enables the user to give and receive spoken messages from any location as well as store them for later use. In addition, with the Executive version, all ELAN software packages can be operated through verbal commands, through the telephone keypad or through the IBM PC keyboard. The computer can then respond verbally, either by telephone or 'in person'.

*ELAN (Extended Local Area Network) formerly ComNet



The Manager

The MANAGER system adds a modem for telephone data communications and by adding a separate handset, will permit voice communications. The modem enables the MANAGER to receive unattended voice and data from any telephone in the U.S. Also, the MANAGER can accept commands through decoding the tones from the telephone keypad.

The EXECUTIVE is the most complete implementation of ELAN, adding computer recognition of spoken commands. An executive might phone the PC to leave or retrieve messages or request specific information. The PC, in a spoken voice, can request a user's access code or prompt the user for a command. The executive can respond either by pushing buttons on the telephone, or by actually speaking back to the computer.

The SECRETARY is the basic ELAN system. It includes an Ethernet interface and all other ELAN features except modem and voice recognition.

Whether you choose the EXECUTIVE, MANAGER or SECRETARY, an ELAN system will improve your productivity and expand the versatility of your IBM PC.



The Secretary

TECMAR 6225 Cochran Road, Cleveland, Ohio 44139, Phone (216) 349-0600, Telex 466692

CIRCLE 253 ON READER SERVICE CARD

Street Price Index

The Creative Computing Street Price Index is an on-going monitor of the average price levels of selected computers, peripherals, video games and related accessories in the real-world marketplace. The list price is the price set by the manufacturer for the product when it was first announced, and is not necessarily the current manufacturer list price.

As time goes on, this Index will be presented in graphical form, but until there are six or seven data points, a graph would be of little value. This Index is not intended to be a purchasing guide. Frequently, the

lowest price for a computer will be offered by a vendor who is going out of business or closing out that particular item. Unless you are convinced you will never need service or are skillful enough to repair an unhealthy computer yourself, you would probably not want to buy a machine from such an outlet.

Furthermore, most of our price monitoring is done in major metropolitan areas on the two coasts. Prices outside of large cities and in the central part of the country are usually higher.

Computer	Orig List Price	Sept 1983			Month Ago	Year Ago
		High	Low	Average		
Apple IIe (64K, 40-col)	1395	1395	1149	1260	1285	n/a
Atari 400, 16K	559	259	69(1)	164	164	352
Atari 800, 48K	999	549	289(1)	412	437	863
Atari 1200, 64K	899	679	349(1)	514	544	n/a
Commodore Vic-20	297	149	69	109	114	274
Commodore 64	599	399	189(1)	294	299	n/a
Osborne 1, 64K	1795	1795	1075	1440	1492	1895
Radio Shack:						
Color Comp, 16K	399	199	199	199	249	399
Model 4, 64K	999	999	999	999	n/a	n/a
TI 99/4A, 16K	635	269	84(1)	167	169	299
Timex 1000, 2K	99	65	29	43	43	149
Average home computer (up to 16K)	398	208	91	145	151	295
<u>Line Printer</u>						
Epson FX-80	699	695	535	615	630	n/a
Epson MX-80FT	745	505	395	450	450	567
NEC PC-8023A	795	499	399	449	449	599
Okidata 82A	799	459	380	420	420	549
Okidata 92	699	599	489	544	544	n/a
Star Gemini 10	449	399	295	357	359	n/a
Average 80-col dot matrix printer	697	526	415	470	473	572
<u>Video Games</u>						
Atari 2600	199	99	69(1)	84	84	149
Atari 5200	269	200	155	178	178	n/a
Colecovision	199	189	135	162	162	n/a
Intellivision II	199	150	79(1)	115	115	189
Average video game	216	145	109	127	127	169
<u>Dynamic Memory Chips (200 ns, quantity 8)</u>						
16K x 1 bit (4116)	...	1.95	1.50	1.73	...	Lowest..
64K x 1 bit (4164)	...	7.49	5.95	6.72	1.50	1.56
					...	n/a

(1) Includes a manufacturer rebate or equivalent



BUY A BANANA.™ SAVE A BUNCH.

Meet the Banana,™ the very tough, versatile, portable, and reliable dot-matrix printer from Gorilla.™

At \$249.95 retail it's an ideal and inexpensive companion for personal computers like Apple® (or Apple™ look-alikes™ such as Franklin® or Albert®), TI, Commodore®, TRS-80®, Kaypro®, Timex®, Osborne®, etc.

After that, it's merely comparable to other printers that can cost up to three times as much: 10" carriages (to handle standard 9½" paper), 80 columns, graphics capability, 10 characters per inch (expandable to 5 cpi) draft-quality print (for perfectly acceptable form letters, data processing,

business reports, etc.) tractor feed (for precise alignment and quick loading), parallel or serial interface (take your pick), self-inking ribbon cassette (for long life and easy installation), 10 portable pounds in weight, and compatibility with so many of the most popular personal computers on the market.

Plus its printhead features a unique single-hammer design that eliminates a lot of moving parts, to eliminate a lot of annoying repairs.

That's the Banana: silly name, serious service. It's everything the expensive dot-matrix printers are . . .

Except expensive.

CIRCLE 188 ON READER SERVICE CARD



Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021
Toll-free: 1-800-343-6833; In Massachusetts (617) 828-8150. Telex 951-624.

Toshiba T100



T100 CPU/keyboard unit has 89 keys, power switch, and RAM pack memory compartment on top.

The Toshiba T100 is a small business computer that boasts an element of portability for the executive on the move. In its normal desktop configuration, the T100 consists of a CPU/keyboard unit, disk drive unit, and monitor. For travelling, the CPU/keyboard unit

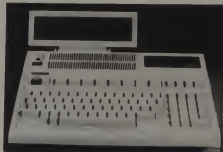
David H. Ahl

tucks into a hardside attache case along with a 40-character by 8-line LCD display, and optional Lexicon direct/acoustic modem.

This type of portability is a cross between the total portability of the TRS-80 Model 100 and the carry-around portability of the Osborne. The T100 in its carrying case with LCD display and coupler weighs in at a hefty 21 pounds. By way of comparison, a Model 100 weighs around one pound, and an Osborne around 28. Unlike the Model 100, the T100 is not battery powered, but it does have memory cartridges which have their own self-contained batteries. When it is being carted about, these memory cartridges take the place of disk drives, although the capacity is considerably less.



T100 computer system, Toshiba P1350 printer, and software packages.



LCD display (8 lines x 40 characters) attaches to the back of the CPU/keyboard unit.



To err is human. To forgive is SAVVY.™

With SAVVY™ you can misspell, mistype or rephrase and still command your computer.

If you're tired of inflexible personal software, it's time to get SAVVY.

SAVVY teaches your computer to adapt to you. It's part hardware, part software, and part remarkable. It lets your computer see things as you see them. Do things the way you like to do them. It even allows for those unavoidable entry errors that we all sometimes make.

What's the secret? SAVVY can recognize patterns (other software products can only recognize exact duplicates) and you can teach it to recognize your language. That means it will carry out your commands instead of flashing "error" messages.

Whether you want SAVVY to teach yourself programming, to run your business applications or to develop drills for students, there's a version of SAVVY to suit your needs and your budget. It's a database system, file manager, natural language programmer, and an operating system, all in one. SAVVY operates on Apple II Plus™ and IIe™ computers as well as Apple-compatibles.

Call 800-551-5199 to arrange for a demonstration at your local dealer.

SAVVY is a product of Excalibur Technologies Corporation, 800 Rio Grande Boulevard N.W., Mercado 21, Albuquerque, New Mexico 87104.



SAVVY™

A product of **Excalibur**
TECHNOLOGIES CORPORATION

CIRCLE 156 ON READER SERVICE CARD

SAVVY™ is a trademark of Excalibur Technologies Corp. Apple II Plus & IIe are registered trademarks of Apple Computer Inc.

CPU/Keyboard Unit

The T100 is based on an 8-bit Z80A running at 4 MHz. In our benchmark test (in Basic), the T100 was the fastest of the twenty 8-bit machines we have tested to date. It ran the benchmark program in 1:09 minutes compared to most other Z80 computers which took around 2 minutes.

The T100 is equipped with 64K of RAM, 16K of video memory, and 32K of ROM. In addition, 16K and 32K RAM and ROM packs can be plugged into two slots on the upper right corner of the unit. These ROM and RAM packs are not in addition to main memory; rather, they are like disk drives. ROM packs contain certain application programs, and RAM packs can be used to store user programs.



ROM and RAM plug into two slots at the top right of the CPU/keyboard unit.

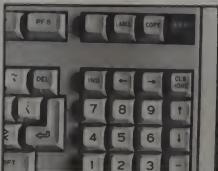
The CPU/keyboard unit measures 16.5" x 11" and slants from a height of 4" at the rear to 1.5" in front. The keyboard has 89 keys divided into a standard keyboard, numeric keypad, and top row of function keys.

The layout of the keyboard is refreshingly standard—both shift keys are where they ought to be, and "extra" symbol keys are to the right of the alphabetic keys.

Three keys that seem to wander around on the keyboards of different manufacturers are the caret (up arrow), apostrophe, and ampersand. On the T100, we find the caret as a shifted 6, the ampersand as a shifted 7, and apostrophe with the quote key to the right of the middle row.

The numeric keypad, surprisingly, does not have the four arithmetic operations adjacent. Instead we find four cursor movement keys and a CLS/HOME key.

The top row of keys includes a green GRAPH key; holding this down while pressing another key on the keyboard produces a graphics symbol. For example, GRAPH plus 2 produces a heart symbol on the display. We would rather



Cursor control keys are adjacent to the numeric keypad.

have had the GRAPH key toggle graphics mode on and off; instead it must be pressed for each character.

Also in the top row are BREAK, ESC, COPY (causes current screen display to be copied to the printer), and LABEL (displays the meanings of the function keys on the 25th line of the display). In graphics mode, the copy function is designed to work with the Toshiba 1010 printer. On other printers, even the top-of-the-line Toshiba 1350, it produces gibberish.

Eight programmable function keys cause particular functions to be executed without pressing RETURN. These keys are assigned different functions in different software packages, or may be user-defined in Basic.

The computer normally operates in overstrike mode, i.e., typing over a character replaces it with a new one. The INSERT key opens up a space to type in an additional character. Unlike some other computers, the T100 does not stay in insert mode; the key must be pressed for each character inserted.

The DELETE key operates in a somewhat unconventional manner. Instead of deleting the character over the cursor, the character to the left of the cursor is deleted. This is very strange, and not at all what one would naturally expect.

However, for normal typing of text and programs, the keyboard has an excellent tactile feel; there is absolutely no keybounce; and it is very pleasant to use. All keys repeat when held down for more than one second; individual keystrokes are silent, but automatic repeats



Rear of CPU/keyboard unit has reset button, volume control, seven I/O connectors, and AC power connector.

creative computing

HARDWARE PROFILE

Product: Toshiba T100 Computer System

Type: Portable small business system

CPU: 8-bit Z80A, 4 MHz

RAM: 64K (optional 16K and 32K RAM packs)

ROM: 32K

Keyboard: 89 full-stroke keys

Text resolution: 80 chars x 25 lines

Graphics resolution: Four modes, up to 640 x 200 pixels

Number of colors: 8

Sound capability: 1 channel, 5 octaves

Ports: RS-232 serial, Centronics parallel printer, cassette

Dimensions: 16.5" x 11" x 4"

Documentation: User's Guide, Programmer's Reference Manual, One manual with each applications software package.

Summary: Outstanding graphics, excellent version of Microsoft Basic, nice choice of applications software. Portable with addition of battery RAM pack, LCD display, and case. Comes with CP/M 2.2, Basic and nine applications packages.

Price: CPU, dual disk drives, monochrome display, software \$1995.

Manufacturer: Toshiba America, Inc. Information Systems Division 2441 Michelle Dr. Tustin, CA 92680

are accompanied by a click sound in the built-in speaker.

Another delightful feature is that the power switch is on the left top of the unit along with a green LED which indicates if it is on—no more reaching around the back to search for an elusive rocker switch.

On the rear of the unit are eight connectors and two controls. A reset pushbutton is on the lower right; this is rarely needed except when loading a new



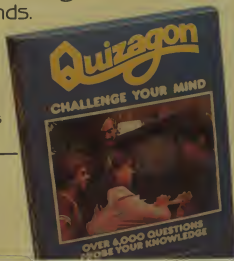
Using Your Brain Is Fun When You're Playing Quizagon!

Knowledge, strategy, luck...all are part of mastering this exciting, new type of game!

Over 6,000 questions explore and expand what you know about science, sports, entertainment and potpourri.

Available for the IBM PC, Apple II, Commodore 64, and VIC-20 computers
For the name of your nearest dealer call 800-328-1223

It's a family game. It's a party game. It's a game for people who want to challenge their minds.



counterpoint software, inc.
4005 west sixty-fifth street • minneapolis, mn 55435
(612) 926-7888 • (800) 328-1223

Toshiba T-100, continued...

disk operating system. A recessed volume control adjusts the volume of the internal speaker.

Two identical 7-pin DIN sockets provide I/O to a cassette recorder and RGB color monitor. This seems to be the emerging standard for non-IBM compatible machines, which is too bad. We have already seen two people try to plug cassette cables into a monitor. Fortunately, the T100 monitor cable terminates in a unique rectangular 8-pin connector at the monitor end, but this is not the case on all machines.

The cassette interface operates at 1600 bps, a moderately high speed. However, we can't imagine using a cassette for storage on a business-oriented computer in this price range, so we did not test this capability.

A small 8-pin connector connects to the LCD display, and an RCA phono jack connects to a B/W monitor. No RF output is provided, so the machine cannot be used with a standard TV set.

The T100 has two RS-232 connectors: a male for a Centronics parallel printer, and a female for a modem, plotter or other RS-232 serial device.

A D50 female connector is provided to connect the disk drives to the CPU/keyboard unit.

High-Resolution Display

Two displays are available for the T100, a monochrome green screen unit and an RGB color display. Much of the software is designed to take advantage of a color display, so it is this one which we tested with the computer.

The RGB display has only two user-accessible controls: vertical hold on the rear (adjust it once and forget it) and brightness on the front. A pushbutton power switch turns the unit on; a green LED indicates when it is on—a nice touch.

Eight well-defined colors can be displayed simultaneously in any of the three display modes: text, low-resolution graphics, and high-resolution graphics.

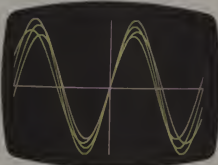
In text (or character) mode, the display can be set to either 80 characters by 25 lines or 36 characters by 24 lines. Both modes use an 8 × 8 dot representation for characters. The bottom-most dot is used for interline spacing as well as for lowercase descenders; this leads to less legibility than one might desire.

In low-resolution graphics mode, two resolutions are also available: 160 × 100 pixels or 72 × 96 pixels. In high-resolution graphics mode, pixel resolution is either an astonishing 640 × 200 or 288 × 192.

Unfortunately, the manual is not clear on how to obtain the two different resolutions within each graphics mode.



High resolution screen displays 600 x 240 pixels in eight colors.



Simple plotting program produces high resolution output.

We found by trial and error that in Basic the WIDTH command would do it, while in CP/M, specifying MONITOR selected the higher resolution and TV selected the lower one.

To produce color graphics, it is somewhat easier to use the low-resolution mode as color can be directly specified in commands such as LINE, PSET, and CIRCLE. In high-resolution mode, color must be specified with the COLOR command which is somewhat more cumbersome to use.

The PA7161U RGB monitor is mounted on a base which permits it to swivel 45 degrees to the right or left and tilt from 5 degrees forward to about 20 degrees back. This makes it easy to adjust for nearly any mounting position or room condition. While a tabletop position is recommended, we put ours on top of the disk unit for a significant saving of desk space.

Disk Drives

The T100 comes with a floppy disk drive unit measuring a sizeable 16.5" × 10.5" × 5". It contains two 5¼" double density, double sided drives capable of storing 280K per disk (formatted). Thus, the dual drives provide about 560K of on-line storage capacity.

The power switch for the disk drives is on the right side at the rear, although a green LED on the front indicates the drives have power, as does the whine of the muffin fan in the unit.

A red LED on each drive indicates when input or output is taking place, but is not always lit when the drive is spinning. Thus, it is probably wise to wait a few seconds after the LED goes out before removing a disk from the drive.

Portability Kit

For portable operation, the T100 requires a hardside attach case, LCD display (8 lines by 40 characters), and one or more RAM packs. Optionally available is a Lexicon LEX-12 modem. The T100 CPU, display, RAM packs, and modem all fit into the case.

In operation, the T100 and modem require 110 volts, so "portable" really means "carry around" and not "operates anywhere."

The LCD display is the same as that found on the TRS-80 Model 100. This one, however, clamps to the rear of the T100 and the entire unit tilts back and forth for legibility under different lighting conditions. This is not as convenient as the adjustment on the Model 100, but it is satisfactory.

IMPROVE YOUR LIFE WHILE WATCHING TV?

Overcome annoying habits...build new and positive ones!

Eight **Expando-Vision™** subliminal programs are available to help you:

1. **Weight control/exercise**
2. **Stop smoking/general health**
3. **Stress control/positive thinking**
4. **Stop drinking/responsibility**
5. **Athletic confidence/golf**
6. **Study habits/memory power**
7. **Career/success motivation**
8. **Sexual confidence**

Expando-Vision™ feeds **positive subliminal messages to your sub-conscious** while you watch regular TV programs. Flashed at 1/30 of a second, the messages occur too fast for your eye to see, but your sub-conscious uses that information to **reinforce your will to succeed**. Subliminal messaging has been shown effective in over 20 years of clinical and university research.

It is legal. The FCC limits commercial subliminal messages—but with **Expando-Vision**, you are personally at the controls in the privacy of your home. You can view the messages in slow motion to see exactly what they are.

It strengthens your will, but, as with any type of positive learning, **Expando-Vision** doesn't work unless you are motivated. **Expando-Vision** programs are designed to provide positive reinforcement.



Computer Hookup

To use the system you need an inexpensive home computer (VIC 20,[®] Commodore 64,[®] Atan 400[®] or Atan 800[®]). You need the **Expando-Vision** Interfacing Device...\$89.95 (a one-time purchase that attaches easily to your computer) and you need **Expando-Vision** programs. \$39.95 each. (Add \$3.00 shipping and handling. Mich. residents add 4% sales tax.)

Credit Card Orders Call Toll Free 1-800-543-7500 Operator 828.

Tell us which program(s) you would like and charge your purchase to Visa, MasterCard, American Express or Diner's Club. Or request **free brochure**. Please use coupon if paying by check or money order. Allow 4 to 6 weeks for delivery.

Full cost refund if not completely satisfied within 30 days of receipt.

Stimutech, Inc., 110 Hill Park
Dept. 301 B, Farming M, 48031

Name _____

Address _____

City _____

Phone _____

Signature _____

Send me Subliminal Program Number(s)

1/1 2/2 3/3 4/4 5/5 6/6 7/7 8/8

④ \$9.95 ea. Plus I/Interface Device at \$89.95

ea. Add \$3 shipping & handling. Michigan

residents add 4% sales tax. **TOTAL PRICE**

\$_____ Enclosed is check or money order

Computer Type: VIC 20 (1) Commodore 64

Atan 400 800 Specify: Cart (1) Disk

(1) Tape (1) will use with cable, transmitting on

Ch. 2 (3) 4 (1) Other Send (1) Divider info

(1) FREE brochure (1) Enclosed is \$3 for System

Manual only

Dealer inquires, orders call 517 332-7717

NOTE TO BUYERS: Owners of VIC 20[®] and Commodore 64[®] Computers can view **Expando-Vision™** with TV signals from a TV antenna (Ch. 3 or 4 only), cable TV (transmission Ch. 3 or 4) or from any video cassette or video disk player. Atan 400 or 800 owners can use **Expando-Vision** with TV antenna (Ch. 3 or 4 only), Cable TV (transmission Ch. 2 or 4) or any video cassette or disk player. **Expando-Vision** computers will other home computers use a video cassette player and video disk player.



EXPANDO-VISION
Straight To The Mind's Eye

CIRCLE 22 ON READER SERVICE CARD

Toshiba T-100, continued...

When the computer is powered up, it automatically "knows" which display is connected and uses it. The monitor and LCD display cannot be used simultaneously; if both are connected, gibberish appears on both screens.

The 300-baud modem is supplied by Lexicon Corp., and can be used directly connected to a modular telephone jack or as an acoustic coupler. The modem requires an external low voltage power supply (included).

RAM packs are available in either 16K or 32K capacities. Two cartridges can plug in simultaneously. In operation, these RAM packs are considered to be disk drive 5 and standard disk commands are used to save and retrieve data and programs.

We had a preliminary T100 Portability Software Kit which consisted of four programs: Memopad (a memo writer similar to the Model 100 Text program), Smalterm (for remote communications), Expense/Accounter (for reporting expense account data), and LCD/LCD3D (demonstration programs for the LCD display).

System Software

The basic T100 CPU has T-Basic resident in ROM. A disk-based system comes with two systems disks, one

containing T-Disk Basic and the other with CP/M 2.2 and CBasic 2. Both disks also contain six or seven utility programs.

The resident T-Basic is actually Microsoft Basic and we have no idea why the manual does not refer to it as such. When the T100 is powered up, it goes through a six-second self-check fol-

Why are only 29,066 bytes free in a 64K machine with Basic in ROM?

lowed by a screen query, "How many files (0 to 15)?" Upon answering, the screen displays:

Toshiba T-Basic
(c) 1982 by Microsoft
29066 Bytes free

Why are only 29,066 bytes free in a 64K machine with Basic in ROM? Apparently, this is due to the addressing limitations of Microsoft Basic which can

use only 32K of user memory, no matter how much is available in the computer.

Disk Basic has even less free memory, 24,820 bytes. These figures are for no files; if files are specified, each file buffer takes up an additional 200-plus bytes of user memory space.

T100 Product Manager Dr. Sorel Reisman tells us that the full RAM space is available under CP/M, but we had no easy way to determine exactly how much there was.

CP/M comes with the base core of CP/M utility packages for disk operations (format, copy, reconfigure, file operations (name, rename, copy, examine, delete), DDT (dynamic debugging technique), CBasic (and CRUN), and several demo programs. CBasic is a compiler Basic written by Gordon Eubanks, who recently merged his company, Compiler Systems, with Digital Research. In any event, CBasic is very fast compared to an interpreted Basic such as Microsoft Basic.

Toshiba does not furnish any documentation on CBasic and gives no hint that CBasic programs must be written using a word processing package such as *Word Right* and executed using CRUN2 (included on the CP/M disk). Nevertheless, it is a nice extra for the serious programmer.

ALF COPY SERVICE

1315F Nelson Street

Denver, CO 80215

(303) 234-0871

FAST • RELIABLE • LOW COST

If you produce software, ALF's disk copying service is the quick, convenient answer to your duplication needs. Most orders are shipped in less than a week. Every disk we copy is verified bit by bit and guaranteed 100% flawless.

We can copy virtually any soft-sectored mini format. Standard formats: Apple II (including nibble-copy proof, double-boot, and fast load), Apple III, Atari, IBM PC, Kaypro, NEC PC8000, Osborne, TRS-80 I and III, Zenith Z-90 and Z-100, and more. Copy protection is available for most formats.

Our "no frills" pricing means you don't have to buy extras you don't need—set-up charges start at \$10, and copying charges are 30¢ to 40¢ per side.—See blank disk prices at right. Minimum: 50 copies. Quantity discounts available for large orders.

Of course, we have the frills too: label application, 3-hole vinyl pages, printing of labels and sleeves, shrink packaging, heat sealing, and much more. We can put your product in a customized package—vinyl folder or IBM-style binder/slip case—for a low price in small or large quantities.

ALF is one of the oldest and most trusted names in the duplication business. ALF designs and manufactures copying machines that other copying services and software publishers around the world rely on every day. Our complete understanding of duplication technology assures you of the finest reproduction available.

We're eager to solve your duplication and packaging problems—whether you want one service or a total package. Give us a call today!

BLANK DISKS

ALF buys large quantities of disks for our disk copying service—and we can pass our savings on to you. If you're buying hundreds of disks, ALF is your ideal source for top quality disks at a reasonable price. We buy our disks in bulk packages, avoiding the expense of fancy printing and labeling.

The disks listed below are 5 1/4", single sided, double density (except as noted), unlabeled, with hub reinforcement ring. Other disks are available, call for details.

3M	\$165 per 100
MEMOREX	\$165 per 100
NASHUA	\$160 per 100
NASHUA (single density)	\$140 per 100
VERBATIM	\$190 per 100

Without sleeves: add \$2.50 shipping per 100.

With tyvek sleeves: add \$7 plus \$2.50 shipping per 100.

Packed in boxes of 10 with tyvek sleeves: add \$15 plus \$3.00 shipping per 100.

NEVER BEFORE COULD YOU MANAGE SO MUCH DATA FOR SO FEW DOLLARS

Base 2™ gives you

No-Limit Flexibility

- ⌘ Unlimited number of records
- ⌘ Unlimited record size
- ⌘ Unlimited number of fields
- ⌘ Unlimited field size
- ⌘ No requirement to define formats or data before entry
- ⌘ Special buffering is provided for larger memory systems
- ⌘ Fast data access through special indexing
- ⌘ Data structure accessible in BASIC
- ⌘ Quick and easy field reorganization
- ⌘ Space saving compression utility
- ⌘ Full variable length processing
- ⌘ Virtual information facility
- ⌘ Index on any list of fields

Base 2™ is a database for

- ⌘ IBM Personal Computer (PC DOS)
- ⌘ Apple II, IIe and III (Apple DOS)
- ⌘ TRS-80 (TRS-DOS)
- ⌘ Osborne (CP/M)
- ⌘ CP/M systems
⌘ (80486) ⌘ (386) format

Base2™

A Data Manager From

XPER SYSTEMS

Software to rely on
(800) 872-3333
Visa / MasterCard

\$39.95!

CALL NOW (800)USA-3333

add \$9.95 media, shipping and handling (\$14.95 for 8" media)
P.O. Box 22 Dresher, PA 19025

Pennsylvania residents call **800-292-9660** and add sales tax.

IBM is a registered trademark of International Business Machines. Apple is a registered trademark of Apple Computer. ⌘ TRS-80 is a registered trademark of Tandy Corporation. Osborne is a trademark of Osborne Computer Corp. CP/M is a registered trademark of Digital Research, Inc.

CIRCLE 258 ON READER SERVICE CARD

Toshiba T-100, continued...

The documentation for CP/M itself is rather sparse, but we were told by Toshiba that this is deliberate. Rather than overwhelming the customer with something he may not need or want, Toshiba felt that CP/M users would either (1) be experienced and know what they were doing or (2) need so much tutorial information that it would substantially add to the cost and bulk of the system.

Microsoft Basic

The T100 version of Microsoft Basic is exceptionally powerful with a rich set of commands, statements, and functions. It has extensive string and file handling capabilities, and good tutorial manuals that describe how to get the most of it and are available from many independent publishers.

T100 Basic has all of the expected operations, single- and double-precision variables, two-dimensional arrays, six Boolean operators, string operations, and the ability to call assembly language subroutines.

The T100 implementation supports multiple program calls using CHAIN, COMMON, and MERGE. Moreover, files can be on either disk or RAM pack.

Both sequential and random files can

be used. Although, it is more complicated to create and access random files than sequential files, there are many advantages to using them. In particular, with random files, data can be located anywhere on a disk or RAM pack; it is not necessary to read through all the information to access a single record.

Full on-screen editing is supported with both the monitor and LCD display. This means that the cursor can be moved about a program listing on the screen, a change made, and RETURN pressed to enter the change.

The T100 has a real-time clock which is set and accessed with the TIME5 function. We would have expected that if a battery-powered RAM pack were installed, it would be used to store permanently the time of day. This is not the case, and TIME5 must be entered each time the machine is powered up.

T100 Basic includes extensive graphics and sound capabilities. Commands such as PSET (turns on a single pixel), PRESET, LOCATE, LINE (draws a line between two points), PAINT, CIRCLE, and COLOR are supported in all of the graphics modes. We found it just as easy to draw plots on the LCD screen as on the monitor. The only difference in using the two graphics modes is that the high resolution mode does not allow a color

attribute to be appended to the LINE, PSET, or CIRCLE statements, nor is it as easy to display the eight colors simultaneously.

In addition to the graphics statements mentioned above, the T100 also has a graphics macro language (GML) within Basic. GML has 14 commands such as U (draw up), L (draw left), and H (draw diagonally down right). In addition it has A (rotate coordinate axis 90 degrees), C (color), S (scale factor), and a powerful string command which allows nesting of drawing actions. In general, GML is very similar to the turtle graphics commands in Logo.

Sound may be produced in two ways. The easiest is by the use of the SOUND (p,d) command which causes notes of pitch p to be played for duration d. The range is five octaves.

A more powerful sound capability is the music macro language. This has seven commands to specify pitch, duration, note or rest, octave, pause, and tempo. As with GML, a string command allows nesting of sound sequences.

In summary, Microsoft Basic as implemented on the T100 is one of the best we have seen and, except for the memory usage limitation, gives the user access to the full capability of the hardware.

OMEGA INTERNATIONAL



OMEGA
BLOCKBUSTER
SPECIAL

AMDEK COLOR I

\$279

Thru Dec. 15

This is the perfect 13" composite color monitor for your Apple, IBM, Comadore, Atari and other popular micro computers

ORDER TOLL FREE

1-800-343-0873

All Others call (617) 229-8464

CHARGE IT

*Mass. Residents Add 5% Sales Tax

*Prices Do Not Include Shipping Charges



PRICES, SPECIFICATIONS AND AVAILABILITY OF ADVERTISED MERCHANDISE SUBJECT TO CHANGE WITHOUT NOTICE

UNADVERTISED SPECIALS • APPLE • C-ITOH • EPSON • GEMINI • IDS • NEC • TANDON

For a complete price list of the best in Computer Equipment Bargains, send a S.A.S.E.

OMEGA INTERNATIONAL

334 R CAMBRIDGE STREET, BURLINGTON, MA. 01803



OKIDATA
MICROLINE 92

- True Descenders
- Up to 180 cps
- Downloadable Character set
- Subscripts & Superscripts
- Pin and Friction paper feed
- Correspondence Quality print @ 40 cps
- Dot-addressable Graphics & Underlining

\$499

Thru Dec. 15

This is the perfect printer for almost any computer application. This is a true cost performer and now it's Omega Priced I (Wide carriage Microline 93 also available at just \$549.00.)

Wargames

Not the movie . . . the real things!

The Avalon Hill Game Company, America's premiere strategy game maker, has combined their years of experience designing military strategy board games with the latest in artificial intelligence for home computers. The resulting computer games are designed to assist you, the player, with combat results, lines of fire and double hidden movement in two player games and provide a worthy opponent in solitary games.



Paris in Danger: A simulation of Napoleon's 1914 campaign in France. One of Napoleon's finest, against the invading Allied Armies. (Austrian, Prussian and Russian). You can choose to take the role as Napoleon, Commander Schwarzenberg, or play both sides to re-create the actual campaign. PARIS IN DANGER is unique, in that it allows the players to compete on both the strategic and tactical levels, on a full-color scrolling map of France and surrounding countries.

For all Atari Home Computers, 48K Disk: \$35.00

T.A.C.: Tactical Armor Command during World War II. You control individual tanks, anti-tank guns, and infantry squads. For one or two players featuring outstanding Hi-Resolution graphics, enhanced sound, and stimulating challenge. Five different scenarios are available from Meeting Engagement, Rear Guard, and Static Defense, to Breakout and Stalemate. The players control up to eight vehicles, guns and squads simultaneously, utilizing the equipment of either the German, British, Russian or American forces.

Atari & Apple Disks (48K): \$40.00



LEGIONNAIRE (by Chris Crawford):

Consumer Electronics Showcase Award for Innovative Programming
Wargame of the Year, VIDEO GAMES PLAYER Magazine
Nominee for Wargame of the Year, Game Manufacturers' Association

"On a scale of 1 to 100, this is a 95" SOFTLINE Magazine, March '83.
"Legionnaire is a wonderful game that combines the graphics and movement of arcade games with the depth of strategy games" BYTE, March '83.
"An entertaining, attractive game in which thinking is more important than fast reflexes" COMPUTE!, July, '83.

For all Atari Home Computers, 16K Cassette: \$35.00
32K Diskette for Atari Home Computers: \$40.00
Apple II Computer Diskette (48K): \$40.00

*Trademarks of Warner Communications, Apple Computers Inc. and Tandy Corporation.

AVAILABLE AT LEADING
COMPUTER GAME STORES
EVERYWHERE
or call Toll-Free: 1 (800) 638-9292
for the name of the dealer near you.
Ask for Operator A.



microcomputer games[®]

A DIVISION OF

The Avalon Hill Game Company

4517 Harford Road • Baltimore, MD 21214 • (301) 254-5300

CIRCLE 106 ON READER SERVICE CARD

Atari 4/800 (40K), TRS-80 (48K)
cassettes: \$30.00
Apple II (48K)
Atari Home Computers (48K)
TRS-80 1/111 (48K)
diskettes: \$35.00

CLOSE ASSAULT:

Advanced wargame of tactical infantry combat. Russian, German, and American forces are represented in this WWII simulation which blends the allure of computerization with tabletop gaming. CLOSE ASSAULT permits original scenario development or pre-programmed ones. Features include double hidden movement, solitary or two player option, morale factors, and most unique, a game system that actually lets you control squad level units in life-like situations.

Word Processing

The standard word processing package furnished with the T100 is *Word Right* by Structured Systems Group. This package runs under CP/M, v. 2.2. Although page 1.2 of the manual indicates that it is distributed on two 5 1/4" double density disks, we received only one disk. Missing also from our package were the key labels without which it is nearly impossible to use the system.

Word Right requires a computer with a minimum of 56K, two disk drives, 24 row by 80 column display, and a printer with a print width of at least 85 columns.

The manual is prepared by SSG and is very comprehensive and thorough. However, the manual is written for a "typical" CP/M system and is not customized at all for the T100.

The manual includes installation instructions, a section on getting started which explains the various screen movement keys, a 30-page tutorial section, a 100-page reference section, and several shorter sections about using the system with files generated on other software packages. All of the sections have illustrations of the keyboard, screen, or both as appropriate—a welcome touch.

A review of *Word Right* could be a feature review in itself. Let us just say that it is a capable word processing package with all the features that one might expect. It is largely menu-driven with Help screens available at any time during creation of a document. Phrases and text from one location or file can be easily used in another, and functions such as Erase, Insert, Cut, Copy, and Paste all work with a single character, word, line, phrase, paragraph, or page.

Depending upon the printer being used, *Word Right* can produce boldface, underline, proportional justification, super- and subscripts, and soft hyphenation.

Word Right works with the SSG *Name and Address* (NAD) system, which is also included with the T100. The NAD package is for the creation of mailing lists. Each name may have up to eight reference variables for sorting or printing. In addition, names may be called by *Word Right* for producing "personalized" letters.

Magic Worksheet

The spreadsheet package included with the T100 is *Magic Worksheet* by Structured Systems Group.

As with *Word Right*, the documentation is for a "typical" CP/M system. The 212-page manual is very complete and includes an 82-page tutorial section with plenty of examples and screen illustrations. In addition to this helpful



Two cub scouts play with a T100 at the Toshiba Display Center on the Ginza in Tokyo. Unfortunately, the games that had them entranced are not available in the U.S.

printed information, *Magic Worksheet* also has a built-in Tutor subprogram, a Help key for detailed explanation of any command, and the option of having a short instructive message appear each time a command key is pressed. With all this help, it would be tough not to learn how to make effective use of *Magic Worksheet*.

Two unexpected software packages included with the T100 are *MatheMagic* and *GraphMagic* by International Software Marketing.

The package can create a spreadsheet of up to 1014 columns and up to 255 rows. It supports the expected spreadsheet operations and, in general, is very similar to the original *VisiCalc*.

Problem Solving

Two unexpected software packages included with the T100 are *MatheMagic* and *GraphMagic* by International Software Marketing. Unlike the other packages, the documentation is produced specifically for the T100. Two booklets are included with *MatheMagic*, a User's Guide and Sample Applications.

MatheMagic is a package for solving mathematical and business problems that can be expressed by one or more formulae. In many ways, it is like a powerful scientific calculator, but the package goes one step further in that it can "back in" to solutions that cannot be directly calculated from your equations. It is an outstanding tool for solving simulations in mathematics, physics, electronics, and business. The 12-page booklet of examples barely begins to scratch the surface of possibilities.

GraphMagic is a graphics package which helps create charts and graphs from data entered directly from the program or retrieved from *MatheMagic*, *Magic Worksheet*, *SuperCalc*, or *dBase II*.

GraphMagic is a menu-driven system. The software, in combination with the T100-specific 54-page manual, makes it very easy to create high-resolution bar, line, and pie charts. We would have liked some screen illustrations in the manual, but managed to muddle through without them.

As with printing graphics in Basic, only the Toshiba 1010 and 1150 printers are supported.

Other Software

Dr. Reisman tells us that in addition to the software packages mentioned above, a bundled T100 also includes *Analyst*, *Q-Sort*, and *Prism*, an illustrated and animated story about a boy's quest for three magical keys of color. The keys exist in real life and are hidden in three

It'll blow your mine.



You and Mounty Bounty Bob follow the notorious Yukon Yohan into the depths of an abandoned uranium mine. But before you can capture him, you've got to maneuver through 10 increasingly difficult levels of traps, tricks and lethal challenges.

You'll scale ladders, make death-defying leaps, jump from moving platforms, neutralize deadly mutants, avoid crushing stompers, even shoot yourself out of a cannon. And through it all, you'll be racing against the clock.

Skill, endurance, split-second timing... you're going to need every ounce you can muster to conquer Miner 2049er.™ But if you like multi-screen, full-color arcade action games, Miner 2049er will blow your mine!



micro fun™
THE COMPUTER ENTERTAINMENT DIVISION
OF MICROLAB, INC.

Available for
Apple II™ and,
Apple IIe™,
IBM PC™,
Commodore™,
Atari™

Miner 2049er is a registered trademark of Big Five Software. Licensed by Compu-Vid. Apple II & Iie, IBM PC and ColecoVision are registered trademarks of Apple Computer, Inc. IBM Corp. and Coleco Industries, Inc. respectively. MicroLab, Inc. 2699 Skokie Valley Road, Highland Park, IL 60035. 312/433-7350

CIRCLE 290 ON READER SERVICE CARD

SPINNAKER'S LINE OF EARLY LEARNING GAMES IS GROWING AS FAST AS YOUR CHILD'S MIND.

Watching your kids grow up is a lot of fun. But making sure their minds grow as fast as their bodies is even more rewarding. That's where we can help. With a growing line of Early Learning Programs that are not only lots of fun to play, but also educational.

Some of the games you see on these two pages help exercise your child's creativity. Others help improve vocabulary and spelling skills. While others

improve your child's writing and reading abilities. And all of them help your child understand how to use the computer.

So if you're looking for computer programs that do more than just "babysit" for your kids, read on. You'll find that our Early Learning Programs are not only compatible with Apple®, Atari®, IBM® and Commodore 64™ computers, but also with kids who like to have fun.



A trip through ALPHABET ZOO™ Ages 3-8



It's a race. It's a chase. It's Alphabet Zoo, the exciting game that will have your kids zipping through the maze, after letters that fit the picture on the screen.

And at the same time, your kids will be learning the relationship of letters and sounds, and sharpening their spelling skills. So they'll be laughing and learning at every turn.



FRACTION FEVER™ brings fractions into play. Ages 7 to Adult.

FRACTION FEVER is a fast-paced arcade game that challenges a child's understanding of fractions. As kids race across the screen in search of the assigned fraction, they're actually developing a basic understanding of what a



fraction is and of relationships between fractions. They're even discovering that the same fraction may be written in a number of different ways.

All in all, FRACTION FEVER encourages kids to learn as much as they can about fractions - just for the fun of it!

KINDERCOMP™ Numbers, shapes, letters, words and drawings make fun. Ages 3 to 8.

KINDERCOMP is a game that allows very young children to start learning on the computer. It's a collection of learning exercises that ask your children to match shapes and letters, write their names, draw pictures, or fill in missing numbers. And KINDERCOMP will delight kids with



colorful rewards, as the screen comes to life when correct answers are given.

As a parent, you can enjoy the fact that your children are having fun while improving their reading readiness and counting skills.



DELTA DRAWING™ Have fun creating pictures and computer programs. Ages 4-Adult.

Kids love to draw. And DELTA DRAWING Learning Program lets them enjoy creative drawing and coloring while they learn computer programming concepts. As they use simple commands to put lines and colors in



their drawings, they're actually writing computer programs!

With DELTA DRAWING, even kids who have never used a computer before can learn to do simple programming and build an understanding of procedural thinking. It's easy, clear, and lots of fun!

SPINNAKER™
We make learning fun.

Delta for: Apple, Atari, IBM, Commodore 64,
Cartidges for: Atari, Commodore 64



T100 computer system with Toshiba 1010 printer.

locations in the U.S. To find the keys, you must unravel clues hidden within the *Prism* story.

Two other programs are on the *MatheMagic* disk, *TbPUT* and *TbGET*. These are utility programs that allow files to be transferred between CP/M and T100 Basic operating systems, and vice versa.

Documentation

As with so many otherwise outstanding computers, the documentation for the T100 is a mixed bag. It is neither the best nor the worst we have seen; indeed, for a Japanese machine, it is quite good.

The 120-page Owner's Manual is divided into four parts and six appendices. Part 1 describes setting up the system in great detail and Part 2 describes basic system operation. Both sections are generously illustrated and written in an easily-to-read tutorial style.

Part 3 is a trouble-shooting guide which, it is to be hoped, will never be needed. Part 4 is a five-page introduction to writing Basic programs which is woefully inadequate for a beginner and rather trivial for an experienced programmer.

The Programmer's Reference Manual is, as its name implies, a reference manual, and not a tutorial. Section 1 is a 20-page guide to using CP/M and ten of the included utility programs.

The bulk of the manual, 170 pages, is devoted to describing the commands, statements, and functions of T100 Basic. It is excellent for an experienced programmer, but the first-time user will want to obtain one or more tutorial guides and books of sample programs.

The appendices describe disk I/O and Basic utilities, as well as presenting several useful lists (error messages, character sets, etc.).

As mentioned earlier, each applications software package is accompanied by a manual provided by the manufacturer of that particular package. For the

most part, these are very good.

Each hardware component is accompanied by a small booklet designed to be inserted in the three-ring Owner's Manual binder. These guides are well-written and nicely illustrated.

Warranty and Service

The T100 and peripherals are covered by a 90-day limited warranty which covers the usual defects in workmanship and material, as well as non-conformity with Toshiba's standard performance specifications. After the initial 90 days, you are on your own.

Service is available from Toshiba dealers, regional service centers, or the corporate service center in Tustin, CA.

Pricing

Although the components are available separately, Toshiba offers a very attractive price on a system with software bundled in. Also, the components of the portability kit are offered in an attractively priced package.

The individual prices are as follows:	
T100 computer/keyboard	\$795
Dual disk drive unit	945
Monochrome monitor	255
RGB color monitor	895
LCD display	295

A bundled system includes the T100, dual disk drive unit, monochrome monitor, CP/M 2.2, T-Disk Basic, *MatheMagic*, *Word Right*, *GraphMagic*, *NAD Analyst*, *Q-Sort*, *Prism*, and several utilities for just \$1995.

The Portability Kit includes the LCD display, LEX-12 modem, 16K RAM pack, hardside attache case, and cables for \$795. A 32K RAM pack adds \$90.

Toshiba Means Business

All in all, the T100 is an exceptionally capable computer system at a very attractive price. It has been on sale in Japan for about a year and has logged



Computer, LCD display and modem in portable carrying case.

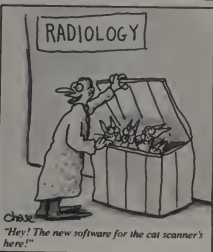
many thousands of hours of successful and reliable service.

The T100 is a no-nonsense business system, although its exceptionally high-resolution color display coupled with an excellent version of Basic make it quite suitable for many CAD, graphics, and entertainment applications as well.

The inclusion of CP/M 2.2 means that many software packages can be easily converted to run on the system. This should enhance its utility for many varied applications.

The documentation is weak in spots, but books from independent publishers are available to make up for these lapses. We were disappointed that the T100 does not support the top-of-the-line P1350 printer, but we understand Toshiba's rationale for not supporting a \$2200 printer with a \$1995 computer system.

After a few days use, we found ourselves regarding the T100 as the standard of comparison for easy-to-use, high-resolution graphics. The day came all too soon when the system had to be returned to Tustin. □



Ch630

"Hey! The new software for the cat scanner's here!"

INTRODUCING **ULTRATERM** YOU'LL LOVE THE VIEW!

With UltraTerm, the revolutionary new card from Videx, you'll enjoy sweeping panoramas of spreadsheet that you've never seen before—128 columns by 72 lines, 13 columns by 24 lines—and even 160 columns by 34 lines. You'll revel in the scenery 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! 5400 of the 80 display, with 8 x 11 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 news.

See us at Comdex Booth #1977

paper! And you can choose the ultimate 110000 lines has to offer: normal, reverse, or 110000 lines inverse—black on white, bright reverse, and 110000 line intensity.

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

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



110000 N.W. Grant Avenue, Corvallis, OR 97330
503-38-0521

Apple is a registered trademark of Apple Computer, Inc. CP/M is a registered trademark of Digital Research, Inc.

CIRCLE 254 ON READER SERVICE CARD



HOW TO UNSCR YOUR NEST

It doesn't take a computer to tell you that money can't buy you happiness.

But at last there is a piece of personal computer software that can make you a lot happier about your money.

And you're looking at it.

Who needs it?

Dollars and Sense™ is designed for everyone who wonders where their money is going. Or why it isn't going as far as it used to. Or even as far as it's supposed to.

It's designed for people on a budget. And for people who aren't.

It's designed for people with expense accounts. And people who just want to account for their expenses.

For people who don't know a thing about computers. And people who know everything.

For people who can't balance a checkbook. And people who can do it in their sleep.

And if you've read this far, it's designed for you.

Where have all the dollars gone?

Dollars and Sense saves you money by organizing your money. By giving you the clearest picture you've ever had of your financial behavior.

You can establish budgets along any lines you like. Monthly or annually. Fixed or variable. On up to 120 accounts.

It can write checks, make transactions automatically, even remind you to pay your bills.

And as time goes by, it tells you exactly how you're doing. With a complete set of reports and full-color graphs.

Year-to-date summaries. Income statements. Balance sheets. Cash flow analyses.

Monthly and yearly comparisons of where you wanted to be vs. where you are.

You can look into the future to discover how much damage that new car, new driver, new dress or new baby will do to your budget.

Or look into the past to find out anything you like. Like how many bar



AMBLE EGG.

tabs you picked up in February.
How much unleaded you
pumped in July.

Or whether your utility
bills have gone far enough through the
ceiling to justify a new roof.

And all you have to do is spend
a few minutes each week telling your
IBM® PC, Apple® II or IIe what came in
and what went out.

Tax break.

You can use Dollars and Sense
around the house or around the office.

And around April 15, you'll be
glad you did. Because a few simple
keystrokes will present you with all
the information you need to satisfy
Uncle Sam.

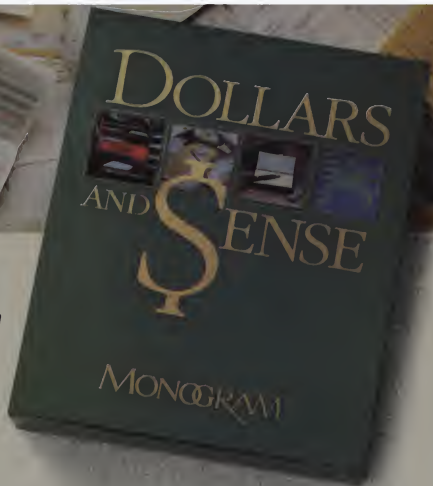
If you do your own Long Forms—
or your own loan applications—you'll
save time. If someone else does them
for you, you'll save money.

Year after year.

User friendly. Really.

Dollars and Sense also happens
to be very easy to use. For everyone
who uses it.

If you're a novice, at computing or
accounting or both, don't worry.



The interactive demonstration disk
will get you started. And the program
will keep you going. With sample
accounts, on-screen prompts and two
different beeps.

One for typographical errors. And
another for other kinds of errors.

As you get faster, so does Dollars
and Sense. You can enter and edit large
amounts of information, right on the
screen. Move from function to function
without waiting around. And get
instant, up-to-date reports.

On screen. Or on paper.
And one more thing. Dollars and
Sense is tax-deductible.

But only if you use it on your taxes.

MONOGRAM™

8295 South La Cienega Blvd.
Inglewood, CA 90301
213/215-0529

Apple is a registered trademark of Apple, Inc.
IBM is a trademark of International Business Machines.
*Color monitor required

CIRCLE 265 ON READER SERVICE CARD



NEC PC-8800 bundled system includes system unit, keyboard, dual disk drives, and monochrome monitor.

NEC PC-8800 Personal Computer System

creative computing

HARDWARE PROFILE

Product: NEC PC-8800 Computer System

Type: Small business computer

CPU: 8-bit Z80A (optional 8086)

RAM: 64K included, 512K maximum

ROM: 72K

Keyboard: Detached, 92 full stroke keys

Text resolution: Up to 80 characters \times 20 lines

Graphics resolution: Color 640 \times 200 pixels, monochrome 640 \times 400 pixels.

Colors: 8 primary, 60+ mixed

Sound: One tone beep

Ports: RS-232 serial, Centronics parallel

Documentation: System manual, Basic manual and reference booklet, CP/M manual, manuals with each applications software package. Among the best documentation we've seen.

Pricing: Bundled system (see text) \$2497

Summary: Exceptional color graphics, excellent Basic, reliable and capable hardware and software. A remarkable system for the price.

Manufacturer:

NEC Home Electronics USA
1401 Estes Ave.
Elk Grove Village, IL 60007

David H. Ahl

In the PC-8800, NEC Home Electronics USA has introduced a computer that belies their name. The PC-8800 is a professional business machine and hardly a home computer—although everyone who has seen it covets one for his home.

The bundled system is especially attractive as NEC has packaged together the keyboard, system unit, dual disk drives, monochrome monitor, CP/M 2.2, Microsoft Basic, *Multiplan*, *WordStar*, and *MailMerge* at an inviting price of \$2497. We have come to expect barely adequate documentation with many

Japanese imports. Surprise! The documentation with the PC-8800 is absolutely outstanding. For these reasons and others we discuss below, the system must be considered a top contender in the small business systems market.

The Basic System

The bundled PC-8800 system comes in four cartons. The first contains the PC-8801A system unit (NEC calls it the "body") and a detachable keyboard.

The body is the heart of the system and contains the cpu, memory, interface circuitry, and I/O connectors. It measures 19.5" \times 13.5" \times 4.2" and makes a very suitable base on which to place the monitor.



Bundled PC-8800 system set up for our evaluation.

SUCCESS STARTS HERE



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

CAI™

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.

CIRCLE 130 ON READER SERVICE CARD

Challenge yo

Make beautiful music. Everyone loves music. And anyone who has ever hummed a tune can write one, now. Scarborough has taken the universal language of music and developed a software program that makes it fun and easy to write songs for budding composers of any age.

Even those who don't recognize a single note can be composing songs in 15 minutes. Simulated piano roll graphics and on-screen commands serve as a guide every step of the way — from scales and rhythm to more complex musical forms and theory.

With Songwriter, composing songs is as simple as "do-re-mi." Write a song, change, delete or add a note, change tempo and teach the computer to repeat musical motifs. Even save compositions to play back through the computer or your home stereo. For added fun, there is also a library of 28 popular songs to listen to and experiment with, as well as a series of educational activities for adults and children.

Songwriter is like a word processor for music that will bring the whole family back to the computer, again and again — because Songwriter encourages experimentation and makes the whole process fun. Isn't that why you bought a personal computer in the first place?

Every kid has a song in his heart. (So does the "kid" in every parent!) Help yours express it with Songwriter.

Available for Apple,® Atari,® Commodore 64™ and IBM-PC* \$39.95



The Scarborough

© Scarborough Systems, Inc., 25 North Broadway, Tarrytown, New York 10591, 1-800-882-8222 in New York: 1-914-332-4545.

CIRCLE 216 ON READER SERVICE CARD

ur creativity.

Be quick on the draw. PictureWriter is magic! Create any shape or pattern, instantly. Fill areas with glowing colors and even hear pictures set to music.

PictureWriter brings out the artist in anyone. With this program, your child can create his or her own picture gallery and watch the computer redraw the pictures like magic on the screen. PictureWriter also includes a library of masterpieces by other "picture writers" that can be colored, edited and redrawn.

Like all Scarborough programs, PictureWriter encourages experimentation and continually challenges the child to explore new avenues. And all the while, PictureWriter subtly develops the child's familiarity with the fundamentals of step by step computer programming.

Getting started is simple. The built-in tutorial zips the artist into the program quickly and keeps him or her creatively occupied for hours.

The possibilities are endless with PictureWriter. In fact, children find it so captivating that parents will probably want to doodle with it, too. And why not?

You can't stay an adult forever.

**Available for Apple® \$39.95
(Soon, Atari®)**

Reproduced on Wabash disks.

Apple, IBM and Atari are registered trademarks of Apple Computer, Inc., International Business Machines Corp. and Atari, Inc. respectively. Commodore 64 is a trademark of Commodore Electronics Limited.



ough System.

NEC PC-8800, continued...

On the front of the body is a pushbutton off/on switch (hurrah—no elusive rocker switch in the back), a recessed reset switch, a red power-on LED, and a green LED indicating the use of N88-Basic. More about this later. Under the power switch is a 14-pin keyboard connector.

The rear is cluttered with every imaginable type of connector. Three DIN connectors are provided for the color display, monochrome display, and cassette recorder. It is unfortunate that the connector for the color display and cassette recorder are the same; this encourages confusion. D-type connectors are provided for a PC-8031A floppy disk unit, printer, and RS-232 device. A power cord jack rounds out the collection of exposed connectors.

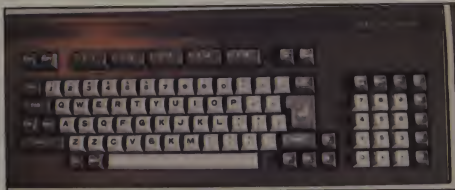
Four bus expansion slots are covered by metal plates. It is into these slots that controller boards are inserted for the standard disk drives (8881A, 8882, 8831A, and 8832A), speech synthesis units, and other peripherals.

Also on the rear are two DIP switches and two jumper switches. These will generally be set once and forgotten. They control such things as which Basic is operative, screen resolution, and communications parameters. They are thoroughly explained in the PC-8801A User's Guide.

Indeed, the entire system set up from unpacking through system use is illustrated and described in the User's Guide. This excellent 157-page manual should be the model for the industry; we have never seen better.

Ergonomic Keyboard

It is fashionable today for manufacturers to describe their keyboards as "ergonomic," whether they are or not. The one on the 8800 is. Character and number keys are matte finished in light gray while special keys are dark gray.



The system has a truly ergonomic keyboard.

The 92 keys are divided into three sections, a qwerty alphabetic section, numeric keypad, and a row of function keys. The keyboard measures 18.3" x 8.4" x 2.8" and plugs into the system unit by means of a coiled cable.

The alphabetic portion of the keyboard is truly standard with shift, caps lock, and tab in the customary place on the left. Unfortunately, there is no LED caps lock indicator, something we have missed since the bygone days of the Teletype 33 and Sol 20. One extra key (underline) at the right end of the bottom row moves the right shift key slightly further to the right than one might expect.

The carriage return key is double size, and special symbols are on keys at the right of the alphabetic keyboard. We found it curious that although all of these extra keys produce two symbols (regular and shifted), six keytops displayed only one symbol.

Actually, each key on the keyboard produces up to four characters. These include the usual upper- and lowercase letters, numerals, and symbols marked on the keytops. In addition, if the GRAPH key is depressed, 56 graphics

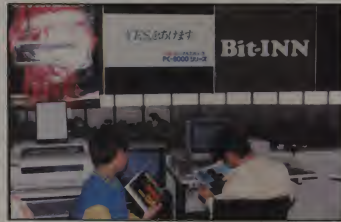


RETURN key is double size and cursor control keys are arranged reasonably logically.

symbols can be produced. If the ALT key is depressed, the regular keys will produce an additional 64 Greek letters and mathematical symbols. In all, the 8800 has 212 built-in characters, all of which are accessible from the keyboard.

The numeric keypad at the right side of the unit has 20 keys for the ten numerals, arithmetic operations, comma, period, RETURN, HOME/CLR, and HELP. The HELP key is a great aid when debugging programs. When an error occurs during program execution, pressing HELP displays the statement and image where the error occurred.

The four cursor control keys are grouped next to the shift key at the right



In Japan, NEC operates a chain of Bit-INNs and demonstration centers where people can go and use any of the computers in the NEC line.



At a NEC demo center in Tokyo, prospective customers try out small business systems.



Prints with built-in format or lets you create your own: center, underline, boldface, elongated, proportional and condensed print.

Inserts and deletes characters, lines or blocks of text.

Duplicates and moves blocks of text.

Searches for and/or replaces words or phrases, one at a time or all at once.



Changes line spacing, margins, print type, paragraph indents anywhere in the document.

Instantly reformats

Enters text easily, with word wrap, one main menu and helpful prompts.

Creates multi-line headers and footers.

Prints double columns, form letters, multiple copies of a page or document, at the touch of a key.

Numbers pages and creates section numbers automatically.

Corrects spelling (with extra software).

Chains and merges files.

Has "print preview": you can check your copy before it's printed.

You can't find a friendlier, more powerful word processor at twice the price. New AtariWriter™ Under \$100.

Now you can do multi-featured word processing at home, simply. At a family budget price.

Our ROM-based cartridge technology means you can use new AtariWriter on any ATARI® Home Computer (even 16K) for personal and business correspondence, term papers, committee reports, mailings, etc.

It also lets you choose between cassette and disk storage systems.

One very special AtariWriter feature: you can correct as you write, without switching back and forth between Create and Edit modes.

And our memory buffer offers an "undo" command to let you change your mind, and restore text you've just deleted.

Check into our remarkable AtariWriter, and our choice of letter quality and dot matrix printers, also reasonably priced, at Atari dealers. Call 800-538-8543 for dealer nearest you. In California, call 800-672-1404.

You'll do more with Atari Home Computers.



© 1983 Atari, Inc. All rights reserved.  A Warner Communications Company

CIRCLE 105 ON READER SERVICE CARD

NEC PC-8800, continued...

end of the keyboard. They are in a reasonably logical arrangement, although we prefer the diamond pattern on the portable NEC PC-8201 computer. These keys, along with the INS/DEL (insert/delete) key, are used for on-screen editing of Basic programs as well as for cursor manipulation in other application programs.

In the top row of keys are STOP (halts execution of a program), COPY (copies the display on the monitor to be printed, assuming a NEC 8023A-C printer is connected), ROLL UP and ROLL DOWN (scrolls the text image on the monitor up or down), and five function keys.

Each of the function keys produces two functions, regular and shifted. In Basic, the default definitions are load, run, auto, list, save, goto, key, print, edit, and cont. The keys can be user defined by means of the KEY statement. For example, KEY 1, "Creative" will cause Creative to be printed whenever KEY 1 is depressed.

The system uses a responsive N-key rollover input which allows speedy, yet accurate entry for word processing and other applications. All keys repeat when held down for more than a half-second; but there is no audible keyclick to accompany key repeats.

On The Inside

The 8801A system unit uses an mpu equivalent to the Z80A running at 4 MHz. In our Basic benchmark program, the 8800 didn't break any speed records, posting times identical to the Apple II and Commodore 64.

The basic system is equipped with 64K of user RAM. It can be expanded to 128K with bank switching possible in 32K units. In addition, when N88-Basic is used, 48K of video RAM becomes operational.

A 32K ROM memory contains N-Basic and the monitor, while another 40K of ROM contains N88-Basic.

The system unit incorporates a NiCad battery to keep the time and date current once they are set. This is a very thoughtful touch, and one that is annoyingly absent on most other computers in this price range.

For those who need such information, the manual provides system block diagrams, a memory map, and pin-outs for all the connectors and the expansion bus.

Disk Drives

The standard disk drive included with the bundled 8800 system is the PC-8831A with dual double-sided, double-density, 5 $\frac{1}{4}$ " drives. Alternatively, an 8" dual double-sided, double-density drive (PC-8881A) is available. Matching dual expansion drives can be added to both

size drive units. For maximum economy, a dual single-sided, double-density, 5 $\frac{1}{4}$ " drive (PC-8031A) is also available.

We tested the 8831A unit which is included with the bundled system. When formatted, each side of each disk stores 160K; thus the dual unit stores 640K on line.

The drive is reasonably compact, measuring 7.6" \times 9.8" \times 14.2". The power switch is awkwardly placed at the right rear. A dim, green LED on the front indicates when power is on. The

drives should be powered up before turning on the system unit.

When power is applied to the unit, the drives do not rotate. The motor goes on only when a read or write operation is initiated by the computer. However, the drive then continues to spin for 2 $\frac{1}{2}$ minutes, so subsequent disk operations are immediate and do not require a wait while the disk gets up to speed. If the drive is not accessed for 2 $\frac{1}{2}$ minutes, the motor shuts down. We judge this an excellent way to speed disk response time

If buying a car was like buying software, you'd see a lot of these on the road.

A flashy vehicle. No doubt the result of several great ideas. But hard to drive with the performance you expect.

Until now, buying business software was similar, a lesson in irregular mechanics. Sure, you can put together all of your own pieces, but will the resulting vehicle give you the performance you expect? If you need consistent operation, easy response, smooth on the straights yet tight on tough corners, we have the answer.

Executec software: the secret's in the system.

One completely integrated software system provides decision support and office automation in a uniform, consistent environment. Software that gives you the power to challenge the total range of business problems by using one synergistic structure.

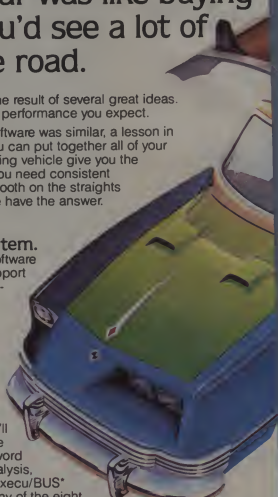
SeriesOnePlus: simplicity plus power.

We call it SeriesOnePlus. You'll call it incredible. Start with the programs you need most — word processing, spread sheet analysis, data management, and the Execu/BUS[®] master program. Assemble any of the eight additional programs available** for even more problem-solving capability. Now you can easily command the resources you constantly need at your fingertips.

*Patent Pending

**Additional programs available: Execu/REPORTER™ — report writer, Execu/PLOT™ — graphic analysis, Execu/LINK™ — 3780 communications for the IBM® PC, PromplDoc™ — user documentation program, plus Fixed Asset Accounting and three other financial industry products.

SeriesOnePlus is available on the IBM® PC, Prontio® Series 16, Durango Poppy®, DEC Rainbow®, Wang® PC, Victor® 9000, and many other 16-bit MS-DOS computers



while saving wear and tear on the drive motor.

A red LED indicator on each drive indicates when a read or write operation is taking place; these lights glow at 20% of full intensity when the drives are in the standby state.

The User's Guide provides extensive illustrated instructions for using the drives; handling, formatting, backing up, and copying disks; loading N-Disk-Basic and N88-Disk-Basic; maintenance; and troubleshooting.

The disk drive is furnished with a system disk that contains both disk Basics, six utility programs, and four demonstration programs.

The bundled PC-8800 system has three additional disks containing CP/M 2.2 and the various applications software packages.

Output Display And Monitors

NEC is a major producer of TV sets and display monitors, so it should come as no surprise that the company offers a



For our evaluation we hooked up an RGB color monitor simultaneously with the included monochrome monitor.

choice of six monitors with the PC-8800 system.

As mentioned earlier, the one bundled with the standard system is the JB-1201, a 12" green phosphor monochrome monitor with resolution of up to 640 x 200 pixels. The monitor also has audio capabilities. Two pairs of RCA jacks are provided for video and audio in and out.

The front of the monitor has three controls for brightness, contrast, and volume. Five additional adjustments are provided on the back.

The monitor is tilted back at a 5-degree angle and has no provision for adjusting tilt or swivel.

Economy 12" and 9" monochrome units are available, as well as an upper-end 14" unit with a resolution of 640 x 400 pixels.

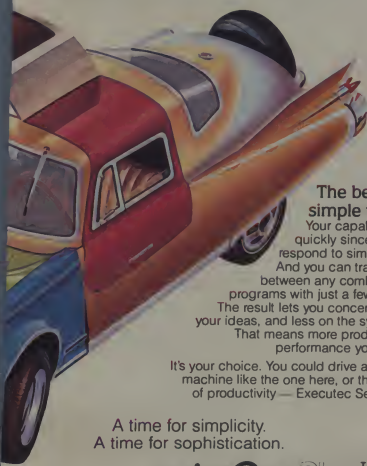
Two color monitors are available. The top-of-the-line unit is the JC-1410, a 14" RGB monitor capable of displaying up to 640 x 400 individual pixels. A smaller, less expensive 12" RGB unit has a 640 x 200 pixel capability.

For many business applications, the 12" monochrome monitor is perfectly satisfactory. However, the computer is capable of producing spectacular, high-resolution graphics, and it seems a shame to waste this capability with a monochrome monitor. On the other hand, the price differential is \$600 or more—enough to make one think twice.

We tested the PC-8800 system with both the included monochrome monitor and a Toshiba high resolution RGB monitor attached simultaneously. For text, the monochrome monitor was slightly better, but for anything with color, the RGB unit was far superior.

The PC-8800 is capable of producing three text formats: 80 characters by 20 lines, 40 by 20, and 40 by 25. Characters are formed with a 5 x 7 dot matrix; descenders use one additional row of dots. With 20 lines on the screen, interline spacing is two rows of dots; this is reduced to one row with 25 lines on the screen. The descenders on lowercase letters use this spacing line, making readability very difficult in this format.

© 1983 Executec Corporation



The benefits are simple to achieve.

Your capability develops quickly since all programs respond to similar commands. And you can transfer data between any combination of programs with just a few keystrokes. The result lets you concentrate more on your ideas, and less on the system details. That means more productivity, the performance you expect.

It's your choice. You could drive an impractical machine like the one here, or the new model of productivity—Executec SeriesOnePlus.

A time for simplicity.
A time for sophistication.

seriesOnePlus™

Software that stands the test of time.

Contact your dealer
or Executec today.

Executec Corporation
12200 Park Central Drive
Dallas, Texas 75251
(214) 239-8080

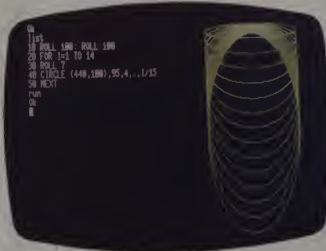
IBM, Pronto, Poppy, DEC, Rainbow, Wang and Vector are registered trademarks of International Business Machines Corporation. Pronto Computers, Inc., Durango Systems, Inc., Digital Equipment Corporation, Wang Laboratories, Inc., and Vector Technologies, Inc. respectively.

CIRCLE 165 ON READER SERVICE CARD

November 1983 • Creative Computing



It is easy to debug graphics programs as the text screen and graphics screen are independent. Here, we have written a simple



four-line program to produce an image and then increased the radius of the circle.

All the application software we examined used the 80×20 mode with occasional use of the 40×20 mode for titles. In Basic, these modes are set by means of the WIDTH or CONSOLE command.

N-Basic has several additional text screen modes. It allows all combinations of 80, 72, 40, or 36 characters by either 20 or 25 lines.

The system discriminates between the text screen and graphics screen. Instructions in Basic are provided to alter each screen independently so that a change in one does not affect the other. This is a marvelous feature for writing and debugging graphics programs since the graphics output remains on the screen as the program is listed and changed.

The graphics screen is actually composed of three 640×200 pixel planes, each one of which can be controlled and set independently. Each plane corresponds to one of the three color guns: red, green, and blue. By combining these colors, eight distinctly different colors can be produced. However, by setting small groups of dots to different color patterns, it is possible to achieve some 60 different colors, hues, and patterns.

Although it is possible to manipulate each plane, most users will want to take advantage of the extensive graphics commands built into the two versions of Basic. However, for programmers wishing to use detailed graphics, the Basic Reference Manual provides excellent instructions, and the system disk has two excellent example programs.

Data Recorder

The NEC PC-6082A data recorder is similar to a standard cassette recorder, but it is especially designed for consistent reading and writing of programs and data on tape. On the other hand, any standard cassette recorder can be

used with the PC-8800. Default transfer rate is 1200 baud, but this can be set in Basic to 600 baud for lower quality recorders.

The 6082 unit has the usual cassette recorder controls augmented by five program search buttons that help locate specific programs on a tape quickly.

Our judgment is that most PC-8800 users will use floppy disks as their primary storage vehicle. But for those who want cassette capability, it is available. For example, we picked up several 8800 programs in Japan that were on tape which we had to read in to transfer over to disk. We accomplished this effortlessly with a standard recorder, although if we were using tapes on a regular basis, we would probably want the NEC unit.

Powerful Basics

The NEC PC-8800 comes with two powerful versions of Basic, N-Basic and N88-Basic. Both can be used with and without disk drives. The N88-Basic is the primary programming tool of the PC-8800. It is a super-set of the original N-Basic with several extended instructions added to take advantage of the hardware.

We did all of our testing with N88-Basic as we believe the majority of PC-8800 users will choose to use that version. N-88 Basic is written by Microsoft and has all the familiar commands, statements, and functions. However, it has many additional capabilities, mostly having to do with graphics and files.

As mentioned earlier, three 640×200 pixel planes of graphics can be independently produced. The SCREEN command selects the desired plane(s) to be displayed on the screen.


The rich variety of available graphics commands are a programmer's delight. Here are some examples.

- GET@ saves a graphics pattern from the screen into an array.
- PUT@ displays the pattern saved with the GET@ command.
- CIRCLE is a generalized statement to draw an ellipse, circle, or arc of any radius, color, or aspect ratio.
- COLOR sets the background, foreground, and border color.
- COLOR@ sets character colors.
- LINE draws a line between user-defined points.
- PAINT fills in an area of the screen that has a graphic boundary.
- POINT is both a function which returns the last referenced screen coordinates, and a statement which can be used to change those coordinates.
- PSET and PRESET turn screen points on and off.
- ROLL scrolls the graphic screen up a specified number of pixels.
- WINDOW and VIEW are used to specify display areas on the screen which can be scaled and moved to another location.

File and device I/O commands are equally extensive and can reference three RS-232 devices, eight floppy disk drives, two cassette tape units, a lightpen, and printer. Three lightpen statements and one function are implemented for use with such a device.

Multiple program calls are supported with CHAIN, COMMON, and MERGE. Naturally, data can be passed to and from programs using disk files. These files can be either sequential or random. Although random files are more difficult to use (requiring the use of FIELD, GET, and PUT), the additional effort is rewarded with much faster data recovery in many instances.

A pause command for which we have felt a need for years is finally implemented on the PC-8800. WAIT sus-



RESTON CLOSES THE GAP BETWEEN ART AND COMPUTERS

For the Atari 800 with 48k memory. Coming soon: 16k ROM cartridge.



CONTEST!

For the best computer animation sequence created using *MovieMaker*™, \$1000 prize. Entries should be submitted on disk by December 31, 1983. Winning entry will be shown at 1984 West Coast Computer Faire. For more details, contact Reston Publishing Company.

In Reston's new book, *Genesis II, Creation and Recreation with Computers*, by Dale Peterson, artists, writers and musicians use computers to create new visions, new sounds and new ways of expressing themselves, all interwoven with stunning illustrations. With *MovieMaker*, an exciting new program for the Atari® Home Computer by Interactive Picture Systems, you'll learn how to do these things yourself. You'll compose scenery and shapes, then propel them into continuous, flicker-free action. You'll actually make a short animated movie, right at your keyboard. Let Reston release the creative spirit in you.

**MovieMaker is a
Creative Pastime™ from
Reston Software**



A Prentice-Hall Company
11480 Sunset Hills Rd.
Reston, VA 22090

Available at your local bookstore
and computer retailer or call us at
(800) 336-0338.

Atari is a registered trademark of Atari, Inc.

CIRCLE 207 ON READER SERVICE CARD



SOFTSMITH

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





CLONE YOUR IBM PC WITH MULTI-RAM™

Integrated software, programs that work simultaneously and share information between them, is here today. With Multi-RAM, from Softsmith™ Corporation, you can integrate your present IBM PC software for less than \$100.*

Think of it! You can simultaneously run up to 9 programs on your IBM PC or XT: your spreadsheet, word processor and data base, plus six other programs all at the same time. You can easily shift between those programs in a fraction of a second using a single key. And for the first time you can extract and move data or text from one program to another, instantly, and without losing any of your original data.

Multi-RAM actually enhances your IBM operating system to partition the machine memory (128K RAM minimum required) into as many as 9 segments.

Multi-RAM is also the first program that gives you the option of using your IBM PC with two monitors at once, each displaying a different program. Use word processing, for example, on one monitor, and a spreadsheet program on the second. Your computer never had such flexibility.

Multi-RAM is brand new, but that doesn't mean it's unproven. At Softsmith, we carefully test, improve and clearly document all of our programs, to make our software the most dependable you can buy. And we back it with a Toll-

Free customer service number you can use to get expert help, anytime.

Softsmith has the largest library of programs under a single brand name — quality programs for Education, Home Management, Entertainment, Word Processing, Business, Communications and Programming, for the most popular personal computers.

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.

Dealer inquiries invited.

IBM PC and IBM XT are registered trademarks of International Business Machines, Inc.

*Based on suggested retail price.

CIRCLE 227 ON READER SERVICE CARD

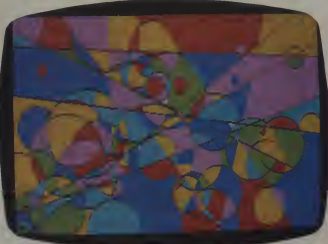
SOFTSMITH™

SOFTWARE LIBRARY





Program uses CIRCLE, LINE, and PAINT statements to produce an ever-changing display of "modern art." The first image is



shortly after starting the program; the second is several minutes later.

pends program execution while waiting for specific input. Conversely, INPUT WAIT is used to accept keyboard input for a specified period of time. These are not the ultimate since they work only in conjunction with input, but combined with the real-time clock, they are a step in the right direction.

As we have come to expect, N88-Basic has full on-screen editing. The cursor can be moved to any point; a change, insert, or delete entered; and RETURN pressed to enter the change. The INS key turns on insert mode; pressing a cursor key or RETURN turns it off. This is far preferable to having to press the insert key for every character to be inserted.

With a 64K machine, N88-Basic can use 56,799 bytes. This is twice the amount of free memory that can be used with Microsoft Basic on many other 64K computers; on such machines, Basic seems artificially limited to addressing 32K or less. N88-Disk-Basic can access 45,410 bytes in a 64K machine. Naturally, if files are specified, buffer space must be allocated which reduces the amount of free memory.

The only notable omission in N88-Basic is any sound capability. Well, perhaps we shouldn't say "any," since Basic does have the BEEP statement, but that is a far cry from three channels with a five-octave range.

Documentation

As mentioned in the opening paragraph, the documentation with the PC-8800 is nothing short of superb. We have said that the 157-page User's Guide should be the model for the industry. The same can be said for the Basic Reference Manual.

Chapter 1 of the Reference Manual is a thorough discussion of the features of

Basic including symbols, variable types, expressions, error messages, screen modes, colors, interrupts, and files.

Chapter 2 contains a comprehensive description of every Basic command, statement, and function. It has many examples, and, for more complex statements, includes two or three short programs showing the use of them.

This is followed by ten appendices, the first five of which contain longer sample programs illustrating some of the more complex statements and programming techniques.

Appendix G is devoted to a discussion of the machine language monitor. Although most computers can be programmed in machine code, it is a rare manual that provides any helpful information. This one not only provides the basic information, but also includes many examples of the use of each command.

The 262-page CP/M manual is exceptionally comprehensive and, like the Basic manual, includes many examples illustrating the use of each command

and utility program. It is the best CP/M manual we have ever seen.

We are used to applications software manuals being prepared by the software producer with perhaps a sheet or two referring to the specific computer. Such is the case with the *WordStar* and *MailMerge* manuals. However, the *Multiplan* manual was specifically prepared for the PC-8800; this is a welcome change.

CP/M Operating System

Upon powering up the PC-8800 system with the disk drive on and the system disk inserted, the computer goes through a lengthy 15-second self check and disk load procedure, and finally comes up in Basic.

To get into CP/M, the CP/M disk is inserted when the system is powered up. After a shorter 8-second wait, the system comes up with the usual copyright notices and the A > prompt.

The CP/M disk contains 18 command files (system, editor, pip, etc.), 14 device drivers (disk drives, RS-232, printer,

```

62K CP/M for the PC-8801 Microcomputer
Licensed to NEC Corporation
CP/M Version 2.2 (c) Copyright Digital Research Inc., 1982
CBIOS (c) Copyright NEC Home Electronics (U.S.A.), Inc., 1983

A>dir
A: MOVCPH COM ; SYSGEN COM ; DISKB COM ; BUILDB COM
A: KEYB COM ; SETBOOTB COM ; STAT COM ; PIP COM
A: SUBMIT COM ; XSUB COM ; ED COM ; ASM COM
A: DDT COM ; INSTALLB COM ; AUTOB COM ; LOAD COM
A: FILECOMB COM ; DUMP COM ; PCB831A DRV ; PCB881A DRV
A: PCHARD1A DRV ; PCB031A DRV ; RS232A DRV ; PCB832A DRV
A: PCB032A DRV ; PCB0312A DRV ; PCB0322A DRV ; HRS232A DRV
A: CLOCK2A DRV ; IRS232A DRV ; PCB882A DRV ; CLOCK1A DRV
A: DUMP ASM ; DEBLOCK ASM ; DISKDEF LIB ; KEYS FIL
A>stat
Bdos Err On A: Bad Sector
A: R/O, Space: 142k
    
```

Figure 1. Power up dialogue with CP/M and list of programs on the system disk.

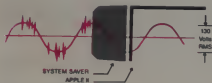
System Saver™

The most important peripheral for your Apple II and Disc.



For Line Surge Suppression

The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

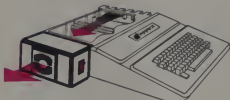


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise 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.

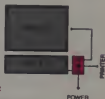
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.



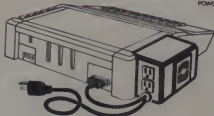
SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.

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.



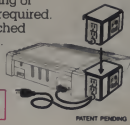
Available in 220-240 Volt, 50 Hz



The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again!

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 203 ON READER SERVICE CARD

NEC PC-8800, continued...

clock, etc.), and four other files. It is a comprehensive library of utilities that allows the use of most of the capabilities of the system, except color graphics, as usual.

WordStar

The word processing program NEC has selected to bundle in with the PC-8800 system is *WordStar* by MicroPro International. This is a programmer's dream of a word processing system and has many features not found in other packages. On the other hand, it is not at all easy to learn and not at all what we would recommend for the occasional user.

The package comes with a single disk, formidable 200-page manual in a three-ring binder, reference card, 26 keytop stickers, and a single sheet indicating the functions of the various keys on the NEC keyboard.

Multiplan

Multiplan is the spreadsheet program by Microsoft that some users swear by and others swear at. It has several improvements over the granddaddy of spreadsheets, *VisiCalc*. However, because of its extended features, many operations and entries require more keystrokes than *VisiCalc*.

On the other hand, on the bottom of the *Multiplan* screen is a short explanation of the various commands; this aids in learning and using the system. A HELP command, which brings in additional help information from the disk, is also available. One very unhelpful thing is that the CP/M labels for the function keys remain displayed on the bottom row of the screen; they are not implemented under *Multiplan* and cause an error if pressed.

Like *WordStar*, *Multiplan* is a favorite spreadsheet of hard core programmers because of its extended capabilities; however, it is more than satisfactory for the occasional user as well.

Communications

The PC-8800 system includes a powerful terminal program built into the ROM. Since the system includes a standard RS-232 serial interface, with the addition of a cable and modem, the PC-8800 is ready to do duty as a communications terminal.

Terminal mode can be entered in two ways. From Basic, the TERM statement allows the selection of communications parameters. Once entered, the computer automatically acts as a terminal.

If you expect to use the computer mainly as a terminal, the DIP switches on the back can be set to enter terminal mode automatically upon powering up the system.



The Bit-INN in the Akihabara area of Tokyo is popular with young people.



The Basic Computer Games books are so popular in Japan as in the U.S.

In either terminal mode, function keys 6-10 are redefined to allow the entry of control codes, select half or full duplex, dump the screen to the printer, and copy data from the buffer. The manual describes the use of terminal mode thoroughly including remote Basic protocol.

Other CPU And Peripherals

In addition to the system components described above, eight expansion boards are available for the computer. Perhaps the most interesting board is one containing a 16-bit 8086 microprocessor. Presumably, with this board the 8800

would be able to run IBM PC software as well as many of the emerging 16-bit packages. Details were not available about this board at the time of writing this review.

Two memory boards are available, one with 32K and the other with 128K in four banks of 32K each.

A serial communication board has two serial ports for different types of synchronous (biisync/SDLC/HDLC) and asynchronous protocols. This board will allow communication with IBM and other mainframes.

A voice synthesis and voice recognition board each contain their own cpu, memory, and special chip set for speech synthesis or recognition.

Last, for engineers and designers, a universal board, which can contain up to 32 wirewrap IC sockets, is available.

Pricing

The PC-8800 bundled package includes the computer with 64K, dual 5 1/4" disk drives, monochrome monitor, both Basics, CP/M, *WordStar*, and *Multiplan*. The package price is \$2497, roughly \$1000 less than the individual items purchased separately.

November 1983 © Creative Computing

It writes, rates, creates, even telecommunicates. Costs less, does more— the Commodore 64.



When Commodore introduced the 64, the industry suddenly realized that

there would be a computer in every home, school and business years before anyone ever dreamed.

That's because Commodore 64 halved the price of high technology: while you can compare the 64's capabilities with those of any sophisticated business PC, you can compare its price with that of an average television.



CIRCLE 133 ON READER SERVICE CARD

COMMODORE 64

What can you do with it? Create with its high resolution Sprite Graphics. Add a printer and type with it. Add a disk drive to use

spread sheets and other financial

programs. Learn and

play music through

your home sound sys-

tem on the 64's

professional quality music synthesizer.

Add a modem, and hook up with

the vast computer networks through

your telephone. In short, the

Commodore 64

is the ultimate

personal computer,

at a price

you can afford.



SCOTT, FORESMAN PROBE

EASY AS PIE! IT'S BASIC

Unlock the full potential of your computer, and satisfy your family's learning appetite.

PROBE makes beginning Basic Programming as easy as pie.

Scott Foresman's approach blends hands-on training with self-instructional activities. From the first minute PROBE's easy-to-follow format shows you how to turn your computer into a productive working tool. Learn simple exercises like "Teaching the Computer to COUNT."

Discover how to DEBUG. Create exciting graphics, sounds, and animation. There's even a Helper's Manual with answers to all the questions.

PROBE is available for four different age levels, ranging from five years to adult. There's nothing else on the market like PROBE.

SCOTT, FORESMAN . . .

Products with tomorrow in mind.



THERE'S MORE TO PROBE
THAN MEETS THE EYE.

Includes: Helper's Manual,
a full-traveler's computer
console, a 16" x 16" keyboard
with 100% sheet pad of screen
saver, and cassette. Available for
use on IBM and other
personal computers.

Buy PROBE wherever quality
software is sold or write:



**Scott, Foresman
and Company**

Electronic Publishing Division

1900 East Lake Avenue, Glenview, Illinois 60045

CIRCLE 168 ON READER SERVICE CARD

NEC PC-8800, continued...

The high-resolution RGB color monitors are somewhat pricey; the 14" one costs \$998 and the 12" one, \$798. The 12" monochrome monitor with the bundled system is \$199 by itself, a less expensive unit is available for \$149.

The PC-6082A data recorder costs \$100. The bundled 5 $\frac{1}{4}$ " dual floppy disk drive costs \$1099 separately while an 8" dual drive costs \$1999.

The 16-bit 8086 mpu board costs \$550 and a 32K RAM board costs \$250.

Most of the above items are generally not discounted. One that is is the NEC PC-8023A-C printer. List price is \$645, but it is frequently available in the low \$500 range.

Although the bundled system at \$2497 is an excellent value, if one were to add a color monitor and printer, the price would jump to around \$4000—still a relative bargain. The 16-bit mpu and more memory would bring the price to over \$5000, still generally in line with other systems with the same or less capabilities.

The Bottom Line

As is probably obvious by now, we are most enthusiastic about the NEC PC-8800 system. It has exceptional color graphics capabilities, an outstanding version of Basic, and a nice complement of included software. The computer has been available in Japan so the bugs are ironed out, and the system should have high reliability. It is an excellent value at the package price of \$2497.

At the moment, there is not a great deal of packaged software for the PC-8800 system (unless you can read Japanese). Although there is a wealth of software that runs under CP/M, it must be recorded onto NEC disks and configured to use the NEC hardware. This can



Trying out a NEC picturephone.

be done by downloading with the terminal package, but at the moment it must be done by you, the customer, assuming you want any packages beyond the included Basic, *WordStar*, and *Multipan*. We have been assured by NEC that a

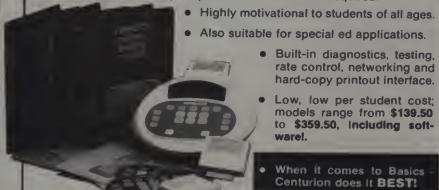
great deal of additional software will be available before long, and we have no reason to doubt them.

As for us, we'll take the system as is; at the price it is a remarkable performer. □

AT LAST: COMPUTER TECHNOLOGY DEDICATED TO LEARNING!

FACT: When it comes to CAI, ONLY Centurion dedicated Educational Computers are designed specifically to support drill and practice instruction in basic academic skills.

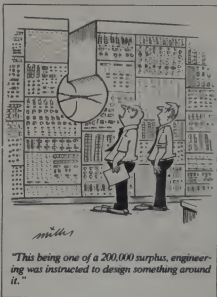
- A proven track record of documented success with over 80,000 Digitor, Alphator and Versator models in U.S. classrooms.
- Hundreds of quality software programs providing literally millions of learning opportunities in Reading, Spelling, Math and Science. Grades K-12.
- No "computer literacy" experience or instruction required.



- Highly motivational to students of all ages.
- Also suitable for special ed applications.
- Built-in diagnostics, testing, rate control, networking and hard-copy printout interface.
- Low, low per student cost; models range from \$139.50 to \$359.50, including software.

- When it comes to Basics - Centurion does it BEST!

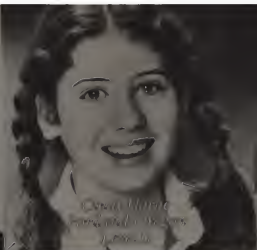
Contact your local dealer or Centurion for FREE classroom evaluation.
Centurion Industries, Inc. 5150 E. CENTURY, 1981 CENTURION DR. MUMFORD PARK, FLA 34403



"This being one of a 200,000 surplus, engineering was instructed to design something around it."



James Barbato
Springfield, Virginia
Level 12



Cynthia Martin
Springfield, Virginia
Level 12



Ron Robertson
Washington, D.C.
Level 12



Mark Romo
Bazemore, Monrovia
Level 12



Greg Teksey
St. Paul, Minnesota
Level 10



David Silver
New York, New York
Level 9



Steven Busse
Springfield, Massachusetts
Level 10



Joe Ivey
Kearney, Nebraska
Level 10



Mary McDermott
Fort Lauderdale, Florida
Level 9



Matt Maultz
Wichita Falls, Texas
Level 12



Jean Cole
San Diego, California
Level 12



Gregory Michael Mullins
South Ayrton, California
Level 12

The 12 Strongest People In The World.



You may know them as students, doctors, office workers, lawyers. But don't let that fool you. They are the *Warriors of Ras*.™

At will, they can enter the world of Ras. A world where sorcery is real and heroics are commonplace. It is there that you'll find the four challenging new computer role-playing games: *Dunzhin*, *Kaiv*, *Wylde* and *Ziggurat*.

You can join them, pitting your mind and reflexes against mazes filled with creatures that are more threatening at every turn. Turns that become more treacherous with every step. And with each triumph you become stronger, faster, wiser.



Even better, you can carry your experience from one game in the *Warriors of Ras* series to the next. You may need to. *Dunzhin*, *Kaiv*, *Wylde* and *Ziggurat* are increasingly difficult.



Dunzhin



Kaiv



Wylde



Ziggurat

All games are for Atari and Commodore 64. *Dunzhin* is also available for Apple and IBM PC.

So sharpen your sword. You could become the first Level 20 Warrior. The strongest in the world.

And all the while even your best friends may never know what's happened to you.

screenplay™

Box 3558, Chapel Hill NC 27514 800-334-5470

The ultimate challenge from Screenplay is coming. Play, and you could win \$10,000.

CIRCLE 218 ON READER SERVICE CARD

Executive Sweet

As this magazine goes to print, Osborne Computer Corp. is in serious financial difficulty. By the time you read this they will either be bankrupt or have been acquired. Nevertheless, many Osborne Executive machines were manufactured and are in the pipeline. We felt the machine was a good value at \$2495; at possible distress prices, it could be a real bargain.

Stephen Arrants

In 1980 Adam Osborne started an avalanche in personal computing with the introduction of the Osborne I Portable computer. The sewing-machine-like case opened up to reveal a self-contained computer with a small, monochrome display, two disk drives, and 64K of memory. Also included in the package was enough software to get the user up and running. *WordStar*, *MailMerge*, *SuperCalc*, CP/M, and utilities that cost almost as much as the computer were thrown in for free.

Imitators soon followed. Kaypro, Compaq, and other manufacturers began bundling portable computers with

creative computing

HARDWARE PROFILE

Product: Osborne Executive

Type: Portable Computer

System: Z80A, CP/M+

Specifications: 20.5" x 9" x 13", 28.5 lbs., CP/M+, MBasic, CBasic, *Word Star*, *MailMerge*, *SuperCalc*, *Personal Pearl*, and the UCSD p-system included.

Performance: Very good

Ease of Use: First time users had no problem.

Documentation: Excellent

Price: \$2495

Summary: Good choice if the software fits your needs.

Manufacturers:

Osborne Computer Corp.
26538 Danti Ct.
Hayward, CA 94545



Osborne has made some intelligent changes from the Osborne I.

software for sale to a lucrative and previously overlooked market. In an effort to keep and expand its market share, Osborne has introduced a new generation of portable computers.

The new line is the Osborne Executive series. The result is a better computer, added features, more intelligent design, and improved software and documentation. As with the Osborne I, there are no real technological breakthroughs. But the Executive does offer a refinement of existing ideas and technology.

Specifications

As with the Osborne I, a Z80 microprocessor is standard, allowing access to the large library of CP/M software. 124K of RAM is included. Additional RAM includes 4K for two 128-character sets, 4K x 12 bit RAM for video mem-

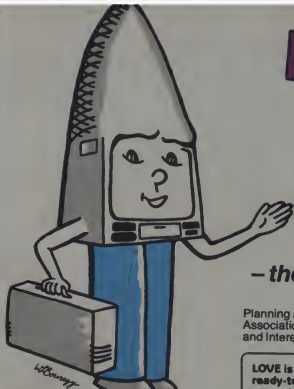
ory, and 2K for scratchpad RAM. 8K of ROM is present.

The most noticeable improvements are a 7" amber display, which is easier on the eyes than the old 5" black and white screen, and two double density disk drives with 185K capacity each. The drives are now placed to the left of the video display. Two RS-232 serial ports, an IEEE 488 parallel port, an external video connector, and a composite video connector are located on the front panel. The power switch has been moved to the front, just under the screen. A fan on top of the case is another welcome addition.

The detached keyboard has 69 keys and a 12-key numeric keypad. Unfortunately, the keyboard feel hasn't been changed from that of the Osborne I. It still offers plenty of key bounce and an

ATTENTION HUMANS! MAGIC HAS LANDED

- the computer for the serious of mind.



Like television and stereo, computers can be used by many different people, in offices and business, in schools and at home... the interest in programs is the difference.

Planning and Scheduling • Church and Association Management • Mortgage and Interest Details •

LOVE is a ready-to-use computer system.



MAGIC speaks many languages including CBASIC which comes with system, plus a dictionary, a word processor, an electronic spreadsheet and a filing system — FREE.

BASIC Programming and Learning • Electronic Spreadsheet • Administrative Reports • Address File, Control and Updating • Dictionary and Spelling • Your Own Private Secretary • Designing Forms • Information for Insurance and Hospitalization • Learning Computers • Managing Home Purchases and Inventory • Structural Engineering • Medical Office Scheduling



Excessive consumption of mass quantities is EASY with Z80A and 6502 processors and up to FOUR 400KB DISK DRIVES.



Here are a few of the ways (or software programs) in which you can put Magic in your life.

Extensive selection of software abound everywhere at economy levels.



Professional Appointment Book • Income Tax Preparation • Accounts

64K RAM, dual processor system, video, communications and printer interfaces.



• Property and Asset Management • Engineering Circularity • Sports and Activity Statistics • Medical and Legal Accounting • Wordprocessing and Letters • Travel

ATTENTION HUMANS!
Our mission here on earth is rapid conversion of excessive data into functional modes of information... this may be accomplished with Itty Bitty Machine... but more productively with MAGIC.



Thesis and Reports • Data Communications • Business Marketing • File and Retrieval Systems • Dental Office Management • Librarianship and Cataloging • Indexing for Small Business • Household Inventory • Investment Analysis and Tracking •



Magic
computer

WRITE TO: Magic Computer Company, Inc. • Two Executive Drive • Fort Lee, NJ 07024
(201) 944-6700 • CALL: (800) 221-1565 • Telex: 144594

CIRCLE 186 ON READER SERVICE CARD

Flight Simulator II

For Apple,
Atari, & Commodore 64



Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to gray cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

See your dealer . . .

Prices in 1985. Some restrictions. For sales orders please add \$1.00 for shipping and handling. UPS is best; mail delivery. American Express, Diners Club, MasterCard, and Visa accepted.

Order Line: 800/637-4983

CIRCLE 234 ON READER SERVICE CARD

subLOGIC
Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

block, a blinking underline, or a steady underline. A key click may also be selected.

Osborne has done something interesting with the way display characters are generated. Normally, the characters are in ROM. On the Executive, the characters are entirely "soft." When you boot up the system, a standard character set is loaded in. You can, however, create and edit new characters to suit your needs. Characters specific to a certain profession or language can be created and stored on disk.

Two external video connectors are now available. One connects to a standard NTSC display. The other is the one familiar to owners of the Osborne 1. These extra connectors are helpful when you want a display larger than the 7" offered. Actually, the new display is quite nice. Since it is, after all, right in front of you, eyestrain doesn't seem to be a problem.

Storage

Two built-in drives provide an increase in storage over the Osborne 1. The double density drives give you 185K of CP/M space each—almost double the storage of the Osborne 1. There is now sufficient storage space for almost all CP/M applications. There is one compartment for disk storage, but if the Osborne modem or RAM disk option is added, you lose it.

Interfacing With The World

The Osborne 1 is noted for its excellent interfacing provisions. It has a standard RS-232 port, software drivers, a modem port, and an IEEE 488 port. The improvements in the Executive are truly spectacular. For example, Osborne is going all out on communications. The Executive will be able to emulate different IBM terminals, as well as other types of terminals. More than 25 emulations are planned; you have only to install the emulation into the operating

system driver by menu selection.

Let's say you are an auditor working in the field. You want to retrieve information from your client's mainframe or mini. Select the correct terminal emulation, and you can retrieve his data. This makes for a very powerful, flexible communications system.

A serial I/O port gives you a selection of 15 baud rates, all selected via the menu. The IEEE 488 port can connect you with a parallel printer, a teletype, and most scientific equipment. A modem port is also present.

Under the CP/M+ operating system, logical and physical devices are entirely separated and easily assigned. The default setup usually assigns different functions to each port; a utility included by Osborne allows you to reassign them. Multiple physical devices can be as-

A strong selling point for the Executive is the amount of software that comes with the system.

signed to one logical device. All three I/O ports could be assigned as list devices and you could have three printers printing in parallel. You may not want to do that often; in fact, you may never want to do it, but it shows that Osborne has tried not to close any doors unnecessarily.

Software

A strong selling point for the Executive is the amount of software that comes with the system. The CP/M+ operating system supplied offers all of the features of the earlier CP/M vers. 2.0 with a few modifications. MAC replaces ASM; SHOW and DIR include

the older STAT functions, and SID replaced DDT. You should have no problems getting accustomed to this operating system.

One glaring omission is the lack of a Help screen. On the Osborne 1 the Help screen provided at least some help to first time users. Apparently, Osborne feels that users of the Executive know what they are doing.

The software consists of *WordStar*, one of the most difficult and time consuming word processors to learn; *MailMerge*, an associated mailing list program; and *SuperCalc*, an excellent spreadsheet program which some feel is superior to all others.

New software with the Executive includes the UCSD p-code and *Personal Pearl*, a database and information system. The addition of any type of database is welcome. Before you can use *Personal Pearl*, however, you must back it up on ten disks! I am certainly glad that they allow you to create backups, but performing this operation took a long time.

Personal Pearl is a serviceable program. It allows the creation of an address book, appointment calendar, forms, and information files. I can't figure out why Osborne included the p-code with the Executive. Although there is an excellent tutorial on its use, there are no suggestions as to what exactly an executive can do with it.

Documentation

The documentation supplied is both comprehensive and informative. Everything you need to know is included in the manuals. The manuals guide you all the way through setting up the system to creating your own *SuperCalc* worksheets. The tutorial style is easy to follow, especially for a system with the complexities of the Osborne Executive. The section on p-code is the most readable I have seen.

Summary

The Executive is a marked improvement over the Osborne 1. The redesign of the front panel, addition of a cooling fan, additional disk storage, extra memory, and the software configurable keyboard make this a comprehensive system. At 28.5 pounds, however, the Executive is a bit heavy to be called a portable.

If you are interested in a system purely for business use, the Executive and its bundled software may be just what you are looking for. Osborne has a good reputation for reliability and service, so I wouldn't worry about that. All in all, the Osborne Executive is a great machine. Now, if only I could play *Pharaoh's Curse* on it. □



"There's No Time Wiser Than After Dark."

When you're looking for solid, up-to-the-minute information, the best place to search is BRS/AFTER DARK. The one system designed for serious searchers, AFTER DARK offers you more databases citing more authorities on more subjects than any other popular online information service—at the lowest cost.

For only \$6 to \$20 per connect hour, including telecommunications charges, you can personally access the same online files used by major reference libraries and corporations worldwide. These files contain the latest information on subjects ranging from business management, mathematics and education to health, psychology, chemistry, family planning, and just about everything in between.

The range of databases available keeps expanding all the time. AFTER DARK now brings you the full text of the **Academic American Encyclopedia**, as well as the **Harvard Business Review**.

CIRCLE 119 ON READER SERVICE CARD



And for microcomputer buffs, there's a new online Software Directory listing major software packages.

AFTER DARK's simple, interactive language and straightforward logic take only minutes to master.

The system is outstandingly comprehensive, remarkably fast, and above all, fun to use. All you need is your classified BRS password and any dial-up system. Then, every weekday from six in the evening until the early morning hours—round the clock on weekends and holidays—you can summon up a wealth of valuable information.

Use the coupon to sign up for BRS/AFTER DARK before another evening goes by. Seriously, it's like having your own university library online at home.

BRS



COLLEAGUE

AFTER DARK

CC 11/83

- Sign me up as a BRS/AFTER DARK subscriber. I understand I will be charged a one-time subscription fee of \$50 plus connect hour rates as low as \$6 per hour, billed to my credit card account with a monthly minimum charge of \$12.
- I'd like to know more. Please send me a list of databases and a brochure describing BRS/AFTER DARK.

My profession is _____.

Mail to BRS • 1200 RT. 7 • LATHAM, NY 12110 • (518) 783-1161

Name _____

Address _____

City _____ State _____ Zip _____

Charge to MASTERCARD/VISA/AMERICAN EXPRESS
(Circle one)

Acct. No. _____

Expires _____

Signature _____

LEARNING with LEEPER™



WHY WAIT UNTIL YOUR KIDS ARE IN SCHOOL?

Let Leeper give them a head start in reading, writing and math.
An award-winning collection of four preschool games for the Apple computer.

CES 1983
SHOWCASE AWARD



This designates a trademark of Sierra On-Line, Inc.
CIRCLE 221 ON READER SERVICE CARD

NOW AVAILABLE FOR
AND
COMMODORE 64
ATARI

Olympus C100 Microcassette Recorder

*A Pocket Recorder
For Your Pocket Computer*

Glenn A. Hart

Hand-held and briefcase portable computers are wonderfully useful devices for the executive, converting otherwise wasted travel time into productive, fruitful worktime. A wide variety of miniature computers can meet almost any business, scientific, or engineering requirements.

One weakness of such devices has been their lack of permanent magnetic storage. While most such units feature low power consumption CMOS-type

The quality of microcassette recorders, while adequate for voice dictation, is not up to the demands of data storage.

memory which retains its contents even when main power to the computer is off, obviously the amount of data which can be stored is limited to the size of RAM installed in the computer. Since most hand-helds don't have much RAM, the data storage is usually severely limited.

Glenn A. Hart, 51 Church Rd., Monsey, NY 10952.

November 1983 • Creative Computing



Even the exceptional unit with some form of archival storage, like the magnetic cards used in the Hewlett-Packard HP-75, doesn't hold much information.

The solution for some units has been the lowly audio cassette. Standard audio cassette recorders can often be used with an optional interface unit to store very large amounts of information, albeit at reasonably low speed. In the past, audio cassettes were sometimes unreliable, but newer designs have been proven to be dependable adjuncts to both hand-held and desktop computers.

One difficulty faced by the portable computerist is the physical size of most

cassette recorders. An average AC recorder is often bigger than the small computer itself, and even portable cassette units are big enough to create a problem in the normal executive briefcase.

On the surface, the new microcassette recorders offer an interesting alternative. Already carried by many executives for dictation, it would seem that such recorders would solve the space problem, in terms of both the size of the recorder and the room taken by the cassettes themselves. Unfortunately, several obstacles arise. Most computer cassette interfaces require jacks for a

creative computing

HARDWARE PROFILE

Product: Olympus C100

Type: Microcassette recorder

System: Any that uses a standard microcassette

Format: Microcassette

Specifications:

Measures 5.4" x 2.6" x 1.1," operates on two standard 1.5 volt AA batteries or optional AC adapter. Two speeds, 15/16 ips and 1/2 ips.

Performance: Good

Ease of Use: Very good

Documentation: Adequate

Price: \$122.50

Summary: Operates correctly with 300-baud cassette recording, may not work at higher speeds. Compact.

Overall Marks: Good

Manufacturers:

Olympus Optical Co.
4 Nevada Dr.
Lake Success, NY 11042
(516) 488-3880

microphone, an earphone, and a remote control jack to control tape movement, and no microcassette recorders have included these jacks. Also, the quality of microcassette recorders, while adequate for voice dictation, is not up to the demands of data storage.

Olympus Optical Co. of Japan, one of the leaders in microcassette technology, has addressed these problems with their new C100 microcassette recorder. In this compact and inexpensive unit, specifically designed for data storage, the limitations of all other microcassette units have been remedied.

External Features

At first glance, the C100 looks like any other pocket microcassette recorder. About average size for such units, the C100 measures 5.4" by 2.6" by 1.1" and operates on two standard 1.5 volt AA batteries or an optional AC adapter. Like many other current units, two speeds are available, the faster (15/16 inch per second) for data and highest voice quality and half speed (1/2 inch per second) for maximum recording time for a given tape length.

Other common features include a built-in condenser microphone, three-digit mechanical counter with reset button, battery condition LED, pause control, cue and review (audible fast for-

ward and rewind for locating segments on the tape), and separate controls for stop/eject, play (also labeled LOAD), record (also labeled SAVE), fast forward, and rewind.

The features which set the C100 apart are the full set of jacks for remote, earphone, and microphone, a monitor switch which makes playback audible even if the earphone jack is inserted so data playback can be heard, a phase reversal switch which is used to adapt the recorder to the needs of various computer systems, and special construction which allows the fast forward and rewind to function even with the remote jack in, which is a real convenience in computer use.

Operation

Operating the recorder is simplicity itself. Everything works exactly as would be expected, with the computer controlling tape motion as it should. Recording level is fixed by an automatic gain control circuit, but playback volume can be adjusted to match the requirements of the computer. The correct setting for the phase switch must be determined by experimentation; the recorder simply won't work on one of the settings.

The monitor switch has no effect on the storage process, but can be a convenience if the computer doesn't have audio output of its own during saving or loading. A special circuit boosts recording level when battery power begins to ebb, ensuring correct recording even when the Battery Indicator LED shows that power is low.

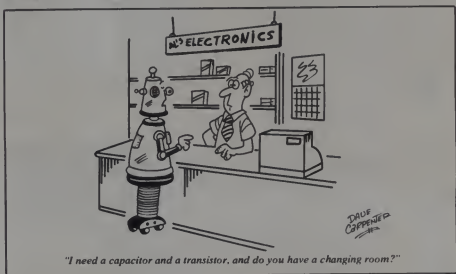
Olympus offers a special microcassette tape optimized for data storage. Designated the MC-15CT, this cassette stores up to fifteen minutes total, which is a very convenient length for data use. It retails for \$2.20 each.

I tested the C100 with three Radio Shack computers, the PC-1 and PC-2 hand-helds, and the Model 100 briefcase executive computer. The C100 batted two for three. Both hand-helds use conservative 300 baud cassette recording, and the C100 worked perfectly with them. Even long programs saved and loaded without any errors, time after time. I also tried the recorder with normal audio microcassettes, and these worked equally well.

The new Model 100, however, presented problems. Its 1500 baud cassette format speeds data transfer dramatically, but the more demanding format proved too much for the C100. I had major problems transferring even a five-line file, and it took ten or twenty tries before I had one successful transfer, even after trying all ten possible playback volume settings and both positions of the phase switch. Longer programs and text files were out of the question; occasionally the computer would recognize the file header from the tape, but the load would invariably abort somewhere in the file itself.

The C100 is ideal for owners of hand-helds like the PC-1 and PC-2 and their Sharp equivalents. The space saved is significant, and operation is essentially perfect. While it is too bad that the already large Model 100 can't benefit from the space saving, this computer is developing a reputation for fussy cassette operation, and many full size cassette recorders have problems with it as well. Thus it is not surprising to find that the C100 has difficulties with the Model 100, too.

Given that the C100 is priced at only \$122.50 retail and also operates as a first-rate voice/dictation recorder, I strongly recommend it to portable computer owners. □





Small Computer BOOK CLUB

a division of the Library of Computer
and Information Sciences

Please accept my application for trial membership and send me the MICROCOMPUTING LIBRARY (003-540) (single copy \$2.95, 12 issues) for the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If you are not satisfied—for any reason—you may return the MICROCOMPUTING LIBRARY within 10 days and your membership will be canceled and you will owe nothing.

Name _____

YAD5
Name of firm _____
(if you want subscription sent to your office)

Address _____

City _____

State _____

Zip _____

(Optional) The Model Type of Microcomputer I use is _____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)
Oswego Computing 11/83



Small Computer BOOK CLUB

a division of the Library of Computer
and Information Sciences

Please accept my application for trial membership and send me the MICROCOMPUTING LIBRARY (003-540) (single copy \$2.95, 12 issues) for the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If you are not satisfied—for any reason—you may return the MICROCOMPUTING LIBRARY within 10 days and your membership will be canceled and you will owe nothing.

Name _____

YAD5
Name of firm _____
(if you want subscription sent to your office)

Address _____

City _____

State _____

Zip _____

(Optional) The Model Type of Microcomputer I use is _____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)
Oswego Computing 11/83



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 230 RIVERSIDE, N J

POSTAGE WILL BE PAID BY ADDRESSEE



**SMALL COMPUTER
BOOK CLUB**

Riverside, New Jersey 08075



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 230 RIVERSIDE, N J

POSTAGE WILL BE PAID BY ADDRESSEE

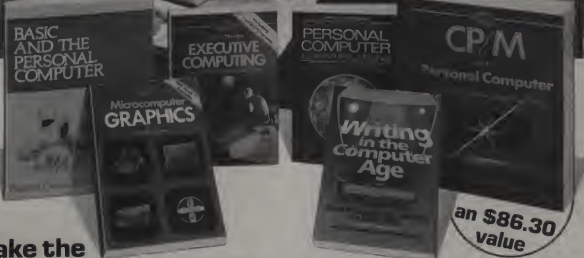


**SMALL COMPUTER
BOOK CLUB**

Riverside, New Jersey 08075



Get more from your small computer!



Take the 6-volume Microcomputing Library for only \$2.95 when you join the SMALL COMPUTER BOOK CLUB

You simply agree to buy 3 more books—at handsome discounts—within the next 12 months.

This set of six carefully selected books—an \$86.30 value—will be your basic reference source for small computing.

1. BASIC AND THE PERSONAL COMPUTER.

Thomas A. Dwyer and Margot Critchfield. A down-to-earth introduction to programming in BASIC. Includes: computer graphics, program development, data bases, and more. Also, many step-by-step examples of word processing, computer games, and computer simulations. **Publisher's Price: \$15.55.**

2. MICROCOMPUTER GRAPHICS.

Roy E. Myers. Provides the essential mathematics and programming techniques you will need for computer graphics applications in BASIC, and many other topics. **Publisher's Price: \$12.45.**

3. THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS:

Everything You Need to Go Online with the World.

Alfred Glossbrenner. This digested collection of detailed information on the far-flung aspects of networking and data bases shows you how to gain access to a universe of information with your small computer. **Publisher's Price: \$14.95.**

4. WRITING IN THE COMPUTER AGE: Word Processing Skills and Style for Every Writer.

Andrew Fluegelman and Jeremy Joan Hewes. A

manual for everything from types of equipment to the fine points of formatting the finished work. **Publisher's Price: \$10.95.**

5. C/P/M AND THE PERSONAL COMPUTER.

Thomas A. Dwyer and Margot Critchfield. A crisp, detailed tutorial that will easily turn the average reader into a skilled C/P/M user. Features lab exercises in each chapter. **Publisher's Price: \$19.95.**

6. EXECUTIVE COMPUTING.

John M. Nevison. 25 business methods illustrated by computer programs, in a step-by-step casebook. You'll find details on pricing techniques... long-range planning... corporate data bases... and much more. **Publisher's Price: \$12.45.**

SMALL COMPUTER BOOK CLUB is a division of the Library of Computer and Information Sciences, the oldest, largest and most respected computer book club in the world. The **SMALL COMPUTER BOOK CLUB** will keep you up-to-date with the latest developments in software, improvements in hardware, programming languages, and much more—all at handsome discounts.

So start enjoying the club's benefits today.

4 Good Reasons to Join

- 1. The Finest Books.** Of the hundreds of books submitted to us each year, only the very finest are selected and offered. Moreover, our books are always of equal quality to publishers' editions, never economy editions.
- 2. Big Savings.** In addition to getting the Microcomputing Library for \$2.95 when you join, you keep savings substantially—up to 50% and occasionally even more. (For example, your total savings as a trial member—including this introductory offer—can easily be over 50%. That's like getting every other book free!)
- 3. Bonus Books.** Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings up to 70% off the publishers' prices.
- 4. Convenient Service.** At 3-4 week intervals (6 times per year) you will receive the Book Club News, describing the Main Selection and Alternate Selections, together with a dated reply card. If you want the Main Selection, do nothing and it will be sent to you automatically. If you prefer another selection, or no book at all, simply indicate your choice on the card, and return it by the date specified. You will have at least 10 days to decide. If, because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

If the reply card has been removed, please write to the Small Computer Book Club, Dept. Y-AD5, Riverside, N.J. 08075 to obtain membership information and an application.

Simons' Basic

As personal computers go, the Commodore 64 appears to be a commercial "hit." It is a reasonably powerful machine with plenty of memory and unique graphic and sound features. Its quick acceptance by consumers should not be a surprise, since it is a bargain. (In December, 1982, the 64 sold for \$595 and there was almost no discounting of prices. As this is being written, it is generally available for around \$225, but by the time you read this, it may be available for even less.)

According to the official company legend, Simons surveyed other Basics and their extensions and picked from among their features.

Shrewd pricing isn't the only trick Commodore has up its sleeve, however. It will soon unveil Simons' Basic, an extension to the resident language of the 64 which will add an unbelievable 114 commands to the machine.

Commodore Basic isn't a bad language. A version of Microsoft Basic, it has very few peculiarities and no major bugs. Its only real problem is that it didn't grow up with the company's computers. While it was serviceable for

Tim Onosko, 1338 Rutledge St., Madison, WI 53703.

Tim Onosko

the original 8K Pet, which had no color, sound, or high-resolution graphics, Commodore Basic just isn't enough for the 64, which has all of those features.

In fact, the complaint about the 64 has often been that its power is difficult to unlock from Basic, and novice users are shut out completely by the complexity of the task. The Apple computers at least have a few screen commands in their Basic, and the Atari computers have even more. Programming even the most rudimentary graphics and sounds on the 64 is an endless job of PEEKing and POKEing.

creative computing SOFTWARE PROFILE

Name: Simons' Basic

Author: David Simons

Type: Basic Language Extension

System: Commodore 64

Format: Disk

Summary: Essential programming tool for the Commodore 64 includes 114 new commands for graphics, sound, programming, and editing.

Price: \$29.95

Manufacturer:

Commodore Business Machines
1200 Wilson Dr.
Westchester, PA 19380



Simons' Basic offers not only a solution to the problem but almost makes the 64 into an entirely new computer. (Probably the one it should have been in the first place.) The 114 new commands are so comprehensive that they make Simons' Basic more than a good language extension. It may be one of the very best ever designed. I predict that it will cement the popularity of the 64 and become the standard language for programming the machine.

Background

The origin of Simons' Basic is interesting in itself. It was created by a British programmer named David Simons, whose parents gave him his first computer just three years ago on his thirteenth birthday. (Commodore's founder and president, Jack Tramiel, should adopt the kid and make him heir to the company fortune, or at least pay him enough to keep him writing for his computers for life.) According to the of-



TO HELP EDUCATE YOUR CHILD, WE ASSEMBLED THIS DISTINGUISHED FACULTY.

It's a rare teacher who can make a child think learning's fun.

But we've found several of them. And they make Monkeymath™ more fun than your child ever dreamed an educational game could be.



Monkeymath
by Dennis Zander

Of course Monkeymath helps give your child a better understanding of addition, subtraction, multiplication and division. That's the part *you'll* like.

But the part your *child* will like is Monkeymath's arcade-type action and animation, three skill levels and scoring. So, like any good arcade game, kids just can't stop playing it.

In fact, in a recent issue of Antic magazine, David Plotkin called Monkeymath "... one of the most entrancing educational games ever written." (And Monkeynews™ and Monkeybuilder™, our soon to be released reading comprehension and word recognition games will be every bit as entrancing.)

So Monkeymath does more than help your child understand math—it teaches him that learning can be fun.

And, as you can see, you don't find teachers like that just anywhere.

Monkeymath™, Monkeynews™ and Monkeybuilder™—a new educational series from Artworx®. For the Commodore 64, Atari, Apple and VIC-20 computers, Cassette/Diskette from \$23.95, Artworx Software Co., Inc., 150 North Main St., Fairport, N.Y. 14450. For a free catalog of Artworx Software write or call 800-828-6573.



Artworx®
So you can play.

Apple*, Commodore*, Timex/Sinclair* . . .

by William B. Sanders



We make them elementary.

 **DATAMOST**

8943 Fullbright Ave., Chatsworth, Co. 91311. (213) 709-1202.

VISA/MASTERCARD accepted. \$2.00 shipping/handling charge.
(California residents add 6% sales tax)

*Apple, Commodore 64, and Timex/Sinclair are trademarks
respectively of Apple Computer, Inc., Commodore Business
Machines, Inc. and Timex Computer Corp. Copyright 1983 Datamost Inc.

The idea of getting your own computer sounded wonderful. But now that you have it you're a little scared . . . you think it sounds so technical. Well, rattle heart. Relax. Help is here. William B. Sanders has written individual books about the Apple, the Commodore 64, and the Timex/Sinclair computers. When you select the one which matches your computer you can breathe easy because it'll be like having your all-time favorite teacher at your side . . . gently guiding you, explaining, and showing.

THE ELEMENTARY series sweeps away the

confusion and explains your Apple, Commodore 64 or Timex/Sinclair in down to earth terms, coupled with enjoyable cartoons. It shows you how to hook it up, how to use the keyboard and work on the screen—all the unique things your computer can do so you can make use of it right away! And

it also answers those questions you'll have about how to write your own simple programs, about graphics, utility programs, and various hardware options.

You'll see your ELEMENTARY book contains a lot of information. And, you'll also see that not one paragraph or chapter is dull or difficult to follow. Prove it your yourself. Visit your computer store. Open the book. Read a page of the introduction, then flip to any page and read a paragraph or so. You'll find it's as understandable, as helpful and as marvelous as we say.

Simon's Basic, continued...

ficial company legend, Simons surveyed other Basics and their extensions and picked from among their features. That is probably true. Simons' Basic resembles other recent extended Basics such as BasicA for the IBM PC.

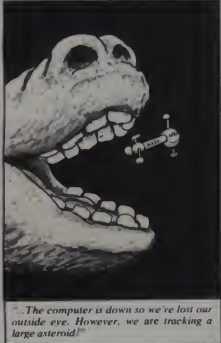
Simons' Basic is packaged as a ROM cartridge, and should be available by the time you read this. At press time, no price was announced by Commodore, as the program had not yet gone on sale either in the United Kingdom or in the U.S. In the U.K., however, a price of £50—or about \$75—has been announced.

Okay, so what's so good about Simons' Basic? That requires more than just a few sentences. The new commands are grouped into several categories: Programming aids ("toolkit" commands and other conveniences); new Basic words for inputting information; arithmetic and math extensions; disk functions; high-resolution graphics; screen manipulation; sprite graphics words; error trapping schemes; music notation; and commands that read controllers (light pens, joysticks, paddles, etc.). Finally, another set of new words is used for structural programming, and can make this Basic very Fortran-like, if you choose to use them. (And I bet you will.)

Obviously, there isn't enough space to describe all 114 commands. (How does all that stuff fit?) Here is a rundown of each category and the highlights of Simons' Basic:

Programming Aids

Though the classic "toolkit" func-



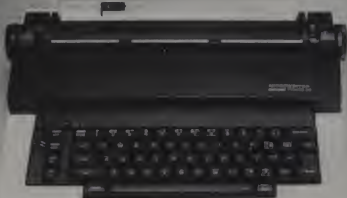
November 1983 © Creative Computing

tions, like AUTO (for automatic line numbering), RENUMBER (for renumbering lines) and FIND (for searching for commands and strings) are here, some of the most impressive commands are not just debugging aids. PAUSE, for example, pauses a program for a length of time you specify. If you press the RETURN key before the time is up, the program will continue. It is very handy. CGOTO lets you GOTO the number of a line calculated by the computer. KEY assigns commands or other words or keystrokes

to the function keys of the 64, and is used for single-key entry. DISAPA and SECURE are used to hide permanently program lines you want to keep from prying eyes. OLD reverses a NEW command.

My only complaint with any of these was RENUMBER, which does not renumber GOTO and GOSUB statements. The book says you won't need them because you will be using "structured" program style (more on this later). I disagree, and found that I immediately

The MICROWRITER™ Daisy Wheel Printer.



Price \$680

Features:

- Microwriter parallel interface mounted internally in the Olivetti Praxis machine
 - Built in self test
 - Portable...comes with deluxe carry case
 - Low noise level
 - Slim modern styling
 - Print quality is identical to the finest office typewriters on the market
 - Can tab
 - Rule single lines both vertically and horizontally
 - Underline
 - Print at 10, 12, or 15 characters per inch (switch selectable)
 - Ten character memory automatic error correction, with lift-off carbon film correction ribbon (for typewriter use)
 - Automatic or programmable page formats
 - Handles letter, legal size sheet and fanfold paper in widths up to 12 inches wide
 - 165 character/12 inch print width
 - Wide selection of 21 interchangeable daisy print wheels available
 - Ribbon cassettes just drop in
 - Switch selectable European keyboard
 - Centronics compatible parallel cables are currently available from stock
- With the Microwriter you will never again have to send an important letter or a simple correspondence that doesn't look impressive. Why settle for just any printer when you can have a MICROWRITER—a fine letter quality typewriter for you and your computer. For more information, see your local computer dealer or contact Ammicro directly.

ammito™

122 East 42 Street, Suite 1700, New York, N.Y. 10168

(212) 254-3030



CIRCLE 113 ON READER SERVICE CARD

Simon's Basic, continued...

wanted to renumber old programs written in original Basic.

Input Handling and Text Manipulation

Hardcore programmers will go crazy over new input routines. I admire the work here, but was fairly happy with INPUT and GET and not much bothered by their limitations. Nonetheless, FETCH is a major improvement which sets limits to the length and type of information expected by the program. ONKEY gives new meaning to the function keys and

Hardcore programmers will go crazy over new input routines.

replaces dozens of lines of Basic code. New string handling words include IN\$ERT, INST, PLACE, and DUP, which allow far finer dissection of strings than I

have ever seen. Three great screen commands are PRINT AT, which eliminates moving the cursor around with loops or multiple PRINT statements, CENTRE (British, remember?) which prints text centered on a line, and USE, a form of PRINT USING.

The new string commands open many, many possibilities unavailable in Basic, and lend themselves to the kind of natural language processing that Basic programmers have only dreamed of. As for the screen commands, PRINT AT, USE, and CENTRE, these come as a relief to anyone who has ever wasted time trying to simulate them.

Thrill Your Friends This Christmas



with a gift
from
bitCards
PERSONALIZED
SOFTWARE
Only \$18.50



Christmas draws near. Santa has disappeared from his ice-castle. The player can solve the mystery using the available clues. Along the way he'll discover that this is no ordinary adventure game: In a storage room, he'll find a shimmering package addressed to him. And in Santa's coat pocket, a scrap of a note signed by you! Santa's computer will call upon him *by name* to help solve the mystery.

And that's just the start of it. We've designed "A Christmas Adventure" to be fun. Great graphics, humor, action sequences and many other features and surprises to charm seasoned adventurer and novice alike. We'll even include your own personal greeting message—right in the program!

A bitCard is the perfect gift for everyone on your list who has access to a micro. They'll love being part of their own adventure. And they'll love you for stuffing their stocking with this Christmas delight.

BitCards. A personalized greeting card. A customized gift.

Now isn't that a better idea than a polka-dot tie?

Available for Apple™ II (all models and compatibles) — 48K disk
16K cassette versions for Commodore 64™, Atari™ 400-800 and TRS-80™ models 1/111 and CC
Cassette versions also available for Vic-20™ (5K) and Vic-20™ w. 8K expander

P.S. Why not order one for yourself too. You'll love the adventure.

TO ORDER A CUSTOMIZED BITCARD:

BY PHONE: (Visa or M.C. accepted) Call 1-800-555-1212 and ask for the TOLL FREE NUMBER FOR BITCARDS.
BY MAIL: (money order or MasterCard/Visa number & exp. date) use separate sheet for each bitCard ordered. Give your name and address and following info about recipient: (1) name (2) address (3) computer (e.g., TRS 80) (4) Model II (4) (optional) his/her phone number. Also include your personal message to recipient (25 word max.) (We'll supply standard message if you prefer.) Indicate if you want bitCard sent to you or directly to recipient. Order should arrive before Dec. 12. Send order or requests for info to: bitCards, 129 S. University Dr., Suite F-4, Plantation, FL 33317. Canadian orders welcome.

DEALER INQUIRIES INVITED

Dealers only: Write to Chartwell Data, Inc., 1130 Laporte, Suite 5, Montreal, Canada H2V 1N8 - (514) 274-1103
Apple is a trademark of Apple Computing, Inc. Vic-20 and Commodore-64 are trademarks of Commodore Business Machines, Inc. Atari is a registered trademark of Atari, Inc. TRS-80 is a registered trademark of Tandy Corp.

CIRCLE 129 ON READER SERVICE CARD

Numeric Aids

MOD returns the remainder when one whole number is divided by another; DIV returns the whole number (integer) and



drops the fractional part. FRAC gives you the fractional part of any number, in decimal form. EXOR performs that logical operation known to mathematicians as an "exclusive or." The commands that most programmers may end up using most are those that do automatic conversion among binary, decimal, and hexadecimal numbers.

If you are involved in understanding the machine on its own level, you know that hexadecimal numbers are vital to programming machine code. Some people pick up on hex and binary numbers quickly and easily. I didn't, so I found these commands a relief.

Disk Commands

There are only two of these, DIR, which gives you a disk directory (lots of options here) and DISK, which allows you to perform most other disk operations without the OPEN, PRINT #, and CLOSE statements required by Commodore Basic.

These almost replace the Wedge (DOS Support) program familiar to anyone who has used any of Commodore's disk systems. *Almost*, that is, except that you can't easily read the disk drive error channel to find the exact nature of a file-handling mistake. Will this cause big

problems? I don't think so. It is unfortunate, though, that you can't yet use Commodore's Wedge in conjunction with Simons' Basic. (Wedge will have to be rewritten.)

Graphics

Here, as expected, is where Simons' Basic really shines. It gives you instant access to high-resolution (320 by 200 pixels) and multicolor (160 by 200) graphic modes. These let you draw defined shapes—REC, for rectangle, CIRCLE, ARC—with a little bit of thought and almost no effort. PAINT fills the shapes with a color. You can also PLOT dots and DRAW lines, of course, and mix TEXT (another command) of several different sizes with the graphics.

These are the commands that will instantly sell Simons' Basic. One line containing any of the eighteen commands eliminates dozens of lines of Basic.

Screen Manipulation

The commands in this category are "extras." None is terribly vital, but each so easy to use that they will be favorites for adding those "bells and whistles" to programs. There are several variations on FLASH, which flashes alternate colors of the screen border, background, and characters. SCRSV lets you save screen text and designs as disk or tape files; scroll commands move areas of the screen in up to four different directions simultaneously. COPY dumps a high-resolution screen to a dot matrix printer.



HRDCPY, for hardcopy, does a similar thing for screens of text.

There are some who may argue over the necessity of these commands—there is a total of fifteen—but that's not the point. This is meant to be an *enhancement*, remember?

Sprite and Character Graphics

Sprites are small pictures that the 64 can move around the screen. They are defined as a one-color block of pixels 24 dots wide by 21 dots high. Multicolor versions of sprites are four-colors (including the background color), but half the horizontal resolution. In addition,

the 64 lets you use a "soft" character set that can be redefined for foreign language characters, special symbols, graphics, etc. Eight new Basic commands (and variations) let you define and move sprites around the screen and redefine the characters.

This is just one approach to the problem of simplifying these kinds of graphics. I am not so sure that the way it is done in Simons' Basic is the best way, but it is the best I have seen.

Music and Sound

Like the sprite commands, new music words offer the best solution yet of how to "talk" to the 64 synthesizer chip, called SID (for Sound Interface Device). VOL sets the overall volume of sound; WAVE assigns each of three voices a



waveform, selecting from sawtooth, pulse/square wave, and triangular waveforms, noise and ring modulation. ENVELOPE lets you "shape" the sound. With MUSIC (another command), you can easily enter musical notes and build song tables. PLAY, which actually produces the sound, has two modes. In the first, the program pauses while music or a sound effect is playing. In the second, the sounds play while the program runs.

Frankly, without commands like these, there is no hope for the Basic programmer who wants to create music easily on the 64. These commands will still take work to understand and use properly, but they are quite good.

Structured Programming

Here is where the real power of Simons' Basic lies, though I am not sure how many first-time programmers will use these new commands. With PROC, you can define and name a procedure, which is kind of a substitute for the traditional Basic subroutine. The name is used to identify the first line of the procedure, and END PROC is used on the last line. This may sound like a trill, but it isn't. The advantages of using this kind of organization in a program will become apparent to you. For one thing,

there are no more GOSUB line numbers to memorize and mess with. One reason RENUMBER doesn't work on GOSUBS and GOTOS is to encourage you to use procedures.

Simons' Basic stands an excellent chance of becoming the standard Basic for Commodore 64 programs.

Veteran Basic programmers may take a little while getting accustomed to this, but the effort is worth it. First-time users should learn to program in this style immediately. It actually makes Basic readable and workable. Structured programming commands also enhance loops, with IF... THEN... ELSE, REPEAT... UNTIL, LOOP... EXIT, IF... END LOOP, and with words that limit the values of variables to specific areas within a program. Lastly, ON ERROR is designed to improve error trapping. It allows a program to continue running, even though one of many different errors might normally occur. The program simply branches to a section where the error can be studied and corrected.

Summary

In my opinion, Simons' Basic stands an excellent chance of becoming the standard Basic for Commodore 64 programs. This can be argued. For example, a Basic expansion has been available for the little Vic-20 almost from the start, but it never really caught on. Very few (if any) published programs take advantage of the Super Expander cartridge that includes new color, graphic and sound commands.

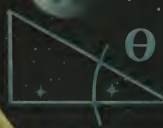
Still, BasicA (Advanced Basic) has become the official Basic of the IBM PC, and no user of that machine would be without its excellent capabilities.

A final word about the Simons' Basic package. A note of thanks should be given to Commodore's U.K. division for assembling a very fine manual. It is thorough but concise, and all of the examples I entered from the book actually worked! (If you have ever worked with a Commodore manual, you know what a joy it is to say this.)

I think many, many people are going to enjoy Simons' Basic, and an equal number are going to flabbergasted by its power. Commodore had better be planning to manufacture lots of copies because they will go fast. □

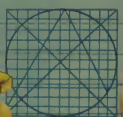


5



$$\sqrt{892}$$

$$a^2 = b^2 + c^2$$



Language
Algebra

ES

Peachtree Software[®]
by **EDUWARE[®]**

The Science Of Learning[™] The smartest way[™] to build specific skills.

Discover how your computer thinks with The Science of Learning.

Computer Literacy

Put the ABCs of computer programming right at your fingertips. The Hands On BASIC Programming[™] Book is written in English and requires only a basic knowledge of mathematics. It takes you through the entire programming technique.

