

WIN
A Dream
Computer System!!
See page 17.

Ten Industry Leaders On The Future Of Computer Games

COMPUTE!

\$3.00
November
1987
Issue 90
Vol. 9, No. 11
\$4.25 Canada
02193
ISSN 0194-357X



The Leading Magazine Of Home, Educational, And Recreational Computing

The Hermit

Explore a mysterious underground world in this exciting text adventure for the Commodore 64, IBM PC/PCjr, Apple II series, Amiga, and Atari

IBM Directory Menu

Load, run, rename, or delete files at the touch of a key

Dynamic Graphics For The 64

Lightning-fast hi-res graphics from BASIC

Chrome II

Powerful double hi-res commands for Applesoft

Speed Up Your Atari

Up to a 30 percent increase

Design Your Own Amiga Icons

with commercial drawing programs

ST Outlook:

An IBM PC emulator for Atari ST

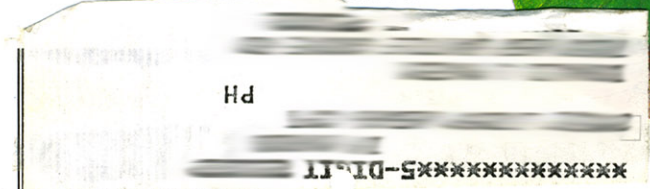
Masked Input For The Amiga

Microscope:

Desktop publishing and expert systems

INSIGHT: Atari—

Atari's newest disk drive



From Origin, creators of the Ultima™ series,
comes a new dimension in fantasy role-playing

MOEBIUS

THE ORB OF CELESTIAL HARMONY

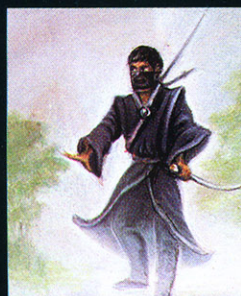
*A danger-filled adventure
through a complex and
colorful Oriental world of
magic, mysticism and intrigue.*

By Greg Malone.

Available on Apple®



Moebius, the fabled deity of the island kingdom of Khantun, has chosen you, his disciple, to recover the stolen Orb from the renegade Warlord and prevent the destruction of the universe.

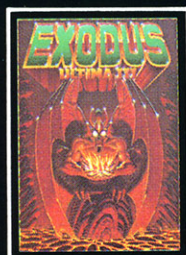


You will journey through the ascending planes of Earth, Water, Air and Fire. At each level your challenges increase in difficulty, demanding greater courage and cunning. All of your martial arts skills will be required to survive the ninja-like assassins who seek to foil your quest. Sword-wielding rebel guards will test your blade every step of the way. And watch out for wild beasts that stalk the forests!

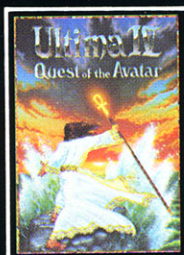
Local villagers can help, but beware—the wrong approach will frighten them away, leaving you in a world where starvation looms ever-present. Wise use of magical charms, prayers and fireballs is essential in reaching the final confrontation with the treacherous Warlord—where victory brings recovery of the long-sought Orb of Celestial Harmony. Good luck!

ORIGIN
SYSTEMS INC.

136 HARVEY ROAD, LONDONDERRY, NH 03053 (603) 644-3360



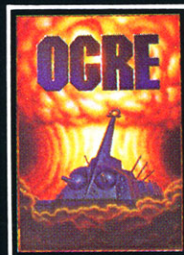
ULTIMA III™ takes you on an incredible fantasy role-playing journey through monster-plagued Sosaria in search of the elusive Exodus.



ULTIMA IV™ is the long-awaited sequel to Ultima™ III. The Quest of the Avatar is a quest to the final frontier—the self.



AUTODUEL™ is a futuristic, fast-paced strategy role-playing game where the right of way goes to the biggest guns.



OGRE™ is a strategy game fought on the nuclear battlefield of tomorrow as an inhuman juggernaut Cyber-tank battles conventional forces.

Ultima is a trademark of Richard Garriott/Moebius is a trademark of Greg Malone
AutoDuel and OGRE are trademarks of Steve Jackson/Apple is a trademark of Apple Computer Inc.

**Authors wanted.
Call us today.**



Apple II & compatibles, Commodore 64/128, IBM & compatibles.

The pros may be the best, but these players are definitely the baddest.

Presenting the Street Sports™ Series from Epyx.

In *Street Sports Basketball*, you'll shoot hoops in dingy alleys. Playgrounds. Parking lots. Occasionally, even the

toughest players in the neighborhood. There's hot shooters and slow dribblers. Team players and show-offs. There's guys who can shoot the eye



Sometimes it's best to take a pass.

score — well, maybe it's time to take up bridge.

Introducing *Street Sports Baseball*.

It's not going to be as simple as you thought to be the

TASTE THE THRILL OF VICTORY AND THE AGONY OF THE STREET.

suburbs (have fun dribbling on the lawn).

You'll pick your three-person team from the 10

out of a needle at 20 feet. And guys who couldn't sink one if they were sitting on the backboard. Pass on the run. Get that big man on the inside. Let Joey pop 'em from the corners. This is real street strategy. Take a hook shot. A tip-in.

Bounce the ball off the chain-link fence, then go for the basket. Or power through a slam dunk.

But don't dribble in the oil slick. And for heavens sake, watch out for windows.

It's not like any basketball game you've ever played on a computer. But just like every basketball game you've ever played for real.



Notice that somebody just stole second base. Funny, it was here a minute ago.

ANOTHER HIT. It's bottom of the ninth. Batter's 0 and 2. The

first on your block.

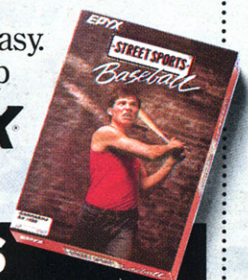
After all, you'll have to cope with makeshift diamonds, bases made from spare tires and trashcans, bushes, rocks, even squealing cars.

Not to mention 16 neighborhood players. Each with their own personalities and skills in pitching, hitting and fielding. With the right combination, you could be the champs. With the wrong combination, the chumps.

You'll pick the place. The team. The positions. The strategy. And then, you'll be right in the middle of it all. With a split-screen view from above and up close.

It won't be easy. But it's right up your alley.

Apple II & compatibles, Commodore 64/128, IBM & compatibles.



THE STREET SPORTS SERIES

FEEL THE HEAT



No matter what kind of game you're in the mood for, you'll find that if it's in a box marked FIREBIRD, it's really hot!

Firebird offers the excitement of a whole range of challenges — Adventures and Strategies for long rainy weekends, Arcade games for exhilarating evenings, Simulations when you need to get away from it all, Productivity software when you're feeling — well, productive.

Look for the Firebird — it stands for top-quality software in virtually every category.

Adventures Ablaze

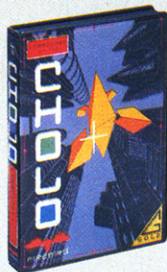
The world has been waiting for a sequel to the highly-acclaimed PAWN, with its stunning graphics and revolutionary text-handling system. Here at last is GUILD OF THIEVES, an extraordinary Adventure like no other! Look for the Firebird logo on other addictive Adventures, too — like the stunning GOLDEN PATH, or the magical illusion of KNIGHT ORC with its superb graphics.



Four-Alarm Arcade Action

When it comes to fast-paced Arcade games, nothing beats Firebird's STARGLIDER, a breathtaking combat flight simulation with incredibly rapid 3D vector effects.

Or try ELITE, a game so different it defies



categorization, or the endlessly puzzling CHOLO.

Sizzling Strategies

If you're in the mood for Strategy, and have exceptional concentration and near-perfect hand/eye coordination, you'll love the challenge of SENTRY with its more than 10,000 full-color landscapes and four-way scrolling. More Strategies from Firebird: the revolutionary UNIVERSAL MILITARY SIMULATOR* and TRACKER, games that introduce totally new concepts in tactical warfare.



Power for Productivity

Firebird even offers economical, professional-quality Productivity software! ADVANCED ART STUDIO is a comprehensive art package with

powerful graphics routines, while our MUSIC SYSTEM in both concise and advanced versions, brings new stimulation to music lovers. This is Firebird — the best in interactive software of every description. We'll prove to you that you don't have to keep switching brands to satisfy your obsession for challenge!

CREDIT CARD HOTLINE
(201) 444-5700



FIREBIRD

"The First Full Line In Software"

Firebird Licensees, Inc.
P.O. Box 49, Ramsey, NJ 07446
(201) 444-5700

Firebird software for IBM-compatible systems, Amiga, C64, Atari 520ST, MacIntosh, and Apple II, is available from \$24.95 to \$59.95.

Firebird, and the Firebird logo are registered trademarks of Firebird Licensees, Inc.

*Available January '88.

IBM is a registered trademark of International Business Machines Corporation. Amiga and Commodore 64 are registered trademarks of Commodore Business Machines, Inc. MacIntosh and Apple II are registered trademarks of Apple Computer, Inc. 520ST is a registered trademark of Atari Corporation.

COMPUTE!

NOVEMBER 1987
VOLUME 9
NUMBER 11
ISSUE 90

FEATURES

- 14** The Future of Computer Games:
Ten Industry Leaders Speak Out Keith Ferrell
44 The Hermit Eric Bryant

GUIDE TO ARTICLES AND PROGRAMS

•
AP/AT/AM/
64/PC/PCjr

REVIEWS

- 32** *Into the Eagle's Nest* Neil Randall
34 *DigiPaint* Rhett Anderson
38 *Accolade's Comics* Robert Bixby
40 *California Games* Ervin Bobo

ST/64/PC
AM
AP/64
AP/AM/64

COLUMNS AND DEPARTMENTS

- 4** The Editor's Notes Richard Mansfield
10 Readers' Feedback The Editors and Readers of COMPUTE!
64 The World Inside the Computer: It's a Hammer! It's a Sandbox!
It's a Refrigerator! No! It's a Computer! Fred D'Ignazio
65 The Beginner's Page: The Random Function C. Regena
66 Computers and Society:
Computers and the Left Hand of Knowledge David D. Thornburg
68 Microscope Sheldon Leemon
69 Telecomputing Today: Just the Fax, Ma'am Arlan R. Levitan
70 IBM Personal Computing: Silent Partners Donald B. Trivette
71 INSIGHT: Atari—Atari's Newest Drive Bill Wilkinson
72 ST Outlook: IBM PC Emulator for Atari ST Philip I. Nelson
74 AmigaView: The Latest in Pictures and Words Sheldon Leemon

•
•
•
•
•
•
•
•
PC
AT
ST
AM

THE JOURNAL

- 75** The Inscrutable Sphinx Brian Flynn
79 Atari Screen Display Toggle Frank Murphy
80 Dynamic Graphics for the 64 Ronald Carnell
86 Masked Input for the Amiga Steve Michel
89 Chrome II: More Double Hi-Res Graphics Commands
for Applesoft Zachary T. Smith
94 Atari Multiple File Deleter Craig Stadler
95 Twin Pack for the Commodore 64 Steve Feinstein
96 Directory Menu for IBM Paul W. Carlson
98 IFF to Icon Translator for the Amiga Charles L. Baker

PC/PCjr
AT
64
AM

AP
AT
64
PC/PCjr
AM

- 105** **CAPUTE! Modifications or Corrections**
to Previous Articles
107 **COMPUTE!'s Guide to Typing In Programs**
110 **MLX: Machine Language Entry Program**
for Commodore 64
113 **MLX: Machine Language Entry Program for Apple**
116 **Advertisers Index**

NOTE: See page 107
before typing in
programs.

AP Apple, GS Apple IIGS, Mac
Macintosh, AT Atari, ST Atari ST,
AM Amiga, 64 Commodore 64,
128 Commodore 128, PC IBM PC,
PCjr IBM PCjr, • General interest.

COMPUTE! Publications, Inc. 

Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies

ABC Publishing, President, Robert G. Burton
1330 Avenue of the Americas, New York, New York 10019

COMPUTE! The Journal for Progressive Computing (USPS: 537250) is published monthly by COMPUTE! Publications, Inc., 825 7th Ave., New York, NY 10019 USA. Phone: (212) 265-8360. Editorial Offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 12 issues, \$24. POSTMASTER: Send address changes to: **COMPUTE!** Magazine, P.O. Box 10955, Des Moines, IA 50950. Second class postage paid at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1987 by COMPUTE! Publications, Inc. All rights reserved, ISSN 0194-357X.

We recently had the opportunity to try out an interesting new product for IBM users. What it does is both worthwhile and paradoxical. You plug it in and it makes your hard disk much faster and, at the same time, increases the space available on the disk.

Normally, of course, there's a tradeoff between size and speed. This rule applies to everything from athletes to cooking a roast. Somehow, though, this plug-in card sent our Norton SI disk efficiency index up from 2.3 to a whopping 10.7, and it added several megabytes of storage space to the bargain. At those speeds, articles are checked for spelling in a second. You don't have to worry about power outages either: Set the word processor to back up your file every ten minutes. The backup happens so fast, you almost don't notice it—you just keep on typing while the disk gulps the whole file in the blink of an eye.

It seems that anytime you increase the speed or storage capacity of your computer system, your behavior changes. There are differences in the way you program, write, debug, model financial information—all of the hundreds of things computers are good for (except games). For one thing, you become more experimental. If it takes five minutes to compile and test a program, you'll think twice before making modifications. The price of frivolity is very high when you have to sit around for a long time, waiting for results. But when compilation takes only seconds, you can play around with new ideas, pull and stretch a program, get inventive.

Likewise, additional memory (or a disk so fast it might as well be online memory) permits the luxury of surrounding yourself with your favorite utilities. Keyboard redefiners, macro shortcuts, calculators, note pads, memo files, the entire collection of your personal "desktop" accessories are only a keypress away. Those tools are much more likely to be used when they're conveniently at hand, when you don't have to load them in from floppy disks.

Floppies were a marvel in their day, though. Back in 1981 we were delighted at how much easier computing became when we switched from

cassette tape to floppy disk storage. But one day, a machine from the future arrived at our offices on loan for review. It was the size of a suitcase and about as loud as an air conditioner, but the astounding thing was that it could hold and quickly access five megabytes (five and a quarter million characters—enough memory to hold an entire book). It cost around \$5,000. Now, of course, you can get 20 megabytes for a few hundred dollars, but the five meg behemoth was a wonder in 1981. It suggested that sometime in the future there may be no need for us to keep feeding tapes or floppies to the computer—everything will be inside, ready when you turn it on.

That day is approaching. This, too, will change the psychology of computing. Consider WORM, a new optical disk technology which offers staggering amounts of storage space. How would you deal with thousands of megabytes, more memory than you could ever fill with programs, writing, even encyclopedias? You could put everything you've ever read, or will read, onto this new kind of disk and still have immense blank areas left over. But there's a catch: It is relentless. The name WORM derives from Write Once, Read Many. It's so big you can put things on it forever, but once stored, nothing can ever be erased.

You write a school paper for two hours, backing it up every ten minutes. All 12 versions are stuck inside your computer. Over the years more information is tattooed into the machine, layer upon layer.

I don't know about you, but I find the whole thing unnerving. Wouldn't you think twice before saving a file or program to WORM, knowing it was going to become eternal? Wouldn't you, for example, try out various versions of a program or a data file on floppy disk before saving it permanently? The most ironic reaction will probably come from people for whom too much is never enough: They'll conserve space; they'll be stingy with the WORM. That's even understandable, a WORM could quickly become impossibly cluttered. Imagine a disk directory with hundreds of thousands of entries. Imagine trying to

back up countless megabytes.

The only solution might be to create disk management software that refuses to access whole regions of the WORM, places where you've "removed" excess data. Instead of backing up your hard disk every week, you would decide which versions or duplicates were to be added to the dead zone. Yet knowing that information is still inside, sitting there but inaccessible, is eerie. Nonetheless, so far we've made transitions from 8 to 612K of RAM memory, from 1 to 18 MHz clock speeds, and from .33 to 100 megabyte disks. It's likely that software designers will eventually find ways to make the relentless WORM effective and, possibly, even seem friendly.



Richard Mansfield
Editorial Director

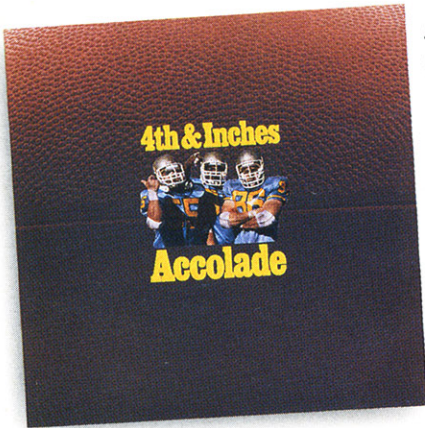
COMPUTE! Publications, Inc., is seeking to fill the following in-house editorial positions:

Assistant Technical Editor— Requires extensive experience with microcomputers, knowledge of machine language. Experience or training in editing or writing. Undergraduate degree preferred, experience in lieu of degree considered.

Microcomputer Programmer— Requires proficiency on one or more of the following computers: IBM-PC, Apple, Commodore, Atari. College degree preferable with coursework in BASIC. Proficiency in BASIC programming. Extensive machine language experience a plus.

Send résumé and salary history in confidence to:

Personnel Department
COMPUTE! Publications, Inc.
P.O. Box 5406
Greensboro, NC 27403



Accolade's 4th & Inches puts you in direct contact with some very special friends. Big, fast, mean and ugly friends who would like nothing better than to break your joystick.

When was the last time you needed oxygen to play your computer?

4th & Inches gives you all of the hard-hitting action of real football: the bombs, the blitzing, the goal line stands. You'll experience graphics and animation that are as riveting as a blind side hit.

As the key player on defense, you've got to have speed, stamina and smarts. As the quarterback, you've got to read an unforgiving defense that takes no prisoners. To win, you'll need all the jukes of a #1 draft choice plus the tactical genius of a veteran head coach.

So, now you and your new friends can share all the sportsmanship and comradery of real football playing Accolade's 4th & Inches. And to show there's no hard feelings, they'll even sign your cast. Available for Commodore 64/128.

Accolade, 20813 Stevens Creek Blvd., Cupertino, CA 95014.

ACCOLADE



**You'll meet some of
the nicest people
playing 4th & Inches.**

Publisher James A. Casella
Editorial Director Richard Mansfield
Managing Editor Kathleen Martinek
Associate Publisher Selby Bateman

Editor, COMPUTE! & COMPUTE!'s GAZETTE Lance Elko
Assistant Editors, COMPUTE! Rhett Anderson, Randy Thompson, Clifton Karnes, Tony Roberts

Production Director Tom R. Halfhill
Editor, COMPUTE!'s Atari ST Disk & Magazine and COMPUTE!'s PC Magazine

Editor, COMPUTE!'s Apple Applications Magazine Gregg Keizer
Features Editor Keith Ferrell

Technical Editor Otis R. Cowper
Assistant Technical Editors Dale McBane, Jim Fuchs

Assistant Editor, COMPUTE!'s Atari ST Disk & Magazine Todd Heimark
Assistant Editor John Shadle

Assistant Features Editor Tom Netsel
Programming Supervisor Patrick Parrish

Editorial Programmers Tim Victor, Tim Midkiff, William Chin, George Miller
Buyer's Guide Coordinator Caroline Hanlon

Copy Editors Karen Uhlendorf, Karen Siepak, Jill Champion
Editorial Assistant Mickey McLean

Submissions Reviewer David Hensley
Programming Assistants Troy Tucker, Joyce Sides

Executive Assistant Debi Nash
Administrative Assistants Julia Fleming, Iris Brooks, Sybil Agee, Claudia Earhart

Receptionist Anita Armfield
Associate Editors Jim Butterfield

Contributing Editor Toronto, Canada
 Fred D'Ignazio

COMPUTE!'s Book Division East Lansing, MI
Editor David Thornburg

Assistant Editors Los Altos, CA
 Bill Wilkinson

COMPUTE!'s Book Division Editor Stephen Levy
Assistant Editors Tammie Taylor, Robert Bixby, Lynne Weatherman

Programming Assistant David Florance
Director of National Sales Joseph W. Hatcher

Production Manager Irma Swain
Art Director Janice R. Fary

Assistant Art Director Lee Noel, Jr.
Assistant Production Manager De Potter

Artists Robin Case, Kim Potts, Scotty Billings, Tony Jacobson
Typesetting Terry Cash, Carole Dunton

Illustrator Harry Blair
Group Advertising Director/Consumer Electronics Peter Johnsmeyer

Advertising Director Bernard J. Theobald, Jr.
Production Coordinator Kathleen Hanlon

Customer Service Manager Diane Longo
Dealer Sales Supervisor Jose Cruz
Individual Order Supervisor Cassandra Green

James A. Casella, President
 Richard Mansfield, Vice President, Editorial Director
 Richard J. Marino, Vice President, Advertising Sales
 Ilene Berson Weiner, Vice President, Production

Editorial Board
 Richard Mansfield, Kathleen Martinek, Selby Bateman,
 Lance Elko, Tom R. Halfhill, Stephen Levy
 Robert Lock, Founder and Editorial Consultant

COMPUTE! Publications, Inc. publishes:
COMPUTE! **COMPUTE! Books**
COMPUTE!'s Gazette
COMPUTE!'s Gazette Disk
COMPUTE!'s Apple Applications
COMPUTE!'s Atari ST Disk & Magazine

Editorial offices: 324 West Wendover Avenue
 Suite 200
 Greensboro, NC 27408 USA

Corporate offices: 825 7th Avenue
 New York, NY 10019
 212-265-8360

Customer Service: 800-346-6767 (In NY 212-887-8525)
 10:00 AM-12:30 PM;
 1:30 PM-3:00 PM Monday-Friday

Dealer Sales: 800-638-3822 (In NY 212-887-8566)
 9 AM-5 PM Monday-Friday

Coming In Future Issues

In-House Expert: How Software Is Helping Home Users In Legal, Medical, and Financial Matters

Leaping Larry: A Fast-Paced, Arcade-Style Game For Commodore 64, Atari, And Apple II

The Commodore 128/MS-DOS Connection

Atari Persistent Ramdisk

Total Disk Menu For The 64

Apple Kaleidoscope

The Elementary Amiga—A New Series By Jim Butterfield

Mystery Mania For The IBM PC

Subscription Orders & Inquiries

COMPUTE!
 P.O. Box 10954
 Des Moines, IA 50340

TOLL FREE
Subscription Order Line
1-800-727-6937

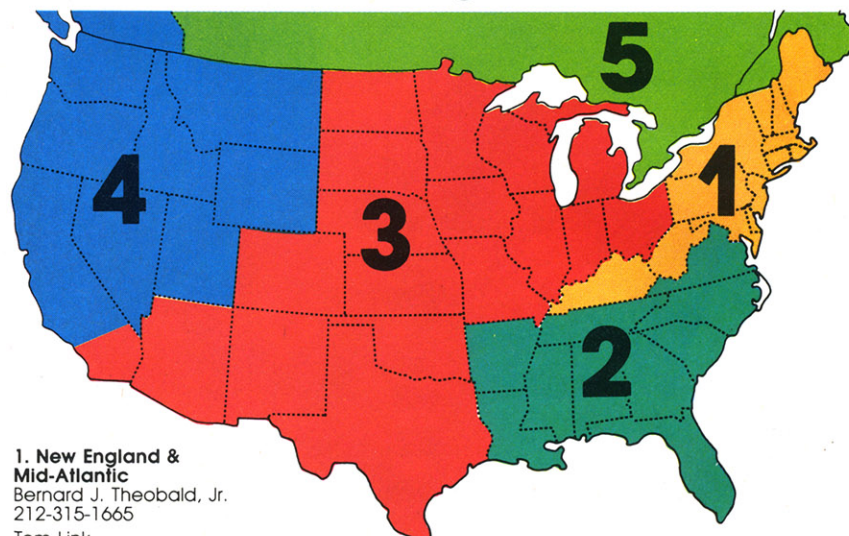
COMPUTE! Subscription Rates (12-Issue Year):

US	Canada & Foreign
(one yr.) \$24	Surface Mail \$30
(two yrs.) \$45	Foreign Air Delivery \$65
(three yrs.) \$65	



Magazine Publishers Association

Advertising Sales



1. New England & Mid-Atlantic
 Bernard J. Theobald, Jr.
 212-315-1665
 Tom Link
 212-315-1665

2. Southeast & Foreign
 Harry Blair
 919-275-9809

3. Midwest & Southwest
 Jerry Thompson
 312-726-6047 (Chicago)
 713-731-2605 (Texas)
 303-595-9299 (Colorado)
 415-348-8222 (California)
 Lucille Dennis
 415-348-8222

4. West, Northwest & British Columbia
 Jerry Thompson
 415-348-8222

Lucille Dennis
 415-348-8222
5. Canada
 Harry Blair
 919-275-9809

Advertising Director:
 Bernard J. Theobald, Jr.
COMPUTE! Sales Office 212-315-1665
Address all advertising materials to:
 Kathleen Hanlon
 Advertising Production Coordinator
COMPUTE! Magazine
 324 West Wendover Avenue
 Suite 200
 Greensboro, NC 27408

The COMPUTE! subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE! P.O. Box 10955, Des Moines, IA 50950. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE! are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of COMPUTE! Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1987. COMPUTE! Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication in COMPUTE! will be returned if author provides a self-addressed, stamped envelope. Programs (on tape or disk) must accompany each submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper- and lowercase, please) with double spacing. Each page of your article should bear the title of the article, date and name of the author. COMPUTE! assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of COMPUTE!.

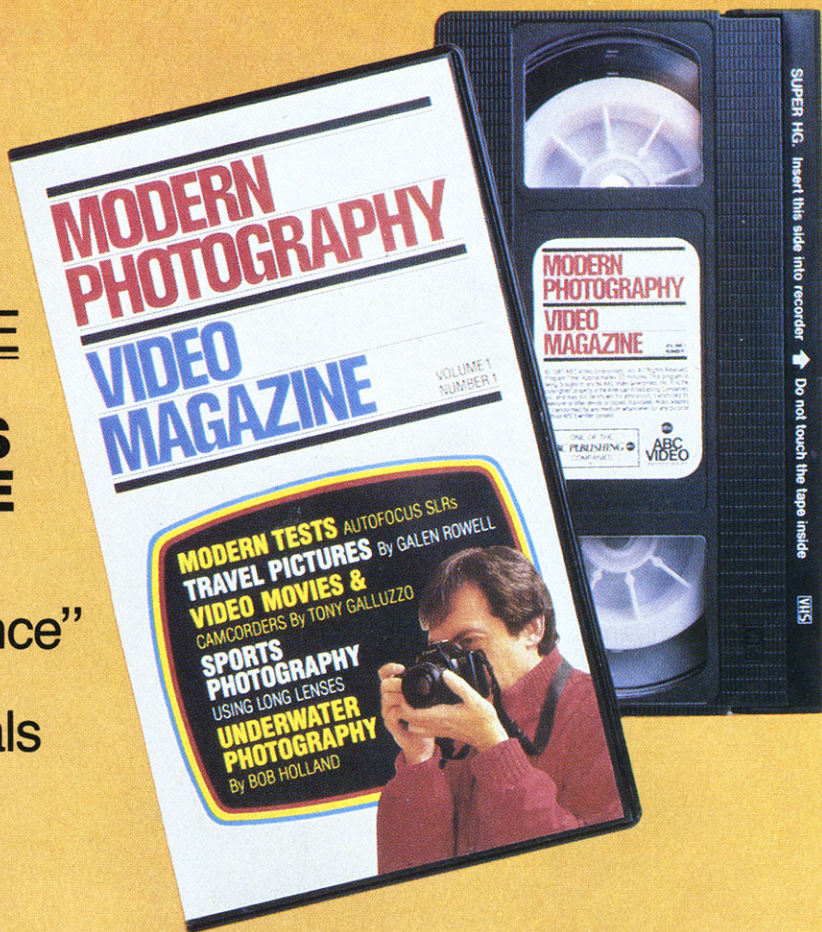
VIC-20, Commodore 64, and Commodore 128 are trademarks of Commodore Business Machines, Inc. and/or Commodore Electronics Limited. Amiga is a registered trademark of Commodore-Amiga, Inc. Atari, XL, XE, and Atari ST are trademarks of Atari, Inc. Apple, Apple II, and Apple IIG are trademarks of Apple Computer Company. Macintosh is a trademark licensed to Apple Computer, Inc. IBM PC and PCjr are trademarks of International Business Machines, Inc. Radio Shack is a trademark of Tandy, Inc.

FREE 30 DAY PREVIEW

IN YOUR OWN HOME

**MOVING PICTURES
TO HELP YOU TAKE
BETTER STILL.**

Share the "total experience"
of picture taking with
today's top professionals



Nothing can equal the impact of actually being there. And nothing comes anywhere near video for putting you in the action. Accompany pros who cover the World Series, photograph the oceans' wonders and travel to exotic places. You'll see how they make critical equipment, filter and lens decisions to create some of the world's finest photos.

In the studio, or on location there's no experience like getting close-up views of the pros at work. Seeing them scout locations, plan out shots or work with studio flash units, metering systems, zooms and auto focus SLRs. The excitement of new equipment and methods too difficult to capture in only words and still pictures.

But now, thanks to the home VCR, MODERN PHOTOGRAPHY VIDEO MAGAZINE captures this excitement with full motion and sound. No other medium brings you as close—makes you literally part of the action...right in the picture.

MODERN PHOTOGRAPHY comes alive with video feature stories and regular columns all designed to make you a better photographer. The perfect complement to your regular monthly magazine. You'll get professional demonstrations, see special lab reports

plus take a look at the latest technology. Each quarterly video issue holds 60 minutes of useful information featuring MODERN PHOTOGRAPHY's staff of experienced camera professionals—as well as some of the greatest figures in the photographic world! Plus, you'll get to see the FREE Bonus Video features from leading photographic equipment and service companies.

**ACT NOW AND
SAVE 20%**

See for yourself at no risk! Each quarterly video issue costs less than the shooting and processing of two rolls of film. So join the pros in the field, in the studio and in the lab.

FREE 30 DAY PREVIEW OFFER

YES! I'd like my FREE PREVIEW of MODERN PHOTOGRAPHY VIDEO MAGAZINE, each video issue designed to give me information on how to take better pictures and to keep me up-to-date on the latest equipment and accessories.

Send my FREE 30 DAY PREVIEW, and sign me up for one full year for only \$79.95, a 20% savings off the single copy price. I'll receive a total of 4 quarterly cassettes—a \$99.75 value! If I'm not completely satisfied with the premiere video, I can return the tape within 30 days and owe nothing. Plus, I may cancel my subscription at any time and receive a full refund for any video issues not shipped.

VHS BETA Allow 6 to 8 weeks for delivery

Bill me just \$79.95.

Bill my VISA or MASTERCARD

Account Number _____ Expire Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone No. _____

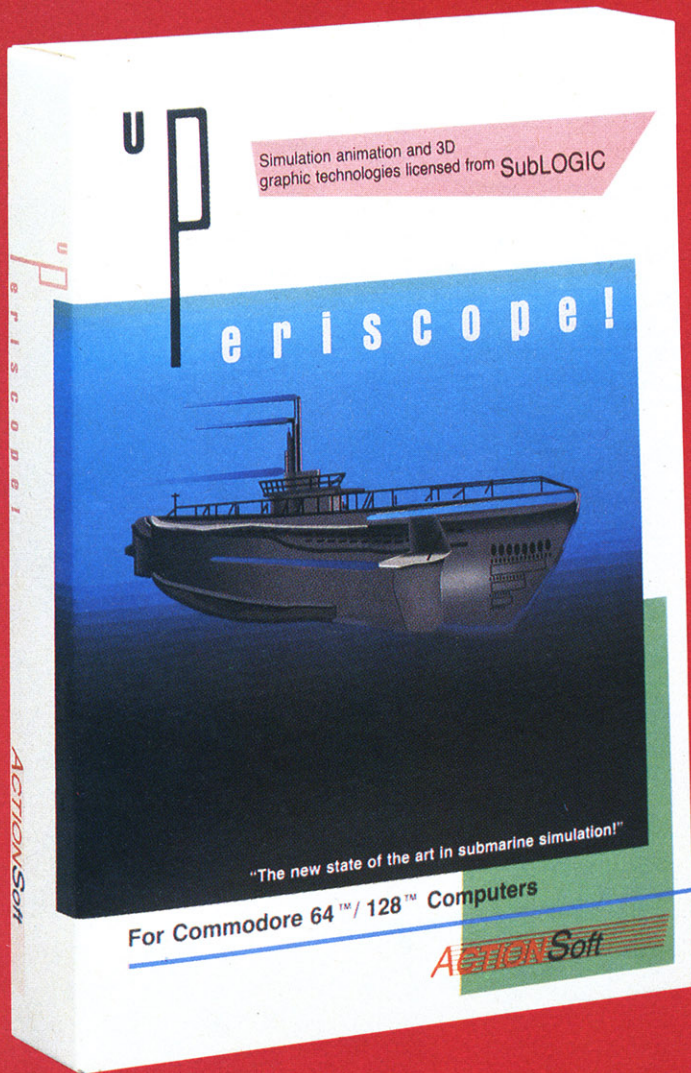
Modern Photography Video Magazine

Box 11368, Des Moines IA 50340-1368

Rush orders call 1-800-999-8783

G0CN9

WE'VE BLOWN THE COMPETITION



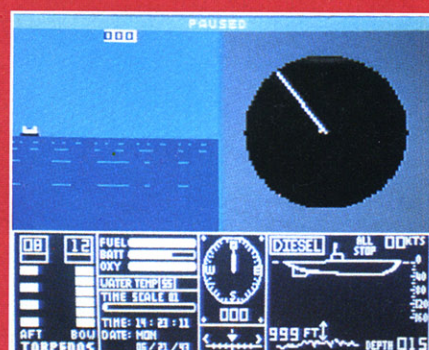
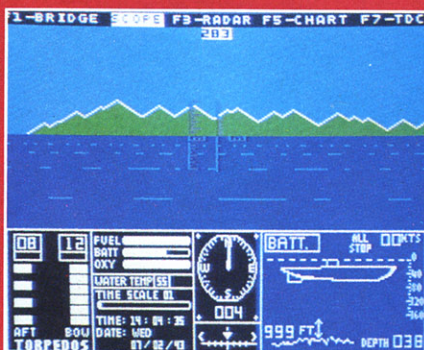
Up Periscope!, the new state of the art in submarine simulation! Blowing the competition out of the water with superior combat strategy and tactics courtesy of Captain John Patten, USN (Ret.). With true animated 3D graphics courtesy of SubLOGIC. Up Periscope!, generations ahead of the pack!

-\$29.95-
Better Engineering at a Better Price

Compare hits for yourself!

Feature (IBM versions)	Up Periscope!	Silent Service	GATO	Sub Battle
Suggested Retail Price	\$29.95	\$34.95	\$39.95	\$39.95
Real 3-D Graphics	Yes	No	No	No
Split-Screen Views	Yes	No	No	No
Torpedo Data Computer	Authentic WWII TDC display	5-line text display only	No	2-line text display only
Size of "World"	All U.S. operating areas in Atlantic and Pacific, fully detailed.	Section of Pacific, not all of Japan!	Tiny, imaginary patrol area.	Sections of Atlantic and Pacific Oceans, partial details only.
Time-Date Selection Capability	Yes	No	No	No
Zoom Feature	Map or ship view	Map view only	No	Map or Ship view
Save Feature	Yes	No	No	Yes

ON RIGHT OUT OF THE WATER!

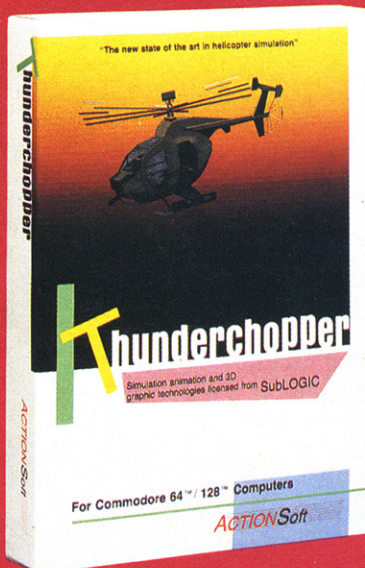


C64 Screens shown. Other computer versions may vary.



ThunderChopper

And don't forget Thunder-Chopper! For true helicopter action and realism, nothing else even comes close. Thunder-Chopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun.



See Your Dealer

Or write or call for more information. Up Periscope! and Thunder-Chopper are available on disk for the Commodore 64/128, Apple II, and IBM PC line of personal computers for the suggested retail price of \$29.95. For direct orders please specify which computer version you want. Include \$2.00 for shipping (outside U.S. \$6.25) and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club charges accepted.

© 1987 ActionSoft Corporation
 3D graphics and special effects courtesy SubLOGIC Corp.
 Commodore 64 and Commodore 128 are registered trademarks of Commodore Electronics Ltd.
 Apple is a registered trademark of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corp.
 Silent Service is a trademark of Microprose Software, Inc.
 GATO is a trademark of Spectrum Holobyte, a division of Sphere, Inc.
 Sub Battle Simulator is a trademark of Epyx, Inc.

ACTIONSoft

"GENERATIONS AHEAD IN STRATEGY ACTION SOFTWARE"

201 WEST SPRINGFIELD AVENUE, SUITE 711
 CHAMPAIGN, IL 61820 (217) 398-8388



Readers' Feedback

The Editors and Readers of COMPUTE!

If you have any questions, comments, or suggestions you would like to see addressed in this column, write to "Readers' Feedback," COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. Due to the volume of mail we receive, we regret that we cannot provide personal answers to technical questions.

MIDI And Micros

I own an Atari ST and am interested in buying a MIDI keyboard, but I don't know which keyboards are MIDI compatible. Does the keyboard come with cables that I can connect to the computer right away? If not, where can I find the cables?

Jasper Wong

There are many synthesizer keyboards available, so it can be difficult to choose one. Among the most popular are the Yamaha DX7II (the latest incarnation of the DX7) and the Casio CZ101. Although MIDI keyboards do not usually come with cables, the cables are not difficult to find. A standard MIDI cable has five-pin male DIN connectors on each end. You should be able to buy one at a Radio Shack or other electronics store, at a computer store, or at a music store.

To use the synthesizer in conjunction with your computer, you'll need to buy appropriate software. Many types are available, ranging from simple programs designed to mimic player pianos, to more ambitious ones that transcribe your playing into sheet music.

The Fastest Amiga Language

I know the Amiga is speedy, and I know its version of BASIC is probably the best, but COMPUTE! has completely neglected to print any machine language programs for the Amiga. There are some tasks (namely, searching and sorting) which require machine language speed.

Vernon Dale Frameli

COMPUTE! depends on its readers to supply the majority of the programs that are published. We simply haven't received many machine language programs for the Amiga (or for the Atari ST, for that mat-

ter). One reason may be that programmers are busy testing how far they can go with BASIC and advanced languages like C and Modula-2 before committing themselves to ML. Also, it will take a while for programmers who cut their teeth on the relatively simple 6502 microprocessor to become comfortable with the more complex instruction set of the Amiga's 68000 microprocessor.

Readers interested in submitting articles and programs to COMPUTE! for publication should refer to "COMPUTE!'s Author's Guide," which we publish regularly in this magazine. Copies may also be requested from our editorial offices: 324 W. Wendover Ave., Greensboro, NC 27408.

File Moves And Translations For The Atari

I have an Atari 800XL. I have two questions. First, is it possible to develop a program that will print an untokenized BASIC program to a printer? Also, could you make a translator program that will convert an ASCII file to a BASIC program that can be run?

Howard S. Bacon

In response to your first question, it is certainly possible to write a program to print any ASCII text file to the printer, including an untokenized BASIC program. But there's an easier way. From the DOS 2.0 or 2.5 menu, choose the DUPLICATE FILE option. Then, when you are asked for the source and destination, give the filename as the source and the printer device name as the destination. Here's an example:

```
D:TESTFILE,P:
```

Another alternative is to load the untokenized program into a word processor and print it out from there.

To answer your second question, you can convert an untokenized BASIC program into one that will run simply by using the ENTER command. An example:

```
ENTER"D:TESTFILE"
```

To convert a program in memory into an untokenized disk file, use the LIST command. Example:

```
LIST"D:TESTFILE"
```

With these two commands, you can use your favorite word processor as a BASIC text editor.

Video Cards For PCs

I am interested in purchasing an IBM PC or compatible for home use. For games, what is the minimum (in cost) video graphics card I need? Will I also need a game port for a joystick?

Eldon Brewer

The short answer to your question is that most games require a color graphics adapter (CGA) card, and many also require a joystick. For the joystick, you will need an appropriate interface card. CGA-compatible cards are widely available, and many are relatively inexpensive. Joystick adapter cards are also available, but you might want to consider a multifunction card that includes a serial port, printer port, and possibly extra memory, in addition to the game controller port. You'll probably find that the multifunction card is significantly cheaper than the combined cost of separate cards with equivalent features.

First time buyers are often confused by all the different video options available for PC's and compatibles. Here is a rundown of what's available. The original monochrome display adapter (MDA) gives you highly readable text, but no graphics. The color graphics adapter (CGA) gives you four-color graphics, but produces text that many users find hard on the eyes. Many users want both text and graphics; the Hercules Graphics Adapter (HGA) gives you both, but only in monochrome. Furthermore, the Hercules card is incompatible with programs written for the CGA. For example, none of the BASIC graphics commands support the HGA. An alternative—albeit more expensive—solution is the enhanced graphics adapter (EGA), which offers higher resolution and more readable text. Some EGA cards (although not IBM's) are also compatible with software written for the older MDA, the CGA, and possibly even the Hercules adapter. The EGA is becoming popular, but many software companies still make their games compatible with the CGA to insure the largest possible market for their products.

The introduction of the new IBM Personal System/2 line has added two new standards to the fray. The Model 30 includes a built-in Multicolor Graphics Array (MGCA), which adds a 256-color medium-resolution mode to the EGA ca-

LEGACY of the ANCIENTS™

DUNGEON SLIME NEVER LOOKED SO GOOD

In most dungeon fantasy games, you can't really see the slime on the dungeon walls. Or watch monsters coming after you.

Introducing Legacy of the Ancients. It's a new fantasy role-playing adventure that offers the richest graphics ever seen in a fantasy game. And something more.

A dangerous quest at a furious pace. Dungeons, castles, and towns to explore. Puzzles. Gambling. Fighting. Magic. In short, everything you love about fantasy games. And lots of new things you've never seen before.



Flickering torchlight on moldy walls. Blood stains on a monster's teeth. Incredible graphic detail.



Explore 24 dungeon levels, each with a different look and challenge.



The displays in the Time-Space Museum can be doorways to new worlds.



Trek through vast wilderness areas. Talk to the locals. Some will want to help. Some are good to eat.



12 different towns. Pick up some magic spells. Stock up on weapons and armor. Rob the bank on your way out.



Master five different action games to win. Visit casinos for extra gold—or build up your character points in the combat-training centers.

HOW TO ORDER: VISIT YOUR RETAILER OR CALL 800-245-4525 FOR DIRECT VISA OR MASTERCARD ORDERS (IN CA CALL 800-562-1112). The direct price is \$29.95 for the C-64 version and \$39.95 for the Apple version. To buy by mail, send check or money order to Electronic Arts Direct Sales, P.O. Box 7530, San Mateo, CA 94403. Add \$3 for shipping and handling (\$5 Canadian). There is a 14-day, money-back guarantee on direct orders. Screen shots represent the C-64 version. Other versions may vary.



pabilities. Models 50, 60, and 80 include the Video Graphics Array (VGA) on the system board. VGA features the capabilities of the MCGA, plus 16-color extra-high-resolution modes. IBM has announced a VGA card for use in the PC, AT, and compatibles; other companies are sure to follow suit.

Many IBM-compatible computers now come with built-in video hardware, or else have a particular video card installed as standard equipment. This is an important feature to look for when shopping for a computer because it could save you the cost of add-on boards.

Once you have decided on a video card for your IBM PC or compatible, you'll need to select a monitor which supports that display format. MDA and HGA cards require TTL monochrome monitors; composite monochrome monitors cannot be used. CGA cards generally require RGBI (digital RGB) monitors. Some CGA cards also provide a composite video output, but composite color monitors produce displays that are considerably less sharp than their RGB counterparts. EGA cards require special (and more expensive) EGA-compatible digital RGBI monitors. The MCGA and VGA require analog RGB monitors. A new class of monitors, spawned by the NEC Multisync, has the capability of working with all of these different video standards. As you might expect, however, these units are usually more expensive than monitors designed for one particular type of display adapter.

Missing Keys On The 800XL?

I have an Atari 800XL computer, and I cannot find two of the keys you use in your listings: { and }. Because of these two missing keys, I cannot type in any of your programs.

Geoffrey Wyatt

Computer programs frequently include graphics characters and other symbols that cannot be clearly represented in the printed listing. To avoid ambiguity, COMPUTE! has established a set of conventions for listing these special characters. The characters you mentioned, { and } (called braces), are used to indicate a variety of control codes and instructions. For example, single characters inside braces in Atari listings indicate that the character within the braces should be typed with the CONTROL key held down. The braces themselves are not typed. (Indeed, we deliberately chose a character that could not be typed.) Thus, when you see { } in an Atari listing, you should hold down the CONTROL key and type a comma. This produces a heart-shaped graphics character. The braces are also used to provide other typing instructions. For example, {6 SPACES} means that you should press the space bar six times.

A complete explanation of our listing conventions may be found in the article "COMPUTE!'s Guide to Typing In Programs," which is included in each issue of the magazine.

Give Me Your Commands

I own a relatively inexpensive modem, and less than top-of-the-line software for my PC. I would like to write programs in BASIC to enhance my modem's capabilities. I would like to find a list of the Hayes command set for my programs.

Peter Laird

The manual that came with your modem should include a complete list of the commands it understands. Most modems these days claim to be "Hayes compatible," but some modems are decidedly more compatible than others. Many of the so-called Hayes compatible modems understand only a limited subset of the full command set of genuine Hayes modems, while others include new commands above and beyond those in the standard Hayes set. If your modem isn't truly Hayes compatible, then using these commands won't have any effect.

Here is a list of the most common Hayes commands:

- AT A Answer immediately without waiting for a ring
- AT Dn Dial a number, where n is the number to dial
- AT Fn Select duplex mode (n is 1 for local echo, 0 for no echo)
- AT Hn Select hook status (n is 1 for off hook, 0 to hang up)
- AT O Switch from command state to online state
- AT P Use pulse dialing
- AT T Use tone dialing
- AT Z Reset modem to its default configuration
- A/ Repeat last command (useful for redialing)

All but the last of these commands are preceded by AT. The AT prefix tells the modem to pay ATtention to the following characters. (Hayes modems require that the AT characters be in uppercase; some compatibles may allow either uppercase or lowercase.) To use any of these commands, send them to your modem as you would any other piece of information. The modem must be in its command state to understand the commands; again, see your modem manual for more information.

Safe From Surges

Is it safe to turn on the computer, disk drive, monitor, and printer all at once with the switch on a power strip?

Charles Wilkinson

With your computer and peripherals connected to a power strip, it is tempting to leave the switches for your computer and each peripheral turned on so that they all

power up when you turn on the power strip. While many people use such an arrangement without incident, we do not recommend this procedure because it carries a slight risk of damage to your computer.

Turning on all your equipment at once can create a brief power surge. The more equipment connected to the power strip, the bigger the potential surge. For most computers, the ideal sequence is to turn each peripheral on individually, then turn the computer on last. When you're through using your system, turn the computer off first, then each peripheral. Turn the power strip off last.

But don't give up on the idea of using a power strip. It can be particularly valuable for computers and peripherals with external power supplies. Even when the device it supplies is turned off, the external power module is usually still on. (Feel it; it will probably be slightly warm.) Many manufacturers recommend that you unplug the external power supply module when the equipment is not being used to turn it off and keep it healthy. Turning the power strip off has the same effect as unplugging the power supply. Power strips with built-in surge protectors also provide valuable protection from power line surges.

A Matter Of Perspective

I have a simple solution for the man from Saudi Arabia who wanted to type from right to left with his Atari. Just turn the monitor upside down and type POKE 755,12. This will flip the characters upside down and backwards.

Paul Dausman

If a computer user wants to read right to left, all he needs to do is view the monitor through a mirror. For hard copy, he could use a sheet of carbon paper to produce the same effect on the back of the printed page.

Carl Panek

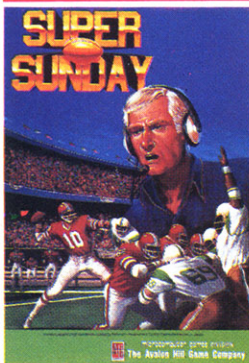
Thanks for your interesting suggestions.

Mainframe vs. Micro

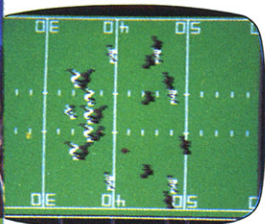
I am a programmer-analyst who works with mainframe computers. I have recently purchased a Commodore 64 for my personal use. I have enjoyed the 64 very much as a game machine, but when I tried to program on it I was appalled at the poor quality of its program editor. I have looked at local computer stores and the other editors available aren't very good either. Are there any good program editors available for the 64?

Scott T. Ellis

You may be surprised to learn that the Commodore 64 is considered to have ex-



BIG LEAGUE SPORTS



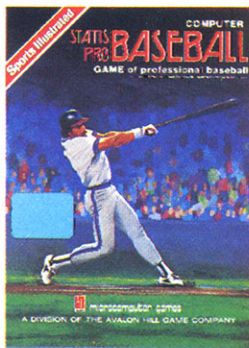
SUPER SUNDAY—Armchair quarterbacks the world over have made SUPER SUNDAY the best selling computer football game. This we attribute to the right blend of graphics, game play and especially statistics, because that's what sets Avalon Hill sports games from the pack. The vicarious experience of coaching real-life players, second guessing your computer or human opponent and the feeling of BEING THERE will send you back to SUPER SUNDAY over and over again. Support of the game system also makes it distinct. You can get the entire '84, '85 or '86 season disks with rosters and stats for all the big league team starters and interchange teams of the past and present. The all new General Manager's Disk (also available separately) allows you to create "dream teams" in setting up your own Pro Football draft. Available for Apple® II, C® 64/128, IBM® PC for \$35.00

NBA—We have taken the same concept as SUPER SUNDAY from the field and put you down on the court in NBA, the definitive pro basketball game. Licensed by The National Basketball Association, NBA gives you the same flexibility, visuals and real-life player stats so you can coach the Celtics dynasty, Kareem, Magic and the Lakers or eighteen other great pro B-Ball teams. Available for Apple® II and C® 64/128 for \$39.95; IBM® coming soon.

STATIS PRO BASEBALL—It's funny that America's favorite sports pastime has not been our best selling computer sports game. Maybe it's because you haven't known about it 'til now. COMPUTER STATIS PRO BASEBALL (based on our best-selling board game) has elicited countless letters of praise from computer baseball fanatics and stat buffs alike. Although it lacks the graphic flair of SUPER SUNDAY and NBA, it's a dandy of a stat baseball game ... and offers more game utilities right on the Master Game disk than any others—such as DESIGN YOUR OWN TEAMS, STAT COMPILER and DRAFT YOUR OWN TEAMS functions. Also, we offer ten past season disks. Available for Apple® II and C® 64/128 for \$35.00

Look for our games wherever good software is sold, or call direct for ordering information ... AVALON HILL, the first name in sports and strategy games!

Dial **1-800-638-9292**. Ask for Operator C11.



microcomputer games DIVISION

The Avalon Hill Game Company

A MONARCH AVALON, INC. COMPANY

4517 Harford Road ★ Baltimore, MD 21214

ceptionally good editing capabilities for a machine of its class. The term program editor means something slightly different in the home computing world than in your mainframe experience. For eight-bit machines like the 64, editors are usually not discrete programs, but rather integrated with the language's interpreter or compiler. Because of the amount of memory available in eight-bit machines, their editors are usually screen-oriented and lack all the commands of mainframe editors like ISPF or XEDIT.

At first, the full-screen editor that comes with the 64's on-board BASIC may seem limited when compared with its mainframe counterparts, but after you use it a while you may begin to like it. Many people are disappointed with mainframe editors after using a Commodore 64.

Custom Cursor On The Apple

Can you tell me how I can change the cursor to any character that I want on the Apple IIe with an 80-column card?

Gary Waters

Although undocumented, there is a way to change the cursor on an Apple IIc, or unenhanced Apple IIe with 80-column card. To change the cursor, POKE location 2043 with the ASCII value of the desired cursor character, plus 128. For example, to

change the cursor to an underline character, enter the following statement:

POKE 2043,ASC("_")+128

This does not work with an Apple IIe without 80-column capability.

If you do not add 128 to the character value, your cursor will be in a flashing mode. To get a solid flashing cursor, try this:

POKE 2043,32

To return the cursor to normal, press Control-Reset.

Location 2043 is part of the text-screen scratch-pad RAM used by expansion slot 3, or the auxiliary slot on the Apple IIe. This location is used by the 80-column card firmware to determine the cursor character, even when the computer is not in 80-column mode.

ProWrite Review Response

Thank you for your recent review of our Amiga product, ProWrite, in COMPUTE!. We feel that the review gave a fair overview of our product. However, there were two minor discrepancies that I would like to mention.

First of all, the review stated that ProWrite can use fonts only up to 20 points in size. This is not true; ProWrite will work with any font and size you

have on your system disk. For example you can use the Zuma fonts, some of which are over 100 points in size.

Secondly, the review stated that only graphics printouts were possible, even when the document is exclusively text. Again this is not true. ProWrite provides both Near Letter Quality and Draft options for printing. Although you cannot get graphics with these two modes, these may be the preferable methods of printing if your document is exclusively text. You still get the on-screen WYSIWYG display and ease of editing and formatting when printing in these modes.

Thank you again for your review. Aside from these two minor inaccuracies it gave a good description of our product.

James Bayless
President
New Horizons Software, Inc.

We regret the oversight and appreciate the clarification. ©

The Future Of Computer Games: Ten Industry Leaders Speak Out

Keith Ferrell, Features Editor

Computer games have never been more diverse—or more fun. Whether you want to play a sports simulation, play a strategy game, experience arcade action, explore alternate realities, solve text puzzles, or even create a challenge of your own devising, the software is available. Who develops these programs and brings them to the market? COMPUTE! talked to ten industry leaders to find out about the past, present, and future of entertainment software.

Surveys show that a computer bought for home use is used more often for playing games than for anything else.

And who could blame the users? Today there are games for every interest, from shoot-and-smash arcade games to high-level intellectual exercises. Behind these games are a variety of people, from programmers and designers to marketing specialists and corporate executives. For our annual games issue we talked with several people responsible for some of the most popular games and found them to be as engaging in conversation as their products are on the monitor. They are a diverse group, sharing some striking similarities of outlook as well as having dynamic differences of approach.

But we'll let them speak for themselves. Meet, in alphabetical order, ten of the industry's leading game makers:

Mark Beaumont, Activision
"We're moving beyond action/arcade games and moving toward giving somebody a full-blown experience."



Mark Beaumont, product manager for Activision, entered the consumer electronics industry in 1982, joining Atari at the height of the Pac-Man craze. He moved to Activision the following year and, since 1985, has been involved in the company's product management.

Beaumont has seen both expansion and dramatic retrenchment. Activision grew dynamically, then faced a period of restructuring and realignment. Currently returning to economic health, Activision faces a market far different from

that of a few years ago.

Many changes result from hardware evolution. "We're starting to move upwards from the 48K machines and the 64. The market today is as much driven by what works from a hardware system as from the sales area. If a machine is doing particularly well, as the MS-DOS machines are doing now, you'll see more people gravitate to that for development and more games designed specifically for that machine."

The number of different systems is exerting an effect on the industry. "The market is getting segmented. At the low end you have the Atari 2600." The 2600 has enjoyed an unexpected resurgence recently, and Activision is responding by developing new software for 2600s.

Moving up, Beaumont sees several areas of opportunity. "At the lower end of the mid-range you have the Atari ST in 520 configuration, on through the Tandy machines which are making significant inroads at the \$700 price point. Then, heading toward the high end you have the Amiga 500. And at the real high end there's the Apple IIGS and the full-boat Amiga. Games are appropriate for each of those machines."

While many of its products are ported to several machines, Activision has found that the games market varies somewhat from machine to machine.

"There's an audience issue at

play. Different kinds of software, different games, appeal to the different machine owners. Arcade games may not work as well on the Amiga as they do on the 64. We're selective about which titles are ported to different systems, and on occasion we will develop specifically for a particular machine. Amiga owners seem to have a desire for fantasy role playing and graphics-intensive products, as well as high-end productivity products. Our *Music Studio* has done very well on the Amiga, for example, where things which are direct ports from other systems might not do as well."

The most dramatic growth has been MS-DOS machines. "As Tandy and some of the other clone manufacturers have brought the price of their computers down, it's opened up a whole new category of buyer. When the MS-DOS machines were a higher-end purchase, the demographics of the buyers were significantly higher, and the kinds of software that appealed to the consumer were quite different. As the demographics have come down, there's been a bigger demand for arcade software. Our *Gamestar* line is a good example. While I don't think that would have done well on MS-DOS machines four years ago, it is doing extremely well now."

Activision understands that computer owners represent a niche within the overall consumer electronics market. Beaumont notes that there are niche markets within this niche market. The key to success in entertainment software, he says, is targeting the largest number of consumers.

"There are subcategories within categories. Working in our favor is the fact that the market continues to grow. As it grows, you bring in a larger variety of people, and individual segments within the installed base also grow."

Market growth can carry dangers as well. "Activision ran into difficulty a couple of years ago. Our mistake was with trying to go to too many different market segments, trying to fragment ourselves too significantly."

With Bruce Davis as the new president and CEO, Activision's recent surge to renewed profitability shows that the company learned

important lessons from its slump. "Now we've focused in on the products that have been most successful for us. We're channeling in on those areas that work best—sports software, entertainment software, creativity and productivity software, and not taking too many forays out into the never-never land of 'who knows what this product is.'"

Still, Activision is willing to take some risks. "We will occasionally gamble, but we'll make sure we have the core business taken care of before we do."

Within the proven categories, Activision is still committed to extending the capabilities of its software. "We're trying to create the experience and the environment of each of our games, throughout the software, the packaging, and the documentation, so that players actually feel that they're participating. We're moving beyond action/arcade type run-and-shoot games and moving toward giving somebody a full-blown experience."

Thus, new Activision products such as *Gamestar's Top Fuel Eliminator* offer players the chance to customize drag racers to the conditions of various tracks. *The Last Ninja* will put martial arts skills in the midst of a quest type of story.

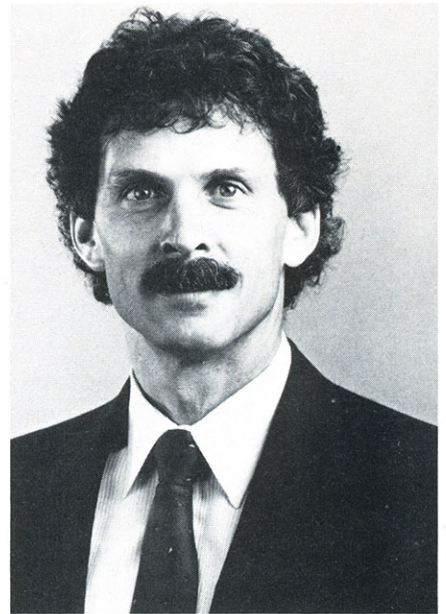
Is there a universal game, a game that will sell 15 million copies? "Consumer taste is so varied that to find one thing that appeals to millions of people would be difficult. To find a market that big, you'd need, for one thing, to have many more computers in the home.

"But that's a double-edged sword. To get more computers into the home you need better software that appeals to more people. As entertainment software becomes better, more people will become interested in computers."

Roger Buoy, Mindscape

"In a decade, we'll be well on our way to projected environments, where you can, through holographic projection, actually take part in an adventure."

Roger Buoy, president and CEO of Mindscape, looks over the company's four-year history and sees the evolution of entertainment software as being shaped by the growth of



both hardware capabilities and software development skills.

"The most dramatic change has been the introduction of the 16-bit computers such as the ST and the Amiga, and more recently the GS. They've brought a whole new level to game-play quality. We're gradually getting nearer the same quality that people expect to see on their TV sets. That's the progression that will continue until we finally reach that accepted standard, which we're all striving to achieve."

For all their advanced capabilities, the 16-bit machines face some problems. It will be a while before the 16-bit machines completely supersede the 8-bit machines. "The problem right now is marketing support for the 16-bit machines. Their market penetration is far below what Atari and Commodore in particular would have expected to achieve. The price has to come down before they become widespread, but also those companies have to focus their marketing. They have to decide what they want their machines to be. It's hard to push an Amiga as a professional workstation and as an entertainment product at the same time."

There has been simultaneous growth in the ability to use 8-bit machines such as the Commodore 64 and 128. "We've learned to get a lot more out of 8-bit machines. Looking at a product such as our *Superstar Ice Hockey*, compared with what was a terrific product four years ago, the older product looks very crude. We're seeing

some terrific products coming out for the 64 and the IBM PC, which are six- and seven-year-old architectures."

There are certain qualifications against which any piece of entertainment software must be measured. What does Buoy look for in a new product? "A couple of things. One is terrific depth, a product that kids and adults won't get tired of very quickly. *Defender of the Crown* is a good example of this and, again, *Superstar Ice Hockey*." Buoy feels that as a result of their depth, such games become experiences rather than just pastimes.

"In another dimension you have arcade games that are so superior in terms of their addictiveness that you can't leave them alone." Mindscape is presently preparing two arcade releases, *Paperboy* and *Gauntlet*, based on two arcade classics.

"On the one hand, you're looking for tremendous depth, but depth of game design includes arcade games. In some ways arcade games theoretically haven't changed a great deal from what we were doing in 1983. You can still be extremely successful, provided the game design is deep enough to provide a very easy-to-play, easy-to-comprehend arcade product."

Perhaps the deepest of all of Mindscape's games, and in many ways the antithesis of an arcade experience, is *Balance of Power*, which simulates the complexity of interrelationships among the world's powerful and emerging nations. Is there a future for such games? "When I first published *Balance of Power*, people thought I was crazy. They saw it as a niche product that would not be successful." The game had been, in fact, originally commissioned by another publisher. "The game was just left to languish. No one wanted to do it." Buoy's instincts were right. "Before Christmas, we'll have done over 100,000 copies."

Not bad for a "niche" product. But aren't all products niche or category products? "We see several market niches, types of games that appeal to different folks."

Is there room for new ideas? Buoy thinks there is. "I'm prepared to take a risk on something new and which represents an opportunity.

And there are some things I think you should do just because it needs to be done. *Balance of Power* was like that—it was a product that had so much love and care put into it, and a year and a half of [developer] Chris Crawford's time, that the apparent quality, and the thought behind it, and its depth, were all just phenomenal. It *had* to be published. It's a great piece of work."

What comes next? "As a follow-up to *Balance of Power*, Chris has *Trust and Betrayal: The Legacy of Siboot*. It's a new type of product, involving artificial personality."

In this game, scheduled for release later this year, the player faces the challenge of establishing communications with six different aliens. Buoy admits that *Siboot* is more of a risk than was *Balance of Power*. "Siboot is so radically different that it's obviously a publishing gamble. No one's ever done this before. It doesn't fall within conventional lines. But the program's intent is good and the amount of work that's gone into it is phenomenal. *Siboot* is very advanced in its design. It's a fun game, but it's also a very intellectual game. You've got to *think* about it. If you don't want to think about it, and you want something that's more of an arcade experience, it's not for you."

As Buoy points out, no game can appeal to everyone. Whether in arcade games, sports simulations, or intellectual adventures, Buoy is determined to continue developing Mindscape's potential.

He has a clear vision of the company's future and of the sorts of games that lie ahead. In the next few years, he suggests, "we'll be pretty close to TV-quality images, and interactive media will be available using compact disc or laser disc technology."

And farther down the road? "In a decade, we'll be well on our way to projected environments, where you can be in a room and through holographic projection actually take part in an adventure."

Peter Doctorow, Accolade

"You like to push the boundaries of enjoyment."

Peter Doctorow, vice president of design and development for Accolade, has been involved with com-



puters for more than two decades, working first as a programmer in higher-order languages and in real-time assembly language.

Doctorow entered the consumer electronics industry in 1983, when he joined Nolan Bushnell at Androbot. "The company doesn't exist any longer, but at that time we were involved in the development of home robots. The heart of the product was basically a computer on wheels. It was called 'BOB'—Brains On Board."

Serving as director of product development for Androbot provided Doctorow with many challenges. "We spent a lot of time figuring out what we could and could not do in software for this robot." The job gave Doctorow much food for thought. "I was involved in software, and directly in the conceptualization of software capabilities." From Androbot, Doctorow moved to Accolade about a year ago, where he's now applying his experience to developing entertainment software. With games such as *Hardball*, *Ace of Aces*, *Mean 18*, and the new *Test Drive!* and *Apollo 18: Mission to the Moon*, Accolade has continued to broaden its approach to entertainment software, with the added effect of further enhancing Doctorow's understanding of the consumer marketplace.

What makes a game successful? "If I knew that, I wouldn't be vice president of product development. I would be *king!*"

More seriously, he points out

COMPUTE! Publications

Presents the

NAME YOUR DREAM SWEEPSTAKES!!!

Now's the chance to win the personal computer system of your dreams!!

A \$5,000 state-of-the-art powerhouse computer, loaded with the latest peripherals and a collection of software!

Take home an amazing new Amiga 2000 multitasking computer, capable of producing stunning stereo sound and superb color graphics as well as running all IBM PC software!

OR

Choose a new Apple Macintosh SE computer, the expanded, faster Mac capable of reading IBM PC software, and a leader in the growing desktop publishing world!

OR

Receive a powerful Atari 1040ST computer system, complete with laser printer, a terrific combination of processing power, super color graphics, and MIDI-equipped sound output!

OR

Pick up a new IBM Personal System 50, the 80286-based computer system with twice the computing speed of an IBM PC-AT and new VGA graphics power!

Each of these one-megabyte dream machines comes with an appropriate mix of hard disk drive and/or 3-1/2-inch and 5-1/4-inch floppy drives, monitor, printer, a modem for telecommunications, and a collection of popular software programs to get you started.

OR

Put together your own custom dream computer system with \$5,000.00 in cash!

Enter today!!

1. No purchase necessary. To enter, complete the official entry form or, on a plain piece of paper, hand print your name, address, city, state, and zip code. Enter as often as you wish, but mail each entry separately to: Name Your Dream Sweepstakes, P.O. Box 537, Lowell, IN 46399. All entries must be received by July 1, 1988. Not responsible for late, lost or misdirected mail.

2. Winner will be determined in a random drawing on or before July 15, 1988, by Ventura Associates, Inc., an independent judging organization whose decisions are final. The prize is guaranteed to be awarded. Winner will be notified by mail and may be required to complete an affidavit of eligibility which must be returned within 21 days of date on notification. No substitutions for prize except as may be necessary due to availability. All taxes are the responsibility of the winner. Entry constitutes permission to use of winner's name and likeness for publicity purposes without additional compensation.

3. Approximate retail value of the prize is as follows: Grand (\$5,000.00).

4. Odds of winning are determined by the total number of entries received. Sweepstakes open to residents of the United States. Employees and their families of Capital Cities/ABC, Inc., its affiliates, subsidiaries, distributors, retailers, advertising and production agencies, and Ventura Associates, Inc., are not eligible. All federal, state, and local rules and regulations apply. Void where prohibited.

5. For the name of the major prize winner, send a stamped, self-addressed envelope before July 1, 1988 to: Name Your Dream Sweepstakes Winners, P.O. Box 773, Lowell, IN 46399.

Strokes C

If you haven't been to Europe or taken a world tour lately, you may not have heard of AMSTRAD. So, let us introduce ourselves.

AMSTRAD is the British company that makes the best selling computer in Europe.* We even out-sell IBM. And worldwide, over 2,000,000 AMSTRAD computers have been sold — not to mention all the AMSTRAD printers and word processors in use.

Now AMSTRAD is coming to America. And you'll soon see why AMSTRAD is making the competition very nervous.

Why buy your computer in expensive little pieces?

With most computers, expanding capabilities means spending a fortune for add-ons. Not with AMSTRAD.

Both the PC1640 and the PC1512 come with additional ports *built-in*. That means no expensive brain surgery is required when you're ready to expand.

AMSTRAD computers also allow you to upgrade graphics capabilities — also without brain surgery. The PC1640 has monochrome (Hercules), CGA and EGA capabilities built into a single motherboard. So, to make your work look better, simply install a more sophisticated AMSTRAD high quality monitor. (Starting to see why AMSTRAD is so popular?)

Everything you need in two manageable boxes. Everything.

Naturally, both models are IBM compatible. They'll run virtually all IBM software for every business or personal need you can think of. And not only that, we've built in

the boards necessary to run mouse-driven, windowing GEM® software to create spectacular graphics. We even give you a mouse.

Of course, we realize that's not everything you need to start computing. That's why both computers come with lots of software — MS DOS V 3.2, GEM® Desktop, GEM® Paint, LOCOMOTIVE Basic and more.

Imagine. Virtually everything you need to start computing within minutes after you open the box. (A smart way to buy a computer, don't you think?)

Extraordinary printers, too.

AMSTRAD gives you a choice of two brilliantly designed printers — the DMP 3000 and the DMP 4000. Both offer IBM compatibility and a list of standard features other printer manufacturers call options.

*Source: International Data Corp.



of Genius.

(We're making our competitors nervous in that department, too.)

What if you don't need a computer?

If you just want to express yourself in plain English, but don't want to learn the language of computing, you'll love AMSTRAD's 9512 Word Processor. It's incredibly easy to use, comes with powerful built-in software to perform a variety of tricks, a large, high-resolution monitor — and a letter quality daisy-wheel printer. To create a bestseller, all you need to add is a great plot.

The Coup de Grâce.

Because of AMSTRAD's ingenious engineering and integration of traditionally optional features into our products, our prices are significantly less than you'd ever expect for such performance. In fact, you

can buy a complete AMSTRAD computer system, for less than \$700.

Add a printer and the price is still less than a thousand dollars. Or buy a complete word processing system for less than \$800.

We may not become as famous as the Beatles, but . . .

With more than 700 dealers in America already (and the number is growing fast), it's no wonder AMSTRAD is quickly becoming famous for putting high performance within reach of thousands of businesses and personal users.

To find out more about putting brilliant performance in your hands, send in the reply form for the name of your nearest AMSTRAD Dealer.

You'll see for yourself, you don't have to be an Einstein to be a genius. Just smart enough to buy AMSTRAD.

Please send me the name of my nearest AMSTRAD Dealer.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Mail to: AMSTRAD, 1915 Harrison Rd.,
Longview, TX 75604



Strokes Of Genius.

Brentwood, England • Paris • Chicago • Dallas
Sidney • Hong Kong • Milan

IBM, MS DOS and LOCOMOTIVE Basic2 are registered trademarks of International Business Machines, Microsoft Corp. and LOCOMOTIVE Software Limited, respectively. GEM Desktop and GEM Paint are registered trademarks of Digital Research, Inc.



that numerous factors play a part in determining a game's success or failure. "One element is timing, another is luck. A variety of things have to come together at just the right time. It's not just the product, it's also the packaging and the distribution channels."

Equally important is the consumer. "The market itself plays a role—what the market wants to buy is a big factor. Success is a function of what time of year a product is sold. It's a function of what hardware the game is written for, of how many marketing dollars are spent not only by the publisher but also the hardware manufacturers."

Included among the factors is the product itself. "Success can be affected by what the product looks like, what category the product falls into. Success is also a function of how deep and how playable the product is."

Doctorow emphasizes that his list of factors is not complete. "The formula is not precise, it's not a scientific evaluation."

Development of entertainment software is not for the faint-hearted. "There is great gamble involved." Getting a product from development to market, "means a commitment of people and money—for a possible payback. When you go to Las Vegas, your payback can occur within seconds. In the software market, your payback is perhaps 18 months down the road."

The payback is worth the wait, Doctorow feels, and the chance of failure is worth the gamble. "We're not so strictly bound up in just dollars and cents, but we're developing a medium for entertainment, for a recreational market. People like to participate in recreational activities. It's a nice feeling to pull your hair out and gnash your teeth for months, and develop a product that's successful and gets good reviews and favorable word-of-mouth. That's what we're in the business for. You like to push the boundaries of enjoyment."

Doctorow wants to see computer games that involve several players, rather than one or two. "We would love to see more group- or family-involvement-type computer games. We took a risk and released a couple of products, *Killed Until Dead* and *Comics*, both of

which are an awful lot more fun when there are several people crowded around the monitor. We've learned, though, that it's tough to get groups around monitors."

In part, the impulse toward group games is mitigated by the nature of the computer itself. "One of the nice things about software is that you can play by yourself. You don't have to have 18 players to enjoy a game of baseball. You don't need a foursome to play a round of golf."

The solitary tendency concerns Doctorow. "I am hopeful that computers will not contribute to the attitude that people should not be social in the way that television contributed to the antisocialization of the human race. People turn on the TV and they go into a coma. I would be hopeful that the computer wouldn't do that. It would be very nice if the computer added to the socialization of the human race. The computer has the capability of bringing people together."

Will *Accolade* be pursuing "social" computer games? Doctorow chuckles. "It's something we won't give up on yet. I do think that we will continue to see products and develop products that begin to be a bit more risky, that try to open up the standards, that represent the next activities that will entertain people."

Michael Dornbrook, Infocom

"With text there are always new things to do."



Before there were full-color 3-D graphics, there was *text*. And now, with graphics of every variety, there is still text, and one company that continues to specialize quite successfully in text games only: Infocom.

Michael Dornbrook, the company's director of marketing, joined Infocom in 1983 as product manager, although he has been associated with the company since the 1970s. "I attended M.I.T. with [Infocom president] Joel Berez, and when Joel was starting Infocom in the late seventies I was hired to test *Zork* as it was being transferred to microcomputers." Not previously a fan of computer games, Dornbrook found himself captivated by the world of *Zork*, and foresaw a huge market for the game. His foresight was accurate. "*Zork* sold way beyond our wildest expectations."

Working as a consultant, Dornbrook began creating promotional materials for *Zork*. He founded the *Zork* user's group, designed maps and hint books, established a newspaper—*The New Zork Times* (now called *The Status Line* as a result of a settlement with *The New York Times*)—and built a successful direct-mail business. "I did anything that I thought people would be interested in."

In 1983, Dornbrook sold the company his mail-order business, and joined Infocom as a full-time member of the management team.

Since *Zork*, Infocom has published close to 30 text games, marketing science-fiction text adventures (*Planetfall*), ghost stories (*Moonmist*), horror (*The Lurking Horror*), archaeological adventure (*Infidel*), alternate realities (*Trinity*), bestseller adaptations (*The Hitchhiker's Guide to the Galaxy*), and even historical romance (*Plundered Hearts*).

Dornbrook feels that interactive text games are virtually inexhaustible. "People say, 'What more can you do?' But that's like saying, 'What more can you do with a book?' There have been hundreds of years of books. People shouldn't see text as a limitation. With text, there are always new things to do."

The increasing sophistication of microcomputers has allowed Infocom to assemble increasingly complex adventures. The company has developed its own program-

ming system, with parsers that offer large vocabularies and stories that branch in many directions.

"Trinity is a good example. We used a new system, and decided to develop the game for 128K computers. The game needed that much memory to be effective." Didn't that decision cost them sales? Dornbrook admits that Infocom was concerned about producing a game that couldn't tap the huge Commodore 64 market.

"But we sold almost exactly the same number of games that we would have had Trinity also been available for the 64. It led us to believe that the 128 market is the more active software buying market now and that there are a lot of 128 owners who are eager to see games developed for their machines."

Can text games, for all the flexibility they offer, compete with increasingly dynamic graphics games? "If people are looking for complete relaxation where they can turn their brains off, our products aren't what they want. But there are a lot of people who do want to keep their brains active. I see our market as about 15 percent of the total home computer market. About one in seven computer users are the potential for us right now."

Can Infocom continue to grow with that size market share? "I'm hoping that we can grow by reaching out with different types of text products. Over time, though, if we really want to reach the whole market—and I'm not sure that we do—I think we'll have to have a different kind of product, with less interaction, with less challenge."

As we move to more and more powerful machines, will we see text adventures moving closer to a real literary experience, to traditional fictional structures? Will we see great novels become interactive computer experiences?

"Taking something like *Wuthering Heights*, for example, and making an interactive experience out of it would be likely to disappoint people. To be interactive, you need a fairly nonlinear structure. Most stories are written with very linear structures in mind. The optimal use of our medium is nonlinear, with different pieces coming together, with a tree structure that offers

lots of different ways to go and lots of different possible endings."

Infocom's relation to fiction is like the movies. "It's very difficult to take a great novel and make it into a great movie. They are very different. What's best, I think, is to come up with something brand new, designed specifically for this medium."

The medium itself is in evolution, and that has Dornbrook excited. "As machines become more powerful, as memory costs go down and things like compact discs come onto the market, you can still have the same type of story, but move away from reading."

Text adventures without reading? "Imagine if you could lie in bed and have a voice-recognition system. When you say, 'Open the door,' you hear a creak or shrieks in the distance. You could play in the dark—the game would be all aural. You could have great narrators, different voices for different people. There would be a much wider potential market for something like that—simply because there are so many people who don't read."

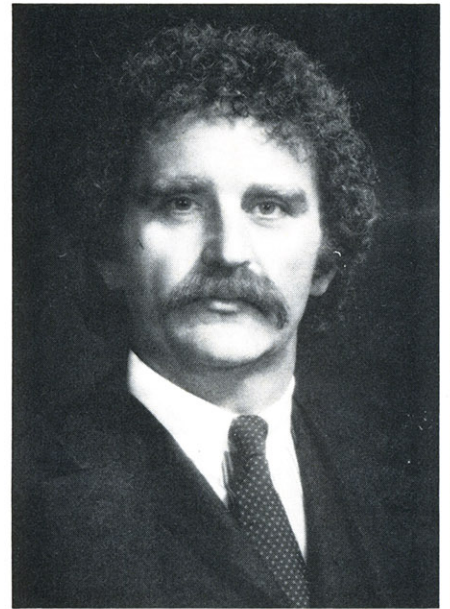
Will Infocom be a part of these new media? "Absolutely. We're interactive storytellers. When we see a medium that lets stories be told, we're going to jump at it."

Thomas Frisina, Three Sixty

"There's a growing market of consumers that don't understand zeros and ones, they don't like big manuals, they want to have fun, they want to enjoy the experience, and they don't want any obstacles."

A founder of Accolade, Tom Frisina left the company earlier this year. "Everybody with an entrepreneurial spirit, gets to the point where they want to do it for themselves. That's why I named my company Three-Sixty: I've come full circle."

How does starting a software company today differ from the early days at Accolade? "We started Accolade in 1985 when the entertainment software industry and the whole home computer industry were in the doldrums. As it turned out, we had the proper set of experiences, and the market was ready for innovation. We built the company to some rather significant heights in a very short time."



Frisina sees both advantages and disadvantages to today's market. "My advantage today is that I have a track record in the industry. But it was easier to get people's attention in 1985. The difficulty is that because the market is healthier, there are more [industry] players today, who are all much bigger than they were in 1985."

Three-Sixty's first entertainment product was released in September of this year. "Dark Castle is our adaptation of the hit Macintosh product. We'll be releasing versions for the Commodore, ST, PC, and Amiga. The game is an implementation of the jumper and climber platform arcade game. We've tried to give players a tremendous sense of realism. And we've added a number of innuendos and characterizations." Three-Sixty will follow *Dark Castle* in 1988 with *Harpoon*, an adaptation of the World War III board game on which Tom Clancy's *Red Storm Rising* was based. Versions will be available for all machines.

Is the variety of machines a dilemma? Frisina sees a conflict at the heart of the market. "The conflict exists both from the developers' point of view and the customer's. Developers want to make the best entertainment programs they can, but if they use the most powerful and sophisticated machines, they have a lesser chance of selling a lot of copies.

"Conversely, if developers choose to go where the money is—the Commodore and IBM environments—they end up never satisfy-

ing themselves as creators, because those machines don't have the capabilities of the higher-end machines. It's like the difference between going to see a 16mm movie, and then seeing the same movie in 70mm Panavision with Dolby sound. The market really limits the scope of what a talented creator can do."

There's a consumer-based conflict as well. "I think that eight-bit machine users are satisfied with their machines, only because most of them don't really know what an ST or an Amiga looks like. They only have as a reference the products they purchased previously for their machines. If the industry continues to push the state of the art forward on those machines, then the customer can continue to be satisfied with their eight-bit machines. But when they see an ST or an Amiga for the first time, *then* you have a conflict."

Where does Apple fit? "Apple is a real aggravation for me. They have disavowed any knowledge of a home market since their inception. They don't promote products for the home market, even though there are a lot of Apple IIs in homes, and a growing number of Macintoshes."

Ironically, Apple may have a machine that's ideal for the home user. "The IIGS can satisfy the home market maybe better than any other machine. It offers graphics and sound capabilities that the Amiga and the ST have, combined with a name that customers can trust." Again, Frisina feels that price stands in the way of substantial market penetration. "When the IIGS comes down in price, it could be the ultimate answer to the home market; it has everything the home user could want."

Frisina is concerned about today's software. "We have a terrible problem today with an overabundance of products. There are too many mediocre products."

He sees the lack of quality as endemic to the way the industry is run. "There's a lack of ingenuity, and a lack of commitment to releasing fewer products, but making them bigger, better, and more satisfying to the consumer."

