

EXCLUSIVE  
DISK INSIDE!

ANTIC'S

JUNE/JULY 1989  
VOLUME 1, NUMBER 2

U.S.A. \$14.95 CANADA \$19.95

# AMIGA<sup>+</sup> *plus*™



## MAGIC REALISM 3-D

Prize-Winning  
Secrets Revealed!

Free Up  
Your Workbench

Spreadsheet  
Showdown—Make  
Your Choice!

Explore AI  
With Magellan





# SWORD OF SODAN™

*Grasp the Sword of Sodan  
and feel the true power  
of arcade action!*

Creaking, groaning, shrieking,  
teeth clenching arcade realism.  
Deep dark forests.  
Misty, eerie graveyards.  
Treacherous, guard-filled streets.  
Dare to enter the evil castle,  
Craggamoore.  
Wield your sword through  
its winding corridors  
and rank rotting dungeons.  
Your story will be  
the greatest ever told  
— Your reward will be  
the greatest ever known!

## FEATURES:

- Battle with massive animated characters that stand 2/3rds the size of the screen.
- Fight as Hero or Heroine through 11 incredibly challenging levels!
- Study your past performance in Replay Mode! (extra memory required)

Packed into 3 disks  
with more than  
4 MEGABYTES  
of detailed  
graphics and  
digitized  
sounds!

Available for Amiga™,  
Coming soon for IBM® and  
compatibles, Apple II GS.



AMIGA screens shown.



Fight your way to your local software retailers. Or, call 1-800-342-6442 for VISA and MasterCard Orders. For check or money orders, send \$49.95 plus \$3 shipping and handling to DISCOVERY SOFTWARE INTERNATIONAL INC. 163 Conduit Street, Annapolis, MD 21401. Allow 4-6 weeks for delivery. Sword of Sodan is a trademark of Discovery Software International, Inc. Amiga is a trademark of Commodore Amiga, Inc. IBM is a registered trademark of International Business Machines, Inc.

CIRCLE 014 ON READER SERVICE CARD



**Color Graphics.**

**Multiple Fonts.**

**Spelling Checker.**

**Mailmerge.**

**Multiple Windows.**

**Resizable Graphics.**

**Fast Printing.**

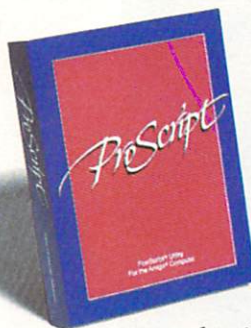
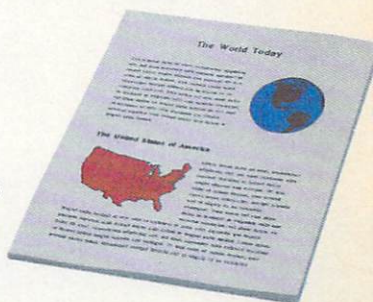
**WYSIWYG.**

**No Other Word Processor For Amiga®  
Stacks Up To ProWrite™ 2.0.**

Word is out. ProWrite 2.0 allows you to expand your Amiga word processing to new horizons. Use it to generate proposals with impressive bar charts. Create letters and reports with snappy graphics. Generate television storyboards. Even dash out newsletters with spot illustrations.

And of course, ProWrite 2.0 has all the other features you expect: a spelling checker with 95,000 word dictionary. Mailmerge. And fast graphics printing. Best of all, it works with our font packages, ProFonts I and II, giving you a broad range of professional and decorative fonts.

All this, plus ProWrite's powerful editing capabilities and ease-of-use combine to make ProWrite the best word processor for the Amiga computer.

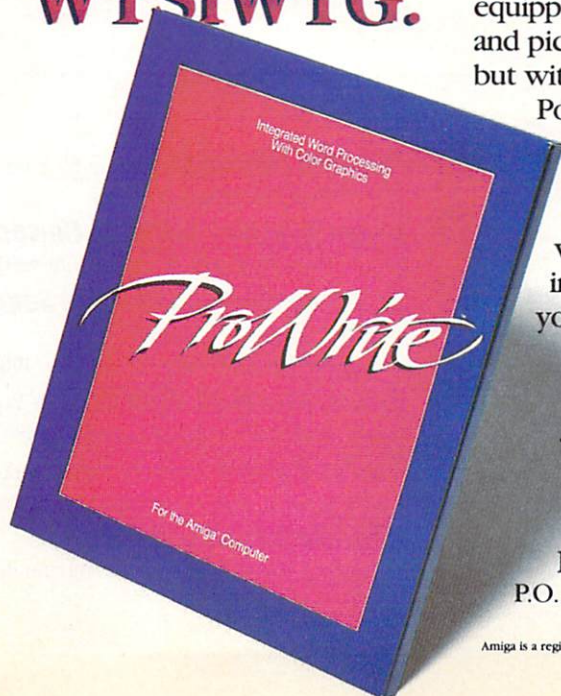


**ProScript: Perfection In  
Print For The Amiga.**

ProScript is the new PostScript utility from New Horizons Software that gives you the professional look of typeset copy.

ProScript reads ProWrite files and prints them on any PostScript equipped printer, giving you the same multiple font and picture capabilities you expect from ProWrite, but with the typeset quality of PostScript printing.

ProWrite 2.0 and ProScript. A powerful new team that puts a new world of word processing and printing at your fingertips.



**New Horizons**  
S O F T W A R E

**First in Personal Productivity and Creativity**  
P.O. Box 43167/Austin, Texas 78745/(512) 328-6650

ProWrite, ProFonts and ProScript are trademarks of New Horizons Software, Inc. Amiga is a registered trademark of Commodore-Amiga, Inc. PostScript is a registered trademark of Adobe Systems, Inc.

CIRCLE 018 ON READER SERVICE CARD



JUNE/JULY 1989  
VOLUME 1, NUMBER 2



# AMIGA<sup>+</sup>plus™

## F E A T U R E S

14

### *Artificial Reality*

by Louis Markoya

Creating natural forms with ray tracing.

Featuring prize-winning picture WoodLand II.



23

### *3-D Modeling Comes of Age*

by Rick Gibson

All about design objects. Tips from a prize-winning Amiga videomaker.

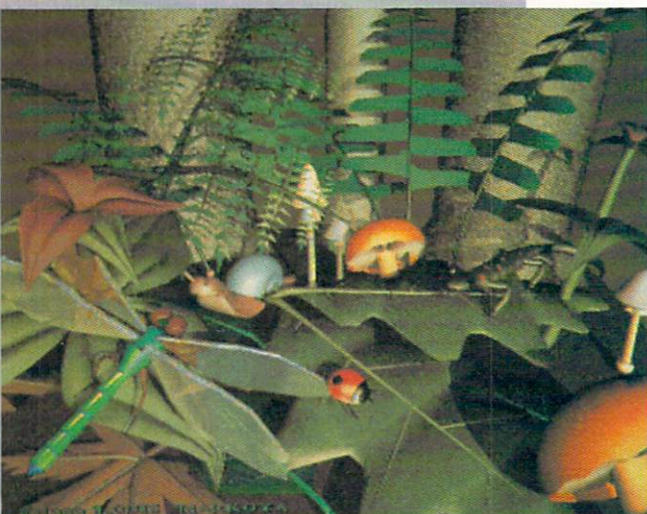


38

### *Understanding Amiga Fonts*

by Lion Kuntz

How to manipulate characters in 3-D and color. Typefaces and tools on disk.



Louis Markoya's WoodLand II—page 14

## A R T S

20

**Fun with FunPaint** program by John Casasanta  
55K of effortless graphics power



30

**Amiga Graphics Software Universe** by Lion Kuntz  
Part I: Paint Programs & Image Generators

42

**Dr. T's Keyboard Controlled Sequencer**  
by Kenny Lyon & Ira Rubnitz  
Most powerful MIDI software for the Amiga



54

**Deluxe PhotoLab Workshop** by Prof. Lewis Tilley  
Image processor for mural-size montages

63

**Photon Paint II** review by Louis Markoya  
Amiga painting evolves beyond professionalism

80

**MovieSetter** review by R.F. Noyes  
TV cartoon-show quality from your Amiga



Amiga Fonts 3-D Converter—page 38





## IN THIS ISSUE!

All articles marked with the disk symbol have programs or graphics on this month's AMIGA Plus Disk! If you bought this magazine *without* the disk, here's how to order yours now!

Don't Miss the *Plus* DISK

**Only \$10.95**

(plus \$2 shipping and handling)

Phone TOLL-FREE

**1-800-234-7001**

6 am to 6 pm Pacific Time

Monday-Friday

Visa or MasterCard Orders only

Or send your check for \$10.95 (plus \$2 shipping and handling) to AMIGA Plus Disk Desk, 544 Second Street, San Francisco, CA 94107. AMIGA Plus Disk Desk ships your order within 24 hours!

## ■ P R O D U C T I V I T Y ■

- 35** **Moniterm Viking 1** review by Simon Rockman  
Big screen hero
- 47** **Magellan** review by Michael Brown  
Artificial Intelligence for the rest of us
- 72** **Amiga Spreadsheet Round-Up**  
review by Michael Brown  
Haicalc, Unicalc, Analyze!, VIP Professional, Plan/IT (MaxiPlan), Superplan

## ■ P R O G R A M M I N G ■



- 67** **Amiga Floating Point Math**  
Part I by Daniel Wolf, Ph.D.  
Valuable hard-to-find information for programmers
- 83** **Clearing Your Workbench** by Arnie Cachelin  
Make room for that utility you can't live without
- 92** **AmigaDOS Inside & Out** review by Arnie Cachelin  
New programming reference book from Abacus
- 99** **HiSoft BASIC Professional**  
review by David Plotkin  
Fast, friendly, compiled BASIC

## ■ E N T E R T A I N M E N T ■



- 28** **FALCON** by Wolf Griffey  
Best aircraft simulator yet
- 50** **Wayne Gretzky Hockey** review by Rick Teverbaugh  
Sports game with everything!
- 53** **BackGammon**  
Commercial U.K. game software on AMIGA Plus Disk
- 60** **Triango** review by Carolyn Cushman  
Strategic territory-game challenge
- 85** **Games Galaxy**  
Sword of Sodan, Solitaire Royale, Western Games, Zak McKracken, Menace, Final Mission

## ■ D E P A R T M E N T S ■

- |   |   |
|---|---|
| <b>6</b> <b>Masthead, Editorial</b>                                     | <b>66</b> <b>Using Your AMIGA Plus Disk</b> |
| <b>8</b> <b>Alert Box</b><br>Amiga News briefs                          | <b>93</b> <b>New Amiga Products</b>         |
| <b>13</b> <b>Guru Bashers</b><br>Answering readers' technical questions | <b>104</b> <b>Reader Art Gallery</b>        |
| <b>19</b> <b>Reader Input</b>   | <b>106</b> <b>Advertisers Index</b>         |



Rick Gibson's 3-D Model—page 23





## PUBLISHER

James Capparell

## ASSOCIATE PUBLISHER

John Taggart

## EDITORIAL

Nat Friedland, *Editor*

Arnold Cachelin, *Technical Editor*

Carolyn Cushman, *Assistant Editor*

Marta Deike, *Editorial Coordinator*

## ART

Kathleen McKeown, *Creative Services Director*

William Foster, *Art Director*

Marianne Dresser, *Design Production Assistant*

Georgia Solkov, *Photo Editor and Cover Photography*

Julianne Ososke, *Production Manager*

Kate Murphy, *Advertising Production Coordinator*

## CIRCULATION

Manny Sawit, *Director*

Amber Lewis Francis, *Subscription Coordinator*

Dennis Swan, *Distribution Coordinator*

Ann Dunlap, *Dealer Sales, (415) 957-0886*

## ADVERTISING

Austin Holian

*Western Sales Representative (415) 957-0886*

Denny Riley

*Eastern Sales Representative (415) 957-0886*

Diane Van Arsdall

*Sales Coordinator (415) 957-0886*

## ANTIC PUBLISHING, INC.

James Capparell,

*President and Chairman of the Board*

John Taggart, *Vice President*

Donald F. Richard and

Richard D. Capparella, *Directors*

Lee Isgur, *Advisor to the Board*

John Cady, *Controller*

## GENERAL OFFICES

(415) 957-0886

544 Second Street, San Francisco, CA 94107

## CREDIT CARD SUBSCRIPTION & SALES

(800) 234-7001, Visa or MasterCard Only

## SUBSCRIPTION CUSTOMER SERVICE

(415) 372-6002

Amiga Plus, P.O. Box 1569, Martinez, CA 94553

June-July 1989, Volume 1, Number 2. Antic's AMIGA Plus Magazine is published bi-monthly by Antic Publishing, Inc. 544 Second St., San Francisco, CA 94107. Third Class postage paid at Mendota, IL. **Subscriptions:** (Six issues with disk) \$39.95 in U.S., \$57.95 in Canada and Mexico, \$64.95 for other foreign address. **Postmaster:** Please send address changes to Antic's AMIGA Plus Magazine, P.O. Box 1569, Martinez, CA 94553.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. However, original purchasers may make disk backup copies for their own personal use. Antic's AMIGA Plus is an independent periodical not affiliated in any way with Commodore Business Machines, Inc. Amiga is a trademark of Commodore Business Machines, Inc. All references to Commodore products are trademarked and should be so noted. Antic's AMIGA Plus is a trademark of Antic Publishing, Inc., An Information Technology Company. Copyright © 1989 by Antic Publishing, Inc. All rights reserved. Printed in USA.

# EDITORIAL

We'd like to thank the Amiga community for making the premiere issue of Antic's AMIGA Plus a hit. At every level, your acceptance of this magazine-with-disk has gone beyond our highest hopes.

For openers we sent a charter subscription offer to some 50,500 Amiga users. Normally in the direct mail biz, you expect a positive response of one or two percent. The AMIGA Plus mailing drew 12,249—nearly 25 percent—which was immediately reflected in an increased print run.

Next, to our pleased surprise, we began getting interesting, thoughtful letters from Amiga users responding to the mailer, even before our first magazine came out in March. A number of these letters are printed in this second issue. Also pulling lots of mail as soon as the magazine debuted—the Guru Basher technical question column and the Reader Art Gallery. We think it's great that readers are already opening up an active two-way dialog with AMIGA Plus and we'll do our best to respond to your queries promptly in these pages.

When we set up a production calendar for the first issue of AMIGA Plus, we couldn't help noticing that the New York AmiExpo was scheduled only a few days before when we thought we might possibly be able to get the magazine completed. So we burned rubber (plus plenty of midnight oil) and managed to get the first batch off the presses with at least 36 hours to spare. What we hoped to gain from our AmiExpo booth was some fast visibility—not to sell a lot of magazines and disks. But the AmiExpo crowds bought up virtually every issue that had been shipped to New York. It was especially satisfying when somebody who bought the

magazine earlier would come back to the booth and purchase the disk or take out a subscription.

In our early forecasts, we had hoped to sell enough ads to be able to put out a 100-page magazine for the first couple of issues. Thanks to a dedicated sales staff (Austin Holian and Denny Riley) and the good will of Amiga advertisers, we came in way ahead of projection. This means the first two issues went to 108 pages each.

I'm not telling you all the above to boast. As far as we're concerned at Antic Publishing, these early signs of success just indicate that at least we were right about what Amiga users want—and didn't seem to be getting before—a magazine that presents technical substance in a professional, entertaining style. We'll keep working to deliver this to you in every issue.

By the way, particularly welcome among the letters and phone calls we received are the many contacts from Amiga journalists and programmers located all over the U.S. and Canada. For example, FunPaint, the stand-alone graphics program on this month's AMIGA Plus Disk, came in unsolicited from Boston programmer John Casasanta. In coming issues, you will be seeing many more of the exciting pieces already assigned to big-name stars or talented newcomers. AMIGA Plus is actively seeking exceptional contributors of all types of Amiga articles, reviews and disk programs. Especially needed right now are experts in the more technical or business uses.

**Nat Friedland**

Editor, AMIGA Plus



# THE PRODUCTIVE AMIGA

Real-world software solutions from Brown-Wagh Publishing...and Amiga

## EXPRESS PAINT 3-

Feature-rich graphics, B/W & Color PostScript, 24-pin dot matrix, Virtual Memory, text importing, 3-D perspective, unlimited Undos & Redos, 64 color Extra Half Brite, dbl-arc curves, 6-range color cycling, large canvas. "Best of 1988" - *Commodore Magazine*.

## PAR REAL I -

Professional real estate analysis for realtors or investors. Amortization tables, balloon and variable payments, depreciation, financial statements, loan evaluations, lease vs. buy, cash flow forecasts, ratios, tax benefits, rate of return, 3-D barcharts, forms, agreements.