You'll learn to develop new computer skills and you'll be backed up with the tools to learn from your experience.

Language Skills

The basics of spelling, reading and computer operation become fun and easy for young children. It captures their attention and entertains as it teaches.

Parents and teachers have a wide variety of teaching options from which to choose according to an individual child's needs. A learner's recorded progress can be periodically reviewed and systematically approached with new programs.

Elementary Mathematics

This program is where a strong foundation in basic mathematics begins. Correct responses advance a learner, while repeated errors bring review. This simple, step-by-step process with an animated figure takes the viewer through each stage of the learning process.

Advanced Mathematics

Mastery of algebra prepares you for success in a competitive world by sharpening your ability to think analytically, apply logic and identify solutions.

Business people who know the connection between sharp analytical skills and advancement use the program to brush up on their knowledge and understanding of algebra.

Parents and teachers enrich a child's schooling by allowing gifted learners to advance at their own pace.

Hands On BASIC Programming, Language Skills programs, Compu-Math[™], EduWare[®] Fractions, EduWare[®] Decimals and Advanced Mathematics programs are available on Apple II, II+, IIe and Franklin Ace. Compu-Math[™] Fractions and Compu-Math[™] Decimals are available on Atari 400 and 800 Introduction to Counting[™] is available on Apple II, II+, IIe, Franklin Ace and Atari 400 and 800.

The Science of Learning is a division of EduWare. EduWare is a registered trademark of EduWare Services Inc., an MSA company. Peachtree Software is a registered trademark of Peachtree Software Incorporated, an MSA company. Hands On BASIC Programming, Compu-Math and Introduction to Counting are trademarks of EduWare Services, Inc. Atari is a trademark of Atari, Inc. Apple is a trademark of Apple Computer Inc.

CIRCLE 157 ON READER SERVICE CARD



The smartest way to learn.[™]

I am interested in the Peachtree Learning Center.[™]
Please send me more information about the Learning Center program. I am: a prospective dealer. an end user.

MSA
Personal Computer Products
MANAGEMENT SCIENCE AMERICA, INC.

Name _____

Company _____ Telephone _____

Address _____

City _____ State _____ Zip _____

Peachtree Learning Center is a trademark of Peachtree Software Incorporated, an MSA company.
© 1983 Peachtree Software Incorporated, an MSA company
3443 Peachtree Road, N.E. / 8th Floor / Atlanta, Georgia 30326 / 1-800-554-8900

TURN YOUR HOME INTO THE HOTTEST ARCADE IN TOWN

O'RILEY'S MINE™

You're a mad Irishman digging your way through an abandoned mine filled with oil, coal, gold, rubies, diamonds—and hungry creatures. You'll need the luck of the Irish to survive, but with so much at stake, it's a chance you're willing to take.



O'RILEY'S MINE™ available for Atari®, Apple® and Commodore 64®.



MOON SHUTTLE™

Your screen explodes with life-threatening action as you pilot your Moon Shuttle through outer space in this home version of the Nichibutsu® favorite. Awaiting you is The Prince of Darkness and his forces, which mysteriously multiply!



MOONSHUTTLE™ available for Atari®, Radio Shack Color®, Apple®, Commodore 64®, coming soon for Apple®.



POOYAN™

One of the biggest arcade game hits from Konami is a game of fast action in life-and-death encounters. You battle a pack of hungry wolves eager to catch your defenseless piglets. You'll need quick reflexes and a good arm in the new arcade hit from Datasoft.



POOYAN™ available for Atari®, Radio Shack Color®, Apple®, coming soon for Commodore 64®.



ZAXXON™

Zaxxon has all the unique color graphics, super sound and unprecedented 3-dimensional effects that made it the star of the arcades. Maneuver your ship through the state-of-the-art defenses of the floating fortress to come face-to-face with the deadly Zaxxon Robot. This is the official home version of the Segas arcade hit.



ZAXXON™ available for Atari®, Apple®, Radio Shack Color®.

Our reputation as one of the premier game manufacturers assures you of the highest quality attainable in action, strategy and graphics. For the hottest titles in entertainment, keep your eye on the leader—DATASOFT.

You'll Find The Best In Home Computer Software

Pooyan™ is a trademark of Konami Industries Company, Ltd.
O'Riley's Mine™ and Datasoft® are registered trademarks of Datasoft Inc.

from
Datasoft®

© 1983 DATASOFT INC.
Moon Shuttle® is a registered trademark of Nichibutsu, USA.
ZAXXON™ and Sega® are trademarks of Sega Enterprises, Inc.

9421 Winnetka Avenue, Chatsworth, CA 91311

(213) 701-5161

CIRCLE 150 ON READER SERVICE CARD

Lisp for the Atari

Datasoft has generally selected well in deciding what functions to incorporate in its implementation of Lisp. If you are familiar with Lisp and wish to invest a significant amount of money, what follows is essential to knowing what to ex-

The elementary functions seem to have been implemented exactly as required by any dialect of Lisp.

pect. The manual assumes knowledge of Lisp, but Datasoft provides a textbook (*Lisp*, by P.H. Winston and B.K.P. Horn, Addison-Wesley Publishing Co., Reading MA, 1981), for those who want to learn.

Be forewarned that you will spend a great deal of time in learning, since this is a language unlike anything else you have experienced.

General Comments

There are two principal dialects of Lisp, Maclisp, and Interlisp. The manual claims that Atari Interlisp is a subset of standard Interlisp. Except for the use of `DEFINEQ` instead of `DEFUN` to define functions, you will not even notice. So little is implemented that the differences between the two dialects are of little consequence. Since the textbook uses Maclisp, a Maclisp emulator was included on the disk to enable you to work the exercises. However, several of the functions in the emulator are flawed, so

Ken Litkowski

you may have trouble obtaining the results in the textbook.

An entire programming environment for Lisp may use 150K; in this implementation, only 32K is used, leaving 16K for user programs. This is a significant limitation, although you should remember that, since data and programs are represented in the same way, programs can be stored on disk and called in as data and executed. This is the only way to proceed, given the memory limitations of the package. It requires a great deal of ingenuity, so you must be prepared to cope with the movement of data and programs between memory and disk to make effective use of the system. Relatively few functions have been implemented here. Thus, the full power of Lisp will not be immediately available to the user. However, since all Lisp functions can be written in Lisp, any needed function can be created.

Mathematical Functions

Atari Interlisp, like Atari Basic, does not distinguish between fixed and floating point numbers. Only the following arithmetic functions are implemented: + (equivalent to the usual PLUS, except that only two arguments are permitted), * (TIMES, again only two arguments), / (QUOTIENT), SUB (DIFFERENCE), EXP, LOG, and INT. The following standard Lisp functions are not implemented: ABS, ADD1, EXPT, FIX, FLOAT, MAX, MIN, MINUS, REMAINDER, SORT, and SUB1.

List Processing Functions

For the most part, the elementary functions seem to have been implemented exactly as required by any di-

lect of Lisp. This is essential, since it is from these functions that everything else grows. The following functions have been implemented: SET, SETQ, QUOTE (including '), EVAL, CAR, CDR, CONS, LIST, APPEND, LENGTH, and LAST. The dotted pair notation is supported (and is effectively used in disk operations). Composite CARS and CDRs are not implemented, but similar functions are easily created.

The more sophisticated list processing functions do not receive quite the same treatment and can pose some problems. Atari Interlisp has the basic "surgical" functions RPLACA and RPLACD, but lacks DELETE, NCONC, SUBST, PUTPROP (or PUT), GET, REMPROP, and REVERSE. These latter functions are provided in the Maclisp emulator, but are not implemented there with care. PUTPROP and NCONC will not operate in the ways expected, so they must be modified by the user to obtain the expected effect. (I modified PUTPROP, REMPROP, and GET so they would create and operate on association lists; thus, it was useful that

creative computing

SOFTWARE PROFILE

Name: Interlisp
 Type: Language
 System: 48K Atari 800 with disk drive.
 Format: Disk
 Summary: A reasonable implementation of a subset of the standard Interlisp dialect of Lisp.
 Price: \$149.95
 Manufacturer: Datasoft Inc.
 19519 Business Center Dr.
 Northridge, CA 91324

Lisp, continued...

they were not system functions.)

Atari Interlisp supports ASSOC, but not the STORE and ARRAY functions. However, it does provide a function @ which returns the nth CDR of a list—a useful function for array-like processing. In addition, the functions UNPACK and PACK are provided for exploding and concatenating atoms. However, PACK ignores numbers and eliminates them from a concatenation.

Predicate Functions

Atari Interlisp contains several predicate functions, but falls quite short of providing the variety that might be found in standard implementations. The following functions are implemented: # (equivalent to NUMBERP), >(GREATERP), EQ, ATOM, MEMBER, AND, and OR. Curiously, and somewhat disconcertingly, MEMBER does not operate on lists of numbers, so you cannot determine, for example, whether 10 is a member of the set (4 10 12).

Some relatively standard functions that are not supported include BOUNDP, EQUAL, LESSP, MINUSP, NOT, NULL, and ZEROP. A version of EQUAL is provided in several of the sample programs. NOT and NULL are equivalent to (EQ X), where the function determines whether X is equal to NIL.

Function-Writing Functions

The elements necessary to write new functions (COND, PROG, GO, RETURN, and PROG), all of which seem to be implemented in their expected form are provided. To write new functions, the Interlisp forms of DEFINEQ and DEFINE are used, instead of the DEFUN of Maclisp. Atari Interlisp supports LAMBDA, NLAMBDA, and MACRO expressions (equivalent to the EXPR, FEXPR, and MACRO forms of Maclisp). The supplied Maclisp emulator makes it possible to use DEFUN forms, except that only one expression is allowed in the body of the function definition.

Using DEFINEQ to write new functions should pose no conceptual difficulties. However, writing such functions does present some practical problems. On the Atari, the length of a function is limited to one logical line—120 characters. To get around this, you can define a function in steps, pressing the RETURN key before entering the final right parenthesis of the definition. The system will thus digest what it has been given and await the entry of further information. Once a definition has been entered in this form, however, it is virtually impossible to alter it. You can retrieve the function definition using GETD, but you cannot modify it by changing an errant portion of the function. The function must be entered from the beginning.

Fortunately, an editing package is provided as one of the sample programs. This package is more than a sample; rather, it is essential for using this system. Although the editing package does not contain all the sophistication that might be found in a major installation, it provides 24 commands, which are quite adequate.

The manual gives some detailed examples of how to use the editor, but does not sufficiently emphasize its importance. The editor takes up some 7K of the 16K available to the user. As a result, you must usually create functions, store them on disk, erase all user-defined functions, reenter the stored functions (without the editor), and then execute them.

Functions with Function Arguments

In addition to the EVAL function, Atari Interlisp implements the APPLY* function. However, none of the com-

The greatest deficiency of Atari Interlisp is the absence of any capability for examining or altering what the system is doing.

ite mapping functions are implemented. MAPCAR and FUNCCALL are provided in the Maclisp emulator, but they are designed to take only one set of arguments. This somewhat defeats the purpose of such functions.

Input and Output Functions

Atari Interlisp provides a sufficient number of read and print functions (READ, READA, READC, PRINT, PRIN1, PRIN2, TERPR1) to provide you with whatever you need. These functions might differ slightly from what you are accustomed to, but the differences should pose no problem. Several additional functions are implemented to account for the peculiarities of the Atari. These include LOAD, SAVE, OPEN, CLOSE, IN#, PR#, POINT, and NOTE. Each of these functions is supposed to operate like its counterpart in Atari Basic, but such is not quite the case. The manual poorly documents these functions and the differences, leading to some aggravation. For example, I found that I could not save a list directly; instead, I had to create another list containing the name of the list I wanted

to save and then save the top list.

Error Handling Procedures

Only a few error types are recognized by the system, for example, encountering an undefined function or an atomic expression when a list is expected. When such errors do occur, control is passed to an error handler, which first displays the error type and the expression which caused the error. Once in the error handler, there are four options: 1) exit from the error handler, thus aborting the current evaluation thread; 2) perform any function which would normally be available (including examining the values of any variables in the current evaluation thread); 3) examine, using the function BAKTRACE, the sequence of evaluation which led to the error; 4) continue the evaluation thread by providing a value for the expression which caused the error. A problem occurs in using BAKTRACE when the sequence of functions leading to the error is longer than can be displayed; the evaluation thread nearest the error condition is lost from view, so the benefits of BAKTRACE are lost.

Atari Interlisp provides only one debugging function (BREAK), which prints a message and then passes control to the error handler. An ongoing evaluation can be halted by pressing the control key and the letter B; doing so also passes control to the error handler. No other tracing or step function is provided.

System Functions

To me, the greatest deficiency of Atari Interlisp is the absence of any capability for examining or altering what the system is doing. Some insignificant functions are provided, but these are not sufficient. OBLIST lists all currently defined (system and user) atoms (including functions). NEW reinitializes the system by deleting all user-defined expressions; this cannot be done selectively. MEM returns the number of unused bytes of memory and is the means by which a garbage collection is forced.

PEEK and POKE enables you to examine and to change the contents of any memory location. However, you are not told what is in memory, except for a very few specific locations. Neither are you told what part of Atari's OS and DOS variables are retained, nor are you given a decent memory map. Further, no provision has been made for calling or constructing machine language subroutines.

Memory allocations are made once and for all, so it is not possible to optimize the use of an already limited memory. Even the information necessary for optimization, e.g., detailed

KRAFT PREMIUM JOYSTICK

For Apple II, IBM PC, TOS (no Com)



TAKE COMMAND!

- Kraft puts total mastery of home computer games at your command. Only Kraft gives you
- **PRECISION LINEAR POTENTIOMETERS** for more accurate cursor control and quicker response
- **TOGGLE SWITCHES** for instant selection of "spring-centering" or "free-floating" operation
- **PATENTED STICK MECHANISM** for smooth, fingertip control
- **DUAL AXIS TRIM CONTROLS** for fine tuning joystick to individual software
- **TWO FIRE BUTTONS**, conveniently placed for fast action

The Kraft difference is advanced engineering. The Kraft's high-performance design features are the result of intensive on-going research — and back result of over twenty years manufacturing experience.

Color coordinated, plug-in Kraft Premium Joysticks are suitable for game, business and graphics software. Take command with Kraft computer products you can feel the difference. Ask your retailer about our complete line of computer products.

All Kraft computer peripherals carry a **FULL 1-YEAR LIMITED WARRANTY**

KRAFT

KRAFT SYSTEMS COMPANY 450 W. California Ave., Vista CA 92083
A division of Creative Corporation since 1975

Your Apple's telephone. Hayes



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



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



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

A complete plug-in communications system for Apple® computers. From Hayes, the established telecomputing leader: the simple but sophisticated Micromodem II™ plug-in board modem and its companion software, Smartcom I™. Everything you need to expand the world of your Apple II, IIe, II Plus and Apple III. In one, convenient communications package.

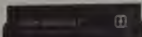
With Micromodem IIe and Smartcom I, you can access data bases, bulletin boards, and the varied resources of information services. Plan your travel itinerary via computer, including flight numbers, hotel and rental car reservations. Retrieve and analyze daily stock and options prices. Work at home and send reports to your office. You can even do your gift shopping by computer!

Micromodem IIe. Think of it as your Apple's telephone. It allows your computer to communicate with any Bell-103 type modem over ordinary telephone lines, at 110 or 300 bits per second.

Micromodem IIe installs easily in an expansion slot, and requires no outside power source. It connects directly to either a single or multiline modular phone jack, to perform both Touch-Tone® and pulse dialing.

Micromodem IIe dials, answers and disconnects calls automatically. And, unlike some modems, it operates in full or half duplex, for compatibility with most time-sharing systems.

A built-in speaker lets you monitor your



Micromodem IIe
Smartcom I



calls when dialing. That way, you'll know if a line is busy. With Smartcom I, Micromodem IIe automatically redials your last number.

Discover how Micromodem IIe can help maximize the capabilities of your Apple. While Smartcom I software will minimize your efforts.

Smartcom I companion software.

For effortless communications.

Whether you're a newcomer to personal computing or a seasoned professional, you'll appreciate the ease and speed with which you can perform any communications function. Thanks to Smartcom I!

Let Smartcom I guide you through a few easy-to-answer questions to tailor the program to your particular needs. Then you're ready to go!

Make a selection from the Smartcom I menu to manage your communications, files or printer. Program prompts guide you along the way. And menu selections let

you easily make a call, end a call, or answer a call. When you're on the receiving end, your Micromodem IIe answers automatically, even if you're not there!

Convenient! And so is the Smartcom I memory for phone numbers. Smartcom I stores three of your most frequently called telephone numbers and one prefix. Plus, it also remembers the last number dialed.

Smartcom I also provides a directory of the files stored on your disk. And lets you create, list, name, send, receive, print or erase files right from its menu.

Smartcom I is as versatile as you need it to be. It accepts DOS 3.3, Pascal, CP/M™ 3.0 or CP/M Plus™ operating systems. And accommodates up to six disk drives and several printer interface cards.

Like all our products, Smartcom I and Micromodem IIe are backed by excellent documentation and full support. Including a two-year limited warranty

on Micromodem IIe and a 90-day warranty on Smartcom I!

See your dealer today. Then plug into the exciting world of telecomputing.

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, Georgia 30092. 404/449-8791.

PCP approved in U.S.A.
© 1983 Hayes Microcomputer Products, Inc.
Micromodem IIe and Smartcom I are trademarks of Hayes
Microcomputer Products, Inc. Apple Computer is a registered
trademark of Apple Computer, Inc. Touch-Tone is a registered trademark
of American Telephone and Telegraph. CP/M is a trademark of Digital
Research, Inc. CP/M Plus is a trademark of Advanced Logic Systems.

CIRCLE 172 ON READER SERVICE CARD

Lisp, continued...

memory maps, how the system makes assignments, and how memory is being used, is not provided.

Atari-Specific Functions

Finally, Atari Interlisp implements functions which pertain to the specific characteristics of the Atari computer. These functions, including COL (to set a color register, equivalent to the Atari Basic command COLOR), DRAW, GR (for GRAPHICS), PLOT, SETCOL (for SETCOLOR), SOUND, STICK, and STRIG, are all essentially equivalent to their Basic counterparts.

Summary

For the most part, Atari Interlisp is a well-designed system. The functions which have been implemented seem to be the most essential ones. I experienced no significant surprises in the operation of the system, and the documentation, though limited, is reasonable, except for the problems noted above.

I have been able to implement and develop complex augmented transition network grammars, even though they are painful and embarrassingly slow.

If you know Lisp, I think the comments above should enable you to decide if Atari Interlisp will meet your needs. If you don't know Lisp, this would be a fairly expensive way to learn; other, less expensive, although perhaps more limited implementations may be available.

If you already own the package and are interested in extending the capabilities of Atari Interlisp, I am willing to serve as a clearinghouse for information regarding the operation of the system and for any system utility functions. This system should not be permitted to languish. We will all benefit if we collaborate to increase its power. □

GREAT MOMENTS IN DATA PROCESSING



643 A.D.
THE PUEBLO INDIANS DEVELOP
THE FIRST 100%, ALL-WOOLEN
WORD PROCESSOR.

Parents! The Top-Rated Software!*

Now you can choose from a variety of the most wanted programs—TUTORIALS, EDUCATIONAL GAMES, DISCOVERY ACTIVITIES, and more . . . all from EDUCATIONAL ACTIVITIES rated #1 in educational software.* EA's new DAYBREAK division offers superior programs designed for children of various ages and abilities . . . at home!

- *The programs are all self-directing.*
- *No adult supervision is necessary.*
- *Tutorial programs are all self-correcting.*
- *Programs are all self-motivating.*

All programs are level-adjustable. Parent or child can vary their complexity and create new challenges as the child progresses.

The Programs Your Child Needs Most!

AGE	TITLE, ORDER NO. and DESCRIPTION	PRICE
3-5	DISCOVER! (DB-3000)—Directionality, colors, body parts with "sprites." Cue cards allow child to work independently. (not available on TRS-80).	\$29.95
7 & up	PERPLEXITY (DB-3000)—Classic puzzles challenge problem solving, logic and organizational skills. Several levels of difficulty.	\$29.95
7 & up	MATH BASEBALL (DB-4000)—Builds basic math skills. Several levels of difficulty.	\$29.95
10 & up	REGIONS of the U.S. (DB-5000)—Game-like program teaches major cities, land forms, products, and climates.	\$39.95
8 & up	ADDITION AND SUBTRACTION OF WHOLE NUMBERS (DB-4030)	\$29.95
T 9 & up	MULTIPLICATION AND DIVISION OF WHOLE NUMBERS (DB-4031)	\$29.95
O 9 & up	ADDITION AND SUBTRACTION OF FRACTIONS (DB-4032)	\$29.95
R 10 & up	MULTIPLICATION AND DIVISION OF FRACTIONS (DB-4033)	\$29.95
I 12 & up	SIMPLE ALGEBRAIC EQUATIONS (DB-4055)—3 programs of progressively difficult levels. Level I—one variable, one operation. Level II—one variable, two operations, frequent use of parentheses. Level III—variable on both sides.	\$39.95

Programs available on Apple II or IIe, TRS-80, Commodore 64, PET, Atari 800. When ordering, please specify computer model and diskette or cassette format. Sorry, no cassettes for Apple.

To order, write or call. Send check, money order or charge to MasterCard or VISA. Include card number, expiration date and signature. Please add 5% for postage and handling. No C.O.D.

* Rating by Queue, Inc., publishers of "Microcomputers in Education"

"I buy more software from EA than from any other publisher."

Kathy Grubbs, Program Director, E. Whittier (CA) Middle Schools



DAYBREAK SOFTWARE 1-800 645-3739 (U.S.)
Div. of Educational Activities 516 223-4666 (N.Y.)
1951 Grand Avenue, Baldwin, N.Y. 11510

WordPerfect

Not Quite Perfect, But Certainly Superb

Let me tell you a story. Once upon a time there was a fellow educated in psychology who found himself writing a statistical newsletter for the oil industry. We'll call him Mr. Allthumbs, because he was a lousy typist. Unfortunately, Allthumbs was the only typist he had. So when someone found an error on the final draft of the newsletter, Allthumbs muttered some very unprintable things as he went back for another session with his Selectric.

Eventually his employer replaced the typewriter with a dedicated word processor, and things became considerably easier. Correcting typos took two minutes, instead of 20 minutes of retyping. As the newsletter grew, so did the editing demands. Graphs had to be inserted into the text, so holes of a specific size and shape had to be left. Tables became more numerous and had to be carefully formed to give the proper appearance. The word processor worked fine—at a cost of \$12,000 per work station.

Finally it came to pass that Allthumbs left his employer to become a freelance writer in another industry, the newsletter continued successfully under the leadership of another editor, and everyone lived happily ever after.

But I wouldn't have lived happily had I been forced to go back to a typewriter, because I'm still all thumbs. Fortunately, I have found a sophisticated word processing program for my Compaq portable computer: Satellite Software International's *WordPerfect*.

All Business

I wouldn't recommend this program to anyone whose most sophisticated

L. L. Beavers

word processing application is an occasional business letter or simple report. For home or most small business use, a simpler program with a price tag lower than \$495 would probably be fine. But if you need to do things like tables of numbers, boilerplating text, form letters, sophisticated layout, footnoting, or

creative computing

SOFTWARE PROFILE

Name: WordPerfect, version 2.24-L

Type: Word processing

System: 128K IBM PC and Compaq; two disk drives

Format: Disk

Summary: Flexible, sophisticated word processing for business and professional applications.

Price: \$495

Manufacturer:

Satellite Software International
288 West Center St.
Orem, UT 84057

equations, then I suggest a long look at *WordPerfect*. This is a fast, flexible, all-business program.

Flexible

I think that the greatest asset of *WordPerfect* is its flexibility. I am a great believer in flexibility, and I will put up with a great deal of inconvenience to get it. We shall discuss the price of flexibility later; for the moment, let's just revel in it.

Of course you can't revel if you are with the wrong group. People who pro-

cess words aren't all alike, so flexibility will mean different things depending on your needs. I think you will find one of the following groups congenial.

For General Business Use

In a general business setting, word processing mostly means correspondence and reports. These applications make few special demands of a word processor. Your reports may need some tables of numbers in them, and you may want to send a personalized form letter to your customers, but you will rarely find a use for more sophisticated capabilities. What you really want is the ability to draft and revise text quickly and easily.

You're covered. In fact, *WordPerfect* may be slightly overqualified for some of you.

The first thing you need is a good editor. The *WordPerfect* editor is screen oriented, which means that you move the cursor to the exact spot in your text that you want to change, and simply type the change. You can position the cursor manually, using an extensive array of cursor-control options, or you can have *WordPerfect* "search" for the text you want to change. The search function can also be used to replace all occurrences of the search text with any other text you specify. This "global search and replace" feature can be invoked with or without operator approval of each replacement.

When you have the cursor where you want it, editing is simple. *WordPerfect* inserts any text you type, while smoothly and quickly pushing aside any succeeding text to make room. If you prefer to replace existing text, you can do that too. You can delete single characters, words, the remainder of a line, or the remainder of the page (the program asks

L.L. Beavers, 23005 Ash Glen Circle, Valencia, CA 91355.

DYNACOMP

The Leading Distributor Of
Microcomputer Software

PRESENTS

HOME FINANCE		CARD GAMES	
PERSONAL FINANCE SYSTEM (ALL)	\$ 39.95	BRIDGE MASTER (ALL)	\$ 29.95
TAX OPTIMIZER (ALL)	\$ 59.95	GIN RUMMY (APPLE)	\$ 22.95
MICROCOMPUTER STOCKS (ALL)	\$ 59.95	POKER PARTY (ALL)	\$ 27.95
MICROCOMPUTER BONDS (ALL)	\$ 59.95	BLACKJACK COACH (ALL)	\$ 33.95
BUDGET MODEL ANALYZER (ATARI)	\$ 23.95	EUCHRE (ATARI)	\$ 19.95
PERSONAL BALANCE SHEET (OSBORNE)	\$ 29.95		
STOCK MASTER/STOCK PLOT (APPLE)	\$ 59.95	WAR GAMES	
NYINDEX (ATARI)	\$ 29.95	LEIPZIG 1813 (ATARI)	\$ 31.95
STOCKAID (ATARI)	\$ 29.95	SHILOH 1862 (ATARI)	\$ 33.95
PORTFOLIO MANAGEMENT (APPLE/OSB)	\$ 69.95	IRONCLADS (CPM)	\$ 29.95
INVESTING ADVISOR (TRS)	\$ 39.95		
INVESTMENT MANAGEMENT (ATARI/IBM)	\$ 49.95	ADVENTURE	
OPTIONS ANALYSIS (TRS/OSB/APPLE)	\$ 99.95	CRANSTON MANOR (CPM)	\$ 19.95
		WINDMERE ESTATE (NORTH STAR/APPLE)	\$ 29.95
BUSINESS		ZODIAC CASTLE (NORTH STAR/APPLE)	\$ 29.95
FINANCIAL MANAGEMENT (NORTH STAR)	\$149.95	STARSHIP LANDING PARTY (TRS)	\$ 19.95
MAIL MASTER (ATARI)	\$ 39.95	GENESIS-THE CREATOR (APPLE)	\$ 49.95
PAYFIVE (APPLE)	\$149.95	VALLEY OF THE KINGS (ATARI)	\$ 29.95
LIFE CYCLE ANALYSIS (APPLE)	\$ 39.95		
DATA RETRIEVAL SYSTEM (ATARI/CPM)	\$ 29.95	GAMES	
OPTIMAC (TRS/APPLE)	\$ 43.95	VALDEZ (ALL)	\$ 23.95
BOOKKEEP (CPM)	\$ 69.95	FLIGHT SIMULATOR (ALL)	\$ 23.95
CUSTOMER PROFILE (OSBORNE)	\$ 59.95	BACKGAMMON 2.0 (ALL)	\$ 23.95
		MANAGEMENT SIMULATOR (ALL)	\$ 29.95
EDUCATION		CHESS MASTER (CPM/TRS)	\$ 23.95
HODGE PODGE (APPLE/TRS)	\$ 18.95	STARBASE 3.2 (ALL)	\$ 17.95
CHILDREN'S CARROUSEL (APPLE)	\$ 19.95	CACTUS LEAGUE BASEBALL (ATARI)	\$ 19.95
TEACHER'S AIDE (ALL)	\$ 17.95	FINAL ASSEMBLY (ATARI)	\$ 19.95
TEACHER'S GRADE BOOK (APPLE)	\$ 49.95		
PLAYER PIANO (ATARI)	\$ 19.95	ENGINEERING/STATISTICS	
SPELL IT (APPLE)	\$ 19.95	DIGITAL FILTER (ALL)	\$ 53.95
ELIZA II (ALL except APPLE)	\$ 19.95	HARMONIC ANALYZER (ALL)	\$ 33.95
PROBABILITY (APPLE/ATARI)	\$ 39.95	BASIC SCIENTIFIC SUBS. Vol. 1 (ALL)	\$ 53.95
TYPEMASTER (TRS)	\$ 18.95	BASIC SCIENTIFIC SUBS. Vol. 2 (ALL)	\$129.95
FEELING BETTER (APPLE)	\$ 39.95	BASIC STATISTICAL SUBS. (ALL)	\$ 99.95
FROGMASTER (ATARI)	\$ 21.95	CELESTIAL BASIC (APPLE)	\$ 49.95
		ACTIVE CIRCUIT ANALYSIS (ALL)	\$ 43.95
DISKETTES		BEAM DEFLECTION (ALL)	\$ 39.95
5 1/4" SS/SD with hub rings, packed in plastic storage box (10/box)	\$ 19.95	ANALYSIS OF VARIANCE (ALL)	\$ 43.95
		PRINCIPAL COMPONENTS (APPLE)	\$ 49.95
		STATTEST (ALL)	\$ 33.95

PRICES ABOVE ARE FOR 5 1/4" SINGLE DENSITY. ADD \$3.00 FOR DOUBLE DENSITY, \$2.50 for 8"

THESE ARE ONLY A FEW OF THE HUNDREDS OF PROGRAMS IN THE DYNACOMP LIBRARY.

Besides being the leading distributor of microcomputer software, DYNACOMP currently distributes software in over 60 countries. DYNACOMP provides FRIENDLY, ACCESSIBLE CUSTOMER SERVICE through our highly qualified and knowledgeable staff. WE'RE AS NEAR AS YOUR TELEPHONE.

DYNACOMP'S prices are highly competitive and we promise prompt processing of every order!

WRITE FOR A FREE, DETAILED CATALOG

Daytime	24 Hour	Office Hotline:
Toll Free Order Phones:	Message and Order Phone:	9-5 E.S.T.
(800) 828-6772 (800) 828-6773	(716) 442-8731	(716) 442-8960

DYNACOMP, INC.

1427 Monroe Avenue • Rochester, NY 14618

CIRCLE 281 ON READER SERVICE CARD

APPLE™

ATARI™

CANON AS-100™

COMPUSTAR™

HEATH/
ZENITH Z-100™

IBM PC™

KAYPRO II™

MORROW
DESIGN™

NEC™

NORTHSTAR™

OSBORNE™

PET/CBM™

SUPERBRAIN™

TRS-80™

CP/M DISKS
DISKETTES

WordPerfect, continued...

for confirmation of page deletes).

WordPerfect also offers "cut and paste" editing. These features let you define blocks of text (even columns in a table), which you can then save, delete, copy, or move to another place in the document. These capabilities take a little practice to master, but their usefulness repays the effort.

Although your layout needs may not be extensive, you probably would like to preview and control the general appearance of the document. With *WordPerfect* the text on the screen has the same essential form as the printed version. You control, page by page if you wish, all four margins, headers and footers, page numbers (and where they appear), character spacing (10 pitch, 12 pitch, or just about any other spacing you can coax out of your printer), and line spacing. Underlined, boldface, and even overstruck text are also available. With a single keystroke you can center text on a line, and with a slightly more complicated procedure you can center a block of text vertically on the page.

For those tabs I said you might want to stick in your reports, there are several handy features. First, tab positions can easily be set and reset. Second, those same tab settings can be used as decimal tabs when you are typing numeric information. This means that the numbers you type are automatically aligned on the decimal point (or on any other character you select—a comma for instance). Third, *WordPerfect* will do simple calculations on the numeric table

entries, including row and column totals and subtotals. You can even specify formulas for these calculations, so that this "math" facility has some of the features of a spreadsheet program. Finally, you can protect your table so that a page break will never appear in the middle of it.

Although some word processing systems offer "mail merge" capabilities as extra-cost options, *WordPerfect* has them built in.

Having compiled, edited, and tidied up your report, perhaps you would like to send the results, with appropriate variations, to your ten sales reps. Although some word processing systems offer "mail merge" capabilities as extra-cost options, *WordPerfect* has them built in. First you type the body of the document with simple codes inserted where you want the variable information to appear. Then you type a file containing the variations (name, address, "Dear Joe," Joe's sales total, etc.), tell *WordPerfect* to execute a merge, answer a couple of questions, and it happens.

As I said, the general business user is covered—and neatly.

For Writers

If you write for a living, the chances are that you are more sensitive to format and style than the average business user. *WordPerfect* has some features that you might particularly like.

For example, I sometimes like to indent a block of text for appearance or emphasis. *WordPerfect* makes this easy by allowing me to specify a temporary left margin, or even temporary left and right margins, with one keystroke.

WordPerfect also offers hyphenation prompting if a line of text would extend more than a fixed distance into the right margin. This distance, called the "hotzone," can be adjusted to your taste, depending on how much hyphenation you want to do.

Writers in the newsletter business might want to look at three other *WordPerfect* features. The first is a text (or "newspaper") columns feature, which allows you to print up to five columns of text across the width of the page, with the margins for each column under your control. This feature can be turned on or off in the middle of a document.

The second feature right-justifies the text. It isn't clear from the documentation whether or not this is done by proportional spacing.

The third feature is called "printer commands." It could be used to embed typesetter's control codes in your text.

Satellite Software Update

SSI's text processing products are now at revision 2.30 and incorporate several new features. In addition, SSI now offers a less expensive version of *WordPerfect* and has announced plans for enhancements to both products.

WordPerfect

The price of \$495 now includes the dictionary, previously a \$145 option. Significant improvements in version 2.30 are the ability to edit two documents simultaneously (and move text freely between them) and much improved prompts and messages (they now resemble the English language). The product is shipped with two versions of the program. The Flash version improves the performance of *WordPerfect* on the IBM PC with monochrome display; the standard version is for color displays or compatible computers.

Will Fastie

Version 3.0 is slated for release late this year. According to VP of Marketing Pete Peterson, versions will be available in Finnish, French, German, Italian, Spanish, and Swedish. True proportional spacing, support for displaying and printing the foreign and technical symbols in the IBM character set, and support for additional printers will also be provided.

A sorter for merge files, a \$95 option, is now available.

Personal *WordPerfect*

At \$195, this version of *WordPerfect* is a powerful word processor and a bargain to boot. It is almost identical in feature and function to its more expensive brother. In fact, document files are

completely interchangeable between the two products. *Personal WordPerfect* does not support columns, math mode, macros, merge, or sort, and some of the more complicated formatting features (e.g., footnotes) are not available. *Personal WordPerfect* does include headers, footers, and page numbering.

SSI plans to offer their dictionary as a \$95 *Personal WordPerfect* option. It should be available as you read this.

P-Edit

P-Edit is one of the most powerful program editors around, and its new price of \$95 makes it very attractive. For *WordPerfect* users, *P-Edit* is an excellent choice because both products operate using almost identical sequences of keystrokes.

Version 2.30 of *P-Edit* supports dual document editing and Flash. The reviewed version is not totally comfortable in the IBM DOS 2.0 environment, although full pathnames are handled properly.

WordPerfect

"Congratulations on such an outstanding word processing software package! We, at Texaco, are really enjoying using your remarkable software system."

Richard W. Horchler, Computer Center Manager, Texaco

"Your system is light years ahead of any other word processor that we have tested."

Douglas L. Mayor, DL Mayor Corp.

"If you're a new PC owner who's scouting around for a top-of-the-line program, check this one out."

Lindsay Van Gelder, PC Magazine

"My favorite word processor."

Will Fastie, Creative Computing



SSI

SATELLITE SOFTWARE INTERNATIONAL

TOLL FREE (800) 321-5906 TELEX 453-168 (801) 224-8554
AVAILABLE ON IBM PC, AND MANY OTHER MS-DOS COMPUTERS.

CIRCLE 215 ON READER SERVICE CARD



ALL THE HARD PART IS MAKING SURE MINI DISKS COME ERROR FREE.

THE HARD PART IS MAKING SURE
THEY STAY THAT WAY.

A disk is built with certain safeguards. That's why most disk makers offer guarantees that the product you receive comes to you error free.

We at Memtek Products are concerned that the standard guarantee error free. Every time you use it. After exposure to dust, cigarette smoke, fingerprints, even wear caused by your computer. And so we have built safeguards around the disk, as well.

**Memtek Products' latest innovation...
acknowledgment of a real world
beyond the laboratory.**

The hub ring. Designed to prevent dirt (minidisks from entering in your machine. Rigid Durable Retainers.)

The coating. A critically-controlled coating of high-energy magnetic oxide particles that covers the disk's surface, which is then micro-polished to improve head to disk contact, preventing droplets, lowering head abrasion.

The lubrication system. A constant lubricant protects both the disk surface and the drive head from wear.

The sleeve. Comes with a soft liner that protects the disk while gently cleaning the surface.

The guarantee.

We'll replace free any minidisk if it fails to accurately store and retrieve data due to a defect in materials or workmanship for up to 5 years from date of purchase. Simply mail the disk back.

The Memtek lineup.

Premium, double and quad density minidisks as well as 10- and 15-minute computer cassettes and a 5 1/4" disk drive head cleaner.



**WE PLAY
FOR KEEPS™**

For Academics And Professionals

People writing for their academic or professional colleagues have a special set of needs. *WordPerfect* covers several of them.

First, it does footnotes. The footnote numbers appear in the printed text as superscripts, and the note appears at the bottom of the same page. Footnotes are automatically numbered, and, if you insert a new footnote, automatically renumbered.

Second, it does equations. The *WordPerfect* subscripting, superscripting, overstrike, and underlining capabilities can be combined to produce quite complicated mathematical statements. With the same set of capabilities, you could also produce chemical formulae. It is not particularly easy, but then it is not particularly easy on a typewriter either.

Finally, it does boilerplating. The term "boilerplating" describes a process in which a document is assembled from a collection of standard chunks of text. Attorneys use boilerplating to prepare

ities for planning and automating the process. These facilities even include allowing the user to write prompt messages telling the operator what file to merge at each point.

The Price

Now you know what I meant when I said that *WordPerfect* was flexible. I also said that we would count the cost. It is time.

The program lists for \$495, but that's not the cost I mean. If you intend to make full use of the capabilities of *WordPerfect*, plan to spend a good deal of time learning it, and plan to tolerate a few operational inconveniences while using it. Those are hidden costs, but they are no less real than the price of the program.

I find the bargain more than eq-

All things considered, I think WordPerfect is a superb package.

many of their documents. Although most word processing programs allow you to merge a file from the disk into one that you are working on, *WordPerfect* offers some very extensive facil-

makes sure the document is correctly formatted before it is saved to disk or printed. Rewrite Screen can usually be a last recourse.

Keyboard Templates—Until now, they have been terrible. The newest version, a one-piece plastic affair, is acceptable. I like templates because they provide an instant menu. You hate 'em, you love 'em, but you definitely can't live without 'em. SSI also provides transparent stickers for certain important keys.

Documentation—*WordPerfect* documentation has been rewritten and reformatted. It is better organized for reference without sacrifice of its tutorial qualities. It is also typeset and easier to read.

Help—I originally learned to use *WP* without cracking the manual because the help facility was so good. In general, depression of a function key causes display of fairly detailed information about that function. If the function key normally displays a menu, *Help* usually displays one too and allows a further level of selection.

Macros—If *WP* can't do what you want, you can usually train it to do so. Although SSI documentation has never explained the feature very well, it is extraordinarily powerful once understood.

Learning Curve—*WordPerfect* is somewhat harder to learn than most word processors with which I am familiar. My experience indicates, however, that once trained, the *WP* user has great range, taking advantage of more of its features and power than he or she would with other programs. The climb up the hill is worth it in the end.

A Word From A WordPerfect Fanatic

I admit it: I'm a *WordPerfect* junkie. I firmly believe that for the majority of tasks, *WordPerfect* is the word processor of choice on the IBM PC; *Personal WordPerfect* answers a low-end need.

Now this comes not only from PC experience, but from two years of using *WordPerfect* (WP) on Data General computers before there even was a PC. If only you could have witnessed my mental state during the period when I used *WP* daily at work, only to come home to other, unmentionable programs. It was cause for major celebration when the first version of *WP* arrived at my doorstep.

I agree with almost everything in Mr. Beaver's well-balanced review of *WP*. I would like to add a few personal observations.

Navigation—Of all the text editing packages I have used, none offers a more elegant method for moving around in a document. The cursor arrow keys have their usual meaning, of course. But prefix a cursor key with a depression of the Home key, and the cursor moves a little further, to the appropriate edge of the screen. Prefix with two Homes and the cursor goes even further, to the appropriate edge of the document (i.e., beginning, end, left- or rightmost margin). Use the control key with the left or right arrows and the cursor moves word by word. Prefix with an Esc and the cursor moves some number (eight is the default) of characters on a line or lines on the page. These sequences are the most natural

Will Fastie

and easy-to-remember I have ever encountered.

Range—*WordPerfect* deviates from the norm with its handling of blocks. However, the deviation creates greater power. Most important, "ranges" can be marked in either direction, and can be arbitrarily large (everything in *WP* is limited only by disk space). In addition to their use with block move and copy, ranges can be used for marking text to be underlined, bolded, deleted, converted to upper- or lowercase, written to a file, or appended to a file.

Dictionary—The speller program is unique because it operates interactively from within *WP*, displaying spelling errors in context, and allowing correction or dictionary update. It lacks only the ability to check the spelling within a range. A stand-alone program is included for dictionary maintenance and checking of non-*WP* documents.

Formatting—*WP* is a "what you see is what you get" editor, meaning that the text is always displayed exactly as it will be printed. It is true that *WP* sometimes disturbs its own display when text is being inserted or modified; sometimes it downright mangles. The rule is that everything above the cursor (between the cursor and the beginning of the document) is correctly formatted, while anything after the cursor may not be. Therefore, moving the cursor forward also reformats, and *WP*

WordPerfect, continued...

uitable, but to help you decide for yourself I have listed a few specific annoyances in the Nuisance Table below.

For You?

If the price seems right, *WordPerfect* may well be the word processor for you. The program is flexible and fast. It offers decent documentation (in the form of a good tutorial), very good on-line help,

and a very nice set of System Commands to help with disk file handling and other useful things.

WordPerfect supports Epson (with Graftrax), Diablo (1650, 3515, and 7715), Qume (Sprint 5 or 9), Spinwriter (5515, 3515, and 7715), and NEC 3550 printers. Printers not compatible with any of those can be used, but some of the capabilities of *WordPerfect* will be lost. *WordPerfect* also supports some cut-

sheet feeders with these printers.

I suggest you experiment before you decide whether your printer is, or is not, compatible. I had some problems setting up my "Diablo compatible" printer with *WordPerfect*, so I called Satellite Software International's toll-free customer support number. The man I talked to suggested that I tell *WordPerfect* that my printer was a Qume. It now works perfectly. I don't know why, and neither did he.

I have called the customer support number twice. I talked to two different people, and both were knowledgeable and helpful. The one who helped with the printer problem stayed on the telephone with me while I tried the solution he had recommended. Neither person could have known I was a reviewer, so I must assume that they offer the same excellent support to all of their customers.

All things considered, I think *WordPerfect* is a superb package. The sophisticated functions take some time to learn, but the ones needed most often tend to be the simplest to use. I recommend *WordPerfect* to anyone needing more than minimal word processing capabilities and not allergic to learning some details. I especially recommend it to those of you who are all thumbs. □

Nuisance Table

Mnemonic Commands	There aren't any, unless you find a natural association between ALT-9 and "Move." If so, please see a psychiatrist at your earliest convenience.
Keyboard Templates	These strips of plastic lay about the keyboard to remind you of what all those unmnemonic commands mean. They get in my way.
User's Manual	What is well organized as a tutorial isn't well organized for reference.
Rewrite Screen	Inserts sometimes cause the screen format to go haywire. A "Rewrite Screen" key fixes the problem immediately, but it is disconcerting at first and very slightly annoying later.

SEPTEMBER 6, 1983
MORNING EDITION

LEGAL NOTICE

TOTAL LEGAL TIME ACCOUNTING... WITH YOUR APPLE[®] AND LEGAL II[™]

This simple cost accounting/service billing system uses formats jointly designed by you, the attorney, and your Apple[®] or Apple[®]-compatible computer. Afterwards, operation is so straightforward, a secretary or a typist can do it all, following built-in program prompts. LEGAL II[™]:

- Generates separate cost accounting and service billing.
- Sorts, files and produces hard copy (lists, labels and invoices) by case type, fee arrangement, responsible attorney, opposing party, etc., for every case and every client.
- Generates updated billing summaries.
- Categorizes by 26 service codes and eight cost codes.
- Produces full text descriptions of services rendered or costs incurred at the push of a single button.

LEGAL II[™] for Apple II[®], II[®] +[®], IIe[®] and Apple[®] compatible computers. ONLY \$400 plus \$2 shipping and handling. Only from:

WINNER'S CIRCLE
2420 Parker Street, Berkeley, CA 94704
(415) 845-4813

Apple II, II[®], IIe[®] and IIe[®] are registered trademarks of Apple Computers, Inc.
CIRCLE 269 ON READER SERVICE CARD

New! Micro Saver™

Protect your computer system with the multi-outlet power strip with built-in line noise filtering and surge suppression.

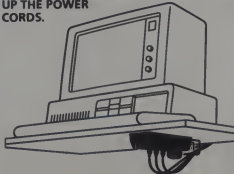


\$6995

8 AMPERE FUSE TO PROTECT SYSTEM.

CONTAINS FOUR OUTLETS—ONE IS SET ASIDE TO ALLOW FOR PLUG-IN TRANSFORMER.

CAN MOUNT ANYWHERE IN WORK STATION. UNIQUE CABLE SUPPORT TIDIES UP THE POWER CORDS.



LIGHTED ON/OFF SWITCH FOR ENTIRE COMPUTER SYSTEM.

9 FOOT LINE CORD. CONSIDER IT A FREE EXTENSION CORD.

MICROSAVER IS UL LISTED, MADE IN USA AND HAS A 1 YEAR WARRANTY.

Technical Specifications

Line Cord Length: 9 feet
Rated Voltage: 125 Volts AC
Rated Current: 4 Amps
Temperature Range: -25°C to +85°C
Test Voltage: 1750 Volts DC for 1 sec, Line Ground
Maximum Average Power Dissipation: 6W

Energy Rating: 40 Joules
Current Peak: 4000 Amps
Typical Response Time: <50 nano seconds
Maximum Ambient Temperature: 60°C
Noise Rejection Frequency: 600 kHz to 40 mHz
Attenuation: 20dB to 50dB

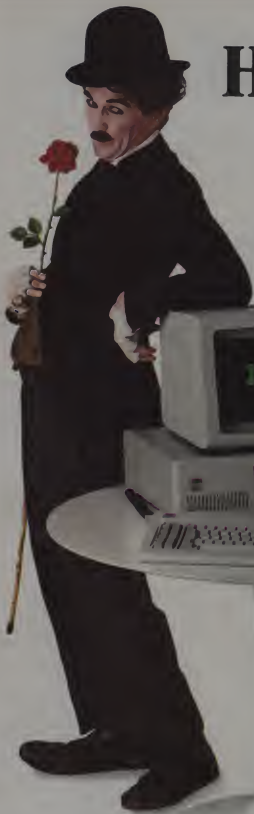


CIRCLE 182 ON READER SERVICE CARD

Kensington Microware Ltd.
919 Third Avenue □ New York, NY 10022
(212) 486-7707 □ Telex: 236200 KEN UR

© 1983 Kensington Microware Ltd

How you can tell



They're both IBM Personal Computers. And they're the same. Only different.

The system that's on the left is the ideal solution for a person who wants to be creative, efficient and improve his or her personal productivity.

So is the other one.

The system on the left incorporates the quality, the reliability and the technological excellence that have made IBM a computer leader for over 30 years.

So does the other one.

So which is which? Simple.

On the left is the IBM Personal Computer, starting with 64KB of user memory (expandable to 640KB) and two optional 5¼" diskette drives.

It can easily satisfy your computing needs at the office, at home or in school.

With 5 expansion slots, it gives you room to grow.

(You can even make it function like the computer shown on the right by adding an expansion unit that houses one or two 10-million-character fixed disk drives.)

This system can run most of the same software and accept most of the same IBM hardware as the computer on the right. And its price/performance is nothing less than remarkable.

The IBM Personal Computer

which is which.

On the right is the IBM Personal Computer XT, starting with 128KB of user memory (expandable to 640KB), a 5¼" 360KB diskette drive *plus* a standard 10-million-character fixed disk drive that's *already* built in.

For a businessperson with heavyweight data requirements, the XT packs a lot of power, because it can store the facts, figures, names and numbers you need to know.

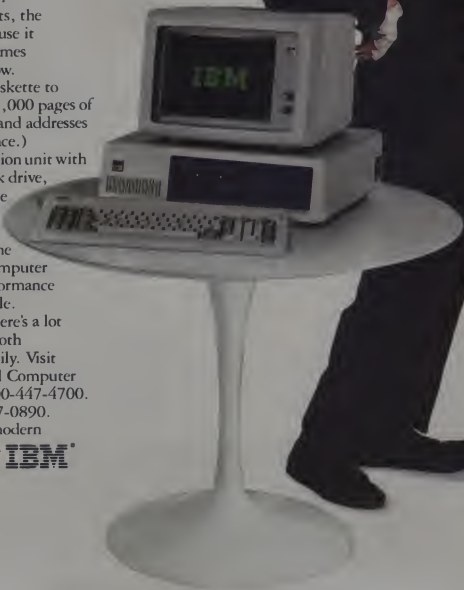
(Instead of going from diskette to diskette, you can have up to 5,000 pages of text or up to 100,000 names and addresses conveniently stored in one place.)

And by adding an expansion unit with a *second* 10-megabyte fixed disk drive, you get *even* more high-volume capacity from the system. XT can run most of the same software and accept most of the same IBM hardware as the computer on the left. And its price/performance is nothing less than remarkable.

But for you to choose, there's a lot left (or right) to learn about both members of this growing family. Visit your authorized IBM Personal Computer dealer. To learn where, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

And see which tool for modern times is right (or left) for you.

IBM®



The IBM Personal Computer XT

CIRCLE 175 ON READER SERVICE CARD

LASER™ 3000

PERSONAL COMPUTER

A brand new Apple® II-compatible
with that old familiar ring.

A completely original computer designed by Video Tech, The LASER 3000 is bound to be a sure seller. Just look at the sales points:

- * Apple® II software compatibility
- * CP/M® software compatibility. (With Z80 CARTRIDGE)
- * 64K Bytes RAM Expandable to 192KB RAM.
- * Built-in 32K Microsoft® BASIC
- * Built-in 80/40 column text display
- * Built-in Centronics interface
- * Built-in 4-channel sound generator
- * Hi-res 560Hx192V 6 colors graphics display
- * 280x192 8 colors bit-image graphic
- * 81-key step-sculptured full-stroke keyboard
- * Composite Video or RGB output or TV
- * 2 MHz 6502A CPU
- * Wide range of optional LASER peripherals including 4-color printer/plotter, modem, light pen, floppy disk drives, joysticks.

ALL
FOR \$695



VIDEO TECHNOLOGY (U.S.) Inc.
2633 Greenleaf, Elk Grove Village, IL 60007
U.S.A.
Tel: (312) 640-1776
Telex: 9102220357

ASK YOUR DEALER TODAY

LASER is a registered trademark of Video Technology Limited.
APPLE is a registered trademark of Apple Computer, Inc.
MICROSOFT is a registered trademark of Microsoft Inc., U.S.A.
CP/M is a registered trademark of Digital Research, Inc.

CIRCLE 262 ON READER SERVICE CARD

See Us at COMDEX/FALL '83
RIVERA HOTEL
Booth No. West 256

Instant Recall

Do you ever get the feeling that computer filekeeping isn't the miracle of automation that it's supposed to be? Searching computer files for bits and pieces of lost information can be almost as dreary as sifting through sheets of paper in a filing cabinet.

A new filekeeping program, *Instant Recall* by Charles R. Landers from Howard Sams & Co., Inc., does away with the least attractive aspects of computer filekeeping. *Instant Recall* does for Apple II filekeeping what computer filekeeping did for conventional paper filing methods. This system re-automates the entire process of keeping files.

Before we examine the program, let's examine two of the problems which inspired it.

Instant Recall is a free-form file cabinet.

One problem is that some data can be categorized under two headings. In maintaining a home recipe file, for example, you might try to figure out where to file your recipe for boeuf bourguignon. You could file boeuf bourguignon under *French Cuisine*, *Stews*, *Main Courses*, or *Beef Dishes*, just to name a few possibilities.

Of course, you could choose to file it under all those categories, but then you would have to enter all that data into every file. With most home filing systems, including the Shell Cabinet supplied by

Brian J. Murphy

Apple, you must re-enter all of the recipe information for each of your four databases. Chances are you will decide it really isn't worth the trouble.

For another aspect of the same problem, suppose someone else is searching your data looking for boeuf bourguignon under *Beef Dishes* not knowing you filed it under *Stews*. You can bet the information will be hard to retrieve.

Let's examine another problem: half-remembered data. Let's say you are a sales representative and have decided to use your Apple II to compile a file on all the contacts on your route. You like to keep your sales calls friendly and personalized, and one of your techniques is to "remember" important personal data, such as awards, birthdays, and anniversaries of your clients. One day, as you are about to start a circuit of the four dozen contacts on your route, you remember that one of your clients has a son named Bruce who will enter college this month. You want to mention him to your client, but which of your contacts is Bruce's father?

It is in your Apple files, but would you want to sit down and scan all 48 records to see whose son it is? Suddenly, the file you have struggled to set up has diminished dramatically in value to you, because it has become a nuisance to work with it.

Solutions

Instant Recall is a free-form file cabinet. You can create files that combine related or unrelated data as you please; you will have no trouble retrieving the information instantly. *Instant Recall* features a unique

key word search feature that allows you to call up a file using *any* word that may occur in any part of that file.

That is a very powerful feature. All you have to remember to access any desired file is any word at all that may occur in that file. The more specific the better, of course, but you can be sure that if you have even the slightest idea what you are looking for, you will find it.

Remember our example of the sales rep trying to remember which of his clients is Bruce's dad? All he would have to do with an *Instant Recall* file is to find his database on clients and search for the word *Bruce*. The *Instant Recall* file will find every *Bruce* in the database.

This search capacity makes the categorizing of information less restrictive. Remember the home recipe file? There is no need to enter the boeuf bourguignon recipe in your file on stews, then to repeat the process for beef dishes, main courses, and French cuisine. You can recall the recipe by searching the files for

creative computing

SOFTWARE PROFILE

Name: Instant Recall
Type: Filekeeping program
Systems: 48K Apple II
Format: Disk
Language: Assembly
Summary: Superior personal filekeeping system.

Price: \$59.95

Manufacturer:

Howard W. Sams & Co.
4300 W. 62nd St.
Indianapolis, IN 46268

Instant Recall, continued...

bourguignon or any other word that may occur in the recipe. If you like, when you save the recipe, you can add to the file the various categories into which the recipe falls as key words. Then, searching the words *stew*, *French/cuisine*, *beef/dishes*, and *main/courses*, will always yield the recipe.

Notice that some of the search keys were actually two words. That is another powerful *Instant Recall* feature. Our sales rep could use the double key word feature to find the missing college student by searching *Bruce/college*. The system will bring up only those files in which both of those words appear. This helps to narrow the search and speed the process.

Learning to use this filekeeping system takes only about an hour or so of study,

Learning to use this filekeeping system takes only about an hour or so of study.

using the tutorial that comes with the program. Once you are set up (file disk must be formatted for *Instant Recall* using a special initializing utility in the main program), simple commands allow you to enter the files, save them to disk, clear memory, and create new files.

Creating Files

Extensive editing capabilities make *Instant Recall* seem like a word processor for data files. Editing functions allow you to write over errors, remove lines, and close up the text, or open up a space for new text between lines. Automatic features like wraparound, which prevents the splitting of words from one line to another, help keep the text orderly and readable.

Instant Recall has automatic features which allow you to use your disk space more effectively. While you are entering text, a numerical display counter at the top of the screen tells you how many entries there have been in the file so far and which entry you are working on. As you write and save files, the system keeps track of how many characters you have left in your file. An Apple standard disk can hold four *Instant Recall* files of 28,000 characters. With two drives you can simultaneously handle as many as 229,000 characters in eight files.

Documentation

The documentation is designed to be very user-friendly and supportive. The system itself allows you to add as much or as little structure to your files as you

please. You don't have to set up and stick to rigid fields of information, the way you would with a Shell Cabinet type file-keeping system. You write your files to suit yourself; you are not forced to input the information in predetermined order.

It is also worthwhile to mention that this system operates at a very high rate of speed. *Instant Recall* boots up quickly, and the maximum loading time for any file is five seconds or less. When you use the catalog command, you see the list of all four files on your disk. Into this list you may put any descriptive titles you want to simplify your searches. Once you are in the desired file, you can speed your searches by using the double key word feature.

Printing

Sooner or later you will want hard copy duplicates of your files, and you will find that *Instant Recall* handles this chore with grace. With some file programs, turning

A Former Incarnation

Instant Recall is still floating around at some computer stores under its original title *PDQ*. The difference between the two packages is in more than just the title. The newer program is fully compatible with the Apple IIe, making good use of its new features including upper- and lowercase (much better printed copy), shift lock, and other editing functions. The newer manual contains instructions for use with all versions of the Apple II. The programs are also compatible with the Apple III in the Apple II emulation mode.

on the printer commits you to printing everything you call up. When you address the printer with *Instant Recall*, however, you won't print the files until you give a specific command to dump the records to the printer. This means you don't have to

Instant Recall is full of nice surprises.

access the files once to find your data and a second time to print out your hard copy.

The greatest strength of the program, its free-form filekeeping capability, makes it less than ideal for some business applications, specifically report writing. The formlessness of the program does not lend itself well to the formality of a corporate environment. The program can be made to adapt, of course, if your Apple has upper- and lowercase and if you are willing to enter or edit the reports in a manner suitable for the requirements of your project.

In the final analysis, *Instant Recall* is best suited to be a personal data bank, a place to keep memos to yourself, information you have trouble classifying (but know you will need sooner or later), and the information you need on a daily basis.

Instant Recall is full of nice surprises. It has a good many capabilities which you can explore, and you will find that you pick them up quickly and easily. One night's practice should make you an *Instant Recall* veteran—and enthusiast. □



"We had to buy the computer to keep track of the kids!"

When you're ready to add disk drives to your system, you'll be excitedly. Get all the options and information you need for your Micro-Sci drive.

Micro-Sci's Model A143 is a Micro-Sci 5 1/4" floppy disk drive. Choose from a selection that includes everything from a designer's choice on to large capacity, high-speed systems for the busy office environment.

Micro-Sci's Model A3 is a superbly crafted, 35-track drive which is completely compatible with all Apple II® and Apple III® hardware and software. It features a jumper-free ROM and a price that its competitors envy. Available for the business-conscious consumer.

Programmers and Worldwidewizards rejoice! You need no longer worry. Prepackaged software compatibility in favor of large storage when you buy a disk drive for your Apple II drive. The new Micro-Sci drive Micro-Sci combines a full 32K capacity—more than twice the space of a Disk II®—

with the ability to read standard 30-track software.

Apple III® owners will crave the Model A3. It offers all the features and capabilities of the Disk II® at a fraction of the price. Ideal as a second drive!

At 286K, Micro-Sci's Model A73 provides Apple II users with twice the capacity of the Disk II, and it plugs right in to the built-in controller—no extra board or power cord!

The king of all Apple compatible drives is the Micro-Sci Model A143, the largest 5 1/4" floppy disk storage system available for the Apple III. 572K storage capacity and the 5msec access time make the A143 a powerful back-up device for hard disk systems.

One option you'll never see on a Micro-Sci drive is a princely price tag—we control your costs as carefully as we control our quality. So drive carefully to your nearest computer center for a demonstration of Micro-Sci craftsmanship and quality. Do it today!



DRIVE CAREFULLY.

μ-SCI

MICRO-SCI

MICRO-SCI IS A DIVISION OF STANDUN CONTROLS INC.

2158 SOUTH HATHAWAY STREET • SANTA ANA, CALIFORNIA 92705 • (714) 662-2801 • TELEX: 910-346-6739

CIRCLE 193 ON READER SERVICE CARD

*Apple II, Apple IIe, Apple III, Disk II and Disk III are registered trademarks of Apple Computer Inc.

Wordcraft

Word Processing On A Budget

Joe Devlin

Throughout the land, salesmen in K-Mart, Penneys and other haunts of low cost computers are being asked the same question by customers looking for computing bargains. "Sure it is cheap, but can it do serious work like word processing?"

I, myself, have been asked this question more times than I care to remember. Since pay scales of salesmen are based on their loquacity and ability to elaborate creatively on the facts, you can guess what the salesmen answer. I had no merchandise to sell and hence tried to be as honest as experience allowed. "Can it do serious work like word processing?" they asked. "Sure," I replied, "but you get what you pay for, and the cheaper system will have limitations." I sounded like a salesman hedging his bets. The truth was, I had never spent much time playing with a low cost word processor running on a low cost com-

puter—until *Wordcraft 20* arrived.

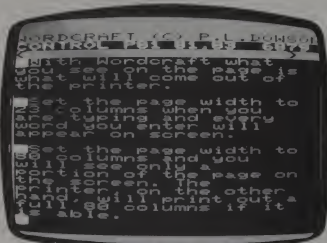
Each staff member at Creative has at least one favorite package, and he argues vociferously on the relative merits of his pet word processor. Word processors are a bit like home cooking—one likes

**Word processors are a
bit like home
cooking—one likes
best what one tastes
first.**

best what one tastes first. My first word processing package, and the package I still use at home, runs on my trusty old Commodore 8032 computer. It is called *Wordcraft*.

The computer business is a volatile one. Old machines die and become extinct. The 8032 has always been an also ran in the United States. Nevertheless, it is a beautiful machine for a writer. It has a large green screen with an 80-column display and good looks that make it a popular extra in commercials and futuristic TV shows.

In Europe, Commodore is king. Commodore supports its business machines there, and lots of software is written for these machines. In the United States the story is different. The 8032 was never aggressively sold in the States and never caught on here. Within the U.S., Commodore has concentrated its efforts on promoting lower priced machines. Exit



You can set the screen color to dark blue and the line width to 23...



or set the page width to 80 and the background to light blue.

creative computing SOFTWARE PROFILE

Name: Wordcraft 20

Author: P.L. Dowson

Type: Word processor

System: Commodore Vic 20

Format: ROM cartridge

Language: Assembly language

Summary: Fast, powerful, and relatively easy to use

Price: \$99.95, \$199.95 with extra 8K RAM

Manufacturer:

United Microware Industries, Inc.
3503 Suite C
Pomona, CA 91768
(714) 594-1351

the 8032 and enter its low cost relatives the Commodore 64 and the Vic 20.

I was not surprised when a version of *Wordcraft* for the Vic 20 arrived at Creative. The Vic is, to a large extent, a redesign of the older Commodore computers; hence conversion of software between machines is relatively painless. It was natural that someone should convert the successful *Wordcraft* line to the Vic and the 64. Finally, I had the opportunity I had been waiting for, the chance to compare a word processor that runs on an 80-column machine with one that runs in 24 columns on a computer that sells for under \$100.

I was prepared to find a very limited software package. That is not what I found. I have always been impressed with the 80-column version of *Wordcraft* (presently called *Wordcraft Ultra*). *Wordcraft 20* lives up to the standard set by its big brother. It is fast, it is powerful, and it is relatively easy to use.

If you have the money to invest in a more expensive computer, you can buy plenty of expensive word processing packages that will offer more tricks than those available from *Wordcraft 20*. You will be hard pressed, however, to find a package that exceeds the speed, power, and ease of use that *Wordcraft* offers.

Features

Although the list of features offered by *Wordcraft* is impressive, it is not the list of features but rather the ease with which they can be implemented that first caught my attention. Anyone who uses a word processor knows that he uses the same elementary functions over and over again.

A good word processing package must allow for easy creation of new text, fluid movement of words and phrases within the document, the quick insertion of new material, and the erasure of words that no longer seem to fit. Both versions of

November 1983 • Creative Computing



TRY SAM'S FOR STARTERS.

If you're considering buying one of the new low-priced computers, or you already have one, let Sams help you get your computing off to a good start.

For TI 99/4A* owners there's THE TI 99/4A USER'S GUIDE. It covers everything from system setup to expansion options, including languages, software and peripherals. It uses no hard-to-understand computer jargon, and clearly explains what you need in order to achieve the results you want. No. 22071, \$11.95.

BATTLESTAR BASIC FOR THE TRS-80† teaches BASIC through an arcade-type video game you create as you learn. Before the aliens land, you'll know how to write programs, edit, use arithmetic logic, subroutines, and more. Good for all ages. No. 22006, \$12.95.

Both you and your family will enjoy MOSTLY BASIC: APPLICATIONS FOR YOUR ATARI, BOOK 1. It provides 38 ready-to-use programs that feature language flash cards, a reading pacer, spelling and math tests, IRS planning guides and more. No. 22075, \$14.95.

To learn some ways you can make money with your computer, get MEGABUCKS FROM YOUR MICROCOMPUTER. It includes detailed instructions for all aspects of writing, reviewing and programming to help develop your creative computing skills. No. 22083, \$3.95.

Try Sams for starters and get the most out of your computer. Get your copies today! To order or to get the name of your nearest Sams Book outlet, call 800-428-3696 or 317-298-5566 and ask for Operator 446.

SAM'S BOOKS AND SOFTWARE

HOWARD W. SAM'S & CO., INC.
4300 West 62nd Street • PO. Box 7079
Indianapolis, IN 46206

Offer good in USA only and expires 3/31/84. Price subject to change without notice. In Canada, contact Lenbrook Electronics, Markham, Ontario L3R 1H2.

TI 99/4A is a registered trademark of Texas Instruments, Inc.
TRS 80 is a registered trademark of Radio Shack, a Tandy Corporation.

CIRCLE 212 ON READER SERVICE CARD

AD446

89

Wordcraft, continued...

Wordcraft perform the basics with style and ease.

This is not to imply that *Wordcraft* can perform only the basics. *Wordcraft Ultra* is not only easy to use, it is sophisticated. To my surprise, I found that the programmer who converted *Wordcraft* for the Vic had managed to pack most of the features that attracted me to *Wordcraft* into the ROM cartridge that bears *Wordcraft 20*.

The two versions of *Wordcraft* share an extensive repertoire of attractive features. The automatic word wrap feature eliminates broken words. Automatic line centering and definable tab stops allow for easy positioning of words on the page. Search and replace can be used to make quick changes. The status lines that appear on the top of the page let you know which page you are working on, where the cursor resides on that page, and how many characters of memory space remain.

Page length and page width can be changed with the stroke of a few keys. A built-in mail list program provides the ability to fill names, addresses, and special phrases into letters for personalized correspondence. If your printer allows, it is possible to underscore text or to print in boldface, and text can be right justified or left ragged.

Wordcraft Ultra does offer some features not offered by its little brother, most significantly automatic page numbering, and automatic headers and

The two versions of Wordcraft share an extensive repertoire of attractive features.

footers. *Wordcraft 20*, on the other hand, makes good use of color within the program to let you know what is going on. It also allows you to change the color of the cursor, erase block, text, and screen background to suit your needs.

Function keys not found on the older Commodore computers that run *Wordcraft Ultra* are used to provide easy single stroke access to the most often used commands on the Vic.

These features are icing on the cake. They may be used only occasionally by the average user, or they may be used frequently by those with special needs. But if the basic commands didn't work well, patience would run out long before the fancy features were invoked. Other word processors may offer more

Creative computing SOFTWARE PROFILE

Name: *Wordcraft Ultra*
Author: P.L. Dowson
Type: Word processing package
System: Commodore 8000 series computers
Format: Disk
Language: Assembly language
Summary: Fast, powerful and relatively easy to use
Price: \$450
Manufacturer: Microsci
Microsci
2158 S. Hathaway
Santa Ana, CA 92705
(714) 662-2801

features, but few packages work as elegantly as *Wordcraft* does.

What You See Is What You Get

Wordcraft is a screen based word processing system, one in which what you see on the screen is what comes out of the printer. To my mind it is the best approach to take with a word processor.

Not all word processing packages are screen based. Some have you embed special characters into the text that appear on the screen. These embedded characters (for example the phrase "... page to force a new page) usually remain on the screen, taking up space and cluttering the page. The commands do not appear on the printed page. Instead, they affect the way in which the page is printed (... page causes the printer to start a new page). In *Wordcraft* you edit text as it appears. If you tell the computer to skip a page it will skip a page both on screen and when printed out. There are no embedded commands appearing on the screen where only your words should be.

Wordcraft accomplishes this feat by using two modes. The Typing mode is used for entering text and the Command mode is used for entering commands. Either mode can be reached at any time with the stroke of a single key. There is no need to exit to a menu and call up a version of the document that shows how it will appear when printed and then go back to a type mode and remember what needs to be changed.

Neither does *Wordcraft* make use of on screen menus. All the commands must be memorized. This does take a little time. You command *Wordcraft* with easy-to-remember mnemonics such as the W for width or P for print or with the function keys. The advantage of this method is that there are no menus to wait for and no menus to clutter up the screen. In the place of the menus,

Sirius Is GIVING AWAY Over \$35,000.00 In VIDEO GAMES!!!

You Can Win A Sirius Game OF YOUR CHOICE!

Correctly answer the questions below to qualify for the FREE GAME DRAWING.

Enter all of the
Grud Quizzes and qualify for all 20 drawings!

GRUD QUIZ #11: TYPE ATTACK

1. What typing speed should intermediate typists choose?
2. In which level does the word "DAD" appear?
3. What is the first word that attacks in level three?
4. How many points do you lose for typing an incorrect character?

TO ENTER:

Just send a postcard or 3 x 5 size of paper to Sirius containing the following information

- 1 Your name and address
- 2 The Grud Quiz number and your four answers

RULES:


1. All entries must be handwritten and individually mailed
2. All entries must be postmarked by midnight, February 29, 1984
3. Only one prize per person per quiz is permitted

1,000 WINNERS!

If ALL of your answers are correct you will qualify for that Grud Quiz drawing 50 winners per quiz will be randomly chosen and notified by mail on or before March 31, 1984. Each winner will receive a complete Sirius catalog listing from which they can select the game or games of their choice

LOOK FOR MORE GRUD QUIZZES in the Oct., Nov., and Dec issues of your favorite computer magazines or at participating software retailers

ALL CONTESTANTS WILL RECEIVE A FREE FULL COLOR SIRIUS CATALOGUE

Sirius 

Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827

(VOID WHERE PROHIBITED BY LAW)

GADZOOKS! MY FAVORITE TV GAME SHOW IS ON...



GRUDS IN SPACE™

ALRIGHT JOHN! FOR 10 POINTS MAKE HAROLD NAME THAT GAME!



YOU'RE GIVEN AN URGENT REQUEST TO DELIVER FUEL TO A STRANDED FLEET OF BATTLESHIPS



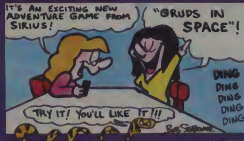
YOU MEET ANGRY GRUDS WHO BURN THE NEEDED FUEL



...AND WATCH OUT FOR THOSE VENUSIANS...



INCORRECT ANSWER JOHN NOW FOR NINE POINTS BETTY...



© 1983 SIRIUS

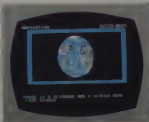
Sirius™



For more information contact your local Sirius dealer or contact Sirius directly at 10364 Rockingham Drive, Sacramento, CA 95827 (916) 366-1195.

Game design by Chuck Sommerville and Joe Dudar. Package program and audio visual 1983 Sirius. All rights reserved.

Sirius and Gruds in Space are trademarks of Sirius Software Inc. Atari 800 and 1200 are trademarks of Atari Inc. Commodore 64 is a trademark of Commodore Business Machines Inc. Apple II, II+, and IIe are trademarks of Apple Computer Inc. IBM-PC is a trademark of International Business Machines Inc.



Atari 800 & 1200 Disk
IBM-PC Disk
Apple II, II+ & IIe
Commodore 64 Disk



BY CHUCK SOMMERVILLE AND JOE DUDAR

CIRCLE 224 ON READER SERVICE CARD

The Exchange

**The Newest
Classic
in
Simulation.**

**\$
hi-res
sound
\$
1 - 6 players
\$
high score
feature
\$
save game
\$
buy/sell/trade
\$
Generate
unlimited
game
variations
\$
challenge
the world of
"The
Exchange"
and
become
a tycoon
or . . . go
bankrupt!**



"The Exchange" by Pat Kelly — enter the stock market world of bike chip, growth speculation precious metals, bonds, and futures. Subscribe to the computer's exchange news service, and receive the latest in business tips (?) or analyze the market yourself. Be prepared for capital gains tax splits, and special news bulletins which influence rises/declines in stocks. Challenging and instructive here-a simulation for all age groups 2 disks \$59.95 U.S.

Ask for it at your local dealer or order directly from:

Applesoft 48K Apple II/II+ II e
with DOS 3.3 and 1 disk drive



**KELCOM
MANAGEMENT LTD.**
30 Southampton Drive W. Waukegan
Aberfeldy Canada T1W 1T1

'Apple' is the registered trademark of Apple Computer Inc

CIRCLE 181 ON READER SERVICE CARD

**Mastercard
&
VISA
honored**

Tel. (403) 253-5397
CONTRIBUTOR INQUIRIES WELCOMED

Wordcraft, continued...

Wordcraft uses the top three or four lines of the screen to keep you informed about where you are in the document and what you are doing.

The screen based approach works best on a computer that displays a full 80-column screen at a time. Although Wordcraft 20 can create and print 66 lines of 99 characters, the Vic screen can display only 25 lines of 24 characters at a time. Once you type the 25th character of a long line, the screen automatically scrolls over to let you see the next 22 characters. Scrolling across the page to see what is on the other side is no fun. Obviously it is much more convenient to work with Wordcraft Ultra which offers a full 80-character page width.

One of the nicer features of both versions of Wordcraft is the ability to reset

The Vic imposes its limits of small screen size and memory on the software, but the package is superb, nevertheless.

the width of the page painlessly in the blink of an eye. This provides a solution to the restricted page width of the Vic. On Wordcraft 20 I set the page width to 23 characters so I can eliminate scrolling, and then I reset to full page width when it comes time to print.

The Constraints Of Memory

Another difference between the two versions of Wordcraft results from the amount of memory available to each program. Wordcraft Ultra is supplied on disk. Wordcraft 20 is supplied in ROM cartridge and plugs into the Vic like any game or memory cartridge. Wordcraft Ultra must be loaded into memory to operate. Wordcraft 20 operates within the ROM and does not chew up memory space. This is fortunate, because there is no room to load the 16K Wordcraft 20 program into the memory of the Vic.

You can buy Wordcraft 20 with or without an extra 8K of RAM memory space built into the cartridge. If you have already purchased a memory expansion cartridge for your Vic, buy the cheaper cartridge without memory. If not, you will need the extra memory offered by the more expensive version.

I used the version with the extra 8K. It provided me with a little over 7000 characters of storage space. This trans-

lates into about four 80-column, double spaced pages. Obviously, Wordcraft Ultra running on a machine with much more memory can store many more pages within memory. Memory is not, however, the only place to store text.

If you need to create a document that will not fit into memory, you can do so by breaking it up into separate documents each with a separate name. Wordcraft 20 gives you the option of saving these documents to either disk or tape. Wordcraft Ultra saves all its documents to disk and offers the option of dividing pieces of a large document into chapters with the same document name but different chapter numbers. Chapters can be linked together and printed out automatically. You can, of course, print as many documents as you like from Wordcraft 20, but each document must be loaded and printed separately.

Included in the price of the Wordcraft 20 is a 31-page user's manual and a cassette full of useful routines such as an instruction program, mailing management routine, and a conversion program that allows files to be transferred from Wordcraft 20 to other versions of Wordcraft.

The manual is easy to follow and well written. It begins with a 14-page tutorial that gets you started with the basics—how to type in a new document, edit it, print it, save it to disk or tape, and then retrieve it.

Plug the cartridge in, connect up the TV and turn the computer on and follow the tutorial. Within an hour or so you should have the fundamentals down pat. Finish the tutorial and you will have learned to perform all the routine functions required by most word processing applications.

The next time someone says to me "Sure the Vic is cheap, but can it do serious work like word processing?" I will tell him about Wordcraft 20. The Vic imposes its limits of small screen size and memory on the software, but the package is superb, nevertheless.

The Wordcraft line continues to grow. UMI will have released a \$99 Wordcraft cartridge for the Commodore 64 by the time this article is printed. If you already own a Vic and want a word processing package for your machine I highly recommend Wordcraft 20. If you don't already own a Vic, check out Wordcraft for the Commodore 64. Running Wordcraft on the Vic requires the purchase of at least an extra 8K of memory. The Commodore 64 has more than enough memory built in. You may find that the savings you will realize by not having to buy the expanded memory version for the Vic will almost account for the difference in price between the Vic and the 64.

50%

THIS MAY BE
THE SAVINGS ON
SOFTWARE
WHEN YOU'RE
A MEMBER OF
SOFTWARE
OF THE
MONTH CLUB

As a member of the Software of the Month Club, you'll receive:

- **SAVINGS:** high volume CLUB purchases allow wholesale-like prices to members.
Example: dBASE II . . . \$389*
- **SELECTIONS:** members to decide best-seller list by frequent polling; 40-50% off. Other requests at cost plus 5-10%.
- **SUPPORT:** technical hot-line.
- **NEWSLETTERS:** tips & "how-to" by consultants.
- **HARDWARE SPECIALS:** co-op savings.
- No minimum purchase required.

Membership registration fee \$25.
Join now for only \$7 (limited time)
and receive price list

CC 11-83

SOFTWARE OF THE
MONTH CLUB, INC.
953 Mission St., Mini Mail
San Francisco, CA 94103

Enclosed is \$7 for this special
Please enroll me in the club

Name _____

Address _____

City _____

State/Zip _____

*Plus shipping/handling
Subject to change without notice

CIRCLE 189 ON READER SERVICE CARD





The Incredible Jack & Think Tank

Steve Arrants

It has been predicted that Pascal will eventually replace Basic as the language of choice for microcomputing. Easy to understand, quick to use, and versatile, Pascal is a good choice for some applications. In fact, software authors are beginning to use Pascal in commercial programs.

It will take a long, long time before Pascal beats Basic, however. There is just too much of an investment in Basic software. But as more quality Pascal software is marketed, its following grows and becomes more loyal.

The two packages reviewed here exploit the main strength of Pascal—text processing. Both could have been written in Basic and assembly language. They probably wouldn't have been as easy to write or use, however.

The Incredible Jack is a word processor/spreadsheet/database package all on one disk, in one program. It is impressive not so much for what it does, although it does a good job, as for what it sets out to do. *Think Tank* is an "idea processor." Really nothing more than an outline generator, it sounds like another wasted application. The surprising thing about *Think Tank* is how useful it is once you get accustomed to its commands and formats. I think you will be impressed.

The Incredible Jack

When this package was handed to me for review, I couldn't believe that the people at Business Solutions Inc. were serious. A word processor and a database and a spreadsheet on one disk? To top that, the documentation is a 125-page book about the size of a floppy. It couldn't work. There was no way that all that code could be packed onto one side of one disk. One boot of this disk, and that would be it. The software would be so incredibly bad, so bare bones, that reviewing it would be a joke.

OK, I was wrong. *The Incredible Jack* does what it says it will do, and it is all on

one disk. The idea behind the development of *The Incredible Jack* is that bundling the most used and useful types of business software will please many people: no more trying to insert *VisiCalc* files into a *WordStar* report; no complex formatting of tables or information into a database. One

**The Incredible Jack
does what it says it
will do, and it is all
on one disk.**

program would do it all. Apple owners would have something resembling the IBM PC package 1-2-3 from Lotus, a software package that fully integrates the three most important business operations—organizing data, manipulating data, and printing data.

Well, if you want the best of those three operations, you will still have to purchase three different software packages. Like a Renaissance man, *The Incredible Jack* does many things well, but none superbly.

That is not to say that it doesn't impress me or that it is useless. After all, great software has to start somewhere. And a strong point in its favor is its ease of use. It is not like learning *WordStar*, *VisiCalc*, and *DB Master* all at once. The different parts of this program work in harmony, producing an easy to learn and easy to operate piece of software.

Using Jack

If you have ever written a letter on a word processor, writing a form letter should be easy. If you have mastered form letters,

creating a database file is almost as simple. Include a way to do calculations on database fields, and you have *The Incredible Jack*.

Calculations with *The Incredible Jack* are not the type users of spreadsheets are used to. There are no rows and columns or cells. In this package, they are called labels. Just because it doesn't look like *WonderCalc* or any of those other spreadsheets doesn't mean that *Jack* can't do sophisticated calculations. For example, let's say you are printing billing notices. If one client hasn't paid in 90 days, that data in one label could cause an extra warning in his letter or print out a stronger letter.

Again, I must stress that you don't move from calculations to the database and then into the word processor. All the commands are available at any time. There is no need to save a calculation file and reload it on your word processor. This is the most impressive feature of *The Incredible Jack*: all the features are available instantly.

The screen is divided into four sections: a command line, a tab line, the work area, a footnote area, and a status line. The prompt messages are almost completely self-explanatory. Enter D for the

Creative Computing SOFTWARE PROFILE

Name: The Incredible Jack

System: Word Processor, Data Base, Calculator

System: 48K Apple II

Format: Disk

Language: Pascal

Summary: Easy to operate, well-integrated package.

Price: \$129

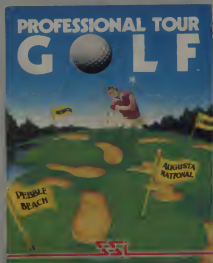
Manufacturer:

Business Solutions, Inc.
60 E. Main St.
Kings Park, NY 11754

If you've ever dreamed of playing the pro-tour golf circuit on the world's finest courses...

Or fantasized about getting ringside seats to all the championship fights in history...

Or drooled over the prospect of managing the best pro baseball teams of all time...



We've just answered all your hopes and wishes!

And SSI's 14-day "satisfaction or your money back" guarantee makes sure our games will help make your dreams of sports glory come true. In fact, the only way they won't is if you don't hurry to your nearest computer/software or game store and get these fine strategy sports games today.

For the APPLE® and COMMODORE 64™:

These games (*\$39.95 each) come on mini floppy disk for the APPLE® II with Applesoft ROM Card, Apple II Plus, Apple IIe, or Apple III. Also on disk for the Commodore 64.™

Apple is a registered trademark of Apple Computer, Inc.

SSI

STRATEGIC SIMULATIONS INC

Commodore 64 is a trademark of Commodore Electronics, Ltd.

If there are no convenient stores near you, VISA & Mastercard holders can order direct by calling 800-227-1617, ext. 335 (toll free). In California, call 800-772-3545, ext. 335. To order by

mail, send your check to: Strategic Simulations Inc, 883 Sterlinc Road, Bldg. A-200, Mountain View, CA 94043. (California residents, add 6.5% sales tax.) Please specify computer format.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES.

CIRCLE 232 ON READER SERVICE CARD

WRITE IT. PROOF IT. SEND IT.

THE WORD JUGGLER™ SYSTEM FROM QUARK.

If you're serious about word processing on your Apple IIe or Apple III, you should try the Word Juggler System from Quark. Integrated tools that combine ease of use with extraordinary power.

WRITE IT WITH WORD JUGGLER.

The anchor of the system is Quark's Word Juggler word processor, a program that lets you easily perform the most intricate editing tasks. For example, you can delete characters, words, even paragraphs with just a single keystroke. You can instantly copy, move or delete entire blocks of text. Then display or print your document by simply pressing a key.

And there's virtually nothing to memorize. Because editing and formatting commands are always right there on the keyboard. Word Juggler for the Apple III comes with special templates which identify principal word processing functions. On our version for the IIe, the editing commands are labeled on easy-to-install, replacement keycaps.

Plus, Word Juggler lets you generate form letters from existing mailing lists, because the program has a built-in interface with both PFS:File and Apple's Quick File.

PROOF IT WITH LEXICHECK™

Once you've written your document, you can quickly proof it with Lexicheck—a high performance spelling checker with a 50,000-word dictionary. Simple and fast, Lexicheck is invoked from within Word Juggler by a single keystroke. The program scans your document and highlights unrecognized words in context. If the words are actually misspelled, you can quickly correct them. If words are merely unknown, as with jargon or abbreviations, you can add them easily to your own personal dictionary.

SEND IT WITH TERMINUS™

And with Quark's new Terminus communications program, you can use Word Juggler for electronic mail applications. A single keystroke invokes the program from within the word processor, allowing you to communicate with most any RS232 device. You can predefine the protocols you need to communicate with as many as 14 different systems, at transmission rates up to 9600 baud.

TEST IT TODAY.

Your dealer wants to give you a complete demonstration of all the features and capabilities of The Word Juggler System from Quark. And while you're there, check into Quark's full line of Office Automation Tools for the Apple II!

Word Juggler for the Apple II, \$295
Word Juggler Ite, \$299
Lexicheck for the Apple II, \$149
Lexicheck Ite, \$129

Terminus for the Apple II, \$89
Terminus Ite, \$89
All prices suggested U.S. retail

Quark
INCORPORATED

Office Automation Tools

Quark, Word Juggler, Lexicheck and Terminus are trademarks of Quark, Incorporated.

Apple and Quick File are registered trademarks of Apple Computer, Inc. PFS is a registered trademark of Software Publishing Corporation.

CIRCLE 202 ON READER SERVICE CARD

THERE'S NOTHING EASIER UNDER THE SUN

Your personal
financial software
from Sundex.

**IT'S EASY TO LEARN...
EASY TO USE...
AND, DURING OUR SPECIAL PROMOTION...
INCREDIBLY EASY TO BUY!!**

• Control your finances and taxes with the Sundex Certified Personal Accountant™ program. With your financial status at your fingertips, easily analyze and manage your finances effectively. It even pays your bills automatically! Normally \$99.95 to \$149.95.

• Enjoy the ease and security of having your investment records on your Sundex Certified Personal Investor™ program. Ideal for personal portfolio management, analysis, and tax form preparation. Normally \$99.95 to \$149.95.

• Have fun with the Sundex Personal Payables™ program as it automatically pays all your bills from as many as 10 different checking accounts and prints out your checks. Normally \$49.95.

EASY TO LEARN ... EASY TO USE

5 minutes with a Sundex program will show you how "an screen" instructions plus a "HELP" key, make these programs so easy.

**DURING OUR "SUNDOWN" PROMOTION ...
INCREDIBLY EASY TO BUY!**

Beginning October 31, 1983 and for 14 consecutive weeks, you will find Sundex Software in your local computer store for once-in-a-lifetime prices ...

STARTING AT \$19.95 ... BUT,
the prices go up every two weeks, so the sooner you buy the less you pay.

Test this remarkable software yourself. Ask your computer dealer to let you try a Sundex program. Then look for the colorful "Sundex Sundown" display, to find that week's price on the programs you want.

**HURRY ... DON'T LET THE SUN GO DOWN ON THIS
INCREDIBLE INTRODUCTORY OFFER!**

Visit your computer dealer today!
Just call 1-800-835-3243 to find out the name of the dealer nearest you.

THERE'S NOTHING EASIER UNDER THE SUN

Dealer inquiries welcome:
1-800-835-3243
Colorado: 303-440-3600

Sundex Software Corp.
3000 Pearl Street
Boulder, Colorado 80301



CIRCLE 241 ON READER SERVICE CARD

Think Tank, continued...

Disk mode to set up a new file. Enter the filename and space is reserved on disk. You are immediately switched into the File mode, ready to enter text. The Pset command may be used to format your work. Enter the text as you would with a computer word processor, i.e. don't enter a return unless you wish to start a new paragraph or block of text.

Suppose you want to create a form. Instead of calling on a new program, enter the form headings and spaces for the fields, ending with a caret (^), the character that delimits the field. After completing your form, use the Lock command to freeze the headings and fields. To use a form, enter the information requested for a field and press the tab. *Jack* jumps you over to the next field automatically.

Calculations are almost as easy. At the file menu, enter CALC and return. Type a definition such as PRICE or DISCOUNT, enter some spaces and end with a caret. To select a calculation formula, select the F mode. Let's say that the discount will be 10% for all purchases. Enter DISCOUNT: .10 * PRICE. You have just set up your first calculation formula.

All of these modes can be combined. You can change a form into a form letter, have a form letter with calculations, or keep an inventory record with calculations. The versatility of *The Incredible Jack* makes it an impressive package.

Summary

The documentation is so-so. I think that the designers of *The Incredible Jack* got a little carried away and thought that

**The versatility of
The Incredible Jack
makes it an
impressive package.**

the documentation should be as small as the disk. A tutorial is included. Although written in Pascal, a fast language, disk access can slow things down, as in the case of *Think Tank*. Also, transferring *Jack* files may be difficult unless you convert them into DOS format or have a Pascal-based communications program.

Finally, it won't replace *WordStar* or *VisiCalc*. There are just some things that they can do better, easier, and quicker. And because it won't be the only program you use, it won't make using the Apple any easier. You will still have to learn different commands and different formats for each program. If you think that you will only be doing light word processing/

database/spreadsheet/applications, *The Incredible Jack* may be the way to go.

Think Tank

Back in grade 3, Sister Amadea taught us all how to outline. Eight-year-olds are not noted for their organizational ability, and at that age, I was more interested in how the Baltimore Orioles were doing in their division. But, Sister worked at it, until we all could outline almost anything from a one-page book report to a plan for life. No matter what you do or plan to do, getting your priorities set up in an organized fashion is the best beginning. Until now, using a pad (or two) of paper and a supply of pencils was about the only way to get organized.

People do not think in a straight, organized path. We are not like computers. Intuition and insight enter into the process, as does the process of one thought causing us to remember another. So, you sit down with paper and pencil, or 3 x 5 cards, or some other organizational tool, writing down the first thoughts that come into your head. A few ideas come to mind. You write them down, and suddenly you are off on a tangent. Or you have the plan all neatly written down, and you decide to change just one point...

Well, now it is a little bit easier to organize your thoughts. With *Think Tank*, described as an "idea processor," thinking, rethinking, planning, organizing, and delegating jobs can be made a little easier. Really just an outline generator, *Think Tank* tries to make outlining as easy as word processing. By breaking down the physical barriers such as a full note-pad,

**Think Tank tries to make
outlining as easy as
word processing.**

blunt pencils, etc., *Think Tank* allows you to flow with the thoughts, cleaning them up later. Since it runs on your computer, erasing something you don't like is just a simple keystroke. The idea behind this product is that the easier it is to process ideas, the quicker and more effortlessly those ideas will come.

Using Think Tank

Although the package looks frightening, working with *Think Tank* is easy. All you need to do is enter your thoughts into

TOUR GOLF



HIGH RESOLUTION
3 DIMENSIONAL
GOLF PROGRAM

REALISTIC GOLF SIMULATION

- 3 dimensional display of each hole
- Two courses: regular or championship
- Two levels of difficulty for each course
- Optional data diskette with other courses available
- 1 to 4 players
- Automatic scoring
- Complete club selection: 4 woods, 9 irons, putting
- Designed for IBM PC 64KB color graphics board, 160 KB diskette

\$39.95

POTENTIAL SOFTWARE

POTENTIAL SOFTWARE
P.O. Box 230232
Portland, OR 97223
(503) 650-0671

CIRCLE 200 ON READER SERVICE CARD

Think Tank, continued...

your Apple. Entries can be in complete sentences, fragments, paragraphs, or cryptic notes. Each entry can be indented, depending upon its importance in your overall scheme.

Again, thinking in a straight-line, organized fashion isn't necessary. Just put down your ideas and organize them later. One idea becomes a heading. Expanding on that heading forms a paragraph. You

think of something that branches off from the paragraph, and you form a sub-heading, and so on and so on. New information or a change of mind is easily accommodated.

Think Tank will not replace a list of "Things to do on Saturday."

After entering an idea, edit it, add to it, or change its importance by moving it around. Don't worry about its placement too much. After all, you don't want to stifle your creativity. Just let the ideas flow onto the screen, taking shape and building upon themselves. Anything can be added anywhere. Ideas that aren't needed can be swept away easily. Indent a heading or an entire paragraph to give it added importance. Scan through your outline to add or delete what you wish.

The commands used are very simple and divided into four main groups. Each command is connected to another command, much like tree branches connected

to a tree trunk. Moving the cursor over a command causes a brief explanation of that command to be displayed.

Want to see just the main headings of your outline? Enter **CONTRACT** and only main headings are shown. Enter **EXPAND** to get a look at more parts of the outline.

Printing is easily done after setting certain parameters such as slot number, page length, and lines per page. You can print out a full outline or a contracted one, having only those categories you want printed.

Although the program is written in Pascal, *Think Tank* files can be translated into DOS text files with a utility that is provided. Since so many people use DOS based word processors, this is a welcome feature. You can merge a *Think Tank* outline into an *Apple Writer* or other Apple word processor, or send them over a modem with a DOS based telecommunications program.

Documentation

The documentation for *Think Tank* looks frightening. The thick, spiral bound manual made me think that learning to use this software was just not worth it. The manual is very well done. A tutorial, reference section, good technical information, glossary, and a "refresher" section for old users of *Think Tank* make this one of the best documentation guides I have seen.

Although there is a great deal of information presented, it is done in such a way that it didn't bore me. Finally, a truly useful reference card is included. Nothing on the card is left to chance. All possible commands are covered, including when to use them.

Summary

Think Tank isn't for everyone. It does have its drawbacks. Since it frequently accesses the disk, it can be slow. Also, the paragraph buffer of 2K may seem too small for some people, though I didn't have a problem with it.

The hardware requirements will cut out many buyers. Two disk drives, the Apple 80-column extended memory card, and a printer are needed. With computers entering the schoolhouse, *Think Tank* seems to be a natural choice. Unfortunately, many schools do not have the necessary equipment.

Of course, *Think Tank* will not replace a list of "Things to do on Saturday." It may not be ideally suited for keeping a list of references or phone numbers. Index cards and little black books are just fine for those uses. But *Think Tank* may be useful in planning out long range or complicated projects. For writers, students—even eight-year olds—*Think Tank* will be a great help. □

creative computing

SOFTWARE PROFILE

Name: Think Tank

Type: Outline generator

System: 64K Apple, 80-column extended memory card, 2 drives

Format: Disk

Language: Pascal

Summary: A great "brainstorming" tool. Very easy to use.

Price: \$150

Manufacturers:

Living Videotext, Inc.
450 San Antonio Rd, Suite 56
Palo Alto, CA 94306

New! BYTEWRITER DAISY WHEEL PRINTER/TYPEWRITERS

- Full Olivetti typewriter warranty when purchased complete



Complete BYTEWRITER using:
Olivetti Praxis 30 portable \$495
Olivetti Praxis 35 portable 5545
Olivetti Praxis 40 office machine 5645
Interface only wired and tested \$165

The parallel interface mounts entirely internally interconnecting cables available for most computers.

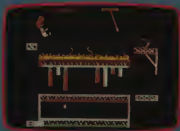
BYTEWRITER

125 NORTH VINEYARD RD. ITHACA, N.Y. 14850
(607) 272-1132

**BUY 2
SIERRAVISION
PRODUCTS
GET 1
FREE**

FLY HIGH WITH SAMMY!

Sammy Lightfoot's itching to break into show business. He's lined up an audition, and now you must put him through the toughest three rings of excitement this side of Heaven and Hell. Run, leap, bounce and swing your way to the top in Scene One. Hop and glide through Scene Two. Dodge, duck and fly in Scene Three. The pace quickens through it (level of action) each, with three stars Sammy Lightfoot's ready for the biggest break of his career. How about you?



SIERRA ON-LINE BUILDING COARSEGOLD CA 93611
209 683 6858

APPLE • ATARI • COM 64 • IBM • COLEGO

CIRCLE 220 ON READER SERVICE CARD

Zorlof II — Word Processor Extraordinaire

I had seen the full page advertisement for *Zorlof* several times, but had not paid any attention to it. I am interested in games, but have little time for them, so I am not attracted to game advertisements. Only when a friend called my attention to it did I realize that *Zorlof* is not a game, but a word processor and a darned good one.

The specifications recounted in the ad were impressive. As a writer, I am always looking for tools that make the job of writing a little easier.

However, I expect programs to have names that suggest their purpose, e.g., *Scriptit*, *Word Star*, and *Lazy Writer* for word processing programs. Programs with names that could have been formed from a spoonful of alphabet soup are usually games. I believe it is a mistake to name a serious program that way. For that reason, *Zorlof II* could have escaped me forever.

Most word processing programs work much the same way. The specific details (syntax) of how to make them perform their functions differ somewhat, but the big difference is in what compromises have been made. The margin of difference is in which of the full word processing functions have been left out. Most word processors written for microcomputers make some significant compromises, but *Zorlof II* leaves out very little.

Page Preview

One of the first features of *Zorlof* to catch my attention was the ability to display the text on the screen as it will appear on the printed page. In the past, I have wasted many reams of paper to get the format I wanted for a particular document. With *Zorlof* you enter View

C. A. Johnson

mode and you can see the entire text without the control characters and with the page breaks and page numbers just as the final copy will look.

Zorlof has all of the basic features you expect in a word processor—word wrap, print formatting (including left and/or right justification and centering), search

Zorlof II leaves out very little.

and replace (single and global), as well as the ability to copy and rearrange text. In addition, it underlines, prints bold, subscripts, and superscripts, and adds another document to the one in RAM. You can even insert a document into the body of the existing text from an external file or write out a portion of your document to a new disk file.

When *Zorlof* is loaded, two status lines are displayed at the top of the screen. The first line contains the name of the file with which you are working and the width of the text line. In addition, the top status line displays the number of words and the number of lines in the document, as well as the amount of free RAM. When you prepare a manuscript, you can tell at a glance how many words you have written and how much space is left in memory—definitely a premium feature. The status lines remain on the screen while you are working with the document. The second

line contains two fields that are used in search and replace operations.

Unusual Features

Several unusual capabilities are included. For example, *Zorlof* supports more than 50 different printers (18 printer drivers) and allows the special printing features of each to be imbedded in the text. This allows you to mix different print modes on the same line. For example, you can mix double-wide letters with normal and emphasized characters and italics in the same body of text. It also supports proportional spacing directly on dot matrix printers, as well as some daisy wheel printers, and right justifies at the same time, if you wish.

Headers and footers are defined separately for odd and even numbered pages; they can be the same or different; they can be turned off and new ones inserted at any time. The page number line is not

creative computing

SOFTWARE PROFILE

Name: Zorlof II

Type: Word processing

System: 32K TRS-80 Models I, III, and 4

Format: Disk

Language: Machine

Summary: Well designed, easy to use, provides on-screen printout preview.

Price: \$69.95

Manufacturer:
Anitek Software Products
P.O. Box 1136
Melbourne, FL 32935

The Bear facts:

Now, you can get...

- 1 NEW software programs featuring Stickybear™ — the hottest-selling computer bear in America.
- 2 The most sophisticated color graphics ever for the Apple® Personal Computer.
- 3 New arcade-quality games for families to play together.
- 4 New fun learning programs for 3- to 6-year-olds created by a world-famous children's author.
- 5 Disk, plus hard-cover book or game, poster and stickers in a sturdy, attractive vinyl binder — with each program.

There's something new for everyone in your family! The playful animation and bubble-gum colors in the educational programs will captivate your youngest. While Stickybear Basketbounce and Stickybear Bop — games of skill and sharp wits — challenge even dedicated arcade games-players.

Look for Stickybear software — developed by

Stickybear is a registered trademark of Optimum Resource, Inc. Apple and Apple II, II +, IIe and III are registered trademarks of Apple Computer, Inc.

A 1413 57



Early Learning (Ages 3 to 6)

NEW Stickybear Opposites



NEW Stickybear Shapes



Stickybear ABC



Stickybear Numbers

Games for the family

NEW Stickybear Basketbounce



Stickybear Bop



Actual Reproductions

Apple II or Apple II+ with
48K and one disk drive,
9.9 DOB, and Apple
IIe or Apple III. Use
with paddles or
keyboard

Optimum Resource, Inc. for
Weekly Reader Family
Software — in finer computer
stores everywhere. Or, call
toll-free 1-800-852-5000, Dept.
AB-19. Only \$39.95 each.

Weekly Reader Family Software

A division of Xerox Education Publications
Middletown, CT 06457

CIRCLE 257 ON READER SERVICE CARD

THE ADVENTURE GAMES THAT TOOK 3,000 YEARS TO CREATE!

We're pleased to announce what we believe are the greatest adventure games of all time. They're based on stories that have been 3,000 years in the telling. They're filled with people, places and amazing events right out of one of the world's oldest history books, The Bible.

The Bible is where our stories begin. But we've woven new adventures through high technology. With stirring action. Startling sound. Dazzling sights. Every member of your family will thrill to the realistic animation and the high-resolution graphics. And you'll share in the pleasures of this unique, new game source—the Bible.

The first of our Bible Adventure Games is *The Philistine Ploy*. Based on the biblical Book of Judges, it starts at a time when law and order have fled from the hills of Judea. It's a turbulent world of intrigue and revenge, altars and idols, heroes and justice. You'll seek the long-lost mythical Treasure of the Seven Nations, racing against a dangerous Philistine warrior who is trying to kill you! But you don't have to know your Bible stories to begin enjoying this adventure game.

Later this year, look for *The Lion's Snare* based on the Book of Daniel. You'll be dropped into Babylon, a city filled with dreams, stargazers, wizards and savage lions!

The Bible Adventure Game Series is for Apple II+/IIe computer with 48K and one disk drive. Games are \$34.95 each.

Ask for these adventure games at quality computer software stores. Credit card holders may order, toll-free.



Call for details, or write for more information.

Call Toll-Free
1-800-621-8227
Dealers may call toll-free
for information and orders.

DAVKA
CORPORATION

845 North Michigan Avenue • Suite 843
Chicago, Illinois 60611



DAVKA ADVENTURE GAMES... WE TOOK OUR TIME.

CIRCLE 304 ON READER SERVICE CARD

This is an example of some of the features of ZORLOF. It will underline, print subscripts and superscripts and it will also mix character modes on the same line, i.e., expanded and normal, and it will print bold characters. This example was printed on my Epson MX-80 F/T Graftrax Plus.

Figure 1.

part of the header or footer, but is defined and located separately on the page.

Form Letters

A fundamental feature of Zorlof is the capability for personalized form letters. You can compose a letter, leaving out the parts that differ in each letter and flagging the place for them to be inserted. In a separate file, the addresses and texts to be inserted are developed. When the form letter is printed, it makes the proper insertions as designated in the

**I am very
pleased with
Zorlof II.**

form letter. It matches the flags in the letter with the field names in the form data file.

As I reviewed this feature, with its open format and unlimited number and size of fields in the form data file, it occurred to me that this capability could be used as a file management system. The number of record types is limited to the number of different characters on the keyboard, but few home data management requirements would exceed that.

I frequently write a manuscript in random pieces and assemble it later, adding the necessary text to link the pieces. Zorlof not only provides the capability to chainload files, but also provides the capability to save any portion of the text to disk as a separate document. Since I often include portions of the same text in several manuscripts, this capability is a special plus.

Another very handy feature is the ability to display the directory, select a file from the directory by moving the cursor to the directory entry, and give the load command. Files can be killed in much the same way to make space for the text in RAM. There is a safeguard in

killing files and deleting blocks of text. These actions must be done twice before they are executed.

Full Screen Editing

As a bonus to programmers, Zorlof supports full screen editing of EDTASM and Basic files, including automatic renumbering. If you have not programmed with a full screen editor, you may not realize the disadvantage of working with a line editor. In word processing mode, some of the keyboard characters have been modified for word processing use, but in editing EDTASM and Basic files, the important ones have been restored to their original form.

Zap-Processing

Another feature of special interest to programmers is the Zap-processing capability. Zap-processing allows you to read any file on a disk and modify it directly, using hexadecimal notation. With it you can patch machine language programs or recover damaged disk files which you could not otherwise read. The capability provided by this feature is available elsewhere as a stand-alone utility or as a part of an operating system. But to my knowledge, it has not been included as part of a word processing package. It is a very powerful tool.

The documentation is easy to read and reasonably complete. Once I had gone through the sample text and had deciphered the format commands, I had little difficulty learning to use Zorlof. Even after you have read the manual and think that you understand Zorlof completely, you should review the sample text and identify what each statement does.

A few things could benefit from some alternative examples. I made a number of wrong attempts when I tried to format page numbers at the top of the page and to start numbering on page 2. This is a common format; I am surprised that it was not used as the basic illustration.

Insertions

I am very pleased with Zorlof II. The

only thing I do not like about it is the manner in which it handles insertions. To insert, you move the cursor to the point where you wish your new text to be inserted and press CLEAR-I (simultaneously). As you enter your insertion, the text spreads one character at a time to make room for the new character until the complete string has been inserted. You then take it out of insert mode with CLEAR-I.

As you type, your new text blends in with the existing text. There is an open

**Zorlof II is a
superior word
processing system.**

text command, but it lasts only for the existing line, then the insertion "catches up" at the end of the line and again blends with the existing text. You do not have the ability to enter several lines of text to see the end of your entry without the distraction of the following text, without a lot of format manipulation, which in itself is distracting. I would rather have the text open up and then close it when the insert is completed. However, I expect that I will soon adjust to Zorlof.

Zorlof II is a superior word processing system unsurpassed in the capabilities it provides for such a modest price. It runs on TRS-80 Models I, III, and 4. It requires 32K memory, one disk drive, a line printer (either serial or parallel), and lower case modification (Model I only). Apparently it will work with a number of operating systems. (I used TRSDOS and NEWDOS.) □



"I think we've abdicated too much control to our machines!"

Much More Than A Spelling Checker

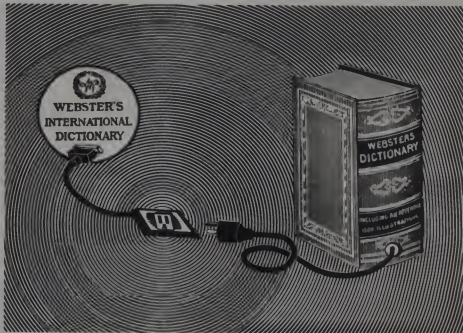
Dan Robinson

I have always been a fast typist. But I am not a master of the touch system, and sometimes I am not very accurate. Sometimes it looks as though I have used my toes, nose, and elbows on the keyboard, and every once in a while my typos slip into the final copy. My errors often appear as misspelled words that make me look like a kindergarten drop-out; and I have found in rushed notes to non-computerists that jargon words like *ROM* and *byte* have crept in. Clearly, I need help.

The most helpful program I have found is *Electric Webster*. After looking at nine proofreading programs, I have settled on *Webster* to keep my final copies accurate and to disguise my precocious senility.

Like a shiny new car, *Webster* comes in a basic model at a reasonable price in CP/M, TRS-80 Model I/III, and PC DOS versions. If you want to go first class, there are options to correct errors *Webster* finds, hyphenate your text, check your document for proper grammar and style, and integrate *Webster* with your favorite word processing program.

Electric Webster boasts a 50,000-word dictionary with virtually unlimited expansion capability. It is a highly enhanced version of the earlier *Microproof* dictionary program; but unlike *Microproof*, *Webster* uses a literal dictionary so that exception-to-the-rule prefixes and suffixes will not slip by. Written by Cornucopia Software's Phil Manfield, the program requires 32K. It may be used with a single disk drive with some disk swapping, but works best on a two-drive, double-density system. Using it with all the options integrated into your word processor, a typical session would go like this:



Spelling

After your document has been typed, pressing a control key in conjunction with another begins the proofing process. *Electric Webster* fires up, storing your file on disk and providing you with a word count. It discards duplicates and displays the number of unique words. The document is compared to the 50,000-word dictionary as well as your own word list and the mismatches are presented on the screen.

Next, each word is presented along with a selection menu for your choice of action (see Figure 1). If the error is obvious, such as a missing space in *sparetime*, you can type the correction once, and it will ultimately be replaced as many times as it appears in your document. If it is a word that is not in the dictionary, such as *Mr. Grunch*, you can choose to leave it alone or add it to the dictionary if there will be many letters to *Mr. Grunch* in the future.

creative computing

SOFTWARE PROFILE

Name: Electric Webster

Type: Proofreading program

System: TRS-80 Mod I/III, 32K
Also available for PC DOS
or CP/M based systems.

Format: Disk

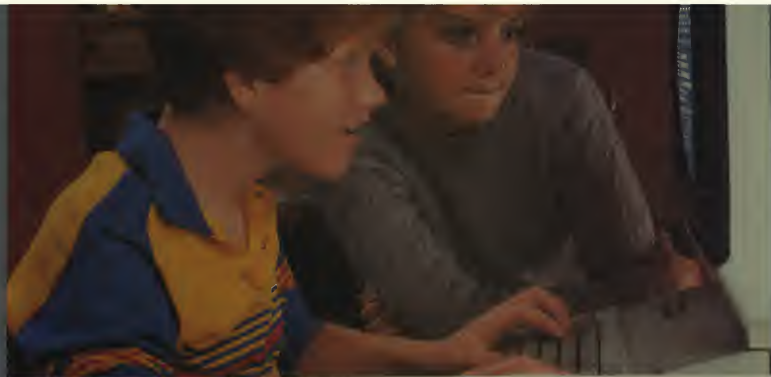
Language: Machine

Summary: Easy to use spelling and grammar checker. An aid to the serious writer.

Price: \$149.95

Manufacturer:
Cornucopia Software
P.O. Box 5028
Walnut Creek, CA 94596
(415) 524-8098

Dan Robinson, 1625 Higgins Way, Pacifica, CA 94034



NOW, PLATO COURSEWARE MAKES ALGEBRA FRIENDLY.

Algebra can be a fascinating learning experience with the help of PLATO® educational courseware.

PLATO helps bring out the best in your child... and the best in your Apple II Plus or Apple IIe.

A new series of PLATO lessons can help your kids feel comfortable and confident about Algebra. Practice problems change at random to challenge them; examples of solutions guide them; performance reports encourage them. If a mistake is made, PLATO shows kids the correct answer or how to correct it. So before they know it, they're

into Roots, Polynomials, Factoring, Equations and much more.

These Elementary Algebra lessons join the growing PLATO library of quality educational



courseware for microcomputers. Other lessons include Math, Foreign Languages, Physics-Elementary Mechanics, Computer Concepts, Computer Literacy and Keyboarding.

See the PLATO line at selected retail outlets. All PLATO micro courseware is available for the Apple II Plus and Apple IIe.

Some lessons are also available for the TI99/4A and Atari 800.

For a free PLATO catalog:
Call toll-free: 800-233-3784.
(In Calif., call 800-233-3785.)
Or write Control Data Publishing Co., P.O. Box 261127,
San Diego, CA, 92126.

Warranty available free from Control Data Publishing Co.
4455 Eastgate Mall, San Diego, CA 92121

PLATO
COMPUTER-BASED EDUCATION

CD
CONTROL DATA
PUBLISHING

CIRCLE 295 ON READER SERVICE CARD

AARDVARK *Action Software*

PRESENTS...

ZEUS

WITHOUT QUESTION, ABSOLUTELY —

The Fastest
ARCADE STYLE GAME

AVAILABLE THAT WE KNOW OF

FAST AND FURIOUS. You become the wizard fighting off the thunderbolts of an angry Zeus. Multiple action. Are you good enough to keep up as the difficulty increases wave after wave. Hours of challenging fun. This is one game you may never completely master.

**AVAILABLE ON: TRS-80C(16K), CMD 64, VIC 20(13K)
STOCK #1007 TAPE:\$24.95 DISK:\$29.95**

PYRAMID. One of the most and most challenging games ever. Average and above the average is right. This is a game you will play over and over very often. This is a game that is popular among all ages.

**AVAILABLE ON: TRS-80C (16K) CMD 64
VIC 20 (13K) TIME/SINCLAIR TI/99-4A
STOCK #5002 TAPE: \$19.95 DISK \$24.95**

QUEST. A 3rd Dimension Adventure game. Played on a multiple generated map. It's like a small band of explorers in a wilderness. You are the leader of Moolock. Takes 2-5 hours to play and is completely different each time.

**AVAILABLE ON: TRS-80C(16K) CMD 64
VIC 20(13K) TIME/SINCLAIR TI/99/4A
EXTENDED BASIC REQUIRED ON TI
STOCK #7007 TAPE: \$19.95 DISK: \$24.95
Quest also available on TRS-80C in 20K and memory 80K & 128K available. It's a little more difficult and will test the most experienced players of the business.
STOCK #7006 TAPE: \$24.95 DISK: \$29.95**

HOURS OF FUN AND ENJOYMENT FROM THE 'ADVENTURE PLACE'

DUNGEONS OF DEATH. A game for 4-6 players. You get to choose your character, your score, map, and you can choose to give him game to game and a little more. It's a game that is popular among all ages.

**AVAILABLE ON: TRS-80C(16K), CMD 64, VIC 20(13K),
TRS-80C 32K DISK
STOCK #7001 TAPE: \$19.95 DISK: \$24.95**

AARDVARK *Action Software*

1000 S. COMMERCIAL RD. WALLED LAKE, MI 48088 (313) 669-3110
CIRCLE 101 ON READER SERVICE CARD

TO ORDER: SEND AMOUNT INDICATED PLUS \$2.00 SHIPPING, PER ORDER, INCLUDE STOCK NUMBER, QUANTITY DESIRED AND YOUR PREFERENCE OF TAPE OR DISK. BE SURE TO INDICATE TYPE OF SYSTEM, AMOUNT OF MEMORY, ETC. WHEN USING CHARGE CARD TO ORDER BY MAIL, BE SURE TO INCLUDE EXPIRATION DATE.



CHARGE CARDS
WELCOME



1-800-624-4327

PHONE ORDERS ACCEPTED
8:00 A.M. TO 8:00 P.M. E.S.T. MON-FRI

AARDVARK *Action Software*

2352 S. COMMERCIAL RD. WALLED LAKE, MI 48088 313/669-3110

CIRCLE 101 ON READER SERVICE CARD

```

SELECT APPROPRIATE RESPONSE:

CORRECT MISPELLED WORD:      ENTER CORRECT WORD.
  LEAVE WORD "AS IS":        HIT ENTER KEY
DISPLAY WORD IN CONTEXT:     ↵
  DISPLAY DICTIONARY:        * (TO SCROLL USE ARROWS)
ADD WORD TO DICTIONARY:     +
                               EXIT:      -

WORD:      precocious
RESPONSE:

```

Figure 1.

```

* TYPE PHRASE CORRECTLY      * HIT <ENTER> TO LEAVE "AS IS"
* " " TO MARK TEXT          * " " TO SKIP PHRASE HEREAFTER
* " " TO ACCEPT SUGGESTION  * " " TO ELIMINATE CATEGORY
***** OPTIONS *****

high when compared to most other dictionary programs: 99%,
99% and 96%. Needless to say.... it scored higher than I
did.

  If you've found yourself promoted from the line up to

PHRASE:      Needless to say--->VERBOSE, HEAVY
SUGGEST:     certainly
RESPONSE:

```

Figure 2.

If you are not sure how the word was used, you can command *Webster* to show the word in context and defer your decision to the end of the session. For example, if you were inviting someone at Palm Springs to have dessert on the desert, you would have to see how the word was used to know if it was correct.

The main choice is to display the dictionary. *Webster* will show a list of words with a question mark where your word would appear alphabetically. The dictionary can be scrolled up or down with repeating arrow keys at a speed of your choice, appearing all uppercase in one direction and all lowercase in the other to keep you from getting lost. If you find the correct spelling, you don't even have to key in the word: by striking the period key, the scrolled-to word is accepted as the replacement.

When you have finished the session, your corrected words will replace the errors wherever they appear in your document. The corrections will follow the capitalization of the words they replace: all upper- or lowercase or first letter capitalized.

Hyphenation

In the meantime, conditional hyphens have been inserted in your text. If the word must be broken to fit on the current line, it will break at the conditional location, a hyphen will be printed, and the rest of the word will appear on the following line.

When you configure the hyphenation program, you select the minimum word

The grammar feature not only displays errors, but also offers suggestions.

length for conditional hyphens. You set the minimum acceptable segment size to appear at the end or beginning of a line, and decide whether single letter syllables can be hyphenated before and after or only after the syllable.

Grammar

Before the corrections are actually written to disk, you have the option of grammar checking. Actually, this fea-

ture goes beyond what Mrs. Mullberry taught at P.S. 42, for some 23 categories of style may be checked.

The grammar feature not only displays errors, but also offers suggestions. If you have used lots of *Webster* will offer many as an alternative. You can leave the phrase as it appears, type your own correction, or merely type a period if you are satisfied with the suggestion. Your other options are to mark the phrase for later repair work, skip that phrase in the remainder of the document, or eliminate the entire error category for the rest of the session.

Among the 23 categories are checks for two spaces at the end of a sentence, sentences without periods, capitalization errors, mistakes in parentheses and quotation marks, and miscellaneous punctuation errors. Repeated words and double negatives are checked.

The program also identifies words and phrases that style manuals recommend avoiding (see Figure 2). These include awkward, imprecise, obsolete, slang, trite, or verbose words and phrases. *Webster* also flags homonyms: words which sound the same but have different meanings. As always, an alternative is provided along with enough of a definition to enable you to choose the proper word.

Webster also looks for words and phrases in a user-defined category—a good way to ensure that professional or industry jargon doesn't leak through to the uncomprehending outside world.

The grammar feature flags long words, phrases, sentences, and paragraphs according to the values you set in configuring the program.

At the end of the grammar session, you see a summary that provides clues as to the overall readability of your document. The summary gives the average word length, number of words in the average phrase and sentence, number of phrases in the average sentence, and number of sentences in the average paragraph. The number and percentages of long words, phrases, sentences, and paragraphs is provided as well as the

ELECTRIC WEBSTER Grammatical Data Summary	
04.6	= Average Word Length.
10.7	words = Average Phrase Length.
02.0	phrases = Average Sentence Length.
01.7	sentences = Average Paragraph Length.
22.1	words = Average Sentence Length.
08	Long Words. (00.4%)
03	Long Phrases. (01.8%)
40	Long Sentences. (51.9%)
00	Long Paragraphs. (00.0%)
00	MAR-KERS (##) PLACED
(Press Any Key)	

Figure 3.

Electric Webster, continued...

number of markers placed in the text. (See Figure 3.)

At the end of the grammar session, the corrections are made, and you find yourself back in your word processor with the completed text on the screen ready to be printed.

Without the options, *Electric Webster* operates as a stand-alone program. It reads your text file and sends the list of mismatches to disk or printer for later correction via the search-and-replace function of your word processor. Separate utilities are provided to expand and edit the spelling list.

Webster will process a 1000-word text file in about 1 1/4 minutes for spelling errors, and somewhat longer for grammar checking, depending on your writing style.

The expandable user dictionary, like the main one, is compressed so that about 500 words occupy only one gran of disk space. Since all of the dictionaries don't have to be on line at one time, the user dictionary could fill an entire disk to give *Webster* an awesome vocabulary.

The Grammar module has utilities to add phrases to be checked together with your own suggested replacements, each assigned to the appropriate grammar category. The files will be alphabetized and integrated into the program files.

Writers of narrow-column newsletters will find the automatic hyphenation a big help.

With the hyphenation option, you can instruct *Webster* where to place conditional hyphens in the words you add to the dictionary.

Documentation

The newly revised documentation for the package is thorough and easy to understand. It consists of 77 full-sized pages to help you set up your files and become familiar with features while following along with the sample file provided on the disk.

I have tested *Webster* with Lincoln's Gettysburg Address; Dr. Thomas Pollock's list of "The Hundred Words Most Frequently Misspelled;" and his list of "The Next 500 Words Most Frequently Misspelled." *Webster* had most of the

words already in its dictionary and scored high when compared to most other dictionary programs: 99%, 99%, and 96%. It certainly scored higher than I did.

If you have found yourself promoted from the line to the paper-pushing level; are foreign born and find our upside-down English troublesome; or if English 101 is where you caught up on your sleep, then you will appreciate the grammar option.

Writers of narrow-column newsletters will find the automatic hyphenation a big help; and if your spelling is less than perfect or if you have ever missed a typo, then you will love this fast and accurate dictionary program. □

Price List	
Electric Webster	\$89.95
Correcting Option	\$60.00
Automatic Hyphenation	\$49.95
Grammar Option	\$49.95
Integration Patches	\$35 each
Electric Pencil 2	
Scripts	
Lazy Writer	
CopyArt	
SuperScripts	
NewScript	
CP/M, PC DOS Version	\$209.95

Version
4

The Ultimate APPLE® Utility Program COPY II PLUS

The last DOS 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 for differences. 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 includes fast and versatile copy programs for making backups of your valuable software. All types of disks can be copied, such as CP/M, PASCAL, DOS and most other formats. Backup speed is as fast as 40 seconds, including formatting and complete sector by sector verification. A disk speed check assures your drives are running in top condition and a nibble editor will allow you to repair damaged diskettes, analyze recording techniques, etc. Call for more details!

"Copy II Plus may well be one of the best software buys available today"
inCider, June '83

CENTRAL POINT
Software, Inc.

P.O. Box 19730-203
Portland, OR 97219
(503) 244-5782

\$39⁹⁵
(Plus \$2 s/h)

Attention current Copy II Plus owners: Return your original disk with \$19.95 for an update to Version 4.

Attention IBM PC owners: Call us about backing up your valuable software with Copy II PC!

ATARI COMPUTER OWNERS:

Pick the positively perfect, practical, printer-port peripheral package, from PERCOM DATA!



That's right... the positively perfect PERCOM DATA 5 1/4" floppy disk drive with a BUILT-IN PRINTER-PORT for your Atari™ 400/800 is now available!

Until now, Atari computer owners who wanted to hook a printer to their computer had two choices: spend about \$220 for an interface device. THOSE DAYS ARE OVER! PERCOM DATA has built a parallel printer-port right into its new AT88 PD model. Now you can add a quality disk drive system AND have a place to plug in a printer... WITHOUT BUYING an interface.

The AT88 S1 PD™ disk drive operates in both single density (88K bytes formatted) and double density (176K bytes formatted).

What more could you want? NO INTERFACE... a high quality PERCOM DATA disk drive... AND a built-in PRINTER-PORT... all with a price of \$599.

Pick up a positively perfect PERCOM DATA disk drive, with printer-port... pronto!

For the name of an authorized PERCOM DATA Dealer near you, call our TOLL-FREE HOTLINE 1-800-527-1222 NOW, or write for more information.

Perfectly Priced

\$599.

PERCOM DATA
CORPORATION

Expanding Your Peripheral Vision

DRIVES • NETWORKS • SOFTWARE

11220 Pagemill Road, Dallas, Texas 75243 (214) 349-5800
1-800-527-1222

Atari is a registered trademark of Atari, Inc. • AT88 S1 PD is a trademark of Percom Data Corporation. © COPYRIGHT PERCOM DATA CORPORATION, 1987.
Prices subject to change without notice.

CIRCLE 199 ON READER SERVICE CARD

Hi-Res Learning Games

Sierra On-Line, one of the leading publishers of Apple games, has recently entered the educational software market with a series of Hi-Res Learning Games.

The graphics in all three programs are outstanding, and we detected the skill of master game designers as we watched the children on our test panel become riveted to the computer screen. The On-Line packages also offer a feature that we have found lacking in educational packages of many other manufacturers: educational objectives. By reading the objectives or "learning features" on the box, a parent or teacher can determine whether the game teaches skills his child or class needs to learn.

Each package comes with a two-page Parent Guide that offers a brief de-

scription of the game(s) on the disk and a list of control keys, of which there are only four.

Let's begin our examination of Hi-Res Learning Games with an outstanding package for pre-schoolers.

Betsy Staples

Learning With Leeper

Learning With Leeper offers four games for children aged three to six. We tried to determine which of the four was the favorite of our testers, but they refused to commit themselves, and we were unable

creative computing

SOFTWARE PROFILE

Name: Learning With Leeper

Type: Educational game

System: 48K Apple, 16K Atari;
joystick

Format: Disk/cartridge

Summary: Excellent learning game
for pre-schoolers.

Price: \$34.95

Manufacturer:

Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614



Learning With Leeper (Dog Count)



Learning With Leeper Menu

to pick a winner based on the frequency of their choices.

Among the most appealing features of *Learning With Leeper* is that after the disk has been booted, the child can play as long as he wants without assistance. All menu choices and game maneuvers are accomplished with the joystick, and a small creature named Leeper provides the demonstrations that substitute for written instructions. There is nothing to read and no need to use the keyboard.

The program opens with the menu, which displays a pictorial representation of one game in each of the four corners of the screen. The child has only to move a picture of Leeper to one of the corners to choose his game.

Dog Count

In *Dog Count*, we see groups of bones—one, two, three, four, and five—lined up at the right of the screen. Each group has the appropriate Arabic numeral displayed alongside. For each round of the game, a different number of Snoopy-type dogs appears at the left of the screen. The child's task is to select the group of bones that will feed the number of dogs on the screen.

After he makes his selection, the bones move to the center of the screen and the dogs walk out one-at-a-time and flop down contentedly to enjoy their bones. The child then enjoys a quick display of swirling smiley faces, and a smiley face is added to his collection on the game board.

If the child has selected too few bones, the boneless dog(s) yaps plaintively after the distribution is complete. If there are too many bones, the left over bone(s) squeaks.

Unfortunately, the yapping dog is just a little too cute, and we found that, as is so often the case, the response for an incorrect answer was almost as rewarding as the response for the correct answer. Children occasionally chose the incorrect answer deliberately. We also felt that children at the higher end of the recommended age range could easily handle higher numbers, and we would have liked to see this extension of the game.

Overall, *Dog Count* earns a high rating for both playability and educational value.

Balloon Pop

The second game on the disk is *Balloon Pop*, a shape matching game. The object is to pick the one of four shapes or letters at the bottom of the screen that matches the shape or letter displayed on the right side of the screen. To do this, the child uses the joystick to maneuver a balloon from which a hook is suspended.

If he chooses the correct shape, he is rewarded with a cute tune and a display

of popping balloons. If he chooses incorrectly, his balloon releases the shape which drops back into its place at the bottom of the screen. After he has successfully matched all four shapes, he gets to play a simple game in which he pops balloons. When he succeeds in popping ten balloons, the next round of the matching game appears on the screen.

We found some of the shapes quite difficult to distinguish from one another, but the children did quite well with them. *Balloon Pop*, too, earns a high rating.

Leap Frog

In *Leap Frog*, the child must guide a cute little frog through a maze. The first maze is very simple, and the child must negotiate it "with skill" before he can progress to another. "With skill" is not defined in the Parent Guide.

If he completes the maze with skill, the child gets to watch a game of leap frog between Leeper and the frog. After they have made one trip across the screen, a caterpillar appears and chases them back.

IF YOU'D RATHER BE SAILING, TRY SAMS BERMUDA RACE.

From your first sail and every breeze and every wave learning the commands of your bones with *Sams BERMUDA RACE*—the new sailing software program for your Apple® computer. ■ *BERMUDA RACE* is the ultimate test for any sailing enthusiast, novice or expert. So whether you race alone or against a competitor, you may be surprised to find out how good a sailor you really are.

Or aren't. Either way, you're sure to enjoy the challenge and excitement of *Sams BERMUDA RACE*. To order or to get the name of your local software dealer, call 800-428-3696 or 317-298-5566. And ask for Operator 440.

Offer good in USA only and expires 3/31/84. Prices subject to change without notice. In Canada contact Tenbrook Electronics, Markham, Ontario L3R 1M2.



CIRCLE 213 ON READER SERVICE CARD

Hi-Res Games, continued...

The second and subsequent mazes are more complex, even though they offer more than one possible correct path. The game is further complicated by the presence of the malevolent caterpillar which is set loose in the maze with the frog.

Ironically, our children found the second level mazes much easier to negotiate than the first qualifying maze. One child was, however, quite disturbed by the caterpillar, and became panicky when it appeared about to overtake his frog in the maze.

The children enjoyed Leap Frog a great deal, but were frustrated by having to complete the qualifying maze each time. Perhaps one qualifying maze per session with the disk would make the game more appealing.

Screen Painting

The final game on the disk, Screen Painting, is not really a game at all but, as the name implies, an artistic exercise.

In each corner of the screen is a pot of paint—red, green, blue, or purple. The child uses the joystick to move the paintbrush around the screen, creating a drawing. To change colors, he has only to pass the brush through a different color paint.

Screen Painting was more popular with the younger children on our panel than the older ones. None of the children seemed inclined to imitate the representational art demonstrated by Leeper; they apparently preferred more contemporary abstract expressions.

Summary

We found that although our youngest tester (barely three years old) understood the concepts involved in the games and could frequently do the counting and identify matches, she could not control the joystick well enough to play the game alone. We also discovered a new form of hardware abuse, joystick jamming. The

Kraft joystick we were using held up well, but parents would do well to give special thought to durability when choosing a joystick that will be used by pre-schoolers.

The cleverness and thoughtfulness of On-Line's programmers is astonishing; Leeper demonstrates each game only once per session. This seems like a small point until you consider the attention span of a pre-schooler and attempt to estimate how many times he will switch games in a single sitting.

All in all, we think *Learning With Leeper* is an excellent package. The games are attractive to children, hold their interest, and teach some useful skills. The father of one five-year-old boy who tested the program told us that *Learning With Leeper* was an extremely positive experience for his son who had never used a computer before and hadn't talked of much else for over a week.

Dragon's Keep

Dragon's Keep is an adventure-type game for children aged "seven and up." The Parent Guide tells us that it "is designed to help your child develop skills in reading comprehension and map reading."

The adventure takes place in and around a small home in suburbia. The object of the game is to free 16 animals that are being held captive by an unfriendly dragon.

Each scene is depicted in splendid hi-res graphics. To act, the player must read the two or three sentences printed at the bottom of the screen and choose one by pressing RETURN. He moves the cursor by pressing the spacebar.