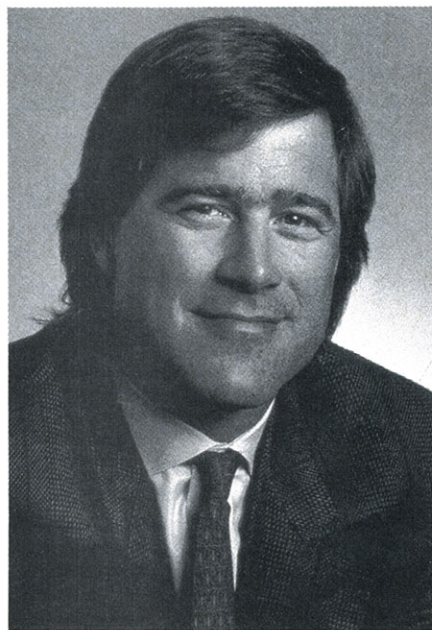
Can this be solved? "I don't think there's going to be a solution.

Bigger companies are either in the midst of public offerings, or are public, or have stockholders who want to get liquid. And the way to do that is to get enough revenues. It's my belief that there's not enough commitment out there to raise revenues by putting out fewer products that sell more, rather than more products that sell fewer units."

Frisina plans to concentrate his company's energies on a couple of games each year. He feels certain the public will respond to his approach. "My company is intended to satisfy the growing home market of consumers that have purchased audio and video and car stereo and compact discs. Now, with their discretionary income they are looking to purchase a home computer for the first time. They don't understand zeros and ones, they don't like big manuals, they want to have fun, they want to enjoy the experience, and they don't want any obstacles. And that's what I'm going to give them."

Bing Gordon, Electronic Arts

"We're talking about using the power to give something more like an interactive television experience."



Vice president of the entertainment division at Electronic Arts, Bing Gordon sees the entertainment software industry as being on the verge of broadening its market—a broadening that's the result of hardware advances as well as more sophisticated software. The two go hand in hand.

"The takeoff of Tandy and the IBM compatibles in the home has opened up a whole new computer market. These machines start with about the same amount of power as a Commodore 64, and then beckon us almost toward minicomputer power. It's a real challenge to do a program that's a winner at the low end with 256K of memory and four colors, and then go all the way up and support an EGA card, 640K, and a hard drive."

Does the evolution of hardware spell an end to the Commodore 64-level games? Gordon doesn't think so, noting that different machines offer different challenges and opportunities.

"The 64 has always excelled at games that let you move a lot of sprites around, with pretty graphics and good sound. The IBM-class machines take a little more power to drive graphics that are competitive with 64 graphics, but because of the disk storage and additional memory, you have a lot more room for math. For simulations, that lets us do incredible amounts of high-speed physics calculations."

The ability to do those calculations lends an ever greater realism to simulation games. "The aerodynamics in *Chuck Yeager's Advanced Flight Trainer*, for example, can be that much more sophisticated. With *Earl Weaver Baseball*, there's something like 200 real-world calculations between the time the pitcher winds up and the time the play is finished, all dealing with the batting average against a particular pitcher, the effect of the wind, the speed of the pitch, and so on. It's not possible to do all of that on the Commodore 64, where you compromise the math or the graphics. With the IBM-class machines, we use 48 or 64K of working RAM just for statistical calculations."

This power lets experts such as Yeager and Weaver contribute skills and experience to simulations that come closer and closer to approximating reality.

Gordon suggests that there are games that so far only have been imagined and categories that are as yet underexploited. Interactive fiction is an example. "Today there are basically two kinds of interactive stories. There's the text adventure where you get a 30-page short



The ^{New} Entertainment Standard For IBM™ - PC's & Compatibles

In the early '80's, IBM computer owners couldn't find any "fun" software on the shelves to fill those "after business" hours... there just wasn't much out there. Then MicroSoft introduced "Flight Simulator", a great program that's trained a whole generation of armchair computer pilots and set the standard for IBM entertainment software.

But this is 1987... and software buyers with IBM-PC's and compatibles are now looking for a new challenge... searching for excitement... and innovation.

Well the search is over!

MicroProse Software presents... **GUNSHIP**... the attack helicopter simulation that sets a new standard of excellence in entertainment software for IBM-PC/compatible software.

Are you bored with simple line graphics? **GUNSHIP** displays filled, solid-object 3D graphics in fine detail and color.

Do you need more realistic flight characteristics? **GUNSHIP** gives you the industry's smoothest animation with a unique dynamic configuration system. The faster your machine operates, the smoother the flight and animation of graphics will be.

Are you tired of just flying around and looking at scenery? In **GUNSHIP**, you pilot an AH-64 Apache helicopter, the modern Army's most lethal weapon, on combat

missions that require split-second timing, lightning reflexes and intense concentration. Different skill levels make it easy to learn, but difficult to master.

So if you're tired of sightseeing and want to experience the exhilaration of high-tech combat flight simulation... look for **GUNSHIP**... the new entertainment standard for IBM-PC/XT/AT/PS2 and compatibles (not PC-Jr.).

GUNSHIP supports 320x200-line CGA (4 color), EGA (16 color) or Tandy (16 color) and can be operated using a joystick and/or keyboard controls. The simulation requires 256K of memory and can be installed on a hard disk drive.

GUNSHIP is available from a "Valued MicroProse Retailer" (VMR) near you. Call us for locations! Suggested retail price \$49.95. If product cannot be found locally, call or write for MC/VISA order.



MICRO PROSE™
SIMULATION • SOFTWARE

180 Lakefront Drive, Hunt Valley, MD 21030 • (301) 771-1151

story and try to make it into a 40-hour experience through a bunch of logic puzzles. Or there's the dungeon fantasy with hit points and tons of melee. Text adventures right now are sort of like Double-Croctic versions of novels.

"With the advent of machines with more on-line storage and more audio/visual capability, there will probably be ways to give someone a first-person story experience without having to impose such artificial slowdown points."

Hardware will likewise exert a large influence on graphics software, but its arrival won't be quick. Even the most advanced machines on the market currently can go only so far. "Look, for example, at Compact Disc-Interactive (CDI) technology, with 400 megabytes of disc storage."

As Gordon points out, 400 megabytes is a finite amount of memory, easily used up. "It costs us, on the Amiga, something like 18K a second for digitized sound, and 20K for a screen. Movies go 60 frames a second, but even if you figure 5 frames a second, you're still looking at an animation cost of 50K a second. That's 1 megabyte for 20 seconds, 3 megabytes a minute. So 400 megabytes can give you roughly two hours of just sitting and watching."

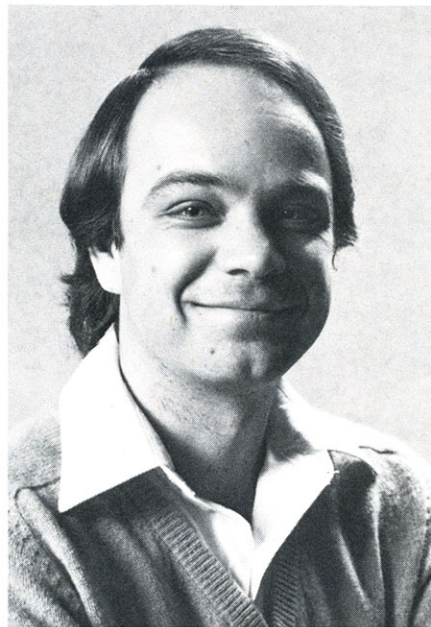
Will CDI's arrival change the nature of the home computer market? "There might be a divergence of the market. Certainly there will be a broadening of it."

That broadening will only come, however, if computers become easier to operate. "For all that we in the industry talk about the ease of use of computers, I don't think they're a whole lot easier to use than a ham radio. We've found with different products ways to go after niches, but we haven't been able to make software yet that persuades a broad spectrum of people to walk by a window and say, 'Hey, I want to buy *that!*' It's still more abstract and harder to use than a lot of people are willing to put up with. Right now, there's so much expertise and experience that you need to have in order to get the enjoyment out of a rich and deep computer game, that we've shut ourselves off from a part of the marketplace that just wants to sit and be entertained."

Gordon makes it clear that Electronic Arts is not simply pursuing "transparent" software. "We're talking about using the power to give something that can be more like an interactive movie or an interactive television experience."

Sid Meier, MicroProse

"We're just at the beginning of what can be done with games."



Sid Meier, cofounder and senior game designer at MicroProse, has been fascinated with games for nearly as long as he can remember. "I've always been interested in games since I was young—board games, card games, war games." In college, Meier began considering a career in some aspect of the computer industry. "I did mainline, traditional computing for a while with a couple of companies."

Personal computers presented Meier with the opportunity to combine his gaming and technological interests. "It was a natural match. I got an Atari 800 and started to play around with it." Meier met Bill Stealey and the two started MicroProse five years ago.

"At first, MicroProse was a part-time thing, but our games were fairly well received, and we turned that into a company." The company's growth, "gave me the opportunity to write games full-time, and it's continued to grow from there."

An air-combat simulation put MicroProse on the map. "*F-15 Strike Eagle* was the first really suc-

cessful game we had. Since then we've put out *Silent Service*, *Gunship*, and *Pirates!*"

Pirates! is Meier's most ambitious game, recreating Caribbean history, with players taking the roles of buccaneers or pirates. The game has strategic, diplomatic, economic, and arcade elements, as well as a detailed social and historical context.

Meier wanted to write an adventure game—with a difference. "The adventure games that I'd played weren't really what I'd wanted out of an adventure game. They were either all text, or they were very numeric oriented. I wanted to just jump in and be the character myself—in a lot of adventure games, you're not the character, you're playing another thing which is the character. Instead of directly playing the role, you play it as a puppet.

I wanted a game where your skills, reactions, and decisions caused things to happen. Not how many hit points or agility you happen to have."

The game had to have animation and action, as well as strategy and planning. "We tried to put all those things in the game. The situation demanded it. If we'd been doing a game—as some of our other games are—with helicopters and airplanes, that's primarily action. When you think of pirates, there's action, but there's also intrigue, trading, politics, and so on."

How long did creating *Pirates!* take? "I spent about nine or ten months on it myself." No game, of course, is assembled alone. "We had an artist working on the game for five months, and our research and documentation took another four or five months. In all, *Pirates!* represents one-and-a-half to two years of work split up among three people."

Are we moving toward games with deeper, more fully realized backgrounds? "Yes—as long as it doesn't intrude on the playability of the game. The more context you have, the more real it is to people, and the more fun they'll have playing it. The down side is that you don't want to get so wrapped up in the historical part that you take away the playability. It's a fine line between presenting it and being

able to play it."

Are games such as *Pirates!* being produced because the technology and programming skills permit their development, or are they a response to an increasingly sophisticated consumer? Meier thinks several factors are at work.

"People are really learning their computers. You can see this as far back as the Atari 2600 machine. If you compare what was available when the 2600 was first introduced, and what was available just a few years later, there's a night-and-day difference. The same thing is happening with personal computers—programmers are learning how to get more and more out of them."

Currently Meier and MicroProse are at work adapting *Red Storm Rising*, Tom Clancy's best-selling novel of World War III. The novel spans several continents, with combat and drama on land and in the air and both on and under the sea.

Other current MicroProse projects include *Airborne Ranger*, an arcade-style game, and *Space*, a science fiction game which Meier says will fall somewhere between *Pirates!* and *Gunship* in terms of the gaming experience it offers.

Meier looks forward to the day when the majority of home computers offer advanced graphics and digitized sound, but he feels those elements will eventually be taken for granted.

"For a short time people are going to respond to the graphics and the sound, but after that it's still going to be a question of what's in the product: What is the experience that I get out of the game—is it fun, is it challenging? Those are the kinds of games that we want to put out."

Chip Morningstar, Lucasfilm Games

"Habitat is the sort of game people have been speculating about for a long time."

Chip Morningstar wants thousands of people to play his game—all at once.

As games designer for Lucasfilm Games, Morningstar is working on an on-line gaming experience called *Habitat*, which is nothing less than an attempt to fabricate an open-ended environment where



players will, in many ways, make their rules as the game proceeds.

"*Habitat* is a fictitious universe that you access via telecommunications using your Commodore 64. The monitor represents your view of the world, with various animated characters moving around on the screen. One of those characters is you, the others are other people who are simultaneously logged into this on-line service."

How many people can play *Habitat* at once? "There's not really any limit—we're doing this on QuantumLink. They support a large number of subscribers, and conceivably they all could play *Habitat*. All the players will be in one common universe." Not all of them will be in the same local area. As local limits are reached, *Habitat* steers new players to new areas. "We call each area of *Habitat* a region, like the notion of a room in an adventure game or a screen in a video game. The screen will show the objects, scenery, and people located in each region. *Habitat's* characters are called *avatars*, and there's a limit of six 'live' avatars per region, with a higher number of 'ghosts'—players without bodies—per region.

"Ghosts can move from region to region, they can turn themselves into avatars when they find an open region where they want to do things, or they can simply watch the action. Ghosting allows for theaters, where half a dozen avatars may put on a show, and hundreds of ghosts sit back and serve as the

audience."

Morningstar notes that while ghosting offers opportunities, the main motivation for creating this aspect of *Habitat* was technical. "We needed to eliminate traffic congestion problems. If you run into a crowded area between regions, just turn into a ghost and breeze on past. When the ghost finds a region with fewer than six avatars, he can become corporeal, an avatar."

What sort of world is *Habitat*? What sorts of things can avatars do or ghosts witness? "One of our objectives is to make the experience as varied and open-ended as possible. We want it to be different things for different people with different interests.

"Activities range from pure socializing, adding a visual and kinesthetic dimension to one of the things that people already use on-line services for. There will be activities which are planned and organized such as adventures, treasure hunts, road rallies, as well as board games like checkers and chess, or a capture-the-flag game that we're working on."

Habitat is an experiment in social structure as well as being a game. "Urban areas, the core inhabited parts of the universe, are set up as weapons-free zones where you can't attack other avatars. Outlying areas will be a little more rough-and-tumble. One of the things that we expect to happen is that people who are into different styles of behavior will drift in different directions."

Despite weapons rules and traffic patterns, Morningstar is committed to making *Habitat* as open an experience as possible. "One of the things that I'm most interested in is seeing what sorts of social structures evolve. We're not imposing too much in the way of government on this world. *Habitat* is pretty much an anarchy."

Anarchy doesn't necessarily mean chaos. "Whenever you get more than three people together in one place you get something resembling political behavior. It will be interesting to see if all the people who live in a particular town decide that they want to have a town council. The game will leave it up to them to set up their government.

Habitat is a sort of sociological laboratory, as well as a game."

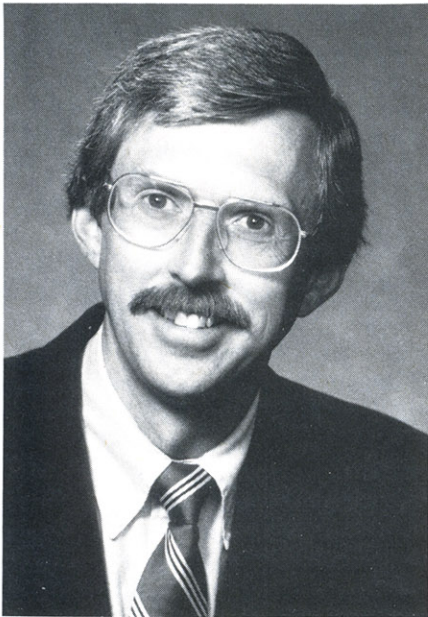
Technical work on *Habitat* began in late 1985, although the earliest glimmerings of it occurred to Morningstar about a year before that. Now, the work is coming together, with play testing under way and hopes for the game being on-line late in 1987.

Morningstar is aware of the risks involved in *Habitat*. "We're the guinea pigs. *Habitat* is the sort of game that people have been speculating about for a long time. If we're successful, I think we'll be seeing a lot more of this sort of thing."

Looking farther ahead, Morningstar sees great opportunities for on-line games. "With the advent of faster computers, larger memories, better graphics and telecommunications, some of the constraints will be removed from what is possible online. It's conceivable that we'll someday have interactive cable television channels, where several thousand people will be able to share experiences in ways that were never before possible."

David Morse, Epyx

"I want people to say we make the best games on the market."



Chairman and C.E.O. of Epyx, David Morse is experienced in both the hardware and software sides of the industry. The founder and president of Amiga Computer, Morse remained with Amiga for almost a year after selling the company to

Commodore in 1984. Because Amiga was designed to serve many purposes in computer entertainment, Morse established close relationships with many of the leading manufacturers of entertainment software.

Asked to join Epyx's board of directors earlier this year, Morse found that many of his interests and goals coincided with those of the company.

He is enthusiastic about prospects for both his company and the entertainment software industry. "The main thing that's going on right now is that the business has gotten down to the main companies that have proved themselves survivors." It's a competitive situation that he thinks makes for better games.

The industry shakeout that has left only a few key players, rather than the dozens of entertainment software companies just a few years ago, coincides with a maturing of programming skills. "We're starting to get real close to the limitations of the hardware on many systems, with the possible exception of the Amiga. But it's amazing the ways that Epyx and other companies have found to make machines like the Apple and the 64 and even the IBM do some very advanced operations that nobody even thought of doing just a couple of years ago."

These increased capabilities are built upon foundations that have taken years to acquire. "It's a very gradual build, with the result that we seem to get smarter and smarter about how to do things on computers."

Development of new products has, as a result, become more intensive. "Our most recent introduction is a good example. *California Games* represents more than three man-years of development time. That's a lot—but that's what it takes to make good products." Commitment of those resources has paid off, with reorders flowing into Epyx quickly after the game's early-summer release.

For all the shared experience and knowledge, there are still new areas to explore. "We have a couple of brainstorming ideas a year. Typically, we'll come up with a few ideas that are improvements on ex-

isting games. But we also come up with two or three ideas that are totally new, that nobody's thought of before. Of course, just because it's a new idea doesn't mean that it's a good idea."

Despite the arrival of the Amiga and the ST, and the increased market presence of IBM compatibles, Morse sees a lot of life left in the classic game machine, the 64. "It's probably a better game machine than, say, the Sega or the Nintendo. Graphically, there's a lot that can be done with the machine. The 64 accounts for a lower percentage of our business than in the past, although the unit volumes are holding up and actually increasing."

Other machines, though, offer more memory and other capabilities than the 64. Is it a problem to develop for the 64 and then port the game to other machines? "It's relatively easy to convert from the 64 to the Amiga or vice versa, despite some obvious limitations. But if you really want to see limitations, you need to look at IBM machines. That's the most difficult machine to develop for."

Will that change? Will IBM compatibles become more serious entertainment machines in the near future? "Obviously, the ability to play entertainment software is one way to sell machines."

Where are we headed over the next five years? "Two years ago, for example, the Amiga was the hottest machine around. In many ways, it still is. But today, technically, we can build machines that would run faster, do even better graphics, and be far easier to program."

Having participated in the industry from both the hardware and software sides, Morse is excited about meeting the future from the vantage point Epyx offers. "I like product development work. Of all the things I do, that's my favorite. At Amiga, we were working on one product, admittedly a very complex one, but still only a single product."

Epyx offers more diversity. "At any given time there are probably 10 or 15 projects going on. That's very interesting and exciting to me to be involved in all of that."

Morse's goals for the next few years? "I want us to be the best software company. I'd like people to say Epyx has the best games, the

All work and some play.



The New OKIDATA 180 and the OKIMATE® 20: Office Quality and Home Versatility.

When the work you do at home needs to look good enough for the office, you need one of these two printers.

Get the new OKIDATA 180 and get crisp near letter quality printing at time-saving print speeds. Enjoy its easy-to-use push-button front panel, easy paper handling and ability to print on anything from letter-head to four-part forms.

And, for pure compatibility, use its dual Commodore® and Epson®-compatible parallel interface.

Take home the OKIMATE 20 and unlock the power of color graphics and 24-element quality.

Give life to your letters with sharp NLQ printing and a choice of built-in fonts. And add impact to your overheads with acetates in hundreds of colors.

The new OKIDATA 180 and the OKIMATE 20 both work beautifully with either your Commodore 64 or 128, your IBM® PC or compatible, Tandy® and most Apple® computers.

These two printers bring home the OKIDATA tradition of toughness you know from the office. *At a price that could convince you to buy both.*

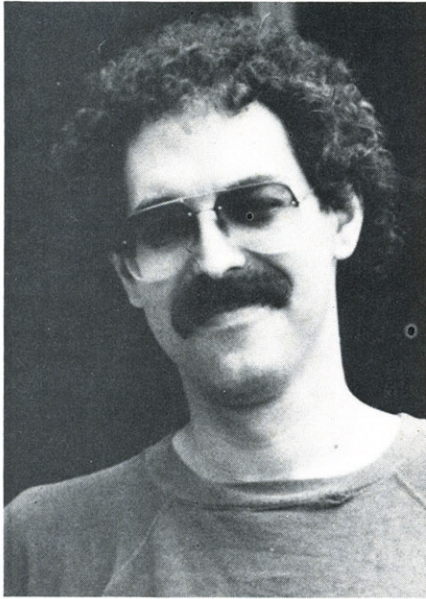
Call 1-800-OKIDATA, Ext. 25, for the name of the retailer nearest you.



best variety of products. I think we're there in some aspects, and on our way there in others. That kind of growth is what's going to make Epyx a fun place to be."

Ezra Sidran

"Imagination is the only limitation you have. Imagination is a lot more important than programming skill."



Freelance software designer Ezra Sidran has just completed his first major product, *Universal Military Simulator (UMS)* for Firebird. Sidran attended Marycrest College in Iowa, the only college in the country offering a degree program in computer graphics. Sidran's own degree is in computer animation, and he has linked his academic background with his interest in military history and war games.

"I invested a year of my life in writing *Universal Military Simulator*." That year will have stretched to two-and-a-half years by the time *UMS* is on the market late in 1987.

Because he was working freelance, and would not submit the game to publishers until it was completed, Sidran was free to follow his own instincts in pursuit of the creation of a strategy game that differed from others on the market. He wanted to come up with a game that would not only include historical scenarios, but also offer gamers the chance to set up their own battles, and even design their own battlefields. Most of all, he wanted the game to have a different look and feel.

"It's a 3-D game in which play-

ers can create and design their own three-dimensional maps, rotate them, zoom in on areas." Those maps can be filled with armies from any time period, equipped with weaponry ranging from bows and arrows to modern firepower to fantasy implements." By the time the game was finished, *UMS* had expanded to 22,000 lines of executable code.

Sidran traces the genesis of the program to an artificial-intelligence program he wrote in college, as well as to other strategy games he developed as he learned programming. Sidran wrote *UMS* in C, a decision he appreciates now that he is porting the game to other machines.

In retrospect, Sidran recognizes the size of the challenge he set himself. "I have to admit that I didn't have any idea how big the job was. Only now do I understand that the reason nobody had done a game like this before was because they all understood how difficult a job it would be."

Dedicated to historical accuracy, Sidran put in as much time in libraries as in writing code. "*UMS* represents a lot of library time. Before I wrote the first line of code I spent a full month in the library, not only doing historical research, but also doing market research. I wanted to make sure I had a fighting chance of succeeding with the program."

Sidran attended the 1986 Summer Consumer Electronics Show in Chicago in order to talk with game publishers. He found the entertainment software industry to be friendlier than even he expected—one major publisher passed on *UMS*, but introduced him to Marten Davies of Firebird, who became Sidran's publisher. "I had a contract for the program about five days later."

With *Universal Military Simulator* ready for release, Sidran is hard at work on new products. "I've got three coming up. I'll be working with Encyclopedia Britannica next, doing a dinosaurs game for younger players." The new game will be developed for the PC first and then for the Apple IIGS and the 64.

Sidran also sees himself doing more strategy games. "We haven't yet scratched the surface of what

we'll be able to do in simulations. What we call high-tech will be laughable just a few years from now. Twenty years from now will be a great time to be a programmer. It will be easier to develop programs, the graphics and sound will be better, everything will be more sophisticated. Right now, we're at the computer equivalent of movable type for printing presses."

Sidran cites 3-D as an example. "3-D is an illusion. But there are all kinds of wonderful 3-D illusions that you can do on computers. We'll be seeing a lot more vector graphics 3-D in the near future."

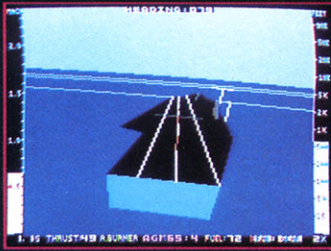
What would an ideal game include? What hardware developments will make these ideal games possible? "The biggest thing is that computers will have much more RAM, much larger memory areas. Also, we'll be looking at larger disk storage space. Even for the ST and the Amiga, you have more RAM than you have disk space. So disks have got to get bigger, or people have to get more hard drives."

For all the new technologies, he also feels that we haven't yet used up the possibilities of existing technology. "We haven't exhausted any of our systems, not by a long shot. All good programmers look at any problem as solvable. Step one is defining the problem and planning solutions. As always, imagination is the only limitation you have. Imagination is a lot more important than programming skill. That's what attracted me to computers from the beginning. There aren't any physical limitations to what you can and can't do."

Is there need for new ideas? "They're screaming for new ideas. There's more work than you can shake a stick at."

Currently anticipating a brief vacation from programming, Sidran is nonetheless looking forward to moving on to new frontiers. "I'm planning a new kind of adventure game. It calls for an exceptionally large 3-D map that adventurers will wander around in."

Sidran's adventurers face a situation that he understands well. "Writing a program is like starting out on an incredibly long journey. The sooner you put one foot in front of the other, the faster you get to the end." ©



1985 - High-performance Jet flight simulator for the IBM, Commodore 64, and Apple II computers



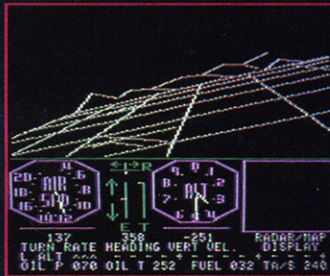
1987 - Expanding Scenery disk coverage; East Coast, Japan, & Europe



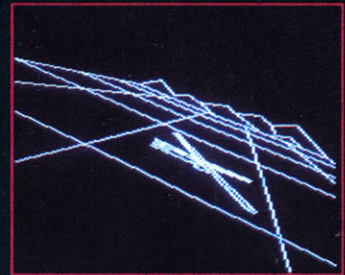
1986 - Flight Simulator II for the 68000 computers



1982/1983 - Microsoft Flight Simulator & Flight Simulator II



1979 - 3D graphics applied to the original FS1 Flight Simulator for the new Apple II and TRS-80 computers



1977 - SubLOGIC's 3D graphics package in BASIC and M6800 Assembly Language

Ten Years of Technology and Dedication

Some say our technology has helped us define the state of the art in flight simulation. We believe our ten years of dedication have gotten us where we are today.

SubLOGIC's first black & white 3D graphics routines, developed in 1977, paved the way for our introduction to flight simulation and aerial combat gaming theory. Our second-generation Flight Simulator II was so well conceived that even we find it difficult to improve upon. Jet's spectacular land and sea battle scenarios set another classic milestone in state-of-the-art simulation gaming. Scenery concepts incorporated into SubLOGIC flight simulation products right from the start continue to evolve as we introduce new, more beautifully detailed areas of the world to explore. And coming in 1988 - a flight control yoke for even more realism!

We invite you to help us celebrate our first decade of success, and share in our anticipation of the next ten years to come. SubLOGIC tenth-anniversary promotional shirts and posters are available at your dealer or directly from SubLOGIC. See your dealer, or write or call us for more information.

subLOGIC
 Corporation
 713 Edgebrook Drive
 Champaign IL 61820
 (217) 359-8482 Telex: 206995
ORDER LINE: (800) 637-4983
 (except in Illinois)



“HeadStart™ is the complete computer system even I can pin down— at a price no one can beat!”

*“King Kong” Bundy
Heavyweight Wrestler*

“King Kong” Bundy hates to get beaten. Even when buying a computer system. But he discovered that the systems advertised as “complete”, weren’t. One had limited expandability. Another charged extra for a second drive or a monitor. Others didn’t come complete with software needed to run them.

But then, HeadStart™ by Vendex™ entered the ring. HeadStart’s the first fully IBM® XT™ compatible computer system that has made standard all those features others charge extra for.

All for less than \$1,000. No hidden extras. No surprises.

A TRUE HEAVYWEIGHT CONTENDER

HeadStart comes with a dual speed 8MHz Turbo 8088-2 microprocessor, so it runs even faster than the IBM® PC/XT™. Two 5-¼” disk drives. 512K of RAM (expandable to a super heavyweight 768K). An 84-key “AT” style keyboard. Parallel, serial, light pen, mouse and dual game ports. 3-in-1 CGA/Hercules™ graphics card. Your choice of 12” TTL monochrome or optional 14” RGB color monitor. Plus seven expansion slots to make keeping up with your expanding needs that much easier.

NO WRESTLING WITH MANUALS

HeadStart comes complete with a bundle of the most popular and versatile software programs— **ATI™ SKILL BUILDER, EXECUTIVE WRITER™, EXECUTIVE FILER™, MyCALC™, and HOT™ POP-UP SERVICES**—and the revolutionary **HeadStart Operating Environment** that makes them easier than ever to use for beginners and buffs alike.

Simply by making a choice on the plain-English menu screens, novices can learn, at their own

pace, how to use their new computer, access spreadsheet and word processing programs, and run MS/DOS commands.

And just as simply, experienced users can perform complex tasks in a matter of keystrokes... without looking up manuals or memorizing a sequence of steps.

This unique operating environment can increase productivity by providing you with instant access to DOS utilities and configuration modifications. Plus, it can even execute the last 16 commands in sequence. All this and much, much more!

VENDEX IS ON YOUR TEAM

To make sure you’re getting the most out of your HeadStart, Vendex is in your corner with:

- A full year’s limited warranty on parts and labor.
- Optional extended warranty and installation service at your home or office, if you prefer.
- A Toll-Free Hotline to answer any technical questions you may have.
- Money-saving coupons worth up to \$1,000.

TAKE THE CHALLENGE

Look around. Check the HeadStart’s standard features against those of any other so-called “complete” computer system out there. Compare speed and power. Software and utilities. And ease of use, service and support.

Discover for yourself that for \$995*, HeadStart is the first truly complete computer system nobody, absolutely nobody, can beat!

For the HeadStart dealer nearest you, call **(800) 227-3900**. In California, call **(800) 632-2122**.

HEADSTART™

by **Vendex**

It will bring out the genius in you!

*HeadStart 888-XT system with monochrome monitor-\$995.00.
With optional RGB color monitor-\$1,295.00.

Vendex Pacific, Inc. 40 Cutter Mill Road, Great Neck, New York 11021, (516) 482-4255

Vendex Turbo 888-XT HeadStart Computer System is a trademark of Vendex Pacific Inc.. IBM, PC, XT, and AT are trademarks of International Business Machines Corp. ATI SKILL BUILDER and ATI Training Power are trademarks of American Training International. HOT Desktop Manager is a trademark of Executive Systems, Inc. MyCalc is a registered trademark of Software Toolworks. Executive Filer and Executive Writer are trademarks of Paperback Software International. MS-DOS and G/W BASIC are trademarks of Microsoft, Inc. Hercules is a trademark of Hercules Computer Technology, Inc.



Into The Eagle's Nest

Neil Randall

Requirements: Commodore 64. Versions are planned for the Atari ST and IBM PC.

Even John Wayne wouldn't try this.

Into the Eagle's Nest puts you in the position of a single G.I. during World War II, inside a Nazi fortress simply jammed with enemy soldiers and drunken officers. All you have to do is find three prisoners and blow up the fortress.

This is no cloak-and-dagger job. The Nazis come fast and furious, shooting when they approach and hiding behind every doorway. You have your work cut out for you, and only great players will finally complete the task.

Thankfully, the Nazis are incredibly stupid. They come after you in single file, usually lining up to be shot. As long as you pick your vantage points carefully, you'll be able to polish off dozens of the bad guys while taking almost no damage yourself. As I said, even John Wayne wouldn't try this.

The game is fun, even addictive. The screen shows an overhead view of a very limited portion of the fortress. The graphics display is sharp and colorful, with the brick walls looking like bricks and the floor looking smooth and hard. All items are easily distinguishable, and the textual information is kept to a minimum. All you need is a joystick, some nerve, and a lot of ammunition.

Doors To Danger

To get from room to room, you have to go through doors. Wooden doors can be shot open, but you need a key to open metal doors. You find keys in various parts of the fortress, but since they are rare you have to choose carefully where you will use them. Sometimes a room is accessible from two directions; sometimes you need not enter it at all.

You receive points for shooting enemy soldiers and for finding treasure and various objets d'art as you travel. Unfortunately, and this is a rather strange objection, you also get points

for killing drunken officers, who sit passed out at their desks. I say *unfortunately* because for some reason this portion of the game bothers me inordinately. I've done enough killing in computer games to make Genghis Khan seem like a pacifist, but this seems too real, too much like cold-blooded murder. After several hours of play, I found myself avoiding rather than shooting the officers, sacrificing the points for the sake of my conscience. Strange how these things affect you.

To shoot, you need ammunition, which you find scattered throughout the fortress. As you get shot, of course, you suffer wounds (expressed as Hit Points). To get rid of wounds, you must find either cold food or, much better, first aid. It's extremely easy to run out of ammunition and to find yourself being hit from all sides, so keeping an eye on the Ammunition and Hit Point totals is a must.

The castle has four floors. To get from one to the other, you must find an elevator pass. There is one on each floor, and each is indispensable (they disappear once used). Once you find a prisoner, you must lead him to the elevator and take him out the main entrance on the ground floor. The prisoners are even dumber than the Nazi soldiers, so prepare to be slightly exasperated.

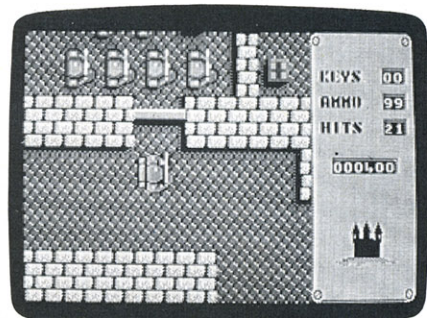
Once you have rescued all three prisoners (one on each floor except the ground floor), you must find and activate the four detonators. If you succeed, and if you make it back to the entrance on the ground floor, the fortress explodes. Your mission is accomplished. At this point the game is saved to disk automatically, and you can work your way through a more difficult fortress.

Save The Prisoners, Not The Game

Here lies one of the game's problems: You are allowed to save the game to disk only after working your way through all four floors rescuing prisoners and then working through all four floors again to activate the detonators. If you quit before accomplishing this, or if you get yourself destroyed, you have to start from scratch.

There are two things wrong with

this approach. First, even with experience it takes two or three hours to complete the entire mission. Second, playing *Eagle's Nest* for three straight hours is more than a little tedious.



Nonstop arcade action and strategy are featured in Into The Eagle's Nest.

Don't get me wrong. *Into the Eagle's Nest* is extremely enjoyable, and very strong in its ability to make you want to finish the job. But few people have the time required to get through an entire mission in one sitting, and fewer still would enjoy it all the way through. Allowing you to save the game after rescuing each prisoner would be a superior option, but better still would be a save option after reaching the elevator on each floor. A menu appears at that point anyway, asking you to choose the next floor, so why not allow a Save choice as well? Tackled in half-hour chunks, *Into the Eagle's Nest* would draw players back again and again.

Graphically attractive and well designed, *Into the Eagle's Nest* is a good, solid arcade game with an interesting mission. It would be nice to have smarter Nazis, a stronger sense of secrecy as you sneak your way along the corridors, and a friendlier save-game feature, but even as is the game should appeal to shoot-'em-up fans of all varieties.

Into the Eagle's Nest
Mindscape
 3444 Dundee Rd.
 Northbrook, IL 60062
 \$29.95

MASTER THE NEW ELECTRONICS WITH MCGRAW-HILL'S

Contemporary Electronics Series

The fast, easy and low cost way to meet the challenges of today's electronic innovations. A unique learning series that's as innovative as the circuitry it explains, as fascinating as the experiments you build and explore.

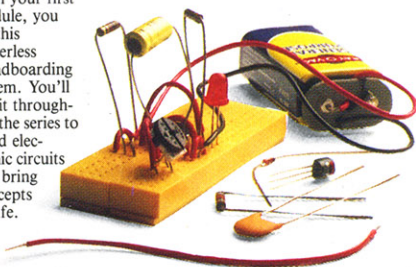
From digital logic to the latest 32-bit microprocessor, the McGraw-Hill Contemporary Electronics Series puts you into the electronic picture one easy step at a time. Fifteen unique Concept Modules, sent to you one every 4-6 weeks, give you a handle on subjects like optoelectronics, robotics, integrated circuits, lasers, fiber optics and more.

Each Concept Module goes right to the heart of the matter. You waste no time on extraneous material or outdated history. It's a fast, efficient, and lively learning experience... a non-traditional approach to the most modern of subject matter.

Unique Interactive Instruction

With each module, you receive a McGraw-Hill Action Audio Cassette. Each tape is a dynamic discussion that drives home the key facts about the subject. Your learning

With your first module, you get this solderless breadboarding system. You'll use it throughout the series to build electronic circuits and bring concepts to life.



experience is reinforced through interaction with vividly illustrated text, audio cassettes, and actual electronic experiments. Indexed binders preserve backup material, notes, and tapes for convenient referral.



Perform Experiments in Contemporary Electronics

Throughout your series, laboratory experiments reinforce every significant point. This essential experience

...dynamic, hands-on demonstrations of theory in practice... will help you master principles that apply all the way up to tomorrow's latest VLSI (Very Large Scale Integrated) circuitry.

In your very first module, you'll use integrated circuits to build a digital oscillator, verifying its operation with a light emitting diode (LED). You'll learn to identify passive and active components, understand concepts common to all electronic circuits.

For Anyone Interested in Electronics

The Contemporary Electronics Series is designed for anyone from hobbyist to professional. It's for you if you're looking for new fields of interest...if you're a teacher who

wants an update in contemporary circuits... a manager or supervisor in an electronics plant... a doctor, an engineer, a chemist who finds electronics playing an increasingly important role in your work. It's even for electronics engineers or technicians who feel their training needs freshening up. It's the quickest, most convenient, probably least expensive way to do it. And the only one that gives you hands-on experience.

15-Day No-Risk Trial

To order your first module without risk, send the card today. Examine it for 15 days under the terms of the order form and see how the Contemporary Electronics Series gets you into today's electronics. If card has been used, write us for ordering information.



McGraw-Hill
Continuing Education Center
3939 Wisconsin Ave.
Washington, D.C. 20016

Digi-Paint For The Amiga

Rhett Anderson

Requirements: Amiga with 512K or more RAM.

Up until now, the best paint programs for the Amiga have allowed you to choose 32 colors from a palette of 4096 for your pictures. While 32 colors are more than any other home computer can handle, it's only natural to wish for more. *Digi-Paint*, a new paint program from NewTek, gives you almost unlimited freedom—all 4096 colors can be used on the screen at once.

Digi-Paint may be the first program that makes you feel as if you are actually painting. It's possible to make your pictures look like oil paintings, watercolor paintings, or chalk drawings. For the most adventurous artists, it's a whole new medium: painting with light. Jaggies—those stairstep squares that appear in other paint programs when you draw diagonal lines—disappear completely in *Digi-Paint*.

Digi-Paint works in the Amiga's hold-and-modify graphics mode. My hat is off to the author of the program, because it is a difficult mode in which to program. Each pixel can either be chosen from a palette of 16 colors, or retain the color of its neighbor to the left, only with the red, blue, or green value modified. For fast response in this unusual graphics mode, *Digi-Paint* is written entirely in machine language. According to the manual, it uses speed-optimized code to find the best color transition from pixel to pixel. I found *Digi-Paint's* algorithm to produce clear and clean pictures.

The default palette—which contains several grays, a blue, a red, a yellow, a green, and a couple of flesh tones—works very well with most pictures. If you like, you can alter the palette color-by-color. You might, for example, want to include a variety of blues, greens, and purples for an undersea image.

There are two versions of the program. One lets you draw in medium resolution (320 × 200); the other, in high resolution (320 × 400). Although you may not be impressed by these numbers, the huge amount of colors available makes the apparent resolution much higher. This is similar to the way a color television works—although the resolution is not spectacularly high, the great number of colors available makes it easy to fake reality.

It does take a while to get used to

having so many colors to choose from. When you first use the program you may find yourself getting bogged down in color selection: "Which blue is best?" *Digi-Paint's* dynamic color selection is a great help. You don't see all 4096 colors at once—only a fraction of them. By clicking on a color, you get a new group of colors close to the color you selected. After you get used to this system, you'll fly through reds, browns, yellows, greens, blues, and grays. If you would prefer to choose colors in a more conventional way, you can use the red, blue, and green sliders next to the dynamic color menus.



Digitized pictures can be altered in a variety of interesting ways with Digi-Paint, a 4096-color, hold-and-modify paint program for the Amiga.



Digi-Paint's dithered gradient-fill and shading options were used to create this bit of original art.



Pictures can be taken from any paint program that supports the IFF graphics standard. For this screen, several drawings from a Deluxe Paint art disk were superimposed onto the reviewer's artwork.

Pictures From Anywhere

An important consideration in reviewing any Amiga paint program is compatibility. Thankfully, *Digi-Paint* goes above and beyond the call of duty. *Digi-Paint* is fully IFF-compatible. (IFF is a file format standard developed by Electronic Arts and Commodore.) Since virtually all paint programs for the Amiga generate IFF files, you can read them into *Digi-Paint*. Amazingly, *Digi-Paint* reads in pictures of all resolutions, converting them to hold-and-modify mode as it reads them in. High-resolution screens (640 pixels across) are converted into *Digi-Paint's* screen format by blending together adjacent pixels. The conversion is excellent—text that is converted is still readable. You can even combine pictures that were drawn with different palettes.

Digi-Paint works well with *Digi-View*, NewTek's video digitizer. With *Digi-View*, you capture an image from a photograph or a still scene and then load it into *Digi-Paint*. You can now alter the picture in any way you like. Add a worm coring into a still-life apple. Draw a mustache on your favorite model. Paint graffiti on your house. Take a bird from a *Deluxe Paint* art disk and place it on your shoulder. More subtle effects are possible—the *Digi-Paint* manual steps through tutorials showing how to add makeup to a black-and-white photo of a woman, and how to add a third eye to the forehead of a little girl. Both of these digitized photos are included on the *Digi-Paint* disk.

While you can get nearly any picture in any format into *Digi-Paint*, you can only get hold-and-modify pictures out of *Digi-Paint*. This prevents you, for example, from working on a picture in *Digi-Paint* and then transferring it to *Deluxe Paint II*.

Of what use are the pictures that you get out of *Digi-Paint*? If you're interested in paint programs for art's sake, you're in luck—*Digi-Paint* is just what you've been looking for. If you're a programmer, there's plenty of potential, but there are a few problems. You could use a hold-and-modify screen as a title screen for a game. You could use a hold-and-modify screen as a background screen, but only if you plan to use only sprites and vsprites. (Since blitter objects are really part of the main display screen, they'll interfere with the background screen, throwing chromatic ghosts across it.)

A Set Of Artistic Tools

Aside from the artist and the capabilities of the medium, the tools available are the most crucial elements of a successful paint program. In this category, *Digi-Paint* scores high, though not so

The new Commodore® Amiga® 500 is everything you never expected from a home computer. That's because we designed it to excite you. To dazzle your senses with 4096 colors and stereo sound. To unleash your creativity. To allow things you never dreamed possible in a home computer. Because until now, they really weren't.

Like built-in speech synthesis, so you'll always have someone to talk to. Pro-quality 3-D animation that lets even beginners put their ideas in motion. Colorful educational programs that make lessons fun and memorable. A complete home office with powerful spreadsheet and database programs—even word processing with WordPerfect®. And unlike any other home computer, the Commodore Amiga 500 can multi-task, so you can run several programs *at the same time*.

Hook it to your VCR with an optional RF modulator, and the Commodore Amiga 500 becomes a home video production center. Paint graphics over video images. Create moving 3-D titles. Produce your own animated feature.

And for pure fun, enter the incredible world of stereo Amiga video games. With graphics so good, major video game makers use them in their coin arcade machines.

AND NOW YOU CAN SEE IT ALL, FREE.

We captured the excitement, beauty and power of the Commodore Amiga 500 on a special VHS video cassette called The Amiga 500 Video Test Flight. If you're ready for the ride of your life, call 1-800-87-AMIGA or contact your Commodore Amiga dealer to find out how you can get your free video demonstration.

1-800-87-AMIGA



COMMODORE
AMIGATM
500

It talks.
It animates.
It educates.
It's a home office.
It's a video studio.
It's arcade games in stereo.
It's the new Commodore
Amiga 500 home computer.



Only Amiga makes it possible.

When you want to talk computers..

ATARI COMPUTERS

Atari Computers

800 XL 64K Computer.....Call
 65XE 64K Computer.....87.99
 130XE 132K Computer.....139.00
 520ST Monochrome System.....499.00
 520ST Color System.....659.00



Atari 1040 Color System **\$859**

Includes: 1040ST, 1 mb RAM with 3 1/2" drive built-in, 192K ROM with TOS, Basic, ST language and color monitor.
 New 520ST FM is in stock.....Call

ATARI SOFTWARE

Access

Leaderboard Golf.....24.99

Accolade

Fight Night.....19.99

Activision

Music Studio.....34.99

Antic

Cad 3-D.....32.99

Batteries Included

Paperclip w/SPELLPACK.....39.99

Degas Elite.....48.99

Infocom

Zork Trilogy.....44.99

Microprose

Top Gunner.....19.99

Silent Service.....24.99

Optimized Systems

Personal Pascal.....47.99

Origin Systems

Ultima 4 XL/XE.....39.99

Paradox

Wanderer (3-D).....27.99

Psygnosis

Deep Space.....34.99

Timeworks

Wordwriter ST.....48.99

VIP

Professional (GEM).....144.00

COMMODORE COMPUTERS



Amiga 500 System

Includes: Amiga 500 CPU, 1 MB, 1080 RGB Monitor, Amiga DOS, Mouse, Kaleidoscope

Call

Commodore 128.....259.00

Commodore 128D.....529.00

Commodore 64C.....179.00

64C, 1541C, 1802C Package....599.00

128, 1571, 2002 Package.....759.00

128D, 2002 Package.....829.00

COMMODORE SOFTWARE

Activision

Gamestar Series.....(ea.) 28.99

Broderbund

The Print Shop.....29.99

The Toy Shop.....39.99

Commodore

Textcraft w/Graphic Craft.....59.99

Assembler.....79.99

Enhancer DOS 1.2.....14.99

Discovery Software

Marauder Back-up.....32.99

Electronic Arts

Deluxe Paint II.....97.99

Deluxe Print.....74.99

Instant Music.....34.99

Deluxe Video 1.2.....97.99

Infocom

Hitchhiker's Guide.....28.99

Micro Illusions

Dynamic-Cad.....349.00

Mindscape

Halley Project.....34.99

SAT Prep.....51.99

Micro Systems

Analyze Version 2.0.....119.00

Scribble.....66.99

On-Line/Comm.....46.99

Sublogic

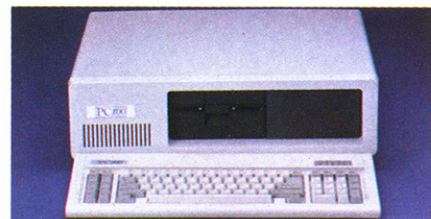
Flight Simulator.....31.99

V.I.P.

V.I.P. Professional.....112.00

MS/DOS SYSTEMS

AT&T 6300.....from \$1299.00
 Compaq.....from 1699.00
 IBM-PS-2 Model 30.....Call
 IBM-AT Enhanced.....from 3499.00
 Leading Edge.....from 999.00
 NEC Multispeed.....from 1499.00
 Toshiba 1000 Lap Top.....from 999.00



PC-T00 512K AT-Compatible **\$999**

(Monitor Optional)

MULTIFUNCTION CARDS

AST

Six Pak Plus PC/XT.....129.00

Hercules

Color Card.....159.00

Graphics Card Plus.....209.00

Fifth Generation

Logical Connection 256K.....299.00

Quadram

Silver Quadboard.....119.00

Video 7

EGA Video Deluxe.....319.00

Zuckerboard

Color Card w/Parallel.....89.99

MS/DOS SOFTWARE

Ashton-Tate

d-Base III +399.00

5th Generation

Fastback Utility.....89.99

IMSI

Optimouse w/Dr. Halo.....99.99

Lotus

Lotus 1-2-3.....329.00

MicroPro

Professional 4.0 w/GL Demo....239.00

Microstuf

Crosstalk XVI.....89.99

P.F.S.

First Choice (Premium).....119.00

Word Perfect Corp.

Word Perfect 4.2.....209.00



COMPUTER MAIL ORDER

.....When you want to talk price.

DRIVES	MODEMS	PRINTERS
<p>Atari AA314 DS/DD Disk (ST).....\$209.00 AA354 SS/DD Disk (ST).....129.00 SHD204 20 Mb ST Hard Drive..579.00</p> <p>Commodore Amiga 1020.....189.00 Amiga 1010 3½".....219.00 1541C.....179.00 1571.....239.00 1581 3½" External.....229.00</p> <p>CSI 10 mb (64-128).....1099.00</p> <p>Indus GT Disk Drive Atari XL/XE.....179.00</p> <p>Microbotics 20 mb Hard Drive (Amiga).....1299.00</p> <p>Racore Jr. Expansion Chassis.....299.00</p> <p>Seagate 20 mb ST-225 Hard Drive Kit...339.00</p> <p>Supra 20 Meg Hard Drive (ST).....559.00</p> <p>Xebec 20 mb (Amiga).....899.00</p>	<p>Anchor Volkmodem 1200.....\$99.99 6480 C64/128 1200 Baud.....119.00 VM520 ST520/1040 1200 Baud.129.00</p> <p>Atari XM301 300 Baud.....42.99</p> <p>Best 1200 Baud External.....119.00</p> <p>Commodore Amiga 1680-1200 BPS.....169.00 CBM 1670 & C-128).....99.99</p> <p>Everex Evercom 1200 Baud Internal....109.00</p> <p>Hayes Smartmodem 300.....129.00 Smartmodem 1200 External.....299.00</p> <p>Novation Parrot 1200.....119.00</p> <p>Practical Peripherals 1200 BPS External.....159.00</p> <p>Supra MPP-1064 AD/AA C64.....69.99 1200AT 1200 Baud Atari.....139.00</p>	<p>Atari 1020 XL/XE Plotter.....\$31.99 XDM121 Letter Quality.....199.00 XMM801 XL/XE Dot Matrix.....189.00 XMM804ST Dot Matrix.....179.00</p> <p>Brother M-1109 100 cps, 9 pin.....199.00 M-1409 180 cps, 9 pin.....319.00</p> <p>Citizen MSP-10 160 cps, 80-Column....279.00 Premier 35 cps Daisywheel.....489.00</p> <p>C.Itoh 315P 132 Column Prowriter.....449.00</p>
<h2>MONITORS</h2>		
<p>Amdek Video 300 Amber Composite....139.00</p> <p>Commodore Commodore 2002.....319.00 Amiga 1080 Hi-Res Color.....299.00</p>	<p>U.S. Robotics Direct 1200 Ext. \$109 U.S. Robotics 2400 Baud Internal.....189.00</p>	<p>Epson EX-800 300 cps 80 Column \$369</p> <p>Epson LX-800 150 cps, Dot Matrix.....169.00 FX-86E 240 cps, 80-column.....329.00 FX286E 240 cps, 132-column....439.00 EX-1000 300 cps, 132-column...499.00 LQ-800 180 cps, 24-Wire.....459.00</p> <p>Hewlett Packard Thinkjet 379.00</p> <p>NEC Pinwriter 2200 24 Wire.....319.00 Pinwriter 660 24 Wire.....459.00 Pinwriter 760 24 Wire.....679.00</p>
	<h2>DISKETTES</h2>	<p>Okidata Okimate 20 Color Printer.....129.00 ML-182 120 cps, 80-column.....239.00 ML-192+ 200 cps, 80-column...329.00 ML-193+ 200 cps, 132-column.479.00</p> <p>Panasonic KX-1080i 120 cps, 80-column....159.00 KX-1091i 180 cps, 80-column....169.00 KX-P3131 22 cps Daisywheel....289.00</p> <p>Star Micronics NX-10 120 cps, 80-column.....159.00 NX-10C 120 cps, C64 Interface.219.00 NX-15 120 cps, 132-column.....339.00</p> <p>Toshiba P-321 SL 216 cps, 24-Pin.....539.00 P-351 II 300 cps, 24-Pin.....899.00</p>
<p>Magnavox 8502 Composite \$179</p> <p>Magnavox 8505 RGB/Composite.....199.00</p> <p>NEC 12" TTL Green or Amber.....99.99 JC-1401P3A Multi-Sync.....549.00</p> <p>Princeton Graphics MAX-12 12" Amber TTL.....149.00</p> <p>Taxan Model 124 12" Amber.....119.00</p> <p>Zenith ZVM 1220/1230.....(ea.) 99.99</p>	<p>Maxell MD1-M SS/DD 5¼".....9.99 MD2-DM DS/DD 5¼".....10.99 MF1-DDM SS/DD 3½".....12.99 MF2-DDM DS/DD 3½".....21.99</p> <p>Sony MD1D SS/DD 5¼".....8.99 MD2D DS/DD 5¼".....10.99 MFD-100 SS/DD 3½".....13.99 MFD-200 DS/DD 3½".....20.99</p> <p>Hewlett-Packard Calculators 28C Scientific Pro.....199.99 18C Business Consultant.....139.95 12C Slim Financial.....74.99</p>	

In the U.S.A. and in Canada

Call toll-free: 1-800-233-8950.

Outside the U.S.A. call 717-327-9575 Telex 5106017898 Fax 717-327-1217

Educational, Governmental and Corporate Organizations call toll-free 1-800-221-4283

CMO. 477 East Third Street, Dept. A211, Williamsport, PA 17701

ALL MAJOR CREDIT CARDS ACCEPTED.

POLICY: Add 3% (minimum \$7.00) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 3 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Pennsylvania residents add 6% sales tax. All prices are U.S.A. prices and are subject to change and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be replaced or repaired at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee.

high as *Deluxe Paint II*. Among the things you *can't* do: Rotate a brush by an arbitrary angle, scale the brush to an arbitrary size, flood-fill an empty area, add text to the screen, and distort brushes. Until a *Digi-Paint II* comes along, you can perform these operations in *Deluxe Paint II* and transfer the results to *Digi-Paint*.

There are several brushes to choose from in *Digi-Paint*. Besides the standard fixed-sized brushes, you can select an expanding circle, a variable-size rectangle, and a polygon-drawing line tool. With any brush, you can select *fill* as an option. Each brush can be used in any of the 12 available modes. Here is a list of these modes: solid, blend, tint, light-tint, minimum, maximum, add, subtract, XOR (eXclusive OR), AND, OR, and shading.

Solid, the first mode, is used to draw solid objects on the screen. Pick a color, pick a brush, and draw. Anything you draw over will disappear. Blend, tint, and light-tint let you tint an area of the screen with a certain color. Blend is the most severe of the three; light-tint is the most delicate.

Minimum, maximum, add, subtract, XOR, AND, and OR combine the brush with the background in various ways. Each of these modes work on the red, blue, and green components of the color separately. Many, many possibilities exist. For instance, by using a white brush in XOR mode, you can create a negative image of your drawing.

Shading is the most impressive and versatile of the 12 modes. With it you can create realistic shading and highlighting, and smooth color changes. Shading works with any brush. You can even alter the shape and position of the "hot spot" within the shading area.

By using the scissor tool, you can "cut" your own brushes. This is the only way to get multicolor brushes. Any operation that can be performed with a normal brush can be done with your custom brush.

By clicking on RubThrough, you can selectively bring areas of an alternative screen into view. This is similar to Captain Kangaroo's Magic Drawing Board, only better. You can rub through in any mode and with any brush. When used with the shading mode, Rub-Through can be used to mix pictures on the screen seamlessly.

Special Effects

Digi-Paint offers an interesting variety of special effects. From the effects menu you can double the screen, halve the screen, soften the screen, mirror the screen, and switch halves of the screen. Each of these effects can be performed

vertically or horizontally. By using vertical soften on an interlace picture, you can remove nearly all traces of the flicker associated with interlace mode.

Digi-Paint utilizes menus and file selectors to make the user interface comfortable and quick to learn. After you save a picture, you'll notice that *Digi-Paint* picture icons feature an interesting twist—they are four-color miniature copies of your artwork.

The 56-page manual that comes with *Digi-Paint* is well-written and informative. Many difficult-to-explain features are dealt with clearly. The three tutorials included are nice, but I wish there were more.

Digi-Paint employs the increasingly popular "keyword" protection system. The program disk is unprotected, but when the program is run, it asks you for a certain word on a certain line of a certain page. The program selects the word randomly. If you fail to answer correctly, you're dumped unceremoniously back into the Workbench. While this method of protection is slightly annoying, it is better than copy-protecting the disk. NewTek has provided us with an excellent program—and they have every right to discourage illegal distribution.

Digi-Paint
NewTek
701 Jackson Suite B3
Topeka, KS 66603
\$59.95

Accolade's Comics

Robert Bixby

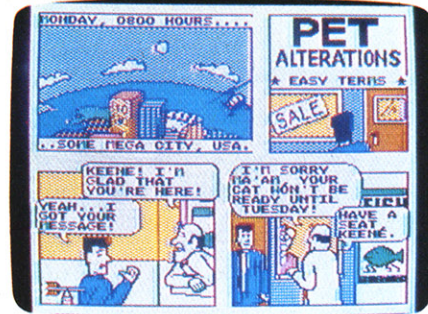
Requirements: Apple II series and Commodore 64.

Who among us has not become intrigued by a comic book hero? Who hasn't spent a rainy afternoon holed up with a bale of Captain Marvel or Batman magazines, wishing life could be more like the comics?

But the comics always had a few drawbacks. The art rarely rose above the mediocre, the dialog would sound moronic if anyone but Bruce Wayne and Dick Greyson spoke it, and the story lines were pretty predictable—particularly after you'd thumbed through the same classics ten weekends in a row.

Comics Comes To The Computer

With art and dialog wide open to parody, and the interactive quality of vi-



Accolade's Comics offers humorous dialog, animated graphics, and arcade action.

deogames, the match between comics and computers seems made in heaven. However, the translation of comics to the electronic medium has been slow.

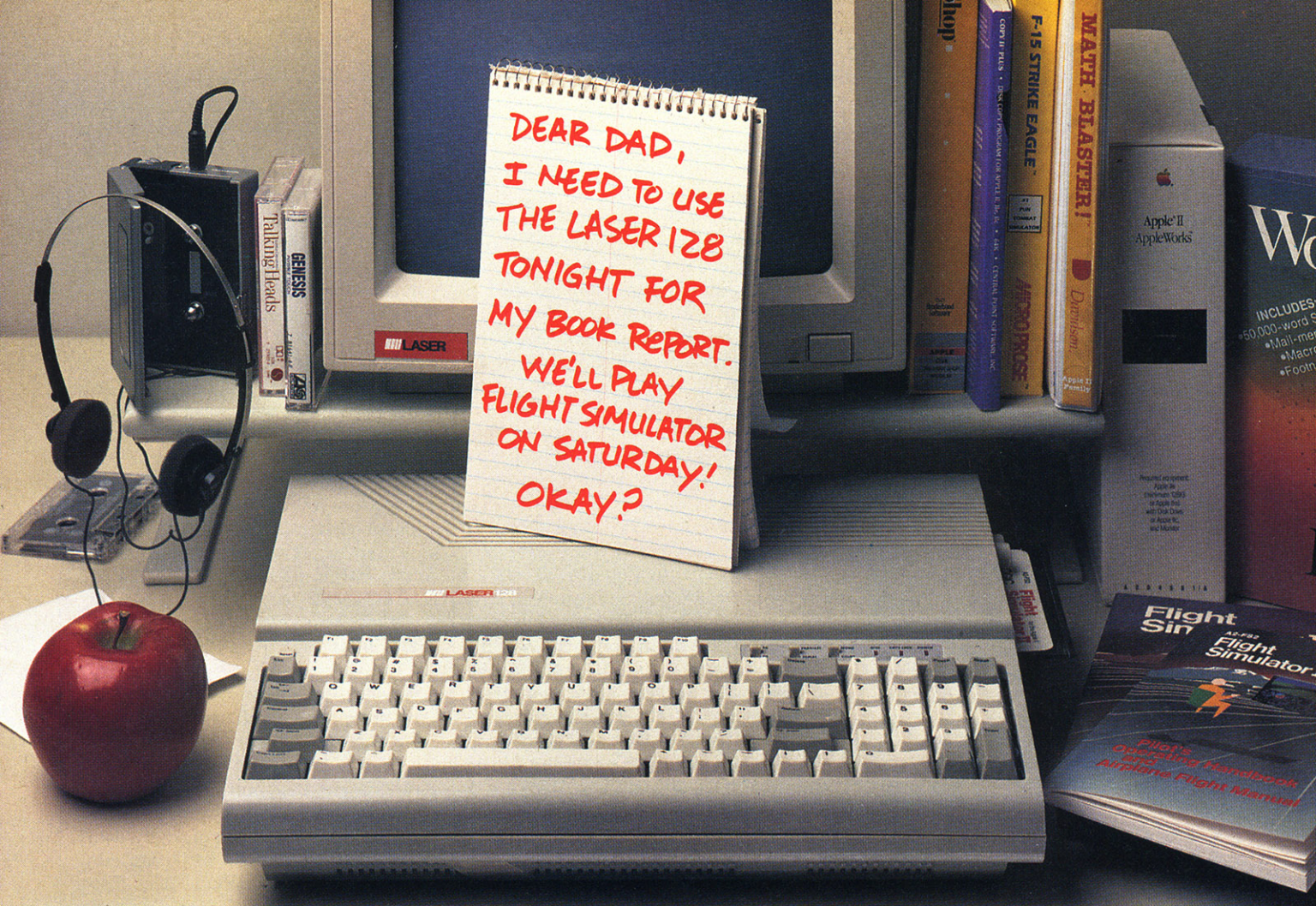
Accolade's Comics finally bridges the gap. It's representative of the new wave in adventure software. No longer are adventures morbidly grim and set in caverns peopled by ogres and halflings. This representative of the new generation of software is brightly lit and humorous, and sophisticated enough to poke fun at itself and its genre.

One might be tempted to comment that this software is not true to life. And particularly as software strives for ever greater verisimilitude, the cartoon drawings and far-out situations that Steve Keene (the hero of *Comics*) finds himself in, leave this action/adventure/role-playing game open to such criticism. But what could be more true to life than a story line that hinges on seemingly insignificant turns of phrase or choices of action? And some of the choices and turns of phrase are hilarious.

Immediately after the program boots, you're given the choice of practicing the videogame sequences or playing the adventure game. My recommendation is to get as much practice as possible with the videogames before attempting anything else.

Steve Keene On The Case

As the story opens, private spy and thrill seeker Steve Keene has been summoned to headquarters (which is cunningly disguised as a small-time pet alterations business) where the thin-skinned chief tells him of an assignment he must complete. As the conversation progresses, you have the opportunity to choose Steve Keene's banter. Will he use wisecracks or respond in a low-key, respectful manner? The decision is yours. But be careful. The chief is not only thin-skinned but also mildly paranoid (as it pays to be in the private spy business). Even if you stick to straight responses, he may get the feeling you are ribbing him, and you'd better apologize when he gets steamed. A word to the wise.



Apple IIe/IIc compatible

Now your kids can afford to do their homework

More and more students are learning with computers. However most parents haven't been able to work a computer into their budget. The Laser 128 Apple-compatible computer will let you do all those things that you and your family want to or have to do – homework, write reports, even play games for a fraction of the cost of an Apple. With a Laser you can work out your budget on a computer, instead of breaking it with one. The Laser lets you take advantage of the largest software library available, so your child can learn more at home with the same programs they learn on in school. And, you can do your work at home on the Laser, too.

The Laser 128 with all its features: built-in disk drive; 128K RAM (expandable to 1 megabyte); serial, parallel, modem and mouse interfaces; 80 column text mode; numeric keypad; and an expansion slot; makes for a pretty educated buy. When you do your homework on which computer to buy, you'll find the Laser 128 at the head of the class with value. For more information on the Laser 128 and the name of your nearest dealer, contact Video Technology Computers, Inc., 400 Anthony Trail, Northbrook, IL 60062, or call (312) 272-6760.



Apple, Apple IIe and Apple IIc are registered trademarks of Apple Computer, Inc.

LASER 128

Manufactured by
VIDEO TECHNOLOGY COMPUTERS, INC.

MAKING COMPUTERS AFFORDABLE

If you survive the conversation, you might be sent on one of two missions. During the course of the missions you will have the opportunity to swap badinage with bad guys, get sapped, be eaten by a vain shark named Harry, get shot by robot copters, have gum stuck to the bottom of your shoe, and play some truly challenging arcade-style games.

One storyline requires that you track down a kidnapped professor who has just made a discovery that will benefit mankind far into the future. You are faced by such obstacles as an airheaded car salesman named Laughin' Al (who must have been a joy to create), toughs who drive Mercedes and Jaguars, a nerdy lab assistant, and even a vampire who appears incongruously from nowhere.

Errors in judgment are handled in true comic-book style. You don't simply perish (except in the arcade sequences). Rather, you are treated to a graphic representation of your demise, as you wait on death row for that fateful call from the governor, or as an ill-tempered French taxi driver throws you from his moving cab. Fortunately, loss of a life doesn't always take you back to the beginning of the adventure. As long as Steve has lives remaining, the adventure simply "rewinds" a few scenes and allows you the opportunity to make different choices along the way. If only life were like that.

Comics comes on six disk sides. Passage through an adventure will require a considerable amount of disk swapping. The panels are in colorful medium-resolution graphics (on the 64) and they load slowly, although I believe the game is assisted by a fast-load program. As each panel is loaded, it is accompanied by some kind of animation. In the chief's office, the overhead fan turns slowly, and the chief absent-mindedly spins a globe while speaking. The mouths of the characters move (particularly in the early sequences) with a kind of "Clutch Cargo" motion. My guess is that for each panel, three or four panels must be loaded in order to accomplish the animation. If this is true, it is worth suggesting that any future version of *Comics* forsake the nonessential animation in order to speed up the plot.

Animated Adventure

In both humor and straight-ahead action, timing is everything. Though funny and impressive at times, the animation just doesn't move the story forward.

Fortunately, you can click the joystick fire button to stop the animation of each panel and move on to the next. Still, it can take several minutes to get through the preparatory sequences to

arrive at the challenge that stopped you on a previous game.

One other suggestion I would make has to do with a feature I thought was enormously funny the first time through. Many of us remember the Fearless Fosdick pitches for Wildroot Cream Oil or the Charles Atlas ads that came with our comics. They featured a short comic and a coupon for a body building course, or a real cardboard tank. *Comics* has a section like that, complete with a coupon to cut out of your television screen.

The animation and story of this advertising section are funny and provide a break from the tension. However, I never felt I had to read the Charles Atlas ad through every time I read a comic book. In *Comics*, you have to go through it, panel by panel.

I hope there will be future versions of *Comics*. There are all kinds of themes crying out to be lampooned—western comics, superhero comics—and I'd love to see what *Comics'* creative crew would do with "Tales from the Crypt."

With features that will appeal to children and adults, videogame addicts, and adventure aficionados, *Comics* is a winner from beginning to end. Or as close to the end as I was able to get after several days of trying. I'm still trying.

If you see the kidnapped professor, tell him not to give up hope. I'll rescue him soon.

Accolade's Comics
Accolade
20813 Stevens Creek Blvd.
Cupertino, CA 95014
\$39.95 Commodore 64 version
\$44.95 Apple II-series version

California Games

Ervin Bobo

Requirements: Commodore 64, Apple II, Apple IIGs, IBM PC and compatibles, and Amiga.

Following the success of *Summer Games* and *Winter Games*, both based on events from the Olympics, Epyx searched for new challenges and settled on *World Games*—supposedly the events the Olympic committee forgot. For this, they combed the world and came up with events such as bull riding and log rolling. Then they apparently sat back, wondering what to do next, and discovered new sports right in their own backyard. The result is *California Games*. It's difficult to think what they might do next, for it will not be easy to top this one.

The *California Games* are, of course,

ones we all know and love—although Midwesterners have few chances to practice surfing—but more than that, they are the games of our time, a part of pop culture. Besides surfing, there is skateboarding, roller skating, BMX bike racing, flying-disc throwing, and foot bagging (also known as hacky sack). For each game, a different set of joystick skills must be learned.

Award From The Sponsor

Your reward for playing well is not only a high score but also an attractive trophy from your sponsor. Sponsor? Of course. Since these are not international events—and since you must represent *somebody*—you compete on behalf of a sponsor rather than a flag. The sponsors themselves are also representatives of pop culture: Kawasaki, Ocean Pacific, Casio, and so on.

Once you've chosen a sponsor, the menu gives you the option of practicing an event, competing in an event, or competing in all events. Pick the one you think you can handle and go on from there.

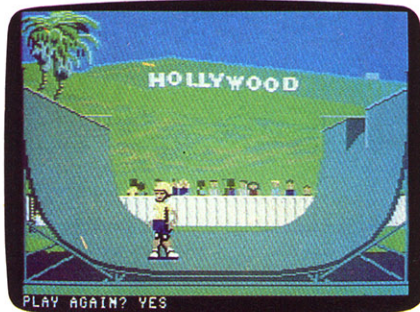
In Skateboarding, you ride a half pipe—in cross section a huge U—and while a good deal of your skills will be used in simply staying upright, extra points can be earned by completing stunts such as Hand Plant, Kick Turn, or Aerial Turn—each requiring the right combination of joystick movement and fire-button use. Assuming you can stay on the board, you're allowed slightly over a minute to complete as many stunts as possible. Otherwise, you're allowed three falls.

Foot Bagging was new to me, yet it was one of the easier events. In this, you juggle a small bean-bag ball with your feet and head. Start the round by tossing the bag into the air; try to keep it airborne with kicks, knee lifts, or thrusts with your head. Success is measured by how long you keep the bag in the air as well as by how you keep it there, with extra points given for making spins and jumps between kicks.

Surf's Up!

Surfing gives you the opportunity to ride the waves in style, but simply riding them will not be enough. Moving your joystick up and down takes you from trough to curl, and careful maneuvering in this part will extend your ride and earn points. More points can be earned by taking chances; making cut-backs or turning a full 360 degrees. While successful rides end by going over the top of the wave (where making a turn will allow you to catch the wave again), many will end with a wipeout, four of which are allowed.

BMX Bike Racing presents you



Skateboarding is one of many challenges in Epyx's California Games.

with a course strewn with obstacles, and, while I consider it a great feat simply to complete the course, my children insist it is even more fun if you complete it while doing backward and forward flips and 360-degree turns. I wouldn't know. At any rate, the object is to complete the course in the shortest possible time, with extra points being awarded for successful stunts.

Roller Skating should be easy, and in fact would be if there just weren't so many hazards like grass in the cracks of the sidewalk, dropped ice cream cones, and sand. With your joystick, pump back and forth to begin skating; then try to avoid all the obstacles in your way by going around them or jumping over them. Extra points are awarded for jumps, and still more points for making a full turn while jumping. You're allowed three falls. One of my favorite routines occurs here: On the third fall, your alter ego—a pony-tailed girl—lies face down, beating her fists and kicking her feet in the ultimate expression of frustration.

Flying Disc Throwing requires controlling two players. For the first, you must maneuver the joystick for a clean throw. There are variations depending on whether you want distance or altitude. Sticking to the marked scale, however, will give you more consistency.

Once the disc is thrown, it appears in a schematic at the top of the screen, which also gives you a representation of the catcher. Don't wait to begin moving the catcher back and forth in an effort to be where you think the disc will be.

In contrast to the repetitiveness of other current software entries, where the challenge seems to be to shoot an alien of a different color or to solve a mystery in a different house, this program from Epyx is both inventive and charming. To paraphrase an old Beach Boys number, I sometimes wish they all could be *California Games*.

California Games
Epyx
600 Galveston Dr.
Redwood City, CA 94063
\$39.95

IT'S A WORD PROCESSOR

IT'S AN OUTLINER

IT'S A FLASH CARD MAKER

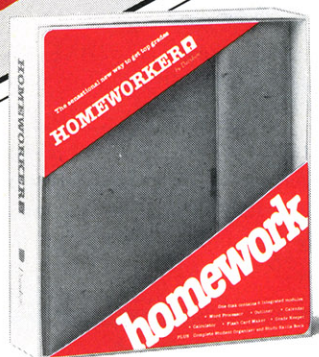
IT'S A CALENDAR

IT'S A GRADE KEEPER

IT'S A CALCULATOR

IT'S

HOMeworkER™



Available
for Apple IIe,
Apple IIc,
and Apple IIgs

Homeworker from Davidson is an easy-to-use productivity program that helps students manage their coursework through six integrated modules: **Word Processor, Outliner, Flash Card Maker, Calculator, Calendar and Grade Keeper.**

The program also features on-screen tutorials, fact finder files and a clipboard for easy transfer of materials from one module to another.

The *Homeworker* software is packaged in a deluxe student organizer, along with a variety of study accessories:

- easy-to-follow instruction manual
- study skills book
- calendar section
- phone/address book
- nine separate subject tabs
- fact finder—a quick reference guide for students
- highlighter and felt tip pen
- metric ruler
- 8½" x 11" notepad
- disk holder

\$89⁹⁵

suggested retail price

Ask your dealer for this Davidson program

or call us directly for assistance:

(800) 556-6141 (213) 534-4070

(Outside California)

(California Only)

Davidson.

Educational software
that works

Davidson & Associates, Inc., 3135 Kashiwa Street, Torrance, CA 90505

Please send me a **FREE COLOR BROCHURE.**

Name _____

Address _____

City _____

State _____

Zip _____

©1987 Davidson & Associates, Inc.

We Won't Be **UNDERSOLD** 1st In Price, 1st In Support, 1st In Warranty

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs
Call before you order, our prices may be lower • All sale prices expire 11-30-87

80 Column Printer • 8½" Letter Size

Big Blue Printer



Dot Matrix
Heat Transfer
Upper Case
Lower Case
Underline
Enlarged
Affordable
Plus More

*No One Sells This
Printer For Less!*

Sale \$39⁹⁵

List \$199

(Add \$7.50 Shipping*)

This printer was made by Canon® for IBM. The Big Blue printer comes ready to hook up to the serial port of the IBM® PC jr, XT, AT & Compatibles. Plus with our low cost adapter cables you can connect this printer to the Apple® II, IIe, IIc and Compatibles, Atari® computers, Commodore® 64, 128, SX-64, Vic 20, Plus 4, and more.

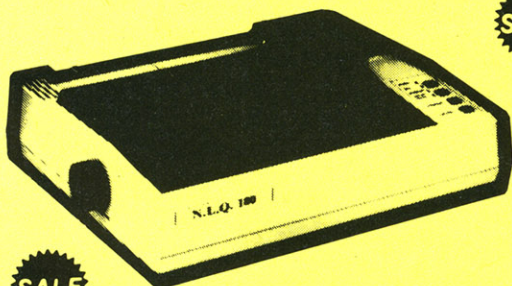
- RS-232 Adapter - Adapter for IBM® PC, AT, XT & Apple® II series RS-232 port. (Specify male or female). List \$49.95 Sale \$19.95
- Apple® IIc & Laser 128 Interface - With printer driver program for graphics and text. List \$49.95 Sale \$19.95
- Intelligent Commodore® Interface - Prints graphics and text. Use Print Shop and more. List \$49.95 Sale \$19.95
- Intelligent Atari® Interface - (Excludes Atari 1200) Prints graphics and text. Use Print Shop and more. List \$49.95 Sale \$19.95
- Paper (2 Rolls) List \$19.95 Sale \$ 5.95 Single Sheet Paper (Qty. 500) List \$29.95 Sale \$12.95

IBM, Apple, Canon, Commodore, Atari & Laser are registered trademarks of International Business Machines, Apple Computer, Canon Inc, Commodore Business Machines, Atari Inc. & Video Technologies Respectively.

5¼" Floppy Disk Sale 24¢ each* *1 Box of 100 — \$24.00 (24¢ each)
Double-Sided • Double-Density • 100% Certified Paper Economy Sleeves (100) — \$5.00

Hi-Speed (160-180 CPS) Printer

NLQ-180 Printer



Near Letter
Quality

*No One Sells This
Printer For Less!*

Sale \$179⁹⁵

List \$499

(Add \$10.00 Shipping*)

Lifetime
Warranty*

- Near Letter Quality Selectable From Front Panel Controls • High Speed Dot Matrix
- Letter Quality Modes • 8K Buffer frees up computer 4-times faster • Super Graphics
- Pica, Elite, Italics, Condensed • Business or Personal • Tractor/Friction • 15 Day Free Trial
- Lifetime Warranty on Print Head* • 6 Month Immediate Replacement Policy •

COMPUTER DIRECT (A Division of PROTECTO)

22292 N. Pepper Rd., Barrington, IL. 60010
312/382-5050 or 312/382-5244

We Love Our Customers

* Illinois residents add 6½% sales tax. All orders must be in U.S. Dollars. We ship to all points in the U.S., CANADA, PUERTO RICO & APO-FPO. Please call for charges outside continental U.S. or C.O.D. MAIL ORDERS enclose cashier check, money order or personal check. Allow 14 days delivery. 2 to 7 for phone orders and 1 day express mail. Prices and availability subject to change without notice. (Monitors only shipped in continental U.S.)

VISA — MASTERCARD — C.O.D.

We Won't Be **UNDERSOLD**

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs

Call before you order, our prices may be lower • Sale prices expire 11-30-87

Complete Apple® Compatible System

Computer, Drive, Monitor, Printer & Software

Sale Price
\$499

List \$1228 (Add \$35.00 shipping.)*



640K
System
Option
\$599

Hi-Speed
NLQ Printer
and
Color Monitor
Options
Available

No One Sells
These Systems
For Less!

- **Laser 128K Computer**
Video, parallel & serial ports included
Runs virtually all Apple II/Ilc/IIe software
- **Hi Res 12" Monochrome Monitor**
- **Big Blue 8½" Printer** with interface and paper
- **Software Package:** word processor, spreadsheet & data entry

Apple® is the registered trademark of Apple Computers, Inc.

Professional IBM® XT Compatible System

Computer, Drive, Monitor, Printer & Software

Sale Price
\$649

List \$2495 (Add \$35.00 shipping.)*



SALE

- **4.77/8 MHz / 512K Super Turbo XT Computer**
Clock/calendar; Parallel, serial and game ports
- **MS DOS 3.2 & G.W. Basic** included
- **Hi-Res 12" Monochrome Monitor**
- **Big Blue 8½" Printer** with interface and paper
- **Software Package:** word processor, spreadsheet & data base

IBM® is the registered trademark of International Business Machines, Inc.

New Commodore® C128D System Sale

Computer, Drive, Monitor & Printer

Sale Price
\$549⁹⁵

List \$825 (Add \$30.00 shipping.)*



Sale

NEW

The Complete System for \$549⁹⁵ Includes:

- **New C128D Computer** with built-in disk drive
- **12" Monochrome Monitor** with connecting cables
- **Big Blue Printer** with interface and 2 rolls of paper

Commodore® is the registered trademark of Commodore Business Machines

5¼" Floppy Disk Sale

Double-Sided • Double-Density



As Low As
24¢ each

100% Certified

Each disk is individually checked.

(Add \$3.00 shipping.)*

Lifetime Free Replacement Warranty

Against failure to perform due to faulty materials or workmanship.

Automatic Dust Remover

Makes sure dust and dirt are constantly removed during operation.

1 Box of 10	\$ 3.90 (39¢ each)
1 Box of 50	\$14.50 (29¢ each)
1 Box of 100	\$24.00 (24¢ each)

Box of 100 comes without disk sleeves.
Paper Economy sleeves 5¢ each.



Call

Call (312) 382-5244

Top #: Commodore & Atari Bottom #: Apple & IBM

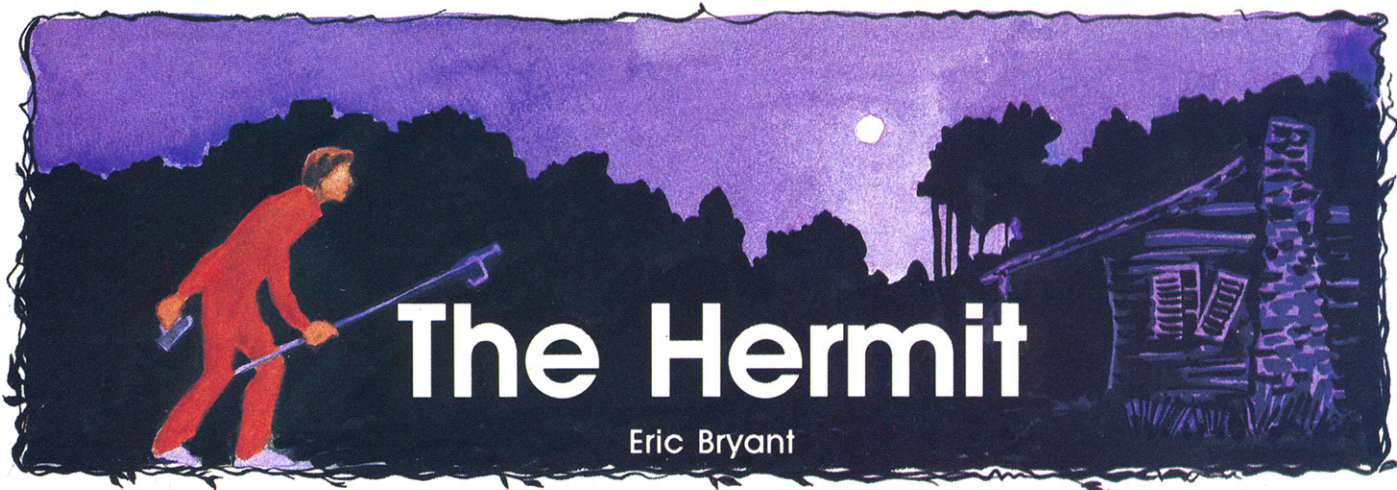
Or (312) 382-5050



Mail

COMPUTER DIRECT

22292 N. Pepper Road
Barrington, IL. 60010



The Hermit

Eric Bryant

Explore hidden caves, discover lost treasures, and battle fierce monsters. "The Hermit," a complex text adventure, begins by placing you outside the underground domain of a most unusual recluse. Versions are included for the Commodore 64, IBM PC/PCjr, Apple II series, Amiga, and Atari 400, 800, XL, and XE. The IBM PC/PCjr version requires BASICA for the PC, GW-BASIC for compatibles, or Cartridge BASIC for the PCjr. The Atari version requires a disk drive.