## EASY LOANS -

Amortization tables, tracks interest, principal and time payments. Speech output. Find incorrect charges.

## OUTLINE -

Organize lists for reports, meetings, appointments, recipes, etc. Cut/copy/paste. Import into WP. "Best of 1988" - *Commodore Magazine*.

## PROJECT MASTER -

Professional project management. Helps you manage projects instead of being managed by them. Graphic flow of activities. Best and worst case schedules. "What if" scenarios for deadlines, resources and budgets. Critical paths. Actual vs. planned. Expense graphs, Gantt and PERT charts, resource loads.



## PEN PAL - Your writing Partner



### UNEQUALED PRINT QUALITY & SPEED

- ◀ Print true printer fonts (NLQ) and graphic images on same page in same pass!
- ◀ Print multiple graphics on same page; each with its original colors and resolution!

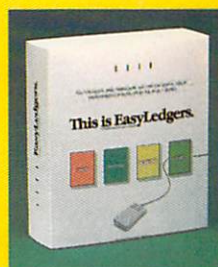
### UNPRECEDENTED PRODUCTIVITY FEATURES

- Automatically flow text around graphics; box & contoured boundaries; even while typing.
- Colored boxes, borders, shadows, lines & backgrounds.
- View full page and closeup while editing and scrolling.
- Resize/crop images (& HAM); keeps original resolution.
- Create forms; fill in field by field; edit & refresh.
- Spellcheck; 100K words; unlimited user dictionaries.
- Analyze writing style; statistics & reading grade-levels.
- Open 4 documents; search/replace; undo/reredo.
- Access 200 B/W or color fonts; sorted by name and size.
- Mailmerge & copy from built-in database. Report templates.
- Open 4 databases; 9 data types including calculations; 32 fields per record; 32k rec. max.
- Print mail labels & reports; titles, sort breaks, sub-totals.
- Sort by multiple fields; search by logical criteria; screen totals.
- Locate duplicates; delete multiple records; merge

**MIDI MAGIC** - Easiest Midi sequencer! Fabulous interface. Help text. Multitasking, 16 tracks, 26 sequences. Quantizing. Multi channel recording. "Beginning and serious amateurs will love MIDI MAGIC for its power" - *Amiga World*

## EASY LEDGERS -

Fully integrated accounting system. Sales, purchases, inventory and general ledger. Extremely easy; uses familiar bookkeeping interface. No complicated codes to learn, no account numbers to remember. Just point and click.



## ARCHITECTURAL DRAWINGS -

4 sets of professional designs; IFF or Aegis Draw(tm) format; FLOOR PLANS - windows, doors, baths, etc.; INTERIOR DESIGNS - beds, tables, desks, sofas, etc.; FOUNDATIONS - framing, rafters, etc.; AUTOS - 1980's, Mercedes, Cady, Ford, etc.

## Give Me More!!!

Call for additional product information, prices and participating dealer locations. Ask about our product demos and money-back guarantee.

We acknowledge the trademarks and give many thanks to the producers of our fine productivity products:

Circum Design  
Madrigal Designs  
PAR Software  
SoftWood Company  
TRS Labs  
Zuma Group

*Brown  
Wagh*

1-800-451-0900

1-408-395-3838 (CA)

16795 Lark Ave. #210, Los Gatos, CA 95030

## TV\*TEXT -

Best selling video titling software. Fonts, colors, shadows, strobes, sizing, grids, backgrounds, special effects.

## TV\*SHOW -

Create super slide show presentations. 50 transitions. Any IFF pictures. Voice; Loops. Just point & click.

## ZUMA FONTS #1-4 -

Professional fonts for video & graphics. Each volume contains 3 styles in 6 sizes at 2 resolutions.



# ALERT BOX

## Record-Breaking NYC AmiExpo

With more than 12,000 users in attendance March 3-5, the 1989 New York AmiExpo set an attendance record. And on display at the Marriott Marquis were high-end professional applications running on the Amiga—from video equipment to local area networks—which compete with systems costing much more.

ASDG premiered their Professional ScanLab interface for Sharp color scanners connected to a Targa graphics board on the IBM-PC side of an Amiga 2000. It was displaying the full 24-bit (i.e. 16 million color) graphics produced by the scanner software. The point of this was the introduction of **ASDG-RESEP** which works with Gold Disk's Professional Page. RESEP will read in a color-separated PostScript file produced by Professional Page, strip out the graphics and replace them with 24-bit color-separations for truly professional quality color graphics output. The software retains the sizing, cropping and position of the HAM version of the picture which was imported and manipulated in Professional Page.

Above: AMIGA Plus crew at our NY AmiExpo booth.

Right: An offer you can't refuse from the Godfather ... uh, Editor of AMIGA Plus.

AmiCore International had some impressive hardware displayed. They build Amiga-based integrated systems for video and industry professionals who will pay for the very best. A black & white scanner is now available from C Ltd. and Gold Disk showed their new software/hardware

interface for the b&w Canon IX-12 scanner. Gold Disk also gave us a private demo of **Transcript**, their new word processor which will work as





an online editor from within the next version of Professional Page. We also saw a sneak preview of their **Advantage** spreadsheet and **Design 3D** package, which provides an impressively fast and easy-to-use interface for 3-D object design.

Both Ronin and GVP have 68030 based accelerator boards for your Amiga which will run at up to 25 mhz . . . watch out Mac IIx. Another hot item was serial port cards for the Amiga 2000. ASDG showed their new **Dual Serial Board** which offers two serial ports without requiring the ASDG Twin-X interface board. They had two Amigas talking at speeds over 50 kbaud! They also showed **Syndesis TSSnet**, a DECnet network for the Amiga which will allow it to fit right into many DEC and VAX networks. The **X-11 X-Window** system from GfxBase was also running on this network.

Amigo Business Computers' **Com-Ports** multi-serial board was running the **IDS MultiBoard** 32-channel bulletin board system from Intercore Development Systems. With four 8-serial-port boards in your Amiga, you could host 32 terminals on your BBS simultaneously, even in CB mode! Creative Microsystems Inc. also has a **MultiPort** board which has both a standard DB25 RS-232 port and an Macintosh style DB9 RS-422 for serial communications, as well as an extra parallel port. There is also software for linking to AppleTalk networks and, of course, device drivers for the extra ports.

Mindware International hosted a press demonstration of **PageSync**, which synchronizes MIDI sound to video events for greater multi-media power.

Micro Momentum Inc. was showing a prototype **Journeyman** portable Amiga with a pop-up 7-inch monitor reminiscent of an amber oscilloscope. It boasts 1Mb of RAM, an RGB port, two drives, a 3.5-inch hard disk bay and a 150-watt power supply. This is no laptop, but it can pack quite an Amiga punch into a relatively small package.—ARNIE CACHELIN ■



Amiga-using Performance Artist Jim Pomeroy keeps an eye, or six, on you.

### Performance Art Amiga

I'll never again view an oven mitt as benign after seeing Jim Pomeroy's performance art piece "Ikonikironik" at Mills College in Oakland, California. His performance persona, Dr. B. Linds Nake, used a mitt as a shark hand-puppet, colorfully transfigured by the Amiga using a Live! video board and Invision software. Jim's high-tech "Rube Goldberg" blend of candid political comment, puns, wordplay, and sight gags, reaches into the higher elevations of corn while giving the audience a gentle intellectual tweak.

The Amiga is Jim's primary art tool. "Ikonikironik" contained whirling animations of Monopoly tokens created with VideoScape 3D and Modeler 3D from Aegis, and The Director. Humorous animations of

U.S. currency were made by manipulating DigiView files with EA's Deluxe Paint II. These images were soundtracked with the digitized drawl of President Bush.

The Amiga is also a teaching tool for Jim in his classes on Video Art and Photography at the University of Texas, Arlington. He gradually entices his computer-wary students into active Amiga creativity. First he introduces the paint programs and the possibilities of digitized images, then he demonstrates simple animation with The Director, from Right Answers group.

Live!, Invision and Digi-View were used by students who gathered for Video "Jams" during the Inauguration and Super Bowl events. The captured video images were colorized and punned in realtime. Viewers could



follow the action on three monitors in an adjoining room while socializing, or do some hands-on "jamming" themselves.

A collection of Jim Pomeroy's Amiga-altered photos were recently issued as a View-Master disk (remember those?). He is a published and scholarly researcher on the Mount Rushmore Monument. His work is presented internationally and could be scheduled at a museum or college near you. Check to see if . . . The Doctor is in.—SUE ALBERT ■

### **Amiga in Japan**

I recently visited Tokyo and was happy to discover that despite obstacles, the Amiga now has a foothold in Japan.

A small group of dedicated Amiga users is spreading the word. The only organized group is called the Commodore Fan Club. It meets in Osaka with around 60 members. However, there is also a loose affiliation of friends in Tokyo and Yokohama who keep in touch through bulletin boards and fax machines, occasionally meeting for special events.

A Tokyo Amiga party is a good time beginning with a raised glass, a "Kampai!" toast, excellent food and camaraderie—followed by software demos. Information about the Amiga is also spread through a newsletter called "Oh! Commodore" and through articles in the thick, glitzy Login computer magazine.

Although it is difficult to obtain exact figures, there are probably only 1,000 or so Amigas in Japan at this time. No Amiga software has been developed yet there, but there are rumors of an upcoming software interface allowing the keyboard to enter Japanese characters. If this happens, it would rapidly increase the popularity of the Amiga. (The Japanese alphabet consists of a few dozen syllabic characters called Hiragana and Katakana, which are used for grammatical terms and foreign words, plus thousands of Kanji characters based on Chinese writing.)

For now, Japanese users are con-

tent to exchange public domain software they obtain from bulletin boards, or to purchase mail-order commercial software from overseas. Yes, Byte Warrior and other viruses have arrived in Japan, too. Fortunately, VirusX is also widely distributed.

The most popular computer in Japan now is the NEC PC-9801, because it has a Japanese keyboard and lots of software. Japanese users com-

# アミガ に 日本

plain that Commodore Japan doesn't support them, and they also complain that commercial software manuals are not available in Japanese. It is difficult and expensive to obtain Amiga software and hardware in Japan. In Tokyo's Akihabara district (also called Electric Town), which is a swirling kaleidoscope of electronics and computer stores, there is only one store, called "Oak Village," selling the Amiga.

Those of us who remember what it was like to be early Amiga owners in the United States can appreciate the position Japanese Amiga users are in today. Soon, I expect new software and hardware will be coming from the Land of the Rising Sun. And to that thought, I raise my glass and say, "Kampai!"—ROB GRIFFITH ■

### **High Simulation**

In a dark, all-black hanger, you are seated in a pilot's chair inside a motionless, skeletal, helicopter cockpit.

The control panel holds several touch-sensitive screens and keypads. You pull the large helmet down over your eyes. The simulation begins. On lenses inside the headgear you see a 360-degree projected view of a computer-generated landscape, the cockpit instruments and the other helicopters under your command when they enter your field of "vision." Moving the controls or your head causes the visual effects to follow smoothly with no lag. The simulation is absorbing, augmented by engine noise, radio transmissions, weapons fire, and near-photo-quality screens. When the simulation is over, you insist that you were actually moving.

A science-fiction upgrade of the ultimate computer game? No, this experience is available now. It is created on a simulator built by the U.S. Army for a pure research project into the use of computer touch panel controls for helicopters which do not exist, even on the drawing board. Several mainframe computers collect reams of data per millisecond. They coordinate and display on superb Silicon Graphics Iris monitors the flexible script of a combat mission. In one super high-tech room, staff members control the time of day, the weather, and certain random events. Across the hall, other pilots sit at micro-VAX computers networked to the simulator and "fly" the companion aircraft. Occasionally one flier is designated a "hostile."

Combat helicopter pilots still acquire much of their technical knowledge in yesterday's traditions—lecture halls, rote learning, taking notes at dry chalkboard demonstrations. In the NASA Ames Research Center at Moffet Field in Mountain View, California a staff of civilian and Army psychologists are using Amiga computers to add a more engaging dimension to flight education.

The research center is a collection of weirdly shaped testing structures located in the shadow of Moffet Field's gargantuan blimp hangers. In the basement of a round building once used to house a centrifuge, a

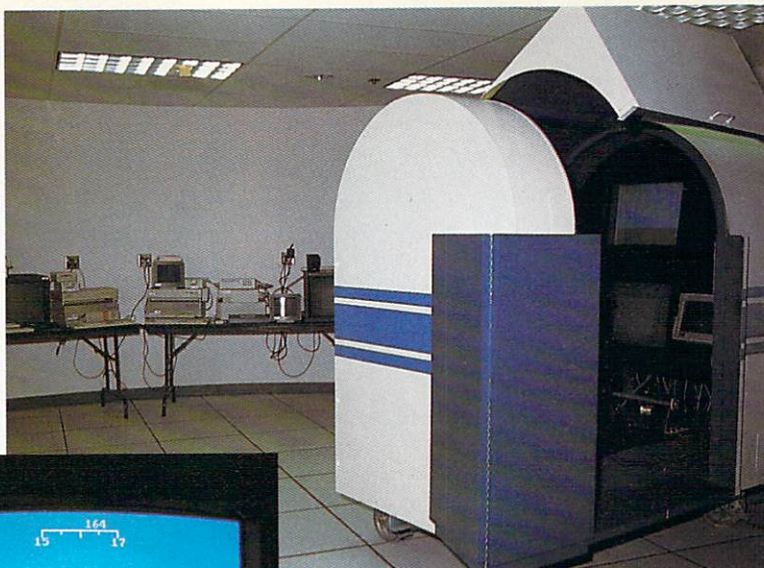


**The ultimate  
Amiga Flight  
Simulator only  
\$39.95**

[illegible]

The speed of the Amiga created an incidental guffaw for the crew. The Big Simulator with its incredible load of simultaneous calculations can sometimes slow down in response time to the touch screen. When Curt brought in the first Amiga touch panel for testing, the staff was amused to find that the inexpensive computer was going to need a programmed lag or the trainees would notice a difference in the response time upstairs.

Another plus for the Amiga system is that it can be immediately and easily "tweaked" or even reprogrammed without the costly downtime required by the mini and mainframe computers. However, the familiar



This is where Joy Matsumoto comes into the picture. She is a Human Factors Engineer and the on-site employee for the Bio-Dynamics project. She and U.S. Army Captain Loran Haworth, a helicopter pilot and psychologist, guided me around the installation. As the networked Amiga systems lining the walls of the lab are being configured for prototype training, Joy is analyzing the interaction of the pilots with the computers and constructing the educational programs that will work in conjunction with Curt's flight simulation and the helicopter control screens.

Her job is to gather the subjective "gut reactions" of the trainees and "optimize the system from the human's point of view into a safe, effective, and efficient training program." Joy's plan is to place each pilot in an separate cubicle with three networked Amigas. One computer will run the training screen while the other two units power the control panel screens. And the educational software environment she is using is VIVA, MichTron's new hyper-media program for the Amiga which was reviewed in the first issue of *AMIGA Plus*.—SUE ALBERT ■



# FALCON



## FALCON TAKES TOP HONORS

- **BEST SIMULATION**
- **BEST ACTION/STRATEGY GAME**
- **BEST TECHNICAL ACHIEVEMENT**

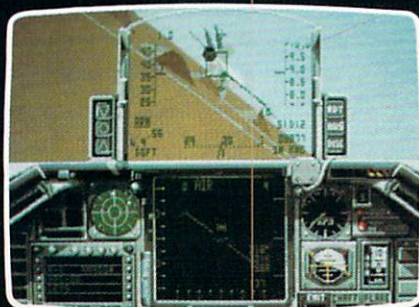
## THE F-16 FIGHTER SIMULATION

Climb into the FALCON cockpit and fly a highly realistic simulation of the F-16A Fighting Falcon. Perform fighter maneuvers while engaging enemy MiG's in dogfight battles OR connect two computers and go head-to-head against another plane piloted by a second person. Realism is captured by use of sound and digitized airplane images, advanced radar mechanisms, and four alternating heads-up-displays. Multiple levels and missions challenge even expert pilots. Feel the exhilaration of power, speed, and maneuverability of the F-16 as you claim the skies as FALCON territory!

FALCON Available on Macintosh (1 Meg), IBM 256K, Amiga 512K, and Atari ST 512K.