Along with the disk and Parent Guide, you get a poster-size map of the house and environs, 16 animal stickers, and a compass sticker which you are advised to

place "on the monitor near the screen." As the child discovers animals, he can place the appropriate sticker on the labeled circles on the map.

The dragon is at large and periodically appears superimposed on the hi-res scene. In theory, he is supposed to hinder the release of the animals, but in practice, he has very little effect other than to slow down game play as his hi-res image spreads out on the screen pixel-by-pixel. The dragon becomes tiresome very quickly.

The reading level of the action choices is second grade, and the game is delightfully free of arbitrary surprises—sudden death, endless mazes, lost treasures, etc. A modicum of common sense and an orderly approach to the exploration will lead to success.

The map is intricate enough and the hiding places of the animals clever enough to be challenging even for players in the "and up" category. We did, however, get tired of waiting for the hi-res pictures to materialize.

Our only other complaint is the method of keyboard control. We found that players had trouble remembering whether to press RETURN or the spacebar to move

creative computing SOFTWARE PROFILE

Name: Dragon's Keep

Type: Educational adventure game

System: 48K Apple

Format: Disk

Summary: Hi-res adventure with educational objectives for ages 7 and up.

Price: \$29.95

Manufacturer:

Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614



Dragon's Keep



Troll's Tale

Everybody's making money servicing microcomputers. Somebody's going to make money servicing them.

Now NRI Trains You At Home To Make Money Servicing, Repairing, and Programming Personal and Small Business Computers

Seems like every time you turn around, somebody comes along with a new computer for home or business use. And what's made it all possible is the amazing microprocessor, the tiny little chip that's a computer in itself.

Using this new technology, the industry is offering compact, affordable computers that handle things like payroll, billing, inventory, and other jobs for business of every size — perform household functions including budgeting, environmental systems control, indexing records. And thousands of hobbyists are already owners, experimenting and developing their own programs.

Growing Demand for Computer Technicians

This is only one of the growth factors influencing the increasing opportunities for qualified computer technicians. The U.S. Department of Labor projects over a 600% increase in job openings for the decade; most of them new jobs created by the expanding world of the computer.

Learn At Home to Service Any Computer

NRI can train you for this exciting, rewarding field. Train you at home to service not only microcomputers, but word processors and data terminals, too. Train you at your convenience, with clearly written "bite-size" lessons that you do evenings or weekends, without going to classes or quitting your present job.

Your training is built around the latest model of the world's most popular computer. It's the amazing TKS-80™ Model 4, now with disk drive and the capabilities and features to perform a host of personal and business functions. No other small computer has so much software available for it, no other is used and relied on by so many people. And it's yours to keep for personal and business use.

You get plenty of practical experience. Under NRI's carefully planned training, you even install a *disk drive* verifying its operation at each step. (Using the NRI Discovery Lab® that also comes as part of your course, you build and study circuits ranging from the simplest to the most advanced. You analyze and troubleshoot using the professional 4-function LCD digital multimeter you keep to use later in your work. Then you use the lab and meter to actually access the interior of your computer; build special circuits and write programs to control them. You "see" your computer at work and demonstrate its power.

(TKS-80 is a trademark of the Radio Shack division of Tandy Corp.)



Same Training Available With Color Computer

NRI offers you the opportunity to train with the TKS-80 Color Computer as an alternative to the Model 4. The same technique for getting inside is enhanced by using the new NRI-developed Computer Access Card. Only NRI offers you a choice to fit your specific training needs.

Become the Complete Computer Person

In addition to training in BASIC and advanced machine language, you gain hands-on experience in the operation and application of the latest computers for both business and personal jobs. You're trained to become the fully rounded, new breed of technician who can interface with the operational, programming, and service facets of all of today's computers. You're ready to take your place in the new electronic age.

Other Opportunities

NRI has been giving ambitious people new electronic skills since 1914. Today's offerings also include TV/Audio/Video Systems servicing with training on our exclusive Heath/Zenith computer programable 25" diagonal color TV. Industrial Electronics Design Technology... and other state-of-the-art courses.

The Catalog is Free. The Training is Priceless.

Send the coupon for our 104-page catalog showing all courses with equipment and complete lesson plans. There's no obligation other than to yourself! See how NRI can help you take advantage of the exciting job and earning opportunities in the exploding field of microcomputers. If coupon has been removed, please write to NRI Schools, 1939 Wisconsin Ave., Washington, D.C. 20016.



All career courses
approved under GI bill
 Check for details

175-113



NRI Schools
McGraw-Hill Continuing
Education Center
1939 Wisconsin Avenue
Washington, D.C. 20016

We'll give you tomorrow

The catalog is free. The training is priceless.

Please check for one free catalog only

- Computer Electronics including Microcomputers
- Color TV, Audio, and Video System Servicing
- Electronics Design Technology
- Digital Electronics
- Communications Electronics • FCC Licenses • Mobile CII • Aircraft • Marine

- Industrial Electronics
- Basic Electronics
- Small Engine Servicing
- Appliance Servicing
- Automotive Servicing
- Auto Air Conditioning
- Air Conditioning, Heating, Refrigeration, & Solar Technology
- Building Construction

Name _____ (Please Print) Age _____

Street _____

City, State, Zip _____

Accredited by the Accrediting Commission of the National Home Study Council

“ I have been using
Transform for all
kinds of programming
... my time has been cut in half...
this is one of the very few utilities
I have never regretted
purchasing for one
instant.”

by Dr. J.C. Gilland
Graphion/Vortex

Whether you are just a beginner, someone reasonably familiar with programming, or a veteran, **Transform** can help you.

What is Transform?

Transform is a better way to write programs in Microsoft BASIC.[®] It is a structured translator which does away with the constraints of line numbers and the single line IF. It adds the high level structures of the block IF-ELSEIF-ELSE-ENDIF, REPEAT-UNTIL, and ON-GOTO-ENDGOTO—similar to languages like Pascal. Symbolic labels are used (such as "GOSUB @ QUICKSORT"). A very versatile INCLUDE-DECLARE feature has been added to enable you to build a library of the subroutine modules you use every day—write it once, then INCLUDE it. High level, structured code in—ordinary BASIC out. It's that quick and easy.

Now! Three great ways to order Transform:
The Transform Tutor. Wanting to learn how to write clean, reliable, structured programs? Let the Tutor teach you with its detailed, easy to learn, step-by-step examples and tutorial. **Only \$39.95!**

The Transform Standard. Already familiar with structured programming? The Standard begins with a more complex example (a utility program) so you can dive right in. **Only \$39.95!**

The Transform Expert. Writing complex program series as a professional? The Expert provides the additional utilities of a source code formatter, destination code optimizer (for use with BASCOM[®] 5.3), and a "REL" file disassembler. Everything you need to master your applications. **Only \$39.95!**

Place your order for the **Tutor**, the **Standard**, or the **Expert** toll free now: **1-800-845-7055**. Direct technical questions to 1-803-244-8174. VISA, MC, COD, company PO, or check accepted. For CP/M.* *Introductory price.

From the same company that created MCDISPLAY, the powerful display interface for Microsoft BASIC which allows you to develop screen-oriented application packages.

EDI Master Computing Inc.

"Practical Solutions Through Technology"
A Division of EDI Technology Companies
11 Regency Hills Drive, Greenville, SC 29615

CIRCLE 160 ON READER SERVICE CARD

Hi-Res Games, continued...

the cursor; all too often, the wrong choice was made, and the player found himself doing something other than what he wanted to do. It seems that a player who can read at the second grade level ought to be able to recognize the number keys and that a better scheme would have been to have him choose by pressing the number corresponding to his choice (the choices are already numbered).

We like *Dragon's Keep*. It uses a popular game format to develop skills rather than just drill them, and although it seems to be designed for home use, it could certainly be useful in the classroom as a cooperative venture.

Troll's Tale

Troll's Tale is very similar to *Dragon's Keep*. It is for slightly older children—ages eight and up—and offers practice in map making, identifying details, making inferences, predicting outcomes, and drawing conclusions. Reading is at the third grade level.

The game takes place in the subterranean kingdom of the Dwarf King Mark. A wicked troll has stolen 16 treasures from King Mark and hidden them in

Creative Computing SOFTWARE PROFILE

Name: Troll's Tale

Type: Educational adventure game

System: 48K Apple

Format: Disk

Summary: Hi-res adventure with educational objectives for ages 8 and up.

Price: \$29.95

Manufacturer:

Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614

caves, cottages, tree trunks, and other unlikely places. The object of the game is to recover the treasures for the king.

This package includes a disk, Parent Guide, poster-size map, 16 treasure stickers, and a compass sticker. Many of the circles on the *Troll's Tale* map are unlabeled, so the mapping procedure is a bit more difficult than in *Dragon's Keep*.

Our criticisms of *Troll's Tale* are the same as our criticisms of *Dragon's Keep*: the appearance of the troll on a scene is tiresome and pointless, and the keyboard control could be improved.

Our endorsement is also similar: *Troll's Tale* is a good game. It seems to be effective in accomplishing the educational objectives it sets for itself, and it does so in an entertaining non-drill-oriented way. □

November 1983 © Creative Computing

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!

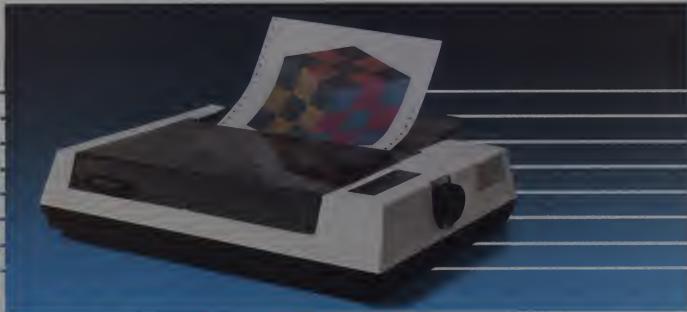
By adding the optional PICS card to your \$599 Transtar 315 color printer, you've opened up a whole new world of easy color printing. For the first time ever, our PICS parallel interface card enables you to screendump virtually any program -- graphics, charts, games -- even copy-protected software! Specially 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 247 ON READER SERVICE CARD

Apple Games: The Latest and Greatest

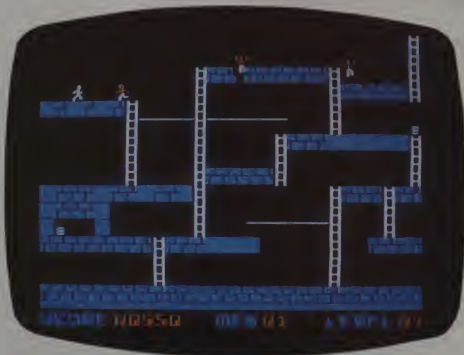
**Steve Williams
and Owen Linzmayer**

The Apple continues to be the machine of choice for many serious gamers. For years, Apple game designers have been described as pushing the computer to its limits, but still they manage to produce better and more sophisticated games—complex arcade games, convoluted hi-res adventures, and imaginative combinations of the two. Here we take a look at some of the newest offerings for Apple gamers.

Lode Runner

Lode Runner is an action game system that simulates the mission of a galactic commando deep in enemy territory. The enemy, known as the Bungeling Empire, has stolen a fortune in gold from the player's peace-loving people. The player's objective is to enter the enemy's underground treasury and recover the gold.

The treasury consists of 150 elaborate screens that resemble somewhat the diggable floors and ladders of *Apple Panic*. *Lode Runner*, however, offers additional features that are uniquely its own, including undiggable floors, trap doors, and horizontal climbing bars.

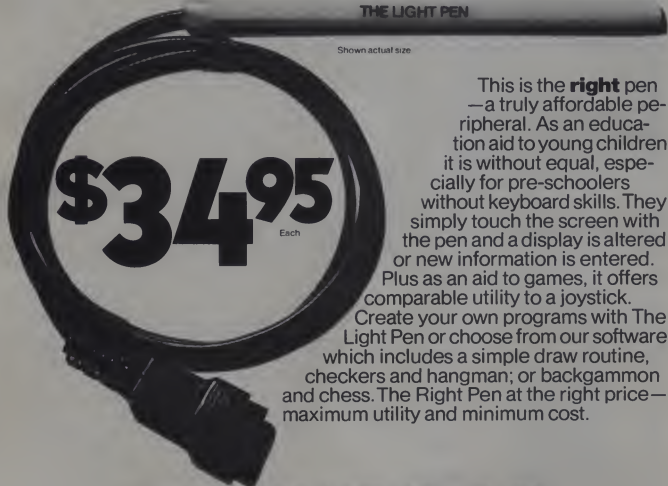


Lode Runner

The player is an animated humanoid armed with a pistol that can blast away portions of the floor, leaving holes that refill approximately ten seconds later (at normal game speed). Blasting can be used to create an exit or to trap the Bungeling

guards, who can be crushed if they fall in and are unable to escape in time. While contact with a guard usually means death for the commando, he can walk freely upon trapped guards as though they were part of the floor.

The Light Pen at the Right Price:



THE LIGHT PEN

Shown actual size

This is the **right** pen—a truly affordable peripheral. As an educational aid to young children it is without equal, especially for pre-schoolers without keyboard skills. They simply touch the screen with the pen and a display is altered or new information is entered.

Plus as an aid to games, it offers comparable utility to a joystick.

Create your own programs with The Light Pen or choose from our software which includes a simple draw routine, checkers and hangman; or backgammon and chess. The Right Pen at the right price—maximum utility and minimum cost.

Prices subject to change without notice. See your local dealer or order direct. New catalog available. Add \$3.00 for postage and handling. Credit card orders call toll free:

1-800-334-SOFT

DEALER INQUIRIES INVITED

programmer's institute

a division of **futurehouse**

p.o. box 3470, dept. A, chapel hill, north carolina 27514, 919-967-0861

CIRCLE 291 ON READER SERVICE CARD



THE HIGH TECH TAROT.

FOR THE WORTHY.

Only *\$29.95 (postage included, USA and Canada only) for the Apple II+ and IIe, 48K*. Unprotected for your convenience. Send check or money order to:



1900 Emery St., Suite 318
Atlanta, GA 30318 (404) 352-1013
* Apple II+ and IIe are registered trademarks of Apple Computer Inc.

CIRCLE 256 ON READER SERVICE CARD

SELL CREATIVE COMPUTING IN YOUR STORE!



- Big profits on sales
- We pay shipping

Minimum order 8 copies per issue

FOR DETAILS, CALL COLLECT:
LYNN KUJAWA
(212) 725-7679

AHL COMPUTING, INC.

A SUBSIDIARY OF ZIFF DAVIS PUBLISHING COMPANY

Apple Games, continued...

Running, jumping, climbing, and avoiding enemy guards, the player must retrieve chests of gold scattered throughout the treasury. Recovering all of the gold in a scene causes a special ladder that leads to the next level to appear.

With 150 different screens each of which requires a different strategy to complete, *Lode Runner* offers a seemingly

soaked through my chainmail and settled in my underquills. The shape of the relic upon the island became clearer with every step. Reaching the base, I began to climb, scratching impatiently at the volcanic cinders. Finally I was at the summit and staring at what appeared to be a weather-beaten sign. From the faint scratches I discerned the message "Beware of Sharks."

"What sharks?" I thought to myself.

Turning once again to the sea, I noticed a dozen huge dorsal fins circling the island.

This was one situation I encountered in playing *The Quest*, a new graphic adventure by Penguin Software, a company long revered for its excellent graphics utilities. Set in medieval times of swords, sorcery, and dragon slaying, this game will appeal especially to those who enjoy fantasy role-playing games.

As King Galt's advisor, the player must accompany a huge swordsman named Gorn on a mission to slay a vengeful dragon that has been terrorizing people in neighboring provinces. The majority of the adventure is spent investigating the wilderness and caves of the kingdom to find clues and prepare for the ultimate battle.

The game follows commands such as "open chest," "tie rope," and "examine carpet," which may be combined in sentence form by using the conjunctions "and" or "then." Certain frequently used

creative computing SOFTWARE PROFILE

Name: Lode Runner
Type: Action
Author: Doug Smith
System: 48K Apple II+ and IIe
Format: Disk
Summary: A superb, 150-scene commando mission

Price: \$34.95

Manufacturer:
Broderbund Software
1938 Fourth St.
San Rafael, CA 94901

endless challenge. Even when played for hours on end, dozens of scenes still remain to be explored. Moreover, a strong addition builds in struggling to reach new screens.

This game requires more thought than the typical action game, especially at the higher levels. Some screens were so involved that I paused to examine them for nearly a minute before taking action.

The only weakness of this program is a minor one. At the start of every scene or after the player is killed, the video display slowly takes a circular form, closes in aperture to a central point, and then opens again. This action takes approximately ten seconds and soon becomes unpleasantly repetitive.

Lode Runner is not only a fascinating game but also a powerful game building utility. "Generator mode" allows players to create their own scenes. This involves moving the cursor to various screen positions and then designating what should occupy them. The process, which uses single keystrokes, is fast and easy to learn.

Lode Runner is demanding, addictive, flexible, and thought provoking. All in all, it is an outstanding game. —SW

The Quest

The island, a chunk of rock not a hundred yards offshore, jutted obliquely from the crashing sea. I waded closer, the water refreshing although cumbersome as it

creative computing SOFTWARE PROFILE

Name: The Quest
Type: Graphic adventure
Authors: Dallas Snell, Joe Toler, and Joel Ellis Rea
System: 48K Apple II, II+, and IIe
Format: Disk
Summary: Stunning graphics and entertaining plot

Price: \$19.95

Manufacturer:
Penguin Software
830 4th Ave.
Geneva, IL 60134

commands may be keyed with convenient, one-letter shorthand.

This game uses exceptional graphics with stunning detail. Over two hundred locations are vividly depicted in colorful high resolution. Considerable time and effort must have been taken in preparing each scene. The player can toggle from graphics to text mode, where he can examine visible items, possible exits, and



HELP OUR POOR BOY MAKE GOOD!

Quasimodo thinks the world got up on the wrong side of the bed. Quasi has been falsely accused of stealing the royal jewels. Quasi knows where they are. He'd give them back if only the nasty soldiers would leave him alone. Help Quasi run, climb and jump his way through a bell ringer's nightmare.

Quasimodo™ is a multiple level arcade adventure game.



CAN YOU SURVIVE THE ENCOUNTER?

Alone, on a distant world, you've triggered an ancient civilization's combat training course—a test that ensures that only the fittest will survive. Suddenly a drone whistles in for the kill. You dodge behind a pylon, swivel the gun turret and desperately stab the fire button. The drone flashes white hot! As you heave a sigh of relief, the radar sights two new ships...

Encounter™ is an awesome action, 3-D scrolling game that will leave you breathless!

Both games are for the Atari™ 400/800/XL™ series in 32K disk and cassette. Available at software dealers everywhere. Or order direct from Synapse Elite. Only \$34.95 plus \$2 shipping and handling (California residents add 6½% sales tax). Send check, money order or your Visa/Mastercard number.

CIRCLE 243 ON READER SERVICE CARD

synapse

5221 Central Avenue, Richmond, CA 94804 • (415) 527-7751



The Quest

past instructions that have scrolled up the screen. A game in progress may be saved at any point.

The Quest offers features that many graphic adventures do not. For instance, it draws visible items on the screen and erases them after they are taken. A few of the scenes are active while the game awaits input; a cat prowls across a dungeon floor, for example. Moreover, when some items are examined, the game displays an additional hi-res picture of them.

There are sometimes two or even three ways to overcome obstacles in *The Quest*. This offers a challenge even after the mission has been completed for the first time, which is by no means an easy task.

Priced under \$20, this game is a great value. It is superior to many adventures costing twice as much, whether graphics or text oriented.

Remarkably outstanding in graphics, story, realism, and price, *The Quest* will be a sure favorite of any serious adventurer. —SW



Sammy Lightfoot

Sammy Lightfoot

Sammy Lightfoot, an aspiring young acrobat with an electric red pompadour, stands calmly upon the platform under the big top. He is about to attempt the most difficult challenge of his career; treacherous chasms, shifting floors, pounding hammers, and a trapeze over flames are only a few of the obstacles that he will face. It will require all the timing and courage that he can muster.

Sammy Lightfoot is an action game in which the player must meet Sammy's challenge in three scenarios and at twelve levels of difficulty. After three scenes pass, the sequence repeats at the next higher difficulty level.

The first scene consists of four floor levels with three trampolines and two swinging ropes. Sammy must bounce to higher floors using trampolines, cross a chasm on a swinging rope, and avoid hazardous circus balls that tumble in his path.

creative computing SOFTWARE PROFILE

Name: *Sammy Lightfoot*

Type: Action game

Author: Warren Schwader

System: 48K Apple II, II+, and IIe

Format: Disk

Summary: Outstanding action

Price: \$38.00

Manufacturer:

Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614

In the second scene, he must leap across disappearing platforms, travel atop plungers, and ride upon a flying carpet. Finally, in scene three, he faces a deadly puff ball, crashing hammers, and the trapeze over scorching flames. Frequently during the game he must avoid crazy pumpkins that scowl wickedly behind dark sunglasses.

Controlled with a joystick, Sammy jumps responsively with a push of the button and is easily directed left and right. The game can be played equally well with the Apple keyboard.

Sammy Lightfoot offers an enjoyable challenge and an addictive lure. The game advances in difficulty as the player improves, and the timely change of scenes holds the player's interest. I felt considerable satisfaction as I reached scenes at higher skill levels. Initially, I predicted that this game would be somewhat limited because it has only three main screen types. However, I soon found this assumption incorrect because new strategies are necessary to overcome the obstacles as they increase in difficulty.

This game uses imaginative, high-resolution graphics. Sammy's movements



WELCOME TO APSHAI. YOU'RE JUST IN TIME FOR LUNCH.



ridge version of the Computer Game of the Year,*
Temple of Apshai™

Gateway has eight levels. And over 400 dark,
nasty chambers to explore. And because it's joy-
stick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy.

Boy, have you taken
a wrong turn. One moment
you're gathering treasure
and the next you're being
eyed like a side of beef.

You're in the Gateway
to Apshai™. The new cart-

Is it treasure you're after? Or glory? You'll
live longer if you're greedy, but slaying mon-
sters racks up a higher score.

The Apshai series is the standard by
which all other adventure games are judged.
And novices will not survive.

They'll be eaten.

*One player; Temple of Apshai, disk/cassette;
Gateway to Apshai, cartridge, joystick control.*



EDYX
COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.



*Game Manufacturers Association, 1981

CIRCLE 159 ON READER SERVICE CARD



Plasmania

are realistically animated in walking, jumping, and swinging. His electric hair spins wildly when he is in trouble. Moreover, each scene is preceded by a short, cheerful tune.

Simply stated, *Sammy Lightfoot* is an excellent game. It is creative, enjoyable, and addictive. Of all action games released this year for the Apple II, it is undoubtedly one of the best. —SW

Plasmania

Remember the movie *Fantastic Voyage*? In that film, several scientists were injected with a serum that shrunk them to microscopic size. After being placed in a similarly diminutive space vessel, they launched into a man's blood-stream and attempted to cure his illness.

Plasmania is an arcade game based on an idea similar to that of *Fantastic Voyage*. As pilot of an armed "sub," the player's objective is to fight his way through twisting veins and clear a blood clot at the patient's brain. This involves blasting away harmful bacteria, avoiding blood cells, and, if necessary, destroying defense cells.

Colliding with any of the micro-organisms, allowing bacteria to pass, bumping the vein walls, or killing benign cells weakens the already debilitated patient. Strength can be restored by blasting enzymes, thereby causing them to release healing agents.

Another opponent that the player must face is not a micro-organism. It is the heart monitor, a clock that ticks down as the patient loses strength. For a successful mission, the blood clot must be reached before time runs out.

With three levels of difficulty and two modes for game duration, *Plasmania* is a versatile game that will challenge players of virtually any ability. After a successful

creative computing

SOFTWARE PROFILE

Name: Plasmania
Type: Arcade action
Authors: David Lubar and Lewis Geer
System: 48K Apple II
Format: Disk
Summary: Challenging, creative game
Price: \$34.95
Manufacturer:
 Sirius Software
 10364 Rockingham Dr.
 Sacramento, CA 95827

clearing of the clot (the mission repeats after completion) the organisms assume new arrangements within the vein, requiring the player to remain alert to shoot or avoid the correct ones.

This program sports good sound effects throughout the game, one of which is particularly noteworthy. At the start of the game, a realistic, simulated voice screams, "Sirius presents *Plasmania*!"

Controlled with a joystick, the sub "swims" cleanly and responsively through the hi-res vein, which is similar to the vertically winding landscape in *Caverns of Mars*. The keyboard may also be used, although it is somewhat clumsy.

It is difficult to find any major flaws in *Plasmania*, but for me it lacks that quality of addiction that would make it truly outstanding. Although the game varies slightly from phase to phase, each part (with the exception of the clot scene) resembles the others closely enough to suppress the excitement that one might feel in striving to reach a new and different level.

Nevertheless, *Plasmania* is of above average quality in all other respects. It is challenging, responsive, flexible, and a fine game overall. —SW

Reach for the Stars

My home planet, a primary class satellite in the Rigel star system, shimmered like a jewel before the solar debris. Long ago and when my race lived solely upon this star, the people selected me to lead them. Since then we have prospered and become a wealthy, powerful empire. Today my territory stretches through light years of space and encompasses nearly two dozen Rignels.

Countless lives rest in my hands, as does my mighty starfleet, which has grown from a motley collection of vessels to a fighting force that can crush entire planets beneath its heels. Presently, though, most of the fleet is away on campaign, and Rigel itself, the jewel where my dreams began, is under siege. I realize that this planet is now little more than a speck in my empire, but nevertheless, I cannot let my homeland fall!

In *Reach for the Stars*, a strategic simulation of colonization, expansion, and conflict in a hypothetical galaxy, the player's job is to help me defend my planet. Each player must lead his people in exploring star systems, colonizing the most promising ones, and protecting them with a fleet of starships. In addition, a player may launch attacks against his opponents and attempt to conquer or destroy their territory.

Before play begins, each of the players must be designated as either human or computer controlled. A maximum of four humans may play; the remaining seats, if any, are taken and played by the Apple. This option allows solitaire as well as group play. A game can last from three to 30 hours and may be saved at any point.

The "galaxy" used in the game is represented in hi-resolution graphics and covers an extensive area of space including 54 star systems, each of which may contain up to three planets. Having their characteristics randomly determined every game, planets are classified in four main categories which describe the fitness of their environment for possible colonization: primary, secondary, tertiary, and hostile. Each planet is also rated for the maximum population, industrial capacity, and social level that it can support.

The combination of the ratings of a planet determines its productivity level and therefore the number of "resource points" it can produce. Resource points, credits which represent manpower and industry, may be allotted to the improvement of planetary characteristics, construction of planet defense systems, population service (food and necessities), technological advancement, and star fleet construction. Six types of ships may be built including explorers, transports, and starships (battle cruisers) of quality deter-

If You Liked Donkey Kong, You'll Love JUMPMAN!

JUMPMAN. THE COMPUTER ACTION GAME.

If you liked jumping over barrels and climbing ladders to save damsels in distress, you'll love the blazing excitement of JUMPMAN. Your incredible speed and jet boosters let you leap from girder to girder, scale ladders and ropes to disarm the bombs planted in Jupiter Headquarters. But it's not easy and there are thirty levels of difficulty. You'll have to dodge missiles, killer robots, flying saucers, crumbling girders and vanishing escape Routes. In the heat of battle, JUMPMAN must keep a cool head.



**The Award-Winning
Computer Games**

Epix, 1043 Kial Court, Sunnyvale, California 94086

CIRCLE 162 ON READER SERVICE CARD

JUMPMAN. Designed by Randy Glover
DONKEY KONG is a trademark of Nintendo of America, Inc.

creative computing

SOFTWARE PROFILE

Name: Reach for the Stars

Type: Strategy game

Authors: Ian Trout and Roger Keating

System: 48K Apple II

Format: Disk

Summary: Exciting and enjoyable simulation

Price: U.S. \$52.00

Manufacturer:

Strategic Studies Group
Ground Floor
336 Pitt St.
Sydney, 2000 Australia



Reach for the Stars

mined by the technological level.

Gameplay proceeds in turns. Production phase takes place on odd turns, during which resource points are spent. Most of the action, though, takes place in the phases that follow. In these phases, ships are moved to new star systems, convoys of starships and transports are formed, explorers are assigned to missions, and colonies are landed. Next, all combat is resolved between opposing ships. Finally, forces may attack opposing planets.

Like most games of its kind, *Reach for the Stars* was slightly confusing at first, and it took me nearly two hours before I fully understood the game. The player's manual is adequate, but it lacks clarity in a few places, such as its explanation of establishing colonies.

Playing by myself against three computer opponents, I found *Reach for the Stars* absorbing and quite enjoyable. Because it required frequent decision making, it maintained my attention and

interest. My mind had little time to wander as it often does in other slow-moving strategy games. The game increases in intensity as more colonies are established and more decisions must be made, especially during movement phase. Note, however, that options are available to aid in playing, such as that for the automatic movement of explorer ships.

The game seemed somewhat sluggish when I played against a friend and two computer opponents. With the two of us at the keyboard of the Apple, each had to look away while the other keyed information that he wished to remain secret. The decision making process that satisfied me before now left me waiting anxiously for my turn. *Reach for the Stars*, I believe, is best when played solitaire.

As a strategy game player, I can appreciate the use of high-resolution graphics in this simulation. Several other strategy programs take the shortcut of using the text screen for the map of territory involved, reasoning that graphics are

not necessary for a game of this nature.

Another feature that I liked was that the basic game can be enhanced by using any or all of the "game options." These eight additional twists to the game include the possibility of natural disasters, the solar debris effect, the formation of novas, and the intervention of irritant life forms known as xenophobes.

Followers of strategy board games such as Avalon Hill's *Third Reich* and Metagaming's *Stellar Conquest* will recognize familiar traits in this simulation. The ideas of resource points, production, development, and conquest have succeeded before. They offer the basis for exciting and satisfying games. *Reach for the Stars* is a stimulating program written in the fine tradition of these simulations. —SW

Buzzard Bait

On the planet Earth, humans sometimes scatter bird seed on their lawns to attract their feathered friends. Imagine, instead, a world where carnivorous birds gather their own living food—a morbid scene in which humans are snatched from the ground by huge buzzards and fed whole to their babies. No, this ghoulish world does not exist in the Twilight Zone, but rather, in *Buzzard Bait*, a new game from Sirius Software.

Designed on the Apple by Mike Ryeburn, *Buzzard Bait* is also available for the IBM-PC. This 48K game can be played with either a set of paddles, the keyboard, a joystick, or an Atari joystick in conjunction with the Sirius Joypoint. My preference is a potentiometer joystick.

You begin each game with three ships at your disposal. To defend against the egg-dropping birds, your ship fires bursts of two shots in rapid succession. This is comforting, because after the three pairs



**PITSTOP.
WHERE WINNING IS THE PITS.**



You'll never make Grand Prix champion just driving in circles.

You've got to stop sometime. The question is when. Right now you're in the lead. But the faster

you go, the more gas you consume. And the quicker your tires wear down.

If you do pull into the pits, though, you lose precious seconds. So it's up to you to make sure the pit crew is quick with those tires. And careful with that gas. Otherwise, poof! you're out of the race.

See your retailer for available computer formats.

CIRCLE 161 ON READER SERVICE CARD

So what'll it be, Mario? Think your tires will hold up for another lap? Or should you play it safe and go get some new ones?

Think it over. Because Pitstop™ is the one and only road race game where winning is more than just driving. It's the pits.

Goggles not included.

One or two players; 6 racecourses,
joystick control.



EPYX
COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.





Buzzard Bait



Mission: Escape

Creative Computing SOFTWARE PROFILE

Name: Buzzard Bait
Author: Mike Ryeburn
Type: Arcade game
System: 48K Apple II/II+ /Ile,
 IBM-PC
Format: Disk
Language: Assembly
Summary: High flying action.
Price: \$34.95

Manufacturer:
 Sirius Software, Inc.
 10364 Rockingham Dr.
 Sacramento, CA 95827

of birds are finished making whoopie in the nests above, they waste no time in attacking the helpless humans on the ground. After a buzzard wraps its talons around a human, it soars back to its nest to place the tasty morsel in the open mouth of its young. In this manner, the baby bird grows strong enough to leave its nest and join the hunt.

Not only must you dodge the rotten eggs that are hurled at your ship, but you must avoid any contact with the buzzards themselves. Some of these guys are actually bigger than your whole fighter! Quick, somebody notify the Audubon Society.

Aiding the flock of buzzards are green and white penguins which have a nasty habit of flying too close to the ground. Penguins can be shot, but since they carry no point value, they are strictly a nuisance. Instead of shooting a penguin, you may opt to leap over it when it threatens you. Pressing the second control button propels your ship high into the air. Sometimes this feature allows you to escape certain death, while at other times it sends you crashing into an attacking buzzard.

Every now and then, after you destroy an attack wave, you are given a chance to earn an extra ship. A space scene fills the screen and your ship is cast among a group of harmless penguins. The object here is to gather the three missing pieces of your ship without running into any of the explosive mines left behind by a thoughtless space traveler. This task is complicated by the penguins which cause you to bounce wildly if you bang into them accidentally.

Buzzard Bait features beautifully executed animation complemented by well done sound effects. Even when the entire screen is alive with flying buzzards and running humans, none of the elements appears to flicker. While the graphics are not earth shattering, they are certainly top notch.

By no means your ordinary shoot-'em-up game, *Buzzard Bait* requires both a quick trigger finger and the ability to make split-second decisions. This program is a must for anyone who has ever had nightmares after watching a late night showing of *The Birds*.
 —OWL

Mission: Escape

Mission: Escape is an Apple version of Lunar Rescue, an old arcade game in which you pilot a shuttlecraft to the planet surface below and pick up stranded astronauts. *Mission: Escape* runs on any 64K Apple-compatible machine and is brought to you from MicroSparc, a New England-based software company.

The object of *Mission: Escape* is twofold. First, you must descend through a belt of slowly moving meteors and safely reach a designated landing pad in the lunar crater at the bottom of the screen. Once done, an astronaut hops aboard, and your job is to bring him back to the mothership that hovers above. Careful

Creative Computing SOFTWARE PROFILE

Name: Mission: Escape
Author: Thomas Schumann
Type: Arcade game
System: 64K Apple
Format: Disk
Language: Assembly
Summary: Nice, but nothing new.
Price: \$29.95

Manufacturer:
 MicroSparc Inc.
 10 Lewis St.
 Lincoln, MA 01773
 (617) 259-9710

though, simply touching an asteroid spells the doom of your mission. On your ascent, you can fire missiles at the scrolling meteors to clear a path for your craft.

After all of the astronauts are either dead or safe in the hull of the mothership, points are awarded for completing the mission. If you finish a round with no fatalities, you earn a special bonus. Each subsequent round brings with it new and increasingly difficult hazards.

The documentation provided with *Mission: Escape* states that the game can be played either on the keyboard or with a paddle. I find, however, that a switch-type joystick works best.

As I play *Mission: Escape*, I am reminded of *Meteor Mission*, a fine TRS-80 game from Big Five Software that I reviewed well over two years ago—both are based on the same video game. It is a shame to see a skillful programmer like Tom Schumann put so much effort into mimicking an antiquated game. I hope that he chooses a more exciting medium for his next offering. The talent is definitely there; only originality is lacking.
 —OWL □

The Challenge: Match Wits with the Mind Games from Brøderbund!

OPERATION WHIRLWIND™



That's how it's your winning weapon in this unique war game. Strategy, not force, is the key to victory as you move your battalions through a series of testing situations and battle actions. Your ability to command, to plan, to move your troops swiftly determines the success of your assault and tactical operations. Operation Whirlwind requires the concentration of a professional—because you may take between one and three hours—and the ability to master the many tactics of waging a full scale war. How well you can focus your strategic energies will decide whether your victory is Questionable, Marginal, Tactical, Strategic or a Breakthrough. A great game for the thinking game player. Available on disk.

MATCHBOXES™

Pit your concentration against another player or the computer. Here's a puzzle game that will keep the whole family bemused, befuddled and playing happily for hours. A grid of 36 numbered boxes conceals an animated menagerie of colorful characters, creatures and objects. The object of the game is to match identical squares and then solve a hidden word puzzle. There are many game variations with puzzles that are frontward, backward, or scrambled. Matchboxes. It's the most memorable memory game you've ever played! Available on disk and cassette.



OPERATION WHIRLWIND AND MATCHBOXES
FOR THE ATARI® HOME COMPUTERS. ATARI® is a trademark of Atari, Inc.

Make sure to look for The Arcade Machine™ and Brøderbund's
new game phenomenon, Lode Runner™—also for Atari.



Brøderbund Software

Discover the Difference

17 Paul Drive San Rafael, CA 94903
CIRCLE 123 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.

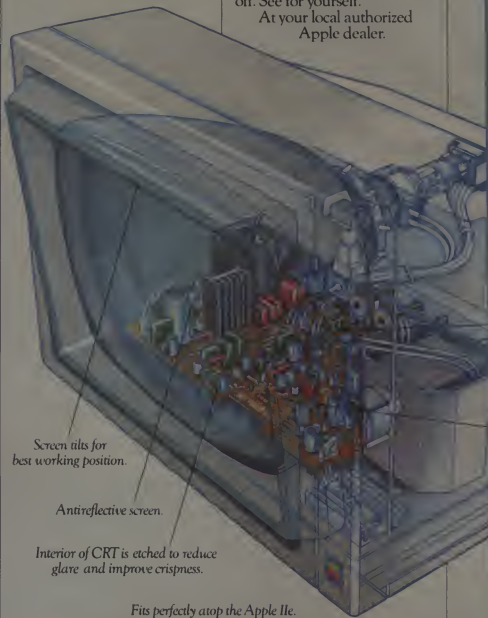
Monitor II also features a high bandwidth video amplifier and a high tolerance linearity circuit. The former keeps characters from smearing

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.

High tolerance
linearity circuit.

High bandwidth
video amplifier.

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., 21525 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 114 ON READER SERVICE CARD

Arcade Action For The Commodore 64

Andrew Hurdidge

Sierra On-Line has entered the slowly maturing Commodore 64 software market with three converted Apple games, two of which are *Crossfire* and the licensed version of Sega's coin-op *Frogger*. They have done an admirable job.

Frogger

Many games boast action so quick and graphics so clear that they make you think you are in an arcade. Sierra On-Line's licensed version of *Frogger* for the Commodore 64 is one of them. But unlike many others, *Frogger* holds true to its claim. It is the best version of *Frogger* I have seen for any machine.

The object of *Frogger* is to guide your frog safely across a busy highway, over a river, and home to his lilypond in the allotted time (120 beats of the timer). To accomplish this successfully, he must cross the highway without being run over and cross the river without falling



Frogger

creative computing SOFTWARE PROFILE

Name: Frogger
Type: Arcade game
System: Commodore 64
Format: Disk/Cassette
Author: Chuck Benton
Summary: Excellent version of arcade Frogger.
Price: \$34.95
Manufacturer:
Sierra On-Line, Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614

in. The latter seems rather strange considering that frogs are very adept at swimming.

Your frog must avoid cars, trucks and bulldozers, deadly snakes, otters, crocodiles, and the treacherous diving turtles. After five frogs have made it to their lilyponds, you advance to the next level.

You move your frog vertically and horizontally using a joystick or, as with *Crossfire*, the redefinable keyboard. *Frogger*, however, lends itself much more to keyboard use than *Crossfire*. The responsiveness of both the joystick and the keyboard is outstanding. Your frog moves as fast as you can press the joystick or hit a key.

The screen is split into two main

parts, the highway and the river. The highway, the first obstacle to be overcome, is located at the bottom of the screen. Situated in between the highway and the river is a narrow strip which in the lower levels offers refuge from danger. In the higher levels this area is patrolled by a dangerous slithering snake. At the top of the screen is the river and your final destination—the lilypond.

Much care has been taken in creating the *Frogger* graphics. The sprite animation of the frog is extremely realistic. It looks much better than the arcade frog. Details such as the tread on the bulldozers, which are made to look as if they are actually turning, are outstanding. The excellent three dimensional logs and the "Game Over" sign which glides

THE EASY CHOICE



Best Separate Compilation – Best Error Handling – Best Implementation on a Small Computer
Comments From 1983 LA AdaTEC Compiler Faire

"... JANUS/Ado encompasses at least 5 times as much of Ado as Supersoft, including many of the more exotic features of the language." *Creative Computing*

"... The compiler performed exceptionally well ... the linker performs flawlessly ... the error handling is excellent ... RR's support is the best I've ever encountered." *InfoWorld*

"The compiler breaks new ground in the microcomputer field with its excellent runtime error-checking code and its excellent compiler error messages." *Microsystems*

"They're (RRS) honest to a fault, so they call their language JANUS; but its more nearly Ada than any other microcomputer implementation I know of ... I watched some of the demonstrations and it works." *Jerry Pournelle, Byte*

Encouragement of this kind deserves a just reward; we now intend to complete our compiler and submit it for validation.

Our Ada line is available on the following operating systems: CP/M, CP/M-86, MS-DOS, PC-DOS and CCP/M-86

Available from the following distributors:

Westco, Inc.
25 Van Zant, St.
Norwalk, CT 06855
(203) 853-9880

Marfam Corporation
5340 Thornwood Dr. Suite 102
San Jose, CA 95123
(408) 226-0170

Suntex Data
10175 Harwin Suite 100
Houston, TX 77036
(713) 271-9191

S-100 Systems
3687-4 Shobumachi
Obayashi
Saitama, Japan 346-01
04808 (5)0416:
04808(5)6565

Internationally

Micronis
11 Blackmore St.
Windsor 4030
QLD, Australia
(07)57 9152

Nord-Micro Informatique
155, rue du Fauburg St.
Denis
75010 Paris
(1)205-39-47

CP/M, CP/M-86, CCP/M-86 are trademarks of Digital Research, Inc.
MS-DOS is a trademark of the U.S. Government or Elsevier
MICRONIS is a trademark of Micronis

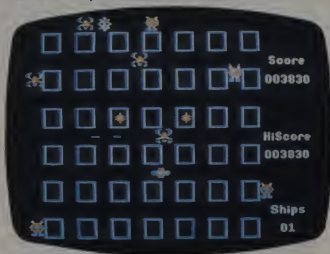
Copyright 1983 RR Software

RR SOFTWARE, INC.

specialist in state of the art programming

P.O. Box 1512 Madison, Wisconsin 53701
CIRCLE 210 ON READER SERVICE CARD

(608) 244-6436



Crossfire

across the screen atop a log make On-Line *Frogger* a great replica of the arcade version.

As in the arcade version the music is non-aggressive and has a winsome melody. Also, bonus points are awarded for gobbling insects, escorting ladies home to your lilypad, and completing a level.

When I first read about the Commodore 64, I revelled in the thought of the games that could be made with its sophisticated high-resolution graphics. *Frogger* comes very close to the games I envisaged. Perhaps Commodore, too, had games such as *Frogger* in mind when they dubbed the 64 "The most brilliant game machine you can buy."

Crossfire

In *Crossfire* aliens have landed and are steadily taking over the evacuated city destroying everything in their paths. You have three ships with which to defend the city from the onslaught.

Crossfire is a one-player shoot-'em-up that brings new meaning to the cliché hand-eye coordination. You navigate your ship around the city using a joystick or the keyboard, which to my delight can be redefined to your liking. But even with the ability to select your own keys, *Crossfire* is not a game to be played with the keyboard. I strongly recommend having a joystick before you even attempt to play this game, as using the keyboard requires the manipulation of nine separate keys.

The screen graphics consist of a top view of the city streets which closely resembles the coin-op game *Targ*. When the game starts, the aliens are surrounding the city and beginning their intelligent attack. Your ship is located in the center of the city where it is vulnerable to the aliens' fire from all four compass



Kickman

directions. You can replenish your ship's ever dwindling supply of ammunition by entering a refueling station, which is randomly placed about the city. After successfully ridding the city of aliens (clearing a board) you advance to the next level. Each new level brings with it faster and more aggressive aliens and less ammunition for your ship, until you reach the minimum of fifteen missiles.

The first thing that struck me upon loading the program was the music. I started off quietly humming the tune, and before I knew it I was singing it out loud. It is fast paced and catchy, and adds greatly to the excitement of the game. Then I toggled off the music and noticed, to my surprise, the virtual absence of the sound effects. All I heard for the effort of blowing up an alien was a disappointing "pop." This disturbed me, as *Crossfire* is the type of game that will appeal to shoot-'em-uppers who thrive on noise as a vampire thrives on blood.

The next thing I noticed was the lack of color in the game. Everything seemed to be in red and blue. I tried adjusting the controls on the monitor, but to no

avail. As a check, I switched to a regular television and got the same result. The game does not make nearly enough use of the 16 colors available on the 64.

The handsome *Crossfire* box depicts a man's hands (which I assume are the player's) firing a laser pistol at an android. Seeing the box, you could mistakenly be led to believe that *Crossfire* is meant to be a version of *Berzerk* for the 64. Not so. *Crossfire* is rather a cross between *Targ* and *Space Zap*.

Crossfire is a game that can be criticized for its lack of color and sound effects. Apart from these two points, which are quickly and easily forgotten as the game progresses, it is an action packed game that is addictive and fun to play. When compared to currently available games for the Commodore 64, *Crossfire* is outstanding.

Kickman

Trying to remain the "Friendly Computer" company in the minds of its devoted customers, Commodore has released, as promised, its first batch of entertainment software for the Commodore 64. Among these is Commodore's version of *Kickman*, a relatively unknown coin-op game by Bally/Midway.

The game screen consists of a three-dimensional city street. A skillful unicyclist at the bottom of the screen is dressed as a clown, and you control his left/right movements with a joystick or the keyboard. Swinging, multicolored balloons, shifty-eyed ghosts, and chomping Pac-Men fall from above the clown, and it is your task to burst or catch them on the top of his pointed hat.

The speed at which an object falls is indicated by its color, making for a colorful game. The clown unicyclist can

creative computing

SOFTWARE PROFILE

Name: *Crossfire*

Type: Arcade game

System: Commodore 64

Format: Disk/Cartridge

Author: Chuck Benton

Summary: Fast-paced action.

Price: \$34.95

Manufacturer:

Sierra On-Line, Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614

creative computing SOFTWARE PROFILE

Name: Kickman
Type: Arcade game
System: Commodore 64
Format: Cartridge
Summary: Good adaptation of the arcade version.

Price: \$29.95

Manufacturer:
Commodore Business Machines
1200 Wilson Dr.
Westchester, PA 19380
(215) 431-9100

kick any objects that fall below the level of his waist back up into the air. As the game progresses and the objects fall faster, you are virtually juggling! When a Pac-Man falls on top of a stack of balloons or ghosts, he chomps through them and comes to rest on the clown's head.

Missing one of the objects causes the clown to fall off his unicycle, scattering in all directions any previously caught balloons and ghosts, and resulting in the loss of a "life."

Kickman is a good adaptation of the coin-op game.

If you are familiar with the arcade version, you will notice the omission of the bonus round with the mad bomber. Also, running into a falling object will not cause it to be knocked aside. In addition, Commodore's version is for one player only. These are only minor drawbacks and in no way impede the game play.

A word of warning if you are using the keyboard. It is easy to mistakenly hit the SHIFT LOCK key instead of the A key (the kick key) frustratingly preventing the A key from being read. I found the background music to be repetitive and annoying and a poor imitation of the carnival music of the arcade version.

On a positive note, the animation is smooth and realistic and the 3-D background is great. As a handy feature, the RUN/STOP key doubles as a pause, allowing you to take a breather.

In summary, *Kickman* is a good adaptation of the coin-op game. It is a welcome change from the usual shoot-'em-up games and will be enjoyed by those familiar, as well as those unfamiliar with the arcade version. □

November 1983 © Creative Computing

Turn your TV into a video drawing board with your computer and a Tech-Sketch Light Pen... \$39⁹⁵



Now you can make your Atari, Commodore or Apple home and personal computer come alive even without using the keyboard, with applicable software. Plug your Tech-Sketch Light Pen into the joystick port, touch the pen to the screen and draw multi-colored pictures or pick from a menu. It's that easy.

Unlike other Light Pens, Tech-Sketch is a high quality, rugged unit with a built-in switch and backed by a 30-day money back guarantee.

FREE Paint-N-Sketch I Program for Commodore 64, Apple* and Atari

With every Tech-Sketch Light Pen you get this program free. Paint-N-Sketch I will help you develop artistic computer skills. *Interface card required \$99.95

It's the natural way to draw pictures on the screen and in colors too. You and your family will master it in no time at all.

Paint-N-Sketch I is a regular \$29.95 value. Order your Light Pen now and get Paint-N-Sketch I free.

12 NEW TECH-SKETCH EDUCATIONAL PROGRAMS FOR MORE COMPUTER ENJOYMENT

1. **PAINT-N-SKETCH — LEVEL II** Contains all of Level I plus: six brush sizes, 12 different colors, greater speed and accuracy and many more options. For Vic 64 and Atari only.

2. **ALPHABET FUN FOR THE YOUNG** Enables children to develop alphabet power. Designed for children on a pre-school level to aid in alphabet identification.

3. **NUMBER FUN FOR THE YOUNG** Designed for children on a pre-school level to develop basic number counting skills through association.

4. **MATH FUN FOR THE YOUNG — LEVEL I** Designed to teach and develop math skills to pre-schoolers thru Grade I. Teaches simple addition and counting skills on three levels.

5. **MATH FUN FOR THE YOUNG — LEVEL II** Advanced LEVEL I program for children Grades 1 and 2. Four levels of difficulty.

6. **SHAPE AND COLOR RECOGNITION** Helps children develop color, figure and word association skills. Permits children to pick and match colors and figures from a random group.

PRICE LIST

Program Numbers	Cassette	Disk	Cartridge
1, 2, 3, 4, 5, 6, 7, 11, **12			
ATARI	\$19.95	\$21.95	\$34.95
COMMODORE VIC 20/64	14.95	16.95	34.95
** Free with Vic 20			
8, 9, 10			
COMMODORE VIC 20/64	14.95	16.95	34.95

7. **MEMORY JOGGER** Stimulates concentration and memory skills by matching object behind "cards" on the screen. Play with others or against the computer. For adults as well as children.

8. **PEEPING TOM** Catch Peeping Tom with your Light Pen before he disappears. Stimulates eye-hand coordination. Three levels of play.

9. **PIANO PLAYER** Video keyboard on your TV screen. Lets you play tunes in three different voice ranges simultaneously. Displays the note being played. A great way to learn music.

10. **FIND IT** Find a specific object in a field of others to test your speed and accuracy against a timer. Three skill levels.

11. **SIMON SEZ** Develops color and sequence memory skills for events generated by the computer.

12. **WORD SEARCH** Expands thinking, spelling and reading skills by finding hidden words in a field. Find the words written backwards, upside down and diagonally. For children of all ages.


THE TECH-SKETCH ANIMATION ILLUSTRATOR for Apple II, III and Plus, consists of LP-105 Light Pen, AP-1 Interface Board and Tech-Sketch Animation Illustrator Software package... \$249.00. With high resolution LP-15 Light Pen... \$295.00.

30-day money back guarantee
See your local dealer or call 800-526-2514. In New Jersey (201) 227-7724.

TECH-SKETCH INC.

Tech-Sketch Inc. is a subsidiary of Ampower Instrument Company
26 Just Road, Fairfield, NJ 07006
Dealers & Distributor Inquiries Invited. Commodore, Atari, Apple, Reg. TM's

CIRCLE 246 ON READER SERVICE CARD

Announcing A Major New Innovation From The Publishers Of 

Now, Get Up To 72 Programs For As Little As \$2.00 Each.

Introducing PC DISK MAGAZINE. The Only Magazine On Disk That Gives You A Library Of Software Programs For Your IBM Personal Computer ... At A Fraction Of The Price!

Imagine building a library of software programs with amazing ease...adding utilities, subroutines, games and data files to your system...for as little as \$2 per program! Introducing PC DISK MAGAZINE

a totally new concept for your microcomputer that gives you all this and more! You get thoroughly tested, ready-to-run programs on a floppy disk—complete with a comprehensive, illustrated User Manual—for the ultimate in ease, efficiency and economy. With your subscription to PC DISK MAGAZINE you'll receive a floppy disk containing up to 12 varied ready-to-use programs and files. Developed by experts and tested by the editors, you'll be able to expand the use of your IBM personal computer.

Business and Finance Aids: Create advanced pie, bar and line chart graphics. 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.

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® or Supercalc® formats.

Home/Personal Applications: Whether you need your own income tax return helper...proven ways to maintain a mailing list...a personal cash flow analyzer...a speed reading trainer...or SAT test preparation aids, you'll get it from PC DISK MAGAZINE

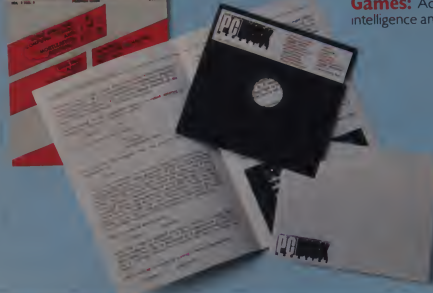
Utilities and Diagnostics: Print graphics, screen images on your printer...backup, copy, delete, un-delete or type files with simple menu commands. Use your computer to simulate a conversational terminal with function key control of disk or printer logging...and more.

Data Files: Tax tables, population statistics, dictionaries and economic times series.

Games: Adventures! Strategies! Test your skills, intelligence and your luck!

Everything Is Ready For You

PC DISK MAGAZINE has everything you need. The accompanying 60-page User Manual is written clearly, concisely, in easy-to-understand terms. You'll be able to try the programs immediately...there's no need to type listings into your computer. Just insert the disk and go! That simply, all the latest software developments are at your fingertips!



Save \$60.00

on



YES! Send me 6 issues of *PC Disk Magazine* for just \$119.00—34% off the full subscription price of \$179.00.

Check One:

I enclose \$_____ (Residents of CA, CO, CT, DC, FL, IL, MA, MI, MO, NJ, NY State, and VT add applicable sales tax.)

Bill me later.

Charge my: American Express

MasterCard Visa

Card No. _____

Exp. Date _____

Mr./Mrs./Ms. _____ (Please print full name)

810096

Address _____

City _____

State _____

Zip _____

Offer valid in U.S. and its possessions only. Please allow 30 to 60 days for delivery of first issue.

Save \$60.00

on



YES! Send me 6 issues of *PC Disk Magazine* for just \$119.00—34% off the full subscription price of \$179.00.

Check One:

I enclose \$_____ (Residents of CA, CO, CT, DC, FL, IL, MA, MI, MO, NJ, NY State, and VT add applicable sales tax.)

Bill me later.

Charge my: American Express

MasterCard Visa

Card No. _____

Exp. Date _____

Mr./Mrs./Ms. _____ (Please print full name)

810096

Address _____

City _____

State _____

Zip _____

Offer valid in U.S. and its possessions only. Please allow 30 to 60 days for delivery of first issue.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 66 BOULDER, CO.

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. 2462
Boulder, Colorado 80321



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 66 BOULDER, CO.

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. 2462
Boulder, Colorado 80321



A LIBRARY OF SOFTWARE PROGRAMS FOR THE IBM PERSONAL COMPUTER

DISK MAGAZINE

BUSINESS & FINANCE
 COMPANY ANALYZER
 ALPHABETIC BAR CHARTER
 WORDSTAR CONFIGURATOR

PROGRAMMING TOOLS
 BASIC PROGRAM EDITOR
 PERPETUAL CALENDAR

HOME/PERSONAL
 PERSONAL CASH FLOW MANAGER
 PART OF 80

UTILITIES & DIAGNOSTICS
 DISK TEST
 IBM MATRIX PRINTER CONTROL

DATA FILES
 DEMOGRAPHIC DATA FILE

GAMES
 HIDE AND SEEK
 POKER AND WATCH

COPYRIGHT © 1983 BY ZIFF DAVIS PUBLISHING COMPANY. ALL RIGHTS RESERVED.



PRODUCT SPECIFICATIONS

- Programs will run on IBM personal computers under PC-DOS and MS-DOS versions 1.1 and 2.0 and require a minimum of 64K.
- Most programs will be written to run on both monochrome and color displays, however, some games and utilities may be specifically developed for color display.
- Most programs will be written in advanced Basic; however, some machine language and compiled code may be used.
- Programs and documentation are copyrighted by Ziff-Davis Publishing Company. All rights of reproduction in all forms and media strictly reserved.

PROGRAM SUBMISSIONS

If you wish to submit a program for inclusion in future issues, please write to: PC 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 on all unmailed issues.

Save \$60 With This Introductory Savings Offer. Get 6 Big Issues of PC DISK MAGAZINE And Save 34%.



P.O. Box 2462, Boulder, CO 80322

#1099

YES, Please accept my subscription to PC 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 \$60 — 34% off the full price of \$179.

- Check one: Please bill me. Payment enclosed.
 Please charge to my credit card.
 American Express Visa
 MasterCard

Credit Card No _____ Exp. Date _____


Name _____

Address _____

City _____

State _____ Zip _____

MAIL NO-RISK COUPON TODAY — AND SAVE 34%!



WOULD YOU SHELL OUT \$1000 TO MATCH WITS WITH THIS?

**MEET YOUR MATCH. MEET INFOCOM GAMES—
PERHAPS THE BEST REASON IN SOFTWARE
FOR OWNING A PERSONAL COMPUTER.**

In fact, people have been known to purchase computers and disk drives solely for the purpose of playing our games. And they haven't been disappointed. Because Infocom's prose stimulates your imagination to a degree nothing else in software approaches. Instead of putting funny little creatures on your screen, we put you inside our stories. And we confront you with startlingly realistic environments alive with situations, personalities, and logical puzzles the like of which you won't find elsewhere. The secret? We've found the way to plug our prose right into your imagination, and catapult you into a whole new dimension.

If you think such an extraordinary experience is worth having, you're not alone. Everything we've ever written—ZORK® I, II, and III, DEADLINE, STARCROSS, and SUSPENDED™—has become an instant

best-seller. For the simple reason that Infocom offers you something as rare and valuable as anything in software—real entertainment.

At last, you can fritter away your evenings playing a computer game without feeling like you're frittering away your computer investment.

Step up to Infocom. All words. No pictures. The secret reaches of your mind are beckoning. A whole new dimension is in there waiting for you.

INFOCOM™
The next dimension.

Infocom, Inc., 55 Wheeler St., Cambridge, MA 02138



For your: Apple II, Atari, Commodore 64,
CPM 8, DEC Rainbow, IBC RT-11, IBM, NEC APC, NEC PC 8000,
 Osborne I, TI Professional, TRS-80 Model I, TRS-80 Model III.

CIRCLE 178 ON READER SERVICE CARD

Zork III

Carl Townsend

Zork III, the sequel to *Zork I* and *Zork II*, starts at the bottom of an endless staircase: "As in a dream, you see yourself tumbling down a great, dark stairway. All about you are shadowy images of struggles against fierce opponents and diabolical traps. These give way to another round of images—imposing stone figures, a cool, clear lake, and an old, but oddly youthful man."

"He turns toward you slowly, his long, silver hair dancing about him in a fresh breeze." "You have reached the final test, my friend. You have proved clever and powerful, yet this is not enough. Seek me when you feel yourself worthy!" His words echo as the dream dissolves around you . . .

"You are at the bottom of a seemingly endless stair, winding its way upward beyond sight. An eerie light coming from all around you casts strange shadows on the walls. To the south is a dark, winding trail. Your old friend, the brass lantern, is at your feet."

As with most adventures, there are few instructions supplied. You must discover your own directions to the game as well as the object of the game. *Zork III* responds to simple verb and noun instructions (e.g., GO WEST) and in some cases requires an adjective or adverb. For example, if you are in a room with several doors and you enter OPEN DOOR, *Zork* asks you which door you wish to open.

As you begin your adventure, you find a sword protruding from a rock, but you can't wrestle it free. If you survive a fight with a strange hooded figure, you hear an ominous rumbling that shakes the entire cavern. The action moves swiftly, keeping the explorer on the edge of danger.

Time Is Related To The Events

Zork III, at times, appears to run in a real-time mode. Unlike Infocom's *Deadline*, however, *Zork* is not a real-time game. There is no clock ticking, and there is no demand on the user to com-

plete the game in a set period. You find, however, that time has a strange relationship to the events. To tell you more than this would spoil the adventure.



Soon you are aware that someone is watching you and is very interested in your progress. Almost in a real-time mode, the character appears at the top of

a cliff while you try to open a chest on the ledge below. As you become frustrated, he offers to help. You have to decide whether you want his help and how much to trust this strange fellow.

Several well designed puzzles in the cave kept me busy for hours. If you think you are ready for the Royal Puzzle, you can drop down into a room of sandstone and marble walls. Moving walls, ladders, a strange door with a slot, and an odd black book all add to the puzzle. More intriguing is the mirror box with two poles, two panels, and four walls—all of which move.

I had a great deal of fun with the three machines in the Technology Museum, although I could get only one of the machines to work. It has enough power, however, to get you into plenty of trouble. The trick is to discover how the machine works (it has one button and a dial), what it does, and how to make it work to your advantage.

Solving The Final Puzzle

The end-game was particularly exciting. As the pieces of the game fall together, you suddenly become aware of the purpose of the game. You can then meet the challenge of the end-game and solve the final puzzle.

It is not necessary to have played *Zork I* or *Zork II* to enjoy *Zork III*, but there are relationships among the three games. *Zork III* is the last of the series. Playing *Zork III*, you find yourself in areas discovered in *Zork I* or *Zork II*. I have played all three, and, in my opinion, *Zork III* is the best of the series.

If you find yourself hopelessly lost and unable to solve a puzzle or reach the end of the game, there is plenty of help available from the *Zork User's Group*. You get information on this group when you purchase *Zork III*. The user group provides dungeon maps at reasonable cost and an *Invisicubes* book in which you can use a special marker to reveal invisible clues.

Infocom traditionally supplies some of the most entertaining CP/M games. If you like good game challenges, try *Zork III*. □

creative computing SOFTWARE PROFILE

Name: Zork III

Type: Prose adventure game

System: CP/M with 48K,
Apple, Atari, IBM,
NEC PC 8000, DEC Rainbow,
Commodore 64, Osborne,
TI, Digital RT 11

Format: Disk

Summary: One of the best
adventure challenges

Price: \$39.95 (\$49.95 on
some systems)

Manufacturer:
Infocom, Inc.
55 Wheeler St.
Cambridge, MA 02138

Carl Townsend, 4110 N.E. Alameda, Portland, OR 97212.



Dungeons, Vermin, 'Copters and Claim Jumpers

Tronix and Epyx have more in common than the letter x; both publish sophisticated games for the Commodore Vic 20.

Here we look at three original arcade games and a complex adventure in the tradition of Automated Simulations. At least one is sure to find its way to the top of your Christmas list.

Scorpion

What is your favorite frog sport? Some players like to jump froggers across lanes of fast moving traffic, others prefer to

Brian J. Murphy, 133 Post Rd., Fairfield, CT 06430.

**Brian J. Murphy
and Steve Williams**

stun them with a jolt of venom and store them up in a scorpion's hole for a rainy day snack.

If you belong to the latter group, you are, above all, very weird. You are also very likely to enjoy *Scorpion*, a hi-res color arcade game cartridge for Vic 20 systems by Jimmy Huey, for Tronix.

The lovable "hero" of this game is a nasty, venomous scorpion, on the prowl for frog eggs or, if none are available,

whole frogs to bring back to the nest for midnight snacking. As the game begins the scorpion is found sitting quietly at home, awaiting the firing of a joystick button to be let loose on his unsuspecting environment.

The scorpion moves in a very competitive environment that looks like a laboratory maze infested with all sorts of nauseating vermin. Hampering the progress of the scorpion in his search for frog-flavored snack food are predators ranging from dragons and worms to Venus flytraps, nasty "pod babies" and lethal "pod mothers." Your scorpion moves with greater speed than any of his enemies, and one blast from his stinger is usually enough to kill any of these creatures.

Of course the frog eggs your scorpion is after are frequently surrounded by one or more of these predators, and just as frequently stray stings destroy valuable eggs. That is too bad, because the eggs are worth 3200 points (in the "easy" version of the game you get bonus scorpions for scoring 4000 points) if you bring all four

THE 22-SECOND DEMONSTRATION OF DESKTOP PERFORMANCE



MT180L (152 columns)

FROM \$698

Suggested U.S. retail price for the
MT160 (80 columns)

In the computerized business of the eighties, more decisions will hinge on getting the right information in the right hands at the right moment. How well you do that will ultimately depend on the performance and durability of your printer.

**SMARTER,
FASTER,
STRONGER.**

In the Tally MT160/180 series, a powerful 16-bit microprocessor masterminds document flow. That means saving valuable seconds when seeking the shortest possible print path. And printing at top speed all day long. Some machines claim 160 cps but can't hold that speed because they're not engineered or built like a Tally.

You can quickly run down the extensive menu of print styles and word processing enhancements, making selections at a touch. On *L* models, switch from draft mode to letter quality just as easily and get results the *Creative Computing* magazine calls "superb."

All 160/180 models have adjustable tractors and friction feed paper handling. And both parallel and serial interface ports are built in. So you're ready to print right out of the box.

The spreadsheet you see above was produced in a scant 22 seconds. In an age when every moment counts, that's desktop performance at its best.

For more information and the name of your nearest dealer, call toll free: **800-447-4700.***

*In Illinois: 800-322-4400 In Canada: 416-661-9783

**MANNESMANN
TALLY**

CIRCLE 264 ON READER SERVICE CARD



Plug 3,000 new applications into your Apple.[®]

THE CP/M Card™ plugs CP/M Plus™ into your Apple. 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. You 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 from Day One. Yet, you still have access to your present library of Apple software.

Plug into incredible performance.

Together, the ultra-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.

A plug about quality.

The CP/M Card was designed and built by Digital Research, the creators of CP/M, and Advanced Logic Systems, the most respected manufacturer of Apple performance products. So you know the CP/M Card is the most perfectly integrated Apple performance package you can buy.

Why just keep plugging along? The CP/M Card provides everything you need—including 64K of on-board memory, CP/M Plus, CBASIC,² GSX™-80 and full documentation—for just \$399.

Now available through the CP/M library. See your local microcomputer dealer today. Or contact Advanced Logic Systems, 1195 East Arques Ave., Sunnyvale, CA 94086 (800) 538-8177. (In California (408) 730-0306.)



Advanced Logic Systems
The CP/M Card for your Apple II.

Also available for the Apple IIe.

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. GSX-80 is a trademark of Graphics Software System. Apple is a registered trademark of Apple Computer, Inc. ©1982 Digital Research Inc.

CIRCLE 125 ON READER SERVICE CARD



Scorpion



Deadly Skies

Creative computing

SOFTWARE PROFILE

Name: Scorpion

Author: Jimmy Huey

Type: Single player arcade

System: Vic 20

Format: Cartridge

Language: Machine language

Summary: Offbeat game with action to spare on 32 levels!

Price: \$39.95

Manufacturer:

Tronix Publishing
8295 South La Cienga Blvd.
Inglewood, CA 90301

of them back—before they hatch into predatory frogs.

Nothing is harder on the appetite than bringing home an egg for breakfast only to have it hatch on you and bite your head off. It is just as bad to be heading for the egg department, after some unavoidable delays caused by having to kill a dozen dragons and worms that were attempting to devour you, only to find your intended omelette, now a crazed killer frog, charging at you with the intention of smashing you into a pulp. In a situation like this the best advice is to run far enough away to give you time to bring your stinger to bear on the frog for a stunning jolt of venom. Safely stunned, he can then be brought back, alive but paralyzed, to the scorpion's lair.

As the required number of frogs and frog eggs are collected, the game increases in difficulty and the layout of the maze changes. The number of predators also increases, and many of them swarm around the scorpion's hole and must be killed before he can even come out to start the next turn. If you can keep the scorpion

on the move and keep shooting a constant stream of venom bolts, you should be able to survive to complete all the levels—all 32 of them. If that is not enough of a challenge, you could try one of the higher difficulty levels you can choose when the game boots.

The theme of *Scorpion* is, to put it mildly, rather offbeat, but that adds to the novelty of this well designed, fast moving game. If you crave an exciting game with plenty of violent, noisy action, *Scorpion* will surely fill the bill. —BJM

Deadly Skies

The skies aren't all that friendly, no matter what United Airlines says. There are asteroids, smart bombs, anti-aircraft missiles and even UFOs that all do their level best to blow you and your helicopter out of the skies, and only because you are on an innocent little weekend bombing mission.

In *Deadly Skies*, a Vic 20 game by Thomas Kim for Tronix, you face all these hazards as you pilot your helicopter above a constantly shifting landscape of military installations and anti-aircraft missile sites. Using joystick controls you can move your 'copter in any direction you please to track the targets below or to avoid the ever-intensifying volleys of anti-aircraft fire from below and above.

As the game begins, the target area is completely obscured by a double row of clouds. You won't be able to hit your targets until you first blow some gaps in the clouds. While you are trying to do this, a UFO will be cruising by overhead, dropping bombs on you, so keep moving and shifting. Also, keep your eyes peeled for the round little "smart bombs" which will be fired up at you from the ground. They will follow you doggedly and shoot you down if you are too slow in evading.

As your skills improve and you wipe

Creative computing

SOFTWARE PROFILE

Name: Deadly Skies

Author: Thomas Kim

Type: Arcade

System: Vic 20

Format: Cartridge

Language: Machine language

Summary: Challenging fun with missiles, helicopters vs. bombs, and asteroids!

Price: \$39.95

Manufacturer:

Tronix Publishing
8295 South La Cienga Blvd.
Inglewood, CA 90301

out the targets on the ground, the game automatically moves you up to the next level of difficulty. As the game progresses you find that more and more anti-aircraft fire is being directed at you.

On some of the levels, you encounter mostly smart bombs. More than a dozen can be in the air at one time, forcing you to spend most of your time running away from them, rather than aiming your bombs. At other times dozens of rockets are fired at you, several volleys at a time. With the skies full of missiles, you will find it hard to thread a safe path, even though they aren't homing in on you.

Another reward of reaching the higher levels are the banks of asteroids which course through the air, drifting like deadly clouds. Evading the missiles and smart bombs is doubly hard when you also have the slow-moving asteroids in your way. Worse, even though you collect a point per hit on them, they frequently block your attack against the targets on the ground.

When you have reached the 17th level of the game (there are 32 levels in all) the

Help Them Share the Learning Experience With Color LOGO And a Network 2 Learning Lab

Tools for a powerful LOGO Lab.

Radio Shack's remarkable Color LOGO programming language, combined with TRS-80® Color Computers and the Network 2 Controller, enables schools to create a computer learning lab at a very reasonable cost per student station. Up to sixteen student stations, each a low-cost 16K TRS-80 Color Computer, can be connected to the host computer, a 64K or 32K Extended BASIC Color Computer with one disk drive. This system allows teachers to send and receive LOGO procedures to and from the student stations, as well as save student-created procedures quickly and reliably on the host disk.



A language for learning. The Color LOGO language is designed to help students grasp graphic relationships and develop problem-solving skills. Through manipulation of a "turtle" on the screen, students learn to program. The benefits? The computer becomes a friendly learning tool, and students gain valuable insight into advanced mathematical, geometric and logical concepts through hands-on experimentation.

Even pre-schoolers can benefit.

Children who haven't yet begun to read can use Color LOGO's "doodle" mode to create their own graphics using predefined one-key commands. As the pattern is drawn, a program is simultaneously created which allows the "doodle" to be recalled at any time.



Simple animation is a snap. The Color LOGO turtle can be changed into a variety of different shapes. Thus, students can create their own animation simply by redefining the turtle's shape as it moves.

Powerful extensions. Color LOGO features a "hatch" command which allows you to create multiple turtles that are capable of running separate programs simultaneously. You can execute virtually any number of turtle graphics programs all on the same screen.

Efficient, economical, easy. The Network 2 Color LOGO Lab can save you money because it requires only one disk-equipped computer. And because student work is saved on the host diskette, procedures can



be located and reloaded easily. The host system requires our Disk LOGO (\$99.00, 26-2721) and a 64K or 32K Extended BASIC Color Computer with one disk drive. Each student station requires the LOGO Program Pak™ (\$49.95, 26-2722) and a 16K Color Computer. Use



your own TVs at each station. Systems connect to the Network 2 Controller (\$499, 26-1211) with included cables.

More advantages. You get a network with complete and independent computer systems instead of terminals connected to a time-sharing system. The teacher's host computer does not have to be on for students to run LOGO. And we have other TRS-80 educational software that can be used with your Color Computer network.

Learn about all the benefits. Stop in today at a Radio Shack Computer Center, participating store or dealer near you—or talk with one of our Regional Educational Coordinators.



For the name of your Regional Educational Coordinator, call 800-433-5682, toll free. In Texas, call 800-772-8538.

Radio Shack®
The Name in Classroom Computing™
A DIVISION OF TANDY CORPORATION

For more information about Radio Shack educational products and services, mail to:

Radio Shack, Dept. 84-A-236
300 One Tandy Center
Fort Worth, Texas 76102

NAME _____
SCHOOL _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE _____

CIRCLE 204 ON READER SERVICE CARD

Prices apply at participating Radio Shack stores and dealers



Gold Fever



Sword of Faragoal

speed of the game is doubled, making it twice as hard to avoid the perils in the sky and throwing off the timing you learned in the previous 16 levels. Of course, if you have made it this far, you will probably catch on quickly, and you will certainly have won extra helicopters to carry on the battle (one extra is awarded for every 10,000 points scored).

Deadly Skies is a great action game requiring quick strategic decisions and even quicker reflexes. The graphics are good and so are the sound effects which, though not elaborate, do enhance play. Once you get your hands on it, you will find it pleasantly addictive. Just remember to dodge those smart bombs and keep your thumb glued to the fire button.
—BJM

Gold Fever

Deep, deep in the heart of your Vic 20 computer a treasure is waiting, a motherload of gold ore. A fortune in the yellow metal is ready and waiting for the first adventurer willing to brave a gauntlet of careening ore carts, crazed claim jumpers, and runaway boulders.

If that kind of treasure hunt appeals to you, you will enjoy *Gold Fever*, a cartridge game in high-resolution color authored by Corey Oatman for Tronix. *Gold Fever* is a fast moving arcade game played on tiers and levels, in the great tradition of *Beer Run*, *Donkey Kong*, *Apple Panic*, and *Miner 2049er*.

As the game begins (with a brisk electronic rendition of "My Darling Clementine") you find your miner on one of the uppermost tiers of the mine. Scattered around the five levels of the mine are little piles of gold. Using a joystick, you can maneuver the miner toward the gold and pick it up. To move your miner safely

Creative Computing

SOFTWARE PROFILE

Name: Gold Fever

Author: Corey Ostman

Type: Single player arcade

System: Vic 20

Format: Cartridge

Language: Machine Language

Summary: Entertaining vertical maze game with great graphics, sound.

Price: \$39.95

Manufacturer:

Tronix Publishing
8295 South La Cienga Blvd.
Inglewood, CA 90301

from level to level you steer him up or down the vertical shafts in the floors.

Of course there are a few little complications, such as runaway ore carts, which interfere with your miner's progress by knocking him flat. Three such collisions and you run out of miners, ending the game. But don't despair; like all good heroes of multi-tier arcade games, your miner will be able to jump over the obstructions—if you time the jumps perfectly. This saves the miner's skin and adds from 30 to 40 points to your score. If your miner is nimble enough to cross a chasm by running across a boxcar, he earns another 20 points.

Your miner's troubles also include having to jump over a lunatic claim jumper who will, from time to time, ambush and mug your hero. The best way to handle this guy is to jump right over him, the same way you jump over the runaway boulders. Didn't I mention the boulders?

They are what makes that odd, ominous rumbling noise while you are trying to

concentrate on avoiding ore carts and maniac claim jumpers. Moving from one tier to the next before the rocks appear on screen doesn't help you evade them; they always appear on the same tier as your miner. The only thing that helps is to learn to time your jumps.

Once you have collected all the gold on the screen, you can make a run for the exit at the lower left of the screen and begin the process on the next level. Each of the nine levels, of course, becomes increasingly difficult as you go along. You must collect more gold on each succeeding level, the obstructions are faster, and as a result you must change the timing of your jumps. By the way, remember not to slow down your miner's action while you study the terrain. The oxygen supply is limited, and slow-moving miners tend to suffocate.

Gold Fever mixes great graphics with fine musical and sound effects and fast arcade action. It is a combination that results in great entertainment and great fun. —BJM

Sword of Faragoal

"The Protectorate Sword was forged, it is told, in the fires of the gods. Kept sheathed in the massive stone floor of a temple in the center of Ferrin, the sword protected the Great Forest from evil for countless years. When wielded against an evil hand, the enemy is surely defeated."

In *Sword of Faragoal*, the player must recover the renowned blade from a dungeon where it has been hidden by an evil wizard. There it can no longer protect the land, and the wizard is free to implement his diabolic schemes.

The player is rated in two main characteristics which improve with his experience level, a numeric measure of his

November 1983 © Creative Computing



LAST NIGHT, COMPU SERVE TURNED THIS COMPUTER INTO A TRAVEL AGENT FOR JENNIE, A STOCK ANALYST FOR RALPH, AND NOW, IT'S SENDING HERBIE TO ANOTHER GALAXY.

NO MATTER WHICH COMPUTER
YOU OWN, WE'LL HELP YOU GET
THE MOST OUT OF IT.

If you've got places to go,
CompuServe can save you time and
money getting there. Just access the
Official Airline Guide Electronic
Edition—for current flight schedules and
fares. Make reservations through our
on-line travel service. Even charter
a yacht through "Worldwide Exchange."

If your money's in the market,
CompuServe offers a wealth of

prestigious financial data bases.
Access Value Line, or Standard and
Poor's. Get the latest information on
40,000 stocks, bonds or commodities.
Then, consult experts like IDS
or Heinold Commodities. All on line
with CompuServe.

Or if, like Herbie, intergalactic
gamesmanship is your thing, enjoy the
best in fantasy, adventure, and space
games. Like MegaWars, the ultimate
computer conflict.

To get all this and more, you'll

need a computer, a modem and
CompuServe. CompuServe connects with
almost any personal computer, terminal,
or communicating word processor.
To receive an illustrated guide to
CompuServe and learn how you can
subscribe, contact or call:

CompuServe

Consumer Information Service, P. O. Box 20212
5000 Arlington Centre Blvd., Columbus, OH 43220
800-848-8199
In Ohio call 614-457-0802

An H&R Block Company

CIRCLE 134 ON READER SERVICE CARD

Creative Computing

SOFTWARE PROFILE

Name: Sword of Faragoal

Type: Fantasy

Author: Jeff McCord

System: Vic 20 with 16K expander

Format: Cassette

Summary: Fast-paced entertainment

Price: \$29.95

Manufacturer:

Epyx/Automated Simulations, Inc.
1043 Kiel Ct.
Sunnyvale, CA 94086

accomplishments in the dungeon. These characteristics are "maximum hits," the amount of damage that he can take before dying, and "battle skill," his ability to fight.

The dungeon, which consists of twenty floors, is randomly determined every game. Each level occupies a single screen and is displayed as an aerial view as in *Temple of Aphaï*. The player's character, monsters, stairways, sacks of gold, treasure, traps, and temples (sanctuaries where the player can offer gold) are likewise shown in colorful illustration.

When play begins on a level, unless the player has a magic map, the dungeon is dark everywhere except the area within the radius of his torch light. Therefore, other rooms must be explored to uncover their contents. Previously entered areas remain alight.

Sword of Faragoal is fast-paced for a fantasy game because of its radical (but welcome) alteration of traditional fantasy rules.

Movement is controlled by joystick, and the eleven special commands, which include drinking a healing potion or casting any of the five spells (invisibility, teleport, regeneration, shield, and light), climbing stairs, and burying gold are executed via the Vic keyboard.

Sword of Faragoal is a streamlined fantasy game that emphasizes graphics, ease of input, and real-time situations rather

than a complex plot. Hence, it may appeal to those who do not care for traditional, intricate fantasy games.

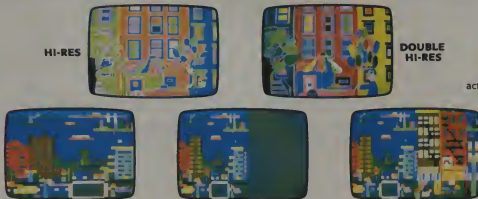
The game uses definitive and crisp graphics. For example, the dungeon walls are not represented by the solid bars that similar games offer but instead by rocky patterns. This and other features such as the gothic text set enhance the atmosphere of the game. In addition, the player may choose background and foreground colors to suit his taste.

Sword of Faragoal is fast-paced for a fantasy game because of its radical (but welcome) alteration of traditional fantasy rules. A character's experience level may rise two or even three times while he explores just one level of the dungeon.

One of the few weaknesses in this game is the lack of player interaction during combat. The player merely moves his character near a monster and watches the message window. I realize the game is meant to be streamlined, but I would like to be able to specify my actions when my life is at stake. Moreover, the game has no sound effects.

Nevertheless, *Sword of Faragoal* has several outstanding points. It is one of the few games for the Vic that devotees of both fantasy and action games can enjoy equally well. —SW

16 Colorful reasons to get doublestuff™



Software Development Inc. now offers you something that Apple never told you was possible in the IIE. It's called **DOUBLESTUFF™**.

Using standard Applesoft BASIC commands, in combination with your existing programs, you can expand your color graphics from 16 color Lo-Res (40 x 48) to double Lo-Res (80 x 48).

Unheard of before! Available NOW! With BASIC commands. Double Hi-Res: 16 colors (560 x 192 pixels) is all yours on your Apple IIE. It literally doubles the width on your standard color TV or monitor.

Requirements: Apple IIE—either 80 column card for double Lo-Resolution. Extended 80 column card for double Hi-Resolution.

NEW Products available November '83:
doublestuff™ designer™ my first coloring book.™

Software DEVELOPMENT INC.
Apple and Apple logo are trademarks of Apple Computer Inc. Doublestuff™ is a trademark of Software Development Inc.

doublestuff™
designed by:
Louis Bonfiglio and Peter Joselov

To order, send check or money order in the amount of \$39.95
New York State residents, add sales tax to.
Software Development Inc.
2053 West 11th Street
Brooklyn, NY 11223 Tel. (212) 449-6300
Dealer inquiries invited.



**64K
Ulc**

Apple II compatible
of RAM
Upper & lowercase



Typewriter-style
keyboard



12-key numeric pad



VisiCalc keys



50-watt power supply



Built-in fan



1982



ACEWriter II

Sophisticated word processing that's easy to learn



ACECalc

VisiCalc™-compatible spreadsheet analysis
program with 80 columns of variable width



ACE Display card

Opens video display to a full 80 columns by
24 lines



ACE 80 CPU card

Allows you to run CP/M and Apple® II
programs



ACE Dual Interface card

Allows you to connect to local and remote
printers, terminals, computers and other
accessories



**64K
Ulc**

Apple II compatible
of RAM
Upper & lowercase



Typewriter-style
keyboard



12-key numeric pad



VisiCalc keys



50-watt power supply



Built-in fan



1983

Good. Better.

**And you thought Franklin
was good before.**

Well, look at Franklin now. You'll find our ACE product line has
grown . . . and grown. To include sophisticated word processing,
Sensational spreadsheet analysis. And an array of peripheral boards.
So you can expand the capabilities of your ACE 1000 as your busi-
ness needs increase. Our product line's not the only thing that's
grown. Franklin now has more than 1,000 authorized dealers
throughout the country. So, if you thought we were good before,
come see us now.

Apple is a registered trademark of Apple Computer Inc.
VisiCalc is a registered trademark of Visi Corp.

2128 Route 38; Cherry Hill, NJ 08002 Telephone: 609-482-5900; Telex: 837-385



**FRANKLIN
COMPUTER CORPORATION**
Better than ever.

CIRCLE 164 ON READER SERVICE CARD



Six Games for the JR-200

This collection of six packages for the Panasonic JR-200 includes three educational packages from Instant Software and three arcade games from TMO Software.

Geography Explorer: USA

Geography Explorer: USA is a quiz game about the states of the U.S.

After a very impressive title page showing the American flag in full color in the rough shape of the USA with "America the Beautiful" playing in the background, the menu displays nine options. The quiz subjects are in options 1-7: names, capitals, areas, populations, flowers, birds, and abbreviations of the 50 states. Option 8 gives all this information on any state you specify, and option 9 lets you quit.

After choosing the quiz subject, you must decide on the quiz type: 1) multiple choice (three choices); 2) the computer gives a fact; you answer with the state; 3) the computer asks a question; you type in the answer (spelling counts!).

The U.S. map is then displayed, and you must choose the region for your quiz: Pacific, Southwest, Rocky Mountain,

David and James Grosjean, 50 Kings Rd., Chatham, NJ 07928.

David and James Grosjean

Midwest, Southeast, Northeast, and New England.

The map of this region is displayed at the top of the screen and the questions at the bottom. If you answer a question incorrectly, you get two more tries (only one more try in the multiple choice mode).

Geography Explorer: USA makes good use of color graphics and music to lead the player through the quizzes.

When you give the correct answer, a few bars of "Yankee Doodle" are played. After nine correct answers, the entire song is played. When you finish the region, your score is calculated. If you score over 75%, the screen is drenched in a variety of colors, and you get several screens of "good good good." If you score

100%, a colorful balloon floats across the screen.

The documentation includes a brief description of the content of the game including score sheets and an eight column chart showing all the information for each state.

The major drawback of the program is that it quizzes mostly on information of limited usefulness such as population, area, state bird and flower. Since the program is in Basic, the quiz content could be changed, but the documentation

creative computing

SOFTWARE PROFILE

Name: Geography Explorer

Type: Educational game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Makes good use of color graphics and music to lead the player through the quizzes.

Price: \$24.95

Manufacturer:

Instant Software

Rt. 101

Peterborough, NH 03458

DBi Software.
It expands your mind,
while enlarging your
universe.

Quite to the point, today's microcomputer software should do more than lockstep you through a specific set of functions.

It should help you propel difficult tasks forward.

And permit you to explore new frontiers of efficiency and application.

At DBi, we believe you deserve the kind of interface versatility and unexcelled response that only our Advanced SystemPac can offer you.

It all begins with a superbly designed language we call DATA BASic.

With it you can write your own programs, or build and expand your own data processing operating environment (DPOE).

Compatible with any computer that operates with CP/M, MS DOS and PC DOS, our ultra responsive Advanced

SystemPac creates, stores, and retrieves information with millisecond capability.

This is software you can creatively build upon today, tomorrow, and forever.

So contact your local Victor microcomputer dealer today, or any of the other fine computer centers in the United States and Canada.

And get ready to enter a marvelous new universe.



Software Products

Turning innovation into information.

102 South Main Street Mt. Pleasant, MI 48858
(517) 772-5055

CIRCLE 147 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!

Save up to 50% on



THE MAGAZINE FOR
apple MICROCOMPUTING

Yes! I want to subscribe to A+.

- 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.

CHECK ONE:

- Payment enclosed. Bill me later.
Please charge my credit card:
 American Express MasterCard Visa

Card No. _____ Exp. Date _____

Mr./Mrs./Ms. _____

(please print full name)

Company _____ 81005

Address _____

City _____

State _____ Zip _____

Offer valid in U.S. and possessions only. Please allow 30 to 60 days for delivery of first issue.

GOOD THROUGH NOVEMBER 30, 1983.

Save up to 50% on



THE MAGAZINE FOR
apple MICROCOMPUTING

Yes! I want to subscribe to A+.

- 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.

CHECK ONE:

- Payment enclosed. Bill me later.
Please charge my credit card:
 American Express MasterCard Visa

Card No. _____ Exp. Date _____

Mr./Mrs./Ms. _____

(please print full name)

Company _____ 81005

Address _____

City _____

State _____ Zip _____

Offer valid in U.S. and possessions only. Please allow 30 to 60 days for delivery of first issue.

GOOD THROUGH NOVEMBER 30, 1983.



BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE



ADVERTISING
P.O. Box 2964
Boulder, Colorado
80321

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE



ADVERTISING
P.O. Box 2964
Boulder, Colorado
80321

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



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 _____

Address _____ 8H005

City _____

State _____ Zip _____

Check One: Payment enclosed. Please bill me.

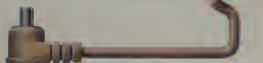
Please charge my:

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





Geography Explorer: USA



Wordwatch

does not indicate how. Furthermore, it does not make use of the hi-res capabilities of the JR-200 in the map drawing. One minor point: Delaware is misspelled!

Geography Explorer: USA is user-friendly and encourages the player at each step. In general it makes good use of color graphics and music to lead the player through the quizzes. It is an enjoyable game, and it has the possibility of being a good teaching tool if more useful information were included.

Wordwatch

Wordwatch is a package of four programs dealing with vocabulary and spelling.

In *Word Race* two players race their cars across the screen by correctly defining a series of words. The first word is given along with two identical columns of definitions—one column for each player. The first player to enter the correct answer advances one unit toward the finish line. If the answer is wrong, he backtracks one, and the other player gets a chance to answer. Then the next word appears and so on. This is a rather exciting and engrossing game which uses good graphics. The vocabulary is about junior high level.

In *Hide 'n Spell*, after choosing one of four levels of difficulty, you enter your name and the amount of time you need to find the misspelled word in a list of four. The timer counts down from 100 by fives. When you pick the misspelled word, the timer stops. You get half the points on the timer for finding the misspelled word and the other half for spelling it correctly. At the end of the game, your score card is displayed. Then a note from the JR-200 is shown encouraging you to keep trying. The vocabulary is about junior high level.

creative computing

SOFTWARE PROFILE

Name: Wordwatch

Type: Educational game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Useful educational tool for up through junior high

Price: \$19.95

Manufacturer:
Instant Software
Rt. 101
Peterborough, NH 03458

Spelling Bee is quite different from the other three. You type in the words you want to be tested on (up to 40). After each word, the computer beeps, turns on the tape recorder, and gives you six seconds to say the word clearly to be recorded onto a blank tape. When you are finished, the computer instructs you to rewind the tape and press PLAY. The computer turns on the tape recorder, plays a word, and asks you to type it out on the computer. If you spell it wrong, the computer gives you three tries and clues to help. This program is very effective in simulating the spelling test situation.

The last program, *Spelling Tutor*, tests you on up to 50 words, which you enter. The game starts by asking you to say each word out loud one by one. The letters of each word are scrambled, and you must spell the word correctly. Next, the words are presented with asterisks replacing some of the letters, and you must supply the missing letters. If you need help, the computer will reveal a

missing letter. In the last exercise, some of the vowels are replaced with random vowels, and you must correct the words. This program is the least effective of the four.

The package would be most useful up through junior high. The latter two programs have the advantage of user defined lists. The lists in the first two could be changed, but this would not be easy.

Typing Teacher

Typing Teacher intends to teach you how to type.

The main menu gives you eight options. The first is an introduction to the home base keys and the way the tests work. The top half of the screen shows a hi-res picture of the keyboard, which remains on the screen during the test. Only the keys you have learned are labeled. After you are shown the base keys, you are tested on them. The tests are like the tests in most typing manuals: you must copy a list of the keys you have just learned in groups of two or three keys.

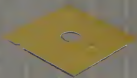
The next five options apply the same method to the different rows on the keyboard. When you choose one, the row is labeled, and you are shown which finger goes to which key. The first part of each lesson drills you on moving your fingers from the home keys to the new keys; the second part drills you on the new keys with real words. You must copy the text given *exactly* and you cannot use the back arrow or the rubout. The computer then tells you how many characters you got correct and in the correct place.

The "advanced" level option has three parts: 1) special character drill including punctuation marks and common computer symbols in Basic sentences; 2) some common words, which are in sentences;

a.d. 2082.
Diskettes
duplicated
by Allenbach
in 1983
will still be
guaranteed.



You'll also appreciate the high standard of excellence demanded by Allenbach. Software duplication for practically any format is our primary business. We've established a team of professional technicians who specialize in all phases of software duplication. Your software is effectively reproduced on specially designed precision duplicating equipment. Also used are exacting verification methods unique in the industry to guarantee 100% accuracy. Plus your software will be duplicated onto the Allenbach diskette, the OEM diskette that is Guaranteed for Life.



This Lifetime Guarantee, exclusive to Allenbach, adds quality and consumer confidence to your software products. While this alone is reason enough to let Allenbach handle your software duplication, most software developers initially choose us for convenience. We can probably complete your production faster than you can. Additionally, your whole project can become one-easy-step by having us perform all packaging requirements from printing to assembly.




ALLENBACH

Allenbach really is the logical solution for your software duplicating needs. So feel free to call us with your questions. Take advantage of our years of experience and knowledge. Have Allenbach do what we do best, so you can do what you do best.

2101 Las Palmas
Carlsbad, California 92008
619-438-2258
800-854-1515 (Toll Free)
Telex: 19-4561 LSA

Copyright 1983 by Allenbach Systems, Inc. All rights reserved.

The Texas Instruments Because it's not just for



Home Computer. ABCs. It's also for Ph.Ds.

From a complete series of easy-to-use early learning cartridges to the most advanced scientific applications, no other home computer offers you the versatility of the TI Home Computer.

There's a good reason why we call it the TI Home Computer.

Because it's for every family member in your home. To help children grow in education and imagination. And to help adults keep growing with improved skills and knowledge.

What makes it so versatile is power — the 16-bit processing power of expensive computers. Combined with a superior amount of usable memory, the TI Home Computer is exceptionally easy to use, since it takes over more work for you than competing 8-bit models.

It's simplicity gets children into computing — and learning — right away. They don't have to push as many keys as with other brands.

And as soon as they start, we give them a choice of more easy-to-use software cartridges, covering more educational areas, than all other computers combined.

TI cartridges do more than drill and practice, too. They really teach. One on one. In a step-by-step process that encourages, rewards, and lets children learn at their own pace.

And only TI brings so much pleasure and stimulation to learning. With an unmatched combination of color, animation, sound effects, graphics and optional speech.

What the TI Home Computer does for a child's growth and achievement, it does for adults as well. It's a serious computer that can help you become more effective in nearly unlimited ways.



You can make more informed financial decisions with it. It can be your secretary, and help you with all kinds of business needs. You can design a personalized fitness program. Improve your chess or compose music. The applications are as broad as you make them.

The TI Home Computer is so capable, in fact, that no comparably priced model is better suited for technical or scientific use. With our built-in BASIC programming

language, plus TI Extended BASIC, its scientific programming ability is as good as you'll find in large technical computers. And even better than some.

The point is, you don't have to be a Ph.D. to use the TI Home Computer. But it can give your child a better chance of becoming one.

And whether you're a Ph.D. or not, you can't find more computer for the money.

The ABCs of the TI Home Computer.

- A. 16-bit microprocessor.
- B. 16K Random Access Memory (RAM) expandable to 48K.
- C. 34K Read Only Memory (ROM), expandable to 72K using 38K software cartridges.
- D. Languages include built-in TI BASIC, TI Extended BASIC, TI LOGO II, UCSD Pascal*, TI FORTH, TI PILOT, TMS 9900 Assembly Language.
- E. Free training course.
- F. Exclusive one-year warranty.

*UCSD Pascal is a registered trademark of the Regents of the University of California.



If you have any questions about the TI Home Computer, before or after you buy it, please call Texas Instruments toll-free at 1-800-TI-CARES.


**TEXAS
INSTRUMENTS**
Creating useful products
and services for you.

Copyright © 1983 Texas Instruments

Think what you get with the LNWS0 Model 2—undoubtedly the most versatile, powerful and fully equipped microcomputer in its class today. A machine so superior in concept and design that it will define the standards of microcomputer performance for years to come.

VERSATILITY

The LNWS0 2 performs wonders with the most complete library of software available to any microcomputer on the market today. Every LNWS0 2 comes complete with this outstanding library of Business Software, LNW SMALL BUSINESS AND PROFESSIONAL ACCOUNTING SERIES, General Ledger, Accounts Receivable, Accounts Payable, Payroll, ELECTRIC SPREADSHEET, ELECTRIC PENCIL, WORDPROCESSOR, MICROTERM, MODEM PROGRAM, CHART EX, HIGH RESOLUTION BUSINESS GRAPHICS, CHARTING PROGRAM, CP/M 2.2, DOSPLUS, LNW-BASIC, MICROSOFT BASIC. In addition to a comprehensive line of LNWS0 2 Software, it is also fully compatible with software from TRS80 (Models 1, 3, 4), CP/M, and Cromemco worlds—the flexibility which gives you access to the most extensive and feature libraries of business, scientific, engineering and entertainment software applications. So no matter how far you expand into user applications, the LNWS0 2 will expand right along with you.

POWER

The LNWS0 2 performs miracles with the computing power of 96K RAM, standard, of user memory, matched with a mass storage capability which handles 5 1/4" floppy disks and 8" hard disk drives. And, since the peripherals included in

controllers for 5 1/4" and 8" floppy disks (single double sided, single double density up to 4.5 Megabytes capacity), the LNWS0 2 also gives you the unique ability to read and write diskettes from a greater variety of other popular computers than does any other microcomputer. So regardless of how big you grow, you will never end up with thumb-twiddling down time while you expand to a more powerful system. The LNWS0 2 will always have enough muscle to handle your biggest and toughest jobs.

FULLY EQUIPPED

The LNWS0 2 was developed to anticipate the needs of both expansion and compatibility. So the computer was designed with enough built-in features to keep you from having to spend a small fortune as you move down the road to higher levels of user sophistication. Standard features include high and low resolution graphics in both color and black-and-white, an RS-232C/RS-422 serial communication channel, and a wide variety of tape, printer, modem and hardware expansion ports. In addition, the LNWS0 2 contains an array of quality construction features that fully justify its remarkable one-year limited warranty.

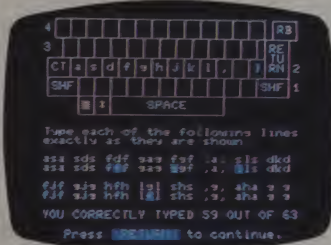
So if you're looking for a microcomputer that will satisfy your performance needs as you grow and develop, take a long hard look at the LNWS0 2. It's the one microcomputer built to meet the challenges of tomorrow—for a long time to come. For more information and the name of the dealer nearest you, write or telephone LNWS Computers, 2620 Walnut, Tustin, California 92680. Telephone: 714/544-5744.



STATE-OF-THE-ART ENGINEERING
STATE OF TOMORROW PERFORMANCE.

LNW COMPUTERS

CIRCLE 278 ON READER SERVICE CARD



Typing Teacher

3) the bottomless page which lets you type on your own. The drills work the same.

Creative Computing SOFTWARE PROFILE

Name: Typing Teacher

Type: Educational program

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Useful primarily as an introduction to typing on the JR-200.

Price: \$24.95

Manufacturer:
Instant Software
Rt. 101
Peterborough, NH 03458

The main drawback to this program is that it is tailored to the JR-200, so switching to a typewriter requires some adjustments because the JR-200 has a Chiclet style keyboard and the characters on some of the keys are different from a typewriter. One of the biggest differences is the extra column of keys between the RETURN key and the semicolon key. This makes for an unreasonable stretch for the pinkie to reach the RETURN key. When typing at faster speeds, we experienced a little key bounce, i.e., double letters and, when using shifted keys, both the shifted and unshifted characters appearing on the screen. Another drawback is in the tabulating of mistakes. There is no grand total, only the total of mistakes after a line or two. Also, there is no timer to see how many words per minute you typed. You must time yourself using the bottomless page and find your own mistakes.



Pig Pen

All things considered, this program is useful primarily as an introduction to typing on the JR-200. If you seriously want to learn to type, a typing book and a typewriter are much better.

Pig Pen

Pig Pen is a game of the Pac-Man type. In this variation you try to fill the screen with dots while avoiding the deadly pigs. It is more difficult than Pac-Man because the maze is far simpler (fewer places to run), the pigs are very intelligent, and you do not move any faster than they do. The game can be played with either the keyboard or a joystick; we found the joystick preferable.

When the tape loads, a cute title screen appears while "Old MacDonald" is played. The screen shows your score, the high score, the level number, and the playfield.

Creative Computing

SOFTWARE PROFILE

Name: Pig Pen

Type: Arcade game

System: Panasonic JR-200

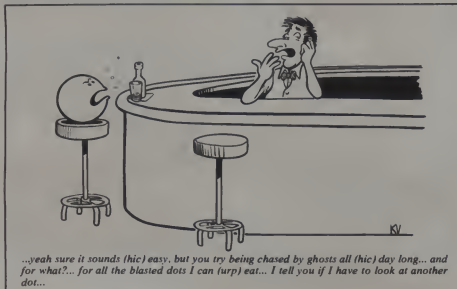
Format: Tape

Language: JR-200 Basic and machine code

Summary: A simple yet intriguing and challenging variation of the Pac-Man type, but weakened by slowness.

Price: \$29.95

Manufacturer:
TMQ Software, Inc.
82 Fox Hill Dr.
Buffalo Grove, IL 60090
(312) 520-4440





Rat Patrol

As soon as you move your humanoid (Old MacDonald?), all four pigs emerge from the pen simultaneously.

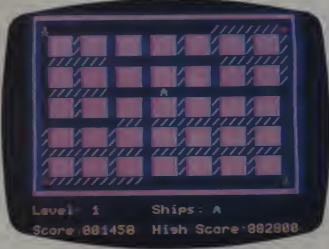
Since you are outnumbered and your speed is the same as that of the pigs, you are easy game for them. Luckily though, you can drop energizers in the corners of the playfield. These allow you a short period of time during which you can eat the pigs. When eaten, the pigs return to their pen in the form of ham butts, only to reemerge after your invincibility period expires.

You start with three lives; bonus lives are awarded every 10,000 points. Eating pigs (scored as in Pac-Man) and corn cobs builds your score more quickly than dropping dots for 10 points each.

One feature of this game is the use of the unused portion of the screen to tell you what is happening, e.g., when you drop an energizer, colors flash to tell you that you can eat the pigs. When you fill the screen, colors scroll up this area. Another feature is that even after the energizer period has ended, you have one or two seconds to eat one more pig.

This game has four problems. 1) It gets quite difficult after about only four screens because of the pigs' intelligence and short energizer periods. 2) The slowness, even at the high levels, often makes the game frustrating, if not boring. 3) It does not accept a name or initials in setting a new high score. 4) The flicker of the ham butts passing through you on their way to the pen can be very distracting.

The game does have some advantages. 1) It is easy to start a new game; pressing BREAK gives the option of beginning a new game or quitting. 2) The graphics and music will probably appeal to players of all ages. 3) Although the game could be improved in several ways, it is a simple yet intriguing and challenging variation on the Pac-Man theme.



Galactic Chase

Rat Patrol

Rat Patrol is a game similar to the Apple computer game *Snake*. You are a snake, and you try to gain points by eating up rats without losing your three lives. The more you eat, the longer you get until you shed your skin. You control the snake's head while the body follows its path. The game can be played using either a joystick or the keyboard.

After loading is partially complete, a nice title screen is displayed. Once loaded a short piece of music is played while the computer waits for you to press a key to start the game. On the screen are shown your score, your length (number of characters long), and a lives-remaining indicator.

You start at the left side of the screen and immediately begin moving to the right. A life is lost by touching anything other than rats, including the screen edges. At every 200 points the game speeds up and another life is awarded.

creative computing

SOFTWARE PROFILE

Name: Rat Patrol

Type: Arcade game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Easy to play, yet requires a great deal of strategy and technique.

Price: \$29.95

Manufacturer:

TMQ Software, Inc.
82 Fox Hill Dr.
Buffalo Grove, IL 60090

When your length reaches a certain maximum, you shed your skin. The shed skin becomes purple, and you revert to your original length.

The rats move somewhat randomly and are not difficult to catch because they move slower than you do. However, they will lure you into death traps (situations in which you have no place to move because your own body prevents it) unless you are careful. Rats, as well as pieces of cheese, are replaced when eaten. When a rat eats a piece of cheese, it turns purple and heads toward a rat hole where it will revert to its normal status. Purple rats increase your length more than normal rats. The rats cannot pass over your body, but they can pass over a shed skin, eating up portions of it in the process. Therefore, you can force them to eliminate skins by herding them to the desired locations.

When the game ends, the new high score is displayed. The computer will ask if you want to play again; if not, the program is erased.

The only problem we found with *Rat Patrol* is that it does not accept a name or initials when a new high score is set. It is easy to play, and yet it requires a great deal of strategy and technique to play well. The sounds, graphics, and color give the game a great appeal. All in all, it is a simple, yet highly enjoyable game.

Galactic Chase

In *Galactic Chase* you are set in the middle of a game area similar to that in Figure 1. You must clear the screen of slashes (Pac-Man style) while avoiding the four aliens which are trying to destroy you.

A beautiful title screen is displayed after loading is partially complete. When the loading is finished, the title screen

November 1983 © Creative Computing

NEW GAME

FORTRESS



REACH OUT AND CONQUER SOMEONE.

Introducing **FORTRESS™**. A classic strategy game of power and conquest. On disk for the **APPLE® & ATARI®**.

Like such classics as chess and go, **FORTRESS** (\$34.95) is beautifully simple. Occupy a place, fortify it, lay siege to your opponent's fortresses, and dominate the countryside. The rules are few, the possible moves, nearly limitless. **FORTRESS** is very fast — each game lasts less than ten minutes.

This two-player game also contains a great solitaire scenario. Five different computer opponents are provided, each endowed with a unique style of play. For example, there is the ruthlessly aggressive Genghis Khan and Lord Maginot, the master of defense.

The crowning glory is that the computer opponents not only play, they learn and improve as they play you. The better you get, the better they get! Which brings forth a most fascinating event



ANNOUNCING THE \$1,000 SSI **FORTRESS** TOURNAMENT

Since you teach the computer opponents every time you play them, they are really an extension of yourself. SSI proudly announces a very different kind of strategy game tournament — computer versus computer! Send us the disk of your best trained computer player and we'll match it against other entries. The winner (the human, not his disk!) of this battle of electronic wits will win \$1,000! Complete details in each **FORTRESS** box.

So get a head start on the competition and head on down to your nearest computer software or game dealer today. **FORTRESS**, a game destined to be a classic, awaits you.

On disk for the Apple® II with AppleSoft™ ROM Card, Apple II Plus, IIc, and III.



Also on disk for the 48K Atari® 400/800/200 with EASE™ Cartridge

Apple is a registered trademark of Apple Computer, Inc.

Atari is a registered trademark of Atari, Inc.



FINALLY, A VIDEO PINBALL GAME FOR THE PINBALL FAN!

On disk for the **APPLE® & ATARI®**.

QUEEN OF HEARTS™ (\$34.95) is dedicated to all you pinball players out there. Just look at what it offers:

- Two playfields with five flippers.
- A realistic "TILT" feature.
- Four sequences: Hit the right targets in the right order and you'll get extra balls and rack up a huge score.
- Sound effects to complete the illusion of a real pinball game.

So if you're itching for a pinball game, don't think pinball arcade. Think computer software or game store instead, 'cause that's where you can get hold of **QUEEN OF HEARTS**.

See above for Apple® specifications. On disk for the 48K Atari® 400/800/200, with 2 joysticks.



If there are no convenient stores near you, **VISA** & **Mastercard** holders can order direct by calling **800-227-1617, ext. 335** (toll free). In California, call 800-772-3545, ext. 335. To order by

mail, send your check to: Strategic Simulations Inc. 883 Sierley Road, Bldg. A-200 Mountain View, CA 94043. (California residents, add 6.5% sales tax.) Please specify computer format.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES.

CIRCLE 233 ON READER SERVICE CARD

THIS PRINTER COST JUST \$119.95*

... ..

... ..

... ..

... ..

... ..

For the name of the dealer nearest you,
call toll free, 800-227-6703
(In California, 800-632-7979)

RiphaCom

creative computing

SOFTWARE PROFILE

Name: Galactic Chase

Type: Arcade game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: The graphics and sound are good; at high levels it has the speed of arcade games; excellent fun.

Price: \$29.95

Manufacturer:

TMQ Software, Inc.
82 Fox Hill Dr.
Buffalo Grove, IL 60090

turns green and instructions are given on the point values, the controls to use, and other information. The computer then asks for a skill level selection from 1 (slow) to 9 (very fast).

At the start and after you lose a ship, the four aliens of randomly determined types appear at the corners of the screen. They will not move until you move. When you shoot one of the aliens, a replacement of the same type appears at one of the corners or in the center. Each type of alien has its own attack patterns, and the touch of each is deadly. The red aliens are very aggressive, while the green ones are quite shy.

When the screen is cleared of slashes, the remaining four aliens must be eliminated. At this stage no replacements appear. Once they are taken care of, the entire screen scrolls off the left side, and another screen appears, this time one skill level higher.

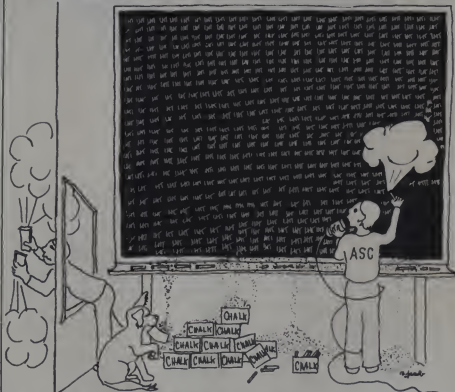
When your four ships are all gone, the game ends, and the final statistics are displayed. These include the new high score, your end of game score, and the skill level you attained.

The game has several disadvantages. 1) Without a joystick it is difficult to play because the keyboard layout makes using the four arrow keys and the space bar awkward. We used a regular switch-type joystick, and the game played well. In fact a joystick can be used with all three of these games. 2) The game cannot be stopped in the middle to start a new game with a different skill level. 3) The final problem is that it does not accept a name or initials when a new high score is set.

Of the three arcade style games *Galactic Chase* is clearly better than *Pig Pen* and a tossup with *Rat Patrol*. The graphics and sound are good. At the high levels, it has the speed of a good arcade game. The game is excellent fun, challenging to your quick thinking and reflexes, and highly addictive. □

November 1983 • Creative Computing

15K MEMBERS AND GROWING



American Software Club™ has been selling software for the APPLE, ATARI, IBM, TRS-80 and CP/M Computers (DEC, Eagle, Vector 4, Northstar, Xerox 820, Superbrain, Heath/Zenith, NEC, Televideo, Altos, Columbia, Osborne, Sanyo) since 1981. Computerists don't just join ASC—they stay with us.

Chalk it up to . . .

Having 600 products in stock and our "lowest price" guarantee.

Chalk it up to . . .

Our free bi-monthly Compendium magazine which gives comprehensive product descriptions, club news, and services.

Chalk it up to . . .

Our toll free technical support and order lines. ASC doesn't just sell software—we support it!

Chalk it up to . . .

Speedy shipping. Because we know waiting can be frustrating, ASC has been shipping more than 60% of orders in under 6 hours.

But don't just take our word for it. Join now, and take advantage of our free one year membership offer. With absolutely no purchase obligation, you have nothing to lose and everything to gain.

Wondering if there are strings attached? The only one is in the cartoon . . .

For a One-Year Trial Membership with no fee or obligation, fill out the coupon or call our Toll Free Number:

1-800-431-2061

(CT Residents call 203-431-4966)

American Software Club, Inc.
80 Topstone Road, Ridgefield, CT 06877

Please begin my free one-year trial membership as outlined above.

Name _____

Address _____

City/State/Zip _____

Outside the US: Please enclose \$15.00 (US) for a one year membership.

My computer is:

- APPLE
 ATARI
 IBM PC
 TRS-80
(Models 1, 2, 3, 4)
 CP/M (8" or 5 1/4")



How to get in touch

KoalaPad™ Touch Tablet
puts the controls
at your
fingertips.

Paint the screen with colorful graphics or play lightning-fast games with just a touch of your finger. The KoalaPad™ Touch Tablet makes using your computer more fun than ever before. Just moving your finger across the special touch-sensitive surface controls graphics, game commands, and much more. It's a great way to get the most out of your computer while you just sit back and



with your computer.

relax. The KoalaPad fits comfortably in the palm of your hand for easy use. And once you have it in

Dancing Bear™ brings a funny, furry cabaret star right into your home where your own programmed performances will win applause every time



your hands, it's hard to put down. That's because the KoalaPad does much more than joysticks, paddle controllers or the "mouse." Each KoalaPad set is packaged with a KoalaWare™



Spider Eater™ the game that attacks musical education with a voracious appetite, taking a bite out of the task of learning the musical scale

graphics program* for creating beautiful, high-resolution graphics right on the screen.

And that's

just the beginning.

There's a full line of KoalaWare programs to choose from with a perfect

Logo Design Master™ uses computerized graphic design to help children and adults learn the basics of programming and prepare for more advanced applications.

combination of entertainment and education.

Add a touch of excitement today to your Apple, Atari, Commodore or IBM® computer.

See the KoalaPad

Touch Tablet at the computer store nearest you. To locate the dealer in your area, call toll free 800-227-6703. (In California, 800-632-7979.)

 **Koala**
Technologies Corporation

We make computing more personal.
CIRCLE 184 ON READER SERVICE CARD



KoalaPad, KoalaWare, Logo Design Master, Spider Eater, and Dancing Bear are trademarks of Koala Technologies Corporation. Spellicopter is a trademark of DesignWare, Inc.

Koala Technologies Corporation,
3800 Patrick Henry Drive,
Santa Clara, CA 95090

*Software included with Touch Tablet varies with computer type



RESTON TURNS COMPUTER LEARNING INTO CHILD'S PLAY

Today, learning about computers is part of growing up. And two new books from Reston take kids beyond arcade-style shoot-'em-ups and into real computer programming. *Rainy Day Activities for the Atari™*, by Nancy Mayer, is designed to introduce younger children to computer fun. *Kids and The Atari™*, by Edward H. Carlson, takes 10-14 year-olds from the fundamentals to complete mastery of BASIC programming. Both feature lively illustrations and simple writing to let kids use them by themselves—with special notes to let parents and teachers help out.

Reston Publishing Company™
A Prentice-Hall Company



11480 Sunset Hills Rd.
Reston, VA 22090

Available at your local
bookstore and computer
retailer or call us at
(800) 336-0338.

Atari is a registered
trademark of Atari, Inc.

CIRCLE 206 ON READER SERVICE CARD



The Graphics Event Of The Year

In an industry where a year can span two generations of development, the sheer longevity of an annual event like Siggraph is enough to qualify it as a "classic." For those unfamiliar with the word, Siggraph stands for Special Interest Group for graphics, part of the professional group, the Association for Computing Machinery. And, as computer graphics have become increasingly important to computing, so has each year's Siggraph conference.

Siggraph is a unique gathering of computer scientists, engineers, and artists. One part of the event is its serious side: The introductory courses in computer graphics and the presentation of papers and examples of work in technical sessions. These cover diverse topics, from office automation and computer aided design/manufacturing (CAD/CAM), to film special effects and animation. Another important element of Siggraph is its exhibition of computers and systems—most of them at prices far beyond the reach of

Tim Onosko

almost every individual in attendance.

Though the talk is often technical and the pricetags large, Siggraph still retains a heavy emphasis on art and artists. The recent addition of a large and impressive art show reinforces that emphasis, as do the annual shows of computer-generated film and video works. Siggraph is still very much an event in which jeans and t-shirts seem as appropriate as business suits and ties.

Most significantly, however, Siggraph is a place to see and hear about the future. Many of the ideas and much of the technology showcased here will eventually reach our own homes, one way or another.

This year's Siggraph computer graphics conference was held from July 25 to July 29 in Detroit, MI. Here are some impressions taken from it.

About 600 people showed up at the first Siggraph conference, held in Boulder,

CO in 1974. Since then, attendance has climbed to over 17,000 in 1982. (Attendance was down in 1983 to about 14,500.) Some 1983 conferees proudly wore their veteran status on their chests in the form of badges, ribbons, and t-shirts from previous Siggraphs.

It was easy to play the "badge game" while walking Detroit's Cobo Hall convention facility. People came from around the world, from major colleges and universities, from industry and from the new glamour companies—the film studios and television production houses.

Despite the welcome diversity of people and topics at Siggraph, the conference is somewhat schizophrenic by nature. Some examples: One gentleman sent by his employer, the torpedo division of a major defense contractor, apparently wasn't told about the wide range of personalities to be expected, and was staggered by the counter-culture types wandering about.

Likewise, examples of sophisticated new imaging techniques on display during the evening film shows were greeted with loud boos and hisses when they came

Tim Onosko, 1338 Rutledge St., Madison, WI 53703.

November 1983 • Creative Computing



1983 COHEN, S.—ADVANCED TECHNOLOGY SYSTEMS



1983 GELLMAN, J.

from the defense community. And, while a group of artists argued that the randomness of real life must somehow be integrated into computer-generated film and art, an auto industry executive called for increased precision in the CAD systems used to design his cars.

The Microcomputer Role

Surprisingly, although microcomputers make up a major part of the computer industry, few were visible at Siggraph. In fact, no single aspect of the conference was oriented to microcomputers and their users. One attempt, an ad hoc call for those interested in small computers and the arts, drew several dozen people, but yielded little more than a session in which everyone introduced themselves and their interests, then broke up into disorganization. It was ironic, too, that few people in this meeting actually owned microcomputers. Many came out of curiosity; more than a few said they were artists looking for jobs.

The organizers of Siggraph would do well to consider an appeal to users of small computers, perhaps by establishing

courses and events devoted to advancements in the micro field. Or would this add yet another disparate element to a conference with many already?

Courses And Sessions

According to a walking around poll, some courses and technical sessions were extremely well-received at Siggraph '83.

A two-day "Introduction to Computer Animation" featured speakers from the New York Institute of Technology, perhaps the most respected group involved in both two-dimensional and three-dimensional (solid-looking) animation. The group also included alumnus Alvy Ray Smith, one of the leaders of the Lucasfilm computer graphics project. In the past, Smith has delivered his in-depth talk about color theory. This year, he chose, instead, to speak about how objects can be mathematically described using a technique known as *splines*.

A new course, entitled "The Artist/Designer and Computer Graphics" boasted a similarly prestigious panel, including Dr. James Blinn, artist David Em, and Richard Taylor. It is Blinn who is respon-

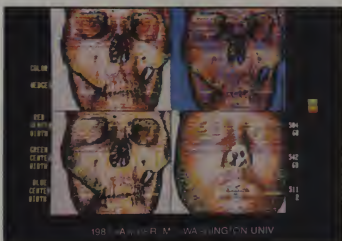
sible for the beautiful computer-generated movie visualizations of NASA's planetary exploration program, particularly the Voyager missions. (Without these, NASA would be practically without a public product to show, its spacecraft millions of miles away from earth.) David Em is an independent artist who uses Blinn's computers and software for his own work. Richard Taylor is an art director, film effects specialist, and computer animator best known for his work on Walt Disney Productions' *Tron*. Late of MAGI Synthesis, a computer animation company, Taylor has recently gone to Lucasfilm, where he is to work on *The Grid*, a film in preproduction there.

On the more practical side, a session on "Graphics in Office Automation" drew well, reflecting the increasing interest in using computers for constructing "information graphics" in management. This is obviously a topic that continues to yield new developments, including the use of laser printers with computers to establish a kind of electronic publishing industry.

Of the technical sessions, two on computer graphics in Japan drew well. These,



© 1983 COOK, R.—LUCASFILM LTD



1983 WARD, R. M.—WASHINGTON UNIV



1983 LORIG G—RPI

organized by Laurin Herr of Pacific Interface, a company specializing in Japanese/U.S. corporate relations, included representatives of Japanese computer companies and artist Yoichiro Kawaguchi, famous for his fantastically organic computer-generated abstractions. More about

Maybe the most intriguing topic discussed at the technical sessions had nothing to do with either art or commerce.

Kawaguchi and his colleagues later.

Maybe the most intriguing topic discussed at the technical sessions had nothing to do with either art or commerce. Radiologist Dr. Michael Vannier, plastic surgeon Dr. Jeffrey Marsh and James Warren of the McDonnell Douglas Aircraft Company outlined their pioneering techniques in the reconstruction of the human face using

computer graphics and fabrication. Developed at Washington University Medical Center, the St. Louis Children's Hospital and McDonnell Douglas, it has already been used to plan corrective surgery for more than 350 patients whose deformities were caused by cancer, birth defects, or traumatic injuries.

Vannier, who was a NASA engineer before becoming a radiologist, uses CAT scan images to arrive at a 3-D image of the entire skull, inside and out. With these extremely accurate images, plastic parts can be fashioned and installed into the human head to replace bone and soft tissue lost because of surgery or missing by birth defect. This is a truly important medical technique and one that impressively demonstrates the potential of computer imaging systems.

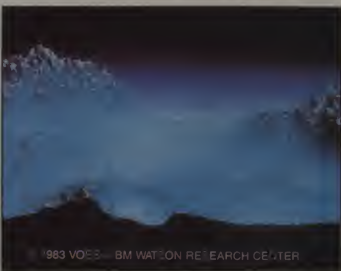
On The Show Floor

Touring the Siggraph hardware show can be an agonizing experience. So much of it is unattainable on a personal level. This is a show for buyers with corporate backing. Many of the machines on display are image systems dependent on large

mainframe computers for their operation. Indeed, this technology will trickle down to personal computer users, but, for now, is devoted to those who can afford it. Still, some products and companies stand out from the crowd.

Cray Research whose legendary Cray-1 supercomputer wasn't even on display, had a booth, but never really expected to sell a single machine. Cray computers sell for more than \$10 million, and fewer than 50 are installed world-wide. Cray was there to remind people that realistic, three-dimensional images require the kind of massive computing power that only a Cray can deliver. (For example, a TRS-80 was recently benchmarked against a Cray-1. Result, the Cray performed approximately 1.6 million times faster than the little Radio Shack machine.) The company distributed very nice, photographically-real portraits of its machine, generated, of course, by a Cray-1 at John Whitney, Jr.'s Digital Productions. "Imagine what you could do with a Cray," suggested the headline.

At the other end of the scale were several graphics products for microcom-



1983 VOSS—BM WATSON RESEARCH CENTER



1983 BARKS—DeMURE—STP





IMAGE OF NEURAPHIL



1983 HALL R — CORNELL UNIV.

puters. Most of these appear to be built around an increasingly popular microchip designed especially for graphics, the NEC 7220. Look to this chip to be used more and more in personal computer graphic displays. (Intel's American version of the chip, the 87220 is expected shortly and may be at the heart of IBM's rumored superior graphics board for the PC.)

Number Nine is a company whose name was inspired, according to a spokesman, by a Beatles song. It makes add-on graphics boards for the Apple II and the IBM PC. It offers resolution of up to 1024 by 1024 pixels per screen in up to 256 simultaneous colors selected from a palette of more than 16 million colors. It is priced at about \$900 for the Apple version, slightly more for the IBM PC. Software, developed by Visual Data Enterprises for the system, is extra.

Another company, Cubicomp, introduced a high quality graphics system. Its model CS-5 is designed to calculate and display solid-looking screen graphics with a resolution of 512 by 512 pixels in up to 4096 simultaneous colors, or enough points and colors to produce pictures of photographic realism. Aimed at industrial and professional users, it is priced at about \$900.

Almost as impressive at about half the price is the Vectrix VX384. This is a true graphics subsystem, a box to which virtually any microcomputer can send data. At Siggraph, the Vectrix was demonstrated with an Apple workalike machine and a Kaypro portable with a hard disk drive. Screen images were very comparable to the quality of much more expensive systems seen on the exhibit floor. The resolution of the Vectrix is 672 by 480 pixels in up to 512 colors selected from a 16 million-color palette.

Where Was Lisa?

It was something of a puzzle why Apple Computer cancelled their exhibit booth;

its Lisa is by far the best-known graphic microcomputer. (Apple was at Siggraph, though, recruiting for Lisa software designers.) This didn't mean that shoppers weren't reminded of Lisa. Several manufacturers showed Lisa-like "window" systems, including a company called Pixel and Sun Microsystems, who boasted that Lucasfilms had selected Sun for its graphic workstations. Pixel's machine, the Pixel 80G is an extremely powerful graphic computer system. Both companies use a

Several manufacturers showed Lisa-like "window" systems.

fast and powerful 68000 microprocessor.

Pixel, which calls its machine a "super-microcomputer" uses a vertically-oriented screen with the astounding resolution of 2048 pixels across by 4096 pixels down. Its black and white image is as close to a printed page as you are likely to see on a computer. Pixel's demonstration showed a line of readable type so small that it looked like nothing more than a blurred line, until you pressed your nose to the video screen. The Pixel 80 system will support two of these graphics terminals or 16 conventional terminals running under the increasingly popular Unix operating system.

Holography

Some displays on the exhibit floor showed true three-dimensional graphics, not just shaded solids. A Southfield, MI company, Dimension Research, demonstrated an excellent hologram derived from computer-generated views. Lee Lacey, a veteran holographer, explained that this *image plane* hologram—appropriately a CAD-designed auto part—was produced from a series of discrete views drawn on

a plotter and photographed on 35mm film. Other computer-synthesized holographic images by Chicago artists Dan Sandin and John Huffman were shown at the Siggraph art show.

Though the holograms at this edition of Siggraph were simple-looking line and wire frame images, it is obvious that synthesized pictures of greater detail and clarity are on the way. The marriage of holography and computer graphics seems a perfect one.

A group of San Rafael, CA artists and engineers insist there is no need to wait for holography to be further perfected. Lenny Lipton, a filmmaker and proponent of 3-D systems, is the prime mover behind the company, Stereographics, Inc., which includes Lhary Meyer, an electronics designer formerly with Lucasfilm. Stereographics' system is a simple one that alternates left- and right-eye images (two are needed for true 3-D on a video screen in rapid sequence).

The screen is viewed through glasses—more like goggles in the demonstrated version—containing electro-optical shutters synchronized with the screen by a wire connection to a black box. These are not mechanical shutters, but tiny electronic elements buried in the lenses of the glasses. A 3-D video system developed by Japan's Matsushita Electric worked the same way and is used in a video arcade game, Sub-Roc. But that earlier system suffered from distinct flickering, which Stereographics' system has eliminated.

The system works very well, despite an apparent reduction of screen resolution. Clips of new 3-D video material, microphotography, a segment from the 1953 3-D classic, *House of Wax* and a 3-D video game screen generated by an Apple computer were shown. (Lipton and company won't say how the flicker is removed, but there appears to be a modification in the number of lines actually scanned on the video screen.)

BASF QUALIMETRIC™ FLEXYDISKS® BUILT FOR ETERNITY - WARRANTED FOR A LIFETIME.

BASF Qualimetric FlexyDisks® offer you more...an extraordinary new lifetime warranty. The BASF Qualimetric standard is a dramatic new international standard of quality in magnetic media...insurance that your most vital information will be secure for tomorrow when you enter it on BASF FlexyDisks today.*

We can offer this warranty with complete confidence because the Qualimetric standard reflects a continuing BASF commitment to perfection...a process which begins with materials selection and inspection, and continues through coating, polishing, lubricating, testing, and 100% error-free certification. Built into our FlexyDisk jacket is a unique two-piece liner. This BASF feature traps damaging debris away from the media surface, and creates extra space in the head access area, insuring optimum media-to-head alignment. The result is a lifetime of outstanding performance.

When your information must be secure for the future, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.



ENTER TOMORROW ON BASF TODAY



BASF

*Contact BASF for warranty details © 1982, BASF Systems Corporation, Bedford, MA

CIRCLE 107 ON READER SERVICE CARD

Compute While You the Buffer that

MICROFAZER PUTS YOU BACK TO WORK

Your computer helps you work fast. Unless the printer is running. Then it doesn't help you work at all. It won't let you enter data or process information. It simply won't compute.

That's where Microfazer by Quadram comes in. It's the print buffer that frees your computer. And lets you keep right on working.

THE BUFFER THAT REMEMBERS IT ALL

Microfazer stores data from your computer in its own memory, then sends it to the printer at the proper rate.

You don't have to worry about losing vital information be-

cause of limited buffer space. Because Microfazer starts with 8K of memory and is expandable to 512K—a full half megabyte. So it can keep pace with your needs. Now, and in the future.

THE ANY COMPUTER, ANY PRINTER BUFFER

Microfazer is perfect for any buffer task. Word Processing. Air Mailing. Graphics.



Available at retail stores worldwide.

Print with Microfazer™, Remembers It All.

You name it. And it's perfect with any enhancement: Printers, Plotters. Even modems.



You'll find Microfazer in a variety of models and sizes. Some stand alone while others are stackable. There's only one that

snaps into the back of the popular MX Series Epson printers. And another that plugs inside an Epson MX or FX.

There's a Microfazer to interface incompatible devices. And for any data transmission need. Serial or parallel.

QUADRAM REMEMBERS TOO

Whatever your system. Quadram has a buffer to handle it. Including Microfazer's counterpart: Interfazer, for buffering and controlling up to eight computers with one or two printers.

Quadram didn't forget the hardware features either. The Ready LED, manual Reset and Pause/Copy buttons are all part of the

Quadram Quality tradition.

A PRICE YOU'LL GO FOR

You'll be glad to know that you can get Microfazer backed by Quadram Quality at a price that won't stop you from owning one. Parallel to parallel versions start at \$159 (8K). Serial to parallel, parallel to serial and serial to serial versions start at \$199.



**MICROFAZER.
THE PRINT BUFFER
THAT REMEMBERS IT ALL.**

MICROFAZER

QUADRAM
CORPORATION

Reset Ready Error

Copy

QUADRAM
CORPORATION
An Intelligent Systems Company



4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 810-766-4915 (QUADRAM NCRS)

CIRCLE 273 ON READER SERVICE CARD



Lhary Meyer claims that the electronics—the black box—for signal processing and synchronization, and the glasses, can be manufactured cheap enough to make the system a consumer product. Furthermore, Lipton says the glasses can be made wireless by using infra-red light to synchronize the system.

If there was a dream system on display at the Siggraph exhibition, it was Images, offered by Computer Graphics Lab, Inc., the commercial arm of the New York Institute of Technology. Essentially, this is the same system that NYIT uses to produce its 2-D and solid-looking animation, and includes its famous Paint and Tween software which runs on DEC PDP-11 and Vax computers. Paint is used to create images, while Tween performs the task of an animator's assistant, interpolating the positions of an image between *key frames*. Another program, Tween, colors each frame.

Other aspects of the Images system allow the artist or animator to add airbrush-style shading, produce mechanical drawings using software drafting tools and manipulate the hues and shades of the 16 million-color palette. It will also allow images from real life to be scanned with a color video camera, then integrated into the digital scene, or even "mapped" onto surfaces. (A similar mapping technique can be seen in a current rock video clip

produced by NYIT, "Adventures in Success with Will Powers." In it, a trio of singing masks rotates on the screen, a female face mapped on the inside, as well as outside, of each one.)