In a secluded section of southern California (somewhere near Bakersfield), there once lived a nameless man. Referred to only as *the hermit* by his neighbors, rumors spread quickly about the life and possible occupation of this mysterious recluse. Many accused him of stealing, while others claimed he hoarded the riches of extensive gold and diamond mines that were hidden beneath his property. All stories, however, agreed on one fact: The hermit was rich.

The hermit is now deceased, and stories about him have dwindled. His shack, however, still stands. Was the hermit truly rich? Could his riches be somewhere on his property? Is it worth investigating?

The program presented here places you in front of the hermit's old shack—and all you've got is a grappling hook, flare gun, and flare. Your goal is to find ten treasures, to deposit them in a safe place (a spaceship), and to make off with your loot (blast off in the spaceship). As with any adventure program, however, your task is hindered by strange creatures, difficult puzzles, and wrong turns.

Interaction

Program interaction is accomplished with simple one- or two-word commands (see "Command Summary"). In two-word commands, the first word represents the action to be taken (the verb), while the second word represents the object that is to be affected (the noun). Only the first six characters of both the verb and the noun are evaluated. Because of this, you have to enter only the first six characters of any word.

Most commands are self-explanatory. The PUT command, however, is a special case. Because of the two-word limit, the command PUT BALL IN BOX is illegal. To get around this, the PUT command requires two separate inputs. For example, the command PUT BALL IN BOX should be first entered as PUT BALL. Then the computer will ask where you wish to put it; you reply with BOX, and the program performs as instructed.

The commands QUIT and RESTART also require some additional explanation. The QUIT command allows you to exit the program and displays your score and final ranking as an adventurer. Before actually exiting the program, the computer asks you if this is what you really wish to do. The command RESTART starts the adventure all over from the beginning, erasing all your deeds and failures. Again, the computer asks if this really is your intention.

Typing In The Program

Because each version is almost the same, we've published one main program (Program 1) with line changes for specific computers (except for eight-bit Ataris—see be-

low). If you are using a Commodore 64, IBM PC/PCjr, Apple II, or Amiga, type in all of Program 1 and then type in the line changes printed in the separate listing for your computer. Program 2 contains the Commodore 64 line changes; Program 3 lists the changes for the IBM PC/PCjr and compatibles; Program 4 shows the changes necessary for the Apple II series; and Program 5 contains the changes for the Amiga. Be sure to save the complete program before you run it, and be sure the Caps Lock key is activated when running "The Hermit," except when using the Commodore 64 version.

Amiga Notes

Amiga users must enter the following commands from immediate mode (at the OK prompt) prior to entering the program:

```
CLEAR ,25000: CLEAR ,50000&
```

These commands must always be executed prior to entering or running The Hermit.

Amiga users should remember that, unlike most other versions of BASIC, Amiga Basic doesn't use line numbers. In an Amiga Basic program, line numbers are treated as labels; the numeric value of the line number is not significant. That is, if you type in the main program, then type line 20 from Program 5, the added line will not automatically be placed between the existing lines labeled 10 and 30. Instead, the line is added *at the position where it is typed*. When adding the lines from Program 5 to the main program, you must manually position the cursor in the proper spot in the listing before entering each line.

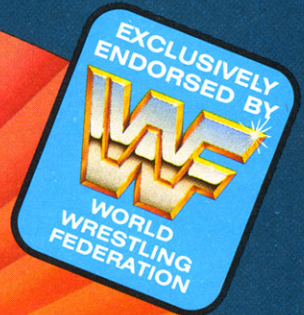
To save time in the future, you may wish to enter and save the

NEW! from Micro League Sports

MICRO LEAGUE *Wrestling*

REAL WWF
STARS
FEATURING
HULK HOGAN!

- ★ Live, bone-crushing matches!
- ★ Your strategy—with authentic moves!
- ★ Ringside commentary, interviews and more!
- ★ Defend The Hulkster's title—or be the bad guy and try to take his title away!



From the team who brought you Micro League Baseball—the exclusive, award-winning game simulation—another exclusive . . .

Micro League and World Wrestling Federation Match Disk!!

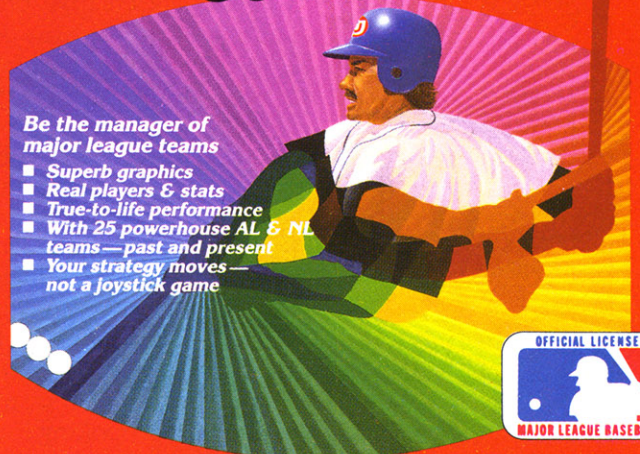
Featuring the Hulkster and some of the WWF's most infamous villains—all in real-life, digitized action.

Strap on Hulk Hogan's Championship belt or put on the bad guy's boots and you make the moves; body slam, leg drop, all the rest!

Take the challenge and step into the squared circle or pace in the dugout. Either way you'll be making all the strategy decisions.

Wrestling Disks available for: Commodore 64/128, Atari ST
Baseball Disks available for: Apple II Series, Commodore 64/128, IBM PC/PC Jr. and compatibles, Atari 65XE/130XE/800/XL.

MICRO LEAGUE *Baseball*



Micro League Sports Association
2201 Drummond Plaza, Newark DE 19711
302-368-9990

Check your software dealer or . . . direct Visa/MC orders call toll free 1-800-PLAYBAL

following program line as a boot program for running The Hermit:

```
CLEAR ,25000:CLEAR ,50000&:RUN
"HERMIT"
```

Now, to run The Hermit, simply run this program. This line assumes that you saved The Hermit program using the file name HERMIT.

Atari Notes

Two separate programs are provided for the eight-bit Atari computers (400, 800, XL, and XE models). If you have one of these computers, type in and save Programs 6 and 7.

Program 6 is the main game program for The Hermit. Before running Program 6 for the first time, you must run Program 7. (You don't need to run Program 7 each time you play the game, run it only before the first time you play.) Program 7 saves important data files to disk. These data files are vital to the adventure. In fact, when you run The Hermit (Program 6), you

should make sure that the disk containing these files is placed in the disk drive. The computer will access these files while you are playing the adventure.

By default, Program 7 creates its data files on the disk found in D1:. By altering the string variable DRIVE\$ in line 20, you can change this. For example, if you own an Atari 130XE, you can set DRIVE\$ equal to "D8:" in order to take advantage of the computer's ramdisk. (If you use the ramdisk, you must run Program 7 before each game to create the necessary data files. Remember that the contents of a ramdisk are lost whenever the computer is turned off.) If the data files are not on the disk in drive 1, you must change line 20 of Program 8 so that the main program knows where to look for its data.

Hints, Tips, And Clues

If you are the type of adventurer who does not need or want help, then read no further. If on the other hand, you find yourself stuck in a seemingly impossible situation, the following paragraphs should be of some assistance.

First, a good rule of thumb in any adventure program is to examine everything—clues may be hidden anywhere. And don't forget to make a map. Making a map of your adventure realm speeds up your journey and decreases your chances of missing any treasures. Also, pick up any object you find. You never know when an object may become useful. Finally, use your imagination. Successfully traversing an adventure takes a lot of creative problem solving.

Now for specific hints: If you are stuck in the hut, push the refrigerator. To take the pouch without falling through the floor, hook the pouch with your grappling hook. Drop the metal rod on the broken piece of track before entering the coal bin. To exit the room containing the pedestal, place the sapphire on top of the pedestal (don't forget to remove the sapphire before you leave).

You may climb the cliff by hooking it with the grappling hook. Build a raft out of logs and vine. Cut the vine from the giant oak. If you lift the mattress in the sunken ship,

you will find a treasure. You may have to dive twice to avoid running out of air.

To avoid the bear, fire your flare at him. Light the mummy. Use the crossbow to shoot the stick at the leopard. If you rub the lamp while in the pentacle room, a demon will appear. Offer the demon the trident (you didn't really want it anyway). Answer the sphinx's question by saying *water*. Enter the door guarded by the dragon statue by putting sand in its mouth. Hit the rock using your pick to get the launch card. And last but not least, drop all treasures in the spaceship before attempting to blast off.

For instructions on entering these programs, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

Program 1: The Hermit—Main Program

```
10 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. - ALL RIGHTS RESERVED
30 PRINT "          ALL RIGHTS RESERVED":PRINT :PRINT :PRINT
40 GOSUB 5640:GOTO 1070
50 A$=INKEY$:IF A$="" THEN 50
60 RETURN
70 IF FNC(24) THEN MC=MC+1:MM=1
80 IF FNC(47) THEN BC=BC+1:BB=1
90 IF FNC(56) THEN DC=DC+1:DD=1
100 IF FNC(67) THEN LC=LC+1:LL=1
110 IF RM>30 AND RM<34 THEN AC=AC-1
120 IF MM THEN PRINT :PRINT "THE MUMMY LUMBERS TOWARD YOU..."
130 IF BB THEN PRINT :PRINT "THE BEAR OPENS HIS ARMS, READY TO EMBRACE YOU."
140 IF DD THEN PRINT :PRINT "THE DEMON TAPS HIS FOOT IMPATIENTLY."
150 IF LL THEN PRINT :PRINT "THE LEOPARD STALKS TOWARD YOU..."
160 IF MC=4 THEN PRINT "THE MUMMY GRABS YOU AND CHOKES YOU TO DEATH.":GOTO 4580
170 IF BC=3 THEN PRINT "THE BEAR EMBRACES YOU. YOU FEEL YOUR RIBS CRACK...."
180 IF AC<3 THEN PRINT "YOU FEEL DIZZY...."
190 IF BC=3 THEN 4580
200 IF DC=4 THEN PRINT QT$;"YOU KNOW WHERE TO REACH ME,":QT$
210 IF DC=4 THEN PRINT "THE DEMON SAYS AND DISAPPEARS.":OL(56)=0:D=0:DC=0:GOTO 410
220 IF LC=3 THEN PRINT "THE LEOPARD POUNCES; THAT IS THE LAST THING YOU SEE...."
230 IF LC=3 THEN 4580
240 IF AC=0 THEN PRINT "YOU RUN OUT OF OXYGEN....":GOTO 4580
250 IF FNC(60) THEN PC=PC+1:SX=1
260 IF SX<>1 OR PC<>1 THEN 320
270 PRINT :PRINT QT$;"WHEN SOLID IT CAN SINK SHIPS;"
280 PRINT "WHEN GAS IT CAN BLOCK THE VIEW;"
290 PRINT "WHEN LIQUID IT CAN WEIGH MANY TONS."
300 PRINT :PRINT "ANSWER MY RIDDLE CORRECTLY AND THOU SHALT LIVE ";
310 PRINT "TO ENJOY THY TREASURES.":QT$
320 IF SX THEN PRINT :PRINT "THE SPHINX IS WAITING PATIENTLY."
330 IF PC<>4 THEN 360
```

Command Summary

One-Word Commands

Command	Abbreviation
NORTH	N
SOUTH	S
EAST	E
WEST	W
UP	U
DOWN	D
DIVE	none
LOOK	L
INVENTORY	I
SCORE	none
RESTART	none
QUIT	Q

Two-Word Commands

Command	Example
ATTACK	ATTACK MUMMY
BUILD	BUILD RAFT
CLOSE	CLOSE BOX
CUT	CUT VINE
DRINK	DRINK ELIXIR
DROP	DROP LANTERN
ENTER	ENTER RAFT
EXAMINE	EXAMINE PEDESTAL
EXIT	EXIT RAFT
FILL	FILL LANTERN
HIT	HIT TREE
HOOK	HOOK CLIFF
LIFT	LIFT MATTRESS
LIGHT	LIGHT LANTERN
OFFER	OFFER TRIDENT
OPEN	OPEN BOX
PUSH	PUSH REFRIGERATOR
PUT	PUT FLARE (then enter) GUN
READ	READ SIGN
RUB	RUB LAMP
SAY	SAY HELLO
SHOOT	SHOOT FLARE
TAKE	TAKE LANTERN

FREE ACCESS. FREE CONNECT TIME. FREE RUN OF THE STORE.

Sign on for savings with America's largest electronic shopping service.



Clip out this ad. Mark the date on your calendar. For one day only, Saturday, November 28, you can have free run of the store, during Comp-u-store OnLine's Annual Open House. Not only will you receive *free* membership access (a \$25 value) and one hour of *free* connect time (a \$6 value), but you can order

any of our more than 250,000 name-brand products at guaranteed savings of up to 50%.*

Special Open House membership offer.



Sony, Panasonic and Blaupunkt. GE, Nikon and Canon. Even IBM and Apple are coming to our Open House. In fact, products from virtually every name-brand manufacturer are available at discount prices *every day* through Comp-u-store OnLine. Until November 30, if not already a member, you can receive a special six-month membership for only \$1* (that's a \$12.50 value). Sign up for this limited-time offer during our Open House or call 1-800-843-7777.

Win a \$1,000 shopping spree!

Signing on is free and easy. Just follow the directions at right. There is absolutely *no obligation* to buy or join—just spend the hour browsing for holiday bargains, if you wish. Everyone who signs on is also eligible to win a free one-year membership and \$1,000 Comp-u-store OnLine shopping spree in our Open House drawing!



OPEN HOUSE

Saturday, November 28, 1987
Midnight to midnight.

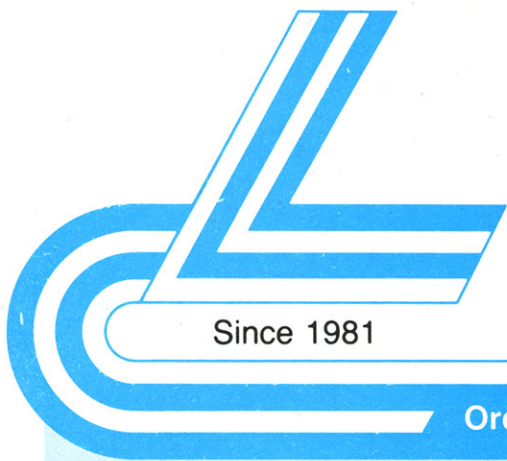
Directions:

1. Set your modem to dial the local CompuServe or Tymnet number for online access. (If unsure of the correct number, call us at 1-800-843-7777 for assistance.)
2. When using a CompuServe number:
Once connected, press the carriage return key.
At HOST NAME:, enter CUCOL
At UIC:, enter SHOP

When using a Tymnet number:
Once connected, enter the letter A and press carriage return.
At PLEASE LOG IN:, enter CUCOL
At PASSWORD:, enter CUCSAVE
3. You've now accessed Comp-u-store OnLine!
At USER NAME:, enter ONLINE
At PASSWORD:, enter DIRECT_SAVE
At MEMBERSHIP #:, enter 2570
At ACCESS CODE:, enter 366359

compu**store**[®]
OnLine

*For price policy and billing information, see Terms and Conditions when you log on.



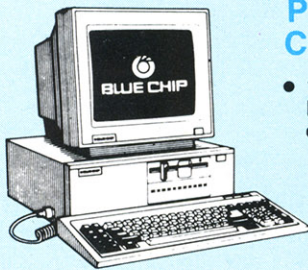
Since 1981

Lycos Computer Marketing & Consultants

Order processed within 24 hours.

BLUE CHIP

PERSONAL COMPUTER



- 100% IBM PC/XT compatible!

\$499⁹⁵

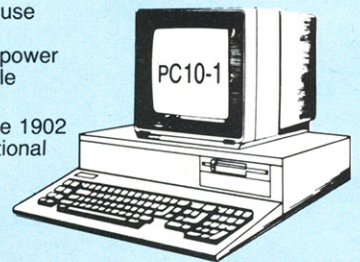
(Green, amber & color monitors available)

PC COMPATIBLE HARDWARE

PC 5 1/4 Drive	\$119
MS DOS + Basic Soft	\$59
BCM 12G Gr. Monitor	\$79
BCM 12A Am. Monitor	\$89
BCM 14C Color RGB Monitor	\$269
BCC CG Color Card	\$94.99
Avatex Graphics Card	\$169
Zuckerboard	\$CALL
Imege Bernoulli	\$CALL
Hercules	\$CALL
AST	\$CALL

COMMODORE PC 10-1

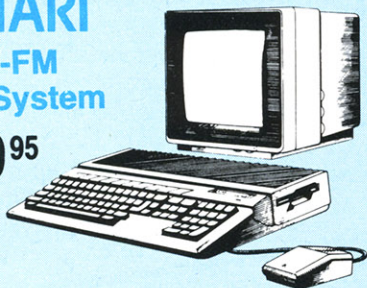
- A ready-to-use package of computing power and versatile graphics!
- Commodore 1902 monitor optional



\$489⁰⁰

ATARI 520 ST-FM Color System

\$599⁹⁵



Seagate HARD DRIVES

20 meg kit	\$275.95*
30 meg kit	\$315.95*
40 meg kit	\$489.95*

*Drives include controller

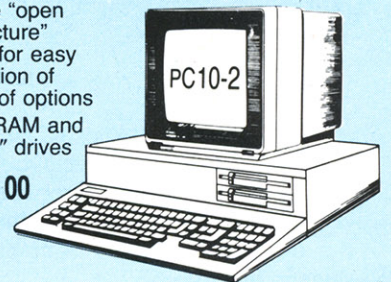
40 meg w/o controller	\$425.95
-----------------------------	----------

COMMODORE HARDWARE

1541 C Disk Drive	\$168.95
1571 Disk Drive	\$219.95
1581 Disk Drive	\$LOWEST
Indus GT C-64 Drive	\$169.95
Blue Chip 64C Drive	\$CALL
Blue Chip C 128 Drive	\$CALL
1802C Monitor	\$189.95
2002 Monitor	\$239.95
1901 Monitor	\$CALL
64 C Computer	\$149.95
128D Computer/Drive	\$449.95
1670 Modem	\$CALL
C-1351 Mouse	\$32.95
1700 RAM	\$109.95
C-1750 RAM	\$169.95
1764 RAM C64	\$124.95

COMMODORE PC 10-2

- Flexible "open architecture" design for easy installation of variety of options
- 640 K RAM and two 5 1/4" drives

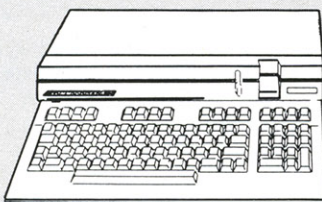


\$589⁰⁰

COMMODORE

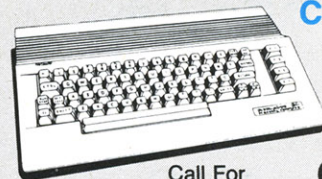
128 D System

\$449⁹⁵



Commodore 128D Plus
Thomson 4120 Monitor...\$659.95

COMMODORE 64C Computer

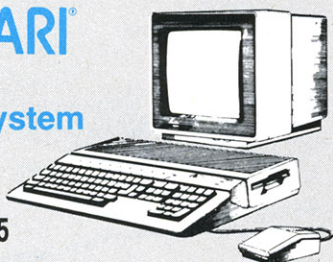


Call For
November Special!

\$149⁹⁵

ATARI 1040 ST Color System

\$799⁹⁵



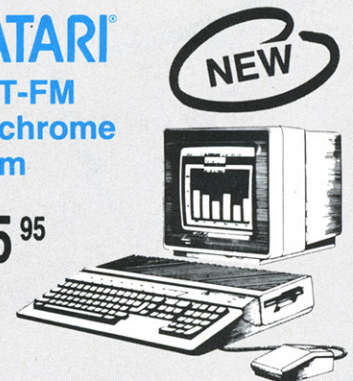
ATARI HARDWARE

520 ST FM Mono	\$475.95
520 ST FM Color	\$599.95
1040 ST Mono	\$665.95
1040 ST Color	\$799.95
130XE Computer	\$125
SX551 Drive	\$179.95
SF 314 Disk Drive	\$199.95
SF 354 Disk Drive	\$119.95
Indus GT Atari Drive	\$175.95
SHD 204 20 MEG Drive	\$569.95
XM301 Modem	\$42.95
SX212 Modem	\$89.95
GTS 100 (3.5" DSDD ST)	\$195.95

ATARI 520 ST-FM Monochrome System

\$475⁹⁵

Internal
drive
included

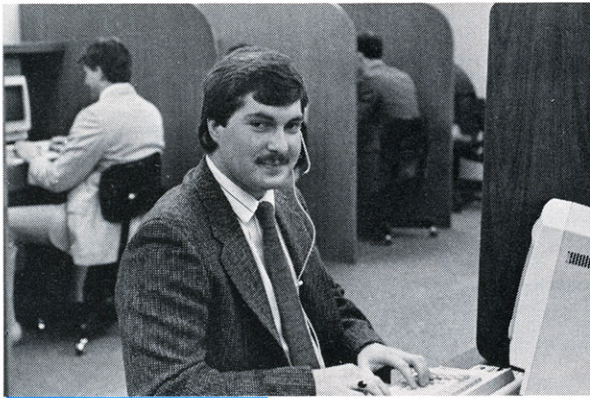


1-800-233-8760

Lycy Means Total Service.

ATARI

ATARI



Mark "Mac" Bowser,
Sales Manager

I would personally like to thank all of our past customers for helping to make Lycy Computer one of the largest mail order companies and a leader in the industry. Also, I would like to extend my personal invitation to all computer enthusiasts who have not experienced the services that we provide. Please call our trained

Call Lycy

sales staff at our toll free number to inquire about our diverse product line and weekly specials.

First and foremost our philosophy is to keep abreast of the changing market so that we can provide you with not only factory-fresh merchandise but also the newest models offered by the manufacturers at the absolute best possible prices. And we offer the widest selection of computer hardware, software and accessories.

Feel free to call Lycy if you want to know more about a particular item. I can't stress enough that our toll-free number is not just for orders. Many companies have a toll-free number for ordering, but if you just want to ask a question about a product, you have to make a toll call. Not at Lycy. Our trained sales staff is knowledgeable about all the products we stock and is happy to answer any questions you may have. We will do our best to make sure that the product you select will fit your application. We also have Saturday hours — one more reason to call us for all your computer needs.

Once you've placed your order with Lycy, we don't forget about you. Our friendly, professional customer service representatives will find answers to your questions

about the status of an order, warranties, product availability, or prices.

Lycy Computer stocks a multimillion dollar inventory of factory-fresh merchandise. Chances are we have exactly what you want right in our warehouse. And that means you'll get it fast. In fact, orders are normally shipped within 24 hours. Free shipping on prepaid cash orders over \$50, and there is no deposit required on

C.O.D. orders. Air freight or UPS Blue/Red Label shipping is available, too. And all products carry the full manufacturers' warranties.

I can't see why anyone would shop anywhere else. Selection from our huge in-stock inventory, best price, service that can't be beat — we've got it all here at Lycy Computer.

TO ORDER, CALL TOLL-FREE: 1-800-233-8760

New PA Wats: 1-800-233-8760

Outside Continental US Call: **1-717-494-1030**

Hours: 9AM to 8PM, Mon. - Thurs.

9AM to 6PM, Friday — 10AM to 6PM, Saturday

For Customer Service, call 1-717-494-1670,
9AM to 5PM, Mon. - Fri.

Or write: Lycy Computer, Inc.

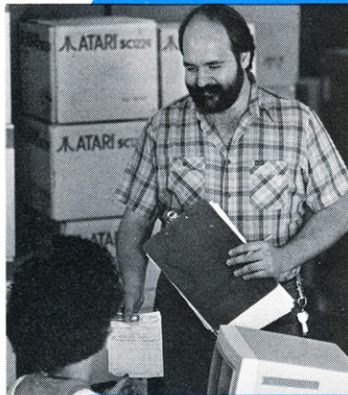
P.O. Box 5088, Jersey Shore, PA 17740



Risk-Free Policy: • full manufacturers' warranties • no sales tax outside PA
• prices show 4% cash discount; add 4% for credit cards • APO, FPO, international: add \$5 plus 3% for priority • 4-week clearance on personal checks
• we check for credit card theft • compatibility not guaranteed • return authorization required • price/availability subject to change

Attention Educational Institutions:

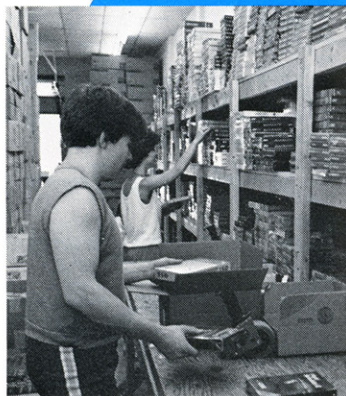
If you are not currently using our educational service program, please call our representatives for details.



Order Now



Here's How



Access:	
Leader Board	\$22.95
Tournament #1	\$11.95
Triple Pack	\$11.95

Activision:	
Hacker	\$8.95
Hitch Hikers	\$13.95
Leather Goddesses	\$19.95
Moonmist	\$19.95
Music Studio	\$19.95
Stationfall	\$19.95
Lurking Horror	\$19.95

Broderbund:	
Print Shop	\$25.49
Print Shop Compan.	\$22.95
Graphic Lib. I, II, III	\$13.49
Karateka	\$12.95
Bank St. Writer	\$27.95

Firebird:	
The Pawn	\$22.95

Microleague:	
Microleag. Baseball	\$22.95
General Manager	\$16.95
Stat Disk	\$13.95
'86 Team Disk	\$11.95

Microprose:	
Conflict in Vietnam	\$22.95
F-15 Strike Eagle	\$19.95
Kennedy Approach	\$13.95
Silent Service	\$19.95
Top Gunner	\$13.95

Optimized Systems:	
Action	\$44.95
Action Tool Kit	\$16.95
Basic XE	\$44.95
Basic XL	\$33.95
Basic XL Tool Kit	\$16.95
Mac 65	\$44.95
Mac 65 Tool Kit	\$16.95

Strategic Simulations:	
Battle of Antietam	\$28.95
Battlecruiser	\$33.95
Nam	\$22.95
Phantasia	\$22.95
Wargame Construc.	\$16.95
Warship	\$33.95
Wizards Crown	\$22.95

Sublogic:	
Flight Simulator II	\$31.49
Night Mission Pinball ...	\$18.95
Scenery #1-#6 ea.	\$12.95
Scenery #7	\$14.95

ATARI ST

Access:	
Leader Board	\$22.95
Tournament #1	\$11.95
10th Frame	\$22.95

Activision:	
Champion. Baseball	\$22.95
Champion. Basketball	\$22.95
Championship Golf	\$New
GFL Football	\$22.95
Hacker 2	\$22.95
Leather Goddesses	\$22.95
Moonmist	\$22.95
Music Studio	\$27.95
Paint Works	\$22.95
Shanghai	\$22.95
Bureaucracy	\$22.95
Stationfall	\$22.95
Lurking Horror	\$22.95
Top Fuel	\$19.95

Broderbund:	
Karateka	\$CALL
Epyx:	
Sub Battle Simulator ...	\$22.95

World Games ..
Wrestling

Winter Games ..

Firebird:

Pawn

Starglider

Golden Path ...

Guild of Thieves ..

Tracker

Microleague:

Microleague Ba ..

General Manag ..

Microprose:

Silent Service ..

F-15 Strike Eag ..

Optimized Sys:

Personal Pasca ..

Personal Prolog ..

Strategic Simu:

Phantasia

Phantasia II

Road War 2000 ..

Colonial Conqu ..

Sublogic:

Flight Simulator ..

Scenery Disk ..

Unison World:

Art Gallery 1 or ..

Print Master

Fonts & Border ..

COMM

Access:

Leader Board ..

Mach 5

Mach - 128

10th Frame

Triple Pack

Wild. Cl. Leader ..

Famous Course ..

Famous Course ..

Action Soft:

Up Periscope ..

Thunder Chopp ..

Activision:

Aliens

Champion. Bas ..

Hacker

Hacker 2

Labyrinth

Music Studio

Tass Times

Titanic

Leather Goddess ..

Stationfall

Lurking Horror ..

Top Fuel Elim

Berkeley Softw:

Geos

Deskpak I

Fontpak I

Geodex

Geofile

Writers Worksh ..

Geo Calc

Broderbund:

Bank St. Writ ..

Carmen San D ..

Graphic Lib. I ..

Karateka

Print Shop

Print Shop Con ..

Print Shop Pap ..

Epyx:

Create A Calen ..

Destroyer

Free ship



\$22.95	Fastload	\$19.95
\$22.95	Football	\$11.95
\$22.95	Movie Monster	\$11.95
	Sub Battle	\$22.95
\$25.95	Winter Games	\$22.95
\$25.95	California Games	\$22.95
\$25.95	Super Cycle	\$11.95
\$25.95	Graphics Scrapbook	\$11.95
\$25.95	Str. Sports Basketball	\$22.95
\$25.95	Wld.'s Great Baseball	\$11.95
	Summer Games II	\$22.95
	Vorpol Utility Kit	\$11.95
	World Games	\$22.95
	Firebird:	
	Colossus Chess IV	\$19.95
	Elite	\$18.95
	Golden Path	\$22.95
	Guild of Thieves	\$22.95
	Pawn	\$22.95
	Talking Teacher	\$22.95
	Tracker	\$22.95
	Starglider	\$22.95
	Sentry	\$22.95
	Learning Company:	
	Reader Rabbit	\$14.95
	Magic Spells	\$14.95
	Gertrude's Secrets	\$11.95
	Rocky's Boots	\$11.95
	Microleague:	
	Microleag. Baseball	\$22.95
	General Manager	\$16.95
	Stat Disk	\$13.95
	'86 Team Disk	\$11.95
	Microleag. Wrestling	\$New
	Microprose:	
	F-15 Strike Eagle	\$19.95
	Gunship	\$19.95
	Kennedy Approach	\$13.95
	Silent Service	\$19.95
	Solo Flight	\$13.95
	Top Gunner	\$13.95
	Springboard:	
	Newsroom	\$29.95
	Certificate Maker	\$29.95
	Clip Art Vol. #1	\$17.95
	Clip Art Vol. #2	\$23.95
	Clip Art Vol. #3	\$17.95
	Graphics Expander	\$21.95
	Strategic Simulations:	
	Gemstone Healer	\$16.95
	Gettysburg	\$33.95
	Kampfgruppe	\$33.95
	Phantasie II	\$22.95
	Phantasie III	\$22.95
	Ring of Zelfin	\$22.95
	Road War 2000	\$22.95
	Shard of Spring	\$22.95
	Wizards Crown	\$22.95
	War in the S. Pacific	\$33.95
	Wargame Constr.	\$16.95
	Battlecruiser	\$33.95
	Gemstone Warrior	\$7.95
	Battle of Antetiem	\$28.95
	Colonial Conquest	\$22.95
	Computer Ambush	\$33.95
	B-24	\$19.95
	Sublogic:	
	Flight Simulator II	\$31.49
	Jet Simulator	\$24.95
	Night Mission Pinball	\$18.95
	Scenery Disk 1-6	\$12.95
	Timeworks:	
	Partner C64	\$24.95
	Partner 128	\$39.95
	Swift Calc 128	\$29.95
	Wordwriter 128	\$29.95
	Unison World:	
	Art Gallery 1 or 2	\$14.95
	Print Master	\$17.95

Access:	
Triple Pack	\$11.95
World Class Leader	
Board	\$23.95
Famous Courses	\$11.95
Activision:	
Zork Trilogy	\$39.95
Game Maker	\$29.95
Leather Goddesses	\$22.95
Term Paper	\$29.95
Champ. Baseball	\$22.95
Champ. Basketball	\$22.95
Championship Golf	\$New
GFL Football	\$22.95
Top Fuel Eliminator	\$19.95
Broderbund:	
Airheart	\$22.95
Print Shop	\$26.95
Print Shop Comp.	\$22.95
Carmen S. Diego (USA)	\$22.95
On Balance	\$56.95
Bank St. Writer +	\$44.95
Epyx:	
Create A Calendar	\$15.95
Destroyer	\$22.95
Movie Monster	\$11.95
St. Sports Basketball	\$22.95
Sub Battle Simulator	\$22.95
Winter Games	\$22.95
World Games	\$22.95
Wrestling	\$22.95
Firebird:	
Colossus IV Chess	\$22.95
Elite	\$19.95
The Pawn	\$25.95
Starglider	\$25.95
Learning Company:	
Think Quick	\$19.95
Reader Rabbit	\$22.95
Math Rabbit	\$22.95
Writer Rabbit	\$22.95
Magic Spells	\$19.95
Microleague:	
Microleag. Baseball	\$22.95
General Manager	\$16.95
Stat Disk	\$11.95
'86 Team Disk	\$11.95
Microprose:	
Crusade in Europe	\$22.95
Decision in Desert	\$22.95
F-15 Strike Eagle	\$19.95
Silent Service	\$19.95
Strategic Simulations:	
Battlecruiser	\$33.95
Colonial Conquest	\$22.95
Gettysburg	\$33.95
Phantasie III	\$22.95
Realms of Darkness	\$22.95
Shard of Spring	\$22.95
Wizards Crown	\$22.95
Eternal Dagger	\$22.95
Shiloh	\$NEW
Sublogic:	
Flight Simulator II	\$30.95
Jet Simulator	\$24.95
Night Mission Pinball	\$21.95
Scenery #1-# ea.	\$12.95
Unison World:	
Art Gallery 2	\$14.95
Print Master	\$19.95
Access:	
Leader Board	\$22.95
Tournament #1	\$11.95
Activision:	
Champ. Basketball	\$25.95

Championship Golf	\$22.95
GFL Football	\$25.95
Hacker	\$13.95
Hacker 2	\$22.95
Music Studio	\$27.95
Tass Times	\$22.95
Epyx:	
Aphai Trilogy	\$11.95
Rogue	\$22.95
Winter Games	\$22.95
World Games	\$22.95
Firebird:	
Guild of Thieves	\$25.95
Pawn	\$25.95
Starglider	\$25.95
Microprose:	
Silent Service	\$22.95
Sublogic:	
Flight Simulator II	\$31.49
Jet Simulator	\$31.49
Scenery Disk	\$CALL
Unison World:	
Print Master	\$19.95
Art Gallery 1 or 2	\$14.95
Fonts & Borders	\$17.95

Strategic Simulations:	
Road War 2000	\$22.95
Kampfgruppe	\$33.95
Shard of Spring	\$22.95
Battle of Antetiem	\$33.95
Computer Baseball	\$7.95
Gettysburg	\$33.95
Wizards Crown	\$22.95
Chickamauga	\$33.95
Sublogic:	
Jet Simulator	\$31.49
Scenery Japan	\$17.95
Scenery San Fran.	\$17.95
Scenery #1-#6	\$64.95
Flight Simulator	\$34.95
Timeworks:	
Swiftcalc	\$39.95
Wordwriter	\$34.95
Unison World:	
Art Gallery 2	\$14.95
News Master	\$49.95
Print Master (+)	\$29.95
Fonts & Borders	\$17.95



Diskettes

5-1/4	
Maxell:	
SSDD	\$7.95
DSDD	\$8.95
Bonus:	
SSDD	\$5.95
DSDD	\$6.95
SKC:	
DSDD	\$6.95
DSDH	\$13.95
Generic DSDD	\$4.95
Verbatim:	
SSDD	\$8.99
DSDD	\$11.50
3.5	
Maxell:	
SSDD	\$11.50
DSDD	\$17.95
Verbatim:	
SSDD	\$14.50
DSDD	\$20.95
SKC:	
SSDD	\$11.95
DSDD	\$13.99
Generic SSDD	\$11.50
Generic DSDD	\$12.95



Access:	
Leader Board	\$22.95
Tournament #1	\$11.95
Activision:	
Champ. Basketball	\$25.95

Joysticks

Tac 3	\$8.95
Tac 2	\$8.95
Tac 5	\$11.95
Tac 1 + IBM/AP	\$17.95
Economy	\$4.49
Slik Stick	\$4.95
Black Max	\$7.95
Boss	\$10.95
3-Way	\$17.95
Bathandle	\$14.95
500XJ	\$10.95
500XJ-Apple/PC	\$21.95
Winner 909	\$19.95
Wico IBM/AP	\$19.95
Contriver Joystick Bd.	\$29.95

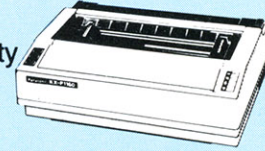
Price Guarantee

Since 1981, we have led the industry by continuing to offer the lowest national prices while providing quality service. Many companies have come and gone trying to imitate our quality and service. If by some oversight we do not have the lowest prices advertised on the products you desire, then we would appreciate the opportunity to rectify this oversight.

New 1080i Model II

- Now 150 cps Draft Mode
- NLQ Mode
- Friction & Tractor Feed
- 2-Year Warranty

Panasonic 1080i Model II



\$159⁹⁵

Monitors

Modems

Thomson:

230 Amber TTL/12"	\$85
450 Amber TTL/15"	\$149
980 White TTL/20"	\$695
4120 CGA	\$225.95
4160 CGA	\$289
4460 EGA	\$359
4375 UltraScan	\$525

Panasonic:

1320	\$369
1361	\$459

Zenith:

ZVM 1220	\$89
ZVM 1230	\$89

NEC:

Multisync	\$549
-----------------	-------

THOMSON 4120 Monitor

- 14" RGBI/video composite/analog
- Compatible with IBM and Commodore
- RGB data cable included

\$225⁹⁵

Avatec:

1200i PC Card	\$99
1200hc Modem	\$99.95
2400	\$219
2400i PC Card	\$CALL

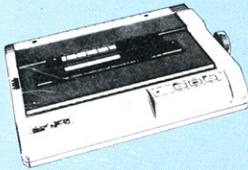
Hayes:

Smartmodem 300	\$125
Smartmodem 1200	\$369
Smartmodem 2400	\$559

Wide Carriage Special

star
MICROFONICS, INC.

NX 15



- 120 cps Draft
- EZ Front Panel Selection
- Full 15" Carriage
- NLQ Mode

\$279⁹⁵

EXCELLENT VALUE

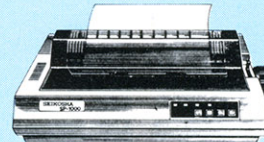
(Limited Quantity)

Great Performance Great Price

SEIKOSHA SP 180Ai

- 100 cps draft
- 20 cps NLQ
- direct connect for Commodore

\$124⁹⁵



PRINTERS

SEIKOSHA

SP 180Ai	\$124.95
SP 180VC	\$124.95
SP 1000VC	\$135.95
SP 1200VC	\$144.95
SP 1200Ai	\$155.95
SP 1200AS RS232	\$155.95
SL 80Ai	\$295.95
MP1300Ai	\$299.95
MP5300Ai	\$375.95
MP5420Ai	\$879.95
SP Series Ribbon	\$7.95
SK3000 Ai	\$349
SK3005 Ai	\$429

star
MICROFONICS, INC.

NP-10	SPECIAL
NX-10	SPECIAL
NX-10C w/interface	\$165.95
NL-10	\$195.95
NX-15	\$279.95
ND-10	\$249.95
ND-15	\$375.95
NR-15	\$409.95
NB-15	\$699.95
NB24-10	\$409.95
NB24-15	\$549.95
SD-10	\$229
SD-15	\$345
SR-10	\$369
SR-15	\$429

EPSON

LX800	\$175.95
FX86E	\$289.95
FX286E	\$429.95
EX800	\$374.95
EX1000	\$509.95
LQ800	\$369.95
LQ1000	\$549.95
LQ2500	\$849.95
GQ3500	\$LOW
LQ850	\$499.95
LQ1050	\$679.95

Panasonic

1080i Model II	\$159.95
1091i Model II	\$179.95
1092i	\$295
1592	\$379
1595	\$419
3131	\$259
3151	\$399
KXP 4450 Laser	\$CALL
1524 24 Pin	\$549.95

SILVER REED

EXP 420P	\$199
EXP 600P	\$499
EXP 800P	\$649

BROTHER

M1109	\$195
M1409	\$299
M1509	\$365
M1709	\$475
Twinwriter 6 Dot & Daisy	\$899
M1724L	\$CALL
HR20	\$339
HR40	\$569
HR60	\$709.95

Toshiba

321SL	\$529
341 SL	\$CALL
P351 Model II	\$949

DIABLO

D25	\$499.95
635	\$779.95

OKIDATA

Okimate 20	\$119
Okimate 20 w/cart	\$179.95
120	\$189.95
180	\$219.95
182	\$229.95
192+	\$309.95
193+	\$449.95
292 w/interface	\$449.95
293 w/interface	\$589.95
294 w/interface	\$839.95
393	\$989.95

CITIZEN

120 D	\$164.95
MSP-10	\$259.95
MSP-20	\$289.95
MSP-15	\$324.95
MSP-25	\$389.95
MSP-50	\$375
MSP-55	\$CALL
Premiere 35	\$464.95
Tribute 224	\$624.95

Join the thousands who shop Lyco and Save!

```

340 PRINT "THE SPHINX POUNCES; HIS
CLAWS EAGERLY AWAITING YOUR THR
OAT...."
350 GOTO 450
360 IF RM<31 OR RM>33 THEN 390
370 IF OL(14)=-5 AND FNA(11) AND OO
(4)=1 THEN OL(14)=0
380 IF OL(15)=-6 AND FNA(12) AND OO
(5)=1 THEN OL(15)=0
390 IF IR THEN OL(63)=RM
400 RETURN
410 GOSUB 70:Y=0:VP=0:MV=MV+1
420 PRINT :IN$="":VB$="":NN$="":ZL=
0:QI=37:X=0:VB=0:NN=0:V=0
430 PRINT ">";
440 PRINT UL$:CL$;
450 GOSUB 50:IF (A$<" " OR A$>CHR$(
95) OR A$=QT$) AND A$<>DL$ AND
A$<>CR$ THEN 450
460 IF A$=DL$ AND ZL>0 THEN IN$=MID
$(IN$,1,ZL-1):ZL=ZL-1:PRINT " "
;CL$:CL$;GOTO 440
470 IF A$=CR$ AND ZL>0 THEN PRINT "
":PRINT :GOTO 500
480 IF A$<>CR$ AND A$<>DL$ AND ZL<Q
I THEN IN$=IN$+A$:ZL=ZL+1:PRINT
A$:GOTO 440
490 GOTO 450
500 IF QQ=1 OR RS=1 THEN RETURN
510 L=LEN(IN$):FOR I=1 TO L:A$=MID$(
IN$,I,1):IF A$<>" " THEN 540
520 IF NN$<>" " THEN PRINT "ONE OR T
WO WORDS PLEASE.":GOTO 420
530 X=1:GOTO 560
540 IF X=0 THEN VB$=VB$+A$:GOTO 560
550 NN$=NN$+A$
560 NEXT I:VB$=LEFT$(VB$,6):NN$=LEF
T$(NN$,6)
570 FOR I=1 TO 44:IF VB$=LEFT$(VW$(
I),6) THEN VB=I:VP=0:GOTO 600
580 NEXT I:IF VP THEN NN$=VB$:GOTO
600
590 IF VB=0 THEN PRINT "I DO NOT KN
OW THAT VERB.":GOTO 420
600 FOR I=1 TO 68:IF NN$=LEFT$(NW$(
I),6) THEN NN=I:GOTO 630
610 NEXT I:IF NN=0 AND VB<>17 THEN
PRINT "I DO NOT KNOW THE WORD "
;QT$;
620 IF NN=0 AND VB<>17 THEN PRINT N
N$:QT$;":":VP=0:GOTO 420
630 IF VB>12 AND VB<36 AND NN=68 TH
EN PRINT VB$;" WHAT?":GOTO 420
640 IF VP THEN RETURN
650 IF (VB<13 OR VB>35) AND NN<>68
THEN PRINT "JUST ";VW$(VB);" PL
EASE.":GOTO 420
660 ON VB GOTO 720,720,790,790,880,
880,920,920,1000
670 ON VB-9 GOTO 1000,1030,1030,149
0,1690,1840,2160,2250,2310
680 ON VB-18 GOTO 2460,2550,2690,28
20,2890,3100,3280,3380,3710
690 ON VB-27 GOTO 3790,3900,3990,40
50,4090,4140,4200,4240,4320
700 ON VB-36 GOTO 4320,4380,4380,45
20,4540,1070,1070,4550
710 PRINT "YOU CANNOT GO IN THAT DI
RECTION.":GOTO 410
720 IF MV(RM,1)=0 THEN 710
730 IF BB THEN BB=0:BC=0:PRINT "YOU
RUN FROM THE BEAR....":PRINT
740 IF LL THEN LL=0:LC=0:PRINT "YOU
FLEE FROM THE LEOPARD....":PRI
NT
750 IF FNC(60) THEN 340
760 IF RM=19 THEN PRINT "THE SOUTH
DOOR CLOSES BEHIND YOU....":PRI
NT :MV(18,2)=0
770 IF IR AND (RM=21) THEN PRINT "F
IRST, YOU MUST EXIT THE RAFT.":
GOTO 420
780 RM=MV(RM,1):GOTO 1070
790 IF MV(RM,2)=0 THEN 710
800 IF FNC(47) THEN PRINT "THE BEAR
STOPS YOU.":GOTO 410
810 IF FNC(67) THEN PRINT "THE BLAC
K LEOPARD STOPS YOU.":GOTO 410
820 IF IR AND (RM=34) THEN PRINT "F
IRST, YOU MUST EXIT THE RAFT.":
GOTO 410
830 IF RM=55 AND TW=1 THEN PRINT "A
S YOU ENTER THE ARCHWAY, A JET
OF"
840 IF RM=55 AND TW=1 THEN PRINT "F
IRE COMES FROM THE DRAGON'S MOU
TH AND"
850 IF RM=55 AND TW=1 THEN PRINT "E
NGULFS YOU.":GOTO 450
860 IF MM THEN MM=0:MC=0:PRINT "YOU
FLEE FROM THE LUMBERING MUMMY.
...":PRINT
870 RM=MV(RM,2):GOTO 1070
880 IF MV(RM,3)=0 THEN 710
890 IF FNC(67) THEN PRINT "THE BLAC
K LEOPARD STOPS YOU.":GOTO 410
900 IF IR AND (RM<27) THEN PRINT "F
IRST, YOU MUST EXIT THE RAFT.":
GOTO 410
910 RM=MV(RM,3):GOTO 1070
920 IF MV(RM,4)=0 THEN 710
930 IF FNC(67) THEN PRINT "THE BLAC
K LEOPARD STOPS YOU.":GOTO 410
940 IF IR=1 AND (RM<27 OR RM>30) TH
EN PRINT "FIRST, YOU MUST EXIT
THE RAFT.":GOTO 410
950 IF RM=30 THEN PRINT "THAT WAY L
EADS TO THE OCEAN; YOU TURN B
ACK.":GOTO 410
960 IF MM THEN MM=0:MC=0:PRINT "YOU
FLEE FROM THE LUMBERING MUMMY.
...":PRINT
970 IF DD THEN DD=0
980 IF RM=29 AND IR=0 THEN PRINT "Y
OU CANNOT SWIM THAT FAR.":GOTO
410
990 RM=MV(RM,4):GOTO 1070
1000 IF MV(RM,5)=0 THEN 710
1010 IF RM=31 THEN PRINT "YOU RETUR
N TO THE SURFACE FOR AIR.":PRI
NT :AC=10
1020 RM=MV(RM,5):GOTO 1070
1030 IF MV(RM,6)=0 THEN 710
1040 IF RM=4 THEN PRINT "AS YOU DES
CEND, THE TUNNEL CAVES IN FROM
ABOVE.":PRINT
1050 IF RM=4 THEN SC=SC+5
1060 RM=MV(RM,6):GOTO 1070
1070 IF RM>36 AND RM<39 AND LT=0 TH
EN PRINT "YOU ARE IN TOTAL DAR
KNESS.":GOTO 410
1080 PRINT "YOU ARE "+RD$(RM)+"."
1090 IF RM=18 THEN PRINT "LIGHT SHI
NES THROUGH A CRACK BETWEEN
SOME BEAMS."
1100 IF HC AND (RM=14) THEN PRINT "
THERE IS A ROPE TO ASCEND THE
CLIFF HERE."
1110 IF HC AND (RM=20) THEN PRINT "
THERE IS A ROPE TO DESCEND THE
CLIFF HERE."
1120 IF IR THEN PRINT "YOU ARE ABOA
RD A WOODEN RAFT."
1130 FOR X=1 TO 67:IF FNC(X) THEN 1
170
1140 NEXT X
1150 IF SB AND RM=8 THEN PRINT "SMA
SHED AGAINST THE WALL IS A COA
L BIN."
1160 GOTO 1410
1170 FL$=LEFT$(OB$(X),1)
1180 IF FL$="*" THEN FL$=MID$(OB$(X
),2,1)
1190 FOR Y=1 TO 5:IF FL$=MID$(VL$,Y
,1) THEN A$="AN ":GOTO 1230
1200 NEXT Y
1210 A$="A "
1220 IF X=15 OR X=31 OR X=45 THEN A
$="SOME "
1230 IF RF=1 THEN RETURN
1240 PRINT "THERE IS "+A$+OB$(X)+"
HERE."
1250 GOSUB 1260:GOTO 1140
1260 FOR Y=1 TO 11:IF X=PO(Y) THEN
RF=1:GOTO 1280
1270 NEXT Y:RETURN
1280 IF OO(Y)=0 THEN RF=0:RETURN
1290 Z=X:W=Y
1300 FOR I=1 TO 66:IF OL(I)=PV(W) T
HEN 1330
1310 NEXT I
1320 RF=0:RETURN
1330 IF Y=1 OR Y=10 THEN 1390
1340 IF Y=7 OR Y=8 THEN 1400
1350 PRINT " THE ";OB$(Z);" CONTAIN
S:"
1360 FOR X=1 TO 66:IF OL(X)=PV(W) T
HEN GOSUB 1170:PRINT " ";A$;O
B$(X)
1370 NEXT X
1380 X=Z:Y=W:RF=0:RETURN
1390 PRINT " ON THE ";OB$(Z);" THER
E IS":GOTO 1360
1400 PRINT " LOADED INTO THE ";OB$(
Z);" THERE IS":GOTO 1360
1410 FOR X=1 TO 6:IF MV(RM,X)>0 THE
N V=V+1
1420 NEXT X
1430 IF V=0 THEN 410
1440 PRINT :PRINT "YOU FIND THAT TH
ERE ";
1450 IF V>1 THEN PRINT "ARE EXITS "
:GOTO 1470
1460 PRINT "IS AN EXIT ";
1470 FOR X=1 TO 6:IF MV(RM,X)>0 THE
N PRINT DR$(X);" ";
1480 NEXT X:PRINT CL$:CL$;".":GOTO
410
1490 IF OL(NN)<-1 AND OL(NN)>-13 TH
EN 1590
1500 IF FNA(NN) THEN PRINT "YOU ALR
EADY HAVE THAT.":GOTO 410
1510 IF (NN=7) AND FNC(66) THEN 168
0
1520 IF (NN=39) AND HC AND (RM=14)
THEN HC=0:MV(14,5)=0:MV(20,6)=
0:GOTO 1580
1530 IF (NN=39) AND HC AND (RM=20)
THEN HC=0:MV(14,5)=0:MV(20,6)=
0:GOTO 1580
1540 IF (NN=44) AND FNC(18) THEN PR
INT "THE VINES ARE CONNECTED T
OGETHER.":GOTO 410
1550 IF FNB(NN) THEN PRINT "YOU DO
NOT SEE THAT.":GOTO 410
1560 IF TF(NN)=0 THEN PRINT "IT FLO
WS THROUGH YOUR FINGERS....":O
L(NN)=0:GOTO 410
1570 IF TF(NN)=-1 THEN PRINT "THAT
ITEM STAYS PUT.":GOTO 410
1580 PRINT "TAKEN.":OL(NN)=-1:GOTO
1640
1590 FOR I=1 TO 11:IF OL(NN)=PV(I)
THEN Y=I
1600 NEXT I
1610 IF FNC(PO(Y)) AND (OO(Y)=1) TH
EN OI(Y)=OI(Y)-1:GOTO 1560
1620 IF FNA(PO(Y)) AND (OO(Y)=1) TH
EN OI(Y)=OI(Y)-1:GOTO 1560
1630 GOTO 1550
1640 IF LEFT$(OB$(NN),1)="*" THEN P
RINT :PRINT "YOU HAVE A TREASU
RE!"
1650 IF (LEFT$(OB$(NN),1)="*") AND
(RM=44) THEN SC=SC-10
1660 IF NN=11 AND OL(14)=-5 AND RM=
44 THEN SC=SC-10
1670 GOTO 410
1680 PRINT "YOU GRAB THE POUCH AND
THE CIRCLE OPENS INTO A PIT...
":GOTO 450
1690 IF OL(NN)<-1 THEN 1780
1700 IF NOT FNA(NN) THEN PRINT "YOU
DO NOT HAVE THAT.":GOTO 410
1710 PRINT "DROPPED.":OL(NN)=RM
1720 IF (NN=38) AND FNC(42) THEN 18
20
1730 IF (NN=14) OR (NN=62) THEN PRI
NT "IT SOAKS INTO THE GROUND..
":OL(NN)=0
1740 IF NN=15 THEN PRINT "IT IS BLO
WN AWAY BY THE WIND...":OL(NN)
=0
1750 IF LEFT$(OB$(NN),1)="*" AND RM
=44 THEN SC=SC+10
1760 IF NN=11 AND OL(14)=-5 AND RM=
44 THEN SC=SC+10
1770 GOTO 410
1780 FOR I=1 TO 11:IF OL(NN)=PV(I)
THEN Y=I
1790 NEXT I
1800 IF FNA(PO(Y)) AND (OO(Y)=1) TH
EN 1710
1810 GOTO 1700
1820 PRINT "YOU REPLACE THE BROKEN
TRACK WITH THE ROD.":OL(42)=
0:OL(38)=0
1830 GOTO 410
1840 IF FNB(NN) AND (NOT FNA(NN)) T
HEN 1550
1850 FOR I=1 TO 11:IF NN=PO(I) THEN
Y=I:PF=1
1860 NEXT I

```

```

1870 IF Y=0 THEN 1910
1880 IF FNC(PO(Y)) THEN 1910
1890 IF FNA(PO(Y)) THEN 1910
1900 IF NOT FNA(PO(Y)) AND (OO(Y)<>
1) THEN NN=0:GOTO 1700
1910 IF NN>26 AND NN<50 THEN PRINT
"YOU SEE NOTHING SPECIAL ABOU
T IT.":GOTO 410
1920 IF NN=4 THEN PRINT "ITS MOUTH
IS OPEN WIDE AND SMOKE IS
COMING FROM IT."
1930 IF NN=5 THEN PRINT "IT IS A PL
ASTIC CARD."
1940 IF NN<6 THEN PRINT "IT HAS SOM
ETHING WRITTEN ON IT."
1950 IF NN=6 AND FL THEN PRINT "IT
IS FILLED WITH OIL.":GOTO 410
1960 IF NN=6 AND BK THEN PRINT "IT
IS SMASHED.":GOTO 410
1970 IF (NN=6) AND (LT=0) THEN PRIN
T "YOU SEE NOTHING SPECIAL ABO
UT IT.":GOTO 410
1980 IF NN=6 THEN PRINT "IT IS LIT.
"
1990 IF NN=9 THEN PRINT "IT HAS SEV
ERAL GEMS ON THE HILT."
2000 IF NN=10 THEN PRINT "IT RESEMB
LES A QUARREL."
2010 IF NN=14 THEN PRINT "IT HAS A
MILKY WHITE COLOR."
2020 IF NN=15 THEN PRINT "IT IS A P
URE WHITE."
2030 IF NN=16 THEN PRINT "IT HAS AN
INSCRIPTION: 'SB-910' ON ITS
STARBOARD."
2040 IF NN=17 THEN PRINT "IT HAS AN
ORANGE BUTTON ON IT WHICH SAY
S:'LAUNCH.'"
2050 IF NN=18 THEN PRINT "IT HAS LO
NG VINES HANGING FROM ITS
BRANCHES."
2060 IF NN=20 THEN PRINT "IT HAS A
SINGLE DRAWER."
2070 IF NN=22 THEN PRINT "IT HAS 'S
IGNAL FLARE' WRITTEN ON IT IN
BLACK INK."
2080 IF NN=23 THEN PRINT "IT HAS A
WORN MATTRESS."
2090 IF NN=24 THEN PRINT "IT IS ENC
ASED IN OLD BANDAGES."
2100 IF PF AND ((NN=2) OR (NN=13) O
R (NN=19) OR (NN=26)) THEN NO=
1
2110 IF PF AND NO=1 THEN PRINT "IT
LOOKS ORDINARY.":NO=0:GOTO 214
0
2120 IF PF THEN PRINT "IT IS ";:IF
OO(Y)=0 THEN PRINT "CLOSED."
2130 IF OO(Y) THEN PRINT "OPEN."
2140 IF PF THEN X=NN:PF=0:GOSUB 126
0
2150 GOTO 410
2160 IF NOT FNA(NN) AND (TF(NN)=1)
THEN 1700
2170 IF NN>5 THEN PRINT "THERE IS N
OTHING WRITTEN ON THAT.":GOTO
410
2180 IF NN=1 THEN PRINT "IT READS:
'THE TRAPDOOR IS UNDER....':G
OTO 410
2190 IF NN=2 THEN PRINT "IT READS:
'TO ESCAPE, OFFER THE SAPPHIRE
TO RA.":GOTO 410
2200 IF (NN=4) AND TW THEN PRINT "T
HE STATUE'S BASE READS: 'DO NO
T ENTER.':":GOTO 410
2210 IF NN=4 THEN PRINT "THE STATUE
'S BASE READS: 'ENTER.':":GOTO
410
2220 IF NN=5 THEN PRINT "IT READS:
'THIS CARD ACTIVATES SPACESHIP
S B-910.':":GOTO 410
2230 PRINT "THE BOOK IS ON DEMONOLO
GY. THERE IS ONLY ONE PAGE INT
ACT. IT READS:";
2240 PRINT " '...DEMON':PRINT "MUST
BE SUMMONED IN PENTACLE.":GOTO
410
2250 PRINT "YOU SAY, ";:QT$;NN$;QT$;
"
2260 IF FNC(60) AND (NN=62) THEN 22
80
2270 PRINT "NOTHING HAPPENS.":GOTO
410
2280 PRINT "THE SPHINX CRIES OUT AN
D JUMPS INTO THE PIT, FALLING
TO HIS DEATH."
2290 PRINT "HE HAS LEFT BEHIND A ST
AR RUBY.":OL(61)=RM:SC=SC+40:S
X=0
2300 OL(60)=0:PC=0:GOTO 410
2310 IF (NN=25) AND FNC(20) THEN OL
(25)=RM:GOTO 2350
2320 IF ((NOT FNA(NN)) AND (TF(NN)=
1)) OR ((FNB(NN)) AND (TF(NN)=
-1)) THEN 1700
2330 IF (NN=28) AND FNC(28) THEN PR
INT "OPENED.":MV(4,6)=5:OL(28)
=0:GOTO 410
2340 IF (NN=25) AND FNB(20) THEN 23
10
2350 FOR I=1 TO 11:IF NN=PO(I) THEN
Y=I
2360 NEXT I:IF Y=0 THEN PRINT "THER
E IS NO WAY TO OPEN THAT.":GOT
O 410
2370 IF NN=1 OR NN=19 OR NN=26 THEN
PRINT "THERE IS NO WAY TO OPE
N THAT.":GOTO 410
2380 IF OO(Y)=1 THEN PRINT "IT IS A
LREADY OPENED.":GOTO 410
2390 IF OO(Y)=1 THEN PRINT "IT IS A
LREADY OPENED.":GOTO 410
2400 PRINT "OPENED.":OO(Y)=1
2410 X=NN:GOSUB 1260
2420 IF NN=50 AND OL(24)=-11 THEN 2
440
2430 GOTO 410
2440 PRINT :PRINT "THE MUMMY OPENS
ITS EYES AND LETS OUT A DEEP
MOAN."
2450 OL(24)=RM:GOTO 410
2460 IF NOT FNA(NN) AND (TF(NN)=1)
THEN PRINT "IT IS NOT HERE.":G
OTO 410
2470 IF NN=28 AND MV(4,6)=5 THEN PR
INT "CLOSED.":OL(28)=RM:MV(4,6
)=0:GOTO 410
2480 IF (NN=25) AND FNB(25) THEN 24
60
2490 FOR I=1 TO 11:IF NN=PO(I) THEN
Y=I
2500 NEXT I:IF Y=0 THEN PRINT "THER
E IS NO WAY TO CLOSE THAT.":GO
TO 410
2510 IF NN=1 OR NN=19 OR NN=26 THEN
PRINT "THERE IS NO WAY TO CLO
SE THAT.":GOTO 410
2520 IF OO(Y)=0 THEN PRINT "IT IS A
LREADY CLOSED.":GOTO 410
2530 IF (NN=25) AND FNC(25) THEN OL
(25)=0
2540 PRINT "CLOSED.":OO(Y)=0:GOTO 4
10
2550 IF FNB(NN) THEN PRINT "YOU DO
NOT SEE THAT HERE.":GOTO 410
2560 IF NN=63 THEN PRINT "YOU ARE A
BOARD THE RAFT.":IR=1
2570 IF IR THEN MV(21,2)=28:MV(34,1
)=28:GOTO 410
2580 IF NN=59 THEN PRINT "YOU PLUNG
E INTO THE PIT....":GOTO 4580
2590 IF NN=35 THEN PRINT "YOU SLIDE
DOWN THE CHUTE....":PRINT :RM
=18:GOTO 1070
2600 IF NN<>16 AND NN<>41 AND NN<>5
0 THEN PRINT "YOU CANNOT ENTER
THAT.":GOTO 410
2610 IF NN=16 THEN PRINT "YOU ENTER
THE SPACESHIP....":PRINT :RM=
44:GOTO 1070
2620 IF NN=50 THEN PRINT "IT IS TOO
SMALL FOR YOU.":GOTO 410
2630 PRINT "YOUR WEIGHT STARTS THE
COAL BIN TO MOVE DOWN THE
TRACK."
2640 IF OL(42)=8 THEN PRINT "UNFORT
UNATELY THE TRACKS ARE BROKEN
AND YOU ARE";
2650 IF OL(42)=8 THEN PRINT " THROW
N AGAINST THE WALL....":GOTO 4
580
2660 PRINT "AFTER A BRIEF RIDE YOU
STOP AT THE END OF THE TRACK.
":PRINT
2670 IF RM=7 THEN RM=12:OL(41)=12:P
RINT :GOTO 1070
2680 IF RM=12 THEN RM=7:OL(41)=7:PR
INT :GOTO 1070
2690 IF (NN<>6) AND (NN<>24) THEN P
RINT "YOU CANNOT LIGHT THAT.":
GOTO 410
2700 IF NN=6 THEN IF NOT FNA(6) THE
N 1700
2710 IF NN=24 THEN IF FNB(24) THEN
1550
2720 IF NN=24 THEN 2780
2730 IF LT THEN PRINT "IT IS ALREAD
Y LIT.":GOTO 410
2740 IF BK THEN PRINT "THE LANTERN
IS SMASHED.":GOTO 410
2750 IF FL=0 THEN PRINT "THE LANTER
N IS NOT FILLED WITH OIL.":GOT
O 410
2760 IF NOT FNA(31) THEN PRINT "YOU
HAVE NOTHING TO LIGHT IT WITH
.":GOTO 410
2770 PRINT "OK, THE LANTERN IS LIT.
":LT=1:FL=0:GOTO 410
2780 IF NOT FNA(6) OR (LT=0) THEN P
RINT "YOU HAVE NOTHING TO LIGH
T IT WITH.":GOTO 410
2790 PRINT "YOU THROW YOUR LANTERN
AT THE MUMMY AND IT BREAKS, EN
GULFING THE ";
2800 PRINT "MUMMY IN":PRINT "FLAMES
. THE LANTERN LIES SMASHED ON
THE FLOOR."
2810 OL(52)=-11:OI(11)=1:MM=0:OL(24
)=0:OL(6)=39:LT=0:BK=1:GOTO 41
0
2820 IF NOT FNA(9) THEN PRINT "YOU
HAVE NOTHING TO CUT IT WITH.":
GOTO 410
2830 IF NN<>44 THEN PRINT "YOU CANN
OT CUT THAT.":GOTO 410
2840 IF FNB(18) THEN PRINT "FROM WH
ERE?":GOTO 410
2850 IF OL(44)<>-13 THEN PRINT "THE
OTHER VINES HANG HIGH ABOVE T
HE GROUND."
2860 IF OL(44)<>-13 THEN 410
2870 PRINT "OK, YOU CUT A LONG PIEC
E OF VINE FROM THE TREE.":OL
(44)=-1
2880 GOTO 410
2890 IF (NN=15) AND (OL(NN)=-6) AND
(FNA(12)) AND OO(5) THEN 2910
2900 IF NOT FNA(NN) THEN 1700
2910 VP=1:XX=NN:PRINT "WHERE DO YOU
WISH TO PUT IT?":GOSUB 420
2920 YY=NN:NN=XX:FOR Y=1 TO 11:IF Y
Y=PO(Y) THEN ZZ=Y
2930 NEXT Y
2940 IF (NN=15) AND (YY<>58) THEN Z
Z=0
2950 IF YY=58 THEN 3060
2960 IF (YY=13) AND (NN<>5) THEN ZZ
=0
2970 IF (YY=19) AND (NN<>10) THEN Z
Z=0
2980 IF (YY=21) AND (NN<>22) THEN Z
Z=0
2990 IF ZZ=0 THEN PRINT "YOU CANNOT
PUT THAT THERE.":GOTO 410
3000 IF FNB(YY) AND NOT FNA(YY) THE
N PRINT "IT IS NOT HERE.":GOTO
410
3010 IF OO(ZZ)=0 THEN PRINT "IT IS
NOT OPEN.":GOTO 410
3020 IF OI(ZZ)=MI(ZZ) THEN PRINT "I
T DOES NOT FIT.":GOTO 410
3030 PRINT "DONE.":OL(NN)=PV(ZZ):OI
(ZZ)=OI(ZZ)+1
3040 IF YY>2 OR NN<>36 THEN 410
3050 PRINT "A DOOR TO THE SOUTH CRE
AKS OPEN.":MV(18,2)=19:GOTO 41
0
3060 IF FNB(4) THEN PRINT "IT IS NO
T HERE.":GOTO 410
3070 PRINT "IT DISAPPEARS INTO THE
MOUTH....":OL(NN)=0
3080 IF NN=15 THEN TW=0
3090 GOTO 410
3100 IF NN=64 AND RM=44 THEN 3190
3110 IF FNB(NN) THEN 1690
3120 IF NN<>27 AND NN<>41 AND NN<>6
4 THEN PRINT "NOTHING HAPPENS.
":GOTO 410
3130 IF NN=41 THEN PRINT "YOU PUSH
THE COAL BIN AND IT ROLLS
AWAY...."

```



```

3140 IF NN=41 THEN OL(41)=0
3150 IF NN=41 AND OL(42) THEN PRINT
"YOU HEAR A SMASH IN THE DIST
ANCE.":SB=1
3160 IF NN=41 THEN AND T
3170 IF (NN=27) AND TR THEN PRINT "
YOU CANNOT MOVE IT ANY FARTHER
.":GOTO 410
3180 IF NN=27 THEN PRINT "YOU PUSH
IT TO REVEAL A TRAPDOOR
UNDERNEATH!"
3190 IF NN=27 THEN OL(28)=RM:TR=1:G
OTO 410
3200 IF OL(5)<>-7 THEN PRINT "NOTHI
NG HAPPENS.":GOTO 410
3210 PRINT "THERE IS A GIANT EXPLOS
ION AND THE";
3220 PRINT "SPACESHIP LAUNCHES THRO
UGH THE CEILING OF THE CAVERN
."
3230 IF SC=170 THEN SC=SC+30:GOTO 3
260
3240 PRINT "UNFORTUNATELY YOU HAVE
NOT OBTAINED ALL THE TREASURES
AND YOU LAND";
3250 PRINT " IN THE CAVERN";:PRINT
"AGAIN.":GOTO 410
3260 PRINT :PRINT "CONGRATULATIONS!
YOU HAVE ALL TEN":PRINT "TREA
SURES!"
3270 PRINT :GOTO 4590
3280 IF NOT FNA(39) THEN PRINT "YOU
DO NOT HAVE ANYTHING TO HOOK
IT WITH."
3290 IF NOT FNA(39) THEN 410
3300 IF NN=40 AND (RM=14 OR RM=20)
THEN 3340
3310 IF (NN=7) AND FNC(66) THEN 336
0
3320 IF FNB(NN) AND (NOT FNA(NN)) T
HEN PRINT "IT IS NOT HERE.":GO
TO 410
3330 PRINT "YOU CANNOT HOOK THAT.":
GOTO 410
3340 PRINT "YOU HOOK THE GRAPPLING
HOOK ON THE SMALL CLIFF."
3350 OL(39)=0:HC=1:MV(14,5)=20:MV(2
0,6)=14:GOTO 410
3360 PRINT "YOU HOOK THE POUCH AND
PULL IT INTO YOUR HANDS."
3370 OL(7)=-1:OL(66)=0:GOTO 410
3380 IF NN=22 THEN 3400
3390 IF FNB(NN) AND NOT FNA(NN) THE
N 1550
3400 IF NOT FNA(19) AND NOT FNA(21)
THEN PRINT "YOU DON'T HAVE AN
YTHING TO";
3410 IF NOT FNA(19) AND NOT FNA(21)
THEN PRINT " SHOOT IT":PRINT
"WITH.":GOTO 410
3420 IF FNA(NN) THEN PRINT "YOU CAN
NOT SHOOT AN ITEM OF INVENTORY
.":GOTO 410
3430 IF FNA(19) AND FNA(21) THEN 34
60
3440 IF FNA(19) THEN 3510
3450 IF FNA(21) THEN 3610
3460 PRINT "WHICH TO USE, YOUR FLAR
E (B)UN, OR YOUR (C)ROSSBOW?"
3470 GOSUB 50:IF A$<>" " AND A$<>"G"
AND A$<>"C" THEN 410
3480 IF A$="C" THEN PRINT :GOTO 351
0
3490 IF A$="G" THEN PRINT :GOTO 361
0
3500 GOTO 3470
3510 IF OL(10)<>-8 THEN PRINT "IT I
S NOT LOADED.":GOTO 410
3520 IF NN=22 THEN PRINT "YOU CANNO
T SHOOT A FLARE FROM A":PRINT
"ROSSBOW.":GOTO 410
3530 IF (NN=24) OR (NN=47) OR (NN=5
6) OR (NN=60) OR (NN=67) THEN
3560
3540 PRINT "ON CONTACT WITH IT, THE
STICK BREAKS INTO SPLINTER
S.":OL(10)=0
3550 GOTO 410
3560 IF NN=24 OR NN=56 OR NN=60 THE
N PRINT "IT DOES NOT SEEM AFFE
CTED.":GOTO 3600
3570 IF NN=67 THEN 3590
3580 PRINT "ON CONTACT THE CROSSBOW
BREAKS INTO SPLINTERS.":O
L(10)=0
3590 PRINT "THE STICK PLUNGES INTO
THE CREATURE'S THROAT.":OL(
NN)=0:LL=0
3600 OL(10)=0:OL(67)=0:GOTO 410
3610 IF NN<>22 THEN PRINT "YOU CAN
ONLY SHOOT THE FLARE, NOT AN
OBJECT.":GOTO 410
3620 IF OL(22)<>-12 THEN PRINT "IT
IS NOT LOADED.":GOTO 410
3630 IF OO(8) THEN PRINT "IT EXPLOD
ES IN YOUR FACE....":GOTO 4580
3640 PRINT "THE FLARE SHOOTS INTO T
HE AIR, SHOWERING YOU WITH SPA
RKS. FNC"
3650 IF FNC(47) THEN PRINT :GOTO 36
70
3660 OL(22)=0:GOTO 410
3670 PRINT "STALACTITES START TO FA
LL TO THE GROUND, AND ONE HITS
THE BEAR IN";
3680 PRINT " THE BACK OF HIS";:PRIN
T "NECK, BREAKING HIS SPINE.":
OL(47)=0:BB=0
3690 GOTO 3660
3700 IF NOT FNA(NN) AND FNB(NN) THE
N PRINT "IT IS NOT HERE.":GOTO
410
3710 IF NOT FNA(NN) THEN 1700
3720 IF (NN=49) AND (FNA(51)) AND D
D=0 THEN 3740
3730 PRINT "NOTHING HAPPENS.":GOTO
410
3740 PRINT "THERE IS A PUFF OF SMOK
E AND A DEMON APPEARS."
3750 IF RM=52 THEN OL(56)=RM:GOTO 3
780
3760 PRINT "YOU ARE UNPROTECTED AND
THE DEMON":PRINT "APPROACHES
YOU";
3770 PRINT " - CLAWS":PRINT "GRASPI
NG FOR YOUR HEART....":GOTO 45
80
3780 PRINT QT$;"SO WHAT DO YOU HAVE
FOR ME?":QT$:GOTO 420
3790 IF NN=14 THEN 3850
3800 IF NN=62 AND RM>27 AND RM<31 T
HEN PRINT "THE WATER HAS PECUL
IAR TASTE.":GOTO 410
3810 IF (NN=62) AND (RM>30 AND RM<3
4) THEN PRINT "SUDDENLY THE WA
TER RUSHES INTO";:DR=1
3820 IF DR THEN PRINT " YOUR":PRINT
"OPEN MOUTH AND YOU DROWN....
":DR=0:GOTO 4580
3830 IF NOT FNA(NN) THEN 1700
3840 PRINT "YOU CANNOT DRINK THAT.":
GOTO 410
3850 IF NOT FNA(11) THEN 1700
3860 IF OL(14)<>-5 THEN 1700
3870 IF OO(4)=0 THEN PRINT "THE VIA
L IS CLOSED.":GOTO 410
3880 PRINT "ALL YOUR WOUNDS ARE HEA
LED INSTANTLY."
3890 OL(14)=0:GOTO 410
3900 IF NOT FNA(NN) THEN 1700
3910 IF FNC(24) OR FNC(47) OR FNC(5
6) OR FNC(60) THEN 3940
3920 IF FNC(67) THEN 3940
3930 PRINT "THERE IS NO ONE HERE TO
ACCEPT YOUR OFFERING.":GO
TO 410
3940 IF FNB(56) THEN PRINT "IT DOES
NOT ACCEPT YOUR OFFERING.":GO
TO 410
3950 IF NN<>65 THEN PRINT QT$;"NO,
THAT WON'T DO.":QT$:GOTO 410
3960 PRINT "THE DEMON ACCEPTS YOUR
OFFERING AND GIVES YOU A G
OLDEN ANKH."
3970 PRINT QT$;"IRONIC ISN'T IT?":Q
T$;" HE SAYS BEFORE":OL(65)=0
3980 PRINT "DISAPPEARING.":OL(57)=-
1:OL(56)=0:SC=SC+15:DD=0:DC=0:
GOTO 410
3990 IF NOT FNA(NN) AND (TF(NN)>0)
THEN 1700
4000 IF NN<>54 THEN 3730
4010 IF NOT FNA(34) THEN 3730
4020 PRINT "AFTER REPEATED BLOWS WI
TH THE PICK, YOU CHIP AWAY THE
ROCK TO";
4030 PRINT " REVEAL A PLASTIC":PRIN
T "CARD INSIDE IT.":OL(54)=0:O
L(5)=-1
4040 GOTO 410
4050 IF NN=24 OR NN=47 OR NN=56 OR
NN=60 OR NN=67 THEN 4070
4060 PRINT "ATTACKING THAT IS FUTIL
E.":GOTO 410
4070 IF NOT FNA(19) THEN PRINT "ATT
ACKING WITHOUT A WEAPON IS SUI
CIDE.":GOTO 410
4080 PRINT "YOU HAVE A CROSSBOW - U
SE IT.":GOTO 410
4090 IF NOT FNA(NN) THEN 1550
4100 IF NN>6 THEN PRINT "YOU CANNO
T FILL THAT.":GOTO 410
4110 IF NOT FNA(29) THEN PRINT "YOU
HAVE NO OIL.":GOTO 410
4120 PRINT "YOU FILL THE LANTERN WI
TH OIL FROM THE BLADDER."
4130 FL=1:OL(29)=0:OL(30)=-1:NW$(29
)="XYYZZ":NW$(30)="BLADDER":G
OTO 410
4140 IF NN=48 AND RM=33 THEN 4170
4150 IF FNB(NN) THEN 1550
4160 GOTO 2270
4170 IF ML THEN 2270
4180 PRINT "SEVERAL THINGS FLOAT FR
OM UNDERNEATH IT.":
4190 OL(12)=RM:OL(49)=RM:ML=1:GOTO
410
4200 IF NN<>63 THEN PRINT "YOU CANN
OT BUILD THAT.":GOTO 410
4210 IF FNA(44) AND FNA(45) THEN 42
30
4220 PRINT "YOU DO NOT HAVE THE MAT
ERIAL TO MAKE IT.":GOTO 410
4230 PRINT "YOU BUILD A RAFT.":OL(4
4)=0:OL(45)=0:OL(63)=RM:GOTO 4
10
4240 IF NN=16 OR NN=63 THEN 4260
4250 PRINT "YOU WERE NEVER IN IT!":
GOTO 410
4260 IF NN=16 THEN PRINT "YOU EXIT
THE SPACESHIP....":PRINT :RM=4
3:GOTO 1070
4270 IF IR=0 THEN 4250
4280 PRINT "YOU EXIT THE RAFT.":IR=
0:MV(21,2)=0:MV(34,1)=0
4290 IF RM>27 AND RM<31 THEN 4550
4300 IF RM=34 AND CR=0 THEN SC=SC+1
0:CR=1
4310 GOTO 410
4320 PRINT "YOU ARE CARRYING:"
4330 FOR X=1 TO 65:IF FNA(X) THEN R
F=1:GOSUB 1170:RF=0:PRINT " ";
A$:OB$(X):GOSUB 1260
4340 IF FNA(X) THEN IN=IN+1
4350 NEXT X
4360 IF IN=0 THEN PRINT "ABSOLUTELY
NOTHING"
4370 IN=0:GOTO 410
4380 PRINT "DO YOU REALLY WISH TO Q
UIT?":QQ=1:GOSUB 420
4390 IF LEFT$(IN$,1)="Y" THEN 4410
4400 PRINT "OK.":QQ=0:RS=0:GOTO 420
4410 PRINT "YOU HAVE ACHIEVED A SCO
RE OF";SC
4420 PRINT :PRINT "OUT OF A POSSIBL
E 200 IN";MV;"MOVES.":PRINT
4430 PRINT "THIS PUTS YOU IN THE RA
NK OF:"
4440 FOR X=1 TO 6:IF SC<=MS(X) THEN
RK$=RK$(X):X=X-7
4450 NEXT X
4460 PRINT :PRINT QT$;RK$;" ADVENTU
RER";QT$
4470 IF SS THEN SS=0:GOTO 420
4480 PRINT :PRINT "PRESS A KEY WHEN
READY."
4490 GOSUB 50
4500 IF QQ THEN END
4510 RUN
4520 PRINT "DO YOU REALLY WISH TO R
ESTART?":RS=1:GOSUB 420
4530 GOTO 4390
4540 SS=1:GOTO 4410
4550 IF RM<>29 THEN PRINT "AS YOU D
IVE INTO THE WATER THE CURRENT
":WH=1
4560 IF WH THEN PRINT "WASHES YOU W
EST - INTO THE SEA.":WH=0:GOTO
4580
4570 PRINT "YOU DIVE INTO THE RIVER
....":PRINT :RM=31:IR=0:GOTO 1
070
4580 PRINT :PRINT :PRINT "YOU HAVE

```

```

DIED.":PRINT
4590 PRINT "DO YOU WISH TO QUIT OR
RESTART?":QQ=1:GOSUB 420:QQ=0
4600 IF IN$<>"QUIT" AND IN$<>"RESTA
RT" THEN 4590
4610 IF IN$="QUIT" THEN QQ=1
4620 IF IN$="RESTART" THEN RS=1
4630 GOTO 4410
4640 DATA 0,2,0,0,0,0,"AT THE FRONT
DOOR"
4650 DATA 1,0,3,4,0,0
4660 DATA "IN THE LIVING ROOM. IT I
S SPARSELY FURNISHED"
4670 DATA 0,0,0,2,0,0,"IN THE BEDRO
OM"
4680 DATA 0,0,2,0,0,0
4690 DATA "IN THE KITCHEN. EMPTY CA
BINETS LINE THE NORTH WALL"
4700 DATA 0,9,6,0,0,0,"IN A ROUGHLY
CARVED TUNNEL"
4710 DATA 0,0,7,5,0,0,"IN A ROUGHLY
CARVED TUNNEL"
4720 DATA 0,8,0,6,0,0,"IN AN INCLIN
ED TUNNEL. A TRACK RUNS TO T
HE SOUTH"
4730 DATA 7,0,0,0,0,0
4740 DATA "AT A STONE WALL. THE TRA
CK RUNS OVER IT, HEADING TO TH
E SOUTH"
4750 DATA 5,11,0,10,0,0
4760 DATA "IN A TUNNEL. THE WALLS G
LITTER WITH IRON PYRITE"
4770 DATA 0,0,9,0,0,0,"IN A NATURAL
CAVE WHICH IS USED FOR STORAG
E"
4780 DATA 9,0,0,0,0,0,"IN A CHAMBER
"
4790 DATA 0,14,13,15,0,0
4800 DATA "AT THE END OF A TUNNEL.
THE TRACK ALSO ENDS HERE,"
4810 DATA 0,0,0,12,0,0
4820 DATA "IN A TUNNEL. TO THE EAST
THE TUNNEL IS BLOCKED BY A
BOULDER"
4830 DATA 12,0,0,0,0,0,"AT THE BOTT
OM OF A SMALL CLIFF"
4840 DATA 0,16,12,0,0,0,"IN A CURVE
D TUNNEL"
4850 DATA 15,17,0,0,0,0,"IN A TUNNE
L"
4860 DATA 16,0,0,0,0,0,"AT A DEAD E
ND"
4870 DATA 0,0,0,0,0,0,"IN AN ABANDO
NED MINE SHAFT"
4880 DATA 18,0,17,0,0,0,"IN AN ABAN
DONED MINE SHAFT"
4890 DATA 0,21,0,0,0,0,"ON A CLIFF"
4900 DATA 20,0,23,22,0,0,"ON THE SH
ORE OF A RIVER"
4910 DATA 0,0,21,0,0,0,"ON THE SHOR
E OF A RIVER"
4920 DATA 0,0,24,21,0,0,"ON A DIRT
PATH"
4930 DATA 27,26,25,23,0,0
4940 DATA "ON A PATH IN THE CENTER
OF AN UNDERGROUND VILLAGE"
4950 DATA 0,0,0,24,0,0,"IN A HUT US
ED AS A MEETING PLACE"
4960 DATA 24,0,0,0,0,0,"IN THE HEAL
ER'S HUT"
4970 DATA 0,24,0,0,0,0,"IN A DEMOLI
SHED HUT"
4980 DATA 21,34,29,30,0,0,"IN THE M
IDDLE OF A RIVER"
4990 DATA 0,0,0,28,0,0
5000 DATA "UPSTREAM IN A RIVER. THR
OUGH THE CLEAR WATER YOU SEE A
SHIP"
5010 DATA 0,0,28,1,0,0,"DOWNSTREAM
IN A RIVER"
5020 DATA 0,32,0,0,29,0,"UNDERWATER
THE CURRENT PUSHES YOU SOUT
H"
5030 DATA 31,0,33,0,0,0,"IN A SUNKE
N SHIP"
5040 DATA 0,0,0,32,0,0,"IN THE CREW
'S QUARTERS"
5050 DATA 0,36,0,35,0,0,"ON THE SHO
RE OF A RIVER"
5060 DATA 0,0,34,0,0,0,"ON THE SHOR
E OF A RIVER"
5070 DATA 34,37,0,0,0,0
5080 DATA "IN A LARGE CAVERN. STALA
CTITES HANG FROM ABOVE"

```

```

5090 DATA 36,38,0,0,0,0,"IN A DARK
TUNNEL"
5100 DATA 37,41,39,0,0,0,"IN A DARK
TUNNEL"
5110 DATA 0,40,0,38,0,0
5120 DATA "IN A BURIAL CHAMBER. THE
SMELL OF DECAY FILLS THE AIR
"
5130 DATA 39,0,0,41,0,0,"IN A CURVE
D TUNNEL"
5140 DATA 38,42,40,0,0,0,"IN A SMAL
L CHAMBER"
5150 DATA 41,49,45,43,0,0,"IN A SMA
LL AMPHITHEATER"
5160 DATA 0,0,42,0,0,0,"IN A GIGANT
IC CAVERN"
5170 DATA 0,0,0,0,0,0,"ABOARD A SPA
CESHIP"
5180 DATA 0,0,46,42,0,0,"IN A HALLW
AY"
5190 DATA 48,0,47,45,0,0,"IN A HALL
WAY"
5200 DATA 0,0,0,46,0,0,"IN A DRESSI
NG ROOM"
5210 DATA 0,46,0,0,0,0,"IN THE LIB
RARY ROOM"
5220 DATA 42,50,0,0,0,0,"IN A CORRI
DOR"
5230 DATA 49,54,51,53,0,0,"SMALL CH
AMBER"
5240 DATA 0,0,52,50,0,0,"IN A CORRI
DOR"
5250 DATA 0,0,0,51,0,0,"IN THE HEXA
GON-SHAPED ROOM"
5260 DATA 0,0,50,0,0,0
5270 DATA "IN AN EAST/WEST TUNNEL.
A CAVE-IN BLOCKS THE WESTWARD
EXIT"
5280 DATA 50,55,0,0,0,0,"IN A CORRI
DOR"
5290 DATA 54,56,0,0,0,0,"AT THE END
OF THE CORRIDOR"
5300 DATA 55,0,0,0,0,0,"IN A LARGE
CHAMBER"
5310 DATA N,NORTH,S,SOUTH,E,EAST,W,
WEST,U,UP,D,DOWN,TAKE,DROP,EXA
MINE,READ,SAY
5320 DATA OPEN,CLOSE,ENTER,LIGHT,CU
T,PUT,PUSH,HOOK,SHOOT,RUB,DRIN
K,OFFER
5330 DATA HIT,ATTACK,FILL,LIFT,BUIL
D,EXIT,INVENTORY,I,QUIT,Q,REST
ART
5340 DATA SCORE,LOOK,L,DIVE
5350 DATA SIGN,-1,PEDESTAL,-1,BOOK,
1,STATUE,-1,CARD,1,LANTERN,1,P
OUCH,1
5360 DATA BACKPACK,1,KNIFE,1,STICK,
1,VIAL,1,BOX,1,SLOT,-1,ELIXIR,
0
5370 DATA SAND,0,SPACESHIP,-1,PANEL
,-1,TREE,-1,CROSSBOW,1
5380 DATA DRESSER,-1,GUN,1,FLARE,1,
BUNK,-1,MUMMY,-1,DRAWER,-1,BED
,-1
5390 DATA REFRIGERATOR,-1,TRAPDOOR,
-1,BLADDER,1,BLADDER,1,FLINT,1,
SKELETON,-1
5400 DATA CIRCLE,-1,PICK,1,CHUTE,-1,
SAPPHIRE,1,GOLD,1,ROD,1,HOOK,
1,CLIFF,-1
5410 DATA BIN,-1,TRACK,-1,DIAMOND,1,
VINE,1,LOGS,1,STALACTITES,-1,
BEAR,-1
5420 DATA MATTRESS,-1,LAMP,1,SARCOF
HAGUS,-1,HANDKERCHIEF,1,FACEMA
SK,1,XYZZ,-1
5430 DATA ROCK,1,PENTACLE,-1,DEMON,
-1,ANKH,1,MOUTH,-1,PIT,-1,SPHI
NX,-1,RUBY,1
5440 DATA WATER,0,RAFT,-1,BUTTON,-1,
TRIDENT,1,POUCH,1,LEOPARD,-1,
",0
5450 DATA SIGN,4,JADE PEDESTAL,18,L
EATHER BOUND BOOK,48,DRAGON ST
ATUE,55
5460 DATA LAUNCH CARD,0,OIL LANTERN
,-10,LEATHER POUCH,0,BACKPACK,
13
5470 DATA *JEWELLED KNIFE*, -2,SHARPE
NED STICK,10,YELLOW VIAL,26,ME
TAL BOX,0
5480 DATA SLOT,44,*ELIXIR OF LIFE*,
-5,WHITE SAND,-6,SPACESHIP,43

```

```

5490 DATA CONTROL PANEL,44,GIANT OA
K TREE,24,CROSSBOW,35,WOODEN D
RESSER,47
5500 DATA FLARE GUN,-1,FLARE,-1,BUN
K,33,MUMMY,-11,DRAWER,0,BED,3,
REFRIGERATOR,4
5510 DATA TRAPDOOR,0,OIL SOAKED BLA
DDER,6,BLADDER,0,FLINT & STEEL
,-2
5520 DATA SKELETON,13,"LARGE CIRCLE
ON THE FLOOR ",11,PICK,17,C
HUTE,16
5530 DATA *SAPPHIRE*,18,*GOLD NUGGE
T*,7,METAL ROD,10,GRAPPLING HO
OK & ROPE,-1
5540 DATA CLIFF,0,COAL BIN,7,BROKEN
TRACK,8,*SMALL DIAMOND*, -4,VI
NE,-13,LOGS,27
5550 DATA STALACTITES,0,LARGE BEAR,
36,MATTRESS,0,*GOLDEN LAMP*,0,
SARCOPHAGUS,39
5560 DATA *GOLDEN HANDKERCHIEF*, -9,
*GOLDEN FACEMASK*,0,XYZZ,0,LAR
GE ROCK,53
5570 DATA PENTACLE ON THE FLOOR,52,
DEMON,0,*GOLDEN ANKH*,0,MOUTH,
0,PIT,56
5580 DATA SPHINX,56,*STAR RUBY*,0,W
ATER,0,RAFT,0,BUTTON,0,TRIDENT
,18
5590 DATA "POUCH HANGING FROM A ROP
E ",11,BLACK LEOPARD,42,"",0
5600 DATA AMATEUR,10,NOVICE,50,AVER
AGE,100,INTELLECTUAL,150,PRO,1
99,MASTER,200
5610 DATA 2,7,8,11,12,13,19,21,25,2
6,50,1,1,4,1,1,1,1,1,5,6,3,1,0
,0,0,0,1,1,0,0
5620 DATA 1,0,-3,-4,-2,-5,-6,-7,-8,
-12,-9,-10,-11
5630 DATA NORTH,SOUTH,EAST,WEST,UP,
DOWN
5640 DIM MV(56,6),RD$(56),VW$(44),N
W$(68),TF(68),OB$(68),OL(68)
5650 DIM PO(11),MI(11),OI(11),OO(11
),PV(11),RK$(6)
5660 FOR X=1 TO 56:FOR Y=1 TO 6:REA
D MV(X,Y):NEXT Y:READ RD$(X):N
EXT X
5670 FOR X=1 TO 44:READ VW$(X):NEXT
X
5680 FOR X=1 TO 68:READ NW$(X),TF(X
):NEXT X
5690 FOR X=1 TO 68:READ OB$(X),OL(X
):NEXT X
5700 FOR X=1 TO 6:READ RK$(X),MS(X)
:NEXT X
5710 FOR X=1 TO 11:READ PO(X):NEXT
X
5720 FOR X=1 TO 11:READ MI(X):NEXT
X
5730 FOR X=1 TO 11:READ OO(X):NEXT
X
5740 FOR X=1 TO 11:READ PV(X):NEXT
X
5750 FOR X=1 TO 6:READ DR$(X):NEXT
X
5760 RM=1:VL$="AEIOU":OI(2)=1:OI(3)
=2:OI(4)=1:OI(5)=1:OL(21)=-1:T
W=1
5770 OL(22)=-1:AC=10:CR=0:MV=-1:OI(
2)=1:OI(3)=2:OI(4)=1:OI(5)=1:O
I(9)=1
5780 OI(10)=1:DEF FNA(X)=(OL(X)--1)
:DEF FNB(X)=(OL(X)>RM)
5790 DEF FNC(X)=(OL(X)=RM):QT$=CHR$
(34):CR$=CHR$(13)
5810 RETURN

```

Program 2: Commodore 64 Line Changes

```

5800 UL$=CHR$(164):CL$=CHR$(
157):DL$=CHR$(20)

```

Program 3: IBM PC/PCjr Line Changes

```

20 KEY OFF:SCREEN 0,0,0:WIDTH 40:FO
R I=1 TO 25:PRINT :NEXT I:PRINT
" COPYRIGHT 1987 COMPUTE! PUB.
, INC."