**NOW AVAILABLE FOR  
AMIGA AND ATARI ST**

- "It's the best flight simulator yet put on a microcomputer... a must for any Mac owner..." John Dvorak — San Francisco Examiner
- Other flight simulators "...pale to insignificance compared to FALCON..." Jack Warner — United Press International
- "Flying FALCON is nothing short of exhilarating..." Howard Bornstein — Computer Currents



Amiga & Atari ST screen

CIRCLE 026 ON READER SERVICE CARD

**Spectrum  
HoloByte™**

2061 CHALLENGER DRIVE  
ALAMEDA, CA 94501 (415) 522-0107

FALCON and Spectrum HoloByte are trademarks of SPHERE, Inc. Macintosh and IBM are registered trademarks of Apple Computer, Inc. and International Business Machines respectively. Amiga is a trademark of Commodore-Amiga, Inc. Atari and ST are registered trademarks of Atari Corp.



# GURU BASHERS

## Answers to readers' technical questions

BY ARNIE CACHELIN,  
AMIGA PLUS TECHNICAL EDITOR



### Renaming Drives

**Q:** In Deluxe Music Construction Set by Electronic Arts you are given a choice of loading from df0:, df1:, or dh0:. This is true also of Photon Paint by MicroIllusions. In Photon Paint, I modified the mountlist and defined dh0: as floppy drive unit 2, using the example provided for renaming df2: as df1: on the Amiga 2000. Now when I click the dh0: gadget I can load and save to df2:.

Unfortunately, this would not work for Deluxe Music.

**Phil Maitland**  
Livermore, CA

**A:** I don't know why the mountlist trick would not work with Deluxe Music Construction Set. There are several ways to work around the inconvenient way EA "hardwired" the gadget names as db0: and df1:. One way is to use the ASSIGN command from the CLI. Type ASSIGN db0: df2:—this will assign the name db0: to whatever disk is in df2: when the command is executed.

Unfortunately, clicking the db0: gadget will now cause Deluxe Music Construction Set to look only for that specific disk, rather than reading whatever is in that floppy drive. If you use IconX (included with Workbench 1.3) to make an icon and script for this command, it would be easy to switch disks in df2: and still have them respond to the db0: gadget.

Another possible solution would be to use a disk editor (like the public domain programs DiskX, Zap, and Sectorama) to "re-hardwire" the gadgets. Use a search function to find the text db0: (or DH0:) in the program itself, and change it to

DF2: everywhere it occurs. This is recommended only for advanced users who are not squeamish at the sight of executable code presented in big hex blocks with only a few recognizable characters. This process should only be tried on a copy of your original disk. Any time you edit a program you risk permanent damage.— + EDITORS

### Double Image Icon

**Q:** I made a double-image icon for my hard drive with the IconED and IconMerge files on the Extras disk. Before I could see the results of my new icon I had to re-boot my Amiga 2000. The results were great; I love that feature! But was there any way for me to see the result of my new double-image hard drive icon without rebooting my computer?

**Mike Titera**

**A:** You can see disk icons you have changed by doing another LOADWB command from the CLI. As far as we can tell, this does not cause any severe problems for the Amiga, and will redisplay the disk.info (icon) files found on the relevant disks. With floppies, you can just remove them from the drive. With hard disks and RAMdisks, it is more difficult. Custom icons for the RAMdisk can be displayed by copying the appropriate file into the RAMdisk in your startup-sequence before the LOADWB command. It can be deleted after the LOADWB is executed, since the image is already on the screen and the disk.info file will not be accessed.

To view hard disk icons while creating them, it would probably be easiest to save the icon to a disk as disk.info and remove and insert the

disk until you have an icon you want to keep. Or you could edit the icon as a Project or Tool type icon with a name like test.info. Then it will be redisplayed whenever you open the drawer it is in. When you are done, change the Icon Type back to DISK and the filename to disk.info.— + EDITORS

### Worth Waiting?

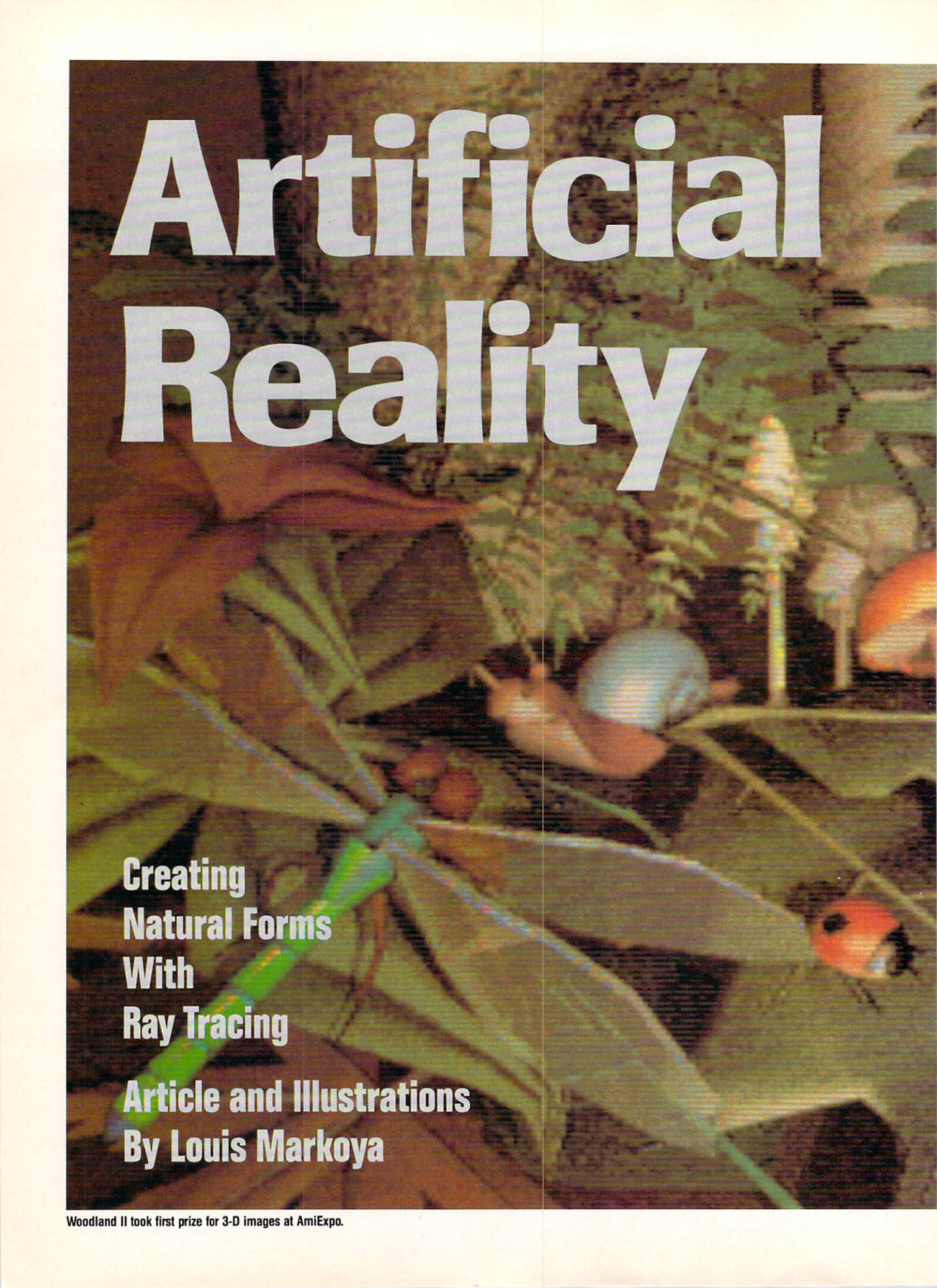
**Q:** I was planning on getting the Amiga 500 with a 512K expansion RAM card. However, I recently read that Commodore is planning to make 1 megabyte of memory standard on A500s in the future. Should I wait and buy the expanded A500? Also, will future machines be equipped with the so-called Enhanced Graphics set, and will these new chips be compatible with existing software?

**David Norton**  
Redding, CA

**A:** Chances are you will not save money by waiting for a 1 megabyte A500 as opposed to buying an A500 and expansion cartridge. Future A500s with the Enhanced Chip set (ECS) will probably have 1 megabyte of RAM, since the ECS upgrade is primarily intended to allow the Amiga's graphics chips to access 1 megabyte of chip RAM rather than the current 512K limit. All Amiga 500s and 2000s are compatible with this upgrade, so it should no problem to have your dealer install the chips whenever they become available. The new chips should work with the memory expansion cartridge for the A500 and be compatible with all software.— + EDITORS ■



# Artificial Reality



**Creating  
Natural Forms  
With  
Ray Tracing**

**Article and Illustrations  
By Louis Markoya**

Woodland II took first prize for 3-D images at AmiExpo.



*The most sophisticated 3-D graphics technique is ray tracing, a process requiring the computer to calculate the path of a ray of light from each light source in the illustration, and the ray's reflections off every illustrated object and background. This article tells the inside story of a recent breakthrough in Amiga ray tracing technique.*

Ray tracing is an artistic application of an exact science based on mathematics and physics. It tends towards a hard-edged world filled with chrome spheres, checkered floors and high reflectivity because most ray tracing programs can portray reflections and shadows very accurately. Without models, a traditional painter would have a difficult time predicting realistic reflections on curved surfaces. This is a major reason why computer artists enjoy the creating of such pictures. Also, using only simple shapes such as spheres and flat surfaces is the least demanding technique for ray tracing. But although the hard-edged pictures are dramatic, jazzy and have high-tech appeal, they are ultimately sterile and lifeless.

Most ray tracing packages include an object library with basic geometric shapes that can be used alone, or combined to form more complex objects. Even these combined objects tend to be blocky and not lifelike. The creation of objects with organic form is usually avoided due to the complexity of these shapes and the difficulty of editing the forms to look realistic in a ray traced 3-D environment with all the scene's objects,

lighting, camera viewpoint and attributes.

My picture, WoodLand II, was an attempt to create with the Amiga an environment that approaches photographic realism and consists of organic objects found in nature. In March 1989 at the New York AmiExpo, WoodLand II won first prize for 3-D pictures. You will find WoodLand II on this month's AMIGA Plus Disk.

### **Ham Realism**

For the first time, the Amiga's HAM mode—with 4,096 colors and resolutions of up to 352 X 440—offers home enthusiasts the ability to create realistic, photographic-quality images at affordable prices. The Amiga community is fortunate to have graphics software second to none in the personal computer field—in many cases, rivaling professional packages for “high end” systems costing ten times more.

Creating a picture such as WoodLand II requires both an object editor and a rendering package. Editors such as Sculpt 3D and Sculpt-Animate 4D, 3Demon, or Modeler 3D could be used to create such objects and Sculpt 3D/4D could also be used to render realistically. For both functions here, I chose Impulse's **Turbo Silver**, which offers a wide range of rendering capabilities and an editor with some unique capabilities (although it is not intuitive).

Like most ray tracing enthusiasts, I started by rendering increasingly complex scenes of high reflectivity. Fascinated by the glossy look of such pictures, I pursued this format for some time. With practice, I learned the Amiga's strengths and shortcomings and compared results with professional systems. The output was surprisingly alike. But what disappointed me was that my pictures had that sterile, somewhat repetitive look—just like what other artists were doing. I decided that I would like to produce Amiga ray tracing that is not confined to the realm of shiny geometric shapes and reflections.

My first effort in a new style was an





Organic objects will be available as 3-D "clip art"!

ocean scene. WhaleTrace eventually developed into a two-megabyte animation of rolling waves set in a random loop for more realistic timing, with a humpback whale that surfaces, arches and re-enters the waves just like in a Jacques Cousteau film-clip. The animation was well-received and I was moved to take the experiment further.

I had rarely seen, in any computer graphics journal, many ray traces of close-up scenes from nature—only occasional glossy insects, a fractal plant here and there, or a range of fractal mountains. So the first decision was to choose objects that any area of woods has in common—ferns, leaves, mushrooms and local insects. With this in mind, I started the project that became WoodLand II.

### Organic Objects

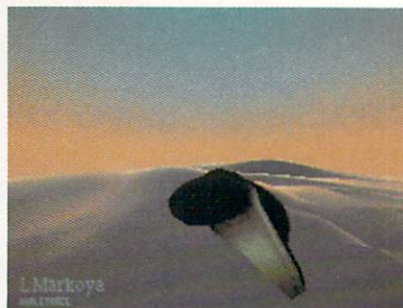
Objects for two varieties of mushrooms were generated first. It was here that the simplest necessary techniques would be tested. The cap of the Bricktop mushroom was made from a sphere with some deleted points. Edge points were then repositioned to make a non-symmetric bottom. The mushroom base was created in the same manner. The second

mushroom, in the Amanitas family, was spun from a profile I created. Both mushrooms, like several of the other objects in the group, are created from groups of smaller objects. In this manner it is easy to pick

**To duplicate  
the soft light of  
a forest, I  
added two light  
sources to  
soften  
shadows.**

the cap, give it different color and size attributes, and scale the entire group to form whole new families of mushrooms.

Next came the ferns, seemingly more difficult, but actually containing enough symmetry to make the task relatively easy. It is this same symmetry which makes ferns great targets for recursive algorithms that create their form, and many indeed have been formed with fractals. The leafy Polypody fern was constructed



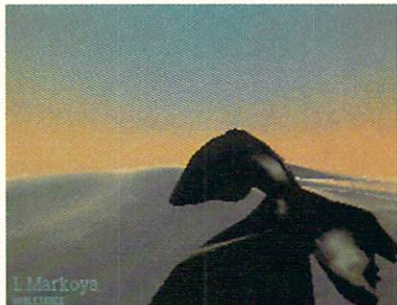
Frames from the WhaleTrace animation

in two parts, stem and leafy section. The stem used a technique unique to Turbo Silver called "skin." This command allows one to place "slices" of an object along any path. The slices may change shape and scale, or be rotated in any direction as long as the number of points remains the same. The "skin" command then converts all the slices to a single skinned object. Very complex shapes are possible with this method, from stems and leaves to moebius strips.

The Humpback whale from WhaleTrace and many of the objects in the WoodLand scene were created with this command. (Sculpt 3D/4D does have a similar command "Edit do UnSlice." But it is limited in that all slices must be perfectly parallel to each other. Such shapes can be made within this program by extruding, shaping and rotating each new extrusion.) The leafy part of the fern was made by simply drawing an outline of the leaf with points and later filling in the outline by connecting the dots to create polygons. The Bracken fern, being more symmetrical, was created by scaling and mirroring one section of fern. The problem with such an object was to maintain its density and complexity without the object size becoming overwhelming.

The snail and its shell, the salamander, trees, leaves and Trillium flowers were all created with use of the skin command. Many of the objects were created with parent-sibling relationships. The ladybug's legs and antennae can move, as well as the salamander's legs, the snail's antennae and the dragonfly's transparent wings. The leaves were created with parent





and sibling objects so that different seasonal colors could be applied to the leaf and stem for more realistic effects.

Test traces of each new object were done so that any corrections or improvements could be made. Pictures labeled "organic objects" were uploaded to People Link and CompuServe to share what I was working on.

After about a month of evening and weekend work, the object creation was done. My scene was created on a flat surface, with turbulence turned up to simulate grainy soil. As I added objects and tested the scene, it was obvious that I needed more memory. My Amiga 2000 with 3 megs could not handle the task. I would like to thank Ronin Research for their help and Amiga Computer Center of Wilton, Connecticut for making the tracing possible.

### More Megs

To properly generate any ray trace, many things must be considered. Object placement, color, lighting and shadow all are elements of the final geometry that makes a picture attractive. Don't let anyone tell you this is not art!

I started placing my objects and trying a trace. To duplicate the soft light of a forest, I added two light sources to soften shadows and illuminate objects completely in shadow. These lights were carefully placed to cast shadows that worked well with the general geometry of the picture and added to the overall look. In the placement of objects I had to deal with Turbo Silver's res-

trictions on a world which is 2,000 X 2,000 X 2,000 units.

Here too is a delicate balance between object size and its relationship to the world. Turbo will trace an object faster if it is large. The smaller the polygon used by the object with-

**Object  
placement,  
color, lighting  
and shadow all  
are elements of  
the final  
geometry that  
makes a picture  
attractive.**

in this 2,000-cubed world, the more memory that initialization requires and the slower the trace will be. After all initial tests were run, all objects placed and camera viewpoint set, my Amiga had 6 megs of memory, one of which was 32-bit. The cell itself was 900K (including all objects, attributes, lighting and camera positions). During initialization I watched the Workbench screen tick down the memory to 3K! A bit faint at heart, my spirits rose as the hard disk light went on and I knew the trace had begun.