To date, Computer Graphics Lab has sold four systems in various configurations. Among the customers are a Japanese film company using theirs to produce a feature film version of the "Lensman" science fiction novels by "Doc" Smith. Nolan Bushnell's Pizza Time Theater company will use its 2-D system to produce "Saturday morning" style cartoons based on the characters originated at the eatery chain.

Film and Video

The film and video shows at Siggraph are legendary events which highlight the best electronically produced film and video of the year. With enough audio, video, and laser equipment to rival a major rock show, the multi-screen show is an attraction all by itself. Large crowds of 3000 to 5000 assembled in Cobo Arena for two different presentations which were preceded by laser shows from the Wisconsin-based Laser Fantasy group.

The Siggraph film audiences are unique. The crowd doesn't just ooh and ahh, but recognizes specific techniques used in the computer pictures. It is not unusual, then, to hear comments like "great ray-tracing," or "good fractals," both of which refer to

the mathematics used in producing the images. And when the fans see something outstanding, they stomp and cheer wildly. Siggraph, in fact, is probably the only place where audiences applaud individual *shots* in films.

Most of the films and video reels are assemblages of visual experiments and demonstrations of specific techniques, without plot or story. Many are abstract or boldly geometric exercises. There is so much of this beauty for beauty's sake that NYIT's Lance Williams has nicknamed it Doily-vision.

There were so many films shown in two nights that it would be impossible to review or summarize each one in this space. A few important ones do deserve special mention, though.

"ACT III" was produced by New York artists Dean Winkler and John Sandborn using a Via Video painting system and several digital video effects systems (the kind used to produce television commercials). A whirling, six minute-long kaleidoscope of shapes, it seemed a perfect visualization of the Philip Glass music it was set against. This was probably the best unified video piece in that it reached beyond experimentation and simple exercise.

Several demonstration reels were extremely well received. Cranston/Csuri Productions, a commercial offshoot of

If there was a dream system on display at the Siggraph exhibition, it was Images, offered by Computer Graphics Lab, Inc.

the computer graphics project at Ohio State University, displayed an exceptional reel which included very impressive examples of shaded and transparent geometric objects. The reel from a relatively young computer images company, Pacific Data Images of Sunnyvale, CA, showed a keen sense of art direction in a specially-created Siggraph logo and in a short segment titled "Teddy Bear Maelstrom." In the latter, digital bears looking as though they were constructed from balloons cavorted on a circular track in space to a synthesized version of the "Teddy Bear's Picnic."

Other commercial demo reels included work from Robert Abel & Associates, a pioneering company best known for its Levis and Seven-Up ads, Bo Gehring Associates, which included a scene from the feature *Nightmares* (video games gone

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.

CIRCLE 201 ON READER SERVICE CARD

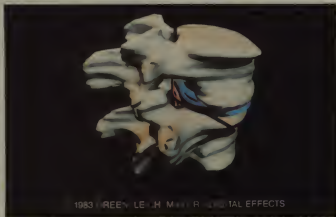
PRO-MODEM does more. It lets you build a full telecommunications system with features like Auto Dialer, Incoming and Outgoing Message Buffering, Business/Personal Phone Directory, Programmable Operating Instructions, a 12-Character Alpha-Numeric Time and Message Display, and versatile PRO-COM Software. 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



1983 GREEN, LE, H. MAYER, R. DIGITAL EFFECTS

berzerk) and Digital Effects, Inc. Produced by Judson Rosebush, who was responsible for the character of the Bit in Disney's *Tron*, the Digital Effects reel offered, by far, the sharpest, cleanest imagery in the shows.

Z-Grass

Not every film was produced using million-dollar computer hardware. One, "OUA OUA" (from an old Hawaiian tune), used the simple effect of a mirror image singing face to a humorous effect. Several examples of Z-Grass animation were shown, including "Floater" by Jane Veeder, "Only Eyes" by Margret Rawlings and "Nuke the Duke" by Charles Kesler and Jaap Postma.

Z-Grass is a graphics computer language developed by Tom DeFanti, one of the founders of Siggraph, and uses relatively inexpensive hardware based on a Z 80 microprocessor. Low-cost hardware is also used by Movie Maker software, a demonstration of which was also shown. The program, developed by Guy Nouri and

Eric Podietz of Interactive Picture Systems, New York, currently runs on the Atari personal computers and is being prepared for the Apple II, IBM PC, and Commodore 64 as well. Its results show that it is a perfect introductory tool for artists and animators interested in beginning to learn about computer pictures.

The masterwork of the show was "Growth: Mysterious Galaxy" created by Yoichiro Kawaguchi.

Atari and Lucasfilm submitted examples for the film shows. In 1982, Lucasfilm showed their "Genesis Effect" clip from *Star Trek: The Wrath of Kahn*, a true achievement in computer effects. This year's clip was less impressive, the computer map effects from one scene of *Return*

of the *Jedi*. Atari's offering was almost embarrassing. It was a clip from *Superman III* featuring comparatively crude video game-like animation. There seemed to be some question as to why it was even shown with other works of much higher quality.

Japanese Entries

Special mention must be made of three Japanese works shown at this year's SIGGRAPH. "Origami," produced by NHK (the national television network) Special Programs Division, was a lyrical film about the art of paper folding, its geometry perfectly suited to computer techniques. "Mandala 1983" was produced and directed by Toyohiko Higashi and Masaki Fujihata for the Deibu Promotional Network. It was another strongly geometric work whose best image was a tray of multi-colored crystal balls generated on a Cray-1 supercomputer.

Finally, the masterwork of the show was "Growth: Mysterious Galaxy" created by Yoichiro Kawaguchi. Kawaguchi's growth algorithms (descriptive mathematical formulae) perfectly blend aesthetic design and sophisticated computer science to produce a distinct organic effect. Kawaguchi is one of the pioneers these techniques and is apparently their undisputed master.

Show Stopper

Again, the strong showing of the New York Institute of Technology must be noted. Its demonstration reel, an accumulation of experimental and commercial work from the previous year, was, as always, a show stopper, eliciting howls of glee and noisy appreciation. Virtually each scene in the 11-minute reel was greeted with enthusiastic response.

Included in the reel were new openings for CBS television sporting events and Home Box Office commercial logos, the rock video mentioned earlier, and an excerpt from Twyla Tharp's video dance piece, "The Catherine Wheel." Also seen were segments from three NYIT in-house



1983 GREEN, LE, H. MAYER, R. DIGITAL EFFECTS



1983 MABUMLA, NISHIMOTO, Y. KAWAGUCHI, HIROSHIMA, H.

SAIGON: THE FINAL DAYS

Vietnam, 1975. Crashing through the dense jungle foliage, you hear the distant fire of the NVA camp guards. You've escaped, but you have a long way to go before you reach Saigon — if you ever do. Uncle Sam is pulling out, and Saigon holds your only hope of ever going home.

SAIGON: THE FINAL DAYS

By Iyym Pearson, Robyn Pearson & Norman Sailer

Gritty realism and historic fact blend to form a unique adventuring experience that plunges you into a controversial chapter of recent history.

Visit your local dealer *today*, or call us for your copy!

800-327-7172

Available for your 16K TRS-80 Model 1 or 3, in either tape or disk format, for only \$24.95.

The Atari tape version (needs 16K) is \$24.95.

The Apple version has great full-color hi-res graphics for \$34.95.

 **Adventure**
INTERNATIONAL
A DIVISION OF SCOTT ADAMS INC.

BOX 3435 • LONGWOOD, FL 32750
(305) 862-6917

148



productions: "The Mouse's Ear," a surrealistic cartoon being developed by Duane Palkya and "3-DV," an extremely funny

A competing conference sponsored by the National Computer Graphics Association may be stealing some of Siggraph's thunder.

clip from a proposed television special featuring a silly all-robot cast.

Last, but certainly not least, a few more minutes from NYIT's long-running feature project, "The Works." Its main characters, again, are robots, the most famous of which is a giant machine which

looks and works like an ant. New this year was the addition of a one-legged hopping robot welder.

The first few minutes of "The Works" debuted at Siggraph several years ago, and only a few more have been added over the years. This lends some doubt that the film will ever be finished, acknowledged by the in-joke t-shirts prematurely advertising a sequel, "The Works II." Lance Williams cites the difficulty in producing a few new minutes of the films, since they must be sandwiched in with continuing research and commercial projects. And, he says, there is no money for real production to proceed with "The Works" or "3-DV." Still it is almost impossible to believe that these fantastic works can go any longer without funding. They seem to be solidly commercial ideas.

It is clear that NYIT is virtually (and single-handedly) defining the genre of computer animation. We can only hope



that advances in technology and software development will bring the group the kind of economic rewards and public appreciation it deserves.

One historical note: NYIT dedicated its 1983 Detroit Siggraph reel, appropriately and with a note of cynicism, to the United Auto Workers.

Pricing Itself Out Of The Market?

Siggraph is a spectacular event, and one of genuine importance to the industrial, academic, and commercial worlds of computing. Is it, however, in danger of losing its preeminence?

Already, a competing conference sponsored by the National Computer Graphics Association may be stealing some of Siggraph's thunder. The NCGA show and

November 1983 © Creative Computing



The Best Just Got Better

Introducing the new Strobe Models 260 and 200 Graphics Plotters. How do you make the world's most cost-effective graphics system even more remarkable? Simple. Make it easier to use, more powerful, more versatile and more attractive. The hard part is doing all of the above while holding the line on a very affordable price. With the new Models 260 and 200 Graphics Systems, Strobe has done it all. And the benefits are all yours.

The Strobe 260 is the first eight-pen plotter and software package available for under \$1,000. With just a few keystrokes on your computer, the system produces superb high-resolution charts, drawings and transparencies with up to eight automated color breaks. The even more economical Model 200 produces the same wide range of graphics with a single pen which may be changed manually.

The new Strobe plotters interface with virtually every popular microcomputer made today, including the Apple II, IIe and III, Victor, IBM PC, Kaypro

and Osborne systems. What's more, the StrobeWare software programs provide every graphic format you will probably ever need, including multicolor pie charts, bar graphs, line graphs, text processing, and a broad selection of symbols and character styles. To further increase your capabilities, the new Strobe systems also interface with over 40 other popular graphics programs.

Every feature of the new Strobe Graphics System is designed to give you the highest quality graphics quickly, easily and inexpensively. The system also looks very nice on your desk. So visit your local dealer today and see how much better the best can be.

Apple II, IIe and III, Victor, IBM PC, Kaypro and Osborne are trademarks of Apple Computer, Inc., Victor Limited, Inc., International Business Machines Corporation, Kaypro Corporation, and Osborne Computer Corporation, respectively.



Strobe Inc.
897 S-A Independence Ave.
Mountain View, CA 94043
415/969-5130

The Strobe Graphics System
Seeing is believing

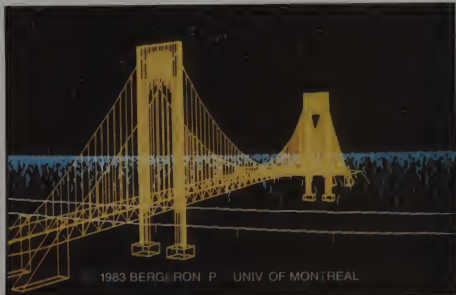
CIRCLE 249 ON READER SERVICE CARD

Siggraph, continued...

conference, held in Chicago a month before Siggraph, reportedly drew over 24,000 people.

One sorry suggestion is that Siggraph may be too expensive for many to attend. The cost of attending courses ranges from \$125 for students, to \$410 for late registrants who are not members of the ACM. Technical sessions cost from \$35 to \$290. Siggraph-furnished lunches sell for an outlandish \$20, and course notes and copies of the papers delivered seem overpriced at \$280 for a complete set of notes and papers.

Too, the Japanese have shown remarkable advances in computer graphics and a commitment to develop both new hardware and programming techniques. This year, the Japanese will hold their own version of Siggraph, sponsored by their own recently-formed organization, Nicograph (Nippon Computer Graphics). Nicograph and Nihon Keizai Shimbun (Nikkei, Japan's business newspaper and publishing company) has hosted parties at the last two Siggraph conferences, attracting the cream of the American graphic talent. Nikkei is also behind a Computer Graphics Grand Prix competition, which offers, not just the honor of having works shown, as Siggraph does, but significant cash prizes for the best computer-generated film and video.



1983 BERGIN-RON P. BRIDGE UNIV OF MONTREAL

A lesson might also be learned from the support that Nicograph has gathered in its own country. The importance of computer graphics to Japanese industry is evident from the list of Nicograph's counselors, which includes the presidents of Nissan Motor Co. (Datsun), Fuji Film, Victor Company of Japan (JVC), Casio Computer, Sord Computer, IBM Japan,

Nippon Steel, Ricoh, and the mammoth Matsushita Electric (Panasonic).

Also associated with the group are Kashiuro Fuchi, the director of ICOT Research Center (the Institute for New Generation Computer Technology); Isao Tomita, the famous electronic composer; Sakyo Komatsu, Japan's best-known science fiction author; and Dr. Shigeru Watanabe, president of the national Japan Microcomputer Club. With this support, it is clear that the Japanese intend to establish a leadership position in the graphics field.

It is to be hoped that, in light of the competition both at home and abroad, that Siggraph can maintain its claim as the world's premier computer graphics event. To do so, however, may take some work and even newer ideas. □

PROTECT YOUR COMPUTERS, DRIVES, PRINTERS, DISKS, BUSINESS!

Born from necessity —

COM-PROTECT III[®]

PROTECTS FROM:

- Power Outages!
- Power Surges!
- Spikes!
- Brown-Outs!
- R.F. Line Interference!
- And More!
- 6 Outlets
- 15 Amp Rating
- 90 Day Replacement Warranty



\$79⁹⁵
Shipping
\$3.00

COM-PROTECT III[®]

Computer Protection Device

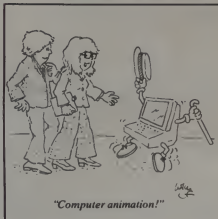
Don't risk chip
damage or disk loss!

COM-PROTECT INC.:

Rt. 4-Box 427X
58401, Louisiana
70458
504-641-1316

VISA
MASTERCARD
ACCEPTED

Siggraph '84 will be held in Minneapolis, MN, July 23 to 27, 1984. For information, contact Siggraph Conference Office, 111 East Wacker Dr., Chicago, IL 60601, or telephone (312) 644-6610.



"Computer animation!"

HIGH TECHNOLOGY REQUIRES HIGH PERFORMANCE ACCESSORIES

In the fast moving, high technology world of microcomputers, the need for high performance accessories often gets overlooked.

Discwasher, recognized as a world leader in audio/video care accessories, understands this need and has developed a line of computer accessories to allow users to get the most from their computer hardware.

The easy-to-use *Discwasher™ Disk Drive Cleaner* is both a problem preventer and problem solver. Its dry format safely cleans single or double-sided drives without altering the delicate head alignment or doing possible damage to rubber drive parts with solvents.

The *Discwasher™ Computer Cassette Drive CareSet™* is a total maintenance package for your cassette drive system. It includes both the *Discwasher™ Computer Cassette Drive Head Cleaner* and the *Computer Cassette Drive Mechanism Cleaner*. Together, these two maintenance units can keep the high resolution heads and the critical drive system of your cassette drive system in optimum performance.

The *Discwasher™ DiscKeeper™* is a magnetically shielded storage system for floppy disks that takes up no more space than conventional folder packs. *DiscKeeper* protects against stray magnetic fields which can destroy valuable software. Three *DiscKeeper* sizes provide loss-free storage and protection for transporting any size disk format.



discwasher

1467 NORTH PROVIDENCE ROAD, P.O. BOX 6621, DEPT. CC, COLUMBIA, MO 65206 USA

A DIVISION OF JENSEN an EDMARK Company

CIRCLE 285 ON READER SERVICE CARD

MEET YOUR CHALLENGE



In Miner 2049er™ you help the legendary mounty, Bounty Bob™, track the villainous Yukon Yohan™ through an abandoned uranium mine — all ten levels of it — grabbing buried treasure and avoiding deadly radioactive mutants along the way.

Well, that was only the beginning!

Yukon Yohan has escaped to the city and Bounty Bob is after him! Only this time, there's run out of bucks, so he's taken a job as a tremor to fund the chase. And guess which villain has foisted a skyscraper to trap Bounty Bob?

You guessed it — Yukon Yohan!

Scraper Caper™ has all the action, adventure and excitement that can be packed into a ROM cartridge. And it features a mind boggling number of rounds, difficulty adjustment, high score table, demo mode and spectacular sound and graphic effects.

Miner 2049er is a gamer's gold mine, but you've got to beat Scraper Caper to get to the top! Scraper Caper is available from your local dealer for the ATARI® 5200 SuperSystem™ and all ATARI Home Computers.

Suggested Retail \$49.95

BIG FIVE SOFTWARE

14640 Keswick Ave., Van Nuys, CA 91405 (213) 782-6861

Miner 2049er, Scraper Caper, Bounty Bob and Yukon Yohan are trademarks of Big Five Software. ATARI, 5200, 5200 SuperSystem are trademarks of Atari, Inc.

CIRCLE 118 ON READER SERVICE CARD

**HOTTEST
YET IN...**

**STAPPER
LAPER**

Programmed
by Bill Hogue



Look over the Rainbow.

Learn RainbowSM computer-based instruction ends manual labor. No slaving over computer manuals, you learn to use the Rainbow on screen, in minutes, not months.

One of the Rainbow's best features is the service and support from Digital, the world's second largest computer company.

The Rainbow's sleek, comfortable keyboard with standard typewriter keypad fits almost anywhere, even on your lap.

Of the hundreds of software applications now available many are Digital Classified and serviced.

The Rainbow shows more character, 132 columns instead of the usual 80. So you can screen a 12 month spreadsheet without losing 6 months.

Keyboard is designed with separate function groups and special keys like 'HELP', 'DO' and 'NEXT SCREEN'.

Only the Rainbow automatically runs the widest range of the popular 8-bit and 16-bit CP/MSM software.

After you look over the RainbowSM personal computer on paper look over the Rainbow in person. To learn where, call 1-800-DIGITAL or write Digital Equipment Corporation, 200 Baker Avenue, Concord, MA 01742.

Not even the world's largest computer company gives you so much. But the second largest does.

digital

© Digital Equipment Corporation 1983
CP/M is a registered trademark of Digital Research, Inc.

Wall Street, continued...

when it comes right down to it, the stock market is not even what the statisticians call a "zero sum game" in which the total won by some people is lost by others. This is because we must subtract brokerage commissions, which, even with the discount brokers, are substantial. My point? Since I began studying the home computer industry, I have seen more and more evidence that Tobias's monkey theory is probably accurate.

The December 8 Debacle

Let's take Atari as an example. On December 8, 1982, Wall Streeters were stunned when Atari announced a huge loss—so stunned that, to this day, we hear about the "December 8 Debacle." The investment community was taken totally by surprise, and Warner stock plummeted. (The Securities and Exchange Commission, incidentally, is investigating several top Warner officials who allegedly unloaded gobs of Warner stock just before the announcement.)

For many months prior to this, the video game magazines were writing about the horrible VCS *Pac-Man* cartridge. Arnie Katz, the editor of *Electronic Games Magazine*, told me at the June 1982 CES that he had been told there were millions of dollars of *Pac-Man* cancellations.

The fact that Atari's *ET* game was unacceptable was no secret to thousands of gamers; yet Atari had hoped this cartridge would become a mega-hit because of the popularity of the movie. And, of course, it was quite obvious to anyone attending June 1982 CES that everybody and his brother was jumping into the VCS software business; there were over 30 producers at that point. Sure, you might say, "That's hindsight." But let's continue the story.

At the Billboard Video Game Conference in San Francisco in April, oft-quoted Lee Isgur of Paine Webber gave a speech. He predicted that Atari could well be "the Coleco of 1983" and that the company could rise "from its own ashes." Another Wall Streeter, Michele Preston from L. F. Rothschild et al., spoke at the conference. She thought that the worst was over for Atari.

Now, the supreme irony. On that very day, guess what was happening 3000 miles to the east? You guessed it! Atari released first quarter results: a \$45 million loss for the consumer electronics division.

A few months went by and Wall Street again settled down. But another bomb went off on July 22 when Warner reported losses for the second quarter of \$283 million. The Atari subsidiary lost \$310 million—coincidentally the exact same amount (to the nearest million) that Chrysler posted as its earnings for the second quarter—and on the very same day! (Re-

member the olden days when auto companies were in trouble and Silicon Valley companies were considered the panacea for the U.S. economy?)

Had Wall Street learned its lesson and expected the worst? You be the judge, from the following reactions:

- Crowell, Weedon & Co.: "It's mind boggling. I never expected anything on that order of magnitude."
- Wertheim & Co.: "It's frightening."
- Goldman, Sachs & Co.: The large loss was "totally unpredictable."

I have seen more and more evidence that Tobias's monkey theory is probably accurate.

Even Atari management was baffled. Steve Ross, Chairman of Warner, stated, "A loss of this magnitude clearly was not anticipated."

Trouble In Texas

Let's take another example. People who play video games and use computers have felt that the TI 99/4A has been overpriced since its inception. Even free evaluation models gathered dust in some magazine offices; some TI 99/4As were never taken out of their boxes. The programming language (TI Basic) is one of the poorest in the industry. The games are even drabber.

Yet the Bill Cosby ads have been selling the 99/4A at rates that stun knowledgeable computerists. At the June CES, TI placed ads touting the 99/4A with, not

one, but four faces of Bill Cosby. I guess this proves the old marketing adage, "It's the sizzle, not the steak."

The industry was once again taken by surprise when, after an announcement that TI expected to lose about \$100 million in its second quarter, TI stock dropped almost 50 points in two days. Reeling from the shock, industry analysts swung their pendulums the other way. One Wall Streeter called for TI to get out of the home computer business. A major newspaper ran a front page article predicting doom and gloom for the entire industry.

Not The Age Of Aquarius

Mattel is an interesting case, too. They displayed Intellivision 3 (in a secret back room) at the January, 1983 CES. While the system is fabulous, Mattel was shown to be out of phase with the industry. Intellivision 3 was made obsolete just one month later by the Coleco wafer tape cartridge.

Mattel's Aquarius also appeared in January. Most reviewers have panned this system. A Mattel marketing executive showed us the in-house slides of the economic and marketing rationale behind the Aquarius system (at the Billboard conference). Someone asked him pointedly, "Does the public really want to balance their checkbook, keep a budget, or try to write with a rubberized keyboard, or is the Aquarius essentially a solution in search of a problem?"

What happened a few months later? Mattel reported electronics division losses of \$34 million. The heads of several key Mattel executives rolled just a few weeks later. Losses continued to mount, and in August, 400 employees of Mattel's electronic division were laid off.

Advice And Predictions

My advice to Wall Streeters: It is well and good that you read industry reports,



WE DOG DOWN DEEP...

AND CAME UP STATIC-FREE.

Fighting the dark shadows of static electricity, The Ground Hog keeps your equipment safe from unintentional hazards that your own body could cause. There could be static measuring up to 30,000 volts lurking in your fingertips, waiting to blow your keyboard, wipe out your entries, or cause other permanent damage to your hardware with just a touch of your hand.

Just a pet of the "Hog" will

ground your fingers and make it safe to handle your equipment. The Ground Hog, a static magnet that sits beneath your computer, and occasional contact renders you static-free and safe to touch anything.

So for those electrifying dangers that lurk in the shadows, the answer could be right there at your fingertips. Get a Ground Hog under your computer today.

SO... PLUS... IN WITHOUT US.



P.O. Box 674, Waltham, MA 02204
(617) 891-6602 • 1-800-388-1010

OR CALL 911 ON READER SERVICE CARD

visit companies, and talk to management. But you should also try to get your information straight from the horse's mouth. When you get home from work, take off your three-piece suits, put on a pair of jeans, grab a joystick, and play some games. Then and only then will you really find out what is going on in the industry.

Enough criticism. Now I shall go out on a limb with some long range predictions.

The home computer hardware industry is similar to the auto industry 60 years ago when there were dozens of car manufacturers trying to cash in on the enormous potential (does that phrase sound familiar?) of the horseless carriage industry. Today, of course, there are only a handful of U.S. car producers. Eventually, there will be only a few dominant hardware manufacturers. The most likely to succeed are:

- IBM. They will make it on quality and name. Watch for a mid-range (\$500-\$700) home computer of excellent quality before long.
- Apple. Support (software and peripherals) is hard to beat. I don't know about Lisa, but I have a feeling other new products (perhaps the Macintosh) will make a real dent in the market.
- Coleco. The Adam may be a smash. Lots depends on where Coleco sells it

Paul Erdman, The Economy And Silicon Valley

I recently heard a talk by Paul E. Erdman at a writers' conference in San Francisco. Erdman is the fellow who, while working for the United California Bank in Basel, Switzerland, was caught with his hands in the cookie jar and served time in a Swiss jail, convicted in a banking scandal.

While in jail, he launched a writing career. His *The Crash Of '79* became a best-seller and was acclaimed for its prophetic accuracy and for the way it made complex international monetary matters simple and understandable. Erdman has been labeled "America's most audacious oracle" with "a crystal ball of his own."

Among Erdman's uncannily predictive books are:

- *The Billion Dollar Sure Thing*, a novel which deals with gold and the dollar. In the book, gold goes way up, and the dollar goes way down (it was written before gold soared to around \$800 per ounce several years ago).

- *The Silver Bears*, a story about several speculators who try to corner the silver market. The attempt ends in disaster. *The Silver Bears* was also prophetic: it was written before the Hunt Brothers silver debacle.

While Erdman's talk focused on the U.S. economy in general, he had some interesting insights into the computer industry.

Erdman recently completed his first non-fiction work in which he predicts how the U.S. economy might evolve over the next two to five years. He presents both pessimistic and optimistic scenarios:

Pessimistic: The Third World debt (they owe about \$700 billion to the International Monetary Fund) and immense U.S. budget deficits will force interest rates back up to the 20% level of 1980. By 1984-5, we will be in the same mess we were in 1980.

Optimistic: GNP will continue to increase by 6% annually (as it is now),



Paul Erdman.

Photo copyright Jerry Bauer.

swelling U.S. tax receipts and decreasing the deficit. Demand for product will increase, and the economically imperiled Third World nations (such as Brazil, Mexico, and Costa Rica) will pull out of their current crises. (An aside: Mexico is solving part of their problem by exporting unemployment. Guess to

Erdman predicts that the U.S. will win the race with Japan to develop the 256K chip.

whom?) We will see a dramatic economic recovery and return to the prosperity of the Eisenhower 50's.

Erdman doesn't think that either of these scenarios will actually occur. The future, he feels, lies somewhere in between. He predicts that interest rates will rise a little bit (they have, in fact, been rising slowly since May) and sta-

bilize, certainly at least until the 1984 election. His investment advice: stay with "financial assets" (e.g., stocks and bonds) a year and a half or so. Then watch carefully and be prepared to shift into hard assets (e.g., gold and silver).

Erdman also noted "Problems In Paradise" as he called the trouble in Silicon Valley. He sees two problem companies: Atari and Texas Instruments (the speech was made after the TI loss was announced, but before the \$300 million Atari deficit).

"But," he adds, "that ain't high tech; that's low tech. A lot of 18-year-olds could build Ataris in their garages."

Erdman assesses TI as a component company that got greedy and went into equipment. "Silicon Valley (the computer industry in general) is by no means dead," Erdman states, "and could be as alive now as it was when it started 20 years ago. I hope so, because its growth is critical to the U.S. economy."

Erdman predicts that the U.S. will win the race with Japan to develop the 256K chip despite many ominous forecasts to the contrary. This is due, he feels, to two factors:

- Much innovation and creativity is occurring in homes, attics, and garages around the country "as Steve Jobs did with the Apple. You can't do this in Germany—you'll get arrested for espionage—or in Japan."

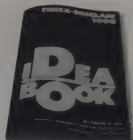
- The availability of venture capital gives the U.S. a significant advantage. Germany and Japan are dominated by universal banks; they have no concept of venture capital.

Erdman believes that Silicon Valley will constitute the country's key growth industry during the 1980's. "In 1990," he goes on, "the industry will be genetic engineering; companies such as Genentec will blossom in about 10 years."

Erdman predicts the U.S. will also prevail against Japan in this race and assume a leadership role. —KU

Discover the hidden power of your TS1000 and ZX-81

The 50 ready-to-run programs in this book will show you how!



If you suspect you're not getting all you can from your Timex Sinclair 1000, here's a new book that will make sure you do.

David H. Ahl has written 16 books about computers. In *The Timex Sinclair 1000 IdeaBook* he puts 25 years of experience to work—to help you put your computer to work.

The *Timex Sinclair 1000 IdeaBook* includes 50 complete, pre-tested programs—each one designed to illustrate a specific problem-solving technique.

By working these programs on your own computer, you'll understand more fully its hidden strengths. Plus, you'll learn how to overcome its inherent weaknesses.

Armed with this knowledge, you're ready to put your Timex to work performing a multitude of practical everyday tasks. Everything from balancing the family budget, to taking inventory, to performing science experiments.

Ten informative chapters show you how to solve problems using:

- Repetitive trial
- Convergence
- Recursion
- Compounding
- Probability
- Geometry
- Science
- Simulation
- Drill
- Practice

The *Timex Sinclair 1000 IdeaBook* is the only volume of its kind ever published for TS 1000 and ZX-81 owners.

Order your copy today—
and start taking full
advantage of your TS 1000.



MAIL TODAY TO
CREATIVE COMPUTING PRESS
Dept. 888, 33 East Hanover Avenue
Morris Plains, NJ 07950

Please send me _____ copies of the *Timex Sinclair 1000 IdeaBook* for only \$8.95 each, plus \$2.00 shipping & handling per book.

Total Amount \$ _____

Payment Enclosed (CA, NJ and NY State residents please add applicable sales tax.)

Charge my (Charge and phone orders \$10 minimum)
 American Express MasterCard Visa

Card # _____ Exp. Date _____

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

For faster service, PHONE TOLL FREE:

800-631-8112

(In NJ only 201-540-0445)

Also available in your local bookstore and computer store

Radio Shack
Color Computer
TOP System 100



ROAR!

Do tricks with your computer without breaking your wallet's spirit! A subscription to **Chromasette** gets you a tape or disk full of quality programs delivered by First Class Mail every month! Write for more information or, better yet, try a Back Issue. At \$6.00 for 6 to 8 programs on tape (\$11.00 on disk), you'll see just how good and inexpensive **Chromasette** software is.

The Bottom Line:	Tape	Disk
1 year (12 issues)	\$50.00	\$95.00
6 months (6 issues)	\$30.00	\$55.00
Single Issues	\$ 6.00	\$11.00

* Call residents, add \$4 to single issues. First Class postage to NY Area included. Overseas add \$10 to subscriptions and \$1 to single issues. Send NO cash. All back issues from July 1981 available. Ask for 10 Programs are for the Estimated BASIC, Pascal and occasionally for disks.



Chromasette

PO Box 1087 Santa Barbara, CA 93109
(805) 963-1066

Wall Street, continued...

(better in computer stores to compete with more expensive systems, than in toy stores, competing with far cheaper game machine/home computers).

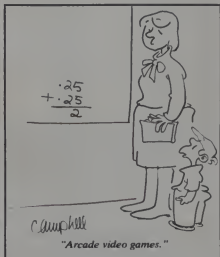
• Commodore. It is hard to argue with success. Commodore passed out their third quarter figures at CES, showing income and earnings per share more than double 1982 levels. But I am still skeptical. The Vic 20 sold tons, and lots of companies are making software for it. The 64 is doing well, too. But neither of these computers in my view can currently be said to excel in the three major areas in which home computers are used: games, education and word processing.

With the enormous volume of software coming out from Commodore and others, this could change. But, as I said, I am skeptical.

• Atari. They are losing multi-millions now, but they have taken some good corrective steps: merging the computer and video system divisions, laying off thousands of workers, moving manufacturing to the Orient, writing off apparently all of their dead game inventory, and introducing their excellent XL and DXL computer line (and making it compatible with previous Atari computers).

Atari does make the best game computers on the market, and the game software available for Atari computers is, in my opinion, the best in the industry. Atari will continue to be a dominant factor in the market. I don't know what this means to their bottom line, however.

If you think the hardware industry is confusing and dynamic, consider the software industry, which is a real can of worms. I can't begin to predict specifically what will happen there, but I will caution, while this isn't any great revelation, to watch for a shake-out. The shake-out, however, will be so enormous that Wall Street will again be stunned, and you will see first page headlines about it in virtually every newspaper in the country. □



"Arcade video games."

TRS-80
COLOR
COMPUTER



STEAL THE BEST PROGRAMS

The best out of our library of over 200 published programs, packaged and priced so low that it seems like robbery.

Games #1 - Action-packed, logical, and colorful ones! Flyby, Blackjack, Motorcycle, Germ Blockade, Life, Diggem, Robot Run, Stellar Empire, and Zero G for your fun and pleasure!

Adventures #1 - Trips to far-off and dangerous places. On the agenda are *Jurassic Adventure*, *Ultimate Adventure*, *Williamsburg Adventure*, *House Adventure*, *Andrea Doria Adventure*, *Blackard's Castle*, and *Realm of Naugal*!

Practicals #1 - Programs for text editing, maillists, budgeting, filing, etc. including *KeepText*, *Keep Address*, *KeepList*, *KeepCheck*, *Keep Budget*, *Files*, and *Tape Inventory*.

Graphics & Charts #1 - For data manipulation and display! Do it with *Pie Chart*, *Bar Chart*, *XY Graph*, *Curve Fit*, and *Two Dates*.

Choose any one of the four packages for just \$12.00 (\$17.00 on disk)!

SILVERWARE
A lot of software for a little silver

See your dealer or
Write or call us direct at PO Box 21101,
Santa Barbara CA 93121 (805) 966-1449

Nightraiders

Fantastic
action game
for Atari*

The elite corps known as the Nightraiders are trying to bring freedom to a conquered earth. Since they are few in number compared to the enemy, they must operate under the cloak of darkness. As the group's leader your mission is to fly over enemy strongholds, identify targets of opportunity and destroy them thoroughly.

While the invaders cannot mount an air attack after the sun has set they do have weapons of awesome power—weapons which relentlessly track your flightpath and anticipate your movements.

Success does not come easy. You must be able to maneuver like the crack of a whip—accelerate and decelerate in and out of hyperdrive—while carefully lining up the targets for your twin ion bombs. And always keep an eye on the special radar screen which spots enemy action for you.

Become a Nightraider and meet the most lawning challenge of your space career.

\$29.95/Atari*

400/800 with
Disk Drive
and Joystick

At your computer store or from:

DATA MOST

8043 Fullbright Ave.
Chatsworth, CA 91311

© 1988 Atari, Inc. All rights reserved.
Atari, the Atari logo, and Nightraiders
are trademarks of Atari, Inc.

*Atari is a registered trademark of Atari, Inc.

DAY
MUST TURN TO NIGHT
BEFORE MANKIND
DARES TO FIGHT

CIRCLE 139 ON READER SERVICE CARD

WHAT DO EACH OF THESE HAYDEN GAMES GIVE YOU THAT NO OTHER GAME CAN?



Now you'll have twice as much fun playing Hayden games. Because when you buy one game, we'll give you any of these games free.*

And what games!

There are widely popular fast action games like LASER BOUNCE, WARGLE and SHUTTLE INTERCEPT.

And strategy games that are in a

class by themselves, such as the classic chess game, SARGON II.

Even text adventure games like CRIME STOPPER and CRYSTAL CAVERNS that will keep you on the edge of your chair.

Inside every one of these Hayden games, you'll find a coupon good for another game of your choice.

A FREE HAYDEN GAME.



BUY ONE, GET ONE FREE.

All you have to do is fill out the coupon, complete the warranty card and send them to us.

As soon as we receive them, we'll send you your free Hayden game.

Take advantage of Hayden's game

*Offer expires January 31, 1984. Hayden games are available for Apple™ disk, Atari™ disk and tape, Commodore™ disk and tape. Not every game is available for every type of computer.

plan today. Check out all the exciting Hayden games at your retailer now. Or call Hayden at 1-800-343-1218. (In Mass. (617) 937-0200.)

HAYDEN SOFTWARE

Hayden Software Company, 600 Suffolk Street,
Lowell, MA 01853

Apple, Atari and Commodore are registered trademarks of Apple Computer, Inc., Atari, Inc., and Commodore Electronics Limited, respectively.

Personal ROBOTS

It sat, motionless, in the corner of the room. At first, the passers-by mistook it for a wet/dry shop vac. "Must be one of those new-fangled Japanese jobs," I heard an obnoxious salesman say. "You know, the kind you can use to pick up anything."

Moments later, the "vacuum cleaner" mysteriously began to move on its own,

Gordon McComb, 3134 Lincoln St., Suite E, Carlsbad, CA 92008.

Gordon McComb

*Nolan Bushnell
with friends,
Topo and
B.O.B.*

and bumped into desks, chairs, and people on its way. It careened around guests and furniture with a tipsy drunkenness, then stopped, remained still for a moment, and continued on with its adventure. Whatever it was, it was eerily feeling its way around the room, studying its surroundings. It was definitely cleaning the carpet.

An uneasy silence fell over the small crowd. The only sound that filled the air was the high-pitch whine of motor-driven wheels. Soon all, including the



Buy Smartmodem 300 right now, and get this \$140 value FREE!

Subscription to THE SOURCE,
including User's Manual.
Value \$100*

One hour connect time
Value \$20.75**

A comprehensive, hard-bound
handbook on communications
Value \$19.95



Your computer's telephone Hayes



Between

Nov. 1-Jan. 15, you and your personal computer can make the big break. From isolated desktop computing. To the exciting world of telecomputing. With Hayes Smartmodem 300. The most popular 300 bps modem you can buy, for any computer with an RS-232C port. Let Smartmodem 300 connect you, via telephone lines, to computers, terminals and information services all across America. Including THE SOURCE™ AMERICA'S INFORMATION UTILITY.™

This offer takes you right to THE SOURCE! And you won't have to pay to join! The same day you purchase your Smartmodem, call THE SOURCE on their toll-free number. And you're already well on your way to getting on-line!

It frees up your time. This offer also entitles you to \$20.75 worth of connect time—at no charge. Use it as you please! Check the latest news and sports. Look up your flight schedule. View your stock portfolio. You name it. The time is yours! Sixty minutes

worth, or more, depending on the day and hour.

Giving you lots of connections. THE SOURCE has assembled the most comprehensive programs available on any system. For fun and practical applications. From games to commodity news. Electronic mail to teleconferencing. Discount shopping to abstracts of articles from business magazines.

And everything you need to know is right

there in your comprehensive, illustrated User's Manual. Included with your free membership to THE SOURCE during this special, limited time offer from Hayes.

Plus the last word on communications. Now here's a book that delivers what it promises! In Alfred Glossbrenner's best seller, *THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS*, you'll find a thorough, informative study of microcomputer communications. Worth every cent of the \$19.95 this hard-bound book sells for. And yours absolutely free!

If you act now! See your dealer soon. Buy Smartmodem 300, and get the best 300 bps modem around.

Plus a \$140 value FREE. Hayes Microcomputer Products, Inc. 5923 Peachtree Industrial Blvd., Norcross, Georgia 30092. 404/449-8791.



Here's all you have to do:

1. When you purchase your Smartmodem 300, save your sales receipt and Hayes registration card (packed inside the box).
2. Pick up the phone and call THE SOURCE, on their toll-free number:

1-800-336-3366.

Tell THE SOURCE representative that you are participating in the special Hayes promotion, give the serial number of your Smartmodem (on the modem), and your credit card number (VISA, Master Card, or American Express). † You will get your password to THE SOURCE, right on the spot

3. Within a week you will receive an agreement from THE SOURCE, along with your New Member Kit. Sign the agreement, and return it within 10 days to THE SOURCE, along with your sales receipt for Smartmodem 300 and Hayes registration card. Remember, send no money. Your membership is free!

4. That's all it takes! Look for your User's Manual and free communications book within two weeks of receipt of the agreement, sales receipt and registration card.

† THE SOURCE requires a major credit card for billing of hourly connect time to individual members. Corporate members may apply for direct billing.

*Suggested retail price. **60 minutes or more connect time, depending on the day and hour. THE SOURCE and AMERICA'S INFORMATION UTILITY are service marks of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. ©1981 Hayes Microcomputer Products, Inc.

CIRCLE 302 ON READER SERVICE CARD

Personal Robots, continued...

dim-witted salesman, began to realize that the two-foot tall metal and plastic canister was no ordinary household gadget, nothing as mundane as a machine to suck up dust balls.

It was a robot.

Indeed, the "shop vac" cum autom-

Fantasy has an unnerving way of creeping into reality.

aton described above—the RBSX from Golden, Colorado-based RB Robots—is just one of the first in what soon will become a long line of "personal robots": clanking and whirring mechanical contraptions that we will use to help us wash the car, change the cat's litter box, watch over the baby, protect the house.

Science fiction stuff? So were the visions of a computer in every home, particle beam "space weapons," atomic fusion, and pocket TVs. Fantasy has an unnerving way of creeping into reality.

Today, personal robotics is where personal computers were in the early-to-mid '70s. The computing industry took nearly ten years to blossom into what it is now. Consumer robotics has just started—it officially began only a year ago. Some believe that it, and not computers, will be this decade's fastest growing industry.

Many companies, mainly Heath, Androbot, and RB Robots, have already started their campaigns to bring automation into the home. What is available today, and is it more than a curio? More importantly, where is robotics heading? Why isn't robotics more advanced? The industry seems behind the times. And what might appear in the few short years?

Let's take a closer look at robots: their past, their present, and their future, and find out if the aluminum and molded plastic bucket of bolts we call "robot" is really here to stay.

Turning Back The Clock

Before anything can be said about present-day robots and their eventual use in our society, we must turn back the clock and take a short peek at the history of the robot.

It is believed that the roots of robots can be traced as far back as Greek mythology to Talos, a giant man-like bronze automaton who guarded the island of Crete. The further use of functionoids in literature, however, seemed not to proliferate until the early 1800's. An example from that time is

"The Sandman," a tale about a beautiful dancing robot by German writer E.T.A. Hoffman.

Other writers, including Edgar Allen Poe, Nathaniel Hawthorne, and Jules Verne, soon picked up on the idea of machines doing the work of humans. Perhaps the dawn of the industrial age and the advent of steam-driven locomotion, had something to do with the true birth of mechanical man.

In 1921, Karel Capek, Czech playwright and novelist, coined the term "robot" in his play "R.U.R." ("Rossum's Universal Robots"). The term robot is based on the Czech *robota*, meaning *compulsory labor*, and *robotnik*, meaning *workman*. Capek's robots, played by actors in silvery suits and shoes, rebelled against their masters, thus setting a precedent that has continued to this day: robots as a symbol of evil.

Robots continued to serve as a hint of the dark side of man in science fiction works for nearly two more decades. In 1940, however, writer Isaac Asimov broke the spell when he wrote a story called "Strange Playfellow," about Robbie, a robot that couldn't help but be loving and faithful and kind.

To make robots more palatable to an audience used to mechanical antagonists, Asimov later defined three rules all robots in his stories obey (some other authors have adopted these rules into their writing, too). The first, and most important rule: "A robot may not harm a human being, or, through inaction, allow a human being to come to harm."

Although Asimov believes that this rule is applicable to real-life robots as well, his golden vision is without basis: already government-owned robots are being used as sentries, providing their masters "shoot to kill" capabilities.

Fiction, more than anything else, has played an important role in the acceptance or non-acceptance of the robot.

On one hand we see Asimov's Robbie and R2-D2™ and C-3PO™ of *Star Wars*. On the



TM & © Lucasfilm Ltd. (LFL) (SW). All rights reserved.

other, we have such hedonists as Kronos (who appeared in a terrible 1957 movie by the same name), Gort (from the classic "The Day the Earth Stood Still"), and Maximilian (the devilish robot from Disney's "The Black Hole").

Androbot, a new company financed by ex-Atari mogul Nolan Bushnell, has striven to develop "friendly" robots. Handless and footless, the Androbot family rolls around on two motor-driven wheels that are canted at 45-degree angles. Their cute bodies and soulful "eyes" (actually various types of sensors) were designed to make them seem less intimidating.

Androbot spends a great deal of time trying to convince people that robots are kind and gentle. For example, one press release for Topo, the less intelligent of the two Androbots, has a line that reads: "From the very look and shape of the head and body style, Topo tells you that he's going to be a cheerful, loyal friend."

Handless and footless, the Androbot family rolls around on two motor-driven wheels that are canted at 45- degree angles.

To add credence to their claims of gentleness, Androbot built Topo and B.O.B. with stress-sensing capability. If Topo or B.O.B. encounters an obstacle, the stress circuit detects the overload on the motor and shuts the robot down. The plastic hand or "claw" on Heath's robot, Hero 1, has a similar safety mechanism. A ratchet-like device on the hand keeps the pincher from exerting too much force.

There is one other reason that robots seem frightening to people, and no amount of cuteness can correct it. Since the introduction of the robot into industry in the 1950's, skilled and unskilled laborers alike have feared that they will be replaced by robots.

People had a similar feeling when computers began taking over mundane office tasks. But the general attitude today is that, if anything, computers have created jobs, and higher paying ones at that. The bottom line: Robots, like computers, must earn their keep—and the respect of humans working with them.

Already, it seems, robots are doing just that. The few computer dealers across the country who handle robots report that there is intense public interest

Jimmy The Greek says, "Increase your knowledge and chances of winning with Advanced Blackjack."TM



Blackjack, the all-time favorite card game, has now even more fun as you learn the secret to winning. Learn the most proven and effective card counting strategies with Advanced Blackjack.TM

With Advanced BlackjackTM you actually play the exciting game of blackjack as you master the Basic, Zany and Advanced Zany strategies of card counting. No more flash-cards or monotonous memorization; practice is made easy as the program teaches you how to play your hand. Learn to bet skillfully with an understanding of how the odds affect the game.

Entertain yourself, dazzle your friends and family or seriously take up the game. No matter what your goal, Advanced BlackjackTM will provide you with all the tools necessary to increase your chances of winning.

\$49.95

FOR APPLE II & APPLE II+ 48K DISK DRIVE

Look for these other fine Muse products.



\$29.95



\$49.95



\$49.95



\$29.95

MUSE
SOFTWARE

347 N. Charles Street
Baltimore, Maryland 21201
(301) 659-7212

CIRCLE 270 ON READER SERVICE CARD

Personal Robots, continued...

in them, and that often demand is much greater than supply.

Topo

Industrial robots do so many weld joints per hour and handle this or that substance faster and safer than a human;

B.O.B. comes with a program that allows him to navigate a living space and talk in a human-like voice.

today's personal robot, in contrast, is rather limited and unintelligent—the equivalent of a six- to nine-month-old child.

On the bottom of the price scale—and the intelligence scale—is one of Androbot's creations: Topo. In his standard \$495 configuration, he is simply a motorized hunk of plastic. He has no computer on board to direct his actions.

Instead, you hook a special controller to the RS-232 communications port on your computer. The controller sends infrared signals to Topo and tells him what to do. Any sequence of commands sent to the robot can also be stored simultaneously on disk to be retrieved later.

In addition, Topo sends information back through the wireless link to your computer, telling it how far he has gone and how much progress he has made in carrying out your instructions. Alternatively, you can control Topo directly with an infrared emitting hand-held joystick.

In some respects, Topo is the most advanced robot on the market, because even the most sophisticated computer and computer program can control his actions. The problem is that Topo must be near your computer to receive instructions.

Topo comes with a TopoForth disk that runs on an Apple II/IIe, Atari 400/800/1200, IBM PC, Texas Instruments 99/4A, Vic 20, or Commodore 64 computer. Since TopoForth is a standard version of the Forth language, original software—by the user or third party programmers—can be custom designed for the robot.

Topo also comes in a \$795 talking version with an on-board voice synthesizer. Like his motions, his voice is remote controlled via the computer-to-Topo infrared link. As with most speech synthesis devices, Topo uses text-to-speech algorithms to allow easier programming.

With text-to-speech, you needn't learn a complex table of codes to produce understandable English.

B.O.B.

Topo's bigger—and smarter—brother is B.O.B. (for Brains on Board). The unit has two true 16-bit 8086 microprocessors built into it (compatible with the 8088 chip used in the IBM PC). Standard on the \$2995 robot is 3Mb of RAM. B.O.B. needs two CPUs and so much memory because he does many things at once. Each 8086 chip regulates only a part of B.O.B.

B.O.B. comes with a program that allows him to navigate a living space and talk in a human-like voice (the speech synthesizer inside B.O.B. uses a linear predictive coding technique and draws on a ready set of digitized, pre-recorded phrases). As he converses, he randomly chooses from over one hundred stored words and lines. Infrared sensors mounted in his head attract B.O.B. to humans, who he may follow at will (and sometimes he doesn't; it depends on his mood). In the process, he avoids inanimate objects in his path via the ultrasonic sensors located in his head.

B.O.B. features the Androbus system (nearly everything in the Androbot line starts with *Andro*). With Androbus, B.O.B. has—the company claims—a limitless potential for expansion: through add-ons to his existing circuitry and the use of owner-created and commercially available software.

Plug-in boards may soon be available to accommodate specific B.O.B. upgrades, such as voice recognition, text-to-speech voice synthesis, and digitized eyesight.

B.O.B. can be user programmed through a specially developed language.

Heath's Hero 1.



called ACL (Androbot Control Language). Ready-made software for B.O.B. is expected to include AndroSentry, a home security/alarm package, and AndroFridge, a unique "me boss, you slave" program and accessory that permits the robot to fetch a can of beer (or Coke or Pepsi or 7-Up) for his master.

B.O.B. lacks some important features, however. The most obvious is that he has no arms or hands. B.O.B. just rolls around the room seeking out people and telling them jokes. He does have two fold down panels that hold objects (like cans of beer), but they can't reach out and grasp things.

Hero

As a matter of fact, the only personal robot on the market today that comes with an appendage is Heath's Hero 1 (which stands for Health Education Robot). Hero, who stands 20" high, has less CPU power and less memory than B.O.B. Built into Hero is a Motorola 6808 CPU along with 4K of RAM, and

You can program Hero to search for the brightest light in the room.

8K of ROM. Both RAM and ROM are expandable. Assembled, Hero costs \$2500; in kit form, only \$1500.

Like B.O.B., Hero has a bus port that allows you to experiment and hook additional things up the unit. The port is less user-friendly than B.O.B.'s, but that is because Hero was really designed as an educational tool for robotics.

Hero also incorporates an ultrasonic sensor that allows him to detect movement or calculate distances. One routine Hero does quite well is the detection of intruders. Point his moveable head (actually a flat plate on top of its squarish body) at a door or window, and he will detect the presence of an adult as much as 15 feet away.

Unique to Hero, and part of his impressive array of features, are his voice synthesis and "voice recognition" capabilities. The voice synthesizer built into Hero is based on the familiar Votrax SC-01 chip, the same one used in Votrax's text-to-speech synthesizer, Type 'N Talk. The chip can create 64 different vocal sounds. A four-step pitch control that helps create more human-like inflection is standard on the SC-01.

Hero hears sound in a 360-degree circle, over a frequency range of 200 to 5000 Hz which more than covers the

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 patterns. 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 to make new dances we've made."

DESIGNWARE ON CREATIVITY. Children learn the best 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 beyond putting a subject "on the screen" by

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

DesignWare, Spellicopter, and Math Maze are registered trademarks of DesignWare, Inc. All other trademarks are the property of their respective owners.

CIRCLE 112 ON READER SERVICE CARD

INTRODUCING THE GAME THAT ISN'T OVER WHEN IT'S OVER. TRICKSTER COYOTE.



Take this clever critter to task and triumph! Trickster Coyote™ is a challenging hidden word game that's especially fun because the coyote's so cunning he can beat you if you blink!

It's fast, colorful and a natural to play with your friends.

Once you clobber the coyote on the first level words you go on to the second.

And when you've downed the dirty dog the second time around you're ready to trip him up on the third.

When all three battles are won, and you've used up the 300 words on the disk, you can add your own words to see if the coyote can beat you at

your own game. This mutt loves punishment!

Trickster Coyote is a brain game that doesn't get boring because you keep on making new games. It grows as you do. Long after other games start to look old and tired, this rotten varmint will still give you a howling good game.

See your local dealer, or Call Toll-Free: 800/431-8800. (NY, AK, HI: 914/241-5727).

Warranty information available upon request by writing to: Reader's Digest Services, Inc., Microcomputer Software Division, Pleasantville, New York 10570.



This disk is designed for use on the APPLE II® or APPLE II Plus™ with 48K and 1 disk drive.



Trickster Coyote is a trademark of The Reader's Digest Association, Inc. Apple is a registered trademark of Apple Computer, Inc. Apple® II, II Plus, IIe: 48K and disk drive.

CIRCLE 217 ON READER SERVICE CARD

Personal Robots, continued...

approximate range of the human voice. The voice input circuitry of Hero converts the incoming sound to 8-bit digital words for processing.

The voice recognition unit really doesn't recognize speech as some of the more sophisticated models do. The processing approach taken by Hero limits his overall effectiveness, but it can be used to count syllables or sounds. For example, you can program Hero to fetch a can of either Coke or 7-Up. He determines which kind of soft drink to get not by examining the minute parts of speech that make up the words, but by counting syllables. Say "Mountain Dew" and he will still get you 7-Up.

Another of Hero's sensors is a light detector. The robot can be programmed to seek out a particular brightness of light (or the lack or presence of it). You can program Hero to search for the brightest light in the room, for instance. He will swivel his head slowly, taking in the entire room, and then decide which is the brightest light.

Hero isn't as much fun as B.O.B. To make Hero go anywhere, you must program his movements step by step into a keyboard on his noggin. You can also "quick teach" Hero by using what Heath calls a remote teaching pendant, an overgrown joystick that attaches to the robot through an 8-foot long cable. With the pendant, you can access all of the eight stepper motors that control Hero's body and arm movement.

RB5X

Another robot aimed primarily at the educational market, but with features more like those of an Androbot, is RB5X, one of the first personal robots to be offered commercially. As shipped from the factory, the \$1495 RB5X has an ultrasonic range finding system and a unique set of eight bumper pads located around his base. A small photoelectric cell is mounted on the underside of his body. RB5X maneuvers around the house in a more or less hit or miss method; you just let him loose and he bounces around the room.

Depending on which bumper pad has been activated, the robot takes evasive action to clear himself and continues on. As he goes about his way, he is learning how to react to each collision. Soon, his event memory pieces all of the hits and runs together and compiles the best way to move around.

Inside RB5X is a National Semiconductor INS8073 CPU with 8K of RAM. The company claims that any computer with a standard RS-232C communications interface can connect to the robot, to add external software control. The robot is programmed in NSC Tiny Basic.

Perhaps the most unique aspect of RB5X is his "nesting" capability. B.O.B., Topo, and Hero require human masters to plug them in so their batteries can be recharged. But when RB5X feels hungry for more juice, he seeks out his own battery charger and plugs himself in. This is how it works: when RB5X senses he is low on fuel, he automatically puts himself into his nest-search program, and begins looking for a white piece of tape on the floor.

The white tape, which stretches from where RB5X is playing to the battery charger, helps the robot find his way back home. He follows the tape until he finds his charger, and plugs himself in. If he spots the middle of the tape and moves away from the charger, the robot automatically stops at the end of the tape, backs up, and retraces his steps.

RB5X can be upgraded to include an on-board speech synthesizer. In addition, RB Robots has introduced an arm for the unit, which gives him Hero-like capabilities. Perhaps the most useful add-on to RB5X, however, is a vacuum attachment that connects the lower skirt of the machine. Given the proper program, RB5X can move back and forth, avoiding obstacles, and vacuum the room. With the eight sensors mounted around his body, he will even detect if you have moved the furniture.

The RB5X.



Going Further

Although not quite as much fun to work as mobile robots, robotic arms can be useful around the house as well. There are several models currently available. Because they are made to lift heavier weights than Heath's Hero, which can lift only 16 ounces, they are more expensive and bulkier.

One is Microbot's Mini-Mover 5, a human-like appendage with six stepper motors to control such functions as wrist rotation, shoulder pitch, and elbow bend. The arm can be interfaced through a 3-foot cable to an Apple II or Apple IIe and most TRS-80 computers. Control of the arm is through a special extension of Basic that Microbot calls ArmBasic. Other robotic arms are the XR-1 from Rhino and Microbot's MIM-5.

Announced, but not yet available as of this writing, is a new automaton from Robotics International called Genus. The new robot, it is said, will include an extendable and usable arm, on-board

Perhaps the most unique aspect of RB5X is his "nesting" capability.

memory and on-board microprocessing. The triple jointed arm, perhaps its most useful feature, retracts inside its near cylindrical body. It should be more than adequate for most chores. The cost for

Genus, which is available in "sections," will be about \$5000 for a well-equipped version. Robotics International says household attachments, such as vacuum cleaner wands, will be offered.

Glimpse Of The Future

What can we look forward to in future generations of personal robotics? Today's robots cater to the hobbyist and the gadgeteer. They are limited and a bit difficult to use. And many are meant more to educate than to entertain or serve.

Tomorrow's robot will do all these things and without much bother by the user. Given advances in computing technology such as cheaper and smaller memory, tiny hard disk drives, and sophisticated, special purpose control languages, the personal robot of tomor-

Personal Robots, continued...

row should go far. Soon—perhaps as soon as three to five years from now—specific applications programs for robots will be commonplace. A home security, room vacuuming, or bartending program (complete with jokes) might do for the robotics industry what *WordStar* and *VisiCalc* did for the computing industry.

The first digital watches and pocket calculators were extremely expensive. The cost to research and develop high technology devices such as these is enormous. But as these items became more popular, their prices dropped. The rel-

atively high cost for robots—\$495 to \$5000—will surely drop, too, making it impractical for you *not* to own one.

How might you use a robot? I know how I would use mine: Feed the cat, fetch the mail, wake me in the morning, mix me a drink at 5:30 in the afternoon, get (and open) a can of soda from the refrigerator, watch over my house at night and when I'm away, check for open windows or doors in the winter-time, plug in the coffee pot in the early morning, read *Creative Computing* to me...



Manufacturers Of Personal Robots

Androbot, Inc.
101 E. Daggett Dr.
San Jose, CA 95134

Heath Co.
Benton Harbor, MI 49022

Microbot, Inc.
453-H Ravendale Dr.
Mountain View, CA 94043

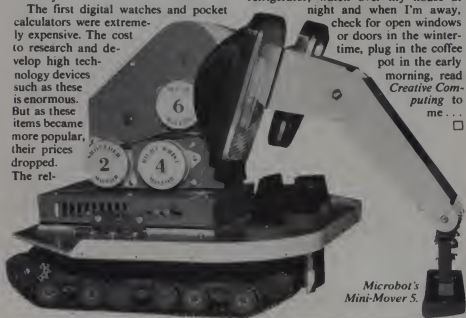
RB Robot Corp.
14618 W. 6th Ave., Suite 201
Golden, CO 80401

Robotics International Corp.
2335 E. High
Jackson, MI 49203

Sandhu Machine Design, Inc.
308 S. State St.
Champaign, IL 61820

Technical Micro Systems, Inc.
366 Cloverdale
Box 7227
Ann Arbor, MI 48107

Terrapin, Inc.
380 Green St.
Cambridge, MA 02139



Microbot's
Mini-Mover 5.

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.

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/1216, IBM-PC \$139.95
Add \$3.95 S & H per package.

Look for forthcoming 3-D application templates

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.



CIRCLE 102 ON READER SERVICE CARD

SNAVE SYSTEMS



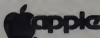
We love to sell
Apples and Franklins
Call for the
Best Price

(we won't be undersold)



We now carry:
IBM
Columbia
Commodore
Eagle
Northstar
Sharp
Toshiba

CALL
FOR
PRICE



BE A SNAVER SAVER!

APPLE SOFTWARE

	list price	our price
AppleWriter IIe	\$195	\$159
Word Handler		
(new ver.)	195	117
Magic Window II	149	93.95
General Manager II	229	152
DB Master	229	152
UD Utility pak		
1 or 2	129	89
Microsoft Multiplan		
(dos 3.3)	275	169
Screen Writer II	129	79.95
A Walk-Special Sale		
Visicalc	250	159
Visifile	250	177
Visidex	250	177
Visiplot	200	149
Visi Schedule	300	213
Visi Trendplot	300	213
PFS: file	125	86
PFS: Report	125	86
PFS: graph	125	86
Home Accountant	74.95	47.95
Locksmith 4.0	99	69.95
Choptitler	34.95	19.95
Zaxxon	39.95	25.95
Word Scrambler & Super Speller	19.95	12.95
Lancaster	29.95	15.95
Zork 1, 2, or 3	39.95	25.95

APPLE GOODIES

	list price	our price
Grappler +	\$175	\$114
Graphitti	125	96
Tymac Interlace	140	87
Plaso	175	127
TG Paddies	39.95	26.95
TG Joystick	59.95	40.95
TG Select-a-port	59.95	40.95
Kratt Joystick	64.95	39.95
Kratt Paddies	49.95	34.95
Microsoft Softcard	345	229
Softcard Plus	645	419
Videx Videoterm		
80 col.	279	199
Ultraterm	379	277
A.L.S. CP/M Card	399	279
Z Card II	169	133
System Saver	89.95	63.95
R.H. Super Fan II	74.95	58.95
Guardian Angel	595	459

PRINTERS

	list price	our price
C-I/OH		
Prowriter	595	363
Prowriter II	995	643
Starwriter	1895	1165
Printmaster	1995	1475
Star		
Gemini 10X special	499	283
Gemini 15	649	457
STS 80	199	169
Delta	please call	
OkiData		
ML-82	549	387
ML-83	899	619
ML-84P	1395	975
ML-92 (special)	899	493
ML 93	1249	853
Smith Corona		
TP-1	895	487
Tractor feed	149	119
Transtar		
Color 315 (color printer)	599	463
Others	250	197
Gonila printer		CALL
Epson		and
Diablo		SAVE
NEC		

MONITORS

	list price	our price
Amdek		
Color I	379	287
Color I +	399	311
Color II (RGB)	529	409
Color III (RGB)	479	359
Color IV (RGB)	1299	997
Video 300	179	137
Amber 300H	199	157
USI		
Pi-1	149	117
Pi-2	210	149
Pi-3	249	147
Pi-4	199	137
1400 C	399	289
Taxan		
Vision I (special)	399	287
Vision III	699	493
K9-12N	179	129
K9-12N-uy	189	137
Others	call	call
BMC		
Sakata		

MODEMS

	list price	our price
Hayes		
Micromodem II (special)	379	257
Micromodem II w/term.	409	287
Smartmodem 300	289	203
Smartmodem 1200	699	493
Novation		
Appelical II	389	259
SSM		
AMC-300 w/source	325	239
ASIO card & cable	149	119
Transend 1	89	66
Transend 2	149	109
Transend 3	275	198
AIO 2	225	159

DRIVES

	list price	our price
Rana		
Elite 1 (special)	379	259
Elite 2	649	447
Elite 3	849	559
w/controller		call
Micro-Scl		
A2 (special)	345	229
A40	379	269
A70	529	349
w/controller		call
Others	call	call
Vista		call
Want Sim-line	375	269
Corvus		call

DISKS

		(quantity discounts available) (box of 10)
Maxell		
MD1 s/s d/d		26.95
MD2 d/s d/d		41.95
Verbatim		
s/s d/d		25.95
d/s d/d		35.95
Dysan		
s/s d/d		37.95
d/s d/d		46.95
BASF		
s/s d/d		25.95
d/s d/d		34.50
Memorex		
s/s s/d		19.95
s/s d/d		21.95
Elephant		call
Wabash		call
OPUS		call

SNAVE SYSTEMS
Post Office Box 957
Niles, Illinois 60648-0957

VISA®

MasterCard

We accept VISA and MASTERCARD (include card # and exp. date).
Money Order, Certified Check, Pers. mail check (allow 10 days clearance).
Add Only \$2 for delivery, (hardware and foreign extra).
Illinois residents add 6% sales tax (except on software).
Prices and policies subject to change.

312/966-4505

FREE Catalog

Apple, Apple IIe, Apple III, and Franklin are Registered Trademarks

From Backyard To Big Time

The CP/M operating system so popular today has its roots in the very genesis of microcomputing. The designer of CP/M, Gary Kildall, in the early 1970's was a software consultant for Intel, one of the first manufacturers of integrated circuits, and the inventor of the first "microcomputer on a chip," the 8088. Kildall's everyday job was as a computer science professor at the Naval Postgraduate School in Monterey, CA. His two jobs put him in a unique position to observe and tinker with the fledgling microcomputer industry.

Gary began collecting the pieces, that by 1973, formed a home grown microcomputer system. The main processor (the brains of the computer) and its memory were integrated circuits from Intel; the disk drive was a recycled test drive from Shugart; the input and output console consisted of a Teletype device.

Needing something to tie all these components together into something that could be used, Kildall wrote a simple "operating system" in his then-favorite language, PL/M. The result he called Control Program/Monitor, or CP/M for short. CP/M, then, is a set of software that controls the basic components of the computer—an operating system.

Kildall showed his earliest versions of CP/M to Intel, but the company declined to market or further develop the project. This isn't surprising, because in 1973 and 1974 microcomputers were a rarity, and the people who had them weren't exactly sure what they wanted to do with them. In addition, Intel already had spent considerable effort on their own operating system, ICIS.

But by 1975 several small companies

Thom Hogan

were marketing microcomputers to curious hobbyists. When most of these companies developed computers that incorporated disk drives, they usually generated their own operating system, also. Had these pioneers—MITS (Altair), IMSAI, Polymorphic, and Processor

Technology, for example—been able to get their products to consumers quickly, CP/M might not have become the quasi-standard operating system it is today.

The insatiable microcomputer owners, however, weren't about to wait for the industry leaders to come out with new products, so they bought whatever they could find. NorthStar, Vector Graphic, Cromemco, and several other companies



Gary Kildall

Adapted and excerpted from the forthcoming *CP/M User Guide*, third edition, published by Osborne McGraw-Hill. Copyright 1983 by Thom Hogan, all rights reserved.

got their start selling pieces that could be added to the original IMSAI and Altair microcomputers.

Several of these small microcomputer manufacturers decided to eliminate a costly research and development stage and adopted Kildall's CP/M operating system for their products. Most notable among these smaller companies were Tarbell Electronics and Digital Micro-systems, two firms that were among the first to ship working disk systems. Because these firms manufactured "addon" components that could be used on

After manufacturers began to deliver reliable disk drives, software developers launched the next vital phase in the evolution of CP/M.

virtually any system, owners of Altairs, Vectors, Polys, and others did not have to wait for the manufacturers of their computers to get around to producing drives. In addition, IMSAI had been shipping disk systems without any software to run them; they promised to ship an operating system as soon as it was ready. After trying to develop their own, IMSAI decided to turn out IMDOS, which was really a disguised version of CP/M.

User Enthusiasm

Another important element in CP/M history was the enthusiasm of its first users. These true hobbyists tackled apparently insurmountable problems in their pursuit of new knowledge and experience. Theoretically, CP/M-80 could link any 8088- or Z80-based microcomputer with any disk system, and soon a group of hobbyists with "mix and match" systems emerged to test Kildall's product. These hobbyists developed several refinements, and, more important, a strong and visible users' group.

The importance of the support of a strong users' group cannot be underestimated. During the infant years of the microcomputer industry, accurate product information was not readily available. Manufacturers often released products with incomplete documentation, computer stores were relatively unknown, and in some cases, users' groups were more stable than the companies that developed the product the group was formed to support.

After manufacturers began to deliver reliable disk drives, software developers launched the next vital phase in the evolution of CP/M. The key to making software development financially feasible is to write programs that run on as many different computers as possible. CP/M-80 was one of the few operating systems that could run on just about any 8080- or Z80-based microcomputer, and was not restricted to one type of disk drive. Obviously, it was a prime choice for software developers.

Fortunately for CP/M, the first programs that became available were development tools—programs to help programmers generate other programs. Among the development tools that helped establish CP/M as the leading operating system for microcomputers were CBasic (and its predecessor, EBasic), Microsoft Basic, and several special assembly language programs. These tools, in turn, were used to write application programs, such as general ledgers, database and inventory programs, and word processors.

The popularity of the CP/M operating system thus became part of an escalating pattern: CP/M spawned programming languages and development tools, which in turn gave birth to application programs. These CP/M-dependent application programs increased CP/M sales, which again led to an increased number of development tools being introduced. This upward spiral of sales leading to more tools leading to more application programs leading to more sales has continued unabated for several years, and shows no signs of ending.

Evolution

During this rapid growth in popularity, CP/M did not remain the same as it was when it was first introduced.

The original CP/M that Kildall wrote (and his wife, Dorothy McEwen, marketed for him through their jointly owned company, Digital Research) was called CP/M version 1.3. CP/M 1.3 had a few minor problems—after all, it was put together quickly and for Kildall's own use. So Kildall rewrote it, tightened up some of the code, and recreated some of the utility programs that came with it. This became CP/M 1.4. At about the same time, Digital Research sold the rights to CP/M 1.3 to Cromemco, who made some modifications of their own, creating CDOS (Cromemco Disk Operating System).

A few comments are in order about CP/M 1.4 and the equipment it was designed to work with. First, CP/M 1.4 was designed at a time when memory was expensive, and disk drives came in only one flavor: single density. Also, paper tape systems and Teletype consoles (key-

board with printer) were still extremely popular.

The result is that CP/M 1.4 was designed with the limitations of these devices in mind. CP/M 1.4 takes up little memory (and therefore is limited in what it can do), assumes no intelligence on the part of the accessories attached to the system (and is thus simplistic), and was designed to allow a mixture of then-available peripherals to be attached. In some respects, these are the characteristics that made CP/M popular and established its identity as a quasi-standard: it was not specific to a single computer and could work on a minimally-equipped system.

Computers changed in 1979 and 1980. With the introduction of programs like *VisiCalc* and *WordStar*, and with new hardware, such as higher capacity disk drives and low cost memory, computers began to be truly useful.

CP/M changed with the computers. CP/M 2.2 was to update the original operating system to make it more compatible with the changing microcomputer. Whereas CP/M 1.4 was severely limited in the amount of disk storage it could address, CP/M 2.2 was expanded to allow for up to 16 drives each with megabytes of storage space.

Other changes occurred, as well. Most of these were minor enhancements or modifications that made CP/M more flexible. The ability to address more than one

During the period 1979 to 1981, CP/M became self-perpetuating.

type of disk drive at a time (such as mixed 8" and 5 1/4" systems) was allowed.

But the original features of CP/M were still evident; it remained compact and flexible. Digital Research concentrated on selling primarily to manufacturers and distributors, rather than to users. Thus, a small sales effort on the part of Digital Research often meant large numbers of users. Probably the best example of this was when Microsoft introduced the Z80 SoftCard with CP/M 2.2 for the Apple II computer. Within months, tens of thousands of new CP/M-80 users were added. (Note: When we refer to CP/M-80 in this article, we refer to CP/M versions 2.2 and 1.4.)

During the period 1979 to 1981, CP/M became self-perpetuating. Its popularity attracted software companies, which

CP/M, continued...

wrote software, which in turn attracted more users, who then attracted more manufacturers. This circular growth pattern accelerated very rapidly, with CP/M-80 going from about 300,000 users in 1979 to almost 1.5 million in early 1983.

But 1981 was the watershed year for CP/M. With the introduction of new microcomputers by computer giants like IBM, Hewlett-Packard, and Xerox, all of which are offered with the CP/M operating system standard or as an option, the number of users of CP/M began increasing at an accelerated pace. During this same year, however, the rapidly changing technology of computers once again caught up with CP/M, so Kildall and Digital Research once again went to work to refine the original operating system.

CP/M was originally designed to work on an 8080-based microcomputer. Not to disparage the poor 8080, but it just wasn't a state of the art central processor in 1981. After the 8080 came the Z80. Not only was the Z80 faster than the 8080, but its expanded instruction set allowed for better and faster software. Fortunately, a Z80 can perform any computer instruction that an 8080 can; therefore, the original CP/M can run on a Z80- or 8080-based microcomputer.

The speed of the Z80 invited computer designers to try to make microcomputers support more than one user at a time. In addition, the diminishing cost of microprocessors meant that a designer could simply add a processor for each user he envisioned. Multiuser microcomputer began to be popular.

Branches On The Tree

CP/M works only for a single user

computer. Digital Research therefore started a second branch of the CP/M tree by creating a product called MP/M (apparently an acronym for Multiple Program/Monitor, although that has never been officially acknowledged).

MP/M works similarly to CP/M (i.e., someone who has used CP/M can generally learn to use MP/M in an hour or two), but is not exactly the same; software that works with CP/M doesn't always work under MP/M. One thing Digital

punch by Seattle Computer Products, which offered a CP/M-like operating system they first called 86-DOS.

86-DOS was patterned after CP/M 1.4 with one very important difference: the disk format was changed and the resulting structure of information stored on the disk is entirely different.

86-DOS went on to become Microsoft DOS, then IBM PCDOS, and is now generally referred to as MSDOS. While it is similar to CP/M and originated from CP/M-like beginnings, it is important not to confuse MSDOS with versions of CP/M.

Digital Research did go on to introduce CP/M-86, a version of CP/M that works on 8088 and 8086 central processors. While it, too, is similar to earlier versions of CP/M, it does have some differences in operation. Later versions of CP/M-86 are Concurrent CP/M-86, a version that allows one user to run multiple programs simultaneously, and MP/M-86, which allows multiple users to work from a single computer. As with MP/M, the 8086 versions of CP/M retain the same structure of information on disk, meaning two machines with different processors but the same disk drives can change data.

Our examination of the history of CP/M is not yet finished, however. In early 1983, Digital Research continued to improve on the original version and to expand CP/M to other central processors. Versions of CP/M for 68000 CPUs, Z8000 CPUs, and 16000 CPUs (called CP/M-68K, CP/M-Z8K, and CP/M-16K, respectively) are now available.

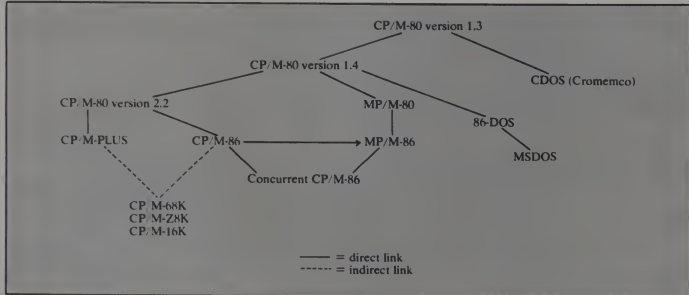
At the same time Digital Research was expanding CP/M to run on new central processors, they took what they had learned in these new versions and applied

86-DOS was patterned after CP/M 1.4 with one very important difference.

Research transferred from CP/M to MP/M was the disk format. That means that a disk created on a MP/M system is directly compatible with a CP/M system (assuming the same disk density and size). It also means that data and some programs can be used on either a CP/M or MP/M system. This is an important attribute of the CP/M family of operating systems.

Another branch of CP/M appeared with the introduction of 16-bit central processors. The first 16-bit processor to become available in systems was the 8086 (and its cousin, the 8088). Digital Research had always planned to come out with a CP/M-86, but was beaten to the

Figure 1.



Target your savings on Creative Computing!



Send me
one year
for \$19.97 —
20% OFF!



Send me
two years
for \$36.97 —
26% OFF!



Send me
three years
for \$49.97 —
33% OFF!

YOU SAVE \$5.00

YOU SAVE \$12.97

YOU SAVE \$24.94

Savings based on full one-year subscription price of \$24.97

Mr./Mrs./Ms. _____

(please print full name)

55266

Company _____

Address _____

City _____

State _____ Zip _____

Check ONE: Please enroll Bill me later

and \$5 a year in Canada, all other countries add \$10 per year.

Please allow 30 to 60 days for delivery of first issue.

Would you like to receive special offers from qualified users

of our mailing list? Yes No



*Special Offer!
Smart Offer!*



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE

Greatlive computing
P.O. Box 5214
Boulder, Colorado 80321



\$150 CHRISTMAS BONUS



Dataproducts wants to put some green back into your holidays. So, when you buy our P Series color printer and autosheet feeder, help yourself to \$100 worth of anything you want at the store of purchase. And that's just the beginning. Buying our full color P Series printer and autosheet feeder also entitles you to another holiday surprise. Our EP2 Program, absolutely free! It allows the user to make his Dataproducts printer perform like the IBM graphics printer or the Epson MX80, at your command. It's a \$50 value that's yours for a smile.

Why are we giving away so much? It's our way of introducing you to the versatile P Series color printer and autosheet feeder. The P Series translates information into brilliant full color charts, graphs and texts. It delivers a full page of text quality print in nothing flat while its feeder automatically prevents loading hassles. And the P Series uses printer or plain paper and fills every appropriate line with crisp, sharp copy, even if it has to hyphenate.

Priced at \$499, the autosheet feeder eliminates the need for manually fed paper, and has the ability to print any report, in large quantities, on standard 8 1/2" paper. The autosheet feeder holds up to 250 sheets of 15 lb. or 200 sheets of 20 lb. 8 1/2" wide paper, including bond, offset and coated paper. And it works on the P Series color printer's existing power source, requires no special programming or controls, and is completely transparent to host software.

Just take this ad with you to your nearest participating computer store and ask to see our P Series Printer. It's the full color printer that'll put some green back into your holidays. For the name of your nearest participating dealer, call 1-800-258-1386.

Dataproducts

COMDEX/Fall '83
CIRCLE 176 ON READER SERVICE CARD

CP/M, continued...

it to the original version of CP/M. The result is a product they call CP/M-Plus. CP/M-Plus is ostensibly CP/M-80 version 2.2 with additions similar to those found in CP/Ms for other processors.

To get the utmost utility from CP/M, it is important to understand the development of CP/M over the last ten years, since much of what CP/M is today comes from the fact that it was designed to be used on a wide variety of quite different computer hardware. See Figure 1.

At present, it is estimated that over 500 computer manufacturers now offer CP/M-80 or CP/M-86 with their equipment. Almost two million users have CP/M on their computers. Even owners of microcomputers that do not have a 8080, 8086, 8088 or Z80, 68000, 16000, or Z8000 central processor are now able to make use of CP/M with add-on processing boards for everything from Apple and Atari computers to the Commodore 64.

From the modest beginnings of CP/M, it has become the most widely used operating system for microcomputers (and possibly for all computers if number of installations are counted instead of number of users). Many changes have been made to Kidlall's original operating system, and, despite its simplicity, it can control even the most complicated equipment.

The Future

No history of CP/M would be complete without a peek at the future.

Digital Research continues to refine CP/M and keep its abilities current with

ware improvements are on the way. Osborne Computer Corporation's pioneering of automatic recognition of differing data formats is almost sure to work its way into future CP/M designs.

More interesting, however, are announcements that Digital Research plans to support the *VisiOn* interface (a product that promotes integration of different types of programs and allows simultaneous display of them) and that Concurrent CP/M-86 is being redesigned to support both CP/M and MSDOS data and program files.

These two announcements indicate the two directions that drive future CP/M development: *VisiOn* points towards the future of computer software, and CP/M will be there; combining MSDOS and CP/M capabilities takes already existing products and attempts to combine them into a single standard product.

Recently, there has been talk of the imminent demise of CP/M, due to IBM's adoption of MSDOS as their standard operating system. Given the effort Digital Research has put into making CP/M address all aspects of microcomputing in the past, and given the number of CP/M users already in existence, such doom-saying is most likely only wishful thinking on the part of competitors. Like it or not, CP/M is here to stay. □

Digital Research continues to refine CP/M and keep its abilities current with the state-of-the-art in computing.

the state-of-the-art in computing. The recent introduction of the GSX kernel, a set of graphics enhancements that allow CP/M to manipulate directly the graphics display of the latest computer systems, is one example. A networking kernel, and kernels for other specific computer hard-

PICK PROOF

...an excellent performance...
...R. Adams, INFOCRUISE



...smith "can't pick it. Nibbles Away" can't sink its teeth into it...
...It won't open. And Clone won't

The DISK ENCRYPTION SYSTEM stands firm against every kind of copy theft, memory theft or dump. Interchangeable program elements and variable parameters (including DOS-Ram protect) allow you to customize literally millions of protection systems for

every program you write. FASTLOAD feature allows you to load protected disks at 5000 bytes per second...FAST. Total program security for any Apple® (or Apple® compatible) with 48K Ram, DOS 3.3.

ONLY \$60, plus \$2 shipping and handling.

CIRCLE 266 ON READER SERVICE CARD

THE DISK ENCRYPTION SYSTEM ONLY FROM:

WINNER'S CIRCLE

2420 Parker St., Berkeley, CA 94704
(415) 845-4813

Apple is a registered trademark of Apple Computers, Inc.



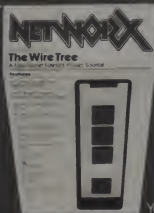
BEFORE YOU DAMAGE YOUR COMPUTER, PLUG IT IN RIGHT.

INTRODUCING THE WIRE TREE™ AC SURGE PROTECTOR, FROM NETWORK.

Power surges and voltage spikes. Their causes can be as simple as someone opening your refrigerator, or running a power tool, or switching on a fluorescent light.

But their results can be devastating. They can wipe out your computer's memory. Even damage its sensitive circuits.

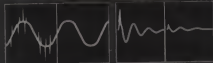
That's why smart computer users protect their personal computers by plugging them into The Wire Tree from Network.



The Wire Tree has four outlets and provides power surge protection that conforms to IEEE guidelines.

It comes with a bracket to mount underneath your desk or table and has a unique cable support feature which organizes your system's power cords into a neat bundle and moves them out of your way. And it lets you control system power from a single illuminated on/off switch.

You've invested a lot of time and money in your computer system. Protect that investment with The Wire Tree. Ask for one at your local computer store.



Voltage surge enters The Wire Tree.

Constant power output.

RF interference enters The Wire Tree.

Filtered power output.

NETWORX

Networx, Brooklyn, N.Y. 11237 (212) 821-7555

CIRCLE 104 ON READER SERVICE CARD

Looks like a Drives like a Parks like a



For additional information, call 1-800-334-4387. In California, call 1-800-544-4387.

© 1983 Indus Systems, 9304 Deering Avenue, Chatsworth, CA 91311. Indus GT is a product of Indus Systems. Apple II, Apple IIe and Apple III are registered trademarks of Apple Computer, Inc. Atari is a registered trademark of Atari, Inc.

Ferrari. Rolls. Beetle.

Introducing the all-new 1984 Indus GT™ disk drive. The most advanced, most complete, most handsome disk drive in the world.

A flick of its "Power" switch can turn an Atari into a Ferrari.

Or an Apple into a Red Hot Apple.

Ask your favorite computer dealer to unveil the remarkable Indus GT for you. Test drive it. Then, get ready to drive home a world-class driving machine.

Looks Like a Ferrari.

The Indus GT is incredibly sleek. Only 2.65" high! Its smoked-glass dust-cover front-loading front-end width is a perfectly proportioned 6.27." Eye-catching. Distinctively European-Gran styled.

Touch its LED-lit CommandPost™ function controls. Lay a finger on its AccuTouch™ buttons. Feel its elegant, fluid form.

Admire its smooth, sculptured, masculine lines. Wonder at its ingenious slimline engineering.

Marvel at how responsive it makes every Atari or Apple home computer.

Drives Like a Rolls.

Nestled into its soundproofed 10.4" length chassis is the quietest and most powerful disk drive power system money can buy. At top speed (which it can handle all day long), it's virtually unheard. Whisper quiet.

Flat out, the GT will drive your Atari track-to-track 0-39 in *less than one second!* Increasing data transfer an incredible 400%.

Built-in, low-friction GT CruiseControl metal band head-positioning assures Apple and Atari owners of trouble-free performance. So you can finish every project you enter.

And quietly tucked into every 1984 Indus GT disk drive is the exclusive GT DrivingSystem™ of software programs (included as standard equipment):

The GT DrivingSystem allows you to shift smoothly into world-class word processing with the GT Estate WordProcessor™. And your dealer will describe the two additional new GT Driving System programs that allow you to advance your driving skills. Instantly. Smoothly. Easily.

The Indus GT and GT DrivingSystem are covered with the GT PortaCase™. Which doubles as a 20-disk storage file when you're at home. Or as a portable case to flaunt your good taste and judgement when you travel. Safely. Smartly.

Parks Like a Beetle.

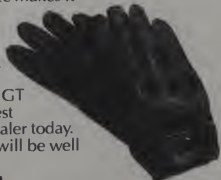
And it's sticker-priced like a Beetle, too. \$449 for Atari. \$329 for Apple.

The all-new, 1984 Indus GT.

Its small size makes it easy to park. And its low price makes it easy to buy.

So see and test drive the GT at your nearest computer dealer today.

The drive will be well worth it.



INDUS GT™

The all-new 1984 Indus GT Disk Drive.

The cover comes off at your computer dealer's showroom.

CIRCLE 292 ON READER SERVICE CARD

The CBasic Clinic

Part One

Would you be interested in a new computer language that allows you to write programs in good old simple Basic yet offers most, if not all, of the advantages of structured languages like Pascal, Ada and PL/1? It also conserves memory, runs faster, eliminates line numbering, gives more accurate math results, and lets you use both string and numeric variable names up to 31 characters long (all of them significant). Perhaps most important, the handling of both random access and sequential files is quite advanced.

Everything I have just said is true (if not conservative), yet this language is no state of the art breakthrough. In fact, hundreds of thousands of computer users have it available right now but haven't tried it. Every Osborne owner has it, as do most Xerox 820 buyers. It's a "sleeper" called CBasic. It has been around since 1977, which in computer time is ancient history. Professional programmers (especially in the business areas) have long known and used its power. It is time we home computer users learned why it keeps getting rave notices from those who make their living writing applications software.

I shall make one promise. If you get into CBasic, you will never be happy going back to your interpretive Basic. Do you know that "interpretive" Basic is the most common language for micro-

John A. Libertine

computers? Microsoft Basic is the best known. It (or a close relative) is used by Radio Shack, Apple, IBM, Atari, and many other computer manufacturers. *Interpretive* means that each line of code is interpreted as the program is run. There are advantages. For "quick and dirty" programs, it is easy to debug and you can write "free form" without getting into too much trouble. From the

Interpretive Basic allows (even encourages) sloppy programming.

pro's viewpoint, these can also be drawbacks, however.

Without getting into the technicalities, interpretive Basic allows (even encourages) sloppy programming, which leads to wasted memory. CBasic is a *compiled* Basic. Your entire program is written and then converted into machine code (or an intermediate code) which can be run with a significant saving in memory and time. You are permitted (and in fact encouraged) to use a "struc-

tured" approach in programming. This can make your programs highly organized, modular, and easier to update and revise—much more about this later. For now, let me assure you that the difference is noticeable and measurable.

What I hope to do in this short series is get you started with CBasic. We will write simple programs to illustrate the advantages of the language and if you will bear with me (and do a little extra "homework" on your own), you should be able to continue to the point where even a sophisticated application won't throw you for a loop.

Historical Background

A little history might be useful here. CBasic is the creation of Gordon Eubanks, Jr. It started as a college project and resulted in his forming a very successful company called Compiler Systems. Recently, he merged with Digital Research (the CP/M people). Mr. Eubanks is now a vice president at Digital and he continues to improve and advance CBasic. It is available for virtually any computer that runs under CP/M (or its derivatives MP/M, CP/M-86, etc.). It is available from computer manufacturers (Osborne and Xerox for example) and from most software dealers.

Prerequisites

To use CBasic, you need CP/M, about 48K minimum RAM, and at least one disk drive with a couple of hundred

November 1983 Creative Computing

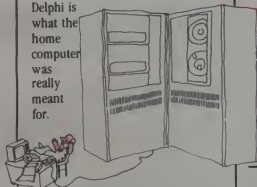
YOUR HOME COMPUTER IS
JUST THE BEGINNING.

You've got your home finances organized, learned a little French, played a lot of Zork. You have all the software you want.

Yet, something is missing.

Introducing Delphi™. The information, communications and entertainment system that takes you far beyond the limitations of disks and cartridges. The system that's so friendly the whole family can use and enjoy it.

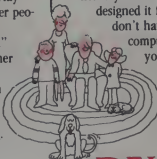
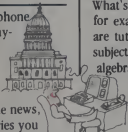
Delphi is what the home computer was really meant for.



HERE'S WHAT DELPHI GIVES YOU NOW.

With a simple telephone call, you can look up anything in a vast research library which includes a 20,000-entry encyclopedia. You can do your banking. Get the news, weather and sports stories you want from several wire services. Check airline schedules and make reservations. Shop from an electronic catalog. Tap into the Comp-U-Store* discount shopping service. Keep track of your appointments. Play games. Get in touch with other people through the electronic bulletin board, mail and "talk" services. Seek advice from other members and volunteer your own expertise. Collaborate on the Delphi novels. Take part in or run a subscriber poll.

That's just the beginning.



What the home computer was really meant for.

YOU CAN BE PART OF THE DESIGN COMMITTEE.

We're continually adding new services. But only services we think you and your family will use and enjoy. What's coming, for example, are tutorials on subjects from algebra to zoology.

You can be part of the design committee. Just tell us what you'd like to see on Delphi.



SO FRIENDLY, YOU DON'T EVEN NEED OUR HANDBOOK.

Delphi is the easy-to-use, friendly information system. We designed it for humans. You don't have to speak computerese. In fact, you don't even need our friendly handbook. We'll take you on a guided tour right on your screen.

DELPHI™

What the home computer was really meant for.

THE PRICE IS FRIENDLY, TOO.

It's just \$49.95 to establish your Delphi membership and for the handbook to get you started. Then just as little as 85 cents for 10 minutes (\$5 per hour) on-line for most services during home time... evenings, weekends and holidays. Office time, of course, is more.

DELPHI IS COMPATIBLE WITH YOUR EQUIPMENT.

No matter what home computer you have, you can use Delphi. Unlike other systems, Delphi is compatible with all makes and is easily adaptable to any screen size. And you can use just about any acoustic coupler or direct connect modem to connect Delphi to your telephone.

WE PROTECT YOUR PRIVACY.

We designed privacy into Delphi from the start. Our password system prevents unauthorized access. We don't even know your password, and you can change it any time. We can't monitor your transactions or communications. We can't retrieve information except at your request. The safeguards are spelled out in our policy statement and agreed to by our people. A copy is available. We are members of and subscribe to the policies of the Videotex Industry Association.

SIGN UP, LOG ON, BE IN TOUCH.

To sign up and log on, or for more information, just see your dealer. Or get in touch with Delphi.

We'll put your computer in touch with destiny.



*Comp-U-Store is a registered trademark of Comp-U-Card of America.
Dealer Inquiries Invited

General Videotex Corp., 3 Blackstone Street, Cambridge, MA 02159 (800) 564-0035 (617) 491-5595

CIRCLE 169 ON READER SERVICE CARD

CBasic Clinic, continued...

Listing 1.

```
10 REM THIS PROGRAM AVERAGES A LIST OF NUMBERS
20 REM INITIALIZE VARIABLES
30 LET A = 0
40 LET B = 0
50 LET C = 100
60 PRINT:PRINT:PRINT
70 PRINT "HOW MANY NUMBERS ON YOUR LIST?"
80 INPUT D
90 REM ENTRY LOOP
100 FOR I = 1 TO D
110 PRINT:PRINT
120 PRINT "ENTER NUMBER BETWEEN -100 AND +100"
130 INPUT E
140 LET A = A + E
150 IF E > B THEN LET B = E
160 IF E < C THEN LET C = E
170 NEXT I
180 LET F = A/D
190 PRINT:PRINT:PRINT
200 PRINT "THE AVERAGE OF YOUR NUMBERS IS: ";F
210 PRINT
220 PRINT "THE HIGHEST NUMBER IS: ";B
230 PRINT
240 PRINT "THE LOWEST NUMBER IS: ";C
250 END
```

K capacity. For any serious programming, you should have 64K minimum RAM and two disks. Since you must write the programs with a text editor or word processor, you should have one like *WordMaster* or *WordStar*. You could use the ED function of CP/M, but I think that is being a masochist of the first order. CP/M is great, but ED is probably its weakest link.

For purposes of experimentation, you can make do with ED, but for any real work get a text editor (or better, get *WordStar*, which is both a great word processor and (in the N, non-document, mode) a text editor).

There is one more modest investment you must make if you are going to be serious about CBasic. For \$15 to \$20, you can buy a book which will help you start off on the right foot. You need this book because the documentation that comes with CBasic is at best formidable and too often approaches the in-

comprehensible for even the seasoned user.

Buy *CBasic User Guide* published by Osborne/McGraw Hill. Its authors include Gordon Eubanks, Jr., Adam Osborne, and Martin McNiff. The publisher states that CBasic is as easy to learn as Basic and may be the only computer language you will ever have to learn. Others have said it is the most advanced of the Basics. I agree with all of the above.

The best advice I can give is to sit down at your computer and try CBasic. The cost of CBasic is about \$125 to \$150. I don't know of any other complete and proved-in-use language for anywhere near that bargain price. For those who really get into it, an advanced, upwardly compatible version (CBasic Compiler), which offers even more power, speed and options is available. But you can do almost everything without the advanced version, so don't think CBasic is a beginner's, experimental, or

stripped-down version like many of the languages being offered today.

Getting Started

Okay, enough theory. Let's get started. To begin with, you must understand that CBasic is written on a text editor or with ED. You do *not* use CBasic to write the program. The program name uses the CP/M format (up to eight characters followed by a period followed by an extension of three characters). The extension must be .BAS. (TESTPROG.BAS for example.)

Once the program is written and stored on disk, it must be *compiled*. This is where you start to use the CBasic program itself. Included on the CBasic disk is a file called CBAS2.COM. Assuming your own program is on the same disk, you would go into CP/M, get the A prompt and type

```
CBAS2 TESTPROG (RETURN)
```

(Note that you do *not* have to type the .BAS extension. The compiler assumes it is there and will not work if it is not.)

The compiler then scrolls the entire program on your screen. If it is a long one, you can stop it to check for errors or whatever by hitting CONTROL-S (hold the control key down while you enter S). Hitting CONTROL-S again re-starts the scrolling. If there are any errors in syntax or format, they will appear on the screen.

If all goes well and there are no errors, you then use the second CBasic program: CRUN2.COM. Enter

```
CRUN2 TESTPROG (RETURN)
```

Now, your program will run (on the screen and/or your printer depending on how you set it up). There is again a chance that you have made an error (for example, asking the computer to do something impossible such as divide by zero). In this case, the program will stop at that point and note the error on your screen.

This is called a *run time error* as opposed to the previous *compiler error*. In either case, you must go back to your text editor, correct the problem and re-compile before running. A complete list of error codes and their meanings can be found in your documentation and in *CBasic User Guide*.

When you compile, CBasic automatically writes a second file. This has the same name as your program but carries the extension .INT for *intermediate*. This is the file to use when you run the program. If your disk space is limited, you need only the .INT file plus CRUN2.COM to run your program successfully.

Listing 2.

```
REM This program averages a list of numbers
REM Initialize variables
TOTAL = 0
HIGHEST.VALUE = 0
LOWEST.VALUE = 100
PRINT:PRINT:PRINT
INPUT "How many numbers on your list?";TOTAL.NUMBERS
REM Entry loop
FOR INDEX = 1 TO TOTAL.NUMBERS
PRINT:PRINT
PRINT "Enter number between -100 and +100"
PRINT
INPUT "Enter number:";NUMBER
TOTAL = TOTAL + NUMBER
IF NUMBER > HIGHEST.VALUE THEN HIGHEST.VALUE = NUMBER
IF NUMBER < LOWEST.VALUE THEN LOWEST.VALUE = NUMBER
NEXT INDEX
AVERAGE = TOTAL/TOTAL.NUMBERS
PRINT:PRINT:PRINT
PRINT "The average of your numbers is: ";AVERAGE
PRINT
PRINT "The highest number is: ";HIGHEST.VALUE
PRINT
PRINT "The lowest number is: ";LOWEST.VALUE
```

NEW
UP TO 2MB
ON
A SINGLE
CARD!

STATE OF THE ART MEMORY SYSTEMS



512KB SINGLE BOARD IBM MEMORY W/RS232-C PORT

- Addressable as a contiguous block in 64KB increments thru 1 megabyte.
- On board parity with interrupt on parity error.

SINGLE QTY. PRICE: \$545.00

MEMDISK 1 Allows memory to emulate disks. Increases system performance!!
FREE with purchase of memory.



64KB SINGLE BOARD EXORCISER I, II, AND ROCKWELL SYSTEMS 65 MEMORY

- Parity checker on board.
- Addressable as a contiguous block in 4K increments with respect to VXA or VUA.
- Pin to Pin compatibility.

SINGLE QTY. PRICE: \$250.00

NEW



512KB TO 2MB SINGLE BOARD MULTIBUS MEMORY

- Pin to Pin MULTIBUS compatibility for both 8 bit and 16 bit systems.
- On board parity with selectable interrupt on parity ERROR.
- Addressable up to 16 megabytes.

SINGLE QTY. PRICE:

512KB	\$ 895.00
1MB	\$3995.00
2MB	\$5995.00



64KB SINGLE BOARD S100 MEMORY

- Addressable as a contiguous block in 4K word increments.
- Battery back-up capability.
- Functions with on-board refresh.

SINGLE QTY. PRICE: \$250.00

NEW



256KB TO 1 MB SINGLE BOARD LSI 11 MEMORY

- On board parity generator checker.
- Addressable as contiguous block in 256KB increments through 4 megabytes.
- Battery back-up mode.

SINGLE QTY. PRICE:

256KB	\$ 525.00
512KB	\$2650.00
1MB	\$3995.00

DON'T ASK WHY WE CHARGE SO LITTLE, ASK WHY THEY CHARGE SO MUCH.



Chrislin Industries, Inc.

31352 Via Colinas • Westlake Village, CA 91362 • 213-991-2254
TWX 910-494-1253 (CHRISLIN WKVG)

CIRCLE 131 ON READER SERVICE CARD

Practice

If this all sounds confusing, don't despair. It will become quite plain as we do it. And that is exactly what you will do to end this introductory session. We will assume that you have at least some knowledge of Basic, so let's take a very simple program originally written in MBasic and change it to CBasic. Look at Listing 1.

As you can see, this MBasic program allows you to enter several numbers in the range of -100 to +100. It then adds them up and averages them. Listing 2 is the same program in CBasic.

Looks a little different, doesn't it? Does it remind you of Pascal? To begin with, you will notice there are no line numbers. CBasic doesn't require them (unless you refer to one specifically as in a GOTO or GOSUB statement).

Also note that the variable names can be much longer and more descriptive. This makes for easier reading and debugging. In this primitive program, those are the major differences, but note a few minor ones: the assigning of variables does not require the word LET (although it would not hurt to use it). There is no END statement; the compiler puts it in automatically. The INPUT syntax is simplified. See if you can find any others. Actually, the two programs are so similar that you can actually compile the MBasic program as written here into CBasic. That will not be true as we get into more advanced work, however.

Time to get down to work: Type out the CBasic program above using ED or the Non-document mode of *WordStar* or your text editor. Call it TESTPROG.BAS. When you have carefully proofread it, store it on disk. Now, leave your text editor and go to CP/M. From the A> prompt, type

```
CBAS2 TESTPROG
```

(note one space between the two names) and hit RETURN. The CBasic copyright notice will come up first followed by your program. The program shown in Listing 3 should appear on your screen.

What's this? There are line numbers! Right, the compiler puts them in to help you make corrections. They are not really part of the program, but they do come in mighty handy in a long program. For example, suppose you have an error in line 467. With most text editors, you can go directly there, make your correction, and re-store the program. You then re-compile (without showing any errors we hope) and be ready to run. Note also the five lines at the end of the program. For now, the only important one is the first: No Errors Detected. Later you will find use for the others.

If you do have an error, the listing will

Variable names can be much longer and more descriptive.

show what kind it is directly below the line where the error was made. The most common is likely to be an SE error. This is a syntax error (you have a grammatical mistake in the CBasic language). Chances are that you forgot to put in a quotation mark at the start or end of a string. Check also that you have not left an equal sign or semi-colon. All Basics are fussy about such things.

Now comes the fun part. From the CP/M A prompt, run the program by typing

```
CRUN2 TESTPROG (RETURN)
```

Answer the questions as they come up on the screen and you will have your average printed out along with your highest and lowest entries as a bonus. You have written and run your first CBasic program. Don't be overwhelmed. From such modest starts, great things will come.

Before we meet again, let me give you a couple of assignments to work on. First, get the *CBasic User Guide* book and start reading right from the begin-

Listing 3.

```
A> CBAS2 TESTPROG
```

```
CBASIC COMPILER VER 2.00  
COPYRIGHT 1981 COMPILER SYSTEMS INC.
```

```

1: REM This program averages a list of numbers
2: REM Initialize variables
3: TOTAL = 0
4: HIGHEST.VALUE = 0
5: LOWEST.VALUE = 100
6: PRINT:PRINT:PRINT:PRINT
7: INPUT "How many numbers on your list?";TOTAL.NUMBERS
8: REM Entry loop
9: FOR INDEX = 1 TO TOTAL.NUMBERS
10:   PRINT:PRINT
11:   PRINT "Enter number between -100 and +100"
12:   PRINT
13:   INPUT "Enter number: ";NUMBER
14:   TOTAL = TOTAL + NUMBER
15:   IF NUMBER > HIGHEST.VALUE THEN HIGHEST.VALUE = NUMBER
16:   IF NUMBER < LOWEST.VALUE THEN LOWEST.VALUE = NUMBER
17: NEXT INDEX
18: AVERAGE = TOTAL/TOTAL.NUMBERS
19: PRINT:PRINT:PRINT:PRINT
20: PRINT "The average of your numbers is: ";AVERAGE
21: PRINT
22: PRINT "The highest number is: ";HIGHEST.VALUE
23: PRINT
24: PRINT "The lowest number is: ";LOWEST.VALUE
25: END
NO ERRORS DETECTED
CONSTANT AREA:      8
CODE SIZE:          318
DATA STMT AREA:     0
VARIABLE AREA:      56
```

ning. Next, write out, compile, and run the first program above (the one written in MBasic). Do give it a different name (TEST2.BAS for example) or you will confuse your computer and yourself. Be sure to follow the spacing *exactly*. CBasic does not allow condensing by eliminating spaces as in, for example, FOR1=JTOK. If you think for a moment, it makes sense. CBasic permits long variable names. Therefore, FOR1 is read as an assignment for the variable JTOK (LET FOR1=JTOK).

Note the similarities and differences on the two compiled listings. For instance, in the second one, you will note that an asterisk follows every line number instead of a colon. Can you figure out why?

For those of you who know Basic, here are a couple of challenges. You note that the program asks you to tell it how many numbers you will enter in total. Can you re-write this so that you can enter any number of numbers without pre-stating the quantity? Of course, you will have to find a way to tell the program when the last number has been entered. While you are at it, how about changing the program so that the numbers entered are not limited to the range -100 to +100?

I hope this has been enough of an eye-opener to inspire your interest. As we go on, you will find the simple examples above can be expanded into rather sophisticated applications. □



YES! Send me
Creative Computing for:

- One year (12 issues)
for \$19.97—save 20%!
- Two years (24 issues)
for \$36.97—save 26%!
- Three years (36 issues)
for \$49.97—save 33%!

Savings based on full one-year
subscription price of \$24.97.

Check one:

- Payment enclosed.
- Bill me later.

Mr. _____
Mrs. _____
Ms. _____

(Please print full name)

45192

Address _____ Apt. _____

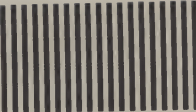
City _____

State _____ Zip _____

Add \$5 a year in Canada; all other foreign add \$10 per year. Please
allow 30 to 60 days for delivery of first issue.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE

creative computing

P.O. Box 5214
Boulder, Colorado 80321

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 that 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? Contact 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. 45192

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.

Logic and Recursion: The Prolog Twist

Jesse M. Heines
Jonathan Briggs
Richard Ennals

Britain's young Prince William has been born into a famous family. As he grows up he will become aware of the distinguished ancestry which links him with several centuries of British monarchs through both his father and his mother.

According to current reports, the popular Prince still appears to lack the physical and intellectual power to carry out an exhaustive search for his forebears himself. However, he may already know enough to initiate a computer-aided search: he knows his immediate ancestors, his parents, as well as the next level, the parents of his parents.

Given the names of William's father and mother, a database of names connected by parent-child relationships, and an effective search strategy, one should be able to write a relatively simple program to list his genealogy.

The key to the programming task is that the problem is *recursive*: for each level of ancestors, the next level can be determined by searching for the ancestors of those ancestors, and so on until no additional ancestors can be found. A recursive problem is one that can be broken down into two or more sub-programs, at least one of which is the same as the original problem with a different set of conditions or arguments.

This article approaches the issue of recursion by describing a traditional programming problem and comparing the ways it is implemented in four languages: Basic, Pascal, Lisp, and micro-Prolog. It is a programming exercise and does not purport to be an exhaustive discussion of recursion or the recursive properties of the four languages.

No claims are made that recursion is a "good" programming technique, and we do not discuss its relative strengths and weaknesses as compared to other techniques such as iteration. Our purpose is simply to present an interesting illustration of recursion across four languages to provide insight into the subtle properties of each language.

The Factorial Function

We will use the factorial function to illustrate recursion throughout this article; as it is a classic example of recursive programming. The factorial of any positive integer n is the

product of all positive integers from 1 to n and is represented by the symbol $n!$ By definition, the factorial of 0 is 1. Therefore:

$$\begin{aligned}0! &= 1 \\1! &= 1 \\2! &= 2 \times 1 = 2 \\3! &= 3 \times 2 \times 1 = 6 \\4! &= 4 \times 3 \times 2 \times 1 = 24\end{aligned}$$

Before proceeding to coding in a particular language, it will help if we can develop a formal specification of the factorial function. This can be done using a logical notation, starting with the definition given above:

[1] 0 has factorial 1

The factorial of a positive integer is the product of that integer and the factorial of the integer to which it is the successor:

[2] u has factorial v if $0 < u$ and
 u is the successor of w and
 w has factorial x and
 x times $u = v$

The successor relationship is specified as:

[3] u is the successor of w if $w + 1 = u$

In traditional computing terms, the simplest way to solve the factorial problem is via iteration. This can be illustrated with the Basic program in Listing 1, using a FOR/NEXT loop to accomplish the iteration.

Listing 1.

10 INPUT N	Enter the number whose factorial is to be computed.
20 LET ANSWER = 1	Initialize the ANSWER to 1.
30 IF N=0 THEN 70	Handle the special 0 case.
40 FOR K=N TO 1 STEP -1	Begin looping from N to 1.
50 LET ANSWER = ANSWER * K	Multiply the ANSWER by the loop index.
60 NEXT K	Iterate over the next index.
70 PRINT ANSWER	Print the answer.
99 END	Stop.

A flowchart for the iterative solution is shown in Figure 1. This program certainly does the job, but it is not a very clear representation of the factorial function in terms of the formal function specification given above. This lack of clarity is *not* because the program is written in Basic, as will be seen in the next section. It is because the solution uses iteration.

Recursion may or may not be more computer efficient, and it may or may not be easier to program. These issues are beyond the scope of this paper. However, as shown by the flowchart in Figure 2, recursion allows one to code the factorial function in a manner that is a much clearer representation of the formal function specification. The sections that follow illustrate how the recursive solution is programmed in four different languages.

Jesse M. Heines, Digital Equipment Corporation, Educational Services, Burlington, MA 01803.

Jonathan Briggs and Richard Ennals, Department of Computing, Imperial College of Science & Technology, University of London, London SW7 2BZ.

SOFTWARE RIOT SAVE 20% TO 40% FOREVER

GAMES

Manufacturer	Saving
Artwork	20%
Avalon Hill	20%
Colortext	20%
Creative Software	25%
Datamost	20%
Data Age	25%
Discovery Games	20%
Funware	20%
Hes	20%
Hexcraft	20%
Milton Bradley	20%
Mind Systems	20%
MMG Micro	20%
PC Software	20%
Quality Software	20%
Screen Play	20%

Sierra On Line	20%
Sim Soft	20%
Sir-Tech	20%
Software Labs	20%
S.S.I.	20%
Telsys	25%
TG Products	20%
Tronix	20%

PDI	20%
SouthWest EdPsych	20%

BUSINESS

Manufacturer	Saving
Alpha	25%
Countryside Data	25%
Execuware	20%
Hayden	20%
Info-Pros	20%
Kensington	20%
Microcomputer Applications	20%
MicroSoft	20%
MicroCraft Legal	40%
MicroData	20%
MicroSystems	20%
Organic	25%
Small Business Systems	20%

EDUCATIONAL

Manufacturer	Saving
Adent	20%
Cross	20%
Edu Pro	20%
Edu Ware	20%
Earle Languages	25%
Krell	20%

SOFTWARE AT LOW CLUB PRICES HUGE VARIETY GUARANTEED SAVINGS SEND FOR FREE CATALOGUE

12 GREAT REASONS TO TRY THE BUDGET WAY

- Save 20% to 40% on software.
- Satisfaction Guaranteed—All items are returnable within 15 days.
- No Minimum amount to purchase each year.
- Bonus Certificates, promotions and regular special discounts.
- Automatic Selection—Do nothing and the Editor's Choice will be shipped to you. But you have your choice of 100's of alternate selections—or none at all with your monthly Club News.
- Huge Selection—More than any store—More than any catalog.
- Extra Bonuses—Introduce a friend and get a free bonus certificate.
- Club News—Keeps you up to date on the latest in Software and Hardware.
- Monthly Hardware Specials—So you can get the peripherals and other tools you need at the lowest possible price.
- Protection Against Price Drops—If the price of an item drops before a new catalog is printed we guarantee you the lower price—regardless of our catalog price.
- Personalized Specials—Your special Editor's Choice of the month is always matched to your own personal computer.
- Prompt Delivery—Shipments can generally be made the day your order is received.

CIRCLE 303 ON READER SERVICE CARD

MEMBERSHIP APPLICATION BUDGET COMPUTER SOFTWARES CLUB, INC. Box B-3, Quogue, New York 11959

Please enroll me as a Charter Member of the BUDGET COMPUTER SOFTWARES CLUB, INC., entitled to all benefits and privileges thereof.

IMPORTANT: To prevent error, please write the name of your computer (), its Model# (), RAM Power (), and Input Type: Disk (), Cassette (), or Cartridge (), here

To help us bring you the kind of softwares you want most, please check (✓) one of the boxes below:

The kind of software I want most is:

Type	Please Give Us Some Examples	
Games	()	_____
Educational	()	_____
Business	()	_____
Personal Management	()	_____
Signature _____	Date _____	
NAME _____		
ADDRESS _____		
CITY _____	STATE _____	ZIP _____
PHONE # _____		

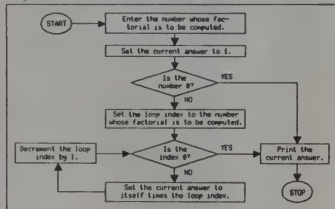


Figure 1. Flowchart of an interactive factorial function.

A Basic Implementation

Not all languages allow recursion, but this is really more a property of the language *implementation* than the language *design*. As stated earlier, a detailed technical discussion of the language implementation requirements for recursion is beyond the scope of this paper. But even Basic, that most maligned of computer languages, allows recursion in some implementations.

Just to demonstrate that it can be done, Listing 2 shows the code for a recursive implementation of the factorial function written in Digital Equipment Corporation's Basic +2.

Listing 2.

```
10 DEF FNF(X)           Begin the function
                        definition.
20 IF X=0 THEN LET FNF=1 Handle the 0 case.
30 IF X>0 THEN LET FNF=X*FNF(X-1) Handle all other
                        cases.
40 FNFEND              End the function
                        definition.
```

When the symbol FNF is used alone on the left side of the equal sign in lines 20 and 30, it represents the result that the function returns. When FNF (X-1) is used on the right side of the equal sign in line 30, it represents a recursive call to function FNF with a new argument (the original argument minus 1). The function is initially called with a statement such as:

```
100 LET F = FNF (4)
```

This function can be made more readable and efficient by using other advanced features of Basic +2, but we needn't proselytize further here.

A Pascal Implementation

While recursion may be somewhat foreign to Basic programmers, it should be familiar to Pascal programmers. Following is the code for a recursive Pascal definition of this function:

```
function factorial (x:integer) : integer;
begin
  if x = 0 then factorial := 1
  else factorial := x *
    factorial (x-1);
end;
```

As in the Basic implementation, when the symbol "factorial" is used alone on the left side of the := sign it represents the result that the function returns. When it is used on the right side of the := sign within its own function definition, it represents a

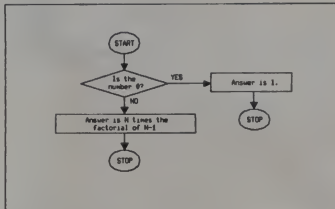


Figure 2. Flowchart of a recursive factorial function.

recursive function call. A Pascal statement for calling this function would have the form:

```
f := factorial (4);
```

A Lisp Implementation

With the recursion concept firmly in mind, we are now ready to go a bit further by looking at two interesting languages that are often used for logic and artificial intelligence applications.

The first is Lisp:

```
(defun factorial (x) ; begin the function
  ; definition
  (cond ; begin a conditional block
    ((equal x 0) 1) ; if the "equal" relation is
    ; true when x is compared to
    ; 0, return 1
    ((t (times x (factorial (difference
      x 1)))))) ; in all other cases, return
    ; the product of x and the
    ; factorial of the difference
    ; between x and 1
```

This code may be difficult to follow for readers who are not used to "prefix" notation, but this should be only a minor stumbling block. Prefix notation puts the operation first, followed by the two arguments. Thus, (equal X 0) means "if x equals 0," and (difference x 1) means "x minus 1." The comment following the last line of the code translates the recursive call into English. A Lisp statement to call this function equivalent to the two previous illustrations would look as follows:

```
(setq f (factorial 4))
```

which sets variable f to the value returned by the function call (factorial 4).

One of the reasons for showing the Lisp implementation is that it is relatively easy to trace Lisp functions to demonstrate the recursive calling sequence. A trace of the above call to compute the factorial of 4 is shown below. The first number in each line is the recursion level. The number is parentheses at the end of each ENTER FACTORIAL message is the *argument* with which the function is called. The number at the end of each EXIT FACTORIAL message is the *result* returned by that recursion level.

```
(1 ENTER FACTORIAL (4))
(2 ENTER FACTORIAL (3))
(3 ENTER FACTORIAL (2))
(4 ENTER FACTORIAL (1))
(5 ENTER FACTORIAL (0))
(5 EXIT FACTORIAL 1)
(4 EXIT FACTORIAL 1)
(3 EXIT FACTORIAL 2)
(2 EXIT FACTORIAL 6)
(1 EXIT FACTORIAL 24)
```

GenTech

HAPPY HOLIDAY SPECIALS

- OTRONA ATTACHE \$2595
 BASIS 108 128K CP/M 3.0 \$1999
 PROWRITER I \$369
 PROWRITER II \$659
 EPSON FX-100 \$725
 RANA ELITE I \$245
 RANA ELITE II \$380
 RANA 1000 (FOR ATARI) \$309
 BUFFERED GRAPPLER
- 16K \$179
 - 32K \$199
 - 64K \$239
- MULTIPLAN IBM, Apple II/III \$169
 IBM PC DSDO Drive
- RANA \$299
 - QUENTIN \$275
 - FOURTH DIMENSION \$275
- LOGO
- Terrapin \$119
 - Krell \$85

CUSTOMER SERVICE & TECH. SUPPORT

401-274-0330

Ask for New Catalog.

ORDERS ONLY

800-843-4302

150 Broadway, Suite 2212, N.Y. NY 10108

Money Order, Cashier's Check, Personal Check, C.O.D. Honored. Add 1% on Credit Card.



COMPUTERS

- FRANKLIN**
ACE 1000 w/color \$700
- ACE PRB System**
 ACE 1000 w/color, ACE 10 Drive,
 80-Column Card, ACE Writer II,
 ACE Calc (80-Col Spread Sheet) \$1205
- ACE 1200 (128K, Dual Processor,**
 1 Drive, 80-Col. CBASIC,
 CP/M & DOS
 ACE Office Management System
 ACE 1200 w/2 Drives, I/O Card,
 WordStar, MailMerge, ACE Calc



- COLUMBIA**
 128K RAM, Oual DSDO (540K) Drives,
 Fully IBM Compatible
 w/Superspack \$2649
- 128K RAM, 10 MB Hard disk
 w/Superspack \$3950
- Portable VP w/Superspack \$Call
- COMPUPRO** \$Call
- CORONA PC & Portable PC** \$Call
- DIGITAL EQUIPMENT CORP**
 Rainbow 100 \$Call

- EABLE**
 PC-2 128K RAM w/2 Drives \$Call
- (540K)
 PC-XL 128K RAM 1 Floppy, \$Call
- 10 MB Hard



- KAYPRO**
 KAYPRO II 84K w/Software \$1390
- KAYPRO IV, KAYPRO ID \$Call
- IBM Compatible 128K or 256K
- MORROW DESIGNS**
 M02 64K, 2 DSDO Drives \$850
- M03 64K, 2 DSDO Drives \$Call
- PIED PIPER** \$965
- SANTO SMC** \$Call
- VICTOR 9000 (128K, 1.2MB Disk)** \$2795

PLOTTERS

- BAUSCH & LOMB**
 OMP 40 \$879
- OMP 29 (6 COLOR 11x17 PAPER) \$1965
- OMP 41 (SINGLE PEN 22x17 INCH) \$2599

FOR APPLE II/IIIe, Franklin Ace

- Fourth Dimension Super Drive \$219
- 80-Col. w/64K (IIIe Only) \$206
- 10K RAM \$41
- ALS CP/M Card \$289
- ALS Dispatcher \$109
- MicroPlot, SoftCard \$225
- Grappier + \$119
- Graphits \$96
- Plasma card \$129
- MicroPlot Dumping GX \$90
- MicroPlot Dumping 16 (16K) \$149
- EPO Surge Protectors \$Call

FOR IBM PC

- AST RESEARCH INC.**
MEGA PLUS
 64K w/Serial & Clock/CLK \$279
- 128K 5.25", 16X 5.25", 256K 5.25"

- 64K w/Ser. Par & Clock \$379
- 128K 5.25", 16X 5.25", 256K 5.25" \$280
- MEGA PAK 256K Module**
- COMBO PLUS**
 64K w/Serial & Parallel \$270
- 128K 5.25", 16X 5.25", 256K 5.25" \$120
- 1/8 PLUS**
 Serial \$39, Parallel \$36, Game \$39

- QUADRAM**
QUADBOARD
 64K \$290
- 256K \$419
- 812+ EXPANSION BOARD**
 Quad 512+(64K) \$219
- Quad 512+(256K) \$390
- Quad 512+(16K) \$630

- QUADLINK** \$480
- MICROFAZER**
 P/P (Parallel/Parallel)
 8K 512K, 64K 512K, 128K 300K
 256K 528K, 512K 540K
 S/P, P/S, S/S
 BK 514K, NK 186K, 32K 195K, 64K 127K
 I/O Power Supply \$18.90

HARD DISK



- COMREX**
 COMPILER 10 MB FOR QX-10 \$1905
- CORVUS** \$Call
- DAWING**
 8 MB \$1895
- 5 MB \$1650
- 10 MB \$2665
- 10 MB \$1650
- 20 MB \$3405
- 21 MB \$2495
- XCOMP** \$Call
- GCS**
 10 MB \$1895
- 10 MB \$2005

DOT MATRIX PRINTERS



- EPSON**
 RX-80 \$349
- MX-80 F/T III \$419
- MX-100 \$589
- FX-80 \$535

- STAR MICRONICS**
 GEMINI 10X \$309
- GEMINI 15/15K \$419/\$479
- SHIBURA**
 MICROLINE 92 \$449
- MICROLINE 83 \$372
- MICROLINE 84 P \$879

- C-10M**
 PROWRITER I \$389
- PROWRITER II \$659
- PROWRITER 800 BP \$995
- MANNESMANN DALL**
 M180L (180 CPS) \$615
- M1 180L (15" Carriage) \$845
- INFO RUNNER RITEMAN** \$Call
- TOSHIBA P1350** \$1545

LETTER-QUALITY PRINTERS



- C-10M**
 F-10 STARWRITER \$1180
- F-10 PRINTMASTER \$1589

- COMREX**
 COMRITER I (P or S) \$790
- COMRITER II Parallel \$470
- COMRITER II Ser (SK) \$500

- BAISYWRITER**
 2000 EXP (48K BUFFER) \$1019
- 48K (16 CPS 15") \$525
- NEC SPINWRITER** \$Call
- QUIM SPRINT II/40** \$1345
- SILVER REEF**
 EXP 550P \$839
- EXP 550S \$879
- EXP 500P \$439
- EXP 500S \$469
- TRANSSTAR T365, T120, T130 & T140** \$Call

MONITORS



- AMBERX**
 300S \$Call
- 300A \$Call
- COLOR I \$Call
- COLOR II \$359
- COLOR III \$Call
- COMREX** \$Call
- QUADRAM**
 QUADCHROME (RGB FOR IBM) \$485
- TEXAM**
 RGB VISION I
 WITH APPLE II+ CABLE & INTERFACE \$279
- RGB VISION II \$519
- KG 12N (12" green) \$125
- KG 12N-4Y (12" amber) \$135
- USI P1-4 (9" green) \$80

TERMINALS



- Freedom 100 (11 FTM Key)** \$499
- Visual 50 (Intachable K'RD) \$589
- Televideo 910+ \$359
- Televideo 925 \$275
- Televideo 950 \$965

MODEMS

- ANCHOR**
 MARK I \$Call
- MARK VIII \$Call

- BAVEX**
 MICROMODEM II \$275
- SMARTMODEM (300 BAUD) \$209
- SMARTMODEM (1200 BAUD) \$569
- SMARTMODEM 1200B for IBM \$439
- SMARTCOM II (TERMINAL LOG) \$89

- HOWARD**
 CAT 300 BAUD Acoustic \$144
- C-CAT 300 BAUD OPTIC \$155
- J-CAT 300 \$109
- APPLE CAT II \$289
- 212 APPLE CAT II \$575
- 103 SMART CAT \$179
- 103/212 SMART CAT \$419

- ISSM**
 300 BAUD MODEM CARO \$229
- 1200 BAUD MODEM CARO \$329
- TRANSCO 11/2/3 869/5109/5200

- US ROBOTICS**
 PASSWORD \$Call
- VEN-TEL \$Call

SOFTWARE

- FOR IBM PC SOFTWARE**
 IUS A/R A/P G/L I/C O/E \$389
- ANY THREE \$975

- FOR DEC RAINBOW AND APPLE II**
 FEATRE G/L A/R A/P I/C \$489
- PAYROLL \$489

CIRCLE 306 ON READER SERVICE CARD

Logic and Recursion, continued...

A Micro-Prolog Implementation

Prolog is different from the three languages already discussed. Although there have been a variety of implementations since 1972, Prolog has received considerable attention in recent months, partly due to its adoption by the Japanese as the starting point for their Fifth Generation machines, which are to be based on logic programming.

The difference between Prolog and the other three languages is that Prolog is *declarative*, while the others are *procedural*. That is, rather than telling the computer *how* to compute the factorial of a number, in Prolog one tries to tell the computer *what* the factorial of a number *is*.

Micro-Prolog is an implementation of Prolog for microcomputers. Since 1980 it has been available for microcomputers with the Z80 microprocessor and the CP/M operating system. It is currently being implemented for a wide range of other microcomputers such as the Sinclair Spectrum, BBC micro, Apple, and Commodore 64.

Returning to our initial formal specification of the factorial function, we can see that little work is required to code the function in micro-Prolog. The sentence [1] in the specification can be used pretty much as it stands, adding only a hyphen in the relationship name:

```
[4] 0 has-factorial 1
```

This is the simplest type of micro-Prolog statement because no conditions are involved. More complex micro-Prolog statements can be thought of as *rules* that define conditions under which certain assertions are true. Sentence [2] in the formal specification can be rewritten into such a rule using the micro-Prolog convention where variables are X, Y, Z, x, y, z, X1, Y1, Z1, x1, y1, z1, etc., and the built-in arithmetic of the TIMES program and the LESS relation. (Note that the uppercase and lowercase letters represent different variables in this version of micro-Prolog.)

```
[5] X has-factorial Y if
    0 LESS X and
    X is-the-successor-of Z and
    Z has-factorial x and
    TIMES (X × Y)
```

This definition of the "has-factorial" relation is recursive because the relation name "has-factorial" appears as one of the conditional clauses within its own definition. Since X is defined by the previous clause to be the successor of Z, Z must be X-1. Thus, the recursive call in the clause "Z has-factorial x" is actually computing the factorial of X-1.

The specification of "is-the-successor-of" given in Sentence [3] is coded in micro-Prolog using the built-in SUM program:

```
[6] X is-the-successor-of Y if SUM (Y 1 X)
```

The micro-Prolog query for finding the factorial of 4 is:

```
Which (x 4 has-factorial x)
```

This is read, "Which values of x are there such that the relation 4 has-factorial x is true?"

Such a query follows the same pattern as queries to databases in micro-Prolog. Indeed, in Prolog, there is no distinction between program and database. A program consists of statements about relationships between individuals, which may be in the form of facts or rules.

The Promise of Logic Programming

Given only this exposure to recursion in Lisp and micro-Prolog, one might prefer Pascal or even Basic. The syntax of Lisp and micro-Prolog may appear unfamiliar, and some might even find it initially difficult to conceptualize something like the factorial function in terms of rules. The syntactic objection might be waved off by saying "one gets used to it," but the conceptual barrier warrants more explanation.

First, one must realize that neither Lisp nor Prolog was designed for mathematical calculation. The reader is referred to the texts listed at the end of this paper for a full discussion of

their design considerations. Second, if all one wants to do is answer the question, "What is the factorial of n?" the authors agree that one might as well simply use a calculator with the appropriate function key.

But now the Prolog twist. We have seen that the factorial of 4 can be computed in Basic by using the statement:

```
LET X = FNF (4)
```

and in Pascal by:

```
x := factorial (4);
```

and in Lisp by:

```
(setq x (factorial 4))
```

and finally in micro-Prolog by:

```
Which (x 4 has-factorial x)
```

In the three procedural languages, one cannot use the functions defined in this paper to find out what number 24 is the factorial of. That is, one cannot write statements such as:

```
24 = FNF (x)
```

```
24 := factorial (x);
```

```
(setq 24 (factorial x))
```

Since the Prolog definition is based on logic, however, one can *theoretically* use it to solve the problem by posing the query:

```
Which (x x has-factorial 24)
```

This is the promise of logic programming: rule-based systems comprehensively defined can be run backwards as well as forwards. Unfortunately, implementation constraints on present machines restrict numerical applications at the present time.

The major problem is that the built-in micro-Prolog relations LESS, SUM, and TIMES are not declarative. They are machine-coded functions that perform their operations using standard procedural techniques. If they were declarative, one should, indeed, be able to get an answer to the backwards question posed above.

Interestingly enough, it is possible to write declarative versions of the LESS, SUM, and TIMES relations. The code for accomplishing this is provided below.