```

```
5800 UL$=CHR$(95):CL$=CHR$(29):DL$=
CL$+" "+CL$
```

Program 4: Apple II Line Changes

```
20 PRINT CHR$(27); CHR$(17)
: FOR I = 1 TO 25: PRINT :
NEXT I: PRINT " COPYRIGHT
HT 1987 COMPUTE! PUB., INC
"
```

```
5800 UL$ = CHR$(95):CL$ = CH
R$(8):DL$ = CL$
```

Program 5: Amiga Line Changes

```
20 WIDTH 40:FOR I=1 TO 25:PRINT
:NEXT I:PRINT " COPYRIGHT 1987
COMPUTE! PUB., INC."
440 PRINT UL$;
460 IF A$=DL$ AND ZL>0 THEN IN$=
MID$(IN$,1,ZL-1):ZL=ZL-1:PRINT C
L$;CL$;:GOTO 440
470 IF A$=CR$ AND ZL>0 THEN PRIN
T CL$:PRINT :GOTO 500
480 IF A$<>CR$ AND A$<>DL$ AND Z
L<QI THEN IN$=IN$+A$:ZL=ZL+1:PRI
NT CL$;A$;:GOTO 440
5800 UL$=CHR$(95):CL$=CHR$(8):DL
$=CHR$(8)
4
```

Program 6: The Hermit For Atari 400, 800, XL, And XE

```
AN 10 REM COPYRIGHT 1987 COM
PUTE! PUBLICATIONS, IN
C. - ALL RIGHTS RESERV
ED
66 20 DIM DRIVE$(3):DRIVE$="
D1:"
BA 30 OPEN #1,4,0,"K":POKE
82,0:POKE 83,39:FOR I=
1 TO 25:PRINT:NEXT I:
PRINT "{3 SPACES}COPYR
IGHT 1987 COMPUTE! PUB
L., INC."
IH 40 PRINT "{8 SPACES}ALL R
IGHTS RESERVED":PRINT
:PRINT :PRINT "PLEASE
WAIT..."
LF 50 GOSUB 4700:POKE 752,25
5:GOTO 1110
HG 60 GET #1,A:A$=CHR$(A)
EH 70 RETURN
EP 80 IF OL(24)=RM THEN MC=M
C+1:MM=1
CJ 90 IF OL(47)=RM THEN BC=B
C+1:BB=1
FJ 100 IF OL(56)=RM THEN DC=
DC+1:DD=1
HM 110 IF OL(67)=RM THEN LC=
LC+1:LL=1
EJ 120 IF RM>30 AND RM<34 TH
EN AC=AC-1
JK 130 IF MM THEN PRINT :PRI
NT "THE MUMMY LUMBERS
TOWARD YOU..."
6E 140 IF BB THEN PRINT :PRI
NT "THE BEAR OPENS HI
S ARMS, READY TO
{7 SPACES}EMBRACE YOU
"
JK 150 IF DD THEN PRINT :PRI
NT "THE DEMON TAPS HI
S FOOT IMPATIENTLY."
HF 160 IF LL THEN PRINT :PRI
NT "THE LEOPARD STALK
S TOWARD YOU..."
AP 170 IF MC=4 THEN PRINT "T
HE MUMMY GRABS YOU AN
```

```
D CHOKES YOU TO
{3 SPACES}DEATH.":GOT
O 4640
```

```
DJ 180 IF BC=3 THEN PRINT "T
HE BEAR EMBRACES YOU.
YOU FEEL YOUR
{4 SPACES}RIBS CRACK.
..."
IH 190 IF AC<3 THEN PRINT "Y
OU FEEL DIZZY..."
BD 200 IF BC=3 THEN 4640
OL 210 IF DC=4 THEN PRINT QT
$;"YOU KNOW WHERE TO
REACH ME,";QT$
AA 220 IF DC=4 THEN PRINT "T
HE DEMON SAYS AND DIS
APPEARS.":OL(56)=0:DD
=0:DC=0:GOTO 420
FB 230 IF LC=3 THEN PRINT "T
HE LEOPARD POUNCES; T
HAT IS THE LAST
{3 SPACES}THING YOU S
EE..."
CB 240 IF LC=3 THEN 4640
6J 250 IF AC=0 THEN PRINT "Y
OU RUN OUT OF OXYGEN.
...":GOTO 4640
J6 260 IF OL(6X)=RM THEN PC=
PC+1:SX=1
CC 270 IF SX<>1 OR PC<>1 THE
N 330
EJ 280 PRINT :PRINT QT$;"WHE
N SOLID IT CAN SINK S
HIPS;"
KK 290 PRINT "WHEN GAS IT CA
N BLOCK THE VIEW;"
OI 300 PRINT "WHEN LIQUID IT
CAN WEIGH MANY TONS.
"
AH 310 PRINT :PRINT "ANSWER
MY RIDDLE CORRECTLY A
ND THOU{5 SPACES}SHAL
T LIVE ";
HD 320 PRINT "TO ENJOY THY T
REASURES.":QT$
OJ 330 IF SX THEN PRINT :PRI
NT "THE SPHINX IS WAI
TING PATIENTLY."
DA 340 IF PC<>4 THEN 370
BA 350 PRINT "THE SPHINX POU
NCES; HIS CLAWS EAGER
LY AWAITING YOUR THRO
AT..."
KA 360 GOTO 4640
AP 370 IF RM<31 OR RM>33 THE
N 400
CH 380 IF OL(14)=-5 AND OL(1
1)=-1 AND OD(4)=1 THE
N OL(14)=0
CN 390 IF OL(15)=-6 AND OL(1
2)=-1 AND OD(5)=1 THE
N OL(15)=0
BO 400 IF IR THEN OL(63)=RM
HF 410 RETURN
OE 420 GOSUB 80:Y=0:VP=0:MV=
MV+1
NC 430 PRINT :IN$="":VB$="":
NN$="":ZL=0:QI=37:X=0
:VB=0:NN=0:V=0
OC 440 PRINT ">";
BE 450 PRINT UL$;CL$;
IO 460 GOSUB 60:IF (A$<" " O
R A$>CHR$(95) OR A$=Q
T$) AND A$<>DL$ AND A
$<>CL$ AND A$<>CR$ TH
EN 460
OL 470 IF (A$<>CL$ AND A$<>D
L$) OR ZL=0 THEN 500
ZL=ZL-1:PRINT " ";CL$
;CL$;:IF ZL THEN IN$=
IN$(1,ZL):GOTO 450
OF 490 IN$="":GOTO 450
OI 500 IF A$=CR$ AND ZL>0 TH
```

```
EN.PRINT " ":PRINT :G
OTO 530
```

```
OH 510 IF A$<>CR$ AND A$<>DL
$ AND A$<>CL$ AND ZL<
QI THEN ZL=ZL+1:IN$(Z
L)=A$:PRINT A$;:GOTO
450
6K 520 GOTO 460
PK 530 IF QQ=1 OR RS=1 THEN
RETURN
DB 540 L=LEN(IN$):FOR I=1 TO
L:A$=IN$(I,I):IF A$<
">" THEN 570
KF 550 IF NN$<>" THEN PRINT
"ONE OR TWO WORDS PL
EASE.":GOTO 430
HC 560 X=1:GOTO 590
CH 570 IF X=0 THEN VB$(LEN(V
B$)+1)=A$:GOTO 590
JH 580 NN$(LEN(NN$)+1)=A$
BH 590 NEXT I:IF LEN(VB$)>6
THEN VB$=VB$(1,6)
FJ 600 IF LEN(NN$)>6 THEN NN
$=NN$(1,6)
BB 610 FOR I=1 TO 44:X=I*7-6
:S$=VW$(X+1,X+ASC(VW$
(X))):IF VB$=S$ THEN
VB=I:VP=0:GOTO 640
IE 620 NEXT I:IF VP THEN NN$
=VB$:GOTO 640
NB 630 IF VB=0 THEN PRINT "I
DO NOT KNOW THAT VER
B.":GOTO 430
MH 640 FOR I=1 TO 67:X=I*7-6
:S$=NW$(X+1,X+ASC(NW$
(X))):IF NN$=S$ THEN
NN=I:GOTO 670
IO 650 NEXT I:IF NN$="" THEN
NN=I:GOTO 670
LB 660 IF NN=0 AND VB<>17 TH
EN PRINT "I DO NOT KN
OW THE WORD ";QT$;NN$
;QT$;".":VP=0:GOTO 43
0
AD 670 IF VB>12 AND VB<36 AN
D NN=68 THEN PRINT VB
$;"WHAT?":GOTO 430
OC 680 IF VP THEN RETURN
DB 690 IF (VB<13 OR VB>35) A
ND NN<>68 THEN X=VB*7
-6:PRINT "JUST ";VW$(
X+1,X+ASC(VW$(X)));
PLEASE.":GOTO 430
AO 700 ON VB GOTO 760,760,83
0,830,920,920,960,960
,1040
NO 710 ON VB-9 GOTO 1040,107
0,1070,1540,1740,1890
,2210,2300,2360
CG 720 ON VB-18 GOTO 2510,26
00,2740,2870,2940,315
0,3330,3430,3760
BH 730 ON VB-27 GOTO 3840,39
50,4040,4100,4140,420
0,4260,4300,4380
CG 740 ON VB-36 GOTO 4380,44
40,4440,4580,4600,111
0,1110,4610
6D 750 PRINT "YOU CANNOT GO
IN THAT DIRECTION.":G
OTO 420
6C 760 IF ASC(MV$(RM*6-6+1))
=0 THEN 750
KI 770 IF BB THEN BB=0:BC=0:
PRINT "YOU RUN FROM T
HE BEAR...":PRINT
OP 780 IF LL THEN LL=0:LC=0:
PRINT "YOU FLEE FROM
THE LEOPARD...":PRIN
T
CE 790 IF OL(60)=RM THEN 350
CN 800 IF RM=19 THEN PRINT "
THE SOUTH DOOR CLOSES
```

```

BEHIND YOU....":PRINT
T :MV$(104,104)="(,)"
KA 810 IF IR AND (RM=21) THE
N PRINT "FIRST, YOU M
UST EXIT THE RAFT.":G
OTO 430
KK 820 RM=ASC(MV$(RM*6-6+1))
:GOTO 1110
GB 830 IF ASC(MV$(RM*6-6+2))
=0 THEN 750
CG 840 IF OL(47)=RM THEN PRI
NT "THE BEAR STOPS YO
U.":GOTO 420
HD 850 IF OL(67)=RM THEN PRI
NT "THE BLACK LEOPARD
STOPS YOU.":GOTO 420
KI 860 IF IR AND (RM=34) THE
N PRINT "FIRST, YOU M
UST EXIT THE RAFT.":G
OTO 420
EE 870 IF RM=55 AND TW=1 THE
N PRINT "AS YOU ENTER
THE ARCHWAY, A JET O
F"
KI 880 IF RM=55 AND TW=1 THE
N PRINT "FIRE COMES F
ROM THE DRAGON'S MOUT
H AND"
OC 890 IF RM=55 AND TW=1 THE
N PRINT "ENGULFS YOU.
":GOTO 4640
CB 900 IF MM THEN MM=0:MC=0:
PRINT "YOU FLEE FROM
THE LUMBERING MUMMY..
.":PRINT
KL 910 RM=ASC(MV$(RM*6-6+2))
:GOTO 1110
GC 920 IF ASC(MV$(RM*6-6+3))
=0 THEN 750
HC 930 IF OL(67)=RM THEN PRI
NT "THE BLACK LEOPARD
STOPS YOU.":GOTO 420
KI 940 IF IR AND (RM<27) THE
N PRINT "FIRST, YOU M
UST EXIT THE RAFT.":G
OTO 420
LA 950 RM=ASC(MV$(RM*6-6+3))
:GOTO 1110
SH 960 IF ASC(MV$(RM*6-6+4))
=0 THEN 750
HB 970 IF OL(67)=RM THEN PRI
NT "THE BLACK LEOPARD
STOPS YOU.":GOTO 420
PL 980 IF IR=1 AND (RM<27 OR
RM>30) THEN PRINT "F
IRST, YOU MUST EXIT T
HE RAFT.":GOTO 420
JP 990 IF RM=30 THEN PRINT "
THAT WAY LEADS TO THE
OCEAN, YOU TURN
{3 SPACES}BACK.":GOTO
420
EJ 1000 IF MM THEN MM=0:MC=0
:PRINT "YOU FLEE FRO
M THE LUMBERING MUMM
Y....":PRINT
PN 1010 IF DD THEN DD=0
LF 1020 IF RM=29 AND IR=0 TH
EN PRINT "YOU CANNOT
SWIM THAT FAR.":GOT
O 420
NH 1030 RM=ASC(MV$(RM*6-6+4)
):GOTO 1110
IO 1040 IF ASC(MV$(RM*6-6+5)
)=0 THEN 750
BD 1050 IF RM=31 THEN PRINT
"YOU RETURN TO THE S
URFACE FOR AIR.":PRI
NT :AC=10
NL 1060 RM=ASC(MV$(RM*6-6+5)
):GOTO 1110
JC 1070 IF ASC(MV$(RM*6-6+6)
)=0 THEN 750
HB 1080 IF RM=4 THEN PRINT "
AS YOU DESCEND, THE
TUNNEL CAVES IN FROM
ABOVE.":PRINT
GB 1090 IF RM=4 THEN SC=SC+5
NH 1100 RM=ASC(MV$(RM*6-6+6)
):GOTO 1110
BE 1110 IF RM>36 AND RM<39 A
ND LT=0 THEN PRINT "
YOU ARE IN TOTAL DAR
KNESS.":GOTO 420
IH 1120 IF RM<>LR THEN GOSUB
4910
BG 1130 PRINT "YOU ARE ";RM$
;"."
HG 1140 IF RM=18 THEN PRINT
"LIGHT SHINES THROUG
H A CRACK BETWEEN
{4 SPACES}SOME BEAMS
."
LJ 1150 IF HC AND (RM=14) TH
EN PRINT "THERE IS A
ROPE TO ASCEND THE
CLIFF{5 SPACES}HERE.
"
PP 1160 IF HC AND (RM=20) TH
EN PRINT "THERE IS A
ROPE TO DESCEND THE
CLIFF{4 SPACES}HERE
."
NJ 1170 IF IR THEN PRINT "YO
U ARE ABOARD A WOODEN
RAFT."
GE 1180 FOR X=1 TO 67:IF OL(
X)=RM THEN 1220
GC 1190 NEXT X
OO 1200 IF SB AND RM=8 THEN
PRINT "SMASHED AGAIN
ST THE WALL IS A COAL
BIN."
MI 1210 GOTO 1460
HI 1220 I=X*29-28:FL$=OB$(I+
1,I+1)
FB 1230 IF FL$="*" THEN FL$=
OB$(I+2,I+2)
OA 1240 FOR Y=1 TO 5:IF FL$=
VL$(Y,Y) THEN A$="AN
":GOTO 1280
GA 1250 NEXT Y
PA 1260 A$="A"
NG 1270 IF X=15 OR X=31 OR X
=45 THEN A$="SOME"
GP 1280 IF RF=1 THEN RETURN
BP 1290 PRINT "THERE IS ";A$
;OB$(I+1,I+ASC(OB$(I
)))"; HERE."
EH 1300 GOSUB 1310:GOTO 1190
IO 1310 FOR Y=1 TO 11:IF X=P
O(Y) THEN RF=1:GOTO
1330
HI 1320 NEXT Y:RETURN
FJ 1330 IF OO(Y)=0 THEN RF=0
:RETURN
ND 1340 Z=X:W=Y
PK 1350 FOR I=1 TO 66:IF OL(
I)=PV(W) THEN 1380
FC 1360 NEXT I
OK 1370 RF=0:RETURN
LC 1380 IF Y=1 OR Y=10 THEN
1440
JB 1390 IF Y=7 OR Y=8 THEN 1
450
NC 1400 I=Z*29-28:PRINT " TH
E ";OB$(I+1,I+ASC(OB
$(I)))"; CONTAINS:"
HK 1410 FOR X=1 TO 66:IF OL(
X)=PV(W) THEN GOSUB
1220:I=X*29-28:PRINT
" ";A$;OB$(I+1,I+A
SC(OB$(I)))
FO 1420 NEXT X
DH 1430 X=Z:Y=W:RF=0:RETURN
GB 1440 I=Z*29-28:PRINT " ON
THE ";OB$(I+1,I+ASC
(OB$(I)))"; THERE IS
":GOTO 1410
KI 1450 I=Z*29-28:PRINT " LO
ADED INTO THE ";OB$(
I+1,I+ASC(OB$(I)))";
THERE IS":GOTO 141
0
CB 1460 FOR X=1 TO 6:IF ASC(
MV$(RM*6-6+X))>0 THE
N V=V+1
GD 1470 NEXT X
OE 1480 IF V=0 THEN 420
SI 1490 PRINT :PRINT "YOU FI
ND THAT THERE ";
LK 1500 IF V>1 THEN PRINT "A
RE EXITS ":GOTO 1520
DI 1510 PRINT "IS AN EXIT ";
PC 1520 FOR X=1 TO 6:I=X*6-5
:IF ASC(MV$(RM*6-6+X
))>0 THEN PRINT DR$(
I+1,I+ASC(DR$(I)))";
, ";
HO 1530 NEXT X:PRINT CL$:CL$
;".":GOTO 420
JP 1540 IF OL(NN)<-1 AND OL(
NN)>-13 THEN 1640
AI 1550 IF OL(NN)=-1 THEN PR
INT "YOU ALREADY HAV
E THAT.":GOTO 420
LN 1560 IF (NN=7) AND OL(66)
=RM THEN 1730
EN 1570 IF (NN=39) AND HC AN
D (RM=14) THEN HC=0:
MV$(83,83)="(,)":MV(
20,6)=0:GOTO 1630
BB 1580 IF (NN=39) AND HC AN
D (RM=20) THEN HC=0:
MV$(83,83)="(,)":MV$
(120,120)="(,)":GOTO
1630
FO 1590 IF (NN=44) AND OL(18
)=RM THEN PRINT "THE
VINES ARE CONNECTED
TOGETHER.":GOTO 420
LN 1600 IF OL(NN)<>RM THEN P
RINT "YOU DO NOT SEE
THAT.":GOTO 420
OB 1610 IF TF(NN)=0 THEN PRI
NT "IT FLOWS THROUGH
YOUR FINGERS....":O
L(NN)=0:GOTO 420
JO 1620 IF TF(NN)=-1 THEN PR
INT "THAT ITEM STAYS
PUT.":GOTO 420
NM 1630 PRINT "TAKEN.":OL(NN
)=-1:GOTO 1690
EK 1640 FOR I=1 TO 11:IF OL(
NN)=PV(I) THEN Y=I
FE 1650 NEXT I
NA 1660 IF OL(PO(Y))=RM AND
(OO(Y)=1) THEN OI(Y)
=OI(Y)-1:GOTO 1610
JA 1670 IF OL(PO(Y))=-1 AND
(OO(Y)=1) THEN OI(Y)
=OI(Y)-1:GOTO 1610
MP 1680 GOTO 1600
MD 1690 I=NN*29-28:IF OB$(I+
1,I+1)="*" THEN PRIN
T :PRINT "YOU HAVE A
TREASURE!"
OF 1700 I=NN*29-28:IF (OB$(I
+1,I+1)="*") AND (RM
=44) THEN SC=SC-10
JD 1710 IF NN=11 AND OL(14)=
-5 AND RM=44 THEN SC
=SC-10
JJ 1720 GOTO 420
FP 1730 PRINT "YOU GRAB THE
POUCH, AND THE CIRCL
E OPENS INTO A PIT..
.":GOTO 4640
HI 1740 IF OL(NN)<-1 THEN 18
30

```

```

MJ 1750 IF OL(NN)<>-1 THEN P
RINT "YOU DO NOT HAV
E THAT.":GOTO 420
MJ 1760 PRINT "DROPPED.":OL(
NN)=RM
PD 1770 IF (NN=38) AND OL(42
)=RM THEN 1870
DC 1780 IF (NN=14) OR (NN=62
) THEN PRINT "IT SOA
KS INTO THE GROUND..
.":OL(NN)=0
PD 1790 IF NN=15 THEN PRINT
"IT IS BLOWN AWAY BY
THE WIND...":OL(NN)
=0
EC 1800 I=NN*29-28:IF OB$(I+
1,I+1)="*" AND RM=44
THEN SC=SC+10
JC 1810 IF NN=11 AND OL(14)=
-5 AND RM=44 THEN SC
=SC+10
JK 1820 GOTO 420
EL 1830 FOR I=1 TO 11:IF OL(
NN)=PV(I) THEN Y=I
FF 1840 NEXT I
AE 1850 IF OL(PO(Y))=-1 AND
(OO(Y)=1) THEN 1760
NF 1860 GOTO 1750
NI 1870 PRINT "YOU REPLACE T
HE BROKEN TRACK WITH
THE<3 SPACES>ROD.":
OL(42)=0:OL(38)=0
KA 1880 GOTO 420
CL 1890 IF OL(NN)<>RM AND OL
(NN)<>-1 THEN 1600
JE 1900 FOR I=1 TO 11:IF NN=
PO(I) THEN Y=I:PF=1
FD 1910 NEXT I
CA 1920 IF Y=0 THEN 1960
GM 1930 IF OL(PO(Y))=RM THEN
1960
CM 1940 IF OL(PO(Y))=-1 THEN
1960
PK 1950 IF OL(PO(Y))<>-1 AND
(OO(Y)<>1) THEN NN=
0:GOTO 1750
DA 1960 IF NN>26 AND NN<50
THEN PRINT "YOU SEE
NOTHING SPECIAL ABOU
T IT.":GOTO 420
IL 1970 IF NN=4 THEN PRINT "
ITS MOUTH IS OPEN WI
DE AND SMOKE IS
<5 SPACES>COMING FRO
M IT."
EB 1980 IF NN=5 THEN PRINT "
IT IS A PLASTIC CARD
."
CM 1990 IF NN<6 THEN PRINT "
IT HAS SOMETHING WRI
TTEN ON IT."
AF 2000 IF NN=6 AND FL THEN
PRINT "IT IS FILLED
WITH OIL.":GOTO 420
DB 2010 IF NN=6 AND BK THEN
PRINT "IT IS SMASHED
.":GOTO 420
CF 2020 IF (NN=6) AND (LT=0)
THEN PRINT "YOU SEE
NOTHING SPECIAL ABO
UT IT.":GOTO 420
LD 2030 IF NN=6 THEN PRINT "
IT IS LIT."
PL 2040 IF NN=9 THEN PRINT "
IT HAS SEVERAL GEMS
ON THE HILT."
FK 2050 IF NN=10 THEN PRINT
"IT RESEMBLES A QUAR
REL."
AD 2060 IF NN=14 THEN PRINT
"IT HAS A MILKY WHIT
E COLOR."
PM 2070 IF NN=15 THEN PRINT
"IT IS A PURE WHITE.
"
IG 2080 IF NN=16 THEN PRINT
"IT HAS THE INSCRIPT
ION: 'SB-910' ON
<4 SPACES>ITS STARBO
ARD."
JJ 2090 IF NN=17 THEN PRINT
"IT HAS AN ORANGE BU
TTON ON IT WHICH SAY
S:'LAUNCH.'"
FB 2100 IF NN=18 THEN PRINT
"IT HAS LONG VINES H
ANGING FROM ITS
<6 SPACES>BRANCHES."
PN 2110 IF NN=20 THEN PRINT
"IT HAS A SINGLE DRA
WER."
OL 2120 IF NN=22 THEN PRINT
"IT HAS 'SIGNAL FLAR
E' WRITTEN ON IT IN
BLACK INK."
DE 2130 IF NN=23 THEN PRINT
"IT HAS A WORN MATTR
ESS."
JK 2140 IF NN=24 THEN PRINT
"IT IS ENCASED IN OL
D BANDAGES."
DO 2150 IF PF AND ((NN=2) OR
(NN=13) OR (NN=19)
OR (NN=26)) THEN NO=
1
AK 2160 IF PF AND NO=1 THEN
PRINT "IT LOOKS ORDI
NARY.":NO=0:GOTO 219
0
MJ 2170 IF PF THEN PRINT "IT
IS ";:IF OO(Y)=0 TH
EN PRINT "CLOSED."
AC 2180 IF OO(Y) THEN PRINT
"OPEN."
AN 2190 IF PF THEN X=NN:PF=0
:GOSUB 1310
JD 2200 GOTO 420
MJ 2210 IF OL(NN)<>-1 AND (T
F(NN)=1) THEN 1750
NB 2220 IF NN>5 THEN PRINT "
THERE IS NOTHING WRI
TTEN ON THAT.":GOTO
420
BL 2230 IF NN=1 THEN PRINT "
IT READS: 'THE TRAPD
OOR IS UNDER....':G
OTO 420
JC 2240 IF NN=2 THEN PRINT "
IT READS: 'TO ESCAPE
, OFFER THE SAPPHIRE
TO RA.":GOTO 420
OL 2250 IF (NN=4) AND TW THE
N PRINT "THE STATUE'
S BASE READS: 'DO NO
T ENTER.':GOTO 420
FO 2260 IF NN=4 THEN PRINT "
THE STATUE'S BASE RE
ADS: 'ENTER.':GOTO
420
CF 2270 IF NN=5 THEN PRINT "
IT READS: 'THIS CARD
ACTIVATES SPACESHIP
SB-910.':GOTO 420
NE 2280 PRINT "THE BOOK IS O
N DEMONOLOGY. THERE
IS ONLYONE PAGE INTA
CT. IT READS: ";
EB 2290 PRINT " '...DEMON':P
RINT "MUST BE SUMMON
ED IN PENTACLE.':GO
TO 420
FM 2300 PRINT "YOU SAY, ";QT
$;NN$;QT$;".
NP 2310 IF OL(60)=RM AND (NN
=62) THEN 2330
PF 2320 PRINT "NOTHING HAPPE
NS.":GOTO 420
HA 2330 PRINT "THE SPHINX CR
IES OUT AND JUMPS IN
TO THE PIT, FALLING
TO HIS DEATH."
LA 2340 PRINT "HE HAS LEFT B
EHIND A STAR RUBY.":
OL(61)=RM:SC=SC+40:S
X=0
MM 2350 OL(60)=0:PC=0:GOTO 4
20
HP 2360 IF (NN=25) AND OL(20
)=RM THEN OL(25)=RM:
GOTO 2400
JH 2370 IF ((OL(NN)<>-1) AND
((TF(NN)=1)) OR (OL
(NN)<>RM) AND (TF(NN
)=-1)) THEN 1750
PC 2380 IF (NN=28) AND OL(28
)=RM THEN PRINT "OPE
NED.":MV$(24,24)=CHR
$(5):OL(28)=0:GOTO 4
20
CC 2390 IF (NN=25) AND OL(20
)<>RM THEN 2360
FC 2400 FOR I=1 TO 11:IF NN=
PO(I) THEN Y=I
LN 2410 NEXT I:IF Y=0 THEN P
RINT "THERE IS NO WA
Y TO OPEN THAT.":GOT
O 420
AG 2420 IF NN=1 OR NN=19 OR
NN=26 THEN PRINT "TH
ERE IS NO WAY TO OPE
N THAT.":GOTO 420
DL 2430 IF OO(Y)=1 THEN PRIN
T "IT IS ALREADY OPE
NED.":GOTO 420
DM 2440 IF OO(Y)=1 THEN PRIN
T "IT IS ALREADY OPE
NED.":GOTO 420
HF 2450 PRINT "OPENED.":OO(Y
)=1
HM 2460 X=NN:GOSUB 1310
IJ 2470 IF NN=50 AND OL(24)=
-11 THEN 2490
JN 2480 GOTO 420
ED 2490 PRINT "THE MU
MMY OPENS ITS EYES A
ND LETS OUT
<3 SPACES>A DEEP MOA
N."
PO 2500 OL(24)=RM:GOTO 420
FF 2510 IF OL(NN)<>-1 AND (T
F(NN)=1) THEN PRINT
"IT IS NOT HERE.":GO
TO 420
GK 2520 IF NN=28 AND MV$(24,
24)=CHR$(5) THEN PRI
NT "CLOSED.":OL(28)=
RM:MV$(24,24)="{}":
GOTO 420
CA 2530 IF (NN=25) AND OL(25
)<>RM THEN 2510
FH 2540 FOR I=1 TO 11:IF NN=
PO(I) THEN Y=I
AG 2550 NEXT I:IF Y=0 THEN P
RINT "THERE IS NO WA
Y TO CLOSE THAT.":GO
TO 420
EP 2560 IF NN=1 OR NN=19 OR
NN=26 THEN PRINT "TH
ERE IS NO WAY TO CLO
SE THAT.":GOTO 420
DO 2570 IF OO(Y)=0 THEN PRIN
T "IT IS ALREADY CLO
SED.":GOTO 420
DA 2580 IF (NN=25) AND OL(25
)=RM THEN OL(25)=0
IB 2590 PRINT "CLOSED.":OO(Y
)=0:GOTO 420
DC 2600 IF OL(NN)<>RM THEN P
RINT "YOU DO NOT SEE

```

```

    THAT HERE.":GOTO 42
    0
JH 2610 IF NN=63 THEN PRINT
"YOU ARE ABOARD THE
RAFT.":IR=1
FA 2620 IF IR THEN MV$(122,1
22)=CHR$(28):MV$(199
,199)=CHR$(28):GOTO
420
BK 2630 IF NN=59 THEN PRINT
"YOU PLUNGE INTO THE
PIT....":GOTO 4640
NA 2640 IF NN=35 THEN PRINT
"YOU SLIDE DOWN THE
CHUTE....":PRINT :RM
=18:GOTO 1110
BL 2650 IF NN<>16 AND NN<>41
AND NN<>50 THEN PRIN
T "YOU CANNOT ENTER
THAT.":GOTO 420
MM 2660 IF NN=16 THEN PRINT
"YOU ENTER THE SPACE
SHIP....":PRINT :RM=
44:GOTO 1110
FL 2670 IF NN=50 THEN PRINT
"IT IS TOO SMALL FOR
YOU.":GOTO 420
AI 2680 PRINT "YOUR WEIGHT S
TARTS THE COAL BIN T
O{6 SPACES}MOVE DOWN
THE TRACK."
EM 2690 IF OL(42)=8 THEN PRI
NT "UNFORTUNATELY TH
E TRACKS ARE BROKEN
AND YOU ARE";
BC 2700 IF OL(42)=8 THEN PRI
NT " THROWN AGAINST
THE WALL....":GOTO 4
640
EK 2710 PRINT "AFTER A BRIEF
RIDE YOU STOP AT TH
E END OF THE TRACK.
":PRINT
AD 2720 IF RM=7 THEN RM=12:O
L(41)=12:PRINT :GOTO
1110
NI 2730 IF RM=12 THEN RM=7:O
L(41)=7:PRINT :GOTO
1110
DJ 2740 IF (NN<>6) AND (NN<>
24) THEN PRINT "YOU
CANNOT LIGHT THAT.":
GOTO 420
CA 2750 IF NN=6 THEN IF OL(6
)<>-1 THEN 1750
LM 2760 IF NN=24 THEN IF OL(
24)<>RM THEN 1600
JK 2770 IF NN=24 THEN 2830
FL 2780 IF LT THEN PRINT "IT
IS ALREADY LIT.":GO
TO 420
LL 2790 IF BK THEN PRINT "TH
E LANTERN IS SMASHED
.":GOTO 420
OB 2800 IF FL=0 THEN PRINT "
THE LANTERN IS NOT F
ILLED WITH OIL.":GOT
O 420
OF 2810 IF OL(31)<>-1 THEN P
RINT "YOU HAVE NOTHI
NG TO LIGHT IT WITH.
":GOTO 420
JF 2820 PRINT "OK, THE LANTE
RN IS LIT.":LT=1:FL=
0:GOTO 420
LI 2830 IF OL(6)<>-1 OR (LT=
0) THEN PRINT "YOU H
AVE NOTHING TO LIGHT
IT WITH.":GOTO 420
KN 2840 PRINT "YOU THROW YOU
R LANTERN AT THE MUM
MY AND IT BREAKS, EN
GULFING THE ";
BC 2850 PRINT "MUMMY IN":PRI
NT "FLAMES. THE LANT
ERN LIES SMASHED ON
THE FLOOR."
KG 2860 OL(52)=-11:OI(11)=1:
MM=0:OL(24)=0:OL(6)=
39:LT=0:BK=1:GOTO 42
0
DE 2870 IF OL(9)<>-1 THEN PR
INT "YOU HAVE NOTHIN
G TO CUT IT WITH.":G
OTO 420
PD 2880 IF NN<>44 THEN PRINT
"YOU CANNOT CUT THA
T.":GOTO 420
MH 2890 IF OL(18)<>RM THEN P
RINT "FROM WHERE?":G
OTO 420
LP 2900 IF OL(44)<>-13 THEN
PRINT "THE OTHER VIN
ES HANG"
HP 2910 IF OL(44)<>-13 THEN
420
IH 2920 PRINT "OK, YOU CUT A
LONG PIECE OF VINE
FROM{3 SPACES}THE TR
EE.":OL(44)=-1
JN 2930 GOTO 420
DP 2940 IF (NN=15) AND (OL(N
N)=-6) AND (OL(12)=-
1) AND OO(5) THEN 29
60
LL 2950 IF OL(NN)<>-1 THEN 1
750
MC 2960 VP=1:XX=NN:PRINT "WH
ERE DO YOU WISH TO P
UT IT?":GOSUB 430
IH 2970 YY=NN:NN=XX:FOR Y=1
TO 11:IF YY=PO(Y) TH
EN ZZ=Y
BL 2980 NEXT Y
AA 2990 IF (NN=15) AND (YY<>
58) THEN ZZ=0
KC 3000 IF YY=58 THEN 3110
LB 3010 IF (YY=13) AND (NN<>
5) THEN ZZ=0
OJ 3020 IF (YY=19) AND (NN<>
10) THEN ZZ=0
OB 3030 IF (YY=21) AND (NN<>
22) THEN ZZ=0
BA 3040 IF ZZ=0 THEN PRINT "
YOU CANNOT PUT THAT
THERE.":GOTO 420
NM 3050 IF OL(YY)<>RM AND OL
(YY)<>-1 THEN PRINT
"IT IS NOT HERE.":GO
TO 420
PL 3060 IF OO(ZZ)=0 THEN PRI
NT "IT IS NOT OPEN.
":GOTO 420
KB 3070 IF OI(ZZ)=MI(ZZ) THE
N PRINT "IT DOES NOT
FIT.":GOTO 420
KH 3080 PRINT "DONE.":OL(NN)
=PV(ZZ):OI(ZZ)=OI(ZZ
)+1
JO 3090 IF YY<>2 OR NN<>36 T
HEN 420
DE 3100 PRINT "A DOOR TO THE
SOUTH CREAKS OPEN.
":MV$(104,104)=CHR$(1
9):GOTO 420
BC 3110 IF OL(4)<>RM THEN PR
INT "IT IS NOT HERE.
":GOTO 420
KP 3120 PRINT "IT DISAPPEARS
INTO THE MOUTH...."
:OL(NN)=0
NM 3130 IF NN=15 THEN TW=0
JH 3140 GOTO 420
KK 3150 IF NN=64 AND RM=44 T
HEN 3240
PF 3160 IF OL(NN)<>RM THEN 1
740
NH 3170 IF NN<>27 AND NN<>41
AND NN<>64 THEN PRI
NT "NOTHING HAPPENS.
":GOTO 420
JF 3180 IF NN=41 THEN PRINT
"YOU PUSH THE COAL B
IN AND IT ROLLS
{6 SPACES}AWAY...."
IH 3190 IF NN=41 THEN OL(41)
=0
LP 3200 IF NN=41 AND OL(42)
THEN PRINT "YOU HEAR
A SMASH IN THE DIST
ANCE.":SB=1
FI 3210 IF NN=41 THEN 420
CB 3220 IF (NN=27) AND TR TH
EN PRINT "YOU CANNOT
MOVE IT ANY FARTHER
.":GOTO 420
JA 3230 IF NN=27 THEN PRINT
"YOU PUSH IT TO REVE
AL A TRAPDOOR
{8 SPACES}UNDERNEATH
!"
FC 3240 IF NN=27 THEN OL(28)
=RM:TR=1:GOTO 420
LF 3250 IF OL(5)<>-7 THEN PR
INT "NOTHING HAPPENS
.":GOTO 420
NJ 3260 PRINT "THERE IS A GI
ANT EXPLOSION AND TH
E"
PA 3270 PRINT "SPACESHIP LAU
NCHES THROUGH THE CE
ILING OF THE CAVERN
."
CH 3280 IF SC=170 THEN SC=SC
+30:GOTO 3310
JJ 3290 PRINT "UNFORTUNATELY
YOU HAVE NOT OBTAIN
ED ALL THE TREASURES
AND YOU LAND";
KL 3300 PRINT " IN THE CAVER
N";:PRINT "AGAIN.":G
OTO 420
MI 3310 PRINT "CONGRAT
ULATIONS! YOU HAVE
ALL TEN":PRINT "TREA
SURES!"
JH 3320 PRINT :GOTO 4650
BK 3330 IF OL(39)<>-1 THEN P
RINT "YOU DO NOT HAV
E ANYTHING TO HOOK I
T{5 SPACES}WITH."
EO 3340 IF OL(39)<>-1 THEN 4
20
NJ 3350 IF NN=40 AND (RM=14
OR RM=20) THEN 3390
LK 3360 IF (NN=7) AND OL(66)
=RM THEN 3410
AG 3370 IF OL(NN)<>RM AND (O
L(NN)<>-1) THEN PRIN
T "IT IS NOT HERE.":
GOTO 420
PI 3380 PRINT "YOU CANNOT HO
OK THAT.":GOTO 420
AN 3390 PRINT "YOU HOOK THE
GRAPPLING HOOK ON TH
E SMALLCLIFF."
KF 3400 OL(39)=0:HC=1:MV$(83
,83)=CHR$(20):MV$(12
0,120)=CHR$(14):GOTO
420
PJ 3410 PRINT "YOU HOOK THE
POUCH AND PULL IT IN
TO YOURHANDS."
IP 3420 OL(7)=-1:OL(66)=0:GO
TO 420
JB 3430 IF NN=22 THEN 3450
CE 3440 IF OL(NN)<>RM AND OL
(NN)<>-1 THEN 1600
EA 3450 IF OL(19)<>-1 AND OL
(21)<>-1 THEN PRINT

```

```

"YOU DON'T HAVE ANYT
HING TO";
CM 3460 IF OL(19)<>-1 AND OL
(21)<>-1 THEN PRINT
"SHOOT IT":PRINT "W
ITH.":GOTO 420
CF 3470 IF OL(NN)=-1 THEN PR
INT "YOU CANNOT SHOO
T AN ITEM OF INVENTO
RY.":GOTO 420
AE 3480 IF OL(19)=-1 AND OL(
21)=-1 THEN 3510
EN 3490 IF OL(19)=-1 THEN 35
60
DP 3500 IF OL(21)=-1 THEN 36
60
NL 3510 PRINT "WHICH TO USE,
YOUR FLARE (G)UN, O
R YOUR (C)ROSSBOW?"
NH 3520 GOSUB 60:IF A$<>"A
ND A$<>"G" AND A$<>"
C" THEN 420
IA 3530 IF A$="C" THEN PRINT
:GOTO 3560
IG 3540 IF A$="G" THEN PRINT
:GOTO 3660
NA 3550 GOTO 3520
JD 3560 IF OL(10)<>-8 THEN P
RINT "IT IS NOT LOA
D.":GOTO 420
LM 3570 IF NN=22 THEN PRINT
"YOU CANNOT SHOOT A
FLARE FROM A":PRINT
"CROSSBOW.":GOTO 420
LN 3580 IF (NN=24) OR (NN=47
) OR (NN=56) OR (NN=
60) OR (NN=67) THEN
3610
IH 3590 PRINT "ON CONTACT WI
TH IT, THE STICK BRE
AKS{4 SPACES}INTO SP
LINTERS.":OL(10)=0
JI 3600 GOTO 420
OB 3610 IF NN=24 OR NN=56 OR
NN=60 THEN PRINT "I
T DOES NOT SEEM AFFE
CTED.":GOTO 3650
JM 3620 IF NN=67 THEN 3640
HB 3630 PRINT "ON CONTACT TH
E CROSSBOW BREAKS IN
TO{5 SPACES}SPLINTER
S.":OL(10)=0
HJ 3640 PRINT "THE STICK PLU
NGES INTO THE CREATU
RE'S{4 SPACES}THROAT
.":OL(NN)=0:LL=0
JB 3650 OL(10)=0:OL(67)=0:GO
TO 420
FL 3660 IF NN<>22 THEN PRINT
"YOU CAN ONLY SHOOT
THE FLARE, NOT AN
{4 SPACES}OBJECT.":G
OTO 420
ND 3670 IF OL(22)<>-12 THEN
PRINT "IT IS NOT LOA
DED.":GOTO 420
HB 3680 IF OO(8) THEN PRINT
"IT EXPLODES IN YOUR
FACE...":GOTO 4640
OC 3690 PRINT "THE FLARE SHO
OTS INTO THE AIR, SH
OWERINGYOU WITH SPAR
KS."
IH 3700 IF OL(47)=RM THEN PR
INT :GOTO 3720
JB 3710 OL(22)=0:GOTO 420
DL 3720 PRINT "STALACTITES S
TART TO FALL TO THE
GROUND AND ONE HITS
THE BEAR IN";
JJ 3730 PRINT "THE BACK OF
HIS":PRINT "NECK, B
REAKING HIS SPINE.":
OL(47)=0:BB=0
NC 3740 GOTO 3710
LH 3750 IF OL(NN)<>-1 AND OL
(NN)<>RM THEN PRINT
"IT IS NOT HERE.":GO
TO 420
LL 3760 IF OL(NN)<>-1 THEN 1
750
NC 3770 IF (NN=49) AND (OL(5
1)=-1) AND DD=0 THEN
3790
AA 3780 PRINT "NOTHING HAPPE
NS.":GOTO 420
PP 3790 PRINT "THERE IS A PU
FF OF SMOKE AND A DE
MON{4 SPACES}APPEARS
."
EA 3800 IF RM=52 THEN OL(56)
=RM:GOTO 3830
AP 3810 PRINT "YOU ARE UNPRO
TECTED AND THE DEMON
":PRINT "APPROACHES
YOU";
EO 3820 PRINT " - CLAWS":PRI
NT "GRASPING FOR YOU
R HEART...":GOTO 46
40
PD 3830 PRINT QT$;"SO WHAT D
O YOU HAVE FOR ME?";
QT$:GOTO 430
JH 3840 IF NN=14 THEN 3900
BI 3850 IF NN=62 AND RM>27 A
ND RM<31 THEN PRINT
"THE WATER HAS PECUL
IAR TASTE.":GOTO 420
ME 3860 IF (NN=62) AND (RM>3
0 AND RM<34) THEN PR
INT "SUDDENLY THE WA
TER RUSHES INTO";:DR
=1
KA 3870 IF DR THEN PRINT "Y
OUR":PRINT "OPEN MOU
TH AND YOU DROWN...
":DR=0:GOTO 4640
LO 3880 IF OL(NN)<>-1 THEN 1
750
EF 3890 PRINT "YOU CANNOT DR
INK THAT.":GOTO 420
HN 3900 IF OL(11)<>-1 THEN 1
750
IF 3910 IF OL(14)<>-5 THEN 1
750
IH 3920 IF OO(4)=0 THEN PRIN
T "THE VIAL IS CLOSE
D.":GOTO 420
BH 3930 PRINT "ALL YOUR WOUN
DS ARE HEALED INSTAN
TLY."
JH 3940 OL(14)=0:GOTO 420
LM 3950 IF OL(NN)<>-1 THEN 1
750
AK 3960 IF OL(24)=RM OR OL(4
7)=RM OR OL(56)=RM O
R OL(60)=RM THEN 399
0
JL 3970 IF OL(67)=RM THEN 39
90
IF 3980 PRINT "THERE IS NO O
NE HERE TO ACCEPT YO
UR{5 SPACES}OFFERING
.":GOTO 420
BD 3990 IF OL(56)<>RM THEN P
RINT "IT DOES NOT A
CEPT YOUR OFFERING.
":GOTO 420
AP 4000 IF NN<>65 THEN PRINT
QT$;"NO, THAT WON'T
DO.":QT$:GOTO 420
CE 4010 PRINT "THE DEMON ACC
EPTS YOUR OFFERING A
ND{5 SPACES}GIVES YO
U A GOLDEN ANKH."
KB 4020 PRINT QT$;"IRONIC IS
N'T IT?";QT$;" HE SA
YS BEFORE":OL(65)=0
AC 4030 PRINT "DISAPPEARING.
":OL(57)=-1:OL(56)=0
:SC=SC+15:DD=0:DC=0:
GOTO 420
MH 4040 IF OL(NN)<>-1 AND (T
F(NN)>0) THEN 1750
NI 4050 IF NN<>54 THEN 3780
IF 4060 IF OL(34)<>-1 THEN 3
780
JA 4070 PRINT "AFTER REPEATE
D BLOWS WITH THE PIC
K, YOU CHIP AWAY THE
ROCK TO";
EL 4080 PRINT "REVEAL A PLA
STIC":PRINT "CARD IN
SIDE IT.":OL(54)=0:O
L(5)=-1
JM 4090 GOTO 420
BK 4100 IF NN=24 OR NN=47 OR
NN=56 OR NN=60 OR N
N=67 THEN 4120
PK 4110 PRINT "ATTACKING THA
T IS FUTILE.":GOTO 4
20
DC 4120 IF OL(19)<>-1 THEN P
RINT "ATTACKING WITH
OUT A WEAPON IS SUIC
IDE.":GOTO 420
FL 4130 PRINT "YOU HAVE A CR
OSSBOW - USE IT.":GO
TO 420
KO 4140 IF OL(NN)<>-1 THEN 1
600
PE 4150 IF NN<>6 THEN PRINT
"YOU CANNOT FILL THA
T.":GOTO 420
JD 4160 IF OL(NN)<>-1 THEN P
RINT "YOU HAVE NO OI
L.":GOTO 420
AH 4170 PRINT "YOU FILL THE
LANTERN WITH OIL FRO
M THE BLADDER."
PM 4180 FL=1:OL(29)=0:OL(30)
=-1:NW$(197,197)=CHR
$(6):NW$(198,203)="X
YZZ":NW$(204,204)=
CHR$(6):NW$(205,210)
="BLADDE"
JN 4190 GOTO 420
KH 4200 IF NN=48 AND RM=33 T
HEN 4230
ON 4210 IF OL(NN)<>RM THEN 1
600
MI 4220 GOTO 2320
OH 4230 IF ML THEN 2320
BI 4240 PRINT "SEVERAL THING
S FLOAT FROM UNDERNE
ATH IT.":
KP 4250 OL(12)=RM:OL(49)=RM:
ML=1:GOTO 420
HC 4260 IF NN<>63 THEN PRINT
"YOU CANNOT BUILD T
HAT.":GOTO 420
AM 4270 IF OL(44)=-1 AND OL(
45)=-1 THEN 4290
AJ 4280 PRINT "YOU DO NOT HA
VE THE MATERIAL TO M
AKE{4 SPACES}IT.":GO
TO 420
BE 4290 PRINT "YOU BUILD A R
AFT.":OL(44)=0:OL(45
)=0:OL(63)=RM:GOTO 4
20
HB 4300 IF NN=16 OR NN=63 TH
EN 4320
KH 4310 PRINT "YOU WERE NEVE
R IN IT!":GOTO 420
IC 4320 IF NN=16 THEN PRINT
"YOU EXIT THE SPACES
HIP...":PRINT :RM=4
3:GOTO 1110
FI 4330 IF IR=0 THEN 4310

```

```

LP 4340 PRINT "YOU EXIT THE
      RAFT.":IR=0:MV$(122,
      122)="(,)":MV$(199,1
      99)="(,)"
KN 4350 IF RM>27 AND RM<31 T
      HEN 4610
NF 4360 IF RM=34 AND CR=0 TH
      EN SC=SC+10:CR=1
JN 4370 GOTO 420
AO 4380 PRINT "YOU ARE CARRY
      ING:"
JB 4390 FOR X=1 TO 65:IF OL(
      X)=-1 THEN RF=1:GOSU
      B 1220:RF=0:I=X*29-2
      8:PRINT " ";A$:OB$(I
      +1,I+ASC(OB$(I))):GO
      SUB 1310
CM 4400 IF OL(X)=-1 THEN IN=
      IN+1
GA 4410 NEXT X
HI 4420 IF IN=0 THEN PRINT "
      ABSOLUTELY NOTHING"
NI 4430 IN=0:GOTO 420
PB 4440 PRINT "DO YOU REALLY
      WISH TO QUIT?":QQ=1
      :GOSUB 430
MO 4450 IF IN$(1,1)="Y" THEN
      4470
AB 4460 PRINT "OK.":QQ=0:RS=
      0:GOTO 430
BN 4470 PRINT "YOU HAVE ACHI
      EVED A SCORE OF ";SC
JM 4480 PRINT :PRINT "OUT OF
      A POSSIBLE 200 IN "
      ;MV;" MOVES.":PRINT
JG 4490 PRINT "THIS PUTS YOU
      IN THE RANK OF:"
GJ 4500 FOR X=1 TO 6:IF SC<=
      MS(X) THEN I=X*13-12
      :S$=RK$(I+1,I+ASC(RK
      $(I))):X=7
GB 4510 NEXT X
BN 4520 PRINT :PRINT QT$:S$;
      " ADVENTURER":QT$
EN 4530 IF SS THEN SS=0:GOTO
      430
PB 4540 PRINT :PRINT "PRESS
      A KEY WHEN READY."
LE 4550 GOSUB 60
GN 4560 IF QQ THEN CLOSE #1:
      POKE 752,0:END
MF 4570 RUN
NL 4580 PRINT "DO YOU REALLY
      WISH TO RESTART?":R
      S=1:GOSUB 430
NI 4590 GOTO 4450
CA 4600 SS=1:GOTO 4470
IA 4610 IF RM<>29 THEN PRINT
      "AS YOU DIVE INTO T
      HE WATER THE CURRENT
      ":WH=1
NL 4620 IF WH THEN PRINT "WA
      SHES YOU WEST - INTO
      THE SEA.":WH=0:GOTO
      4640
NH 4630 PRINT "YOU DIVE INTO
      THE RIVER...":PRIN
      T :RM=31:IR=0:GOTO 1
      110
FJ 4640 PRINT :PRINT :PRINT
      "YOU HAVE DIED.":PRI
      NT
DK 4650 PRINT "DO YOU WISH T
      O QUIT OR RESTART?":
      QQ=1:GOSUB 430:QQ=0
IK 4660 IF IN$<>"QUIT" AND I
      N$<>"RESTART" THEN 4
      650
BO 4670 IF IN$="QUIT" THEN Q
      Q=1
AE 4680 IF IN$="RESTART" THE
      N RS=1
NL 4690 GOTO 4470
ED 4700 DIM TF(68),OL(68),MI
      (11),OI(11),OO(11),P
      V(11),PO(11),MS(6)
LJ 4710 DIM MV$(56*6),OB$(67
      *29),NW$(67*7),VW$(4
      6*7),RK$(13*6),DR$(6
      *6)
EI 4720 DIM RM$(62),PO$(11),
      IN$(37),VB$(37),NN$(
      37),QT$(1),UL$(1),CL
      $(1),DL$(1),FL$(1),C
      R$(1),A$(16),VL$(5),
      S$(64)
NC 4730 TRAP 4990:S$=DRIVE$:
      S$(LEN(S$)+1)="HERMI
      T.BEG":OPEN #2,4,0,S
      $
FK 4740 FOR X=1 TO 56:FOR Y=
      1 TO 6:INPUT #2:I:MV
      $(X*6-6+Y)=CHR$(I):N
      EXT Y:NEXT X
JG 4750 FOR X=1 TO 44:I=X*7-
      6:INPUT #2;S$:VW$(I)
      =CHR$(LEN(S$)):VW$(I
      +1)=S$:NEXT X
DC 4760 FOR X=1 TO 67:I=X*7-
      6:INPUT #2;S$:NW$(I)
      =CHR$(LEN(S$)):NW$(I
      +1)=S$:INPUT #2:I:TF
      (X)=I:NEXT X
HE 4770 FOR X=1 TO 67:I=X*29
      -28:INPUT #2;S$:OB$(
      I)=CHR$(LEN(S$)):OB$(
      I+1)=S$:INPUT #2:I:
      OL(X)=I:NEXT X
EN 4780 FOR X=1 TO 6:INPUT #
      2;S$:I=X*13-12:RK$(I
      )=CHR$(LEN(S$)):RK$(
      I+1)=S$:INPUT #2:I:M
      S(X)=I:NEXT X
AC 4790 FOR X=1 TO 11:INPUT
      #2;I:PO(X)=I:NEXT X
PB 4800 FOR X=1 TO 11:INPUT
      #2;I:MI(X)=I:NEXT X
PK 4810 FOR X=1 TO 11:INPUT
      #2;I:OO(X)=I:NEXT X
AD 4820 FOR X=1 TO 11:INPUT
      #2;I:PV(X)=I:NEXT X
DD 4830 FOR X=1 TO 6:INPUT #
      2;S$:I=X*6-5:DR$(I)=
      CHR$(LEN(S$)):DR$(I+
      1)=S$:NEXT X
DN 4840 CLOSE #2:PRINT "{UP}
      ":TRAP 32768
KB 4850 RM=1:LR=0:VL$="AEIOU
      ":OI(2)=1:OI(3)=2:OI
      (4)=1:OI(5)=1:OL(21)
      =-1:TW=1
KK 4860 OL(22)=-1:AC=10:CR=0
      :MV=-1:OI(2)=1:OI(3)
      =2:OI(4)=1:OI(5)=1:O
      I(9)=1
IL 4870 OI(10)=1
LA 4880 QT$=CHR$(34):CR$=CHR
      $(155)
IM 4890 UL$=CHR$(95):CL$=CHR
      $(30):DL$=CHR$(126)
KN 4900 RETURN
IM 4910 LR=RM:TRAP 4940:S$=D
      RIVE$:S$(LEN(S$)+1)=
      "HERMIT.DAT":OPEN #2
      ,4,0,S$
IO 4920 FOR I=1 TO RM:INPUT
      #2;RM$:NEXT I
DA 4930 CLOSE #2:TRAP 32768:
      RETURN
FO 4940 CLOSE #2:TRAP 32768:
      PRINT :PRINT :PRINT
      "***DISK ERROR***
      {BELL}"
NL 4950 PRINT "MAKE SURE THA
      T THE DISK CONTAININ
      G THE FILE HERMIT.D
      AT IS IN ";DRIVE$:PR
      INT
FE 4960 PRINT "PRESS RETURN
      TO CONTINUE";
BO 4970 GOSUB 60:IF A$<>CR$
      THEN 4970
GK 4980 PRINT :PRINT :GOTO 4
      910
GD 4990 CLOSE #2:TRAP 32768:
      PRINT :PRINT :PRINT
      "***DISK ERROR***
      {BELL}"
LD 5000 PRINT "MAKE SURE THA
      T THE DISK CONTAININ
      G THE FILE HERMIT.B
      EG IS IN ";DRIVE$:PR
      INT
EH 5010 PRINT "PRESS RETURN
      TO CONTINUE";
DI 5020 GOSUB 60:IF A$<>CHR$
      (155) THEN 5020
EL 5030 PRINT :PRINT :RUN

```

Program 7: The Hermit Data File Creator For Atari 400, 800, XL, And XE

```

LD 10 REM THE HERMIT'S DATA
      FILE CREATOR
BO 15 REM COPYRIGHT 1987 COM
      PUTE! PUBLICATIONS, IN
      C. ALL RIGHTS RESERVE
      D.
BE 16 PRINT "{CLEAR}":POSITI
      ON 10,5:PRINT "COPYRIG
      HT 1987":POSITION 6,6:
      PRINT "COMPUTE! PUBLIC
      ATIONS, INC."
LD 17 POSITION 8,7:PRINT "AL
      L RIGHTS RESERVED.":FO
      R I=1 TO 1500:NEXT I
PG 20 DIM S$(255),DRIVE$(3):
      DRIVE$="D1:"
JH 30 PRINT "{CLEAR}WORKING.
      . . .";
OM 40 S$=DRIVE$:S$(LEN(DRIVE
      $)+1)="HERMIT.BEG":OPE
      N #1,8,0,S$:S$(LEN(DRI
      VE$)+1)="HERMIT.DAT":O
      PEN #2,8,0,S$
GC 50 FOR X=1 TO 56:FOR Y=1
      TO 6:READ I:PRINT #1;I
      :NEXT Y:READ S$:PRINT
      #2;S$:NEXT X:CLOSE #2
IJ 60 FOR X=1 TO 44:READ S$:
      PRINT #1;S$:NEXT X
PI 70 FOR X=1 TO 134:READ S$
      :PRINT #1;S$:READ I:PR
      INT #1;I:NEXT X
JH 80 FOR X=1 TO 6:READ S$:P
      RINT #1;S$:READ I:PRIN
      T #1;I:NEXT X
DA 90 FOR X=1 TO 44:READ I:P
      RINT #1;I:NEXT X
IC 100 FOR X=1 TO 6:READ S$:
      PRINT #1;S$:NEXT X
FM 110 CLOSE #1
EG 120 PRINT "{CLEAR}DONE.":
      END
AL 130 DATA 0,2,0,0,0,0,AT
      HE FRONT DOOR
NP 140 DATA 1,0,3,4,0,0,IN
      THE LIVING ROOM. IT IS
      {7 SPACES}SPARSELY FU
      RNISHED
FK 150 DATA 0,0,0,2,0,0,IN
      THE BEDROOM
CD 160 DATA 0,0,2,0,0,0,IN
      THE KITCHEN. EMPTY CAB
      INETS LINE THE NORTH
      WALL
HG 170 DATA 0,9,6,0,0,0,IN
      A ROUGHLY CARVED TUNNE

```


L
HE 180 DATA 0,0,7,5,0,0, IN A
ROUGHLY CARVED TUNNE
L
BP 190 DATA 0,8,0,6,0,0, IN A
N INCLINED TUNNEL. A
TRACK{3 SPACES}RUNS T
O THE SOUTH
JK 200 DATA 7,0,0,0,0,0, AT A
STONE WALL. THE TRAC
K RUNS OVER THE WALL
TO THE SOUTH
OJ 210 DATA 5,11,0,10,0,0, IN
A TUNNEL. THE WALLS
GLITTER WITH IRON PY
RITE
CJ 220 DATA 0,0,9,0,0,0, IN A
NATURAL CAVE WHICH I
S USED FOR STORAGE
KK 230 DATA 9,0,0,0,0,0, IN A
CHAMBER
HB 240 DATA 0,14,13,15,0,0, A
T THE END OF A TUNNEL
. THE{5 SPACES}TRACK
ALSO ENDS HERE
NJ 250 DATA 0,0,0,12,0,0, IN
A TUNNEL. TO THE EAST
THE{4 SPACES}TUNNEL
IS BLOCKED BY A BOULD
ER
AL 260 DATA 12,0,0,0,0,0, AT
THE BOTTOM OF A SMALL
CLIFF
LN 270 DATA 0,16,12,0,0,0, IN
A CURVED TUNNEL
PI 280 DATA 15,17,0,0,0,0, IN
A TUNNEL
MP 290 DATA 16,0,0,0,0,0, AT
A DEAD END
BG 300 DATA 0,0,0,0,0,0, IN A
N ABANDONED MINE SHAF
T
II 310 DATA 18,0,17,0,0,0, IN
AN ABANDONED MINE SH
AFT
EM 320 DATA 0,21,0,0,0,0, ON
A CLIFF
NA 330 DATA 20,0,23,22,0,0, O
N THE SHORE OF A RIVE
R
GJ 340 DATA 0,0,21,0,0,0, ON
THE SHORE OF A RIVER
IB 350 DATA 0,0,24,21,0,0, ON
A DIRT PATH
HB 360 DATA 27,26,25,23,0,0,
ON A PATH IN THE CENT
ER OF AN{4 SPACES}UND
ERGROUND VILLAGE
EP 370 DATA 0,0,0,24,0,0, IN
A HUT USED AS A MEETI
NG{6 SPACES}PLACE
KH 380 DATA 24,0,0,0,0,0, IN
THE HEALER'S HUT
LL 390 DATA 0,24,0,0,0,0, IN
A DEMOLISHED HUT
DD 400 DATA 21,34,29,30,0,0,
IN THE MIDDLE OF A RI
VER
EL 410 DATA 0,0,0,28,0,0, UPS
TREAM IN A RIVER. THR
OUGH THECLEAR WATER Y
OU SEE A SHIP
KH 420 DATA 0,0,28,01,0,0, DO
WNSTREAM IN A RIVER
OE 430 DATA 0,32,0,0,29,0, UN
DERWATER. THE CURRENT
PUSHES YOU SOUTH
CE 440 DATA 31,0,33,0,0,0, IN
A SUNKEN SHIP
KK 450 DATA 0,0,0,32,0,0, IN
THE CREW'S QUARTERS
KK 460 DATA 0,36,0,35,0,0, ON
THE SHORE OF A RIVER
HB 470 DATA 0,0,34,0,0,0, ON
THE SHORE OF A RIVER
HP 480 DATA 34,37,0,0,0,0, IN
A LARGE CAVERN. STAL
ACTITES HANG FROM AB
OVE
CD 490 DATA 36,38,0,0,0,0, IN
A DARK TUNNEL
FC 500 DATA 37,41,39,0,0,0, I
N A DARK TUNNEL
IO 510 DATA 0,40,0,38,0,0, IN
A BURIAL CHAMBER. TH
E SMELL OF DECAY FIL
LS THE AIR
HB 520 DATA 39,0,0,41,0,0, IN
A CURVED TUNNEL
MC 530 DATA 38,42,40,0,0,0, I
N A SMALL CHAMBER
IK 540 DATA 41,49,45,43,0,0,
IN A SMALL AMPHITHEAT
ER
OP 550 DATA 0,0,42,0,0,0, IN
A GIGANTIC CAVERN
GH 560 DATA 0,0,0,0,0,0, ABOA
RD A SPACESHIP
DI 570 DATA 0,0,46,42,0,0, IN
A HALLWAY
HJ 580 DATA 48,0,47,45,0,0, I
N A HALLWAY
IO 590 DATA 0,0,0,46,0,0, IN
A DRESSING ROOM
NH 600 DATA 0,46,0,0,0,0, IN
THE LIBRARY ROOM
IA 610 DATA 42,50,0,0,0,0, IN
A CORRIDOR
CJ 620 DATA 49,54,51,53,0,0,
SMALL CHAMBER
ID 630 DATA 0,0,52,50,0,0, IN
A CORRIDOR
LD 640 DATA 0,0,0,51,0,0, IN
THE HEXAGON-SHAPED RO
OM
EJ 650 DATA 0,0,50,0,0,0, IN
AN EAST/WEST TUNNEL.
A CAVE-IN BLOCKS THE
WESTWARD EXIT
IJ 660 DATA 50,55,0,0,0,0, IN
A CORRIDOR
HK 670 DATA 54,56,0,0,0,0, AT
THE END OF THE CORRI
DOR
EP 680 DATA 55,0,0,0,0,0, IN
A LARGE CHAMBER
MP 690 DATA N,NORTH,S,SOUTH,
E,EAST,W,WEST,U,UP,D,
DOWN,TAKE,DROP,EXAMIN
,READ,SAY
OJ 700 DATA OPEN,CLOSE,ENTER
,LIGHT,CUT,PUT,PUSH,H
OOK,SHOOT,RUB,DRINK,O
FFER
NN 710 DATA HIT,ATTACK,FILL,
LIFT,BUILD,EXIT,INVEN
T,I,QUIT,Q,RESTART
FM 720 DATA SCORE,LOOK,L,DIV
E
CE 730 DATA SIGN,-1,PEDEST,-
1,BOOK,1,STATUE,-1,CA
RD,1,LANTER,1,POUCH,1
CF 740 DATA BACKPA,1,KNIFE,1
,STICK,1,VIAL,1,BOX,1
,SLOT,-1,ELIXIR,0
AO 750 DATA SAND,0,SPACES,-1
,PANEL,-1,TREE,-1,CRO
SSB,1
JK 760 DATA DRESSE,-1,GUN,1,
FLARE,1,BUNK,-1,MUMMY
, -1,DRAWER,-1,BED,-1
EP 770 DATA REFRIG,-1,TRAPDO
,-1,BLADDE,1,BLADDE,1
,FLINT,1,SKELET,-1
BD 780 DATA CIRCLE,-1,PICK,1
,CHUTE,-1,SAPPHI,1,GO
LD,1,ROD,1,HOOK,1,CLI
FF,-1
EA 790 DATA BIN,-1,TRACK,-1,
DIAMON,1,VINE,1,LOGS,
1,STALAC,-1,BEAR,-1
KP 800 DATA MATTRE,-1,LAMP,1
,SARCOF,-1,HANDKE,1,F
ACEMA,1,XYZZ,-1
MF 810 DATA ROCK,1,PENTAC,-1
,DEMON,-1,ANKH,1,MOUT
H,-1,PIT,-1,SPHINX,-1
,RUBY,1
NI 820 DATA WATER,0,RAFT,-1,
BUTTON,-1,TRIDEN,1,PO
UCH,1,LEOPAR,-1
CH 830 DATA SIGN,4,JADE PEDE
STAL,18,LEATHER BOUND
BOOK,48,DRAGON STATU
E,55
LN 840 DATA LAUNCH CARD,0,OI
L LANTERN,-10,LEATHER
POUCH,0,BACKPACK,13
IA 850 DATA *JEWELD KNIFE*,
-2,SHARPENED STICK,10
,YELLOW VIAL,26,METAL
BOX,0
NP 860 DATA SLOT,44,*ELIXIR
OF LIFE*, -5,WHITE SAN
D,-6,SPACESHIP,43
PD 870 DATA CONTROL PANEL,44
,GIANT OAK TREE,24,CR
OSSBOW,35,WOODEN DRES
SER,47
NN 880 DATA FLARE GUN,-1,FLA
RE,-1,BUNK,33,MUMMY,-
11,DRAWER,0,BED,3,REF
RIGERATOR,4
OG 890 DATA TRAPDOOR,0,OIL S
OAKED BLADDER,6,BLADD
ER,0,FLINT & STEEL,-2
JO 900 DATA SKELETON,13,LARG
E CIRCLE ON THE FLOOR
{3 SPACES},11,PICK,17
,CHUTE,16
ME 910 DATA *SAPPHIRE*,18,*G
OLD NUGGET*,7,METAL R
OD,10,GRAPPLING HOOK
& ROPE,-1
FF 920 DATA CLIFF,0,COAL BIN
,7,BROKEN TRACK,8,*SM
ALL DIAMOND*, -4,VINE,
-13,LOGS,27
FH 930 DATA STALACTITES,0,LA
RGE BEAR,36,MATRESS,
0,*GOLDEN LAMP*,0,SAR
COPHAGUS,39
NJ 940 DATA *GOLDEN HANDKERC
HIEF*, -9,*GOLDEN FACE
MASK*,0,XYZZ,0,LARGE
ROCK,53
AO 950 DATA PENTACLE ON THE
FLOOR,52,DEMON,0,*BOL
DEN ANKH*,0,MOUTH,0,P
IT,56
IB 960 DATA SPHINX,56,*STAR
RUBY*,0,WATER,0,RAFT,
0,BUTTON,0,TRIDENT,18
JA 970 DATA POUCH HANGING FR
OM A ROPE{3 SPACES},1
1,BLACK LEOPARD,42
NC 980 DATA AMATEUR,10,NOVIC
E,50,AVERAGE,100,INTE
LLECTUAL,150,PRO,199,
MASTER,200
IL 990 DATA 2,7,8,11,12,13,1
9,21,25,26,50,1,1,4,1
,1,1,1,1,5,6,3,1,0,0,
0,0,1,1,0,0
AN 1000 DATA 1,0,-3,-4,-2,-5
, -6,-7,-8,-12,-9,-10
, -11
CD 1010 DATA NORTH,SOUTH,EAS
T, WEST,UP,DOWN ©

Take the set that suits your system for only \$4.95!

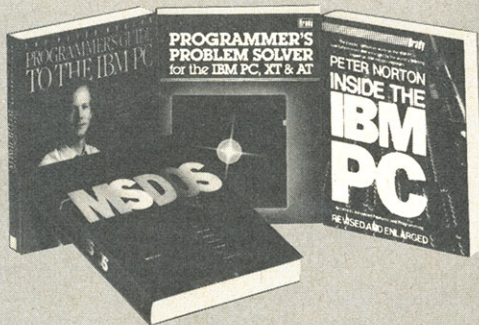
when you join the

Small Computer Book Club (values to \$103.80)

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

THE IBM® PC SET

- The Peter Norton Programmer's Guide to the IBM PC
 - Inside the IBM PC: 2nd Edition
 - Programmer's Problem Solver for the IBM PC, XT & AT
 - Advanced MS-DOS
- Total Value: \$85.80**



THE APPLE® SET

- Apple ProDOS: Advanced Features for Programmers
 - The Big Tip Book for the Apple II Series
 - Command Performance: AppleWorks
 - Applesoft BASIC Subroutines and Secrets: A Collection of Programming Tips, Tricks, and Techniques for the Apple II Plus, IIe, and IIc
- Total Value: \$74.80**



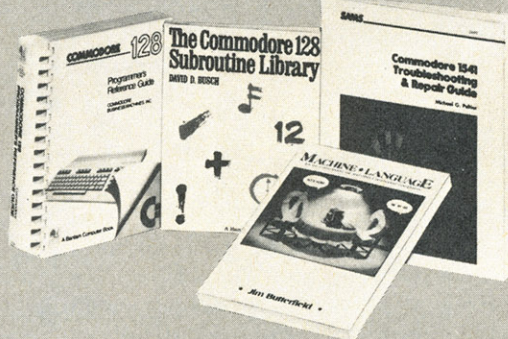
THE MACINTOSH™ SET

- Macintosh Revealed Volume One: Unlocking the Toolbox, Revised Edition
 - Macintosh Revealed Volume Two: Programming with the Toolbox, Revised Edition
 - The Complete Book of Macintosh Assembly Language Programming
 - Microsoft Machinations: An Introduction to Microsoft BASIC for the Apple Macintosh
- Total Value: \$103.80**



THE COMMODORE® SET

- Commodore 128 Personal Computer Programmer's Reference Guide
 - Machine Language For the Commodore 64 and Other Commodore Computers
 - The Commodore 128 Subroutine Library
 - Commodore 1541 Troubleshooting & Repair Guide
- Total Value: \$73.80**



SMALL COMPUTER BOOK CLUB is a division of the Library of Computer Sciences, the oldest, largest and most respected computer book club in the world. Unlike other microcomputer clubs, Small Computer Book Club offers books from a wide variety of leading publishers. 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.