### Not Trouble-Free

I feel obligated to mention just how hard it was to get to that frightening moment. I had to survive

several days of system crashes due to memory problems. Using some 32-bit RAM on my Ronin board along with multiple 2-megabyte Commodore 2052 boards was shaky at best. Ronin said problems could be expected. Trying to work with a Commodore 2058 board was even worse, and in many cases the machine wouldn't even boot. Finally the combination that always worked was to include a Microbotics SIMM board.

I'm no hardware expert by any means, but I am told that the Microbotics boards draw less power. I mention these problems only for those contemplating a high-end system. Be careful of your component mix and avoid unnecessary headaches.

The trace took only three hours and 40 minutes to complete. The results are presented here and rival the look of much costlier computers, proving that nature close-ups can be successfully achieved on the Amiga.

The objects from WoodLand II are now available from Impulse as a complete set in Turbo Silver format. Other formats are soon to be released from Antic Software. ■

*Louis Markoya works as an engineer in Connecticut and is an independent Computer artist in his spare time. He can be contacted through AMIGA Plus Magazine, on People Link as L.Markoya, or on CompuServe as 75766,504.*

**TURBO SILVER 3.0** \$199.95  
Impulse Inc., 6870 Shingle Creek Parkway,  
Suite 112, Minneapolis, MN 55340. (612)  
566-0221. Not copy-protected, requires at  
least 1Mb memory.

CIRCLE 257 ON READER SERVICE CARD



# Get Clicking With Your Amiga

Subscribe *now* to Amiga PLUS *with disk!*



## GRAPHICS

Outstanding animation and graphics from the best Amiga artists around, from AMIGA Plus Disk right on your screen.



## PROGRAMMING

Tutorials on AMIGA Plus Disk bring the expertise of top Amiga programmers and artists directly to you.



## GAMES

Stimulate your imagination and your reflexes with games on AMIGA Plus Disk!

**Subscribe Today! Call 1-800-234-7001**

Use your Visa or MasterCard



# READER INPUT

## MasterMind Icon

Your magazine looks like it could grow into something really great. It would be nice if you could take up some of the slack due to the loss of The Amigan.

As for your disk, a personal peeve: when a window comes up I like to see all the icons totally displayed, not like your main and programming windows. The only real problem I came across, though, was the icon for MasterMind, which was a Tool Type when it needed to be a Project Type. Thanks to Fred Fish and his Disk Number 69, and thanks to Larry Phillips for writing IconType which changes icon types.

Allan Baer

Simi Valley, CA

*You're right—we goofed on the icon. We got it at the last minute, and it looked so spiffy that we forgot to make sure it was the right type. As it is, you can't run the program simply by clicking on the icon, even if you have the program on a disk with BASIC on it. Instead, you have to run BASIC, then load the MasterMind program. Saving MasterMind from BASIC will replace the icon with a working (if boring) BASIC program icon. To change the icon type, we recommend IconType or Hermes' shareware ICONLAB.—*  
+ EDITORS

## Potential Author

I'm very interested in AMIGA Plus. It sounds like a magazine that will give Amiga owners a lot of info, and there aren't many that offer that—and the disk is a great bonus. Other disk-based publications are simply

too costly for some people, like myself. I'm physically handicapped and have very little income.

I like to see timely reviews that tell people how software works from a user's point-of-view. How do I go about writing for you?

Michael Bearden

Rockmart, GA

*Anyone interested in writing for AMIGA Plus should submit writing samples and some information on their special areas of expertise. We look at unsolicited submissions. Articles should be submitted on disk, with a cover letter. Programmers are also invited to send in their programs for evaluation. For a copy of our guidelines, send a Self-Addressed Stamped Envelope to Author Guidelines, AMIGA Plus, 544 Second Street, San Francisco, CA 94107.—*  
+ EDITORS

## Pro's Prose

I just got the promotional mailing for AMIGA Plus today and promptly signed up for a year's subscription. Sounds good!

I have an article coming out in American Cinematographer on the Amiga as a source of dynamic graphics in professional video production. If the editor doesn't chicken out, I point out that the Amiga survived and flourished because of the software industry, which really took advantage of the machine's amazing capabilities and offered customer support which had not been forthcoming from Commodore.

Tom Sullivan

Union City, NJ

*As far as we've observed, Commo-*

*dore is neither the best or the worst computer company when it comes to enhancing and supporting their hot products. We like the way Commodore showed working prototypes of forthcoming upgrade boards at the winter trade shows, so the new features could be seen in action even if specific prices and release dates were not ready yet. And at least CBM does not keep their prices jacked up the way Apple does.—*  
+ EDITORS

## Joy of Tutorials

I just received your new magazine and enjoyed the structure and content—so much so I asked for a subscription.

Your selling point for the magazine will be the tutorials you offer. I was sorry to see that the tutorial on PhotoLab was not put in as originally advertised in your brochure. Most Amiga magazines do not even give tutorials, so if you do make a policy of running them you will sell a lot of magazines. So often the manuals are confusing, and actual projects (in tutorials) would be worth the price of the magazine—especially for Sculpt 3D, Sculpt-Animate 4D, Videoscape GEO building, Zoetrope, MovieSetter and others.

Daniel Leonard

Fort Wayne, IN

*The PhotoLab tutorial which was held for this issue is typical of the graphics how-to material you'll find in AMIGA Plus. We think that having the actual image file available on disk adds yet another dimension to the usefulness of these tutorials.—*  
+ EDITORS ■





# Fun With FunPaint

55K OF EFFORTLESS GRAPHICS POWER

Program by John Casasanta

Article by Carolyn Cushman, AMIGA Plus Assistant Editor

If you enjoy Amiga graphics, but have no overwhelming reason to invest in a commercial paint program, then FunPaint is just the thing for you. This AMIGA Plus Disk Bonus is seductively easy to use—it definitely lives up to its name. Yet FunPaint is powerful enough to create and edit impressive paintings in every Amiga graphic display mode—even HAM with its 4,096 different colors!

You'll find FunPaint on this month's AMIGA Plus Disk in the Utilities drawer, along with an extensive set of step-by-step instructions (which you really should read). Just double-click on the FunPaint icon, pick your display mode and you'll be off and painting. Just be warned that it can be hard to quit a FunPaint session once you start fooling around with this software.

Drop-down menus at the top of your screen make all the commands easily accessible and simple to learn. FunPaint has a streamlined set of features that won't confuse beginners.

**FunPaint is  
powerful  
enough to  
create  
impressive  
paintings in  
every Amiga  
graphic display  
mode.**

It's easy to draw free-hand with the mouse, or pour color into an enclosed area. More experienced artists will find a lot of the features they expect from paint programs—such as adjustable colors, custom brushes and rubber-band boxes, ellipses and lines.

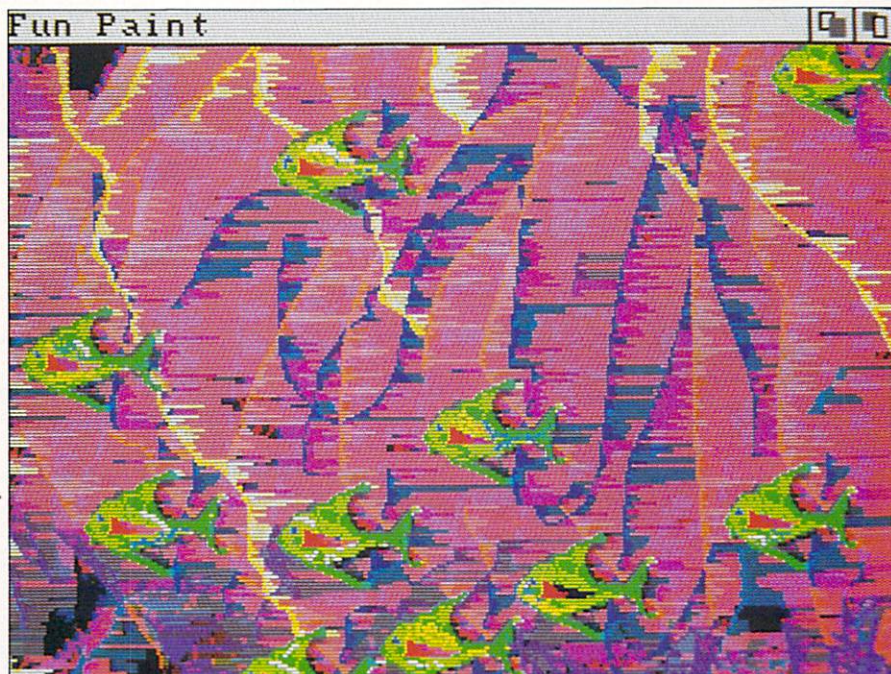
For such a small program—just under 55K—FunPaint gives you access to an amazing range of display modes. You work in Low-Resolution

Mode with two to 32 colors. Using Extra-Halfbrite with Low-Resolution gives you 64 colors, by adding 32 extra colors that are half as bright as the first 32. (Extra-Halfbrite is not available on many early Amiga 1000s.) High-Resolution Mode makes 2, 4, 8 or 16 colors available. Interlace Mode gives you twice as many vertical lines as Non-Interlace Mode. Hold-and-Modify (HAM) Mode lets you work with 4,096 colors, thanks to the interactions of the colors on the special HAM Palette.

## **IFF Compatible**

Pictures are opened and saved in Interchange File Format (IFF), giving FunPaint a high degree of compatibility with many other Amiga graphics programs. Unfortunately, loading paintings created with other software can be a bit tricky. Your picture must be exactly the size of the screen in order to load—and you need to set FunPaint for the correct format before you load.





HAM Aquarium made with FunPaint on the AMIGA Plus disk.

A painting saved by FunPaint automatically creates its own icon and it can be opened by clicking on this icon from the Workbench. FunPaint then will also open automatically, as long as FunPaint is on the same disk (in the root directory).

When you first enter FunPaint, you are asked to select the display mode. Then the work screen appears and you're ready to start drawing. If you want to change modes, select New from the Project Menu. To clear your screen without changing Modes, select Clear from the Edit Menu. This menu has several other useful options. Undo lets you delete the last operation performed. Title Bar, Pointer and Crosshairs can be removed from your screen, or brought up again whenever you wish.

Under the Paint Menu, you'll find the drawing options. Use Freehand to draw with a pixel-wide line. Line, Rectangle and Ellipse let you stretch lines in the current color into perfect boxes, circles and ovals, or straight

lines. Flood Fill lets you fill any defined area with color. With Get Brush you can turn part of your painting into a brush, or create a custom brush in any shape or colors you desire.

The drop-down Palette initially contains a default set of colors, with the current color marked by an arrow. To draw with a new color, point-and-click on the new color you want. You can adjust the current color to your liking just by clicking on Adjust. This will bring up a set of Red, Green and Blue (RGB) sliders that you move back and forth until you make the color you want. Note that if you already used the color you're changing, it will change in the picture to match the new color. If you like your picture but don't like the colors you used, this gives you a chance to modify them without damaging your work.

HAM colors get a bit more complex, and this program has an interesting way of manipulating them.

The HAM colors actually change the colors of the pixels next to them, in order to get the full 4,096 colors possible. With FunPaint, several adjacent pixels in horizontal lines may change when you add a new color. This occasionally results in an uncontrollable effect reminiscent of watercolors or "bleeding" inks. It can be quite dramatic, but before starting on your first major work of HAM art, experiment with the effects FunPaint can give you to make sure you have the control you need.

FunPaint isn't intended as a professional artist's tool, but it provides a highly entertaining introduction to the world of Amiga graphics. If you're thinking about buying a paint program, but don't know exactly what you want, FunPaint can give you a feel for different modes and tools available. And with so many colors and modes to play with, FunPaint by itself is more than enough to keep most amateur artists busy and challenged for hours to come. ■



# zo·ë·trope (zō'ə trōp)

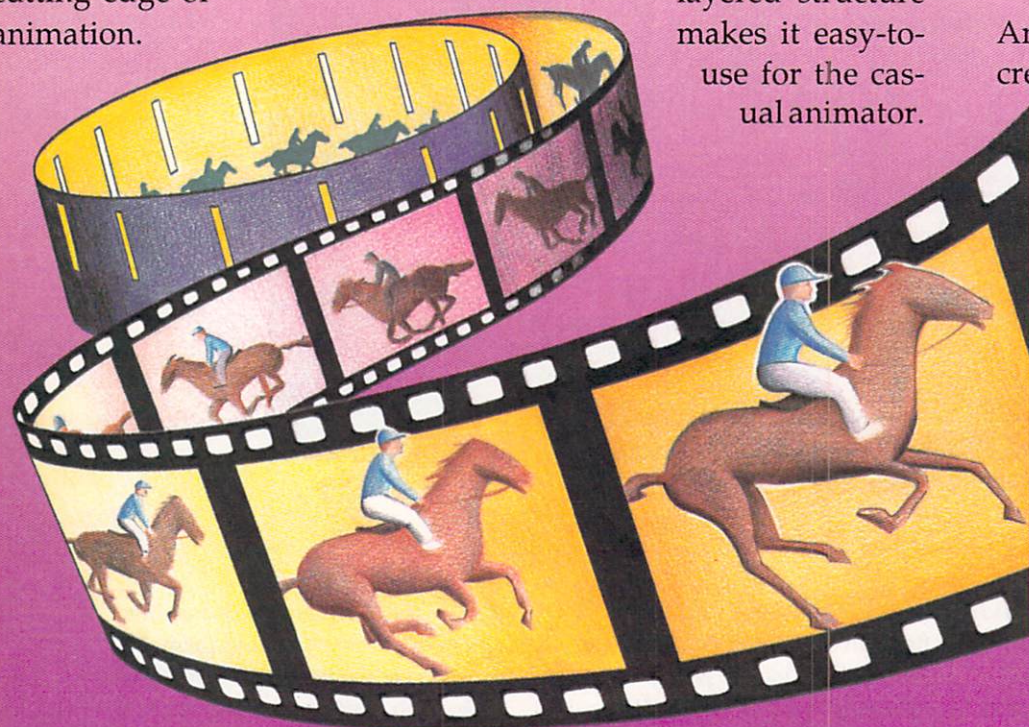
*n.* [irreg. f. Gr. *zoe-*, life + *tropos*, turning] 1. a device that gave static images an illusion of motion. Known as the "wheel of life", the zoetrope brought the magic of animation to the parlours of the mid-1800's. 2. a new state-of-the-art advanced animation system for the Amiga® computer from Antic Software.

Now! The program you've been hearing so much about... Zoetrope puts you right on the cutting edge of animation.

Its high end features satisfy even the most demanding of professional users. Its unique layered structure makes it easy-to-use for the casual animator.

Bring your imagination to life with Zoetrope: the faster way to animate.

Now with Zoetrope, The Animation System™, *you* can create magical motion.

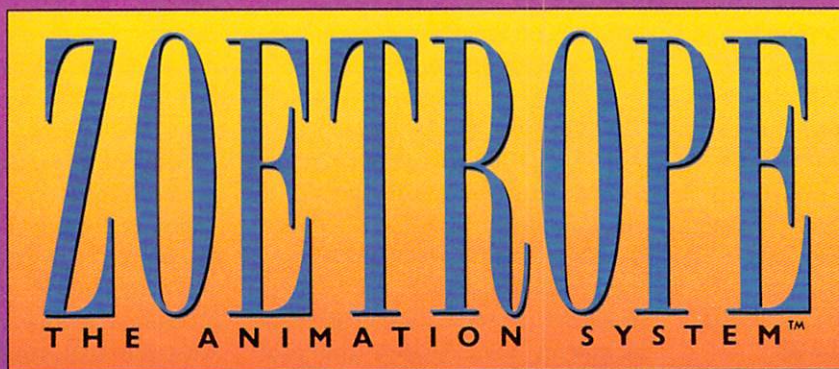


Here are just a few of Zoetrope's exciting, advanced features:

- Spin and swoop titles and images through 3D space.
- Apply computer power to classic "cel" animation.
- Overlay and underlay (compositing) your favorite pictures or animations.

## Taking animation into the 21st Century

By Jim Kent, the creator of Aegis Animator\*



Another great Cyber Graphics product.



To see the entire line of Cyber Graphics from Antic Software, visit your favorite Amiga® retailer. To order direct, call 800-234-7001.

Amiga® is a registered trademark of Commodore-Amiga, Inc. Aegis Animator is a trademark of Aegis Development. Zoetrope, The Animation System, Cyber Graphics, Antic Software and Antic are trademarks of Antic Publishing, Inc.