We begin by declaring successor relationships:

```
1 is-the-successor-of 0
2 is-the-successor-of 1
3 is-the-successor-of 2
4 is-the-successor-of 3
5 is-the-successor-of 4
6 is-the-successor-of 5
```

Using these relationships, we can then declare the rules by which one determines whether one number is less than another:

```
X is-less-than Y if
  Y is-the-successor-of X
X is-less-than Y if
  Z is-the-successor-of X and
  Z is-less-than Y
```

The first rule handles cases where Y is one greater than X, while the second rule uses recursion to handle all other cases. Given these relationships, we can now define the "sum" relation declaratively:

```
sum (0 0 0)
sum (0 X X) if
  0 is-less-than X
sum (X 0 X) if
  0 is-less-than X
sum (X Y Z) if
  0 is-less-than X and
  0 is-less-than Y and
  X is-the-successor-of x and
  sum (x y z) and
  Z is-the-successor-of y
```

The first rule says that the sum of 0 and 0 is 0. The second rule says that the sum of 0 and X is X if 0 is less than X. The third rule says that the sum of X and 0 is X if 0 is less than X. The fourth rule says that the sum of X and Y is Z if 0 is less



APPLE HARDWARE

AL 5	CPM Card	\$278	M&R	Super Fan II	\$38
Z Card II		\$119	MicroSoft	Super Fan	\$129
Smartem II		\$129	Softcard		\$228
ALLEN GROUP			Softcard Premium I		\$129
Apple Voice Box		\$128	Softcard Premium II		\$149
Apple Voice Box		\$98	ORANGE MICRO		\$259
INTERACTIVE STRUC.			Grapple		\$155
Phono Interface		\$127	Bullfinch Grapple		\$49
KENSINGTON			RH ELECTRONICS		
System Server		\$64	Super Fan II		\$69
KOALA TECHNOLOGIES			TQ PRODUCTS		
Apple Graphic Tablet		\$79	Joystick I w/Toggle		\$41
Alan Graphic Tablet		\$69	Joystick II		\$41
C&A Graphic Tablet		\$69	Joystick III		\$41
KRAFT			TYMAC		\$29
Joystick		\$40	Printer Interface		\$74
Packies		\$35			



APPLE COMPUTER INC.			ON LINE		\$65
Apple Writer II		\$157	Sammy Lightfoot		\$20
ARTSICI			General Manager II		\$145
Magic Window II		\$95	Graphic Writer II		\$45
Magic Window		\$45	Wiz & Princess		\$22
ASHTON TALE			Time Zone		\$65
D Base II (Req. 2.0)		\$299	Maurauder		\$23
Finan. Plan. (Req. 2.0)		\$200	Propper		\$23
Friday		\$198	Cannonball Blitz		\$23
AVALLON HILL			Powerhouse Prof.		\$126
ATeleport		\$20	PENGUIN		
VC		\$17	Spy's Demise		\$14
Empire Of Overmind		\$20	Graphic Magic Window		\$30
AVANT GARDE			Comp. Graphics Sys.		\$30
Zero Grav. Penball		\$20	Comp. Graphics Sys.		\$27
Hi Res Golf		\$70	PLATO		
Hi Res Secrets		\$70	Whole Numbers		\$38
BEAGLE BROS.			Fractions		\$38
Doc's Boat		\$17	Quality		\$38
Alpha Plot		\$20	Reg. of Trucks		\$27
Utility Guy		\$20	Ali Baba & 40 Thieves		\$22
Top Disk #		\$15	QUALITY		
Apple Mechanic		\$20	Sensei Speller		\$70
Printo Data		\$20	SILICON VALLEY		
Flex Text		\$20	Word Handler		\$128
Frame Up		\$20	Line Handler		\$58
Type Faces		\$14	SIRIUS		
PRODRUM			Kabul Spy		\$23
Bank St. Writer		\$45	Dave's Midnight		\$23
S&P		\$45	Apple Panic		\$27
AE		\$45	Alien Rant		\$27
S&P		\$45	Arche Machine		\$27
Chopfliter		\$23	BPI		\$20
Star Bright		\$23	General Acct.		\$275
Dave's Midnight		\$23	A/R		\$275
Apple Panic		\$27	BU TECH		\$275
Alien Rant		\$27	Power Artist		\$23
Arche Machine		\$27	Wizardy		\$23
BEAR		\$20	On Line Of Dia.		\$23

600XL CALL
800XL CALL

1050 Drive	\$335	MICROBITS INC	\$78
1025 PRINTER	\$399	BO COLUMN BO	\$249
1025 COMP PTR	\$219	TECHNICAL NOTES	\$25
1027 PRINTER	\$279	48K RAM (ITEC)	\$89
1010 RECORDER	\$279	64K RAM (ITEC)	\$115
850 INTERFACE	\$48	RAM (MOASIC)	\$169
128K RAM OSK	\$299	64K RAM (MOASIC)	\$145

ASTRA 1620	\$445	PERCOM 40-51	\$418
RAMA 1000	\$295	PERCOM 40-52	\$718
PERCOM 68-51	\$298	PERCOM 44-51	\$510

*ASTRA 1620 DISK DRIVE SYSTEM

MORE FOR YOUR MONEY
DOUBLE OR SINGLE DENSITY
TWO DRIVES

SPECIAL \$469

ATARI SOFTWARE

Saga I-2 each (D)	\$27	Stardust (D)	\$37
Dirky (D)	\$33	Deadline (D)	\$24
Eastern Front (CD)	\$23	Baseball (D \$23)	\$23
747 Land Sim (CD)	\$17	Pool 1.5 (D)	\$23
Microsoft Basic II (D)	\$68	Date Perfect (D)	\$24
Atari Writer (R)	\$68	Date Perfect (D)	\$24
Assembler Editor (R)	\$42	C-65 (D)	\$58
Pac Man (R)	\$40	24x65 (D)	\$58
Dongle Kong (R)	\$34	Action (D)	\$48
VC (D)	\$17	Al Babo (D)	\$20
Leoponne (C)	\$17	Ultima II (D)	\$20
Telegraf (D)	\$10	Ultima III (D)	\$20
Sky Blazer (D)	\$10	Wavy Navy (D)	\$23
A.E. II (D)	\$46	Type Attack (D)	\$23
Bank Shot (D)	\$23	Chopfliter (I) \$23	\$23
Chopfliter (I) \$23	\$23	Shootout (I or II) \$30	\$30
Serpentine (I) \$23	\$27	Moat Armz. Thing (D)	\$27
Spell Wizard (D)	\$27	Face Maker (D)	\$27
Basic Compiler	\$65	Kender Comp (D)	\$20
Zaxxon (CD)	\$27	Pro Apocalypse (CD)	\$23
S.A.M. (D)	\$23	Parash's Curse (CD)	\$23
P.M. Animator (D)	\$23	Protector II (D)	\$23
Spelling Bee (D)	\$27	Spasmus (D)	\$23
Fractions (C \$21) (D) \$27		Blue Max (CD)	\$23
Decimals (C \$21) (D) \$27		Combat Leader (CD)	\$23
Jumpman (CD)	\$27	Shogun's Tower (CD)	\$27
Temple of APS (CD)	\$27	Cosmic Balance (C)	\$27
Nich Wizard (D)	\$20	Tigers In Desert (CD)	\$27
Sargon II (C) \$20 (D) \$23		Miner 2049er (R)	\$34
Supers II (D)	\$34	Atactic Chase (D)	\$27
Zork I, II or III (D)	\$27	Financial Wizard (D)	\$41

SPECIALS

Gemini 15X Printer	\$379
Axiom AT-100 Printer (with interface)	\$229
Astra Double Density Dual Drive	\$469
Rana 1000 Drive	\$319
Bit-3.80 Column Board	\$245
Manesmart Talley 1601 Printer	\$569
Atan 400 Keyboard (In Home)	\$389
Programmer Kit	\$48
Entertainer Kit	\$49
Wico Joystick	\$23
Wico Trackball	\$49

COMMONWARE

1541 DISK DRIVE \$239

1701 Color Master	\$255	1530 Recorder	\$59
1525 Printer	\$229	1530 Printer	\$58
1526 Printer	\$188	1650 Auto Medium	\$158

64 SOFTWARE 64

Neutral Zone (CD)	\$26	Fort Apocalypse (CD)	\$23
Sprite Master (CD)	\$27	Parash's Curse (CD)	\$23
Computer Football (C)	\$18	Protector II (D)	\$23
Telegraph (C)	\$16	Shamus (D)	\$23
Chopfliter (R)	\$29	Nukewar (C)	\$12
Temple of Appahal (D)	\$20	Wigwag Campaign (C)	\$19
Jumpman (CD)	\$27	Paper Clip (D)	\$19
Crank Crumble (D)	\$20	Word Pro 3.0 w/ Spell	\$114
Orbitranner (R)	\$26	Video Pak 30	\$139
Zork I, II or III (D)	\$27	Script 64 (D)	\$77
Propper (CD)	\$23	Calc Result Prof (D)	\$119
Starcross (C)	\$23	M File (D)	\$89
Debugger (CD)	\$23	Quick Brown Fox (D)	\$85
Face Maker (D)	\$20	Wigwag Assistant (D)	\$85
Undercom (D)	\$20	Overseas Assistant (D)	\$85
Wiz Didgie (D)	\$23	File Assistant (D)	\$85
Most Amaz. Thing (D)	\$27	Hesmon 64 (R)	\$27

APPLE HARDWARE

64K SYSTEM LIST #1995
CALL FOR LOW PRICE
APPLE DRIVES

Printers/Etc.

GEMINI 10X	\$289	PROWRITER	\$345
GORILLA	\$195	SMITH TPI	\$488
CITOH	\$345	QUIME 1114	\$1299
Prowriter II	\$629	OK-DATA	
Starliner II	\$1149	Microline 82A	\$396
Printmaster	\$1448	Microline 53A	\$638
RO2A-C	\$409	Microline 64P	\$958
3510	\$1375	Microline 93	\$488
3550	\$1779	DIABLO	\$309
7110/7730	\$1968	630R	\$1719

MONITORS

AMDEC		NEC	
Color I	\$289	GRN (JB1260)	\$115
Color II	\$138	Color II	\$148
V300A	\$149	Color Composite	\$296
Color II	\$449	RGB Color	\$596

MODEMS

HAYES		Smartmodem	\$209
Smartmodem	\$209	Smartmodem 1200	\$468
Microdem II	\$259		
NOVATION		J Cat	\$99
Apple Cat II	\$259	D-Apple	\$149

COSMIC COMPUTERS

727 BREA CANYON RD., SUITE 16
WALNUT, CA 91789
ORDER LINES OPEN MON-SAT 8 am - 6 pm
(800) 626-7642
PLEASE FOR ORDERS ONLY
SORRY, NO C.O.D.'S
(714) 594-5204

ADD \$2.50 shipping per software order in continental U.S. Add \$5.00 shipping per software order for AK, HI, PPO. Add \$10.00 for 15% Typing (whichever is greater) per software order for non-U.S. Call for cost of hardware shipping. Calif. residents add 8 1/2% sales tax. Cashless check or money orders filled within 24 hours for items in stock. Personal checks require 4 weeks to clear. MasterCard and Visa OK for software only within continental U.S. add 7% surcharge. Include card no. expiration date and signature. Due to our low prices, all sales are final. All defective returns must have a return authorization number. We cannot take on any sales returning goods for replacement or repair. Prices & availability subject to change.

LEARNING COMPANY		Juggles' Rainbow	\$27
Bumble Games	\$27	Protector II	\$23
Bumble Plot	\$27	Parash's Curse	\$23
Gettrudes Puzzles	\$30	Rocky's Boots	\$34
Rocky's Boots	\$34	LJK	\$89
Letter Perfect	\$20	Lotus	\$125
Exec. Brief Sys.	\$125	MicroLab	\$185
MicroLab	\$185	Miner 2049er	\$34
Miner 2049er	\$34	Data Factory 5.0	\$189
Data Factory 5.0	\$189	Payroll Manager	\$159
Payroll Manager	\$159	MICROSOFT	
MICROSOFT		Typing Tutor II	\$119
Typing Tutor II	\$119	AppleSoft Compiler	\$76
AppleSoft Compiler	\$76	A.L.D.S. (Req. 2.0)	\$176
A.L.D.S. (Req. 2.0)	\$176	Basic Compiler	\$160
Basic Compiler	\$160	Multiplan	\$160
Multiplan	\$160	Optional Decatation	\$20
Optional Decatation	\$20	MSB	\$27
MSB	\$27	Robot	\$27
Robot	\$27	Classical Mathematics	\$45
Classical Mathematics	\$45	QEDSTA	\$27
QEDSTA	\$27	Chess	\$45
Chess	\$45	Zoom Graphics	\$34

CIRCLE 145 ON READER SERVICE CARD

Logic and Recursion, continued...

than both X and Y, X is the successor of some number x, and the "sum" relation is true such that x plus Y is y when Z is the successor of y. In essence, the recursive call in the last rule breaks down the problem of finding the sum of 2 and 3 as follows:

$$\begin{aligned}
 2 + 3 &= (1 + 1) + 3 \\
 &= 1 + (1 + 0) + 3 \\
 &= (1 + 0) + (1 + 0) + 3 \\
 &= (1 + 0) + (1 + 0) + (2 + 1) \\
 &= (1 + 0) + (1 + 0) + 2 + (1 + 0) \\
 &= (1 + 0) + (1 + 0) + (1 + 1) \\
 &\quad + (1 + 0) \\
 &= (1 + 0) + (1 + 0) + 1 + (1 + 0) \\
 &\quad + (1 + 0) \\
 &= (1 + 0) + (1 + 0) + (1 + 0) \\
 &\quad + (1 + 0) + (1 + 0)
 \end{aligned}$$

and returns the answer 5 by finding the successor of the successor of the successor of 0!

The "times" relation can be defined declaratively in terms of the above "sum" relation:

```

times (0 0 0)
times (0 X 0) if
  0 is-less-than X
times (X 0 0) if
  0 is-less-than X
times (X Y Z) if
  0 is-less-than X and
  0 is-less-than Y and
  X is-the-successor-of x and
  times (x Y y) and
  sum (Y y Z)
    
```

Interpretation of this definition is similar to "sum." We now have fully declarative definitions of the "less," "sum," and

"times" relations. Note that these relations are written with lowercase letters to distinguish them from the built-in relations. A fully reversible micro-Prolog factorial function can then be written by replacing the built-in functions with our declarative versions:

```

X has-factorial 1 if
  X is-less-than 1
X has-factorial Y if
  0 is-less-than X and
  X is-the-successor-of Z and
  Z has-factorial x and
  times (X x Y)
    
```

This definition now allows us not only to ask the forward question:

```
Which (x 3 has-factorial x)
```

and achieve the answer 6, but also to ask the backward question:

```
Which (x x has-factorial 6)
```

and achieve the answer 3.

As one might expect, the processing time needed to compute either of these answers is very slow. If you try it yourself, we recommend that you stick to the factorials of 0, 1, 2, and 3. Computing the factorial of 4 requires declaration of successor relationships up to 24 and takes several minutes to compute.

This performance problem, however, is partially due to the sequential nature of the systems on which micro-Prolog is currently implemented. When parallel machines are commonplace in the Fifth Generation, perhaps the promise of logic programming will make the Prolog twist a valuable technique rather than just an interesting exercise.

Further Reading

Clark, K.L., J.R. Ennals, and F.G. McCabe, 1982. *A micro-Prolog Primer*. Logic Programming Associates, London, England.

Clocksink, William F., and Christopher S. Mellish, 1981. *Programming in Prolog*. Springer-Verlag, Berlin, Heidelberg, New York.

Digital Equipment Corporation, 1982. *VAX-11 Basic Language Reference Manual*. Digital Equipment Corporation, Maynard, Massachusetts.

Ennals, Richard, 1983. *Beginning micro-Prolog*. Ellis Horwood, Ltd., West Sussex, England.

Jensen, Kathleen, and Niklaus Wirth, 1974. *Pascal User Manual and Report*. Springer-Verlag, Berlin, Heidelberg, New York.

Kowalski, R.A., 1979. *Logic for Problem Solving*. Elsevier North Holland, Inc., New York, Amsterdam, Oxford.

Winston, Patrick Henry, and Berthold Klaus Horn, 1981. *Lisp*. Addison-Wesley Publishing Company, Reading, Massachusetts.

New Inmac Catalog jam-packed with computer/ wp supplies. Yours free!



Accurately called "the bible of the industry" it's loaded with great products and ideas for your personal computer, minicomputer or word-processing system. You'll enjoy:

- **Free-ship shipping.** Over 2,000 products to choose from.
- **Easy ordering.** Mail, phone, or TWX. Verbal P.O.'s welcome.

- **Fast delivery.** 24-hour shipment! Over-night emergency shipments available.
- **48-day trial.** Full refund if not completely satisfied.
- **Guaranteed quality.** All products field-tested to highest standards.
- **Lower shipping costs.** 6 fully stocked distribution centers serving the U.S.

For fastest delivery of your free 100-page Inmac catalog, call 1 (800) 547-5444. 1 (800) 547-5447 in California.

inmac Catalog Dept. 2465 Augustina Drive, San Jose, CA 95051

Please be sure to include your phone number.

NAME _____ () _____
 PHONE _____
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP _____

114123

CIRCLE 151 ON READER SERVICE CARD



"It's a little like Space Invaders!"

The Company You Keep is Important, In Business *it's a Must!*

CompuView systems software helps make the computer user a true professional. Our VEDIT full screen text editor is being chosen by more hardware manufacturers, application software houses and system integrators to enhance the sale of their products than any other editor on the market today.

VEDIT has been chosen by such firms as Siemens A G, N.E.C., Pickles and Trout, and R R Software. Organizations like University of Michigan, Standard Oil of California, IBM, Xerox, General Electric and DuPont of Canada, have chosen VEDIT for program development and general text editing.

VEDIT supports virtually all 8080-8086 hardware, the full range of CP/M MSDOS operating systems and COMPUVIEW provides post sale technical support to all dealers, distributors and endusers.

A stack of software materials including a manual and two diskettes. The manual is white with "CompuView VEDIT" printed on it. The diskettes are black with white labels that also feature the "VEDIT" logo and "CompuView Software" text.

CompuView
VEDIT

VEDIT - Disk and Manual
8080, Z80 or IBM PC..... \$150
CP/M-86 or MSDOS..... \$195
Manual only..... \$18

O.E.M. Distributors and Dealers Call
Ms. Tracy, National Accounts Co-ordinator
at (313) 996-1295

CompuView
PRODUCTS, INC.

1955 Pauline Blvd, Suite 200 Ann Arbor, Michigan 48103 (313)996-1299

CIRCLE 142 ON READER SERVICE CARD

APL

A Language of Pleasant Surprises

Vincent Stanford

APL, A Programming Language, is both very different from Basic and very powerful. After almost ten years of programming in Fortran, Basic, assembly language, and many structured variants of these languages, I decided to try it when it became available for my TRS-80.

I have been consistently amazed at the power of APL. APL is different, fundamentally different from the more commonly used languages. One of the main differences is that APL handles arrays as objects as well as individual entries. For example, consider how an array is moved to another array in Basic for two arrays X and Y (of two dimensions each):

```
10 for i=L1 to H1
20   for j=L2 to H2
30     Y(i,j)=X(i,j)
40   next j
50 next i
```

The corresponding construct in APL is given as:

Y←X

The reason for this difference is that Basic is what John Backus, the author of both Fortran and Algol (yes, the same man was responsible for both) calls a Von Neuman Language.

The Von Neuman computer, which is the prototype for most modern computers, consists of memory for storage and an accumulator and index registers for processing. To move a block of storage on such a machine, each memory location in the source block must be stored in the appropriate location of the destination block. To add two sets of numbers in two blocks of storage as in vector addition, an element from the first block indexed with the contents of an index register if a loop is being used, and an element from the second block must be added to the accumulator and the resultant sum stored at the desired location. In other words, almost all processing activities must be performed one number at a time and pass through the accumulator.

Higher level languages such as Fortran and its direct descendants, Algol, Basic, PL/1, and Pascal reflect this basic underlying computer architecture. In these languages, just as in assembly language, an algorithm must, ultimately, present a

stream of numbers to an accumulator for processing: all the numbers must line up single file to pass through a bottleneck.

For example, consider the following program segments, both of which compute the total of the numbers contained in an array X:

Basic	APL
10 T=0	
20 for i=1 to n	T ← +/X
30 T=T+X(i)	
40 next i	

In the Basic algorithm, we are required to deal with each entry of X as an individual number using a "for" loop and an intermediate total for each step. In APL we can use two powerful array operators ← and /, and can treat that array X as an entity. In APL we "reduced X under addition," the reduction of an array X under an operator ⊕ being defined as:

$(\dots(X_1 \oplus X_2) \oplus X_3) \oplus \dots) \oplus X_n$

In the case of addition for ⊕ this is simply:

$X_1 + X_2 + \dots + X_n$

This approach to programming allows the subordination of nonessential detail; it cuts down on unnecessary clutter. This can be seen by considering, in order, each discrete step required to implement the two algorithms.

Basic

- 1.) The variable used for the total must be given a name and initialized if it has been used before.
- 2.) A loop must be set up.
- 3.) An index must be chosen.
- 4.) A lower bound for the index must be chosen, in this case, 1.
- 5.) An upper bound, n, for the index must be chosen.
- 6.) A formula to compute the partial sums which lead to the desired grand total must be devised. This involves:
 - a.) Two references to the variables containing the total.
 - b.) A reference to the array X.
 - c.) A reference to the array index i.
 - d.) A special knowledge of Basic syntax to differentiate the occasions in which = means = (equals) and when it means ← (gets). Also, in high school algebra, $T=T+x(i)$ implies that $0=X(i)$.
- 7.) The loop index must be incremented by the programmer using the "next" statement.

Together these discrete steps constitute roughly ten distinct possibilities for error. An important related point is that

humans have, on average, the ability to hold seven plus or minus two items in short term memory. That means that even a small segment of code can exceed our ability to perceive directly the function being performed.

By contrast, consider the steps below:

APL

- 1.) The variable to be summed must be named.
- 2.) The reduction operator must be invoked.
- 3.) The + must be used to indicate reduction under addition.

In APL, only three discrete items must be kept in mind to perform the summation. No loop and no index are needed.

Another, less trivial programming example shows that the difference in labor can be even greater than that described above. Programs which sort an array called X are shown in Basic and APL in Figure 1. A bubble sort is used in the Basic example.

Space and patience prohibit a careful analysis of all the elements required to do the sort in Basic. In APL, by contrast, we know only that \uparrow is an array operator which produces a "sort vector" which is then used as a kind of a generalized subscript to unscramble X. Yes, in APL arrays may be used as subscripts. For example:

X [3 4 5] is equal to 22 67 9

if X is the array sorted in the example above.

So APL is based on operators which work on arrays rather than on numbers. Another thing that constantly contributes to the endless string of pleasant surprises about APL is that these operators usually have more than one meaning. This combines with the completely dynamic nature of APL variables to form the basis for a truly delightful computer language.

For example, suppose that the following statement were executed (X need not be declared in advance):

X ← 100 99 98 97 96 95 94 93 92 91

Then X [5 6 7] takes the values 96 95 94, which are just the middle five through seven numbers of the X array. Next, suppose that the following statement were executed:

X ← 'The Middle Characters'

X has now changed to a character variable from a numeric one.

GREAT MOMENTS IN DATA PROCESSING



1490 ... THE SPANISH INQUISITION
PIONEERS NEW METHODS FOR
INCREASING MEMORY CAPACITY.

November 1983 © Creative Computing

ATARI ATARI ATARI ATARI

INTRODUCING...
Super Monitor Plus
48K DISPLAY
\$49.95

The Most User Friendly Mail Management program available! It even allows you to cancel your record, book or other collection. Limited only by your imagination! Fast machine language sorts-Works on single or double density format Auto deletes of duplicates-Print disk directory-Official State abbreviations built-in-Special coding feature-Relabel fields for unlimited uses-Merge files-Create subfiles-Search on any field-Print labels or file copy-More!

NEW!!! From Atari

Colorful,
Scrolling
Screen



Super
Speedway
Action
POLE POSITION
\$44.90
Reg \$49.95
• 16K Cartridge

FREE CATALOG

► WITH ANY ORDER... OR SEND \$1.00 (Refundable with Order)

★ OVER 1000 items for your ATARI!

Including product descriptions

- EPSON • PERCOM
- BRODERBUND • APX
- ROKLAN • ON-LINE
- DATASOFT • ATARI
- ADVENTURE INT'L
- SYNAPSE • VISICALC • Much More



★ We handle only ATARI compatible hardware & software... so we know what works best! **CALL US FIRST!!!**

SUPER SPECIALS... Up To 70% Off!

Original Price	Special Price	Original Price	Special Price	
Die Hard I	9.95	Blindfold	9.95	
Pacific Coast Meep	29.95	15.95	Platin' Mama	24.95
ProtectoDad I	14.95	19.95	Alien Wars	24.95
Kitar Patrol	19.95	19.95	Journal of the I Think	17.95
Krazy Antennae	19.95	19.95	Star-Walking Unit	24.95
Number Bunch I	9.95	9.95	6512 Drums'n'Beats I	9.95
Bug Off	29.95	14.95	Apple Park II	29.95
BrookBak	49.95	29.95	Helix Shuttle II	29.95
Pacific Paradise I	14.95	19.95	Shaw & Batoon I	49.95
Dr Goodwin's Lawnmower	29.95	9.95	MegaDip I	29.95
Match Racem	29.95	9.95	Magic Mailer	59.95
NaukuDip	14.95	19.95	GoRid	49.95
Crackin'Dip	14.95	19.95	4-Dip	29.95
ShimDip I	14.95	19.95	Alien Wars II	29.95
Rear Guard	29.95	9.95	Space Shuttle	29.95
Tuff Tuff	29.95	9.95	LunarK	14.95
Race at Right	29.95	12.95	Chattered Alliance	49.95

LIMITED QUANTITIES...WHILE SUPPLIES LAST!

CREDIT CARD ORDERS - TOLL FREE 1-800-452-8013

(ORDERS ONLY - For Information (503)683-6620

Shipping & Handling: UPS or PARCEL POST \$2.00

UPS Air (48 hr. Delivery!) \$3.90



COMPUTER PALACE
Furnishes
Royal Software

2160 W. 11th Ave.
Eugene, OR 97402
(503)683-5361

CIRCLE 209 ON READER SERVICE CARD

FLEXIBLE DISK ORGANIZERS

for 5 1/4" or 8" diskettes

VERTICAL DISK BINS offer easy access to active files

Made of impact resistant sand colored plastic, each unit stores up to 15 diskettes

Self-standing VERTICAL DISK BINS can be located at computer work stations to provide eye-level view and ready DISK access

Wall-mounted VERTICAL DISK BINS save desk space while providing convenient and accessible disk storage



LIMITED

INTRODUCTORY OFFER

(OFFER EXPIRES 12/31/83)

VERTICAL DISK BIN

5 1/4" diskettes reg \$19.95 NOW \$14.95

8" diskettes reg \$22.95 NOW \$17.95

ADD \$2.00 per order shipping & handling

NEW YORK STATE RESIDENTS add sales tax
PERSONAL CHECK or MONEY ORDER only



VERTICAL DISK BINS

PO BOX 2005

NEW HYDE PARK, NY 11040

TELEPHONE (516) 365-7923

DEALER INQUIRIES INVITED

CIRCLE 251 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 lam-

ply 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. HA40 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 \$_____.

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 US, 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)

APL, continued...

Figure 1.

Basic	APL
10 REM load the data array	
20 n=7: data 11,22,22,67,9,81,3	X ← 11 22 22 67
30 DIM X(n)	9 81 3
40 for i=1 to n	
50 read X(i)	
60 next i	
70 REM sort the array	
80 for i=1 to n-1	X ← X[↑ X]
90 k=n-i+1	
100 for j=2 to k	
110 If not (X(j)≤X(j-1)) then go to 150	
120 t=X(j)	
130 X(j)=X(j-1)	
140 X(j-1)=t	
150 REM end if	
160 next j	
170 next i	
180 REM output the results	X
190 for i=1 to n	
200 print X(i); " "	
210 next i	
220 print	
230 stop	

and from 10 to 21 elements. But the expression X [5 6 7] still has a valid meaning:

X [5 6 7] has the value MID
So, the index operator [] serves not only the role of the Basic subscript but also that of the substring operator MID. Everything seems to work that way, which makes it an enjoyable language to play with.

Uses Of APL

APL is especially strong in the area of statistical computation. This makes it an excellent aid for statistics course work and hard science laboratory work. Many problems which require either long sequences of hard calculations or cumbersome Basic programs can be accomplished with a few symbols in APL. For example, a function to compute the mean of a vector X which is defined mathematically as:

$$\frac{1}{m} \sum_{i=1}^m X_i$$

can be defined in APL80 as follows:

def Mean.of.data = mean data

1: Mean.of.data ← (+/data)÷p data

Several features of this function will be new to Basic programmers. The long and self-explanatory name Mean.of.data is one. APL80 names may be up to 2 characters in length. The shape operator p (often called either rho or shape) tells how many elements are in data at the current time. This can change at the option of the programmer in APL. Similarly the variance of a vector X is defined mathematically as:

$$\frac{1}{(m-1)} \sum_{i=1}^m (X_i - \bar{X})^2$$

Where \bar{X} is the mean of X. An APL80 function to compute the variance could be as follows:

```
)def Variance.of.X←Var X
```

```
1: Variance.of.X←(+/(X-mean X)*2)÷((pX)-1)
```

Note the structural similarity of statement 1 of Var to the original formula. No loops were needed. Often in APL programs operators such as reduce (/), which handle arrays, take the place of loops. Note also that we were able to make immediate use of the mean function defined earlier.

The Pearson correlation coefficient computed from two vectors X and Y is defined mathematically as:

$$\frac{\sum_{i=1}^m X_i Y_i - m\bar{X}\bar{Y}}{\sqrt{\left(\sum_{i=1}^m X_i^2 - m\bar{X}^2\right)\left(\sum_{i=1}^m Y_i^2 - m\bar{Y}^2\right)}}$$

This can be implemented in APL80 as:

```
)def R ← X corr Y
1: X ← X-mean X
2: Y ← Y-mean Y
3: R ← (+/(X*2)x(+/Y*2)
4: R ← (+/X*Y) ÷ R*.5
```

Again, this is simply implemented in APL with only a few symbols and array operators.

A function which produces a histogram of a set of data points can be simply defined as follows in APL80:

```
)def plot ← X hist grid; cell; freqs; max.freq
1: cell ← +/X°.> grid
2: freqs ← +/tpgrid°. = cell
3: max.freq ← I/freqs
4: plot ← *'[1+(I max.freq)°.> freqs]]
```

This routine is complicated enough so that a discussion of how to read APL is in order. APL is best read with the aid of the APL interpreter. Especially at first, the language symbols look like hieroglyphs and are not easy to comprehend. A good way to learn is to make up test values for the variables used and to execute the statements piece by piece and examine the intermediate results in the immediate mode of the interpreter to explain and verify what has been written in the function.

First, though, we should take a look at the operators used. Remembering that APL executes statements from right to left, the first operator we encounter in the function is the °. This is called the outer product, sometimes pronounced "jot dot." It requires two variables and diadic operator as its operands. Roughly speaking, it forms all possible pairs products of the elements of the two variables under the specified operator. This is simpler than it sounds. Let's make up some data for the histogram variables:

```
grid ← 0 100 200 300 400 500
and
X ← ?10p600
X
```

```
545 297 364 205 140 398 321 80 438 27
```

The ? command will give us ten random numbers between 1 and 600. The expression $x^{\circ}.$ grid is now defined as shown in Table 1. Notice that 545, the first entry, is greater than 500, so the row in the outer product corresponding to it contains five ones. This means that it is in the "greater than 500" class in the histogram. The next one down, 297, corresponds to a row with three ones or the "greater than 200 but less than or equal to 300" category.

Table 1.	>	grid					
		0	100	200	300	400	500
	545	1	1	1	1	1	1
	297	1	1	1	0	0	0
	364	1	1	1	1	0	0
	205	1	1	1	0	0	0
X	140	1	1	0	0	0	0
	398	1	1	1	1	0	0
	321	1	1	1	1	0	0
	80	1	0	0	0	0	0
	438	1	1	1	1	1	0
	27	1	0	0	0	0	0

If there were only some way to add up the ones in each row, we would have the histogram class for each of the numbers in X. Plus reduction (+/) added up the numbers in one row, which was a vector. In APL most operators generalize to two and higher dimensions of arrays. A natural, and in APL usually successful, impulse would be to try the expression $+/X^{\circ}.$ grid and see what results.

```
cell ← +/X°.> grid
```

```
cell
```

```
6 3 4 3 2 4 4 1 5 1
```

A quick check of Table 1 shows that plus reduction summed up the two dimensional array $X^{\circ}.$ grid in a row major order which results in the class of each data point. This array of classes is assigned to the variable name "cell" in the histogram algorithm.

TRS-80 COMPUTERS

ALL PURE RADIO SHACK EQUIPMENT



DISCOUNT

15% AND UP

ALL TRS-80 MODELS

- COMPUTERS
- PRINTERS
- ACCESSORIES
- GAMES

CALL FOR OUR COMPETITIVE PRICES ON OTHER MAJOR BRANDS

FREE PLEASE WRITE AND REQUEST . . .

- CUSTOMER DISCOUNT PRICE LIST
- MANUFACTURE WARRANTIES

© TRS-80 TANDY CORPORATION

PERRY COMPUTERS

Dept No. H-8 137 NORTH MAIN ST., PERRY, MI 48872
FOR ORDERS CALL 1-800-248-3823

FOR INFORMATION CALL (517) 825-4161

CIRCLE 173 ON READER SERVICE CARD

B. Dalton
BOOKSELLER

The Source for Computer Books

OMNI ON-LINE DATABASE DIRECTORY

Mike Edelhart & Owen Davies



Make the most of your personal computer with this comprehensive guide to over 1000 databases, their content and their uses.

- Access information; subscribing
- Using a personal computer with a database
- Choosing modems and setting up phone links
- Suppliers' addresses
- Content and use evaluation
- Solutions to frequent problems
- Computer glossary

Omni's first computer book is a resource you can't afford to be without. Get your copy today at B. Dalton.

Macmillan \$10.95

B. Dalton stocks a complete selection of computer books in 700 stores nationwide. Check your Yellow Pages for the B. Dalton near you.

People who know books know B. Dalton.

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____
 Check/Money Order Enclosed
 VISA MasterCard American Express
Card No. _____ Exp. Date _____
Book Title: *OMNI ON-LINE DATABASE DIRECTORY* Price: \$10.95 Qty. _____

Please send \$1.75 for postage and handling.
Please add appropriate sales tax.

B. Dalton Bookseller
3340 Jamie Ave. S.
Minneapolis, MN 55431

CIRCLE 274 ON READER SERVICE CARD

APL, continued...

The next line uses another jot dot, this time a jot dot of =. But, what is the meaning of ϵ grid? Ask your APL interpreter:

```

grid
6
 $\epsilon$ grid
1 2 3 4 5 6
 $\epsilon$  (iota or "index") of N is a vector containing the integers 1
though N. As before ( $\epsilon$ grid)0=cell is defined as shown in
Table 2, and APL tells us:
□ - freqs - +/( $\epsilon$ grid)0=cell
2 1 2 3 1 1
  
```

		cell									
Table 2.	=	6	3	4	3	2	4	4	1	5	1
	1	0	0	0	0	0	0	0	1	0	1
	2	0	0	0	0	1	0	0	0	0	0
	3	0	1	0	1	0	0	0	0	0	0
	4	0	0	1	0	0	1	1	0	0	0
	5	0	0	0	0	0	0	0	0	1	0
	6	1	0	0	0	0	0	0	0	0	0

which are exactly the frequency counts for each class given by grid. This vector is assigned to freq in the function for subsequent use.

The next line shows another generalization of an operator. Plus reduction has just been used to good effect; now max reduction is also used. The operator Γ chooses the larger element of a pair. Γ /array chooses the maximum element of an array.

Line four of the histogram function actually creates the plot of the frequency counts. As above, the way it accomplishes this can be understood by starting at the righthand side of the expression and breaking it down into small pieces. This proceeds as follows:

```

Max.freq
6
 $\epsilon$  Max.freq
1 2 3 4 5 6
freqs0 >= Max.freq
  
```

		Max. freq					
Table 3.	>=	1	2	3	4	5	6
	2	1	1	0	0	0	0
	1	1	0	0	0	0	0
	2	1	1	0	0	0	0
	3	1	1	1	0	0	0
	1	1	0	0	0	0	0

Table 3 shows the result of this operation. Since zero is not a valid subscript in APL80, 1 is added to (freqs⁰ >= Max.freq) to transform the zeroes and ones to ones and twos respectively. These are used as subscripts to the character array '* *' to convert the ones and twos to blanks and asterisks. The expression in the final line of the function results in:

```

* * [1 + (( $\epsilon$ Max.freq)0 >= freqs)]
  
```

• •
• • • • •

Many other basic statistical computations can be done with very small APL80 functions which are quickly and easily written. I have found the orderliness and generality of APL a continuing source of surprises. Always pleasant surprises—APL.

November 1983 • Creative Computing

ZAP
D'FUZE

KEY
QUEST

TIC
ATTACK

DOT
A
LOT

BOMBER
WORD

SPACE
BATS

RES Q

THE
HOTTEST
NEW GAMES
FOR YOUR VIC 20[™]
ARE FROM **TYMAC**

Load up your VIC 20 with these hot new games. Arcade style action riffs in your living room. Exciting, challenging ways to get more fun out of your computer. Buy these cartridges only from your favorite computer products retailer.

Limited Time Offer: Show proof of purchase of any two of these games and \$40.00 and receive TYMAC's EXPAND-O-RAM as a \$19.00 retail value. EXPAND-O-RAM gives you 1MB switchable cartridge slots and 100K of additional memory. See dealer inside every package.

TYMAC

TYMAC INCORPORATED

127 MAIN STREET
FRANKLIN, NJ 07416
201 827-4050

TYMAC is a registered trademark of Tymac Computer Corporation.

EXPAND-O-RAM is a registered trademark of Tymac Computer Corporation.

EXPAND-O-RAM is a registered trademark of Tymac Computer Corporation.

ORDER NOW ON READER SERVICE CARD

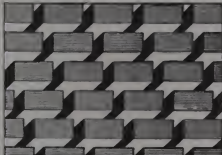
Assembly Language

A Coward's Introduction

Charles Leedham

Assembly language programming can accomplish miracles, but it been made to seem almost as mysterious as the Aztec priesthood. It is a fair bet that the majority of personal computer owners are fairly well versed in Basic programming, but very few have ventured into the mysterious realm of assembly language. And more's the pity, as assembly can do things that Basic never dreamed of.

One of the nice things about Basic is that you can see results right away. Type in "Hello", press the ENTER key, and the machine nicely prints out HELLO. It is encouraging, and you go on from



there. Assembly, on the other hand, has always been presented as a massive task, requiring the mastery of mystical registers, and indirect register addressing, and things that boggle the mind of the lowly Basic programmer. If only you could do something simple with assembly that would show results right away.

That is what this article is all about. You can start off slowly in assembly, and do some nice small things with it. But seeing is believing, and the way to see it is to type into your computer the relatively short Basic program in Listing 1. You will soon see what remarkable things assembly can do in the way of instantaneous screen graphics. Along the way you can pick up a few reassuring

facts about assembly if you want to, but you don't even need to do that.

Doing It In Basic

Now, let's pose this problem: you have written a nice little program and you would like to have on the screen the outlines of five playing cards, the values to be put in by the rest of the program. You could draw the card outline with the agonizingly slow *set* method—you may even have in your cassette collection a commercial program or two that does exactly that.

Or, you may be a step further along, and have worked to graphics via PEEKs and POKEs which enable you to draw things on the screen up to six times faster than you could by setting X and Y. In the TRS-80 card outline program in Listing 1, the figures are drawn about $2\frac{1}{2}$ times faster than they would be using SET.

Take a look at Listing 1. Lines 50 through 100 put the card outlines on the screen using the SET command. This is really quite simple, but it takes what seems like forever as the lines crawl slowly across and down the screen. Then lines 130 through 160 do essentially the same outlines by POKing graphics symbols directly into the screen locations you have read about in the manuals.

This method is similar to assembly, because by POKing, you are *addressing* the 1024 little memory cell on the screen more or less directly. But because you are writing Basic, there is an interpreter in the way to slow things down.

In essence, the interpreter sees the word POKe and stops for a while to look it up in its electronic "Basic to Binary" dictionary, discovers that you want a certain graphics character to be put into the specified location, and only then

does it. It is the looking up that takes over 99% of the time. Actually putting the symbol on the screen once it knows what you want takes something on the order of two microseconds.

The Same Thing In Assembly

Now we get to assembly itself, or at least the portion of Listing 1 which accomplishes an assembly (more properly, machine language) presentation of the card outlines. To do this part, I wrote a very small assembly program with an Editor/Assembler utility program. See the *source code* in Listing 2. The utility program *assembled* the source code directly into numerical instructions which are the native lan-

How does the Basic program execute machine language instructions?

guage of the Z80. Those numerical instructions are the numbers listed in the DATA statements from lines 240 through 290.

How does the Basic program execute machine language instructions? First, the program tells the Z80 that there is a machine language program present in high memory, and specifically that it starts at memory location 32000. That is what line 20 is all about.

Memory locations 16526 and 16527 in the TRS-80 contain the address of still another location at which a machine language program begins, provided you have put the location into those two cells, which is what POKing 0 into 16526 and 125 into 16527 does. If you want to know more about this process, look at Section 8 of the Level II manual,

Enjoy a world of learning and leisure with the Sakata Model SC-100 Color CRT Monitor

Model SC-100 accepts a composite video signal; has a modern streamlined design; includes an audio speaker and an earphone jack for privacy of operation and is compatible with fine popular personal computers.

Your SAKATA monitor will enhance your picture quality comparable to the most expensive computers available.

Improve your education and increase your fun with SAKATA CRT DISPLAY MONITORS . . . "We Promise Performance" . . .

Also available: Model SC-200 13" RGB high

resolution COLOR CRT MONITOR. Model SC-300 13" RGB super high resolution COLOR CRT MONITOR. Model SG-1000 12" monochrome high resolution CRT MONITOR (green). Model SA-1000 12" monochrome high resolution CRT MONITOR (amber).

SAKATA CRT MONITORS are available wherever personal computers are sold or write for technical and illustrated literature and prices.

SAKATA U.S.A. CORPORATION
651 Bonnie Lane, Elk Grove Village,
Illinois 60007 / (312) 593-3211
800-323-6647 (outside Illinois)

CIRCLE 211 ON READER SERVICE CARD

Sakata

"Serving industry worldwide since 1896"

Displays
Model SC-100 CRT
COMPOSITE COLOR
DISPLAY MONITOR



Assembly Language, continued...

under `USR(X)`, a section which is somewhat confusingly written, but will tell you more than we have space for here.

The number 32000 in the decimal number system is 7D00H in hexadecimal, but don't let your eyes start glazing over just yet. There will be as little talk about hexadecimal numbers as possible. Just accept the fact that for reasons best known to its designers, the first memory location, 16526, contains the *least significant byte* of 7D00H, and that byte, the last two figures, is zero.

The second location, 16527, contains the *most significant byte*, 7DH. Confusing as it is, and despite the fact that the machine works with hexadecimal numbers and binary bits, you must `POKE`

things into the memory locations in the decimal equivalents of the hexadecimal bytes. So the hexadecimal 7DH which must go into 16527 must go in as 125.

Here, by the way, Radio Shack's manual makes a truly staggering error, telling you that to `POKE 7DH`, you use the figure 208. 208 isn't 7DH; 125 is.

Hex To Decimal

As an aside, you convert a two-digit hexadecimal number to decimal by multiplying the first digit by 16 and then adding the second digit, remembering that the letters A through F represent 10 through 15. Seven times 16 is 112 and you add 13 (what D stands for), and you get 125.

Now, to get back on track, line 20 tells the machine that a machine language program begins at location 32000 and that when it later gets an instruction to jump to a machine language routine, that is where to look for the beginning. Line 190 gives that instruction.

Don't be puzzled because I didn't use the recommended `?USR(N)` or another common command, `?USR(0)`. If you do that way, it will print an N or a 0 in the upper lefthand corner of the screen for reasons which quite escape me. But the version in line 190 doesn't.

The 58 numbers in the DATA lines are direct numerical instructions to the Z80 which the Editor/Assembler provided along with the addresses of the memory locations from 32000 through 32057 in which to put them. The first action line of the assembled program (after line 00100, which tells it where to start) is 00110, and it looks like this on the screen after assembly or printed out on your printer:

```
7D00 21023D 00110 START LD
HL,15618
```

This tells you that starting at 7D00 (32000 in decimal), there was a three-byte instruction. Every two digits in the number that follows represent one byte. So I converted the 21H to 33, the 02H to 2, and the 3DH to 61.

As the first three numbers in the DATA lines, they are `POKE`d into memory locations 32000 through 32002 by line 30, which is exactly what a pure machine language program would do. From then on, I did the same thing for every memory location and instruction. The DATA numbers were the result, and line 30 reads the DATA numbers one by one and `POKE`s them one by one into all the memory locations between 32000 and 32057.

Once the computer hits line 190 and sees that it is to go to a machine language routine, it immediately looks at locations 16526 and 16527, finds the 32000 address, and jumps there to see what is happening—all in a few microseconds.

Then, at 32000, it finds the number 33. In an instruction location, the number 33 tells the Z80 to load a register pair called HL with the number that follows in the next two memory locations, in this case 32001 and 32002. So it moves swiftly on, finds the overall number 15618, and obediently puts that number into the two memory locations which make up the special section called the HL register pair.

In listing the source code, incidentally, I have used all decimal numbers in the instructions, just to make it easier to look back and forth between the assembly listing and the `POKE` part of the Basic program, which may give you

November 1983 Creative Computing

Listing 1.

```
10 CLS
20 POKE16526,0:POKE16527,125
30 FORA=32000TO32057:READ:POKEA,B:NEXTA
40 PRINT@793,"SET GRAPHICS":GOSUB210
50 Y=14:FORX=5TO120
60 SET(X,Y):SET(X,Y+16):NEXTX
70 X=5:FORZ=1TO6
80 FORY=15TO29
90 SET(X,Y)
100 NEXTY:X=X+23:NEXTZ
110 GOSUB220
120 PRINT@793,"POKE GRAPHICS":GOSUB210
130 FORX=15618TO15678:POKEX,176:POKEX+384,131:NEXTX
140 Z=15682:FORA=1TO5
150 FORX=ZTOZ+48STEP12:POKEX,149:NEXT:POKEZ+60,170
160 Z=Z+64:NEXTA
170 GOSUB220
180 PRINT@790,"ASSEMBLY GRAPHICS":GOSUB210
190 X=USR(N)
200 GOSUB220:GOTO40
210 FORX=1TO300:NEXT:RETURN
220 PRINT@914,"PRESS 'ENTER' TO CONTINUE":
230 INPUTA:CLS:GOSUB210:RETURN
240 DATA 33,2,61,17,3,61,1,60,0,54,176,237,176
250 DATA 33,130,62,17,131,62,1,60,0,54,131,237,176
260 DATA 14,5,33,66,61,205,39,125,13,194,31,125,201
270 DATA 17,12,0,6,5,54,149
280 DATA 25,5,194,44,125,54,170
290 DATA 17,4,0,25,201
```


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.

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

Apple is a registered trademark
of Apple Computers Inc.



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

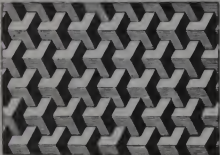
CIRCLE 294 ON READER SERVICE CARD

Assembly Language, continued...

some clues as to what is going on in the assembly section. Normally, putting decimal numbers in assembly source code instructions is considered bad form, but the machine can handle it nicely.

What all of this has done, essentially, is to tell the Z80 to start with memory location 15618 (a screen location) and do whatever comes next.

What comes next is contained in lines 00120 through 00150 in Listing 2, the last of which has the simple instruction LDIR. If you have done some graphics using POKES, you know that the upper left-hand corner of the screen is memory



location 15360 and the lower right is 16383.

The five assembly lines tell the Z80 to start with location 15618 and fill it with a graphics character—the one represented by TRS-80 graphics code 176—and then do the same with the next one, and so on 60 times, which is what the 60 in the instruction LD BC,60 means.

The LDIR (along with what is in register pair BC) is a nice automatic loop not unlike FOR X = 1 TO 60. Those five lines, in just 11 bytes, tell the computer to draw a 60-unit horizontal line across the screen, starting at 15618.

Listing 2.

00100		ORG	32000	00240	DEC	C
00110	START	LD	HL, 15618	00250	JP	NZ, LINES
00120		LD	DE, 15619	00260	RET	
00130		LD	BC, 60	00270	VERTS	LD DE, 12
00140		LD	(HL), 176	00280		LD B, 5
00150		LDIR		00290	LOOP	LD (HL), 149
00160		LD	HL, 16002	00300	ADD	HL, DE
00170		LD	DE, 16003	00310	DEC	B
00180		LD	BC, 60	00320	JP	NZ, LOOP
00190		LD	(HL), 131	00330		LD (HL), 170
00200		LDIR		00340	LD	DE, 4
00210		LD	C, 5	00350	ADD	HL, DE
00220		LD	HL, 15682	00360	RET	
00230	LINES	CALL	VERTS	00370	END	

The next section tells it to do the same thing starting at 16002, and the remainder tells it how to draw the six vertical lines. As you can see, assembly is an economical way to program, as well as being extremely fast when it comes to graphics.

If you type in the Basic program in Listing 1 and run it, you will see the card outlines drawn first using the SET command, which really takes only a few seconds, but seems quite slow. Next it draws the same lines using POKES—faster, but still slow. Then, the outlines are simply popped onto the screen by the assembly section; the card outlines appear on the screen in something under one-thousandth of a second.

What Next?

Now, what does this do for you, a non-assembly language programmer? It shows you not only the miracle of machine language graphics, but how they can be made to work quite simply. And that they can be included in a Basic program with just a few DATA statements.

One note of caution: If you type in the Basic program in Listing 1, dump it on a spare bit of tape before you try to run it. If you have made a mistake of so much as a single digit in the DATA statements, you may find yourself with a blank screen, nothing happening, and no way to recover without turning the computer off and starting all over. There are no error messages in machine language. One wrong digit in a machine language instruction can send the program racing off doing all sorts of unintended things, happily loading memory locations with interesting things that aren't meant to be there, including numbers which disable

the BREAK key and even the Reset button.

In the DATA statements, the numbers are put into the lines the way they are not just at random, but to give you an opportunity to play with assembly graphics.

Line 240 contains the numerical instructions equivalent to the first five lines, up to the LDIR, of the assembly program in Listing 2. The last two numbers of Line 230 are the numerical

Once you have the program running and have finished marvelling at the speed of machine language graphics, you can begin playing with it a bit.

instructions which tell the Z80 to do its LDIR number. The number before that, 176, is the code number for the graphics figure which is the lower two little pixels of the 2 x 3 graphics block.

Experimenting With The Program

Once you have the program running and have finished marvelling at the screen machine language graphics, you can begin playing with it a bit. Graphics block code numbers run from 129 through 191, and each one is a little dif-

ferent. Use the editing mode and, for example, put 144 in the third-from-last position instead of 176, and you will get a dotted line along the top of the figure. Or put in 185 and see what happens. Try the same thing with line 250, substituting another graphics code number for 131.

You can even experiment, *very carefully*, with the 60 in lines 240 and 250. Put in a lower number and the horizontal lines will be shorter. Try a longer number and you will get stripes. But don't try to put a number in larger than 255, the maximum that can be **POKED** into that one memory cell.

Where To Go From Here

All this fun is well and good, and the idea is to show you that assembly language isn't all that mystical—at least not when you have the instruction numbers sitting there in **DATA** statements. But what if you get enthusiastic about instantaneous assembly graphics and want something other than a card outline?

You might be lucky enough to have a friend who programs in assembly who will put together a small program for you with his **Editor/Assembler** and then let you work out the **DATA** numbers to **POKE** in.

Or, you might want to get serious about learning assembly. Get an **Editor/Assembler** and a good book on learning assembly, and begin, in easy stages. Type in source code, Listing 2. Find out just how and why it works. Enter a few of the other small and interesting source code listings you have seen in this and other magazines but passed by because they were written in assembly language. Get yourself a good screen location diagram pad (Radio Shack sells them) and experiment with loading different graphics characters into screen memory locations to make any figure you want.

Most important, however, get an **Editor/Assembler** that allows you to "assemble in memory" so you can write a little experimental program, assemble it directly into memory, switch to **Basic**, and run the program. If it doesn't work right, you can switch right back to **assembler**, list the source code on the screen or to your printer, and find out what went wrong. If you can't do "in memory" assembling, it is really tedious to make tapes, dump, re-load, try out, then re-load the assembler.

Microsoft's **Editor/Assembler/Plus** is a good one but there may be others on the market that do the same work. Don't be afraid of assembly. You may never be an accomplished assembly programmer—it takes a long time and very hard work—but then again you just might. And with even a little knowledge of assembly, you can do some really nice things with your **Basic** programs. □

November 1983 © Creative Computing

OAK COMPUTER FURNITURE



**DISTINCTIVE COMPUTER FURNITURE.
FACTORY DIRECT.
UNCONDITIONALLY GUARANTEED.**

All the peripherals you can buy won't help the productivity of your computer system if you don't have an organized way to utilize them. **System VII Furniture** gives you an efficient, comfortable workspace. With the warmth and beauty of hand-rubbed Oak

and the affordability of factory direct delivery. Write us for our toll-free number for our full-color catalog.

SYSTEM VII FURNITURE

CALL 1-800-547-8888

P.O. Box 4 • Clayton, Georgia 31765

CIRCLE 170 ON READER SERVICE CARD

MATM 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

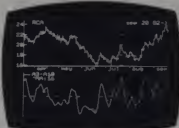
Telecommunications — Access news, market commentary and quotes • Holds 20-30 pages of dialog for off-line review and printing

MARKET ANALYST...
Available from selected dealers or from Anidata. Includes MCS Password and sample stock database.

Apple II/II+/IIfx
IBM PC 5405
Apple is a registered trademark of Apple Computer, Inc.
Dealer inquiries invited

ANIDATA

ANIDATA, INC.
318 South Black Horse Pike
Blackwood, NJ 08012
(609) 228-3034



CIRCLE 315 ON READER SERVICE CARD

The Joy Of Lex



Thomas M. Paikeday

If you think the joys of life end with sex, food, and video games, I have news for you. Some people revel in words and even have orgies.

One of the many occupations that microelectronics has revolutionized is the compilation of reference works which require the collection and organization of vast amounts of data gathered from innumerable sources. Traditionally, the editors of catalogs, indexes, directories, thesauruses, encyclopedias, and dictionaries have relied on the card file as their main repository of information.

As is well known, dictionaries are the most widely used of reference books, second only to the Bible in total word sales. They are also the most specialized and complicated of all, requiring data files that consist of millions of 4" x 6" slips called citations illustrating the meanings and usages of words. The citation file of a traditional dictionary publisher such as Oxford University Press or the Merriam-Webster Company in Springfield, MA, is as large as the card catalogs of the largest libraries in the world.

Until a few years ago, computerizing a data file of such a size was prohibitive even for the most prosperous of book publishers. The microelectronic revolu-

tion, however, has made it affordable for even the private lexicographer.

One of the latest dictionaries on the American market today is *The New York Times Everyday Dictionary*, published in the fall of 1982 by Times Books. In the late 1970's when the *Times* dictionary was commissioned, microcomputers were just making their debut. By the time the dictionary was ready for publication, a complete micro-computer system for the collection and

Until a few years ago, computerizing a data file of such a size was prohibitive even for the most prosperous of book publishers.

analysis of dictionary data was in service—a world's first for a publication associated with one of the world's greatest newspapers.

This article outlines the various functions of that microcomputer system, the Lexicon program, as it has been called. It should prove of interest not only to lexicographers and linguists but to a wide spectrum of authors, editors, indexers, and word lovers—practically every-

one concerned with any type of English composition or language analysis.

Except for the file creation routine which is written in Basic, the rest of Lexicon is in machine code, in two separate modules, each taking up less than 5K of memory. Most routines are executed by the computer at an average reading speed of about 25,000 words a minute. This is using a computer with only 48K of internal memory working at about 2MHz clock speed like the first machine we used on our project, a TRS-80 Model I. With larger and faster machines using hard disks, the speed is considerably higher.

Preparing The Bed

A word processing program such as *Scriptit* working with 48K of memory can handle online files of only up to 5000 words—too small for a dictionary data file or even to hold a book of some size as, say, *Joy of Cooking* or *The Thorn Birds* (250,000 words). Lexicon is designed for book-length files, in fact, for files of indefinite length.

The first routine of Lexicon creates a continuous "mainfile" on the disk drives connected to the computer. The mainfile is continuous in the sense that when a global search is commanded, say for a word count of the entire online file, the computer starts with Drive 0 and reads to the end of the last drive connected to it. An uninterrupted search of one megabyte of data (about 200,000 words)



COMPUTERS: A RENAISSANCE IN CREATIVITY.

During each age of man, the discovery of new technology has given artists greater freedom to create. Moveable type and printing presses gave birth to the novel, the photographic process ushered in motion pictures. Now, computers are allowing artistic spirits to soar as never before. Artists are creating new visions, musicians are creating new sounds, writers are turning their thoughts into text almost as fast as they can think them. All through computers. *Genesis II-Creation and Recreation with Computers*, by Dale Peterson, thoroughly explores the computer revolution and how artists are turning it into a creative revolution. It's the kind of reading that can help free the artist in any computer owner's soul. And it's only from Reston.

Reston Publishing Company

A Prentice-Hall Company
11480 Sunset Hills Rd. Reston, VA 22090

Available at your local bookstore
and computer retailer or call us at (800) 336-0338.



CIRCLE 290 ON READER SERVICE CARD

[Eve Zibart: Cooking / Entertaining, Wash.Post, 12 Apr 82, Cook]

Washington Post Page TW-111
 COOKING / ENTERTAINING: Quick meal: Foolproof seafood
 By Eve Zibart
 Washington Post Staff Writer

I'm a fierce proponent of the quickie dinner. Out of necessity: I have achieved that certain age when it becomes necessary to disperse with the preliminaries and leap right into, "Why don't you follow me home and I'll whip up something more comfortable?"

I'm also a seafood devotee: It's less caloric than meat and easier to get away with later in the evening. The following is my favorite way to prepare either scallops or fish, and can be frilled up with various different herbs and spices.

Figure 1a. Text ready for input into mainfile with inserted line within boundary markers.

[2,583: cook82ap/twp.....CompuServe, 12 Apr 82
 [Eve Zibart: Cooking & Entertaining, Wash.Post, 12 Apr 82, Cook
 Washington Post Page TW-112 COOKING / ENTERTAINING: Quick meal: Foolproof seafood By Eve Zibart Washington Post Staff Writer I'M A fierce proponent of the quickie dinner. Out of necessity: I have achieved that certain age when it becomes necessary to disperse with the preliminaries and leap right into, "Why don't you follow me home and I'll whip up something more comfortable?" I'm also a seafood devotee: It's less caloric than meat and easier to get away with later in the evening. The following is my favorite way to prepare either scallops or fish, and can be frilled up with various different herbs and spices. Drain scallops and save liquor. Poach them (or fillets of a firm-fleshed fish) in a mixture of vermouth or white wine and water, bottled onion juice, and lemon juice.
 Eve Zibart: Cooking & Entertaining, Wash.Post, 12 Apr 82, Cook.

Figure 1b. Text is loaded into mainfile with all word spaces reduced to one each. Inserted lines are displayed at the bottom of the screen.

takes from eight seconds to eight minutes, depending upon whether the information sought is at the beginning or end of the mainfile.

The creation of a mainfile itself takes about ten minutes to go through four 40-track double density drives—the floppy system we found most practical for everyday use. Once a set of disks is thus prepared, they can be used as masters to copy from relatively quickly for making more mainfiles for storage and analysis of different texts.

Texts are typed in using a word processing program or received from other databases such as CompuServe and online newspapers using a terminal program included in Lexicon.

Lex With Ancients and Moderns

When we work on books that have already been typeset, instead of keying in the whole text, we buy the magnetic tapes used for their composition. The major works of world literature, ancient and modern, in languages from Chinese to Greek and Latin to Tibetan and Turkish, are available in machine readable form to scholars at nominal cost from the computing centers of universities such as Oxford and Cambridge. All such tapes can be put on the tape drive of a mainframe computer and converted for use on your micro through a hardwired connection to the RS-232 interface.

Since text entered in a mainfile cannot be changed after loading, all editing is done before input. Again the word processing program comes in handy for routine editing, but only Lexicon can be used for inserting bibliographies, footnotes, etc. in the texts going into a mainfile.

Insertions are made by calling up the desired file on the screen from its disk storage, typing in the new material at the appropriate places in the text, and entering it after inserting boundary markers before and after it. Insertions must not

be longer than one line each, or 64 characters and spaces. Such inserted lines are displayed by the computer at the bottom of the screen without being read as part of the online text (Figure 1).

Once your texts have been edited, they may be loaded from the buffer into mainfile one after another with a single keystroke.

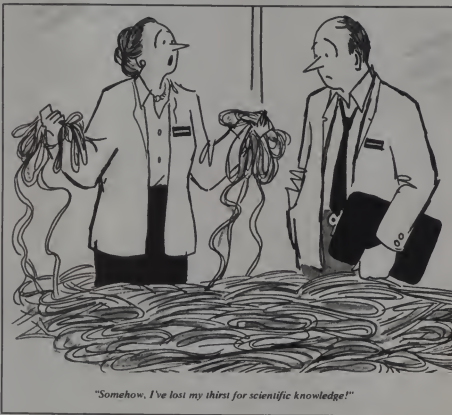
The Lex Drive Or Seven On The Floor

Using the first of seven retrieval functions of Lexicon, any string of characters and spaces to a maximum length of 64 (including the command word FIND) may be searched for in the mainfile (Fig-

ure 2). Variations in the spacing before and after the input string yield four possible variations on what is retrieved. In the following commands # stands for space:

1. FIND # # (string) # (ENTER)
2. FIND # # (string) (ENTER)
3. FIND # (string) # (ENTER)
4. FIND # (string) (ENTER)

This is designed chiefly to get out dictionary data based on word formations. Thus, if you wanted *form*, *formal*, *formed*, *former*, *formula*, and *form* and substance, you would key in "Form" us-



he change by further reducing their chances of developing heart disease and by diminishing the impact of their coronary risk factors such as cigarette smoking. (5,717) sci82apr/m9d.....
Comp/Serve, 14 Apr 82, B.J.Feder: High Tech -- Robots, N.Y. Times, 28 Mar 82, Science, NYT 93/28 10:23 EST #2822 HIGH TECH MOLOGY: ROBOTS By RANAHAY J. FEDER NEW YORK -- Some people say that, strictly speaking, machines that "think" are unimaginable. A few say that such artificial intelligence is conceivable, but should never be built. But most people seem to feel that, by any reasonable definition, artificial intelligence is already a reality and that one day its manufacture will become a big business. Scientists have programmed computers to store so much information and use the data so well that the machines perform as if they are in fact thinking. Laboratory models can make medical diagnosis.....
 B.J.Feder: High Tech -- Robots, N.Y. Times, 28 Mar 82, Science

Figure 2. The FIND "artificial intelligence" was the command used to have this portion of text displayed. The key word appears flashing in the center of the screen.

pril, CES officials, who contend that they coined the phrase last February, began informing their viewers in May that "We've Got It All Together." Sears, Roebuck, too, "puts it all together." A senior vice president of the company's agency -- Reach, McClintock & Co. -- says that he was struck by the line two years ago, after hearing blacks use it, and that the agency began testing the campaign last October. National Airlines ads now proudly proclaim that "National's put it all together." A dealers commercial for American Motors' Gremlin used a similar theme. Apparently the phrase has a hypnotic attraction at the Kane, Light, Gladwin Inc. agency. On different occasions, it has learned on the line in ads for two clients: Arthur Murray and Bond Stores, Inc. -- 144, 5 Oct 70, p. 86. Ad in Toronto Globe & Mail, 25 Jul 73, p. 44. For the busy woman with lots of changes to make, there's not.....
 TIME, 5 Oct 70, p. 86

Figure 3b. The PHRASE command specifying "p...together" searched out this portion of text with the phrase put it all together.

ing the second command above. If you wanted *inform, perform, transform,* and *unify*, you would key in "Form" using the third command.

But the chief purpose of the FIND function in dictionary-making is to have large data banks of English texts belonging to various genres online to tap into for evidence of new words entering the vocabulary. The traditional method using a card file has been shown to be erratic in its results. In the just-published ninth edition of the best-selling *Merriam-Webster Collegiate Dictionary*, for example, which is supposed to reflect the new vocabulary of the decade since the eighth was published in 1973, relatively current terms such as computerist, bargaining chip, baby boom, fast lane, spreadsheet, X-rated, bodysailing, and checkbook journalism are not entered, while such rare and obsolescent ones as computernik, downsize, and white flight are.

In common use, the FIND function of Lexicon comes in handy for locating re-

lated words, as *Reagan, Reagan's,* and *Reaganomics* in the text that is being analyzed. Since the stress of the Lexicon program is on the lexical or meaningful aspect of a word, the FIND routine is geared to finding words and phrases irrespective of spelling variants involving capital and lowercase letters, as in *XEROX/xerox, MacDonald/Macdonald,* and *However/however*. It also disregards punctuation marks and symbols which the computer simply reads as spaces.

The found word or phrase appears flashing in the center of the screen surrounded by text with its relevant bibliography or footnote displayed in the last line. If more context than is on the screen is desired, the text may be scrolled forward or backward to either end of the file using the up/down arrow keys. A printout of what is on the screen at any time may be obtained by pressing a specified key.

To get the next occurrence of the word or phrase being searched, the

oducts were said to be "now" or "out of sight." Trouble is, such ads quickly become painfully repetitions. They seem fatuous and, contrary to the people who understand the catchwords, hopeless for confusing to those who do not. And today's argot changes so quickly that by the time a catch line shows up in ads, it has often become as outdated and square as, well, the word square itself. Lately, admen have discovered a new old phrase with which to elaborate the public: "Getting it all together." The line is said to be derived from the vocabulary of football coaches and orchestra conductors ("Now let's get it all together, fellas"). It was popularized several years ago when -- as is the case with so many catch phrases -- it was picked up by the blacks and then the young. At least seven advertising campaigns have been riding on the familiar theme. Writers at Foote, Cone & Belding claim that t.....
 TIME, 5 Oct 70, p. 86

Figure 3a. The PHRASE command searches out variable strings defined by the initial letter(s) and final word of the string. Thus "g...together" searched out this portion of text with the phrase Getting it all together.

and dose with half-egg wine or vermouth. Let that boil down for a minute and then empty the mushroom mixture into a bowl. Melt 2 more tablespoons of butter in the second skillet and stir in 2 or 3 tablespoons of flour. Stir in scallion liquor, then slowly add the poaching liquid and simmer until thickened. You can add a little heavy cream at this point, or a touch of sherry or mad era or even cognac. Stir in mushroom mixture, heat through and serve the sauce with the poached fish. This takes only about 15 minutes, and is virtually foolproof. (I "proofed" it just recently while on vacation: At the last minute, discovering that the flour bin was empty, I resorted to a handful of crushed dried rice cereal belonging to my 8-month-old niece, and they ate it anyway.) (4,548) edi18cap/wp5.....Comp/Serve, 12 Apr 82, Wash Post: Nuclear Civil Defense, WashPost, 12 Apr 82, Eve Zibart: Cooking & Entertaining, WashPost, 12 Apr 82, Cook.

Figure 4. The PHRASE command specifying "poach" and "fish" searched out this portion of text containing poached fish.

ENTER key is pressed and held momentarily. This process may be repeated until the end of the online file is reached and the computer returns to the READY prompt. The BREAK key is used to interrupt the search at any time and FIND another word or phrase.

Using the PHRASE function, you can locate strings that are discontinuous and variable, to a maximum length of 32 characters and spaces, within initial and final characters that must be specified in the command. Thus, by keying in "g" followed by "together" you could search for variants of a phrase such as *get together, get it together, get it all together, get himself together, get your act together, and got it together* (Figure 3). Or, by keying in "la" followed by "claim" you could find occurrences of *lays claim and laid no claim*. Leaving no space after "claim" will net occurrences such as *laying claims*.

A popular use of this function would be to locate portions of text containing two specified key words as, say, *poach*

the 64-character display. Pressing the CLEAR key provides a printout of a concordance after which the computer automatically proceeds to prepare another concordance from the next portion of the file. The BREAK key is used to command a new concordance with a different string.

As in the FIND routine, the commands may be varied in four ways to draw up a concordance of the particular string you want: in the free, prefixed, suffixed, or infixed position.

Your Lex Profile

Alphabetization and the three remaining routines proceed at about 1000 words a minute, perhaps the fastest at which so much sorting and merging can be done by a micro of less than 2MHz clock speed. If that is not fast enough, consider that your workhorse will never take even a coffee break, and the work will be done and waiting for you when you return from lunch.

Alphabetization is useful not only in vocabulary studies but also for reading

Alphabetization is useful not only in vocabulary studies but also for reading proofs of books that have been typeset.

proofs of books that have been typeset. To catch typos and such spelling errors, just check the alphabetical printout for unusual forms and then comb the file using the FIND routine for their exact locations.

Another routine that is based on alphabetization is Comparison of Vocabularies, a routine which enables you to check two files against each other and print out the differences in vocabulary.

A third routine that is very useful for students of vocabulary as well as dictionary makers is frequency-ranking. You can rank *the, of, and, to, a, in, is, you, that, it, or whatever*, depending on the vocabulary used in the text being studied. A ranked list gives a profile of the writer's diction and reveals many other facets of the English language that are of technical interest to the linguist or lexicographer.

Thomas M. Paikeday is chief editor of *The New York Times Everyday Dictionary* published by Times Books, 1982, 1776 Chalkline Grove, Mississauga, Ontario, Canada L4W 2C3.

November 1983 [¢] Creative Computing

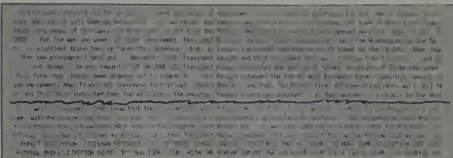


Figure 8. You can use a concordance to line up key words of a book for indexing.

FineTech Presents THE WOODBURY SERIES.

Because your home computer furniture shouldn't look like computer furniture.



Computer furniture. The phrase alone brings to mind cold steel legs and pressboard veneer. But as our computer age swiftly moves into the home, FineTech realizes the need for custom-made fine furniture to house the personal computer. Thus the handcrafted solid oak designs of the Woodbury Series.

Choose either our traditional or contemporary design, in your preference of three hand-stained finishes. Each making its mark as fine furniture to even the

most discriminating tastes, yet you'll find that the Woodbury Series is priced very affordably. Call or write for our full color complimentary brochure and specifications. Because there's no reason for your computer furniture to look like computer furniture.

Yes, I am interested in the Woodbury Series.
 Please send me your brochure.

NAME

ADDRESS

CITY

STATE ZIP

FineTech
FURNITURE, INC.
P.O. Box 280 Woodbury, TN 37190
615/765-5021

FINETECH FURNITURE, INC.
P.O. Box 280 Woodbury, TN 37190

CIRCLE 166 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 297 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 223 ON READER SERVICE CARD

The Making of a Small Computer

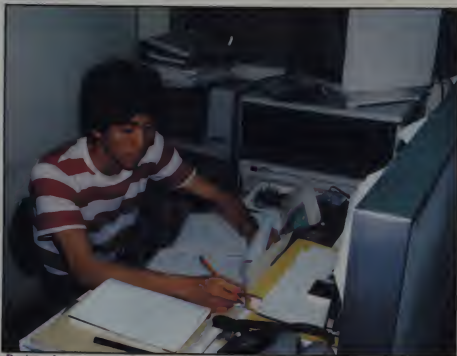
David H. Ahl

We recently had an opportunity to tour the Video Technology factory in Hong Kong. There we saw the design and assembly of pocket games, video games, and small computers. Although

Video Technology has recently moved to more spacious quarters, the steps in making a product are much the same as they are pictured here.



Freder Centre is typical of the manufacturing buildings in Hong Kong.



Design of a new computer is done with the aid of other computers, pencil and paper, and human ingenuity.

Next, a wire wrapped prototype is made and tested.



Then, working drawings of the PC boards are produced.





Incoming mpus and IC's are thoroughly tested.



After component insertion, a wave soldering machine solders all the components uniformly to the PC board.



Subassemblies, switches, and connectors are added to the main PC board.



Overview of the assembly line.



Completed boards are burned in and monitored.



If a board fails the test procedure, it is either fixed or scrapped.



The computer is then tested with a full complement of peripheral devices attached.

After final assembly, each computer is loaded with a program that checks all of its memory and other operations.



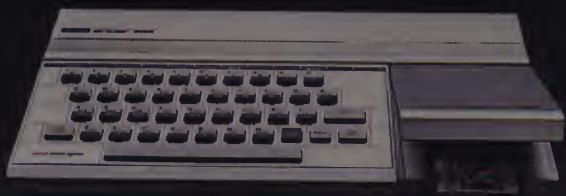
Final burn-in of Laser 200 computers prior to packaging. (The machine is sold as the V-Tech VZ200 in the United States.)

Software development is an ongoing activity.



Now from Timex...a powerful new computer.

72K
COLOR
SOUND
UNDER
\$200



TIMEX SINCLAIR 2068

CIRCLE 301 ON READER SERVICE CARD

Deciphering the "Protected" Code of MBasic

It is always comforting to discover that the publisher of a proprietary program has been kind enough to include source code on the distribution disk. Then, when you need to change the program to fit your revised circumstances

***I will show you how to
get Basic-80 to tell all it
knows about a
protected program.***

or fix a bug in which the vendor has no interest, you can do it yourself. Unfortunately, few publishers of proprietary software offer source code with their packages.

One general exception is software written to run under Microsoft's Basic interpreter. You can *always* recover the source code for one of these programs. Even if the program has been saved in the P (for protect) mode, for the sake of program integrity. (You cannot accidentally delete a line while in direct mode after you load a protected program.) Of course, the interpreter is not supposed to LIST, EDIT, or even SAVE protected code. But it will, with the proper inducement.

In what follows, I will show you how to get Basic-80 to tell all it knows about

Murray L. Lesser

a protected program. The examples will be for my version of MBasic, which runs under CP/M. However, I am sure you can extend the technique to use with other versions and other operating systems.

We are going to give the Basic-80 interpreter two almost identical programs to load. The program names will be different (so we and the system can tell them apart); one will be saved with the P option while the other will not. Then, we will let Basic-80 examine its own innards while it contains each of the two programs, and look for differences.

As you might expect, the important

```
A>MBASIC
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
31483 Bytes free
Ok
10 PRINT "THIS IS A TEST"
20 PRINT 23 " SKIDOO"
30 SYSTEM
SAVE "TEST1"
Ok
SAVE "TEST2",P
Ok
RUN
THIS IS A TEST
23 SKIDOO
A>
```

Note: Underlined characters entered from keyboard.

Figure 1. Manufacturing Test Program Files.

Protected Code, continued...

difference is limited to a single *flag* byte. If we change the flag, the interpreter will forget that the program was supposed to be protected. Once you know the address of that flag byte for your system, you can LIST, EDIT, or SAVE any protected Basic-80 program you may encounter.

The Test Programs

You must start by writing a test program that will be saved in two modes. Figure 1 is a printout of my CRT screen while making the two program load modules. If your version of the Basic-80 interpreter does not have the SYSTEM command (line 30), use its equivalent to get out of Basic and back to your operating system.

Figure 2 shows CP/M Dynamic Debugging Tool (DDT) images of the two test programs, as saved. DDT loads the requested files (in this case, TEST1.BAS and TEST2.BAS) into the transient program area (TPA) of CP/M before examining them. For "standard" CP/M, TPA starts at location 0100 (hex). Thus, the addresses shown down the left-most column are the memory addresses (in hex) for every sixteenth byte, starting at that value. The next 16 columns are the contents of those 16 locations, also in hex. The right-most block contains the corresponding ASCII characters, or a period if the ASCII character is not printable.

Figure 2a is a portion of the DDT image of TEST1.BAS, which has been stored in compressed binary (or token) form. The interpreter knows this is a token program load module because it starts with the byte FF. The image of the first program line starts at address 0101. After the module is loaded, the two

bytes 1E 62 tell the interpreter that the next Basic line will start at memory location 621E.

The following two bytes are the line number, 000A (hex for 10 decimal). The line ends with a 00 byte (image address 0117). Each line of the original program is coded in this format. The non-existent last line of the program starts at the location 6237, and consists of two 00 bytes in succession (addresses 0131-0132, in this image). The remainder of the load module contains "left over" bytes to pad out the 128-byte sector.

Figure 2b is the similar image of TEST2.BAS, the protected version of

Don't assume that the flag byte in your system is at the same location as it is in mine.

the same program. Note that it starts with an FE instead of an FF. No "program" byte is identical to that in the same location in the unprotected load module, although the two forms occupy the same space. The padding bytes following the end of the program (starting at address 0133) are identical to those in Figure 2a.

Figure 2c is a DDT image of TEST2.BAS as loaded into my version of MBasic. (I shall show you how to examine the insides of MBasic with DDT later.) If you compare this with Figure 2a, you will note that the LOAD

operation decoded the protected code. The resulting token program (starting at 6207) is identical to that of the unprotected program.

All we have to do now is find the flag byte that tells MBasic it contains a protected program, and change it.

Finding The Flag

We will find the flag by comparing two files, each of which is a byte-by-byte image of a portion of MBasic as loaded with each of the two programs. Figure 3 shows my CRT screen while making and storing the image of MBasic containing TEST1.BAS. The SAVE following the second CP/M prompt (A >) is not the Basic SAVE; it is the CP/M built-in utility of the same name. I saved 11 pages under the name TEST1.COM for later comparison. I arrived at that number by experiment; it is the minimum number of pages that includes the flag for my version.

Follow the same procedure with the protected program, running TEST2.BAS under MBasic and saving the memory contents as TEST2.COM.

Once you have the two .COM files, finding the flag is simple. Compare them byte-by-byte and record any differences, using an appropriate computer program to make the comparison. You can use any file comparison program you happen to have. In case you don't have one, I have provided COMPARE.BAS (Listing 1).

Figure 4 shows the results of running COMPARE.BAS on TEST1.COM and TEST2.COM. There are only two differences. Address 0803H contains 31H (ASCII 1) for TEST1.COM and 32H (ASCII 2) for TEST2.COM. Obviously, address 0803H in my version of MBasic is a portion of the file control block used for loading the program to be run.

The other difference shows our old friend FE. Address 0BEC is the flag byte. It contains 00 for the unprotected program and FE for the protected one. (There are no printable ASCII equivalents for either byte.) To protect a program, all we have to do is to set the flag byte to zero *after* we have loaded in the program.

You might think you could POKE &0BEC, 00 and the task would be finished. Unfortunately, things are not quite that simple. One of the things Microsoft's manual doesn't tell you is that direct mode PEEK and POKE are inoperative when the interpreter is guarding a protected program. So, more drastic measures are required.

Changing The Flag

Since we can't POKE our way to success, we shall have to arrange to have

```
0100 FF 1E 62 0A 00 91 20 22 54 48 49 53 20 49 53 20 ..b... "THIS IS
0110 41 20 54 45 53 54 22 00 31 62 14 00 91 20 0F 17 A TEST".1b... ..
0120 20 22 20 53 4B 49 44 4F 4F 22 14 00 37 62 1E 00 BD " SKIDOO".7b... ..
0130 00 00 00 1A 98 07 AF 32 93 07 32 64 0A 32 F3 0B .....2..2d.2..
```

Figure 2a. DDT image of TEST1.BAS.

```
0100 FE EA 1A 2B C1 5B F7 85 14 20 16 05 F1 7C 62 F0 ...+.[...%#b.
0110 98 52 16 C6 F1 C1 33 60 FB 52 9B 9D 72 39 4D 70 .R...3*.R..x9#p
0120 4A C9 1E F4 48 2B 18 E1 A6 ED F0 D0 4C C9 AB 78 J...H+.....L..x
0130 ED 05 93 1A 98 07 AF 32 93 07 32 64 0A 32 F3 0B .....2..2d.2..
```

Figure 2b. DDT image of TEST2.BAS.

```
6200 CA 28 62 60 69 6E 0E 1E 62 0A 00 91 20 22 54 48 .(b"1n..b... "TH
6210 49 53 20 49 53 20 41 20 54 45 53 54 22 00 31 62 IS IS A TEST".1b
6220 14 00 91 20 0F 17 20 22 20 53 4B 49 44 4F 4F 22 ... .. " SKIDOO"
6230 00 37 62 1E 00 BD 00 00 00 C2 04 44 44 01 D4 00 .7b.....DD...
```

Figure 2c. DDT image of TEST2 in MBasic.

Complete Personal Accountant: we've made the best much more friendly.

If you have any doubts that we offer the best and most complete personal financial package available, look over the features listed below. Now we have the only package with **full screen editing** for Atari 400/800*, TRS-80 COLOR, Commodore 64* and VIC-20; the ability to move the cursor in any direction makes our accountant-designed package even more friendly than before. No one else offers all of these:

1. CHECKBOOK MAINTENANCE—automatically balances your checkbook with each entry; manages checks, charges, deposits, and interest quickly and accurately.

2. CHART OF ACCOUNTS—maximum of user flexibility with up to 99 accounts plus 9 sub-categories may be defined.

3. CHECK SEARCH—multi-reference; tracks items on every field including tax deductibles.

4. NET WORTH/INCOME/EXPENSE STATEMENT—know exactly where you stand program generates statements with the touch of a key.

5. DETAIL & SUMMARY BUDGET ANALYSIS—an absolute necessity in financial planning.

6. CHECK WRITER—prints personalized checks.**

7. PAYMENTS/APPOINTMENTS CALENDAR—monthly displays of up to 250 bills and 200 appointments.

8. COLOR GRAPH DESIGN PACKAGE—graphs all monthly files.

9. MAILING LIST—maintains all records, sorts by name or zip, allows add/change/delete.

10. FRIENDLY USER MANUAL—complete with indexing, flow charts and diagrams; the most thorough documentation on the market.

This all adds up to the finest personal financial system available—comprehensive enough for a small business.

Less than one hour of data input per month will allow this menu-driven package to help you handle your finances with a lot more fun than drudgery.

Plus, ours is the only expandable system; purchase the package in sections and add on as your financial needs grow. Features 1, 2, 3 and 6:

Features 1, 2, 3 and 6:

\$39.95 diskette, \$36.95 cassette; Features 4 and 5: \$29.95 diskette, \$26.95 cassette;

Features 7, 8 and 9: \$29.95 diskette, \$26.95 cassette; or

save \$19.90 or \$16.00

respectively by buying the entire system for \$79.95 diskette, \$74.95 cassette.

Prints all statements and files on any 80 character printer.

Prices subject to change without notice. See your local dealer or order direct. New catalog available. Add \$3.00 for postage and handling. Credit card orders call toll free.

1-800-334-SOFT

DEALER INQUIRIES INVITED

programmer's institute

a division of FUTUREHOUSE, INC.

p.o. box 3470, dept. A, chapel hill, north carolina 27514, 919-967-0861

CIRCLE 206 ON READER SERVICE CARD

```
A>MBASIC TEST1
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
31483 Bytes free
THIS IS A TEST
23 SKIDOO

A>SAVE 11 TEST1.COM
A>
```

Note: Underlined characters entered from keyboard.

Figure 3. Making TEST1.COM for Comparison.

the interpreter run under DDT (or some other monitor) and use the monitor to get around the defenses of Basic. The technique, tested on our protected TEST2.BAS, is shown in Figure 5. Once you have done it with a test case, you are ready to try real live protected programs.

To start, you must know two system-dependent locations. One is where *your* Basic-80 interpreter will check to see if any additional information was included in the command line (e.g., the name of a program to be run, as in Figures 3 and 4). For CP/M, this location is the beginning of the *temporary buffer* (tbuf). For "standard" systems, tbuf starts at memory location 0080H. Most "modified" CP/M systems use location 4280H. Non-CP/M operating systems may use other locations.

The other necessary address is the location to which your monitor jumps on a break-point interrupt. For CP/M monitors (DDT, SID, and ZSID) this is 0038H (or 4238H). Other monitors may use other locations.

Once you know these two addresses for your system, the rest is like following a cookbook procedure. Figure 5 uses DDT, because it was handy. Before giving the "Go" to MBasic under DDT, set the "run program" flag to zero (to get rid of DDT's left over) using the "Substitute" command (note 1 in Figure 5) of the monitor.

After you are in MBasic, use LOAD to load the protected program. Just to show what happens, I tried to list TEST2.BAS and got an illegal function call for my trouble.

Now you must get back to DDT. The two direct mode commands starting at note 2 will do it. I have displayed the contents of the 16 bytes starting at 0BEO, just to show the flag, FE, *in situ* (note 3). The actual code breaking occurs by zeroing byte OBEC (note 4).

```
A>MBASIC COMPARE
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
31483 Bytes free
First <filename> (ALL CAPS)? TEST1.COM
Second <filename> (ALL CAPS)? TEST2.COM
ADDRESS TEST1.COM TEST2.COM
0803 31 (1) 32 (2)
OBEC 00 FE
Comparison ended at 0BFF
```

A>

Note: Underlined characters entered from keyboard.

Figure 4. Comparing the Files.

```
A>DDT MBASIC.COM
DDT VERS 2.2
NEXT PC
6100 0100
-S80
0080 35 00 [Note 1]
0081 2D _
-G
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
27381 Bytes free
Ok
LOAD "TEST2"
Ok
LIST
Illegal function call
Ok
LET DDT=6H38 [Note 2]
Ok
CALL DDT
*4DC9
-DOBEO,OBEP [Note 3]
OBEO 00 00 00 00 00 00 38 00 00 00 80 00 FE 00 00 00 .....8.....
-SOBEC [Note 4]
OBEC FE 00
OBEO 00 _
-G
Ok
LIST
10 PRINT "THIS IS A TEST"
20 PRINT 23 " SKIDOO"
30 SYSTEM
Ok
RUN
THIS IS A TEST
23 SKIDOO
A>
```

Note 0: Underlined characters entered from keyboard.

Note 1: 80H must be set to zero to prevent MBasic from looking for wrong file.

Note 2: Entry point for DDT (or SID or ZSID).

Note 3: Looking at FE flag in OBEC (hex).

Note 4: Turning off flag by setting OBEC to zero.

Figure 5. Making MBasic Decipher Itself.

UNICORN TREASURES MAKE LEARNING A PLEASURE



10 LITTLE ROBOTS™ — Ages 2-7. The most delightful way to introduce your young learner to the computer. 10 Little Robots has five different games to keep your child's avid attention. There is upper and lower case letter recognition, counting the robots, robot addition, and an interactive storybook tale and a unique robot sketch game that will enchant kids in a most creative way. The storybook tale introduces the concept of subtraction and serves as a motivational tool for the beginning reader.

IBM with 64K, one disk drive color monitor required.
Available for Atari 400/800/1200, 48K, and one disk drive.
Soon to be available for Commodore 64 and Apple Computers.



SHIPS AHOY™ — Ages 5-13. Outstanding graphics and sound makes this program an entertaining way for children to practice their basic math facts. The object of the game is to sail your ship across the ocean avoiding the treacherous mine hidden beneath the sea. Ships Ahoy allows you to select beginner, intermediate or advanced levels within the four basic math functions. The flexibility of this program lies in the option of choosing to be timed or not enabling the academically talented student to practice speed math. An equation program and built-in tables enhance the effectiveness of Ships Ahoy. Two unique and different games are included as rewards.

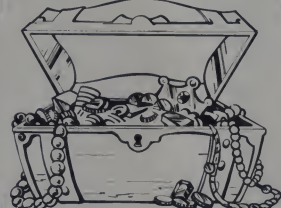
Available at your local computer store if you can't find them there, you can order directly from Unicorn Software. All programs \$39.95. Please enclose \$2.00 for shipping and handling. Visa and Mastercard welcomed.

Atari, Commodore 64, IBM PC and Apple are trademarks of Atari, Inc., Commodore Electronics LTD, International Business Machines Corp and Apple Computer, Inc. respectively.

Copyright 1983 by Unicorn Software Company. All rights reserved.

Each Unicorn educational game teaches as it entertains. All our treasures have been developed and tested at The Computer Learning Center for Children. Written by experts who make them educational and fun, our games feature colorful, high-resolution graphics, multiple difficulty levels, beautiful music, and are completely user-friendly with simple on-screen instructions.

Unicorn's educational games are unique in their flexibility. Parents will be delighted to be able to use them year after year as their child's educational needs change. No need to spend a lot of money on software that children will master in a short time and not use again.



FUNBUNCH™ — The most flexible language arts program on the market today. Available on three levels, elementary (grades 1-6), intermediate (junior high school), and college board preparatory (high school). Each level includes over 2000 words and phrases. Within the elementary level the word list can be accessed by grade. The program also allows you to enter your own words and phrases. You can adjust the length of time the words and phrases are displayed on the screen, making Funbunch an excellent tool for speed reading as well as memorization. There is a built-in printer option which allows you to list the vocabulary for further review. Funbunch also contains a computer doodle drawing game for creative fun. Please specify Funbunch (elementary), Funbunch (intermediate) or Funbunch (college board preparatory) when ordering.



RACE CAR ARITHMETIC™ — Ages 5-Adult. A math game that the entire family can play together. Each person can compete on their own level in a race to the finish line. Children and adults alike will have hour upon hour of educational fun together and can practice the four basic math functions, each choosing their own operation, difficulty level and optional time factor. Race Car Arithmetic fully utilizes your computer's superb graphics and sound capabilities. An arcade-style race car game is included as a reward. From 1 to 4 players.



UNICORN™
SOFTWARE

DEALER INQUIRIES INVITED
UNICORN SOFTWARE™
1775 East Tropicana Avenue
Las Vegas, Nevada 89109
(702) 798-2727 or (702) 798-5990

CIRCLE 248 ON READER SERVICE CARD

Protected Code, continued...

Leave DDT with the G command, and you will again see the MBasic Ok prompt. Just to prove it works, I have listed TEST2.BAS, in its newly un-protected state.

Don't assume that the flag byte in your system is at the same location as it is in mine. Run through the entire procedure and locate yours for yourself. After you have found it, make a note in your programmer's notebook so you will be able to unprotect any Basic-80 load module. Once the flag has been set to zero, you can save the program (preferably under another name) in the un-protected mode for later reference.

The File Comparison Program

The file comparison program COMPARE.BAS (Listing 1) has some characteristics that may be of interest beyond its intrinsic value as a utility. It has been carefully written to run when compiled with Microsoft's Basic-80 compiler BASCOM. This is not the trivial task you might think it to be. Not all usable MBasic programs will run properly when compiled with BASCOM; some won't even compile.

The major additions are the DEFINT statement (line 1000) and the CLOSE #1 statements in the error traps (line 60010-60020), none of which are necessary for proper operation under MBasic. However, these make the program useful for anyone who owns BASCOM, does not own MBasic, and doesn't already have a file-compare utility. I should point out that the program will not run noticeably faster when compiled because it is file-input limited.

The program was written with Microsoft's Edit-80 line editor, rather than with the MBasic built-in editor, mostly for convenience but also for appearance. You must turn off the high-order bits on the line numbers, as left by Edit-80, to get such a program to run or compile. (Use the CP/M PIP utility to PIP COMPARE.BAS to itself with the (Z) parameter.)

Lines 1060-1130 are an existence test with error trap to make sure you have properly entered the filenames to be compared. The error trap gives you another chance when you make an entry type, without having to restart the whole process.

Most file comparison programs indicate the location of the difference as a count from the beginning of the file. Since this one was intended to compare memory image files, I show the actual memory address. This is obtained by initializing COUNT to one less than the TPA starting address (line 2010). To change the traditional mode, initialize COUNT to zero.

The target files are read as 128-

character records in random mode. Each file buffer is fielded as a single 128-byte string (lines 1210-1240).

The program has been structured for speed. The major loop (lines 2040-2090) tests the string pair for equality. If there isn't any difference, it fetches another pair of records, continuing until the shorter file has been checked in its entirety. If there is a difference, the differing bytes are found in the subroutine starting at line 3000 and displayed in the subroutine starting at line 4000, using the format subroutines in lines 5000-5030 and 5500-5540. Note that EXPAND and ITEM are local variables used by the format subroutines.

According to Microsoft's *Basic-80 Reference Manual*, the End of File

(EOF) function doesn't work when in random mode, except in CP/M versions. If it doesn't work in yours, use the substitute major loop in Listing 2.

I tested both forms of COMPARE.BAS, both as an MBasic and as a BASCOM program, under my hardware vendor's versions of both CP/M 1.4 and CP/M 2.2.

For obvious reasons, I couldn't test the unprotect procedure for other versions of Basic-80 running other operating systems. If your version is different, going through the general methodology should work for you, even though the details may vary. After all, Microsoft is a successful software vendor and successful software vendors don't usually reinvent successful constructs. □

Listing 1. COMPARE.BAS.

```
00010 ' *****
00020 ' *** COMPARE.BAS ***
00030 ' *****
00040 '
00050 '   Program to compare two files, byte-by-byte,
00060 '   and display differences.
00070 '
00080 '   Written by M. L. Lesser, 11/12/82
00090 '   Written for Microsoft MBASIC v 5.21 with CP/M
00100 '
00100 DEFINT I,R      'INDEX,ITEM,RECORD
00110 DEFMSG C,E     'COUNT,EXPAND
00120 DEFSTR F,T     'FILE1,FILE2,TEXT1,TEXT2,T1,T2
00130 '
00140 ON ERROR GOTO 60000      'Error trap
00150 '
00160 '   Check files to compare:
00170 INPUT "First <filename> (ALL CAPS)"; FILE1
00180 OPEN "I", #1, FILE1     'Check for existence
00190 CLOSE #1
00200 INPUT "Second <filename> (ALL CAPS)"; FILE2
00210 OPEN "I", #1, FILE2     'Check for existence
00220 CLOSE #1
00230 '
00240 '   Open files for comparison:
00250 OPEN "R", #1, FILE1, 128      'Use random mode
00260 OPEN "R", #2, FILE2, 128
00270 FIELD #1, 128 AS TEXT1
00280 FIELD #2, 128 AS TEXT2
00290 '
00300 '   Display headers:
00310 PRINT "ADDRESS" TAB(10) FILE1 TAB(30) FILE2
00320 '
00330 '   Compare records:
00340 LET COUNT = &HFF      'One less than start of TPA
00350 LET RECORD = 1
00360 GET #1,RECORD: GET #2,RECORD      'First records
00370 WHILE (EOF(1) = 0) AND (EOF(2) = 0)
00380   IF TEXT1 <> TEXT2 THEN GOSUB 3000      'Compare detail
00390   LET COUNT = COUNT + 128
00400   LET RECORD = RECORD + 1
00410   GET #1,RECORD: GET #2,RECORD      'Next records
00420 WEND
00430 LET EXPAND = COUNT
00440 PRINT "Comparison ended at ";
00450 GOSUB 5000      'Hex expansion
00460 PRINT
00470 CLOSE
00480 SYSTEM
00490 '
00500 '
00510 '
00520 '
00530 '
00540 '
00550 '
00560 '
00570 '
00580 '
00590 '
00600 '
00610 '
00620 '
00630 '
00640 '
00650 '
00660 '
00670 '
00680 '
00690 '
00700 '
00710 '
00720 '
00730 '
00740 '
00750 '
00760 '
00770 '
00780 '
00790 '
00800 '
00810 '
00820 '
00830 '
00840 '
00850 '
00860 '
00870 '
00880 '
00890 '
00900 '
00910 '
00920 '
00930 '
00940 '
00950 '
00960 '
00970 '
00980 '
00990 '
01000 '
01010 '
01020 '
01030 '
01040 '
01050 '
01060 '
01070 '
01080 '
01090 '
01100 '
01110 '
01120 '
01130 '
01140 '
01150 '
01160 '
01170 '
01180 '
01190 '
01200 '
01210 '
01220 '
01230 '
01240 '
01250 '
01260 '
01270 '
01280 '
01290 '
01300 '
01310 '
01320 '
01330 '
01340 '
01350 '
01360 '
01370 '
01380 '
01390 '
01400 '
01410 '
01420 '
01430 '
01440 '
01450 '
01460 '
01470 '
01480 '
01490 '
01500 '
01510 '
01520 '
01530 '
01540 '
01550 '
01560 '
01570 '
01580 '
01590 '
01600 '
01610 '
01620 '
01630 '
01640 '
01650 '
01660 '
01670 '
01680 '
01690 '
01700 '
01710 '
01720 '
01730 '
01740 '
01750 '
01760 '
01770 '
01780 '
01790 '
01800 '
01810 '
01820 '
01830 '
01840 '
01850 '
01860 '
01870 '
01880 '
01890 '
01900 '
01910 '
01920 '
01930 '
01940 '
01950 '
01960 '
01970 '
01980 '
01990 '
02000 '
02010 '
02020 '
02030 '
02040 '
02050 '
02060 '
02070 '
02080 '
02090 '
02100 '
02110 '
02120 '
02130 '
02140 '
02150 '
02160 '
02170 '
02180 '
02190 '
02200 '
02210 '
02220 '
02230 '
02240 '
02250 '
02260 '
02270 '
02280 '
02290 '
02300 '
02310 '
02320 '
02330 '
02340 '
02350 '
02360 '
02370 '
02380 '
02390 '
02400 '
02410 '
02420 '
02430 '
02440 '
02450 '
02460 '
02470 '
02480 '
02490 '
02500 '
02510 '
02520 '
02530 '
02540 '
02550 '
02560 '
02570 '
02580 '
02590 '
02600 '
02610 '
02620 '
02630 '
02640 '
02650 '
02660 '
02670 '
02680 '
02690 '
02700 '
02710 '
02720 '
02730 '
02740 '
02750 '
02760 '
02770 '
02780 '
02790 '
02800 '
02810 '
02820 '
02830 '
02840 '
02850 '
02860 '
02870 '
02880 '
02890 '
02900 '
02910 '
02920 '
02930 '
02940 '
02950 '
02960 '
02970 '
02980 '
02990 '
03000 '
03010 '
03020 '
03030 '
03040 '
03050 '
03060 '
03070 '
03080 '
03090 '
03100 '
03110 '
03120 '
03130 '
03140 '
03150 '
03160 '
03170 '
03180 '
03190 '
03200 '
03210 '
03220 '
03230 '
03240 '
03250 '
03260 '
03270 '
03280 '
03290 '
03300 '
03310 '
03320 '
03330 '
03340 '
03350 '
03360 '
03370 '
03380 '
03390 '
03400 '
03410 '
03420 '
03430 '
03440 '
03450 '
03460 '
03470 '
03480 '
03490 '
03500 '
03510 '
03520 '
03530 '
03540 '
03550 '
03560 '
03570 '
03580 '
03590 '
03600 '
03610 '
03620 '
03630 '
03640 '
03650 '
03660 '
03670 '
03680 '
03690 '
03700 '
03710 '
03720 '
03730 '
03740 '
03750 '
03760 '
03770 '
03780 '
03790 '
03800 '
03810 '
03820 '
03830 '
03840 '
03850 '
03860 '
03870 '
03880 '
03890 '
03900 '
03910 '
03920 '
03930 '
03940 '
03950 '
03960 '
03970 '
03980 '
03990 '
04000 '
04010 '
04020 '
04030 '
04040 '
04050 '
04060 '
04070 '
04080 '
04090 '
04100 '
04110 '
04120 '
04130 '
04140 '
04150 '
04160 '
04170 '
04180 '
04190 '
04200 '
04210 '
04220 '
04230 '
04240 '
04250 '
04260 '
04270 '
04280 '
04290 '
04300 '
04310 '
04320 '
04330 '
04340 '
04350 '
04360 '
04370 '
04380 '
04390 '
04400 '
04410 '
04420 '
04430 '
04440 '
04450 '
04460 '
04470 '
04480 '
04490 '
04500 '
04510 '
04520 '
04530 '
04540 '
04550 '
04560 '
04570 '
04580 '
04590 '
04600 '
04610 '
04620 '
04630 '
04640 '
04650 '
04660 '
04670 '
04680 '
04690 '
04700 '
04710 '
04720 '
04730 '
04740 '
04750 '
04760 '
04770 '
04780 '
04790 '
04800 '
04810 '
04820 '
04830 '
04840 '
04850 '
04860 '
04870 '
04880 '
04890 '
04900 '
04910 '
04920 '
04930 '
04940 '
04950 '
04960 '
04970 '
04980 '
04990 '
05000 '
05010 '
05020 '
05030 '
05040 '
05050 '
05060 '
05070 '
05080 '
05090 '
05100 '
05110 '
05120 '
05130 '
05140 '
05150 '
05160 '
05170 '
05180 '
05190 '
05200 '
05210 '
05220 '
05230 '
05240 '
05250 '
05260 '
05270 '
05280 '
05290 '
05300 '
05310 '
05320 '
05330 '
05340 '
05350 '
05360 '
05370 '
05380 '
05390 '
05400 '
05410 '
05420 '
05430 '
05440 '
05450 '
05460 '
05470 '
05480 '
05490 '
05500 '
05510 '
05520 '
05530 '
05540 '
05550 '
05560 '
05570 '
05580 '
05590 '
05600 '
05610 '
05620 '
05630 '
05640 '
05650 '
05660 '
05670 '
05680 '
05690 '
05700 '
05710 '
05720 '
05730 '
05740 '
05750 '
05760 '
05770 '
05780 '
05790 '
05800 '
05810 '
05820 '
05830 '
05840 '
05850 '
05860 '
05870 '
05880 '
05890 '
05900 '
05910 '
05920 '
05930 '
05940 '
05950 '
05960 '
05970 '
05980 '
05990 '
06000 '
06010 '
06020 '
06030 '
06040 '
06050 '
06060 '
06070 '
06080 '
06090 '
06100 '
06110 '
06120 '
06130 '
06140 '
06150 '
06160 '
06170 '
06180 '
06190 '
06200 '
06210 '
06220 '
06230 '
06240 '
06250 '
06260 '
06270 '
06280 '
06290 '
06300 '
06310 '
06320 '
06330 '
06340 '
06350 '
06360 '
06370 '
06380 '
06390 '
06400 '
06410 '
06420 '
06430 '
06440 '
06450 '
06460 '
06470 '
06480 '
06490 '
06500 '
06510 '
06520 '
06530 '
06540 '
06550 '
06560 '
06570 '
06580 '
06590 '
06600 '
06610 '
06620 '
06630 '
06640 '
06650 '
06660 '
06670 '
06680 '
06690 '
06700 '
06710 '
06720 '
06730 '
06740 '
06750 '
06760 '
06770 '
06780 '
06790 '
06800 '
06810 '
06820 '
06830 '
06840 '
06850 '
06860 '
06870 '
06880 '
06890 '
06900 '
06910 '
06920 '
06930 '
06940 '
06950 '
06960 '
06970 '
06980 '
06990 '
07000 '
07010 '
07020 '
07030 '
07040 '
07050 '
07060 '
07070 '
07080 '
07090 '
07100 '
07110 '
07120 '
07130 '
07140 '
07150 '
07160 '
07170 '
07180 '
07190 '
07200 '
07210 '
07220 '
07230 '
07240 '
07250 '
07260 '
07270 '
07280 '
07290 '
07300 '
07310 '
07320 '
07330 '
07340 '
07350 '
07360 '
07370 '
07380 '
07390 '
07400 '
07410 '
07420 '
07430 '
07440 '
07450 '
07460 '
07470 '
07480 '
07490 '
07500 '
07510 '
07520 '
07530 '
07540 '
07550 '
07560 '
07570 '
07580 '
07590 '
07600 '
07610 '
07620 '
07630 '
07640 '
07650 '
07660 '
07670 '
07680 '
07690 '
07700 '
07710 '
07720 '
07730 '
07740 '
07750 '
07760 '
07770 '
07780 '
07790 '
07800 '
07810 '
07820 '
07830 '
07840 '
07850 '
07860 '
07870 '
07880 '
07890 '
07900 '
07910 '
07920 '
07930 '
07940 '
07950 '
07960 '
07970 '
07980 '
07990 '
08000 '
08010 '
08020 '
08030 '
08040 '
08050 '
08060 '
08070 '
08080 '
08090 '
08100 '
08110 '
08120 '
08130 '
08140 '
08150 '
08160 '
08170 '
08180 '
08190 '
08200 '
08210 '
08220 '
08230 '
08240 '
08250 '
08260 '
08270 '
08280 '
08290 '
08300 '
08310 '
08320 '
08330 '
08340 '
08350 '
08360 '
08370 '
08380 '
08390 '
08400 '
08410 '
08420 '
08430 '
08440 '
08450 '
08460 '
08470 '
08480 '
08490 '
08500 '
08510 '
08520 '
08530 '
08540 '
08550 '
08560 '
08570 '
08580 '
08590 '
08600 '
08610 '
08620 '
08630 '
08640 '
08650 '
08660 '
08670 '
08680 '
08690 '
08700 '
08710 '
08720 '
08730 '
08740 '
08750 '
08760 '
08770 '
08780 '
08790 '
08800 '
08810 '
08820 '
08830 '
08840 '
08850 '
08860 '
08870 '
08880 '
08890 '
08900 '
08910 '
08920 '
08930 '
08940 '
08950 '
08960 '
08970 '
08980 '
08990 '
09000 '
09010 '
09020 '
09030 '
09040 '
09050 '
09060 '
09070 '
09080 '
09090 '
09100 '
09110 '
09120 '
09130 '
09140 '
09150 '
09160 '
09170 '
09180 '
09190 '
09200 '
09210 '
09220 '
09230 '
09240 '
09250 '
09260 '
09270 '
09280 '
09290 '
09300 '
09310 '
09320 '
09330 '
09340 '
09350 '
09360 '
09370 '
09380 '
09390 '
09400 '
09410 '
09420 '
09430 '
09440 '
09450 '
09460 '
09470 '
09480 '
09490 '
09500 '
09510 '
09520 '
09530 '
09540 '
09550 '
09560 '
09570 '
09580 '
09590 '
09600 '
09610 '
09620 '
09630 '
09640 '
09650 '
09660 '
09670 '
09680 '
09690 '
09700 '
09710 '
09720 '
09730 '
09740 '
09750 '
09760 '
09770 '
09780 '
09790 '
09800 '
09810 '
09820 '
09830 '
09840 '
09850 '
09860 '
09870 '
09880 '
09890 '
09900 '
09910 '
09920 '
09930 '
09940 '
09950 '
09960 '
09970 '
09980 '
09990 '
10000 '
10010 '
10020 '
10030 '
10040 '
10050 '
10060 '
10070 '
10080 '
10090 '
10100 '
10110 '
10120 '
10130 '
10140 '
10150 '
10160 '
10170 '
10180 '
10190 '
10200 '
10210 '
10220 '
10230 '
10240 '
10250 '
10260 '
10270 '
10280 '
10290 '
10300 '
10310 '
10320 '
10330 '
10340 '
10350 '
10360 '
10370 '
10380 '
10390 '
10400 '
10410 '
10420 '
10430 '
10440 '
10450 '
10460 '
10470 '
10480 '
10490 '
10500 '
10510 '
10520 '
10530 '
10540 '
10550 '
10560 '
10570 '
10580 '
10590 '
10600 '
10610 '
10620 '
10630 '
10640 '
10650 '
10660 '
10670 '
10680 '
10690 '
10700 '
10710 '
10720 '
10730 '
10740 '
10750 '
10760 '
10770 '
10780 '
10790 '
10800 '
10810 '
10820 '
10830 '
10840 '
10850 '
10860 '
10870 '
10880 '
10890 '
10900 '
10910 '
10920 '
10930 '
10940 '
10950 '
10960 '
10970 '
10980 '
10990 '
11000 '
11010 '
11020 '
11030 '
11040 '
11050 '
11060 '
11070 '
11080 '
11090 '
11100 '
11110 '
11120 '
11130 '
11140 '
11150 '
11160 '
11170 '
11180 '
11190 '
11200 '
11210 '
11220 '
11230 '
11240 '
11250 '
11260 '
11270 '
11280 '
11290 '
11300 '
11310 '
11320 '
11330 '
11340 '
11350 '
11360 '
11370 '
11380 '
11390 '
11400 '
11410 '
11420 '
11430 '
11440 '
11450 '
11460 '
11470 '
11480 '
11490 '
11500 '
11510 '
11520 '
11530 '
11540 '
11550 '
11560 '
11570 '
11580 '
11590 '
11600 '
11610 '
11620 '
11630 '
11640 '
11650 '
11660 '
11670 '
11680 '
11690 '
11700 '
11710 '
11720 '
11730 '
11740 '
11750 '
11760 '
11770 '
11780 '
11790 '
11800 '
11810 '
11820 '
11830 '
11840 '
11850 '
11860 '
11870 '
11880 '
11890 '
11900 '
11910 '
11920 '
11930 '
11940 '
11950 '
11960 '
11970 '
11980 '
11990 '
12000 '
12010 '
12020 '
12030 '
12040 '
12050 '
12060 '
12070 '
12080 '
12090 '
12100 '
12110 '
12120 '
12130 '
12140 '
12150 '
12160 '
12170 '
12180 '
12190 '
12200 '
12210 '
12220 '
12230 '
12240 '
12250 '
12260 '
12270 '
12280 '
12290 '
12300 '
12310 '
12320 '
12330 '
12340 '
12350 '
12360 '
12370 '
12380 '
12390 '
12400 '
12410 '
12420 '
12430 '
12440 '
12450 '
12460 '
12470 '
12480 '
12490 '
12500 '
12510 '
12520 '
12530 '
12540 '
12550 '
12560 '
12570 '
12580 '
12590 '
12600 '
12610 '
12620 '
12630 '
12640 '
12650 '
12660 '
12670 '
12680 '
12690 '
12700 '
12710 '
12720 '
12730 '
12740 '
12750 '
12760 '
12770 '
12780 '
12790 '
12800 '
12810 '
12820 '
12830 '
12840 '
12850 '
12860 '
12870 '
12880 '
12890 '
12900 '
12910 '
12920 '
12930 '
12940 '
12950 '
12960 '
12970 '
12980 '
12990 '
13000 '
13010 '
13020 '
13030 '
13040 '
13050 '
13060 '
13070 '
13080 '
13090 '
13100 '
13110 '
13120 '
13130 '
13140 '
13150 '
13160 '
13170 '
13180 '
13190 '
13200 '
13210 '
13220 '
13230 '
13240 '
13250 '
13260 '
13270 '
13280 '
13290 '
13300 '
13310 '
13320 '
13330 '
13340 '
13350 '
13360 '
13370 '
13380 '
13390 '
13400 '
13410 '
13420 '
13430 '
13440 '
13450 '
13460 '
13470 '
13480 '
13490 '
13500 '
13510 '
13520 '
13530 '
13540 '
13550 '
13560 '
13570 '
13580 '
13590 '
13600 '
13610 '
13620 '
13630 '
13640 '
13650 '
13660 '
13670 '
13680 '
13690 '
13700 '
13710 '
13720 '
13730 '
13740 '
13750 '
13760 '
13770 '
13780 '
13790 '
13800 '
13810 '
13820 '
13830 '
13840 '
13850 '
13860 '
13870 '
13880 '
13890 '
13900 '
13910 '
13920 '
13930 '
13940 '
13950 '
13960 '
13970 '
13980 '
13990 '
14000 '
14010 '
14020 '
14030 '
14040 '
14050 '
14060 '
14070 '
14080 '
14090 '
14100 '
14110 '
14120 '
14130 '
14140 '
14150 '
14160 '
14170 '
14180 '
14190 '
14200 '
14210 '
14220 '
14230 '
14240 '
14250 '
14260 '
14270 '
14280 '
14290 '
14300 '
14310 '
14320 '
14330 '
14340 '
14350 '
14360 '
14370 '
14380 '
14390 '
14400 '
14410 '
14420 '
14430 '
14440 '
14450 '
14460 '
14470 '
14480 '
14490 '
14500 '
14510 '
14520 '
14530 '
14540 '
14550 '
14560 '
14570 '
14580 '
14590 '
14600 '
14610 '
14620 '
14630 '
14640 '
14650 '
14660 '
14670 '
14680 '
14690 '
14700 '
14710 '
14720 '
14730 '
14740 '
14750 '
14760 '
14770 '
14780 '
14790 '
14800 '
14810 '
14820 '
14830 '
14840 '
14850 '
14860 '
14870 '
14880 '
14890 '
14900 '
14910 '
14920 '
14930 '
14940 '
14950 '
14960 '
14970 '
14980 '
14990 '
15000 '
15010 '
15020
```


PIED PIPER™

THE COMPUTER WITH THE STORY!



THE \$1299.00 PIED PIPER™ STORY:

- AN INCREDIBLE 1 MEGABYTE OF FLOPPY DISK STORAGE CAPACITY!
- STANDARD 64K MEMORY – No need to buy extra memory boards
- FULL SIZED TYPEWRITER KEYBOARD
- PLUS AN ADVANCED SOFTWARE PACKAGE – Including the CP/M® operating system and business applications programs!

And it's portable! Weighing only 12½ pounds, the PIED PIPER™ goes where you go. The PIED PIPER™ computer is the total system solution you've been waiting for!

Combining value and performance in an attractive portable carrying case, the PIED PIPER™ complements your busy lifestyle. No other microcomputer offers more value for the money.

Remember the PIED PIPER™. What a Story!!!

Contact your local dealer or
STM Electronics Corporation, 525 Middlefield Road, Suite 130,
Menlo Park, CA 94025 (415) 326-6226
PIED PIPER is a trademark of Semi-Tech Microelectronics Corp.
CP/M is a registered trademark of Digital Research, Inc.
Video monitor must be purchased separately.

CIRCLE 231 ON READER SERVICE CARD

LOWEST CP/M PRICES GUARANTEED

We hereby certify that your purchase from Discount Software represents the lowest price sold anywhere. If you find a lower price on what you purchased within 30 days, send the ad and we'll refund the difference.

19 SPECIAL BARGAINS

(Call toll-free number for hundreds more!)

ARTIFICIAL INTELLIGENCE

dBase II Call \$4??

DIGITAL RESEARCH

Northstar \$149
TRS-80 Model II (P & T) \$159
C-Base-2 \$98
PL/1-80 \$449
Z-Sid \$90

FOX & GELLER

DUIH \$65

MICROPRO

WordStar \$279
Mail Merge \$179
SpellStar \$199

MICROSOFT

Basic-80 \$249
Basic Compiler \$329
Fortran-80 \$349
Cobol-80 \$549
Macro-80 \$159

SORCIM

SuperCalc I \$179

WORD PROCESSING

The Word Plus \$145

COMMUNICATIONS

Crosstalk \$139
Move-It \$89



FREE WITH PURCHASE
Complete Software
Buyer's Guide
(\$5.00 value)

CC-783

Outside Continental U.S. add \$10 plus air fare of Post. Add \$3.50 postage and handling per each item. California residents add \$3.50 sales tax. Allow 2 weeks for delivery. (1) \$100 (2) \$150 (3) \$200 (4) \$250 (5) \$300 (6) \$350 (7) \$400 (8) \$450 (9) \$500 (10) \$550 (11) \$600 (12) \$650 (13) \$700 (14) \$750 (15) \$800 (16) \$850 (17) \$900 (18) \$950 (19) \$1000 (20) \$1050 (21) \$1100 (22) \$1150 (23) \$1200 (24) \$1250 (25) \$1300 (26) \$1350 (27) \$1400 (28) \$1450 (29) \$1500 (30) \$1550 (31) \$1600 (32) \$1650 (33) \$1700 (34) \$1750 (35) \$1800 (36) \$1850 (37) \$1900 (38) \$1950 (39) \$2000 (40) \$2050 (41) \$2100 (42) \$2150 (43) \$2200 (44) \$2250 (45) \$2300 (46) \$2350 (47) \$2400 (48) \$2450 (49) \$2500 (50) \$2550 (51) \$2600 (52) \$2650 (53) \$2700 (54) \$2750 (55) \$2800 (56) \$2850 (57) \$2900 (58) \$2950 (59) \$3000 (60) \$3050 (61) \$3100 (62) \$3150 (63) \$3200 (64) \$3250 (65) \$3300 (66) \$3350 (67) \$3400 (68) \$3450 (69) \$3500 (70) \$3550 (71) \$3600 (72) \$3650 (73) \$3700 (74) \$3750 (75) \$3800 (76) \$3850 (77) \$3900 (78) \$3950 (79) \$4000 (80) \$4050 (81) \$4100 (82) \$4150 (83) \$4200 (84) \$4250 (85) \$4300 (86) \$4350 (87) \$4400 (88) \$4450 (89) \$4500 (90) \$4550 (91) \$4600 (92) \$4650 (93) \$4700 (94) \$4750 (95) \$4800 (96) \$4850 (97) \$4900 (98) \$4950 (99) \$5000 (100) \$5050 (101) \$5100 (102) \$5150 (103) \$5200 (104) \$5250 (105) \$5300 (106) \$5350 (107) \$5400 (108) \$5450 (109) \$5500 (110) \$5550 (111) \$5600 (112) \$5650 (113) \$5700 (114) \$5750 (115) \$5800 (116) \$5850 (117) \$5900 (118) \$5950 (119) \$6000 (120) \$6050 (121) \$6100 (122) \$6150 (123) \$6200 (124) \$6250 (125) \$6300 (126) \$6350 (127) \$6400 (128) \$6450 (129) \$6500 (130) \$6550 (131) \$6600 (132) \$6650 (133) \$6700 (134) \$6750 (135) \$6800 (136) \$6850 (137) \$6900 (138) \$6950 (139) \$7000 (140) \$7050 (141) \$7100 (142) \$7150 (143) \$7200 (144) \$7250 (145) \$7300 (146) \$7350 (147) \$7400 (148) \$7450 (149) \$7500 (150) \$7550 (151) \$7600 (152) \$7650 (153) \$7700 (154) \$7750 (155) \$7800 (156) \$7850 (157) \$7900 (158) \$7950 (159) \$8000 (160) \$8050 (161) \$8100 (162) \$8150 (163) \$8200 (164) \$8250 (165) \$8300 (166) \$8350 (167) \$8400 (168) \$8450 (169) \$8500 (170) \$8550 (171) \$8600 (172) \$8650 (173) \$8700 (174) \$8750 (175) \$8800 (176) \$8850 (177) \$8900 (178) \$8950 (179) \$9000 (180) \$9050 (181) \$9100 (182) \$9150 (183) \$9200 (184) \$9250 (185) \$9300 (186) \$9350 (187) \$9400 (188) \$9450 (189) \$9500 (190) \$9550 (191) \$9600 (192) \$9650 (193) \$9700 (194) \$9750 (195) \$9800 (196) \$9850 (197) \$9900 (198) \$9950 (199) \$10000 (200)

ORDER TOLL-FREE
VIA VISA OR MASTERCARD

1-800-421-4003

or 1 213-837-5141 Calif 1 800 252 4092
6520 Selma Avenue Los Angeles CA 90028

SOFTWARE

CIRCLE 155 ON READER SERVICE CARD

Protected Code, continued...

```

03000 ' Compare detail
03010 FOR INDEX = 1 TO 128
03020 IF MIDS(TEXT1,INDEX,1) <> MIDS(TEXT2,INDEX,1)
      THEN GOSUB 4000 'Detail doesn't match
03030 NEXT INDEX
03040 RETURN
03050 '
04000 ' Detail doesn't match:
04010 LET EXPAND = COUNT + INDEX
04020 LET T1 = MIDS(TEXT1,INDEX,1)
04030 LET T2 = MIDS(TEXT2,INDEX,1)
04040 GOSUB 5000 'Hex expansion
04050 PRINT TAB(10);
04060 LET ITEM = ASC(T1)
04070 GOSUB 5500 'Display detail
04080 PRINT TAB(30);
04090 LET ITEM = ASC(T2)
04100 GOSUB 5500 'Display detail
04110 PRINT
04120 RETURN
04130 '
05000 ' Hex address expansion to four digits:
05010 IF EXPAND < 6H10 THEN PRINT "000" HEX$(EXPAND);
      ELSE IF EXPAND < 6H100 THEN PRINT "00" HEX$(EXPAND);
      ELSE IF EXPAND < 6H1000 THEN PRINT "0" HEX$(EXPAND);
      ELSE PRINT HEX$(EXPAND);
05020 RETURN
05030 '
05500 ' Display byte detail:
05510 IF ITEM < 6H10 THEN PRINT "0" HEX$(ITEM);
      ELSE PRINT HEX$(ITEM); 'Byte in Hex
05520 IF ITEM > 31 AND ITEM < 128
      THEN PRINT " (" CHR$(ITEM) ")"; 'Printable ASCII
05530 RETURN
05540 '
60000 ' Error trap:
60010 IF ERR = 53 AND ERL = 1080 THEN PRINT
      CHR$(34) FILE CHR$(34) " does not exist. Try again":
      CLOSE #1; RESUME 1070
60020 IF ERR = 53 AND ERL = 1110 THEN PRINT
      CHR$(34) FILE CHR$(34) " does not exist. Try again":
      CLOSE #1; RESUME 1100
60030 ON ERROR GOTO 0
60040 '

```

Listing 2. Modifications.

Modifications to COMPARE.BAS for non-CP/M systems

1. Add another integer variable "INTENT" (change line 1000)
2. Insert line 1125 to tell program when file ends (standard MBASIC doesn't recognize EOF with random files):

01125 INPUT "How many pages to compare"; INTENT
3. Delete lines 2000-2160 and substitute the following (inserting the proper initial value for COUNT in line 2010):

```

02000 ' Compare records:
02010 LET COUNT = <??> 'One less than start of TPA
02020 FOR RECORD = 1 TO 2 * INTENT
02030 GET #1,RECORD; GET#2,RECORD
02040 IF TEXT1 <> TEXT2 THEN GOSUB 3000 'Compare detail
02050 LET COUNT = COUNT + 128
02060 NEXT RECORD
02070 CLOSE
02080 END
02090 '

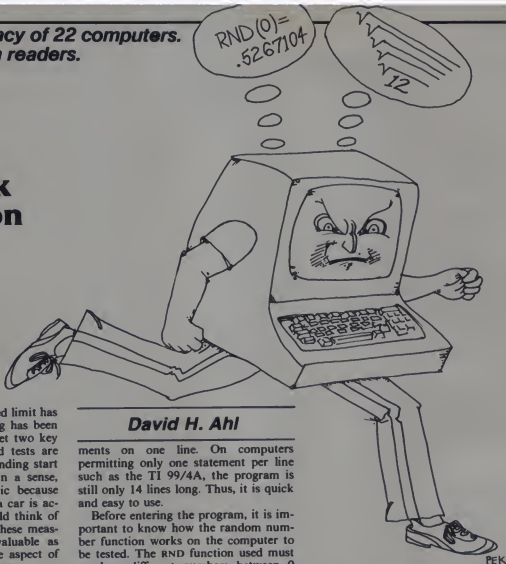
```

Note: If your version recognizes SYSTEM (or some other return to the operating system) use that in line 2080 instead of END.

November 1983 © Creative Computing

**Speed and accuracy of 22 computers.
Help wanted from readers.**

Benchmark Comparison Test



David H. Ahl

For years, the national speed limit has been 55 mph and drag racing has been outlawed on public roads. Yet two key measures in automobile road tests are the 0 to 60 time and the standing start quarter mile elapsed time. In a sense, both measures are unrealistic because they do not reflect the way a car is actually used, and no one would think of buying a new car based on these measures alone. But they are valuable as comparative measures of one aspect of the performance of different cars.

Likewise, the benchmark program presented here is not representative of the way computers are actually used; it measures only a few aspects of performance, and no one should buy a computer based solely on the results of these measures. Yet, the results provide some interesting comparative data.

The Benchmark Program

The program is just six lines long on computers which permit multiple state-

ments on one line. On computers permitting only one statement per line such as the TI 99/4A, the program is still only 14 lines long. Thus, it is quick and easy to use.

Before entering the program, it is important to know how the random number function works on the computer to be tested. The RND function used must produce different numbers between 0 and 1. On some computers, RND(0) produces different numbers and RND(1) always produces the same one; on other computers, these functions are reversed. Some computers require only RND with no argument at all. In the benchmark program, be sure to use the function that produces different numbers or you will get erroneous results.

What It Measures

The program measures three things,

Ahl's Simple Benchmark Test

```
1 ' Ahl's simple benchmark test
2 ' In Lines 30 and 40, some computers
3 ' may require RND(1) for correct results
10 PRINT " Accuracy Random"
20 FOR N=1 TO 100:A=N
30 FOR I=1 TO 10:A=SQR(A):R=R+RND(0):NEXT I
40 FOR I=1 TO 10:A=A 2:R=R+RND(0):NEXT I
50 S=S+A:NEXT N
60 PRINT ABS(1010-S/5);ABS(1000-R)
```

the most important of which is execution speed in Basic. This speed measure is the time required to execute a main loop 100 times (lines 20 to 50) with two ten-statement loops inside (lines 30 and 40).

The first inside loop (line 30) takes the square root of the value of the outside loop index (N) ten times. In other words, if the program is executing the 49th outside loop, the first square root of 49 is 7, the second of 7 is 2.6457513, the third of 2.6457513 is 1.6265765, and so on. These successive values are stored in A.

The second inside loop (line 40) then takes the final value of A from the first loop and squares it ten times. If the computer was absolutely accurate, the final result should equal the starting value of the index. For instance, in the above example, the final value should be 49.

In line 50, all the values of A from 1 to 100 are summed and stored in S. The integers 1 to 100 when added together equal 1010. Line 60 prints out how much S differs from the correct total of 1010. This is a measure of accuracy.

One might argue that this is not a very

Benchmark, continued...

good measure of accuracy since one value of A might be high and another low, and they would cancel out the errors. Indeed, this is what happens to some extent. However, checking four computers with a more sophisticated (and much longer) measure of accuracy gave very similar results to this much simpler approach.

The last thing measured, the quality of the random number generator, is the least reliable. In this case, the program simply adds the value of 2000 random numbers keeping the running total in R. The values should be randomly distributed between 0 and 1. More simply, half of the values should be between 0 and 0.5 and the other half between 0.5 and 1. Thus the total of 2000 numbers should be 2000×0.5 or 1000. Line 60 prints out how much R differs from this theoretical value of 1000.

Since random numbers should be truly random, one cannot say that 2000 of them should be perfectly distributed around 0.5. Indeed, if a random number generator simply produced 0.1 and 0.9 alternately, it would give a perfect result in this test, yet it would hardly be producing random numbers.

On the other hand, the majority of programs that use random numbers do not use 500 numbers, much less 2000. Thus, from a purely pragmatic point of view, it is desirable that random numbers be uniformly distributed right from the start. Hence, this measure has some value, although it must be taken with a grain of salt.

Reading the Results

Naturally, the faster the execution time, the better. Times around two minutes were average. Anything under one minute is excellent while times over four minutes are quite slow.

The measure of accuracy should be as close to zero as possible. In the chart, all the exponential values (2.018 E-07, for example) have been converted to decimals. A value of 0.001 is about the norm. Anything larger than that (0.18, for example) is poor, while smaller values (0.00000021, for example) is very good.

The measure of randomness should also be as close to zero as possible. Anything under 10 is quite good. Values between 10 and 20 are acceptable. Values over 20 are not as good, but the random number generator may still be producing acceptably random numbers. In the chart, the numbers have been rounded to one decimal place.

As with nearly everything, there are tradeoffs. Some computers are fast, but not especially accurate. Others are accurate but slow. Those that rank high on several facets tend to be more expensive

Some computers are fast, but not especially accurate.

than those that do not. Some of the slower units do all their calculations in double precision and can gain a bit of speed by specifying single precision variables; of course, this speed improvement will be at the expense of accuracy.

Actual Results

The fastest computer tested to date is the Olivetti M20, a 16-bit computer using Microsoft-like Basic with PCOS, a proprietary operating system. However, its accuracy is nothing to brag about.

Nevertheless, the M20 is about twice as fast as the IBM PC which has virtually the same accuracy. In the same price and speed range, the Computer Devices DOT is marginally faster than the IBM PC, but has twice the accuracy.

The Vectrex tested was a prototype add-on to the GCE Vectrex video game unit; production units may not be exactly the same. The Laser 2001, an Apple work-alike from Hong Kong was also a prototype.

Fastest computer in the low price category, and also one of the most accurate, is the Panasonic JR200. At \$300, this is a remarkable performer.

The Aquarius and NEC 8201 were the least accurate of the computers tested. It

is interesting to compare the virtually identical TRS-80 Model 100 to the NEC 8201; accuracy of the Model 100 is considerably better because all calculations are done with four-byte (double-precision) numbers, but speed suffers badly.

Most of the 6502-based machines complete the timed loop in roughly the same time and produce identical accuracy figures. This includes the Apple, Vic, and Commodore 64. Likewise, the Z80- and 6800-based machines are quite similar within families.

Two calculator-like machines are among the slowest, the TI CC-40 and Casio FP-200. However, the TI more than makes up for its slow speed with its excellent accuracy, whereas the Casio does not.

Slowest of all the machines tested is the Atari 800 (and identical 400). On the other hand, Atari Basic has some features not found in some other Basic interpreters which may partially make up for its leisurely performance.

Additional Entries

In updates of this chart, we would like to include as many computers as possible. We would be pleased to receive benchmark results from readers who have machines that we have not listed. We would be especially interested to include the results of the test on mini-computers and mainframes. Be sure to use an accurate stopwatch for timing. Alternatively, if your computer has a real-time clock, as the NEC 8201 does, it can be used. □

Benchmark Test Results

Computer	Time	Accuracy	Random
Olivetti M20	0 : 13	.0114136	6.2
Computer Devices DOT	0 : 22	.005859375	7.1
IBM PC	0 : 24	.01159668	6.3
GCE Vectrex	0 : 33	.0753174	0.9
Laser 2001	0 : 40	.000327295	17.4
Panasonic JR200	0 : 57	.00021481514	15.1
Mattel Aquarius	1 : 17	.187805	10.0
NEC PC-8201	1 : 44	.187805	9.3
Vic 20	1 : 49	.0010414235	23.7
Commodore 64	1 : 53	.0010414235	8.9
Apple II Plus	1 : 53	.0010414235	12.0
Apple IIe	1 : 53	.0010414235	12.0
TRS-80 Model III	1 : 59	.0338745	5.8
Micro Color Computer	1 : 59	.000596284867	7.6
Atari 2600 Graduate	2 : 15	.000224679708	7.9
Color Computer	2 : 23	.000596284867	7.3
Epson HX-20	2 : 36	.0338745	23.8
SpectraVideo 318/328	3 : 40	.0000002058	12.4
TRS-80 Model 100	4 : 54	.0000002058	12.4
Casio FP-200	5 : 05	.00723	30.3
TI CC-40	5 : 41	.00000011	6.2
Atari 800	6 : 48	0.12959	22.8

SJB DISTRIBUTORS.

THE MOST COMPETITIVE PRICES ON COMMODORE.



NEW COMMODORE PRODUCTS

The Executive 64	Call
CBM 8128-80	\$ 825
CBM 8256-80	1095
CBM BX700	2990
B Series Software	Call
CBM 1520 Plotter	349
CBM 1526 Printer	349

SOFTWARE FOR CBM 64K BUSINESS

WordPro 3 1/2 64	
w/Spell Right Plus	\$ 79
Spell Right Plus	55
Calc Result (Advanced)	125
Calc Result (Easy)	75
BusiCalc II	95
Mirage Concepts	
(Powerful Data Base)	95
M File (Merge with WordPro)	89
Home Utilities	49
64 Mailing List (Galoclic)	28
The Manager	50
Home Accountant (continental)	75
Code Writer	
(Writes Basic Programs)	95
Stock (investment analysis)	80
Agricultural Management	Call
General Ledger, A/R, A/P, P/R, Inv	Call

RECREATION

Assembler Package (cassette or disk, compiled, includes editor, loader, disassembler)	39
Sprite Master (access)	30
Neutral Zone (access)	35
Space Belt	19
Pet Emulator	30
Coco II (build your own games)	40
Vic Tree (programmers utilities)	75
Micro-Term (save to printer, disk)	39
Hesmon	35
Synthesound	45
Gothmog's Lair	30
Road Toad	15
Commodore Games	Call

INTERFACES & ACCESSORIES

80 Column Expander	\$159
VIC 1600 Modem	95
VIC 1650 (auto answer, auto dial)	150
VIC 1525 Graphic Printer	225
VIC 1530 Datasette Recorder	65
VIC 1541 Disk Drive	249
VIC Switch (connect B 64's or Vics to printer, dd)	149

PET-IEEE cable	33
IEEE-IEEE cable (2m)	49
5 Slot Expander for 64	65
Parallel Interface (Epson, Okidata, IDS, NEC)	70
Programmers Reference Guide	18
Verbatim Diskettes (10 per box)	26
Hes Modem	75
ADA 1450	149
ADA 1800 (new)	129
Numeric Keypad	35

VIC PRODUCTS & ACCESSORIES

8K RAM Memory Expansion Cartridge	\$ 40
16K RAM	70
24K RAM	105
VIC 3 Slot Expander	27
VIC 6 Slot Expander	70
Gorf (64 also)	30
Omega Race	30
Arcade Joystick - Heavy duty w/2 firing buttons! Great for the VIC or 64	25
Auto Clock	125

MONITORS - GREAT RESOLUTION (64 OR VIC)

CBM 1701 Color Monitor	\$ 249
Amdtek Color Plus	299
Panasonic TR-120 (w/speaker)	155
Panasonic CT-160	279
BMC (green screen)	95
Video/Audio Cable	15

PRINTERS - LETTER QUALITY

CBM 6400, 40 cps	\$1450
Diablo 620, 25 cps	949
Translar 140 (serial)	1395
Translar 130, 16 cps (auto load, wp features!)	769
NEC 3500 Series	1600
NEC 7700 Series	2350

PRINTERS - DOT MATRIX

CBM 8023, 150 cps/graphics	\$ 545
CBM 4023 Printer	395
Epson FX Printer, 160 cps	549
Epson MX-80 FT w/golftrax	Call
Epson FX-100	859
Okidata 82A, 120 cps (serial and parallel)	429
NEC 8023A (parallel)	429
Okidata 92	559
Star Gemini, 10X	329
Star Gemini, 15	499
Translar 315 (hi-res, color)	575

COMMODORE BUSINESS SERIES

SuperPet (5 languages, 2 processors)	\$1059
CBM 8032 Computer, 80 Column	625

CBM Memory Expansion, 64K	259
CBM 8050, 1 mg. Dual Drive	995
CBM 8250, 2 mg. Dual Drive	1295
CBM D9060, 5 mg. Hard Disk	1995
CBM D9090, 7.5 mg. Hard Disk	2250
CBM 2031, 170K Single Drive (New)	295
DC Hayes Smart Modem	220

BUSINESS SOFTWARE-8032

WordPro 4* or 5*	\$ 309
InfoPro	219
Administrator	489
VisiCalc (expanded)	199
BPI A/R, G/L, Job Cost, Inventory, Payroll	ed.325

MasterCard, Visa, Money Order, Bank Check

ADD 3% surcharge for credit cards. In stock items shipped within 48 hours. F.O.B. Dallas, Texas (Texas Res. add 5% tax). All products shipped with manufacturer's warranty. Prices are subject to change without notice.