MEMBERSHIP BENEFITS • In addition to getting 1 of 4 sets for only \$4.95 when you join, you keep saving substantially on the books you buy. • Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings of up to 65% off the publishers' prices. • At 3-4 week intervals (16 times per year), you will receive the Small Computer Book Club News, describing the coming 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.

Small Computer Book Club

Riverside, New Jersey 08075

Y-BN3

Please accept my application for trial membership and send me the set indicated below billing me only \$4.95, plus shipping and handling. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three additional books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If I am not satisfied—for any reason—I may return my introductory set within 10 days. My membership will be canceled, and I will owe nothing.

Please check one:

- The IBM PC® SET (00762) The Macintosh™ Set (00840)
 The Apple® Set (00763) The Commodore® Set (00764)

Name _____

Name of Firm _____
 (If you want subscription sent to your office)

Address _____ Apt. _____

City _____

State _____ Zip _____

(Books purchased for professional purposes may be a tax-deductible expense. Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.) Compute! 11/87



The World Inside the Computer

Fred D'Ignazio, Associate Editor

It's A Hammer! It's A Sandbox! It's A Refrigerator! No! It's A Computer!

When I'm hungry, I head to the refrigerator, grab the handle, yank it back, and voilà! The door opens, and I get to gobble up whatever's inside.

Refrigerators are not something I normally spend much time thinking about. I have a certain image of my refrigerator, and that image conforms to the real world (99.9 percent of the time the refrigerator works exactly as I think it should). My image of the refrigerator is clear and it's also constant. Tomorrow I won't wake up and find that my refrigerator now works like a wind tunnel or a Corvette. I can depend on my refrigerator. It holds few surprises (except when we leave leftovers inside too long).

Computers are different. My image of a computer is not clear, and it's certainly not constant. And I propose, dear reader, that your image may be even fuzzier and more fickle than mine.

Ancient Image

Let's try a test: Ten years ago (in 1977), what was your image of a computer? Did you think of computers as game machines, children's tutors, and capable of disappearing into wristwatches, microwave ovens, and pay telephones? How about ten years before that? (Had you even heard of computers in 1967? Were you even alive then?)

How about me? In 1967, I was reading science-fiction books about computers that lived under mountains and took over the world. By 1977, my science-fiction vision had come true: I was a programmer buried deep under the Pentagon programming a monstrous mainframe computer known as the Honeywell 6000. The manuals for that computer weighed over 500 pounds. I would have laughed if you had told me that a decade later toddlers,

handicapped people, and octogenarians would be operating desktop computers which were more powerful than the behemoth that I got to see only because I had four top-secret security badges.

Now let's think about computers of today. When you hear the word *computer*, which image comes to mind—toy, tutor, or tool? Is it one of these or all of the above? Does it depend on your mood or the day of the week? Or what your parents, teacher, or boss just ordered you to do?

People use the word *computer* lightly, as if they knew what they were talking about. But don't be fooled. I think we're all mixed up. I don't think anyone is sure what a computer is. Or if they are sure, I think they're wrong.

I think it's time we stopped accepting our current images of computers and began questioning those images. Is thinking about computers any more productive than thinking about refrigerators? Yes, for two reasons. First, as I said, we're not really sure what computers are today, and we don't have a clue about what they'll be tomorrow. Second, our image of computers limits the use we get out of them. For example, if we see computers only as electronic typewriters, then that's all we can imagine doing with them. Or if we see them only as data display devices, then it's unlikely that we'll ever use them to learn speed reading, conduct a flight simulation, send electronic mail, or teach our children.

Now comes the punch line: Things are going to get worse. We are sitting on the edge of a cliff—a continental divide, a great abyss. In the next ten years, computers will change more thoroughly and more profoundly than they have in the 40 years since they were invented.

Now you think you get it. You

think I must be talking about the new Tandy 1000 HX. Or the IBM PS/2 Model 25. Or maybe Apple's new secret computer that we keep hearing about.

Wrong.

These new computers are chips off the old block, clones of clones. I'm talking about something you can't imagine. Something so fundamentally different that the word *computer* can't begin to describe it. It's right around the corner, and since you can't imagine it, you won't see it coming, until—SMACK!—it'll whack you on the head and send you sprawling.

Do we want this to happen? Of course not. As educators nurturing young minds, as business people planning for the future, as parents rearing our children, we need to grab a chisel right now and start carving a new image for computers—one that strains our imaginations and opens our minds wide to the new possibilities that are in store for us.

Really...Write

I often end my columns by appealing to my readers to respond. Often I do this lightheartedly, but this time I'm not kidding. I'm deadly earnest. I am desperate to know what your image of computers is, and what you imagine computers might be like just ten years from now. We all know that they'll be faster, have better graphics, more memory, and so on. But let me know what you've come up with that *isn't* predictable—that's the exciting stuff. Write:

Fred D'Ignazio
c/o COMPUTE! Magazine
324 West Wendover Ave., Suite 200
Greensboro, NC 27408

©



The Beginner's Page

C. Regena

The Random Function

The random number feature is a key ingredient in computer games and educational drill programs. This month, we will discuss how you can use random numbers in your own BASIC programs.

RND is the function for getting a random number in most versions of BASIC. The RND function returns a decimal fractional value between 0 and 1 (but never exactly 0 or 1). For example, try entering `PRINT RND(1)` and see what your computer does. Try it again. You should get a different number.

Actually, the computer is too logical and methodical to produce a truly random number. The RND function returns *pseudorandom* values. It takes a given *seed value* and plugs it into a formula to generate the "random" value. If you knew the algorithm and seed value, you could predict the value that RND would return. However, the formula used is sufficiently complex that the results closely approximate a random distribution.

In real life, you don't usually want fractions—you want whole numbers. For example, you may want to generate two random numbers, each from 1 to 6, to simulate the roll of two dice. Or you may want to place obstacles on a game screen at randomly selected row and column positions. In these examples, we need to use whole numbers or *integers*. To change our random decimal fraction into an integer, we need BASIC's `INT` function. The `INT` function yields the integer, or whole number portion of a number. For example, `INT(8.7914)` is equal to 8.

To generate a random integer between 0 and 9, enter this line:

```
PRINT INT(10*RND(1))
```

The computer multiplies 10 by the random decimal fraction, and then converts it into an integer. Note that if the random fraction is less

than .1, the value of `INT(10*RND(1))` is 0. If the random fraction is greater than or equal to .9, the value of `INT(10*RND(1))` is 9. Thus, our range of random numbers is 0 to 9. To get random numbers from 1 to 10, just add 1: `INT(10*RND(1))+1`.

Rolling Dice

Let's try another example. In rolling one die, the possibilities are numbers from 1 to 6. To simulate a roll in BASIC, we use the statement

```
D=INT(6*RND(1))+1
```

Now let's shake two dice. Your total number will be a number from 2 (one dot on each die) to 12 (six dots per die). The formula is `INT(11*RND(1))+2`. In general, to choose a random integer number from A to B, inclusive, the formula is `N=INT((B-A+1)*RND(1))+A`.

Now let's try a short program that prints ten random numbers in the range 1-10:

```
100 FOR N=1 TO 10
110 PRINT INT(10*RND(1))+1
120 NEXT N
```

Run the program several times. If you are using an IBM PC, Atari ST, or Amiga, you get the same sequence of ten numbers each time you run the program. Knowing this sequence may help when you are debugging a program, but if you use the same sequence for a game, the game soon loses its appeal. So, for the IBM PC, Atari ST, and Amiga computers, you'll need to add the `RANDOMIZE` statement. `RANDOMIZE` needs to appear *before* any use of `RND`. To add it to the program above, add this line:

```
90 RANDOMIZE
```

Now, each time you run the program, you will get a different sequence of ten random numbers.

Different versions of BASIC use `RANDOMIZE` differently. You may need to specify a seed value that tells the computer what value it should start with. If your computer

requires a seed, and you use `RANDOMIZE` by itself, the computer stops the program and asks you to enter a number. This number is used to generate the random number series. Having to enter a number can be a nuisance, so `RANDOMIZE` lets you specify a seed value like this:

```
RANDOMIZE X
```

or

```
RANDOMIZE 0
```

or

```
RANDOMIZE 532
```

However, if you use a constant number as the seed, the numbers will still be the same every time the program is run. On the Atari ST, `RANDOMIZE 0` (that's a zero) makes the computer provide its own random seed. On the PC and Amiga, the statement `RANDOMIZE TIMER` tells the computer to use its internal clock value as a random seed. The `TIMER` value is almost always a different number each time the program is run.

The `RND(1)` function in the versions of BASIC for the Apple II and Commodore eight-bit computers does not return the same sequence of numbers each time a program is run, but it does always start with the same sequence after the computer is turned on or is reset. Although these computers do not have a `RANDOMIZE` command, you can still reseed the random number sequence. For the Commodore 64, a statement of the form `X=RND(-TI)` is equivalent to the `RANDOMIZE TIMER` statement described above.

In Atari eight-bit computers, the `RND` function returns random values generated by a hardware counter in the `POKEY` sound chip. Atari BASIC's `RND` function is therefore more truly random than in other BASICs, and no special randomization steps are required.©



Computers And The Left Hand Of Knowledge

I had lunch last week with an artist—let's call her Betty. Betty lives with a friend of mine along with his two dogs, three computers, and 15 music synthesizers. Since Betty is an artist and my friend has a Macintosh, I asked if she had ever done any computer graphic artwork. Her response surprised me. She said she had tried it once but didn't like it, so she never tried it again.

I persisted. Was the problem that she thought computers were doing the actual "creating"? No, that wasn't it. Technophobia wasn't an issue either—she did use the computer for correspondence and articles, but she just wasn't interested in using it for the creation of artwork. The reason she gave was quite simple: The computers she had seen just weren't good enough.

Not Good Enough

Betty isn't a snob and she doesn't make up excuses to hide her real feelings. From her perspective, the quality of computer graphics tools on personal computers are just too poor to be of interest to her as a professional artist. There isn't an aspect of computer art that she seems to like. The input devices are clumsy ("Drawing pictures with the rock-like mouse is a joke"), the display resolution is crude ("You can't even draw a circle without glaring 'jaggies' all over the place"), and the interface to the software is so cumbersome as to interfere with the flow of ideas from the mind to the screen.

As a technologist who is interested in the arts, I found her comments to be quite revealing. I realized that she was quite mature and rational in her feelings and that those of us who have trumpeted the benefits of computers have been willing to overlook some limitations of this technology in our excitement over its capabilities.

My First Mac

I remember the joy of setting up my first Macintosh computer complete with its ImageWriter printer. I was liberated from the typeface barriers I had known before. Instead of simple dot-matrix characters or one high-quality daisywheel typeface, I could now mix and match typefaces in my documents. The exhilaration I felt when I could italicize certain words in a document or change typefaces altogether masked one limitation I was to confront later: The quality of the printout really wasn't that good. The ImageWriter printer does a fine job for a dot-matrix impact printer, but the result is hardly typeset quality. Still, I enjoyed this tool so much that I used it for everything—letters, articles, overhead transparencies. I used it for anything requiring marks on paper.

I might not have ever known how poor this tool was if I hadn't gotten a laser printer. Once I made this purchase, my print resolution went from 75 dots per inch to 300. There was no comparison between the two. If the ImageWriter had sensitized me to the limitations of my earlier print capabilities, the laser printer showed that I still had a lot to learn.

The ImageWriter that had been my workhorse was, within one day, relegated to a corner where it is used for printing invoices and labels. The quality of the laser printer was so high that I had to redo all the ImageWriter-produced overhead transparencies whose quality was a sudden embarrassment to me.

A Lesson

This experience taught me a lesson. We accept the quality to which we are sensitized. If we don't know how good things can be, then we are really happy with what we have. As long as I was encountering

progressive advances in technology, I was happy. But, with each advance, I was also being sensitized to how far we had come and to how far we still had to go.

Art And Technology

On the surface, many people might say, "So what? The function of your tools is to help you communicate. As long as you are communicating effectively, why worry about some ultimate communication vehicle. Just be happy with what you have."

This view is appropriate for many computer applications. For most of these applications, the meaning of the activity is independent of its representation. For example, the meaning of 3, three, and III is the same, even though the representation differs. Analytical computer applications (including financial calculations and most word processing tasks) involve representation independent of meaning. As a consequence, all we care about is the speed and flexibility with which the computer lets us do our tasks. We don't need fancy fonts, all we need is accuracy and ease of use.

This is not the case for the artist. For the artist, meaning and representation are inseparable—they are intertwined in such a tight manner that one cannot distinguish between the two. If this were not the case, painters would have died out with the invention of photography.

One cannot look at a painting of a pond of water lilies without sensing much more than the physical reality of the depiction. If the painting is any good, the viewer will be transported within himself to view the pond in a multisensory fashion to feel the quiet of the place, to hear the hum of the insects and the splash of the water as a fish jumps, to feel the warmth of the sun, and to experience the transpor-

tation of the spirit from the gallery to the heart of the artist who created the picture in the first place.

This is the function of art.

The question is simply this: Why is it that some artists feel capable of creating art of this caliber with a piece of charcoal and a sheet of paper and yet feel that computers just aren't good enough?

Some might argue that today's computers are serial (one step at a time) machines and that the creation of art is a holistic process. The computer belongs to the domain of the right hand, and art to the domain of the left. For this reason, the two will never mesh properly.

My problem with this argument is that it gives the computer too much credit. It suggests that the computer is more than a mere tool for expression when it is, in fact, only an alternative to the paint brush or piece of charcoal. To say that the computer is, at its core, a "left-brained" analytical tool makes as little sense as saying that a sculptor's mallet is a "right-brained" holistic tool.

The reality is that the computer is whatever kind of tool we want it to be. Those of us who want it to be a tool for the arts can turn it into one. We need all the technical help we can get in the realm of display and input technology, but mostly we need the vision to create software that allows artists to capture the soul of a scene along with its picture.

I am reminded of the story of Ansel Adams who decided to give up a career as a pianist to become a photographer. His family complained, saying that the camera couldn't express the soul. "Perhaps," Ansel replied, "but the photographer can."

Dr. Thornburg welcomes letters from readers and can be reached at P.O. Box 1317, Los Altos, CA 94023. ©

LOTTO CIPHER™

GET THE BEST ODDS ON ANY LOTTERY
SIX NUMBER - PICK FOUR - DAILY GAME

- PRODUCES FOUR COMBINATIONS OF NUMBERS TO CHOOSE FROM.
- ANY AMOUNT OF BALLS AND NUMBERS CAN BE PROGRAMMED.
- PRINTS OUT PAST LOTTO NUMBERS DRAWN, PAST COMPUTER PICKS, AND NUMBER DRAW FREQUENCY LIST.
- RANDOM NUMBER GENERATOR INCLUDED. \$24.94



COMMODORE, COMMODORE AMIGA, AND IBM SYSTEMS

Window Magic

SUPER HI-RESOLUTION DRAWING IN MULTI OR MONO COLOR

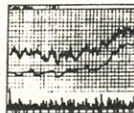
- COPY
- FILL
- LINES
- DRAW
- COLOR SQUARES
- TYPES LETTERS AND GRAPHICS
- POLYGON SHAPES-EXPAND, SHRINK AND ROTATE, THEN STAMP ANYWHERE
- ZOOM PLOT-DRAW ON AN EXPANDED WINDOW AND YOUR DRAWING AT THE SAME TIME
- MIRROR, FLIP, AND SCROLLING WINDOWS
- ZOOM-EXPANDS A WINDOW TO DOUBLE SIZE
- SAVE AND LOAD YOUR WINDOWS ON DISK
- PRINTS ON STANDARD DOT MATRIX PRINTER
- CLONE COLOR ATTRIBUTES

\$19.95 C-64/128

STOCK BROKER™

PROFITS GUARANTEED OR
YOUR MONEY BACK

- BUYING GOOD QUALITY, VOLATILE ISSUES AND USING THIS TRADING SYSTEM WILL HAVE YOU FULLY INVESTED AT THE LOWEST PRICES AND CONVERTING TO CASH AS THE STOCK NEARS ITS PEAK.
- TECHNICAL TRADING THAT WORKS.
- BAR GRAPH PRINT-OUTS.
- RECORD UP TO 144 STOCKS ON A DISK.



\$29.95

COMMODORE, COMMODORE AMIGA, AND IBM SYSTEMS

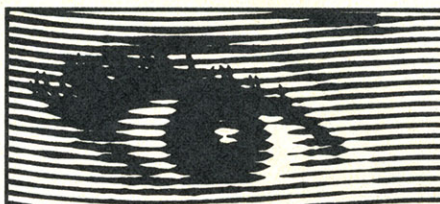
ACORN OF INDIANA, INC.

2721 OHIO STREET
MICHIGAN CITY, IN 46360



800-521-4536 219-879-2284

SHIPPING AND HANDLING, ADD \$1.50 - C.O.D.'S ACCEPTED
VISA AND MASTER CARD ORDERS ADD 4%
INDIANA RESIDENTS ADD 5% SALES TAX



Looking for Thermal Paper or Mailing Labels for your Okimates? Call Precision!

Precision Images now has available for your Okimate printers, GENUINE Okidata thermal transfer roll paper and mailing labels. We also carry a large supply of spare parts and supplies for all Okidata printers. Precision Images is "your direct connection to genuine Okidata parts and supplies."

New Microlite 93 Printer—\$375

for Visa/MasterCard orders call:
1-800-524-8338



Precision Images, Inc.
P.O. Box 563, Dept. C
Chester, New York 10918

NEC LAP-TOP COMPUTER LIQUIDATION



A Powerful Lap-Top PC That Lets You Get The Job Done Wherever it's Convenient. Built-In Word Processing Spreadsheet, Filing and Telecommunications — Ready Instantly Wherever You Go.

The Model PC-8401A-LS Features:

- 64K RAM memory stores data
- 4 Built-in programs include: WordStar To-Go, Calc To-Go, Personal Filer and Telcom
- Built-in 300 Baud Modem with auto dial
- 80 column x 16 line LCD Display
- Interfaces: Standard Parallel, RS232C, Modular phone, CMT
- Dimensions: 8½" x 12" x 2¼".
Wt. 5.9 lbs.
- Powered by 4 'C' size batteries. (not included)
- Full Factory Warranty

Optional peripherals available through NEC include: Memory Expansion, Disk Drive, 1200 Baud Modem, AC Adaptor.

PUBLIC NOTICE

NEC, one of the world's top computer makers, recently introduced their state-of-the-art Multi-Speed Lap-Top computer. As a result, we can offer you this discontinued model at FAR BELOW DEALER COST!

Manufacturer's
Suggested Retail
\$995.00

DAMARK PRICE

\$298

Order No. B-554-100156
Insured Ship./Hand.: \$11.50

For fastest service, call TOLL-FREE

1-800-533-3379



or send check,
money order or credit
card information to:



DAMARK INTERNATIONAL, INC.

7714 Brooklyn Blvd., Minneapolis, MN 55443
Corporate Offices • 612/560-5415

Please send me _____ NEC Lap-Top Computer(s) @ \$298 each, plus \$11.50 shipping/handling each. MN res. add 6% sales tax.

Name _____
Address _____
City, State, Zip _____
 Check/M.O. VISA Mastercard
Card No. _____
Exp. Date _____ Ph#: () _____
Signature _____

Order No. B-554-100156

Delivery to 48 United States Only



Microscope

Sheldon Leemon

Almost as if in response to last month's column about desktop publishing, a lot of news items have come in lately relating to that field. For instance, no sooner did I jokingly refer to *The Newsroom* as the Commodore 64's answer to desktop publishing, when Berkeley Softworks announced a for-real desktop publishing program for the Commodore 64. As unlikely as it may seem—hooking up a big, expensive laser printer to a 64—before *GEOS*, a lot of people wouldn't have believed a mouse-driven OS for the 64, either.

In another sort-of-64-related desktop publishing development, Ashton-Tate announced that it will ship its *Byline* desktop publishing program for the IBM PC at the end of October. The reason this story is somewhat related to the 64 is that the author of *Byline* happens to be none other than Ken Skier, of SkiSoft, the author of the *SkiWriter* word processor for the 64. No word yet on whether owners of the 64 program will be able to upgrade.

One aspect of desktop publishing that's beginning to get more attention is the problem of "laser junk." In the right hands, a fancy desktop publishing system can produce beautiful, professional-quality documents. But in the wrong hands, the same setup can generate mountains of ill-composed pages with a riot of mismatched type styles.

We know of one software company, however, that's working on an ingenious solution to this problem. It's developing an expert system that works with desktop publishing software. Using this program, all you have to do to lay out a newsletter or brochure is to answer some questions about the document and tell the program where the picture and text files are stored. The program then composes

the layout of each page and feeds the information to the desktop publishing program. Since the expert system was designed using a series of rules specified by publishing professionals, it is more likely than the average user to come up with a page design that's pleasing.

Expert systems are currently a hot area of artificial-intelligence (AI) research. The way these programs work is that they each use a large base of rules from which to draw inferences about problems, and then propose their solutions. These rules, sometimes numbering in the thousands, must be entered into the system by a human expert so that the program can, in effect, "learn" how that expert goes about solving such a problem. The best known examples of this type of program are those used for medical diagnosis. A program starts by asking general questions about the patient's symptoms and then asks a series of more specific questions which are designed to narrow down the possibilities.

Although expert-system programs have been available for micros for a while, such programs generally provide only an "inference engine"—the framework used for drawing conclusions based on a collection of rules. Unfortunately, it's up to the user to enter these rules. Since these programs are not geared toward the beginner, you almost need to be an expert in AI to figure out which rules to enter and how to enter them.

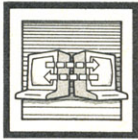
That's why this software company's approach is so interesting. It has identified a number of very specific problems and is tailoring turnkey expert systems to solve them. In addition to desktop publishing, the company is working on a program that writes complete résumés and cover letters, based on the user's response to a series of ques-

tions. It's also working on a *Lotus 1-2-3* add-in program that analyzes financial statements prepared with the spreadsheet.

Perhaps the most interesting type of AI program in the works is the kind that watches the way the user interacts with another program. For example, an upcoming *Lotus* add-in program keeps track of all the commands issued by a user. If you make a mistake in using the program, the expert system can examine its record of your actions, diagnose the problem, and suggest a solution.

Work currently being done suggests that computer programs are going to get smarter in the very near future. For example, to download a program from an information service, you need to run a terminal program and go through a completely predictable series of steps to do so. If you had a really "smart" terminal program, however, you could just tell it to download the file and have it log on and do the busywork. It's possible to accomplish this task with current terminal programs, but only by first giving the program step-by-step instructions in its own special script language—more busywork.

Another type of smart program you may see in the near future is a control program that watches the way the user operates the computer. If, for example, the program sees that you always operate the same set of programs in the same order, it may ask if you would like for the first program to be run as soon as you turn on the computer. The others would then be run automatically in sequence. Such a program might even remind you to make backups of valuable data periodically, or it could automatically make the backups. ©



Just the Fax, Ma'am

Apple Computer introduced its new Applefax Modem at the Mac-World exposition in Boston, Massachusetts. Facsimile devices (called "Fax" in the business world) are essentially photocopy machines that can send copies of paper documents over regular telephone lines at high speed. As recently as three years ago, the high cost (over \$10,000) of Fax machines limited their use to well-heeled businesses, although low-volume users could opt for Fax-based services such as Federal Express's instant "Zap Mail." A recent wave of high-quality, under-\$2000 Fax machines from Japan put Zap Mail to bed and Fax units into the hands of most any small business. The new Apple modem allows Mac owners to transfer files from one Applefax-equipped system to another at transmission speeds of 9600 bps, and it can communicate with many regular facsimile machines as well. The Applefax comes with software that supports attended and unattended data transfers of Macintosh files and Fax documents.

The Shocking Truth

Most computer owners are aware of the dangers posed by electrical power surges and spikes, and consequently buy devices to protect their computer systems from them. Spike and surge protectors are typically connected between a computer and the AC power outlet. The underlying principle behind such a device is to quickly erect an electronic "fence" between the AC power line and your equipment when spikes and power surges are detected.

Even when equipped with such protection, most telecomputer systems have an Achilles heel. Remember that your modem plugs into the phone line as well as an AC outlet. While the normal current carried on the phone network is

very low, a nearby lightning strike during an electrical storm can damage a modem, and in some cases, the computer system attached to it.

An inexpensive solution to the problem is Radio Shack's Model 43-102 Spike Protector. The unit goes between your modem and modular phone-line jack and plugs into a grounded AC outlet. It's a bargain at \$12.95—about half the price of competitive products.

How Low Can You Go?

The street price of 1200-bps modems has taken another dive with many bargains popping up in unlikely places. C.O.M.B. liquidators, usually seen touting low-cost briefcases and the like in the margins of the *Wall Street Journal*, has been selling discontinued Kyocera modems that respond to the bulk of the Hayes command set. Kyocera may not be a household name, but it designed and built the popular Tandy Model 100 laptop computer. While somewhat sensitive to line noise, the Kyocera modem (which formerly listed at \$295) is an adequate performer and is a great buy at C.O.M.B.'s \$79 price.

The Empire Strikes Back

Last August, CompuServe set up a special section for users who wished to protest the proposed FCC rule changes for next year. These proposed changes may result in four- to five-dollar-an-hour surcharges on information service connect time. CompuServe users were given advice on what to include in the letters they write protesting the new rules. CompuServe also provided the names, addresses, and phone numbers of legislators and FCC officials, as well as facilities for sending low-cost "FCC Congress-Grams" to one's favorite Washingtonian. CompuServe graciously waived normal connect charges for

time spent in the FCC section.

If the new FCC rules go into effect, the stage will soon be set for the commercial information services and alternative long-distance voice-service providers to bypass the local telephone networks by using existing cable television services. In Great Britain, two cable systems recently signed agreements with a private telecommunications firm and behind-closed-doors discussions reportedly began this summer in the U.S. Such a switch may actually be a boon to information-service subscribers, since the cable systems can handle higher speed data transmission than the present public telephone network.

Tanks For The Memories

This summer, the U.S. Naval Institute unveiled an unclassified online database intended to provide information on the world's armies, navies, air power, special and strategic forces, and weapons systems. Also included is a "Who's Who" on the battlefield, detailing unit-battle organization and high-ranking military officers.

The first phase of the system, which went online this summer, contained information on the Soviet Union and United States. By year end, information on all NATO and Warsaw Pact countries will be available, and information on the rest of the world by late spring. According to the Institute, "details of . . . armed forces, their orders of battle, and descriptions of their weapons and electronics will be immediately available at the touch of a computer key."

User reaction during initial testing of the system was said to be extremely favorable, although it is rumored that some were unduly nervous about the possibility of pushing the wrong button on their keyboards. ©



Silent Partners

How often have you sat around biting your nails, wishing you knew how to play bridge? Or maybe you've blown the game off as too complicated or too highbrow. In fact, it's neither. Many people who like programming computers also like bridge—they both require the same type of logic, order, and memory. Now, with Electronic Arts' *Grandslam Bridge*, you not only learn the basics along with many advanced techniques—you can play countless games, which any bridge guru will tell you is the only way to learn.

For those unfamiliar with the game, bridge is played by four players—two sets of partners—often referred to by the major compass directions: North and South against East and West. After all 52 cards are dealt, "bidding" begins. The purpose of bidding is to establish how many "tricks" you and your partner expect to take, and how many you expect to concede to your opponents. (A trick is four cards, one from each player.) There are 13 tricks in a round ($52 / 4 = 13$).

Bidding is a rather formal process that is the cause of most problems for beginners, but the idea is simple. If you could bid in plain English, the conversation might go something like this: "Joe, I have the ace through nine of spades, and the king and queen of hearts, and I don't have any clubs. Do you have the ace of hearts? What other cards do you have? Do you think we can take ten tricks?"

Of course you can't say this at the bridge table. Instead, you must use code words to try to convey to your partner the cards in your hand, and he must do the same. Thus, the bidding might go: One spade, pass, two diamonds, pass, two spades, pass, four spades. Notice that the opposing players have cards of so little value, they believe

few tricks, if any, can be theirs. Instead of bidding, they pass. Your partner is telling you he has good diamonds. In reality, as the *Grandslam* manual and many other books explain, bidding is determined by strict convention. Each face card has a point value, and points are assigned for other factors. By adding up your point value, you determine what and how much to bid.

After *Grandslam Bridge* deals the cards, it allows you to bid your hand, and then it bids the other three. It alerts you if you try to make an invalid bid—two diamonds after a two-hearts bid, for example.

By bidding four spades, you and your partner have agreed that you'll try to take a total of ten tricks—the four you bid plus six more called the "book." You always add your bid to the six tricks of the book; thus, the most you could bid would be seven. That would mean you plan to take every trick, which is called a grand slam. It's the equivalent of a home run. For bidding and making a grand slam, you get a lot of points.

Playing The Hand

Once the bid has been established—here a "contract" of four spades—play begins. It is much like the card game "Hearts." One of the opposing players leads, putting a card on the table. Your partner puts *all* of his cards on the table—he is now the "dummy" (and usually goes for drinks and popcorn). You play his cards and your own. If he had mentioned spades first, he would be playing and you would be off popping corn. *Grandslam Bridge* plays the opponents' hands; you play your own hand and the dummy's hand. If your side loses the bid, *Grandslam* plays three hands.

Suppose your opponent leads the queen of clubs. You see that you can take the trick either by playing

your partner's king of clubs, which is showing on the table (or "on the board"), or you can wait until the play reaches your hand and then play a spade. Spades are the trump suit because that's what you bid—four spades. A trump suit is higher than any other suit, and since you can't follow the suit that led (because you have no clubs in your hand), you may play a trump. Whichever strategy you use, the trick will be yours. You scoop up the four cards and place them on the table face down. You must collect nine more tricks to make your bid of four spades.

In many ways, *Grandslam Bridge* is a tougher opponent than real players—it doesn't make mistakes or silly moves, and it plays with such finesse, I wonder sometimes if it peeks at my hand. That's in its best mode; *Grandslam* also has two less-difficult levels of play. As for you, you're allowed to replay tricks (or an entire hand) if you make a mistake or change your mind about a move.

Scorekeeping is as complicated as assembly language. People usually play for years before they learn how to keep score. Fortunately, *Grandslam Bridge* does the scorekeeping, and does it in such a way that you can learn by watching.

Grandslam Bridge is not frivolous software; it's a serious program for those who want to learn the game or improve their game, or those who just want to play but can't find three partners.

Grandslam Bridge
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(256K, CG/EGA, key-disk protection, disk drive)
\$60

©



Atari's Newest Drive

After three months of pretty heavy stuff, it's time for a slightly different tack. And since my time has recently been monopolized by a project near and dear to all eight-bit Atari owners, I've decided to share some "secrets" with you. We're going to take a very close look at the new XF551 drive from Atari.

The XF551 is a sleek drive, lower and wider than a 1050, and in a style and color that matches the XE computers. Quite simply, it looks good. As you read about the internals of the drive, I hope I can convince you that Atari has really done something *right*.

The XF551 started out as the XF351—the 3 designated a 3½-inch drive. Some people are disappointed that Atari changed over to a 5¼-inch drive, but I view it as a very positive step. Current users can upgrade to this drive, yet still keep and use all their old disks. Software manufacturers don't have to produce two different versions of their software, and there are other points of compatibility.

For starters, the drive is compatible with disks created by virtually all Atari-compatible drives—in single, enhanced, and double density. Not only that, several of the different DOS systems I've tried have also worked flawlessly. And I know Atari has tested the drive with many, many pieces of commercial software with many different protection schemes. Summary: The drive works, and works well.

At a suggested price of under \$200, the very fact that a true double-density drive is now available from Atari would be welcome news. But the drive is also double-sided. That means that each disk can hold up to 360K—nearly three times the capacity of a 1050 and four times that of an 810.

As I write this article, Atari does not have a DOS that will sup-

port this extra capacity. However, the reason this drive has monopolized my time recently is simple—I have been writing a new DOS for Atari. ADOS (as it will be known) is full-featured, with subdirectories, random access files, a combination menu/command structure, and much more. However, it is not releasable as I write this, so back to the drive.

Inside The Drive

As you may remember, I discussed SIO (Serial Input Output) as it applies to disk drives, in the September 1985 issue. I noted that the four basic SIO commands are R, W, P, and S, for Read, Write, Put, and Status, respectively. Besides these, the Atari 810 and 1050 only understand format commands.

Then, in the next issue, I explained the concept of a device configuration table, as implemented by all the makers of true double-density drives. Well, we can add Atari Corporation to that list: The XF551 supports the Percom standard configuration table. That means you can tell the drive that it's an 810, a 1050, a double-density drive, or (best of all) a double-sided double-density drive. Or, perhaps just as important, the drive can tell you what kind of disk it holds. For these capabilities, we add N and O (which I think of as iN and Out) commands on the serial bus.

But there's even more. If you send it a Read or Write or Put command with the upper bit set (the inverse video bit, in screen terms), then the XF551 transfers data in high-speed mode. To take advantage of this, you need a compatible DOS, but ADOS is nearly ready and I'm sure others will be modified to support high-speed transfers.

Last, but not least, the XF551 adds a special format command (hex \$A1, an inverse-video exclamation

point) that tells the drive to use a special high-speed interleave that enhances the high-speed read and write commands even more. (But note that ordinary reads and writes are even slower than usual on disks formatted in this special way, just as they are on Sparta DOS ultraspeed disks used in non-US Doubler drives. I should warn you that each of these drives seems to use a slightly different high-speed scheme.)

So the drive gets my nod of approval from a software standpoint. But what about the hardware? Will the drive stand up to physical abuse, overheating, and the like? Truthfully, I have not had even the prototype long enough to make a definitive statement on this point. But I *have* had the cover off the drive, and I have looked at its construction. It looks great. The inside is as well built as the outside.

In fact, Atari has never produced a more solid piece of equipment. The drive frame is heavy-duty cast aluminum, the mechanical parts are finely polished and aligned, and the controller board appears to be adequately ventilated. Only one point of caution: Double-headed drives are more sensitive to shock and misalignment than their single-headed cousins. Treat the drive with care. Always use its cardboard protector when you move it. Make sure it has adequate ventilation. In other words, use common sense.

If this column sounds like an advertisement for the XF551, I won't apologize—I'm not getting a penny in royalties on the drive or ADOS. This glowing report is for one reason and one reason only: I just *had* to tell you that Atari has not abandoned the eight-bit market. And they've proven that fact in grand style. ©



IBM PC Emulator For Atari ST

What's made by Atari and runs your favorite IBM PC software? Six months ago, the answer would have been Atari's new PC clone. But now Avant-Garde Software has introduced a program named *pc-ditto* which emulates an IBM PC entirely in software.

Objections Sustained

Emulation—one computer mimicking another—is a controversial topic. Let's start with some popular pros and cons, airing the cons first.

- The IBM PC is an inferior machine with a slow processor, crude graphics, and a user interface that harks back to the infancy of computing. Even assuming that you could emulate such a device, what ST owner would *want* to? Let the ST be an ST.
- Software emulators give you the worst of both worlds. A PC/ST combo, for example, combines the PC's antiquated, keyboard-driven user interface with the ST's non-standard keyboard. Strip both machines down to the lowest common denominator, and you're left with all the functionality of a VIC-20.
- PC clones are so cheap, they'll soon be peddled in shrink-wrap on the racks of grocery store checkout lines. If you really want to run IBM PC software, do what everyone else does: Buy a clone.

Objections Overruled

Now for some pros.

- The IBM PC software base is immense and mature. A software emulator provides the cheapest possible entrée to thousands of slick programs—most of which will never be released in native ST versions.
- A software emulator makes sense if you have an occasional need to run an MS-DOS application, but can't spare the dollars or desk space for an entire second system. If you had to choose a second computer,

you could do worse than a PC-compatible, even one that's slow.

• Regardless of utility, there's something inherently fascinating about a software emulator. If you fire up *pc-ditto* at an ST user-group meeting, you may hear some catcalls, but there won't be a soul in the room who can resist peeking over your shoulder to see if it really works.

DOS Required

Like every PC-compatible machine, *pc-ditto* has to boot up by loading the system files *IBMBIO.COM*, *IBMDOS.COM*, and *COMMAND.COM* (the names of these files will differ on non-IBM systems). However, the *pc-ditto* package does not include the IBM PC system files, which belong to Microsoft or IBM, depending on whether you're talking about MS-DOS or the virtually identical PC-DOS.

Thus, your first task is to obtain a copy of DOS on a disk that your system can read. Disk compatibility creates less difficulty than you might imagine, since a 3½-inch ST drive can read and write to any 3½-inch MS-DOS disk, provided the disk was formatted on an MS-DOS machine. Many PC-compatible laptops have 3½-inch drives, as do the new Personal System/2 machines from IBM. It's also possible to buy a PC-compatible 5¼-inch external drive for the ST.

Once you supply *pc-ditto* with a DOS disk, the drive whirs briefly while the system files load. Then it appears—the famous *A>* prompt that inspires love and hate in so many of us. If you type *DIR* and press Return, the computer prints a genuine MS-DOS directory on the screen. It looks like you're in business. Could it really be this easy?

It's an old programming adage that any computer can emulate any other computer, *as long as speed is no consideration*. Like most adages,

this one isn't strictly true, but it emphasizes a vital point. Much of the functionality of any computer rises from the speed at which it performs the task at hand. You wouldn't tolerate a word processor that made you wait three seconds between every keystroke, for instance. The *pc-ditto* emulator isn't that slow, but I found it sluggish enough to make most MS-DOS programs virtually unusable.

My original plan for this column was to show how you might bootstrap your way into PC compatibility at the lowest possible cost. Using *pc-ditto*, I planned to boot up *GW-BASIC*, type in a rudimentary telecommunications program, call an information service, and download a public domain word processor, which I would use to write a column about the joys of PC compatibility.

I am not writing this column on an emulated IBM PC, although I did go so far as to download and try out the public domain word processor, along with a dozen assorted MS-DOS applications I brought home from the office. Although I was anxious for *pc-ditto* to work well, it now lives in a box labeled "Software I Will Never Use Again."

What Price Compatibility?

Here are some figures to explain my lack of enthusiasm. They're based on the venerable Sieve of Eratosthenes benchmark program which everyone and his brother now uses to measure processing speed (even though it doesn't test much except looping speed). The first set of numbers shows the time in seconds to run a BASIC version of the Sieve, using *GW-BASIC* on an IBM AT, IBM XT, and a 1040ST using *pc-ditto*.

Model	Seconds
IBM AT	80
IBM XT	202
<i>pc-ditto</i>	1480

The last number is not a misprint. It takes *pc-ditto* over 24 minutes to run a GW-BASIC program that an XT runs in just over 2 minutes and an AT runs in less than 1½ minutes. Here are the times for running the compiled C version of the Sieve:

Model	Seconds
IBM AT	35
IBM XT	85
<i>pc-ditto</i>	703


In this case, the emulator takes close to 12 minutes to process code that the XT runs in 1½ minutes and the AT rips through in just over ½ minute.

All of these times represent the average of several trials, rounded to the nearest second. Speed isn't everything, of course. Sluggishness aside, I have to admit that *pc-ditto* seems to run "well-behaved" MS-DOS software without noticeable problems, although my survey was anything but scientific. Whether you're willing to tolerate a ten-to-one speed decrease is a question you'll have to answer for yourself. As with all software, it's only prudent to try before you buy. Haul your favorite MS-DOS application down to your local dealer and ask to see it demonstrated with *pc-ditto*.

Ignoring The Lessons Of History

Here's another case where the Amiga's history offers an interesting parallel. Commodore sank considerable effort into a software IBM PC emulator called the "Transformer," but eventually junked it in favor of a hardware/software solution that amounts to a PC on a card. The Amiga 2000's Bridge card contains an 8086 processor, floppy disk controller, some shared RAM, and two or three glue chips to hold everything together. The arrangement makes sense, especially given the very low price of basic PC components. You let the 8086 do its own processing, make your ports and keyboard available for I/O, and use the host processor only for supervision, as it were. You'd expect the same solution to be even easier on the ST, since it already contains a disk drive that can read and write MS-DOS disks. But the ST's closed architecture makes it hard to design such a card at a reasonable cost. ©

PRINTER MANIA !!!!



EPSON

CALL

FX86E \$445.00

FX286E \$395.00

EX800 \$540.00

EX1000 \$375.00

LQ800 \$490.00

LQ850 \$499.00

LQ1000 \$660.00

LQ1050

AMIGA 500 CALL

AMIGA 2000 CALL

PANASONIC

1080i \$155.00

1091i \$175.00

1092i CALL

1592 CALL

1595 \$419.00

3131 CALL

3151 \$399.00

HARD DRIVES SEAGATE

CALL

WE WILL MEET OR BEAT ANY ADVERTISED PRINTER PRICE

MISCELLANEOUS

HP CALCS CALL

HP LASER II 1895.00

TOSHIBA T1000 \$1075.00

ZENITH 181 LAPTOP \$1595.00

WYSE PC OR AT CALL

10 DISKS \$9.00!!!

EXCELLENT PRICES ON 300 1200B MODEMS AND COLOR MONITORS

3.5 / 5.25 Incompatibility??? NOW SOLVED! with our MW-777 Switch

SOFTWARE

LOTUS CALL

WORD PERFECT CALL

DBASE III CALL

PFS FILE CALL

PFS WRITE CALL

FIRST CHOICE CALL

CALL FOR OTHER SOFTWARE AND HARDWARE

MICRO WORLD ELECTRONIX, INC.-

3333 S. WADSWORTH BLVD LAKEWOOD, CO 80227

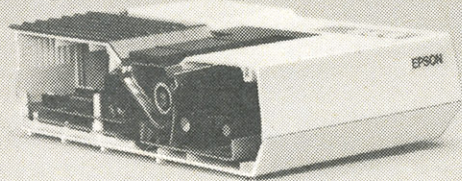
SALES 1-800-288-8088 CUST. SVC. (303) 988-5907

Manufacturer's warranty honored. prices subject to change.

Attention all FX80, FX100, JX, RX, & MX owners:

You already own half of a great printer

See us at Comdex booth B137



Now Only \$79.95

Now for \$79.95 you can own the rest. You see, today's new dot matrix printers offer a lot more.

Like an NLQ mode that makes their letters print almost as sharp as a daisy wheel. And mode switching at the touch of a button in over 160 styles. But now, a Dots-Perfect

upgrade kit will make your printer work like the new models in minutes— at a fraction of their cost.

And FX, JX and MX models will print the IBM character set, too.

So, call now and use your Visa, MasterCard, or AmerEx. Don't replace your printer, upgrade it!

1-800-368-7737

(Anywhere in the United States or Canada)

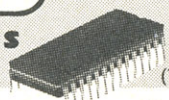


Dots-Perfect™



Dresselhaus

8560 Vineyard Ave., Ste. 405, Rancho Cucamonga, CA 91730



(714) 945-5600

An upgrade kit for EPSON FX, JX, RX, & MX printers

IBM is a registered trademark of International Business Machines Corp. Grafix™ PLUS is a trademark of Epson America, Inc. Epson is a registered trademark of Epson America, Inc.



The Latest In Pictures And Words

Andy Warhol once said that in the future, everyone would be famous for 15 minutes. To Amiga observers, however, it seems more likely that everyone will get to be in charge of the frame-grabber project for 15 minutes. Commodore first announced that it would manufacture a realtime video digitizer at the Amiga's Lincoln Center debut in 1985, where Warhol himself used it to produce an instant pop art portrait of Deborah Harry. In the following months, Commodore exhibited prototypes of the unit at trade shows. Months dragged on, and production was still nowhere in sight. Finally, when Commodore failed to bring it out within the time limits imposed by their contract, it was agreed that A-Squared, the creators of the digitizer, would distribute it.

At that point, R. J. Mical and some other members of the original Amiga design team stepped into the picture with a plan to finish the software and manufacture the hardware. They formed a company called Grab, Inc., and started taking orders. However, just a few days after the product was displayed once more—this time at the Siggraph computer graphics show—it was announced that because of artistic differences between Mical and A-Squared, Grab is no more. Mical has since gone to work for Epyx, following in the footsteps of David Morse, the charismatic founder of Amiga, who is now Epyx' president.

This latest development puts the fate of the frame grabber back into the hands of A-Squared, which is currently wrapped up in product development for the Apple IIGS market, and, thus, is likely putting the Amiga product on the back burner. One has to wonder about this since the GS market appears to have a smaller potential (and market), while the Amiga 500 could have more than a million new own-

ers by next year. So it looks like *Live!* is finally dead, at least for now.

Word Processors: Old And New

The sad tale of the frame grabber brings to mind many other fine products that have had a confused evolution. For example, when the Amiga first appeared, Commodore commissioned a company named Arktronics to write a word processor for the machine. The result, a program called *Textcraft*, was easy to use, but did not really mesh well with the Amiga operating system. Reason? To get the software out on time, most of it had to be written before the operating system was finished. A few months after the Amiga's release in early 1986, Arktronics, which had by then become ICT, finished an extremely nice, updated version of the program called *Textcraft Plus*. It was fully multitasking. It used a window on the Workbench screen, with a size gadget. It had many nice new features, such as mail-merge. By this time, however, Commodore—for reasons possibly stemming from the staff and departmental restructuring at Commodore over the past couple of years—decided that it really didn't want to be in the software business. It wanted to encourage third parties like WordPerfect to write word processors, without having to worry about competing with Commodore itself. *Textcraft Plus* went into an extensive quality control testing phase, where it has stayed ever since.

As a result, Amiga users have been able to buy only one word processor, *Scribble*, for over a year. This is not to say that *Scribble* isn't a reasonably good word processor. It is clearly not, however, the perfect word processor for every user and for every use. Lately, with the appearance of *Pro Write*, *LPD Writer*,

and *WordPerfect*, Amiga users are finally getting a bit more choice. Meanwhile, Commodore has decided to release *Textcraft Plus*. In fact, *Textcraft Plus* is going to be used in a promotion for the new Amiga 500. Commodore is planning to mail coupons to a quarter-million Commodore users group members, allowing them to buy big software bundles with the purchase of a 500. For \$99, group members will get \$600 worth of software, including *Textcraft Plus*, *PageSetter*, *Deluxe Paint II*, and *Marble Madness*. For \$199, they'll get \$1,200 worth of software, including *Word Perfect*, *Superbase*, *PageSetter Deluxe*, *Maxiplan*, and *Deluxe Video*. Commodore hopes to convert a lot of 64 owners to Amiga owners. If bargains like these don't work, they'll have to try dynamite.

While Commodore was busy "testing" *Textcraft Plus*, ICT wasn't sitting still. They were improving the program, adding features like a spell checker and onscreen fonts, and provisions for importing graphics into a document. The resulting program will be marketed by Electronic Arts as *Deluxe Write*, probably around the end of the year. One of the unique features of the program will be its superfont printing mode, which will use the highest-density graphics mode of each printer to produce the highest quality fonts possible. In a future column, we'll take a look at *Deluxe Write*, along with other upcoming word processors. ©

The Inscrutable Sphinx

Brian Flynn

This colorful puzzle game for the PC/PCjr and compatibles conjures up the mystery of ancient Egypt. In "The Inscrutable Sphinx," you pit your strategic powers against either the computer or a human opponent. A color/graphics adapter or equivalent hardware is required along with BASICA for the PC, GW-BASIC for compatibles, or Cartridge BASIC for the PCjr.

Near the ancient pyramids of Giza, not far from the river Nile, sits the inscrutable Egyptian Sphinx. Part man and part lion, this colossus has intrigued archeologists for ages. The mighty Sphinx is nearly 5000 years old, but its exact purpose seems buried forever in the sands of time.

This much we do know: The man-lion was carved out of a single sandstone knoll. It is four-fifths the length of a football field, measures 66 feet at its highest point, and is roughly 14 feet at its widest point. The Sphinx's headdress with Cobra was a sign of royalty, and its face was thought to resemble the features of Kephren, son of the great Pharaoh Cheops.

Whatever its original purpose, the ancient Sphinx reappears in all its regal splendor in this beguiling board game of wits. Indeed, you'll think you're on the Giza Plateau as you and your opponent (human or computer) alternately place Sphinxes and pyramids on the board.

The next few paragraphs will explain the rules of "The Inscrutable Sphinx." We'll see how the PC searches for an optimal move, and how to fine tune the program to take advantage of some of the features available on more recent PCs.

How To Play

The intellectual action in this game of thought takes place on a 7 × 7 board (see figure on following page). Your goal is to line up four Sphinxes in a row, in any direction, before the computer lines up four of its pyramids. To make a move, use the arrow keys to slide a Sphinx along the top edge of the board, then press ENTER or RETURN. The Sphinx will fall to the bottom of the column. The computer moves similarly.

You can go first, if you'd like, but it may not do you any good: The computer is very clever. You'll have to think ahead to win. And if you blunder badly, be warned that the PC will mercilessly exploit your mistake.

Finally, the game ends in a draw if you and the computer fill the board without success.

Enhancements

IBM PC-compatible computers come in all shapes and sizes. To take advantage of some of the enhanced features on the newer models, a few key variables appear at the beginning of the program:

```
110 ' CLEAR ,,,32768! : ' PC jr Mode
                          (SCREEN 5)
120 ' PLAY "V8" : ' VOLUME (0 to
                          15)
130 PLAY "MB" : ' MUSIC
                          BACK-
                          GROUND
```

Line 110: Eliminate the first tic mark or REM symbol to reserve enough RAM for Screen 5 graphics. This mode makes your game more colorful. If your computer doesn't support Screen 5, you'll get a syntax error upon striking the tic mark.

Line 120: Eliminate the first tic

mark to set the level of sound to medium (V8), and change the volume to any value you'd like, using a scale of 0-15. Earlier versions of Microsoft BASIC do not support this parameter.

Line 130: If your machine locks up when it tries to play music while executing additional program lines, insert a tic mark at the beginning of this line.

Program Notes

After you've placed a Sphinx, the computer searches the board for a good move using these steps:

First, it finds the last empty square in each column.

Second, it evaluates that square from the point of view of both itself and the human player. It tallies a score based on the number of like markers in a row, assuming there are blank squares at each end of the sequence.

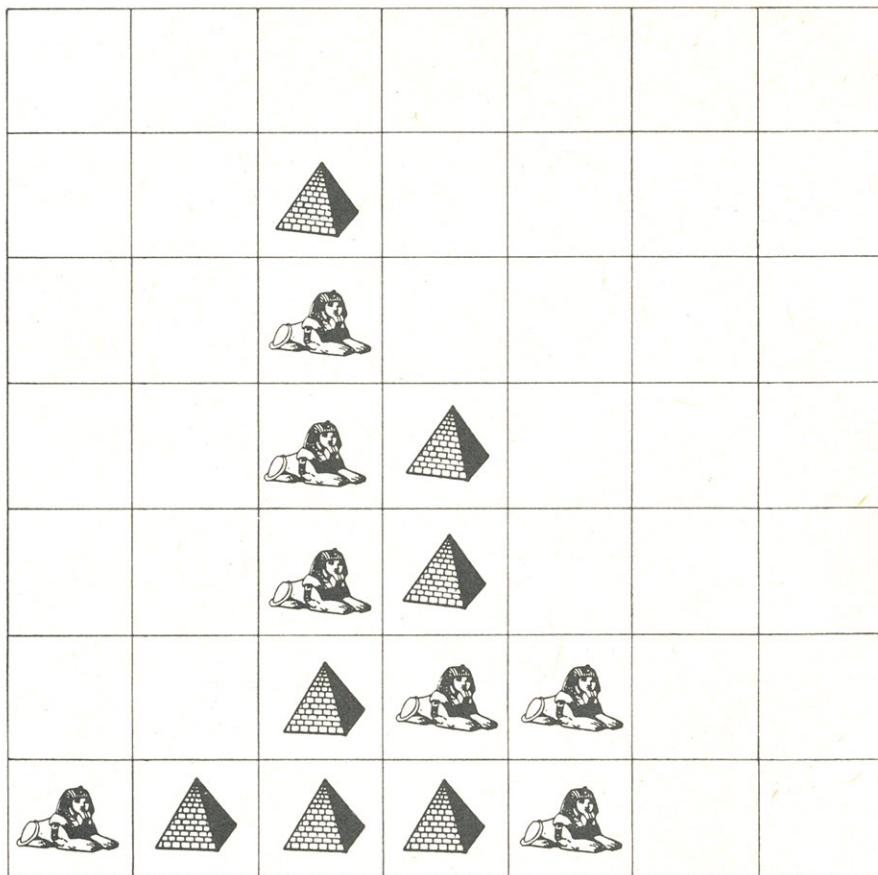
Third, it chooses as a next move that square with the highest number of points.

More concisely, to use the language of Artificial Intelligence, the computer applies an evaluation function to each possible move, and makes what it reasons to be an optimal selection. Here are the details.

The computer uses a special version of the board to facilitate its search for a good move:

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81

The center box (with corners 11, 17, 65, and 71) is the playing surface.



The rules are simple, but the strategy can be complex in "The Inscrutable Sphinx."

Each of these middle 49 squares takes on one of three values throughout the game: 0=blank, 1=computer, 2=human. Each square in the outer border, on the other hand, always holds a value of -9. This tags the square as an off-the-board position.

Two subroutines constitute the search procedure: lines 2510-2700 and lines 2760-2900. In the first subroutine, the PC finds the last empty square (SQ.END) in each of seven columns (2 through 8). For each SQ.END, or possible move, the PC generates a score for itself (J=1) and for its opponent (J=2). The computer wants to play aggressively while blocking good opportunities for the human. Whichever score is higher (human or computer) becomes the rank for that square (lines 2600 and 2620). The square's rank, in turn, is compared to the previous highest rank (lines 2630-2650), and a new best value is chosen, if appropriate.

The PC tallies a score for each square in the second subroutine, using these steps:

First, for each of four directions (horizontal, upward slant, vertical,

and downward slant), the PC counts the number of like markers in a row.

Second, it determines whether or not the squares at each end of the sequence are blank (lines 2830 and 2870).

Third, it ranks the square according to the evaluation function in line 2880. The variable T represents the number of markers in a row laid down. The binary variables F1 and S1 equal one for blank end-squares, and zero otherwise. Notice that $T > 2$ (win on next move) gives a score of at least 1000.

The Inscrutable Sphinx

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

EG 100 'Inscrutable Sphinx
AE 101 'Copyright 1987 COMPUTE!
      Publications, Inc. All
      rights reserved.
FL 110 ' CLEAR ,,,32768!: JR$
      = "Y": ' PC jr MODE (SCR
      EEN 5)
AC 120 ' PLAY "V8"
      : ' VOLUME (0 to 15
      )
HL 130 ' PLAY "MB"
      : ' MUSIC BACKGROUN
      D
EA 140 GOSUB 200: ' DO SET-UP

```

```

WORK
AD 150 GOSUB 1500: ' PLAY
KB 160 GOSUB 3910: ' ASK TO PLA
      Y AGAIN
IM 170 IF A = 89 THEN 150
QI 180 GOSUB 3950: ' EXIT
MH 190 END
CM 200 REM DO SET-UP WORK
PF 210 GOSUB 280: ' SET SCREEN
JC 220 GOSUB 440: ' DRAW SQUAR
      ES
JB 230 GOSUB 590: ' DRAW PYRAM
      IDS
GA 240 GOSUB 700: ' DRAW SPHIN
      XES
QK 250 GOSUB 1000: ' SET VALUES
BH 260 GOSUB 1240: ' EXPLAIN RU
      LES
NK 270 RETURN
BF 280 REM SCREEN
MB 290 DEFINT A-Z
NB 300 IF JR$ = "Y" THEN SCREEN
      5 ELSE SCREEN 1
GC 310 IF JR$ = "Y" THEN COLOR
      14,1 ELSE COLOR 1,1
BG 320 KEY OFF: CLS
HO 325 PRINT TAB(13)"Copyright 1
      987":PRINT TAB(7)"COMPUTE
      ! Publications, Inc.":PRI
      NT TAB(10)"All Rights Res
      erved."
BM 330 ' TITLE
GP 340 LOCATE 12,12: PRINT "Ins
      crutable Sphinx"
HH 350 ' COLORS -- CURSOR; EVEN
      SQUARE; ODD SQUARE; PYRA
      MID;
JF 360 ' SPHINX'S BOD
      Y, HEADADDRESS, LEG; BOARD
FI 370 DATA 1,1, 3,0,2,0,1,2:
      ' SCREEN 1
KN 380 DATA 14,7,11,4,8,1,5,5:
      ' SCREEN 5
BE 390 READ K1,K2,K3,K4,K5,K6,K
      7,K8
ED 400 READ A,B,C,D,E,F,G,H
EP 410 IF JR$ = "Y" THEN K1 = A
      : K2 = B: K3 = C: K4 = D:
      K5 = E
IP 420 IF JR$ = "Y" THEN K6 = F
      : K7 = G: K8 = H
NE 430 RETURN
JE 440 REM SQUARES
KD 450 DIM B(81),SQEVEN(128),SQ
      ODD(128),CURSOR.PYD(128),
      CURSOR.SPX(128)
MC 460 DIM PYRAMID1(128),PYRAMI
      D2(128),SPHINX1(128),SPHI
      NX2(128)
BD 470 ' -- CURSORS (BACKGROUND
      )
AF 480 LINE (70,100)-(92,120),K
      1,BF
EH 490 LINE (175,100)-(197,120)
      ,K1,BF
DJ 500 ' -- SQUARES
KD 510 LINE (100,100)-(122,120)
      ,K2,BF
NH 520 GET (100,100)-(122,120)
      ,SQEVEN
DO 530 LINE (130,100)-(152,120)
      ,K3,BF
BC 540 GET (130,100)-(152,120)
      ,SQODD
KH 550 ' -- OTHER SQUARES
GH 560 PUT (205,100),SQEVEN
BF 570 PUT (235,100),SQODD
NP 580 RETURN
QJ 590 REM PYRAMIDS
HO 600 FOR I = 0 TO 2
FN 610 X0 = I*30 + 81: Y0 = 11
      0
EK 620 PSET (X0,Y0-5),K4

```

```

OH 630 DRAW "G10 R20 H10"
NK 640 PAINT (X0,Y0),K4
OP 650 IF I = 0 THEN GET (70,
100)-(92,120),CURSOR.PYD
KL 660 IF I = 1 THEN GET (100,
100)-(122,120),PYRAMID1
KP 670 IF I = 2 THEN GET (130,
100)-(152,120),PYRAMID2
CE 680 NEXT I
NC 690 RETURN
JK 700 REM SPHINXES
IF 710 DATA -3,0,-2,-1,-3,0,-2,
2,0,4,1,1,18,0,1,-1,-1,-1
EG 720 DATA -2,0,0,-3,-1,-1,0,-
1,1,-1,2,0,0,-2,1,0,-1,-2
CE 730 DATA 0,-2,-3,0,-3,4,0,3,
-2,0
GI 740 DATA 2,0,2,-3,1,-1,2,0,-
1,-1,-3,0,-2,1,-1,3
IJ 750 FOR I = 0 TO 2
KD 760 RESTORE 710
MB 770 X0 = I*30 + 186: Y0 = 1
10
PJ 780 ' -- BODY
PA 790 PSET (X0,Y0+1),K5
JL 800 FOR J = 1 TO 23
PE 810 READ X,Y
ID 820 LINE -STEP(X,Y),K5
JA 830 NEXT J
NN 840 PAINT (X0,Y0+4),K5
HG 850 ' -- HEADADDRESS
MH 860 PSET (X0+2,Y0-3),K6
OC 870 FOR J = 1 TO 8
AC 880 READ X,Y
LK 890 LINE -STEP(X,Y),K6
JL 900 NEXT J
CI 910 PAINT (X0+4,Y0-5),K6
FF 920 ' -- HIND LEG
FL 930 PSET (X0-7,Y0+5),K7
KP 940 LINE -STEP(3,0),K7: LIN
E -STEP(1,1),K7
MB 950 IF I = 0 THEN GET (175,
100)-(197,120),CURSOR.SPX
CL 960 IF I = 1 THEN GET (205,
100)-(227,120),SPHINX1
CO 970 IF I = 2 THEN GET (235,
100)-(257,120),SPHINX2
CH 980 NEXT I
NF 990 RETURN
HE 1000 REM KEY VALUES
MD 1010 BELL$ = "D3 G8"
OP 1020 BUZZ$ = "T255 O3 C8 < C
8"
EJ 1030 GURGLE$ = "T255 O3 L16
CGCG"
DB 1040 RANDOMIZE TIMER
EM 1050 DEF FNEVEN.ODD(I,J) = -
((I+J)/2 = INT((I+J)/2))
EK 1060 DEF FNX(V) = 24*V + 29
FG 1070 DEF FNY(V) = 22*V - 20
BG 1080 DEF FNROW(V) = INT(V/9)
+ 1
KI 1090 DEF FNCOL(V) = V - (R-1
)*9
GI 1100 ' -- OFF-BOARD SQUARES
MB 1110 FOR I = 1 TO 81: B(I) =
-9: NEXT
OH 1120 FOR I = 11 TO 65 STEP 9
OK 1130 FOR J = I TO I + 6
AB 1140 B(J) = 0
BO 1150 NEXT J,I
MO 1160 ' -- DIRECTION DELTAS
ME 1170 DATA 1,8,9,10
NM 1180 FOR I = 1 TO 4
MC 1190 READ DR(I)
PP 1200 NEXT
EO 1210 ' -- CONTINUE
CE 1220 FOR PAUSE = 1 TO 1000:
NEXT PAUSE
JI 1230 RETURN
GO 1240 REM RULES
HE 1250 CLS
KA 1260 LOCATE 2,1
EC 1270 PRINT " Near the ancie
nt pyramids of Giza,"
DJ 1280 PRINT "not far from the
river Nile, sits"
EF 1290 PRINT "the inscrutable
Egyptian Sphinx."
EA 1300 PRINT
LD 1310 PRINT " Part man and p
art lion, the mighty"
AC 1320 PRINT "Sphinx is your p
iece to play."
FJ 1330 PRINT
KB 1340 PRINT " Try to line up
four Sphinxes in a"
KA 1350 PRINT "row, in any dire
ction, before I line"
PM 1360 PRINT "up four of my py
ramids."
FF 1370 PRINT
IO 1380 PRINT " Use the arrow
keys to move a Sphinx"
FH 1390 PRINT "along the top ed
ge of the board."
EC 1400 PRINT
EB 1410 PRINT " -- Then press
ENTER."
CN 1420 PRINT " -- The Sphinx
will fall to the bottom"
FA 1430 PRINT " of the colu
mn."
FO 1440 PRINT
IJ 1450 PRINT " I'll move my p
ieces similarly."
FB 1460 ' -- CONTINUE
NF 1470 LOCATE 24,14: PRINT "Pr
ess any key";
NI 1480 WHILE INKEY$ = "": WEND
KO 1490 RETURN
NH 1500 REM PLAY
CO 1510 GOSUB 1640: ' SELECT O
PPONENT
DI 1520 IF GAME = 1 THEN GOSUB
1780: ' FIRST TO GO
CN 1530 IF GAME = 2 THEN GOSUB
1920: ' ENTER NAMES
FG 1540 GOSUB 2050: ' SET THE
RECORD
BJ 1550 GOSUB 2270: ' DRAW THE
BOARD
FB 1560 WHILE GAME$ = "ON" AND
N <> 49
GD 1570 GOSUB 2460: ' ENTER MO
VE
BJ 1580 GOSUB 3120: ' MAKE MOV
E
NP 1590 GOSUB 3320: ' CHECK FO
R THE END
EB 1600 PLAYER = 3 - PLAYER
EP 1610 WEND
AE 1620 GOSUB 3450: ' GAME'S O
VER
JA 1630 RETURN
QN 1640 REM SELECT OPPONENT
IM 1650 CLS
CM 1660 LOCATE 10, 8: PRINT "Pl
ease choose your opponen
t."
FN 1670 LOCATE 12,14: PRINT "<1
> Me"
IE 1680 LOCATE 13,14: PRINT "<2
> Another human."
BB 1690 LOCATE 15,14: PRINT "=="
> ?"
HD 1700 ' -- SELECT
DO 1710 GAME = 0
BA 1720 WHILE GAME <> 1 AND GAM
E <> 2
OJ 1730 PLAY BELL$
EM 1740 S$ = INKEY$: IF S$ =
"" THEN 1740
EI 1750 GAME = ASC(S$) - 48
FA 1760 WEND
KO 1770 RETURN
JE 1780 REM FIRST TO GO
JK 1790 CLS
CF 1800 LOCATE 11,4: PRINT "Wou
ld you like to go first
(Y/N) ?"
QO 1810 GOSUB 1840: ' YES OR NO
QE 1820 IF A = 78 THEN FIRST.TO
.GO = 1 ELSE FIRST.TO.GO
= 2
JE 1830 RETURN
MF 1840 REM YES OR NO
KM 1850 A = 0
BM 1860 WHILE A <> 78 AND A <>
89
OC 1870 S$ = INKEY$: IF S$ =
"" THEN 1870
AE 1880 A = ASC(S$): IF A > 90
THEN A = A - 32
JK 1890 IF A <> 78 AND A <> 89
THEN PLAY BELL$
EC 1900 WEND
JA 1910 RETURN
QP 1920 REM ENTER NAMES
IM 1930 CLS
CI 1940 LOCATE 2,8
PO 1950 PRINT "Please enter you
r names."
LO 1960 FOR I = 1 TO 2
EI 1970 NME$(I) = ""
LP 1980 WHILE NME$(I) = ""
JP 1990 LOCATE I*2 + 3,3: PRI
NT USING "Player #";I;
OI 2000 INPUT " = ";NME$(I)
EC 2010 WEND
CP 2020 NME$(I) = LEFT$(NME$(I
),12)
PF 2030 NEXT
JI 2040 RETURN
LC 2050 REM RECORD
HE 2060 CLS
LD 2070 ' -- VACANT = 0; COMPUT
ER = 1; HUMAN = 2
GH 2080 FOR I = 11 TO 71
MH 2090 IF B(I) <> -9 THEN B(I
) = 0
PO 2100 NEXT
GI 2110 ' -- LAST EMPTY SQUARE
IN EACH COLUMN
FOR I = 2 TO 8
BK 2130 LAST(I) = I + 63
QK 2140 NEXT
KK 2150 ' -- TURNS
CO 2160 IF GAME = 1 THEN TURN$(
1) = "My turn ..."
KO 2170 IF GAME = 1 THEN TURN$(
2) = "Your turn ..."
CL 2180 IF GAME = 2 THEN TURN$(
1) = "Your turn, " + NME
$(1) + "."
HE 2190 IF GAME = 2 THEN TURN$(
2) = "Your turn, " + NME
$(2) + "."
AG 2200 ' -- FIRST PLAYER TO GO
GL 2210 IF GAME = 1 THEN PLAYER
= FIRST.TO.GO ELSE PLAY
ER = 1
HC 2220 ' -- OTHER VALUES
BE 2230 GAME$ = "ON"
OJ 2240 N = 0: ' NUMBER OF MOVE
S
LN 2250 VICTOR = 0
JC 2260 RETURN
EG 2270 REM DRAW BOARD
IL 2280 LINE (76,23)-(244,177),
KB,BF
JE 2290 FOR R = 2 TO 8
NK 2300 FOR C = 2 TO 8
KK 2310 SHAPE = 0: GOSUB 2340
DE 2320 NEXT C,R
JL 2330 RETURN
MN 2340 REM DRAW SHAPE
PO 2350 X = FN X(C): Y = FN Y(R
)

```



```

KK 2360 E.D = FN EVEN.ODD(R,C)
PJ 2370 ' -- BLANK
KK 2380 IF SHAPE = 0 AND E.D =
1 THEN PUT(X,Y),SQEVEN,P
SET
NJ 2390 IF SHAPE = 0 AND E.D =
0 THEN PUT(X,Y),SQODD,PS
ET
KO 2400 ' -- MARKER
FI 2410 IF SHAPE = 1 AND E.D =
1 THEN PUT(X,Y),PYRAMID1
,PSET
GC 2420 IF SHAPE = 1 AND E.D =
0 THEN PUT(X,Y),PYRAMID2
,PSET
LB 2430 IF SHAPE = 2 AND E.D =
1 THEN PUT(X,Y),SPHINX1,
PSET
NK 2440 IF SHAPE = 2 AND E.D =
0 THEN PUT(X,Y),SPHINX2,
PSET
JD 2450 RETURN
AG 2460 REM ENTER MOVE
KG 2470 S$ = TURN$(PLAYER)
BN 2480 LOCATE 24,21-LEN(S$)/2:
PRINT S$;
MI 2490 IF GAME = 1 AND PLAYER
= 1 THEN GOSUB 2510 ELSE
GOSUB 2910
IG 2500 RETURN
DA 2510 REM COMPUTER'S TURN
GO 2520 HPTS = -999
FO 2530 FOR SQ.CSR = 2 TO 8
FO 2540 SQ.END = LAST(SQ.CSR)
EJ 2550 IF SQ.END = SQ.CSR THE
N 2600
DG 2560 ' -- DRAW THE CURSOR
BC 2570 GOSUB 2710
IA 2580 ' -- RANK THE SQUARE
KB 2590 J = 1: GOSUB 2760
HP 2600 PTS = SCORE
JH 2610 J = 2: GOSUB 2760
DE 2620 IF SCORE > PTS THEN PT
S = SCORE
JO 2630 ' -- COMPARE TO PREVIO
US BEST SCORE
PO 2640 IF PTS = HPTS AND RND(
1) > .5 THEN MOVE = SQ.C
SR
JJ 2650 IF PTS > HPTS THEN HPT
S = PTS: MOVE = SQ.CSR
KJ 2660 ' -- ERASE THE CURSOR
BE 2670 GOSUB 2710
IE 2680 NEXT SQ.CSR
PL 2690 SQ.CSR = MOVE
JK 2700 RETURN
CJ 2710 REM DRAW CURSOR
MM 2720 X = FN X(SQ.CSR): Y = F
N Y(1) - 1
MM 2730 IF PLAYER = 1 THEN PUT(
X,Y),CURSOR.PYD,XOR
EN 2740 IF PLAYER = 2 THEN PUT(
X,Y),CURSOR.SPX,XOR
KJ 2750 RETURN
NN 2760 REM RANK SQUARE
FA 2770 SCORE = -J
KC 2780 FOR D = 1 TO 4
PP 2790 T = 0: DLT = DR(D)
BP 2800 ' -- FIRST PART
KC 2810 SQ = SQ.END
EC 2820 SQ = SQ + DLT: IF B(SQ
) = J THEN T = T + 1: GO
TO 2820
AD 2830 F1 = -(B(SQ) = 0)
CE 2840 ' -- SECOND PART
LO 2850 SQ = SQ.END
BK 2860 SQ = SQ - DLT: IF B(SQ
) = J THEN T = T + 1: GO
TO 2860
HH 2870 S1 = -(B(SQ) = 0)
NJ 2880 SCORE = SCORE + F1*S1*
3*T - 1000*(T > 2)
KH 2890 NEXT D
JO 2900 RETURN
DA 2910 REM HUMAN'S TURN
PC 2920 SQ.CSR = 5
KJ 2930 A = 0
NN 2940 WHILE A <> 13
HD 2950 GOSUB 2710: ' DRAW CUR
SOR
LP 2960 ' -- MAKE ENTRY
HD 2970 A = 0
GP 2980 WHILE NOT ( A = 13 OR
A = 75 OR A = 77 )
KA 2990 S$ = INKEY$: IF S$ =
"" THEN 2990
CF 3000 IF LEN(S$) > 1 THEN A
= ASC(MID$(S$,2,1)) ELS
E A = ASC(S$)
ED 3010 WEND
BL 3020 GOSUB 2710: ' ERASE CU
RSOR
DB 3030 ' -- FIND NEW LOCATION
MN 3040 SQ = SQ.CSR
MH 3050 IF A = 75 THEN SQ = SQ
- 1: ' LEFT
ID 3060 IF A = 77 THEN SQ = SQ
+ 1: ' RIGHT
IF 3070 IF SQ > 1 AND SQ < 9 T
HEN SQ.CSR = SQ ELSE PLA
Y BUZZ$
FH 3080 ' -- CHECK FOR FULL CO
LUMN
HJ 3090 IF A = 13 AND B(SQ.CSR
+9) <> 0 THEN A = 0: PLA
Y BUZZ$
DE 3100 WEND
IC 3110 RETURN
HH 3120 REM MAKE MOVE
QP 3130 SQ.END = LAST(SQ.CSR)
AC 3140 GOSUB 3210: ' MOVE DOWN
DO 3150 PLAY GURGLE$
NA 3160 B(SQ.END) = PLAYER
PJ 3170 LAST(SQ.CSR) = SQ.END -
9
JM 3180 N = N + 1
JE 3190 LOCATE 24,9: PRINT SPAC
E$(24);
IB 3200 RETURN
MA 3210 REM MOVE DOWN
IC 3220 FOR I = SQ.CSR + 9 TO S
Q.END STEP 9
EC 3230 R = FNROW(I)
FL 3240 C = FNCOL(I)
PK 3250 ' -- DRAW PIECE
PN 3260 SHAPE = PLAYER: GOSUB
2340
LN 3270 FOR PAUSE = 1 TO 100:
NEXT PAUSE
OL 3280 ' -- ERASE PIECE
AC 3290 IF I <> SQ.END THEN SH
APE = 0: GOSUB 2340
MP 3300 NEXT I
IG 3310 RETURN
KO 3320 REM CHECK FOR END
JM 3330 FOR D = 1 TO 4
OJ 3340 T = 0: DLT = DR(D)
BF 3350 ' -- FIRST PART
LI 3360 SQ = SQ.END
OD 3370 SQ = SQ + DLT: IF B(SQ
) = PLAYER THEN T = T +
1: GOTO 3370
CH 3380 ' -- SECOND PART
LB 3390 SQ = SQ.END
HP 3400 SQ = SQ - DLT: IF B(SQ
) = PLAYER THEN T = T +
1: GOTO 3400
EE 3410 ' -- CHECK
EM 3420 IF T >= 3 THEN GAME$ =
"OVER": VICTOR = PLAYER
: DIRECTION = D
JO 3430 NEXT D
JB 3440 RETURN
HA 3450 REM GAME'S OVER
HP 3460 IF JR$ = "Y" THEN GOSUB
3500: ' SHOW MARKERS
OK 3470 GOSUB 3750: ' SHOW WINN
ER
PE 3480 GOSUB 3840: ' PLAY MUSI
C
KA 3490 RETURN
MK 3500 REM SHOW MARKERS
PD 3510 DLT = DR(DIRECTION)
LI 3520 ' -- INITIAL PIECE
QJ 3530 SQ = SQ.END: GOSUB 3680
JG 3540 ' -- FIRST PART
CH 3550 LOOK = 1
IP 3560 WHILE LOOK
GD 3570 SQ = SQ + DLT
CJ 3580 IF B(SQ) = VICTOR THEN
GOSUB 3680 ELSE LOOK =
0
FH 3590 WEND
GB 3600 ' -- SECOND PART
CN 3610 LOOK = 1
QI 3620 SQ = SQ.END
II 3630 WHILE LOOK
IM 3640 SQ = SQ - DLT
BC 3650 IF B(SQ) = VICTOR THEN
GOSUB 3680 ELSE LOOK =
0
FA 3660 WEND
KO 3670 RETURN
II 3680 REM HIGHLIGHT MARKER
KJ 3690 R = FN ROW(SQ)
JF 3700 C = FN COL(SQ)
PL 3710 X = FN X(C): Y = FN Y(R
)
DI 3720 IF VICTOR = 1 THEN PUT(
X,Y),CURSOR.PYD,PSET
LJ 3730 IF VICTOR = 2 THEN PUT(
X,Y),CURSOR.SPX,PSET
JH 3740 RETURN
AG 3750 REM SHOW WINNER
PD 3760 IF GAME = 1 AND VICTOR
= 0 THEN S$ = "We tie ..
. sigh."
JO 3770 IF GAME = 1 AND VICTOR
= 1 THEN S$ = "I win !"
JA 3780 IF GAME = 1 AND VICTOR
= 2 THEN S$ = "You win !
"
NF 3790 IF GAME = 2 AND VICTOR
= 0 THEN S$ = "You tie .
.. sigh."
PK 3800 IF GAME = 2 AND VICTOR
= 1 THEN S$ = "You win,
" + NME$(1) + " !"
FM 3810 IF GAME = 2 AND VICTOR
= 2 THEN S$ = "You win,
" + NME$(2) + " !"
IL 3820 LOCATE 2,21-LEN(S$)/2:
PRINT S$;
JG 3830 RETURN
DK 3840 REM PLAY ANTON DVORAK'S
"HUMORESQUE"
DI 3850 PLAY "O2 T96 L16"
LM 3860 S1$ = "G P12 AG P12 AB
P12 > DE P12 D"
FE 3870 S2$ = "G P12 F+A P12 GF
+ P12 AG P12 E"
QN 3880 PLAY "XS1$; XS2$; D P12
DE P12 DG P12 ED P12 <
BA2 P12"
EP 3890 PLAY "XS1$; XS2$; D P12
DG P12 < GAB > D6 < G4.
"
JP 3900 RETURN
JC 3910 REM ASK TO PLAY AGAIN
JK 3920 LOCATE 25,12: PRINT "Pl
ay again (Y/N) ?";
PD 3930 GOSUB 1840
KL 3940 RETURN
CF 3950 REM EXIT
DJ 3960 SCREEN 0: WIDTH 40: LOC
ATE ,,0: COLOR 15,0,0: C
LS
DK 3970 PRINT "BYE-BYE"
KH 3980 RETURN

```

Atari Screen Display Toggle

Frank Murphy

A press of a key speeds up your Atari by 30 percent when you use this short utility. It's compatible with most languages, including Atari BASIC and many assemblers and compilers. A disk drive is required.

When you run a BASIC program, or when you assemble or compile programs in other languages, your computer is fighting against itself. In one corner is the 6502 micro-processor, doing its best to run your program at 1.78 megahertz. In the other corner is the Antic video chip which has the job of constantly updating your screen. Antic turns off the 6502 repeatedly to look at screen memory and character definitions. "Atari Screen Display Toggle" lets you turn the Antic chip off or on with a single keypress—speeding your computer up by as much as 30 percent. Of course, the price to pay for turning off Antic is a blank screen.

Typing It In

Type in Program 1 and save a copy to disk. Since the program requires accurate entry, be sure to use "The Automatic Proofreader" program located elsewhere in this issue when you type it in.

Load Program 1 and type RUN. You are asked to choose whether you want to save the program as a binary file or POKE it directly in memory. If you're going to be using the program in BASIC, choose P, for Put into memory. Choose C, for Create disk file, to be able to use Screen Display Toggle from within any language. If you choose this option, you must create a filename for the program. I suggest a name like SDT.OBJ.

If you choose to create a binary file, go to the DOS menu and select L, Binary Load. When you are asked for a filename, respond with the name you used to create the file. If you are using an alternative DOS like OS/A+ or DOS XL, simply type the name of the file at the DOS prompt.

Screen Display Toggle (SDT) is ready. Press SHIFT-CTRL-S to blank the screen and speed up the computer. Repeat the keystroke to return the screen to normal. Whenever you need an extra burst of speed, SDT is the answer.

Program 2 is the source code for SDT. You do not need to enter this program to use Atari Screen Display Toggle—it is included for those interested in machine language programming. The program, as written, is assembled into the cassette buffer. Those who wish to use the program with a cassette drive can assemble the program at another location (two possibilities are \$100 and \$600).

Program 1: Atari Screen Display Toggle

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

NO 1 REM COPYRIGHT 1987 COMP
    UTE! PUBLICATIONS, INC.
      {3 SPACES}ALL RIGHTS RE
    SERVED.
IA 2 PRINT "{CLEAR}"
BB 5 DIM X$(40):OPEN #2,4,0,
    "K:":POKE 752,1
BB 10 PRINT "{10 SPACES}COPYR
    IGH 1987":PRINT "
      {5 SPACES}COMPUTE! PUB
    LICATIONS, INC.":PRINT
      "{8 SPACES}ALL RIGHTS
    RESERVED."
AO 20 ? :? :? "Put into memo
    ry, or Create Disk Fil
    e?"
JI 25 GET #2,X:X$=CHR$(X):IF
    (X$<>"P") AND (X$<>"C
    ") THEN 25
MB 30 IF X$="C" THEN 50
  
```

```

KC 40 RESTORE 130:FOR X=1026
    TO 1072:READ Y:POKE X
    ,Y:NEXT X:POKE 1024,PE
    EK(520):POKE 1025,PEEK
    (521)
BC 45 POKE 520,2:POKE 521,4:
    POKE 752,0:END
EA 50 POKE 752,0:?:? " Ent
    er Dn:Filename:":INPU
    T #16,X$
DD 60 IF (X$(2,2)<>":") AND
    (X$(3,3)<>":") THEN GO
    SUB 95
EL 70 OPEN #1,8,0,X$:FOR X=1
    TO 53:READ Y:PUT #1,Y
    :NEXT X:CLOSE #1:POKE
    752,0:END
MB 95 X=LEN(X$):X$(20)=X$:X$
    (1,2)="D:":X$(3)=X$(20
    ):X$(1,X+3)="":RETURN
AP 100 DATA 255,255
DO 110 DATA 2,4
HD 120 DATA 42,4
PD 130 DATA 173,9,210,201,254
PP 140 DATA 208,8,173,47,2,73
CD 150 DATA 254,141,47,2,108
    ,0
IM 160 DATA 4,173,8,2,141,0
IP 170 DATA 4,173,9,2,141,1
JF 180 DATA 4,169,2,141,8,2
NE 190 DATA 169,4,141,9,2,96
LH 200 DATA 226,2,227,2,20,4
  
```

Program 2: SDT Source Code

```

0100 ;-----;
0110 ;Source Code: Screen Toggle ;
0120 ;-----;
0130 ;Copyright 1987 COMPUTE! PUBL.;
0140 ;INC. ALL RIGHTS RESERVED ;
0150 ;-----;
1000 KBCODE = $D20F
1010 SDMCTL = $022F
1020 OLDVEC = $0400
1030 VKEYBD = $0208
1990 START = $0402
1995 * = START
2000 ; This is where the new interrupt
2010 ; routine is handled.
2020 ;
2030 LDA KBCODE
2040 CMP #$FE ; Check for SH-CT-S
2050 BNE NEXT1
2060 LDA SDMCTL ;
2070 EOR #$FE ; Toggle Display
2080 STA SDMCTL ;
2090 NEXT1
2100 ; New funtions follow...
2990 JMP (OLDVEC)
3000 ;
3005 ; Initialize our new routine
3010 ;
3015 INIT
3020 LDA VKEYBD ; You can write
3030 STA OLDVEC ; your own prgs.
3040 LDA VKEYBD+1 ; that make use
3050 STA OLDVEC+1 ; of VKEYBD's
3060 LDA $START+255 ; vector by using
3070 STA VKEYBD ; code similar to
3080 LDA $START+256 ; this with your
3090 STA VKEYBD+1 ; own routine's
3100 RTS ; address.
9000 ;
  
```

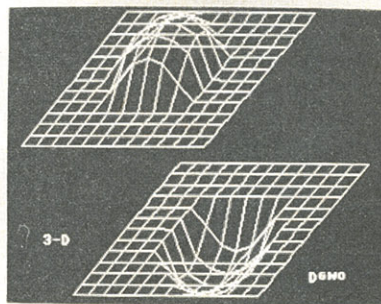
Dynamic Graphics For The 64

Ronald Carnell

You don't have to program in machine language to get lightning-fast graphics. This impressive, full-featured program lets you easily and quickly generate high-resolution graphics from BASIC. A disk drive is recommended.