CIRCLE 002 ON READER SERVICE CARD

MM8AW3





# 3D Modeling Comes of Age



## *All about design objects*

ARTICLE AND ILLUSTRATIONS BY RICK GIBSON

It wasn't so long ago that I was just nibbling at the edge of the 3-D modeling art form. Art form? In every sense of the phrase, creating design objects by 3-D modeling is truly a creative art. Born of a need to provide objects for video productions—without requiring the

skills of a Disney animator—3-D modeling dramatically changes the way users organize and direct video projects.

Traditional animation programs normally assume that the user is a polished artist—or at least a minimally accomplished drafter. I



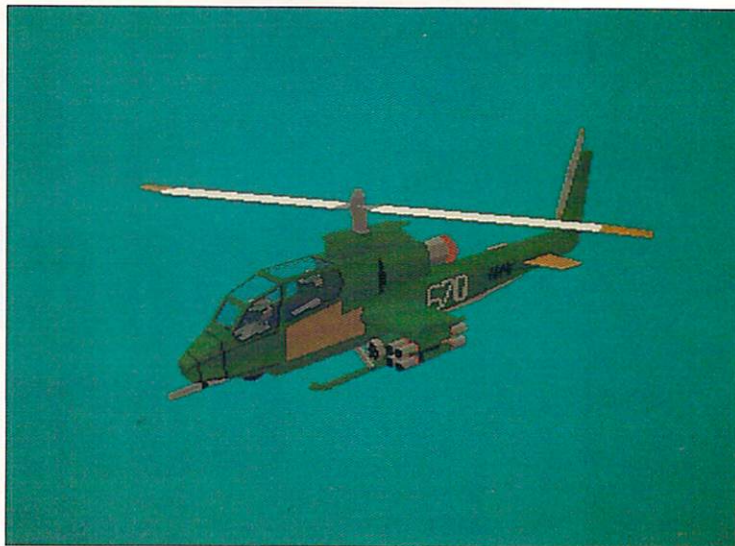
like to think of myself as a creative person, but please don't ask me to draw. Yet with a good object editor and rendering program in my hands, I can produce many exciting, imaginative, and realistic art objects. When you couple the capability of the new software with an unlimited subject matter, you are beginning to see the possibilities 3-D modeling brings to animation.

I started developing design objects in response to a request by a friend's son, Blaze Harvey, who was fascinated by things that fly. Most of my early video works emphasized spacecraft, aircraft, helicopters, and the like. I'd build a general story line, then dig in and create the vehicles around which the story would unfold.

Those of you who may have seen either of my widely distributed Amiga videos—"Captain Blaze" and "Jailbreak"—at a computer show or on a demo tape, know how exciting a short video can get. I'm not even sure my friend's little boy gets as big a kick out of it as the adult audiences do. This art form is a whole lot of fun—and it's terribly addictive. As soon as I finish one video, I immediately start thinking about new, fertile themes.

So how do you take a simple box, cone, or sphere and end up with a Porsche 956, or the USS Lexington aircraft carrier that you need for your

**CHOPPER1 is a picture showing the finished object rendered in VideoScape 3D.**



**With a good editor, some imagination and great patience, anyone can create something really special.**

current video project? I won't kid you and say that it's going to be easy, but with a good editor, some imagination and great patience, anyone can create something really special.

### Software Choices

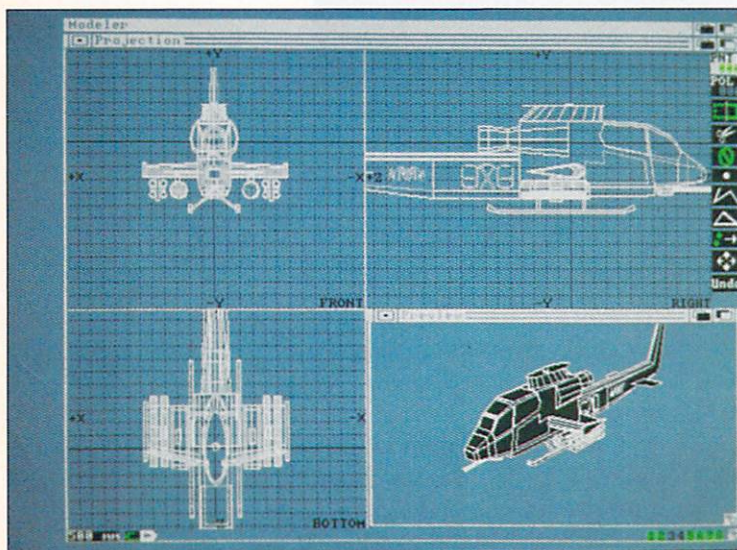
A number of excellent object editors and rendering programs are on the market today. Some programs are stand-alone editors, while others combine editing and rendering features. Some offer outstanding speed, others offer greater degrees of object complexity, more lighting and terrain effects, or more user friendliness.

In my personal experience, I have found the leading editing/rendering programs to be **Aegis Modeler 3D**, Byte by Byte's **Sculpt 3D** and Impulse's **Turbo Silver**.

Until Modeler 3D was released, Sculpt 3D was the most advanced package available. As a combination editor and rendering program with ray-tracing features, Sculpt 3D allowed far more object complexity than earlier programs—although it was slow. (At this writing, I have not worked intensively with Byte by Byte's new **Sculpt-Animate 4D**.)

Aegis Modeler 3D, a relatively new release, is by far the most sophisticated stand-alone editing package I have worked with. Among its great features, Modeler 3D has the ability to generate eight individual layers which can be superimposed on the basic object frame. Other features in-

After you are satisfied with the individual parts, you can now superimpose layers for viewing and/or rendering prior to final assembly. You can always go back and re-edit the object.





clude speedy operation, plus ability to accept images from other software. However, imported objects can only be saved in Modeler 3D's own format—Aegis VideoScape 3D.

I must confess some frustration with lack of format compatibility between various programs. I hate having to use third-party conversion software to transfer products of one program into another. Generally, conversion software succeeds only partially in transferring the detail of complex design objects between programs.

Most of the popular editors work within what is known as a tri-view environment. Tri-view simply means that the editor permits you to view the object from three views at the same time—for example, top, side, and front. But the Turbo Silver editor views an object from only one perspective at a time. All views are shown from a straight line perspective. Only when you actually render (manipulate) the object do you get to

**This art form is  
a whole lot of  
fun – and it's  
terribly  
addictive.**

see all the other angles.

On the other hand, Turbo Silver is a fast ray-tracing program with some unique advanced features, such as simulating 32,000 light sources in a single scene, or letting you wrap one digitized design around the surface of another. Surface mapping and reflective lighting creation are marvelous. (Since writing this article, I have found myself doing an increasing percentage of my new work with Turbo Silver.)

#### ***Researching Objects***

Once you have a good editor, it's time to do some research. After I select the object I want to create, I be-

gin looking for magazines and books with helpful pictures, diagrams, notes and descriptions. Wire-frame schematics or cut-away drawings can be particularly helpful in understanding how things are put together and what the relationships are between different sides, tops, and bottoms of the objects.

Precision is the key in the 3-D modeling art form. Whether you are designing a new spacecraft or a simple household item, the object must have the proper symmetrical relationships. Almost anyone can draw a car, but if the dimensions are not correct and the wheel size is out of proportion to the wheel wells, the car isn't going to look much like your lovely red TR-7 out in the driveway.

Whenever possible, I acquire a model to work from. Plastic models can provide very detailed imagery and offer a very precise format from which accurate measurements and angles may be obtained. Toy cars, trucks, trains and airplanes can be

**!!! IT'S HERE !!!**

***B.E.S.T.***

**Plan / IT**

**The BEST Spreadsheet Program For The Amiga  
-- Maybe The BEST Spreadsheet For ANY Computer --**

#### **NEW POWER**

**ARexx Compatability  
LOTUS Compatability  
-- Plus much more --**

#### **NEW PRICE**

**\$ 149.95**

With the reliability and support you have grown to expect from B.E.S.T., Inc.

Call B.E.S.T., Inc. at (503) 684-6655 for the location of your nearest Plan / IT dealer

LOTUS is a registered trademark of the LOTUS Development Corporation



just what you need to assist you in defining complex shapes on the computer. Now is the time to let that engineer side of you excel. Using calipers or other convenient devices will aid the accurate transfer of measurements from the model to your computer drawing.

Once you have a working model, the next step is to visually break down the model into workable sections that can be defined by simple geometric shapes. You would be surprised how easy it is to create a jet aircraft from lots of simple rectangles and cones. Using your editor program, you draw these shapes on your monitor. Once the simple basic shape is established, you can begin to pull, stretch, and mold the computer drawing until it has the exact shape you want. Remember, correct mathematical relationships are the basis of believable finished products. Attention to details often makes the difference between modeling a good object and a great object.

## Precision is the key in 3-D modeling, whether you are designing a new spacecraft or a simple household item.

When you are satisfied with the basic foundation, start adding the next layers in the object's structure. If you have ever built model airplanes in your youth, the process should seem familiar. The model starts with an open wire-frame schematic and ends with the final coat of computer-generated paint on the finished object. Instead of glue and plastic, you are dealing with points and graphic lines. As each new line is drawn, the object gains strength, form, and dimension. Once the basic frame is

established, the layering of additional features on the object increases both the complexity and the realism. The ability to superimpose layers greatly enhances your ability to visualize the finished product. It's during this period that your patience and free time will be fully tested.

When VideoScape 3D first hit the market, the manual suggested plotting the model object on graph paper first, and then entering each x, y, and z axis point into the computer. If you have ever tried this method, you already know what a chore it can be. However, this pre-entry designing technique is ideal for objects that do not already exist, or have no readily available models to work from. The graphed drawing provides a preliminary step in which you sort out the angular and dimensional relationships, providing the opportunity to resolve scaling and geometric sectioning decisions that should precede any computer entry. Fortunately some editor programs, such as Modeler 3D and Sculpt 3D, have made this whole graphic process a great deal simpler.

Always take advantage of the features provided by your editor. If your editor permits you to mirror a portion or duplicate a section of your object, then by all means do so. When you have struggled to make your measurements and details accurate on one side of the object, use a duplication or mirroring feature to transpose that accuracy to the opposite side.

## Ready-Mades

If you are more interested in the development of video shorts rather than spending the time creating 3-D objects, a host of interesting object "clip-art" is now commercially available and more is on the way. These commercially available products can be modified or changed by the user to suit a specific video environment. Some objects are part of 3-D software packages and some are even available in the public domain. The availability of ready-made 3-D objects puts the necessary tools in our

hands to complete any special video project.

So, if starting from scratch and modeling a 3-D object isn't for you, you can still avail yourself of superbly finished design objects which are just waiting to be part of your next video project. This seems to be one

## 3-D modeling dramatically changes the way users organize and direct video projects.

of the few areas in which you can "have your cake and eat it, too." If you thought animation was strictly for the artist, you may now find that with 3-D models and the many rendering programs available, animation and video productions are well within your reach. ■

*Rick Gibson is a famed Amiga videomaker from Laguna Hills, California. His "Jailbreak," created with Anton Sixt, won first prize in the 1988 Aegis Desktop Video Contest. Rick is 35, married and the father of a daughter, and co-owns an independent Porsche repair garage.*

## Manufacturers

### MODELER 3D \$99.95

Aegis Development, 2115 Pico Boulevard, Santa Monica, CA 90405. (213) 392-9972.

CIRCLE 271 ON READER SERVICE CARD

### SCULPT 3D \$99.95

Byte by Byte, 9442 Capital of Texas Highway North, Suite 150, Austin, TX 78759. (512) 343-4357.

CIRCLE 272 ON READER SERVICE CARD

### TURBO SILVER \$199

Impulse Inc., 6870 Shingle Creek Parkway, #112, Minneapolis, MN 55430. (612) 566-0221.

CIRCLE 273 ON READER SERVICE CARD



# **GFA-BASIC 3.0** **for the Amiga**

**\$139<sup>95</sup>**



***Boldly goes where no  
BASIC  
has gone before.***

- High-Speed Interpreter for easy program development
- Over 300 powerful commands
- FAST! – Execution times comparable to C
- In-line C and Assembler Commands
- Easy access to all Amiga libraries
- Extensive Amiga commands with submenus and built-in file requester
- Built-in Text Editor with syntax checking, procedure hiding and auto-indenting
- 400-page comprehensive manual
- Includes Run-Time Interpreter

**Available NOW**

from



544 Second Street, San Francisco, CA 94107

Call today to order:

**800-234-7001**

or see your local Amiga dealer.

CIRCLE 003 ON READER SERVICE CARD

(GF9200)

GFA-BASIC 3.0 is a trademark of GFA Systemtechnik, Germany; Antic Software and Antic are trademarks of Antic Publishing, Inc.; Amiga is a registered trademark of Commodore-Amiga Inc.



# Falcon

## BEST AIRCRAFT SIMULATOR YET

Reviewed by Wolf Griffey

I have finally found a true flight simulation that's fast, challenging, colorful and just plain great to operate. Spectrum HoloByte's **FALCON, The F-16 Fighter Simulation**, is the best aircraft simulation program on the Amiga yet.

The F-16 is a dual mission-profile aircraft, air-to-air and air-to-ground. FALCON comes with twelve missions and five levels of difficulty to test those profiles. The missions are either pure air combat, ground turning, or a mixture. The levels of difficulty are marked by the rank of the pilot (First Lieutenant to Colonel). As the pilot climbs in rank, the flight characteristics become truer and missions more challenging.

In those higher ranks the responses to a change of aircraft speed, attitude and power become quicker and surer. Meanwhile, the other side gets better, too. This forces the pilot to work harder, getting better and better as missions are completed and rank increases, just like in the real world.

### **Fine Feathers**

In addition to some of the standard items we have become used to in aircraft simulations, such as remote views of the aircraft, Spectrum HoloByte has included two items on my longtime personal wish list. One is the Black Box (cockpit flight recorder) that lets pilots review that last air to air combat. The Black Box

review lets you play back a fight and find out what went wrong—or even better, what went right.

The other item on my list was a training mode for experienced flyers. With FALCON, training modes are

**From loading  
to landing I  
always feel I am  
piloting a real  
machine.**

available for pilots of all ranks. Training in Air Combat Maneuvers (ACM) has the opponent MiG's flight path marked by diamonds, giving the F-16 pilot a real visual aid for getting into the proper place for the shot. The training mode doesn't make it safer, but it lets the pilot spend more time feeling out the bird's handling at a new rank.

After putting in many hours and many missions, I'm still learning how to get the most out of FALCON. Yet from loading to landing I always feel I am piloting a real machine. I've been overjoyed by just how very complete, realistic and accurate it is, and amazed that FALCON is on a desktop and not housed in a massive building.

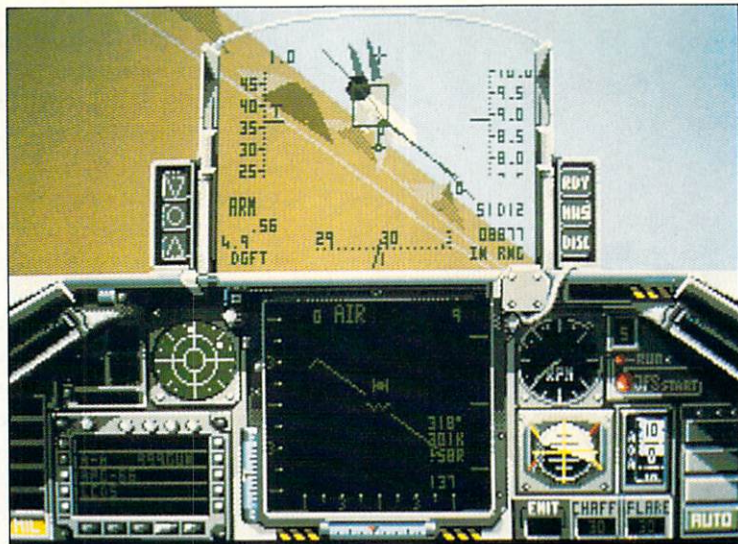
The pilot sits in the cockpit of the fighting Falcon, wrapped around by four views and three panels of displays, readouts and instruments, just like a multi-million-dollar mechanical simulator. FALCON has over a dozen major systems and subsystems located on those three display panels. Prominent in the front view is the working head-up display (HUD). This incorporates in one device airspeed, altitude, attitude, weapons status, heading scale, flight path, ladder, target information (range/designator/aiming) and more. The HUD alone provides more than enough information to allow for safe operation of the aircraft, be it in normal flight or combat.

Below the HUD is a console with a Combined Map/Electronics Display (COMED), and to either side are the engine power indicator, weapons status display, attitude director indicator, RPM gauge, threat warning display and a few caution/warning panels and lights. The Map/Electronics Display is a multi-use device, either showing position in map mode, or providing a radar display mode.