TO ORDER CALL TOLL FREE 800-827-4893 800-442-1048

(Within Texas) Business Hours Mon. - Fri. 8 to 6, Sat. 10-2 Write for free catalog.

SOFTWARE OF THE MONTH

Mirage Concepts Machine Language Data Base 2000 Characters PL Record 200 Fields Per Record Multiple Files Per Disk

PRODUCT OF THE MONTH

INTERPOD (Intelligent IEEE RS232, serial interface for VIC or C64) \$ 179



SJB DISTRIBUTORS INC.
10520 Plano Road, Suite 206
Dallas, Texas 75238
(214) 343-1328

80 COLUMN PRINTER SALE—\$149.00*



COM-STAR T/F

Tractor
Friction
Printer

only **\$219**

(Parallel or Serial)

- Lowest price quality tractor friction printer in the U.S.A. • Fast 80 characters per second
- 40, 46, 66, 80, 96, or 132 characters per line spacing • Prints labels, letters, graphs, and tables
- List your programs • Print out data from modem services

*STX-80 COLUMN PRINTER—\$149.00

Prints full 80 columns. Super silent operation, 80 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 throughput 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.
- **FRICION 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 ENTERPRISES (WE LOVE OUR CUSTOMERS!)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order.

SUPER-10"

ABCDEFGHIJKL MNOPQRST UVWXYZ
ABCDEFGHIJKL MNOPQRST UVWXYZ 1234567890

GRAFSTAR (Apple interface card - "Like Grappler Plus") SALE \$69.00.

CIRCLE 305 ON READER SERVICE CARD

COMMODORE 64

(more power than Apple II at half the price)

COMPUTER AND SOFTWARE CHRISTMAS SALE

VIC-20

(a real computer at the price of a toy)

\$99.50*

- 170K DISK DRIVE \$159.00*
- TRACTION FRICTION PRINTER \$119.00*

(* with software savings applied)

WE
HAVE
THE
BEST
SERVICE

WE
HAVE
THE
LOWEST
PRICES

\$77.00*

- 40-80 COLUMN BOARD \$89.00
- VOICE SYNTHESIZER \$59.00

(* with Cassette and Gortek purchase)

COMMODORE 64 COMPUTER \$99.50
You pay only \$199.50 when you order the powerful 84K COMMODORE 65 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net computer cost is \$99.50!!

SOFTWARE BONUS PACK \$29.95
When you buy the Commodore 64 Computer from Protecto Enterprises you qualify to purchase ONE SOFTWARE BONUS PACK for a special price of \$29.95!! Normal price is \$49.00 programs on disk or 24 programs on 5 tapes.

170 DISK DRIVE \$159.00
You pay only \$259.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your disk drive that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net disk drive cost is \$159.00.

TRACTION FRICTION PRINTER \$119.00
You pay only \$219.00 when you order the Comat 17F deluxe line printer that prints 8 1/2" x 11 full size, single sheet, roll or fan fold paper, labels etc. 40, 66, 80, 132 columns, impact dot matrix, bi-directional, 80 CPS. LESS the value of the SPECIAL SOFTWARE COUPON we pack with your printer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied your net printer cost is only \$119.00.

80 COLUMN BOARD \$149.00
You pay only \$149.00 for this 80 Column Board, included with this board is word processor pack, electronic spread sheet and mail merge data base on two tapes. List \$249.00. (Disk add \$10.00).

80 COLUMN WORD PROCESSING PACKAGE \$79.00
SCRIPT 64 EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 Computer! THE ULTIMATE for PROFESSIONAL wordprocessing application, DISPLAYS 80 COLUMNS IN COLOR. Featuring simple operation, powerful text editing with a customized 250 word dictionary, complete cursor and insert/delete key controls, line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers. Included is a powerful MAIL MERGE When used with THE COMPLETE DATA BASE PACKAGE. List \$99.00. Sale \$79.00. Coupon Price \$52.00. (Disk only).

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE COUPON with every COMMODORE 64 COMPUTER-DISK DRIVE-PRINTER-MONITOR we sell!!

This coupon allows you to SAVE OVER \$100 OFF SALE PRICES! \$200-\$300 savings are possible!! (example)

PROFESSIONAL BUSINESS SOFTWARE COMMODORE 64

Name	List	Coupon
Executive Word Processor	\$99.00	\$52.00
Complete Data Base	\$89.00	\$46.00
Electronic Spreadsheet	\$89.00	\$46.00
Accounting Pack	\$89.00	\$32.00
Total \$2 Word Processor—Plus	\$69.00	\$37.00
Tape	\$79.95	\$42.00
Disk	\$44.95	\$26.00
Total Text 2 1/2 Word Processor—	\$44.95	\$26.00
Disk	\$24.95	\$12.00
Disk	\$29.95	\$15.00
Quick Brown Fox Word Processor	\$69.00	\$40.00
Programmers Reference Guide	\$20.05	\$12.50
Programmers Reference Basic Tutor	\$29.95	\$15.00
Typing Teacher	\$29.95	\$15.00
Sortie Designer	\$19.95	\$10.00
MedicineMan	\$19.95	\$12.00
Weather War II	\$19.95	\$12.00
Music Master	\$19.95	\$12.00
EDJ Pack	\$24.95	\$13.00
3D Maze Chase	\$24.95	\$12.00
Professional Joy Stick	\$39.95	\$20.00
Light Pen	\$39.95	\$20.00
Deluxe Dust Cover	\$ 8.95	\$ 4.60

(and many other items)

Write or call for

Sample SPECIAL SOFTWARE COUPON!

PROFESSIONAL BUSINESS SOFTWARE EXECUTIVE QUALITY BY TIME WORKS!

The Cadillac of business programs for Commodore 64 Computers

Item	List	*SALE
Inventory Management	\$69.00	\$69.00
Accounts Receivable	\$69.00	\$69.00
Accounts Payable	\$69.00	\$69.00
Payroll Management	\$69.00	\$69.00
Cash Flow Management	\$69.00	\$69.00
Sales Analysis	\$69.00	\$69.00
General Ledger	\$69.00	\$69.00

(* Coupon Price \$58.00)

VIC-20 COMPUTER \$77.00
You get the Commodore VIC-20 Computer for only \$77.00 when you buy at sale prices: The Commodore Data Cassette for only \$69.00 and the Gortek Introduction to Basic program for only \$19.95. TOTAL LIST PRICE \$302.95. SPECIAL PACKAGE SALE PRICE \$185.25.

40-80 COLUMN BOARD \$89.00
A fantastic price breakthrough for VIC-20 owners on this most wanted accessory!! Now you can get 40 or 80 Columns on your TV or Monitor Screen! Plus we add a word processor with mail merge, electronic spread sheet, time manager and terminal emulator!! These PLUS programs require 8K or 16K RAM memory. (Disk add \$10.00)

VOICE SYNTHESIZER \$59.00
Votrax Based. Make your VIC-20 COMPUTER TALK! Has features equivalent to other models costing over \$370.00. You can program an unlimited number of words and sentences and even adjust volume and pitch. You can make adventure games that talk! A must for enhancing your programming creativity and pleasure

60K MEMORY EXPANDER \$59.00
Sixslot - Switch selectable - Reset button - Ribbon cable. A must to get the most out of your VIC-20 Computer. Includes FREE \$29.95 adventure game

8K RAM CARTRIDGE \$39.95
Increases programming power 2 1/2 times. Expands total memory to 31K (33,000 bytes). Memory block switches are on outside of cover! Includes FREE \$16.95 game.

18K RAM CARTRIDGE \$69.00
Increases programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are on outside cover! Includes FREE \$29.95 adventure game!

12" GREEN SCREEN MONITOR \$99.00
Excellent quality GREEN PHOSPHORUS VIDEO MONITOR with ant glare, 1920 characters (80 characters x 24 rows). Save your TV! a must for 80 column word processors. PLUS \$9.95 for VIC 20 or Commodore 64 Cable.

12" AMBER SCREEN MONITOR \$119.00
Premium quality AMBER VIDEO MONITOR With ant glare, 180 characters x 24 rows, exceptional clear screen, faster scanning, 1000 lines. PLUS \$9.95 for VIC 20 or Commodore 64 Cable.

- LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for PAXXA, PUERTO RICO, HAWAII 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 Canada orders must be in U.S. dollars. VISA — MASTER CARD — C.O.D.

CIRCLE 272 ON READER SERVICE CARD

PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

Easy Plotting on the TRS-80 Model 100 and NEC 8201

David H. Ahl

Do you want a simple program to show off your new TRS-80 Model 100 or NEC PC-8201? Would you like to learn easily how pixel addressing works? Or would you like to explore some mathematical functions without doing any calculations and hand work?

If you answered "yes" to any of these questions, then key in this short 27-line program on your Model 100 or 8201 and have some fun while you learn.

Plot Any Function

Programs to plot any function have been around for 15 years or so, but many of them are oriented to hard copy listings in which the x-axis runs in the vertical direction of the paper feed

on the printer. For computers without the ability to address individual screen locations easily, these programs are still quite useful.

However, when a computer offers pixel addressing by means of a PSET, LOCATE, or PLOT command, it seems that one ought to take advantage of this capability and orient plots so that the x-axis is horizontal.

This program is one of 50 programs that appear in my new series of Ideabooks for seven different computers. It started off as a conversion of a plot-any-function program that I wrote in 1971, but wound up bearing very little resemblance to the original.

Fitting The Plot On The Screen

The screen on the Model 100 and 8201 is 240 pixels in width by 64 pixels high (see Figure 1). The standard computer

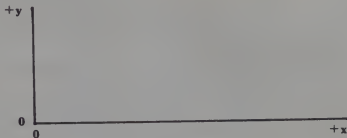
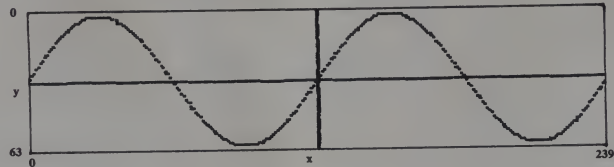


Figure 1. The positive y direction on the computer screen is opposite standard algebraic notation.

convention for numbering the pixels in the vertical direction is from the top to the bottom, just the opposite of what you learned in algebra and geometry. Hence, we are faced with two problems in plotting a function: scaling it to fit on the screen (240 x 64) and orienting it "correctly" (bottom to top).

Since the x-direction has far more pixels than the y-direction, 240 vs. 64, it seems sensible to plot every point in the x-direction and let the y points fall where they may. As we will see later, this is not always satisfactory, but for the most part this approach produces acceptable results.

Although we will have the computer do some of the scaling, we will allow the user to specify upper and lower limits for the values of x and y (inputs in lines 30 and 40). Scaling in the x-direction takes place in lines 50 and 60. DX is the distance between the upper limit (XU) and lower limit (XL) of x values. This distance, DX, is then divided by the 240 horizontal pixels to produce a horizontal scaling factor which is also used as a horizontal step (SP).

This horizontal step, SP, when used in the FOR loop starting in line 100, produces 240 equal steps between the lower and upper limits of x.

A similar scaling factor for the y-direction (SY) is computed in lines 70 and 80.

Line 90 simply clears the screen and causes the label line at the bottom to disappear. We are then ready to enter the function plot loop between lines 100 and 160.

Each x-value to be plotted (XP) is computed in line 110. If all our plots started with a lower limit of 0, the plotted x-value would be simply the actual x-value divided by the scaling factor. However, to allow for plots that start above or below 0, the lower limit of x (XL) must be subtracted from the actual x-value and the result divided by the scaling factor.

The function we wish to plot is stated in line 120 in the form, y equals any function of x. Several examples are given later.

In line 130, the y-value to be plotted (YP) is calculated. To compensate for the computer screen pixels being numbered from top to bottom instead of bottom to top, the computed value is subtracted from 64. This effectively inverts the plot.

```

10 CLS:PRINT "Plot any function. Define"
20 PRINT "function in Line 120."
30 INPUT "Lower & upper X limits";XL,XU
40 INPUT "Lower & upper Y limits";YL,YU
50 DX=XU-XL
60 SP=DX/240
70 DY=YU-YL
80 SY=DY/64
90 CLS:SCREEN 0,0
100 FOR X=XL TO XU STEP SP
110 XP=(X-XL)/SP
120 Y=(10/X)+SIN(X)
130 YP=64-(Y-YL)/SY
140 IF YP<0 THEN YP=0
150 PSET (XP,YP)
160 NEXT X
170 IF SGN(XU)=SGN(XL) THEN 220
180 XA=-XL/SP
190 FOR Y=0 TO 63
200 PSET (XA,Y)
210 NEXT Y
220 IF SGN(YU)=SGN(YL) THEN 270
230 YA=64+YL/SY
240 FOR X=0 TO 239
250 PSET (X,YA)
260 NEXT X
270 GOTO 270

```

The PSET (XP,YP) statement in line 150 turns on the LCD pixel at x-coordinate XP and y-coordinate YP. Since we allow the user to specify the upper and lower limits of both x and y, it may happen that one or more y-values are outside of the dimensions of the screen. The x-values, of course, cannot be off the screen since we are using XL and XU as the right and left edges of the plot.

Y-values that exceed the screen dimensions by a small amount should be plotted as the top or bottom line of the screen instead of having the program halt with an error message. Hence, line 140 converts negative plot values (above the top of the screen) into a zero (top row of pixels). In the positive (lower) direction, the Basic language is somewhat forgiving and accepts y-values up to 255, but plots them as though they were 63 (bottom row of pixels).

Line 170 tests whether the y-axis is on the screen by checking if the lower and upper limits of x are the same sign. If the axis is on the screen, line 180 determines where it is; it is then plotted in lines 190 to 210. The same calculations and plot are performed for the x-axis in lines 220 to 260.

Line 270 simply keeps the program in a loop so the plot stays on the screen until the program is interrupted by pressing the BREAK key on the Model 100 or the STOP key on the NEC 8201.

What To Plot?

This program will plot any function that can be specified in terms that can be interpreted by the Basic language. In the program, this is done in line 120. Although relatively few functions are directly implemented in Basic, virtually any function can be represented by combinations of the Basic functions. For example, if you are interested in inverse hyperbolic functions, you will have to translate them into functions which are implemented in the Basic language.

This, incidentally, is not as difficult as it may sound. Many reference books and computer manuals have tables of derived functions. For example,

Cosecant = 1/SIN(X)
Hyperbolic Cosecant = 2/(EXP(X)-EXP(-X))
Inverse Hyperbolic Cosecant =
LOG ((SGN (X) *SQR(X*X+1)+1)/X)

Some of these derived functions are quite intriguing and may pique your curiosity. For example, try plotting some Bessel functions or Laplace transforms.

On the other hand, you can learn a great deal from experimenting with other, straightforward functions, while producing some fascinating displays. Here are some functions that work well:

Function	X limits	Y limits
Y=30*EXP(-X-X/100)	-25 25	0 30
Y=SIN(X)	-6.28 6.28	-1 1
Y=SIN(X)	0 314	-1 1
Y=X ² -15	-6 6	-20 30
Y=-X ² +2X+20	-7 8	-38 22
Y=EXP(SIN(X))	-6.28 6.28	0 3
Y=(10/X)-SIN(X)	2 24	-2.5 5
Y=(10/X)+SIN(X)	-12 12	-2.5 10
Y=3-SIN(X)+X	-12.6 12.6	-15 15

For best results, the limits of trigonometric functions are generally multiples of pi (3.14159). Limits for other functions are best found by experimentation.

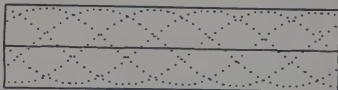
This list of functions barely scratches the surface of possibilities. You will find that some functions produce problems in the program. For example, a function that has x in the denomi-

Easy Plotting, continued...

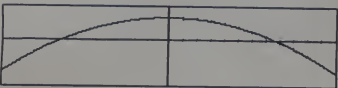
nator will cause a divide-by-zero error if x is zero. Why, then, doesn't the last equation fail since x passes through zero? Because the way the steps occur, the expression is evaluated just below and just above zero; with other limits it might possibly blow up.

The second suggested set of limits for the sine curve (0 and 314) produces an interesting plot. Since 314 is more than the number of horizontal divisions (240), the plot "misses" many critical values. As a result, the ten normal sine curves that should appear between 0 and 314 (π times ten), appear to be ten interlocking and overlapping sine waves, each one exactly $2\frac{1}{2}$ normal periods in length. Can you explain this phenomenon? Incidentally, the plot can be improved slightly by making the lower and upper y limits, -1.1 and 1.1 . You will find this is often true, i.e., slight variations in the limits of x and y produce more (or less) pleasing plots.

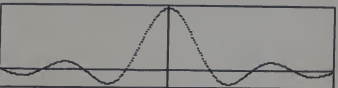
This type of curve, in which a great deal is happening in the y direction relative to the x direction, illustrates the problem mentioned earlier. You will recall that we said that, "since the x -direction has far more pixels than the y -direction, 240 vs. 64, it seems sensible to plot every point in the x -direction and let the y points fall where they may." It should now be obvious that this may not always produce the best possible plot because of many missing vertical points. For most plots, however, we feel justified in sticking with our first decision of plotting 240 horizontal points.



Y=SIN(X) 0 314 -1 1



Y=X²-15 -6 6 -20 30



Y=(10/X)*SIN(X) -12 12 -2.5 10

Making All Plots Fit

It is possible to add a routine to the program to make all plots fit within the y screen dimensions. First, we must eliminate line 40 asking for the upper and lower limits of y . Instead, we must write a routine to insert between lines 60 and 70 to evaluate y over the entire range of values for x , saving the maximum and minimum values. These two values then become the lower limit (YL) and upper limit (YU) of y . We leave it to the reader to write this routine. Hint: it can be done in five lines.

This program can be "cleaned up" in other ways. Nevertheless, in its present form, you should find it educational, interesting, and entertaining.

Continuous Checks, Statements, and Invoices for Desk-Top Computers

- Compatible with software from over 300 sources. Or program to NEBS standard forms yourself.
- Continuous Micro-Perf™ Letterheads and matching continuous Envelopes provide a clean, trim look.
- Also, diskettes, continuous labels, other supplies and accessories.
- Our policy is to process forms printed with your name within 6 working days. Then ship direct to you (We pay shipping charges on prepaid orders).

**QUALITY PRODUCTS
SMALL QUANTITIES AT LOW PRICES
MONEY-BACK GUARANTEE**

FREE Full-color, catalog
fast service by mail or phone
TOLL FREE 1 + 800-225-9550
(Mass. residents 1 + 800-922-8560)

NAME/TITLE		PHONE
COMPANY		
STREET		
CITY, STATE, ZIP		
SOFTWARE BRAND	PACKAGE #	<input type="checkbox"/> DO OWN PROGRAMMING
COMPUTER BRAND	MODEL	<input type="checkbox"/> PLAN TO PURCHASE WITHIN
YOUR LINE OF BUSINESS		NUMBER OF EMPLOYEES
HOW OFTEN USE MY COMPUTER FOR		
<input type="checkbox"/> WORD PROCESSING	<input type="checkbox"/> ACCOUNTING	<input type="checkbox"/> OTHER

Nebs Computer Forms
12 South Street, Townsend, Massachusetts 01469
A Division of New England Business Service, Inc.

14108

CIRCLE 267 ON READER SERVICE CARD

PLACE ORDERS TOLL FREE!

Continental U.S.
800-421-5500

Inside California
800-262-1710

For Technical Inquires
or Customer Service call:
213-973-7707

Visit Your Nearest
JADE Computer Showroom

LOS ANGELES
SAN FERNANDO VALLEY

SANTA ANA
SAN DIEGO

SAN JOSE
DALLAS

We accept cash, checks, credit cards, or Purchase Orders from qualified firms and institutions. **Minimum prepaid order \$15.00** California residents add 6 1/2% tax. Export customers outside the U.S. or Canada please add 10% to all prices. **Prices and availability subject to change without notice.** Shipping and handling charges via UPS Ground 506/1b. UPS Air \$1.00/lb. minimum charge \$3.00

S-100 MEMORY BOARDS

64K STATIC RAM - Jade

Uses new 2K x 6 static RAMs, fully supports IEEE 696 24 bit extended addressing, 200ns RAMs, lower 32K or entire board programmable, 2716 EPROMs may be added for RAMs, any 2K segment of upper 80K may be disabled, low power typically less than 500ma

MEM-99152B Bare board	\$49.95
MEM-99152C Kit less RAM	99.95
MEM-32152K 32K kit	\$199.95
MEM-56152K 56K kit	\$299.95
MEM-64152K 64K kit	\$299.95
Assembled & Tested	add \$50.00

256 RAMDISK - SD Systems

ExpandoRAM III expandable from 64K to 256K using 64 x 1 RAM chips, compatible with CP/M, Oses, & most other Z-80 based systems, functions as ultra-high speed disk drive when used with optional RAMDISK software

MEM-85064A 64K A & T	\$474.95
MEM-85128A 128K A & T	\$574.95
MEM-85192A 192K A & T	\$674.95
MEM-85256A 256K A & T	\$774.95
BFC-850900P RAMDISK altier CP/M 2.2	\$44.95
BFC-850900P RAMDISK with EXRAM III	\$24.95

SINGLE BOARD COMPUTER

SUPERGPU - Adv. Micro Digital

Single board standard size S-100 computer system, 4MHz Z-80A single or double density disk controller for 5 1/4" or 8" drives, 64K RAM, extended addressing up to 4K of EPROM, 2 serial & 2 parallel I/O ports, real time interrupt clock, CP/M compatible

CPC-3090A A & T	\$724.95
IPC-4232A Serial I/O adapter	\$29.95

DISKETTE TUBS

Diskette Storage Boxes

Clear Plexiglass storage boxes for up to 75 Diskettes

NMA-508 Holds 75 5 1/4" Diskettes	\$19.95
NMA-508 Holds 50 8" Diskettes	\$24.95

LETTER QUALITY PRINTERS

Letter Quality Printer - BMC

Wordstar compatible, Diablo protocols, proportional area incremental spacing, 16 CPS bi-directional printing, 10, 12 or 15 CPI, up to 17-inch wide paper. Available in parallel or serial version.

PRD-52001 Parallel	\$790.00
PRD-52002 Serial	\$820.00
PRA-82000 Tractor option	\$159.95

3802 by Data Terminals & Communications

Based on the same quality mechanism as the Comex printer, the 3802 contains electronic enhancements that allow it to print at speeds up to 32 CPS. Other features include a 48K buffer, proportional spacing, and Diablo 1640/1650/830 compatible protocol. Comes with printhead, ribbon and users manual. Serial, parallel, and IEEE 488 interfaces standard.

PRD-11300 3802 printer	\$1295.00
PRA-11000 Tractor option	\$189.95
PRA-12000 Cut Sheet Feeder	\$99.95

Printers From Jade

BEKOSHIA 10" Graphics, 30CPS	\$229.95
OKIDATA 82 10" 120 CPS	CALL
OKIDATA 82 10" 180 CPS With Graphics	CALL
OKIDATA 83 15" 180 CPS With Graphics	CALL
OKIDATA 83 15" 120 CPS	CALL
OKIDATA 84 15" 200 CPS With Graphics	CALL
OKIDATA 2350 15" 350 CPS	CALL
OKIDATA 2410 15" 350 CPS	CALL
DAIHWYRITER 2000 48K Daisywheel	\$1395.00
GEMINI 16 100 CPS With Graphics	\$349.95
GEMINI 15 15" With Graphics	\$499.95
COMEX CR1	\$849.95

EPROM ERASERS

Ultra-Violet EPROM ERASERS

Inexpensive erasers for industry or home

XME-3100A Electronics w/o timer	\$69.95
XME-3101A Electronics with timer	\$94.95
XME-3200A Logical Devices	\$49.95

DUAL DISK SUB SYSTEMS

Disk Sub-Systems - Jade

Handsome metal cabinet with proportional balanced air flow system, rugged dual drive power supply, power cable kit, power switch, line cord, fuse holder, cooling fan, neoprene rubber feet, all necessary hardware to mount 2-4" disk drives, power supply, and fan, does not include signal cable

Dual 8" Sub-Assembly Cabinet	
END-000420 Bare cabinet	\$49.95
END-000421 Cabinet kit	\$195.95
END-000431 A & T	\$249.95

8" Sub-Systems - Single Sided, Double Density

END-000423 Kit w/2 Siemens FD100-8Ds	\$850.00
END-000424 A & T w/2 Siemens FD100-8Ds	\$995.00
END-000433 Kit w/2 Shugart SA-801Rs	\$999.95
END-000434 A & T w/2 Shugart SA-801Rs	\$1199.00

8" Sub-Systems - Double-Sided Double-Density

END-000426 Kit w/2 Qume DT-8s	\$1224.95
END-000427 A & T w/2 Qume D-8s	\$1424.95
END-000436 Kit w/2 Shugart SA-851Rs	\$1274.95
END-000437 A & T w/2 Shugart SA-851Rs	\$1474.95

8" SLIMLINE SUB-SYSTEMS

Dual Slimline Sub-Systems - Jade

Handsome vertical cabinet, with scratch resistant baked enamel finish, proportionally balanced air flow system, quiet cooling fan, rugged dual drive power supply, power cable, power switch, line cord, fuse holder, cooling fan, all necessary hardware to mount 2-4" slimline disk drives, does not include signal cable

Dual 8" Slimline Cabinet	
END-000620 Bare cabinet	\$59.95
END-000622 A & T w/2 drives	\$179.95

Dual 8" Slimline Sub-Systems

END-000623 Kit w/2 SS DD	\$619.95
END-000624 A & T w/2 SS DD	\$819.95
END-000633 Kit w/2 DS DD	\$1149.95
END-000634 A & T w/2 DS DD	\$1379.95

S-100 CPU BOARDS

SBC-200 - SD Systems

4 MHz Z-80A CPU with serial & parallel I/O, 1K RAM, 6K ROM space, monitor PROM included

CPU-30206A A & T	\$329.95
------------------	----------

THE BIG Z - Jade

2 or 4 MHz switchable Z-80 CPU board with serial I/O, accommodates 2796, 2718, or 2732 EPROM, baud rates from 75 to 9600

CPU-38019B Bare board w/manual	\$35.00
CPU-38019K Kit with Manual	\$149.95
CPU-38021A A & T with Manual	\$195.95

2810 Z-80 CPU - C.C.S.

2 or 4 Z-80 CPU with serial I/O port & on board monitor PROM, front panel compatible

CPU-30400A A & T with PROM	\$299.95
----------------------------	----------

CPU-Z CompuPro

2 or 4 MHz Z80A CPU, 24 bit addressing

CPU-30500A 2 1/4 MHz A & T	\$279.95
CPU-30500C 3 6 MHz CSC	\$374.95

8085/8088 - CompuPro

Both 8 & 16 bit CPUs, megabyte 6 bit S-100 bus, up to 8 MB of excess 16 Megabytes of memory

CPU-20510A 8 MHz A & T	\$390.95
CPU-20516C 6 8 MHz CSC	\$479.95

VIDEO MONITORS

Video Monitor - Jade

1000 lines ultra-high resolution, 20 MHz ultra-high bend width 9" or 12", Amber or Green phosphor, the finest monitors we sell

VDM-759020 9" Green	\$89.95
VDM-759018 9" Amber	\$129.95
VDM-751205 12" Green	\$129.95
VDM-751210 12" Amber	\$139.95

5 1/4" DISK DRIVES

Tandon TM100-1 single-sided double-density 48 TP	
MBM-551001	\$219.95 ea 2 for \$196.95 ea
Shugart SA800L single-sided double-density 40 track	
MBM-104000	\$224.95 ea 2 for \$224.95 ea
Tandon TM100-2 double-sided double-density 48 TP	
MBM-551002	\$294.95 ea 2 for \$289.95 ea
TEAC FD05A single-angled double-density 40 track	
MBM-600551	\$299.95 ea 2 for \$239.95 ea

5 1/4" Cabinets With Power Supply

END-000219 Single cab w/power supply	\$89.95
END-000226 Dual cab w/power supply	\$94.95

S-100 MOTHERBOARDS

ISO-BUS - Jade

Silent, simple and on sale - a better motherboard

6 Slot (5 1/4" x 8 1/2")	
MB5-0618 Bare board	\$22.95
MB5-0619 Kit	\$39.95
MB5-0614 A & T	\$89.95
12 Slot (9 1/4" x 9 1/2")	
MB5-1218 Bare board	\$34.95
MB5-1219 Kit	\$89.95
MB5-1214 A & T	\$109.95
18 Slot (14 1/4" x 8 1/2")	
MB5-1818 Bare board	\$54.95
MB5-1819 Kit	\$99.95
MB5-1814 A & T	\$149.95

8" DISK DRIVES

Siemens FDD 100-8 single-sided double-density	
MBF-201120	\$274.95 ea 2 for \$248.95 ea
Shugart SA801R single-sided double-density	
MBF-10801R	\$364.95 ea 2 for \$389.95 ea
Shugart SA851R double-sided double density	
MBF-10851R	\$554.95 ea 2 for \$529.95 ea
Qume DT-8 double-sided double-density	
MBF-750900	\$524.95 ea 2 for \$496.95 ea
Tandon TM8481 single-sided double thin-line	
MBF-558481	\$379.95 ea 2 for \$369.95 ea
Tandon TM848-2 double-sided double thin-line	
MBF-558482	\$498.95 ea 2 for \$484.95 ea
NEC FD1165 double-sided double thin-line	
MBF-851165	\$484.95 ea 2 for \$449.95 ea

S-100 I/O BOARDS

THE BUS PROBE - Jade

Inexpensive S-100 Diagnostic Analyzer	
TXB-2008 Bare board	\$59.95
TXB-2009 Kit	\$129.95
TXB-200A A & T	\$159.95

INTERFACER 4 - CompuPro

3 serial, 1 parallel, 1 Centronics parallel	
IOI-1840A A & T	\$314.95
IOI-1830C CSC	\$414.95

I/O-4 - SSM Microcomputer

2 serial I/O ports plus 2 parallel I/O ports	
IOI-1010A A & T	\$249.95

I/O-5 - SSM Microcomputer

Two serial & 3 parallel ports, 110-19.2K Baud	
IOI-1015A A & T	\$299.95

MODEMS

SMART BUY in Modems - Signalman

1200 and 300 Baud direct connect, automatic answerer or originate selection, auto-answer, auto-dial on deluxa models. Bt battery allows total portability, full one year warranty	
IOH-5400A 300 baud direct connect	\$89.95
IOH-5410A 300 baud Deluxa	\$149.95
IOH-5820A 1200 300 baud Deluxa	\$249.95
IOH-5830A 300 baud for Osborns	\$119.95
IOH-5400A 300 baud card for IBM	\$269.95

SMARTMODEM - Hayes

Sophisticated direct-connect auto-answer/auto-dial modem, touch-tone or pulse dialing, RS-232C interface programmable

IOH-5500A Smartmodem 1200	\$574.95
IOH-5400A Smartmodem 300	\$224.95
IOK-1500A Hayes Chronograph	\$219.95
IOH-1100A Micromodem 100	\$368.95
IOH-2018A Micromodem II w/term prgm	\$328.95
IOH-2012A Terminal program for MIII	\$89.95

1200 Baud Smart CAT - Novation

103-212 Smart Cat & 103 Smart Cat 1200 & 300 baud, built-in dialer, auto re-dial if busy, auto answer/disconnect direct connect, LED readout displays mode, analog digital coexist self test, usable with multi-line phones

IOH-5241A 300 baud 103 Smart Cat	\$229.95
IOH-5251A 1200 baud 212-103 Smart Cat	\$549.95

J-CAT™ MODEM - Novation

1/5 the size of ordinary modems, Bell 103, manual or auto-answer, automatic answer/originate, direct connect, built-in self-test, two LEDs and audio beeps provide status information

IOH-6291A Novation	\$149.95
--------------------	----------

CP/M PLUS 3.0

NEW! CP/M Plus 3.0

CP/M 3.0 is Digital Research's latest version of the industry standard disk operating system. It features many performance improvements, such as intelligent record buffering, improved directory handling, "HELP" facility, time/date stamping of files and many more improvements. A TREMENDOUS INCREASE IN SPEED! It is fully CP/M 2.2 compatible and requires no changes to your existing application software. Available only to Versafloppy II owners with SBC-200 CPU's

SFC-55009059F Unbanked, RS232	\$290.00
SFC-55009059F Unbanked, VDB8024	\$250.00
SFC-55009057F Banked, RS232	\$290.00
SFC-55009056F Banked, VDB8024	\$250.00
SFC-55009057D Manual	\$60.00

S-100 EPROM BOARDS

PB-1 - SSM Microcomputer

2708, 2716 EPROM board with on-board programmer	
MEM-99519K Kit with manual	\$154.95
MEM-99519A A & T With Manual	\$219.95

PROM-10 - SD Systems

2708, 2716, 2732 EPROM programmer with software	
MEM-99520K Kit With software	\$189.95
MEM-99520A A & T With software	\$249.95

S-100 DISK CONTROLLERS

VERSAFLOPPY II - SD Systems

Double density disk controller for any combination of 5 1/4" and 8" single or double sided, analog phase-locked loop data separator vectored interrupts CP/M 2.2 & QDOS compatible control/diagnostic software PROM included

IOD-1160A A & T With Prom	\$399.95
SFC-36009071F CP/M 3.0 With VF-II	\$139.95

DOUBLE D - Jade

High reliability double density disk controller with on-board Z-80A, auxiliary printer port, IEEE S-100 can function in multi-user interrupt driven bus

IOD-1208B Bare board & hw manual	\$59.95
IOD-1200K Kit w/hw & 3/8r manual	\$299.95
IOD-1200A A & T w/hw & 3/8r manual	\$325.95
SFC-39002001F CP/M 2.2 With Double D	\$89.95

APPLE II ACCESSORIES

DISK DRIVE For Apple™

Totally Apple compatible, 143,360 bytes per drive on DOS 3.3 Full one year warranty, half-track capability reads all Apple software, plugs right into Apple controller as second drive. DOS 3.3, 3.2, 1 Pascal, CP/M compatible

MSM-431010 Add-on Apple Drive	\$249.95
MSM-431030 Controller only	\$64.95
MSM-431040 Controller w/software	\$99.95

16K RAM Card For Apple II™

Expand your Apple II to 64K, use as language card, full one year warranty. Why spend \$175.00?

MEX-19700A Save over \$175.00	\$49.95
-------------------------------	---------

80 COLUMN APPLE™ Card

80 column x 24 line video card for Apple II, addressable 26th status line, normal/inverse or high/low video, 128 ASCII characters, upper and lower case 7 x 9 dot matrix with true descenders, CP/M, Mac & Fortran compatible, 58/80 Hz, 40/80 column selection from keyboard. Best 80 column card

IOV-2000A 80 Column card	\$149.95
--------------------------	----------

Z-Card For APPLE™ II - A.L.S.

Two computers in one. Z-80 & 8502, more than doubles the power and potential of your Apple, includes Z-80 CPU card, CP/M 2.2 and complete manual set. Pascal compatible, utilities are menu-driven. One year warranty

CPX-92800A A & T with CP/M 2.2	\$159.95
--------------------------------	----------

SERIAL I/O Card - A.L.S.

Full feature serial card for modems & printers, baud rates from 110 to 19,200, CTS/RTS & X-on/X-off protocols, auto line feed, RS-232C cable interface included

IOI 1000A A & T "Dispatcher Card"	\$129.95
-----------------------------------	----------

CP/M 3.0 Card For Apple™ - A.L.S.

The most powerful card available for your Apple! 6 MHz Z-80B, additional 64K of RAM, CP/M 3.0 Plus 100% CP/M 2.2 compatibility, C Basic, CP/M graphics, 300% faster than any other CP/M for Apple. One year warranty

CPX-62810A A.L.S. CP/M Card	\$369.95
-----------------------------	----------

ADDS Computer Products

4901 West Rosecrans Ave. Hawthorne, California 90250

CIRCLE 180 ON READER SERVICE CARD

The Satellites Are Out Tonight



After installing a satellite dish, connecting it to decoders and tuning equipment, you must find out where the satellites are.

Donald F. Biresch

Millions of people use cable TV to watch films, cultural events, professional sports, and distant television stations. For most of us, one or two pay services, a Superstation, and maybe MTV is about as exotic as we'll ever get. A few people are using private ground stations to receive the same services in addition to signals from other sources, sent through geosynchronous satellites. They are called geosynchronous because they revolve at the same rate as the Earth, appearing to stay in one location. Lock onto one satellite and the signals are available for your viewing.

What extras can you pick up? Some network programs are fed to affiliates earlier than the scheduled airtime. News organizations use satellite communications to transmit and receive news reports from distant locations, so it is possible to pick up a late-breaking news story before airtime. Suppose your favorite football team blacks out home games; with a satellite

dish, you can watch the game. The legal aspects of tuning into signals are unclear, and viewing for private, home use is thought to be safe, but check current FCC regulations regarding the interception of private signals to be sure.

Satellite dishes and the connecting equipment are expensive, with costs running in the thousands of dollars. After installing a satellite dish, connecting it to decoders and tuning equipment, you must find out where the satellites are. This is often the most difficult part of hooking up with a "bird."

Guides as to the general location of satellites are available, but they give only a general idea of the location of a given satellite. What you need is a way of personalizing the search for the area where you live. Since the values used are con-

stant—azimuth and elevation angles for the satellites, and the location of the receiving station—all you need to do is make the correct calculations. Why not use your computer to help you? Just enter the proper values, and the correct location of a satellite will be shown.

The Geosynchronous Satellite Locator Program

Geosynchronous Satellite Locator was written for an Atari 800 with one disk drive, Atari Basic, and an optional Epson printer.

The program automatically computes azimuth and elevation angles for geosynchronous satellites. The program will work for any geosynchronous bird as long as its longitude and height above its subpoint are known.

Donald F. Biresch, Tabor Rd., Otisville, PA 18942.

Satellites, continued...

Using The Program

All necessary data except the earth station coordinates are included in the program for the satellites currently in orbit in the Clark Belt. The program automatically compensates for the hemisphere in which the earth station is located.

All input is via the keyboard. All angular data are requested in degrees. However, it would be a trivial task to allow input in radians. Distances have been (at the user's option) permitted in miles or kilometers.

Although the program provides for hard-copy, this feature is user selectable at run time. Therefore, a printer is not necessary to use the program.

The program is self prompting, and since it is written in Basic, it is pretty well self documented. The equations used in the program can be found in most books on advanced trigonometry.

A sample printout for my location is included as an example. Both kilometers and miles are demonstrated.

Please note that the geosynchronous satellites are a very special and very simplified subset of the satellite community. This program will not work for orbiting satellites (such as oscar), since these require a moving antenna to maintain contact. The equations for such satellites are considerably more complicated, and their solutions are of little consequence to the average homeowner.

I created this program to simplify the task of establishing a site for my earth station dish.

In using the data derived from this program, it is important to remember that all azimuth angles are true (not magnetic) north. Consult an aviation sectional chart to determine the variation for your area. Westerly magnetic variation is added, and easterly variation is subtracted. If in doubt, any pilot will be able to provide guidance. Generally, here on the East Coast we add westerly variation.

With this program, a good quality compass, and an inclinometer (or better yet, a transit), you can accurately determine your window to the Clark Belt satellites. Accurate determination is now even more important since the FCC has approved 2 degree spacing for the geostationary satellites in this belt. Those with 10' or smaller dishes may notice rather severe interference as this new close spacing takes effect.

Changes For Other Computers

Since Atari Basic is a subset of most more comprehensive interpreters, the program should be easily adaptable to most home computers. If the trig and inverse trig functions are not available on your machine, series expansions work quite well for the arcsin, arctan, and arccot functions. However, they will slow down execution time considerably.

I have refrained from using the extensive graphics capabilities of the Atari, since these functions would not easily transfer to other micros. The special printer codes used throughout are specifically for the Epson MX80-FT. They will, no doubt, have to be modified for other machines.

For certain satellites an error message

may be generated to indicate that the bird is not visible from the earth station. In general, for great circle angles between the ground station and the satellite subpoint (the point on the earth directly below the satellite) which are greater in absolute value than 81.3 degrees the satellite will not be visible. □

Geosynchronous Satellite Locator sample run.

EARTH STATION AT OTTISVILLE, PA:

LATITUDE = 40.5 DEGREES (--SOUTH), LONGITUDE = -75.17 DEGREES (--WEST)

SATELLITE: BATCOM F1, LONGITUDE = -135 DEGREES (--WEST)

ELEVATION ANGLE = 14.04276086 DEG
AZIMUTH ANGLE = 249.316839 DEG
SLANT RANGE = 24959.1254 MILES

SATELLITE: SATCOM F3, LONGITUDE = -131 DEGREES (--WEST)

ELEVATION ANGLE = 16.97783841 DEG
AZIMUTH ANGLE = 246.208976 DEG
SLANT RANGE = 24771.7937 MILES

SATELLITE: WESTAR 5, LONGITUDE = -123 DEGREES (--WEST)

ELEVATION ANGLE = 22.68684451 DEG
AZIMUTH ANGLE = 239.533225 DEG
SLANT RANGE = 24420.2185 MILES

SATELLITE: SATCOM F2, LONGITUDE = -119 DEGREES (--WEST)

ELEVATION ANGLE = 25.42906223 DEG
AZIMUTH ANGLE = 235.920519 DEG
SLANT RANGE = 24258.0464 MILES

SATELLITE: ANIK C3, LONGITUDE = -117.5 DEGREES (--WEST)

ELEVATION ANGLE = 26.4327625 DEG
AZIMUTH ANGLE = 234.511747 DEG
SLANT RANGE = 24199.8629 MILES

SATELLITE: ANIK A3/A2, LONGITUDE = -114 DEGREES (--WEST)

ELEVATION ANGLE = 28.71383511 DEG
AZIMUTH ANGLE = 231.100462 DEG
SLANT RANGE = 24070.076 MILES

SATELLITE: ANIK B, LONGITUDE = -109 DEGREES (--WEST)

ELEVATION ANGLE = 31.79863339 DEG
AZIMUTH ANGLE = 225.90093 DEG
SLANT RANGE = 23900.1914 MILES

Geosynchronous Satellite Locator listing.

```
5 GRAPHICS 0
6 DIM W(1),TOWN(30),BAT(15)
8 J1=0:J2=0:IDEG:K1=0
10 POSITION 0,@:PRINT "      GEOSYNCHRONOUS SATELLITE LOCATOR "
13 PRINT "      COPYRIGHT 1983 BY DON BIRESCH:PRINT "      ALL RIGHTS RESERVED
20 PRINT :PRINT "THIS PROGRAM AUTOMATICALLY COMPUTES ":PRINT "AZIMUTH AND ELEVAT
ION ANGLES FOR:"
25 PRINT "GEO- SYNCHRONOUS SATELLITES FOR ALL LOCAT-":PRINT "IONS ON THE EARTH"
30 PRINT "THE LATITUDE AND LONGITUDE OF THE"
32 PRINT "EARTH STATION LOCATION MUST BE":PRINT "KNOWN, AS WELL AS THE LONGITUDE
OF"
35 PRINT "THE SATELLITE SUBPOINT."
39 PRINT "PRINT "ALL POSITIONS ARE ENTERED IN DEGREES"
40 PRINT "(NORTH LATITUDES ARE "+, SOUTH ARE -)"
45 PRINT "(EAST LONGITUDES ARE "+, WEST ARE -)":PRINT
50 PRINT "IF LOCAL MAGNETIC VARIATION IS KNOWN:PRINT "COMPASS HEADINGS ARE PROV
IDED.":PRINT
70 PRINT "HIT 'RETURN' TO CONTINUE:"
75 TRAP 75:INPUT W$
77 GRAPHICS 0:POSITION 0,@:PRINT "      GEOSYNCHRONOUS SATELLITE LOCATOR "
80 PRINT "LONGITUDES OF THE SATELLITES IN THE "
90 PRINT "CLARK BELT:"
```


CALL OR WRITE TODAY!

ELEPHANT
DISKS
\$5.00
10... \$17.95
\$5.00
10... \$20.95
\$5.00
10... \$26.95

Inventory Selections
...just to name a few!
(We also have IBM, Atari and Commodore to keep your Hardware on the "FAS-TRACK")

- ULTIMA II \$ 34.95
- LEAGUE BAG 19.95
- FLEX TEXT 19.95
- FRAMES-UP 19.95
- TIP DSK #1 15.95
- TYPEFACES 39.95
- COMPUTER AMBUSH 29.95
- MOST AMAZING THING 29.95
- RENDEZVOUS 29.95
- SNOOPER TROOPS 1 OR 2 29.95
- QUEST 19.95
- LOSE RUNNER 23.95
- COSMIC BALANCE I OR II EA. 29.95
- ZORK I, II OR III EA. 26.95
- DEADLINE, SUSPENDED ON WITNESS 33.95
- STARCRDS 29.95
- CREATURE CREATOR 27.95
- WIZARDY 33.95
- KNIGHT OF DIAMONDS 32.95
- ZAXXON 26.95
- PFS: FILE 84.95
- PFS: REPORT 84.95
- PFS: GRAPH 84.95
- DUNZINH 77.95
- SARGON II 52.95
- LEGACY OF LYLGMAYN 26.95
- GERMAN 1981 26.95
- THIERS IN THE SNOW 26.95
- MINER GEMER 26.95
- KNIGHT OF THE DESERT 26.95
- POLICE ARTIST 22.95
- SAMMY LIGHTFOOT 22.95
- STICKY BEAR SOLO 38.95
- STICKY BEAR NUMBERS 28.95
- STICKY BEAR ABC 28.95
- FACE MAKER 22.95
- STORY MACHINE 22.95
- 3000 STREET WRITER 32.95
- ZOOM GRAPH 32.95
- SENSIBLE SPELLER 78.95
- SCREEN WRITER II 81.95
- SCREEN WRITER PROFESSIONAL 129.95
- ASC II PROFESSIONAL 19.95
- PRONTO DOS 19.95
- DOUBLE TAKE 29.95
- ALPHA PLOT 29.95
- APPLE MECHANIC 19.95
- BEADLE BASIC 23.95
- DOS KERNEL 15.95
- HOME ACCOUNTANT 47.95
- THE GENERAL MANAGER II 149.95
- VISICALC 3.3 244.95
- WISITRENDDILOT 199.95
- KNOW YOUR APPLE II 16.95
- UTILITY KIT 20.95
- SPLE 42.95
- DOWN JONES MARKET ANALYZER 27.95
- COPY II PLUS 86.95
- BOOKENDS 96.95
- THE WRITER 6080 68.95
- ORCAIM 298.95
- WORDSTAR

Personal checks only 2 weeks. We accept Visa & MasterCard. (Some cards not in & expansion cards) include \$2.50 for shipping Ohio residents add 5 1/2% state sales tax. Prices shown are suggested only & are subject to change without notice. Please enclose your check or cash with your order.



Box 456
Columbus, Ohio 43216
Phone Orders/24 Hours: (614) 863-1699
OR TOLL-FREE OUTSIDE OHIO
1-800-272-1600

CIRCLE 167 ON READER SERVICE CARD

Satellites, continued...

```

92 PRINT " SATCOM F5 143 DEG WEST":PRINT " SATCOM FIR
93 PRINT " GALAXY S1 137 DEG WEST":PRINT " SATCOM F3
94 PRINT " COMSTAR D4 124 DEG WEST"
96 PRINT " WEBSTAR 5 123 DEG WEST":PRINT " SATCOM F2
BT"
106 PRINT " ANIK A3 114 DEG WEST":PRINT " ANIK A2
110 PRINT " ANIK B (AB) 109 DEG WEST":PRINT " ANIK D (AD)
115 PRINT " WEBSTAR W4 99 DEG WEST":PRINT " COMSTAR D2
"
120 PRINT " WEBSTAR W3 91 DEG WEST":PRINT " COMSTAR D3
125 PRINT " SATCOM F4 83 DEG WEST":PRINT " WEBSTAR W2
127 PRINT " WEBSTAR W6 76.5 DEG WEST":PRINT " GALAXY S2
BT"
130 PRINT " SATCOM F2R 72 DEG WEST":PRINT " SPACENET S2

```

```

135 PRINT "HIT 'RETURN' TO CONTINUE!"
140 TRAP 140:INPUT W$
145 GRAPHICS @:POSITION @, @:PRINT " GEOSYNCHRONOUS SATELLITE LOCATOR "
146 PRINT "HILEB(1) OR KILDMEETS(0)":TRAP 140:INPUT H
150 PRINT "ENTER EARTH STATION NAME(MAX.50 CHAR.)"
155 TRAP 150:INPUT TOWN:PRINT "
156 PRINT "ENTER EARTH STATION MAGNETIC VARIATION(+=WEST, -=EAST)":PRINT "IF NOT
KNOWN ENTER '99'"
157 TRAP 157:INPUT VAR:PRINT
158 IF VAR<>99 THEN 140
159 K1=1
160 PRINT "ENTER EARTH STATION LATITUDE(DEGREES)":PRINT "(NORTH+=, SOUTH+=)!"
162 TRAP 162:INPUT LA:PRINT
164 PRINT "ENTER EARTH STATION LONGITUDE(DEGREES)":PRINT "(EAST+=, WEST=-)!"
165 TRAP 165:INPUT LD:PRINT
166 PRINT "HANT CLARK BELT PRINTOUT(I=YES, @=NO)"
167 TRAP 167:INPUT Z1:IF Z1=1 THEN GOTD 990
168 PRINT "ENTER SATELLITE NAME"
169 TRAP 169:INPUT SATS:IF J2<>0 THEN 100
170 PRINT "ENTER SATELLITE LONGITUDE":PRINT "(EAST+=, WEST=-)!"
175 TRAP 175:INPUT SL
176 REM BEGIN CALCULATIONS
100 B=LD-SL
190 IF ABS(B)<C=100 THEN 190
194 IF B>100 THEN B=B-340
196 IF B<-100 THEN B=B+340
198 C=ATN(Y/DOR(-Y+Y1))+90
203 IF ABS(C)<91.3 THEN 210:REM SATELLITE BELOW HORIZON AND NOT VISIBLE
205 PRINT "PRINT 'SATELLITE BELOW HORIZON FOR THIS STATION'"
206 PRINT " NO WINDOW EXISTS"
210 TANB=IN(B)/COS(B)
214 REM CALCULATE A21MUTH(TRUE HEADING OF SATELLITE)
215 IF LA>=0 THEN 220:REM NORTH HEMISPHERE
216 @=ATN(TANB/SIN(LA)):REM SOUTHERN HEMISPHERE
219 GOTD 225
220 A=100+ATN(TANB/SIN(LA))
225 IF J1=1 THEN 250
234 IF H=0 THEN 245:REM METERS
240 M=2245:R=3957:GOTD 250:REM SATELLITE HEIGHT ABOVE EARTH AND RADIUS OF EARTH
(1N MILES)
245 RM=3475+35000:REM IN METERS
248 @RQR(R+R=(R+H)+(R+H)-2R+R=COS(C)):REM SLANT RANGE
250 S=(S+R+R-(R+H)+(R+H))/(2+R+R)
259 REM CALCULATE ELEVATION ANGLE
264 E=ATN(S/DOR(-S+1))
270 PRINT "PRINT "ELEVATION ANGLE = "E1" DEG"
280 PRINT "A21MUTH ANGLE = "A1" DEG"
281 IF K1<1 THEN 285:REM CALCULATE COMPASS HEADING=TRUE HEADING +(WESTERLY) OR
+(EASTERLY) LOCAL MAG. VAR.
282 PRINT "COMPASS HEADING NOT AVAILABLE":GOTD 284
283 PRINT "MAGNETIC HEADING = "I+VAR1" DEG"
284 IF H=0 THEN PRINT "SLANT RANGE = "I@1" KILDMETERS":GOTD 292
290 PRINT "SLANT RANGE = "I@1" MILES"
292 IF J2<>0 THEN 320
300 PRINT "PRINT "HARD COPY (I=YES, @=NO)"
310 TRAP 310:INPUT Z1:IF Z1<1 THEN 350
320 IF J1=0 THEN 400
330 PRINT :GOTD 400
335 PRINT "PRINT "DO AGAIN WITH NEW SAT. DATA (I=YES, @=NO)"
340 TRAP 340:INPUT Z1:IF Z1=1 THEN 140
345 PRINT "RETURN PROGRAM FROM BEGINNING (I=YES, @=NO)"
360 TRAP 360:INPUT Z1:IF Z1<1 THEN 370
367 GRAPHICS @
368 IF J1=0 THEN GOTD 8
369 LPRINT CHR$(12):GOTD 8
370 DO
380 END
390 REM HARDCOPY ROUTINE
400 TRAP 500:LPRINT CHR$(27):CHR$(76):CHR$(4):CHR$(14) " GEOSYNCHRONOUS SATELL
175 LOCATOR"
401 LPRINT CHR$(28):LPRINT :LPRINT
402 LPRINT "EARTH STATION AT "TOWN@1"
403 LPRINT "MAGNETIC VARIATION = "I+VAR1" DEG"

```

APPLE

Apple II E	\$1149.00
Apple Monitor III w/ Stand	\$ 199.00
Apple Disk II	\$ 399.00
Apple 80 Col. Card ...	CALL
Apple Extended 80 Co. Card	CALL
Apple II E Starter System II E, 80 Co. Card, Monitor III, Monitor Stand, Disk II+, Controller	\$1699.00



ACE 1000
w/ color
\$ 999.00

FRANKLIN

Starter System
Color Computer, AceWriter II, AceCalc,
Ace 80 Col. Card, Ace 10 Disk Drive &
Controller, 12" Green Screen
Monitor..... CALL

Starter System
w/EPSON MX80 III
Printer Interface Card
and Cable

RanaSystems

Elite I	\$260.00
w/Controller	\$320.00
Elite II	\$360.00
w/Controller	\$530.00
Elite III	\$595.00
w/Controller	\$670.00



SMITH-CORONA TP-1 DAISY WHEEL PRINTER

TP1-Serial	\$445.00
TP1-Parallel	\$445.00
Tractor Feed	\$129.00

EPSON

EPSON AMERICA, INC.

MX 80 III	\$359.00
MX 80 FT III	\$399.00
MX 100 III	\$599.00
FX 80	\$589.00
FX 100	\$699.00
RX 80	\$369.00

OKIDATA

ML 80	\$ 325.00
ML 82A	\$ 389.00
ML 83A	\$ 623.00
ML 84P	\$ 949.00
ML 84S	\$1019.00
ML 92P	\$ 489.00
ML 92S	\$ 559.00
ML 93P	\$ 829.00
ML 93S	\$ 899.00
Okigraph I	\$ 40.00
<i>(Specify B2 or B3)</i>	
Okigraph II	\$ 50.00
<i>(For Apple or Franklin)</i>	
Roll Paper Stand	\$ 30.00
<i>For B2A</i>	
Tractor Feed	\$ 50.00
<i>For B2A</i>	



Micro Modem II	\$275.00
Micro Modem II w/Terminal Program	\$309.00
Smart Modem 300	\$239.00
Smart Modem 1200	\$529.00

Novation



Applecot II	\$269.00
212 Applecot Upgrade	\$329.00
DSR Controller	\$ 19.00
Handset	\$ 29.00
Expansion Module	\$ 39.00
*CAT	\$150.00
*D-CAT	\$170.00
*AUTO-CAT	\$559.00
*I-CAT	\$120.00
*SMART CAT 103	\$189.00
*Require RS 232 Interface	



STX-80 (Thermal)	\$179.00
Gemini 10	\$295.00
Gemini 15	\$319.00

SILVER-REED PRINTERS

EXP 500	CALL
EXP 550 Serial	\$660.00
EXP 550 Parallel	\$630.00
EXP 770	CALL

DOW JONES SOFTWARE

Market Analyzer
Market Microscope
Market Manager
Connector

CALL FOR PRICING



Prices subject to change without
notice (up or down).

MAIL ORDER DIVISION

Carolina Microsystems

For technical support, call 1-803-254-6233. To
order, call tollfree: 1-800-845-7077; phone lines
open 10:00 am - 6:00 pm Eastern time. For
Mastercard or Visa, add 3% service charge. Call
today or send check/money order to Carolina
Microsystems, Mail Order Division, Suite 69,
1332 Main Street, Columbia, S.C. 29201.

S.C. residents add 4% sales tax. Add 1% for shipping and handling.

Satellites, continued...



```
485 LPRINT "LATITUDE = "LAI" DEGREES (--SOUTH), LONGITUDE = "LOI" DEGREES (--W
EST)";LPRINT
498 LPRINT LPRINT "SATELLITE: "ISAT";, LONGITUDE = "ISL" DEGREES (--WEST)"
415 IF ABS(C)<B1.3 THEN 450
416 LPRINT "SATELLITE BELOW HORIZON FOR THIS STATION-RECEPTION IS IMPOSSIBLE"
450 LPRINT LPRINT "ELEVATION ANGLE = "IEI" DEG"
460 LPRINT "AZIMUTH ANGLE = "IAI" DEG"
461 IF KI>1 THEN 463
462 LPRINT "COMPASS HEADING NOT AVAILABLE-VARIATION NOT KNOWN":GOTO 465
463 LPRINT "COMPASS HEADING = "IA+VARI" DEG"
465 IF M#0 THEN LPRINT "SLANT RANGE = "IS" KILOMETERS":GOTO 480
470 LPRINT "SLANT RANGE = "IS" MILES"
480 J1:=TRAP 500
485 IF J2#0 THEN GOTO 350
486 IF (1000+J2)>1200 THEN 2020:REM DONE WITH CLARK BELT PRINTOUT
487 GOTO 1000+J2
500 TRAP 500:PRINT "PRINTER NOT ONLINE-HIT 'RETURN' TO CONT.":INPUT W$
510 IF J1#0 THEN 400
520 TRAP 500:GOTO 400
980 TRAP 980:PRINT "TURN PRINTER ON - HIT 'RETURN'":INPUT W$
990 TRAP 980
999 REM CLARK BELT SATELLITES-AUTO PRINTOUT
1000 SATS="SATCOM F5":SL=(-143):GOTO 2000
1010 SATS="SATCOM F1R":SL=(-139):GOTO 2000
1020 SATS="GALAXY G1":SL=(-134):GOTO 2000
1030 SATS="SATCOM F3":SL=(-131):GOTO 2000
1040 SATS="COMSTAR D4":SL=(-127):GOTO 2000
1050 SATS="WESTAR W5":SL=(-123):GOTO 2000
1060 SATS="SATCOM F2":SL=(-119):GOTO 2000
1070 SATS="ANIK A5":SL=(-114):GOTO 2000
1080 SATS="ANIK A2":SL=(-112):GOTO 2000
1090 SATS="ANIK AB":SL=(-109):GOTO 2000
1100 SATS="ANIK AD1":SL=(-104.5):GOTO 2000
1110 SATS="WESTAR W4":SL=(-99):GOTO 2000
1120 SATS="COMSTAR O2":SL=(-95):GOTO 2000
1130 SATS="WESTAR W3":SL=(-91):GOTO 2000
1140 SATS="COMSTAR O3":SL=(-87):GOTO 2000
1150 SATS="SATCOM F4":SL=(-85):GOTO 2000
1160 SATS="WESTAR W2":SL=(-79):GOTO 2000
1170 SATS="WESTAR W6":SL=(-78.5):GOTO 2000
1180 SATS="GALAXY G2":SL=(-74):GOTO 2000
1190 SATS="SATCOM F2R":SL=(-72):GOTO 2000
1200 SATS="SPACNET S2":SL=(-70):GOTO 2000
2000 PRINT LPRINT "SATELLITE "ISAT$
2010 J2:=J2+10:GOTO 1000:REM RETURN TO FINISH CALCULATIONS
2020 J2#0:GOTO 350:REM FINISHED-GO AGAIN
```



BLYTHE VALLEY SOFTWARE MEANS BUSINESS

Joining our home/educational line of products are two new business programs with more on the way. Watch for them in our advertisements or in your dealer's showroom in the near future.

SUPERPLOT

SUPERPLOT is an easy to use plotting routine for generating high resolution graphs on your printer. You may create character plots, line plots and simulate smooth curves using the capabilities of your printer without the need for a color/graphics card. The simple data format is easy to read and write with a BASIC program and may be used in combination with other programs you or others may write.

(System Requirements: IBM PC, 128K and Epson printer with Graphix+)
Sug. Ret. \$59.95

PAIRSTAT

PAIRSTAT is a multi-purpose, paired data statistical package. This collection of programs has been designed as a powerful tool for analysis of certain business, scientific and engineering data. PAIRSTAT's many uses include interpreting experimental data, finding optimums, determining trends and displaying one or more sets of data on a printed graph. As with SUPERPLOT, no color/graphics card is required.

(System Requirements: IBM PC, 64K, IBM or Epson printer with Graphix+)
Sug. Ret. \$129.95

IBM and IBM PC, Epson and Graphix+ are trademarks of IBM Corporation and Epson America, Inc. respectively.

BLYTHE VALLEY SOFTWARE

P.O. BOX 1, OAKHURST, CALIFORNIA 93644, (209) 683-4735

Apple
discount
software

CALSOFT

Personal—Entertainment—Business
SOFTWARE



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!

We have all the latest
software—ASK US!

ATARI, IBM PC, CP/M,
COM 64: send for
FREE catalog!

Call Toll Free: (800) 423-5290 In California: (213) 991-9641

BEAGLE

DOS Boss
Utility City
Apple Mechanic
Printo DOS
Double Task

List Price	Our Price
24.00	20.40
29.50	25.05
29.50	25.05
29.95	25.45
34.95	29.20

PENGUIN

Complete Graphics System
Graphics Magician
Trisylvania
The Quest

List Price	Our Price
59.95	59.45
58.95	44.95
19.95	18.95
19.95	15.95

STRATEGIC SIMULATIONS

Computer Quarterback
Napoleon's Campaigns
Quadrant Campaign
Cosmic Balance II
Germany 1985
Galactic Adventures
Bowley
Epidemic
Fighter Command
RDF 1985
North Atlantic '86
Knights of the Desert
Geopolitics 1990
Ringade Seal
Broadsides

Our Price	Our Price
39.95	33.95
59.95	50.95
59.95	44.95
39.95	33.95
59.95	44.95
59.95	50.95
59.95	50.95
34.95	29.70
58.95	44.95
39.95	33.95
39.95	33.95
39.95	33.95
39.95	33.95
39.95	33.95

BPI SYSTEMS

General Ledger
Accounts Receivable
Accounts Payable

List Price	Our Price
395.00	318.00
395.00	318.00
395.00	318.00

BRODERBUND

The Arcade Machine
Chopstick
AE
Bank Street Writer
Gumball
Lode Runner
Spore Change
Questron

List Price	Our Price
59.95	50.95
34.95	29.70
34.95	29.70
99.95	92.45
29.95	25.45
34.95	29.20
34.95	29.20
44.95	38.70

SIERRA ON-LINE

Ulysses
Dark Crystal
Cross Fire
Screen Writer Professional
Ultima II
Frogger
The Arist
General Manager
Jawbreaker
Learning with Lesper
Dragon's Keep
Bop-a-Bot
Troll's Tale
Sunny Lightfoot
Mr Cool
Apple Cider Spder

List Price	Our Price
34.95	29.70
38.95	28.95
29.95	25.45
199.85	149.85
59.95	44.95
34.95	29.70
79.95	87.95
229.00	171.75
29.95	25.45
34.95	29.70
29.95	25.45
27.95	23.75
29.95	25.45
37.95	29.45
37.95	32.25
33.95	28.45

HOME ACCOUNTANT

74.95 56.20

CONTINENTAL

CPA Modules #1-4 (each)
FCM

List Price	Our Price
250.00	197.50
99.95	84.95

DECISION SUPPORT

The Accountant
The Business Accountant

List Price	Our Price
129.00	106.95
255.00	191.25

EDU-WARE

Prisoner 2
Algebra 1-4 (each)
Algebra 5 & 6
Fractions/Decimals (each)
PSAT/SAT Word Skills (each)

List Price	Our Price
32.95	28.00
39.95	29.95
49.95	42.45
49.00	41.95
49.00	41.95

HAYDEN

Orca/M
Pie Writer 2.2
Sargon II

List Price	Our Price
149.95	127.45
149.95	127.45
29.95	25.45

INFOCOM

Zork I, II, III (each)
Deadline
Starcross
Suspended
Witness
Planetfall

List Price	Our Price
38.95	29.95
49.95	42.45
39.95	33.95
49.95	42.45
48.95	37.45
49.95	42.45

MICROSOFT

Multiple
Typing Tutor II
Applesoft Compiler

List Price	Our Price
275.00	206.25
24.95	21.20
175.00	131.25

SIRIUS

Type Attack
Repton
Critical Mass

List Price	Our Price
39.95	33.95
39.95	33.95
39.95	33.95

SIR-TECH

Wastory
Knight of Diamonds
Legacy of Llylygynn

List Price	Our Price
49.95	42.45
34.95	29.70
39.85	29.95

SOFTWARE PUBLISHING

PF8
PF8: Report
PF8: Graph

List Price	Our Price
125.00	93.75
125.00	93.75
125.00	93.75

SPINNAKER

Snepner Troops #1, #2 (each)
Story Machine
The Most Amazing Thing

List Price	Our Price
44.95	33.70
34.95	29.70
39.95	33.95

DB MASTER

229.00 171.75

STONEWARE

DB Master 4.0
DB Master Utility Pak #1
DB Master Utility Pak #2

List Price	Our Price
350.00	292.50
129.00	106.95
129.00	106.95

SOUTHWESTERN

Martin
Asci Express Professional
Romance Machine
Munch-a-Bug
SOS Combo

List Price	Our Price
84.95	48.70
128.95	97.45
84.95	55.20
49.95	42.45
119.95	101.95

SCREENWRITER

129.95 97.45

VISICORP

VisiCalc
VisiText/VisiPlot
VisiFile

List Price	Our Price
250.00	193.75
300.00	225.00
250.00	199.95

MISCELLANEOUS

Accounting Plus G/L
Ches7.0
Incredible Jack
Ken Utson's Blackback
Mastertype
Maze Craze Const. Set
Microterminal
Sensible Speller
Story Text
Terrapin Logo
Wastack 50 Col. Preboot
Zaxxon

List Price	Our Price
395.00	316.00
59.95	59.45
179.00	143.20
59.95	59.45
38.95	29.95
39.95	33.95
84.95	72.20
125.00	93.25
99.00	84.15
149.95	127.45
49.00	41.95
38.95	29.95

IBM PC SOFTWARE

Apple Panic
BPI Personal Accounting
CDEX Training for Visicalc
Flight Simulator
Home Accountant Plus
Multi-Tool Word
Norton Utilities
Peachpak (GL/AR/AP)
Peachtek 5000
Perfect Writer
Personal Investor
PF8: Write
Smartcom II
TKI Solver
Wordstar
Ultrafile

List Price	Our Price
29.95	25.45
195.00	156.00
89.95	59.45
49.95	42.45
150.00	112.50
395.00	316.00
80.00	68.00
385.00	318.00
395.00	319.00
495.00	396.00
145.00	123.25
140.00	105.00
119.00	101.15
299.00	239.20
495.00	371.25
195.00	156.00

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 126 ON READER SERVICE CARD

COMPUTER WORLD

TeleVideo



TERMINALS	
910	\$559.00
912	\$689.00
920	\$729.00
925	\$719.00
930	\$879.00
910	CALL

COMPUTERS	
800A	\$1,089.00
802	\$2,889.00
803	\$1,949.00
803B	\$4,689.00
806-20	\$4,999.00
816-40	\$8,199.00
1602	\$3,399.00
1603	CALL

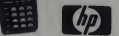
MODEMS	
HAYES	
Smart	\$219.00
Smart 1200 (1200 Baud)	\$519.00
Chronograph	\$199.00
Micromodem 100	\$309.00
Micromodem II	\$279.00
Micromodem II (with term)	\$299.00
Smart Com II	\$89.00
Smart 1200B	\$469.00

NOVATION	
J-Cat	\$119.00
Cat	\$164.00
D-Cat	\$159.00
103 Smart Cat	\$189.00
Apple Cat II	\$279.00
103/212 Smart Cat	\$439.00
212 Apple Cat II	\$299.00
Apple CatII 212 Upgrade	\$309.00

ANCHOR	
Mark I (RS-232)	\$79.00
Mark II (Atari)	\$79.00
Mark III (T 1.8M)	\$109.00
Mark IV (IBM PC)	\$129.00
Mark V (Osborne)	\$95.00
Mark VI (IBM PC)	\$179.00
Mark VII (Auto Ans./Auto Dnt)	\$119.00
Mark VIII	\$269.00
TRS-80 Color Computer	\$89.00
9 Volt Power Supply	\$9.00

ZENITH	
Z11 Terminal	\$359.00

**HEWLETT
PACKARD**



HP 41C CV.....	\$208.00
HP 7B.....	\$749.00
HP 41C.....	\$148.00
HP 10C.....	\$53.00
HP 11C.....	\$68.00
HP 12C.....	\$92.00
HP 13C.....	\$92.00
HP 16C.....	\$92.00

For HP41C1V

HPIL Module	\$99.00
HP II Cassette or Printer	\$359.00
Cash Reader	\$144.00
Extended Functions Module	\$84.00
Time Module	\$64.00

EAGLE



IE 1	\$1369.00
IE 2	\$1649.00
IE 3	\$2399.00
IE 4	\$2199.00
PC 1	\$1579.00
PC 2	\$2799.00
PC XL	\$3599.00
1820	\$6499.00
1830	\$6899.00
1840	\$6999.00
Cyma Software	CALL

MONITORS

AMDEK	
300G	\$149.00
300A	\$159.00
310A	\$169.00
Color II plus	\$279.00
Color II	\$399.00
Color III	\$249.00
Color IV	\$999.00

UBI	
P. 1, 9 G	\$99.00
P. 2, 12" G	\$119.00
P. 3, 12" A	\$159.00
P. 4, 9" A	\$139.00
1400 Color	\$299.00

MONITORS

ZENITH	
ZVM 122A	\$119.00
ZVM 123G	\$109.00

BMC	
12" Green	\$85.00
9191 13" Color	\$299.00

TAKAN	
12 N Green	\$129.00
12 A Amber	\$139.00

PANASONIC	
TR 120 Nires. Green	\$149.00
CT 180 Dual Mode Color	\$279.00

NEC	
JB 1200	\$119.00
JB 1201	\$149.00
JC 1212	\$299.00
JC 12-202	\$299.00
JC 1203	\$469.00

GORILLA	
12" Green	\$89.00

**EPSON
COMPUTERS**



OX 10	CALL
HX 20	CALL

**TI-40
COMPACT
COMPUTER**

\$209

**TIMEX
SINCLAIR \$49⁹⁵
1000**

18K Memory	\$44.95
200K Printer	\$59.95
W/Calc	\$17.95
Miniview Printer	\$99.00

IBM



NEC3860PRINTER \$1795

PERCOTATA/TAOON DRIVE

5 1/4" 320K Floppy	\$279.00
3 meg hard w/ controller	\$1469.00
10 meg hard w/ controller	\$1795.00
15 meg hard w/ controller	\$2195.00
20 meg hard w/ controller	\$2395.00

AMDEK

310A Amber Monitor	\$199.00
OX 10 Plotter	\$599.00
Color II	\$399.00

AST RESEARCH, INC

SIPAPLUS 64K clock, serial, parallel	\$299.00
clock, serial, parallel, gameport	\$339.00
MEGAPLUS 64K clock, serial, parallel	\$339.00
clock, serial, parallel, gameport	\$419.00
COMBOPLUS II 64K clock, serial, parallel	\$299.00
I/OPLUS II clock, serial, parallel	\$145.00
clock, serial, parallel, gameport	\$179.00

PROFESSIONAL SOFTWARE

PC Plus Word Processing	\$319.00
-------------------------	----------

MICRO PRO

Word Star/Mail Merge	\$319.00
InfoStar	\$299.00
Spell Star	\$159.00
CallStar	\$159.00

MICROSTUP

Crosstalk	\$139.00
-----------	----------

MICROSOFT

Multiuser	\$199.00
-----------	----------

ASHTON-TATE

D-Base II	\$419.00
-----------	----------

IUS

EasyWriter II	\$209.00
EasySpeller	\$129.00
EasyReader	\$129.00

CONTINENTAL SOFTWARE

181 Class Mail Form Letter	\$89.00
The Home Accountant Plus	\$109.00

SYNAPSE

File Manager	\$119.00
--------------	----------

LOTUS

123	\$389.00
-----	----------

PPS

File	\$69.00	IBM	\$99.00
Report	\$89.00	IBM	\$89.00
Graph	\$89.00	IBM	\$99.00
Write	n/a	IBM	n/a

KRAFT

IBM Joystick	\$55.00
IBM Paddles	\$39.00

QUAD RAM.....CALL

SHARP

PC-1500A	\$169.00
Pocket Computer	
PC-180A.....	\$89.00
125 Printer/Micro Cassette	\$129.00
150 Printer/Micro Cassette	\$129.00
132 Cassette Recorder	\$62.00
155 K RAM	\$64.00
156 9K RAM Battery	\$129.00
191 16K RAM	\$129.00

SANYO



MBC 555PC	\$785.00
MBC 1100	\$1599.00
MBC 1150	\$2099.00
MBC 1200	\$1999.00
MBC 1250	\$2399.00
FOJ 3200 320K Drive	\$899.00
FOJ 5400 GAK Drive	\$499.00
PR 5500 Printer	\$399.00

PRINTERS

M80 FT. M100. FAXO.	FAXO	CALL
82 53 54 52 93	OKIATA	CALL
	STAR	
STX 80	STAR	\$189.00
Cermus 10X		\$299.00
Cermus 15		\$479.00
Serial Board		\$75.00

BWATH CORONA

TR 1	\$469.00
TR 2	CALL
Printer Feed	\$119.00

CITICH

Gentle	\$209.00
Prowler 6510P	\$379.00
Prowler 1550P	\$689.00
Stamwriter F10-40P	\$1149.00
Printmaster F10-55P	\$1569.00
Tractor Feed	\$199.00

DAISYWRITER

2000 Letter Quality	\$1149.00
2500 NEW Tractor Feed	\$1149.00
	\$109.00

CIASLO

630	\$948.00
630	\$1769.00

IOB

Call for All Configurations on 108 PRISM Printers	
	CALL

NEC

8023	\$399.00
8025	\$729.00
8015	\$1449.00
3530	\$1499.00
3550	\$1799.00
7710/7730	\$1999.00

IBM

401 Letter Quality	\$699.00
--------------------	----------

BROTHER

Comtrier II Printer	\$499.00
---------------------	----------

CABLES & CONNECTIONS

Apple to Parallel	\$29.00
Apple to Serial	\$29.00
Apple to Parallel/Graphics	\$69.00
Apple to Serial	\$69.00
IBM to Parallel	\$35.00
IBM to Serial	\$29.00
Parallel to Parallel	\$29.00
Serial to Serial	\$29.00
Grapple Plus	\$129.00
PRASO	\$139.00
Atari to Modern Cable	\$29.00
IBM to IEEE Board	\$79.00
Apple 80 Column Card	\$159.00
IBM to Parallel	\$29.00
IBM to Serial	\$69.00

PAPER SUPPLIES

100' Address Labels(Tract Feed)	\$9.95
15' Report Paper(Tract Feed)	\$24.95
8 1/2" 8 1/2" White Paper(Tract Feed)	\$19.95

WEST

1-800-648-3311

VISA

In NV call (702)588-5654 Order Status Number: 588-5654

Dept. 1108, P.O. Box 8689, Staceline NV 89449

No risk, no deposit on C.O. orders. No cash orders. Free shipping within the UPS continental United States with no waiting period for certified checks or money orders. Add \$3. (minimum US \$50) shipping and handling on all C.O. and credit card orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. We stock manufacturers' and third party software for most all computers. NV has market. Call today for our catalog.

COMPUTER & VIDEO ORDER

FRANKLIN

CALL 1000 Color Computer
ACE 1100 Drives & Cover for ACE 1000
ACE 1200 Computer with Disk Drive
ACE PRO PACK
ACE 1000, Disk Drive
80 Column Card, ACE Case &
ACE Writer II

MICRO-SCI Apple & Franklin

A4 \$245.00
A5 \$245.00
ATD \$445.00
C2 Controller \$475.00
C4 Controller \$565.00
RANA
Elite I (Apple/Franklin) \$275.00
Elite II (Apple/Franklin) CALL
Elite III (Apple/Franklin) CALL

VIDEO CRIP

FOR APPLE, IBM & FRANKLIN
Videos \$189.00
Vastate \$189.00
Viasplot... \$159.00
Vastream \$39.00
Vistand/Plot \$229.00
Viaschedule \$225.00
Desktop Plan \$199.00
Visacat (Apple IBM CGM) \$179.00
Visacat 4 (IBM) \$209.00
Visacat Advanced Ite \$309.00
Stretch Calc \$89.00
Visacore prices for IBM may vary slightly.

LJK

Letter Perfect Apple \$109.00
Data Perfect Apple \$75.00

AXLON

Apple/Franklin 128K Ram \$299.00
Apple/Franklin Ram Disk \$725.00

MPC

ByteDisk (128K Non-Volatile) \$649.00

JOYSTICKS WICO

Joystick \$21.95
Famous Red Batt. \$23.95
Power Grip \$21.95
Three Way Deluxe \$22.95
Alan/VIC Trackball \$34.95
Apple Trackball \$55.95

KRAFT

Alan Single Fire \$13.00
Alan Switch Kitter \$19.00
Apple Joystick \$44.00
Apple Pedals \$33.00

Commodore

CBM 8032

\$599

CBM84...\$219

VIC 20...\$99

CALL ON
Executive 64 Portable

1520 Color Printer/Plotter \$168.00
1520 80 Column Printer \$218.00
1526 \$319.00
1530 Datasette \$69.00
1541 Single Disk Drive \$249.00
1600 VIC Modem \$59.00
1650 AD/DA Modem \$69.00
1701 14 Color Monitor \$249.00
Pet 64 \$589.00
Pet 64 \$259.00
CBM 8032 \$559.00
Super Pet \$999.00
9129 80 \$278.00
83258 80 \$865.00
2031 \$279.00
4040 \$699.00
8050 \$84.00
8250 \$279.00
9080 \$1999.00
9090 \$2199.00
4023 \$375.00
6400 \$1389.00
64K Upgrade \$299.00
Spell Master \$149.00
Z-Ram \$549.00
Silicon Office \$749.00
The Manager \$209.00
Soft Ram \$125.00
Jansam CALL
Call Result 64 \$132.00

PROFESSIONAL SOFTWARE

Word Pro 2 Plus \$158.00
Word Pro 3 Plus \$189.00
Word Pro 4 Plus \$279.00
Word Pro 5 Plus \$279.00
InfoTools \$179.00
Administrator \$399.00
Power \$379.00
Word Pro 64 Plus \$85.00

CARDCO VIC 8032/84

Light Pen \$32.00
Casette Interface \$29.00
Parallel Printer Interface \$89.00
3 Slot Expans. Interface (20) \$32.00
6 Slot Expans. Interface (20) \$79.00

ATARI HOME COMPUTERS

ATARI

ATARI 600XL.....\$149

ATARI 800XL.....\$269

ATARI 1200XL.....CALL

ATARI 400.....CALL

ATARI 800.....CALL

1010 Program Recorder \$74.00
1020 40 Col. Printer/Plotter \$248.00
1020 80 Col. Printer \$489.00
1037 Letter Quality Printer \$399.00
1050 Disk Drive \$379.00
1030 Direct Connect Modem CALL
CX40 Paddler \$12.00
CX32 Remote Joystick CALL
CX40 Joystick \$8.00
CX17 Touch Tablet \$69.00
CX80 Trak Ball \$49.00
CX85 Keypad \$105.00
CX418 Home Manager \$69.00
CX488 Communicator II \$229.00
KX7068 Alarm Accountant \$209.00
KX7101 Entertainment \$89.00
KX7102 Arcade Champ \$75.00

PERCOM

DISK DRIVES FOR ATARI
AT88-A1 \$369.00
AT88-B1 \$299.00
AT88-52 \$599.00
AT88-51 PD \$489.00
AT88-52 PD \$669.00
AT88-D4 \$119.00
AT88-E1 \$579.00
AT88-D2 \$969.00
TEAS INSTRUMENTS DRIVE
TX 90-81 \$349.00

RANA 1000 Atari Disk Drive \$318.00

FLOPPY DISKS

MD-1 MAXELL \$32.00
MD-2 \$44.00
FD-1B \$40.00
FD-2IB (5D DD) \$50.00
5 1/4" 55 SD ELEPHANT \$19.95
5 1/4" 55 DD \$25.95
5 1/4" 55 DD VERSABATUM \$28.00
5 1/4" 55 DD \$38.00
5 1/4" 55 DD HEAD \$14.95

ALIEN

Atan Voice Box \$115.00
Apple Voice Box \$145.00

MEMORY BOARDS

Axon 32K Ram \$59.00
Axon 48K Ram \$99.00
Axon 128K Ram \$299.00
Intec 48K Board \$85.00
Intec 64K Board (600 only) \$99.00
Intec Real Time Clock \$39.00

DISK & CART HOLDERS

Flap-n-File 10 \$4.00
Flap-n-File 50 \$15.00
Flap-n-File 400/800 Cart \$15.00

C.M.O. TOP 80

CBM 84
1. Word Pro 64 \$85.00
2. Jumpman \$29.00
3. Gorf (20/64) \$14.95
4. Microcass Data Base 64 \$89.00
5. Logo 64 \$39.00
6. Microcass Gen Ledger 64 \$49.00
7. Zork III \$29.00
8. Frogger (164) \$23.00
9. Quick Screen Fax (20/64) \$45.00
10. Anasaurus \$29.00
11. Deadline \$29.00
12. Anasaurus 84 \$14.95
13. Zork II \$29.00
14. 3-D Man \$14.00
15. Protector \$82.00
16. Star Wars \$29.00
17. Easy Mail 64 \$14.95
18. Grave Robber \$11.00
19. Wall Street \$19.00
20. Trash Man \$32.00

ATARI
1. Donkey Kong \$39.00
2. Zaxxon \$29.00
3. E.T. Phone Home \$39.00
4. Miner 2048 \$35.00
5. Dig Dug \$33.00
6. Choplifter \$29.00
7. Donkey Kong Jr. \$39.00
8. Canyon Climber \$29.00
9. Snapper Traps \$24.00
10. Word Wizard \$59.00
11. Phonic Paranoia \$34.00
12. Jumpman \$29.00
13. Bramaus \$34.00
14. Letter Perfect \$109.00
15. File Manager 800 \$68.00
16. Preppie \$29.00
17. Astro Chase \$24.00
18. Gladi/Stack Hole \$27.00
19. Pac Man \$33.00
20. Ninja Suppax \$25.00

21. Crush, Crumble & Chomp \$24.00
22. Yeti \$27.00
23. Zork II \$26.00
24. Vastacat \$159.00
25. Alan Writer \$79.00
26. Three Little Pigs \$25.00
27. Upper Reaches of Apshe \$18.00
28. Warlord Football \$24.95
29. Ortha \$26.00
30. Protector \$25.00
31. Frogger \$25.00
32. Lunar Lander \$24.00
33. Wizard of Wor \$34.00
34. Undercoats \$21.00
35. Moon Shuttle \$22.00
36. Home Accountant \$53.00
37. Temple of Apshe \$29.00
38. Spell Wizard \$33.00
39. Ninja \$26.00
40. O'Riley's Mine \$22.00

800-233-8950

In PA call (717) 327-9575 Order Status Number: 327-9576

Dept. 1108 477 E. Third Street, Williamsport, PA 17701

International Orders: All shipments outside the continental United States must be pre-paid by certified check only. Include \$10.00 shipping and handling. Maximum \$1000. Additional discounts are available from both Computer Max Order locations to qualified Educational Institutions. A/P & P/O. Add minimum \$5.00 shipping and handling.

CIRCLE 139 ON READER SERVICE CARD



Graphics Fun With The Epson HX-20

Figure 4. The Epson Monster.

The Epson HX-20 notebook computer offers many impressive features, including 120x32 dot graphics. During my first few days with the HX-20, I decided to write a sheet program to produce a constantly changing graphics display on the liquid crystal display (LCD). During occasional dull moments during the annual meeting of the Linguistic Society of America, I unobtrusively entered, debugged, and modified the program while seated in a back row of one of the meeting rooms. It was an exhilarating experience to touch-type in silence on a full-size, full stroke, QWERTY keyboard without relying on a bulky monitor or access to an electrical outlet.

Figures 1 and 2 are sample screen displays from the output. These figures don't convey the charm of the program, which constantly changes the graphics display in a manner that suggests the movement of two twirling rods in three dimensions. These figures were printed using the integral Epson dot matrix printer, which considerably compresses the LCD graphics. No programming



Figure 1.

was required to produce the printed screen dumps. The user need only type CTRL PF2 to copy screen displays from the output.

Many users enjoy waiting for the screen to produce an interesting graphic, printing it, allowing the display to change to another interesting graphic,

Allen Munro

printing that, and so on. The printed tape produced is an extended graphic that takes on qualities different from the sum of its parts. Some printouts, such as that shown in Figure 3, are reminiscent of the ink-blots used in Rorschach projective tests.

The program appears in Listing 1. Lines 130 and 140 provide a randomiza-



Figure 2.

tion seed, using the day of the week and the "seconds" value of the real time clock at the time the program is run.

MAXLNS is the number of lines that the program displays at one time. When it is time to generate the MAXLNS+1th line, the first one is erased first. The arrays LOLIM and HILIM are the minimum and maximum coordinate values that the ends of the plotted lines can take on.

The two-dimensional array ALN is an array of the coordinate values of the end points of all the lines that can be displayed at one time. The values of the coordinates of the first line are randomly selected in lines 210-240.

The main body of the program is given in lines 300 to 550. This portion repeats indefinitely, that is, until the user interrupts it with the BREAK key. The oldest line on the screen is erased, and a new line is generated. (In fact, the line has a bilaterally symmetric counterpart which is also erased, and a correspond-

ing new line is drawn. In this discussion, these mirror-image lines are not referred to further. The instructions for their erasure and production follow immediately after the line drawing commands for the first line of the pair.) To draw a new line, its starting and ending coordinates must first be determined. This is done by adding a STEPSZ (stepsize) to each of the four values that specify the end-points of the previous line. A given set of STEPSZ values is used for only NUMSZ times (5-20), and then a new set of STEPSZ increments for the coordinates is chosen. The subroutine in lines 570-620 is responsible for setting the four STEPSZ values and the next NUMSZ. To appreciate how the program works



Figure 3. It can be fun to elaborate artistically on such graphics, as a friend did in Figure 4.

In detail, type it into your HX-20 and enjoy it, then try TRACE mode to follow program flow during execution. Enjoy the graphics capabilities of the most impressive portable computer yet. □

THE BEST WAY TO INCREASE THE VALUE OF YOUR APPLE:



CONNECT IT TO THE WORLD.

TRANSEND

THE WORLD JUST KEEPS GETTING SMALLER.

CIRCLE 229 ON READER SERVICE CARD

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

For the beginner: Menu 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 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 trademark of Transend Corporation, a subsidiary of The Reader's Digest Association, Inc.

APPLEWARE, INC.

The Apple Users Group
Software Library Bonanza
At truly affordable prices!

For the first time enjoy your
Apple to its fullest capacity,
using specially packaged disks
with over 60 outstanding
programs each.
(not available from any other source)

Each packed disk includes an extensive variety of
interesting, useful and entertaining programs
indispensable to all computerists! Each mixed category
packed disk includes:

**BUSINESS • EDUCATIONAL • DATA BASE • GAMES
UTILITIES • SCIENCE • MUSIC • GRAPHICS • FINANCE**
Library Disks I, II and III are mixed categories. Dedicated
disks are:

• **GAMES • UTILITIES • GRAPHICS • INTEGER •
SCIENCE & TECHNOLOGY.** Each packed disk is
available for only \$59.95 each.

WHY PAY MORE?

Order direct from this ad and **Save up to \$150.** Buy
Library Disks I, II and III and get a special bonus disk
FREE - over 260 programs for \$179.95 + \$3.
shipping. For the best value, receive all 9 disks featuring
over 600 of our best programs for only \$59.95 each -
for a package price of only \$369. Postage Paid!

NEW! Business • Professional • Executive Package (enabling
you to bring your business to its highest level of efficiency) also
available, circle Readers Service Card for our complete catalog.

For Orders Only Call now
TOLL FREE: 1-800-327-8664
Florida: 1-305-887-8665



Compatible with II, II+, Ite, II Emul., and Franklin Ace (For 3.3 DOS)

CIRCLE 111 ON READER SERVICE CARD



Gurmal is Coming...

"Gurmal buys a Computer" 1984 Calendar

Share in the adventures of Gurmal
each month with a new hilarious,
side splitting scene from the
"Gurmal Buys a Computer"
calendar for 1984. Gurmal
travels through the world of
Hardware, Software and Robo-
tics from the Corporate Office to
his home.

The Gurmal 1984 Color Calendar

Please send me
copy(s) of the "Gurmal Buys a
Computer" Calendar for 1984
(\$49.95 (Utah residents add 5.35%
sales tax) +\$5.00 postage &
handling fee)

Computer Humor, Inc.
P.O. Box 959
Park City, UT 84060

©1983 Computer Humor, Inc.

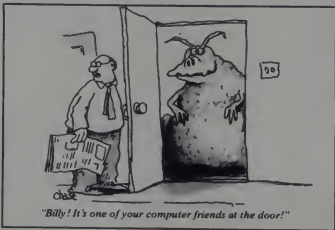


HX-20 Graphics, continued...

Listing 1.

```

100 CLS;PRINT * Dynamic Graphics*
110 PRINT;PRINT * Use Break to exit*
120 FOR Z=1 TO 700:NEXT Z
130 SECS=VAL(RIGHTS(TIMES,2))
140 RANDOMIZE (SECS*DAY+100)
150
160 MAXLNS=20
170 DIM ALN(20,4)
180
190
190 * Initialize
200 CLS
210 ALN(0,1)=RND*60
220 ALN(0,2)=RND*32
230 ALN(0,3)=RND*60
240 ALN(0,4)=RND*32
250
250
250 HILIM(1)=59: HILIM(2)=31
270 HILIM(3)=59: HILIM(4)=31
280
290
290 * Infinite loop from 700
300 FOR LNO=1 TO MAXLNS
310 * Erase oldest line
320 LINE(ALN(LNO,1),ALN(LNO,2))- (ALN(LNO,3),ALN(LNO,4)),PRESET
330 LINE((119-ALN(LNO,1),ALN(LNO,2))- (119-ALN(LNO,3),ALN(LNO,4))),PRESET
340
350 * Pick a stepsize
360 IF NUMSZ=0 THEN GOSUB 570
370 * Fix starting and ending points for next line
380 FOR COORO=1 TO 4
390 ALN(LNO,COORO)=ALN(LNO-1,COORO)+STPSZ(COORO)
400 IF ALN(LNO,COORO)<LDIM(COORO) THEN ALN(LNO,COORO)=ALN(LNO-1,COORO)+STPSZ(COORO)+STPSZ(COORO)-1
410 IF ALN(LNO,COORO)>HILIM(COORO) THEN ALN(LNO,COORO)=ALN(LNO-1,COORO)+STPSZ(COORO)+STPSZ(COORO)-1
420 NEXT COORO
430
440
440 * Draw the line
450 LINE(ALN(LNO,1),ALN(LNO,2))- (ALN(LNO,3),ALN(LNO,4)),PSET
460 LINE((119-ALN(LNO,1),ALN(LNO,2))- (119-ALN(LNO,3),ALN(LNO,4))),PSET
470 NUMSZ=NUMSZ-1
480 NEXT LNO
490
500 * Feed the tail of the array to its head
510 FOR COORO=1 TO 4
520 ALN(0,COORO)=ALN(MAXLNS,COORO)
530 NEXT COORO
540 * Loop back to start of infinite loop
550 GOTO 300
560
570 * Stepsize subroutine
580 NUMSZ=5*(1+RND*5)
590 FOR S1=1 TO 4
600 STPSZ(S1)=RND*10-4
610 NEXT S1
620 RETURN
    
```



"Billy! It's one of your computer friends at the door!"

ALL BEAGLE DISKS ARE UNLOCKED, COPYABLE, AND COMPATIBLE WITH APPLE II, II+ AND IIe.*
(Don't Settle for Less!)

*APPLE is a Registered Trade Mark of Your-Know-Who

APPLE MECHANIC

SHAPE-WRITER / BERT KERSEY
BY TERRY KERSEY

SHAPE EDITOR: Keyboard-draws shapes for animation in your program. Create Proportionally-Spaced Typefaces with special characters. Six fonts included. Listable AppleSoft demos show you how to animate graphics and create professional Charts and Graphs. BYTE-ZAP: Rewrites any byte on a disk for repair or alteration. Load entire sections on the screen for inspection. Help/Doc/Asst displays and input. Educational instructions include experiments for making track files, names, restoring deleted files, changing DOS, etc. MORE: Useful music, text and hi-res tracks for your programs. Clear educational materials. (See page 48)
(\$29.50 Includes Peekas/Pokes Chart & Tip Book #5)

APPLE MECHANIC TYPEFACES

26 NEW FONTS for use with Apple Mechanic program. Many sizes of fully-editable characters. BEAGLE MENU: Display only the file names you want from your disks (for example, only AppleSoft files or only Locked files) for fast one-key cursor selection.
(\$20.00 Includes Peekas & Pokes Chart)



HUMM... THIS AD SAYS THAT "ALL BEAGLE DISKS ARE UNLOCKED (423) PEKES & POKES CHART. CHARTS & GRAPHS COME WITH OTHER CHARTS AS WELL!"

ALPHA PLOT

HI-RES GRAPHICS/TEXT UTILITY
BY BERT KERSEY AND JACK CASHBIDY

DRAW IN HI-RES on both pages using keyboard OR paddles/joystick. View lines before plotting. Use miscelaneous and Reverse (background opposite) plotting. Fast hi-res circles, boxes and ellipses, filled or outlined. Compress Hi-res images to 1/3 Disk-Space. Super-Imposes hi-res pages 1 and 2 or re-locate any rectangular image area anywhere on either hi-res page. Proportionally-Spaced Hi-Res Type with adjustable character size and color. Upper and lower case with no tabs/tab lines. Sideways typing for graphs too.
(\$29.50 Includes Peekas/Pokes Chart & Tip Book #4)

DOS BOSS

DISK COMMAND EDITOR
BY TERRY KERSEY AND JACK CASHBIDY

RENAME DOS COMMANDS and Error Messages. "Catalog" can be "Cat", "Syntax Error" can be "Oops" or anything. Pretest your programs—An unauthorized Save-attempt can produce a "Not Copyable" message, or any message you want. Also List-Prevention and one-key program-execution from catalog. CUSTOMER DOE: Change the disk file name heading to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips and experiments. ANYONE using your disks (booted or not) will be formatting DOS the way YOU designed it.
(\$24.00 Includes Peekas/Pokes Chart & Tip Book #2)

TIP DISK #1

BY BERT KERSEY

100 LISTABLE PROGRAMS from Beagle Bros Tip Books 1-4. Make your Apple do things it never does! All 100 programs are changeable and low-experimentation. Includes APPLE COMMAND CHART with all AppleSoft, Integer Basic & DOS Commands and Descriptions.
(\$29.00 With 2 Charts, Peekas/Pokes & Commands)



#12

Beagle Bros

Micro Software Inc.

4315 SIERRA VISTA / SAN DIEGO, CA 92103
818-296-6400

UTILITY CITY

21 USEFUL UTILITIES BY BERT KERSEY

LIST FORMATTER prints each program statement on a new line. Loops indented with printer Page Breaks. A great AppleSoft program de-bugger! Also... Multi-Column Catalogs for printouts, auto-post Page Numbers & Date in programs, put invisible commands in programs, create Invisible File Names, alphabetize/store info on disk, convert doc to hex or Integer/F.P. protect and expand programs, dump text to printer. MORE TOO: 21 Programs Total, A best-seller!
(\$29.50 Includes Peekas/Pokes Chart & Tip Book #3)

PRONTO-DOS

HIGH-SPEED DOS / DOSE-MOVE UTILITY
BY TOM WEISHAAR

Put HIGH-SPEED DOS in your Apple's internal memory. Function Control or Apple IIe's high-memory—

LOAD HI-RES IMAGE 10 sec.	3 sec.
LOAD 80-SECTOR PROGRAM 13 sec.	3 sec.
SAVE 80-SECTOR PROGRAM 24 sec.	9 sec.
LOAD LANGUAGE CARD 13 sec.	4 sec.

 (Text files, No Change)

Boot the Pronto disk or your updated disk, created with the normal INIT command. Compatible with all DOS Commands, GPLE and most of your programs. MOVE DOS to your Language Card or Apple IIe standard high-memory, freeing up 10,000 Extra Bytes! 15 Extra Sectors per disk. Catalog Free-Space display, new TYPE Command reveals Text File contents.
(\$29.50 Includes Peekas & Pokes Chart)



10 MORE FOR \$10 TO 25%
FOR 23.9%
HPILOT 0.1
CALL 3363
NEXT X

YA KNOW, HARRY, I NEVER THOUGHT OF IT QUITE LIKE THAT.

FLEX TEXT

20-40/56/70-COLUMNS WITHOUT HARDWARE
BY MARK SIMONSEN

PRINT VARIABLE-WIDTH TEXT on both hi-res screens with normal AppleSoft commands (including Hiab 1-7). Normal, expanded & compressed text with no hardware. 70-column requires hi monitor (not tv). Add Graphics to Text or Text to Graphics. Run your existing AppleSoft programs under Flex Text control. Fast, easy to use and Compatible with GPLE. Flex Text Key: font compatibility, or use the supplied Flex Text typefaces. Select up to 10 fonts with control-key commands. Custom text character editor included.
(\$29.50 Includes Peekas & Pokes Chart)

FRAME-UP

HIGH-SPEED PRESENTATION UTILITY
BY TOM WEISHAAR

MAKE PROFESSIONAL PRESENTATIONS of existing hi-res, lo-res and text frames. FAST hi-res loads in 2nd-second Padlock or keyboard-advance frames. Unattended Shows are optional with each picture arranged and pre-programmed to display from 1 to 99 seconds. Test Screen Editor lets you create black-and-white text "slides" and add type "live" from the keyboard during shows. Mail copies of presentations on disk to friends and associates (or home to Mom!).
(\$29.50 Includes Peekas & Pokes Chart)

BEAGLE BASIC

APPLESOFT ENHANCER BY MARK SIMONSEN

Requires Apple IIe (or II/II+ with RAM Card). RENAME ANY APPLESOFT COMMAND or Error Message to any word, for program clarification or encryption. Plus add optional NEW COMMANDS—
 ELSE follow If-Then's (as in IF X=2 THEN PRINT Yes; ELSE PRINT No). SWAP for exchanges 2 variables. Use TONE command to write music with no messy notes & calls. HSCRN reads the color (off/on) of any hi-res .dot .BGR. scrolls the text screen in either direction. TXT2 lets Text Page 2 act like Page 1.

Also—GOTO or GOSUB may precede variables (as in "GOSUB FIX" or "GOTO 4*"). Escape-mode indicated by special ESC CURSOR. Replace Apple's awkward Graphics Screen Switch poles with one-word commands. Change ctrl-D Beep to any tone. INVERSE REM STA TELEM. Get an APPLE compatible.

These new functions occupy ZERO extra memory!
(\$34.95 Includes Peekas/Pokes Chart & Tip Book #6)

BEAGLE BAG

12 APPLE GAMES BY BERT KERSEY

COMPARE BEAGLE BAG with any single-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are clear—and the disk is COPYABLE. You can even change the programs or let them to learn by seeing how they work. Twelve Games from the AppleSoft-Ac, Bert Kersey—TeeBall, Wozzle, Buzzzle, Magic Pack & more. Excellent Reviews—(see Jan-83 Softpak, page 148). BEAGLE MENU too: Description under "Typefaces".
(\$29.50 Includes Peekas & Pokes Chart)

DEAR BEAGLE BROS—

YOUR LOCAL SOFTWARE STORE DOESN'T HAVE ONE OF YOUR DISKS, SO I GOT THEM TO TELEPHONE YOU OR MAIL SOFTWARE TO ME. I'M RIGHT AWAY WELL IT WORKED AND I GOT MY DISK IN AN HOUR. COUPLE OF DAYS THANKS!



DOUBLE-TAKE

2-WAY-SCROLL/MULTIPLE UTILITY
BY MARK SIMONSEN

LISTINGS & CATALOGS SCROLL UP AND Down, making file names and program lines much easier to access. Arrow-keys control scroll direction. New AppleSoft LIST FORMAT: each program statement on new line for FAST program tracing and de-bugging. Variable-Display shows all of a program's strings and variables with current values. Cross-Reference shows line no. on which each variable is stringing appears. Better Renumber/Append to Merge programs (not just text and-to-into-). Also Auto-Line-Number, Instant Hex to Dec Converter, Program Stats, Eliminate/Redline Error, Free Space-On-Disk. All GPLE-compatible. (\$24.95 With 2 Charts, Peekas/Pokes & "Tips & Tricks")

- RUSH the following disks by First Class Mail—
- Alpha Plot . . . \$39.50
 - Ap.Mechanic . . . \$29.50
 - Beagle Bag . . . \$29.50
 - Beagle Basic . . . \$29.50
 - DOS Boss . . . \$24.00
 - Double-Take . . . \$49.95
 - Flex Text . . . \$29.50
 - Frame-Up . . . \$29.50
 - Tip Disk #1 . . . \$20.00
 - Utility City . . . \$29.50
 - ADD ME to mailing list.
 - ALREADY ON mailing list.

AT YOUR APPLE DEALER NOW!
Or order directly from Beagle Bros—



Visa/MasterCard or COD, call TOLL-FREE
 Nationwide: 1-800-854-2043 ext. 827
 California: 1-800-520-1500 ext. 827
 Alaska/Hawaii: 1-800-854-2822 ext. 827

Or mail US Check, Money-Order or Visa/MC to BEAGLE BROS, 12th Floor
4315 SIERRA VISTA, SAN DIEGO, CA 92103

ADD \$1.50 First Class Shipping, Any-Size Order
Overseas add \$4.00. COD add \$3.00. California add 6%
ALL ORDERS SHIPPED IMMEDIATELY.

Best Little Cat



Bob Bergstrom

This article will introduce the Basic programmer to simple machine language subroutine creation and use in a Basic program. It will also shed some light on the way the Apple sends text from the disk catalog to the screen. In addition, a useful disk cataloging utility is the end product.

If you are like me, you ran your Apple II with cassette storage until you could afford a disk drive. After you installed your disk system, you could load files in seconds instead of minutes—what a feeling of exhilaration. Using version 3.2 of Apple DOS allows you to store up to 84 files on each disk. And with DOS 3.3, each disk holds up to 105 files. Now your biggest problem seems to be what to do with all those cassettes.

Bob Bergstrom, Oxford Associates, 201 East B St., Al-
pha, IL 61413.

Figure 1. First menu page.

```

BEST CAT FOR DISK VOLUME 254
.....
1 HELLO                18 HI-RES DUMP.B (I
2 AUDIO SAMPLING      19 CHECKBOOK CHANGE
3 D/A CONVERTER       20 APPEND SHAPES
4 INPUT AMPLIFIER     21 CENTER TITLES
5 GREAT HELLO PR      22 INTEGER ENTRY PT
6 APSOFT TOKENS       23 LOWER CASE RTN
7 APSOFT POINTERS     24 SPLIT CAT/SEC FR
8 APPEND APPLESOFT    25 MONITOR RTN }
9 APSOFT DIS TBL     26 MONITOR RTN }
10 APSOFT VARIABLES   27 TRANSPARENT
11 OOPS & MISC        28 LINKER
12 HI RES COLORS      29 SCRUNCH
13 GRAPHIC SCREEN     30 SPLIT CATALOG
14 DISC ACCESS UTIL   31 SCRUNCH.B
15 CAT.PATCH          32 HEX/DEC CHART
16 I225 PRINTER DR    33 HIRES GR ROUTINE
17 HI-RES DUMP (IP2   34 SPLIT CATALOG.0R

NUMBER <RET> = RUN    -NUMBER <RET> = LOAD
TO SCROLL MENU       -> <RETURN>
TO MENU DRIVE 1     --> ZERO <RET>
    
```

Figure 2. Last menu page.

```

BEST CAT FOR DISK VOLUME 254
.....
66 WOZPAK HIRES RTN  83 DOS FINDER
67 SPEED-N           84 SHAPE TABLE
68 STRING SWAP       85 FP LISTER
69 I.B. SCREEN DUMP  86 MAKE PF LIST
70 LOWER CASE PTR R  87 INIT.5
71 DISSASSEMBLER    88 CATALOG
72 RANDOM DRILL
73 C-A MENU
74 DEC FORMATTER
75 NUMBERS >32767
76 CRAWLER
77 LIST
78 SO WHAT
79 POST-EDITOR
80 PERSONIFY
81 AUTONUM.L
82 MODIFY PLE

NUMBER <RET> = RUN    -NUMBER <RET> = LOAD
TO MENU DRIVE 1     -> ZERO <RET>
TO MENU DRIVE 2     --> 'D' <RET>
    
```

Program Features

This disk menu program works equally well under version 3.2 or 3.3 DOS and is written in Applesoft Basic. Although Best Little Cat was written on an Apple with 48K of memory, it can run on a 32K machine. Among its features:

- Files are numbered from 1 to 105.
- 34 files are shown at a time.
- Files are immediately available for load or run.
- Text files are not numbered but preceded by a T.
- Disks can be accessed from drive 1 or drive 2.
- The active disk drive can be cataloged.

Figure 1 shows the first menu screen of a disk containing 34 or more files. Figure 2 shows a final menu screen.

Both menus print the first 16 characters of each file name preceded by an identifying number. There are always five operation options available (although there is room to show only four of the five on each screen). First, typing in a file number and RETURN will RUN or BRUN the specified file.

Second, preceding a file number by a minus sign will cause a LOAD or BLOAD of the specified file. Third, pressing only RETURN will scroll the next menu page onto the screen.

If the last page of the menu is already on the screen when RETURN is pressed, the first menu page is scrolled onto the screen.

Fourth, pressing zero and RETURN will provide a menu from a disk in the same drive as the last menu. And fifth, pressing D and RETURN will provide a menu from a disk in the other drive on the same controller card. In other words, the D command causes a toggle between drive 1 and drive 2.

The Machine Language Subroutine

The explanation of how the subroutine works is detailed and may require that you read this section more than once. The numbers contained in this section are decimal except when preceded by a \$ which indicates a hexadecimal number (base 16). The symbol < is read as "less than."

Best Little Cat creates a name look-up table in RAM to be used when a file is to be loaded or run. This table is also used to print the file names to the screen. This table is constructed by a machine language routine which is POKED into memory by lines 10 and 20 of the Basic program. Listing 1 is a disassembled ver-

Listing 1. Disassembled input/output subroutine.

*300L		
0300-	60	RTS
0301-	84 00	STY \$00
0303-	A0 00	LDY #500
0305-	C9 40	CHP #540
0307-	80 02	BCS \$0308
0309-	69 40	ADC #540
030B-	91 02	STA (\$02),Y
030D-	E6 02	INC \$02
030F-	D0 02	BNE \$0313
0311-	E6 03	INC \$03
0313-	A4 00	LDY \$00
0315-	60	RTS
0316-	00	BRK
0317-	00	BRK
0318-	00	BRK
0319-	00	BRK
031A-	00	BRK
031B-	00	BRK
031C-	00	BRK
031D-	00	BRK

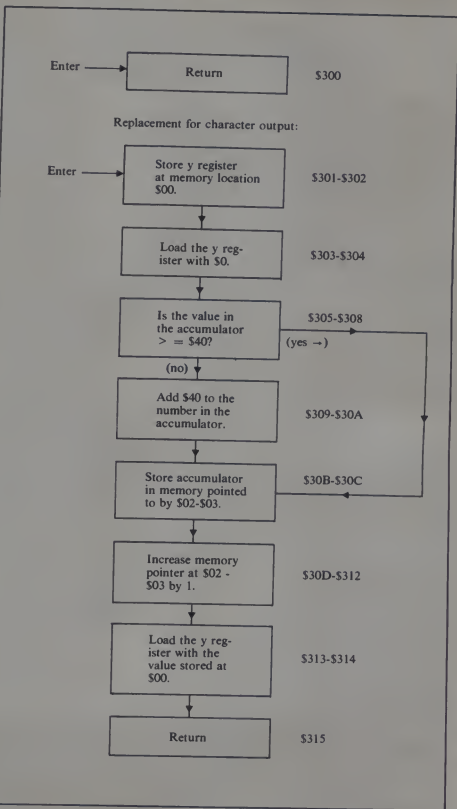


Figure 3. Replacement for keyboard input.

sion of the routine and Figure 3 is a flowchart for it.

Actually, there are two routines which replace the normal input/output routines. The first one replaces the stan-

dard keyboard input routine which is in ROM. The other replaces the ROM routine which outputs text to the video screen.

The keyboard replacement routine is

Best Little Cat, continued...

at address \$300. It is the shortest routine possible, and it simply returns control to DOS when DOS calls it. Without this one-step wonder, you would have to press RETURN to get DOS to start reading the disk file names.

The text (screen) output replacement routine starts at address \$301 and ends at \$315. Instead of printing text to the video screen, the replacement output routine builds a look-up table in RAM. For each character to be stored, DOS first reads a byte from the disk directory track (track \$11) and places it in the 6502 accumulator. Then it calls to the replacement text output routine at \$301. When this routine is called, the value stored in the Y register is saved to memory so it can be brought back later. (When using a machine language subroutine, you should exit the subroutine within the various 6502 register contents unaltered.)

Next, the Y register is set equal to zero. The byte in the accumulator is checked to see if it is at least \$40. If it is less than \$40, then \$40 is added to it (this is important). After the code is tested, it is deposited in the memory location pointed to by \$02 and \$03 plus the offset contained in the Y register (which is always \$00).

The pointer contained in \$02 and \$03 is then increased by one, the Y register is loaded back from memory (remember why?), and control is given back to DOS. DOS now reads another byte before calling \$301 again. This cycle continues until the disk directory has been completely read and the table built. The normal keyboard/text output routine pointers are then reinstalled which causes the Apple to forget about the routines at \$300 and \$301.

Why Add \$40—A Slight Diversion

If the character byte transferred from the disk directory to the accumulator is less than \$80, it was not placed in the disk directory by Apple DOS. Probably, somebody used one of the available disk utility programs to place inverse or flashing screen codes in the disk directory. How can this be done? If you look on page 15 in the Apple Reference Manual, you will find the ASCII screen character set. By POKING character values which are less than \$80, fancy inverse or flashing headers can be part of a disk catalog. This technique works because the disk CATALOG function uses the standard ROM text output routine to print to the screen. Note, however, that Apple DOS will not LOAD or RUN flashing or inverse files so this technique can be used only for fancy catalog headers.

If you recall, the replacement output routine for Best Little Cat intercepts

each character that DOS would send to the ROM screen print routine and sends it to a RAM location other than the text screen to be part of the look-up table. After the disk is completely cataloged, Best Little Cat uses a PRINT statement—i.e., PRINT CHR\$(PEEK(---))—to transfer the file names from the look-up table to the screen. So far, so good—or is it? When the CHR\$(function is used to print an inverse screen character code, the character is converted to a control character (which is invisible on the text screen).

How does a screen inverse character become a control character? The CHR\$(function was designed to work on standard keyboard ASCII, not Apple screen code ASCII. Normally, after the ROM keyboard input routine has read the keyboard for an ASCII value and the main program has received the character, the keyboard strobe is cleared so that the next character can be read. This clearing results in 128 (\$80) being subtracted from the ASCII code of the character (refer to page 6 of the Apple Reference Manual).

These two different versions of ASCII are referred to as positive and negative ASCII. The CHR\$(function has to work in an environment in which standard (positive) keyboard ASCII and/or "low band" (negative) keyboard ASCII could be encountered. Therefore it must recognize the negative ASCII codes and add 128 (\$80) to them before translating from the numerical value to the actual character.

Try this: while in Applesoft Basic,

type PRINT CHR\$(193), CHR\$(65) (RETURN). Two letter A's will be printed to the screen even though the codes are 128 character codes apart. If you look at table 7 on page 15 of the Apple Reference Manual, you will see that decimal 65 is actually the screen character code for a flashing A. However, since the code was processed through the CHR\$(function, it was treated as a low band keyboard character, and 128 was added to it. This resulted in a normal character being printed to the screen. Now type PRINT CHR\$(1) (RETURN). Nothing is printed on the screen. Decimal 1 is the screen character value for an inverse A. Again, this value was interpreted as a low band ASCII code and 128 was added to it. But when 128 was added to it, the result was a control character, and control characters are invisible on the video screen.

To avoid control characters, the replacement output routine must determine if the ASCII code is an inverse code (< \$40 or 64) before POKING it to memory. When the code for an inverse character is found, 64 (\$40) is added to it, converting it to the code for a flashing character. Since the CHR\$(function interprets flashing screen characters as normal screen characters, the character will be printed in a normal fashion. It must be emphasized that this code conversion is for display purposes only—inverse or flashing files cannot be loaded or run.

The Subroutine Summary

To sum it up, the replacement output routine converts inverse screen charac-

Little did Marty know that his only functioning brain cell was being invaded by an alien life form.



Improve Your Business' Future.



"I see the future of Software is... Solid."

PICK SOLID SOFTWARE'S TESTED BUSINESS PROGRAMS.

Only Solid Software™ offers 12 specific programs for business. Commercial Property Management • Commercial Property Analysis • Medical Data Management • CPA Multi-client Write-up System • Contractors Job Costing • Sales Order Entry/Accounts Receivable/Inventory Mall List • Personnel Agency Search System • General Ledger • Accounts Receivable • Accounts Payable • Payroll

When you're picking your business software, choose the ones that mean business. Solid Software. Offering everything from specific applications for specific businesses to a complete line of general accounting software.

No matter which you select, every Solid Software package is designed for easy understanding. And accompanied by high quality documentation. Yet each package contains comprehensive features typically found only in custom-made programs. And all Solid Software packages are totally integrable with each other. Plus they're all user-proven and

backed by a warranty so strong, we'll pay you \$50.00 if you can find even one bug.*

Best of all, Solid Software programs are available today. From 200 authorized dealers coast to coast.

Your business will profit more with programs that work specifically for you. From Solid Software. All programs available in MS-DOS™ and CP/M® operating system formats. See your dealer for a free demonstration. If he doesn't carry Solid Software, call us toll-free 1-800-554-4078 for the authorized dealer nearest you. In Georgia, call collect, 404-952-7709.

*See your dealer for details. MS-DOS is a trademark of Microsoft, Inc. CP/M is a registered trademark of Digital Research, Inc.

The future of Software is Solid.™

Solid Software™

5500 INTERSTATE NORTH PARKWAY, SUITE 501, ATLANTA, GA 30328, 404/952-7709

CIRCLE 242 ON READER SERVICE CARD

Best Little Cat, continued...

ters (\$00-\$3F) to flashing screen characters (\$40-\$7F) before storing them in memory. This allows the Basic CHR\$ function to be used as a screen character interpreter. The replacement routine stores control characters (\$80-\$9F) and alphanumeric characters (\$A0-\$DF) directly to memory without conversion. Therefore, Best Little Catalog correctly loads files with names that contain hidden control characters. Since DOS will not load file names which contain inverse or flashing screen characters, Best Little Catalog can only display these files.

The Basic Listing

Before explaining the Basic listing, I want to make one clarification. To avoid confusion between the number zero and the letter O, the letter O has not been used in variable names. The letter O appears only in Basic command words and within PRINT statement quotes. Therefore, the statement AB = 0 is equating the variable AB to zero, not to a variable named letter O.

Figure 4 shows the printing logic for Best Little Cat. These are the logical steps taken by the program when printing the non-final screens of a multi-screen catalog. The final screen logic is much the same except it "drops through" line 160 to lines 170 and 180. This printing logic is somewhat involved. If you understand how the printing is done, the rest is straightforward.

As mentioned earlier, lines 10 and 20 POKE the new I/O routine into memory at \$300. Line 20 also dimensions memory for the variable A and sets an error trap. The rest of the listing is explained as follows:

Line 30 initializes variables, sets CP% to point to free memory space, POKES the value of CP% into \$02-\$03, and sets C as a pointer to the DOS I/O pointers.

Line 40 POKES the location of a new I/O routine in DOS, catalogs the disk, resets I/O pointers to normal ROM routines, sets C = 1, and reads DISK VOLUME and volume number from memory.

Line 50 prints the menu header.

Line 60 begins the file reading loop and checks whether a file is a text file.

Line 70 saves a memory pointer for each file name and prints a space if the current file number is less than 10.

Line 80 prints the file number to the screen and increments the current file number.

Line 90 prints the file name and checks if the cursor is above the bottom of menu area.

Line 100 checks if the cursor is in the righthand column.

Line 110 sets the scrolling window for right column printing.

Line 120 sets the scrolling window for

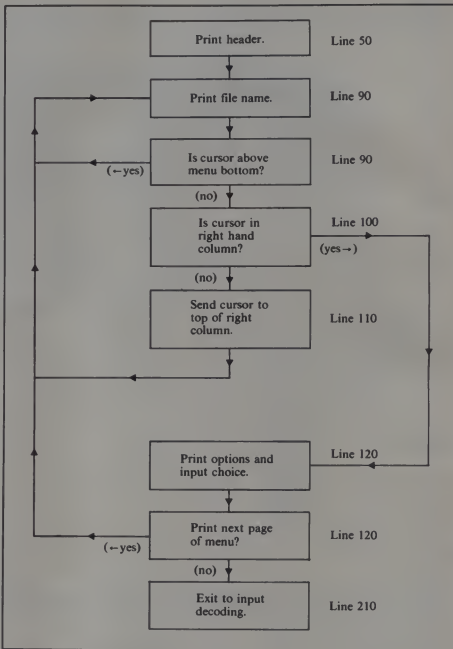


Figure 4. Menu printing logic.

full width printing, prints instructions, requests input and prints the next menu screen if requested.

Line 130 checks if MENU OTHER DISK DRIVE was requested.

Line 140 converts a string variable to a real variable and checks if MENU SAME DISK DRIVE was requested.

Line 160 terminates the file reading loop and prints a space if fewer than 10 files are on the disk.

Line 170 prints a number equal to the number of files on the disk plus one, prints CATALOG, and sets the scrolling window to full width.

Line 180 prints instructions and requests input and checks if MENU OTHER

DISK DRIVE was requested.

Line 190 checks if REPRINT MENU was requested.

Line 200 checks if CATALOG DISK was requested.

Line 210 checks if MENU ANOTHER DISK was requested.

Line 220 checks if LOAD command was requested.

Line 230 checks for invalid option number.

Line 240 assembles a string of the parameters chosen, and checks if it is a binary file.

Line 250 deletes the file parameters from the file name string and determines RUN or LOAD.

Line 260 RUNS the chosen file.

Line 270 LOADS the chosen file.

Line 280 deletes the file parameters from the file name string and determines BRUN or BLOAD.

Line 290 BRUNS the chosen file.

Line 300 BLOADS the chosen file.

Line 310 CATALOGS the disk.

Line 320 checks for an invalid option number.

Line 330 sets the LOAD flag and sets the file number positive.

Line 340 POKES in the stack clean-up routine found on page 82 of the Applesoft manual and calls this routine.

Line 350 resets the input/output pointers for keyboard input and text screen output and ends the program.

Program Entry And Debugging

When you first type in Best Little Cat, I suggest that you leave the statement ON ERR GOTO 340 out of line 20. Then, if you have made a typographical error, the Apple will tell you where the syntax error exists when the program is run.

When the program is completely entered, save it to a disk and remove the disk from the drive. Next, insert into drive 1 a disk containing at least 34 files, type RUN and press RETURN. The first 34 files on the disk will be displayed with a corresponding number. Press RETURN and the next page of files will be shown. A CATALOG option will follow the last file on the disk.

Type in the number that runs the CATALOG option and press RETURN. A normal catalog should occur. Type RUN and press RETURN. The first menu page will be displayed again.

If you have a second drive, remove the disk from drive 1 and put it in drive 2. Press D then press RETURN. Drive 2 will spin and the first menu page will be displayed. Regardless of which drive the disk is sitting in, choose a program, enter its number and press RETURN. That program will now run.

If Best Little Cat has behaved as just described, add the statement ON ERR GOTO 340 to line 20. Now a master copy of the program can be saved and used as a HELLO program when new disks are initialized.

Customization

Best Little Cat is a product of evolution. I suspect that two months from now it will have gone through at least one more generation. One handy change would be to include a CALL -151 on line 300 so that after a BLOAD, you will be in the monitor mode. Another would be for language card owners to have Best Little Cat load Integer Basic onto that card before displaying a disk menu. Several other ideas come to mind, but I don't want to stifle your creativity. □

Listing 2. Basic listing.

```
0 REM BEST LITTLE CAT IN ALPHA, 1L.
10 POKE 768,96:POKE 769,132:POKE 770,0:POKE 771,160:POKE 772,0:POKE
773,201:POKE 774,64:POKE 775,176:POKE 776,2:POKE 777,105:POKE 77
8,64
20 POKE 779,145:POKE 780,2:POKE 781,230:POKE 782,2:POKE 783,208:POKE
784,2:POKE 785,230:POKE 786,3:POKE 787,164:POKE 788,0:POKE 789,9
6: DIM A(105):ONERR GOTO 340
30 H$ = "":PP = 1:DS = CHR$(4):CPZ = ( PEEK (115) + PEEK (116) + 256) -
5000:POKE 2,CPZ - ( INT (CPZ / 256) ) = 256:POKE 3,CPZ / 256:C = PEEK
(54) + PEEK (55) * 256 + 2966
40 POKE C,1:POKE C + 1,3:POKE C + 2,0:POKE C + 3,3:PRINT DS:"CATALOG,
D" + 1:PRINT DS;"PR#0":PRINT DS;"IN#0":C = 1:FOR I = CPZ + 2 TO C
62: DIM A(105):ONERR GOTO 340
50 TEXT : HOME : HTAB (7):PRINT "BEST CAT FOR "H$:VTAB (2):FOR K = 1 TO
39:PRINT " ":NEXT I:PRINT " ":VTAB (4):POKE 34,3
60 FOR I = CPZ + 19 TO ( PEEK (2) + PEEK (3) * 256) - 1 STEP 38:IF PEEK
(I + 1) = 212 THEN PRINT " T ";:GOTO 90
70 A(C) = 1:IF C < 10 THEN PRINT " ";
80 PRINT C;" ";C = C + 1
90 FOR J = 1 + 7 TO I + 22:PRINT CHR$( PEEK (J));:NEXT J:PRINT :IF
PEEK (37) < 20 THEN 160
100 IF PEEK (32) = 20 THEN 120
110 POKE 33,20:POKE 32,20:VTAB (4):GOTO 160
120 TEXT :VTAB (22):POKE 34,3:PRINT "NUMBER <RET> = RUN -NUMBER <RET>
= LOAD TO SCROLL MENU --> <RETURN> TO MENU DRIVE "D + 1" -->
ZERO <RET> ";:INPUT "H$:HOME :IF LEN (ABS) = 0 THEN 160
130 IF ABS = "D" THEN D = NOT D
140 AB = VAL (ABS):IF AB = 0 THEN C = 1
150 GOTO 210
160 NEXT I:IF C < 10 THEN PRINT " ";
170 PRINT C;" ";:POKE 50,63:PRINT "CATALOG":POKE 50,255:POKE 32,0:POKE
33,40
180 VTAB (22):PRINT "NUMBER <RET> = RUN -NUMBER <RET> = LOAD TO MENU
DRIVE "D + 1" --> ZERO <RET> TO MENU DRIVE " NOT D + 1" -->
"D" <RET> ";:INPUT "H$:HOME :IF ABS = "D" THEN D = NOT D:GOTO
30
190 IF LEN (ABS) = 0 THEN C = 1:VTAB (4):GOTO 60
200 AB = VAL (ABS):IF ABS (AB) = C THEN 310
210 IF AB = 0 THEN 30
220 IF AB < 1 THEN 320
230 IF AB > C THEN C = 1:VTAB (4):GOTO 60
240 FOR I = A(AB) + 36:AS = AS + CHR$( PEEK (1)):NEXT I:IF MIDS
(AS,2,1) = CHR$(194) THEN 280
250 AS = RIGHTS (AS,30):IF PP < 1 THEN 270
260 TEXT : HOME :PRINT DS;"RUN ";AS
270 TEXT : HOME :PRINT DS;"LOAD ";AS:END
280 AS = RIGHTS (AS,30):IF PP < 1 THEN 300
290 TEXT : HOME :PRINT DS;"BRUN ";AS
300 TEXT : HOME :PRINT DS;"BLOAD ";AS:END
310 TEXT : HOME :PRINT DS;"CATALOG":END
320 IF AB < - (C - 1) THEN C = 1:VTAB (4):GOTO 60
330 PP = - 1:AB = (C - 1) * AB:GOTO 240
340 POKE 790,104:POKE 791,168:POKE 792,104:POKE 793,166:POKE 794,223:
POKE 795,154:POKE 796,72:POKE 797,152:POKE 798,72:POKE 799,96:CALL
790
350 PRINT DS;"PR#0":PRINT DS;"IN#0":END
```

Variable List:

- A() Holds memory pointer for each file name.
- AS Holds file name to be loaded or run.
- AB Holds number of selected file.
- ABS Holds input response (number of empty string).
- C Holds DOS I/O pointer location.
- or holds file count as file names are read from disk directory.
- CP% Holds beginning address of file name table in memory.
- D Holds disk drive toggle value.
- DS Holds CONTROL-D.
- H\$ Holds DISK VOLUME and disk volume number.
- I Holds FOR/NEXT loop counter.
- J Holds FOR/NEXT loop counter.
- K Holds FOR/NEXT loop counter.
- PP Holds RUN vs. LOAD flag.