The Commodore 64's hardware support of high-resolution (hi-res) graphics is among the best found in an eight-bit computer. Unfortunately, that hardware is very difficult to access from BASIC. Like many graphics enhancements, "Dynamic Graphics" solves this problem by adding commands that allow you to draw on the hi-res screen in BASIC. It does this, however, in an unusually ingenious—and fast—way.

The graphics commands added by most programs are interpreted, just like any other BASIC statement. This technique, however, leads to slow execution time. For example, to plot 500 points using a FOR-NEXT loop, BASIC has to in-



Complex high-resolution graphics can be drawn instantaneously from BASIC.

terpret the plot command 500 different times—and that can take quite a while. Dynamic Graphics operates under the philosophy that graphics commands should be executed only once, without the burden of BASIC's interpreter.

When Dynamic Graphics encounters one of its graphics commands, it does not execute it, so to speak. Instead, the points plotted by each graphics command are assembled into a specialized *shape table*. Later, when it's time to display the graphics, a dedicated machine language routine plots each

point, quickly and efficiently to the hi-res screen. Shape tables can be quite complex, and may be saved to disk for later use.

Typing It In

Dynamic Graphics is listed below as Program 1. This program is written in machine language, so you'll need to use the "MLX" machine language entry program to type it in. MLX is found elsewhere in this issue. When you run MLX, you will be asked for a starting address and an ending address for the data you'll be entering. For Dynamic Graphics, use the following values:

Starting Address: C000
Ending Address: CA7F

After typing in Dynamic Graphics, save it to disk or tape. Because Dynamic Graphics is written in machine language, it must be loaded with a ,1 extension (LOAD "filename",8,1). To activate Dynamic Graphics after it has been loaded into memory, enter SYS 49152. Dynamic Art can be disabled with the command SYS 49155.

Using The Program

Dynamic Graphics' commands fall into three different categories: Build, Execute, and Immediate. Build commands, such as Point and Line, are used to build the graphics shape table. An Execute command displays the hi-res screen, plotting each point specified in the shape table. Remember: Until an Execute command is used, no graphics are output to the screen. Immediate commands are commands that execute immediately and do not affect the shape table.

All of Dynamic Graphics' commands begin with an exclamation point (!). Parameters are placed on the line following the graphics command. Parameters must be preceded by a colon. If there is more than one parameter (which there usually is), they too must be separated by colons. Do *not* use commas for separating data. For example, the syntax for the Line command might appear as

```
100 !DO (LINE)
110 :X1:Y1:X2:Y2
120 !END LINE
```

Parameters may be constants, variables, or even expressions such as $X*\text{SIN}(3.14159265)$. If a parameter contains a syntax error, the line number in which the command is located (line 100 in the example above) is listed as the offending line. Some parameters are enclosed in parentheses directly following the command.

Parameters for hi-res screen coordinates are entered in :X:Y (:horizontal:vertical) format. The X coordinate can vary between 0 and 319. The Y coordinate can vary between 0 and 199.

Below is a description of each of Dynamic Graphics' commands.

Build Commands

!DO (POINT). This command plots points on the hi-res screen. Following this command can be any number of point coordinates. The following example plots points in the center and four corners of the screen:

```
100 !DO (POINT)
110 :0:0:319:199
120 :0:199:319:0
130 :160:100
140 !END POINT
```

You must end the Point command

with an !END POINT statement.

!DO (LINE). This command allows you to draw one, or several connected lines. Like the Point command, Line can contain any number of point coordinates. Here's an example:

```
100 !DO (LINE)
110 :10:10:132:10
120 :132:100:10:100
130 :10:10
140 !END LINE
```

This routine draws four connecting lines in the shape of a square. When one set of coordinates is specified, only a single point is plotted. When two coordinates are specified, a line is drawn.

The !DO (LINE) command is exited by !END LINE. An alternative exit is !STOP LINE. Normally, lines drawn by different !DO (LINE) commands are kept separate. If, however, a Line command ends with !STOP LINE, succeeding !DO (LINE) commands start plotting from the endpoint of the previously drawn line. Executing a !FINLINE returns things back to normal by keeping lines created by different !DO (LINE) commands separate.

!DO (SPRITE). This command allows you to define up to 96 sprite shapes. Although Dynamic Graphics does not provide commands for displaying or moving sprites—this still must be done with POKEs—it does allow you to define sprite shapes.

Exactly 64 numeric parameters must follow the !DO (SPRITE) command. For example, a solid-square sprite would be defined by the following:

```
100 !DO (SPRITE)
120 :255:255:255:255:255:255:255
130 :255:255:255:255:255:255:255
140 :255:255:255:255:255:255:255
150 :255:255:255:255:255:255:255
160 :255:255:255:255:255:255:255
170 :255:255:255:255:255:255:255
180 :255:255:255:255:255:255:255
190 :255:255:255:255:255:255:255
200 !END SPRITE
```

Every !DO (SPRITE) must terminate with an !END SPRITE statement. Later, sprite shapes are referenced by number. This number is determined by the order in which the sprites were defined. The first sprite defined is referred to as sprite 0, the second sprite is referred to as sprite 1, and so on.

!COLOR (bg,fg,x,y,n). The

!COLOR command allows you to set the hi-res screen's colors. On the hi-res screen, you can have separate background and foreground colors for each 8×8 -pixel area of the screen (often referred to as character boundaries). The parameters *bg* and *fg* specify the background and foreground colors of the character boundary defined by the *x* and *y* coordinates. The color parameters can range from 0 to 15. The *x* coordinate can range from 0 to 39, while *y* can range from 0 to 24.

The final parameter, *n*, specifies how many character boundaries the command affects (a maximum of 1000). As an example, !COLOR (0,5,0,0,1000) sets the background color to black and the foreground color to green for the entire screen. It is a good idea to execute a !COLOR command at the beginning of a program. Otherwise, you never know what strange colors you'll end up with.

!HUE (bg,fg). This command sets the colors of all pixels drawn after its use. As with the !COLOR command, *bg* and *fg* represent the background and foreground colors, respectively. If a line of a different color is drawn through a character boundary previously set by the !COLOR command, the new color supersedes the old.

!BRUSH (n). !BRUSH allows you to set the pixel width of your brush. The *n* parameter specifies the new width, and can range from 1 to 15. The actual size of lines drawn, however, depends on the angle of the lines. It is much like working with a chisel-point pencil. Experiment with different brush sizes to see a variety of effects.

!TEXTURE (n). Unlike any other Dynamic Graphics command, !TEXTURE can be used only once within a program. This command determines the texture of all lines drawn with a brush size greater than one. The *n* parameter specifies a brushes pattern. As an example, a line drawn with !BRUSH (2) and a !TEXTURE (2) results in a pixel/blank/pixel brush. Again, experiment with this command to get a feel for its capabilities.

!ERASE. This command tells Dynamic Graphics to erase points instead of draw them. This command

affects all of Dynamic Graphics' drawing commands. Erase mode is terminated with the statement !END ERASE.

!QUITPIC. This *very* important command informs Dynamic Graphics that you're finished defining a shape table. You *must* use this command prior to an Execute command. If you do not, the computer will try to plot points found beyond the shape table, possibly locking up your computer system.

Execute Commands

!VIEW. This command clears and displays the hi-res screen, drawing anything found in the shape table. Points and lines found in the shape table are drawn in the order in which they were defined. Because of this, it's possible to create an animation effect by drawing and redrawing various objects. !VIEW continues to display the hi-res screen until a key is pressed.

!MAP (ON/OFF). This command turns the hi-res screen on and off. When a !MAP (ON) is executed, the hi-res screen is displayed and the shape table is drawn. This command does not clear the hi-res screen, so it's possible to draw on top of previously drawn graphics. If you prefer, you may clear the hi-res screen prior to a !MAP (ON) with the !CLRMAP command described below. To return to the text screen, use the command !MAP (OFF). Unlike !VIEW, !MAP (ON) does not automatically return to the text screen after a key is pressed.

Immediate Commands

!SAVE "filename". The !SAVE command saves the current shape table to disk. Dynamic Graphics normally saves shape tables to device 8. If you wish to save your shape table to the drive known as device 9, enter a **POKE 49159,9** prior to using the !SAVE command. To load a shape table, simply use BASIC's built-in load command. For example, **LOAD "filename",8,1** loads the specified shape table into memory, ready to be displayed by an execute command.

!NEWPIC. Dynamic Graphics allows you to keep two separate shape tables in memory at once. This command switches between the two. When you execute a

!NEWPIC, the current shape table is switched out and a new one is put in its place. To access the old shape table, simply execute another !NEWPIC.

Execute commands always display the current shape table. To see which shape table is currently active, PEEK location 49158. If this location contains a 0, the default shape table—the one active when you first run your program—is in use. If this location returns a 1, then you're using the alternate shape table. Note that once you have defined a shape table and executed the !QUITPIC command, you can not alter it. To redefine a shape table, you must either exit and re-run your program, or load in a new shape table from disk.

!DEFSPR(s,n). This command assigns a sprite shape defined by !DO (SPRITE) to one of the 64's sprites. The *s* represents the desired sprite shape (0-95), and *n* represents one of the 64's eight sprites (0-7). To assign the first sprite shape stored in the shape table to the 64's eighth sprite, for example, use the command !DEFSPR(0,7). Remember, in order to display a sprite, *you* must provide the proper POKES.

!GETCHARS (ct). This command allows you to pick the type of characters produced by the !STRING statement (see below). The *ct* parameter determines the character type. Below is a list of *ct*'s possible values:

Value	Character Type
0	Normal uppercase/graphics
128	Reverse uppercase/graphics
256	Normal lowercase/uppercase
384	Reverse lowercase/uppercase

Notice that *ct* is simply an offset into the 64's built-in character set. You can use your own custom character sets by loading them into memory at 52000.

!STRING (x,y,s\$). This command prints characters on the hi-res screen. The *x* and *y* parameters specify the horizontal and vertical position of your text. The *x* coordinate can range from 0 to 39 while *y* can range from 0 to 24. When !STRING is executed, *s\$* is output to the hi-res screen. This parameter can be a string literal—like "Score"—or a string variable. Before using !STRING, you should use the !GET-

CHARS command to select the type of characters desired.

All of Dynamic Graphics' commands work from within a program only. And remember, before you can use any of these commands, you must first load Program 1 and execute a SYS 49152.

Sample Programs

Programs 2-4 offer examples on what you can do with Dynamic Graphics. Before any of these programs can be run, you must load Program 1 first.

Program 2 uses Dynamic Graphics to draw a potential game screen, complete with text. Program 3 displays a three-dimensional drawing in two different perspectives (see photo). Finally, Program 4 shows off Dynamic Graphics' ability to create animated art using a single shape table.

Dynamic Graphics

Please refer to the "MLX" article in this issue before entering the following program.

```

C000:4C 0D C0 4C 78 C0 00 08 96
C008:01 02 60 03 00 A2 14 A9 23
C010:00 9D 34 03 CA 10 FA A9 E5
C018:00 85 37 A9 5A 85 38 A9 7F
C020:4C 85 7C 8D C0 C0 A9 85 CD
C028:85 7D A9 C0 85 7E A9 00 86
C030:8D 36 03 A9 84 8D 37 03 CC
C038:A2 07 A0 6F 98 9D F8 5F 64
C040:9D F8 9F 9D F8 83 88 CA 4E
C048:10 F2 A9 00 85 05 85 FB 0B
C050:A9 A0 85 06 85 FC AD 0C 67
C058:C0 D0 1C A9 00 85 FD A9 48
C060:E0 85 FE A2 20 A0 00 A9 EA
C068:C2 91 FB 91 FD C8 D0 F9 F6
C070:E6 FC E6 FE CA D0 F2 60 51
C078:A9 C9 85 7C A9 3A 85 7D 78
C080:A9 B0 85 7E 60 48 C9 21 74
C088:D0 18 A5 7B C9 02 F0 12 2F
C090:A5 D4 D0 0E AD 41 03 C9 57
C098:A7 D0 04 A5 61 F0 03 68 3A
C0A0:D0 10 68 C9 20 F0 03 8D 90
C0A8:41 03 C9 3A 90 01 60 4C FD
C0B0:80 00 20 73 00 8D 42 03 6B
C0B8:20 73 00 F0 10 C9 2C F0 27
C0C0:0C C9 28 F0 08 C9 22 F0 6B
C0C8:04 C9 3A D0 EB A2 FF E8 E5
C0D0:E0 11 B0 2C BD 03 C1 CD 2B
C0D8:42 03 D0 F3 8A 0A AA BD 25
C0E0:14 C1 8D EC C0 BD 15 C1 46
C0E8:8D ED C0 20 FF FF 20 79 80
C0F0:00 F0 0D C9 3A F0 09 20 B4
C0F8:73 00 F0 04 C9 3A D0 F7 63
C100:4C 79 00 42 44 56 45 51 83
C108:46 53 4D 54 48 43 80 94 57
C110:A2 9C A1 96 D4 C1 EF C1 F8
C118:4B C3 E3 C1 15 C3 A6 C2 92
C120:2E CA 3E C3 CD C1 40 C1 29
C128:52 C1 E9 C1 FA C8 54 C5 08
C130:58 C8 30 C9 2F C4 20 73 F4
C138:00 20 9E AD 20 AA B1 60 E1
C140:20 36 C1 8C 0B C0 20 36 34
C148:C1 98 0A 0A 0A 0A 8D 0A 52
C150:C0 60 20 36 C1 8C 45 03 81
C158:8C 0B C0 20 36 C1 98 0A F2
C160:0A 0A 8D 0A C0 0D 45 38
C168:03 8D 45 03 20 36 C1 84 8B

```

C170:FB	20	36	C1	84	FC	20	36	6B	C408:40	8D	36	03	A5	06	69	00	24	C6A0:34	CA	D0	BD	C6	2C	10	B9	B1
C178:C1	8C	34	03	8D	35	03	A9	A7	C410:8D	37	03	A5	42	85	05	A5	C0	C6A8:60	A5	2B	85	2F	A5	2C	85	7B
C180:00	85	3B	A9	9C	85	3C	A6	81	C418:44	85	06	20	73	00	C9	80	97	C6B0:30	06	2F	26	30	A5	2D	85	18
C188:FB	F0	0E	18	A5	3B	69	28	9E	C420:D0	F9	A9	4C	85	7C	A9	85	81	C6B8:31	A5	2E	85	32	06	31	26	98
C190:85	3B	90	02	E6	3C	CA	D0	66	C428:85	7D	A9	C0	85	7E	60	A9	A5	C6C0:32	38	A5	2F	E5	31	85	31	4D
C198:F2	18	A5	3B	65	FC	85	3B	69	C430:00	85	FB	A9	84	85	FC	A9	13	C6C8:A5	30	E5	32	85	32	38	A5	20
C1A0:90	02	E6	3C	AD	34	03	D0	A2	C438:00	85	FD	A9	5A	85	FE	20	84	C6D0:2F	E5	2D	85	33	B0	02	C6	94
C1A8:05	AD	35	03	F0	1E	A0	00	32	C440:36	C1	84	42	20	36	C1	84	EB	C6D8:34	A6	2D	20	1B	C7	18	A5	9F
C1B0:AD	45	03	91	3B	E6	3B	D0	92	C448:44	A6	42	F0	0E	18	A5	FD	0F	C6E0:F9	65	37	85	F9	24	34	30	FC
C1B8:02	E6	3C	38	AD	34	03	E9	30	C450:69	40	85	FD	90	02	E6	FE	88	C6E8:21	18	A5	F7	65	35	85	F7	44
C1C0:01	8D	34	03	B0	03	CE	35	43	C458:CA	D0	F2	A6	44	F0	0E	18	5E	C6F0:A5	F8	65	36	85	F8	18	A5	85
C1C8:03	4C	A4	C1	60	20	36	C1	43	C460:A5	FB	69	40	85	FB	90	02	2C	C6F8:33	65	31	85	33	A5	34	65	F5
C1D0:8C	08	C0	60	20	36	C1	C0	D8	C468:E6	FC	CA	D0	F2	A0	3F	B1	55	C700:32	85	34	CA	D0	D5	20	1B	76
C1D8:10	90	02	A0	0F	98	0A	8D	4F	C470:FB	91	FD	88	10	F9	60	A9	77	C708:C7	60	18	A5	33	65	2F	85	04
C1E0:09	C0	60	A9	20	8D	44	03	82	C478:00	85	05	A9	80	85	06	A0	66	C710:33	A5	34	65	30	85	34	CA	4A
C1E8:60	A9	00	8D	44	03	60	20	EE	C480:00	B1	05	85	39	85	F7	C8	08	C718:D0	C1	60	8A	48	A5	F7	85	83
C1F0:73	00	C9	4C	F0	0C	C9	53	CA	C488:B1	05	85	3A	C8	B1	05	85	1D	C720:42	A5	F8	85	43	A5	F9	85	DB
C1F8:D0	03	4C	BD	C3	A9	40	8D	DD	C490:3D	85	F9	20	3B	C5	A5	3A	D1	C728:44	A5	41	85	49	20	74	3F	3F
C200:43	03	20	78	C0	20	73	00	E0	C498:29	80	85	47	A5	3A	29	40	A4	C730:A5	45	D0	09	B1	03	05	FE	31
C208:D0	FB	18	A5	7A	69	05	85	5B	C4A0:85	48	A5	3A	29	20	85	45	71	C738:91	03	4C	4A	C7	38	A9	FF	F1
C210:7A	90	02	E6	7B	20	79	00	F4	C4A8:A5	3A	29	1E	4A	85	41	A5	2B	C740:E5	FE	85	FE	B1	03	25	FE	06
C218:F0	13	C9	80	F0	07	C9	90	E3	C4B0:3A	29	01	85	3A	85	F8	20	14	C748:91	03	C6	49	F0	17	18	A5	88
C220:D0	06	4C	C0	C2	4C	A6	C2	7C	C4B8:D2	C2	A0	00	B1	3B	8D	46	4C	C750:F7	6D	08	C0	85	F7	90	02	73
C228:20	73	00	D0	E8	20	36	C1	9D	C4C0:03	A5	48	D0	32	A0	00	B1	11	C758:E6	F8	18	A5	F9	6D	08	C0	4D
C230:8C	39	03	8D	3A	03	20	36	D7	C4C8:05	85	3E	C8	B1	05	85	3F	76	C760:85	F9	4C	2D	C7	68	AA	45	68
C238:C1	8C	3B	03	AD	3A	03	F0	A6	C4D0:C8	B1	05	85	40	20	3B	C5	E2	C768:44	85	F9	A5	42	85	F7	A5	D2
C240:15	C9	01	F0	05	A9	01	8D	50	C4D8:A5	3F	29	80	85	47	A5	3F	06	C770:43	85	F8	60	A9	00	85	03	83
C248:3A	03	AD	39	03	C9	41	90	47	C4E0:29	40	85	46	A5	3F	29	20	C0	C778:A9	60	85	04	A5	F9	4A	4A	D9
C250:05	A9	40	8D	39	03	AD	3B	10	C4E8:85	45	A5	3F	29	1E	4A	85	0B	C780:4A	85	FB	A5	F7	85	FC	A5	E5
C258:03	C9	C9	90	05	A9	C8	8D	02	C4F0:41	A5	3F	29	01	85	3F	A5	41	C788:F8	85	FD	46	FD	66	FC	46	E3
C260:3B	03	A0	00	AD	39	03	85	36	C4F8:06	C9	C0	B0	3D	A5	39	85	93	C790:FD	66	FC	46	FD	66	FC	A9	E9
C268:F7	91	05	C8	AD	3A	03	85	5D	C500:F7	A5	3A	85	08	A5	3D	85	EE	C798:00	85	3B	A9	5C	85	3C	A6	A3
C270:F8	0D	09	C0	0D	44	03	0D	6F	C508:F9	A5	48	F0	0A	20	1B	C7	E0	C7A0:FB	F0	0E	18	A5	3B	69	28	C2
C278:43	03	91	05	C8	AD	3B	03	59	C510:A5	47	D0	26	4C	7F	C4	A5	4C	C7A8:85	3B	90	02	E6	3C	CA	D0	8A
C280:85	F9	91	05	20	3B	C5	A5	EB	C518:3E	85	FB	85	39	A5	3F	85	60	C7B0:F2	18	A5	3B	65	FC	85	3B	8D
C288:06	C9	C0	90	06	20	48	C5	AE	C520:FC	85	3A	A5	40	85	FD	85	C6	C7B8:90	02	E6	3C	A0	00	AD	46	58
C290:EE	21	D0	20	D2	C2	20	0A	DD	C528:3D	20	BB	C5	A5	47	D0	0A	24	C7C0:03	91	3B	A5	F7	29	07	85	EF
C298:C3	20	79	00	C9	3A	F0	03	53	C530:A5	46	F0	03	4C	7F	C4	4C	A4	C7C8:FD	38	A9	07	E5	FD	85	FE	3C
C2A0:4C	0A	C2	4C	15	C2	20	48	28	C538:C5	44	60	18	A5	05	69	03	7C	C7D0:A5	F9	29	07	85	FD	A5	FB	B2
C2A8:C5	78	A9	36	85	01	58	A0	49	C540:85	05	90	02	E6	06	60	60	72	C7D8:0A	AA	18	BD	24	C8	65	03	09
C2B0:01	B1	05	09	40	91	05	78	1F	C548:38	A5	05	E9	03	85	05	B0	81	C7E0:85	03	BD	25	C8	65	04	85	67
C2B8:A9	37	85	01	58	20	3B	C5	21	C550:02	C6	06	60	AD	06	C0	49	A5	C7E8:04	A9	00	85	FB	06	FC	26	55
C2C0:A9	00	8D	43	03	A9	4C	85	DD	C558:01	8D	06	C0	A9	00	85	FB	E8	C7F0:FB	06	FC	26	FB	06	FC	26	1A
C2C8:7C	A9	85	85	7D	A9	C0	85	99	C560:85	05	A9	A0	85	FC	85	06	60	C7F8:FB	18	A5	03	65	FC	85	03	9E
C2D0:7E	60	46	F9	46	F9	46	F9	B6	C568:A9	00	85	FD	A9	E0	85	FE	34	C800:A5	04	65	FB	85	04	18	A5	E3
C2D8:46	F8	66	F7	46	F8	66	F7	E6	C570:A2	20	A0	00	78	A9	34	85	C1	C808:03	65	FD	85	03	90	02	E6	D1
C2E0:46	F8	66	F7	A9	00	85	3B	A7	C578:01	B1	FB	48	B1	FD	91	FB	99	C810:04	A5	FE	AA	BD	1C	C8	85	0D
C2E8:A9	9C	85	3C	A6	F9	F0	0E	EB	C580:68	91	FD	C8	D0	F3	E6	FC	12	C818:FE	A0	00	60	01	02	04	08	77
C2F0:18	A5	3B	69	28	85	3B	90	48	C588:E6	FE	CA	D0	EC	A9	37	85	AF	C820:10	20	40	80	00	00	40	01	53
C2F8:02	E6	3C	CA	D0	F2	18	A5	95	C590:01	58	A9	00	85	FB	A9	9C	F3	C828:80	02	C0	03	00	05	40	06	5D
C300:3B	65	F7	85	3B	90	02	E6	DC	C598:85	FC	A9	18	85	FD	A9	80	D4	C830:80	07	C0	08	00	0A	40	0B	10
C308:3C	60	AD	0B	C0	AD	0A	C0	3B	C5A0:85	FE	A2	04	A0	00	B1	FB	A7	C838:80	0C	C0	D0	00	0F	40	10	C2
C310:A0	00	91	3B	60	A9	00	8D	05	C5A8:48	B1	FD	91	FB	68	91	FD	40	C840:80	11	C0	12	00	14	40	15	75
C318:40	03	20	48	C5	78	A9	36	A2	C5B0:C8	D0	F3	E6	FC	E6	FE	CA	0E	C848:80	16	C0	17	00	19	40	1A	28
C320:85	01	58	A0	01	B1	05	48	E0	C5B8:D0	EC	60	A2	00	86	34	86	27	C850:80	1B	C0	1C	00	1E	40	1F	DA
C328:78	A9	37	85	01	58	68	30	FF	C5C0:3E	86	32	86	2E	86	FA	86	BC	C858:A9	00	85	03	A9	60	85	04	7D
C330:08	09	80	91	05	20	3B	C5	0C	C5C8:FE	86	36	E8	86	35	86	37	18	C860:A2	20	A0	00	98	91	03	C8	39
C338:60	EE	40	03	D0	F7	20	73	FD	C5D0:38	A5	FB	E5	F7	85	2B	A5	91	C868:D0	FB	E6	04	CA	D0	F6	60	66
C340:00	C9	91	F0	03	4C	AA	C3	DD	C5D8:FC	E5	F8	85	2C	24	2C	10	2E	C870:A9	00	85	FB	A9	9C	85	FC	0F
C348:4C	7F	C1	20	15	C3	20	58	AD	C5E0:17	A9	FF	85	35	25	36	A5	8C	C878:A9	00	85	FD	A9	5C	85	FE	38
C350:C8	20	7F	C3	20	E4	FF	F0	F5	C5E8:2B	49	FF	18	69	01	85	2B	63	C880:A2	04	A0	00	B1	FB	91	FD	17
C358:FB	20	AA	C3	78	A9	36	85	D3	C5F0:A5	2C	49	FF	69	00	85	2C	06	C888:C8	D0	F9	E6	FC	E6	FE	CA	AC
C360:01	58	20	93	C8	AD	40	03	3C	C5F8:38	A5	FD	E5	F9	85	2D	A5	0E	C890:D0	F2	60	A9	00	85	05	A9	

```

C938:20 36 C1 8C 3E 03 8D 3F C2
C940:03 A2 08 18 A5 03 6D 3E D2
C948:03 85 03 A5 04 6D 3F 03 D0
C950:85 04 CA D0 EE A9 20 85 F1
C958:3B A9 CB 85 3C 78 A9 33 10
C960:85 01 A2 04 A0 00 B1 03 F6
C968:91 3B C8 D0 F9 E6 04 E6 14
C970:3C CA D0 F2 A9 37 85 01 54
C978:58 AD 3E 03 10 05 49 80 43
C980:8D 3E 03 60 60 A9 00 85 FF
C988:03 A9 60 85 04 A6 FB F0 10
C990:10 18 A5 03 69 40 85 03 71
C998:A5 04 69 01 85 04 CA D0 DF
C9A0:F0 A6 FC F0 0E 18 A5 03 24
C9A8:69 08 85 03 90 02 E6 04 32
C9B0:CA D0 F2 60 48 29 80 4A 74
C9B8:85 FB 68 29 3F 05 FB 38 EB
C9C0:ED 3E 03 A2 20 86 FB A2 1B
C9C8:CB 86 FC AA F0 0E 18 A5 C3
C9D0:FB 69 08 85 FB 90 02 E6 23
C9D8:FC CA D0 F2 60 20 73 00 51
C9E0:C9 22 D0 35 E6 7A D0 02 14
C9E8:E6 7B A0 00 B1 7A F0 07 43
C9F0:C9 22 F0 03 C8 D0 F5 8C 42
C9F8:3C 03 A5 7A 85 FD A5 7B B2
CA00:85 FE 18 A5 7A 6D 3C 03 7A
CA08:85 7A 90 02 E6 7B 20 79 10
CA10:00 F0 05 20 73 00 D0 F6 B8
CA18:60 20 8B B0 A0 00 B1 47 12
CA20:8D 3C 03 C8 B1 47 85 FD 2C
CA28:C8 B1 47 85 FE 60 20 36 BF
CA30:C1 84 FB 20 36 C1 84 FC 08
CA38:20 DD C9 20 85 C9 A9 00 37
CA40:48 68 CD 3C 03 F0 22 A8 5A
CA48:C8 98 48 88 B1 FD 20 B4 74
CA50:C9 A0 00 B1 FB 91 03 C8 03
CA58:C0 08 D0 F7 18 A5 03 69 B0
CA60:08 85 03 90 DC E6 04 D0 20
CA68:D8 60 A2 20 B5 2B 9D 80 EE
CA70:CA CA 10 F8 60 A2 20 BD 3B
CA78:80 CA 95 2B CA 10 F8 60 4F

```

For instructions on entering these programs, please refer to "COMPUTE!'s Guide to Typing in Programs" elsewhere in this issue.

Dynamic Graphics—Demo 1

```

KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
XA 20 PRINT CHR$(147)"
{3 SPACES}COPYRIGHT 1987
COMPUTE! PUBL., INC."
EB 30 PRINT "{10 SPACES}ALL RI
GHTS RESERVED"
EM 40 SYS 49152:POKE 53280,6
ER 50 ICOLOR (6,1,22,0,120)
PM 60 ICOLOR (14,0,0,0,880)
FC 70 IBRUSH (3):!TEXTURE(2)
QA 80 IHUE (14,6)
RF 90 FOR I=0 TO 252 STEP 4
QD 100 IDO (LINE)
FC 110 :32+I:20:32+I:120
EK 120 END LINE
ER 130 NEXT I
XH 140 IBRUSH (1):!HUE(14,0)
CS 150 IERASE:FOR I=0 TO 1
EG 160 IDO (LINE)
EH 170 :32:122+I:289:122+I
QS 180 END LINE
BM 190 NEXT I:!END ERASE
HJ 200 IDO (LINE)
PR 210 :0:125:308:125:288:110
AB 220 END LINE
PM 230 IDO (LINE)
RB 240 :288:104:319:117
ED 250 END LINE
XQ 260 IDO (LINE)
EJ 270 :0:135:319:135
JF 280 END LINE
XD 290 IERASE:X=50

```

```

QB 300 FOR I=0TO22
BB 310 IDO (LINE)
PM 320 :X:100+I:X+20:100+I
BG 330 END LINE
XP 340 NEXT I
QK 350 X=X+50:IF X<280 GOTO300
DK 360 IEND ERASE
DG 370 FOR I=1 TO 24
RE 380 IDO (LINE)
DE 390 :32-I:22+I:32-I:122-I
CM 400 END LINE
EM 410 NEXT
QE 420 IQUITPIC:ICLRMAP:IMAP (
ON)
FH 430 IGETCHA?RS (384)
XX 440 ISTRING (23,1,"SCORE ")
AC 450 ISTRING (23,34,"TIME ")
CG 460 ISTRING (24,1,"000000")
FP 470 ISTRING (24,34,"00:00")
CD 480 GETK$:IFK$="" GOTO480
JK 490 IMAP (OFF)
PE 500 SYS 49155

```

Dynamic Graphics—Demo 2

```

KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
XA 20 PRINT CHR$(147)"
{3 SPACES}COPYRIGHT 1987
COMPUTE! PUBL., INC."
EB 30 PRINT "{10 SPACES}ALL RI
GHTS RESERVED"
ER 40 SYS 49152
XH 50 ICOLOR (0,1,0,0,1000)
CE 60 T=30*↑/180:IX=136:IY=151
:GOTO80
FP 70 T=210*↑/180:IX=182:IY=51
JK 80 Q1=1:S=15:DI=45:C=26*↑/1
80
DG 90 FOR H=-90 TO 90 STEP S:Z
=H
SM 100 FOR V=-90 TO 90 STEP S:
X=V
BJ 110 Y=0:IF H<-DI OR H>DI GO
TO140
PB 120 R=SQR(DI*DI-H*H):IFV<-R
ORV>RGOTO140
DS 130 Y=SQR(R*R-V*V)
CM 140 GOSUB370
BP 150 NEXT:NEXT
KR 160 PRINT:PRINT"WORKING":!F
INLINE
EB 170 Q1=2:Q=1
KA 180 FOR V=-90 TO 90 STEP S:
X=V
BP 190 FOR H=-90 TO 90 STEP S:
Z=H
BR 200 Y=0:IF V<-DI OR V>DI GO
TO230
HX 210 R=SQR(DI*DI-V*V):!FH<-R
ORH>RGOTO230
XF 220 Y=SQR(R*R-H*H)
MB 230 GOSUB370
JS 240 NEXT:NEXT
BJ 250 IF QQ=0 THEN QQ=1:GOTO7
0
CC 260 !FINLINE:IQUITPIC
DG 270 PRINT:PRINT"PRESS ANY K
EY..."
XD 280 GETK$:IFK$="" GOTO280
XX 290 ICLRMAP:IGETCHRS(256)
GM 300 ISTRINGS (5,4,"3-D")
XA 310 ISTRINGS (2,32,"DEMO")
JS 320 IMAP (ON)
XA 330 GETK$:IFK$=""GOTO330
JX 340 IMAP (OFF)
QR 350 SYS 49155
XQ 360 END
AC 370 IF Z=0 THEN Z=.001
AF 380 Z2=-TAN(T)*V:DZ=Z2-H:IF

```

```

DZ=<=0 GOTO460
AC 390 L1=DZ*SIN(T):X1=V+COS(T
)*L1:Z1=Z2-SIN(T)*L1
DE 400 Y1=0:IF X1<-DI OR X1>DI
GOTO430
GA 410 R=SQR(DI*DI-X1*X1):IF Z
1*Z1>R*R GOTO430
XA 420 Y1=SQR(R*R-Z1*Z1)
RS 430 L=SQR(DZ*DZ-L1*L1):DY=Y
1-Y:DA=ATN(DY/L)
BD 440 IF DA>C THEN Q2=1:GOTO5
20
XK 450 Q2=0:IF F2=1 THEN Q2=2
SQ 460 A=-T:IF H<0 THEN A=T
PQ 470 L=SQR(Z*Z+Y*Y):Z=ABS(Z)
BS 480 A1=ATN(Y/Z):A2=A1+A
CM 490 Y2=SIN(A2)*L
DH 500 L=SQR(Z*Z+X*X):A1=ATN(X
/Z):A2=A1+A
RR 510 X2=SIN(A2)*L
PS 520 IF YY=Y2+IY AND XX=X2+IX
X GOTO600
DC 530 IF Q2 THEN !FINLINE
XX 540 IF Q1=2 AND H=-90 THEN
{SPACE}!FINLINE
BD 550 IF Q1=1 AND V=-90 THEN
{SPACE}!FINLINE
CQ 560 XX=X2+IX:YY=Y2+IY
CA 570 IDO (LINE)
HM 580 :XX:YY
HG 590 !STOP LINE:PRINT". ";
HP 600 RETURN

```

Dynamic Graphics—Demo 3

```

KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
XA 20 PRINT CHR$(147)"
{3 SPACES}COPYRIGHT 1987
COMPUTE! PUBL., INC."
EB 30 PRINT "{10 SPACES}ALL RI
GHTS RESERVED"
ER 40 SYS 49152
DH 50 ICOLOR (0,0,0,0,1000)
SG 60 IHUE (0,0)
KA 70 IBRUSH(1):!TEXTURE(2)
PM 80 RA=90:E=.8:AN=360:S=5
DC 90 FOR T=1 TO 11
DD 100 FOR TH=1 TO AN STEP S
KB 110 H=INT(RND(0)*15)+1:IHUE
(0,H)
KA 120 X=(RA*COS(TH)+(160*E))/
E
MG 130 Y=(RA*SIN(TH)+100)
QE 140 IDO (LINE)
EC 150 :X:Y
JM 160 !STOP LINE
HQ 170 IF INT(TH/2)=TH/2 THEN
{SPACE}!FINLINE
HX 180 NEXT TH
RJ 190 !FINLINE
KQ 200 IERASE:AN=300
QB 210 IF INT(T/2)=T/2 THEN !E
ND ERASE:AN=360
SD 220 PRINT T,PEEK(5)+256*PEE
K(6)
AK 230 NEXT T
PR 240 IF S=5 THEN S=3:!END ER
ASE:GOTO90
GE 250 IQUITPIC:PRINT"{DOWN}PR
ESS ANY KEY..."
PH 260 GETK$:IFK$=""GOTO260
HS 270 ICLRMAP
EB 280 IGETCHRS(0)
ER 290 ISTRINGS (1,0,"COLOR")
EE 300 ISTRINGS (1,34,"WHEEL")
QX 310 IMAP (ON)
KG 320 GETK$:IFK$="" GOTO320
QQ 330 IMAP (OFF)
AR 340 SYS 49155

```

Train for the Fastest Growing Job Skill in America

Only NRI teaches you to service all computers as you build your own fully IBM-compatible microcomputer

NEW!
Train with the newest Sanyo 880 Series Computer - it's fully IBM-compatible and runs almost twice as fast as the IBM PC!

With computers firmly established in offices—and more and more new applications being developed for every facet of business—the demand for trained computer service technicians surges forward. The Department of Labor estimates that computer service jobs will actually *double* in the next ten years—a faster growth rate than for any other occupation.

Total systems training

No computer stands alone... it's part of a total system. And if you want to learn to service and repair computers, you have to understand computer *systems*. Only NRI includes a powerful computer system as part of your training, centered around the new, fully IBM-compatible Sanyo 880 Series computer.

As part of your training, you'll build this highly rated, 16-bit IBM-compatible computer system. You'll assemble Sanyo's "intelligent" keyboard, install the power supply and disk drive and interface the high-resolution monitor. The 880 Computer has two operating speeds: Standard IBM speed of 4.77 MHz and a remarkable turbo speed of 8 MHz. It's confidence-building, real-world experience that includes training in programming, circuit design and peripheral maintenance.

No experience necessary—NRI builds it in

Even if you've never had any previous training in electronics, you can succeed with NRI training. You'll start with the basics, then rapidly build on them to master such concepts as digital logic, microprocessor design, and computer memory. You'll build and test advanced electronic circuits using the exclusive NRI Discovery Lab®, professional digital multimeter, and logic probe. Like your computer, they're all yours to keep as part of your training. You even get some



Your NRI total systems training includes all of this:

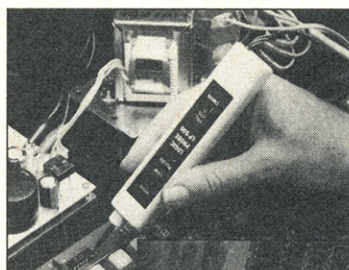
- NRI Discovery Lab® to design and modify circuits
- Four-function digital multimeter with walk-you-through instruction on audio tape
- Digital logic probe for visual examination of computer circuits
- Sanyo 880 Series Computer with "intelligent" keyboard and 360K double-density, double-sided disk drive
- High resolution monochrome monitor
- 8K ROM, 256K RAM
- Bundled software including GW BASIC, MS DOS, WordStar, CalcStar
- Reference manuals, schematics and bite-sized lessons.

of the most popular software, including WordStar, CalcStar, GW Basic and MS DOS.

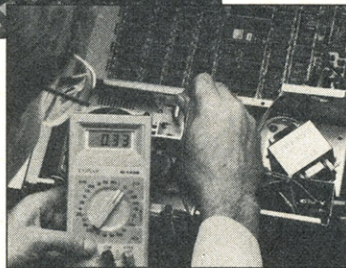
Send for 100-page free catalog

Send the post-paid reply card today for NRI's 100-page, full-color catalog, with all the facts about at-home computer training. Read detailed descriptions of each lesson, each experiment you perform. See each piece of hands-on equipment you'll work with and keep. And check out NRI training in other high-tech fields such as Robotics, Data Communications, TV/Audio/Video Servicing, and more.

If the card has been used, write to NRI Schools, 3939 Wisconsin Ave., N.W., Washington, D.C. 20016.



NRI is the only technical school that trains you as you assemble a top-brand microcomputer. After building your own logic probe, you'll assemble the "intelligent" keyboard...



... then install the computer power supply, checking all the circuits and connections with NRI's Digital Multimeter. From there, you'll move on to install the disk drive and monitor.

NRI SCHOOLS

McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, NW
Washington, DC 20016

We'll Give You Tomorrow.



IBM is a Registered Trademark of International Business Machine Corporation.

Masked Input For The Amiga

Steve Michel

Here's a versatile input routine for use in your Amiga Basic programs. Written as a subprogram, this input routine selectively masks out all unwanted characters. Whether you need numeric input or a simple Y/N response, "Masked Input" can do the job.

Probably the most vulnerable part of a program is its input routine. If a program is going to crash, it usually does so here. To avoid such occurrences, input routines must carefully screen illegal and unacceptable keypresses. For example, when the program is expecting a numeric response, the input routine should accept only numeric data. Editing keys must be monitored as well. You do not want someone who is using the program to accidentally clear the screen or backspace over your input prompt simply because they press the wrong key.

"Masked Input" is an Amiga Basic subprogram that provides a welcome alternative to the INPUT statement. Because it is a subprogram, Masked Input can be easily

transported into your own programs. Besides being useful, Masked Input offers a good example of the use of subprograms and Amiga library routines.

Getting Started

Type in the demo program and save a copy before you run it. This program contains both the Masked Input subprogram, named INPUTSTRING, and some preliminary code that demonstrates its use.

Masked Input makes use of the Amiga library file `graphics.bmap`. This file is included in the Basic-Demos drawer of the Amiga Extras disk. Before you run the program, make sure that a copy of the `graphics.bmap` file is on the same disk as the demo program. The location of this file is important. It must be either in the current directory, or in the directory named LIBS on the disk used when you booted the system. If you do not have this library file in the correct place, BASIC will stop with a *file not found* error when you run the program.

When run, the demo program asks you to enter a string length and

edit mask (see below for details). Next, the program calls the INPUTSTRING subprogram using your previous two entries, prompting you for your final input. After you press RETURN, the computer echoes your entry to the screen, waits for the RETURN key to be pressed, and then reruns the program.

Using The Subprogram

The proper syntax for calling INPUTSTRING is

```
CALL INPUTSTRING(entry$,strlen  
,emask)
```

Amiga Basic also provides an alternative call syntax that allows the subprogram to be used like a new BASIC command:

```
INPUTSTRING entry$,strlen,emask
```

INPUTSTRING requires three parameters: *entry\$*, *strlen*, and *emask*. The string variable *entry\$* returns the text entered by the user. The *strlen* parameter specifies the maximum length of input to be allowed. The *emask* parameter is an edit mask that determines the type of data that can be entered. Valid val-

ues for *emask* range from 0 to 127. Different mask values produce the following results:

Value	Function
0	All characters accepted
1	Numbers 0-9
2	Punctuation marks , , +, and -
4	Upper- and lowercase letters A-Z
8	Blanks (spaces) allowed
16	Uppercase letters A-Z
32	Characters Y and N
64	Null input not allowed

An important aspect of this method of masking is that the *emask* values may be added together to produce a cumulative effect. A value of 85 (1 + 4 + 16 + 64), for example, allows numbers, upper- and lowercase letters, and spaces, but not punctuation characters or a null input. This method of input masking puts the programmer in complete control.

INPUTSTRING uses less-than and greater-than symbols to frame the area of input. This lets the user see exactly how many characters can be entered. All responses are returned in the variable *entry\$*. If a numeric value is required, *entry\$* may be converted to a number with the VAL function as illustrated in the demo program.

This subprogram is fully documented with remark statements. All comments that follow the apostrophes found at the end of lines are instructional and may be omitted. The comments following the REMs, however, should be left in place to document the different parameters that are necessary for using the subprogram.

Editing Keys

In addition to the keys allowed by the edit mask, several other keys are available for editing input. The RETURN key terminates input. The cursor keys allow you to move through entered text. The current position of the cursor is denoted by an underline character. The BACK SPACE key deletes characters at the end of the input string. Pressing the DEL key erases the entire input field.

Subprograms

As explained above, the entire input routine is contained in the subprogram named INPUTSTRING. A subprogram is a section of code that is called by the main program and in-

teracts with the main program by passing data back and forth through variables called parameters. Parameters are listed in parentheses after the subprogram name. Other variables may also be held in common between the main program and the subprogram through the use of the SHARED statement. Except for passed parameters and shared variables, the subprogram acts as though it were in a world by itself. All other variables used within the subprogram are referred to as *local variables*, which means they are known only to the subprogram. Thus, the variable LOOP.CNTR in the main program and the variable LOOP.CNTR in a subprogram are treated as two different variables and do not interfere with each other.

Why use a subprogram instead of a subroutine to perform this input function? The main reason is efficiency. Once a subprogram has been written, debugged, and polished up, it can be attached to any program that requires its services. With a variety of prewritten subprograms, you no longer have to rewrite vital routines for each new program. Ideally, one could build and maintain a whole library of subprograms, each one designed for a specific application (inputting, sorting, reading a disk directory, and so on). Writing a program would then simply consist of splicing the appropriate subprogram into the main program. And because each subprogram acts independently, you do not have to worry about conflicting variable names.

It's easy to create a version of the Masked Input subprogram that you can add to your own programs. First, load the demonstration program and delete all the lines that come before the SUB INPUTSTRING statement. Next, save the subprogram text to disk as an ASCII file. Use a statement of the form **SAVE "masked input",A**

When you want to add the subprogram to one of your own programs, load or type in that program, then use a command of the form

MERGE "masked input"

to add the subprogram text from disk. Then add the statements for access to the graphics library routines, as explained below. All that's left is to add CALL statements for

the INPUTSTRING subprogram and your program is set up for customized input.

Libraries

When the Amiga is first booted with Kickstart, approximately 192K of operating system is loaded into the upper part of the computer's memory. (Kickstart is found in ROM on the Amiga 500 and Amiga 2000.) This code contains, among many other things, a whole set of instructions that manage the Amiga's graphics. This set of instructions is organized into a neat collection of routines collectively known as the graphics library, which consists of such routines as ClearScreen(), Draw(), WritePixel(), and SetSoftStyle().

Before any library routine can be used from BASIC, you must open the library with the LIBRARY command. In the case of our Masked Input routine, the command **LIBRARY "graphics.library"** is used. Executing this command instructs Amiga Basic to load the file graphics.bmap.

To create an underlined cursor, INPUTSTRING uses the graphics library routine named SetSoftStyle(). This routine allows you to change a font's type style. The syntax for SetSoftStyle is

```
CALL SetSoftStyle&(WINDOW(8)
,font.style,font.mask)
```

where WINDOW(8) is a pointer to the RastPort for the current window, *font.style* is a value in the range 0-7, and *font.mask* is a value that specifies which type styles are valid for a particular font. Not all fonts have the capability of producing every type style.

To insure that Amiga BASIC interprets this as a function and not as an array reference, a **DECLARE FUNCTION AskSoftStyle& LIBRARY** command is placed near the beginning of the demo program.

At this point, we're ready to change a character's font style to produce an underlined cursor. Legal values for the *font.style* parameter are

```
0 = normal
1 = underlined
2 = boldface
4 = italics
```

These values may be added together to achieve multiple font

styles. For example, a value of 3 produces underlined boldface type. For our purposes, however, we need only use a 1 for underline.

Masked Input—Demo Program

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
' Copyright 1987 COMPUTE! Publications, Inc.
' All Rights Reserved
demo.driver:
' the following declaration must be made in the calling program
DECLARE FUNCTION AskSoftStyle& LIBRARY
LIBRARY "graphics.library"
tell AmigaBASIC to read it
start:
CLS
PRINT "Copyright 1987 COMPUTE! Publications, Inc."
PRINT "All Rights Reserved."
FOR tt=1 TO 3500:NEXT tt
CLS
strLen = 2: emask = 1
' set default values
LOCATE 2,2: PRINT "Enter string length ";
CALL INPUTSTRING (entry$,strLen,emask)
size = VAL(entry$): strLen = 3
' convert to # & reset length
LOCATE 4,2: PRINT "Enter edit mask (0 - 127) ";
CALL INPUTSTRING (entry$,strLen,emask)
mask = VAL(entry$)
' convert to number
CLS: PRINT: PRINT "Enter input here => ";
CALL INPUTSTRING (entry$,size,mask)
PRINT: PRINT: PRINT "User input was => ";entry$
LOCATE 20,10: PRINT "PRESS ANY KEY"
get.Loop:
g$ = INKEY$: IF g$ = "" THEN get.Loop
GOTO start:
SUB INPUTSTRING (entry$,strLen,emask) STATIC:
REM entry$ = input string returned to calling program
REM strLen = maximum size of field to be input
REM emask = number (0-127) that determines input field traits
REM emask = see table at end of subprogram for values & traits
poss.style% = AskSoftStyle&(WINDOW(8))
' get possible styles
IF emask < 0 OR emask > 127 THEN emask = 0
input.string:
g$ = INKEY$: IF g$ <> "" THEN input.string
yLine = CSRLIN: xcoL = POS(0)
' get screen positions
PRINT "<";LOCATE yLine, xcoL +
```

```
strLen + 1: PRINT ">";LOCATE yLine, xcoL
pos.cntr = 1: Len.cntr = 1
entry$ = "": backspace$ = CHR$(8)
next.key:
IF Len.cntr = pos.cntr AND Len.cntr <> strLen + 1 THEN
LOCATE yLine,xcoL + pos.cntr: PRINT " ";
END IF
get.key:
g$ = INKEY$: IF g$ = "" THEN get.key
ascii = ASC(g$)
IF ascii = 13 THEN quit.sub
' return
IF ascii = 8 THEN back.up
' backspace
IF ascii = 30 THEN move.right
' cursor right
IF ascii = 31 THEN move.left
' cursor left
IF ascii = 127 THEN wipe.out
' del(ete)
IF Len.cntr = strLen + 1 AND Len.cntr = pos.cntr THEN get.key
IF emask = 0 OR emask = 64 THEN print.char
' AND each bit of emask to determine edit functions
check.num:
IF (emask AND 1) = 0 THEN check.punct
IF ascii >= 48 AND ascii <= 57 THEN print.char
check.punct:
IF (emask AND 2) = 0 THEN check.upLow
IF ascii = 46 OR ascii = 43 OR ascii = 45 THEN print.char
check.upLow:
IF (emask AND 12) = 0 THEN check.spaces
IF ascii < 65 OR (ascii > 90 AND ascii < 97) OR ascii > 122 THEN check.spaces
IF (emask AND 8) THEN g$ = UCASE$(g$)
GOTO print.char
check.spaces:
IF (emask AND 16) = 0 THEN check.yorn
IF g$ = " " THEN print.char
check.yorn:
IF (emask AND 32) = 0 THEN bad.char
g$ = UCASE$(g$): IF g$ = "Y" OR g$ = "N" THEN print.char
bad.char:
' invalid character based on edit mask
GOTO get.key
print.char:
' valid character so print it
IF Len.cntr = pos.cntr THEN
' at end of entered text ?
PRINT backspace$;g$;
entry$ = entry$ + g$
Len.cntr = Len.cntr + 1
pos.cntr = pos.cntr + 1
ELSE
' no, in middle of entered text
MID$(entry$,pos.cntr,1) = g$
GOTO move.right
END IF
GOTO next.key
back.up:
' delete key action
IF entry$ = "" THEN get.key
IF pos.cntr <> Len.cntr THEN get.key
PRINT backspace$;" ";backspace$;
```

```
Len.cntr = Len.cntr - 1: pos.cntr = pos.cntr - 1
IF LEN(entry$) < 2 THEN entry$ = "": GOTO next.key
entry$ = LEFT$(entry$,LEN(entry$)-1): GOTO next.key
move.right:
' cursor right action
IF pos.cntr = Len.cntr THEN next.key
char$ = MID$(entry$,pos.cntr,1)
CALL SetSoftStyle&(WINDOW(8),0,poss.style%)
LOCATE yLine, xcoL + pos.cntr
PRINT char$;
pos.cntr = pos.cntr + 1
char$ = MID$(entry$,pos.cntr,1)
CALL SetSoftStyle&(WINDOW(8),1,poss.style%)
LOCATE yLine, xcoL + pos.cntr
PRINT char$;
CALL SetSoftStyle&(WINDOW(8),0,poss.style%)
GOTO next.key
move.left:
' cursor left action
IF pos.cntr = 1 THEN get.key
IF (pos.cntr = Len.cntr) AND (Len.cntr <> strLen + 1) THEN
LOCATE yLine, xcoL + pos.cntr
PRINT " ";
END IF
IF pos.cntr < Len.cntr THEN
char$ = MID$(entry$,pos.cntr,1)
CALL SetSoftStyle&(WINDOW(8),0,poss.style%)
LOCATE yLine, xcoL + pos.cntr
PRINT char$;
END IF
pos.cntr = pos.cntr - 1
char$ = MID$(entry$,pos.cntr,1)
CALL SetSoftStyle&(WINDOW(8),1,poss.style%)
LOCATE yLine, xcoL + pos.cntr
PRINT char$;
GOTO get.key
wipe.out:
' erase WHOLE input field & position at start of field
LOCATE yLine,xcoL+1: FOR wo = 1 TO strLen: PRINT " ";: NEXT wo
entry$ = "": pos.cntr = 1: Len.cntr = 1: LOCATE yLine, xcoL+1
GOTO next.key
quit.sub:
' return to calling program
IF (emask AND 64) AND entry$ = " " THEN next.key
END SUB
REM === EMASK values ===
REM 0 = all characters
REM 1 = numbers only
REM 2 = . + - punctuation
REM 4 = A-Z , a-z upper and lower
REM 8 = A-Z force upper case
REM 16 = blank spaces allowed in input
REM 32 = Y or N only (forced upper case)
REM 64 = null input not allowed
REM all mask values may be added together for a cumulative effect
REM i.e. an emask of 67 = forced entry of numbers and punctuation
```

Chrome II

More Double Hi-Res Graphics Commands For Applesoft

Zachary T. Smith

Last month we presented "Chrome," a powerful double hi-res extension for Applesoft BASIC. "Chrome II" adds several new features to its predecessor, including FILL, enhanced H PLOT and ELLIPSE modes, box draw, windowing support, and more. For the Apple IIe (Revision B), IIc, and IIGS computers. DOS 3.3 is required.

"Chrome," presented in the October issue of COMPUTE!, was an extension of Applesoft's graphics capabilities, providing a new ELLIPSE command and a revised H PLOT command with horizontal resolutions of 560 pixels in monochrome or 140 pixels in 16 colors.

"Chrome II" complements Chrome with new and extended commands to produce a graphics toolbox. Chrome II was designed to help you write your own drawing program or personal typesetter.

Setting Up The Disk

First, note that you must have a working copy of the original Chrome program to be able to use Chrome II.

Type in a copy of Chrome II using the Apple version of the "MLX" machine language entry program found elsewhere in this

issue. When you run MLX, you'll be asked for a starting and an ending address for the data you'll be entering. For Chrome II, use the following values:

```
STARTING ADDRESS? 0C00
ENDING ADDRESS? 1347
```

After you have entered all the data, be sure to save a copy to disk before leaving MLX.

To use Chrome II, copy it onto a disk that contains a copy of Chrome. Then edit the setup program given in the October issue to read as follows:

```
10 PRINT CHR$(4)"PR#3"
15 PRINT "DOUBLE HI-RES EXTENDED
  D APPLESOFT BEING LOADED"
20 PRINT CHR$(4)"BLOAD CHROME"
25 PRINT CHR$(4)"BRUN CHROME I
  I"
30 NEW
```

Lines 20 and 25 assume that the Chrome and Chrome II programs are saved with the filenames CHROME and CHROME II, respectively. You may need to change those lines to reflect the names you actually used. Remember to resave this as the disk's HELLO program so that it will run automatically when the disk is booted. When you boot your computer with this disk, Chrome II should be installed.

Program 2 is a demonstration program which shows off the capabilities of Chrome II. Type it in and

save a copy before trying it out. Perhaps the best way to learn how to use Chrome II is by studying and altering the demo. It uses all of the new features except the auxiliary RAM data-mover command.

The New Commands

Chrome II offers six new commands, all of which are designed for the 560-point monochrome mode. This mode is selected with the DOUBLE command provided in the original Chrome. For quick reference, the tables located near the end of the article show the syntax of the new commands. Of course, all of the old commands from the original Chrome are still functional.

LINE is similar to H PLOT, except that it can draw only horizontal lines. The syntax is

```
LINE x1,x2,y
```

where $x1$ and $x2$ are, respectively, the left and right endpoints of the line (0-559), and y is the line's vertical position (0-191). As with H PLOT, the type of line drawn is determined by the setting of the HCOLOR= command. When the HCOLOR mode is 0, 1, or 2, LINE simply draws a horizontal line as H PLOT would with the same HCOLOR= setting. In these modes, LINE $x1,x2,y$ is the same as H PLOT $x1,y$ TO $x2,y$. HCOLOR

mode 0 sets bits, turning on pixels to draw white lines. Mode 1 clears bits, turning pixels off. You can think of this either as erasing lines or as drawing black lines. Mode 2 inverts (toggles) the state of the pixels in the line.

The real power of LINE becomes obvious when the HCOLOR mode is set to 3 (HCOLOR=3). In this case, LINE draws a patterned line. The default pattern looks like bricks, but you can change the pattern with the SETPTN (set pattern) command, described below.

Actually, you won't see the brick pattern if you draw just a single line. The complete pattern is eight lines tall, so you must use the LINE command on eight successive lines to see the full pattern. Each screen line has a fixed relationship to the pattern. For example, when you use the LINE command on screen lines 0, 8, 16, 24, and so forth, the line drawn will take its pattern from line 0 (the top line) of the pattern definition. Lines drawn on screen lines 2, 10, 18, 26, and so forth, will have the pattern of line 2 (the third line) of the pattern definition. Note that nothing will be drawn if you use the LINE command on a screen line for which the corresponding pattern definition line is blank.

LINE can also be used to read data from the screen into RAM. To do this, set the HCOLOR mode to 4 (HCOLOR=4). The syntax for this is
LINE *x1,x2,y* [AT *address*]

The optional *address* value specifies the starting location of the area of memory to which the data will be transferred. If this parameter is omitted, the address value in memory locations 96 and 97 (in low byte/high byte order) determines the starting address for the operation. The address in these locations is automatically updated as each byte is stored. Thus, when reading a series of lines from the screen, you do not need to manually update the address for each line—only for the first line to be read. The number of bytes required to store the data read from a single screen line can be calculated with the expression $\text{INT}((x2 - x1 + 7) / 7)$.

LINE can also move data from memory to the screen, reversing the process described above. This is

achieved by setting the HCOLOR mode to 5 (HCOLOR=5). The syntax of the LINE command in this case is identical to that used for reading from the screen in HCOLOR mode 4. Remember that the *address* value is automatically incremented during each reading or writing operation. If you use HCOLOR mode 4 to read a line from the screen, you must reset the address before using HCOLOR mode 5 to write that line back to the screen.

When restoring data to the screen with HCOLOR mode 5, you must maintain the horizontal bit-position alignment with which the data was saved. If you restore the data at the same horizontal position from which it was saved, you'll have no problem. However, data restored at a different horizontal position will be distorted unless the new pixel position has the same bit position within its screen memory byte. The bit position for pixel position *x* can be determined by the expression $((x / 7) - \text{INT}(x / 7)) * 7$.

AREA performs the same function as a series of executions of the LINE command. Therefore, it uses HCOLOR modes in the same way that LINE does (see the explanation above). Its syntax is

AREA *x1,y1,x2,y2* [AT *address*]

The first coordinate pair—*x1,y1*—specifies the upper left corner of the area to be affected, and the second pair—*x2,y2*—specifies the lower right corner. By selecting the proper HCOLOR modes, AREA can whiten, blacken, invert, pattern fill, save, or restore any rectangular portion of the screen. When saving screen data, the number of bytes of memory required can be calculated using the expression $\text{INT}((x2 - x1 + 7) / 7) * (y2 - y1 + 1)$.

FILL is perhaps the most exciting of the new commands. It can flood fill any enclosed screen area with the current pattern. Its syntax is
FILL *x,y,buffer address,autofill*

The *x* and *y* values specify the horizontal and vertical coordinates, respectively, at which the fill operation is to begin. These can be anywhere within the enclosed figure to be filled. Be careful that the figure being filled is completely enclosed by set (white) pixels. If there are any

gaps in the figure boundaries, the fill operation will spill out through the gaps into adjacent areas of the screen.

The algorithm used for the FILL routine first generates a list of the starting and ending addresses in memory of each screen line to be filled and then proceeds to fill in the lines. The *buffer address* parameter in the command allows you to specify the starting address for the area of memory to be used to hold this list. You can choose any address you want for the buffer area, but it's best to place the buffer at the top of memory.

Fill operations stop when FILL is finished or when the buffer pointer goes above 38143 (\$94FF hex), which is considered an overflow. Thus, you should set the buffer address sufficiently far below that address to provide space for the list. The larger and more irregular the area you are filling, the more room will be required for the list. (The entry for each screen line to be filled requires four bytes.) For example, a *buffer address* value of 37376 provides 768 bytes of line-list buffer space.

To prevent the FILL command from corrupting BASIC variables as the list is generated, you should include a HIMEM command at the beginning of your program to restrict variables to the area below the list. The syntax for the command is

HIMEM: *address*

where *address* is one location above the highest address used for variables. In this case, specify the value of the lowest *buffer address* used in any FILL statement in your program. For instance, if you were using the *buffer address* value in the example above, your program should begin with the statement HIMEM: 37376.

The *autofill* parameter specifies whether the area is to be filled solidly or with the current pattern. An *autofill* value of 0 specifies a solid-white fill (all pixels set in filled area), while a value of 1 specifies a pattern fill.

REFILL takes advantage of the two-phase structure of FILL to provide a quick way to change the pattern of the most recently filled area. It uses the list created by the most recent FILL operation to fill the same area with the current pattern. For example, you could use a FILL com-

mand with an *autofill* value of 0 to solidly fill an area and then use a series of SETPTN and REFILL commands to paint a variety of different patterns in the area.

SETPTN allows you to define the fill pattern used by LINE, AREA, FILL, REFILL, and ELLIPSE. Its syntax is

SETPTN *address*

where *address* is the starting location of a 32-byte area of RAM containing the definition of a 28 × 8-pixel pattern.

Pattern definitions are stored in memory just as they are on the screen, with the highest bit (bit 7) unused. Thus, one simple way to create pattern definitions is to design the pattern in a 28 × 8 area of the screen using HPLOT, LINE, and the other drawing commands and then use an AREA command in HCOLOR mode 4 to copy the contents of that screen area into the memory to be used for the pattern.

You can place pattern definitions anywhere in memory that you want, but the 1K of unused RAM at 2048–3071 (\$0800–\$0BFF hex) is a good choice. If you've used HIMEM to reserve space for the FILL list, there will also be 256 bytes available at 38144–38399 (\$9500–\$95FF), just below the start of DOS 3.3 at 38400 (\$9600). The FILL operation doesn't use any locations above 38143.

One special case of the command is SETPTN -1, which restores the default pattern.

AUXMOVE, the last of the new commands, isn't a drawing command like the others. Instead, it provides a handy way of moving data to and from the 64K RAM in the auxiliary bank of a 128K system. The command calls the ROM subroutine of the same name to transfer any length of data from one bank to the other. One practical use for this command is to store the original contents of screen windows for later replacement. Its syntax is

AUXMOVE *direction,source start,source end,destination*

The *direction* parameter specifies the direction of the transfer. Use a value of 1 to transfer data from main memory to auxiliary memory, and use a value of 0 to transfer from

Quick Reference—Chrome II Commands

LINE *x1,x2,y* [AT *address*]

Draws, saves, or restores horizontal lines according to the current HCOLOR mode setting.

AREA *x1,y1,x2,y2* [AT *address*]

Draws, saves, or restores rectangular areas of the screen according to the current HCOLOR mode setting.

FILL *x,y,buffer address,autofill*

Fills enclosed areas of the screen. An *autofill* value of 1 means fill with the current pattern, a 0 means solid fill.

REFILL

Uses the last line-fill list to refill an area with the current pattern.

SETPTN *address*

Specifies the location of a 32-byte area of memory to be used as the current pattern definition.

SETPTN -1

Selects the default (brick) pattern.

AUXMOVE *direction,source start,source end,destination*

Employs the AUXMOVE subroutine in ROM to move data to and from auxiliary memory. A *direction* value of 1 means transfer from main to auxiliary RAM, and a 0 means transfer from auxiliary to main RAM.

HPLOT

A new HCOLOR mode 4 draws dotted lines.

ELLIPSE *xr,yr,mode* [AT *xc,yc*] [AT *address*]

New *mode* values allow filled ellipses. Add 16 to the *mode* value to fill the lower half, and add 32 to fill the upper half. The current HCOLOR setting determines how the outline of the ellipse will be drawn, and the current COLOR setting determines how filled portions of the ellipse will be drawn.

Quick Reference—Drawing Modes

Drawing modes for LINE, AREA, and ELLIPSE are as follows:

Mode	Effect
0	Set pixels (white line)
1	Clear pixels (black line)
2	Invert (toggle) pixels
3	Set or clear pixels according to pattern
4	Read line to RAM
5	Write RAM to screen line

For LINE and AREA, the modes are set with the HCOLOR= command. For filled areas drawn with ELLIPSE, the modes are set with the COLOR= command.

auxiliary memory to main memory. The *source start* and *source end* parameters specify, respectively, the starting and ending addresses of the area of memory to be copied to the other bank. The *destination* parameter specifies the starting address of the area in main or auxiliary memory to which the data is to be copied. Because of the limitations of the ROM routine used, AUXMOVE cannot be used for moves to or from screen RAM, control RAM (the first 512 addresses, hex \$0000–\$01FF), and high RAM (the 16K RAM cards for each bank). Thus the allowable areas are \$0200–\$03FF and \$4000–\$95FF in the main bank, and

\$0200–\$1FFF and \$4000–\$BFFF in the auxiliary bank.

New Modes For Old Commands

HPLOT, which previously could draw only solid lines, now has the capability to draw dotted lines as well. For dotted lines, specify HCOLOR mode 4 (HCOLOR=4). The 16-bit definition of the dots and dashes is preset, and there is no equivalent to the SETPTN command for changing the dotted-line pattern. However, the widths of the dots or dashes can be manually changed with POKES to locations 3075 and 3076.

ELLIPSE can now fill in the ellipse as it goes. Chrome's original **ELLIPSE** command could draw only an outline. The extended syntax is

ELLIPSE *x radius,y radius,mode* [AT *x center,y center*] [AT *address*]

The *x radius* and *y radius* values specify the horizontal and vertical radii of the figure, and the optional *x center* and *y center* values specify the center point of the figure, just as in the original version of the command. The third parameter, called *quadrant* in the original command, now uses two additional bits to allow a filled ellipse. Previously, four bits were used to specify which quadrants of the figure's outline were to be drawn. In Chrome II, bit 4 of the *mode* value specifies whether or not to draw the lower half of the interior of the figure, and bit 5 does the same for the upper half. The effect of various *mode* values is as follows:

lower right outline	1
lower left outline	2
upper right outline	4
upper left outline	8
lower half filled	16
upper half filled	32

As before, the values are cumulative. For example, to draw a figure with the lower half filled and the upper half outlined, use a *mode* value of 28 (16 + 8 + 4). The new drawing modes work only in the monochrome (DOUBLE) mode. If Chrome's multicolor (COLOR) mode is selected, the two extra bits are ignored, and only outlines are drawn.

Drawing modes for the enhanced **ELLIPSE** command are selected differently from the other drawing commands. The **HCOLOR=** command is used to select the drawing mode for outlines, while the **COLOR=** command selects the mode for interior areas. For outlines, **HCOLOR** can take the following values:

HCOLOR=	Effect
0	Set pixels (white outline)
1	Clear pixels (black outline)
2	Invert (toggle) pixels
3	Draw pattern outline
4	Draw dotted outline

The **HCOLOR** setting has no effect on the interior area of the ellipse, if that is filled. The interior fill is controlled by the current

COLOR= mode. For filled ellipses, **COLOR** can take the following values:

COLOR=	Effect
0	Set pixels (fill with white)
1	Clear pixels (fill with black)
2	Invert (toggle) pixels
3	Fill with pattern
4	Copy data from screen to memory
5	Copy data from memory to screen

With **COLOR** modes 4 and 5, you can now use the **ELLIPSE** command to transfer data between memory and an elliptical (or circular) area of the screen. The *mode* setting determines whether the command reads or writes data for the shape's outline or for its interior area. The optional **AT address** parameter allows you to specify the starting address of the area of memory to or from which the data is to be transferred. Note that, if you give the **AT address** parameter, you must also specify the **AT x center, y center** parameter.

Having the border and interior drawn by two different methods is a powerful feature. You could, for instance, save a portion of the screen (in the shape of an ellipse) and then draw a black outline of an elliptical window as well as fill the inside with white. Later, **COLOR** mode 5 could be used to restore the background, thus closing the window.

Chrome II And Memory

RAM usage by Chrome II is minimal. It creates no new tables and occupies only RAM from the area just before the original Chrome—3072–5119 (\$0C00–\$13FF). There is still 1K of unused RAM available at 2048–3071 (\$0800–\$0BFF), page 3 is still free for machine language programs, and 21.5K of RAM is still available for BASIC programs, excluding the **FILL** buffer at the top of memory.

Program 1: Chrome II

For instructions on entering this program, please refer to the "Apple MLX" article elsewhere in this issue.

0C00:	4C 8A 0D 00 FF 7F 7E 7C F9
0C08:	78 70 60 40 01 03 07 0F B9
0C10:	1F 3F 7F 7F 7F 7F 7F 60 C8
0C18:	00 60 00 60 00 60 00 60 30
0C20:	00 60 00 7F 7F 7F 7F 00 41
0C28:	60 00 60 00 60 00 60 00 40
0C30:	60 00 60 60 A6 E2 E0 C0 CD
0C38:	B0 F9 8D 80 C0 BD 00 D8 B6
0C40:	85 26 BD 00 D9 09 20 85 15

0C48:	27 8A 29 07 0A 0A A8 B9 AF
0C50:	A1 13 8D 8F 13 B9 A2 13 80
0C58:	8D 90 13 B9 A3 13 8D 91 6F
0C60:	13 B9 A4 13 8D 92 13 A4 B7
0C68:	E0 A5 E1 09 D0 8D 77 0C DE
0C70:	09 04 8D 7A 0C B9 00 7F
0C78:	BE 00 D4 8D 93 13 8E 94 FD
0C80:	13 A4 E6 A5 E7 09 D0 8D 15
0C88:	91 0C 09 04 8D 94 0C B9 5E
0C90:	00 D0 BE 00 D4 8D 95 13 CF
0C98:	8E 96 13 8D 88 C0 18 ED 3E
0CA0:	93 13 8D 97 13 4E 93 13 7E
0CAB:	A2 01 90 01 CA 9D 54 C0 AA
0CB0:	AC 93 13 AE 94 13 BD 05 C2
0CB8:	0C AE 97 13 10 09 AE 96 3F
0CC0:	13 3D 0C 0C 4C DD 0C 20 06
0CC8:	E4 0C CE 97 13 30 08 A9 BC
0CD0:	FF 20 E4 0C 4C CA 0C AE A2
0CD8:	96 13 BD 0C 0C 20 E4 0C 30
0CE0:	8D 54 C0 60 AE 99 19 F0 F1
0CE8:	0E E0 02 90 1B F0 1F E0 45
0CF0:	04 90 1F F0 3D B0 49 11 72
0CF8:	26 91 26 A2 00 2C 1C C0 21
0D00:	30 02 C8 E8 9D 54 C0 60 7A
0D08:	49 FF 31 26 90 EB 51 26 4C
0D10:	B0 E7 85 E8 98 29 01 0A 31
0D18:	AA 2C 1C C0 30 01 E8 BD 37
0D20:	8F 13 25 E8 48 A5 E8 49 ED
0D28:	7F 31 26 85 E8 68 05 E8 47
0D30:	90 C7 31 26 A2 00 81 60 85
0D38:	E6 60 D0 BF E6 61 D0 BB 0E
0D40:	A2 00 48 21 60 85 E8 68 1A
0D48:	49 FF 31 26 05 E8 E6 60 89
0D50:	D0 A7 E6 61 D0 A3 C7 19 6D
0D58:	CD 19 0F 1D 3E 1F 31 0E 32
0D60:	94 0E 54 0E DE 12 73 11 EA
0D68:	19 13 4C 49 4E C5 41 52 50
0D70:	45 C1 46 49 4C CC 41 55 68
0D78:	58 4D 4F 56 C5 52 45 46 A9
0D80:	49 4C CC 53 45 54 50 54 91
0D88:	CE 00 20 00 18 A9 B0 8D 64
0D90:	80 1A A9 07 8D 70 1A A9 23
0D98:	2F 8D 6F 1F A9 13 8D 70 B2
0DA0:	1F A9 D4 8D B2 1D A9 11 96
0DA8:	8D B3 1D A9 DF 8D 54 1E B0
0DB0:	A9 11 8D 55 1E A0 FF C8 27
0DB8:	B9 6A 0D 99 A6 17 D0 F7 B0
0DC0:	A2 56 8E 57 19 E8 8E 53 E5
0DC8:	19 A9 0D 8D 58 19 8D 54 EA
0DD0:	19 A9 4C 8D B1 1D 8D D7 39
0DD8:	1A A9 7B 8D D8 1A A9 0E 43
0DE0:	8D D9 1A 8D 89 C0 2C 89 85
0DE8:	C0 2C 89 C0 A9 CA 8D 24 63
0DF0:	D0 A9 0E 8D 25 D0 8D 88 88
0DF8:	C0 A9 49 A0 07 99 61 A2
0E00:	8C 99 19 88 10 F7 8D 80 70
0E08:	C0 2C 83 C0 2C 83 C0 A0 9D
0E10:	BF B9 00 D9 09 20 99 00 14
0E18:	D9 88 C0 FF D0 F3 8D 88 55
0E20:	C0 A0 1F B9 13 0C 49 7F 1F
0E28:	99 A1 13 88 10 F5 60 4C C9
0E30:	06 F2 20 D4 12 C9 02 90 A9
0E38:	06 D0 F4 E0 30 B0 F0 86 E4
0E40:	E0 85 E1 20 15 13 20 A1 43
0E48:	19 86 E2 84 E6 85 E7 20 74
0E50:	B9 0E 4C 34 0C 20 A1 19 D6
0E58:	86 E2 84 E0 85 E1 20 15 18
0E60:	13 20 D4 12 48 BA 48 20 E6
0E68:	15 13 20 F8 E6 8E 75 0E D1
0E70:	68 AA 68 A8 A9 00 29 01 A3
0E78:	4C 1A 0F E0 04 F0 07 A2 C5
0E80:	01 31 26 4C DB 1A 0E 03 59
0E88:	0C 2E 04 0C 90 06 EE 03 F4
0E90:	0C 4C ED 1A 60 20 A1 19 05
0E98:	86 E2 84 E0 85 E1 20 15 58
0EA0:	13 20 A1 19 86 E3 84 E6 C7
0EA8:	85 E7 20 B9 0E 20 34 0C 86
0EB0:	E6 E2 A5 E3 C5 E2 B0 F5 FC
0EB8:	60 20 B7 00 C9 C5 D0 F8 04
0EC0:	20 B1 00 20 D4 12 85 61 B6
0EC8:	86 60 60 2C 92 19 30 03 6B
0ED0:	4C E9 F6 20 F8 E6 29 07 2B
0ED8:	8E 99 19 60 A9 00 8D 93 C7
0EE0:	19 20 7C 1A A5 E1 09 D0 5A
0EE8:	8D F7 0E 09 D4 8D FD 0E 03
0EF0:	A6 E0 8D 80 C0 BD 00 D0 20

```

0EF8: 8D 83 13 BD 00 D4 8D 88 F1
0F00: C0 8D 82 13 AA BD 9A 19 FD
0F08: 8D 8E 13 A5 06 F0 02 A9 EE
0F10: FF 6A 09 00 8D 93 19 4C B4
0F18: 7C 1A 8D 61 1D 86 D0 84 EB
0F20: D1 8E 75 11 8C 79 11 86 7D
0F28: D2 84 D3 A0 00 A5 E0 91 3F
0F30: D2 A5 E1 C8 91 D2 A5 E2 EF
0F38: A0 03 91 D2 A9 03 8D 99 DA
0F40: 19 20 DC 0E 8D 8C 13 49 7D
0F48: FF 8D 8D 13 4C 62 0F A0 57
0F50: 00 B1 D2 85 E0 C8 B1 D2 E1
0F58: 29 03 85 E1 A0 03 B1 D2 E1
0F60: 85 E2 A2 FF 8E 84 13 8E 89
0F68: 87 13 8E 86 13 8E 89 13 42
0F70: A5 E0 8D 8A 13 A5 E1 8D 74
0F78: 8B 13 A9 03 8D 99 19 20 AB
0F80: DC 0E 4D 8C 13 F0 03 4C B1
0F88: 34 10 A6 E2 8D 80 C0 BD 75
0F90: FF D7 85 1B BD FF D8 85 2C
0F98: 1C BD 01 D8 85 D4 BD 01 DD
0FA0: D9 85 D5 8D 88 C0 AD 8E D1
0FA8: 13 51 26 91 26 A6 E2 F0 05
0FB0: 20 B1 1B 4D 8C 13 2D 8E 1D
0FB8: 13 8D 85 13 AD 84 13 F0 3C
0FC0: 0A AD 85 13 D0 05 A9 FF 1F
0FC8: 20 47 11 AD 85 13 8D 84 DD
0FD0: 13 E0 BF 80 20 B1 D4 4D 72
0FD8: 8C 13 2D 8E 13 8D 88 13 83
0FE0: AD 87 13 F0 0A AD 88 13 54
0FE8: D0 05 A9 01 20 47 11 AD E3
0FF0: 88 13 8D 87 13 CE 82 13 2E
0FF8: 4E 8E 13 90 1C A9 40 8D E2
1000: 8E 13 A9 06 8D 82 13 CE 2D
1008: 83 13 30 22 AD 83 13 4A C2
1010: A8 A2 01 90 01 CA 9D 54 19
1018: C0 A5 E0 D0 02 C6 E1 C6 E0
1020: E0 B1 26 4D 8C 13 2D 8E 50
1028: 13 D0 09 4C A6 0F A0 00 9E
1030: 84 E0 84 E1 A0 00 A5 E0 AA
1038: 91 D2 A5 E1 C8 91 D2 AD 88
1040: 8A 13 85 E0 AD 88 13 85 70
1048: E1 AD 86 13 8D 84 13 AD 19
1050: 89 13 8D 87 13 E6 E0 D0 EA
1058: 02 E6 E1 A5 E0 C9 30 A5 FD
1060: E1 E9 02 90 03 4C 05 11 99
1068: A9 03 8D 99 19 20 DC 0E 7A
1070: 4D 8C 13 F0 03 4C 0D 11 40
1078: AD 8E 13 51 26 91 26 A6 F4
1080: E2 F0 20 B1 1B 4D 8C 13 A7
1088: 2D 8E 13 8D 85 13 AD 84 76
1090: 13 F0 0A AD 85 13 D0 05 B1
1098: A9 FF 20 47 11 AD 85 13 63
10A0: 8D 84 13 E0 BF 80 20 B1 CB
10A8: D4 4D 8C 13 2D 8E 13 8D A0
10B0: 88 13 AD 87 13 F0 0A AD 26
10B8: 88 13 D0 05 A9 01 20 47 25
10C0: 11 AD 88 13 8D 87 13 EE B6
10C8: 82 13 0E 8E 13 AD 82 13 01
10D0: C9 07 D0 1E A9 01 8D 8E 8E
10D8: 13 A9 00 8D 82 13 EE 83 87
10E0: 13 AD 83 13 C9 50 B0 1D A5
10E8: 4A A8 A2 01 90 01 CA 9D 78
10F0: 54 C0 E6 E0 D0 02 E6 E1 94
10F8: B1 26 4D 8C 13 2D 8E 13 6B
1100: D0 0B 4C 78 10 A0 02 84 E9
1108: E1 A0 2F 84 E0 A0 02 A5 A4
1110: E0 91 D2 A5 E1 88 0A 0A 0B
1118: 11 D2 91 D2 A5 D2 18 69 E8
1120: 04 85 D2 90 02 E6 D3 A5 02
1128: D0 C5 D2 A5 D1 E5 D3 B0 57
1130: 13 A5 D2 8D 9F 13 A5 D3 E0
1138: 8D A0 13 8D 54 C0 AD 61 E6
1140: 1D D0 31 60 4C 4F 0F 8D 9C
1148: 6E 11 A5 D0 18 69 04 85 9B
1150: D0 90 02 E6 D1 A5 D1 C9 40
1158: 95 B0 E0 98 48 A0 00 A5 81
1160: E0 91 D0 C8 A5 E1 91 D0 A6
1168: A0 03 A5 E2 18 69 00 91 76
1170: D0 68 A8 60 A9 00 85 D0 59
1178: A9 00 85 D1 05 D0 F0 F3 7E
1180: AD 9F 13 85 D2 AD A0 13 BD
1188: 85 D3 A9 03 8D 99 19 A5 72
1190: D2 45 D0 D0 06 A5 D3 45 48
1198: D1 F0 D8 A0 00 B1 D0 18 85
11A0: 69 01 85 E0 C8 B1 D0 29 4E

```

```

11A8: 03 69 00 85 E1 B1 D0 4A C0
11B0: 4A 85 E7 C8 B1 D0 38 E9 0E
11B8: 01 85 E6 80 02 C6 E7 C8 68
11C0: B1 D0 85 E2 20 34 0C A5 5E
11C8: D0 18 69 04 85 D0 90 BF 17
11D0: E6 D1 80 BB 8D 5D 1D A2 6B
11D8: 80 8E 81 13 4C B4 1D AD 5D
11E0: 81 13 8D 9E 13 8D 09 C0 C5
11E8: A5 0E 8D 08 C0 8D 81 13 E5
11F0: 2C 98 19 10 03 4C D0 1E 7C
11F8: AD 99 19 48 A5 30 29 0F 4F
1200: 8D 99 19 A5 E0 48 A5 E1 24
1208: 48 A5 E2 48 A5 E0 18 6D E8
1210: 5B 1D 85 E6 8D 9A 13 A5 EA
1218: E1 6D 5C 1D 85 E7 8D 9B 68
1220: 13 A5 E0 38 ED 58 1D 85 73
1228: E0 8D 98 13 A5 E1 ED 5C 51
1230: 1D 85 E1 8D 99 13 A5 E2 A0
1238: 18 6D 5D 1D 85 E2 8D 90 B1
1240: 13 AD 5D 1D F0 0F 2C 9E 91
1248: 13 10 0A AD 61 1D 29 10 F7
1250: F0 03 20 34 0C 68 48 38 BF
1258: ED 5D 1D 85 E2 8D 9C 13 60
1260: 2C 9E 13 10 0A AD 61 1D 8C
1268: 29 20 F0 03 20 34 0C 68 C9
1270: 85 E3 68 85 E7 68 85 E6 88
1278: 68 8D 99 19 AD 9A 13 85 7C
1280: E0 AD 9B 13 85 E1 AD 9D D1
1288: 13 85 E2 AD 61 1D 29 01 A1
1290: F0 03 20 12 0F AD 9C 13 8E
1298: 85 E2 AD 61 1D 29 04 F0 8A
12A0: 03 20 12 0F AD 98 13 85 FC
12A8: E0 AD 99 13 85 E1 AD 61 7D
12B0: 1D 29 08 F0 03 20 12 0F 89
12B8: AD 61 1D 29 02 F0 08 AD D3
12C0: 9D 13 85 E2 20 12 0F A5 64
12C8: E6 85 E0 A5 E7 85 E1 A5 F6
12D0: E3 85 E2 60 20 67 DD 20 25
12D8: 52 E7 A5 51 A6 50 60 20 41
12E0: F8 E6 8A 48 20 15 13 20 AC
12E8: D4 12 48 8A 48 20 15 13 AD
12F0: 20 D4 12 86 3E 85 3F 20 AB
12F8: 15 13 20 D4 12 86 42 85 72
1300: 43 6A 85 3C 68 85 3D 68 92
1308: 6A BA 8E 80 13 20 11 C3 EA
1310: AE 80 13 9A 60 A9 2C 4C 08
1318: C0 DE 20 D4 12 C9 FF D0 30
1320: 03 4C 21 0E A0 1F B1 50 15
1328: 99 A1 13 88 10 F8 60 20 B3
1330: A1 19 86 E2 84 E0 85 E1 01
1338: 20 B9 0E 68 68 4C 77 1F A7
1340: 60 AA 20 52 20 52 45 50 8F

```

Program 2: Chrome II Demo

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

73 5 REM COPYRIGHT 1987 COMPUTE!
PUBLICATIONS, INC. ALL RIGHTS
RESERVED.
04 6 HOME : PRINT "COPYRIGHT 198
7": PRINT "COMPUTE! PUBLICA
TIONS, INC.": PRINT "ALL RI
GHTS RESERVED.": FOR TT = 1
TO 1500: NEXT TT: HIMEM: 2
4320
23 7 PRINT CHR$(4)"PR#3": PRINT
: HGR 3: HCOLOR= 3: DOUBLE
: SETPTN - 1: HOME : VTAB
21
0E 8 INVERSE : PRINT "EXTENDED
CHROME DEMO": NORMAL
01 9 PRINT "DEMONSTRATES /FILL/,
/AREA/, HCOLOR=4 USED WITH /
H PLOT/, EXTENDED /ELLIPSE/
8B 10 PRINT "/LINE/, AND FINALLY
THE SCREEN R/W AND SHIFT
FUNCTIONS...
33 15 FOR Y = 1 TO 100
14 20 LINE Y, Y + Y, Y: NEXT
76 25 HCOLOR= 2
82 30 AREA 75, 40, 450, 150
90 35 HCOLOR= 1: H PLOT 0, 159 TO

```

```

559, 0
7E 40 HCOLOR= 2: HCOLOR= 2
1A 45 ELLIPSE 250, 60, 35 AT 280, 9
0
7E 49 HCOLOR= 1
03 50 COLOR= 3: ELLIPSE 90, 40, 63
AT 390, 100
9D 65 INPUT "PRESS <RETURN>"; A$
44 100 HOME
E2 105 VTAB 22
9F 110 PRINT "THE SCREEN READ/WR
ITE MODES OF /LINE/ AND /
AREA/ CAN BE USED TO OPEN
AND CLOSE WINDOWS EASILY
..."
86 120 REM
94 130 HCOLOR= 4
58 140 AREA 100, 30, 300, 130 AT 24
576
A3 150 REM CLEAR WINDOW AND DRAW
OUTLINE
8E 160 HCOLOR= 1
E2 170 AREA 100, 30, 300, 130
8E 180 HCOLOR= 0
56 190 H PLOT 100, 30 TO 300, 30 TO
300, 130 TO 100, 130 TO 10
0, 30
4B 200 REM PRINT O-K USING WITHO
UT SHAPES
56 210 ELLIPSE 20, 20, 15 AT 175, 8
0
D0 215 ELLIPSE 19, 19, 15 AT 175, 8
0
C2 220 H PLOT 205, 60 TO 205, 100
CE 225 H PLOT 204, 60 TO 204, 100
11 230 H PLOT 205, 80 TO 245, 60
1D 235 H PLOT 204, 80 TO 244, 60
EE 240 H PLOT 205, 80 TO 245, 100
FA 245 H PLOT 204, 80 TO 244, 100
FC 250 INPUT "HIT ANY KEY"; A$
51 255 PRINT "AND WITH /FILL/ YO
U CAN DO MONOCHROME AND P
ATTERNED FILL-INS
1F 260 FILL 150, 70, 32000, 1
92 280 INPUT "HIT ANY KEY"; A$: F
OR X = 2100 TO 2131: READ
A: POKE X, A: NEXT
E4 285 PRINT "AND EVEN /REFILL/
WHAT WAS FILLED WITH THE
CURRENT PATTERN
8B 290 SETPTN 2100: REFILL
04 300 REM RESTORE BACKGROUND
96 310 HCOLOR= 5
56 320 AREA 100, 30, 300, 130 AT 24
576
55 400 DATA 64, 64, 64, 64
CF 410 DATA 32, 32, 32, 32
83 420 DATA 16, 16, 16, 16
01 430 DATA 8, 8, 8, 8
58 440 DATA 4, 4, 4, 4
05 450 DATA 2, 2, 2, 2
5C 460 DATA 1, 1, 1, 1
5E 470 DATA 1, 1, 1, 1
A4 500 HOME : VTAB 21
32 510 PRINT "AND FINALLY /ELLIP
SE/ CAN BE USED TO MAKE U
NUSUAL WINDOWS
17 520 COLOR= 4
72 560 ELLIPSE 200, 50, 48 AT 280,
76 AT 24576
90 570 HCOLOR= 0
1D 580 COLOR= 1
5A 590 ELLIPSE 200, 50, 63
98 591 HCOLOR= 0
18 592 REM DRAW AN "X"
34 593 H PLOT 0, 50 TO 559, 109
37 594 H PLOT 0, 109 TO 559, 50
F6 600 INPUT "HIT ANY KEY"; A$
1A 620 COLOR= 5
6D 630 ELLIPSE 200, 50, 48 AT 280,
76 AT 24576

```

©

Atari Multiple File Deleter

Craig Stadler

Free up valuable disk space by quickly discarding old files with this handy disk utility. For all Atari eight-bit computers.