Left view panel is where the backup instruments reside, i.e. standby compass, airspeed and trim indicators. With them the pilot can continue safely and return to ground should a main system be damaged in combat. The right view panel is filled with the caution lights that tell the pilot what has been damaged.



Inside the cockpit of the F-16A Fighting Falcon



## Outside Environment

The outside environment is as complete as the aircraft. If the pilot is engaged, either in air-to-air combat or making a run on some ground target, the background will be in full detail and moving smoothly. Always in line with the speed of the ship, the background responds faithfully to the control inputs of the pilot.

Appearance of a new ground feature does not cause any slowdown. Targets, aerial or ground based, respond equally well. This backgrounding feature is so good, trucks can even be found traveling along the roads during strafing missions. FALCON updates itself so well that when the action is all over, a survey of the area will show the hits and misses just as they happened.

This is all benchmark material. Each and every item has a function and functions as it should. The main systems provide complete input for the pilot's use. Backup systems follow the main units, change for change. Redundancy of systems is what real-world ships have—there are no reset buttons for a system if it goes off line.

## Flying the FALCON

FALCON comes with a 140-page manual, two disks, a copy-protection code wheel and a control/map layout card. The first three will get you go-

ing, while the fourth is a good reference to hold onto until you have the system down.

The manual begins with "Your First Flight in the Falcon AT". The new pilot is introduced to flying with a mission called Milk Run. The manual made me familiar with the systems, not only telling me what to expect, but also showing how it would look, with printed screen shots of the different phases of flight and fighting. The manual gives a complete and detailed account of the system in use—and a glossary of fighter jockey terminology with which to impress your friends.

Best of all, this Falcon acts like a true bird in flight. Want to lose some speed?—point the nose toward the sky and watch the knots fall off. If you need to make a turn inside the bad guy, use some speed brake to get down to the best turn speed and then start climbing up that target six and go for the shot. In fact, the higher the rank the truer the handling.

With fast correction, real-time background updating, true-to-life flight characteristics, all you need is a few hundred hours to just begin to put this ship through its paces. ■

**FALCON** \$49.95  
Spectrum HoloByte, 2061 Challenger Drive,  
Alameda, CA 94501. (415) 522-3584.  
CIRCLE 274 ON READER SERVICE CARD

**LIVE!**™

## from A-Squared It's HOT!

...real-time LIVE! video on your Amiga's screen.

➔ **True Color:** just as it comes from your video source: camera, VCR, TV, laser disk. Direct, moving, in your Amiga's memory...our patented technology.

➔ **Fast:** video images in black & white, 32-color, and 4,096-color HAM. See 15 new images every second in black & white, 12 in color, 4 in HAM.

➔ **Save:** moving video, play it back, use it in other programs. Unlimited stills, too.

➔ **Video Effects:** real-time mouse-controlled...posterization, fades color-keying, strobe, more.

➔ **Roll Your Own:** programmer's video library, hardware documentation, examples in C, basic.

➔ **NEW LIVE!2000 includes:** Dual video source switching with fade/wipe/dissolve; BNC connectors on all input; Selectable Composite or direct RGB input; 640 Resolution; Advanced video effects — Tiling. Mirroring. Keyhole paint.

LIVE!2000, \$450 sug. list  
LIVE!1000, \$295 sug. list  
LIVE!500, \$399 sug. list

**See your Amiga Dealer.**

For more information, contact:

**a<sup>2</sup>**

**A-Squared Distributions Inc.**  
6114 La Salle Ave., Suite 326  
Oakland, CA 94611  
(415) 339-0339

CIRCLE 001 ON READER SERVICE CARD



# AMIGA GRAPHICS SOFTWARE UNIVERSE

## Part 1: Paint Programs & Image Generators

A four-part series by Lion Kuntz

During the first year of the Amiga this would have been a pretty easy series to write. There would have been only one article and it would have covered just three paint programs and one animation program.

By now, in the last half of the third year of the Amiga, a four-part series really isn't enough, because new programs are coming to market monthly and we have just gotten into the beginnings of some really exciting Amiga graphics developments.

However, easy categorization of graphics software has broken down. DELUXE PAINT III is marketed by Electronic Arts as an animation program, not a paint program. Antic Software's ZOETROPE is an animation program with more painting features than all three of the original Amiga paint programs combined, plus more animation features than the first-year animation program.

This series will try to make sense of the confusing overlap by discussing software in each category where it has major strengths, even if some programs are discussed twice or more. Note that I will capitalize the FIRST mention of each software product.

Paint programs are image generation programs. Since there are other types of software that provide a lot of control over image construction, these also will be discussed. Structured drawing programs and 3-D object rendering programs can create images which are impossible to tell apart from images made in paint programs.

### IFF Links

The Amiga universe is the first-ever personal computer base where competitors sat down together and agreed on a standard image file for-

mat that can be transferred freely among many programs. The Interchange File Format (IFF) has meant compatibility between programs from dozens of developers. All four of the first year's graphic software products had compatible picture files, and it has been that way ever since.

This is important because it allows Amiga owners to buy software at their own pace and gradually collect an array of programs that can all work with the same picture files. You can use your old and new software in combination—to attain the exact features you need. Evaluating software then becomes not only a process of comparing features, but also of determining the compatibility or dead-end isolation of products.

### What I Need

As a professional graphic artist using the Amiga for package design, magazine illustration, store demo disk animations and presentation slideshows, I speak from the experience of using \$3,000 worth of graphics software.

I recently designed a package front cover using Deluxe Paint II, Zoetrope, Photon Paint and Deluxe PhotoLab. Typically I zip in and out of programs to do touch-ups that are only available from one product. Ease of loading and speed of getting into a program are important to me. Being able to operate from a hard disk is important. Multi-tasking, memory efficiency and cleaning up all resources after exiting are important to me. Time is money to me, and missing a deadline can mean I will never get another job from that client. Speedy execution and lots of keyboard shortcuts are important to me.

There is no perfect program, and I like it that way. The perfect program with all the features I ever want to use would take all day to load and use megabytes of memory just to fit itself into RAM. Programs are just modules to me. I load up DPaint II instead of DPaint III because I don't really need the extra features which add 100,000 bytes of loading time.



For people who "can't draw" there are rendering programs capable of painting for you to your instructions. This rendering is done using TurboSilver 3.0, by freelance Amiga artist, James Redd.



(Near the top of my wish list would be a common IFFilbm.library. This could shave off an average 50K from most graphics programs and free about 2 megabytes of storage from my hard drive.)

I have spent more hours using Deluxe Paint than the average college student spends in classrooms getting a diploma. But no graphics software on the market has an "expert" mode where I can turn off those silly "Are you sure, really really sure?" requesters. That's what undo is supposed to be for! When do I get to graduate and tell the software one time that I'm sure I want to erase the picture because otherwise I wouldn't have clicked on the erase gadget?

And would some of these programmers please actually use their own programs before putting them on

sale—then we wouldn't have software requiring you to press Right-Amiga plus some other key. We could keep one hand on the mouse and one on the keyboard to tap whichever magic button does what we want next.

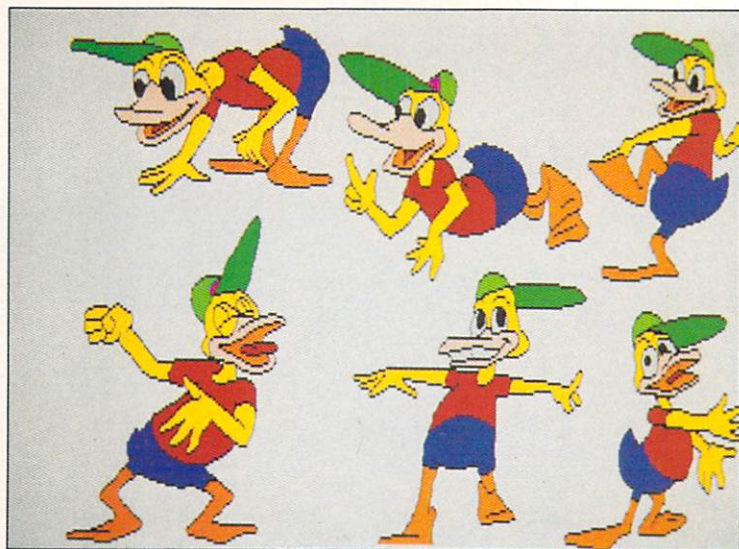
### **Paint/Animate**

Deluxe Paint was the first program of stature on the Amiga. It has now been upgraded twice. A lot of programs imitated features in Deluxe Paint, but by DPaint III we are seeing it do some imitation of other programs. Electronic Arts is in the curious position of being in competition with itself. In the Deluxe series there is Deluxe Paint II & III, and a package called DELUXE PHOTOLAB which contains a program module simply called Paint. PhotoLab Paint took a

lot of ideas from Deluxe Paint II, and even uses most of the same keyboard shortcuts, but also added a lot of new ideas. Then Deluxe Paint III copied a lot of the improvements from PhotoLab Paint and some of the best ideas from Zoetrope during the upgrade process.

Although they are sold as animation programs, Zoetrope from Antic Software and EA's Deluxe Paint III both contain the best paint program features ever assembled. Deluxe Paint invented the idea of spare screens, where you could have two pictures loaded in memory at once. You could cut pieces from one picture and paste them down on the other. Or you store a copy of the original picture on the spare screen while you experiment away on the first picture. Then if you want to, you could go back to





**Comic Setter  
Funny Figures  
Clip Art from  
Gold Disk,  
which may be  
imported into  
almost every  
paint program,  
is only one of  
many IFF clip  
art packages  
on the market.**

the spare picture and discard your experiments that didn't work out.

Zoetrope carries this concept out to the ultimate conclusion. It allows you to create as many as 4,095 spare pictures, each with its own color palette—depending on available memory. By racing through the sequence of images, moving animations can be produced. Just as movies are only a series of still pictures displayed rapidly to produce animated images, so also do all animation programs work this way. Deluxe Paint III now also added animation using a great quantity of spare screens.

Perhaps the most unusual Amiga graphics software is Gold Disk's COMIC SETTER. Although this is designed as a special-purpose program to produce near-professional comic book pages, it does offer bit-map tools and structured drawing tools, plus a substantial library of clip art. With very little experience, even a non-artist can use this software to compose finished images and pages of combined images.

### Express Paint

The current version of EXPRESS PAINT, version 3.0, has added many more features—especially undo with a vengeance. There are now unlimited levels of selective undo. Express Paint 3 is the very first program to have color PostScript output on the Amiga, and it's the first graphics pro-

gram to support Shared Virtual Pages.

Express Paint 3 allows for many defaults to be customized by the user, but this can make the program very slow to load. Express Paint 3 and Deluxe PhotoLab are the only two programs which do not impose limits on your picture size. As much RAM as you have can be used to build the bit-map of the picture.

Express Paint 3 is the only paint program which allows you to import text from a word-processor and flow it into an outlined area. Text can be justified, flow around irregular-shaped outline guides, or distort to fill shapes.

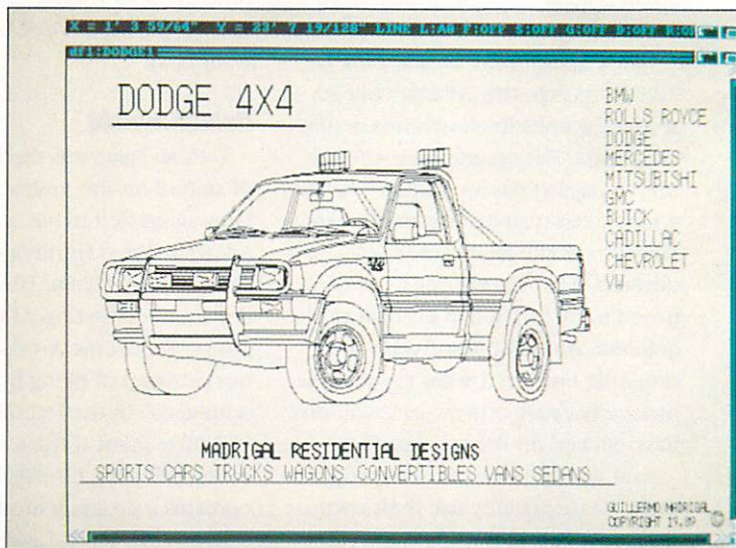
### HAM It Up

All Amigas ever made support the

4,096 color mode. Very few programs do, however. The 4,096 color mode is called HAM, for Hold-And-Modify. Current programs that support HAM painting are DIAMOND from Impulse, DIGIPAIN from New-Tek and PHOTON PAINT by Micro-Illusions. Strictly in the area of HAM, Deluxe PhotoLab has the most to offer. However, PhotoLab supports all 24 resolution modes of the Amiga, which makes it tower above the rest of them. The fact that PhotoLab also allows pictures as large as memory, unlimited spare screens in their own resolutions, plus cut and paste between all these screens and resolutions make it my favorite for HAM work.

Photon Paint was recently upgraded to Photon Paint II, which is reviewed by Louis Markoya elsewhere in this issue of AMIGA Plus. Even the original version of Photon Paint had earned a place on my hard drive, while some other HAM programs remain on floppies because I don't expect I'll need them more than once a year, if ever. Photon Paint has been known primarily for its very useful wrapping features. It can wrap clippings around 3-D primitive shapes, like cone, ball, cylinder, and cube. You can set a light angle for the wrap and the program is intelligent enough to calculate shadings and create very good looking 3-D simulations. It is very much faster than any

**Structured  
graphics from  
programs like  
Aegis Draw2000  
may be re-  
scaled and dis-  
torted without  
jaggies arti-  
facts found in  
paint programs.  
This picture is  
from Madrigal  
Designs Clip  
Art.**





of the 3-D rendering programs for this type operation, if you need quick and simple 3-D effects on a single image.

### Rendering 3-D

SCULPT 3D is an image generation program that creates in 4,096 color mode. Unlike paint programs, Sculpt 3D uses primitive shapes combined to create objects. These objects are data files which can be recalled repeatedly, and more than a single

view is contained in the object file. Images may be created with many possible views of the same objects, as if viewed from varying angles. Very realistic-looking images can be created—or unrealistic objects with a very strong illusion of solidity, such as Steve Segal's "Happy Guy" from the first issue of *AMIGA Plus*.

Sculpt 3D has been described as "a paint program for people who can't paint." The computer does the painting for you after you have gone

through a series of steps deciding the primitive shapes of the objects, the colors, the surface textures and reflectivity, and the positions of the view angle and illumination angles. If this sounds complicated, well, it is. And it is often extremely time consuming, taking the computer a full week of round-the-clock calculations to create the bitmap from your directions. The results can be extremely beautiful, with all the credit going to you.