CORDLESS TELEPHONES

up to 700 ft. range

from \$69.75

Educator.....	\$109.75	Entertainer.....	\$ 63.75
Programmer.....	\$ 51.75	Bookkeeper.....	\$164.75

PARKER BROTHERS

Tutankham R.....	\$33.75
Super Cobra R.....	\$33.75
Astro Chase R.....	\$33.75
Frogger R.....	\$33.75
Obert R.....	\$33.75
Popeye R.....	\$33.75
Risk R.....	\$42.75
Chess R.....	\$42.75

SPINAKEY

Story Machine R.....	\$26.75
Face Maker R.....	\$24.75
Kindercomp R.....	\$20.75
Fraction Fever R.....	\$24.75
Delta Drawing R.....	\$26.75

SSI

Battle of Shilo C/D.....	\$26.75
Tigers in the Snow C/D.....	\$26.75
Battle for Normandy C/D.....	\$26.75
Knights of the Desert C/D.....	\$26.75
Cosmic Balance C/D.....	\$26.75

ON-LINE

Frogger.....	\$24.95
Wizard & Pin.....	\$26.95

ROKLAN

Wizard of War.....	\$29.75
Gorf.....	\$29.75
Delux Invader.....	\$27.95

BIG 5

Miner 2049.....	\$32.75
-----------------	---------

BUSINESS

Vistacalc.....	\$159.75
Letter Perfect.....	\$69.75
Letter Perfect.....	\$69.75
Data Perfect.....	\$69.75
Text Wizard.....	\$49.75
Spell Wizard.....	\$64.75
File Manager.....	\$69.75
Home File Mgr.....	\$66.75
Bookkeeper.....	\$119.75
C.R.I.S.....	\$199.75
Atari Word Pro.....	\$109.75
Tax Advantage.....	\$35.75
Home Accountant.....	\$59.75
Bank Street W.....	\$49.75

ADVENTURE

Atari Word Pro.....	\$109.75
Prepple 2.....	\$19.95
Prepple 1.....	\$19.95
Diskey.....	\$39.95
Sea Dragon.....	\$25.50
Siretos.....	\$25.00
Treasure Quest.....	\$13.50
Home Accountant.....	\$59.75
Saga Series 1-6.....	\$24.95
Stone of Sisyphus.....	\$29.95
Eliminator.....	\$16.95

800XL \$\$\$\$149.00	
800 XL... SCALLS	
1200 XL \$499.00	
1400 XL... SCALLS	
1450 XL... SCALLS	
1025 Printer.....	\$399.00
1020 Color Printer.....	\$245.00
1027 Printer.....	\$299.00
1010 Recorder.....	\$75.00
810 Recorder.....	\$75.00
810 Disk Drive.....	\$399.00
1050 Disk Drive.....	\$335.00
850 Interface.....	SCALLS



RANA

DISK DRIVES

Elite 2.....	\$295.00
Elite 3.....	\$449.00
Elite 3.....	\$559.00

MICRO-SCI

A2.....	call
A40.....	call
A70.....	call

MUSE

Castle Wolfenstein.....	\$20.75
Caverns of Frigate.....	\$20.75
Delta Drawing.....	\$26.75

CONTINENTAL

Home Accountant.....	\$51.75
Book of Apple Software.....	\$116.75

BRODERBUND

Bank Street Writer.....	\$44.75
AE.....	\$24.75
Apple Panic.....	\$21.75
Chopflifer.....	\$24.75
David's Midnight.....	\$24.75

SPINAKEY

Kindercomp.....	\$21.75
Story Machine.....	\$23.75
FaceMaker.....	\$23.75
Snooper Trooper.....	\$29.75
Delta Drawing.....	\$34.75

EPYX

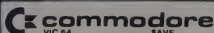
Temple of Apshai.....	\$26.95
Star Warrior.....	\$26.95
Crush, Crumble & Champ.....	\$22.75

ADVENTURE

Saga#1 Adventurand.....	\$29.95
Saga#2 Pirate Adventure.....	\$29.95
Saga#3 Secret Mission.....	\$29.95
Stone of Sisyphus.....	\$24.95

ALIEN GROUP

Atari Voice Box.....	\$99.00
Apple Voice Box.....	\$129.00



HES 84

64Forth R.....	\$55.75
Hesmon R.....	\$29.75
Turtle Graphics R.....	\$46.75
Heswriter R.....	\$38.75
Gndrunner R.....	\$29.75
Attack of Mut Cam R.....	\$34.75
Turtle Tutor R.....	\$29.75
Turtle Trainer R.....	\$29.75
Paint Brush R.....	\$23.75
Benit Space Rescue D.....	\$29.75
Home Manager C/D.....	\$39.75
Time Money Mgr D.....	\$55.75
OmniCalc D.....	\$79.75
Sword Point D.....	\$24.75

EPYX 84

Temple of Apshai.....	\$26.00
Upper Reaches of A.....	\$15.00
Crush Crumble & C.....	\$23.00
Jumpmen.....	\$26.00

CARDCO

Cardprintr, LOT.....	\$499.00
Cardprint DM1.....	\$109.00
5 Slot Expansion 64.....	\$54.00
84 Write NOW.....	\$39.00
64 Mail NOW.....	\$29.00
2, Write NOW.....	\$29.00
64 Keypad.....	\$29.00
Universal Cass. Int.....	\$29.75
Printer Utility.....	\$19.75
8 Slot Expansion.....	\$79.95
3 Slot Expansion.....	\$24.95
Vic 20/64 Printer Int.....	\$59.95

BRODERBUND 64

Serpentine R.....	\$26.75
Chopflifer R.....	\$32.75
Seatos R.....	\$26.75
PARKER 20.....	\$33.75
Frogger (ROM).....	\$33.75
Obert (ROM).....	\$33.75
Tutankham (rom).....	\$33.75

SPINAKEY 64

Kindercomp.....	\$21.75
Story Machine.....	\$23.75
Face Maker.....	\$23.75
Snooper Trooper.....	\$29.75
Delta Drawing.....	\$34.75
Shamus II c/d.....	\$24.95
Pinhead c/d.....	\$22.95

QUICK BROWN FOX

QBF Word Processor.....	\$49.95
LJK.....	

Letter Perfect.....	\$105.00
Data Perfect.....	\$95.00

ADVENTURE INTERNATIONAL

S. Adams Adventure.....	\$26.75
VIC-64.....	\$69.75

WORDPRO 3+

VIC 20.....	\$69.75
King Arthur Hear Cass.....	\$24.75
Monstr. Maze Run.....	\$24.75



HARD DISK DRIVES for

APPLE IBM-PC TRS-80*

5MEG.....	\$1349.00
10MEG.....	\$1599.00
15MEG.....	\$1999.00
20MEG.....	\$2359.00

*Add \$10.00 for TRS 80 D. disk

SINGLE DRIVE AT88 S1	\$349.00
DUAL DRIVE AT88 S2	\$535.00
AT88 with printer port	\$449.00
AT88 Doubler Board	\$129.00
DUAL HEAD 44S1	\$575.00
DUAL DRIVE 44S2	\$899.00
SINGLE DRIVE 40S1	\$499.00
TI Drive	\$339.00

Lyc0 Computer Marketing & Consultants

TO ORDER
CALL US

TOLL FREE 800-233-8760

In PA 1-717-327-1824

EASTERN HOUSE	
Monkey Wrench 2	\$52.75
INHOME	
Baseball	\$29.95
Speedway Blast	\$29.95
Pool 1.5	\$28.95

GALAXIAN	\$29.75
DEFENDER	\$29.75
DIG DUG	\$29.75
SPEED READING	\$53.75
ATARI WRITER	\$54.75
BOOKKEEPER	\$102.75
CK4018 PILOT HOME	\$54.75
CK 405 PILOT EDU.	\$91.75
CKX404 WORD PRO.	\$99.75
CKL4013 ASTEROID	\$25.75
CKL4020 CENTIPE DE	\$29.75
CKL4022 PACMAN	\$29.75
CKL4011 STAR RAIDER	\$29.75
CKL4004 BASKETBALL	\$25.75
CKL4006 SUPER BREAK	\$25.75
CKL4008 SPACE INVA.D.	\$25.75
CKB130 CAVERNS OF M.	\$27.75

APX	
Eastern F1.41	\$25.50
DeRay Alert	\$19.95
Meth-Tic-Tac	\$15.95
Pres of US	\$15.95
3R Math	\$19.95
Typo Attack	\$24.95
Family Budget	\$19.95
F. Cash Flow	\$19.95

BRODERBUND	
Bank Street Writer D.	\$44.75
AE D.	\$24.75
Apple Pkic D.	\$23.75
Choplifter ROM	\$32.75
David's Midnight	\$24.75
Stellar Shuttle C/D	\$18.75
Fl. Apocalypse	\$24.75
HES	
Gridrunner R.	\$27.75
Sword Point D.	\$24.75
INFOCOM	
Zork 1/2/or 3	\$29.95
FIRST STAR	
Astro Chase	\$22.95

RANA DISK DRIVE	
1000	\$CALL

ALIEN GROUP	
Voice Box 2	\$99.75
DON'T ASK	
Sam	\$41.75
Abuse	\$15.95
Teleair	\$27.95
Poker Sam	\$24.95
Amulet	
Nuke Sub	\$16.75
Magic Story Book	\$24.75
Thurgor Island	\$13.95
ARTWORX	
Hazard Run	\$24.95
Hodge Podge	\$18.95
S. Poker	\$28.95
Bridge 3.0	\$18.95
EPFX	
Jumpman	\$26.97
Temple of Asahi	\$27.75
Star Warrior	\$27.75



MODEMS

ANCHOR MARK I	\$74.75
MARK II	\$74.75
HAYES 1200	\$508.75
MICRO 2	\$274.75
SMART	\$214.75
NOVATION CAT	\$144.75
D-CAT	\$185.75
J-CAT	\$114.75
MICROBIT	\$159.75

MONITORS

NEC JB1260	\$115.00
NEC JB1201	\$145.00
NEC TC1201	\$315.00
Amdek Color I	
Amdek 300 Green	\$149.00
Amdek 300 Amber	\$149.00
GORILLA GREEN	\$88.00
K TV (13" Color 1 yr. wr.)	\$229.00

WICO JOYSTICKS

APPLE - VIC - ATARI - TI	
Command Control	\$20.95
Redball	\$22.75
Apple Trackball	\$58.00
TRACK BALL	\$52.75
EXTENSION CORD	\$9.75
APPLE ADAPTOR	\$18.95
T I ADAPTOR	\$9.95
POINT MASTER	\$12.75



APPLE DUMPLING GX	\$99.75
APPLE DUMPLING 64 (16 Buffer)	\$179.75
INFOCOM	
Zork I, II, or III	\$28.75
Deadline	\$33.75

BLANK DISKETTES

ELEPHANT 5 1/4/SD	\$18.25
ELEPHANT 5 1/4/DD	\$21.75
KANGAROO 5 1/4/SD with storage case	\$24.75
MAXELL MD I	\$29.75
MAXELL MD II	\$39.75
DISK CASE (holds 10)	\$4.95
DISK CASE (holds 50)	\$19.75
ROM CASE (holds 10)	\$19.75
SANYO	
NEW COMPUTER LINE	
NOW IN-STOCK	
CALLS	
MBC4050	\$2749.00
EPD 160 Disk	\$499.00
5500 Letter Q. Printer	\$649.00

PRINTER

INTERFACING AVAILABLE

APPLE DUMPLING GX	\$99.75
APPLE DUMPLING 64 (16 Buffer)	\$179.75

ATARI APPLE VIC

EPSON	\$35.00	\$79.00	\$85.00
CITOH	\$35.00	\$79.00	\$85.00
NEC	\$35.00	\$79.00	\$85.00
OKIDATA	\$35.00	\$79.00	\$85.00
GEMINI	\$35.00	\$79.00	\$85.00
SMITH CORONA	\$35.00	\$79.00	\$85.00

Atari parallel Printer cable (8')	\$39.95
Microbits Parallel Interface & Cable	\$74.75

COMMODORE

Torg C	\$14.75
HES Games I C	\$14.75
HES Games II C	\$14.75
VIC Fortit Rom	\$42.75
HES MON Rom	\$28.75
Turtle Graphics Rom	\$26.75
HES Writer Rom	\$28.75
Shemus Rom	\$28.75
Protector Rom	\$31.75
Robot Panic Rom	\$28.75

DISKETTE SALE

BULK DISKETTE (qty 150)	\$1.50 ea
Carton CC-10 (3 blank cassettes)	\$3.75

PRINTER
RIBBONS
AVAILABLE

PROWRITER 2P	\$679.00
GEMINI 15	\$439.00
PRINTMASTER	\$1589.00
SMITH CORONA TP1	\$549.00
CITOH 8600B	\$1025.00
STARWRITER	\$1099.00
OKIDATA 82	SAVE
OKIDATA 83	LOWEST PRICE
OKIDATA 84P	AVAILABLE
OKIDATA 93	SAVE
TRACTOR	\$49.75
OKIDATA 92	SAVE

SAVE on these in-stock PRINTERS

GORILLA GX-100	\$195.00
GEMINI 10X	\$279.00
PROWRITER	\$349.00
NEC 8023	\$379.00
DELTA 10	\$479.00
EPSON LINE	\$\$\$CALL\$\$\$
DIABLO 630	\$1749.00



TO ORDER



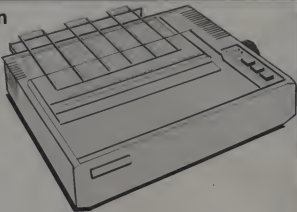
CALL TOLL FREE
800-233-8760
in PA 1-717-327-1824

or send order to
Lyc0 Computer
P.O. Box 5088
Jersey Shore, PA 1774C

POLICY
In-stock items shipped within 24 hours of order. Personal checks require four weeks clearance before shipping. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the continental U.S. PA residents add sales tax. All products subject to availability and price change. Advertised prices show 4% discount offered for cash, add 4% for Master Card or Visa. DEALER INQUIRIES INVITED.

Q. What has the Gorilla Banana in common with printers sold by Commodore, Panasonic, SpectraVideo, and others?

A. They're all the same under the skin.



Print About Printers

The Seikosh GP-100A printer is one of the most widely sold printers in the U.S., although it is rarely sold under the brand name Seikosh. Instead, Seikosh is an OEM (original equipment manufacturer) who packages their printer for distributors and computer manufacturers to sell under their own label.

Thus, Leading Edge sells this printer as the Banana, Axiom as the AT-100, Panasonic sells it as the JR-PO2U, Commodore as the 1525, and SpectraVideo as the SV-701. Several other manufacturers market it as well. We tested the Panasonic and Seikosh versions, although they are all virtually identical.

On The Outside

The printer measures a compact 16.6" x 9.3" x 5.4" and weighs in at 10 pounds. The case is made of molded plastic in light beige and dark brown. A

David H. Ahl and David Grosjean

hard clear plastic cover over the printing mechanism reduces noise and protects the interior from dust.

Two LEDs on the front indicate "power on" and "error" conditions (paper jam or ribbon out). In the rear next to the power cord is an on/off rocker switch and a 0.5A fuse. On most versions there are no other switches or indicators—no linefeed, no form feed, and no on line/local switch (which allows the printer to be on but disabled).

To replace the linefeed and form feed, there is a mechanical paper dial which rotates the paper roller in a forward direction; it is not reversible.

Loading And Connecting

The sprocket feed mechanism accepts pin feed paper, labels, and forms from 4.5" to 10" wide. Generally, most users will use 9 1/2" fan fold paper which can be stripped down to standard 8 1/2" x 11" sheets. The printer does not have friction feed and does not accept single sheets.

Loading the paper is quite simple and the manual with the JR-PO2U illustrates the steps in great detail. The printer accepts up to four-part forms and has an internal printing pressure adjustment which may be set in one of seven positions to produce the best density print.

The ribbon is continuous, but has two self-inking cassettes which must be positioned over two spindles at the right and left side of the printer.

Although the manual indicates that a



Gorilla/Banana is one of many guises of the Seikosh GP-100A.



Panasonic JR-200 computer system with JR-PO2U printer at the left.

THE BUFFER DID IT.

Who Stole The 1500 Letters From The Computer?

Let's just say you've got to send a letter to 1500 different people. Would you like to spend 22.5 hours* or 60 seconds of computer time?

With a garden-variety buffer, the computer has to mix, merge and send 1500 addresses and 1500 letters to the buffer. Trouble is, most buffers only store about 32 letters. So after 32 letters, the computer's down until the printer's done. Altogether, you're talking 22.5 hours.

In the case of our new (not to mention amazing) ShuffleBuffer, computer time is 60 seconds flat. Just give

ShuffleBuffer one form letter and your address list, and it takes care of the mixing, the merging, and the printing. But that's not all ShuffleBuffer's stolen from the computer. Oh, no.

Who Changed and Rearranged The Facts?

Again, ShuffleBuffer's the culprit. You want to move paragraph #1 down where #3 is? Want to add a chart or picture? No problem. No mystery, either. Any buffer can give you FIFO, basic first-in, first-out printing. And some

buffers offer By-Pass; the ability to interrupt long jobs for short ones. But only ShuffleBuffer has what we call Random Access Printing — the brains to move stored information around on its way to the printer. Something only a computer could do before. Comes in especially handy if you do lots of printing. Or lengthy manuscripts. Or voluminous green and white spread sheets. And by the way, ShuffleBuffer does store up to 128K of information and gives you a By-Pass mode, too.

And Who Spilled The Beans 239 Times?

Most buffers can't tell the printer to duplicate. If they can, they only offer a start/stop switch, which means you're the one who has to count to 239. Turn your back on your buffer, and your printer might shoot out a room full of copies. ShuffleBuffer, however, *does* control quantity. Tell it the amount, and it counts the copies. By itself.

So, What's The Catch?

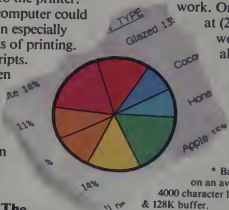
There isn't any. Sleuth around. You won't find another buffer that's as slick a character as this one.

You also won't find one that's friendly with any parallel or serial computer/printer combination. This is the world's only universal buffer.

With a brain.
CIRCLE 179 ON READER SERVICE CARD

Who Wants You To Catch A ShuffleBuffer In Act/on?

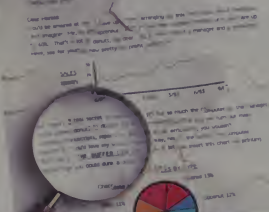
You guessed it. We do. Just go to your local computer dealer and ask him to show you a ShuffleBuffer at work. Or, you can call us at (215) 667-1713, and we'll clue you in on all the facts directly.



* Based on an average 4000 character letter & 128k buffer.

Now, keep th
my doughboy
Love,
Gladys

But there's a
that's turned donuts
mailings, manuscripts, reports
believe it. You'd love my
didn't do it.



ShuffleBuffer
The Buffer with a Brain
Interactive Structures Inc.
146 Montgomery Avenue
Bala Cynwyd, PA 19004

CREATIVE COMPUTING
 Creative Computing
 Creative Computing
 CREATIVE COMPUTING

Figure 1. Single and double width characters.

!	"	#	\$	%	&	'	()	*	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N
O	P	Q	R	S	T	U	V	W	X	Y	Z	[\]
^	_	`	a	b	c	d	e	f	g	h	i	j	k	l
m	n	o	p	q	r	s	t	u	v	w	x	y	z	{
	}	~	ä	å	ä	å	ä	å	ä	å	ä	å	ä	å
ä	å	ä	å	ä	å	ä	å	ä	å	ä	å	ä	å	ä
ä	å	ä	å	ä	å	ä	å	ä	å	ä	å	ä	å	ä

Figure 2. Built-in character set has 124 letters, numerals, and symbols.



Figure 3. The printer can reproduce graphics characters as defined by the computer.

self-test mode is available, it is not at all clear how to activate it.

The printer has a standard Centronics-type connector which connects to any computer with this parallel protocol. An optional serial interface is available.

Printing

The specifications claim a speed of 50 cps, although speed in actual service was somewhat slower. It prints only from left to right and has a relatively small buffer of 480 bytes (about six lines).

The printer has three print modes, two for text and one for graphics. The default text mode prints 10 characters per inch, up to 80 characters per line, and six lines per vertical inch.

The statement LPRINT CHR\$(SOE) switches to the extended (double width) print mode of 5 characters per inch and 40 characters per line. (See Figure 1.)

Graphics mode is accessed with LPRINT CHR\$(SOF). This removes spacing between characters in both the vertical and horizontal directions to provide full, continuous graphics.

All printing is done with a 5 x 7 dot matrix printhead; thus there are no descenders on the lowercase g, j, p, q, and

y. The printer has a character set of 124 characters which includes upper- and lowercase letters, numerals, 17 accented letters, the ASCII symbols, and a few extra symbols (see Figure 2). There are no built-in graphics characters, but the printer will reproduce graphics characters as defined by the computer (see Figures 3 and 4).

In addition to the usual LPRINT and LLIST commands, both the Panasonic JR-200 and SpectraVideo computers have commands which automatically reproduce the contents of the screen on the printer. Well, yes and no.

Depending upon the colors displayed on the screen, the printer may or may not print anything. For example, you may have a vivid screen display of red on blue or blue on red, but the printer does not distinguish these as different values for printing. Furthermore, the way graphics blocks are displayed on the screen is different from the way the print routine "sees" these blocks. For example, white on black and black on white may appear similar on the screen (reversed, of course), but the printer recognizes them as quite different (see Figures 5a and 5b).

Documentation

As with so many computers and peripherals the 15-page manual (with the Panasonic version) is a mixed bag. The section on setting up is comprehensive and well-illustrated. The section on operation has a few examples, and the section on troubleshooting is adequate. However, the manual does a poor job of explaining how to take advantage of the capabilities, particularly graphics, of the printer.

**JR
 200**

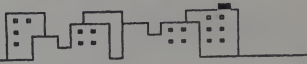


Figure 4. A screen composed of graphics characters can be reproduced on the printer with the HCOPY command.



THE PERSONAL PRINTER BUILT LIKE A SHERMAN TANK PERFORMS LIKE A STRADIVARIUS.

A Tough Act To Follow. Frankly, an Okidata printer is the best printer on the market today. Why? We pack more performance features per dollar into our dot matrix printers than anybody. Bar none. Data processing at speeds from 80 to an incredible 350 characters per second. Exceptional letter quality printing at three times the speed of most daisywheels. Draft and color printing. High resolution all points addressable graphics for charts, graphs, illustrations and photos. Even alternate character sets for self-designed typefaces and symbols. (Print a G-clef, if you like.)

Long-Term Engagement. Our high performers are the most reliable printers available, with rugged steel

frames, laser-welded parts, and a print head (the most vital part of all) so strong we guarantee it for up to one full year. No wonder our warranty claim rate leads the industry at less than 1/3%.

Perfect Harmony With Your Computer. Every Okidata printer works in concert with the major names in personal computers. Better and faster, in fact, than the major computer name printers. (Which, by the way, aren't even made by the major computer companies.)

Best Selection. Right Price. Nobody offers you a better choice. There are eight Okidata printers in all, ranging in price from \$449 to \$2995, suggested retail. Suggest you call

1-800-OKIDATA (in NJ, 609-235-2600) to find the dealer nearest you. You'll get more for your money from your personal printer. Not to mention your personal computer.



OKIDATA

Mt. Laurel, NJ 08054

A subsidiary of Oki Electric Industry Company Ltd

CIRCLE 198 ON READER SERVICE CARD

ATLANTIC COMPUTER ACCESSORIES

CALL OR WRITE FOR
FREE CATALOG

WE SUPPORT WHAT WE SELL!

AGDS		
AT 11 ANIMAL		19.95
AT 11 ANIMAL		19.95
AMDEK		
AMDEK I-13" COLOR MONITOR	305.00	
AMDEK II-13" HI RES RGB COLOR MON	429.00	
AMDEK III COLOR MONITOR	425.00	
ALUM		
ALUM AT 100	899.00	
CUSTOM CABLES		CALL
DC TAPES		
DC TAPES 1/2" 7.5" 90 MIN. 90 MIN. W/	17.00	
HILBERT TAPES 1/2" 90 MIN. W/	17.00	
HILBERT TAPES 1/2" 90 MIN. W/	17.00	
HILBERT TAPES 1/2" 90 MIN. W/	17.00	
HOUSTON INSTRUMENT		
DMP-40 A/D SITE PLOTTER	759.00	
DMP-41 C/D SITE PLOTTER	2550.00	
IBM		
IBM 4	79.00	
IBM 4	79.00	
KOALA		CALL
KEYBOARD		59.00
MICROBIT		
MPP 1000 MODEM FOR ATARI	155.00	
MPP 1100 PRINTER INTERFACE FOR ATARI	79.00	
MICROCOPY		
1 1/2" 5 1/4" 720	1.00	
1 1/2" 5 1/4" 720	1.00	
MULTI-MEDIA PLAN 8/11	1.00	
MULTI-MEDIA PLAN 8/11	1.00	
MICROTEK		
64K RAM CD 64K MEMORY CARDS	199.00	
128K RAM CD 128K MEMORY CARDS	295.00	
MAGNUM 80 80 COLLIMAN CARD	169.00	
DUMPING 10K PARA INTER W/ 16K BUF	160.00	
0 DISK 128K W/DISK EMULAT FRMR	329.00	
MICROWARE DS1		
PERFORMER	79.00	
MURA DIRECT CONNECT MODEM		77.00
NOVATOR		79.00
NOVATOR	79.00	
OKIDATA		CALL
OKIDATA	CALL	
ORNI DEES		79.00
ORNI DEES	79.00	
PANASONIC		
CT-160 COLOR MONITOR	299.00	
TR-120-MIP HI RES GREEN PHOSPHOR	163.00	
QUANTER		
QUANTER 7000 MULTIMODE PRINTER	1695.00	
SILVER REE EXP		89.00
SURGE PROTECTORS		CALL
TALLY MT 160	199.00	
TAXAN		
VISION I RGB MON	325.00	
VISION III HI RES RGB MON	529.00	
TE PRODUCTS		
JOY STICKS	47.00	
PADDLES	32.00	
TEAC PARALLEL INTERFACE & CABLE		99.00
UBI INTERNATIONAL		
P12 12" GREEN PHOSPHOR MONITOR	126.00	
P13 12" AMBER PHOSPHOR MONITOR	149.00	
VIBEX		99.00

CALL for MONTHLY SPECIALS and
CURRENT LOWER PRICES.

Prices subject to change. Fla. residents Add 5% Tax
FREE SHIPPING - Payment w/order
Se Hablas Espanol over \$100.00
COMPUSERVE ID# 75735.252

1-800-327-8020

1-305-972-5399

6951 N.W. 15th Avenue
FL. Lauderdale, FL 33309

Print About Printers, continued...

The Bottom Line

Depending upon what it says on the front panel, you can pay between \$249.95 and \$369.95 for this printer. Of course, the versions from computer manufacturers usually come with connecting cables which sell for an astonishing amount when purchased separately.

For the price, the Seikosha GP-100A is a capable performer for both text and graphics. Using the HCOPY command on

the Panasonic and SpectraVideo computers with this printer, it is much easier to get screen prints than with much more expensive computer/printer combinations.

On the other hand, the printer doesn't have the speed, versatility, or print quality of an Epson or Diablo, but it costs a fraction as much. Also, we would have liked more complete documentation, but again, you get what you pay for. □

```

Angle of sun? 55
You sot the enemy!!
Try again (Y,N)?
Break in line 280
Ready
  
```

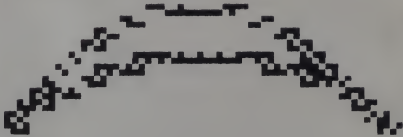


Figure 5a. A black on white graphics screen does not reproduce correctly on the printer.

```

Angle of sun? 55
You sot the enemy!!
Try again (Y,N)?
Break in line 280
Ready
  
```

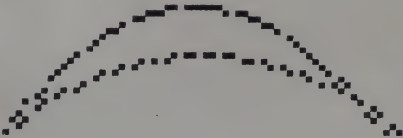


Figure 5b. The same screen as in Figure 5a but with the color set to white on black reproduces correctly on the printer.

In the flash of one second, Delta-10 can print the alphabet six times.

At 160 cps, 100% duty cycle, Delta-10 is built for speed. It's the dot matrix printer that quickly strikes up an intense working relationship with your computer.

There's no nonsense. Delta-10 performs with serial and parallel interfaces as standard. The 8K buffer gives Delta-10 the power to instantaneously store and print data as it frees your computer to continue its job. Turn Delta on

and it can print three crisp copies simultaneously at the continuous speed of 160 cps.

And Delta-10's performance isn't only measured in swiftness. There's the diversity of its character fonts, its true descender matrix, and its underlining ability.

Star's new Delta-10. Designed for red-hot efficiency. And isn't that what you need?

star
MICRONICS, INC.

THE POWER BEHIND THE PRINTED WORD.

Computer Peripherals Division
P.O. Box 612186, Dallas/Ft. Worth Airport, TX 75261
CIRCLE 244 ON READER SERVICE CARD





Outpost: Atari

I am honored to be sitting in the same editorial seat that has been occupied by the likes of David and Sandy Small and John Anderson. Over the last two years this column has brought you (and me) an abundance of information. The charter was to be an oasis of Atari-related information, which at times, seemed to wander away from the easily obtained "tips and techniques" type of material into the more philosophical and esoteric. However, I believe these journeys have been worthwhile and in keeping with the concept and spirit of an outpost.

I plan to continue in the same tradition. My goal is to present at least one hardware and one software review each month, and to use this column as a clearinghouse for ideas, news and trends relating to the Atari computer. I hope that those of you who are old-timers will benefit from my experiences and continue to think of this column as yours. To the newcomers to the world of Atari computing, welcome aboard and be assured that I will not leave you behind.

Many people have asked me which computer to buy. The next few questions follow quite logically: how much memory do I need, what are the best programs, and the inevitable: should I wait until the prices come down some more.

When asked why they want to buy a computer, some respond with specific applications or a plan of action (like involving the whole family in computing, or automating their coin collection information). A majority of people either don't know what they would do with a computer or have general ideas of "learning about computers."

Arthur Leyenberger, c/o Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950.

Arthur Leyenberger

The point is, if you want to get involved with computing, the time to buy a computer is now. If you wait six months, you may still not buy a computer. If you do, you will be six months behind in the learning process, when you could have been a veteran by now. Atari computers are excellent entry level machines that you will not outgrow as you progress from being a neophyte to an advanced user. The learning process continues. Atari computing remains challenging and fun.

Recently, I looked back at a 1976 issue of *Creative Computing*. On the back cover was an advertisement for the Altair 680 computer from MITS. For only \$420 you could have a 1K (RAM) machine with RS-232 interface and provision for 1K ROM. There were no word processors available, no Basic language and definitely no Pac-Man. The darn thing was programmed in assembler from toggle switches on the front panel. I'll bet people were asking each other back then, "should I buy one now, or wait until the price drops a little?"

Computers are funny things. They have a strange habit of being used for all kinds of applications once they find a home. Typically, the owner has no idea about real uses prior to getting a computer. I strongly believe that it is fine to want to "get into computing." Continue to read *Creative*. Read some books and talk to people. Then go out and buy a computer and start to use it.

Attention Teachers

More and more, computers are becoming a regular part of the educational

scene. Computers are showing up in the classroom faster than New Jersey mosquitos at a *Creative Computing* staff picnic. One of the problems that teachers face is the continuing struggle to choose good educational software from the vast assortment of generally mediocre courseware. Rather than have educators re-invent the wheel by evaluating the same Atari software in every school in the land, a new group called the Atari Teachers' Network is forming. It will provide a medium of communication between Atari users and the educational community. The network is headed by Nancy Austin Schuller and Curt Springstead.

The low entry price and superior sound and graphics of the Atari make it promising for use in educational settings. It is in this spirit that the group has formed and committed to sharing Atari-related information—and acting as an educational resource. The group publishes a quarterly newsletter containing reports, questions and answers, an exchange of software written by teachers, and discussions about computers in the classroom, and Atari in particular.

The newsletter also contains information from insiders at Atari on the company's current projects. For more information on the network and the newsletter, contact the Atari Teachers' Network, P.O. Box 1176, Orange, NJ 07051. A one year membership is \$4.

Add Music to Your Basic Programs

How many times have you wished that you could add a little music to your Basic programs? Maybe a little Bach while the title screen to your latest adventure game is being displayed. Or perhaps the theme from Star Trek melodically enveloping

WE INTERRUPT THIS AD TO BRING YOU THIS IMPORTANT PROGRAM...

Now you could add **your** program to the rapidly expanding list of MMG Software with MMG's **Write Your Own Program Contest!** Each month a program will be chosen and developed from the entries and suggestions sent in by **you** and best of all, the winners will receive royalties from the sale of their entry. You don't have to be a computer whiz to enter, so see your local retailer who carries ATARI products for details. FINAL FLIGHT is only one of the many exciting and useful programs for the ATARI system now available from MMG Micro Software that are designed with you in mind. At MMG, we believe that people are as important as the programs they use



MMG

micro software

P.O. Box 131 Marlboro, NJ 07746
(201) 431-3472

CIRCLE 191 ON READER SERVICE CARD



Music Box



Matchboxes

you as the Enterprise warps out of orbit. Well, now there is a utility, programmed by Jerry White, that allows you to do all of this and much more. *The Music Box* from Program Design Inc. (PDI) allows you to play Atari Music Composer files (after conversion) during the vertical blank interrupt routine from Basic.

The music runs independently of Basic. You can display graphics on the screen or do calculations while the tune continues. You can even stop the program, list it and do some editing with the music going. However, once any I/O operation is performed, the music is interrupted.

There are actually five separate Basic programs and a menu driver that make up *The Music Box* utility. The CONVERT program converts Atari Music Composer (AMC) data files into Music Box (MB) files that can be used with the COLORGAN and PLAYTEST programs. This program runs slowly but is not objectionable. After an AMC file has been converted to MB format, the PLAYTEST program is used to play it using a machine language routine.

Normally the program prompts for the program to be played, loads it from disk and begins playing it immediately. However, by deleting a section of code (lines 350 to 500) your own Basic program can be entered between lines 350 and 7998. Even after the removal of these lines, there is still some prompting for a file name from the program. Table 1 contains

a list of the overhead code that should be removed for incorporating the PLAYTEST program with your own program.

Another program, COLORGAN, contains a machine language routine that interprets the frequency and volume of MB data files and displays a psychedelic, graphics mode 19 image on the screen. These colorful, pulsating images will bring back memories for all who survived the late sixties.

The MUSICBOX program is designed to help you understand how to enter sheet music into *Music Composer*. It uses player/missile graphics to display notes, sharps, flats, and the treble and bass clefs. The joystick is used to manipulate the notes on the screen, and as the display changes, the appropriate sound is heard. The pitch number and *Music Composer* interpretation of each note is displayed at the bottom of the screen.

The final program, TRANSLAT, is used to dump AMC data files to either the screen or a printer. This is handy for debugging your song files and making a permanent record of them.

As an example of combining sound and graphics, I used the flag program from the Atari Basic Reference Manual (Appendix H-9) and inserted it within my stripped down MUSICBOX program. I then included a converted *Music Composer* file of the Stars and Stripes Forever on the same disk. When the program is run, the Stars and Stripes plays as the American

Flag is drawn on the screen. Let it never be said that the Atari computer is not patriotic.

The *Music Box* is a very useful music utility if you wish to play Atari *Music Composer* files from a Basic program. The manual is well written and the disk contains eleven converted *Music Composer* files. It requires 32K RAM and costs \$29.95.

Good, Clean Fun

Detractors of video games say that among other things, these electronic menaces are responsible for the break up of the American family. I would have to agree to some extent with this comment. Consider the facts. Most video games are of the shoot-'em-up variety and are generally played by one person. I mean, how much fun can people over 30 really have with twitch games, anyway?

When I was growing up, I used to enjoy family time when we would all play such games as Monopoly, Scrabble, and Tripoli. In fact, I still enjoy an occasional game of Scrabble as long as professional Scrabble players like my wife's mother, Phyllis, are not around. In any case, there are very few games for the Atari computer that the whole family can enjoy. *Matchboxes* from Broderbund is different. Programmed by Al Cheser, it is not only fun for the whole family but is also wholesome and well done.

Matchboxes is really several variations of the old standby game Concentration. In this game, a 6 x 6 matrix is displayed on the screen and the object is to pick two squares that match. Hiding behind each square is an animated monster, shape, or object that has its own unique tune. The tunes are all familiar—Clementine, Pop Goes the Weasel, I've Been Working on the Railroad—and are usually associated with the particular graphic.

In the simplest game, you play against

Table 1. Modifications to PLAYTEST program.

Delete the following lines:

350 — 500
8010 — 8080

Add:

8120 POKE 53279,0: POKE 53279,0: US\$R\$=ANYNAME.MBD":
LU=LEN(US\$): IF LU=0 THEN 12000

Where filespec "ANYNAME.MBD" is a converted Music Composer File

I have the slippers. Could you get the paper?



The perfect addition to any family, the RB5X Intelligent Robot™ is a versatile, multi-purpose, programmable home appliance.

RB5X comes completely assembled, with software that allows it to learn its environment; sonar and tactile sensors that detect obstacles in the robot's path; a routine that helps RB5X find its charger when its batteries are low; and an array of options that turns RB5X into a real workhorse.

With the vacuum attachment, you can program RB5X to vacuum the living room each morning after you leave. Add an arm, and RB5X becomes a messenger, able to lift and carry up to 12 ounces. Add the fire detector/extinguisher, and RB5X senses small fires, finds them, and puts them out. RB5X with voice capability can

respond to your spoken word with actions or words of its own.

We also offer a Robot Control Language (RCL) with Savvy™ that makes programming RB5X easier than training the family dog. A unique combination of hardware and software, the Savvy system speeds up software development by letting you program your RB5X with common English words and phrases. Available now for the Apple II and Apple IIe, RCL™ will soon be mounted on board the robot, making it compatible with most other brands of computers.

Imagine all the wonderful things a robot in your home could do for you. Then see RB5X for yourself. You'll never be the same again.

Ask your local computer retailer for a demonstration. Or contact us for the name of the RB5X dealer nearest you.



RB ROBOT
CORPORATION

18301 West 10th Avenue, Suite 310, Golden Colorado 80401, USA (303) 279-5525

CIRCLE 214 ON READER SERVICE CARD

Outpost: Atari, continued...

an opponent or the computer and the player with the most matches at the end of the game is the winner. There are some tricky matches where the object may be the same but in two different colors. Occasionally, wild cards turn up which will match anything.

There are three other variations of the game that can be played either alone or with someone else. One game permits each opponent to select a word which is hidden behind the puzzle. As pictures are matched, parts of the word are exposed, and the first one to guess the word is the winner. Another version of the game has the hidden words spelled backwards. I played this version several times and kept losing until I realized that the words were backwards (next time I will read the instructions first). The final variation has the hidden words scrambled. I am terrible at this particular variation.

Matchboxes is available on disk or cassette, requires 32K, and costs \$29.95. This really is a *fun* game and one that the whole family can enjoy together. There ought to be more such games.

Atari User Groups

Some of you might know me as the editor of the Jersey Atari Computer Group (JACG) Newsletter. I have spoken to others of you and have accessed your bulletin boards. Having been associated with the JACG and its 500 members for over a year, I now realize many things about the world of Atari and specifically the Atari computer user. I can easily say, without fear of being struck by lightning, that Atari users are generally the most energetic, interested, loyal, and diverse group of people I have ever met. If you don't belong to a user group, call Atari's toll-free number to find the one nearest you. Then join and participate in computing.

In the past, Atari has been unwilling to realize (or take advantage of) the fact that their users are their best salespeople. The future may bring some changes, but we'll have to wait and see. My crystal ball is a little cloudy right now. There are over 50,000 members of Atari user groups in the United States alone, and that number is increasing steadily.

I mention this as a prelude to a request that all Atari user groups send me their newsletters. I want to stay in touch with what is *really* happening in Ataridom and I feel that this is the best way to do it. I also welcome suggestions and comments from users on what type of material you would like to see covered in this column. I cannot answer every letter, but I assure you I will read every one. If you would like a reply, please enclose a self-addressed stamped envelope. Send input to me, in care of *Creative Computing*, 39 East Hanover Ave., Morris Plains, NJ 07950.

Listing 1.

```
32000 REM SCREEN LOAD UTILITY BY TOM PAZEL.
32010 REM LOADS SCREEN FROM DISK FILE.
32020 REM SHOULD WORK FOR ANY BASIC
32030 REM GRAPHICS MODE.
32040 REM USES PAGE 6 (WHAT ELSE?)
32050 REM FOR MACHINE LANGUAGE ROUTINE.
32060 GOSUB 32100:REM POKE IN MACHINE CODE
32070 OPEN #1,4,0,FILES
32080 A=USR(1536)
32090 GOTO 32090
32100 FOR #L=-1536 TO 1639:READ BYTE:POKE #L,BYTE:NEXT #L:RETURN
32110 DATA 104,162,16,165,87,24,101,87,160,185,00,6
32120 DATA 157,72,3,200,185,00,6,157
32130 DATA 73,3,169,7,157,66,3,165
32140 DATA 80,157,68,3,165,89,157,69
32150 DATA 3,32,86,220,162,16,169,9
32160 DATA 157,72,3,169,0,157,73,3
32170 DATA 169,7,157,66,3,169,2,157
32180 DATA 69,3,169,192,157,68,3,32
32190 DATA 86,220,162,16,169,12,157,66
32200 DATA 3,76,86,220,192,3,224,1
32210 DATA 240,0,240,0,224,1,192,3
32220 DATA 128,7,0,15,0,30,0,30,0,30,0,30
```

Listing 2.

```
32000 REM SCREEN SAVE UTILITY BY TOM PAZEL.
32010 REM SAVES SCREEN TO DISK AS A FILE.
32020 REM SHOULD WORK FOR ANY BASIC
32030 REM GRAPHICS MODE.
32040 REM USES PAGE 6 (WHAT ELSE?)
32050 REM FOR MACHINE LANGUAGE ROUTINE.
32060 GOSUB 32100:REM POKE IN MACHINE CODE
32070 OPEN #1,0,0,FILES
32080 A=USR(1536)
32090 END
32100 FOR #L=-1536 TO 1639:READ BYTE:POKE #L,BYTE:NEXT #L:RETURN
32110 DATA 104,162,16,165,87,24,101,87,160,185,00,6
32120 DATA 157,72,3,200,185,00,6,157
32130 DATA 73,3,169,11,157,66,3,165
32140 DATA 80,157,68,3,165,89,157,69
32150 DATA 3,32,86,220,162,16,169,9
32160 DATA 157,72,3,169,0,157,73,3
32170 DATA 169,11,157,66,3,169,2,157
32180 DATA 69,3,169,192,157,68,3,32
32190 DATA 86,220,162,16,169,12,157,66
32200 DATA 3,76,86,220,192,3,224,1
32210 DATA 240,0,240,0,224,1,192,3
32220 DATA 128,7,0,15,0,30,0,30,0,30,0,30
```

General Purpose Screen Save/Load Utility

Often, when creating graphic screens in Basic it is useful to save the screen for future use. Similarly, when writing a program that requires multiple screens throughout its operation, it would be handy to be able to load graphic screens from

disk. Well, Tom Pazel of Dover, NJ has written a couple of very useful utilities to do just that. What's more, graphics mode 8 (and higher) screens are fully compatible with Datasoft's *Graphic Master* program. Let's take a closer look at Tom's programs.

Listing 1 is the Load routine. It is really quite simple to use. The following two



First Star Has 4 New Games.

Fernando Herrera, designer of *ASTRO CHASE™* and our design team again define "State of the Art." Superior graphics, real-time animations,[™] multiple

screens, intermissions, arcade-quality sound, innovative gaming, challenge and excitement—we deliver it all!

THE BAD NEWS? You can't play them all at once.



BOING!™

Designed by Alex Leavens
& Shirley A. Russell
Atari VCS 2600



BRISTLES™

Shattering Pearls the Panther
Designed by *Fernando Herrera*
Atari Home Computers
Commodore Computers



FLIP and FLOP™

Designed by Jim Nangano
Atari Home Computers
Commodore Computers



PANIC BUTTON™

TRS-80 Color Computer
by Paul Kanersky
Vic-20 Home Computer
by Wayne Lam



Atari, Pan II and TRS-80 Color are the registered trademarks of Atari, Inc. Commodore and Commodore 64 are registered trademarks of Commodore International, Inc. All other trademarks and registered names (Game Boy, Super Mario Bros., Super Mario Bros. 2, Super Mario Bros. 3, Super Mario Bros. 4, Super Mario Bros. 5, Super Mario Bros. 6, Super Mario Bros. 7, Super Mario Bros. 8, Super Mario Bros. 9, Super Mario Bros. 10, Super Mario Bros. 11, Super Mario Bros. 12, Super Mario Bros. 13, Super Mario Bros. 14, Super Mario Bros. 15, Super Mario Bros. 16, Super Mario Bros. 17, Super Mario Bros. 18, Super Mario Bros. 19, Super Mario Bros. 20, Super Mario Bros. 21, Super Mario Bros. 22, Super Mario Bros. 23, Super Mario Bros. 24, Super Mario Bros. 25, Super Mario Bros. 26, Super Mario Bros. 27, Super Mario Bros. 28, Super Mario Bros. 29, Super Mario Bros. 30, Super Mario Bros. 31, Super Mario Bros. 32, Super Mario Bros. 33, Super Mario Bros. 34, Super Mario Bros. 35, Super Mario Bros. 36, Super Mario Bros. 37, Super Mario Bros. 38, Super Mario Bros. 39, Super Mario Bros. 40, Super Mario Bros. 41, Super Mario Bros. 42, Super Mario Bros. 43, Super Mario Bros. 44, Super Mario Bros. 45, Super Mario Bros. 46, Super Mario Bros. 47, Super Mario Bros. 48, Super Mario Bros. 49, Super Mario Bros. 50, Super Mario Bros. 51, Super Mario Bros. 52, Super Mario Bros. 53, Super Mario Bros. 54, Super Mario Bros. 55, Super Mario Bros. 56, Super Mario Bros. 57, Super Mario Bros. 58, Super Mario Bros. 59, Super Mario Bros. 60, Super Mario Bros. 61, Super Mario Bros. 62, Super Mario Bros. 63, Super Mario Bros. 64, Super Mario Bros. 65, Super Mario Bros. 66, Super Mario Bros. 67, Super Mario Bros. 68, Super Mario Bros. 69, Super Mario Bros. 70, Super Mario Bros. 71, Super Mario Bros. 72, Super Mario Bros. 73, Super Mario Bros. 74, Super Mario Bros. 75, Super Mario Bros. 76, Super Mario Bros. 77, Super Mario Bros. 78, Super Mario Bros. 79, Super Mario Bros. 80, Super Mario Bros. 81, Super Mario Bros. 82, Super Mario Bros. 83, Super Mario Bros. 84, Super Mario Bros. 85, Super Mario Bros. 86, Super Mario Bros. 87, Super Mario Bros. 88, Super Mario Bros. 89, Super Mario Bros. 90, Super Mario Bros. 91, Super Mario Bros. 92, Super Mario Bros. 93, Super Mario Bros. 94, Super Mario Bros. 95, Super Mario Bros. 96, Super Mario Bros. 97, Super Mario Bros. 98, Super Mario Bros. 99, Super Mario Bros. 100) are trademarks of their respective owners. © 1988 Atari, Inc. All rights reserved. © 1988 First Star Software, Inc.



"When being first counts... we're number one!"
22 East 41st Street, New York, NY 10017
Distributor and Dealer Inquiries Invited/212 532-4666

CIRCLE 267 ON READER SERVICE CARD

Outpost: Atari, continued...

Listing 3.

```
5 REM SAMPLE GRAPHICS PROGRAM
7 REM BY TOM PAZEL.
10 DIM FILES(14):FILES="D:TESTPGM.SCR"
20 GRAPHICS 10
30 POKE 704,0:POKE 705,14:POKE 706,26:POKE 707,42:POKE 708,50
40 POKE 709,74:POKE 710,90:POKE 711,106:POKE 712,244
50 FOR I=0 TO 79
60 COLOR I+1:PLOT I,I+2:DRANTO I/5#2,I#2
70 NEXT I
80 GOTO 80
```



NO POWER SPIKES WITH SUPER FAN II.

Super Fan II's Zener™ Transient Voltage Suppressor and Power Filter squelches spikes up to 6000 amps—even those caused by lightning—while responding up to 100 times faster than Apple II's

built-in suppressor.

In addition, Super Fan II cools your Apple, removing heat buildup at a remarkable 17 cubic feet of air per minute. Yet it's the quietest fan of its kind on the market.

Super Fan II also positions a lighted on/off computer switch and two accessory plugs at your fingertips. It's warranted for two years and simply clips to your Apple II. It or monitor stand.

See your R.H. Electronics dealer today about Super Fan II®, or contact us at 566 Irelan Street, Buellton, CA 93427, (805) 688-2047.

RHELECTRONICS, INC.



Super Fan II, in back of box \$199
With 1" x 2" Control Box \$14.95
Add \$10 for air flow duct. \$5
Available in 240V 50 Hz

Warranty OEM machines included
*U.S. Patent #2068263
#4302296

France, call BIP 1-255 4463
Austria, call Imaginering 021212 1411

lines of code must be typed in:
10 DIM FILES(20):FILES=
"D:Anyname.ext"

20 Graphics n

"Anyname.ext" is the name of the disk file that contains the screen image. On line 20, n refers to the graphics mode of the screen image. Next, the Load routine, which has previously been listed to the disk, is merged with the above two lines using the ENTER command. Type RUN, and the screen file is loaded and displayed.

The Save routine (Listing 2) works in a similar way. Your Basic program should not have any line numbers higher than 31999. Also, a line similar to line 10 above should be included somewhere near the top of the program. Then ENTER the Save routine (which has been written previously to the disk in LIST format). "Anyname.ext" is the filename of what you want to call the save screen.

Now, merely run your program. Your program will draw its pretty picture and, after a slight pause, the disk drive will become active, the screen being saved as a disk file under the name you specified. Be sure that when run, your program currently in RAM will execute the Save routine as the last thing it does. In other words, don't use line numbers higher than 31999 and avoid lines such as:

```
300 GOTO 300
```

Listing 3 is a sample graphics program that can be used to test the Load and Save routines. Notice that line 80 is a no-no when using the Save utility. It must be deleted before running the program.

These utilities work with all 12 Basic graphics modes. What can you do with these utilities? Well I can think of a few uses. Graphics modes 1 and 2 title screens can be saved for future use and loaded as needed. As mentioned before, screens using graphics modes 8 and above can be created, saved, and then brought into a program like *Graphics Master* to put on the finishing touches. Then, after the screen is once more saved to disk, it is ready for use any Basic program. Thanks Tom, for a fine job on these useful routines.

I hear the music playing in the background, meaning it is time to fold up our tents for this edition of the Outpost. Christmas is not too far away, so next month I will have my Christmas list of Atari products. Both existing products and dream products from my wish list will be mentioned. □

Firms Mentioned In This Column:

Broderbund Software, Inc.
1938 Fourth St.
San Rafael, CA 94901
(415) 456-6424
Program Design, Inc.
95 East Putnam Ave.
Greenwich, CT 06830

IBM Images



Although I write this with a glass of iced coffee resting dewily beside the computer, by the time these words see the inside of a magazine, the iced coffee will have been transformed into a defrosting turkey. I realize that poultry is not a featured peripheral of most computers; in my case, however, it serves to remind me that it needs to be cooked. Without its constant presence, Thanksgiving might well become a feast of Dr. Pepper and Fritos.

We are fast approaching the Christmas season, and withal the problem of what to buy everyone in the household such that it can be played with—preferably on an IBM. This philosophy is designed to please everyone concerned, especially me. I recall one unmemorable Christmas morning, when I was presented with three flannel nightgowns, an umbrella, a wind-up crab (slightly broken from having been diddled with by the giver) and a pair of practical, furry slippers. Everyone else was having a grand time playing with their little gizmos.

I ask you, how do you play with an umbrella? Therefore, this month we will look at some software guaranteed to keep this from happening to you. Give your computer a Christmas present.

Big Top And Master Miners

Funtastic, the software house which has been responsible for turning my hand into a joystick claw, has two new games on the market: *Big Top* and *Master Miners*. Both uphold the addictive tradition of *Cosmic Crusaders* and *Snack Attack* and are among the best arcade games available for the PC. They are both copy-protected and require 64K

Susan Glinert-Cole

and the color graphics adapter.

Master Miners bears a resemblance to *Crossfire*, if you are familiar with that game. The game transforms the lowliest computer user into an asteroid miner first class. The object of the game is to maneuver around the asteroid belt and mine the gems which appear around the display.

Points for a successful catch are given only after you have returned to home base and dropped off the payload. The situation is complicated by various nefarious occupants of the asteroid belt, such as the exceedingly greedy Commie Claim Jumpers, which beetle around the maze, swipe jewelry, and spirit it off to the Commie starbase (Vladivostok?).

Your ship comes equipped with a supply of torpedoes, with which you can vanquish all the little beasties around you. *Master Miners* has a two-player mode, which can be used from the keyboard, or, if yours is the Complete Computer, dual joysticks can be employed. The big-



Master Miner

gest problem with this mode is, that instead of rounding up diamonds and assaulting the aliens, the players around here end up shooting each other instead. This game may initiate many nasty arguments concerning strategy and fair play.

Big Top is unique, very funny, and, like all the other Funtastic games, full of excellent graphics. Wendell the acrobat must be guided around a circus ring with the keyboard or joystick to collect all the pink hats in the vicinity. He must go up and down ladders, swing from ropes, and slide down poles while avoiding local problems, like clowns, knives, and beach balls.

Wendell can jump, duck, and fall a short distance, but considerable dexterity and timing are needed to do these maneuvers effectively. When all the hats are collected, a ladder appears. Climbing the ladder puts Wendell in the next ring. I have seen only three levels of rings; the documentation claims there are more.

Points are awarded for accumulating hats, prizes, and weights; the faster a round is completed, the more bonus points are awarded. This game is harder than it looks.

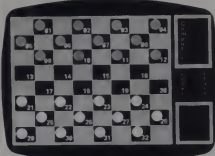


Big Top

IBM Strategy Games

If thinking is one of your habits, this set of games will let you indulge to only a mild degree. The package consists of four games on one disk, Checkers, Elusion, Battleship, and Reversi. The disk is not copy-protected and requires 64K and a color graphics adapter card. All the games are colorful and cheery, and because they are not difficult to beat, they are ideal for children. None of these implementations are particularly challenging to anyone with a little experience with strategy games.

The checkers game is called Checkers for Beginners. It does have two levels of play, beginning-beginner and beginner. After you have made a move, a prompt announces that the computer is think-



Checkers for Beginners

ing. The prompt changes color during this activity and is accompanied by little beeping noises to give you a feel for how hard the PC is working its silicon synapses.

When it has discovered a move, a light bulb appears (with appropriate auditory accompaniment). Generally this fanfare is followed by a move, but sometimes the computer discovers that the move it found wasn't so hot, so it returns to its colorful and noisy thinking mode.

I haven't played checkers in years, but this game was easy to beat. It was rather pathetic, waiting for it to finish making like a rainbow and a friendly, low-key French horn, knowing it was doomed to a triple jump.

Elusion is a game created just for the PC. It is played on a square board and the object is to make the last move. It takes about three games to dope out a consistent winning strategy, but the game board is cute.

Battleship comes up with a really clever graphic display, complete with an anchor chain and an air raid siren noise that is uncomfortably realistic. The game itself is standard Battleship, played on a grid. You must guess where your opponent's ships are located and then shoot to kill.

The game can be played in three different modes: you try to sink the

computer's navy, you and the computer try to sink each other's ships, or you and a friend can battle it out. The graphics on this one are very well done. Those of you with a lugubrious turn of mind will enjoy this rendition of an old favorite.

Reversi, a.k.a. Othello, can be a very challenging game to play when a good algorithm has been used in planning the computer strategy. The game is played on an eight by eight board. The object of the game is to take as many squares as possible by capturing the opponent's markers.

This is done by playing a piece in such a way that you enclose markers of the other player. You must capture a piece on each move.

This version of Reversi is very slow and can always be won. I have two other versions of the game, both of which are fast and mean. If Reversi, or Othello, is a game you enjoy, I recommend the version in the *Friendly Ware Introductory Set* from FriendlySoft.

101 Monochrome Mazes

This game (also from IBM) will run only on the monochrome display, alas. I don't have one at home, and am therefore constrained to playing it at the office. The designers should have realized the implications of the sound effects... it is embarrassingly apparent to everyone in the office when you are not doing charts, graphs, or word processing.

Some of the noise can be toggled off with one of the game options, but there is always a little background of obvious beeping when you are not doing too well. These beeping will draw your boss into the office to find out what you are doing. Your boss will probably not find

this game as entertaining as you will.

The graphics for *Monochrome Mazes* are done as well as could be expected, given the limitations of a monochrome display. Safe areas are in dark green, walls are light green, and the pools of water are black. You select the maze number, speed of the marker, full sound option, and scoring method (timed or point value).

Each level of difficulty has 10 mazes; maze 101 is on a level of its own. Scoring is a combination of maze level, marker speed, and time of completion. If you fall into a pool, survival points are awarded, depending on how far the marker went before drowning.

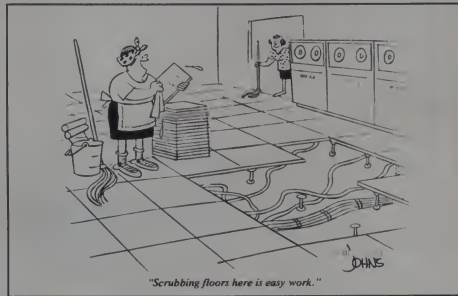
The low numbered mazes are pretty easy, but don't be fooled into thinking that they are all this way. As you progress up the levels, new hazards appear: invisible walls, trap doors, and pools of water where the marker has just been (which makes returning from a blind alley impossible). The game has no joystick option and is played with the numeric keypad only. A few of these games are a good refresher in the middle of a long day at the office.

Is There Life After Zork?

Infocorn continues to produce classy, complex text adventure games, one of which is almost guaranteed to drive the most seasoned adventurer nuts. *Starcross*, a science fiction adventure, is reviewed in the 1983 *Creative Computing Software Buyer's Guide*.

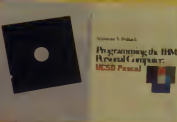
Suspended, another game with a sci-fi theme, is reviewed in the September, 1983 *Creative Computing*. See these issues for detailed descriptions of these excellent games.

Deadline is more down-to-earth (sorry



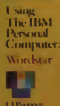
"Scrubbing floors here is easy work."

Whatever you need to do with your IBM Personal Computer... Our book/software series can show you how.



Programming the IBM Personal Computer: UCSD Pascal

Seymour V. Pollack
A self-paced introduction to UCSD Pascal (and programming) on the Personal Computer, using the UCSD p-System. Many examples and problems, both serious and whimsical.
Book/Diskette Package:
1983, 323 pages, \$34.95
ISBN 0-03-063978-8



Using the IBM Personal Computer: Wordstar

CJ Puotinen
Even for those unfamiliar with the Personal Computer, this book's many examples and projects will easily lead to mastery of the Wordstar word processing system.
Book/Diskette Package:
1983, 272 pages, \$24.95
ISBN 0-03-063981-6

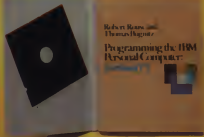
Using the IBM Personal Computer: Visi-Calc

Robert Crowley
Learn Visi-Calc step-by-step on your Personal Computer, work on projects—some easy, others not—in a wide range of application areas.
Book/Diskette Package:
1983, 256 pages, \$35.95
ISBN 0-03-063982-4



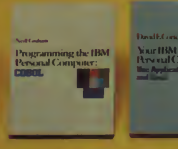
Programming the IBM Personal Computer: Fortran 77

Robert Rouse and Thomas Bugnitz
Examples, problems, and exercises from science and engineering illustrate both introductory and advanced topics, including IBM's Fortran compiler.
Book/Diskette Package:
1983, 240 pages, \$34.95
ISBN 0-03-063979-4



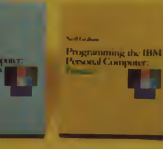
Programming the IBM Personal Computer: BASIC

Neil Graham
From switching your Personal Computer on to editing text, handling random and sequential files—even making music—this easy-to-follow book shows you how.
1982, 291 pages, \$17.00
ISBN 0-03-063667-1



Programming the IBM Personal Computer: COBOL

Neil Graham
A spiral development and a wealth of sample programs lead you step-by-step into all features of the IBM Personal Computer's version of COBOL.
1983, 400 pages, \$16.95
ISBN 0-03-060538-5



Your IBM Personal Computer: Use, Applications, and Basic

David E. Cortes
An elementary, non-threatening introduction to the Personal Computer—set-up and testing, disk files, Visi-Calc and other software, and the rudiments of BASIC.
1982, 253 pages, \$17.00
ISBN 0-03-063671-X



Programming the IBM Personal Computer: Pascal

Neil Graham
Accessible to beginners, this structured presentation shows how to program with the powerful computer. Pascal developed by IBM for the Personal Computer.
1983, 256 pages, \$16.95
ISBN 0-03-061982-3

PC WRITERS—Let me know your book/software ideas.
—Bret Harrison, Editor, CEPP, 829 Sonoma Ave., Suite 5, P.O. Box 1180, Santa Rosa, CA 95402, (707) 544-4448.

ORDER BY PHONE... USE OUR TOLL-FREE 800 NUMBER!
(800) 227-1917 ext. 339 (in California, (800) 772-3545 ext. 336)

CBS
EDUCATIONAL & PROFESSIONAL
PUBLISHING
383 Madison Avenue, New York, NY 10017

IBM is a registered trademark of the International Business Machines Corporation. Wordstar is a registered trademark of Micropro. Visi-Calc is a registered trademark of VisiCorp. UCSD p-System is a registered trademark of the Regents of the University of California.

CIRCLE 121 ON READER SERVICE CARD

MAIL THIS COUPON TODAY!

To: Deborah Mitera
CBS Educational & Professional Publishing
383 Madison Avenue, New York, NY 10017

PLEASE SEND ME (check ISBNs of items desired):
For each order, please enclose the price, 75¢ handling,
5% for shipping, and applicable sales tax. Or we will bill you, or charge your VISA Mastercard.

NO _____ EXP. DATE _____

SIGNATURE _____

NAME _____

COMPANY _____

STREET _____

CITY _____

STATE _____

ZIP _____

Offer valid in USA only; prices subject to change without notice

BOOK/DISKETTE PACKAGE

- 0-03-063978-4 (UCSD Pascal)
 0-03-063981-6 (Wordstar)
 0-03-063982-4 (Visi-Calc)
 0-03-063979-4 (Fortran)

BOOK

- 0-03-063667-1 (Basic)
 0-03-060538-5 (Cobol)
 0-03-063671-X (Use/Basic)
 0-03-061982-3 (Pascal)
 0-03-062882-8 (Assembler)

PCT

about that) than *Starcross* and *Suspended*. The packaging is marvelous, being the documentary evidence folder (complete with lab reports, interview excerpts, and a package of Ebullion—the presumed cause of death) for the late lamented Marshall Robner. You are the detective responsible for investigating this possible homicide case by interviewing the family, snooping in closets, and ultimately making the (correct) arrest.

The neat thing about this game is that it happens in real time; you have 12 hours to solve the mystery and all the events which take place are happening around you in a realistic fashion. People are moving about out of your purview, just as they do in real life. This is in contrast to other adventure games where nothing happens unless you cause it to. Infocoom says this is a first in a series of detective adventures. This one will keep you busy for a long time.

All these Infocoom games allow one back-up copy to be made and require at least 48K memory. If you have a 512K adapter board in your computer, you may have to return the software to Infocoom for a patch, as some copies do not load if more than 64K is signaled from the motherboard. If your games refuse to load and the family is screaming around you, set the switches on the system board to 64K. This is a pain, but better than having your spouse gnawing on your ankle.

High Tech Fingerprint

Many of the drawing packages designed for the computer leave much to be desired in terms of speed and flexibility. *Creative Graphics*, by Accupipe, is a well designed and reasonably fast program which is very easy to use. It is also easy to crash if you are not careful to follow the directions.

The packaging is elegant; it consists of an understated dark blue binder about a half an inch larger than the IBM notebooks, a printed template for the function keys and an excellent presentation of the capabilities of the program. Half of the manual is a 29-minute tutorial to get you started, and the remainder gives



Creative Graphics

more detailed coverage of the individual commands.

The program will dump your picture to an IBM or Epson with GraTrax or an IDS Prism or Microprism printer. The review copy required 64K of memory,



Creative Graphics

DOS 1.1 and, of course, a color graphics adapter card. It is also copy-protected.

The program is well designed from a human interface point of view. All commands are chosen with the function keys and sub-menus which appear to give clear directions for further choices. When the program is invoked, a screen appears with a cursor in the center, a drawing mode toggle, and a current drawing color indicator.

By pressing the function keys, the drawing color and palette may be changed. Different drawing modes may also be selected; freehand line drawing (up, down, right, and left only), and an automatic function which will produce boxes, circles, ellipses, or diagonal lines with a few well-placed keystrokes. During the drawing process, the Paint function key will fill in an area with a selected color.

Any square area of the display may be designated for flipping, rotating, moving, or copying. Moving and copying are very fast; flipping and rotating are tiresomely slow. Text may be placed anywhere in the drawing by whacking another function key.

The drawings may be saved in two ways: as "symbols" or as part of a slide show. The slide show may be designated to run in an automatic or manual mode

when creating the show.

You are cautioned that touching the keyboard while the program is in the process of manipulating your drawing may have unexpected results. They weren't kidding. Sit on your hands or nibble on some tasty snack—do not touch the keyboard while the computer is at work.

Pits And Stones

A favorite pastime of the Neanderthal, this game has been updated from the original treerunk with prune pit peripherals to your local computer video. It is played on a board with fourteen holes (pits). One large pit on each side is the home base for each player. The object of the game is to move stones from one depression to another, trying to capture your opponent's stones and maneuver them into your home pit.

The game begins with the same number of stones in each pit, and the difficulty level rises quickly with the number of starting stones. This is a very colorful game, and the action is reasonably rapid—no computer mumbling "I'm thinking" in this game. There is an incredible amount of noise, raucous tune-playing, and other sound effects; children seem to like this but adults immediately lunge for the DEL key, which turns off the racket.

The simple levels are easy enough for kids, but adults will have a hard time with the upper levels. The graphics are very good, if you like smiley faces; the disk has a five year/50,000 game war-



Pits and Stones

rantly, and is not copy-protected. It can be played on any type of monitor, and will make a pleasant change from *101 Monochrome Mazes*. It is available from Orion Software.

Clutter

This is another game which can be played on a monochrome or color monitor, and it is a delightful one. The general idea is to deflect a photonic ghost hunter, in the form of a little square, into a ghost, thereby vanquishing same and gaining points. The deflection is done by

SYNC HOME DELIVERY

- One year (6 issues) of Sync for \$12.97 — I save 19%.
- Two years (12 issues) for \$22.97 — I save 28%.
- Three years (18 issues) for \$31.97 — I save 33%.

Savings based on full one-year subscription price of \$16.

Mr.
Mrs.
Ms.

Company _____ (Please print full name)

8H1B7

Address _____ Apt. _____

City _____

State _____ Zip _____

CHECK ONE:

- Payment enclosed
- Bill me later.

Please charge my credit card: American Express MasterCard Visa

Card No. _____ Exp. Date _____

Add \$4 a year in Canada and all other foreign countries. Please allow 60 to 90 days for delivery of first issue.

Would you like to receive special offers from qualified users of our mailing list?
 Yes No

SAVE UP TO 33%!

NEW SUBSCRIBERS ONLY



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. Box 2938
Boulder, Colorado 80321

TIMEX **sinclair 1000**

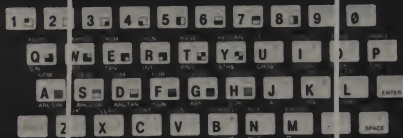
The magazine for Sinclair and Timex Sinclair users

SYNC

Math and Science:
• Least Squares Analysis

Programming:
• Alternative Display
• Storing Words

Space Warp
Graphics Game



FOR SINCLAIR AND TIMEX SINCLAIR OWNERS ONLY

If you own a Timex Sinclair, a ZX81, or any other Sinclair computer, you've probably discovered that the big microcomputer magazines cover only the bigger computers. Where can you find helpful articles on the Sinclair? In *Sync*!

Sync is the one magazine that's written exclusively about Clive Sinclair's marvelous inventions, the Sinclair computers. And it's the one magazine to read if you want to get more from your Sinclair.

You'll find program listings for games, helpful programming techniques, hardware upgrades, math and science programs, news of new products for the Sinclair—in short, everything you need to use and enjoy your Sinclair to the fullest.

In just two recent issues, for example, we covered:

- Putting a Reverse Character in a String
- How to Double Your Memory
- Least Squares Data Analysis With the ZX80/81
- Space Warp: A Graphics Space Game
- How to Reduce "Blank Screen Time"

- Storing Three-Letter Words in an Array
- Software Review: ZX Galaxians
- An Introduction to Expression Evaluation
- Short Programs Just for Fun
- The ZX81 Parser and User-Defined Commands
- Understanding Floating Point Arithmetic
- Handling Strings from Another Dimension
- Book Review: Understanding Your ZX81 ROM
- How to Add a Keyboard to Your Sinclair
- Translating Other Basics: DEF on the ZX81
- Six Outer Space Games—With Program Listings
- Hardware Review: Sinclair ZX Spectrum High Resolution Color/Sound Computer

If you own a Sinclair microcomputer, *Sync* is the only computer magazine you really need. Subscribe now to *Sync*, and you can save up to 33%! Just complete and return the postage-paid reply card or the coupon at right.

**SAVE UP TO 33%
ON SYNC!**

SYNC

CN 1986 • Morristown, NJ 07960

YES! Please send me *Sync* for:

- One year (6 issues) for \$12.97—
I save 19%.
 - Two years (12 issues) for \$22.97—
I save 28%.
 - Three years (18 issues) for
\$31.97—I save 33%.
- Savings based on full 1-year subscription price of \$16.

Mr. _____
Mrs. _____
Ms. _____
(please print full name) BH187

Address _____ Apt _____

City _____

State _____ Zip _____

CHECK ONE:

Payment enclosed. Bill me later.
Offer valid in U.S. and possessions only. Please allow
60 to 90 days for delivery of first issue.

NEW SUBSCRIBERS ONLY

Thinking about buying something you've
seen in this magazine? Getting the best
price is as easy as

1-800-554-7661

The call's on us and the savings are on
you. We're old fashioned merchants in a
high tech world — hardware, peripherals,
software and accessories at user friendly
prices.

Epson RX-80 Printer	\$329.00
Hayes 300 Smartmodem	\$199.95
Hayes 1200 Smartmodem	\$499.95
Elephant Diskettes, box of 10 SSDD	\$ 19.95
Verbatim Datalife Diskettes, box of 10 SSDD	\$ 24.95
Quadchrome Color Monitor	\$459.00
Micropro Professional Packs, each	\$599.00
(Wordstar, Spellstar, Mailmerge, Starindex)	
Sanyo 12" Green Monitor	\$ 99.95
ATI Training Programs, each	\$ 59.95
Persyst 64K Ram & Clock/Serial	\$249.95

**micro
STOREHOUSE**

Micro Storehouse Company
333 Peters Street, S.W.
Atlanta, Georgia 30313
In Georgia call 404-577-8892

Visa, MasterCard and American Express accepted

CIRCLE 259 ON READER SERVICE CARD

IBM Images, continued...

placing mirrors (slashes) in the way of
the hunter.

Once a mirror has been placed, it re-
mains there forever. This is not a prob-
lem in the beginning, but after a few
minutes the display is full of the little
things, and the hunter is caroming all



Clutter

over the place. Every time a ghost gets
hit, a black hole appears to replace it.
These don't go away either, and if your
hunter falls in one, its good-bye photonic
ghost chaser.

There are three levels of difficulty, the
easiest of which has a gigantic ghost that
is almost impossible to miss. This game
is unusual in several respects. First, it is
one of the few games whose sound ef-
fects are so charming that I don't turn
them off. Second, the game comes with
five preprinted labels for your backups.
Third, it is written in uncompiled Basic,
and yet the action is fast and fun.
Starside Engineering has a very pleasant
attitude towards copy-protection, and
their low-key explanation is a nice
change from the usual page of legal
intimidations.

For The P-System

Another book on the p-System arrived
in my office this month and it is destined
to be the classic on this operating sys-
tem. *Personal Computing with the UCSD
p-System*, written by Mark Overgaard
and Stan Stringfellow and published by
Prentice-Hall, is by far the best ex-
position on the p-System I have ever
seen.

It is written in an entertaining and
coherent fashion, and addresses almost
every facet of the formidable number of
commands and utilities available. A tu-
torial is provided for getting started
which is mostly an introduction to the
filer, editor, and compiler.

The remainder of the book is a de-
tailed reference text (although it still
reads very well) and has numerous
appendices which finally explain some of
the mysterious error messages that ap-
pear every so often (or more often than
preferred, actually). There is also spec-
ific information on the IBM p-System,

as well as on the Osborne Executive and un-Executive version.

It is an outstanding and comprehensive book for anyone using this operating system—beginner or otherwise.

Stocking Stuffers

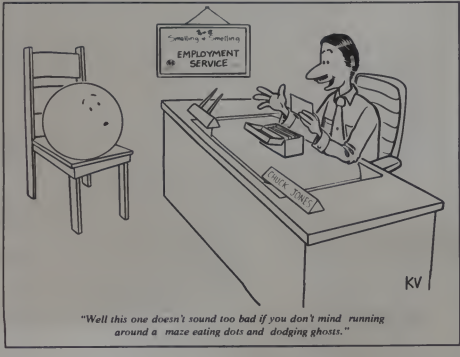
Siechert and Wood, Inc. offer a beautifully designed set of tabs for DOS and Basic manuals; they are available for all the DOS variants and their respective Basics. I have only seen the set for DOS 1.1, which consists of 16 tab cards, eight each for DOS and Basic, printed on heavy card stock with sturdy plastic tabs. They made excellent use of each insert, which lists all sorts of handy summaries of command sets and instructions. Although fairly expensive at \$9.95, they are a timesaver.

Preprinted tiny labels for function keys, or any other part of the IBM you want to name, are available for 25 cents apiece from David Tlusty. You must enclose a stamped, self-addressed envelope and specify what you want on the label. The order is mailed the same day it is received.

Microsoft Goes to Hollywood

This is a test. See if you can fill in the blanks below.

Hollywood	Microsoft
Jaws 1.0	_____ 1.0
Jaws 1.05	_____ 1.05
Jaws 1.1	_____ 1.1
Jaws 2.0	_____ 2.0
Jaws 3.0	_____ 3.0
Son of Jaws	Son of _____



"Well this one doesn't sound too bad if you don't mind running around a maze eating dots and dodging ghosts."

If the bookshelf you reserve for operating system manuals runneth over, you probably had no trouble with this little quiz. By early fall, Microsoft plans to release version 3.0 of the metamorphic MS-DOS.

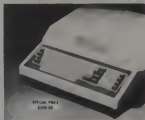
Version 3.0 will be multi-tasking, that is to say you will be able to switch back and forth between *SurlyCalc* and *Galactic Geraniums* without exiting to the operating system and reloading a program.

It is also rumored to be upwardly compatible with Xenix, Microsoft's version of Unix, such that programs which run under 3.0 will also run under Xenix. The Xenix environment is, among other things, a multi-user operating system and is presently available for the Apple Lisa and a few other 68000-based computers. It is so large (8 Mb, to be precise) that I understand it will be sold in chunks so you may decide which pieces of Xenix are most appropriate for your system. It seems that we have been toiling up this upwardly-compatible-with-Xenix mountain ever since DOS 1.0 appeared on the shelves. I wish they would hurry up and get it over with.

It is still unknown whether IBM intends to release 3.0 under its imprimatur, but Microsoft is taking the view that there are so many 8086/8088 clones around that the time has come to give them software support. A new department has emerged at Microsoft with the title of Independent Vendor Support. The intent is to work with those vendors who wish to adapt MS-DOS and its supporting software to their machines.

WHY PAY MORE?

BUY AT DEALER PRICES
30 DAY SATISFACTION GUARANTEE
(ALL ITEMS 100% APPLE & FRANKLIN COMPATIBLE)



ZEUS 2001 — \$999.00 NOW \$599.00
APPLE + CP/M + 64K

- 8 Expansion Slots
- Auto Repeat Keys
- 60 Function Keys
- Built-in Cooling Fan
- Numeric Key Pad
- Expandable to 128K
- Color Graphics
- Break + Pause Keys
- Runs Apple and CP/M Software



DISK DRIVE — \$275.00 NOW \$179.00

- 35 Track SS-D0
- Quiet + Reliable
- Shuggart Mechanism
- 90 Day Warranty



YANJEN MONITOR — \$179.00 NOW \$134.00

- 20 MHz
- 1,000 Lines At Center
- Amber or Green
- Super High Resolution

ACCESSORIES

(100% COMPATIBLE TO APPLE AND FRANKLIN)

	WAS	NOW
1 Disk Drive Interface Card	\$159.00	\$ 89.00
2 TEAC Slimline Disk Dr.	\$295.00	\$239.00
3 2-80 CP/M Software	\$199.00	\$ 79.00
4 80 Column Card	\$229.00	\$ 99.00
5 Soft Switch For 80C/C	\$ 39.00	\$19.00
6 16K RAM Card	\$159.00	\$ 69.00
7 RS-232 Serial Interface	\$199.00	\$ 79.00
8 Integer Card	\$149.00	\$ 69.00
9 Communication Card	\$149.00	\$ 79.00
10 Parallel Printer Interface	\$159.00	\$ 69.00
11 APPLE Dampening Pr. Interface	\$179.00	\$ 99.00
12 Grappler Pr. Interface	\$179.00	\$ 99.00
13 Epson Printer Card	\$149.00	\$ 59.00
12 Prowriter Printer	\$595.00	\$399.00
13 T.V. Interface	\$ 39.00	\$19.00

If it works or runs on an Apple™ it works or runs on ours

DISCOUNT COMPUTERS

3500 S. Orange Ave., Suite #102
Orlando, Fla. 32806

(305) 425-7770

Ask About Our \$3.00 Phone Credit

IBM Images, continued...

Microsoft is also now in the business of selling their generic MS-DOS language compilers directly to the end user. When I visited Microsoft in July, Fortran ver. 3.10, Pascal ver. 3.11, Lisp ver. 4.0, Basic, Business Basic, Cobol, and C were all being shipped in cleverly designed plexiglass boxes.

This is a fantastic idea (the compilers, not the boxes) for a couple of reasons. First, Microsoft, because it is smaller and less ponderous than IBM, could theoretically fix problems (read: bugs) in a more timely and responsive fashion than is now customary.

The problem of updates was brought to our attention rather abruptly when we discovered that our local IBM Pascal Compiler refused to operate under DOS 2.0. How to remedy this little situation was discovered in an obscure appendix in the DOS manual. By providing real end-user support for these types of problems, Microsoft will be performing an act of public mercy.

Secondly, an IBM user will now have a wider choice of language compilers. For a long time, if IBM chose not to release a language for the PC, users did without. Since Microsoft compilers are now available in software stores, they can be purchased by anyone.

The drawback of this generic software

is that it is not customized for the IBM (or any other machine for that matter). So, while a program written for one machine will be transportable to another, no advantage will be taken of the spiffy little features of each computer.

The Lisp compiler (version IV) will have routines for customization, but this language is not Microsoft's own, (they bought it elsewhere), and I don't know if the customization program was added on by Microsoft. I hope that all of their compilers will incorporate some configurator; this will eliminate a lot of resistance to generic software.

I had a chance to try the new *Multi-Tool Word* package, complete with mouse, while I was out there. The mouse requires a bit too much coordination for my taste; it is far easier to hit a key than aim a little plastic rodent by rolling it around on a desk top. The device will be swell for daredevil pilot types with clean desk tops, however.

The word processor itself has 65 different type fonts built into it. The formatting capabilities of the program will present the text on the screen in the chosen type face, which is nifty to see. It obviously won't do you any good to select Times Roman type, if the printer won't handle it.

I now have a CompuServe number

(71056,727) and will check EMAIL messages on a weekly basis. You can also leave a message with the MUSUS SIG, if you are a member. MUSUS serves members of USUS, the p-System users group.

The membership fee entitles a member to receive newsletters, access the MUSUS software library and exchange war stories with other members. Information on USUS and MUSUS is available from:

The Secretary
USUS
P.O. Box 1148
La Jolla, CA 92038.

Firms Mentioned In This Column

IBM Personal Computer
Sales and Service
P.O. Box 1328-C
Boca Raton, FL 33432

Funtastic
5-12 Wilde Ave.
Drexel Hill, PA 19026
(215) 622-5716

Siechert and Wood Technical
Publications
133 West Colorado Blvd.
Pasadena, CA 91105

David E. Tlusty
N1757 Robin Rd.
Medford, WI 54451
(715) 748-4558

Infocom
55 Wheeler St.
Cambridge, MA 02138

Accupiece Corporation
222 West Lancaster Ave.
Paoli, PA 19301
(215) 296-7376

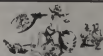
Orion Software
P.O. Box 2488, Dept. 283
Auburn, AL 36831
(800) 821-8088

Stars Engineering
P.O. Box 8306
Rochester, NY 14618
(716) 461-1027

Prentice-Hall, Inc.
Englewood Cliffs, NJ 07632

Microsoft
10700 Northrup Way
Bellevue, WA 98004

FrientlySoft
213 Peeblesbrook
Arlington, TX 76014



COMPUTER GAMES

40% BELOW RETAIL FOR:

APPLE, ATARI, & COMMODORE 64

CHOOSE FROM THESE MAJOR COMPANIES:

ADVENTURE INTERNATIONAL	EPTX		
PREPPIE II	20.97	TEMPLE OF APSHAI	23.97
STONE OF SISYPHUS	20.97	OIL BARONS	60.00
SAGA SERIES	23.97	HELLFIRE WARRIOR	23.97
AWAOLN HILL		SCREEN PLAY	
TAC	24.00	WIDE	23.97
TELENGARD	16.80	ZIGURAT	23.97
PARIS IN DANGER	21.00	DUNZINH	23.97
STRATEGIC SIMULATIONS	EDUWARE		
RINGSIDE SEAT	23.97	INTERSTELLAR SHARKS	19.77
EAGLES	23.97	PRISONER II	19.77
BROADSIDES	23.97	WORLD BUILDERS	19.77
GEOPOLITIQUE 1990	35.97		

HUNDREDS OF MORE TITLES IN STOCK

1-800-331-9131

FOR FREE INFORMATION AND BROCHURE LISTING, COMPLETE AND MAIL THIS FORM TO:
MARCO POLIO, 4881 S. 83rd E. Ave., Tulsa, OK 74145
(Check which ones) (APPLE) (ATARI) (COMMODORE 64)
NAME _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____

All Orders Processed by Personal Check, Money Order, Cash, or Credit Card. Visa or MasterCard. Please Add \$5.00 Shipping, and for Credit Card Charges or Personal Checks Add 4%; Oklahoma Business Add 5% Sales Tax.

CIRCLE 266 ON READER SERVICE CARD
310

INTRODUCING OMNI TEMPLATE for APPLE & COMMODORE OWNERS

A definite difference exists between "thinking about writing programs" and "actually writing them." Even greater a difference are the rewards. **OMNI TEMPLATE** will make that difference! With **OMNI TEMPLATE** you get better looking, more organized programs — and therefore, if you wish to sell your programs, you are better able to sell them.

OMNI TEMPLATE is a program template with utility routines. You just need to add your routines to make more professional programs. It even copy protects your product! (Apple version)

Even if you write just application programs, it will give them a professional look. Better yet, it is a great learning tool.

Available in Apple DOS disk and Commodore 64 tape and disk.

Send check or money order, \$24.95 plus \$1.50 shipping to:

Omni Technology
P.O. BOX 10630
Pittsburgh, PA 15235

PA residents add \$1.56 for PA tax.

CIRCLE 288 ON READER SERVICE CARD

big big selection savings

TITLE	COST						
APPLE		Caverns of Fretag	19 95	Edware	Stretch Calc	79 95	
Applied Software Technology		Titan Empire	27 95	Algebra I	VisiCalc 4	200 00	
Versalform Apple II	\$311 20	Odesia		Fox & Geller			
OBase Apple II	151 20	Chess 7 0	55 95	Quick Code	236 00	COMMODORE 64	
Ashten Tate		Organ Systems		Harcourt Brace Jovanovich		Moon Shuttle (D)	23 95
dBase II	499 00	Ultima III Exodus	43 95	Computer SAT	63 95	Planet Fall (D)	39 95
Fidas	236 00	Sensible		Infocom		Home Accountant (D)	56 95
Beagle Bros.		Sensible Speller IV	100 00	Zork I	31 95	Temple of Apshar (D)	29 95
DOS Boss	19 20	Report Card	47 95	Zork II	31 95	Upper Reaches of Apshar (D)	
Beagle Bag	23 00	Back II Up III	59 95	Zork III	31 95	Curse of Ra (D)	14 95
Top Disk No 1	16 95	Sierra/Dn Line		IUS		Jumpman (D)	29 95
Bruderbund Software, INC.		The Dictionary	79 95	Easy Writer II	280 00	Witness (D)	39 95
Bank Street Writer	55 95	The General Manager	183 95	Easy Speller II	180 00	Mr. Cool (C)	31 95
A E	27 95	Frogger	27 95	Koala		Frogger (D)	27 95
Gumball	27 95	Lunar Leeper	23 95	Koala Pac w/PC Design	120 00	Fort Apocalypse (D)	26 25
Lode Runner	27 95	Ultima II	47 95	Lightning		Fort Apocalypse (T)	26 25
Spare Change	27 95	The Dark Crystal	39 95	Master Type	39 95	Inventory Management (D)	63 95
Questron	35 95	Sammy Lightfoot	103 95	Micropro		Sales Analysis Management (D)	63 95
Maze Machine	47 95	Apple Coder Spider	27 95	Wordstar	396 00	Invocing (D)	63 95
Budge Co.		Mr. Cool	31 95	Infostar	396 00	A/P Management & Invoicing (D)	63 95
Pinball Construction Set	31 95	Sir-Tech Software, INC.		Spellstar	200 00	A/P Management & Checkwriting (D)	63 95
Business Solutions		Wizardry I-Proving Grounds	39 95	Malmirage	200 00	Paper Clip	99 95
Incredible Jack	143 20	Wizardry II-Knights of Diamonds	27 95	Personal Software		Calc Results (D/C)	127 50
CDEX (Training Courses)		Wizardry III-Llygarnyn Whizzy Print	19 95	Sierra/Dn Line		Master Type (D)	31 95
Continental Software		Software Publishing Corp.		Ultima II	47 95	General Ledger	63 95
The Home Accountant	59 95	PS File II	100 00	Software Publishing Corp.		Word Pro 3 Plus Spell Right	79 95
Datamast	31 95	PFS Report II	100 00	PS File	112 00	Quick Brown Fox	55 95
Artex	31 95	PFS Graph II	100 00	PFS Report	100 00	Choplicher (C)	32 95
Multi Play	19 95	PFS Graph IIE	100 00	PFS Graph	112 00	Snakman (TorD)	23 95
Roundabout	23 95	PFS Graph IIE	100 00	PFS Write	112 00		
Bleisload	31 95	PFS Write IIE	100 00	Stoneware			
Conquering World	23 95	Spinmaker		Advanced OB Master	476 00		
Datsoft, Inc.		Complete Line (Call US)		Visicorp			
Zaxxon	31 95	Stoneware Products		VisiCalc	200 00		
Moon Shuttle	23 95	D B Master	182 20	VisiFile	240 00		
Pooyan	23 95	DB Master Version 4	280 00	Desklop Plan	240 00		
Designware		Sublogic		Visischedule	240 00		
Spellscaptor	31 95	Pinball (A2-PB1)	27 95				
Creature Creator	31 95	Fight Simulator (A2-FS1)	26 80				
Desktop Computing		Gertrude s Secrets	35 95				
Graph & Calc II	159 20	Gertrude s Puzzles	35 95				
Fox & Geller		Rocky s Boots	39 95				
Quick Code	236 00	Visicorp					
Harcourt Brace Jovanovich		VisiPlot	160 00				
Computer SAT	63 95	VisiDex	250 00				
Infocom		VisiCalc	200 00				
Zork I	31 95	VisiFile	200 00				
Zork II	31 95	Advanced Version IIE	320 00				
Zork III	31 95	Xerox					
Deadline	39 95	Sticky Bear Bop	31 95				
Starcross	39 95	Sticky Bear ABC	31 95				
Suspended	39 95	Sticky Numbers	31 95				
Witness	39 95	Sticky Bear Shapes	31 95				
Koala		Sticky Bear Opposites	27 95				
Pad w/Micro Illus	99 95	IBM					
Lightning Software		(all OSks)					
Master Type	31 95	Alpha Software					
Micropro		Alpha IBM Connection (D)	156 00				
Wordstar	396 00	Ashten Tate					
Spellstar	200 00	0 Base II	499 00				
Malmirage	200 00	Friday	236 00				
Infostar	396 00	CDEX Training Courses					
Microsoft		all programs	55 95				
Typing Tutor	19 95	Continental Software					
Multi Plan	220 00	Home Accountant	120 00				
Musa Company							
Castle Wolfenstein	23 95						
Know Your Apple Ite	19 95						

TO ORDER Send certified checks, money orders, or use your Master Card or Visa Cards and call 1-800-343-8019. From inside New Hampshire call (603) 542-6175. Personal or company checks require two to three weeks to clear. All prices are subject to change without notice.

Please include \$2.00 for complete order. For C.O.D. add additional \$1.70. 2-day air (UPS) add \$4.00. FOREIGN ORDERS INCL. CANADA. Please add \$5.00 (US) Service fee and 10% ground and 15% by air. Hours: Monday thru Saturday 8:00 to 10:00 Eastern Time.



UNIVERSAL SOFTWARE
The Best Software for Less
P.O. Box 955
Claremont, N.H. 03743



CALL NOW • 1-800-343-8019 • TOLL FREE

CIRCLE 250 ON READER SERVICE CARD

Notebook Computing



This is the first column in what will be a periodic series, although not necessarily monthly. In it we will bring you news of new computers, peripherals, software packages, and books in the category of what is loosely known as notebook computers. These include such machines as the Radio Shack TRS-80 Model 100, NEC PC-8201, TI CC-40, and Epson HX-20.

Five other manufacturers were showing notebook-size computers at the summer Consumer Electronics Show, so we expect to see increasing competition in both price and features in the near future.

Model 100/PC-8201 Compatibility

If you read the sidebar to the review of the Model 100 in the August issue, you know that the Model 100 and NEC PC-8201 are virtual twins. The Model 100 is slightly smaller, has built-in graphics characters, built-in modem, 880 fewer bytes of overhead, and address and scheduling programs not found on the 8201.

On the other hand the NEC 8201 has ten function keys (including KILL), cursor control keys laid out in a logical diamond pattern, on-screen editing within the Basic language, user-definable graphics characters, a LOCATE command for graphics, a side expansion connector for external memory cartridges, and a tape of utility and demonstration programs included.

For communications, the edge goes to the Model 100. Also, if you have need of the name and address or the scheduling package, the Model 100 comes out ahead. However, for programming, the

David H. Ahl

NEC is the clear winner. For text editing, the 8201 also has a slight edge as a result of a nice print formatting program included free.

However, that raises another issue. Software is beginning to appear for the Model 100 and there are several packages for the NEC available in Japan. Since the machines are virtually identical, can software for one be used on the other? Well, yes and no.

Programs written for one machine will run on the other, as long as they do not use the LOCATE command (available only on the NEC). However, cassette tapes for one machine will not load on the other. So if you want any of the wonderful NEC games or utility programs for your Model 100, or vice versa, you must get a program listing somehow, and type the program in on your computer.

We have talked to some software companies who tell us they plan to release tapes for both computers, but not all suppliers plan to do this.

SilverWare Games

The folks at CLOAD who produce monthly cassette "magazines" for other Radio Shack computers have decided to broaden their horizons by going into software for the Model 100. Their first package is called *Games #1* and has four games.

Blockade is similar to the old Atari VCS game, Surround. Two players each have four keys with which to control a constantly-moving snake. Each player

has two objectives: eat morsels of food that appear randomly on the screen, and cause the opposing player to run into the wall or either snake (all of which are lethal). Points are awarded or lost for each action. The winner is the first player to amass 100 points.

The game can be played by a single player in a sort of "practice" mode. The game has three speeds, slow, medium, and impossible.

We found the controls somewhat unresponsive, probably because the program does not sample the keyboard often enough. This, coupled with the small playing area, made the game a bit of a disappointment.

Reversi is the game sold commercially as Othello. This is a one- or two-player game although in the two-player version, the computer is simply taking the place of a playing board. In the one-player version, you play against the computer.

None of us here is a world class Reversi player, so we cannot judge how well the program plays. It has only one skill level which provided more than enough challenge for us; our won/loss record was about 50-50.

The other two programs are both adventures: Frankenstein Adventure and Alexis Adventure. They are fair-size programs (15,000 bytes for Frankenstein and 18,500 bytes for Alexis). This pushes the capacity of a 24K Model 100, but is relatively small compared to the 48K adventures for other personal computers.

As adventures go, these are relatively straightforward and on a manageable scale. For example, Frankenstein Adventure has 16 locations and about 10

or 11 "problems" to be overcome. Directions (go north, go east) and the Look command can be abbreviated to single letters, while two-word commands can be shortened to four-letter abbreviations.

The vocabulary is relatively small, and if the program is looking for the phrase UNLOCK DOOR, you can express it in a dozen different ways, but for your efforts get only, "I don't know how to do that."

It is not always easy to understand what the program is trying to tell you. For example, we were in a room with "a bookcase, a writing desk, and a pen holder." We told the program, OPEN DESK (your input must be all upper case), and the program told us, "I don't see it here." Hmmm.

Nevertheless, the adventures were good fun. They provide a nice diversion while travelling when you have too little time to start a serious project and too much to twiddle your thumbs.

The Games #1 package costs \$24.95 from SilverWare, Box 21101, Santa Barbara, CA 93121. (805) 966-1449.



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

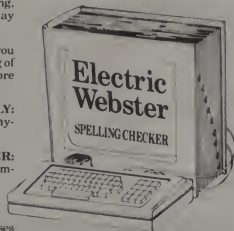
Bible Research Systems
9415 Burnet, Suite 208
Austin, TX 78758
(512) 835-7981

THE WORD
processor
\$199.95
Plus \$1 postage/handling

Requires APPLE II+, IBM-PC, TRS80-III, OSBORNE, KAYPRO, or CPM 8"

CIRCLE 115 ON READER SERVICE CARD

- **DISPLAYS CORRECT SPELLINGS:** If you don't know the correct spelling, EW will look it up for you, and display the dictionary.
- **VERIFIES CORRECTIONS:** If you think you know the correct spelling of a word, EW will check it for you before making the corrections.
- **HYPHENATES AUTOMATICALLY:** (Optional). Inserts discretionary hyphens throughout text.
- **GRAMMAR & STYLE CHECKER:** (Optional). Identifies 22 types of common errors. Makes suggested corrections with the stroke of a key. Runs within EW.
- **50,000 WORD DICTIONARY:** Uses only 2½ bytes per word; add as many words as you wish.
- **FAST CORRECTING:** In as little as 30 seconds, Electric Webster can return you to your Word Processing program, with your text fully corrected and on your screen.
- **INTEGRATES:** into 11 different word processing programs: Wordstar, Spellbinder, Newsprint, Lazy Writer, SuperScript, Scripsit, Electric Pencil, Copy Art, Superscript, Zorlof, and Magic Wand (specify). Begins proofing at the stroke of a key; returns you to word processing automatically.



"The Cadillac"
of spelling checkers
80 Microcomputing, 9/82

VOTED #1: If this sounds too good to believe, you don't need to take our word for it. Take the word of the thousands of 80 Micro readers who voted Electric Webster the #1 spelling checker (1/83).

"The most helpful program I've found is Electric Webster. After looking at nine proofreading programs, I've settled on Webster..." *Creative Computing, 11/83*

ACCLAIMED:

"Electric Webster is the best. Just read any review in any magazine and I don't believe that you will find even one disagreement to that statement." *CINTUG, Cincinnati's Users Group Mag., 4/83*

"In my opinion, the perfect combination is Correcting Electric Webster with the hyphenation and grammar add-ons. To my surprise, it fills every reasonable expectation. It is fast, easy to use and accurate." *Desktop Computing, 12/82*

Performance "Excellent"; Documentation "Good"; Ease of Use "Excellent"; Error Handling "Excellent". *Info World, 8/82*

LOW PRICES:

CP/M or PC/DOS	
Electric Webster	\$209.95
(with Correcting Feature)	
Hyphenation Option	Included*
Grammar & Style Option	Included*
*Limited Time Only	
TRS-80	Electric Webster
w/Correcting Feature	\$ 89.95
Hyphenation	\$149.95
Grammar & Style Checker	\$ 49.95



CORNUCOPIA
SOFTWARE

(415) 524-8098

Post Office Box 6111

Albany, California 94706

CIRCLE 144 ON READER SERVICE CARD

Apple Cart



For the past two weeks, I've been spending almost all my time trying to set up a communications link with our New York office. Currently, we send material to be typeset from Morris Plains to New York by courier. When you work with the tight deadlines we have, getting something typeset even a few hours earlier can help. Well, the lines are up, and we are plugged into the computer in New York. After endless tests of the modem, terminal software, and telephone lines, everything seems to work. Which brings me to the topic of this month's column.

Telecommunications

A Foreword into the Past

Around the same time Babbage introduced his Analytical Engine in 1822, Andre Ampere experimented with various concepts of communication involving signals sent over electrical wires. Samuel Morse took Ampere's idea and his friend Alfred Vail of Morris Plains, NJ, developed the telegraph and the system for transmitting letters and numbers that later became known as Morse code. This was the first step in communication using electrical signals over a distance.

From that milestone to the development of computers, sending information over wires became routine. Different standards evolved over the years, with the RS-232C becoming the standard for microcomputer communication.

As we all know, the Apple is a very open system. That is, almost any peripheral device can be added by simple attachment to the Apple slots. Adding telecommunications capabilities to an Apple is not difficult. There are three things you must

Stephen Arrants

consider: hardware, software, and what you want to access. The answers to these questions may seem complicated, but it is really quite simple. Let's take a look at the options available to you.

Hardware

You really need concern yourself with only two pieces of hardware. You need a peripheral card to communicate with the outside world and a way to get signals to and from your Apple. Almost any RS-232C serial card will work in telecommunication applications. This card allows data to be transmitted to and from your computer in a standard fashion. Connected to that card is a modem, or modulator/demodulator.

A modem takes the electrical impulses from your computer, converts them into sound, and sends them over a telephone line. It also takes the sounds coming from another computer and converts them into electrical impulses that your Apple can understand.

Modems are either direct connect or acoustic. A direct connect modem offers more reliability and versatility because there is nothing between it and the phone line. It can also answer the phone automatically, if another computer is calling you, or automatically dial another computer. Direct connect modems plug into your telephone, usually in the back, where the phone connects to the line. If you wish both the phone and the modem connected, buy a telephone jack doubler, a device that fits right into the receptacle behind a desk phone and give you two

receptacles—one for the phone line and another for the modem connection. With the deregulation of the telecommunications industry in the past few years, permission from Ma Bell is not needed.

One thing to consider when purchasing a modem is speed. Most electronic bulletin boards, on-line information services, and other computers communicate at 300 baud. Baud is a unit of transmission, sometimes defined as bits-per-minute. The term takes its name from Baudot, an early pioneer in telegraphic communications. Three hundred baud will serve almost everyone's needs. Twelve hundred baud is growing more popular, but not every local bulletin board offers this speed. Since many commercial information services impose high surcharges when 1200 baud is in operation, you end up paying about the same amount whether you stay connected for 30 minutes at 300 baud or 10 minutes at 1200 baud.

Consider the "cleanliness" of your telephone line. Errors tend to become more serious at higher rates of transmission. But if 1200 baud is what you want, make sure it is Bell 212 compatible. It should say this on the packaging or advertising. Do not get a Bell 202 compatible modem; this protocol isn't used frequently and can cause trouble when your call is routed through a satellite.

You can buy a modem separately or as part of a software package.

Data in the form of characters are encoded into bits. Length can be either 5, 6, 7, or 8 bits, because of the various standards that have arisen over the years. Each bit is transmitted as a pulse across the phone lines, each pulse having a defined duration. At the receiving end, the other computer must be synchronized to the pulses sent. It must know when a bit

starts, how long it is, and when a character starts and stops.

Microcomputers use asynchronous operation. That is, characters can be thrown onto the transmission line in almost any fashion; timing is not important. But transmission must be at a fixed rate and must be framed with start bits and stop bits. These bits delimit a character, providing a check on what is sent.

Also involved in this error checking is parity. When data are transmitted, errors can occur if the line is "dirty." This can cause an extra bit to be included in a character, causing a parity error. To guard against such problems, a parity bit may be appended to the word sent, making the total number of binary ones in the word odd or even, depending upon the type of parity chosen. An extra or missing binary one will tell the computer that an error has occurred. Depending on your software, the computer may ask for that specific word or character to be resent or flag it for later examination. Parity may be odd, even, or absent.

Software

What you want to do will have bearing on what type of software you should consider. If you just want to transmit what you type rather than capture or send files, "dumb" terminal software is what you need. This bare-bones software is cheap and easy to use, but severely limited in scope. You can't download files, capture data for printing out hard copy, or do much else. Smart terminal software isn't much more expensive, and the added features are welcome. What features should you expect?

All smart terminal software should allow the transmission and capture of disk files. For example, suppose you see a terrific new utility in the download section of a bulletin board. Transferring it to your Apple disk drive is certainly much easier than copying the program by hand and



"You—OOPS!—must be the gentleman who has a problem with our floppy disks!"

November 1983 © Creative Computing

CLASSROOM SOFTWARE for the 16K TRS-80

Easy to use software for models I/III with tape disk or network. Complete manuals plus on-screen instructions. As simple as typing CLOAD and RUN.

Each program recorded twice on a separate side of a quality long-lasting cassette.

CLASSROOM PACKS. Each has 4 programs in a subject area and permits self-paced study with unlimited running time. Choice of review or self-test modes plus progress reports and help feature. Missed questions are corrected and recalled until learned. Price \$44.95 each.

- Geography I
- U.S. Government I
- U.S. History I
- Driver Education
- Electronics I
- Music Theory I

Other outstanding cassette software	
• Logic Games Package	\$24.95
• Anagrams	\$19.95
• Scramble-Grams	\$19.95

30-DAY GUARANTEE

At local dealers or order direct

Educational Media Associates

Software Products

342 West Robert E. Lee
New Orleans, LA 70124

MC & VISA include card # and expiration date. Free shipping on prepaid and credit card orders. Others add \$1.50 per package.

CIRCLE 171 ON READER SERVICE CARD

Happy Hands

Offers Discounts on All

TRS-80™ COMPUTERS

We Have What You Are Looking For

Free Shipping Within United States

- 100% New Original Equipment
- Prices Comparable to Any Other
- No Tax On Out of State Shipments

For Prices and Shipping Information
Call Toll Free

1-800-545-9019

N.M. Residents Call 257-7865

or write

HAPPY HANDS

P.O. DRAWER 1

RUIDOSO, NEW MEXICO

88345

CIRCLE 183 ON READER SERVICE CARD

Learn how to Program and Use PERSONAL COMPUTERS



Now at Home in Spare Time, you can learn everything you always wanted to know about personal computers. How to program in BASIC. How to understand and use more than 80 BASIC commands and functions. How to write and run your own programs.

For both personal and business applications. How to use pre-packaged programs and change it to meet your special needs. How to make sense of the overwhelming maze of books, information and advice available at your local computer store.



More Than Just A Computer Manual

This is more than just another programming manual... it's an entire comprehensive course written by experts. Yes, because it was especially developed for home study, you learn everything right in your own home, without changing your job or lifestyle, without attending a single class.



Plus You Get Your Own Computer to give you practical hands-on experience. This course includes your own personal computer—the TImex 1000 with 16K memory module—plus a cassette recorder that lets you save your programs on tape. **Get all the facts!**

MAIL ORDER TODAY!

ICS
Circle 184

COMPUTER TRAINING, Dept. DH053
Scranton, PA 18515

Name _____ Age _____

Address _____

City/State/Zip _____

*DOUBLES DISKETTE STORAGE SPACE!!

REDUCE YOUR DISKETTE COSTS BY 50%



"The back of your 5 1/4" single sided diskette has recording medium. All you need is an ACCURATELY placed "write enable notch"

to use it, on many systems **NIBBLE NOTCH™** is a precision engineered tool designed for this purpose.



IT'S A MONEY SAVER!
IMMEDIATE SHIPMENT!

ONLY \$14.95

Add \$1.50 Postage-Handling (\$4.50 Foreign)

—Florida Residents Add 5% Sales Tax—

ORDER TODAY!

SEND CHECK OR MONEY ORDER TO

NIBBLE NOTCH™

Division of Cortan International

4211 N.W. 75th Terrace, Dept. L 11
Lauderhill, Florida 33319

PAT. PEND.

CIRCLE 196 ON READER SERVICE CARD

Apple Cart, continued...

then typing it into the Apple.

Let's say that you want to place a public message on many boards. Why spend time typing it over for each board? Why not save it as a text file and transmit it with one keystroke?

Having the ability to interrupt the data capture at any time can prevent host prompts and commands from being saved to disk. Suppose that the program you are capturing has special control codes or commands that might make a mess on your computer? The ability to flag for later editing or change them to harmless or more meaningful characters is a feature you should look for.

Pay attention to the file transfer protocols that are offered. You must have identical software for transfer to work. What a protocol does is use an accepted way of functioning. It uses a specific length of data for each transmission block sent or received. If a block sent does not match an agreed upon figure, a protocol error results. The receiver then tells the originating computer to send the block again. Many protocols exist. The closest thing to a standard is called the Christiansen protocol, also known as Modem, XModem, or CP/M standard. It is the most widely used protocol among microcomputer systems, though others are used.

Other useful features include access to DOS commands. This is useful if you

can't remember the exact file you plan to send, or if you need to delete some files to make room on a disk for a long file. Software that allows storage of macro commands is useful, especially when you use a complicated log-on series. A phone directory that can automatically look up and dial is almost a necessity if you use many services.

Some software allows communication only at 300 baud or less. If you are serious about telecommunications, get a software package that allows you to select baud rate. Sooner or later you may get a modem with 1200 baud capability. Don't let your software lock you in.

Starting Small

Now that you have the hardware and software, what can you do with it? For a start, call up a local bulletin board. These are usually privately run and free, and the interests of their users are almost limitless. There are boards for fantasy game players, photographers, science fiction fans, hardware/software purchase or trade, and on many other topics. Most boards are free form, however. They can include many different interests and philosophies, with few restrictions.

Operators are called Sysops, and they may be available on-line to answer questions you may have or just talk. Often, the board operates on the Sysop's own

Apple. Therefore, don't expect it to be up 24 hours a day. After all—there are other things to do with an Apple.

When you dial up a bulletin board, a signal is sent from the host computer to your Apple. After this carrier is received, your modem sends out a signal telling the host that a connection is established. From that point on, you are connected with another computer. Instructions are displayed on your monitor. They may or may not ask for your name, address, phone number and type of computer. A password can be issued that allows for faster log-on and access to restricted parts of the board, such as a download section. Don't give a phony name or phone number. If you want to use a "handle," tell the Sysop in a private message and usually he will oblige.

Get involved in the board. If someone asks a hardware or software question, and you think you know the answer, answer it! A board needs active discussion to survive. Unfortunately, it is rare to have more than one user on at a time. Any discussion that takes place will resemble using the mails.

Quite often, uploading and downloading are available. You can upload to the host and download to your Apple. If you are on a general board—one that isn't exclusively Apple-oriented—there may be programs for the IBM PC, TRS-80, Color Computer, and many other computers. You can download these files if you want, but they will not run on your Apple. Of course, you could save them as text files and translate them into Applesoft if you wish.

A few words about these free programs. First, don't expect to find a copy of *VisiCalc*, or *Lode Runner*. That would be a copyright violation and Sysops are fanatical about keeping their systems clean. Second, you get what you pay for. The programs are frequently undocumented; the descriptions may not match performance; and many may not work at all. Still, I have found a few programs that were worth the time and effort. Rarely, you find a program that is so well-written and documented that you would have paid for it.

For every one or two programs you downloaded, upload one. The program you contribute doesn't have to be the most amazing piece of code ever written. Maybe you have a better way to draw a shape or a new twist on formatting a screen display. If it is a bad program, the marketplace will let you know. Here, though, it is the effort that counts.

Where to start? I have included a list of some BBSs across the country.

For a more comprehensive list, dial up Novation at (213) 881-6880. Though the list they provide isn't complete, it includes

Low Discount Prices & Technical Support = FANTASTIC VALUE

Computers:

Apple IIe starter system.
SALE PRICE \$1579.95

Franklin Ace Pro Pack includes
ACE 1000 with color, 64K, disk
drive with controller, 80 column
card, assembler, and acascal.
ALL FOR \$1269.95

Columbia MPC Computer in-
cludes 2 disk drives, 128K,
\$3,000 worth of software,
Columbia keyboard.
ALL FOR \$2735.00

Software Publishing:

PFS File \$88.00
PFS Graph \$88.00
PFS Report \$88.00

Printers:

Epson FX-80 \$525.00
Epson FX-100 \$689.00
Epson RX-80 \$349.95
Epson RX-80 FT \$469.95

Gemini 10X \$295.00
Gemini 15X CALL
Prowriter I \$365.00
Prowriter II \$625.00

Diskettes:

Elephant DS/DD \$28.99
Maxell MD-2 \$39.95

All software:

All software marked 30% off list
Budgetco Raster Blaster \$21.95
Budgetco Zaxxon \$29.95
Edu-Ware Compu-Read \$21.95
SAT Word Attack \$36.00
Kraft Joysticks below dealer
cost \$34.95

FREE CATALOG

TEAM COMPUTER PRODUCTS

109 Church Street, Suite 303
New Haven, CT 06510
(203) 777-2284

CIRCLE 245 ON READER SERVICE CARD

FREE CATALOG

It's Simple. . . **CALL AND SAVE MONEY**

1-800-841-0860

**CONVENIENT
ORDER ENTRY**
GA. INFO. 912-377-7120

"Telemarketing Works For You"

Commodore

**CALL FOR BEST
PRICES ON
COMMODORE**

COMMODORE 64
VIC 1541 DISK DRIVE
VIC 1530 DATASETTE REC.
VIC 1525 GRAPHIC PRINTER
VIC 1520 COLOR PLOTTER
VIC 1600 VIC MODEM
VIC 1701 COLOR 14" MONITOR

COMMODORE 64 SOFTWARE
HERWARE SOFTWARE
WORDPRO PLUS 3

'CALL

**TRS-80
COMPUTERS**

• PURE RADIO SHACK EQUIPMENT •

UP TO **20%** AND MORE

DISCOUNT

***** CALL FOR PRICES ***
ON COMPLETE LINE**

**IBM COMPATIBLES
YOUR CHOICE**
**EAGLE PC
COLUMBIA PC
CORONA PC**
\$CALL

**RB ROBOT
RB5X 'CALL
ARMATRON
ROBOT ARM
'29**

**EPSON
PRINTERS**

FROM 'CALL

FX-80..... **SAVE**
RX-80..... **SAVE**
FX-100..... **SAVE**

**TRS-80 PRINTERS
COMPLETE LINE FROM '199**

IBM SMITH
CORONA

**TP-1 DAISY
WHEEL
PRINTER**

FROM \$CALL

Star

GEMINI
10X & 15
PRINTERS

FROM '299

C. Itoh

PROWRITER
8510..... *CALL
NEW1
8600..... *CALL

**OKIDATA
PRINTERS**

FROM \$CALL

MICROLINE SERIES
*83A
*84P *92P *93P
PACEMARK 2350P

MODEMS

Hayes

Innovation

'CALL

MONITORS

USI

AMDEK

\$CALL

NOTICE

ALL PRODUCTS WE SELL ARE BRAND NEW AND COVERED BY THE MANUFACTURER'S SPECIFIC WARRANTIES. COPIES AVAILABLE UPON REQUEST. WE DO NOT SELL ANY USED, RECONDITIONED, FOREIGN OR SUPERIOR MODIFIED EQUIPMENT. PRICES AND PRODUCTS SUBJECT TO CHANGE WITHOUT NOTICE

QUADRAM

GRAPPLER +

FRANKLIN

Albert

COMPUTERS

'CALL

FREE

UPON REQUEST
• DISCOUNT PRICE LIST & INFORMATION KIT
WRITE
MICRO MANAGEMENT SYSTEMS
TELEMARKET DEPT. #

**NEW
PRODUCTS
'CALL**

**Verbatim
DATALIFE
DISKETTES
\$CALL**

Since 1978

- PIONEER IN DIRECT TO CONSUMER SALES OF MICRO COMPUTERS AND ELECTRONICS
- NAME BRAND PRODUCTS
- LARGE INVENTORIES
- NEXT DAY SHIPMENT ON MOST PRODUCTS



**Micro Management
Systems, Inc.**

2803 Thomasville Road East
Cairo, Georgia 31728
(912) 377-7120

**DISCOUNT
PRICES**
**BUY
DIRECT**

TELEMARKET DEPT.

CIRCLE 192 ON READER SERVICE CARD

Apple Cart, continued...

The following list is not comprehensive, but will give you an idea of some bulletin boards around the country.

R=TRS-80 oriented
A=Apple oriented
CP/M=CP/M system
*=most computers

Name:	Phone:	Type:
RCP/M	201-272-1874	CP/M
FORUM-80	201-528-6623	R
Conference Tree	201-627-5151	*
ABBS	201-994-9620	A
BULLET-80	203-744-4644	R
BULLET-80	205-272-5069	R
Magnetic Fantasy	213-388-5198	*, Sci-Fi
NOVATION	213-881-6880	Lists other systems
DRUCOM	215-855-3809	S
ABBS	305-261-3639	A
ABBS	312-420-7995	A
Apple Gram	313-295-0783	A
CPU	313-547-7903	*
Davy Jones Locker	313-764-1837	A
Twilight Phone	313-775-1649	*
ABBS	415-881-5662	A
Assembly Line	502-459-5531	A
PMS	503-689-2655	*
CBBS	516-561-6590	R
ABBS	516-698-4008	A
ABBS	604-437-7001	A
FORUM-80	617-692-3973	S
Mines of Moria	713-871-8577	*
Adventurer's Tavern	714-538-3103	A
ABBS	802-879-4981	A
ABBS	907-225-6789	A

Send phone numbers to:
APPLE CART
Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07950

hundreds of different boards. Some BBSs spring up and die very quickly. Don't be discouraged.

Moving Up

If you get tired of the small boards, and you can afford them, there are several large timesharing systems available. The Source, Compuserve, Dow Jones, and Delphi are just a few of the systems available. After using small boards, using one of the large systems makes you feel like a kid in a candy store. There is so much available that you may find it tough to decide where to start.

Don't take too long, though. These systems charge by the hour and hit you with a surcharge if you run at 1200 baud. Rates may be as low as \$5 per hour after 6 p.m. local time, rising to about \$30 per hour during business hours.

What is available? Well, you can do almost anything: read news right off a wire service (AP, Reuters) or talk with different users in a chat mode or Citizen Band radio simulation. Out of work or thinking about changing careers? Add your resume to a special database or look at the want ads. You can send mail to a friend's account on the system, learn how to program, do some programming, or buy something over the computer.

Games are available on-line. What makes these games exciting is that more than one person can play at a time. You not only play against the computer, but against the other players. Hollywood gossip, a personal advice server, horoscopes, and other forms of entertainment are available.

Perhaps the most useful features are the Sigs or Special Interest Groups. These

are bulletin boards and discussion sections revolving around one interest. There are Sigs for feminists, automobile collectors, science fiction fans, and an almost limitless number of other interests. These Sigs are not run by the timesharing system, but by the people in the Sigs.

Well, I think that that is enough information to give you a start. Let me know if you discover an unusual BBS. From time to time we will publish telephone numbers of boards across the country.

Letters

To Lisa Handley of West Palm Beach, FL: As a general rule, the files generated by one calc-type program may be successfully transferred to another if the data are saved in DIF format. DIF, or Data Interchange Format, is the format that *VisiCalc* files began using. Many other calc programs, such as *MagiCalc* and *SuperCalc*, allow their files to be saved in this format. As always, ask your dealer if the particular package you are considering allows for DIF file storage.

To Donald McInerney of Dearborn, MI: I use *Apple Writer IIe* and I haven't experienced the problems you mention. Perhaps you are losing letters because you do not strike each key completely. Is anyone else experiencing this problem? Do you strike a series of keys and find letters missing?

To James Workman of Zanesville, OH: Here is how to delete that space after underlining in *Apple Writer IIe*: Embed a CONTROL-H after the underline token, and punctuation marks will immediately follow the underlined text. The sequence is CONTROL-V, CONTROL-H, CONTROL-V. That's all there is to it!

To all who have written about trading up to an Apple IIe: I'm sorry, but I cannot put you in touch with a dealer offering this service. The retail market changes very quickly, and even if I knew a dealer offering trade-ups in your area, the dealing period would be over by the time my reply reached you.

Future Cart

Next month, a report on the September survey. I'll print your answers, questions, comments, and complaints (none so far!). Keep those surveys coming in. I read each one and take your suggestions seriously.

This morning, I saw a demonstration of *Supersprite*, a peripheral card that allows the creation and use of sprite graphics on the Apple. I couldn't believe what this card did. It is one of the most innovative and exciting Apple peripheral cards to come along in years. I'll have a review next month. Also reviewed will be Key-Wiz, a special keyboard that can be configured for your own needs. □

Your money saving Christmas list from Nonagon

SPECIALS

APPLE	
Wordstar with CPM Card (Micropro)	\$ 360.00
1K8 Bcardcard (RG8)	47.95
Disk Drive 5 1/4" (RG8)	224.95
Diagnostic Controller Card (RG8)	99.95
System Server	62.95
Multiplan	185.95
TG Joystick for Be	43.95

ALTAI

Role Position (Altair) R	34.95
Blue Max (Synapse) D/C	29.95
Combat Leader (SSD) D/C	39.95
Jumpman (SS) R	31.95
Bank Street Writer D	54.95
COMMODORE 44	
Fort Apocalypse (Synapse) D/C	26.50
David's Midnight Magic (Broderbund)	26.50
Home Accountant II	24.50
In Search of Most Amazing Things (Spinnaker) D	29.95
Pharaoh's Curse (Synapse) D/C	29.95
RES Writer R	29.95

IBM

123 (Lotus)	370.00
High Rise (Microsoft)	23.95
Flighi Simulator (Microsoft)	150.00
Master Type (Lightning)	37.95
Money Decisions (Eagle) Vol I	175.00
Money Decisions (Eagle) Vol II	175.00
FOR ALL COMPUTERS	
5 1/4" Diskette Databases D/DD	25.95
5 1/4" Data Use Databases D/DD	40.00
5 1/4" Head Cleaning Kit (Verbatim)	9.95
5 1/4" Verbatim Retris for Head Cleaning Kit	15.50

APPLE BUSINESS

	RETAIL PRICE	YOUR PRICE
AIRPORT-TATE	295.00	235.00
Factory		
BRODERBUND		
Bank Street Writer	69.95	49.95

CONFIDENTIAL

Home Accountant	74.95	52.50
Gen Ledger/APWR/Payroll	249.95	174.95
Property Management	494.95	346.50

EMBLE

Money Decisions Vol I	199.95	149.95
Money Decisions Vol II	229.95	172.95

MICRO PRO

Wordstar	495.00	346.50
Maintenance	250.00	174.95
Spellstar	250.00	174.95

MICROSOFT

MultiTool Financial Statement	100.00	80.00
MultiTool Budget Analysis	150.00	120.00
Screenwriter Pro	199.95	139.95
General Manager	229.95	169.95

SILKWOOD VALLEY

Last Handler	39.95	27.95
Word Handies	59.95	34.95

SOFTWARE PUBLISHERS

PPS-File	125.00	83.50
PPS-Report	125.00	83.50
PPS-Graph	125.00	83.50

FOURWHEELS

DB Mastery-40	350.00	245.00
Utility Pk #1	129.95	90.95
Utility Pk #2	129.95	90.95
Statistics Pk	129.95	90.95

APPLE GAMES

AMBIT GARDI	
Hi Ten Golf II	39.95 27.95
BRODERBUND	
Lead Runner	34.95 24.50
AL	
Gumbali	29.95 20.95
BUDBECO	
Raster Blastie	29.95 20.95
Pin Ball Carol	39.95 27.95
DATAMOST	
Zaxxon	39.95 27.95
EDU-WHEELS	
Prisoner II	32.95 23.50
Empire I or II	32.95 23.50
Tenderfoot	39.95 27.95
MATHM	
Sargon II	34.95 24.50
TIPOCCON	
Zork I, II or III	39.95 27.95
Suspended	49.95 34.95
Witness	49.95 34.95
Deadline	49.95 34.95

MICROBAS	
Miner 2040er	39.95 27.95
High Rise	34.95 24.50
ODERA	
Chess	69.95 49.95

OSBORN SYSTEMS

OS/2	54.95 44.95
PENQUIN	
Quest	19.95 15.95
Transylvania	19.95 15.95

SERENA-ON-LINE

Ultima II	59.95 48.95
Time Zone	99.95 69.95
Dark Crystal	39.95 27.95

SIR TECH

Priming Grounds	49.95 34.95
Knighi of Diamonds	34.95 24.50
Legacy of Lygamym	39.95 27.95
Galactic Attack	29.95 20.95
Star Wars	24.50 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

SYNERGETIC

Microbase	44.95 31.50
Bojo	34.95 24.50
APPLE HARDWARE	
ADVANCED LOGIC SYSTEMS	
Z Card II	169.95 142.95
Ultimate II	179.95 151.95
ELECTRO HOME	
Hi Res RGB Color Monitor with NTS/Interface	599.95 449.95

HATES

Micro Modem with Terminal Program	408.95 306.95
-----------------------------------	---------------

YG PRODUCTS

Paddies	39.95 27.95
Select A Port	59.95 41.95
DEI	
Hi Res Amber/Green Monitor	249.95 169.95

APPLE UTILITIES

BEAGLE BROTHERS	
Alpha First	39.95 27.95
Apple Mechanic	29.95 20.95
Doss Boss	23.95 19.50
Promo Doss	29.95 20.95
Double Take	34.95 24.50
Tip Disk #1	19.95 15.95
Utility City	29.95 20.95

HATEDN

Apple Soft Computer	99.95 69.95
PENQUIN	
New Graphics Magician	59.95 41.95
Complete Graphics System	69.95 48.95

PHOENIX

Zoom Graphics	49.95 34.95
SOUTH WESTERN DATA	
Munch-A-Bug	49.95 34.95
Mexlin	64.95 45.50
Assembly Lines	19.95 15.95
Photographers	49.95 34.95

ENTERTAINMENT

ATARI	
Dig Dug (Altair) B	44.95 33.95
Donkey Kong (Altair) R	49.95 37.50
Castle Wolfenstein (Muse) D	29.95 22.50
Ultima II (Serena On Line) D	59.95 44.95
Dimension III (Synapse) D/C	34.95 24.50

COMMODORE

Jumpman (Epyx) D, C, R	39.95 31.95
Choplifter (Broderbund)	64.95 35.95
Grid Runner (RES)	39.95 31.95
Temple of Apath (Epyx) D/C	39.95 31.95

IBM

Serpentine (Broderbund)	34.95 26.50
Suspended (Infocom)	49.95 37.50
Cyborg (Sentiment)	39.95 26.50

BUSINESS

ALTAI	
Altair Writer (Altair)	99.95 74.95
Time Wise (Altair)	29.95 22.50
Home Accountant (Continental)	74.95 56.50
Visacost (Visicorp)	250.00 187.50
IBM	
PPS Write	140.00 105.00
D Base II (Ashlon) Plus	695.00 450.00
Home Accountant Plus (Continental)	150.00 112.50
Easy Writer II (RES)	350.00 262.50

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 Altair, Commodore, Apple and IBM computers. Prompt delivery. Call us and order today.

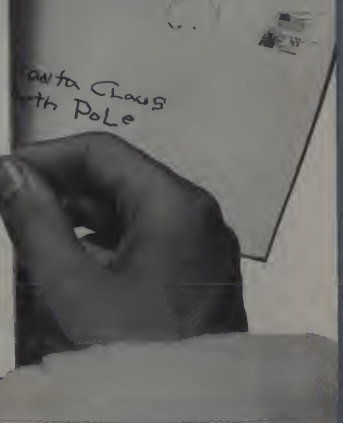
TOLL FREE 800-942-2058

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
PO BOX 1486
EL CERRITO, CA 94530
PH (415) 237-4406

Add \$3.00 for shipping and handling (foreign orders/hardware extra). California residents add 6 1/2% sales tax.

CIRCLE 197 ON READER SERVICE CARD



NONAGON SOFTWARE



Commodore's Port

John J. Anderson

First off, keep those cards, letters, and especially manuscripts rolling in. I have been quite favorably impressed by the overall quality of the Commodore submissions we have been getting. At this rate, the *Creative Commodore* programming books will be among the strongest available for any micro around. Keep up the good work, folks.

Let's make a brief diversion to the mailbag. Mike Steed, of Provo, UT, wrote in with the following fix:

"In the July 1983 issue on page 176, Eric Luce and James Wheeler presented an excellent program using redefined characters on the Vic. To make room for the characters, they moved the start of Basic to \$1801 (6145 decimal). This is very handy, except for one thing. The RUN command without a following line number, and NEW, will return an error message.

"This can be prevented quite easily. For some strange reason, Vic-20 Basic requires a zero byte at the start of Basic minus one.

"So, to remove the error message after those strange POKES, add POKÉ 6144,0 to line 30 in listing 1, preferably before the NEW. Also, add the same command to both of the immediate-mode sets of POKES."

Okay, Mike, we will do so.

Still Seeking Resolution

We have also received many responses to our piece on Commodore 64 video resolution. A few monitor owners wrote in with the same fix as Mark Kuehn, of Eau Claire, WI. Mark stated the following:

"I recently bought a Commodore 1701 color monitor for my Commodore

64. Unfortunately, when I used the two-cable jack supplied with the monitor, light vertical lines appeared on the picture. This problem is described in the August 1983 Commodore's Port.

"The problem can be remedied by using a three-jack cable connected to the optional three-jack input on the back of the 1701 monitor. The same five-pin DIN jack can be used to plug into the 64, but the cable will have a separate *luminance* line added.

"Connect the luminance output of the C-64 (pin 1) to the jack labeled LUMA, the video output (pin 4) to the jack labeled CHROMA, and the audio output (pin 3) to the audio input jack. A pin-out diagram is shown on page 142 of the Commodore 64 User's Guide.

"Through the addition of the luminance output, a much sharper picture is obtained, the colors are purer, and the troublesome vertical lines are eliminated completely."

Thanks, Mark. Speaking of the Commodore 1701 monitor, I recently saw a retail price of \$240 for the unit. This has got to be one of the best prices around for a quality NTSC monitor. And if you have a C-64, it is the only logical choice. What a difference it makes in video quality.

Nonetheless, we have gotten many letters from disappointed owners of C-64s, some with color monitors, suffering from a problem *Compute* magazine recently christened "sparkle." This glitch results in a distracting glitter effect across the screen. One of the 64s we

have here at the lab has a really bad case of the sparkles, for which *Compute* faults a ROM problem. It makes certain programs very hard to watch, and certainly spoils many graphic effects. Even text screens are affected. At press time, Commodore had yet to officially acknowledge the problem or state when a fix would be available.

Rest assured we will keep a close eye on the Commodore video story and update it again soon. As soon as a sparkle fix is available we shall report on it.

The Key to the Commodore Keyboard

When you take your new Vic-20 or Commodore-64 computer out of the box, the keyboard of the machine immediately offers a challenge. Staring at it, you can almost hear it say "I dare you to make me do something."

Of course you can make it do things without learning much about the keyboard. You might choose to learn only the commands that load prepackaged software into the machine and get your C-64 or Vic-20 to do some neat things. But if you want to do more, you will have to learn more about the Commodore keyboard layout.

The keyboards of these machines are easy to learn, but have their little tricks. Sometimes something works one way, then later in another, leaving you perplexed as to why you can or cannot get certain keypresses to work.

Another aspect of the keyboard that can be confusing is the concept of special graphics characters. They have their own special meanings and are sometimes hard to find on the keyboard. This kind of problem often surfaces when you are typing in a listing from a printed source.

MICROSOFT

APPLESOFT COMPILER	109.99
BASIC COMPILER	239.99
SYSTEMCARD 64K (IBM)	239.99
FORTRAN (IBM)	239.99
MOUSE	129.99
MULTIPLAN (ALL FORMATS)	184.99
MULTITOOL/FIN STMT	69.99
SOFTCARD (APPLE)	229.99
PREMIUM SOFTCARD (IBM)	329.99

Novation

APPLE CAT II	295.99
APPLE CAT 212	595.99
D-CAT	579.99
EXPANSION MODULE	159.99
FIRMWARE ROM	34.99
J-CAT	25.99
SMART CAT 103	104.99
SMART CAT 103/212	189.99
	429.99

QUADRAM

APC (APPLE /// PAR) 129.99
512+ (BAK) 259.99
IPC (IBM PAR) 59.99
MICROFASER P/P 8K 139.99
QUADBOARD (84K) 279.99
QUADCHROME MONITOR 499.99
QUADCOLOR I 239.99
QUADCOLOR II 219.99
QUADLINK 549.99

apple

ALS CPM 3.0	299.99
BANK ST. WRITER	44.99
BPI (GLA.PAR.PAY.JNV)	49.99
COPY II PLUS	22.99
6 BASE I	429.99
DEADLINE	29.99
FINGERPRINT	44.99
MINER 2048R	31.99
MICROMODEM II	254.99
MICRO SCI-A-2 DRIVE	229.99
MTN C/P5	144.99
MTN EXP CHASIS	529.99
MTN MUSIC SYSTEM	289.99
SCREENWRITER II	89.99
SUSPENDED	29.99
TG JOYSTICK	46.99
VISCALC	169.99
VISCALC ADV (III ONLY)	279.99
VISIFILE	169.99
VISILINK	169.99
VISISCHEDULE	219.99
VISITREND/PL0T	219.99
WILD CARD	29.99
WTN ESS	29.99
WIZARDRY	32.99
WORD HANDLER II	49.99
ZORK I, II, III	24.99
16K RAM CARD	39.99

MicroPro

CALCSTAR	89.99
DATASAT	179.99
INFOSTAR	299.99
MAILMERGE	149.99
REPORTSTAR	209.99
SPELLSTAR	149.99
STARINDEX	119.99
SUPER SORT	149.99
WORDSTAR	239.99
WORDSTAR PRO	419.99

Continental

HOME ACCT (A, AT, TRS 80)	44.99
HOME ACCT (OSB)	59.99
HOME ACCT (IBM)	99.99
FCM (APPLE)	85.99
FCM (IBM)	84.99
PROP. MANAGEMENT	209.99
CPA (GL, AP, AR, PAY)	159.99
TAX ADVANTAGE	39.99
AT&T SOFTWARE 1983	14.99
APPLE SOFTWARE 1983	14.99
APPLE GRAPHICS	14.99

IBM

AST MEGA + 2 64K	439.99
AST SII PAK + 64K	359.99
9 BASE II	429.99
CDEX TUTORIALS	57.99
COPY II PC	22.99
DEADLINE	29.99
FLIGHT SIMULATOR	32.99
HAYES 1200B MODEM	489.99
IBM ENCYCLOPEDIA	59.99
LOTUS 123	349.99
MASTER TYPE	34.99
MILLIONAIRE	49.99
MINER 2048R	31.99
16 HOT DS/DD DRIVE	229.99
PERFECT WRTR/SPELL	269.99
PFS FILE	59.99
PFS GRAPH	79.99
PFS REPORT	69.99
PFS WRITE	69.99
PLANTRONICS COLOR-	389.99
PRINCETON RGB MON	489.99
QUICK COPY	29.99
STATE OF THE ART	SCALL
VISWORD	269.99
VOLKSWRITER	119.99
WITNESS	29.99
WIZARDRY	42.99
ZORK I, II, III	24.99

Beagle Bros

ALPHA PLOT	24.99
APPLE MECHANIC	19.99
BEAGLE BASIC	24.99
DOS BOSS	15.99
DOUBLE TAKE	24.99
FLEX TEXT	19.99
FRAME-UP	19.99
PRONTO DOS	19.99
TIP DISK#1	14.99
TYPEFACES	14.99
UTILITY CITY	19.99

Videx

APPLE WRITER PRE-BOOT	16.99
CHARACTER ROMS	24.99
ENHANCER II	99.99
FUNCTION STRIP	34.99
INVERSE VIDEO	19.99
PSIO	169.99
SOFTSWITCH	19.99
ULTRATERM (132 COL)	299.99
ULTRATERM PRE-BOOTS	SCALL
VIDEOTERM (80 COL)	199.99
VISCALC PRE-BOOT	32.99

POTPOURRI

BROTHER/DTC RIBBONS	2.99
BROTHER/DTC DSYWHL5	19.99
FAN W/SURGE (APPLE)	49.99
FLIP FILE (STORES 75)	17.99
1/4 HEIGHT APPLE DRIVE	229.99
KOALA PAD (AP) (IBM)	99.99
LIBRARY CASE (STORES 10)	1.99
MX 8X 80 RIBBONS	4.99
MX 8X 100 RIBBONS	8.99
OKI 8243 GEMINI RIBBONS	3.99
POWER STRIP W/SURGE	24.99
SHIFT KEY MOD.	9.99
VERBATIM 55/DD (10)	24.99
VERBATIM 55/DD (100)	235.99

KRAFT

JOYSTICK	44.99
JOYSTICK (AT)	14.99
PADDLES	31.99
QUICK-VIS	14.99

USI

P1 1" GREEN	109.99
P1 2 1/2" GREEN	139.99
P1 3 1/2" AMBER	159.99
P4 6" AMBER	129.99

SORCIM

SPELL GUARD	119.99
SUPERCALC	99.99
SUPERCALC 2	167.99
SUPERWRITER	179.99

SATURN SYSTEMS

ACCELERATOR	499.99
NEPTUNE (80 COL + RAM)	499.99
SATURN 128K (APPLE)	529.99
TITAN 64K (IBM)	529.99

EDUCATIONAL

BUMBLE GAMES	29.99
DLM	SCell
EDUWARE	SCell
FACEMAKER (A, IBM)	24.99
GAME SHOW (MASTER)	29.99
GERTRUDE'S PUZZLES	29.99
JUGLES BAINBOW	21.99
KINDERCOMP (A, IBM)	20.99
MATH BLASTER (IBM)	34.99
MICRO MOTHER GOOSE	29.99
ROCKY'S BOOTS	24.99
SNOOPER TROOPS (A, IBM)	24.99
STORY MACHINE	29.99
WORD ATTACK (IBM)	34.99

KENNINGTON MICROWARE



SYSTEM SAVER
 • Surge Suppression
 • Dual Outlet
 • 6' Lined
 • Fits Apple
 Stand
\$65

BROTHER HRT	699.99
EPSON (ALL MODELS)	SCell
GEMINI 10X	299.99
GEMINI 15	429.99
OKIDATA 62A	379.99
OKIDATA 9C	529.99

PRINTERS

DTC

380 Z 1099.99
 48K BUFFER 32 CPR
 GRAPHICS, DAISY WHEEL
 T tractor
 \$169.99

- No Charge For Credit Cards
- Prices Subject To Change
- Software Sales Are Final
- Min. \$4.00 Shipping Charge
- Purchase Orders Call First



COMPUTER DISCOUNT PRODUCTS

MAIL ORDERS & RETAIL STORE
 860 S. Winchester Blvd.
 San Jose, CA 95128
 (408) 985-0400 Orders Only
 (408) 985-0401 Sales & Tech. Asst.