Once your disk library has grown to a dozen or more disks, discarding old files can become quite a chore. "Atari Multiple File Deleter" simplifies the housekeeping, allowing you to scratch files with the press of a key.

Getting Started

Type in and save a copy of Multiple File Deleter. To use the program, load it and type RUN.

First, choose the drive from which you would like to delete files. If you are using DOS 2.5 with the RAMDISK.COM file on a 130XE, you may choose drive 8—the ramdisk. Insert the correct disk into the selected drive, then press any key to continue. Each file on the disk is displayed, one at a time. Press D if you wish to delete the file. Press RETURN if you want to keep the file. Press X to escape and start over. To exit the program without deleting any files, press the BREAK key.

The files aren't deleted when you press D—in fact, no files are deleted until you have decided whether or not to delete every file on the disk. Before the files tagged for deletion are actually deleted, you are given one final chance to change your mind and start over.

For the safety of your files, this utility does not attempt to delete

locked files. Files can be locked and unlocked from the DOS menu. If you wish to unlock all the files on a disk at once, enter *.* as the filename after choosing unlock.

Atari Multiple File Deleter

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

AO 10 REM COPYRIGHT 1987 CO
MPUTE! PUBLICATIONS, I
NC. ALL RIGHTS RESERV
ED.
BB 20 ? "(CLEAR)":POSITION 1
3,6:PRINT "Copyright 1
987":POSITION 6,7:PRIN
T "COMPUTE! Publicatio
ns, Inc."
KD 30 POSITION 10,8:PRINT "A
ll Rights Reserved.":F
OR I=1 TO 1500:NEXT I
NB 100 CLR :POP :GRAPHICS 0:
GOSUB 1000
MF 110 ? "(CLEAR) Atari M
ultiple file deleter
":?
AG 120 TRAP 110:?"Use drive
1-8":INPUT DR:IF D
R<1 OR DR>8 THEN 120
FL 130 DR*(1,1)="D":DR*(2,2)
=STR$(INT(DR)):DR*(3,
6)=":*.:"
OD 140 ? "(UP)Insert disk an
d hit any key.":GET
#A2,A
ML 150 CLOSE #A1:OPEN #A1,A6
,A0,DR*:TRAP 110
JC 160 ? :?"(UP){6 SPACES}R
ETURN for next file
{3 SPACES}":?"(TAB)
 to delete file":?"
(TAB) to end select
ions"
DE 170 ? "-----"
":?
"(TAB){7 SPACES}Drive
#":DR:?" :?
HP 180 FOR A=A0 TO 65:TRAP 3
20:INPUT #A1,A#:IF A#
(14,15)="OR" THEN 320
BJ 190 ? ;A+1;"(TAB)";A*(1,1
);

```

```

NC 200 A*(1,11)=A*(3,13):FOR
X=A1 TO 8:IF A*(X,X)
=CHR$(32) THEN 220
HA 210 ? A*(X,X):NEXT X
NK 220 ? ". ";A*(9,11);"
(TAB)";A*(15,17);":";
HK 230 GET #A2,C
BD 240 IF C=155 OR C=68 OR C
=88 THEN ? CHR$(C)
AB 250 IF C=155 THEN ? "
{3 UP}":NEXT A
DH 260 IF C=88 THEN 10000
BK 270 IF C=68 THEN GOSUB 29
0:NEXT A
BI 280 GOTO 230
HJ 290 DIR$(LEN(DIR$)+1)=DR$
(1,3):DIR$(LEN(DIR$)+
1)=A*(1,X-1)
EB 300 DIR$(LEN(DIR$)+1)=CHR
$(46):DIR$(LEN(DIR$)+
1)=A*(9,11)
LL 310 DIR$(LEN(DIR$)+1)=CHR
$(155):RETURN
NB 320 ? :? :?"PRESS to E
XIT":?"PRESS ANY KEY
TO BEGIN":GET #A2,CC
BI 330 IF CC=88 THEN 100
EI 340 ? :CLOSE #A1:IF LEN(D
IR$)<5 THEN 100
FA 350 FOR A=A1 TO LEN(DIR$)
:XD=XD+1
BJ 360 IF DIR$(A,A)=CHR$(155
) THEN 420
EI 370 DR*(XD,XD)=DIR$(A,A)
OC 380 NEXT A:?"(END OR
ESTART PROGRAM?":GET
#A2,CC
KI 390 IF CC=69 OR CC<>82 TH
EN ? "(CLEAR)":END
EJ 400 IF CC=82 THEN GOTO 10
0
HA 410 REM DELETE FILENAMES
FB 420 ? "DELETING-":DR*:TRA
P 430:X10 33,#A1,A0,A
0,DR*:XD=0:GOTO 380
KB 430 ? "FILE-":DR*:?"LOCK
ED/DISK ERROR":?"NEX
T FILE...":XD=0:GOTO
380
BH 1000 DIM A*(17),DIR$(600)
,DR$(15)
DB 1010 A0=0:A1=1:A2=2:A4=4:
A6=6:A33=33:XD=0
AF 1030 CLOSE #A2:OPEN #A2,A
4,A0,"K:"
KF 1040 RETURN

```

©

Twin Pack

For The Commodore 64

Steve Feinstein

This handy pair of utilities gives BASIC programmers the ability to delete multiple program lines and, with a single-character command, to list selected lines.

"Twin Pack" adds two useful programming utilities to your 64: Erase, and a LIST command with a memory. The Erase command deletes several program lines at once. Twin Pack's List command lists program lines and remembers these lines for later use.

Both commands are called by entering a period (.) followed by the appropriate single character: Erase and List are called by typing .E and .L, respectively.

Using The Program

Because Twin Pack is written in machine language, it must be typed in with "MLX," the machine language entry program found elsewhere in this issue. When you run MLX, you'll be asked for a starting address and an ending address for the data you'll be entering. For Twin Pack, respond with the following values:

Starting address: C000
Ending address: C127

After you've entered all the data, be sure to save a copy before leaving MLX.

To use Twin Pack, load it with a statement of the form
LOAD "TWINPACK",8,1

(Tape users should replace the ,8,1 with ,1,1.) After the loading is completed, activate the program with the command SYS 49152. When the READY prompt returns, Twin Pack is ready for use.

The Erase command is called by entering

.E *starting line-ending line*

where *starting line* is the number of the first line to be erased and *ending line* is the number of the last line. So, the command

.E10-100

erases lines 10 through 100, inclusively. Lines deleted with the Erase command cannot be recovered. If you accidentally erase any important program lines, you will have to re-type them.

Twin Pack's List command is called by entering

.L *starting line-ending line*

where, again, *starting line* and *ending line* specify the range of line numbers to list. To list a single line, you must supply the same number for both *starting line* and *ending line*.

What makes this command different than BASIC's list command is that Twin Pack remembers which lines were last listed. So, to see the program lines that were previously listed, all you have to do is enter a period (.) and press RETURN. This single-character List command can come in handy when you are working on a particular section of your program.

Twin Pack

Please refer to the "MLX" article in this issue before entering the following program.

```
C000:A9 4C 85 7C A9 0D 85 7D EB
C008:A9 C0 85 7E 60 C9 2E D0 7E
C010:08 48 A5 7A C9 00 F0 09 3D
C018:68 C9 3A 90 01 60 4C 80 33
C020:00 68 20 73 00 D0 03 4C 8C
C028:AB C0 C9 4C D0 03 4C AB 84
C030:C0 C9 45 D0 E6 20 73 00 D8
C038:20 6B A9 20 13 A6 A5 5F B9
C040:85 FB A5 60 85 FC 20 73 12
C048:00 20 6B A9 20 13 A6 A0 15
C050:00 38 B1 5F 85 FD E5 FB F7
C058:8D A7 02 C8 B1 5F 85 FE 6C
C060:E5 FC 8D A8 02 A2 00 A0 8B
C068:00 84 02 B1 FD F0 04 86 AB
C070:02 D0 09 E6 02 A5 02 C9 2B
C078:03 F0 0C 8A 91 FB C8 D0 C0
C080:EA E6 FC E6 FE D0 E4 A9 ED
C088:00 91 FB 38 A5 2D ED A7 D6
C090:02 85 2D 85 2F 85 31 A5 0A
C098:2E ED A8 02 85 2E 85 30 02
C0A0:85 32 20 D7 AA 20 33 A5 D4
C0A8:4C 74 A4 C9 4C F0 10 AD 92
C0B0:1F C1 D0 08 AD 20 C1 D0 0F
C0B8:03 4C A2 C0 4C DF C0 20 B2
C0C0:73 00 20 6B A9 A5 14 8D 50
C0C8:1F C1 A5 15 8D 20 C1 20 E0
C0D0:73 00 20 6B A9 A5 14 8D 60
C0D8:21 C1 A5 15 8D 22 C1 AD 87
C0E0:00 03 8D 23 C1 AD 01 03 D0
C0E8:8D 24 C1 A9 0F 8D 00 03 BE
C0F0:A9 C1 8D 01 03 AD 1F C1 48
C0F8:85 14 AD 20 C1 85 15 20 68
C100:13 A6 AD 21 C1 85 14 AD 78
C108:22 C1 85 15 20 BD A6 AD 02
C110:23 C1 8D 00 03 AD 24 C1 20
C118:8D 01 03 6C 00 03 00 00 D5
C120:00 00 00 00 00 00 00 00 A3
```

©

Directory Menu For IBM

Paul W. Carlson

This handy utility displays a directory of all the BASIC programs on your disk and allows you to load, run, rename, or delete them with just the touch of a key. A color/graphics adapter or equivalent hardware is required, along with BASICA for the PC, GW-BASIC for compatibles, or Cartridge BASIC for the PCjr.

Have you ever wished that managing your BASIC programs was easier? There are BASIC commands to load, run, rename, and delete files, but they can be time-consuming and cumbersome to use. "Directory Menu for IBM" makes performing these BASIC file operations simple and fast.

To get started, type in and save the program below. Save it with a short name that's easy to remember (for example, DM for DISK MENU) so that you can run it quickly—it's a program you're likely to use often. In fact, you'll probably want a copy of the program on any disk with which you'll be doing BASIC programming. The program is only 1667 bytes long, so it won't use much disk space.

Now run the program. You'll see the current directory displayed at the top of the screen followed by a list of all the BASIC programs (.BAS files) in the directory. After the list of files, the total number of free bytes on the disk is shown. The menu selections appear at the bottom of the screen. An arrow will be pointing to the name of the first file in the list. Use the cursor keys to move the arrow. Don't be concerned about moving the arrow too far—the program won't let you

move it off of the list.

With the arrow pointing at the file you want to load, run, rename, or delete, simply press the key corresponding to the highlighted letter of the menu selection. If you press N to rename a file, you'll be prompted for the new name. (The program will allow you to enter a name with an extension other than .BAS, but the new name won't appear in the updated directory listing.) After you enter the new name, the directory of BASIC programs will be redisplayed and you can continue with the menu program. The file that you renamed will probably not be in the same location in the list as it was previously.

If you press D, the file the arrow is pointing to will be deleted immediately, so be sure you really want to delete it—you won't get a second chance. After a file is deleted, the directory of BASIC programs is redisplayed and you can continue with the menu program.

If you load or run a program, it will replace the menu program if it is in memory. This means you won't be able to continue with the menu program unless you reload it from disk and run it again.

The program will trap any errors and, after printing an error message, will allow you either to continue or to quit the menu program. There is one exception: If a syntax error is found, the program will stop and display the line containing the syntax error.

How It Works

Directory Menu for IBM uses the PC's *memory-mapped video*. (Memory-mapped simply means that anything displayed on the

screen is also stored at known locations in memory.) Since you may want to use video memory in programs of your own, here's a brief explanation of how it works (for more details, see page 173 of *Mapping the IBM PC and PCjr* from COMPUTE! Books). Some of the variables involved are NF, the number of files displayed; F, the number of the file that the arrow moves from; T, the number of the file that the arrow moves to; and F\$, the name of the file.

The program sets the default segment to &HB800 (line 10). This is the beginning of video memory for the IBM color/graphics adapter. All PEEK and POKE values will now be the number of bytes counting from the beginning of video memory. The program uses the FILES statement to display all the .BAS files on the screen and place the names in video memory (line 40). Then it counts the number of files displayed by PEEKing in video memory and checking for the presence of the period (.) that separates the filename from its BAS extension (line 50). The program POKES the number 112 into the proper attribute bytes in video memory to highlight the first character for each of the menu selections (lines 70 through 110).

The program reads the names of the files directly from video memory by starting at the memory location corresponding to the beginning of a filename and PEEKing every other memory location (skipping the attribute bytes) until either a space or a period is found (lines 450 through 470). This eliminates the extra spaces, if any, after the filename. The .BAS extension is

added to the filename before a file is renamed or deleted.

Directory Menu For IBM

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

AB 1 REM COPYRIGHT 1987 COMPUTE
! PUBLICATIONS, INC. ALL R
IGHTS RESERVED.
JB 2 CLS:LOCATE 10,30:PRINT "Cop
yright 1987":LOCATE 11,24:P
RINT "COMPUTE! Publications
, Inc."
EC 3 LOCATE 12,27:PRINT "All Rig
hts Reserved.":FOR I = 1 TO
1500:NEXT I
NC 10 T=0:F=0:DEF SEG=&H8800:SCR
EEN 0,0,0,0:WIDTH 80:KEY O
FF
FC 20 P#=CHR$(17)+CHR$(205)+CHR$
(205)+CHR$(60)
DI 30 ON ERROR GOTO 270
KL 40 CLS:LOCATE ,0:A$="F":FILES
"*.BAS":NF=0:PRINT:PRINT
CN 50 K=176+160*(NF\4)+36*(NF MD
4):J=PEEK(K):IF J=46 THE
N NF=NF+1:GOTO 50
MC 60 GOSUB 480
NL 70 LOCATE 25,10,0:PRINT"Load"
;:POKE 3859,112
FI 80 LOCATE 25,20,0:PRINT"Run";
:POKE 3879,112
LL 90 LOCATE 25,30,0:PRINT"Name"
;:POKE 3899,112
HH 100 LOCATE 25,40,0:PRINT"Dele
te";:POKE 3919,112
HD 110 LOCATE 25,50,0:PRINT"Quit
";:POKE 3939,112

```

```

CE 120 ON KEY (11) GOSUB 500
GE 130 ON KEY (12) GOSUB 520
KE 140 ON KEY (13) GOSUB 540
OE 150 ON KEY (14) GOSUB 560
DL 160 KEY (11) ON:KEY (12) ON:K
EY (13) ON:KEY (14) ON
GA 170 A$=INKEY$:IF A$="" THEN 1
70
PD 180 KEY (11) OFF:KEY (12) OFF
:KEY (13) OFF:KEY (14) OF
F
FB 190 A$=CHR$(ASC(A$) AND 223):
IF A$<>"L" AND A$<>"R" TH
EN 210
DA 200 GOSUB 450:CLS:PRINT"Searc
hing for ";F$;".BAS"
EL 210 IF A$="L" THEN LOAD F$
CB 220 IF A$="R" THEN LOAD F$,R
OF 230 IF A$="D" THEN GOSUB 450:
KILL F$+".BAS":T=0:F=0:GO
TO 40
HC 240 IF A$="N" THEN GOSUB 450:
GOTO 330
IB 250 IF A$<>"Q" THEN 160
BL 260 CLS:ON ERROR GOTO 0:END
IP 270 IF ERR<51 THEN 260
IL 280 RESUME 290
EN 290 IF A$="N" THEN 350
BN 300 IF A$="L" OR A$="R" THEN
390
BC 310 IF A$="D" THEN CLS:GOTO 3
90
IL 320 IF A$="F" THEN 400
OE 330 CLS:PRINT"RENAME ";F$;".B
AS TO ";:LINE INPUT;N$
EC 340 NAME F$+".BAS" AS N$:GOTO
40
BK 350 PRINT CHR$(7):PRINT"ERROR
- possible causes:"
BH 360 PRINT " New file name wa
s illegal"

```

```

IP 370 PRINT " New file name al
ready exists"
ON 380 PRINT" Disk access erro
r":PRINT:GOTO 410
DB 390 PRINT CHR$(7):PRINT F$;".
BAS not found.":PRINT:GOT
O 410
ID 400 PRINT CHR$(7):PRINT"No .B
AS files in this director
y":PRINT
ND 410 PRINT"Press C to continue
or Q to quit...";
AH 420 R$=INKEY$:IF R$="C" OR R$
="c" THEN 40
JJ 430 IF R$="Q" OR R$="q" THEN
260
EL 440 GOTO 420
IJ 450 F$="":E=160+160*(T\4)+36*
(T MOD 4)
IP 460 U=PEEK(E):IF U<>46 AND U<
>32 THEN F$=F$+CHR$(U):E=
E+2:GOTO 460
NH 470 RETURN
PK 480 RW=F\4+2:CL=18*(F MOD 4+1
)-5:LOCATE RW,CL,0:PRINT"
";
OL 490 RW=T\4+2:CL=18*(T MOD 4+1
)-5:LOCATE RW,CL,0:PRINT
P$;F=T:RETURN
AA 500 V=F-4:IF V>=0 THEN T=V:GO
SUB 480
MB 510 RETURN
PJ 520 V=F-1:IF V>=0 THEN T=V:GO
SUB 480
NF 530 RETURN
EF 540 V=F+1:IF V<NF THEN T=V:GO
SUB 480
NJ 550 RETURN
GE 560 V=F+4:IF V<NF THEN T=V:GO
SUB 480
NN 570 RETURN

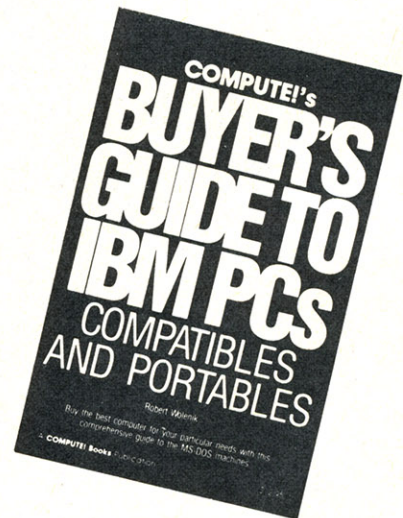
```

Everything you need to know about buying an IBM PC, compatible, or portable—all in an easy-to-understand, convenient format.

COMPUTE!'s Buyer's Guide to IBM PCs, Compatibles, and Portables

Robert Wolenik ISBN 0-87455-123-4 \$12.95

This comprehensive guide to PC compatibles and portables includes all the information needed to make intelligent decisions about the purchase of an IBM PC or compatible. For each computer, we've included a concise review, and discussions of the computer's background, features and potential drawbacks, as well as technical data. The author of *COMPUTE!'s Buyer's Guide to IBM PCs, Compatibles, and Portables* has authored or co-authored more than a dozen computer books including the highly successful *Buyer's Guide to Home Computers*.



To order COMPUTE! books, call toll free 1-800-346-6767 (in NY 212-887-8525) or write COMPUTE! Books, Customer Service, P.O. Box 5038, F.D.R. Station, New York, NY 10150. Customer Service hours are 10:00 a.m. to 12:30 p.m. and 1:30 p.m. to 3:30 p.m. Eastern time Monday through Friday. Please add \$2.00 per book U.S. and surface mail or \$5.00 air mail shipping and handling. NC residents add 5 percent sales tax and NY residents add 8.25 percent sales tax. Please allow 4-6 weeks for delivery.

COMPUTE! books are available outside the United States from subsidiaries of McGraw-Hill International Book Company.

COMPUTE! Publications, Inc. 
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies

IFF To Icon Translator For The Amiga

Charles L. Baker

Design your own Workbench icons using programs such as Deluxe Paint, Aegis Images, and Graphicraft.

"IFF to Icon" lets you customize your Workbench icons by translating IFF image files into Workbench info files. IFF (Interchange File Format) is a standard file structure developed jointly by Electronic Arts and Commodore-Amiga. Most commercial drawing programs for the Amiga store images according to the IFF standards.

In order for a file's icon to appear on the Workbench screen, there must be a corresponding info file. The Preferences program, for example, has the Preferences.info file associated with it. Drawers, the Trashcan (a special type of drawer), and even disks use info files to describe what their icons look like. By modifying info files, we can redefine Workbench icons.

Creating An Image

Before you can use this program, you must create an image file with *Deluxe Paint* or any other IFF-compatible program. This article will describe what you must do when using *Deluxe Paint*; other programs

use a similar process. Once you have created the image file, you can run IFF to Icon to convert your image into a Workbench icon.

Before you create the image, set the drawing program to the type of screen which your Workbench uses—either medium-resolution or high-resolution (interlace). The icon's colors are ultimately determined by the Workbench and not the drawing program used to design the icon. You may use the Preferences program to change the Workbench colors. Remember that the Workbench only uses four colors.

After you have drawn the desired image, it must be saved as a brush. To select an image as a brush within *Deluxe Paint*, click the left mouse button on the brush-selection tool and drag a selection box around the image. To save a brush file, select Save or Save As from the Brush menu.

Exit the drawing program. At this point, the image has been saved as a brush file on disk. To minimize disk swapping, you should copy the brush file to your BASIC work disk.

Getting Started

Type in and save IFF to Icon. The program uses the system library file named icon.bmap. In order for Amiga Basic to use this library, it

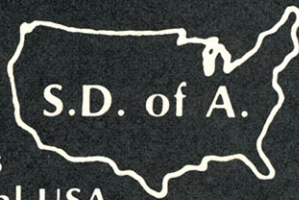
must have a file description of the library in a form which it understands. This form is called a *bmap file*. The bmap file is essentially a list of pointers that allow Amiga Basic to access library routines.

The file icon.bmap must be created before you can run IFF to Icon. If you have version 1.2 of the Amiga operating system (available as an inexpensive upgrade from any Amiga dealer), you can create icon.bmap quite easily. The BASIC-Demos disk for 1.2 contains a BASIC program named ConvertFd, as well as a directory named FD1.2. Run the ConvertFd program and enter the following information when prompted:

```
Enter name of .fd file to read > Amiga  
Extras:fd1.2/icon-lib.fd  
Enter name of .bmap file to produce >  
icon.bmap
```

When the ConvertFd program is finished, the disk contains the icon.bmap file. Copy this file onto the same disk as the IFF to Icon program. When IFF to Icon is run, the icon.bmap file must be either in the current directory or in the directory named LIBS (LIBRARIES) on the disk used when you booted the system. The LIBS directory is a good place for bmap files, since their purpose is to give you access to libraries. If you don't have the bmap files

SOFTWARE DISCOUNTERS OF AMERICA



For Orders Only — 1-800-225-7638
PA Orders — 1-800-223-7784
Customer Service 412-361-5291

- Free shipping on orders over \$100 in continental USA
- No Surcharge for VISA/MasterCard
- Your card is not charged until we ship

IBM SOFTWARE

ACCESS	Archon	\$9.88	MONOGRAM	
10th Frame Bowling	Mind Mirror	\$9.88	Dollars & Sense	\$109
World Class	Music Const. Set	\$9.88	PARAGON	
Leader Board	One-on-One	\$9.88	Master Ninja	\$23
ACCOLADE	Pinball Const. Set	\$9.88	SHARE DATA	
Ace of Aces	Seven Cities Gold	\$9.88	Jeopardy	\$8.88
Hardball	Super Boulder Dash	\$9.88	Wheel of Fortune	\$8.88
Mean 18 Golf	ELECTRONIC ARTS		SIERRA	
Mean 18 Famous	Amesia	\$29	Black Cauldron	\$24
Course Disk #2	Arctic Fox	\$23	King's Quest	
Mean 18 Famous Course	Bard's Tale	\$32	1, 2, or 3	\$30 Ea.
Disks #3 & 4	Chessmaster 2000	\$26	Leisure Suit Larry	\$24
ARTWORX	Chuck Yeager's Advanced		Space Quest	\$30
Bridge 5.0	Flight Simulator	\$26	SIMON & SHUSTER	
Strip Poker	Earl Weaver Baseball	\$26	Chem Lab	\$24
Data Disk #1 Female	Empire	\$32	Promethean Prophecy	\$24
Data Disk #2 Male	Grand Slam Bridge	\$39	Real Estate Investment & Management	\$65
Data Disk #3 Female	Instant Pages	\$32	Typing Tutor 4	\$30
Linkword Languages:	Marble Madness	\$23	Websters:	
Dutch	Mavis Beacon Typing	\$26	Spelling Checker	\$39
French	Scrabble	\$26	Thesaurus	\$44
German	Starfleet 1 or 2	\$32 Ea.	SPECTRUM HOLDBYTE	
Italian	Starflight	\$32	Falcon F-16 Sim	\$32
Russian	World Tour Golf	\$32	SPINNAKER	
Spanish	ENLIGHTENMENT		T-Shirt Shop	\$32
AVALON HILL	Guide to Chess Openings	\$39	T-Shirt Art #1	\$14
Dr. Ruth's Game	Paul Whitehead		SPRINGBOARD	
Super Bowl Sunday	Teaches Chess	\$39	Certificate Maker	\$36
S.B.S. Champs Disk	EPYX		C.M. Library #1	\$21
S.B.S. '85 Team Disk	Create A Calendar	\$19	Early Games	\$21
S.B.S. '86 Team Disk	Destroyer	\$24	Newsroom Pro	\$89
BRODERBUND	Pitstop 2	\$9.88	N.R. Clip Art #1 or 3	\$19 Ea.
Ancient Art of War	P.S. Graphics Scrapbook:		N.R. Clip Art #2	\$24
Ancient Art of War at Sea	#1 Sports	\$16	P.S. Graphics Expander	\$24
Bank St. Writer Plus	#2 Off the Wall	\$16	SSI	
Business Week's Business Advantage	#3 School	\$16	Battle of Antietam	\$30
Carmen Sandiego	Sub Battle Simulator	\$24	Gettysburg	\$36
USA	Summer Games 2	\$24	Kampfgruppe	\$36
World	World Games	\$24	Phantasia	\$24
Karateka	GAMESTAR		Rings of Zilfin	\$24
Memory Mate	Champ. Baseball	\$24	Roadwar 2000	\$24
Print Shop	Champ. Basketball	\$24	Shard of Spring	\$24
P.S. Companion	Champ. Golf	\$24	Wizard's Crown	\$24
P.S. Graphics Library	GFL Ch. Football	\$24	TELARIUM	
Holiday Edition	HI-TECH EXPRESSIONS		Amazon	\$9.88
P.S. Graphics Library #1 or #2	Award Ware	\$9.88	Dragonworld	\$9.88
P.S. Paper Refill	Card Ware	\$6.88	Fahrenheit 451	\$9.88
Search & Destroy	Party Ware	\$9.88	Nine Princes	\$9.88
Toy Shop	INFOCOM		Perry Mason	\$9.88
Toy Shop Refill	Beyond Zork	\$32	Rendezvous	\$9.88
Type!	Bureaucracy	\$24	THUNDER MOUNTAIN	
CENTRAL POINT	Hitchhikers Guide	\$19	Top Gun	\$6.88
Copy 2	Hollywood Hijinx	\$24	TIMEWORKS	
PC Option Board	Leather Goddesses	\$24	*Data Manager	\$39
PC Tools	Nord & Bert Couldn't Make Head or Tail of It	\$24	Evenly Wood Reader	\$39
DAC	Stationfall	\$24	Partner	\$39
Easy Accounting 2.0	The Lurking Horror	\$24	*Swiftcalc w/Sideways	\$39
Easy Payroll 2.0	Zork 1	\$24	Sylvia Porter's Financial Planner	\$59
DATA EAST	Zork Trilogy	\$44	*Word Writer	\$39
Commando	INTRACORP		*All 3 in 1 Power Pack	\$79
Tag Team Wrestling	Business Card Maker	\$39	UNISON WORLD	
DAVIDSON	MICROPROSE		Fonts & Borders	\$23
Algeblaster	F-15 Strike Eagle	\$21	Newsmaster	\$59
Grammar Gremlins	Gunship	\$32	Printmaster Plus	\$36
Homeworker	Silent Service	\$21	Art Gallery 1 or 2	\$19 Ea.
Math Blaster	MINDSCAPE		WEEKLY READER	
Math Blaster Plus	Balance of Power	\$30	Stickyear Math	\$23
Spell It	Bop & Wrestle	\$19	Stickyear Numbers	\$23
Word Attack	Crossword Magic	\$30	Stickyear Spelling	\$23
ELECTRONIC ARTS	Defender of the Crown	\$24	Stickyear Readgraber	\$23
Software Classic Series:	Infiltrator	\$19	Stickyear Typing	\$23
	Perfect Score SAT	\$44		
	Super Star Ice Hockey	\$24		

APPLE II SERIES

ACCESS	Spell It	\$27	Stationfall	\$24
Famous Course Disk #1 for WCLB	Word Attack	\$27	The Lurking Horror	\$24
Triple Pack: BH1, BH2, Raid Over Moscow	DAC		Zork Trilogy	\$44
World Class Leader Board	EASY ACCOUNTING	\$44	MECA	
ACCOLADE	ELECTRONIC ARTS		Ancrew Tobias: Managing Your Money 2.0	\$95
Hardball	Age of Adventure	\$9.88	MICROLEAGUE	
Hardball GS	Archon 1 or 2	\$9.88 Ea.	Baseball	\$24
Killed Until Dead	Arctic Fox	\$26	Box Score Stats	\$14
Mean 18 Golf GS	Bard's Tale GS	\$32	General Mgr./Owner	\$19
Mean 18 Famous Courses GS	Bard's Tale 2	\$32	1986 Team Disk	\$12
Call	Chessmaster 2000	\$29	MICROPROSE	
ACTIVISION	Deluxe Paint II GS	\$65	F-15 Strike Eagle	\$21
Aliens	D. Paint Art #1 GS	\$19	Silent Service	\$21
Draw GS	D. Paint Art #2 GS	\$19	Silent Service GS	\$25
Ghostbusters	Deluxe Print 2 GS	\$32	MINDSCAPE	
Hacker 2	Earth Orbit Station	\$23	Balance of Power 128K	\$29
Hacker 2 GS	Instant Music GS	\$32	Bop & Wrestle	\$19
Might & Magic	Legacy of Ancients	\$26	Defender of the Crown GS	\$32
Music Studio GS	Lords of Conquest	\$9.88	Indoor Sports	\$24
Paintworks GS	Marble Madness 128K	\$23	Infiltrator	\$19
Portal	Movie Maker	\$30	Infiltrator 2	\$24
Postcards GS	Music Const. Set	\$9.88	Perfect Score SAT	\$44
Postcards 128K	Music Const. Set GS	\$32	S.D.I. GS	\$32
Shanghai	One-on-One	\$9.88	MONOGRAM	
Shanghai GS	Pegasus	\$23	Dollars & Sense 128K	\$69
Tass Times GS	Pinball Const. Set	\$9.88	SHARE DATA	
Writer's Choice Elite GS	Russia (The Great War)	\$26	Family Feud	\$8.88
ARTWORX	Scrabble	\$26	Jeopardy	\$8.88
Bridge 5.0	Seven Cities of Gold	\$9.88	Wheel of Fortune	\$8.88
International Hockey	Skyfox	\$9.88	SPRINGBOARD	
Strip Poker	Star Fleet 1	\$14	Certificate Maker	\$29
Data Disk #1 (Female)	Star Fleet 2	\$14	C.M. Library Vol. 1	\$21
Data Disk #2 (Male)	Super Boulder Dash	\$9.88	Newsroom	\$32
BAUDVILLE	World Tour Golf GS	\$26	N.R. Clip Art #1 or #3	\$17
Award Maker Plus	EPYX		N.R. Clip Art #2	\$23
Video Vegas	Champ. Wrestling	\$24	STYLEWARE	
BRODERBUND	Create A Calendar	\$19	Multiscribe 2.0 128K	\$44
Animate 128K	Destroyer	\$24	Multiscribe 2.0 GS	\$65
Bank St. Writer + 128K	Movie Monster	\$14	SSI	
Carmen San Diego	P.S. Graphics Scrapbook:		Battlecruiser	\$35
USA	#1 Sports	\$14	Eternal Dagger	\$24
World	#2 Off the Wall	\$14	Gettysburg	\$35
Choplifter	#3 School	\$14	Phantasia 1, 2 or 3	\$24 Ea.
Dazzle Draw 128K	Sub Battle Simulator	\$24	Realms of Darkness	\$24
Fantavision	Summer Games 2	\$24	Rings of Zilfin	\$24
Fantavision GS	Winter Games	\$24	Roadwar 2000	\$24
Karateka	World Games	\$24	Roadwar Europa	\$24
Loderunner	FIRST BYTE		Shard of Spring	\$24
On Balance 128K	First Shapes GS 768K	\$32	War in S. Pacific	\$35
Print Shop Enhanced	Kid Talk GS 768K	\$32	Wizard's Crown	\$24
Print Shop Companion	Math Talk GS 768K	\$32	SUBLOGIC	
Print Shop GS	Speller Bee GS 768K	\$32	Flight Simulator 2	\$32
P.S. Graphics Library #1, 2 or 3	*These programs talk!		F.S. Scenery Disks	Call
P.S. Graphics Library Sampler Edition GS	GAMESTAR		Jet	\$26
Science Tool Kit	Champ. Baseball 128K	\$24	WEEKLY READER	
Toy Shop	Ch. Basketball 128K	\$24	Stickyear ABC's	\$23
Type!	Ch. Basketball GS	\$29	Stickyear Math 1 or 2	\$23 Ea.
Wings of Fury	Champ. Football 128K	\$24	Stickyear Music	\$23
CENTRAL POINT	Top Fuel Eliminator 128K	\$19	Stickyear Numbers	\$23
Copy 2	Award Ware	\$9.88	Stickyear Shapes	\$23
DAVIDSON	Card Ware	\$6.88	Stickyear Spellgraber	\$23
Algeblaster	Party Ware	\$9.88	Stickyear Typing	\$23
Grammar Gremlins	INFOCOM		WINDHAM CLASSICS	
Math Blaster	Beyond Zork 128K	\$32	Alice in Wonderland	\$9.88
Math Blaster Plus 128K	Bureaucracy 128K	\$24	Swiss Family Robinson	\$9.88
	Hitchhiker's Guide	\$19	Treasure Island	\$9.88
	Hollywood Hijinx	\$24	Wizard of Oz	\$9.88
	Leather Goddesses	\$24		
	Nord & Bert 128K	\$24		
	Plundered Hearts	\$24		

Commodore 64 & 128 Owners: Please read our full page ad in this month's Compute's Gazette!

P.O. BOX 111327 — DEPT. CP — BLAWNOX, PA 15238

*Please Read The Following Ordering Terms & Conditions Carefully Before Placing Your Order: Orders with cashiers check or money order shipped immediately on in stock items. Personal & Company checks, allow 3 weeks clearance. No C.O.D.'s! Shipping: Continental U.S.A. — Orders under \$100 add \$3; free shipping on orders over \$100. AK, HI, FPO, APO — add \$5 on all orders. Canada & Puerto Rico — add \$10 on all orders. Sorry, no other international orders accepted! PA residents add 6% sales tax on the total amount of order including shipping charges! REASONS FOR CALLING CUSTOMER SERVICE — 412-361-5291 (1) Status of order or back order (2) If any merchandise purchased within 60 days from S.D. of A. is defective, please call for a return authorization number. Defective merchandise will be replaced with the same merchandise only. Other returns subject to a 15% restocking charge. After 60 days please refer to the manufacturer's warranty included with the merchandise & return directly to the manufacturer. Customer service will not accept collect calls or calls on S.D. OF A.'s 800# order lines! Have you seen our on line catalog of 1000 software titles for Commodore, Atari, Apple, IBM and Amiga? It's on Computervs Electronic Mail — just type GO SDA and shopping for software will never be the same again! HOURS: Mon.-Fri. 9 AM-5:30 PM, Sat. 10 AM-4 PM Eastern Time. Holiday Hours: Nov. 2-Dec. 17; Mon.-Thurs. 9 AM-8 PM, Fri. 9 AM-5:30 PM, Sat. 10 AM-4 PM Eastern Time. When sending a mail order, please specify make & model of your computer!

in the correct place, BASIC will stop with a *file not found* error when you run IFF to Icon.

Using The Program

Run IFF to Icon. The program asks you to enter the name of the IFF file to translate and the name of the info file to modify. You must specify the disk and folder in which the programs are located. Do not include the .info extension when entering the second filename. The program does this for you. If you wish to change the trashcan's icon, for example, simply enter the filename TRASHCAN. The IFF to Icon program does not create new info files; it modifies existing ones. So, the info file must already exist on disk.

After both filenames have been entered, IFF to Icon translates the IFF image, creates a temporary image file of its own, and finally modifies the specified info file. To convert IFF image files, this program uses code from the "IFF Translator" program published in the April 1987 issue.

Even after modification, a file's original icon will stay on the Workbench screen until the file, drawer, or disk is closed and redrawn. For files and drawers, this means closing and reopening the window that the icon is located in. If you modified a disk's icon, you must close all drawers and windows from the disk, remove the disk from the drive, and reinsert the disk after the original icon has disappeared. In some cases, you may have to reboot in order to remove the original disk icon from the Workbench screen.

IFF To Icon

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
' Copyright 1987 COMPUTE! Publications, Inc.<
' All Rights Reserved<
'<
' IFF to Icon<
'<
DECLARE FUNCTION GetDiskObject<
LIBRARY<
DECLARE FUNCTION PutDiskObject<
LIBRARY<
DECLARE FUNCTION FreeDiskObject<
LIBRARY<
<
LIBRARY "icon.library"<
<
MainLine:<
GOSUB Initialize<
OPEN FileIFF$ FOR INPUT AS 1<
PRINT "Reading from file      : ";
FileIFF$<
```

```
GOSUB TransLateChunks<
CLOSE 1<
OPEN FileIFF$+"_Image" FOR OUTPUT
AS 1<
PRINT "Writing to file      : ";
FileIFF$+"_Image"<
GOSUB CreateImageFile<
CLOSE 1<
OPEN FileIFF$+"_Image" FOR INPUT
AS 1<
PRINT "Translating file      : ";
FileIFF$+"_Image"<
GOSUB TransLateImage<
CLOSE 1<
KILL FileIFF$+"_Image"<
PRINT "Modifying file      : ";
FileInfo$+".info"<
GOSUB CreateInfoFile<
LIBRARY CLOSE<
END<
<
Initialize:<
WINDOW 1,"Brush To Icon",(0,120)
-(450,186),15<
PRINT "Copyright 1987 COMPUTE! P
ublications, Inc."<
PRINT "      All Rights Rese
rved.":PRINT<
DEFINT a-z<
DIM R1(31), G1(31), B1(31)<
true = -1<
false = 0<
INPUT "IFF file to translate: ",
FileIFF$<
INPUT ".info file to modify : ",
FileInfo$<
RETURN<
<
TransLateChunks:<
ckID$=INPUT$(4,1)<
SkipData$=INPUT$(4,1)<
ckType$=INPUT$(4,1)<
IF ckID$ <> "FORM" OR ckType$ <>
"ILBM" THEN<
PRINT "File is not a FORM ILBM c
hunk."<
STOP<
END IF<
FoundBMHD = false<
FoundCMAP = false<
WHILE true<
ckID$=INPUT$(4,1)<
ckLength$=CVL(INPUT$(4,1))<
IF ckID$="BMHD" THEN<
GOSUB TransLateBMHD<
FoundBMHD = true<
ELSEIF ckID$="CMAP" THEN<
GOSUB TranslateCMAP<
FoundCMAP = true<
ELSEIF ckID$="BODY" THEN<
IF FoundBMHD AND FoundCMAP THEN<
GOSUB TransLateBODY<
RETURN<
ELSE<
PRINT "Context chunks are missin
g."<
STOP<
END IF<
ELSE<
SkipData$=INPUT$(ckLength&,1)<
SkipData$=""<
END IF<
IF ckLength& MOD 2 THEN<
SkipData$=INPUT$(1,1)<
END IF<
WEND<
<
TransLateBMHD:<
Wide&=CVI(INPUT$(2,1))<
Height&=CVI(INPUT$(2,1))<
SkipData$=INPUT$(4,1)<
depth&=ASC(INPUT$(1,1))<
Masking=ASC(INPUT$(1,1))<
Compression=ASC(INPUT$(1,1))<
```

```
SkipData$=INPUT$(1,1)<
TransCoLoR=CVI(INPUT$(2,1))<
SkipData$=INPUT$(2,1)<
PageWidth=CVI(INPUT$(2,1))<
PageHeight=CVI(INPUT$(2,1))<
ScnMode=PageWidth/320+2*(PageHei
ght/200-1)<
pLanepick=2^depth&-1<
IF Masking<>2 THEN<
PRINT "Unknown masking technique
used."<
STOP<
END IF<
IF Compression = 0 THEN<
FileCompressed = false<
ELSEIF Compression = 1 THEN<
FileCompressed = true<
ELSE<
PRINT "Unknown compression techn
ique used."<
STOP<
END IF<
IF TransCoLoR <>0 THEN<
PRINT "Register zero is not the
transparent color."<
STOP<
END IF<
Header$=MKL$(0)+MKL$(0)+MKL$(dep
th&)+MKL$(Wide&)+MKL$(Height&)<
Header$=Header$+MKI$(24)+MKI$(pL
anepick)+MKI$(0)<
RETURN<
<
TranslateCMAP:<
CoLoRCount=ckLength&/3-1<
FOR register=0 TO CoLoRCount<
R1(register)=INT(ASC(INPUT$(1,1)
)/12)/20<
G1(register)=INT(ASC(INPUT$(1,1)
)/12)/20<
B1(register)=INT(ASC(INPUT$(1,1)
)/12)/20<
NEXT register<
RETURN<
<
TransLateBODY:<
BytesPerRow = 2*INT((Wide&+15)/1
6)<
BytesPerPLane = BytesPerRow*Heig
ht&<
ReqBytes = BytesPerPLane*depth&<
BitMap$=STRING$(ReqBytes,CHR$(0)
)<
FOR RowNo=1 TO Height&<
pointer=1+BytesPerRow*(RowNo-1)<
FOR PLaneNo=1 TO depth&<
Offset=BytesPerPLane*(PLaneNo-1)
<
IF FileCompressed THEN<
Row$=""<
WHILE LEN(Row$)<BytesPerRow<
UByte=ASC(INPUT$(1,1))<
ControlByte=UByte-2*(UByte AND 1
28)<
IF ControlByte<-127 THEN<
' No operation<
ELSEIF ControlByte<0 THEN<
Row$=Row$+STRING$(-ControlByte+1
,INPUT$(1,1))<
ELSEIF ControlByte<128 THEN<
Row$=Row$+INPUT$(ControlByte+1,1)
)<
END IF<
WEND<
ELSE<
Row$=INPUT$(BytesPerRow,1)<
END IF<
MID$(BitMap$,pointer+Offset,Byte
sPerRow)=Row$<
NEXT PLaneNo<
NEXT RowNo<
RETURN<
<
CreateImageFile:<
PRINT#1, Header$+BitMap$;<
```

```

RETURN<
<
TransLateImage:<
garbage$ = INPUT$(8,1)
' throw away colorset and dataset
t<
depth& = CVL(INPUT$(4,1))
' depth of screen in bitmaps<
bwidth& = CVL(INPUT$(4,1))
' width of screen in pixels<
bheight& = CVL(INPUT$(4,1))
' height of screen in pixels<
garbage$ = INPUT$(2,1)
' drop masking flags<
pLanepick% = CVI(INPUT$(2,1))<
pLaneonoff% = CVI(INPUT$(2,1))<
bit$ = INPUT$(LOF(1)-26,1)
) ' bitplane data<
RETURN<
<
CreateInfoFile:<
diskobj& = GetDiskObject&(SADD(FileInfo$))<
IF diskobj& = 0 THEN<
PRINT "error opening ";FileInfo$
;"info"<
GOTO ending<
END IF<
POKEL diskobj& + 8, 0 ' top corner at 0,0<
POKEW diskobj& + 12, bwidth&<
POKEW diskobj& + 14, bheight<
imageptr& = PEEKL(diskobj& + 22)
<
POKEW imageptr& + 4, bwidth<
POKEW imageptr& + 6, bheight<
POKEW imageptr& + 8, depth<
POKEL imageptr& + 10, SADD(bit$)
<
POKE imageptr& + 14, pLanepick%
<
POKE imageptr& + 15, pLaneonoff%
<
erro=&PutDiskObject&(SADD(FileInfo$), diskobj&)<
IF erro = 0 THEN<
PRINT "error on file writing "<
END IF<
erro=&FreeDiskObject&(diskobj&)<
IF erro <> 0 THEN<
PRINT "error on memory clearing --> ";erro<
END IF<
ending:<
RETURN<
<

```

All the programs in this issue are available on the ready-to-load **COMPUTE! Disk**. To order a one-year (four-disk) subscription, call toll free **1-800-727-6937**. Please specify which computer you are using.

EXCLUSIVE SOFTWARE

Quality Software! Great Prices!

Originals by Zephyr, Not Public Domain

IBM PC/XT/AT APPLE IIe/IIc/IIgs

Pick the Ones YOU Want:

FINANCER™—10 most needed financial calculations. Menu selectable for: amortization schedule, present values, future values, simple & compound interest, installment loan, & more. Output to screen or printer. "FINANCER is best"—G.W., Montana \$19.95

STATCALC™—Key statistical functions for student or experienced user. Includes Correlation & Regression, Normal, T, Poisson, Binomial, Chi-square, distributions, data handling for sorts, mean, standard deviation, range, median. Save data to disk. Manual explains statistics and program use with examples. \$39.95

SUPERCAT™—Professional level cataloging for up to 5,000 books per directory with hard disk or 1000 per floppy (300 for Apple). Multiple subjects & authors, call #, title, publisher, etc. for 13 field types. Print 3x5 index cards & reports in various formats. Sort & retrieve data by any field. Fast and easy to use. \$49.95

CATMAN™—Catalog your books, records, tapes with ease. Store author, title, and subject for up to 3000 item per floppy (1500 for Apple). Use search options to get listings on screen or printer. Your choice if full power of Supercat not needed. \$19.95

HEADLINER™—Print banners and signs on any printer in letters up to 13" high (smaller sizes, too). Any length headline. Great for parties, kids, offices, stores. Get your message across! On PC MAG Holiday '85 Wish List. \$19.95

HOROSCOPICS™—For birthdate, time & location sky conditions calculated & horoscope chart printed, with zodiac, sun, moon & all planets. Gives astrological reading, sun & moon sign, ascendant, conjunctions & oppositions. \$24.95

BIO-DATA™—Biographies for any time period. Display on screen or to printer. Gives celestial longitude of sun & your astrological sign, Julian Day #, days since birth & day of week. \$19.95

ORACLE-EAST™—Modern version of the ancient Chinese I Ching method of fortune telling. Casting techniques generate trigrams and hexagrams which provide the divination. Authentic presentation and interpretations, including 'moving' lines. Eastern wisdom now on diskette. \$24.95

NUMBERSCOPE™—Analyzes your name & birthdate according to traditions of Numerology. Results include destiny number, karmic lessons, life cycles, turning points motivation, expression, inner-self numbers plus interpretations. \$19.95

VOCABULATOR™—Increase your vocabulary at selectable skill level, from high school to advanced. Multiple choice or quick review mode. Add words you want. "Recommended: Excellent Program"—Electronic Learning Mag \$29.95

MUSICMAN™—Compose music on screen, placing notes, rests, sharps, flats on musical staff. Vary key, pitch, tempo & legato. Save compositions to replay/revise. Comes with musical selections. \$29.95

PUZZLEPIX™—Choose from 100 built-in puzzles or create your own. Move & rotate pieces to solve puzzle. Difficulty level variable for kids or adults. Option for timed play. Great for the whole family! For IBM & compatibles with CGA or EGA graphics. \$29.95

TIMETEACHER™—Four games that teach children 3 to 8 how to tell time. Color graphics, animation, and music make learning fun! Julie Jaybird, Johnnie Jumper and others play along and keep score. Skill level variable. Your kids will love it! For IBM & compatibles with CGA or EGA graphics. \$29.95

ASTROSTELL™—Learn all 88 constellations. Four levels of star brightness simulate sky on screen. Gives star names, positions of galaxies, nebula, etc., plus lore & observing tips. "A Perfect Delight"—Prof. M.F., Minnesota. \$29.95

ASTROCALC™—Calculates for sun, moon & all planets rise/set times, positions in sky, orbital elements, brightness, phase, sidereal time & much more for any date, time & location. Manual explains theory & use. \$29.95

PHYSICAL™—Introduction to Physics for high school/college level. Includes mechanics, gravity, electricity, light, quantum mechanics & relativity. 30 key equations explained with easy on screen calculations. Example problems (& solutions), physics terms and history. \$29.95

CHEMICALC™—Introduction to Chemistry for high school/college level. Includes atoms & molecules, chemical reactions, gas laws, periodic table, solutions, acids & bases. With example problems (& solutions), chemistry terms & brief chemistry history. \$29.95

ORDER TODAY!

1-800-533-6666 9-9 Mon-Sat Orders Only

For info or in PA Call 412-422-6600

By phone or mail. Check, M.O., credit card (# & Expir.). Add \$2 shipping (\$4 overseas). PA add 6%. Give COMPUTER TYPE. JOIN OUR THOUSANDS OF SATISFIED CUSTOMERS in 50 states & 78 countries. Fast shipment! Friendly service.

ZEPHYR SERVICES

1900 Murray Ave. Dept. U
Pittsburgh, PA 15217

FREE Catalog - call or write

OUR 6th YEAR OF BUSINESS

SEIKO

WATCH / PC TERMINAL LIQUIDATION



Now With This State-of-the-Art 5-Function Seiko Watch, You Can Have Everything You Need to Remember on Your Wrist!

This Space-Age Watch Interfaces With Your PC Allowing You to Carry Important Information Wherever You Go — Right At Your Fingertips!

IBM, Comm. 64, Apple IIE & IIC Models

FEATURES:

- 5-Function Quartz Watch: Time/Calendar, Data Memo, Schedule Alarm, Weekly Alarm, World Time
- Includes RS232C cable for simple hookup
- 2K RAM memory stores phone numbers, appointment times, key dates — any kind of information you can think of!
- Specially formatted menu driven software program — that makes data input a breeze (included)
- 12 distinct data files

Manufacturer's Suggested Retail

\$150.00

DAMARK PRICE

\$48

PUBLIC NOTICE

Seiko, leading manufacturer of watches, decided to liquidate this high tech model. Because of this marketing decision, we bought their overstock & offer them to you at **FAR BELOW COST!**

IBM Comp Order No. B-553-100883
Commodore Order No. B-553-100891
Apple IIE Order No. B-553-100909
Apple IIC Order No. B-553-100917
Insured Ship./Hand.: \$5.00

For fastest service call TOLL-FREE

1-800-533-3379



or send check, money order or credit card information to:



DAMARK INTERNATIONAL, INC.
7714 Brooklyn Blvd., Minneapolis MN 55443
Corporate Offices • 612/560-5415

SEND ME:

(qty.) IBM Comp(s) @ \$48 ea. Order No. B-553-100883
(qty.) Commodore(s) @ \$48 ea. Order No. B-553-100891
(qty.) Apple IIE(s) @ \$48 ea. Order No. B-553-100909
(qty.) Apple IIC(s) @ \$48 ea. Order No. B-553-100917
In MN add 6% sales tax. Include \$5.00 Ins. ship./hand. ea.

Name _____
Address _____
City, State, Zip _____
 Check/M.O. VISA MasterCard
Card No. _____
Exp. Date: _____ Ph.#: () _____
Signature _____

Delivery to 48 United States Only

Copies of articles from this publication are now available from the UMI Article Clearinghouse.

For more information about the Clearinghouse, please fill out and mail back the coupon below.

UMI Article Clearinghouse

Yes! I would like to know more about UMI Article Clearinghouse. I am interested in electronic ordering through the following system(s):

- DIALOG/Dialorder ITT Dialcom
 OnTyme OCLC ILL Subsystem
 Other (please specify) _____
 I am interested in sending my order by mail.
 Please send me your current catalog and user instructions for the system(s) I checked above.

Name _____
 Title _____
 Institution/Company _____
 Department _____
 Address _____
 City _____ State _____ Zip _____
 Phone (____) _____

Mail to: University Microfilms International
 300 North Zeeb Road, Box 91 Ann Arbor, MI 48106

Save Your Copies of COMPUTE!



Protect your back issues of *COMPUTE!* in durable binders or library cases. Each binder or case is custom-made in flag-blue binding with embossed binding with embossed white lettering. Each holds a year of *COMPUTE!*. Order several and keep your issues of

COMPUTE! neatly organized for quick reference. (These binders make great gifts, too!)

Cases:

\$7.95 each;
 3 for \$21.95;
 6 for \$39.95

Binders

\$9.95 each;
 3 for \$27.95;
 6 for \$52.95

(Please add \$2.50 per unit for orders outside the U.S.)

Send in your prepaid order with the attached coupon

Mail to: Jesse Jones Industries, P.O. Box 5120,
 Dept. Code COTE, Philadelphia, PA 19141

Please send me _____ *COMPUTE!* cases binders.
 Enclosed is my check or money order for \$ _____
 (U.S. funds only.)

Name _____
 Address _____
 City _____
 State _____ Zip _____

Satisfaction guaranteed or money refunded.
 Please allow 4-6 weeks for delivery.

SINCE 1982

ComputAbility

Consumer Electronics

CHRISTMAS SHOWCASE

800-558-0003

CAMCORDERS

Panasonic PV320 1) Full Size VHS Camcorder 2) Free Panasonic Hard Case 3) 7 LUX 4) 1/1000 Shutter \$1129	RCA CPR 300 1) Full size VHS Camcorder 2) Free RCA hard case 3) 7 LUX 4) 8:1 Power Zoom CALL	Panasonic PV 100 1) Compact Size VHS-C Camcorder 2) Free Panasonic Soft Case 3) 7 LUX 4) 1/1000 Shutter \$999
--	--	---

VIDEO EQUIPMENT

Panasonic SUPER VHS 1) Super VHS System 2) Hi Fi/Stereo 3) Bar Code Program 4) On Screen Display CALL	PIONEER LASER PLAYER LD838D 1) Laser Vision Player w/Digital Sound 2) Auto Load & Auto Selection 3) 400 Line Resolution \$439	PIONEER LASER PLAYER CLD 1010 NEW 1) Plays All 4 Laser Formats (CD/CDV/8" 12") 2) Auto Front Load 3) Digital Sound \$619
---	--	--

Panasonic PV4780 VCR 1) Hi Fi/Stereo 2) Digital Picture N Picture 3) Digital Special Effect 4) 4 Heads \$829	Panasonic PV4760 VCR 1) Hi Fi/Stereo 2) On Screen Display 3) 155 Channels 4) 4 Head \$509	RCA VPT 595 VCR 1) Stereo with Dolby 2) Digital Special effects 3) On Screen Program \$599
--	---	---

AUDIO EQUIPMENT

PIONEER COMPACT DISC PDM 50 1) Wireless "SR" remote 2) Random program play 3) 6 Disc magazine 4) Headphone w/volume \$299	PIONEER A/V RECEIVER VSX5000 1) A/V Receiver with AMP 2) Surround sound 3) Video inputs 4) Full function remote \$419	TEAC CD / CASSETTE AD 4 1) 3 Beam Laser Pick-up 2) Dolby B&C 3) Wireless Remote \$379
---	---	--

STOCKING STUFFERS

Nintendo ENTERTAINMENT SYSTEM™ • Call for Price • 3rd Party software; Konami, Broderbund; Data East, Sunsoft, Techno, Taito CALL	CASIO COMPUTER KEYBOARD HT700 NEW • Midi Interface • 640 Chords/198 Operations • Synthesizer Function • Built in Speaker \$319	CASIO COMPUTER GUITAR DG20 NEW • Midi Interface • Built in Drum Sounds • 20 Fret Neck • Built in Speaker \$349
--	---	---

SNOOPER RADAR DETECTOR D4000 Top Rated • X and K band alert • Loud audible Signal • Flashing Warning Light • City/ Highway CALL	COBRA RADAR DETECTOR RD3170 • Micro size- 2 3/4 x 3/4 x 4 1/4 • Signal strength meter • 3 Selectable alert signals • volume control \$179	COBRA ANSWERING MACHINE AN8512 • Function Beeperless Remote • Access Messages From any touch tone Phone • Remote Turn on • Call Screening \$69.95* * Price reflects \$10.00 Consumer Rebate
--	---	--

see next PAGE for Order Information

SINCE 1982 ComputAbility

THE HOME COMPUTER STORE THAT'S AS CLOSE AS YOUR TELEPHONE



**NX-10 PRINTER
ONLY
\$149**



**1091i - II PRINTER
NEW Now at 192 CPS
ONLY
\$179**



**1080i - II PRINTER
NEW Now at 144 CPS
ONLY
\$159**



**1092i PRINTER
ONLY
\$289**



64C COMPUTER
1541C DISK DRIVE
1802C MONITOR
1581C DISK DRIVE

C-128 COMPUTER
1571 DISK DRIVE
1902 MONITOR
C-128 D COMPUTER

CALL FOR INDIVIDUAL
& SUPER PACKAGE PRICES

1750 RAM EXPANDER
1764 RAM EXPANDER
1351 MOUSE
AVATEX 1200 HC MODEM
AVATEX 2400 HC MODEM
ICON TROLLER
CALL FOR
CURRENT PRICES

COMMODORE
PC-10
PC COMPATIBLE
COMPUTER

CALL FOR
CURRENT PRICES



COMPUTER SYSTEM
CALL FOR CURRENT PRICES & AVAILABILITY



PRINTER PACKAGES
PRICES TOO LOW TO ADVERTISE



520 ST & 1040 ST
SYSTEM PACKAGES
CALL FOR LATEST PRICES

IBM	AMIGA	C128	APPLE	ATARI 8-BIT	ATARI ST	C64
Annals 29.95	Aegis Animator 84.95	Abacus Book CALL	Airheart 22.95	Animation Station 59.95	Aegis Books CALL	Bard's Tale 25.95
Art Gallery 1 24.95	Aegis Draw 159.95	Basic Compiler 126 39.95	Animata 44.95	Archeon 10.95	Aegis Animator 48.95	Bard's Tale 2 25.95
Art Gallery 2 18.95	Analysis 2.0 84.95	Bureaucracy 22.95	Autoball 32.95	Archeon II 10.95	Art Gallery 10/2 18.95	Basic Compiler 64 25.95
Balance of Power 31.95	Bards Tale 32.95	Card Pak 126 39.95	Bards Tale 29.95	Atariwing Plus 39.95	Bop 'n Rumble 18.95	Bop 'n Rumble 25.95
Bop-N-Wrestle 19.95	Bureaucracy 25.95	Chart Pak 25.95	Bards Tale II 32.95	Bop-N-Wrestle 19.95	Assempra 39.95	Carmen U.S.A. 29.95
Certificate Maker 38.95	Cambridge Lip 129.95	Cobol 126 39.95	Bop-N-Wrestle 19.95	Chessmaster 2000 25.95	Back-up 24.95	Certificate Maker 39.95
Championship Baseball 25.95	CBM Textcraft 69.95	Datamanager128 42.95	Certificate Maker 31.95	Chessmaster 2000 22.95	Balance of Power 32.95	Champ. Baseball 18.95
Championship Golf 25.95	Championship Baseball 29.95	Fleet System 4 46.95	Certificate Maker Lib #1 22.95	Gettysburg 39.95	Certificate Maker 31.95	Chart Pak 25.95
Chessmaster 2000 25.95	Championship Golf 25.95	Fontmaster 126 36.95	Clip Art 1 or 3 18.95	Hardball 18.95	Chessmaster 2000 32.95	Chessmaster 2000 25.95
Chuck Yeager F.S. 26.95	Chessmaster 2000 29.95	Goza 126 44.95	Clip Art 2 25.95	Home Planetarium 27.95	Colorful Conquest 25.95	Data Manager II 25.95
Clip Art 1.3 19.95	Defender of the Crown 32.95	Mach 126 42.95	Destroyer 25.95	Leaderboard 24.95	CZ Druid 69.95	Defender of the Crown 22.95
Clip Art 2 25.95	Deja Vu 32.95	Mach 126 42.95	F-15 Strike Eagle 22.95	Leather Goodies 22.95	Dac Easy Accounting 44.95	Desk Pak 1 22.95
Commando 25.95	Deluxe Music 2.0 64.95	Multiplan 126 27.95	Fight Night 21.95	Mail Order Monsters 10.95	Dac Payroll 32.95	Desk Pak 2 22.95
Conflict in Vietnam 25.95	Deluxe Print II 84.95	Paperclip II/126 CALL	Graphics Lib 1,2or3 16.95	Megaloft II 16.95	Datamanager ST 42.95	Desktop Publisher 39.95
Crusade in Europe 25.95	Deluxe Paint 64.95	Partner 126 42.95	Hardball 32.95	Movie Maker 10.95	Datatrave 32.95	Echelon 29.95
Defender in the Desert 25.95	Deluxe Video 2.0 84.95	Perfect Writer 49.95	Infiltrator 19.95	Music Studio 22.95	Deep Space 29.95	Elminal Dagger 25.95
Defender of the Crown 25.95	Earl Westler Baseball 32.95	Pocket Filer 2 36.95	Jet 27.95	Page Designer 18.95	Defender of the Crown 32.95	Final Cartridge 3 42.95
Destroyer 25.95	Fairy Tale Adventure 31.95	Pocket Writer 2 36.95	Newroom 37.95	P.S. Companion 22.95	Deep Space 29.95	Fight Simulator II 33.95
F-15 Strike Eagle 21.95	First Snaps 31.95	Speed Term 126 25.95	On Balance 64.95	P.S. Interface 18.95	Desk Cart 42.95	Font Master II 29.95
Flight Simulator I 38.95	Flight Simulator II 33.95	Superbase 126 57.95	Pawn 29.95	Racing Destruction 10.95	Easy Draw 48.95	Geocalc 34.95
Grand Slam Bridge 39.95	Flip Side 31.95	Super C Compiler 39.95	Pegasus 25.95	Rubber Stamp 18.95	Flash Track 39.95	Geo Chart 27.95
Graphics Library 1 or II 21.95	Foreign 77 169.95	Super Pak 2/126 59.95	Phantasia 1, 2 or 3 25.95	Shant Star 22.95	Fish 27.95	Geodex 25.95
Hitchhikers Guide to the Galaxy 19.95	GFL Football 29.95	Super Pascal 126 39.95	Print Shop 31.95	Shant Star 22.95	Flight Simulator 35.95	Geopolis 34.95
Hollywood Hijinx 25.95	Goldspeil 27.95	Superscript 126 46.95	Silent Service 22.95	Synfile 32.95	GFA Basic 48.95	Geopublish 34.95
Infiltrator 19.95	Grand Slam Tennis 44.95	Swift 126 42.95	Starjumper 28.95	Synfile 32.95	GFA Compiler 48.95	Geos 37.95
Inqur Portfolio 149.95	Grid Iron 31.95	Sylvia Parlar 126 42.95	Street Sports Baseball 25.95	Synfile 32.95	GFA Draft 62.95	Gunship 22.95
Jet 33.95	Impact 54.95	Ultima II 25.95	Street Sports Basketball 25.95	Synfile 32.95	GFA Vector 24.95	Harbowl 18.95
Kings Quest I, II, or III 31.95	Instant Music 32.95	Ultima III 36.95	Tag Team Wrestling 22.95	Ultima IV 36.95	GFA Runner 24.95	Hollywood Hijinx 22.95
Leather Goodies 25.95	Kampgruppe 38.95	Visaster 126 54.95	Where in the U.S.A. is Carmen Sandiego 29.95	Ultima IV 36.95	Hardball 24.95	Last Ninja 22.95
Newsmaster 62.95	Kid Talk 31.95	Visaster 126 54.95	Where in the World is Carmen Sandiego 25.95	Ultima IV 36.95	Hardball 24.95	Leather Goodies 22.95
Newsroom 37.95	Kids Quest 1, 2 or 3 32.95	Wordwriter 126 42.95		Ultima IV 36.95	Hardball 24.95	Legacy/Ancients 29.95
One on One 10.95	Logistix 89.95			Ultima IV 36.95	Hardball 24.95	Newsroom 39.95
Orbitr 31.95	Marble Madness 32.95			Ultima IV 36.95	Hardball 24.95	Omnicron Conspiracy 24.95
Pawn 29.95	Mean 18 27.95			Ultima IV 36.95	Hardball 24.95	Paper Boy 22.95
P.C. Powerpack 77.95	Microleague Baseball 39.95			Ultima IV 36.95	Hardball 24.95	Partner 64 39.95
Phantasia 25.95	Module 2 64.95			Ultima IV 36.95	Hardball 24.95	Pawn 25.95
Police Quest CALL	Music Studio 32.95			Ultima IV 36.95	Hardball 24.95	Pegabus 22.95
Printmaster 36.95	On Line 42.95			Ultima IV 36.95	Hardball 24.95	Prissa 25.95
Print Shop 37.95	Organize 62.95			Ultima IV 36.95	Hardball 24.95	Printmaster Plus 21.95
P.S. Companion 31.95	Page Setar 89.95			Ultima IV 36.95	Hardball 24.95	Printshop 28.95
Radio Baseball 25.95	Pawn 29.95			Ultima IV 36.95	Hardball 24.95	P.S. Companion 22.95
Roadwar 2000 25.95	Phantasia 25.95			Ultima IV 36.95	Hardball 24.95	Printshop 22.95
Seven Cities of Gold 10.95	Print Master Plus 31.95			Ultima IV 36.95	Hardball 24.95	Starjumper 25.95
Shanghai 22.95	Publisher 119.95			Ultima IV 36.95	Hardball 24.95	ST. Sports Baseball 24.95
Silent Service 21.95	Scribble 62.95			Ultima IV 36.95	Hardball 24.95	ST. Sports Basketball 24.95
Space Quest 31.95	S.D.I. 32.95			Ultima IV 36.95	Hardball 24.95	Super Bike Challenge 18.95
Starflight 32.95	Shanghai 25.95			Ultima IV 36.95	Hardball 24.95	Super Pak 2/4 59.95
Sub Battle 25.95	Silent Service 25.95			Ultima IV 36.95	Hardball 24.95	Super Star Hockey 22.95
Super Star Hockey 25.95	Smoed 32.95			Ultima IV 36.95	Hardball 24.95	Swiftrac/Sideways 25.95
Tag Team Wrestling 25.95	Skyfox 26.95			Ultima IV 36.95	Hardball 24.95	Sub Battle 22.95
Tenth Frame 29.95	Sonic 54.95			Ultima IV 36.95	Hardball 24.95	The Gauntlet 22.95
Two on Two Basketball 25.95	Starjumper 29.95			Ultima IV 36.95	Hardball 24.95	Top Fuel Eliminator 18.95
Universa II 47.95	Superbase Personal 89.95			Ultima IV 36.95	Hardball 24.95	Ultima 1 25.95
Where in the U.S.A. is Carmen Sandiego 29.95	Tass Times 25.95			Ultima IV 36.95	Hardball 24.95	War In S. Pacific 39.95
Where in the World is Carmen Sandiego 25.95	Two on Two Basketball 29.95			Ultima IV 36.95	Hardball 24.95	Worntester 3 32.95
World Tour Golf 32.95	VIP Professional 169.95			Ultima IV 36.95	Hardball 24.95	World Class Laser 25.95
	Wintar Games 25.95			Ultima IV 36.95	Hardball 24.95	World Tour Golf 22.95

SINCE 1982 ComputAbility Consumer Electronics

P.O. BOX 17882, MILWAUKEE, WI 53217

ORDER LINES OPEN

Mon-Fri 9am-9pm CST Sat 11am-5pm

To Order Call Toll Free

800-558-0003

For Technical info, Order Inquiries, or for Wisc. Orders

414-357-8181

TELEX NUMBER 9102406440

(ANSERBACK-COMPUT MILW UQ)



No surcharge for Mastercard or Visa

ORDERING INFORMATION: Please specify system. For fast delivery send cashier's check or money order. Personal and company checks allow 14 business days to clear. School PO's welcome. C.O.D. charges are \$3.00. In Continental U.S. include \$3.00 for software orders. 5% shipping for hardware. minimum \$5.00. MasterCard and Visa orders please include card # expiration date and signature. WI residents please include 5% sales tax. HI, AK, FPO, APO, Puerto Rico and Canadian orders, please add 6% shipping. minimum \$6.00. All other foreign orders add 15% shipping. minimum \$15.00. All orders shipped outside the Continental U.S. are shipped first class insured U.S. mail. If foreign shipping charges exceed the minimum amount, you will be charged the additional amount to get your package to you quickly and safely. All goods are new and include factory warranty. Due to our low prices all sales are final. All defective returns must have a return authorization number. Please call (414) 357-8181 to obtain an R.A. or your return will not be accepted. Prices and availability subject to change without notice.

MONTGOMERY GRANT

115 Nassau St. NY, NY, 10038 Bet. Beekman & Ann Sts. (212) 732-4500 Open Mon-Fri, 8:30-6:30/Sat, 9:30-6:30/Sun, 9:30-6

Penn. Station, Amtrack Level Beneath Madison Sq. Garden, NY, NY. (212) 594-7140 Open Mon-Wed, 8:30-8/Thurs & Fri, 8:30-9/Sat & Sun, 10-7

FOR ORDER & INFORMATION CALL TOLL FREE **1(800)345-7058**

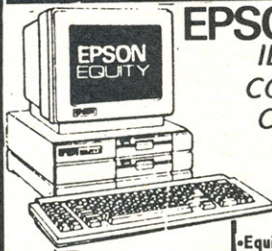
IN N.Y.S. CALL (212) 732-4500

FOR CUSTOMER SERVICE CALL (718) 965-8686

ALL COMPUTERS & PERIPHERALS COME COMPLETE WITH AC ADAPTOR, OWNER'S MANUAL AND ALL CONNECTING CABLES.

OPEN SEVEN DAYS A WEEK FOR ORDERS

ALL MERCHANDISE IS BRAND NEW AND FACTORY FRESH. COMPLETE WITH MFR. U.S.A. WARRANTY.



EPSON EQUITY IBM PC/XT COMPATIBLE COMPUTER PKGS.

EQUITY II PACKAGE

• Equity II Computer • 640K RAM Power • 360K Drive • 10MHz • 12" High Res. Monitor • Serial/Parallel Ports

\$849⁹⁵

EQUITY II PKG. w/1 360K DRIVE & 1 20MB HARD DRIVE.....\$1099

EQUITY I+ PACKAGE
• 640K RAM • Two 360K Drives • Serial/Parallel Ports • Clock Calendar Keyboard • 12" Monitor

\$799⁹⁵

IBM COMPUTER PACKAGES

IBM XT HARD DRIVE PACKAGE

• IBM XT Computer • IBM Keyboard • 256K RAM Expandable to 640K • 360K Disk Drive • 20MB Hard Drive • Monitor Optional • Package of 10 Diskettes

\$1499⁹⁵

IBM XT PKG w/2 FLOPPY DRIVES..\$1199



IBM PERSONAL SYSTEM II PACKAGE

MODEL 30

• IBM Computer • Two 720K Drives • 640K RAM • Built-in Graphics • Serial and Parallel Ports • 12" Monitor

\$1299⁹⁵

IBM PERSONAL SYSTEM II MODEL 50.....\$2599

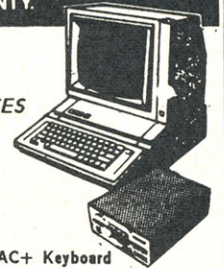


COMPUTER PACKAGES FOR APPLE IIC APPLE IIE APPLE MAC PLUS APPLE IIGS

Apple IIC, IIE, IIGS, or MAC+ Keyboard 5.25" Disk Drive • 12" Monitor • Package of 10 Diskettes • AC Adaptors • All Hook-up Cables

APPLE IIC PACKAGE **\$649** | APPLE IIE PACKAGE **\$869** | APPLE IIGS PACKAGE **\$1095** | MACPLUS PACKAGE **\$1599**

IMAGEWRITER II PRINTER.....\$449
APPLEWORKER SOFTWARE.....\$69.95



PRINTERS

EPSON FX-86 \$309.95
EPSON FX-286E \$429.95
EPSON LQ-800 \$429.95
EPSON LQ-1000 \$559.95
EPSON EX-1000 \$489.95
PANASONIC 1091 I \$189.95
PANASONIC 1092 \$289.95

HP LASERJET SERIES II \$1695.95
STAR NB24-10 \$399.95
STAR NB24-15 \$559.95
STAR NB-15 \$759.95
OKIDATA 120 \$199.95
OKIMATE 20 \$139.95

NEC MULTISPEED \$1325
TOSHIBA 3100 \$2650
ZENITH 181 \$1639

20MB SEAGATE Hard Drive w/Controller \$299⁹⁵
30MB IN STOCK

LAPTOPS



BLUE CHIP IBM PC/XT COMPAT. PRINTER PKG.

• Blue Chip Keyboard • 512K Expandable to 640K • Brother 80 Col. Printer • 6 Expansion Slots • Optional 20MB Hard Drive • All Hook-up Cables & Adaptors • Package of 10 Diskettes • 12" Monitor

SPECIAL **\$529⁹⁵**

Commodore PC10-1 PACKAGE IBM PC/XT Compatible

• PC10-1 Computer • 512K Expandable to 640K • 360K Disk Drive • Enhanced Keyboard • Serial & Parallel Ports • 12" Monitor • All Hook-up Cables & Adaptors • 10 Diskettes

\$499⁹⁵

PC10-2 640K Computer w/2 360K Floppy Drives **\$599⁹⁵**



Commodore AMIGA 500 WE WILL BEAT ANY PRICE!

• 68000 Processor • 512K Ram Expandable to 9MB
AMIGA 1010 DISK DRIVE
AMIGA 1020 DISK DRIVE
AMIGA 501 - 512K EXPANSION
AMIGA 1080 RGB COLOR MONITOR
THESE AND ALL OTHER PERIPHERALS IN STOCK

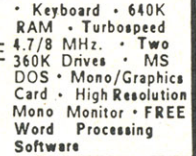
AMIGA 1000 w/512K RAM & Built-in 3.5" Disk Drive **\$699**



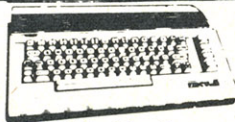
IBM PC/XT COMPATIBLE PACKAGE

• Keyboard • 640K RAM • TurboSpeed 4.78 MHz • Two 360K Drives • MS DOS • Mono/Graphics Card • High Resolution Mono Monitor • FREE Word Processing Software

\$699⁹⁵



commodore



COMMODORE 64-C PERSONAL COMPUTER **144⁹⁵**
COMMODORE 128 PERSONAL COMPUTER **219⁹⁵**
COMMODORE MPS-1200 Computer Printer **219⁹⁵**
COMMODORE MPS-803C Computer Printer **129⁹⁵**
COMMODORE MPS-1000 Computer Printer **199⁹⁵**
COMMODORE 128 D w/Built-in Disk Drive **439⁹⁵**

COMPUTER PACKAGES Get it all together & save!

COMPLETE PACKAGE

• Commodore 64 Computer
• Commodore 1541 Disk Drive
• Commodore Color Printer
• 12" Monitor

\$369⁹⁵

COMPLETE PACKAGE

• Commodore 128 Computer
• Commodore 1541 Disk Drive
• 12" Monitor
• Commodore Color Printer

\$469⁹⁵

To substitute 1571 for 1541 add **\$60**

COLOR PACKAGE

• Commodore 64C Computer
• Commodore 1541C Disk Drive
• Commodore Color Printer
• Color Monitor
With Geos Program!

\$509⁹⁵

20MB HARD DRIVES FOR 64C.....\$769

DELUXE PACKAGE

• Commodore 128 Computer
• Commodore 1571 Disk Drive
• Commodore 1902 Color Monitor
• Commodore 80 Column Printer

\$729⁹⁵

20MB HARD DRIVES FOR C-128.....\$849

commodore

COMMODORE 1541C NEW Disk Drive **149⁹⁵**
COMMODORE 1571 Computer Disk Drive **214⁹⁵**
COMMODORE 1902 80 Column RGB Color Monitor **229⁹⁵**
COMMODORE 1802 Color Computer Monitor **169⁹⁵**
COMMODORE "MAGIC VOICE" Module **49⁹⁵**
COMMODORE 1700 - 128K Expansion Module **99⁹⁵**
COMMODORE 1750 - 512K Expansion Module **169⁹⁵**
COMMODORE 1670 Automodem **129⁹⁵**
COMMODORE 1764 Expansion Module **Call**



WE INVITE CORPORATE & EDUCATIONAL CUSTOMERS

Certified check, Bank check, Mastercard, Visa, Am-Ex, Diner's Club, Carte-Blanche, Discover Card and C.O.D.s accepted. No additional surcharge for credit card orders. Non-certified checks must wait 4-6 weeks clearance. Money orders are non-certified checks. N.Y. residents add applicable sales tax. Prices and availability subject to change without notice—so call before placing your order. Not responsible for typographic errors. Return of defective merchandise must have prior return authorization number, or returns will not be accepted. IBM PC/XT are registered trademarks of International Business Machine Corp. All orders can be shipped Air Express—call for details.

CAPUTE!

Atari Marbles

A printing problem obliterated a character in line 1580 of the Atari version of this game from the October issue (Program 1, p. 40). The line should read as follows:

```
1580 ML=USR(ADR(MOVE$), 57344,
      CHSET, 1024)
```

Monte Carlo

All versions of this game program from the September issue (p. 30) are correct as listed, except for a minor problem in the Amiga version. The copyright message in the first line of Program 4 should begin with an apostrophe ('), which Amiga Basic accepts as a substitute for the REM statement.

Reader Joseph Meany has provided an enhancement to the Commodore version (Program 1) which allows the game to be played with a joystick in addition to the keyboard. If you are interested in this modification, add or

change the following lines:

```
840 GET A$:J=PEEK(56320):IF(A$
  ="" ANDJ=127) THEN 840
842 J=-13*(J=111)-145*(J=126)-
  17*(J=125)-157*(J=123)-29*(
  J=119)
844 IF A$="" THEN A$=CHR$(J)
846 FOR DE=1 TO 100:NEXT DE
```

With these changes, you can use a joystick in port 2 to move the card cursor. Press the fire button to select a card. You must still use the keyboard to enter other commands.

BASIC Batch Files With Atari DOS

The article with this handy utility from the August issue (p. 81) suggested that batch files could be used to load and run BASIC programs. However, reader Justin E. Wilder discovered a problem with this technique. A BASIC program started from a batch file will crash with an ERROR 133 message if it contains

any INPUT statements. This occurs because the the IOCB channel value in location 180 is left set to 7, the batch-file channel. The solution is to add a POKE 180,0 command to the batch file to reset the system for the default channel (the screen editor). To work properly, the POKE must appear on the same line as the LOAD or RUN command, and on the last line of the batch file (once the POKE is executed, no more lines will be read from the disk). For example, the proper batch-file line to automatically load and run a BASIC program named GAME.BAS would be POKE 180,0:RUN "D:GAME.BAS"

IBM QuickChange

This memory-resident screen color selection program from the September issue (p. 82) will not work on the IBM PCjr. ©

COMPUTER PRICE BLOWOUT!!

FOR MAIL ORDERS ONLY! CALL TOLL FREE 1-800-234-5888

COMPUTER WORLD

ASTORIA
4017 Broadway East Of
Steinway St. Corner
FOR INFO: 718-726-8118
MON.-FRI. 10:30-7/CLOSED SAT./SUN. 11-6

GREAT NECK
5820 Middle Neck Road
FOR INFO: 516-829-2188
MON.-FRI. 11-7/CLOSED SAT./SUN. 11-5

EPSON EQUITY II PACKAGE

IBM PC/XT COMPATIBLE

\$549

- Equity II Computer
- 360K Disk Drive
- Serial and Parallel Ports
- 640K Ram Power
- 12" High Resolution Monitor

BLUE CHIP

IBM PC/XT COMPATIBLE PACKAGE

\$535

- Blue Chip Keyboard
- 512K Expandable To 640K
- 6 Expansion Slots Optional 20MB Hard Drive
- All Hook-Up Cables & Adaptors
- Package Of 10 Diskettes
- 12" Monitor

IBM TURBO

IBM PC/XT COMPATIBLE

\$749

- 640K • 2 Drive / 360K • 8088 / 2 CPU
- 4.77 8 MHZ • 12" High Resolution Monitor
- MS-DOS Mono Graphic Card

AUTHORIZED DEALER FOR MOST MAJOR BRANDS

COMMODORE

PC10-2 IBM PC/XT COMPATIBLE

CALL FOR PRICE

- PC10-2 Computer
- Disk Drive
- Enhanced Keyboard
- Serial & Parallel Ports
- All Hook-Up Cables & Adaptors
- 640K
- Duel 360K
- All Diskettes
- 12" Monitor

II GS PACKAGE

- Apple II GS Computer
- 5.25" Disk Drive
- 12" Monitor
- Package Of 10 Diskettes
- AC Adaptors
- All Hook-Up Cables

\$1049

MODEMS IN STOCK!

• IBM

• COMMODORE

EXPANSION MODELS AVAILABLE!

Call For Low Prices!!

FULL LINE OF IBM COMPATIBLES!!

Call For Lowest Prices!!

COMMODORE

NEW!! 500 AMIGA 512K SYSTEM

WE'LL BEAT ANY PRICE!!!

- 512K Computer
- W/Build-In Disk Drive & 1080 Color Monitor
- Including Software

AMIGA 2000.....CALL

ATARI 520 COLOR..CALL

C 64 COMPLETE PACKAGE

- Commodore 64 Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer 12" Monitor

\$349.00

C 64C COLOR PACKAGE

- Commodore 64C Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer
- Color Monitor With GEOS Program

\$449.00

SOFTWARE

- F15 \$12.95
- Pitstop \$12.95
- Pitfall \$8.95
- Championship Baseball \$19.95

WE CARRY A FULL LINE OF COMMODORE SOFTWARE

COMMODORE 128D

NEW! WE'LL BEAT ANY PRICE!

C 128 COMPLETE PACKAGE

- Commodore 128 Computer
- Commodore 1541 Disk Drive
- 12" Monitor
- Commodore Color Printer

\$499.00

C 128 DELUXE PACKAGE

- Commodore 128 Computer
- Commodore 1571 Disk Drive
- Commodore 1902 Color Monitor
- Commodore 80 Column Printer

\$699.00

COMMODORE

- Commodore 1541C New!!
- Disk Drive \$159
- Commodore 1571 Computer
- Disk Drive \$205
- Commodore 1902 80 Column RGB Color Monitor.... \$225

•Expansion Modules Available•

COMMODORE C-1802 COLOR MONITOR \$175

ALL COMPUTERS & PERIPHERALS COME COMPLETE W/AC ADAPTOR, OWNER'S MANUAL AND ALL CONNECTING CABLES.

Mastercard, Visa, American Express, Diner's Club, Carte Blanche, Discover Card, Certified And Bank Checks Welcome. C.O.D.'s Accepted Upon Approval. No Additional Surcharge For Credit Card Orders. Non-Certified Checks & Money Orders Must Wait For Clearance. N.Y. Residents Add Applicable Sales Tax. We Are Not Responsible For Typographical Errors. Prices And Availability Are Subject To Change Without Notice. To Return Defective Merchandise Call For Authorization Number. IBM PC/XT Are Registered Trademarks Of International Business Machine Corp. All Orders Can Be Shipped Air Express.

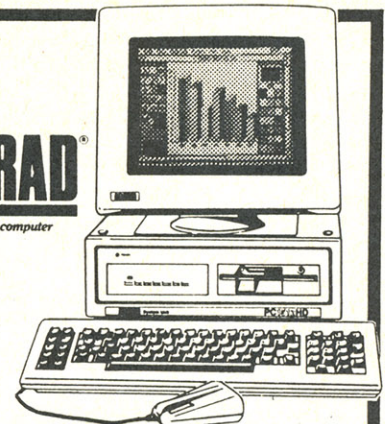
STation

The one Stop shop
ORDERS ONLY
CALL TOLL FREE
1-800-CALL TRU
(1-800-225-5878)
10AM - 6PM E.S.T.
ORDER STATUS, INFORMATION, R.A.'s
CALL 1-313-595-0788

\$699 mono. Call for pricing on other models.
\$500 FREE Software!

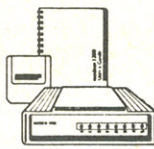
- "Mouse" with window software
- Digital Research, Inc.'s GEMdesktop, GEMpaint, DOSPLUS, Basic2
- MSDOS V3.2
- 512K Memory, IBM®-compatible
- Paper white monochrome monitor (16 grey levels)
- Optional RGB color monitors (16 colors)
- Tilt and Swivel monitor stand
- PC-XT-style keyboard
- Joystick port
- Speaker with volume control
- Serial and Parallel ports
- 3 PC-compatible, full-size expansion slots
- Quartz Real time clock
- 16 bit 8086 processor (8 MHz)
- 360KB double-sided Floppy drive
- Optional Second Floppy drive or 20MB hard drive
- User manuals
- CP/M-86 Software compatibility
- CGA enhanced color graphics software
- Expandable to work in network environment for multi-tasking.

AMSTRAD
The "Family-friendly" computer



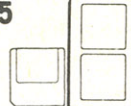
1200 BAUD MODEM KIT
Access Bulletin Boards & Information Services
All Just \$119

- Avatex 1200 HC
- ST or PC Software
- Compuserve Starter Kit
- RS-232 Cable M-F CALL FOR 2400 BAUD KIT PRICING
- Phone Cord



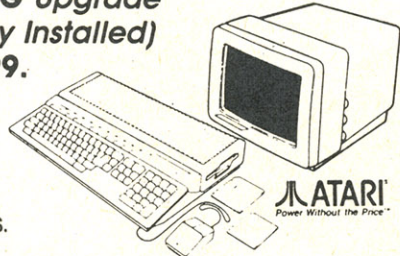
Super Special Seagate
PC-XT HARD DRIVE KIT
\$299 20 MEG
Complete with:
Western Digital Controller and Mounting Hardware

3 1/2" Continuous Label Kit
• 500 3 1/2" Disk Labels
• FREE Label Program
• Automatically Reads Disk and Makes Labels
• Create Database
\$9.95



THE NEW 520ST FM \$489
Mono
WITH BUILT IN DRIVE

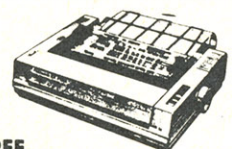
With 1 MEG Upgrade (Already Installed) Add \$99.
Call for pricing on other models.



BONUS! FREE STARTER KIT
• Monitor Riser
• 3 1/2" Label Kit
• Dust Cover
• 3 1/2" Disk Head Cleaner
\$50 VALUE

Panasonic Dot Matrix Printer
KXP-1080I \$179.00
KXP-1091I \$199.00

- Print speed (cps) KXP-1080I Draft 142
- Print speed (cps) KXP-1091I Draft 192



FREE STARTER KIT
• \$68.00 value
• IBM-ST cable
• 200 pack paper
• Heavy duty metal printer stand
• Vinyl dust cover



BULK 3 1/2 DISKS
\$.99 SS DD QTY. 25
\$ 1.29 DS DD QTY. 25

ST HARDWARE	
Atari 1040ST	CALL
Atari 314 Drive	199.00
Atari 354 Drive	139.00
Atari SC1224 Color Monitor	299.00
Atari SH204 Hard Drive	549.00
Atari SM124 Mono Monitor	139.00
Supra 20 Meg Hard Drive	559.00
Upgrade, E-Z Ram	159.00
Z-Time 1040	49.95
Z-Time 520	39.95
PRINTERS	
Okimate 20w Plug-N-Print	198.00
Panasonic KX-PI080I	179.00
Panasonic KX-PI091I	199.00
Panasonic KX-PI092I	309.00
Panasonic KX-PI592	399.00
Panasonic KX-PI595	435.00
Panasonic KX-P3151	409.00
Panasonic KX-P3131	299.00
DUST COVERS	
1040 ST	9.95
Gemini 10	6.95
IBM PC Keyboard	6.95
IBM PC System	23.95
Panasonic 1080 90 91	6.95
SF 314	5.95
SF 354	5.95
SM 1224	11.95
SM 124	11.95
CABLES, INTERFACES	
AB Switch Box Parallel	39.95
AB Switch Box RS-232	39.95
AB-X Crossover Box Par	49.95
IBM ST Printer Cable 10'	9.95

IBM ST Printer Cable 6'	6.95
Microstuffer	59.95
RS-232 FF 6'	9.95
RS-232 MF 10'	12.95
RS-232 MF 6'	9.95
RS-232 MM 6'	9.95
ST Drive Cable 6'	14.95
ACCESSORIES	
14" Twist-N-Tilt	14.95
5.25" Disk Notcher	7.95
Amaray Printer Stand	14.95
Mouse House	4.95
Mouse Mat	7.95
Printer Stand 2-Pc.	12.95
Six Outlet Surge Strip	12.95
Disk File 40 - 3.5"	6.99
Disk File 60 - 5.25"	6.99
Library Case - 3 (5.25")	.99
Library Case - 5 (3.5")	.99
Pocket Pack (3.5")	14.99
DISKETTES	
Bulk 3.5" SS DD	.99
Bulk 3.5" DS DD	1.29
Bulk 5.25" DS DD	.39
Maxell 3.5" SS DD	14.95
Maxell 3.5" DS DD	22.95
Maxell 5.25" SS DD	10.95
Maxell 5.25" DS DD	11.95
Maxell 5.25" DS HD	23.95
Sony 3.5" SS DD	14.95
Sony 3.5" DS DD	22.95
Sony 5.25" SS DD	8.95
Sony 5.25" DS DD	9.95
Sony 5.25" DS HD	22.95
RIBBONS	
Epson FX MX RX-80	5.99

IBM Proprinter	9.95
Panasonic 1080 90i	9.99
Star Okidata	2.99
XMM 801 Legend BMC	7.99
SMM 804	7.99
THOMSON MONITORS	
4160 CGA Color	339.00
450A Monochrome-132CLM	159.00
4350 EGA Dual Scan	469.00
4375M Ultra Scan	629.00
TTL Monitor	119.00
CONTROLLERS	
Atari Economy	4.95
Epyx 500XJ	14.95
Replacement Mouse (ST)	49.95
Tac 2	8.95
TAC-10 IBM & Apple	27.95
Wico 3-Way	23.95
Wico Boss	12.95
IBM HARDWARE	
PC-XT	
1200 Baud Internal Modem	119.00
C.G.V. Card	59.95
DS/DD 1/2 Hl 360k Drive	89.95
I/O Plus II Card	79.95
Monographics Card	79.95
Printer Card	29.95
RS-232 Card	38.95
IBM & ATARI SOFTWARE	
Access	
10th Frame	26.95
Accolade	
Hardball	26.95
Mean 18	CALL
Activision	
GFL Champ FB.	26.95
Music Studio	34.95

Shanghai	25.95
Tass Times	25.95
Batteries Included	
D E G A S ST	26.95
D E G A S Elite	54.95
Thunder	26.95
Time Link	33.95
Broderbund	
Printshop	29.95
PS Graphic 1-2-3	22.95
DAC	
DAC Easy Actcing	47.95
DAC Payroll	34.95
Electronic Arts	
Autoduel (ST)	34.95
Chessmaster 2000	27.95
Ogre	26.95
Skyfox	31.95
Starfleet 1 & 2	34.95
Winnie The Pooh	17.95
Epyx	
Champ Wrestling	26.95
Sub Battle Simulat	26.95
Temple Apshai Tril	12.95
Winter Games	26.95
World Games	26.95
Firebird	
Guild of Thieves	29.95
Pawn (ST)	29.95
Star Glider	29.95
Infocom	
Bureaucracy	26.95
Hitchhikers Guide	19.95
Hollywood Hijinks	26.95
Leather Goddess	26.95
Moonmist	26.95
Zork Tri	46.95

Lotus	
Lotus 1-2-3 (IBM)	CALL
MWC	
Mark Williams C (ST)	125.00
Mastertronic	
Ninja	12.95
Microprose	
F-15 Strike Eagle	24.95
Silent Service	24.95
Mindscope	
Balance of Power	33.95
Defender of Crown	33.95
High Roller (ST)	33.95
S.D.I. (ST)	33.95
Infiltrator	19.95
Superstar Hockey	26.95
Sierra	
3D Helicopter	33.95
Black Cauldron	26.95
Kings Quest 1 & 3	33.95
Space Quest	33.95
Springboard	
Certificate Maker	39.95
Clip Art	CALL
Sublogic	
Flight Simulator II	33.95
Jet	33.95
Scenery Disks	19.95
Timeworks	
Data Manager ST	54.95
Data Manager PC	39.95
Swiftcalc ST	54.95
Swiftcalc PC	39.95
Wordwriter ST	54.95
Wordwriter PC	39.95
Work Perfect	CALL

No surcharge for MasterCard or Visa

All orders are considered verbal contracts and adhere to all laws as set by the Federal Trade Commission. All order cancellations will be charged 5%. **Ordering Information: Credit Card** - Have number, expiration date, shipping address and DAY phone number ready with order. **Personal and company checks:** Call order in - you will receive an order number. Send order to P.O. Box listed. **Shipping:** Continental USA - All Orders add 3%, minimum \$3.00. HI, AK, Canada add 5%, minimum \$5.00. All other order areas add 15%, minimum \$10.00. No C.O.D.'s over \$100.00, add an additional \$3.00 shipping charge for C.O.D. All areas not serviced by U.P.S. will be shipped first class insured mail. All shipping charges in excess of the above items will be added. All orders are shipped on a first come first served basis and are usually shipped immediately. Please allow 2-3 weeks delivery time. All goods are new and include factory warranty. **All defectives must have a return authorization number.** Please call (313) 595-0788 to obtain an R.A.# or return will not be accepted. Prices and availability subject to change without notice. All correspondence should be sent to P.O. Box 75 - Wayne, MI 48184. *SATISFACTION REFUND - IS LESS SHIPPING & HANDLING - Call for Details.

Not responsible for typographical errors.

COMPUTE!'s Guide To Typing In Programs

Computers are precise—type the program *exactly* as listed, including necessary punctuation and symbols, except for special characters noted below. We have provided a special listing convention as well as a program to check your typing—"The Automatic Proofreader."

Programs for the IBM, TI-99/4A, and Atari ST models should be typed exactly as listed; no special characters are used. Programs for Commodore, Apple, and Atari 400/800/XL/XE computers may contain some hard-to-read special characters, so we have a listing system that indicates these control characters. You will find these Commodore and Atari characters in curly braces; *do not type the braces*. For example, {CLEAR} or {CLR} instructs you to insert the symbol which clears the screen on the Atari or Commodore machines. A complete list of these symbols is shown in the tables below. For Commodore, Apple, and Atari, a single symbol by itself within curly braces is usually a control key or graphics key. If you see {A}, hold down the CONTROL key and press A. This will produce a reverse video character on the Commodore (in quote mode), a graphics character on the Atari, and an invisible control character on the Apple.

Graphics characters entered with the Commodore logo key are enclosed in a special bracket: [<A>]. In this case, you would hold down the Commodore logo key as you type A. Our Commodore listings are in uppercase, so shifted symbols are underlined>. A graphics heart symbol (SHIFT-S) would be listed as S. One exception is {SHIFT-SPACE}. When you see this, hold down SHIFT and press the space bar. If a number precedes a symbol, such as {5 RIGHT}, {6 S}, or {<8 Q>}, you would enter five cursor rights, six shifted S's, or eight Commodore-Q's. On the Atari, inverse characters (white on black) should be entered with the inverse video

Atari 400/800/XL/XE

When you see	Type	See	
{CLEAR}	ESC SHIFT <	↵	Clear Screen
{UP}	ESC CTRL -	↑	Cursor Up
{DOWN}	ESC CTRL =	↓	Cursor Down
{LEFT}	ESC CTRL +	←	Cursor Left
{RIGHT}	ESC CTRL *	→	Cursor Right
{BACK S}	ESC DELETE	⌫	Backspace
{DELETE}	ESC CTRL DELETE	⌫	Delete character
{INSERT}	ESC CTRL INSERT	⌵	Insert character
{DEL LINE}	ESC SHIFT DELETE	⌫	Delete line
{INS LINE}	ESC SHIFT INSERT	⌵	Insert line
{TAB}	ESC TAB	␣	TAB key
{CLR TAB}	ESC CTRL TAB	⌫	Clear tab
{SET TAB}	ESC SHIFT TAB	⌵	Set tab stop
{BELL}	ESC CTRL 2	🔔	Ring buzzer
{ESC}	ESC ESC	⌫	ESCape key

Commodore PET/CBM/VIC/64/128/16/+4

When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME	⌫	⌫ 1	COMMODORE 1	⌫
{HOME}	CLR/HOME	⌵	⌫ 2	COMMODORE 2	⌵
{UP}	SHIFT ↑ CRSR ↓	⬆	⌫ 3	COMMODORE 3	⬆
{DOWN}	↑ CRSR ↓	⬇	⌫ 4	COMMODORE 4	⬇
{LEFT}	SHIFT ← CRSR →	⬅	⌫ 5	COMMODORE 5	⬅
{RIGHT}	← CRSR →	➡	⌫ 6	COMMODORE 6	➡
{RVS}	CTRL 9	⌛	⌫ 7	COMMODORE 7	⌛
{OFF}	CTRL 0	⬛	⌫ 8	COMMODORE 8	⬛
{BLK}	CTRL 1	⬛	{ F1 }	f1	⬛
{WHT}	CTRL 2	⬜	{ F2 }	SHIFT f1	⬜
{RED}	CTRL 3	⬜	{ F3 }	f3	⬜
{CYN}	CTRL 4	⬜	{ F4 }	SHIFT f3	⬜
{PUR}	CTRL 5	⬜	{ F5 }	f5	⬜
{GRN}	CTRL 6	⬜	{ F6 }	SHIFT f5	⬜
{BLU}	CTRL 7	⬜	{ F7 }	f7	⬜
{YEL}	CTRL 8	⬜	{ F8 }	SHIFT f7	⬜
			←	←	⬛

key (Atari logo key on 400/800 models).

Whenever more than two spaces appear in a row, they are listed in a special format. For example, {6 SPACES} means press the space bar six times. Our Commodore listings never leave a single space at the end of a line, instead moving it to the next printed line as {SPACE}.

Amiga program listings contain only one special character, the left arrow (←) symbol. This character marks the end of each program line. Wherever you see a left arrow, press RETURN or move the cursor off the line to enter that line into memory. Don't try to type in the left arrow symbol; it's there only as a marker to indicate where each program line ends.

The Automatic Proofreader

Type in the appropriate program listed below, then save it for future use. The Commodore Proofreader works on the Commodore 128, 64, Plus/4, 16, and VIC-20. Don't omit any lines, even if they contain unfamiliar commands or you think they don't apply to your computer. When you run the program, it installs a machine language program in memory and erases its BASIC portion automatically (so be sure to save several copies before running the program for the first time). If you're using a Commodore 128, Plus/4 or 16, do not use any GRAPHIC commands while the Proofreader is active. You should disable the Commodore Proofreader before running any other program. To do this, either turn the computer off and on or enter SYS 64738 (for the 64), SYS 65341 (128), SYS 64802 (VIC-20), or SYS 65526 (Plus/4 or 16). To reenoble the Proofreader, reload the program and run it as usual. Unlike the original VIC/64 Proofreader, this version works the same with disk or tape.

On the Atari, run the Proofreader to activate it (the Proofreader remains active in memory as a machine language program); you must then enter NEW to erase the BASIC loader. Pressing SYSTEM RESET deactivates the Atari Proofreader; enter PRINT USR(1536) to reenoble it.

The Apple Proofreader erases the BASIC portion of itself after you run it, leaving only the machine language portion in memory. It works with either DOS 3.3 or ProDOS. Disable the Apple Proofreader by pressing CTRL-RESET before running another BASIC program.

The IBM Proofreader is a BASIC program that simulates the IBM BASIC line editor, letting you enter, edit, list, save, and load programs that you type. Type RUN to activate. Be sure to leave Caps Lock on, except when typing lowercase characters.

Once the Proofreader is active, try typing in a line. As soon as you press RETURN, either a hexadecimal number (on the Apple) or a pair of letters (on the Commodore, Atari, or IBM) appears. The number or pair of letters is called a *checksum*.

Compare the value displayed on the screen by the Proofreader with the checksum printed in the program listing in the magazine. The checksum is given to the left of each line number. Just type in the program a line at a time (without the printed checksum), press RETURN or Enter, and compare the checksums. If they match, go on to the next line. If not, check your typing; you've made a mistake. Because of the checksum method used, do not type abbreviations, such as ? for PRINT. On the Atari and Apple Proofreaders, spaces are not counted as part of the checksum, so be sure you type the right number of spaces between quote marks. The Atari Proofreader does not check to see that you've typed the characters in the right order, so if characters are transposed, the checksum still matches the listing. The Commodore Proofreader catches transposition errors and ignores spaces unless they're enclosed in quotation marks. The IBM Proofreader detects errors in spacing and transposition.

IBM Proofreader Commands

Since the IBM Proofreader replaces the computer's normal BASIC line editor, it has to include many of the direct-mode IBM BASIC commands. The syntax is identical to IBM BASIC. Commands simulated are LIST, LLIST, NEW, FILES, SAVE, and LOAD. When listing your program, press any key (except Ctrl-Break) to stop the listing. If you enter NEW, the Proofreader prompts you to press Y to be especially sure you mean yes.

Two new commands are BASIC and CHECK. BASIC exits the Proofreader back to IBM BASIC, leaving the Proofreader in memory. CHECK works just like LIST, but shows the checksums along with the listing. After you have typed in a program, save it to disk. Then exit the Proofreader with the BASIC command, and load the program as usual (this replaces the Proofreader in memory). You can now run the program, but you may want to re-save it to disk. This will shorten it on disk and make it load faster, but it can no longer be edited with the Proofreader. If you want to convert an existing BASIC program to Proofreader format, save it to disk with SAVE "filename",A.

Program 1: Atari Proofreader

By Charles Brannon

```
100 GRAPHICS 0
110 FOR I=1536 TO 1700:READ
A:A=POKE I,A:CK=CK+A:N
EXT I
120 IF CK<>19072 THEN ? "E
rror in DATA Statement
s. Check Typing.":END

130 A=USR(1536)
140 ? :? "Automatic Proofr
eader Now Activated."
150 END
160 DATA 104,160,0,185,26,
3,201,69,240,7
170 DATA 200,200,192,34,20
8,243,96,200,169,74
180 DATA 153,26,3,200,169,
6,153,26,3,162
190 DATA 0,189,0,228,157,7
4,6,232,224,16
200 DATA 208,245,169,93,14
1,78,6,169,6,141
210 DATA 79,6,24,173,4,228
,105,1,141,95
220 DATA 6,173,5,228,105,0
,141,96,6,169
230 DATA 0,133,203,96,247,
238,125,241,93,6
240 DATA 244,241,115,241,1
24,241,76,205,238
250 DATA 0,0,0,0,0,32,62,2
46,8,201
260 DATA 155,240,13,201,32
,240,7,72,24,101
270 DATA 203,133,203,104,4
0,96,72,152,72,138
280 DATA 72,160,0,169,128,
145,88,200,192,40
290 DATA 208,249,165,203,7
4,74,74,74,24,105
300 DATA 161,160,3,145,88,
165,203,41,15,24
310 DATA 105,161,200,145,8
8,169,0,133,203,104
320 DATA 170,104,168,104,4
0,96
```

Program 2: IBM Proofreader

By Charles Brannon

```
10 Automatic Proofreader Vers
ion 3.0 (Lines 205,206 adde
d/190 deleted/470,490 chang
ed from V2.0)
100 DIM L$(500),LNUM(500):COLO
R 0,7,7:KEY OFF:CLS:MAX=0:
LNUM(0)=65536!
110 ON ERROR GOTO 120:KEY 15,C
HR$(4)+CHR$(70):ON KEY(15)
GOSUB 640:KEY (15) ON:GOT
O 130
120 RESUME 130
130 DEF SEG=&H40:W=PEEK(&H4A)
140 ON ERROR GOTO 650:PRINT:PR
INT"Proofreader Ready."
150 LINE INPUT L$:Y=CSRLIN-INT
(LEN(L$)/W)-1:LOCATE Y,1
160 DEF SEG=0:POKE 1050,30:POK
E 1052,34:POKE 1054,0:POKE
1055,79:POKE 1056,13:POKE
1057,28:LINE INPUT L$:DEF
SEG:IF L$="" THEN 150
170 IF LEFT$(L$,1)=" " THEN L$
=MID$(L$,2):GOTO 170
```

```

180 IF VAL(LEFT$(L$,2))=0 AND
MID$(L$,3,1)=" " THEN L$=M
ID$(L$,4)
200 IF ASC(L$)>57 THEN 260 'no
line number, therefore co
mmand
205 BL=INSTR(L$, " "):IF BL=0 T
HEN BL$=L$:GOTO 206 ELSE B
L$=LEFT$(L$,BL-1)
206 LNUM=VAL(BL$):TEXT$=MID$(L
$,LEN(STR$(LNUM))+1)
210 IF TEXT$="" THEN GOSUB 540
:IF LNUM=LNUM(P) THEN GOSU
B 560:GOTO 150 ELSE 150
220 CKSUM=0:FOR I=1 TO LEN(L$)
:CKSUM=(CKSUM+ASC(MID$(L$,
I)))*I AND 255:NEXT:LOCATE
Y,1:PRINT CHR$(65+CKSUM/1
6)+CHR$(65+(CKSUM AND 15))
+" "+L$
230 GOSUB 540:IF LNUM(P)=LNUM
THEN L$(P)=TEXT$:GOTO 150
'replace line
240 GOSUB 580:GOTO 150 'insert
the line
260 TEXT$="":FOR I=1 TO LEN(L$
):A=ASC(MID$(L$,I)):TEXT$=
TEXT$+CHR$(A+32*(A>96 AND
A<123)):NEXT
270 DELIMITER=INSTR(TEXT$," ")
:COMMAND$=TEXT$:ARG$="":IF
DELIMITER THEN COMMAND$=L
EFT$(TEXT$,DELIMITER-1):AR
G$=MID$(TEXT$,DELIMITER+1)
ELSE DELIMITER=INSTR(TEXT
$,CHR$(34)):IF DELIMITER T
HEN COMMAND$=LEFT$(TEXT$,D
ELIMITER-1):ARG$=MID$(TEXT
$,DELIMITER)
280 IF COMMAND$<>"LIST" THEN 4
10
290 OPEN "scrn:" FOR OUTPUT AS
#1
300 IF ARG$="" THEN FIRST=0:P=
MAX-1:GOTO 340
310 DELIMITER=INSTR(ARG$,"-"):
IF DELIMITER=0 THEN LNUM=V
AL(ARG$):GOSUB 540:FIRST=P
:GOTO 340
320 FIRST=VAL(LEFT$(ARG$,DELIM
ITER)):LAST=VAL(MID$(ARG$,
DELIMITER+1))
330 LNUM=FIRST:GOSUB 540:FIRST
=P:LNUM=LAST:GOSUB 540:IF
P=0 THEN P=MAX-1
340 FOR X=FIRST TO P:N$=MID$(S
TR$(LNUM(X)),2)+" "
350 IF CKFLAG=0 THEN A$="":GOT
O 370
360 CKSUM=0:A$=N$+L$(X):FOR I=
1 TO LEN(A$):CKSUM=(CKSUM+
ASC(MID$(A$,I)))*I AND 255
:NEXT:A$=CHR$(65+CKSUM/16)
+CHR$(65+(CKSUM AND 15))+"
"
370 PRINT #1,A$+N$+L$(X)
380 IF INKEY$<>" " THEN X=P
390 NEXT :CLOSE #1:CKFLAG=0
400 GOTO 130
410 IF COMMAND$="LLIST" THEN O
PEN "lpt1:" FOR OUTPUT AS
#1:GOTO 300
420 IF COMMAND$="CHECK" THEN C
KFLAG=1:GOTO 290
430 IF COMMAND$<>"SAVE" THEN 4
50
440 GOSUB 600:OPEN ARG$ FOR OU
TPUT AS #1:ARG$="":GOTO 30
0
450 IF COMMAND$<>"LOAD" THEN 4
90

```

```

460 GOSUB 600:OPEN ARG$ FOR IN
PUT AS #1:MAX=0:P=0
470 WHILE NOT EOF(1):LINE INPU
T #1,L$:BL=INSTR(L$," "):B
L$=LEFT$(L$,BL-1):LNUM(P)=
VAL(BL$):L$(P)=MID$(L$,LEN
(STR$(VAL(BL$)))+1):P=P+1:
WEND
480 MAX=P:CLOSE #1:GOTO 130
490 IF COMMAND$="NEW" THEN INP
UT "Erase program - Are yo
u sure";L$:IF LEFT$(L$,1)=
"y" OR LEFT$(L$,1)="Y" THE
N MAX=0:LNUM(0)=65536!:GOT
O 130:ELSE 130
500 IF COMMAND$="BASIC" THEN C
OLOR 7,0,0:ON ERROR GOTO 0
:CLS:END
510 IF COMMAND$<>"FILES" THEN
520
515 IF ARG$="" THEN ARG$="A:"
ELSE SEL=1:GOSUB 600
517 FILES ARG$:GOTO 130
520 PRINT "Syntax error":GOTO 1
30
540 P=0:WHILE LNUM>LNUM(P) AND
P<MAX:P=P+1:WEND:RETURN
560 MAX=MAX-1:FOR X=P TO MAX:L
NUM(X)=LNUM(X+1):L$(X)=L$(
X+1):NEXT:RETURN
580 MAX=MAX+1:FOR X=MAX TO P+1
STEP -1:LNUM(X)=LNUM(X-1)
:L$(X)=L$(X-1):NEXT:L$(P)=
TEXT$:LNUM(P)=LNUM:RETURN
600 IF LEFT$(ARG$,1)<>CHR$(34)
THEN 520 ELSE ARG$=MID$(A
RG$,2)
610 IF RIGHT$(ARG$,1)=CHR$(34)
THEN ARG$=LEFT$(ARG$,LEN(
ARG$)-1)
620 IF SEL=0 AND INSTR(ARG$,".
")=0 THEN ARG$=ARG$+".BAS"
630 SEL=0:RETURN
640 CLOSE #1:CKFLAG=0:PRINT "St
opped.":RETURN 150
650 PRINT "Error #";ERR:RESUME
150

```

Program 3: Commodore Proofreader

By Philip Nelson, Assistant Editor

```

10 VEC=PEEK(772)+256*PEEK(773)
:LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
R FOR ";:IF VEC=42364 THEN
{SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
C-20"
40 IF VEC=35158 THEN GRAPHIC C
LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
46:GRAPHIC CLR:PRINT "128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
E ADR,BYT:ADR=ADR+1:CHK=CHK
+BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
ERROR* CHECK TYPING IN DATA
STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
RS=SA+RF:HB=INT(RS/256):LB=
RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
*ERROR* RELOAD PROGRAM AND

```

```

{SPACE}CHECK FINAL LINE":EN
D
120 POKE SA+149,PEEK(772):POKE
SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
14,22:POKE SA+18,23:POKESA+
29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
EEK(LO)+256*PEEK(HI))-1,0:N
EW
160 DATA 120,169,73,141,4,3,16
9,3,141,5,3
170 DATA 88,96,165,20,133,167,
165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
1,199,157,227,3
190 DATA 202,16,248,169,19,32,
210,255,169,18,32
200 DATA 210,255,160,0,132,180
,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
1,34,208,8,72
220 DATA 165,176,73,255,133,17
6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
3,167,165,168,105
250 DATA 0,133,168,202,208,239
,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
85,211,3,32,210
280 DATA 255,162,31,189,227,3,
149,199,202,16,248
290 DATA 169,146,32,210,255,76
,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
116,117,151,128,129,167,136
,137

```

Program 4: Apple Proofreader

By Tim Victor, Editorial Programmer

```

10 C = 0: FOR I = 768 TO 768 +
68: READ A:C = C + A: POKE I
,A: NEXT
20 IF C < > 7258 THEN PRINT "ER
ROR IN PROOFREADER DATA STAT
EMENTS": END
30 IF PEEK(190 * 256) < > 76 T
HEN POKE 56,0: POKE 57,3: CA
LL 1002: GOTO 50
40 PRINT CHR$(4);"IN#A$300"
50 POKE 34,0: HOME = POKE 34,1:
VTAB 2: PRINT "PROOFREADER
INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96

```


MLX Machine Language Entry Program For Commodore 64

Ottis Cowper, Technical Editor

"MLX" is a labor-saving utility that allows almost fail-safe entry of Commodore 64 machine language programs.

Type in and save some copies of MLX—you'll want to use it to enter future machine language (ML) programs from COMPUTE!. When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0-9 and the letters A-F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a check-

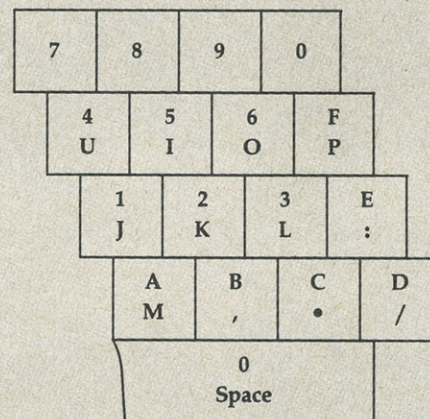
sum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing.

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

Only the numerals 0-9 and the letters A-F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, a numeric keypad is now incorporated in the listing. The keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figure below shows the keypad configuration:



MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice

versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to

restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save. Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands. Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT address, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you

can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD "filename",8 for disk or LOAD "filename" for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64. Other programs must be reloaded to specific addresses with a command such as LOAD "filename",8,1 for disk or LOAD "filename",1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to ensure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

MLX For Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
    30,950 MODIFIED, LINES 4
    85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
    I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
    4=254:Z5=255:Z6=256:Z7=
    127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
    :BS=PEEK(55)+Z6*PEEK(56)
    :H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
    :S$=" ":D$=CHR$(20):Z$=
    CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
    +23:POKE I,0:NEXT:POKE
    {SPACE}SD+24,15:POKE 78
    8,52
FC 150 PRINT "{CLR}"CHR$(142)CH
    R$(8):POKE 53280,15:POK
```

```
E 53281,15
EJ 160 PRINT T$ "{RVS}"{RVS}
    {2 SPACES}{8 0}
    {2 SPACES}"SPC(28)"
    {2 SPACES}{OFF}{BLU} ML
    X II {RED}{RVS}
    {2 SPACES}"SPC(28)"
    {12 SPACES}{BLU}"
FR 170 PRINT "{3 DOWN}"
    {3 SPACES}COMPUTE1'S MA
    CHINE LANGUAGE EDITOR
    {3 DOWN}"
JB 180 PRINT "{BLK}STARTING ADD
    RESS{4}"":GOSUB300:SA=A
    D:GOSUB1040:IF F THEN18
    0
GF 190 PRINT "{BLK}"{2 SPACES}EN
    DING ADDRESS{4}"":GOSUB
    300:EA=AD:GOSUB1030:IF
    {SPACE}F THEN190
KR 200 INPUT "{3 DOWN}"{BLK}CLEA
    R WORKSPACE [Y/N]{4}"":A
    $:IF LEFT$(A$,1)<>"Y"TH
    EN220
PG 210 PRINT "{2 DOWN}"{BLU}WORK
    ING...":FORI=BS TO BS+
    EA-SA+7:POKE I,0:NEXT:P
    RINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}"
    {BLK}{RVS} MLX COMMAND
    {SPACE}MENU {DOWN}"{4}"":
    PRINT T$ "{RVS}E{OFF}NTE
    R DATA"
BD 230 PRINT T$ "{RVS}D{OFF}ISP
    LAY DATA":PRINT T$"
    {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$ "{RVS}S{OFF}AVE
    FILE":PRINT T$ "{RVS}Q
    {OFF}UIT{2 DOWN}"{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
    MID$( "EDLSQ",I,1)THEN A
    =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
    90,700,280:GOSUB1060:GO
    TO250
EJ 280 PRINT "{RVS} QUIT ":INPU
    T "{DOWN}"{4}"ARE YOU SURE
    [Y/N]"":A$:IF LEFT$(A$,
    1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
    LEN(IN$)<4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
    =MID$(IN$,3):GOSUB320:A
    D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
    $(B$,J,1):B=ASC(A$)-C4+
    (A$>"0")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
    0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
    H$,B+1,1):B=A-B*C6:PRI
    NT MID$(H$,B+1,1):RETI
    RN
RR 360 A=INT(AD/Z6):GOSUB350:A
    =AD-A*Z6:GOSUB350:PRINT
    "":
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
    CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT "{DOWN}STARTING AT
    {4}"":GOSUB300:IF IN$<>
    N$ THEN GOSUB1030:IF F
    {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT "{RVS} ENTER DATA
    {SPACE}":GOSUB400:IF IN
    $=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
```

```

      THEN PRINT IN$:PRINT "
      {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
      =S$:FOR J=1 TO 2:IF F T
      HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT "{RVS}"B$L$;:IF I<
      24 THEN PRINT "{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF(A$>"/"ANDA$<"")OR(A
      $>"@ANDA$<"G")THEN540
GS 485 A=- (A$="M")-2*(A$=",")-
      3*(A$=".")-4*(A$="/")-5
      *(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":
      ") -9*(A$="U")-10*(A$="I
      ") -11*(A$="O")-12*(A$="
      P")
CM 487 A=A-13*(A$=S$):IF A THE
      N A$=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
      =1)OR F)THEN PRINT B$;:
      J=2:NEXT I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRI
      NT B$:J=2:NEXT I=24:NEX
      T:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF TH
      ENPRINT B$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
      ((I=0)AND(J=1))THEN GOS
      UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$;:
      J=2-J:IF J THEN PRINT
      {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
      {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT "{UP}
      {5 RIGHT}";:INPUT#3,IN$
      :IF IN$=N$ THEN CLOSE3:
      GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
      MID$(IN$,I):GOSUB320:IF
      I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT I:IF A<>CK THEN GOSU
      B1060:PRINT "{BLK}{RVS}
      {SPACE}ERROR: REENTER L
      INE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT "{DOWN}{BLU}
      ** END OF ENTRY **{BLK}
      {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT "{CLR}{DOWN}{RVS}
      {SPACE}DISPLAY DATA ":G
      OSUB400:IF IN$=N$ THEN2
      20
RJ 620 PRINT "{DOWN}{BLU}PRESS:
      {RVS}SPACE{OFF} TO PAU
      SE, {RVS}RETURN{OFF} TO
      BREAK[4]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
      I=BTO B+7:A=PEEK(I):GOS
      UB350:GOSUB380:PRINT S$
      ;
CC 640 NEXT:PRINT "{RVS}";:A=CK
      :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
      ENPRINT "{DOWN}{BLU}** E
      ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
      SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
      UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT "{DOWN}{RVS} LOAD
      {SPACE}DATA ":OP=1:GOTO
      710
PC 700 PRINT "{DOWN}{RVS} SAVE

```

```

      {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT "{DOWN}FILE
      NAME[4]";IN$:IF IN$=N$
      {SPACE}THEN220
PR 720 F=0:PRINT "{DOWN}{BLK}
      {RVS}T{OFF}APE OR {RVS}
      D{OFF}ISK: [4]";
FP 730 GET A$:IF A$="T"THEN PR
      INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT "D{DOWN}":OPEN15,8
      ,15,"I0":B=EA-SA:IN$="
      0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHR$(AL)
      ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      R$(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT "{DOWN}
      {BLK}ERROR DURING SAVE:
      [4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":G
      OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
      $)+256*ASC(B$+Z$):IF AD
      <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
      OKE BS+I,ASC(A$+Z$):IF(
      I<>B)AND ST THEN F=2:AD
      =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
      >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
      CLOSE1:CLOSE15:GOSUB10
      60:PRINT "{RVS}ERROR: "A
      $
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
      187,PEEK(FA+3):POKE188,
      PEEK(FA+4):IFOP=0THEN92
      0
HJ 890 SYS 63466:IF(PEEK(783)A
      ND1)THEN GOSUB1060:PRIN
      T "{DOWN}{RVS} FILE NOT
      {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
      30):IF AD<>SA THEN F=1:
      GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
      2)-1:F=F-2*(A<EA)-3*(A>
      EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
      OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
      UB1010:ON OP GOTO950:SY
      S 63591
AE 940 GOSUB1080:PRINT "{BLU}**
      SAVE COMPLETED **":GOT
      O220
XP 950 POKE147,0:SYS 63562:IF
      {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT "{BLU}**
      LOAD COMPLETED **":GOT
      O220
DP 970 GOSUB1060:PRINT "{BLK}
      {RVS}ERROR DURING LOAD:
      {DOWN}[4]":ON F GOSUB98
      0,990,1000:GOTO220
PP 980 PRINT "INCORRECT STARTIN
      G ADDRESS ("):GOSUB360:
      PRINT":RETURN
GR 990 PRINT "LOAD ENDED AT ";:
      AD=SA+AD:GOSUB360:PRINT
      D$:RETURN
FD 1000 PRINT "TRUNCATED AT END
      ING ADDRESS":RETURN

```

```

RX 1010 AH=INT(A/256):AL=A-(AH
      *256):POKE193,AL:POKE1
      94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
      *256):POKE174,AL:POKE1
      75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
      1050
HA 1040 IF(AD>511 AND AD<40960
      )OR(AD>49151 AND AD<53
      248)THEN GOSUB1080:F=0
      :RETURN
HC 1050 GOSUB1060:PRINT "{RVS}
      {SPACE}INVALID ADDRESS
      {DOWN}{BLK}":F=1:RETU
      RN
AR 1060 POKE SD+5,31:POKE SD+6
      ,208:POKE SD,240:POKE
      {SPACE}SD+1,4:POKE SD+
      4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
      T01090
PF 1080 POKE SD+5,8:POKE SD+6,
      240:POKE SD,0:POKE SD+
      1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
      KE SD+4,0:POKE SD,0:PO
      KE SD+1,0:RETURN

```

©

Attention Programmers

COMPUTE! magazine is currently looking for quality articles on Commodore, Atari, Apple, and IBM computers (including the Commodore Amiga and Atari ST). If you have an interesting home application, educational program, programming utility, or game, submit it to COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. Or write for a copy of our "Writer's Guidelines."

Moving?

For address changes or subscription information, call toll free

1-800-727-6937

MLX Machine Language Entry Program For Apple

Tim Victor, Editorial Programmer

To make it easier to enter machine language programs into your computer without typos, COMPUTE! is introducing its "MLX" entry program for the Apple II series. It's our best MLX yet. It runs on the II, II+, IIe, and IIC, and with either DOS 3.3 or ProDOS.

A machine language (ML) program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost identical to a correct one. To make error-free entry easier, COMPUTE! generally lists ML programs for Commodore and Atari computers in a format designed to be typed in with a utility called "MLX." The MLX program uses a checksum system to catch typing errors almost as soon as they happen.

Apple MLX checks your typing on a line-by-line basis. It won't let you enter invalid characters or let you continue if there's a mistake in a line. It won't even let you enter a line or digit out of sequence. Best of all, you don't have to know anything about machine language to enter ML programs with MLX. Apple MLX makes typing ML programs almost foolproof.

Using Apple MLX

Type in and save some copies of Apple MLX on disk (you'll want to use MLX to enter future ML programs in COMPUTE!). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS. Programs entered with Apple MLX, however, must be saved to a disk formatted with the same operating system as Apple MLX itself.

If you have an Apple IIe or IIC, make sure that the key marked CAPS LOCK is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the ML program. These values vary for each program, so they're given at the beginning of the ML program listing and in the program's accompanying article. Find them and type them in.

The next thing you'll see is a menu asking you to select a function. The first is (E)NTER DATA. If you're just starting to type in a program, pick this. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the

first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the RETURN key and begin entering the data.

Once you're in Enter mode, Apple MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit RETURN, Apple MLX recalculates the checksum from the eight bytes and the address. If you enter more or less than nine numbers, or the checksum doesn't exactly match, Apple MLX erases the line you just entered and prompts you again for the same line.

Invalid Characters Banned

Apple MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. Apple MLX will read two single-digit numbers instead of one two-digit number (F 6 means F and 6, not F6).

You can't enter an invalid character with Apple MLX. Only the numerals 0-9 and the letters A-F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, Apple MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, Apple MLX will catch your mistake.

Apple MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, Apple MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. Apple MLX will stop you.

Editing Features

Apple MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line that you are entering, so you can retype data. Pressing the CON-

TROL (CTRL) and D keys at the same time (*delete*) removes the character under the cursor, shortening the line by one character. Pressing CTRL-I (*insert*) puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither CTRL-D nor CTRL-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), Apple MLX automatically leaves Enter mode and redisplay the functions menu. If you want to leave Enter mode before then, press the RETURN key when Apple MLX prompts you with a new line address. (For instance, you may want to leave Enter mode to enter a program listing in more than one sitting; see below.)

Display Data

The second menu choice, (D)ISPLAY DATA, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press D, Apple MLX asks you for a starting address. Type in the address of the first line you want to see and hit RETURN. Apple MLX displays program lines until you press any key or until it reaches the end of the program.

Save And Load

Two more menu selections let you save programs on disk and load them back into the computer. These are (S)AVE FILE and (L)OAD FILE. When you press S or L, Apple MLX asks you for the filename. The first time you save an ML program, the name you assign will be the program's filename on the disk. If you press L and specify a filename that doesn't exist on the disk, you'll see a disk error message.

If you're not sure why a disk error has occurred, check the drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system you're using for Apple MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit Apple MLX (by pressing the Q key), delete an old file or two, then run Apple MLX again. Your typing should still be safe in memory.

cursor, shortening the line by one character. Pressing CTRL-I (*insert*) puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither CTRL-D nor CTRL-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), Apple MLX automatically leaves Enter mode and redisplay the functions menu. If you want to leave Enter mode before then, press the RETURN key when Apple MLX prompts you with a new line address. (For instance, you may want to leave Enter mode to enter a program listing in more than one sitting; see below.)

Display Data

The second menu choice, (D)ISPLAY DATA, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press D, Apple MLX asks you for a starting address. Type in the address of the first line you want to see and hit RETURN. Apple MLX displays program lines until you press any key or until it reaches the end of the program.

Save And Load

Two more menu selections let you save programs on disk and load them back into the computer. These are (S)AVE FILE and (L)OAD FILE. When you press S or L, Apple MLX asks you for the filename. The first time you save an ML program, the name you assign will be the program's filename on the disk. If you press L and specify a filename that doesn't exist on the disk, you'll see a disk error message.

If you're not sure why a disk error has occurred, check the drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system you're using for Apple MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit Apple MLX (by pressing the Q key), delete an old file or two, then run Apple MLX again. Your typing should still be safe in memory.

Apple MLX: Machine Language Entry Program

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

88 100 N = 9: HOME : NORMAL : PR
INT "APPLE MLX": POKE 34,
2: ONERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "S
TART ADDRESS": GOSUB 530
: IF A = 0 THEN PRINT CHR
$ (7): GOTO 110
8C 120 S = A

```

```

E3 130 VTAB 2: HTAB 20: PRINT "E
ND ADDRESS " : GOSUB 530
: IF S > = A OR A = 0 THE
N PRINT CHR$ (7): GOTO 13
0
20 140 E = A
85 150 PRINT : PRINT "CHOOSE: (E)
NTER DATA": HTAB 22: PRI
NT "(D)ISPLAY DATA": HTAB
8: PRINT "(L)OAD FILE (
S)AVE FILE (Q)UIT": PRIN
T
AE 160 GET A$: FOR I = 1 TO 5: I
F A$ < > MID$ ("EDLSQ", I,
1) THEN NEXT : GOTO 160
93 170 ON I GOTO 270,220,180,200
: POKE 34,0: END
AF 180 INPUT "FILENAME: "; A$: IF
A$ < > "" THEN PRINT CHR
$ (4): "BLOAD"; A$: ", A"; S
A1 190 GOTO 150
38 200 INPUT "FILENAME: "; A$: IF
A$ < > "" THEN PRINT CHR
$ (4): "BSAVE"; A$: ", A"; S; "
,L"; (E - S) + 1
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN
150
9E 230 FOR B = B TO E STEP 8: L =
4: A = B: GOSUB 580: PRIN
T A$; ", ": L = 2
85 240 FOR F = 0 TO 7: V(F + 1) =
PEEK (B + F): NEXT : GOS
UB 560: V(9) = C
F2 250 FOR F = 1 TO N: A = V(F):
GOSUB 580: PRINT A$; ", ":
NEXT : PRINT : IF PEEK (4
9152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN
150
48 280 FOR B = B TO E STEP 8
A6 290 HTAB 1: A = B: L = 4: GOSUB
580: PRINT A$; ", ": CAL
L 64668: A$ = "": P = 0: GO
SUB 330: IF L = 0 THEN 15
0
F9 300 GOSUB 470: IF F < > N THE
N PRINT CHR$ (7): GOTO 2
90
27 310 IF N = 9 THEN GOSUB 560:
IF C < > V(9) THEN PRINT
CHR$ (7): GOTO 290
72 320 FOR F = 1 TO 8: POKE B +
F - 1, V(F): NEXT : PRINT
: NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$
= 0$: P = 0: PRINT CHR$ (7
);
22 340 L = LEN (A$): O$ = A$: O =
P: L$ = "": IF P > 0 THEN
L$ = LEFT$ (A$, P)
E0 350 R$ = "": IF P < L - 1 THE
N R$ = RIGHT$ (A$, L - P -
1)
55 360 HTAB 7: PRINT L$: FLASH
: IF P < L THEN PRINT MID
$ (A$, P + 1, 1): NORMAL :
PRINT R$:
7B 370 PRINT " ": NORMAL
E6 380 K = PEEK (49152): IF K <
128 THEN 380
C1 390 POKE 49168,0: K = K - 128
58 400 IF K = 13 THEN HTAB 7: PR
INT A$; ", ": RETURN
8A 410 IF K = 32 OR K > 47 AND K
< 58 OR K > 64 AND K < 7
1 THEN A$ = L$ + CHR$ (K)
+ R$: P = P + 1
C1 420 IF K = 4 THEN A$ = L$ + R
$
5F 430 IF K = 9 THEN A$ = L$ + "
" + MID$ (A$, P + 1, 1) +
R$
8A 440 IF K = 8 THEN P = P - (P
> 0)

```

```

93 450 IF K = 21 THEN P = P + (P
< L)
9D 460 GOTO 330
37 470 F = 1: D = 0: FOR P = 1 TO
LEN (A$): C$ = MID$ (A$, P
, 1): IF F > N AND C$ < >
" " THEN RETURN
88 480 IF C$ < > " " THEN GOSUB
520: V(F) = J + 16 * (D =
1) * V(F): D = D + 1
5F 490 IF D > 0 AND C$ = " " OR
D = 2 THEN D = 0: F = F +
1
88 500 NEXT : IF D = 0 THEN F =
F - 1
17 510 RETURN
85 520 J = ASC (C$): J = J - 48 -
7 * (J > 64): RETURN
AB 530 A = 0: INPUT A$: A$ = LEFT
$ (A$, 4): IF LEN (A$) = 0
THEN RETURN
6F 540 FOR P = 1 TO LEN (A$): C$
= MID$ (A$, P, 1): IF C$ <
"0" OR C$ > "9" AND C$ <
"A" OR C$ > "Z" THEN A =
0: RETURN
2D 550 GOSUB 520: A = A * 16 + J:
NEXT : RETURN
28 560 C = INT (B / 256): C = B -
254 * C - 255 * (C > 127
): C = C - 255 * (C > 255)
20 570 FOR F = 1 TO 8: C = C * 2
- 255 * (C > 127) + V(F):
C = C - 255 * (C > 255):
NEXT : RETURN
DA 580 I = FRE (0): A$ = "": FOR
I = 1 TO L: T = INT (A / 1
6): A$ = MID$ ("0123456789
ABCDEF", A - 16 * T + 1, 1)
+ A$: A = T: NEXT : RETUR
N
IF 590 PRINT "FROM ADDRESS " : G
OSUB 530: IF S > A OR E <
A OR A = 0 THEN B = 0: R
ETURN
8D 600 B = S + 8 * INT ((A - S)
/ 8): RETURN
86 610 PRINT "DISK ERROR": GOTO
150

```

©

All the programs in this issue are available on the ready-to-load COMPUTE! Disk. To order a one-year (four-disk) subscription, call toll free **1-800-727-6937**. Please specify which computer you are using.

Classified

SOFTWARE

COMMODORE: TRY BEFORE YOU BUY. Best selling games, utilities, educational, + classics and new releases. 100's of titles. Visa/MC. Free brochure. RENT-A-DISC, Frederick Bldg. #345, Hunt'n, WV 25701 (304) 529-3232

FREE APPLE SOFTWARE

Over 1000 Public Domain Programs on 50 diskettes. \$5 each plus \$1 for s/h (US funds) Send \$1 for catalog, refundable with order.

C&H ENTERPRISES

PO Box 29243, Memphis, TN 38127

DISCOUNT SOFTWARE for most computers. FREE CATALOG. Sale: 5.25" DSDD Disks 25 for \$13.95 ppd. WMJ DATA SYSTEMS-C, 4 Butterfly Dr., Hauppauge, NY 11788

Cheap Software/IBM, PCjr, Compatibles. 5.25 or 3.5 disk. For catalog of diskettes available for education, games, business, etc., Write: Morning Star Industry, Box 3095, Ann Arbor, MI 48106

FREE SOFTWARE for C64, C128, IBM & CPM send SASE for info (specify computer) to: PUBLIC DOMAIN USERS GROUP PO Box 1442-A1, Orange Park, FL 32067

MILLION \$ "LOTTO BUSTER" PROGRAM SCIENTIFIC. HITS JACKPOTS. NO RN/G \$49.95 Ap II, Atari, MS/DOS, C64. OH res add 6% s.tax. Also: FANTASTIC DAILY NUMBER FORECASTER! GETS Straight Hits Weekly! \$42.95. Both: \$79.95. Large SASE gets info. Z-Way, POB 9017-C, Canton OH 44711 (216) 875-2512

More than 200 great ML routines for 64 and 128, ready to add to your own programs, in COMPUTE! Books' MACHINE LANGUAGE ROUTINES FOR THE COMMODORE 64/128. Explanations, uses, commented source code. 585 pages, \$18.95. Check your local bookstore or call (800) 346-6767

TI-99/4A Software/Hardware bargains. Hard-to-find items. Huge selection. Fast service. Free catalog. D.E.C., Box 690, Hicksville, NY 11801

COMPUTE! Classified is a low-cost way to tell over 350,000 microcomputer owners about your product or service.

Rates: \$25 per line, minimum of four lines. Any or all of the first line set in capital letters at no charge. Add \$15 per line for boldface words, or \$50 for the entire ad set in boldface (any number of lines.) Inquire about display rates.

Terms: Prepayment is required. Check, money order, American Express, Visa, or MasterCard is accepted. Make checks payable to COMPUTE! Publications.

Form: Ads are subject to publisher's approval and must be either typed or legibly printed. One line equals 40 letters and spaces between words. Please underline words to be set in boldface.

General Information: Advertisers using post office box numbers in their ads must supply permanent address and telephone numbers. Ad will appear in next available issue after receipt.

Closing: 10th of the third month preceding cover date (e.g., June issue closes March 10th). Send order and remittance to: Harry Blair, Classified Manager, COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. To place an ad by phone, call Harry Blair at (919) 275-9809.

Notice: COMPUTE! Publications cannot be responsible for offers or claims of advertisers, but will attempt to screen out misleading or questionable copy.

FREE PUBLIC DOMAIN SOFTWARE - Request free catalog or send \$2 for sample disk & catalog (refundable). Apple or C64/128 (specify) CALOKE IND., Box 18477, KC, MO 64133

FREE! PUBLIC DOMAIN SOFTWARE FLYER! IBM & Compatibles - (MS-DOS) Save \$\$\$ @ \$3.50 per disk! Write to: AP-JP Inc., Box 1155, W. Babylon, NY 11704

IBM PUBLIC DOMAIN SOFTWARE \$3 PER DISK

Send stamp for catalog. Hundreds of disks to choose from. Excellent service.

Two disk sizes now available: 5.25" @ \$3.00 and 3.5" @ \$5.00. Send for your list. Now accepting Mastercard or Visa...

JDX/C, P.O. BOX 1561, CORONA, CA 91718

ATARI 8 BIT: FULL FUNCTION BUSINESS DBMS. Any drive(s)/upgrades. GL/AR/AP/Inv/Mail W/P. 9000 records/disk. MICROMOD, 1635-A Holden Ave., Orlando, FL 32809 (305) 857-6014

C64 - FREE MEMBERSHIP & LIST

Public Domain Disks \$3 each or less! Northland, P.O. Box 2413 Homer, Alaska 99603. SASE please.

ATARIWARE: The BEST PD software from Atari enthusiasts across the US! 140 disks to choose from: \$5 each. Catalog free with SASE. GATOR-ACE, Box 1215, Gainesville, FL 32602. Specify ST or 8-bit computer, PLEASE!

AREA CODE ACCESSOR! \$12.00 A must for home & business. Over 3000 cities with Area Codes. Easy! IBM. Free information. Data Extensions, 126 Whittier, Prov, RI 02909

NEVER PUBLISHED PROGRAMS VIC 20 & C64.

Gorgon, Pearl Diver, Gorgon's Revenge, Ultra Lite, Complete Private Accountant. Most programs employ Mity Kwik loader. Minimum 3 games or utilities per Disk or cartridge. \$22.50 ea (FL res add 5% tax) plus \$2.50 s/h Visa/MC, check or money order to: E&J Enterprises of Naples, Inc., 5625 Taylor Rd., Naples, FL 33942 (800) 445-7416 in Florida: (813) 597-2234

\$\$\$ LOTTO USA \$\$\$
Pick the winning numbers in all states that have LOTTO games. Easy to run menu. Lottery games for daily picks, LOTTO 40, 48 etc. Diskette only C-64 or IBM. Allow 3-4 weeks for delivery. Send \$19.95 + \$3.50 S/H. New York residents add tax. To: QUEENS SOFTWARE PO Box 7279 Grand Central Station N.Y., N.Y. 10163-6028

C64 FINEST PUBLIC DOMAIN PROGRAMS Hand-picked and tested! ON DISK! Most \$1.50! YOU pick the programs that YOU want! For a list and description, send SASE to: JLH Co., Dept. H, Box 67021, Topeka, KS 66667

HARDWARE

PC CLONE BUILDER'S MANUAL with parts list. Detailed instr for assembly, testing & trouble-shooting. Covers all switches, jumpers & hard-disk installation: \$19.95. Digital Solutions, 26 E 14th St. #505C, Indpls, IN 46202

MISCELLANEOUS

SAFWARE INSURES COMPUTERS against fire, theft, & power surges for as little as \$39. Call Safeware, The Insurance Agency Inc. at 800/848-3469, Columbus, Ohio.

PERSONAL COMPUTER OWNERS CAN EARN \$1000 to \$5000 monthly selling simple services part time. Free list of 100 best services. Write: A.I.M.H.U., PO Box 60369, San Diego, CA 92106-8369

Easy-CAD. Learn about computer-aided drafting. FREE information. CADTECH, Inc., Dept. CP1187, 31 Oneida Street, Pawtucket, Rhode Island 02860

SUPER DATA: BASE 1 - 2 - 3

(more than a data base)

Only

\$39.95 *

Will generate all the custom software you will ever need.

1. Create Professional Data Screens.
2. Run Custom Reports.
3. Link Everything Together With Custom One Key Menus.

• Easy Manual and Tutorials •

For IBM PC, PC Jr., XT
Atari (except ST) Kaypro
Commodore 64 - Apple II, IIC, IIE
Hard Disk compatible - 36,000 Files

• High Quality •

Adventure Games Only \$ 9.95 ea. *

I. M. P. SOFTWARE

Rt. 1 Box 362
Ozark, Mo. 65721
Call your local dealer or us at
(417) 485-6398

* Add \$2.00 shipping and handling
Missouri residents add 5.25% sales tax

WP-KEY WP-KEY WP-KEY

WP-KEY

A NEW FORM OF WRITE PROTECTION

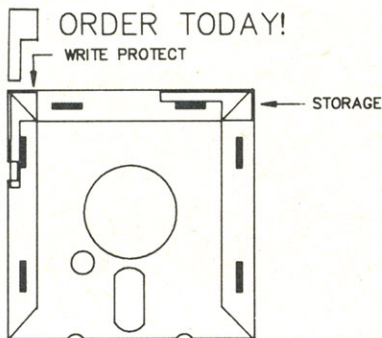
WP-KEY slides into the disk at the top corner directly above the write-protect notch and slips down to cover the notch from the inside.

WP-KEY slides out just as easily to allow the disk to be written to.

WP-KEY is good for the life of your disk.

WP-KEY is light in color allowing it to be viewed when the disk is installed in the drive just by glancing at the drive door.

WP-KEY sells for \$1.39 per pkg of ten (10). Please include \$.50 for shipping and handling. Sorry, no C.O.D. or credit card orders.



NEAR FUTURE COMPUTER



P.O. Box 1726
Walla Walla, Wa 99362
(509) 525-3288

Advertisers Index

Reader Service Number/Advertiser

Page

102 Accolade	5
103 Acorn of Indiana	67
104 ActionSoft Corporation	8-9
105 Activision Inc.	IBC
106 Amstrad	18-19
107 The Avalon Hill Game Co.	13
112 Commodore	35
113 CompuStore	47
108 ComputAbility	102-103
109 Computer Direct	42-43
110 Computer Mail Order	36-37
111 Computer World	105
114 Damark International, Inc.	67
115 Damark International, Inc.	101
116 Davidson & Associates	41
117 Dresselhaus	73
118 Electronic Arts	11
119 EPYX	1
120 Firebird Licensees, Inc.	2
121 I.M.P. Software	115
122 Lyco Computer	48-51
McGraw-Hill Continuing Education Center	33
123 MECA	68i
124 Micro League Sports Association	45
125 MicroProse Simulation Software	23
126 Micro World Electronix, Inc.	73
127 Modern Photography	7
128 Montgomery Grant	104
129 Near Future Computers	116
NRI Schools	85
130 Okidata	27
131 Origin Systems, Inc.	IFC
132 Precision Data	116
133 Precision Images, Inc.	67
Small Computer Book Club	63
134 Software Discounters of America	99
135 ST Station	106
136 subLOGIC Corporation	29
137 subLOGIC Corporation	BC
138 Vendex Pacific Inc.	30-31
139 Video Technology, Inc.	39
140 Zephyr Services	101

MADE IN U.S.A.

5 1/4" DISKETTES

DSDD

33¢
each

DSHD

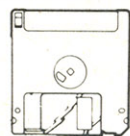
89¢
each



• Lifetime Warranty
• Error Free

- Sturdy Blank PVC Jacket
- With ID Label
- With Write Protect Tabs
- With Envelopes
- In Factory Sealed Poly Packs

SOLD IN LOTS OF 100



3 1/2" DISKETTES
(UNBRANDED)

SALE **99¢** each
SOLD IN LOTS OF 50

S & H: \$4.00, FIRST 100 OR FEWER DISKS:
\$3.00, EACH SUCCEEDING 100 OR FEWER DISKETTES.

MINIMUM ORDER: \$25.00. S&H: Continental USA. Foreign Orders, APO/FPO, please call. MI residents add 4% tax. C.O.D. add \$4.00; payment with cash, certified check or money order. Prices subject to change. Hours: 8:30 AM-7:00 PM ET.

Call for **FREE CATALOG**

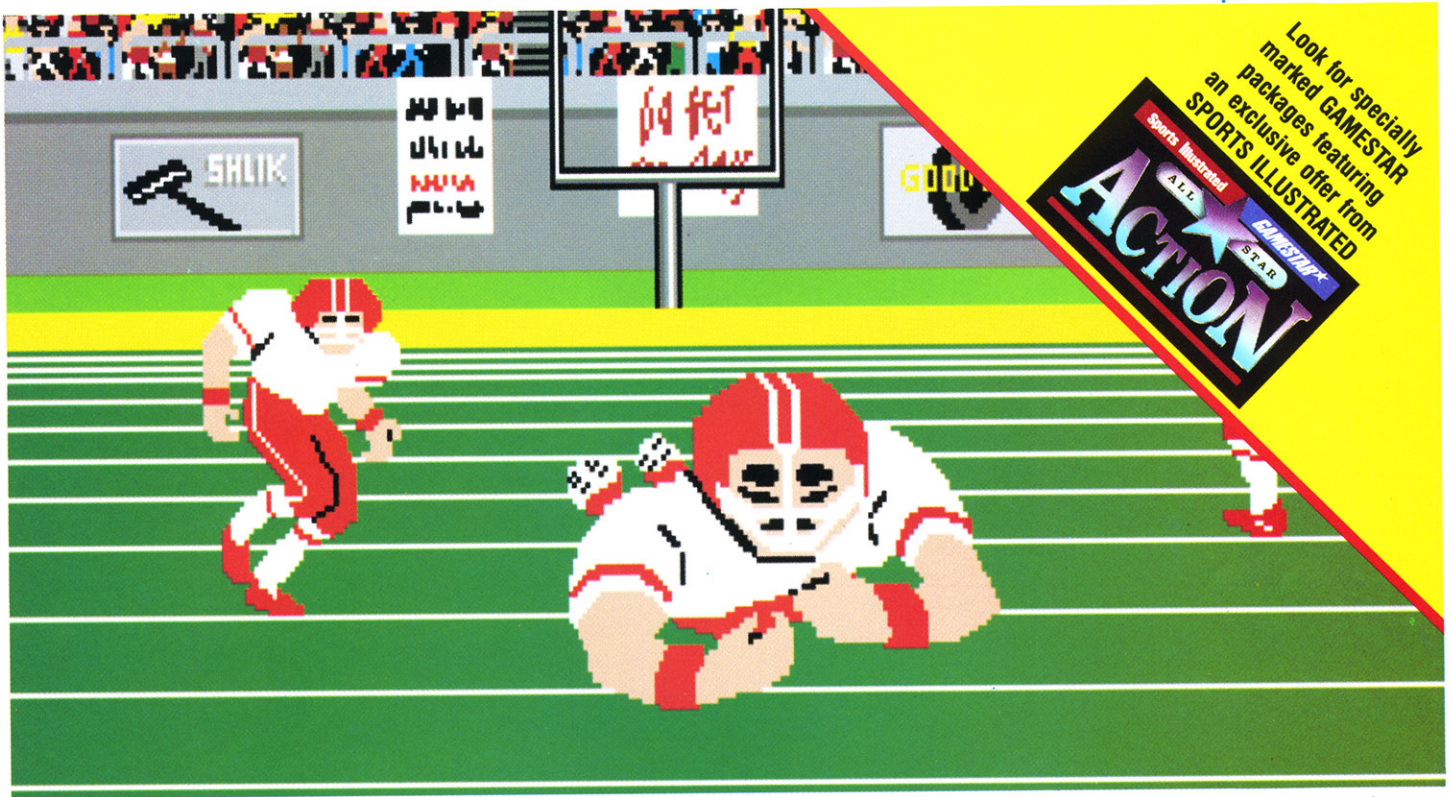


COD



Precision Data Products™
P.O. Box 8367, Grand Rapids, MI 49518
(616) 452-3457 • FAX: (616) 452-4914
Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

COMPUTE!'s Buyer's Guide to IBM PC, Compatibles, and Portables	97
COMPUTE! Sweepstakes	17



SO REAL IT HURTS

GFL Championship Football™

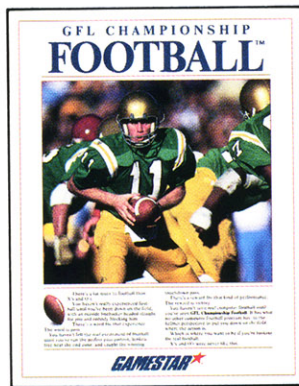
The way computer football *should* be.

Other football games put you in the grandstands, looking down on the action. Now see what it's like from the *player's* perspective—looking out of your helmet at an angry linebacker headed straight for you, and no blockers in sight.

With **GFL Championship Football™**, you've got the first football simulation that actually takes you down on the field, taking the hits and making the plays. And it's more than just a pretty picture—you really get the feel of *playing* football.

No other football simulation gives you so many features:

- *In-the-helmet perspective* puts you at ground



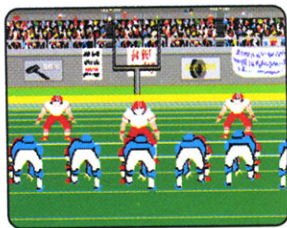
level on the playing field.

- *Scrolling-screen animation* moves you up and down the playing field.
- *Realistic sound effects* let you hear everything from the quarterback calling the signals to the sound of your own footsteps.
- *Team selection screens* allow you to set the playing style of your team and that of your opponent.

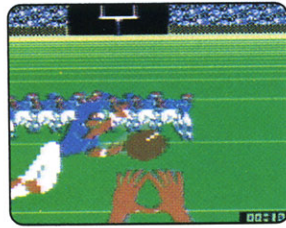
Whether you're taking on bone-crunching action against a friend, or going up against any of the 27 computer-controlled teams in the **GFL**, this is the one that puts you where the action is!

Available now for the Commodore 64/128, IBM PC and Tandy 1000, Apple IIe, IIc, Amiga, Atari ST and 100% compatible computers.

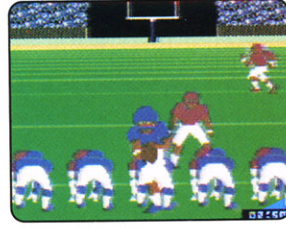
Look for Activision products at your local software dealer.
Or you can buy by mail at suggested list price by calling 1-800-227-6900.



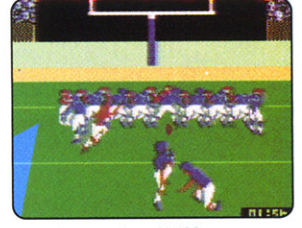
Amiga screen



Commodore 64-128 screen



Commodore 64-128 screen



Commodore 64-128 screen

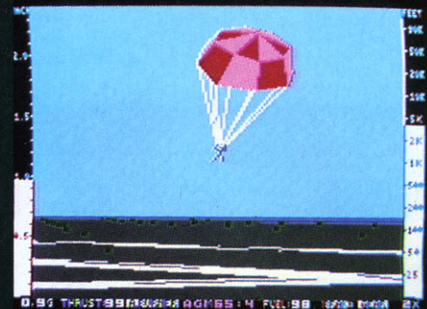
GAMESTAR™



F-18 Takeoff (Control Tower View)



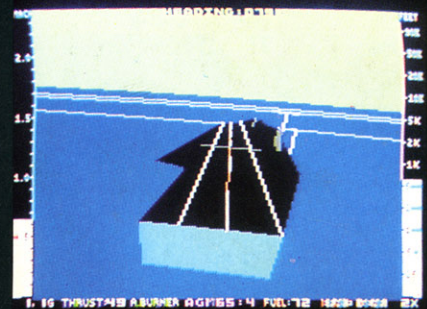
F-16 Night Flight with Radar and Attitude Indicator



Pilot Parachuting to Safety (Control Tower View)



F-16 Target Strike with Target Range Indicator



F-18 Carrier Landing Approach

Jet

From the author of Flight Simulator comes the state of the art in jet simulation. Let Jet's unparalleled realism and programming depth launch you into an exhilarating experience!

Realistic Scenery

- Highly detailed aircraft models (F-16, F-18, MiG-21, MiG-23)
- Multiple detailed airports
- Detailed ships (carrier & cruisers)
- Detailed enemy land and sea targets

Realistic Aircraft Control

- Fly a land-based F-16 or carrier-based F-18
- Powerful, gas-guzzling afterburners
- "Fly by Wire" flight controls
- Flight performance affected by armament and fuel levels
- Realistic airbrakes for quick midair deceleration

Realistic Modern Electronic Instrumentation

- Real "Heads Up Display" with complete attitude indicator
- Target range indicator
- Enemy target tracking radar
- Multiple system status displays

Realistic Combat Missions

- Dogfight and target strike missions
- Accurate offensive and defensive strategic considerations
- Realistic fuel constraints
- Multiple advanced air-to-air and air-to-ground weapon systems
- Progressive skill levels

Nice Touches

- Functioning ejection seat
- Full screen out-the-window view with instant zoom control
- Realistic carrier catapult launches and tripwire landings

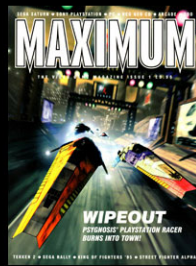
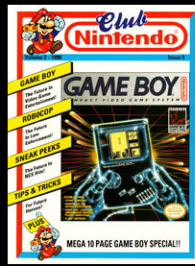
See Your Dealer, or write or call for more information. Jet is available on disk for the IBM PC for \$49.95, and for the Commodore 64/128 and Apple II computers for \$39.95. For direct orders please indicate which computer version you want, enclose the correct amount plus \$2.00 for shipping, and specify UPS or first class mail delivery. Visa, Mastercard, American Express, and Diners Club Charges accepted.



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

ORDER LINE: (800) 637-4983
(except in Illinois)

Open 7AM to 7PM Central Time



RETROMAGS

Our goal is to preserve classic video game magazines from years gone by, before they are lost forever.

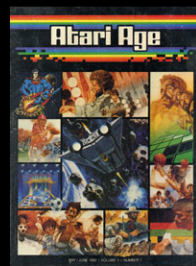


Thanks goes out to everyone who makes this possible. Starting with the original writers and editors, to all the people involved in acquiring and digitizing these magazines.



People interested in helping us out, in whichever way possible.

Either by donating magazines, scanning, editing or helping in the distribution, visit us at www.retromags.com



We are only interested in preserving magazines which are at least 5 years out of print.

We have no desire, nor intent to profit from these scans in any way.



So please, if you come across people trying to sell these releases,

DO NOT SUPPORT THEM!



THANK YOU