	DPaint2	DPaint3	PhotoLab	Zoetrope	Photon1	Diamond	Express3	DigiPaint	Draw2000	ProDraw	ComicSet
OVERALL RATING:	GREAT!	GREAT!	THE BEST!	FUN & EASY!	GOOD.	GOOD.	FAIR.	FAIR.	GOOD.	SLOW!	FUN & EASY!
PROGRAM TYPE:	PAINT	PAINT animation	PAINT, Process, Print.	Animation PAINT	HAM PAINT	Digitizer process, PAINT	PAINT, Text process.	Digitizer process	DRAW, C.A.D.	DRAW	Page Compose COMICS
COLORS:	2, 4, 8, 16, 32.	2, 4, 8, 16, 32, 64	2, 4, 8, 16, 32, 64, 4096	2, 4, 8, 16, 32	4096	2,4,8,16, 32,64,4096 2 million!	2, 4, 8, 16, 32, 64	4096	16	16	16
SCREEN RESOLUTIONS:	Hi, Lo, Interlace, Non-Int	Hi, Lo, Interlace, Non-Int	ALL AT ONCE!	Lo, Non-Int	Lo, Interlace, Non-Int	Hi, Lo, Interlace, Non-Int	Hi, Lo, Interlace, Non-Int	Lo, Interlace, Non-Int	Hi, Interlace, Non-Int	Hi, Interlace, Non-Int	Hi, Lo, Interlace, Non-Int
LARGEST BITMAP: (width/height)	1008w 1024h	1008w 1024h	NO LIMIT!	320w 200h	352w 480h	999w 999w (CHIP)	NO LIMIT!	320w 400h	640w 400h	1008w 1024h	1008w 1007h
DRAWING PRIMITIVES: (dot, line, box, circle, shapes, etc.)	17 draw tools, 10 fixed brushes, more!	Same as DP2, plus ANIM brush!	14 draw tools, 16 fixed brushes, more!	7 tools, 16 shapes, and many modifiers.	13 draw tools, 8 fixed brushes, more!	14 draw tools, 14 fixed brushes.	Hundreds, confusing display.	10 tools, 10 shapes, modifiers.	MANY! CAD line and fill pattern tools.	Virtually infinite, custom modify.	Both structure draw, paint tools.
ADDITIONAL PAINT MODES: (smooth, blend, merge, etc.)	Perspective paint, several others.	Perspective ANIM, more new ones.	MANY! More than 40 modes, modifiers.	Lots! Some only for animation.	3 modes, plus 4 modifiers.	About a dozen modes, modifiers.	Tinting, perspective, color adjust.	11 additional modes.	NONE	NONE	NONE
SPECIAL EFFECTS:	Stencil, others.	MANY!	MANY!	MANY UNIQUE!	3D Brush wrap!	NONE.	Design ICONS.	Horiz/Vert soften.	250 layers.	NONE	NONE
IMPORT FILE TYPES: (IFF pic, brush, drawing, etc.)	IFF pic, brush.	IFF pic, brush, ANIM, Anim brush.	IFF Pic, brush.	RIF, IFF pic, brush, Alive! Anim, Animator, CyberPaint.	IFF Pic, brush	IFF pic, brush, RGB4, RGBN.	IFF pic, brush, ASCII, Virtual Page.	IFF pic, brush	DRAW, objects.	Private, IFF pic, brush.	Private, IFF pic, brush.
OUTPUT FILE TYPES:	Same as above.	Same as above.	Same as above.	RIF, IFF pic, brush.	Same as above.	Same as above.	Same as above.	Same as above.	Same plus IFF.	Same as above.	Same as above.
DOCUMENTATION: ILLUSTRATED, INDEXED.	Very well organized complete, tutorials.	Same quality as DP2.	Much better than DPaint.	Good, complete. Tutorials, Quick card.	Decent, Tutorial. No index or pics.	Docs on disk. OK, but no index/pics	important features hard to find.	Adequate tutorials	Adequate decent samples	Good tutorial. Indexed. Pics.	Good pics, tutorial. Indexed.
KEYBOARD SHORTCUTS, FAST MENUS.	Good planning, easy.	Good planning, easy.	Better, easy.	The BEST! easiest!	Few but enough.	Too few.	The WORST! Danger!!	No keys, bad panel position.	Many keys, good icon	Good keys, icons.	Good keys, icons.
MINIMUM MEMORY	512K	512K	1 Meg.	1 Meg.	512K	512K	512K	512K	1 Meg, 2 drives	1 Meg.	1 Meg.



Other 3-D rendering programs can also be used to create individual pictures, even though they are intended to be animation programs. VIDEO-SCAPE 3D, version 2.0 and TURBO SILVER, version 3 are really animation programs which use object files to compose the frames of the animation in 4,096 color mode. They just add the additional feature of motion by rendering multiple pictures with changing positions of the objects or the views. Individual frames may be rendered and saved to disk, just like Sculpt-3D. Animation programs will be explored later in this series.

Clip art packages are available for the rendering programs, such as four packages from Antic Software to build architectures, robots, human skeletons, and futuristic machinery. Turbo Silver's publisher, Impulse, sells four disks of objects including

organic things like flowers and leaves, ladybugs and such for creating realistic fantasy landscapes in 3-D view. They also market a terrain disk for 3-D mountains or waters, as well as a disk of fonts which can be built into 3-D titles. Syndesis sells INTERCHANGE to convert objects from one program for use by additional programs, so you are not stuck in a dead-end with only one program that reads your object data.

### High-Level Drawing

The rendering programs are special forms of structured drawing programs. They read data, then translate that into a visible form, creating bitmaps as their output. There are other kinds of structured drawing programs which do not primarily produce bitmaps. Their purpose is to create images of higher resolution than the Amiga is capable of, and then output the image to ultra-high-resolution output devices. They create temporary bitmaps so the user can get some kind of preview of what the output will look like. These temporary bitmaps may be saved to disk as Amiga standard images and then imported into any other program which paints or displays bitmaps.

Aegis Draw was the first structured drawing program, since upgraded to DrawPlus, then to AEGIS DRAW 2000. Aegis published the secrets to its "structures" in their manual, and other programs incorporated Draw object types, such as X-CAD, PROFESSIONAL PAGE, and MODELER 3D.

The newest kid on the structured drawing block is PROFESSIONAL DRAW from Gold Disk. This one arrived too late for me to give it any real examination, but I did a few tests with it on two different Amigas equipped with fast 68020 CPUs. Even with high speed processors, it took a long time to distort and move text object structures. The company recommends working in wire-frame mode for speedier preliminary drawing. I found the lack of any gradient tones a significant limitation. Future

versions are promised to include this feature. ■

*Lion Kuntz operates Lion's Amiga Art Studio in San Francisco. He performs graphics and technical services for a variety of Amiga developers, including package design, technical support, documentation writing and professional beta testing.*

### Manufacturers

<b>AEGIS DRAW 2000</b>	\$279.95
<b>VIDEOSCAPE 3D</b>	\$199.95

Aegis Development, 2115 Pico Boulevard, Santa Monica, CA 90405. (213) 392-9972.

CIRCLE 262 ON READER SERVICE CARD

<b>DELUXE PAINT II</b>	\$99
<b>DELUXE PAINT III</b>	\$149
<b>DELUXE PHOTOLAB</b>	\$149

Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (415) 571-7171.

CIRCLE 263 ON READER SERVICE CARD

<b>DIGIPAIN</b>	\$59.95
-----------------	---------

NewTek, 115 West Crane Street, Topeka, KS, 66603. (913) 354-8934

CIRCLE 264 ON READER SERVICE CARD

<b>EXPRESS PAINT, V. 3</b>	\$99.95
----------------------------	---------

Brown-Wagh (PAR), 16795 Lark Avenue, Suite 210, Los Gatos, CA, 95030. (408) 395-3838.

CIRCLE 265 ON READER SERVICE CARD

<b>PHOTON PAINT II</b>	\$149.95
------------------------	----------

Microlusions, 17408 Chatsworth Street, Granada Hills, CA 91344. (818) 360-3715.

CIRCLE 266 ON READER SERVICE CARD

<b>COMICSETTER</b>	\$99.95
<b>PROFESSIONAL DRAW</b>	\$199.95

Gold Disk, 2175 Dunwin Drive, Unit 6, Mississauga, Ontario, Canada, L5L 1X2. (416) 828-0913.

CIRCLE 267 ON READER SERVICE CARD

<b>DIAMOND</b>	\$30
<b>TURBO SILVER</b>	\$199

Impulse Inc., 6870 Shingle Creek Parkway, #112, Minneapolis, MN 55430. (612) 566-0221.

CIRCLE 268 ON READER SERVICE CARD

<b>ZOTROPE</b>	\$139.95
----------------	----------

Antic Software, 544 Second Street, San Francisco, CA 94107. (415) 957-0886.

CIRCLE 269 ON READER SERVICE CARD

### Amiga Graphic Standards

Standards exist because many people use them. Standards are not necessarily the best way to get something done, but they get the job done to the satisfaction of many. Sometimes standards just happen because one early product became popular first and lead to many imitators.

Important to Amiga graphic products are three standards—IFF images, Aegis Draw objects and ANIM files. IFF is more than just paintings. It encompasses paintings, brushes, two types of music files, two types of text files, and five generations of ANIM files. There are additional IFF types in use, and many more are proposed for the future. ANIMs are a type of IFF images stored together and highly compacted to save disk storage space.

Programs which use one or more of these standards are more valuable because you can absorb input from many programs and send output to many programs. You can share your data across the whole universe of programs which speak the same data standard language.—LION KUNTZ



# Moniterm Viking 1

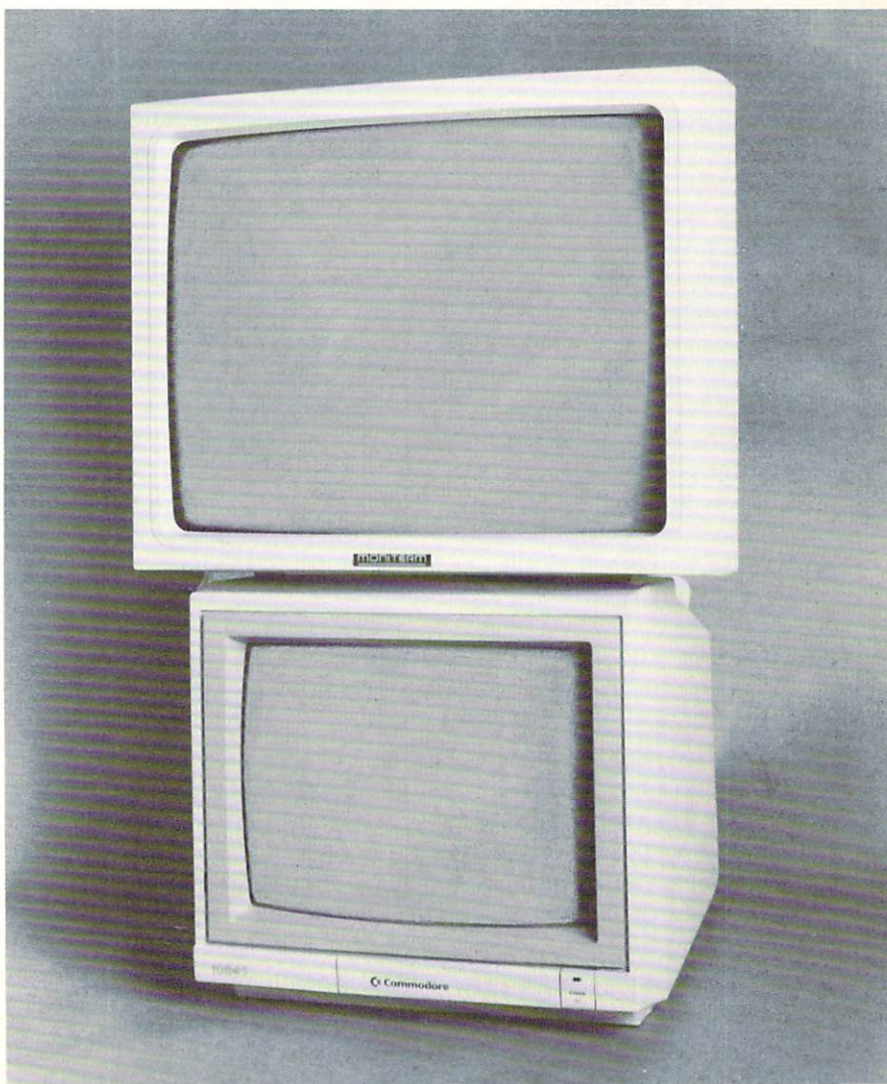
Reviewed by Simon Rockman

## **Big Screen Hero**

Moniterm's 19-inch **Viking 1** monochrome monitor uses a custom chip designed by Headley Davis at Commodore. The long-awaited Commodore A2024 monitor will use this chip. Perhaps the major advantage of the 2024 is that it will work with an Amiga 500 because the custom circuitry is inside the monitor, while the larger Viking uses a board that plugs into the Amiga 2000's video slot.

**The static  
display is rock  
steady, a  
pleasure to  
look at.**

The Moniterm design is very clever. With a normal screen the whole picture is updated, or refreshed, 60 times a second. The interlace mode gets more detail onto the screen by having twice as many lines, but it can only update every other line in the same time. This leads to interlace flicker. What Micro-Way's Flicker Fixer board does is store the picture in separate memory, updating every other line, but then





displaying every line from the memory. It needs an expensive multisync monitor but works well. The Viking takes this a step further. The Amiga sends out six screens and the Headley chip builds them up like a patchwork to make one big display. The result is a screen 1,008 pixels wide and 1,008 pixels high.

## **The Amiga sends out six screens and the Headley chip builds them up like patchwork to make one big display.**

The shortcoming of the system is that the update rate is cut drastically. Anything which moves rapidly across the screen, such as the mouse pointer, gets a ghost image while it is moving. Text tears as it scrolls and window outlines look funny while they are being dragged. However, the static display is rock steady, a pleasure to look at.

The Viking display is only monochrome, the price of a color screen with the necessary resolution being prohibitive. Either way the image is limited, like Workbench, to four colors or shades of grey.

### **And It Works**

The amazing thing is that with all this screen manipulation, most software still works with the Viking. Only programs which open a standard Workbench window will use the full 1,008 X 1,008 resolution. Software which is not compatible with the big screen mode functions perfectly, using standard resolution and looking a little daunting on a giant display.

Commodore supplies a Jumpstart disk with the Viking. There is a script

file, like startup-sequence, which copies all the new utilities into the right places on a hard disk. But you don't need to change ROMs or your libraries. A utility called RAMkick loads bits of Kickstart which the Viking needs into RAM and then protects them from being overwritten. When the computer is reset with a CTRL-AMIGA-AMIGA it reboots, but uses the new Kickstart. A special script file loads updated Intuition, Graphics and Exec Libraries to support the Viking and then reboots the system to make those RAMkicked libraries accessible to all system software. A command called Setmonitor then tells the system that you have a big screen attached.

To flip into the special mode, a utility called ResetWB is provided. It will let you turn on interlace without having to re-boot the system. Only disk windows and directory windows can be open on the Workbench screen, however.

The mode is chosen from Preferences. This means the Change Serial box has been squeezed in with the Change Printer gadget to make room for an A2024 gadget. This gives you the choice of leaving the mode off, set to a 10Hz or 15Hz refresh rate. The 15Hz mode gives a clearer display but needs more processor time, so programs may run a little slower. The depth of the Workbench can be set to 1 or 2 bits. A 1-bit display will only give a black and white display, but takes up less memory than the 2-bit with four shades of grey.

### **ECS Rescue**

Memory is important. The Headley can only use chip RAM. This is the memory the blitter can access, and can be used for video displays. At present Amigas have 512K of chip RAM. Once you have a couple of windows behind each other, chip RAM gets used up very quickly. This problem will be fixed with Commodore's Enhanced Chip Set (ECS). The Viking monitor was reviewed both with a standard Amiga and with a beta test version of ECS. Windows which could not be dragged to fill

the screen on a normal A2000 worked properly under ECS. One thing the Moniterm won't do is use the "productivity" mode which ECS provides. This gives a flicker-free 640 X 480 four-color display with a multisync monitor. But the Viking only works in old modes and its own enhanced mode.

Software compatibility is chancy, partly because of the chip RAM limitation but mainly because of the way applications open a screen. Anything which opens a window with one of those funny little squares in the bottom right corner should be draggable so that it fills the whole screen. CLI works, so does WordPerfect. But some programs don't know that it is possible to have a screen bigger than 640 X 200 and make that the limit. One or two programs grieved, for example the system clock supplied with 1.2. Some developers have had

## **A machine with this monitor and the new UNIX operating system will take on the best of the expensive workstations.**

prototype machines for a while. Gold Disk's Professional Page and Infinity's Shakespeare desktop publishing programs have been customized for the 2024 and Viking. Dale Luck, one of the people on the original Amiga development team, has implemented the X-windows user interface. A machine with this monitor and the new Amiga UNIX operating system will take on the best of the expensive workstations. ■

---

**VIKING 1** \$1,995  
Moniterm, 5740 Green Circle Drive, Minnetonka, MN 55343. (612) 935-4151.  
CIRCLE 260 ON READER SERVICE CARD



A

LOCK

ON

QUALITY

GEN/ONE from CSI...  
Quality. With the  
commitment to match.

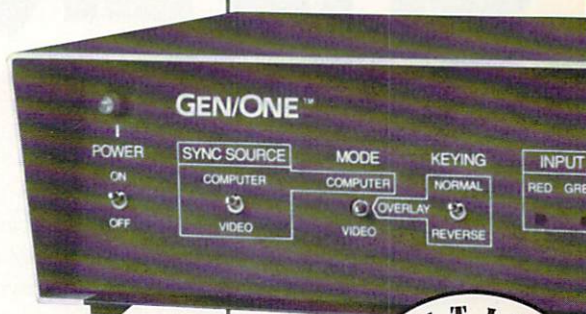
One look and you'll see for  
yourself why this desktop  
genlocking encoder is tak-  
ing the marketplace by  
storm.

Specially designed for com-  
patibility with all AMIGA  
computers, the GEN/ONE is a  
no-nonsense interactive  
component for superb video  
graphics.

So give us a call to get more  
information about this  
feature-packed accessory.  
For the price, it's the best  
composite genlocking en-  
coder around, with Super-  
VHS output as an added  
bonus.

Remember, we back  
GEN/ONE with the best  
warranty in the business.