HOURS: MON-FRI 9AM-6PM SAT 9AM-5PM SUN 10AM-5PM

Commodore's Port, continued...

You know what the character is, but you don't know how to get it to appear.

Boston Electronic Systems Training has released a keyboard tutorial, called *Best Keyboard Coach*, for the C-64. It uses an audio cassette, along with animated color graphics programs, to provide painless familiarization with the Commodore keyboard. A second program offers interactive drill and practice.

At \$20, I can't think of any beginning C-64 owner who would want to do with-

out it. As I have said, getting past the keyboard is the first real hurdle. For more information, contact Boston Electronic Systems Training, Inc., 24 Munroe St., Newtonville, MA 02160. (617) 969-2378.




































































About the most common questions we get about Commodore computers concern keyboard problems. Let's hold a short tutorial on the subject right now. Even if all that follows seems utterly simple to you, try reading it through. It

might help clarify things in the long run.

When you turn on your Commodore machine, it defaults to the caps mode. In this configuration all letters are printed out as capital letters. Shifted characters print out as special graphics shapes, as depicted on the front righthand side of each key. Make sure you are always in this mode when programming. Otherwise you can end up making things out on yourself or others later.

The other mode you can choose is

Figure 1.

Character	Description	Function	How to get it	CHRS
	Inverse heart	Clear screen and home cursor	 	147
	Inverse R	Turns inverse on	 	18
	Inverse underline	Turns inverse off	 	146
	Medium block left of center	Black	 	144
	Inverse E	White	 	5
	Inverse British pound	Red	 	28
	Inverse right triangle	Cyan	 	159
	Half-checked half-solid	Purple	 	156
	Inverse up arrow	Green	 	30
	Inverse left arrow	Blue	 	31
	Inverse pi	Yellow	 	158
	Inverse spade	Orange	 	129
	Bite from lower right	Brown	 	149
	Large inverse x	Light red	 	150
	Inverse donut	Dark gray	 	151
	Inverse club	Medium gray	 	152
	Inverse vertical right of center	Light green	 	153
	Inverse diamond	Light blue	 	154
	Inverse cross	Light gray	 	155
	Inverse vertical down the center	Cursor left	 	157
	Inverse right bracket	Cursor right		29
	Inverse circle	Cursor up	 	145
	Inverse Q	Cursor down		17

lowercase, which is turned on and off by pressing the SHIFT and Commodore logo keys simultaneously. The screen characters will then resemble those on an ordinary typewriter, with capital letters appearing when SHIFT is pressed.

To get the graphics characters on the left-hand side of each key front, press the Commodore logo key along with the key that depicts the shape you want. That's all there is to it.

But not every graphics character is depicted on the keyboard itself. There are some mysterious but especially powerful ones you should get to know, and you will, quite soon.

Why problems occur if you program in the lowercase mode will become obvious if you look at mixed caps and lowercase text from the caps mode. All the capital letters will have reverted to graphics characters. I once wasted a great deal of time trying to load a file name with caps that had been entered from the lowercase mode. File names with graphics characters in them are rather inconvenient to type.

This problem may also drive you crazy looking for graphics characters when typing in a program. Stay in the caps mode, unless there is a very good reason to go to lowercase. A good rule of thumb is to use the lowercase mode only when *running*, as opposed to *editing* a program. If you are editing lowercase text, shift back regularly.

You may also have noticed that something funny happens after you type a quotation mark. When the Commodore editor sees a quote, it puts the computer into what in other machines is called an "escape" mode. That means that rather than executing a keyboard command, it puts the message to execute that command into a print statement within the very program you are typing. If it sees a second quote, it returns to normal.

Outside a quote, CTRL-BLK will turn the cursor, and all subsequent characters, black. Inside a quote, a special character will be inserted, which tells the machine upon *execution* of that line to turn the cursor black.

This is where all the mysterious special characters come into play when typing program listings. It takes more than just a little while to get to know these characters when you see them, let alone what they mean and how to obtain them. But my suggestion is to work on it. There are only 22 really important ones. At the least, learn to recognize them.

Figure 1 is a listing of the prevalent ones, and how to get them to happen on the keyboard. Consider cutting out Figure 1, gluing it to some card stock, and keeping it near your computer.

You will also notice that the last column in Figure 1 gives a special numerical code for each character. In some program listings, these CHR\$ numbers are used rather than special graphics characters. For example, instead of printing an inverse hatch to clear the screen and home the cursor, you might say PRINT CHR\$(147) to accomplish the same task.

Although this technique avoids the use of graphics characters, it makes program listings harder to understand—unless you know which codes are which. I think it is easier to associate a graphics

character with a special command than a number. For that reason I avoid this approach in my own programs. However Figure 1 is a good reference to consult when you see CHR\$ commands in other programs.

So you see, the secrets of the Commodore keyboard are not difficult at all once you learn what they do and why. My advice is to start experimenting.

Next month, among other things, we shall examine wedge programs for the Vic-20 and the 64, and see how they can make life much easier for the Commodore computer owner. See you then! □

NAME THAT KEY

(ALL 248 OF THEM!)



THE FIRST USER DEFINABLE KEYBOARD

- Define each key with up to 8 characters of your choice directly from your computer keyboard.
- Redefine any key: `anyChar` for any software program.
- Each key is completely user definable without software or disk interaction.
- 82 user definable keys (31 lower case/3 shifted) per keyboard.
- Stores up to 4 82 key keyboards in its own memory.
- Switch between keyboards at the touch of a button making all 248 user defined keys available.
- KeyWiz is complete, no other parts to buy or PROMs to purchase and does not disable your keyboard.

keywiz VIP
(Very Intelligent Peripheral)

Turn the POWER OFF and when you turn the power ON again

Full 1 Year WARRANTY

Also available - our KeyWiz 83 Convertible

- Programmed Auxiliary Keyboards with 30 Visually Assisted Function Keys.
- Arrow Keys for full cursor positioning, a great asset to any Calc or word processor user.
- Available with a Numeric Key Pad (our Model 83-1) or an optional 1/2 Commodore Mouse) works with any program.
- End Users: KeyWiz compacts your microcomputer package.
- Also available with the latest Word Processor Function Keys (Optional on the 83 model for \$60.00 and provided without charge in the "Convertible" Model).
- Dealers: KeyWiz makes it easier to sell software.
- Educators: KeyWiz sharply reduces training time and stress in the B.S.E.
- Why waste time memorizing word processor or Calc commands or stringing key strokes together when KeyWiz stores single key strokes labeled in plain English. KeyWiz makes it all understandable.
- OEM's: Provide a programmed keyboard with that software package you're marketing. Call us about Custom Key Pads.

CREATIVE COMPUTING PERIPHERALS, INC.
530 N. Zeeb Road
Sunnyvale, CA 94085
October 25, 1983

CURRENTLY AVAILABLE

AppleLink II
Substation II
Robot Text
Magic Window II
Word Base
and several others
Call Today

ORDER NOW

For the: **APPLE II e or FRANKLIN ACE**
Burgess KeyWiz 83
VisCalc I/Access Key pad w/numeric key pad 298.00
Word Processor Word Processor 139.00
(Choose one)

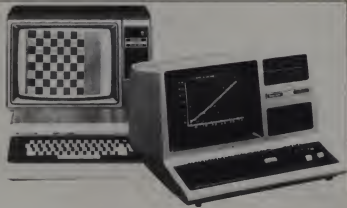
KeyWiz Convertible
VisCalc I/Access key pad w/Word Processor 299.00
(Choose one)

Custom Key Module (stand for basic) 40.00
KEYWIZ VIP for Apple IIe or Apple IIE
User Definable Keyboard with plastic Alphabet Basic Template
Pack Template and 2 Blank. 439.00

Add \$5.00 Shipping/Handling to order
B.S. Sales Tax in New Jersey
Send \$3.00 for our informative Users Manual

CIRCLE 146 ON READER SERVICE CARD

TRS-80 Strings



Looking at the fifty-seventh variation on a TRS-80 theme, we see that it consists of a single subject: the *Profile III Plus* database management system, which has been called "probably the greatest program Radio Shack has released." Plus a short program that lets you twinkle a little.

Profile III Plus

Many personal computer owners use their machines mostly or entirely for word processing or "electronic filing," an office-of-the-future phrase for the storage and retrieval of data with the help of a computer.

For the TRS-80 user, Radio Shack offers the *Scriptit* and *SuperScriptit* word processing programs. For personalized electronic filing, Radio Shack has the *Profile* database management system, or DBMS for short.

Profile was first introduced for the TRS-80 Model I and III in the RSC-4 catalog dated 1981: "Stores information of any kind. Keeps track of names and addresses, records, or even personal references. You can specify both display and printout formats. Powerful editing features make changes easy. Files can be interactive with simple Basic Programs. (32K, one disk)... \$79.95."

Profile II, for the TRS-80 Model II, was introduced in the same RSC-4 catalog. At \$179, it stores more records than the I/III version and is more versatile. *Profile II* stores up to 99 data fields in a single record, and stores up to 3000 records with a one-disk Model III/12 system. Files can be searched by any one of 36 user-defined fields.

Profile Plus for the 11/12 is an ex-

Stephen B. Gray

panded version of *Profile II*, with many extras, priced at \$299. It permits arithmetic operations between fields, with up to 16 equations of 63 characters each. Among the many advanced features of *Profile Plus* is selectable record lengths, which prevents wasted disk space.

The \$199 price of *Profile III Plus*, for the 111/4 with two disk drives and at least 48K of memory, reflects its use of most of the *Profile II* features. It stores up to 2500 one-segment, 100-character records. Records can be 1020 characters long, with up to 99 fields per record. Up to 36 search fields can be defined by the user.

Profile for the I/III is still available at \$79.95, but is now described as "ideal when changes are infrequent."

The \$299 hard disk version of *Profile III Plus* increases the number of records in the system and offers extra sorting features.

Setting Up a Database

The *Profile III Plus* manual shows in great detail how to set up a database, using as an example a company whose salesmen sell encyclopedias.

Defining Files

The package comes with two disks. Insert the Creation disk in drive 0, and the first display is the Creation menu which offers eight "create" functions for setting up and designing layouts for databases.

```
CREATE DB PROGRAMS
1 - Define Files
2 - Define Screens
3 - Define Records
4 - Define Labels
5 - Define Segments (S)
6 - Define Database (D)
7 - Define Formulas
8 - Define User Names
9 - Database Panel
X - Exit
```

First, tell *Profile III Plus* what information you want in your database (called a file in this DBMS), and what names you want to give it. You start with item 1, Define Files.

The display asks you:

Enter File name

so you type:

SALESMEN

and press ENTER. Eight spaces are available for database names.

The display then asks you to:

Mount RUNTIME Disk

so you put it in drive 1. This will eventually contain all the display screens, report formats, label formats, and user menus you generate with the Creation disk. Once the Runtime disk is completed, you no longer need the Creation disk to use your new database.

The display asks if the file is new. Press Y and ENTER, and this question won't appear again when you work on the Salesmen database.

The screen shows:

File Currently Contains 0 Segments

Enter Segment # (1-1)

A segment consists of the related

PULL. PULL. STICK. STICK. CHANGE PERFORMANCE THAT QUICK.



What you see here is a remarkable system that will change the personality of your IBM Personal Computer. A system that makes it possible for you to use your PC to develop applications that normally require the resources of a much bigger computer. A system that quite literally transforms your computer from personal to professional. Here's how:

Easy As A,B,C

First you apply the character labels to your keyboard, then you plug in the custom ROM that will enable your PC to display these new characters. Third, you insert the disk and load the software to complete the change: APL*PLUS®/PC System from STSC.

Now, instead of limiting yourself to off-the-shelf spreadsheets, word processors, or slow program development in BASIC, you can develop custom solutions to problems that previously were beyond the scope of your PC.

The APL*PLUS/PC System is a complete APL language processor

from STSC, the leading supplier of APL products and services for more than 14 years. It also includes STSC's business report formatting feature, communications capabilities, and data management features.

The APL*PLUS/PC System can interface to non-APL programs and data



stsc
A Contel Company

CIRCLE 289 ON READER SERVICE CARD

files so you can integrate your other software packages with the APL*PLUS/PC. And APL programs developed on your PC will run on other desktop computers, minis, and mainframes that support APL. Software developers may license the APL*PLUS/PC System to develop APL applications for resale using a run-time version of the system.

Everything You Need for Application Development

It's all here in our comprehensive package. In addition to the keypad labels, custom ROM, and software disk, you also get a reference manual, an introductory tutorial, and a widely used APL textbook. All for only \$595.*

The APL*PLUS/PC System requires an IBM PC™ or IBM PC XT with PC DOS at least 192K RAM memory, and one floppy disk drive. To order APL for your PC, call or write STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852, (301) 984-5123.

*U.S.A. price only.

TRS-80 Strings, continued...

fields that contain data. One segment might contain name, address, and phone-number fields, while another might contain a spouse name, hobbies, and other such fields.

You can have up to four segments in each *Profile III Plus* database. This lets you spread the data over four disk drives, if you wish. The first segment is the most important. The fields you enter into this segment, called the Key segment, can be used later as search and sort fields to retrieve individual records. Segments 2 through 4 contain data only.

Salesmen contains no segments at this point. You can only enter Segment 1. Later, when you have defined other segments, the numbers in parentheses change to let you access any segment you have defined or let you create a new segment.

For example, with two existing segments in a database, the parentheses show (1-3), which means you can access Segment 1 and 2, or create Segment 3.

Defining Segment 1

Type 1 and press ENTER, and the screen shows:

```

- FOR THIS SEGMENT -
Number of Fields Remaining      36
Characters Remaining For Fields 250
Characters Remaining For Headings 201
    
```

Below that is a line asking you to enter a field heading. This is the beginning step for setting up a database. At the left of the screen is the field number 1.

The first heading you want to use is the salesman's district, so you type:

DISTRICT

Next you are asked to:

Enter Max Field Length
 —the number of spaces you want to be available for entering data in this field. So, after looking through the district names to see how long they are, you type:

10
 When you do, the three numbers in the top half of the display change because you have reduced the Number of Fields Remaining (by 1) to 35, reduced the Characters Remaining For Fields (by 10) to 245, and reduced the Characters Remaining For Headings (by 10) to 191.

Now you enter the remaining fields you have chosen for this first segment,

along with the maximum field length of each:

```

2      Position      10
4      Last Name    15
4      LS Sets      4
5      DH Sets      4
6      H Sets       4
7      Sales By Unit 10
8      Sales By Amount 10
9      Commission   10
    
```

The three abbreviations in fields 4-6 stand for Library sets, Deluxe Home sets, and Home sets.

When you have entered all the fields, press ENTER to return to the Creation menu. If necessary, you can review the first segment of Salesmen by pressing 1 and then entering Salesmen, and the screen will display field numbers, headings, and lengths. The bottom of the screen provides four options: Hardcopy (print a list of the defined fields in the segment); Replace (for redefining segments); Add Fields; and Next Segment (to define or review the next segment).

Defining Segments 2-4

Now you define the other segments, adding fields for salesmen's data in Segment 2 (first name, address, phone, date hired, total sales by unit); fields for dollar value of sales in Segment 3 (month

by month, with annual total); and fields for volume and dollar amounts for each type of set in Segment 4.

Defining Screens

The next step is to design the way you want *Profile III Plus* to prompt you on the screen for the data required when you enter the data. You can design up to five screens for each database.

In the manual, you design two screens for Salesmen. One screen prompts for monthly statistics, the other for yearly statistics. So you use a dozen "field indicators" to tell *Profile III Plus* the type of data each field is to contain, such as * for an alphanumeric field, # for a numeric field (accepts only numbers, decimal points, and minus signs), ! for a protected field (contains data that can be displayed but not changed from the keyboard), and so forth.

By the time you have finished designing the first screen, it should look like Figure 1.

Defining Math Formulas

At this point you need to define math formulas to compute values for your screen. So you set up formulas that, for example, multiply the number of Library Sets by the commission. The last formula totals the various commissions.

This is a powerful feature, which allows you to use the four basic math functions to write up to 16 formulas, using up to 20 fields per formula. You can calculate commissions, subtotals, totals, taxes, and so on.

```

Enrichment Encyclopedias, Inc.      Monthly Report for
Name, Last: <3 / First: *10 /
Street: *11 / District: *2 /
City: *12 / Phone: *15 /
State: *13 / Zip: *14 / Hired: *16 /
Description-----Number of Units-----Value of Units-----
Library Sets *9 / LS Units 131 / LS Amt 134 /
Deluxe Home Sets *5 / DH Units 132 / DH Amt 135 /
Home Sets *6 / H Units 133 / H Amt 136 /

Commission Sales By Unit Sales By Amt
19 / 17 / 18 /
.....
14:60 Press CLEAR to Record BREAK to Cancel
    
```

Figure 1. The Monthly Report screen will be used later to enter sales data.

Some Very Good Reasons to Buy an Echo Speech Synthesizer.

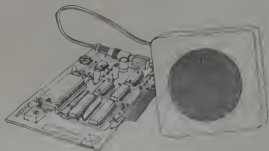
We're confident we have the most intelligible, versatile, and economical speech synthesizer on the market. Once you hear it, we're sure you'll be convinced too. All ECHOs are capable of speaking in four different voice modes which range from a robotic machine voice to natural female speech. (The fixed 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.



The Echo II is a registered trademark of Street Electronics Corporation. The Grappler⁺ and Bufferboard are registered trademarks of Orange Micro.

Value

Each ECHO comes ready to use with a speaker and tutorial-style manual. The ECHO I, 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 Syntex 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 I™ Talking Demonstration.



Street Electronics Corporation

1140 Mark Avenue Carpinteria, CA 93013
Telephone (805) 684-4593

Educational software for your Apple & Atari!

BE A PROTECTOR TEACHER...

Trickster Coyote (Reader's Digest) Apple only. 3rd grade-up. Scenic adventure teaches vocabulary. \$ 48.95

Invasion Attack (Zeitgeist) * Apple only. 4th-8th grades. Practice in addition and subtraction of mixed numbers and fractions. 49.50

Master Type (Lightning Software) * Apple/Atari 32K disk. Jr. high-up. Typing tutorial with unique motivation. 39.95

CONTROL THE COMPUTER...

Logo (Krell) Apple only. 3rd grade-up. ...Develop programming skills through graphics. 89.95

Zes Authoring System (Avant Garde) * Apple only. Jr. high-up. Create animated computer assisted instructional packages. 250.00

SIMULATE THE REAL WORLD...

Millionaire (Blue Chip) Apple/Atari disk. High school-up. Stock market investment participation. 59.95

Volcanoes (Earthware Computer Services) Apple only. Jr. high-up. Earth science study through volcano exploration. 49.50

EXPRESS YOURSELF...

Music Maker (Sublogic) Apple only. 5th grade-up. Create original music and sound effects. 39.95

The Bank Street Writer (Broderbund) Apple/Atari disk. Jr. high-up. Simple yet powerful word processing. 69.50

EXPLORE AND DISCOVER...

In Search of the Most Amazing Thing (Spinnaker) Apple/Atari 48K disk. 5th grade-up. Define values and develop social skills. 39.95

Time Traveler (Krell) Apple/Atari 48K disk. Jr. high-up. Text adventure in an historical setting. 24.95

Sammy the Sea Serpent (PDI) * Atari 24K disk, 16K cass. requires joystick. Preschool-1st grade. Journey with Sammy back to the sea. 23.95 disk 18.95 cass.

* Qualifies for our unique buy back plan. See catalog for details.

These are just a few choices from our free catalog of educator reviewed software.

Order today! Don't forget to send your address and telephone number. Check, money order, VISA and MASTERCARD accepted. (Include account number and expiration date.) Add \$2.00 for shipping. Missouri residents add 5.625% sales tax.

THE COMPUTER SHOP ONLINE

9256 Clayton Road
St. Louis, MO 63124
(314) 997-0724

CIRCLE 141 ON READER SERVICE CARD

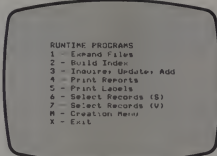
TRS-80 Strings, continued...

Next you design the screen for yearly statistics. Now you are ready to enter data.

Entering Data

During data entry, you don't need the Creation disk; you need only the Runtime disk in drive 0, and any data disk(s) on which you want to store your files in drives 1, 2 or 3. You should, of course, periodically back up these data disks.

By typing RM and pressing ENTER, you call up the Runtime menu:



Use selection 1 to create room on the disk to store records, 2 to specify a field on which to sort records, and 3 to run the main part of *Profile III Plus*, where you enter, delete, edit, and search data.

Selection 6 lets you specify a sort field and up to 16 selection fields to select records to merge with *SuperScript*. Selection 7 does the same for passing records to *VisiCalc*.

Searching Records

You can use any of the fields entered in Selection 3 (Inquire, Update, Add) to search for specific records or a group of records.

You might want to search for all salesmen whose last names occur alphabetically after Johnson. At the Runtime menu, press Selection 3, enter Salesmen, and type:

Johnson
and a relationship abbreviation. In this case you want all the names "greater than" Johnson, so you enter:

GT
and all the names after Johnson are displayed.

The screen now shows:

Enter Connective (AND, OR, ENTER)

(to let you further limit the search. If you type:

AND
you are asked for a second field number, and the data for those salesmen whose names appear after Johnson are searched for a second criterion, such as all those who are over 40. Only those records that

satisfy both after (after-Johnsons over 40) are then displayed.

A wild-card symbol (=) makes *Profile III Plus* show you all records that contain anything in a certain field or part of a field. For example, to find everything entered during February 1983, you can scan for:

02/= =/83

Indexing

An indexing feature lets you look through your records in alphabetical or numerical order, using any field from Segment 1. You can start at any point in the database and go either forward or backward. But before you can do any indexing, you must tell the computer which field(s) you want to use with the Build Index program on the Runtime menu.

Report Formats

The next step is to define report formats, for printing reports. *Profile III Plus* lets you define up to five different reports for each database.

You set up the reports very much like defining screens for data entry. You determine what is to be printed where, what totals are to be calculated, and on which fields the data are to be sorted before printing.

Each format can include up to two title lines, three header lines, and up to 66 lines or one or two-line detail information. Reports can be dated, paginated, and printed up to 132 columns wide.

If you want to print labels, such as for mailing letters to salesmen, you also define the label formats.

SuperScript and VisiCalc

Selection 5 on the Creation menu is for merging *Profile III Plus* with Model III *SuperScript* to print form letters and documents. This creates the familiar "computerized" letter, which can print, in the body of the letter, variable data such as first name, sales figures, and so on.

Profile III Plus allows you to use *VisiCalc* with your databases. You need the *VisiCalc* program disk, of course. You can select up to 16 fields to pass to *VisiCalc*.

Password Protection

Profile III Plus provides your database with limited security. You can use passwords to protect screens, which will not be displayed without the user having entered the proper passwords.

Profile III Plus Manual

The 202-page manual shows in great detail how to create and use *Profile III Plus*, with extensive examples. The last

1984 Business Activity Planner

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 A
GREAT
GIFT
IDEA,
TOO!

Business
Activity Planner

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 Planners)
- ___ Chairman of the Board Activity Planners)
- ___ Executive Woman Activity Planners)
- ___ Executive Activity Planners)

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
CD-11 within 10 days for a prompt refund!

FOR FASTER SERVICE CALL TOLL FREE
800-327-1969
(In Fla. and Canada call (305) 595-8744.)

YOUR CHILDREN'S FUTURE



BEGINS TODAY

Discover how you can help your children grow with educational software from Opportunities for Learning. Write for your FREE catalog today!



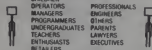
OPPORTUNITIES FOR LEARNING, INC.
8950 Lutline Ave., Dept. L62
Chatsworth, CA 91311
(213) 341-2535

CIRCLE 279 ON READER SERVICE CARD

COMPUTER DESK CADDY PICTURE FRAME



A GREAT GIFT IDEA FOR:



CHILDREN
MANAGERS
PROGRAMMERS
TEACHERS
ENTREPRENEURS
RETAILERS
PROFESSIONALS
ENGINEERS
PARENTS
LAWYERS
EXECUTIVES

AN ATTRACTIVE ADDITION TO YOUR HOME OR OFFICE

\$12.95 - \$2.00 Shipping & Handling
N.Y. Residents Add Appropriate Sales Tax.
Allow 4-6 Weeks Delivery
Send Check Or Money Order, Too

TOMOROSE PRODUCTS, 1204 Avenue U
Suite 1152A, Brooklyn, NY 11229

CIRCLE 219 ON READER SERVICE CARD

TRS-80 Strings, continued...

73 pages consist of a Reference Guide (to check information quickly) and Appendices (making backups, formatting data disks, printouts of all the Salesmen files, a glossary, and so forth).

Learning By Doing

Although the manual is detailed, you learn almost as much when you try to use the program, as you do reading about it. However, once you get underway, you will be quite impressed by its speed and flexibility. You can easily switch from one component program to another, and screens and report formats are easily designed.

Of course, the first time through takes a while unless you have had some experience with database systems. Even then, you have to become familiar with the *Profile III Plus* way of doing things.

Many little decisions must be made the first time, such as how many spaces to allow for names and addresses, what headings to use for reports, and so on. You must remember how to get from one component program to another. The first time you try to search the files, it may not work, or not in the way you expected, especially if you skimmed over the manual and didn't read all the details.

The Creation and Runtime disks both contain TRSDOS 1.3, which means *Profile III Plus* isn't compatible with any other operating system, if you prefer DOSPLUS or LDOS.

At \$199, *Profile III Plus* isn't cheap, but it has a great many advantages, such as convenience of use, interfaces to *SuperScript* and *VisiCalc*, password protection, and arithmetic operations.

If you think you need your own electronic filing system, you might want to check out this one at a Radio Shack Computer Center. If you have enough time to understand and appreciate the many sophisticated features of *Profile III Plus*, you will probably want it.

Short Program 44: Twinkle

George Collins' letter, which had no return address, said: "My 13-year-old daughter Dawn was sitting at the TRS-80 Model I, putting dots on the screen. I thought I could use her program to illustrate graphically to her the abstract notion of a random process. The program listed below might be of general interest to young programmers since the dy-

```

10 CLS
20 RANDOM
30 X1=RND(127) : Y1=RND(47)
40 X2=RND(127) : Y2=RND(47)
50 X3=RND(127) : Y3=RND(47)
60 SET(X1,Y1)
70 RESET(X2,Y2) : RESET(X3,Y3)
80 GOTO 20
    
```

namic aspect of random processes can be easily visualized. The program randomly sets and resets pixels on the screen for a twinkling effect."

Well, not quite a twinkling effect. Twinkling stars change in brightness; they don't turn on and off. This is a problem if you want to produce a twinkling effect with pixels that have only two states: on and off.

Although the program may achieve George's aim, there must be better ways to approximate twinkling stars. George's program sets pixels randomly, then resets some. Note that there are two RESET statements for every SET statement. So can you figure out why line 70 doesn't eventually turn off all the pixels?

Can you write a program that creates a field of stars, then turns off a star and immediately turns it back on again, and does it randomly across the field? Or can you approach the twinkle effect by other methods? Can it be done effectively in Basic or only in assembly language?

Here is a program that provides a twinkle of sorts:

```

100 CLS
110 X=RND(126)
120 Y=RND(46)
130 SET(X,Y)
135 FOR A=1 TO 30 : NEXT
140 RESET(X,Y)
150 FOR B=1 TO 30 : NEXT
160 SET(X,Y)
170 RESET(X+1,Y+1)
180 GOTO 110
    
```

However, it twinkles each star only once as it turns on that star.

Call for Shorties

We are running out of short programs for this column, so if you have written a new and different program that might fit here, please send it to me at the magazine.

Computer printouts are preferred, because they are subject to fewer errors. In addition, please explain any tricky lines. □



"It jumps 'Jump if Not Zero'..."

ANNOUNCING CREATIVE COMPUTING's 1984

BUYER'S GUIDE

TO PERSONAL COMPUTERS & PERIPHERALS

ADVICE YOU CAN TRUST ON SELECTING PERSONAL COMPUTERS, PERIPHERALS AND ELECTRONIC GAMES

Unless you have the memory of a computer there's no way you can keep track of all the games, programs and peripherals available for your computer. And even if you could, you'd still have a problem figuring out what's best for your needs and how to get the most for your money.

That's why you need the *1984 Buyer's Guide to Personal Computers & Peripherals*. It's a comprehensive collection of product reviews and consumer-oriented shopping advice put together by the experts at *Creative Computing* magazine.

You'll get a rundown of what's new on the market. Analysis of new product performance, reliability, operation, applications, cost—even what kind of repair service you can

expect. Easy-to-understand comparisons between different models. Tips on bugs and design problems. Plus "inside" information you won't get from manuals or sales people.

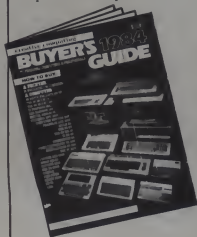
Plug into the *1984 Buyer's Guide to Personal Computers & Peripherals* and find out what's hot in...

- Personal computers
- Pocket-sized computers
- Telecomputers
- Disk drives
- Memory expanders
- Word processors
- Dot matrix printers
- Electronic games
- Video game cartridges
- Joysticks and paddles
- Game port extenders
- Color graphics boards
- Speech synthesizers
- Do-it-yourself kits
- And more

You may even discover that you need *less* equipment than you think. The *1984 Buyer's Guide to Personal Computers & Peripherals* helps you avoid overbuying by showing you how to customize your current system.

What else does the *1984 Buyer's Guide to Personal Computers & Peripherals* give you? Book reviews, glossaries of new terms, evaluations of batteries for electronic games and calculators, and lots of other useful information.

Don't buy until you've consulted the *1984 Buyer's Guide to Personal Computers & Peripherals!* Order your copy today.



Send to: **Creative Computing Buyer's Guide**
CN 1914, Morristown, NJ 07960

HE1F

Yes! Please rush me *Creative Computing's 1984 Buyer's Guide to Personal Computers & Peripherals*. Enclosed is my check or money order for \$3.95 plus \$1 for postage and handling.

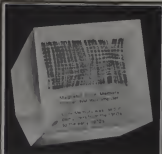
Mr./Mrs./Ms. _____
(please print)

Address _____

City _____

State _____ Zip _____

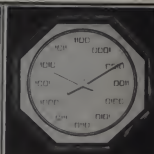
Please make check payable to Creative Computing Buyer's Guide, CA, NJ and NY State residents please add applicable sales tax. Price outside U.S.A. is \$6.



MEMORY BLOCK

Clear Lucite™ cube containing a fragment of history... Ideal for paperweight or interesting exhibit. Contains magnetic core memory from an IBM 360 Computer (circa: late '50's-early '70's). Size 2" x 2" x 2 1/2". 10 day money-back guarantee if not completely satisfied. *\$14.95

Call Toll-Free Mon.-Fri. 9am-6pm 1-800-B-E-S-W-E-E-T
In Fla. (305) 687-9338, or mail coupon below.



TIMESHARE

Only you and your fellow programmers will know what time it is with this binary numeral wall clock. Handsome simulated dark walnut finish, accurate quartz movement with sweep second hand. Perfect for office or home. Runs on one AA battery. (not incl). 11 1/2" diagonal. 1 yr. warranty. 10 day money-back guarantee if not completely satisfied. *\$39.95

sweet gum Inc.

15490 FW 7th Ave., Miami, FL 33169

Please send me Memory Blocks

at \$14.95

Add \$2 ea. for ship. & hand.

Please send me Timeshare clocks

at \$39.95

Add \$35 ea. for ship. & hand.

Fla. residents add 3% sales tax.

Total \$ _____

Enclosed is Check Money Order CC-113

Charge my MasterCard Visa

Card # _____ Exp _____

Just send your free COMPUTER/PC/MS Catalog

Signature _____

Name _____

Address _____

City _____

State _____ Zip _____

CIRCLE 238 ON READER SERVICE CARD

OPTIMIZING C86™ is now (8/15/83) in Beta Test.

Call us to see if it is available now.

Any customer who purchases the current product will be able to upgrade to Optimizing C86 without charge.

It includes the following improvements from C86 1.33:

- Substantially faster execution speed of the programs you write. We've seen some programs run 300% faster! Overall speed has been improved along with I/O and string handling.
- 1,000K Addressing of code and data is supported as a complete-time option - "Large Model"

When released commercially it will also have:

- Object module format compatible with your OS and Assembler
- 8087 code inline (faster execution)
- Option for Assembler output from the compiler
- Extra functions for MSDOS 2.0
- New manual has examples for every library function

Other Notes:

- ISAM products and products compatible with C86 and with OPTIMIZING C86 are available from some of our customers
- Graphics and screen manipulation function libraries are available. Ask for a product list
- C-to-BASE™ is in Beta Test by CI. It is a package to interface C86 with dBASE files. Heavily annotated source to the product and a function library are included. Save time and learn C86 quickly
- A C86 User's Group is being formed.

See your local Dealer or CCI Computer Innovations to All formats available
 Buy C86 for \$395 PC-Ranx Vector 2100 etc.
 Get Details. VISA and MasterCard accepted

C86 OPTIMIZING C86 and C-to-BASE are trademarks of Creative Computing. C86 and MS-DOS are registered trademarks of Digital Research. dBASE is a trademark of Microsoft. CCI is a trademark of Magnasonic Business Machines. dBASE is a trademark of Ashton Tate.
 Prices subject to change without notice.



Computer Innovations, Inc.
10 Mechanic St.
Suite J-143
Red Bank, NJ 07071
Phone: (201) 330-0985

CIRCLE 262 ON READER SERVICE CARD

Book Reviews

Kids And The Apple by Edward H. Carlson. Datamost/Reston Publishing Co., Reston, VA. 219 pages with index. \$19.95.

Teachers frequently complain that there is a lack of good text materials to supplement the new computer literacy programs which are appearing in secondary schools across the country. *Kids And The Apple*, prepared by Michigan State University professor Edward H. Carlson fills in a big gap in text materials by offering a tutorial for a specific piece of hardware, the Apple II.

The Apple II isn't the only personal computer in the junior and senior high schools. You'll find Pets, Ataris, and TRS-80, but the Apple II is undeniably a popular choice. Given the clear, clean, logical, and accessible presentation of beginning programming in *Kids*, the Apple II may become even more popular, as courses are shaped around an Apple II/*Kids And The Apple* "system."

The introduction to teachers states that *Kids* was written for students at the seventh grade level. In fact, the book is written with such clarity that an advanced fifth grader should have no unresolvable difficulties. The wide range of material covered should hold the interest of high school students in the first and second years.

This book is not just a recapitulation of previously published Applesoft tutorials. It looks at the material in a fresh, imaginative way, presenting it in a manner that gives young programmers solid conceptual foundations on which to build skills and provides a fundamental understanding of the logic of computer programming.

The instruction begins from the ground up, teaching the use of the HOME, PRINT, NEW, and RUN commands. The material goes on to teach skills in making the computer print in various ways, making the bell sound, inverting printing, recovering normal printing, and incorporating the appropriate commands in programs.

Every step of the way, concepts are illustrated in programs which the child copies from the book. As the instruction progresses, the child is given the tools to write programs that use string variables, call up subroutines, "glue" strings on program lines, and use low resolution graphics and even elementary animation techniques. As new concepts are introduced, old ones are reinforced and understanding is enhanced.

As suitable as this book is in a classroom setting, it is not an ideal home tutorial, unless the parent is willing to make a conscious effort to monitor the progress of his child and to actively guide instruction. It may well be worth the trouble; in scanning this book I learned a few things I didn't know and found some concepts from my "adult" Applesoft Tutorial explained so clearly that my own programming skills now reflect an improved understanding.

Adding to the delight of the book are illustrations by Paul D. Trap whose whimsical drawings are frequently very funny and almost always valuable in visually reinforcing a concept in a painless, palatable manner.

November 1983 © Creative Computing

Steve Gray, et al.

Kids And The Apple, is just what teachers and parents have been looking for to convert the Apple II from a passive, game-playing diversion into a tool for learning and growing.—
Brian Murphy

Robotics and Industrial Electronics, Heath Co., Benton Harbor, MI 49022, 1,257 pages, looseleaf in two binders, \$99.95, 1982.

Designed to be used with the Heathkit Hero I robot (\$999.95 kit, \$399.95 arm kit, \$149.95 voice synthesizer kit; \$2499.95 assembled with arm and voice), this course is "fully functional without it," according to the company.

The course, which takes about 120 hours of study, consists of twelve lessons: Robot Fundamentals (robot evolution, terminology, low-technology robots, medium and hi-tech robots), AC and Fluidic Power (AC power, AC motors, hydraulics, pneumatics), DC Power and Positioning (batteries, DC motors, stepper motors), Microprocessor Fundamentals, A Typical Microprocessor Controller (6808 MPU), Data Acquisition (sensors), Data Handling and Conversion, Voice Synthesis, ET-18 Interfacing (ET-18 is the robot's catalog number), Industrial Robots at Work, and Experiments. Four appendices cover Number Systems and Codes, 6808 Data Sheets, Definition of the Executable Instructions, and The Phoneme Dictionary.

Heath recommends previous completion of their courses in AC and DC electronics, digital techniques, and basic microprocessors, "or a basic knowledge of those subjects," before starting the Robotics Course, which is designed for industrial training as well as individual use. The robot can be assembled in 40 to 60 hours, but Heath doesn't advise novices to try building it.

The text is straightforward, very clear and detailed, with many helpful illustrations. The interfacing chapter gets down to the gate level to describe in detail how the RAM, ROM and control circuits operate. Self-test reviews are provided at the end of each unit within each chapter, plus an optional final exam to be sent to Heath for scoring.

The longest chapter is the last one, 276 pages of experiments, meant to be used with the assembled robot and accompanied by the few necessary additional parts.

This is Heath's most ambitious product yet, and is well worth the money, although the final chapter is of little value without the robot. The course is as complete and detailed as the robot construction manual, written by a company that puts much more effort into its famous, easy-to-follow kit manuals than any other.

PET/CBM Personal Computer Guide, by Adam Osborne and Carroll S. Donahue. Osborne/McGraw-Hill, Berkeley, CA. 509 pages, paperback \$15. Second edition, 1980.

Although Adam Osborne hasn't been connected with Osborne/McGraw-Hill since this last May 1, because he's

Our Best Printer Package For Apple II, II Plus, and Ite and Franklin ACE



Complete System Ready-to-Run List Price \$976 Reg. Sale \$809

- Epson FX-80 Printer with 160 c.p.s. Including Graftrax
 - The Grappier Plus Interface Card & Cable
 - Quality Printer Stand
 - Case of 3200 Sheets, Fan-fold Paper
 - Printer Dust Cover
 - Extra Printer Ribbon
- Now Only **\$729**
- Available with Okidata 92 \$699

If you're looking for price, selection and service, call Computer Discount of America — where the only thing we discount is price.

ORDER TOLL FREE: 800-526-5313
COMPUTER DISCOUNT OF AMERICA, INC.
15 Marshall Hill Road, West Milford Mall
West Milford, New Jersey 07480-219
In New Jersey Call 201-728-8800

**Computer
Discount
of America**

CIRCLE 135 ON READER SERVICE CARD

FREE CATALOG

• BASF Disks, 5 1/4", 10/bx.....	1.9/bx	10+ bx
• SSD, soft sector.....	21.90	19.90
• DSD, soft sector.....	30.90	28.90
• Lifetime Guarantee, Certified, Hub-ripped FREE PLASTIC CASE WITH EACH BOX		

• APPLE	• ATARI	
• Micromodem II w/term prog	• 8 Key 400 Keyboard	39.00
• Keytronic Keyboard	• Percom SSD Disk Drive w/term	160.00
• Micro-Slot A2 Disk Drive, w/term.	• Disk Drive add-on	390.00
• A2 Disk Drive, add-on		
• Microsoft Softcard	• Premium Pack	495.00
• Phasos Printer Interface	• Epson 7080 Dr.	87.00
• Videoterm, 80 col card	• Okidata 80, 82, 92, 93, Dr.	33.00
• System Server Fan	• Quora 3.5" Multistrike Dr	42.00
	• NEC 5050, 700 Multistrike Dr	81.50
• IBM	• ACCESSORIES	
• Amdah 310A, 12" Amber Monitor	• Lemon Surge Protector	43.00
• STS-SHO 84K mem, clock & I/O	• Lima Surge Protector	85.00
• Keytronic Keyboard	• Head Cleaning Kit, 5 1/4"	19.95
• Smartmodem 300 (RS-232)		225.00

SEND ME YOUR PRICE LIST
 PAYMENT ENCLOSED \$_____

Add 3% Shipping (\$3 minimum), Texas residents add 5% sales tax
Two week delay on personal checks

CHARGE MY: MasterCard Visa

Card No. _____ Exp. Date _____

Signature _____

Name _____ (please print full name)

Address _____ Apt. _____

City _____ State _____ Zip _____

214-644-2811

Software 't' Boot
2116 E. Arapaho #600
Richardson, TX 75081 11C

CIRCLE 240 ON READER SERVICE CARD

SUPER DISK

Floppy Disk Drive For VIC-20 & Commodore 64

Super Disk[®] is a Commodore compatible disk drive designed to interface to the various Commodore computers such as the PET[®], VIC-20[®] and the Commodore 64[®]. The disk drive is compatible to the model 4040, 2031, 1540, and the 1541 disk drives and recognizes programs generated on any of these disk drives. The capacities are comparable to those found on the Commodore drives, and Super Disk[®] recognizes the full instruction set of the Commodore drives. Super Disk[®] offers RAM area within the disk unit, a serial and an IEEE bus interface. (Software programs included.)

Call Toll Free 1-800-527-7573 For Latest Price Information.
In Texas Call: (214) 484-7836

Also Available:

Gemini-10X w/Interface	\$379	TTY-1014 Daisy Wheel Printer	\$499
CPI Parallel Interface	59	5-Slot C64 Expansion Board	55
Gorilla Banana Monitor [®]	90	Monitor Cable (lum pin)	10
10-Key Pad for VIC & C64	60	VIC 8K RAM	35
CIE (IEEE for C64)	85	VIC 16K RAM (Switchable)	55

CATALOG OF OTHER HARDWARE & SOFTWARE AVAILABLE ON REQUEST.

We accept: VISA, Mastercharge, and A/E

Southwest Micro Systems, Inc

2554 Southwell • Dallas, Texas 75229

¹Commodore Int. ²MSD ³Leading Edge

CIRCLE 228 ON READER SERVICE CARD

Computer Protection

KLEEN LINE[®] CONDITIONER

Prevents:

- Computer Damage
- Lightning Spike Damage
- Brownout Interruptions
- Disruptive Line Noise
- Program Errors

Regulator • Filter • Suppressor

KLR-250A	250 Watt Load	\$291.95
KLR-250A-1S0	250 Watt Load; Patented Filter Isolated Sockets	\$346.95
KLR-500A	500 Watt Load	\$390.95
KLR-500A-1S0	500 Watt Load; Patented Filter Isolated Sockets	\$445.95

Shipping: \$12.75 Land; \$45.50 Air

Ask Your Local Dealer

ESD[®] Electronic Specialists, Inc.

171 South Main Street, Box 389, Natick, Massachusetts 01760

Toll Free Order Desk 1-800-225-4876

MasterCard, VISA, American Express

CIRCLE 108 ON READER SERVICE CARD

Book Reviews, continued...

gotten heavily involved with the Osborne I computer, his name lives on in this and many other superior publications that have set a standard for computer books.

According to the back cover, this is a "step-by-step guide that assumes no prior knowledge of computers. If you can read English, you can use this book... If you're thinking about buying any personal computer, this book will show you what a PET can do for you. If you've just bought a PET or CBM, this is the book you must have to really understand the computer."

This book tells you just about everything you could possibly want to know about the PET and CBM, with over 500 pages that get into every nook and cranny.

The eight chapters cover an introduction to CBM computers, Operating the CBM, Screen Editing, Programming the CBM, Making the Most of CBM Features, Peripheral Devices, System Information, and CBM Basic. Six appendices cover character codes, error messages, Basic bibliography (10 of the best books), CBM publications (magazines and newsletters) and reference manuals, number-base conversion tables, and a list of differences between the two sets of ROMs, as they affect the text.

The preface says you can skip everything after the first three chapters if you have no intention of becoming a programmer but only want to run canned programs. Those first three chapters go into fine detail on how to use the computer, with a great many drawings and photographs. The rest of the book is equally detailed, with many examples, short and simple sentences, a layout that makes for very easy reading, and many short programs intended for hands-on use.

As usual with Osborne books, the highpoints are printed in boldface, so an experienced programmer can browse through it quickly and pick up what he needs to know in a short time.

Learning With Computers, by Alfred Bork. Digital Press, Digital Equipment Corp., 12 Crosby Dr., Bedford, MA 01730. 301 pages, hardcover \$28. 1981.

"This book focuses on the use of the computer as a learning device... a panoramic view, reflecting many types of usage... based on papers written during the last 10 years, reflecting the work of the Physics Computer Development Project and the Educational Technology Center at The University of California, Irvine," according to the dust jacket.

Each of the seven chapters is each divided into sections and further into topics. "Overview" consists of five short papers providing an overview of computers in education. "Graphics" examines the part played by graphics as an aid to learning. "Educational Technology Center at Irvine" consists of three articles on the work and activity at the Center. "Physics" has six articles on computer dialogs (student interaction with programs). "Classroom" includes five papers on fitting applications into the full class structure. "Authoring Dialogs" has five articles that describe the production of computer-based learning materials. "The Future" sums up with seven papers reviewing future possibilities in areas such as videodiscs, computers versus television, and personal computers in learning.

The book covers a very wide area, and thus almost anyone involved or interested in computers in education can find much of value in these pages. The writing is simple and uncluttered, and there are many illustrations of screen displays. All in all, this is a fine book for a professional who wants details on what's going on in the world of learning with computers (as reflected in the work at one institution), as well as for the amateur who just wants to know something about the field.

November 1983 • Creative Computing

Working Robots, by Fred D'Ignazio. Elsevier/Nelson Books, New York. 164 pages, hardcover \$11.50, 1982.

The title is somewhat misleading, because this is not a book about how to construct a robot that works, but is rather a low-key look at the world of robots, mostly the industrial and hobbyist types.

After defining what a working robot is, the author goes on to describe various types of robots, briefly discusses the robot brain (a computer, mostly), then looks at languages that teach a robot what to do, robot interfaces to the outside world (speech, vision, mobility, etc.), industrial robots, explorer robots (undersea, outer space), classroom robots (school projects), home robots, building your own (general discussion), robots and the future, and a light discussion of whether robots are servants, friends, or foes. The book ends with a glossary, a list of materials and schools (catalogs, hardware, courses), and a list of books, magazines and articles.

The book seems to have been written for the person who wants to know something about robots, in general, without getting technical. There are no schematics, not even block diagrams, only photographs of the various types of robots discussed. The author writes clearly and informally, and gets into enough detail to be interesting but not so much as to be too technical or boring. Among the robots discussed are Tod Loubbourrow's Mike, the Mars Viking Lander, Hans Moravec's Cart, the Unimate industrial units, and the Terrapin Turtle.

This is a fine book for those whose interest is non-technical, but who want to learn more than just a little about the different kinds of robots and what they can do.

Computer Choices: Beware of Conspicuous Computing!, by H. Dominic Covey and Neil Harding McAlister. Addison-Wesley Publishing Co., Reading, MA. 236 pages, paperback \$8.95, 1982.

According to the front cover, "People are running out and buying computers that improve their image but don't work for them. With this book you will learn to avoid the wastefulness of hi-tech exhibitionism and to choose, develop, and use systems that satisfy real needs." The back cover says this "is not a buying guide, rather it examines the problems and pitfalls of becoming a consumer in the computer age."

The authors have written a fairly standard, basic book on how to buy a useful computer, and improved it with a better title than most such books, as well as inserting a variety of horror stories (which several other authors have also done).

The 14 chapters are about what you'd expect in such a how-to book, but with some snappier titles, such as Introduction: The Enemy is Us, Conspicuous Computing, and Tales of Horror, plus the usual titles such as Software Engineering, Privacy and Security, and Economics of Computing.

Conspicuous computing, used in the catchy subtitle, is described as buying a computer more as a status symbol than as a useful tool. The chapter warns against being misled by ads that dazzle you with all the wonderful things a computer can do for you, and for your image.

The book is interesting as an exercise in trying to turn what can be a boring subject into a more readable and interesting text. However, there are better books, several of which have been reviewed here within the last year, that get right down to the nuts and bolts of selecting a computer for your particular application, with want-lists and all sorts of things to check for.

As a general text, this is good, but for more useful detail, you'll have to go elsewhere. □

November 1983 ° Creative Computing

From Computer Plus to YOU...

PLUS after PLUS after PLUS



Model 100 BE 1679
Model 100 2AE 1638



Color Computer II 168 1188
w/16K Ext. Basic 1210
w/48K Ext. Basic 1395



Model IV 168 1649
Model IV 64K
2 Disk & PS/212 1449



CICOM Powerline 1378
CICOM Powerline 1649



CICo Drive 8 1229
CICo Drive 1 1235



DWP10 1629

BUY DIRECT

Here are just a few of our fine offers
call TOLL FREE for full information

COMPUTERS	1369	15 Medium's	140	ISSA DRIVES	545
Model 12 64K 2 Drive	3375	15 SC-1200	545	15 Model IV Drive D	545
Model 12 64K 2 Drive	3495	PRINTERS	607	Color Computer Drive D	329
Model IV 16K	649	Smith Corona PR D W	607	Color Computer Drive T	235
Model IV 64K	949	Smith Read I 1950 D W	630	Primary High Disk 612	269
2 Disk & PS/2	1049	Smith Read I 1950 D W	645	Control Unit 64K	179
Color Computer II 16K	185	Daisy Wheel 4	740	ETC	
w/16K ext. Basic	265	DWP10	837	CCS II expansion	22
Color Computer II 16K	305	DWP100	1199	C.C. Jevons Kit	52
Model 168 12 254K	1065	CPA115	159	16K Ram Chips	25
Model 168 12 254K	4249	DWP100	315	16K Ram Chips	75
Model 168 2AE 254K	4913	DWP120	395	30 Pin Top Subconnector	130
Model 100 2E	479	DWP200	520	Personal printer Cables (w/ connectors for most computers)	
Model 100 2AE	635	DWP400	1010	SOFTWARE	
MODEMS		DWP1000	1219	CCS II File File D O S	49.95
Link-A-Mate	235	DWP1000	1760	15 1/2" Software 19K ext. out	
Hayes Smartmodem 3	235	Genium 101	215	15 1/2" Software 19K ext. out	
Hayes Smartmodem 1009	565	Genium 115	245	Complete listing of brand name software	
Newbiton Smartmod 1000	459	CICOM Powerline	375		
Hayes Smartmodem 1009	565	CICOM Powerline 2	449		
Hayes Smartmodem 1000	459	Ch-SMS	CALL		
Hayes Smartmodem 1009	565	Epson	CALL		

We have the lowest possible
Fully Warranted Prices AND
a full complement of Radio Shack
Software.

Prices subject to change without notice
Not responsible for typographical errors
We are a registered trademark of Radio Shack



TOLL FREE
1-800-543-8124
computer plus
P.O. Box 1074
400 King Street
Cincinnati, OH 45201
617-646-3173
Since 1975

DOWNSWAY

CALIFORNIA INCORPORATED

MEMORIES FOR VIC-20 and T/S 1000

Stylish to match the computers - rugged, reliable and light fitting
fully assembled and tested

Proven Products! Tens of thousands of Downsway memories already sold world wide - your guarantee of quality and performance

16K RAM cartridge for VIC-20 - Switchable for 3 K or 16K giving you 20K of RAM. Compatible with all appropriate accessories

\$67.50

64K RAM cartridge for T/S 1000 - Ultra slim, light and compact, only 3 1/2" x 2 1/8" inches, with gold plated edge connectors. 64K module needs no extra power supply. 8 1/4" area can be switched out to use other accessories

16K \$39.95 64K \$124.95

Plus new software for T/S 1000, T/S 2000, VIC-20 and Commodore 64
Desired Inquiries Invited! Full ad copies below or for faster service

CALL TOLL FREE: 800-556-7872
In CA call: 619-342-1222 (8 a.m. - 5 p.m.)

DOWNSWAY CALIFORNIA INCORPORATED / En-821 Trade Press Div. Index CA 92791

Name (Print) _____
Address _____
City State Zip _____
Please send me _____ (Specify Computer)

Check Money Order VISA Mastercard

Card No. _____ (16 Digits)

Signature _____

In CA add 6% Sales Tax. Include \$2.00 for shipping (13.00 UPS Blue Label). \$6.00 Canada.

CIRCLE 163 ON READER SERVICE CARD

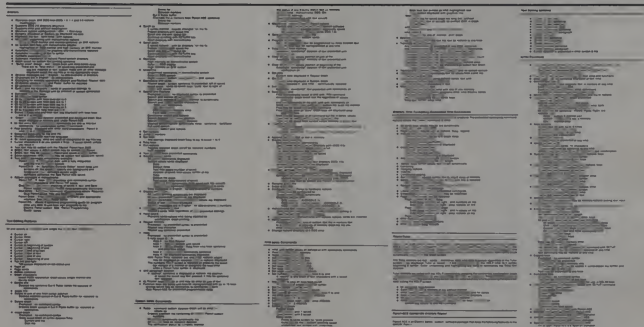
History *has* recorded a profound irony.
The fastest and most powerful word processing package ever
created for the IBM personal computer wasn't created by IBM...
or Leading Edge.

The Electric Pencil PC_{T.M.} Word Processing System

Here is one feature of The Electric Pencil PC word processing system with Pencil-ACE and Pencil Tutor:

**Reprogram any key, shift key, control key or alternate key
with up to 255 keystrokes.**

Here are the other 452:



Electric Pencil PC is on sale *now*. See an incredible demonstration of word processing power at your computer dealer today. Don't take our word for it... See it for yourself.

Electric Pencil - \$299.95, Pencil Tutor - \$49.95 and Pencil-ACE - \$149.95. The Electric Pencil PC PRO-Pak (includes The Electric Pencil, Pencil Tutor and Pencil-ACE) - \$499.95. In addition you will receive a \$50 rebate when you return the coupon included with every PRO-Pak. This offer good on purchases of the PRO-Pak only.

The Electric Pencil is available at computer stores and selected B. Dalton Booksellers. If your dealer is out of stock, order direct. Include \$4.00 for shipping and handling. Foreign residents add \$11.00 plus purchase price in U.S. Funds.

Dealers

The Electric Pencil is available from IJG, Inc. 1-714-946-5805, Telex 469775 IJG/GI INC. International Dealers contact Laurant Martres at IJG, Inc. or contact one of the following distributors or dealers:

- Australia: Dick Smith Electronics - (02) 888 32 00 • Belgium: Immo-Elec Sprl - 02/640 73 01 • Belgium: Micro-2000 - 733 65 40
- Canada: Micron Distributors - (416) 593-9862 • Canada: Microwest Dist. (604) 984-9191 • Denmark: E.C. Data - (2) 81 81 91
- England: Molimerx Ltd. - 0424/220391 • France: Pentasonic - 524 23 16 • France: Alpha Systemes - 76/478067 • France: Sideg Informatique - 557 79 12 • France: Sivea S.A. - 522 70 66
- Germany: Hofacker GMBH - (08024) 7331 • India: Lord International - 272375 • Netherlands: Computer Collectief - 20/223573 • South Africa: Technical Books (Pty) Ltd. - 21-6540

**If it's from IJG
IT'S JUST GREAT!**

Electric Pencil PC is a trademark of Michael Strayer Software
CIRCLE 177 ON READER SERVICE CARD

the creative computer mart

SOFTWARE AND HARDWARE SHOPPERS GUIDE

Radio Shack and TDP-100



COLOR COMPUTER

8 NAMES
8 PRINT & WRITE
8 ENHANCEMENTS & ADD-ONS
8000 PROGRAMS INSTALLED

COMPUTERWARE

Box 688
Encinitas, CA 92024
(619) 436-3512

VERSACALC!

VERSACALC!

VERSACALC!

VERSACALC!

VERSACALC!

TUTORIAL UTILITIES AND FILE MANAGER ENHANCEMENTS TO VISICAL!

- SORT any number of files
- MENU — DRIVEN MODULES
- AUTO CATALOG
- AUTO SCREEN FORMAT
- PRINT OUT THE LIST OF COORDINATES
- AUTO BATCH UPDATE

VERSACALC runs without Visicalc!

Apple	100.00	Hardware Original, Inc.	100.00
Commodore	120.00	101 North Avenue	120.00
IBM	150.00	Portland, ME 04103	150.00
Apple	100.00	411-448-3178	

\$1,250.00

FRANKLIN SYSTEM

SYSCOM II (Apple Compatible) \$ 550
APPLE IIe SYSTEM \$1,675
FRANKLIN 1200 \$1,599

*APPLE TYPE DRIVE \$ 180
128 K Card \$ 250
Gemini 10 \$ 300

FREE BROCHURE
!!WE WILL BEAT ANY PRICE!!

SOFTSELL SYSTEMS
P. O. Box 18928
Philadelphia, Pa. 19119

Visa, MasterCard preferred or C.O.D.
Apple is a trademark of Apple Computer

POWER LINE PROBLEMS?



SPIKE-SPIKERS... The Solution!

Minimize equipment damaging spikes and conducted RF noise to or from sensitive equipment. Transient surge protection plus low pass RFI hash filtering. All units 120V 15A

MINI II \$44.95
Wall Mount
3 stage filter
2 sockets

QUAD II \$59.95
Wall mount Dual 3 stage filter
4 sockets & light

DELUXE \$79.95
Dual 5 stage filtered
chkt. 8 switch sockets
moon switch, fuse light

Kelpco Electronics Co., Inc.
55 8th St. Dept C C
Bethlehem PA 18017

Order Factory Direct
215-837-0700

Out of State
800-523-9685

DEALERS INVITED
PA Res. Add 4% - COD add \$3.00 - Shipping

APPLE Compatible ANKO JOYSTICK

ALSO CAN BE USED FOR PLOTTING DRAWINGS ON MONITOR



19.95

- 4 BUTTON FIRING ACTION
- HANG HOLD OR SECURE TO DESK
- 8 X COORDINATES 360° CURSOR CONTROL
- EXTREMELY DURABLE
- DEALER INQUIRIES WELCOME
- 30-DAY MONEY BACK GUARANTEE

Send check or money order for \$19.95 to:
MFG. FINDERS
BOX 1381, HIGHLAND PARK, N.J. 08904

CIRCLE 340 ON READER SERVICE CARD



Best Prices On TRS-80 Computers

Our 6th year of discounts
Ed or Joe McManus
Fgr. Prepaid. Save Tax.
Toll Free 800-231-3680

Marymex Industries, Inc.
22511 Katy Fwy., Katy
(Houston) Tx 77450
1-713-392-0747
Telex 774132

See us in the Wall Street
Journal every Tues. Wed. Thurs.

★MICROCOMPUTER★

BUSINESS SOFTWARE

MEDICAL MGMT...
DENTAL MGMT...
INSURANCE AGENT
LEGAL BILLING.....
PROPERTY MGMT..
AND MUCH MORE !

UNIVAP INTERNATIONAL
9024 St. Charles Rock Road,
ST. LOUIS, MISSOURI 63114
(314) 426-1099

Smith-Corona TP-1 Daks Wheel Printer

\$439.00

UNBELIEVABLE!

- Fully formed characters
- serial or parallel operation
- compatible with most micro-computers

Also for your TP-1 letter quality printer—
the Smith-Corona Tractor Feed

\$134.95

- Adjustable tractor widths
- For continuous forms
- Quick, easy removal



Call Collect
1-714-876-8521

PCBARE LOCK BUSINESS EQUIPMENT, INC.
6400 Gaskin Avenue • Dallas, Texas 75214

TRS-80

COMPUTER DISCOUNTS

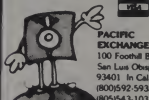
- Factory Direct
- Best Prices Anywhere
- No Out-of-State Taxes
- 100% Radio Shack Warranty
- Free Price List
- Authorized TRS-80 Sales Center

SCOTT TASSO ASSOCIATES
175 North Delsea Drive
Vineland, N.J. 08360
800-257-0426
NJ 609-691-7100

MEMOREX

FLEXIBLE DISCS

WE WILL NOT BE UNDER-
SOLD! Call Free (800)235-4137
for prices and information. Dealer
inquiries invited and COD's
accepted.



PACIFIC EXCHANGES
100 Foothill Blvd
San Luis Obispo, CA
93401 In Cal call
800/592-5935 or
805/543-1037

CIRCLE 328 ON READER SERVICE CARD

SAVE 50% on maxell. DISKETTES

Dealer inquiries invited

5 1/4" Specify Soft	Price/10
10 or 16 Sector	\$27.90
MD1-MH1 1 side/rdbl dens	\$27.90
MD2-MH2 2 side/rdbl dens	\$40.00
MD1-DDM 1 side/quad 96 tpi	\$36.50
MD2-DDM 2 side/quad 96 tpi	\$48.50
8" Specify Soft or 42 Sector	Price/10
F01-FH1 1 side/sgl or dbl dens	\$36.90
F02-FH2 2 sides/dbl den	\$48.50

Check VISA-MC-C.O.D. Add \$2 Shipping
Call or write for our discount Catalog
LYBON COMPUTER SYSTEMS
2720 Harder Ave., St. Clair Shores, MI 48081
Phone: (313) 777-7780

Maxell. The Gold Standard.

CIRCLE 337 ON READER SERVICE CARD

The First and Only System to Backup
Diskettes Protected by Bad Sectoring
without modification to your drive.



ATARI DISK BACKUP SYSTEM (48")
Superior to the only ATR diskette cover system that lets
you backup just about ANY copy protected diskette...
including those protected by bad sectoring. Bad tracks
and sectors are created without modifications to or adjustments
of your hardware. Each backup diskette generated by SuperDisk
functions exactly like the original...all loading, etc. (In fact
we suggest that you use the backup and save the original.)
SuperDisk includes:
• SCAN ANALYSIS: Map of diskette contents (Location of
data, bad sectors, etc.)
• FORMATTING/BAD SECTORING: Non-ATARI DOS for
formatting and bad track/sector creation.
• BACKUP: Copies just about everything you can find
regardless of protection scheme.
• SUPER-DISK: User-friendly and simple to use.
• PRIVATE TAKE NOTE: Write your own notes onto diskettes.
You'll be made of more than just your backup... SuperDisk!
SYSTEMS
Atari 480 and 800; Commodore 48K; Memory
One Atari 800 Disk Drive; Printer Optional
Available at your computer store or direct from
SCOW TRUNNERS, Inc. (In CA call (800) 555-4790
In Nevada or for International Call (800) 555-4790
TOLL FREE ORDER LINE: 24 hrs. 1-800-648-4790
In Nevada or for International Call (800) 555-4790
Special rates allow 2-3 weeks to clear
M.C. and VISA accepted.
• Memory 128K (128K upgrade available for shipping)
FRONT RUNNERS 318 Colchester Ave., Ste. 212
Reno, Nevada 89501 (702) 785-1111
Others Make Copies! SUPERCLONE makes copies!
AARI is a trademark of Atari, Inc.

CIRCLE 338 ON READER SERVICE CARD

COMPUTERIZED GREETING CARDS

Special Christmas Card Series

Now you can have your computer send a
personal message to everyone on your Christ-
mas list. Our beautiful Christmas Cards and
Envelopes come continuous with tab feed for
standard and home printers.

Box 20 Cards w/Matching Envelopes
Only 9⁹⁵

- specify design when ordering
- CX 1 — Santa Clause
 - CX 2 — Snow Scene and Sleigh
 - CX 3 — Yuletide Scene
 - CX 4 — Religious

To order send check or money order
VISA/MC accepted - C.O.D. add \$3.00
Include \$1.50 per order (\$5.00 Foreign
Orders) shipping.

Compu Cards Samples sent on request
P.O. Box 894 Phone orders: (404)299-0713
Stone Mtn., GA 30086

A.T.T.L.A.-APPLE THREADED INTERPRETIVE LANGUAGE

THE FORTH FOR THE APPLE™

"Incredible Features at an Incredible Price"

- Complete Forth Word Set
- Full Screen Editor
- Complete Structured 6502 Macro Assembler
- Hi-Res Graphics
- Floating point with all popular functions
- Complete self contained DOS
- Interface to DOS 3.3 Files
- Fifty+ Page Manual
- Strings, Array, Case, Lo-Res, Sound Words, and More!

29⁹⁵

COMPLETE! 29⁹⁵ NJ residents
incl. 6% Sales Tax
Minimum system: Apple II, II Plus, or IIe w/48K
and one disk drive; can use language card
and more disk drives if available.
VISA/MasterCard accepted; incl. card, exp. date
and signature, or send check or M.O. to:

TERRY BROTHERS SOFTWARE
P.O. Box 29, ROOSEVELT, NJ 08855
(609) 799-9190

CIRCLE 338 ON READER SERVICE CARD

CASSETTES!!!

FOR YOUR COMPUTER

DIGITAL

- Computer Grade
- 100% Error Free
- Fully Guaranteed
- Wide Dynamic Range
- 3 Screw Housing
- Carefully Packaged

All Prices include U.S. Shipping

Phone Orders Add \$2.50 C.O.D. Fee

COMPUTER TAPE PRICES

Length	25.01	100.01	1800.01
0-5	45.11/25	35-35/00	30-30/00
8-10	50-12/50	35-35/00	30-30/00
12-20	55-13/75	40-40/00	35-35/00

BASF-DPS Tapes Add 5% Cents Per Tape
—Custom Lengths Available—
Write For Volume Prices

12-240 Cases 20 Ea 250-13 Ea
12 Labels for 20 120 for 1 to
1000 Printed Labels 14 3/4

SEND MONEY ORDERS OR CHECKS TO

CASS-A-TAPES

Box B1-11-C

Kansas City MO 64112

B10-444-0n17

MS DOS & ATARI Compatible APPLICATION SOFTWARE

POWERFUL Business Software	Integrated
ORDER ENTRY	\$695
INVOICING	Complete
INVENTORY CONTROL	Complete
ACCOUNTS RECEIVABLE	(MS DOS Only)
SALES ANALYSIS	(MS DOS Only)
MAILING LABELS	MS Pkg. \$80
PURCHASE ORDERS	MS Pkg. \$80

Residential Property Analyst	or Homeowner	
Buyer's Agents		\$29.95
Investment Property		
Cash Flow Analysts		\$49.95

Database Manager	Software for Sales Activity	\$99.95
------------------	-----------------------------	---------

Conical	PO Box 185	
Distributed	Lombard, Illinois 60148	
Computing	(312) 488-0121	
Systems		

PROGRAMMERS FLIGHT SIMULATOR

Apple II Plus DOS 3.3 48K



This total IFR System disk features globe
of menu selectable flight programs each
with breath taking realistic picture
graphics, moving scenery, airport ap-
proaches, holding patterns and much
much more.

\$50.00. At your computer. Store or direct from
Vista Mastercard
Programmers Software
Box 199
Cabel, Arkansas 72023
(501) 843-2968

CIRCLE 339 ON READER SERVICE CARD

TYPEWRITER INTERFACES

\$175 ASSEMBLED & TESTED
CENTRONICS PARALLEL
1 YEAR WARRANTY

- ROYAL 5010
- ROYAL ALPHA 2001
- OLIVETTI
- ET 121, 221 & 231
- PRAXIS 30, 35 & 40
- CUSTOM INTERFACING

CENTRONICS PARALLEL 85 722 OPTION \$275-
SERIAL PARALLEL KSR OPTION \$250-
FOR ALPHA & PRAXIS ONLY

CALL COLLECT! ☐
(615) 727-6000
SYSTEMED P.O. Box 430
615/727-6000 (7-11 PM EST)

**ELF—The Statistical Package
Reads All...Writes All
For IBM, Apple, and CP/M**

FEATURES

- Reads and writes from VisiCalc, SuperCalc, dBase II, dBase III, etc. • Factor analysis and principal components • Stepwise regression • Stepwise discriminant analysis • Analysis of variance (1 and 2 way) • Mean, standard deviation, etc. • Test on means • Crosstabs • Frequencies • Histograms • Create and revise a database • Complete transformation language • Report writer • Software numeric keypad • more

CAPACITY

DATABASE: Observations unlimited (multi-diskette) Variables: IBM 350 • Apple 250, CP/M 150 ANALYSIS (memory) IBM 35 • Apple 25 • CP/M 15 • Note: some CP/M machines require smaller capacity version

PRICE

IBM \$350, MS DOS \$350, Apple \$200, CP/M \$200, CP/M 86 coming soon. To order or for further information write or call

The Winchendon Group, Inc.,
PO Box 10339, Alexandria, VA 22310
(703) 960-2587

MC/Visa

Trademark: VisiCalc, VisiCorp, dBase II Ashton Tate SuperCalc, Sorcom, ELF, The Winchendon Group, Inc.

**SPEEDY EPROM
PROGRAMMER
For APPLE II**

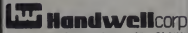
Programming any EPROM

2716, 2732, 2732A
2764, 27128
2516, 2532, 2564

In just 30 seconds.

Only \$119.00

1 Year Full Warranty

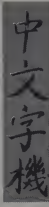


4962 El Camino Real, Los Altos, CA 94022
Tel: (415) 962-9260 (outside Calif)
(415) 962-3628 (outside Calif)
T.L.S. #11947 HANDEWELL LTD.

CIRCLE 325 ON READER SERVICE CARD

**CHINESE WORD
PROCESSING**

H: Rev Brush Stroke Calligraphy



- Invitations Notices Reports Letters
- 400 Character Basic Vocabulary
- English Dictionary for Input
- User-Expandable
- Define New Characters with Graphics (Tast)
- Expanded English Dictionary
- Insert/Delete Characters
- Read and Write to Files
- Runoff to Printer

他不是日本人嗎?
我的中文很流利
但英文是我们的

For APPLE II+ 48K DOS 3.3 and 1 Drive MicroVn/Epson (graphics Capable Printer)

Send check or money order to
DUNE ASSOCIATES
P.O. Box 1631
KALILUA, HI 96734 **\$69.95**

CIRCLE 326 ON READER SERVICE CARD

**PROMPT DELIVERY! AND
TRY TO BEAT THESE IC PRICES**

64K DYNAMIC RAM ICs
200 ns @ \$5.27
150 ns @ \$5.47
120 ns @ \$6.55

16K DYNAMIC RAM ICs
200 ns @ \$1.50

OTHER ICs

27128	300 ns	\$19.20
2764	300 ns	\$5.90
2732	450 ns	\$3.89
6264P-15	150 ns	\$33.00
6116P-3	150 ns	\$4.79

MADE IN USA BY SPC, SAN JOSE, CALIF.
Factory New, Prime Parts
MICROPROCESSORS UNLIMITED
24 000 South Pacific Ave
88 0008 Ch. 14231 (918) 267-0461

Price \$1.95

Prices subject to change. Please reserve higher prices on some parts due to hard ware shortages. Call for shipping prices. Subject to available quantities. Shipping & Insurance extra. Cash discount prices shown.

\$ SAVE \$\$\$\$ SAVE \$\$\$\$ SAVE \$

**.. MAKE MONEY ..
.. WITH YOUR ..
.. MICRO NOW!!!! ..**

There's probably a gold mine in your own kitchen drawer loaded with unused food coupons. That's right, coupon! Complete system for maximizing the return on your Micro by utilizing a creative methodology that combines a manual and systems approach (in Basic) by maintaining and evaluating food coupon activities, utilizing tips and techniques that will pay for this package many times over! At this very low price of \$35 you can hardly afford to be without it! Make that Micro begin paying for itself now! Includes complete program listings and documentation.

Send \$35 to
Sensible Systems
PO Box 2961
Richardson, TX 75083
(specify operating system and floppy type)

CIRCLE 327 ON READER SERVICE CARD

wabash®

When it comes to Flexible Disks, nobody does it better than Wabash.

MasterCard, Visa Accepted
Call Free: (800) 235-4137



PACIFIC EXCHANGES
100 Foothill Blvd
San Luis Obispo CA
93401 (In Calif call
(805) 543-1037)

CIRCLE 328 ON READER SERVICE CARD

**JUKI 6100
LETTER QUALITY PRINTER**



\$499.

- 18 cps
- Word processing and graphic functions
- Proportional spacing control
- Uses IBM Selectric ribbons
- Compatible with Kaypro, IBM, Apple, Dellmark, and others.

Free shipping in U.S.

**COMPUTERS
and more**

2420 University Ave., To Order
San Diego, Ca. 92104 (619) 291-1442

**Educational Programs for —
ATARI, VIC 20, TI 99/4A
TRS 80 Color Computer**

only \$7.00 per cassette

Alphabet, Physics, Algebra, Weather, Planetary Positions and many others.

Now! Offering, also
SAT Preparation
(5 cassettes)

Write for free list:
MOSES ENGINEERING
P.O. Box 11038
Huntsville, AL 35805
Telephone (205) 837-3356

**SALES
POWER**

Creative Computing not only sells itself at a nice profit, it helps sell the hardware and software in your store too. Because it goes home with customers and continues to influence buying decisions long after you're closed for the day. Let's talk now.

CALL COLLECT:
(212) 725-7679

Or write:
Ziff-Davis Publishing
One Park Avenue
New York, NY 10016



Minimum order, 10 copies. We pay all shipping costs.

creative computing CLASSIFIED

CLASSIFIED RATES: Per Word, 15 Word Minimum. **REGULAR:** \$2.85. **EXPAND-AD:** \$4.28. Ads set in all bold type at 20% premium. Ads set with background screen @ 25% premium. **GENERAL INFORMATION:** Prepayment discounts available. Payment must accompany order except credit card—Am. Ex., Diners, MC, VISA (include exp. date) — or credited ad agency insertions. Copy subject to publisher's approval, must be typed, written or printed. First word set in caps. Advertisers using P.O. Boxes MUST supply permanent address and telephone number. Orders not acknowledged. They will appear in next available issue after receipt. Closing date: 5th of the 3rd month preceding cover date (e.g., April issue closes Jan. 5th). Send order & remittance to: Classified Advertising, CREATIVE COMPUTING Magazine, 1 Park Avenue, New York, N.Y. 10016. To Charge your ad to a major credit card, call Lois Price (212) 725-7228. For Customer Service, call (212) 725-4312.

SOFTWARE

FREE SOFTWARE DIRECTORY. Database manager, mailing list, inventory accounting, payroll, TRS-80, no-don. IBM-PC. Long SASE, 375 Micro Architect, 90 West Arlington, MA 02174. 817-843-4713.

VIC-20 TRS 80 SOFTWARE, HARDWARE—Moran, code RTY, EPROM, programmer memory FRANK LYMAN, P.O. Box 3091, Haines, AK 99801.

ATARI, APPLE, IBM-PC: Extensive line-educational, entertainment, business. FREE BROCHURE. New Dimension Software, 39010 Baroque, Mt. Clemens, MI 48044.

TI-99/4A PROGRAMERS: Affordable Software Catalog, only \$1. PROGRAMS: SOFTWARE, 1435 Burney Square North, Columbus, OH 43228.

GUARANTEED LOWEST SOFTWARE PRICES FOR ALL SYSTEMS! Write for quotes and FREE CATALOG. Specialty systems. N.Y.S.E., P.O. Box 722, Newtown, PA 18840.

TI99/4A SOFTWARE—Free price list and newsletter. Glen Dobb, Box 801-CC, Santa Maria, CA 93458.

VIC-20/COMMODORE-84 Educational Software designed by teachers. Free catalog. ATHENA SOFTWARE, 727 Swarthmore, Newark, DE 19711.

ATTENTION! 1989/94. SINCLAIR TS1060. COMMODORE VIC-20/84. APPLE ATARI 400/20/320. Software Selection. Send \$1.00 for CATALOGUE. State make, model. Alpha Software, 182 Chapel Drive, Churchville, PA 18689.

ULTIMENU FOR DOS simplifies IBM's, PC-DOS to meet your needs. \$24.95. DB/DOC Software Associates, P.O. Box 4895, Manchester, NH 03108.

TI-99/4A owners. Send for free list of new and exciting, low-cost software. DYVAMO, Box 124, Hicksville, NY 11601.

CHECK OUR SOFTWARE PRICES! First! Business-Educational-Games for all popular computers. Free brochure LOG-ON, Box 747, Winchester, CA 92398 (714) 925-1141.

FLOPPY DISKS for Apples, TRS-80's, Commodore's, Atari's, IBM's, etc.—10 disks/Box \$5.00-DASB/\$20.00-Wabash/\$20.00-Scotch/\$23.00-Memorex/\$25.00-Maxell/\$28.00-Dynas/\$35.00—Double side and 8" also available. Shipping \$2.50/order. Add N.J. sales tax if applicable. COMPUTER DISK, 24 Washington Ave., Liza Hiawatha, NJ 07034.

FREE EDUCATIONAL SOFTWARE CATALOG—Pet. Commodore 84, Apple II+, TRS-80—Island Software, P.O. Box 300, Dept. G, Lake Grove, NY 11755. (516) 585-3755.

AIR NAVIGATION TRAINER—The most realistic program available for learning flight navigation. \$40. (Apple II). Space-Time Associates, 20-39CC Country Club Drive, Manchester, NH 03102. (603) 828-1084.

VIC-20, COMMODORE 84, TI. Spreadsheet, File Manager, and other business programs. None more than \$19.95. For details: large, 1000 Cyle Ave., Mountain View, CA 94043.

APPLE & ATARI—Software, Hardware, books, educational, etc. Great prices, outstanding service. Vulcan Software, 1805 Sautter Rd., Fremont, CA 94530.

MINI-SCRIPT WORD PROCESSING SOFTWARE—All you need to write letters/reports! Features include justification, TRS-80 Mod II only Cassette \$9.95. Disk \$14.95. Huntley Enterprises, 4640 Main Street, Oakland, CA 94601-4989.

SAVE ON SOFTWARE—Free catalog. Specify Computer The Floppy Disk, Box 5392-C, North Hollywood, CA 91618.

APPLE Users Predict NFL results. Regular season through superbowl. Easily updated. Send \$19.95 for immediate delivery. Vector Mosaic, 3504 NW 27, Tamarac, FL 32065.

VIC, PET, 84 PROGRAMS: Free Catalog. Specify machine. Low Prices. Top Quality. Write C & G Inc., Box 2306, Midland, Michigan 48644.

FRENCH AND MULTI-LINGUAL software for the Apple II or IIe. FREE CATALOG. LE PROFESSEUR, P.O. Box 301-C, Swanton, Vermont 05468. (514) 747-9130.

FREE CATALOG—Pet, Vic, Commodore 84 software. Books, TIS, Box 921 Dept. CG10, Los Alamitos, NH 87544.

VIC20 and C64 SOFTWARE. Special—Eighty VIC20 Programs on two cassettes, \$15.95. Postage \$1.50. Public Domain. SASE to FANFARE SOFTWARE, 120 E. Main, El Paso, TX 79902.

APPLE-ATARI-COMMODORE SOFTWARE. Price list \$1.00. Please specify which computer: 20/20/VIDEO, Box 60132-A, Chicago, IL 60660.

SOFTWARE-Discount prices. Free catalog. La-teration software, P.O. Box 473, Herndon, VA 22070. (703) 820-3855.

HANDICAPPING PROGRAMS FOR MOST PERSONAL COMPUTERS. Free Catalog: Gambler's Edge Computing, Dept 84, 250 Richards Rd., Suite 254, Kansas City, MO 64118. 1-800-821-3343, 1-818-471-8860.

UNIQUE WPL program for use with Applewriter. Includes WPL progulator, zip code sort, search prog for user specified word/item/phrase. Complete printable documentation on disk and use demo program. Specify Apple IIe/IIIe. Send \$24.95 to New Horizons, Box 4655, Medford, Oregon 97501.

COMMODORE 84, VIC-20, 99-4/A, SINCLAIR, and ATARI software. Free catalog. Escalator Enterprises, Dept. C2, Box 20093, Riverside, CA 92518 (714) 355-8675.

FREE money saving bulletin on popular brand name programs and books for your small computer. Superior, Dept. CR, 8630 Westchester Road, Westchester, OH 45069.

POSTER* Assists Income Tax Preparation, Budgeting, and Accounting. Check Book Applications, Credit Summaries. Simple and Accurate. BASIC program in spiral bound pamphlet. \$20. postpaid. WOODSON Products, 700 Madras Lane, Charlotte, N.C. 28211 (714) 384-7634.

X-RATED XBASE ADDS PM GRAPHICS. Bring arrays, 30 new functions to Atari! Basic \$829.95. FDPS great mail file handling. DOS 2.05 compatibility. APOX file-FORTH 38.95. Superware, 2028 Kinghouse Road, Spring Springs, MD 20684. (301) 238-4450.

HARDWARE

NEC and OKIDATA PRINTERS, AMDEK MONITORS. Free literature. Lowest Prices! Tech-Systems, P.O. Box 565, Spring, TX 77383.

FREE DISCOUNT CATALOG OF SYSTEMS, PERIPHERALS AND SOFTWARE. Most major brands. Descriptions complete with options and accessories. Please indicate your specific interest and application. Micro Trend Inc, 2001 Kirby Drive, Suite 908, Houston, TX 77019. (713) 520-0107.

NEW IBM PC-XT SALE! Discount prices hardware and software. Save on printers, monitors, peripherals. Call (213) 824-1313.

PRINTERS, PRINTERS, ACCESSORIES! Epson FX-80 Printer, \$519.00. Gamihi IX Printer, \$298.00. Okidata Printers, etc.—Lowest prices! Free catalog! Team Computers, (203) 777-7464, 109 Church St., Suite #303, New Haven, CT 06510.

COMPUTER EQUIPMENT/SUPPLIES

WANT A PLEASANT SURPRISE? Call or write for quotes: Atari, Commodore, Times, T.I., Corona (IBM work-alike), Amdek, Amodes, Apple & IBM accessories, Hayes, Moxie, GET SURPRISED! HARDWARE SOFTWARE ANYWARE. CO, 10 Colles Street, Brooklyn, NY 11231. (212) 592-3992.

COMPUTER PAPER—SAVE \$\$\$—Top quality, low single-carbon prices. Free shipping via UPS. Call A-1, (800) 828-3783 or (213) 804-1270.

FLIP YOUR 8IN DISK—Use both sides, special punch, template and instructions. \$8.00. Intex Computer Ware, 1475 Brentwood Ter., Mt. Laurel, NJ 08054.

FREE! Computer Supplies Catalog—low prices—Satisfaction guaranteed—DATA SYSTEMS, Box 99, Fern Park, Florida 32730. (305) 788-2145.

ATTENTION TI-99/4A Users! For only \$385 you can buy a PAP4000 that includes: PHP1200 expansion box, PHP124 disk controller, PHP1200 disk drive, PHP1260 expansion memory and logo II or TI Writer or Intex-PIU and SAVE! \$250 OFF THE TOTAL PRICE. PURCHASE SEPARATELY! Extensive selection—peripherals—also most microcomputers! Competitive prices. CATALOG, Calem Enterprises, 3878 Mose, Westerville, Ohio 43081. (614) 890-7725 after 4:30, weekends, certified check, M.O., plus \$7.00 shipping.

PRINT WHEELS WITH DURABLE GLASS-REINFORCED CHARACTERS. For Diablo, OUME, C. ITOH Printers. Last up to 10X longer than conventional plastic printwheels. Business Support Systems, 705 Butternut Ave., Royal Oak, MI 48067. (313) 585-4736.

COMPUTER PUBLICATIONS

MAKE MONEY NOW with microcomputer and related products! The best monthly newsletter tells how. Let us help you plan, start, grow! How, Box 218, Washington, DC 20018, 81571.

HOW TO MAKE MONEY WITH YOUR MICROCOMPUTER. Hard-back, 168 page guide shows how. Money Back guaranteed. Send \$14.95 to RPI Publications, P.O. Box 105/C, Sullivan, IL 61951. Send \$1.00 for specialized computer book list.

VALLEY VIDEO & COMPUTER EXCHANGE. Looking to exchange computer information, buy, sell, or trade software, or video-related items?? Your 35-word message or classified ad will be printed in our new video/computer newsletter for FREE, with no obligation! Send your ad today to VALLEY VIDEO & COMPUTER EXCHANGE, P.O. Box 3011, Nepe, CA 94958.

SAVE \$5 ON Computer books & software! For FREE DISCOUNT CATALOG write: Downtown Book Bazaar, Dept. C, P.O. Box 2490, Brooklyn, NY 11220.

YOUR OWN MICROCOMPUTER based mail order business. Free info. Bork Research, 23 East Elm Ct, Quincy MA 02170.

COMPUTER CLUB

JOIN THE BIG RED APPLE CLUB, a national Apple user club with benefits including monthly newsletter and large library of free software. Annual membership \$12. Sample newsletter \$1. BIG RED APPLE CLUB, 1301 N. 19th, Norfolk, NE 68701 (402) 379-3531.

JOIN A FAST GROWING COMPUTER CLUB for TRS-80 owners & users. Monthly Newsletter with FREE Programs and special club prices on computer accessories. Annual Membership \$16. Enclose this Ad with membership fee and receive Free Club Hat. To: American Computer League, P.O. Box 2726, Pomona, CA 91768.

FOR SALE/BARTER

CABLE TV SECRETS, the informative publication of the Cable Companies tried to ban. HBO, Movie Channel, Showtime, converters, etc. Send \$8.95 to CABLE FACTS, Box 711/CC, Pataskala, OH 43062.

CABLE TV EQUIPMENT. Channel 38/4 Notch Filter \$20.00. Information \$1.00. Goldcoast, P.O. Box 63/6025B, Margate, FL 32083.

BUSINESS OPPORTUNITIES

MAIL ORDER OPPORTUNITY! Start profitable home business without experience or capital. Information free. MAIL ORDER ASSOCIATES, Dept. 585, Montvale, NJ 07648.

MULTI-LEVEL marketing of national brand home computer and software. For information write Computer Logic, P.O. Box 418061, Indianapolis, IN 46241.

COMPUTER CASH! 101 exciting, new, operations home business opportunities. Report #4. Associated Research, Box 22485, Houston, TX 77227.

BUSINESS SERVICES

LOST IN THE PERSONAL AND MICRO-COMPUTER MAZE? Business Applications Systems can help you find your way. For more information, write: Business Application Systems, Dept. CCM, 1734 Barry Avenue, West Los Angeles, CA 90025.

GAMES

TAKEOVER—Strategic wargame for TI-99/4A. Send \$18. Schneitzer Software, 48 Lexington Rd., Howell, NJ 07731.

JOYSTICK TROUBLE? Try **LITTLE WASKAL**, a unique new community letter designed for joystick. For all switch-type sticks compatible with Atari 2600 or Sears arcade units. Perfect for assembly-line work. Custom leads include standard troubleshooting order your today! Send \$18.00 + 2.00 shipping to **LITTLE WASKAL**, P.O. Box 1825, Roubalo, WA 98370.

APPLE-IIe and Apple-II+ users, get the new **Foxvision** entertainment pack, 8 quality games on the same disk for \$24.95. Extremely fast delivery! Visa/Mastercharge accepted. **Foxvision Inc.**, 28090 Tavistock Trail, Southfield, Michigan 48034.

TI 99/4A GANGSTER SHOWDOWN game program. Cassette and catalogue, \$7.00. Ken Baum, 782 Boxwood, Warminster, PA 18974.

GAMES YOU can sell IBM PC Color Graphics 84 BASIC Source Code INCLUDED. Six for \$20.00. T. Rabenold, R.D.4, Box 406, Quakertown, PA 18951.

PROGRAMS

TI-99/4A BUSINESS PROGRAM Provides main index of 89 programs. Specify TI-BASIC, or printer version. Cassette Based full use instructions easy to use, 7 mins. per day input needed. Fully guaranteed, \$150.00. No CODs. Send check or money order to **Electronics Lab C14**, Box 7, Hudson, NC 28528.

PROGRAMS: 5 for \$2.50 plus S.A.S.E. LIST IN BASIC SEND TO: P.D.M. ENTERPRISES, P/O Box 5875, North Pole, AK 99705.

COMPUTER FURNITURE

COMPUTER FURNITURE—SAVE 20-40%. Send \$3.00 for 50 page, color catalog (refundable with order): VIXIA-Dept. CC, Box 83013, Rochester, NY 14823.

TIMEK/SINCLAIR

KROK, STAR SEARCH, NOAH'S ARK, latest programs available. Machine language action, graphics. **SASE** Brown Cottage, 5488 Bright Hawk, Columbia, MD 21045.

"MUST-HAVE" UTILITY SOFTWARE. Cassette-relocatable machine language. **SASE** for information **BIR-IUB WARE**, 6 Turning Mill Rd., Lexington, MA 02173.

32-BIT SIMULATORS set of five realistic games: 16K "MATH BY NUMBERS" unique digit-by-digit practice in four math operations on multi-digit numbers. **Grades 3-5**. Either tape (inc. int.) \$12.95 plus **Charles Bonner**, POB 1979, Norfolk, VA 23505.

INSTRUCTION

UNIVERSITY DEGREES BY MAIL Bachelors, Masters, Ph.D.s—Free revealing details. **Counseling, Box 389-C111, Tustin, CA 92680.**

COMMODORE 64

ARCADE ACTION—MOVIE THRILLS—"Lightcycles", futuristic motorcycle chase-fast machine language for Commodore 64 on Disk or cassette. Send \$15.95 to **LINCUS PLANS, I.J. Gray Summit, MO 63029.**

COMMODORE 64 Casino Pac—Includes Blackjack, Poker, Keno, Slots—Graphic Simulations of Vegas video machines—\$38. **84TOUR**—intro to 64's features and capabilities—\$12. (Disk or Tape). **Advanced Microcomputers, 1701 A Park Glen Circle, Santa Ana, CA 92706. (714) 554-8470.**

COMPUTER FORMS

PERSONALIZED CUSTOM OR BLANK CONTINUOUS FORMS—Letter-heads—labels. Also computer pages, diskettes, and ribbons. Call (201) 721-1171. **NBS Company, P.O. Box 6808, Bridgewater, NJ 08807.**

TRS-80

TRS-80 COLOR COMPUTER Software available **Chattanooga Choo-Choo Software, P.O. Box 15892, CHATTANOOGA, TN 37415. (615) 875-8858.**

APPLE PRODUCTS

APPLE 8-TRACK TAPE DRIVES. Read/write industry standard 800 bpi tapes on an Apple. Call/write for detailed brochure. **Electrovalue Industrial Inc.**, Box 378-D, Morris Plains, N.J. 07950. (201) 287-1177.

MAILING LISTS

COMPUTER SHOW ATTENDEES N.Y., N.J.: 15,000 names. \$30/M. P/S labels. For info, (201) 297-2528.

creative computing's RETAIL ROSTER

A DIRECTORY OF STORES AND THE PRODUCTS THEY CARRY
TO PLACE A LISTING CALL COLLECT: LOIS PRICE (212) 725-4215

ALABAMA

VILLAGE COMPUTERS, 1720 28th Avenue South, Homewood, 35209. (205) 870-8943. Apple, Vector, Graphics, Peripherals, Software, Training and Service.

ALASKA

JUNEAU ELECTRONICS—1000 Harbor Way, 99601. (907) 858-2260. Apple, Osborne Hardware/Software/Peripherals. All Software and Support.

ARIZONA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **PHOENIX**—2727 W. Indian School Rd., (602) 278-8247. **TUCSON**—7109 E. Broadway. (602) 865-6773.

CALIFORNIA

D.E.S. DATA EQUIPMENT SUPPLY—8315 Firestone, Downey 90241. (213) 923-8631. **VICVILLE**, (714) 778-5455. Commodore PET, Commodore-64, Vic-20 specialists. Latest software, Hardware, Books, Supplies, Peripherals in stock.

GLENDALE—COMPUTER PALACE, 1029 E. Broadway, 91205. (213) 241-2551. **Hardware/Software/Peripherals/Service Business/Home—Best Prices!**

COMPUSALES—18819 South Hawthorne Boulevard, Leandale 90260. (213) 370-3224. IBM, Victor 9000, Basis 108, Osborne, NEC, Apple.

UBURN-AMERICAN MICROTEC, 884 Lincoln Way, Suite 32B, 95603. (918) 885-1172. **Apple/Franklin, Atari, Commodore, Corona, IBM** Software, Hardware, Peripherals, Books/Magazines. Classes/Research/Personalized consultations for systems tailoring. **Atari, Service, Factory Authorized** Network.

ANAHEIM—SOUND ROOM, 1100 W. Lincoln, 92805. (714) 835-8821. **Atari, Apple, Commodore—Hardware/Software/Peripherals/Support/Training.**

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **ANAHEIM**—330 E. Ball (408) 377-8820. **EL CERRITO**—6000 Potrero Ave. (415) 238-8870. **LA MESA**—8363 Center Drive, (714) 481-0110. **LOS ANGELES**—2309 S. Flower St. (213) 748-0281. **POMONA**—1555 N. Orange Grove Ave. (714) 823-3543. **REDWOOD CITY**—2001 Middlefield Rd., (415) 385-8155. **SACRAMENTO**—1880 Fulton Ave., (916) 488-1575. **WOODLAND HILLS**—22504 Ventura Blvd., (213) 863-0531.

THE COMPUTER STORE OF OAKLAND—Apple, KayPro, Osborne, Telside, Texas Instruments, Classes/Services/Financing/Free Parking, 1320 Webster, 94812. (415) 783-7800.

DAILY CITY—LOTUS CENTER, 287 Lake Merced Blvd., 94105. (415) 982-5230. All major computer lines at discount prices!

COLORADO

ALPHA CENTER—12351 W. 64th, ARVADA 80004. (303) 421-6361. **Atari, Ti, Kaypro, Epson, Huge Software Selection! Repairs/Training.**

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **DENVER**—5940 W. 38th Ave., (303) 422-5486.

LOOKING GLASS MICROPRODUCTS—4233 West Erieville, Loveland, 80537. (303) 669-2861. Everything for Atari. Discount Prices with Full Service and Support. Atari service factory authorized network.

CONNECTICUT

EAST HARTFORD—COMPUTERFICS, 358 Burnside Ave., 06108. (203) 528-9819. **Atari, Epson, IBM, NEC, Okidata, Panasonic, Victor, Sales and Consulting.**

EXEL, COMPUTER CENTER—2235 Summer St., Ridgefield, Stamford, 06905. All lines of Apple, Hypertron, KayPro, Texas Instruments. Big selection software/printer/software. Renowned service!

PLANS AND KITS

APPLE PRODUCTS, KITS—Programmable 30 key alpha-numeric keypad under \$25.00. Plans, parts list \$3.95 + SASE. **Catalog SASE**, UCI Inc., 119 West 57th Street, Suite 719, New York, NY 10019.

PROJECTOR TV—Convert your TV or COMPUTER MONITOR to project 7 foot picture. Results comparable to \$2,500 projectors. Total Cost less than \$300. **PLANS & LENS** \$19.95. Illustrated information FREE. **Macrocom**, E.B. Washington Crossing, Pennsylvania 18977. Credit card orders 24 hours. (215) 736-3979.

USERS GROUPS

FREE VIC-20 and COMMODORE 64 USERS GROUP MEMBERSHIP with software purchase. Why pay to belong to a users group when you don't have to? Benefits: Newsletter, extensive club library, discounts, contests, questions hot-line and more! Free details—(800) 787-1533. **Lords of BASIC**, PO Box 459, Dept. 103, Ladson, SC 29456.

ALARMS

PROTECT MICROCOMPUTERS and ELECTRONICS! Free Catalog of systems for SCHOOLS OFFICES, HOMES. **SCM Corporation**, 8 West Main, Bound Brook, NJ 08905. (201) 489-8855.

FREE CATALOG!

Just let us know and we'll mail you a FREE Creative Computing Catalog—16 pages filled with books, buyer's guides, magazines, and more!
To get your FREE Catalog, write to: **Creative Computing Catalog**, Dept. NATX 39 East Hanover Ave., Morris Plains, NJ 07950.

C & E DISTRIBUTING—Edgewood Drive, Jersey City 06351. (202) 427-0857. Retail outlet and wholesaling for dealers.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **AVON**—385 W. Main St., (41) 403) 878-0323.

MICROAGE COMPUTER STORE—345 Main Street, Danbury, 06810. (203) 797-1823. **Authorized Sales/Service—IBM, Atos, Commodore, Software, Peripherals, Training.**

FLORIDA

FLORIDA BOOK STORE COMPUTER CENTER—1814 West University Ave., Gainesville, 32604. (904) 378-5606. **Commodore, Hewlett-Packard Computers**: Software and Accessories.

FAMILY COMPUTERS—4047 Bee Ridge Rd., SARASOTA 33582. (813) 921-7150. **TOP-100 micro, SV-318 Computer**. Peripherals/Software/Books.

FORT LAUDERDALE—THE SOFTWARE CONNECTION, 5480 N. State Road 7, 33318. (305) 484-7547. Discounted software/peripherals for TRS-80.

HOLLYWOOD—COMPUTERS 101, 101 Hollywood Fashion Center, 33023. (305) 981-1011. **Franklin, KayPro, Gemini Printers, DTS Cassy Wheel Printers, ATARI, Etc.**

GOERINGS' BOOK CENTER—1310 West University Avenue, Gainesville 32603. (904) 378-0363. Books and magazines. Open 9:00 to 9:00. Sun 1:00 to 5:00.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **HIALEAH**—4705 W. 18th Ave., (305) 823-2280. **JACKSONVILLE**—8282 Arlington Expressway, (904) 725-4554. **PLANTATION**—7173 W. Broward Blvd., (305) 781-7300. **TAMPA**—4109 Hillsborough Ave., (813) 886-2541.

GEORGIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **ATLANTA**—5285 Roswell Rd., (404) 252-4341.

MENTOR TECHNOLOGY, 3957 Pleasantdale Road, Atlanta, 30304, 404-447-5238. Teletype, Eagle, KayPro, OSM, TLI, Leading Edge, Prowriter, Transar, Business Software.

ILLINOIS

VIDEO ETC. 465 Lake Cook Plaza, DEERFIELD, 80015, (312) 498-9969. Other locations: SKOKIE (312) 875-3855, ORLAND PARK (312) 480-8980, BUFFALO GROVE, (312) 459-5577, strong hard/software support for Apple, Atari, Kay Pro, IBM PC.

FARNSWORTH COMPUTER CENTER—1691 N. Farnsworth Ave., Aurora 60505, (312) 851-3888 and 383 E. North Ave., Villa Park 80181, (312) 950-7100, Mon.-Fri., 10-6 Sat. 10-5 Apple, Fortune, Hewlett-Packard Series 80 Systems, HP Calculators, IDS Prism, SMI, Dobby Writer Printers.

DIGITAL WORLD—ADDITION, 711 Army Trail Rd., 60101, (312) 828-8222. Atari, Commodore, Franklin, NEC, Xerox, Zenith and more. Books/Magazines, Full Service and Training.

COMPUTERLAND/NORTHBROOK—3069 Dundee Road 80062, (312) 272-4703. IBM, Apple, DEC, Osborne, Altos, Compaq, Software, Peripherals, Service.

THE SOFTWARE STORE—Glenview—1787 Glenview Road, 60025, (312) 724-7378. Microcomputer Software, Apple, IBM, CP/M, more. Special order Specialists! Open Mon.-Sun.

DATA DOMAIN OF SCHUMBURG, 9612 E. Algonquin Rd., Schaumburg 60185, (312) 387-8706, 12-9 Mon.-Fri., 10-5 Sat. Authorized Sales and Service for Apple II, Apple III, Lisa, Osborne and Alpha Micro Computers. Hewlett-Packard Calculators and accessories. Largest Book and Magazine selection in Midwest. VISA, MC, Amer. Exp. accepted for phone orders.

INDIANA

BYTREC COMPUTER SYSTEMS—5958 Stillhorn Rd., Fort Wayne 48115, (219) 485-7511. Atari, Zenith, Sony, Teletype, Hardware/Software, Sales & Service.

SOUTHERN COMPUTER SYSTEMS—Shelbyville, (502) 633-5638, Louisville, (502) 491-7704. For more information, see listing under Kentucky.

IOWA

AMERICA'S COMPUTER SYSTEMS, Amory Building, Decora 52101, (319) 382-8600. Acas, Epson (Printers and Computers), Typesetting and Agricultural Software.

KENTUCKY

SOUTHERN COMPUTER SYSTEMS—SHELBYVILLE, 630 Main Street, 40065, (502) 835-5839. LOUISVILLE, 10476 Blue Grass Parkway, 40299, (502) 491-7704. Microcomputers: Northstar, TRS-80, Kaypro, Franklin, Peripherals, Ovidas, C. Itoh, Corvus, Software. All major brands. Turnkey Systems. We service all major brands!

MARYLAND

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, BALTIMORE—1712 E. Joppa Rd., (301) 861-4446. ROCKVILLE—5542 Nicholson Lane, (301) 861-5420.

MASSACHUSETTS

SCIENCE FANTASY BOOKSTORE—18 Elliot St., Harvard Square, Cambridge 02138, (617) 547-5917, 11-5 Monday-Saturday till 8 Thursday, Apple, Atari, IBM, TRS-80, and Commodore 64 strategy and adventure games.

BURLINGTON/SOFT SUPPLY & SYSTEMS, 88 Middlesex Tpk., 01903, (617) 229-8666. Supporting, IBM, NEC, Digital, SEICO, Chameleon.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, PEABODY—242 Andover St., (817) 531-9330, WELLESLEY—165 Worcester Ave., (817) 237-1510.

RAM COMPUTER CENTER—ARCTON, 427 Great Road, 01720, (617) 263-0415. C's Largest Selection of Personal Computer Software.

MICHIGAN

COMPUTERLAND—22000 Granger Mack Avenue, St. Clair Shores, 48060, (313) 772-8540. Apple, Atari, Compaq, DEC, Epson, Fortune, IBM, Osborne.

COMPUTER CONTACT—3017 East Hill, Grand Blanc 48439, (313) 894-3740. Apple, DEC, Epson, Compaq, Columbia, Corvus, Software, Service.

COMTEC COMPUTER SALES—516 Adams Street, Owosso, 48867, (517) 755-7328. For sales, service, consultation in IBM, Apple, Epson.

SOUTHFIELD—MICRO ATARI SOFTWARE CENTER. A large selection of Software, Supplies & Peripherals. 2444 West 10 Mile, 48034, (313) 358-5282.

MISSISSIPPI

COMPUTERLAND—IBM / OSBORNE / SOFTWARE / Training/Service/Books/Magazines. 1852 Highway #1 South, Grenville, MS 38701.

MISSOURI

COMPUTER ANNEX—411 South Campbell, Springfield 65806, (417) 864-7036. Franklin, Epson, Hardware/Software, Service, Supplies, Classes.

MISSOURI

COMPUTER STORE—BILLINGS, 1218 18th St. West, 59102, (406) 245-0092. Apple, Kay Pro, Hewlett Packard, Commodore, Hardware/Software/Peripherals—Service/Training.

NEW HAMPSHIRE

COMPUTER MART OF NEW HAMPSHIRE, 170 Main St., Nashua, 03063, (603) 883-0268. The Apple Specialists. Full Line Hardware/Software, Training/Service.

VIDEO STORE—140 Congress, Portsmouth 03801, (603) 431-1211. Osborne and Epson OX-10 for your business/home. Software, Supplies.

NEW JERSEY

SOFTWARE MART—352 Bloomfield Avenue, Caldwell 07006, (201) 228-4949. Software for Apple, Atari, TRS-80, 10-20% off list.

COMPUTERLAND/EATONTOWN—I.B.M.P.C. Compaq, Apple, Dec, Service, Leasing, Training, Software, 288 Route 35, 07724, (201) 389-2333.

RED BAK—FELICE'S COLLIES, 66 Broad St., 07701, (201) 842-2862. Atari, VIC20/64, 1199, Times/Sinclair, Hardware / Software / Peripherals—Demonstrations, Bookazines, Most Complete Micro Store in Monmouth County + Competitive prices.

PARSIPPANY—COMPUTER NOOK. New location!—160 Route 48 West, 07054, (201) 575-9488. Apple, DEC, Osborne, Sales/Service/Support.

COMPUTERLAND, 35 Plaza, RI 4 West Paramus, 07652, (201) 845-9303. Apple, IBM, DEC, etc. We know small computers.

TRANSNET COMPUTER STORE—1945 Route 22, Union, NJ 07083, (201) 888-7112, 1111 Route 35 N., Ocean, NJ (201) 531-7020. Apple, DEC, TI, HP, Osborne + Hardware/Software/Peripherals/Accessories. Full on-site service/Training.

STONEHENGE COMPUTER CORP., 89 Summit Ave., Summit 07901, (201) 277-1020, 10-50 3rd Fl., 10-5 Sat. Apple, IBM, West. Authorized Dealer Sales and Service.

WAYNE SOFTWARE—1459 Route #23, Wayne 07470, (Across from Packack Center) Books, Programs, Discount Prices! (201) 828-7318.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, ASBURY PARK—1013 State Hwy 35, (201) 775-1131, FAIR LAWN—35-07 Broadway, (Ri.) (201) 781-8935.

VIDEO CONNECTION and COMPUTER CENTER OF SOMERSET—900 Easton Avenue, 08873, (201) 545-8733. Atari, Altos, Commodore, IBM Hardware/Software/Supplies.

NEW YORK

COMPUTER STORE—6484 W. Quaker St., Orchard Park, 14127, (718) 662-4141, M-F: 9-9, Sat. 9-5, Atari, Commodore—VIC-20, 64, Epson HX20, QX10 computers, and printers, Hardware/Software.

COMPUTER DISCOUNT SERVICES, 448 West 55th St., New York, 10019, 212-757-8998. Times Sinclair, Atari, Texas Instruments Hardware, Software, Peripherals.

LEIGH'S COMPUTERS, 212 East 85 Street, New York City 10028, (212) 678-6257. Apple, Atari, Franklin, VIC 20, Commodore 64—Hardware/Software, IBM Software, All Peripherals. Discount prices.

MERRICK—VIDEO CONNECTION, 27 Merrick Ave., 11566, (516) 548-5040. Atari, TI, Panasonic, Hardware/Software/Books/Magazines. Software try-out available!

SOFTWARE EMPORIUM—151 Minerva/Willis Ave., Roslyn Heights, 11557, (516) 825-0500. LARGEST SELECTION OF SOFTWARE ON LI. Apple, Atari, TI, Commodore, IBM and more + hardware/peripherals/books/magazines.

FARMINGVILLE/DATASCAN COMPUTER SYSTEMS, 2308 N. Ocean Ave., 11736, (516) 896-8265. Atari, NEC, KAYPRO, APPLE Compatibles, Business Systems, Software/Peripherals/Service.

WATERTOWN—MCDANSY COMPUTERS, Stateway Plaza, 13801, 516-8608. Apple—Software/Peripherals, Full Service. Training is our specialty!

ALPHA STEREO—345 Cornelia Street, Plattsburgh 12901, (518) 561-2822. Atari computers and software. Weekdays 10-6, Sat. 10-8, Sun. 12-5.

COMPUTERWARE—2384 Hampstead Turnpike, East Haverhill, 13555, (518) 731-7038. Apple—Software/Peripherals, Full Service. Featuring business releases. Authorized Franklin Ace service.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, ALBANY—3478 Sheridan Dr., (718) 835-3090. ROCHESTER—937 Jefferson Rd., (718) 424-2560. N. WHITE PLAINS—7 Javor Rd., (914) 781-7890.

NORTH CAROLINA

NICKORY—SIMPLIFIED SOFTWARE, 118 Third Avenue, N.W. 28901, (704) 326-2386. Authorized Zenith Data Systems Dealer. Software for 2100, IBM/PC, DEALER INQUIRIES INVITED.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, GREENSBORO—4820 W. Market St., (919) 299-5390.

OHIO

ABACUS II—1417 Bernhart Pkwy., TOLEDO 43815, (419) 865-1009, 4751 Monroe St., (419) 471-0082, 10-8, 10-9 Thursday, IBM, Apple, Atari, Apple, Osborne, Lisa.

BARNHART COMPUTER CENTER—548 N. Main, Urbana 43078, (513) 853-7257. ATARI, KayPro Portable, Columbia (IBM Compatible), TImax/Sinclair.

NORTH COAST COMPUTERS, 850 Dover Center, Bay Village 44140, 216-835-4345, 10-8 Mon-Fri, 10-8 Tuesday, 9-30-5 Saturday, Apple, Osborne, Vector, Graphics, Altos.

TOLEDO—HEATHKIT ELECTRONIC CENTER, 46 South Byrns Rd., 43815, (419) 537-1887. Heath/Zenith Computers, Software, Peripherals.

COLUMBUS—HEATHKIT ELECTRONIC CENTER, 2500 Morse Rd., (814) 475-7200. Heath/Zenith Computers, Software, Peripherals, Training.

AKRON—DATA MANAGEMENT SYSTEMS, 3979 W. Market St., 44313, (216) 866-3228. Atari, Commodore, OS/NEC & more. Factory authorized dealer/repairs. Software development/marketing, systems analysis.

NORTH CANTON—THE COMPUTER STORE, 118 7th St., N.W. 7252, (216) 487-9298. Franklin, Atari, Teletype, Osborne, IBM, Service/Classes.

COMPUTER CORNER—5104 Mayfield Rd., LYNDHURST 41224, (218) 473-5010. Commodore, NEC, SKS, Atari, Epson, Star, Hardware/Software/Peripherals. Authorized Service—Training Classes.

SOUTHERN COMPUTER SYSTEMS—Shelbyville, (502) 833-5838; Louisville, (502) 491-7704. For more information, see listing under Kentucky.

OKLAHOMA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, OKLAHOMA CITY—2727 North Expressway, (405) 546-7953.

OREGON

CONTEMPORARY COMPUTERS—1478 Williamsdale, Eugene, OR 97401. KAYPRO, Chameleon, Vector, Graphics, Altos, Molecular, NEC, APC.

PENNSYLVANIA

CALDWELL COMPUTER CORP., 8720 Ring Sun Ave., Philadelphia 19111, (215) 742-8900. Apple, Commodore, Percom, Zenith, Sales, Service.

HARRISBURG AREA—1 STOP COMPUTER SHOPPE, 65 N. 5th St., LEMOYNE 17043, (717) 761-6754. Full line dealer in Commodore, Osborne, Zenith, Software/Peripherals—Service/Training.

MARKETLINE SYSTEMS INC., 95 Jaylor Rd., Southampton, PA 18966, (215) 355-5400. We sell and service MicroComputers and peripherals. Related books/magazines available.

PERSONAL SOFTWARE, 146 Pool Pk., Paoli, 19355, (215) 286-2728. Software Specialists. Custom Programs, Canned Programs and Peripherals.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals, PHILADELPHIA—6318 Roosevelt Blvd., (215) 780-1980. FRAZER—630 Lancaster Pike, (Rt. 301) (215) 647-5555. PITTSBURGH—3482 Wm. Penn. Hwy., (412) 824-3654.

THE TOY STORE AND COMPUTER CENTER—3878 Washington Rd., McMurry, 15317, (412) 941-2029. Total availability of software/hardware for Atari, C.B.M., Adm. II, I.B.M., Apple, NEC, Teletype, for business or pleasure. Sales, Guidance, Support.

RHODE ISLAND

COMPUTOPIA, 853 North Main Street, Providence, RI 02906, (401) 274-0330. Computer and peripherals specialist. Full Service, Classes.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **WARWICK**—558 Greenwich Ave., (401) 738-5150.

UTAH

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals **MIDVALE**—58 East 7200 South, (801) 566-4828.

VERMONT

MONTEPIELIER, TIRONE'S INC., 22 Langdon Street 05602, (802) 223-8063. Atari, TI 99/4A, Peripherals, Software, Training. Authorized Atari Service Center.

VIRGINIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **ALEXANDRIA**—8201 Richmond Hwy., (703) 785-5515. **VIRGINIA BEACH**—1055 Independence Blvd., (804) 480-0997.

WASHINGTON

COMPUTERS 4—2504 Jefferson Avenue, Tacoma, 98402, (208) 272-2329. Atari/Commodore Computers. Atari/Commodore/TRS-80 Software, Supplies.

SEATTLE—PROGRAMS PLUS, 16850 Southeast Pheny, 98118, (206) 575-1375. Apple, Atari, I.B.M., TRS-80, CP/M, Commodore—Software/Peripherals/Books. Open 7 days/wk.

YAKIMA—ROB ROY COMPUTER SHOP—1109 West Yakima Avenue 98902, (509) 575-7704. Norimatec, Atari, Software, Peripherals, Magazines.

PICTURE your Expand-Ad® in all BOLD type! Call 725-3927 for more information.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. **SEATTLE**—305 8th Ave., North, (206) 882-2172. **TUKWILA**—15439 53rd Ave. South, (206) 246-5358. **VANCOUVER**—518 S.E. Chaklov Dr., (206) 254-4441.

LYNNWOOD—MEDIA MAN—18500 33rd W., Suite B-2 (in the Alderwood Plaza), 206/775-8544. Software and supplies for Apple, Atari, I.B.M., Commodore.

WISCONSIN

MILWAUKEE—HEATHKIT ELECTRONIC CENTER, 5215 W. Fond du Lac (414) 873-8250. Heath/Zenith Computers, Software, Peripherals, robotics.

CANADA

ARKON ELECTRONICS LTD.—409 Queen St. West, Toronto M5V 2A5, (416) 593-8502. Apple dealer. Software/Hardware for Apple, Atari, Commodore 84, VIC-20, TRS-80, and more. #1 in service! Books/Magazines U.S. inquires.

MICRO SHACK OF WESTERN CANADA—PARK ST., REGINA S4S 3A8, (306) 543-4079. Commodore Computer/Supplies, Epson Printers, Service/Training. VISA/MC accepted. U.S. inquires.

MINTRONICS COMPUTERS—1440 Kingway, Vancouver V5N 2R5 (804) 872-5814. Apple Authorized Sales & Service Center. Peripherals/Printers, Training. U.S. inquires.

SABRE COMPUTER SYSTEMS—Unit #1—2810 St. John St., Port Moody, B.C. V3H 2C1. Hardware/Software/Peripherals for business, education and home. Apple, Atari, Commodore, IBM and more. Full Service/Support/Training & Mail Order. U.S. inquires.

BYTE COMPUTERS-VANCOUVER, 2151 Burrard Street, V6J 3H7, (804) 738-2181. Apple Authorized National Account Dealer. DEC, IMS, MORROWDS, OX-10. Hardware/Software/Service/Training.

YOUR Expand Ad® will stand out best in all BOLD type on a BENDAY background like this! Call (212) 725-3927 for more information.

\$\$\$ WE WILL NOT BE UNDERSOLD \$\$\$

FRANKLIN COMPUTERS

Ace 1000, 1200, and PRO PAK
LOWEST PRICES IN USA!!!

PRINTERS

New Gemini 10X.....	\$329
Gemini 15.....	499
C. Itoh Prowriter (P).....	385
Serial.....	Call
C. Itoh 1550 (P).....	679
Serial.....	Call
Smith-Corona TPL.....	549
Brother HR 1.....	Call
Brother HR 2.....	Call
OkiData B2A.....	419
OkiData B3A.....	649
OkiData 92.....	520
OkiData 93.....	869

DISK DRIVES

Apple/Franklin 1 year warranty.....	239
Slim TEAC 1 year warranty.....	269
Controller Card.....	69
Controller Card w/Diagnostics.....	99
RANA ELITE SERIES APPLE COMPATIBLE	
RANA ELITE One 40 TRK 163K.....	289
RANA ELITE Two 40 TRK DS326K.....	435
RANA ELITE Three 80 TRK DS652K.....	575
RANA ELITE Controller w/Drive.....	75

Microsoft Softcard is a registered trademark of Microsoft Corporation

EPSON

RX 80, MX 80 FT III, MX 100 III,
FX 80, and NEW FX 100!!!!
CALL - Prices Too Low To Print

MISCELLANEOUS HARDWARE

Gibson Lite Pen.....	259.00
Microbuffer II 32K Parallel.....	249.00
Microsoft Premium Pak.....	479.00
Microsoft Softcard.....	239.00
System Saver Fan.....	74.95
Videx Enhancer Rev. B.....	99.75
Videx Enhancer Rev. 7.....	117.95
Videx Function Strip.....	64.95
Wizzard 80 column card.....	179.00
with soft switch.....	
Wizzard 16K card.....	75.00

MODEMS

Hayes 300 Baud.....	\$209
Hayes 300/1200.....	5485
Micromodem II.....	289
Apple Cat II.....	282.50
J-Cat.....	129
SSM Modem Card.....	249

SALE COMMUNICATIONS PAK SALE

Microcommod II.....	269.00
Source Subscriptions.....	75.00
ASC II Express.....	49.95
ALL THREE PIECES.....	389.00

A COMPUTER SHOP

Dept. 345, 3941 B S. Bristol St.
Santa Ana, CA 92704

(Outside CA) (800) 824-2227 Orders Only

(714) 261-1383 Technical Information

TERMS: We accept VISA, Mastercard, Cash, Checks, Certified Checks, C.O.D. and Money Orders. Finance add 3% for bank cards. Please add 3% for shipping

SOFTWARE

AE.....	\$22.21
Applewriter Preboot.....	43.16
Bank Street Mail.....	51.91
Bag of Tricks.....	29.63
Canyon Climber.....	27.34
Castle Wolfenstein.....	22.21
Chopflifer.....	25.92
iBase II.....	420.00
Deadline.....	37.06
Flight Simulator.....	28.82
Frogger.....	25.92
Mask of the Sun.....	32.36
Master Type.....	32.36
Miner 2049er.....	189.00
Multi Plan.....	18.50
Mystery House.....	81.60
PFS: File.....	81.60
PFS: Graph.....	62.70
PFS: Report.....	24.26
Pinball.....	32.36
Pinball Construction Set.....	32.36
Preschool IQ Builder.....	19.40
Serpentine.....	420.00
Snack Attack.....	25.92
Story Machine.....	22.21
The Home Accountant.....	28.31
Typing Tutor.....	55.62
Typing Tutor.....	19.40
Visicalc.....	179.00
Visicalc Pre Boot.....	43.16
Visicalc 80 w/Memory Expand.....	72.31
Wordstar.....	199.00
Wizardry.....	39.08
Versa Form.....	279.00
1st Class Mail.....	55.62
Eighth Track SSSD.....	18.99

ALL PRICES ARE SUBJECT TO CHANGE

Index To Advertisers

Reader Service No.	Advertiser	Page	Reader Service No.	Advertiser	Page	Reader Service No.	Advertiser	Page
101	Aardvark	110	155	Discount Software	258	206	Programmers Institute	253
102	Abacus	204	163	Downsday	335	201	Prometheus Products Inc	177
125	Advanced Logic Systems	144	281	Dynacom	75	305	Proctelo	262
103	Adventure International	179	154	Educational Achieves	73	272	Proctelo	263
-	ALF Products	171	171	Educational Media Assoc	315	273	Quadram Corp	174-175
158	Allenbach	157	157	Edu-Ware	202	202	Quark	96-99
109	Alpha Com	164	260	Electronic Protection Devices	189	204	Rabco Shack	146-147
110	American Software Club	165	296	Electronic Protection Devices	1	214	RB Root	299
113	Amnicro Corp	63	106	Electronic Specialists	334	217	Readers Digest Software	202
315	Andata	299	159	EPYX	125	207	Raston Publishing	37
114	Apple Computer Inc	132-133	162	EPYX	127	208	Raston Publishing	168
111	Appleware, Inc	280	161	EPYX	129	280	Raston Publishing	241
-	Artwork	61	156	Escalbur	11	237	R H Electronics	302
105	Atan	33	165	Executech	34-35	209	Royal Software	229
112	Atlantic Computer	294	167	Executive Software	5	210	RR Software	135
106	Avaton H&I	19	167	Fasttrak	272	211	Sakata	235
297	Avant Guard	246	166	Fee Tech Furniture	245	212	Howard Sams & Co	89
274	B Dalton	232	287	Frat Star Software	301	213	Howard Sams & Co	115
107	BASF	173	164	Franklin Computer Corp	151	215	Satellite Software	77
116	Beagle Brothers	281	306	Gentech	223	216	Scarborough Systems	30-31
115	Bible Research Systems	313	169	General Videotex	215	168	Scott Foresman (Electronic Publishing)	44
118	Big Five Software	184-185	170	Greenwood Manufacturing	239	216	Screen Play	46-47
123	Bythe Valley	274	183	Happy Hands	315	221	Serra On Line	54
117	Broderbund Software	131	111	Hayden Software	194	195	Serra On Line	103
119	BRS After Dark	53	302	Hayes Microcomputer Products	197	224	Sirus Software	91
303	Budget Computers	221	172	Hayes Microcomputer Products	72	225	Sirus Software	90
124	ByteWriter	102	175	IBM	82-83	230	SuB	261
126	Calsoft	275	177	IDS	209	226	Suave	150
120	Carolina Microsystems	273	192	I.J.G.	336	236	Software Development	205
121	CBS Professional Book Co	305	178	Indus Systems	212-213	227	Software Guide, The 39	38-39
127	Central Point Software	112	151	Infocom	140	189	Software of the Month Club	93
128	Centuron	45	179	innac	226	240	Software T Boot	333
129	Charlatan Data Inc	64	180	Interactive Structures	291	242	Sold Software	285
131	Chrisn Industries	217	181	Jacm Computer	268-269	228	Southwest Microsystems	334
-	C-Load	192	182	Kensington	92	229	Spectra Video	C2
-	C-Load	192	203	Kensington	81	229	SonyStar	22-23
133	Commodore Business Machines	43	184	Koala Technologies Corp	166-167	244	SSM Microcomputer	278
235	Comp-Protect Inc	182	284	Kraft	71	222	Star Micros	295
134	Compu Serve	149	188	Leading Edge	9	222	Stinutek	15
130	Computer Advanced Ideas	29	190	Leading Edge	C4	231	STM Electronics	257
135	Computer Discount of America	333	278	LNW	160	233	Strategic Simulations	163
136	Computer Discount Products	321	185	Lycu Computer	288-289	282	Street Electronics	327
138	Computer Humor	280	-	MacMillan Book Club	57-59	249	Strobe Inc	181
262	Computer Innovations	332	186	Magic Computer	49	289	STSC	325
139	Computer Mail Order	276-277	264	Mannesmann-Taty	439	234	Sublogic	30
300	Computer Outlet	266	266	Marco Polo	310	241	Sundex Corp	100
-	Computer Plus	335	180	Master Computing	118	238	Sweet Gum Inc	332
141	Computer Room	328	-	Mentex	78	243	Synapse	123
276	Computer Store	345	290	Micro Lab	31	223	Synelix Inc	247
132	ContiSoftics	C3	192	Micro Management Systems	217	245	Team Computer Products	316
142	Compu View	227	193	Micro Sci	246	246	Tecm Sketch	7
294	Concord Peripherals	237	259	Micro Storehouse	308	253	Tecmar	7
143	Conroy La Pointe	95	191	MWRG Microsoftware	297	283	Teas Instruments	156-159
122	Continental Software	2	270	Musa	199	301	Telex-Sencor	250
295	Control Data	109	-	National Education Corp	315	219	Tomorrow Products	330
144	Corrections Software	313	267	Nesta Computer Forms	267	247	Transfer a division of Vwitar	
145	Cosmic Computer	225	194	Nelvorx	211	247	Transfer a division of Vwitar	
-	Counterpoint Software	13	196	Nibble Notch	315	265	Tronix	119
146	Creative Computer Peripherals	323	197	Noragon	119	207	Tymac	26-27
147	Data Basic Inc	153	198	NIH Schools/Electronic Division	317	248	Uncom Software	255
148	Data Most	82	288	Okidata	199	293	Universal Software	311
149	Data Most	193	-	Omni Technology	310	251	Vertical Data Bess	236
150	Data Soft	68	-	Omega International	18	252	Video Tech	84
304	Davka	106	279	Opportunities for Learning	330	254	Vides	25
152	Designware	199	201	Percon	113	269	Warlock Software	122
-	Digital Equipment	187	173	Perry Gas & Oil	101	269	Winner Circle	80
285	Disc Washer	183	200	Potential Software	101	257	Winner Circle	210
153	Discount Computer	309	291	Programmers Institute	121	258	Xerox Education Publications	105



FREE INFORMATION SERVICE

Learning more about a product that's advertised or mentioned in an article in this month's issue is as simple as 1-2-3. And absolutely free.

1 Print or type your name and address on the attached card. Use only one card per person.

2 Circle the numbers on the card that correspond to the numbers at the bottom of the advertisements or articles for which you want more information. (Key numbers for advertised products also appear in the Advertisers' Index.)

3 Simply mail the card, and the literature will be mailed to you free of charge by the manufacturer.

The address on the attached card is for product information only. Editorial inquiries should be directed to **CREATIVE COMPUTING**, 39 East Hanover Avenue, Morris Plains, New Jersey 07950.

FREE INFORMATION SERVICE

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
 128 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME _____ PHONE # (____) _____

COMPANY _____

ADDRESS _____ APT. _____

CITY _____ STATE _____ ZIP _____

(Zip code must be included to insure delivery) Void after January 31, 1984.

Send me one year of *Creative Computing* for \$19.97 and bill me.
 (Full subscription price \$24.97.)

CC11833

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
 128 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME _____ PHONE # (____) _____

COMPANY _____

ADDRESS _____ APT. _____

CITY _____ STATE _____ ZIP _____

(Zip code must be included to insure delivery) Void after January 31, 1984.

Send me one year of *Creative Computing* for \$19.97 and bill me.
 (Full subscription price \$24.97.)

CC11832

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
 128 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475
 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME _____ PHONE # (____) _____

COMPANY _____

ADDRESS _____ APT. _____

CITY _____ STATE _____ ZIP _____

(Zip code must be included to insure delivery) Void after January 31, 1984.

Send me one year of *Creative Computing* for \$19.97 and bill me.
 (Full subscription price \$24.97.)

CC11831

creative computing

creative computing

creative computing

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

creative computing

P.O. BOX 13010
PHILADELPHIA, PA. 19101

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

creative computing

P.O. BOX 13010
PHILADELPHIA, PA. 19101

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

creative computing

P.O. BOX 13010
PHILADELPHIA, PA. 19101

FREE INFORMATION

about the products
and services
advertised in this
issue of

creative computing



See other side for directions



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.

VERSA RECEIVABLES™

\$99.95

VERSA RECEIVABLES™ 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. VERSA RECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEGGER II™ and VERSAINVENTORY™.

VERSA PAYABLES™

\$99.95

VERSA PAYABLES™ 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. VERSA PAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSA PAYABLES™ you can even let your computer automatically select which vouchers are to be paid.

VERSA PAYROLL™

\$99.95

VERSA PAYROLL™ 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 VERSALEGGER II™ system.

VERSA INVENTORY™

\$99.95

VERSA INVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSA INVENTORY™ 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 VERSA RECEIVABLES™ system. VERSA INVENTORY™ 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.

COMPUTRONICS

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.

CIRCLE 132 ON READER SERVICE CARD

VERSA LEDGER II™

\$149.95

VERSA LEDGER II™ is a complete accounting system that grows as your business grows. VERSA LEDGER 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.

- VERSALEGGER 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.

VERSA LEDGER II™ comes with a professionally written 160 page manual designed for first-time users. The VERSALEGGER II™ manual will help you become quickly familiar with VERSALEGGER 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. residents call 914-425-1535)

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

DEALER INQUIRIES WELCOME

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

IBM is a trademark of IBM Corp. * OSBORNE is a trademark of Osborne Corp.

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 its
memory.

How fingerprints can
actually damage disks,
Unretouched Kfirian
photographs of UFO's
(Unidentified Floppy
Objects) The incredible
importance of making
copies, the Department
of Redundancy Depart-
ment - and what goes on
when it goes on! Power-
ful secret methods that
scientists claim can ac-
tually 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 190 ON READER SERVICE CARD