- Separate RGB & Video Gain Controls
- H, V, Subcarrier Computer Timing
- 3 Modes of Operation
- Y/C Output for Super-VHS
- 2 Composite Outputs



\$895.  
With 1 Year Warranty

Call For More Information  
And A Free Brochure  
(516) 273-0404

☒ Communications  
☒ Specialties, Inc.

89-A Cabot Court  
Hauppauge, NY 11788

CIRCLE 011 ON READER SERVICE CARD



## Even Up The Score!



Let your Amiga give you the Advantage  
in making *better investment decisions!*

Color graphics of Individual Stocks and General Market Trends help you make more profit in this volatile market. High Low Close, Moving Averages, Centered Moving Averages, Volume, Relative Strength, Stochastics, Wilder's RSI, Cycles, Trend lines and Momentum. Powerful reports such as the Relative Strength Report help you pick the best performers. Use the Market Barometers to help you time your market entries. Update Stocks, Mutual Funds and Commodities manually or automatically. Easy to use communications included.

Only **\$99.95**

See your local Dealer or Call:

Software Advantage Consulting Corporation  
37346 Charter Oaks Blvd

Mt. Clemens, MI 48043 (313) 463-4995

Amiga and the Investor's Advantage are trademarks of their respective companies.

CIRCLE 031 ON READER SERVICE CARD



## VIDEO MADNESS

ARE YOU HAVING A DEVIL OF A  
TIME FINDING AN RGB CABLE?!

We Do The Weird And Unusual Cables

AMIGA - ANALOG - MAGNAVOX -  
APPLE IIGS - SONY -  
MITSUBISHI - SEARS -  
ATARI TO 5 BNC OUTPUTS  
**\$25<sup>00</sup> to \$35<sup>00</sup>** + shipping  
+ handling



Atari to IBM Type Disk Drives - 14 MDin to  
34 FH Atari Midi Y Cable. Call For Prices!!



For The Dealer Nearest You!

EAST COAST WEST COAST  
615-478-5760 206-882-2009



CIRCLE 032 ON READER SERVICE CARD



# UNDERSTANDING

## Characters in 3-D and Color

*Find out how to access Amiga character fonts and gain more control over them. As a bonus, three types of ready-to-use fonts are featured on the AMIGA Plus Disk—including fonts in color and 3-D.*

I've identified twelve kinds of fonts being used by programs on the Amiga, but I can't write about them all in this article. So here I'll cover the most common font types.

The first kind of font you ever encountered on the Amiga was a ROM font. There are two fonts (Topaz 8 and Topaz 9) in Kickstart ROM, and they are used to put the names of programs under the icons on your Workbench screen. They are also often used by many programs to spell out the words in the pull-down menus, in requesters, title bars, gadgets, or to type out the text in word-processors and text editors. These two fonts are exactly the same in every way as another type of font called a "diskfont." Diskfonts are stored on disk, loaded as requested, and erased from memory when no longer in use. The gem-named fonts of the standard Workbench disk are of this type.

Diskfonts and ROM fonts are also known as "bitmap" fonts. For each letter there is a picture stored in the font. The picture is made up of bits, each one the size of a pixel (smallest

dot available in any particular screen resolution). Each character picture is drawn within a bounding rectangle, and the bits are either drawn or they are absent. The combination of bits drawn creates each letter. Bitmap fonts also store information about the spacing between letters and other data in the font file.

### **Mystery Assign**

The worst omission Commodore ever made in their documentation and users manuals was not explaining that there is only one way to switch from one set of fonts to another set of fonts stored on another disk or directory. The "assign" command is the only method available to the user. Commodore never comes out and says that in any of their enhancer documentation, owner manuals, or even in their developers documentation. This makes AMIGA Plus the first national Amiga publication to explain it to you here and now.

When you turn on your Amiga, get to the point where the "insert Workbench" hand is displayed and put in your Workbench disk, there are no diskfonts available to the system or the programs you will be using. The Amiga looks for a number of directories on your Workbench. Autoboot hard-drives go through the same process. The Amiga operating system is seeking directories named: devs, l, libs, s, c and fonts. The Amiga nicknames the bootup disk as sys: and if it finds any of those directories listed it nicknames them according to the bootup disk directory of the same name—devs:, l:, libs:, s:, c:, and fonts: respectively.

These assignments are made before the Amiga even begins reading the commands in your startup-

sequence file. From this point on you must make your own assignments if you want to make changes. Many people with hard drives that are not auto-booting put the reassignment commands in their startup-sequence file to transfer control over to their hard drives.

Reading about the AmigaDOS assign command is recommended. There's a lot of interesting things you can do with it besides its usefulness with fonts. Assign is used in the CLI or Shell only. You type your commands on the command line and press the RETURN key to pass the command over to the system. Until you press RETURN or ENTER you can backspace and edit your line. (From now on, let's assume I said "press RETURN key" after every command line example.)

Assign has three functions—report current assignments, cancel an assignment, change an existing assignment or create a new assignment. The first function is good to know about, because you can look anytime and see what assignments have already been made. In particular, you can check that your assignment was entered correctly and is now in use by the Amiga operating system. For example:

```
l> assign
```

If you have stretched the CLI window to full screen size you should be able to see everything on the screen at once. Later, when you have gotten used to assigning things, your listing will get too large to fit all on one screen. By pressing the right mouse button you can pause the scrolling long enough to look for what you are interested in before letting it scroll up



# AMIGA FONTS

by Lion Kuntz

ON  
DISK

Two fonts named Sherbert on the AMIGA Plus disk



more text. The assign reporting will give you information in three sections—Volumes, Directories, and Devices. Right now we are only interested in the middle section, a two-column listing labelled Directories.

At the left edge of the screen are nicknames that each get the colon (:) character attached at the end whenever they are used. That colon is very important, and forgetting to add it is the most common mistake in getting satisfactory results from the assign

command. On the right of the directories section is the filepath that prefaces the actual disk name or hard-drive partition name, before a colon and any following directories are appended. Directories within directories are indicated by slash mark (/) separators.

Somewhere on the left side of the directories section will be the word “fonts.” Reading over from the right might be something like “workbench:fonts” which tells you the as-

signed fonts are found on a disk called “workbench” in a drawer called “fonts.”

1> assign fonts:

If you ever typed this on the CLI line, you would find the word “fonts” missing from your directories listing in the assignments report next time you checked. If you ever see a system message requester saying “insert volume fonts in any drive,” this is



what probably happened.

The second use of the assign command—cancel or remove an assignment—is probably not something you ever want to do with fonts.

The third function of the assign command is the most useful one. Here's where we actually get to change assignments, so instead of using fonts on the Workbench disk we can instead use the fonts on another disk we bought, or even look at the fonts on the disk that goes with this magazine. This time we must type three words on the command line. Generically the syntax goes like this:

### 3-D Fontmaker

The AMIGA *Plus* disk contains a Utility called Iff2Geo which converts an IFF format picture file into a 3-D object file with the .geo format used by Videscape 3D and other programs. This is particularly useful for creating text objects from your favorite Amiga bitmap fonts, even ColorFonts.



Before: This simple IFF picture is easy to make, but flat!



After: The object was imported into Videscape 3D and rendered.

```
1> assign <name> <path>
```

The assign command is called by the first word in the line, the second word gives it a name, and in our case it is "fonts:". The third word tells where the system should look whenever any program wants to load diskfonts.

Owners of only one disk drive are going to have special problems using the assign command. You need to load the assign command from your Workbench disk, out of the c: directory where it is stored. But you will need to remove the Workbench and insert your other disk before the command is completed. You will type:

```
1> assign fonts: df0:fonts +
```

That plus sign will tell the Amiga to load the assign command from the Workbench disk and then wait until you press the RETURN key again. During that pause, after the drive light goes out (indicating that the assign command is now loaded from Workbench and waiting to complete the command) you will remove the Workbench from the drive and insert your other disk into the drive. As soon as the system gets done checking the disk and the drive light goes out again, press RETURN and the assignment will be completed. You can check whether it did what you told it to by using the report function described above.

The only Workbench you can be sure is a Workbench is one that you buy from Commodore. A lot of products include pieces from a Workbench, under license from CBM. But pieces are missing because they need room for their own programs on the disk. Electronic Arts sells Deluxe Paint and Deluxe Paint II on disks which boot up just like a Workbench, but are missing the assign command. If you boot from these disks you cannot change font assignments (or any assignment) because only the assign command does that. It's usually okay to boot from a real Workbench and then start your pro-

gram by clicking on the the program disk icon. If you don't boot from the program disk itself, you'll know that all the tools you use are always going to be there whenever you decide you need them.

### Colorfonts

Besides bitmap diskfonts, there is another kind of diskfont called "ColorFonts." Invented by InterActive Softworks, maker of the Calligrapher Professional Font Editor, these are fonts which come ready-made in up to 16 colors, sometimes exotically patterned. The Amiga wasn't designed to use multi-colored fonts, so it was necessary to create a program that patched itself into the operating system software and add this capability to display multi-colored font characters. Commodore licensed this technology from InterActive Softworks and is planning to include it in ROM for Kickstart version 1.4. Meanwhile, they released ColorText as a temporary version on bulletin boards for non-commercial use. You need to remember to run ColorText before you can use Color-

### Finding Out About Fonts

Johannes Gutenberg's movable type made fonts commercially useful, and that's why he is given credit for "inventing" printing, even though printing was in use on three continents for centuries before. A font is one set of letters, numbers, punctuation and some symbols—all in a single size. Each size is a font all its own. Related character sets in similar style are called "typefaces," or sometimes called a "family" because of the similar shapes, even though the sizes vary.

Fonts are sizes, and sizes are fonts. When you need to make your own from scratch you will discover it takes just as much work to make two fonts in different sizes of the same typeface, as it takes to make two fonts of the same size in different typefaces.



Fonts. At this time Calligrapher is the only font editor which creates Color-Fonts. It allows you to load any bitmap diskfont and add colors. You can also create fonts from scratch using the built-in paint program. Patterns may be applied to the characters (or a sub-set of the font), and 16 color IFF brushes imported from many paint programs may be applied to the letters. It is a fairly easy thing to do.

### **Fonts On Disk**

Included on this disk is one bitmap font, provided by permission of the artist, Marlin Greene of Chrysalis Studios, Redmond, Washington. This font is called Sherbert (48 point), and is one of 29 fonts, many multi-colored, sold by InterActive Softworks, in the CalligraFonts series as Studio Fonts, Volume 1. I created the ColorFont Sherbert (61 point) using Calligrapher in under 10 minutes. Considering that I changed the font to 16 colors, colored the letters, outlined it with two more contrasting colors, and added 11 layers of decending drop shadows to it, I'd say that's pretty fast work. Once you create some styles and patterns you like, you can save these to disk and use them again and again in future font editing sessions, making the work of colorizing fonts even faster. I could have colored five more fonts using the same colors and styles in another 10 minutes, if I wanted to.

Many newer programs know how to read the colors of a font stored in a ColorFont file. Older programs cannot do this, but many of them allow you to load an IFF brush and select the color palette from the brush file. Most ColorFonts include brushes just for this reason, so you can see the colorfont in the colors the artist designed. The Sherbert colorfont uses the first 16 default colors of the Deluxe Paint palette. So you can see this one without loading any brushes if you boot up DPaint in low resolution. Remember to run ColorText first and assign fonts to the AMIGA Plus Disk's fonts directory.

ColorText and these fonts are not

public domain and may not be given away. These are provided to buyers of the AMIGA Plus Disk only, with proper license from the copyright owners.

### **Interfonts**

Finally, included is an InterFont, which is a trademark of Syndesis, makers of the InterFont and Inter-Change programs. These are a special intermediate kind of fonts, completely different from the types already discussed. For one thing, the

## **It takes more than just tracing to make InterFonts.**

InterFont is only useful to owners of the InterFont product, and can't be used by anyone without it. Since it is a pretty small, and uses about 1% of a disk, it is included even though lots of readers will have no use for it. Even owners of InterFont can't do anything directly useful with an InterFont. InterFont outputs objects to be used in 3-D programs or DrawPlus object-compatible programs such as Draw, DrawPlus, Draw 2000, Professional Page, X-CAD, and others.

What makes InterFonts different from bitmap fonts is the way letters are stored as a series of computer instructions on how to draw each character, instead of as fixed pictures stored in the font file. This introduces the idea of "structured drawings" or "algorithmically designed letterforms." There are a number of different types of fonts used by the Amiga in this category, including high-level Postscript fonts, Aegis Draw stroke font, Aegis VideoTitler Polyfonts, CGI Provideo fonts, and others. The InterFont Designer module of the InterFont program allows you to load in an Amiga bitmap diskfont and trace it. This is the process that creates InterFonts. It is not as easy as colorizing fonts in Calligrapher. It can take a profession-

ally trained artist several full working days to carefully trace every letter, making proper corrections along the way. The InterFont product includes six InterFonts, so you don't have to be a trained artist to begin using them. And thanks to AMIGA Plus you now have another InterFont to work with.

What InterFont does offer is the ability to create "word objects," "sentence objects" and "paragraph objects." This means you create the formulas that certain other programs understand for drawing onscreen whole words, sentences, or short paragraphs. These formulas are then used by Videoscape 3D, Sculpt 3D, or DrawPlus for treatment as a single object. In Videoscape your object can be rendered in 3-D, flown around, shaded, viewed from any angle, etc. In Draw the object can be stretched or squashed, and otherwise re-sized without any jaggie stair-steps. Inexpensive optional modules allow you to output InterFont objects to Forms In Flight and Turbo Silver 2.0. You can ray-trace, IFF texture-map, and do a lot of fancy things to these text objects. Making chrome font titles becomes easy, even for someone who can't draw a straight line! Suddenly you have the power to make glass and crystal letters for your videos that look like the ones shown on broadcast television.

Because the InterFont Designer is so difficult to use, and basically traces all the imperfections and compromises of bitmap fonts, most people will buy additional Inter-Fonts—just as most people buy bitmap fonts in ready-to-use packages. (A font editor comes free on the Workbench Extras disk.) It takes more than just tracing to make Inter-Fonts; it takes the knowledge of when to not follow the bitmap and get back to the original font design. Typography has always been an art, and there is an apprentice period required before anyone gets good at it. Computer tools make it easier for artists to apply their knowledge, but knowledge is necessary to guide the computer along. ■



# Dr. T's Keyboard Controlled Sequencer V1.6A

THE MOST POWERFUL MIDI SOFTWARE FOR AMIGA

By Kenny Lyon and Ira Rubnitz

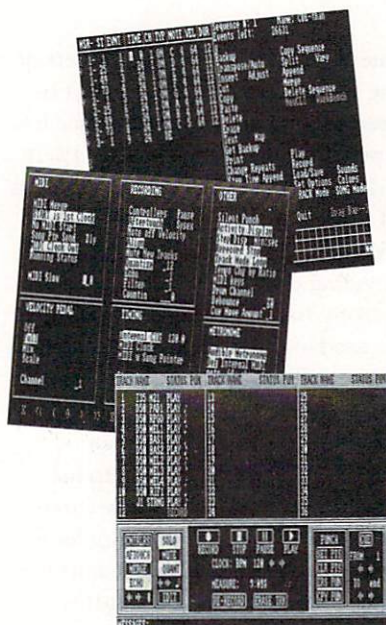
Dr. T's **Keyboard Controlled Sequencer V1.6A** (A for Amiga) is a work of programming art on a grand scale. It gives you the ability to work in whatever manner you choose, and to create just about anything in music that you can imagine. As such, it can be intimidating in the same way that sitting down at a Steinway piano or picking up a Stradivarius violin would be intimidating.

The authors of this tutorial/review are music industry professionals who have been working with Keyboard Controlled Sequencer (KCS) since its release for the Amiga in 1988. Not until nearly a year of experience with KCS did we consider that we fully understood how to get the most out of this epic musical toolbox.

KCS is divided into three main sections. Track mode is linear based, like a simulated tape recorder. Song mode works with looped phrases, like a drum machine. Open Mode allows any combination of the first two. Each section has play/record and edit screens, and can instantly transfer data into any other section (and working method).

## Track Mode

When the Keyboard Controlled Synthesizer is loaded, it presents a



list of potential available events and a slider. Here you must decide how much memory to allocate to the program and how much to leave for other programs. There is no going back on this decision without quitting the program, so allocate wisely if you plan to multi-task. After this is done, the Track Mode Play/Record screen appears.

The Track Mode screen is laid out with 36 visible tracks (12 more invisible tracks exist for a total of 48). At the bottom are tape recorder control icons for record, play, stop and

pause. On either side of these are function controls for muting, soloing, auto-punch in/out, live edit, echo, merge, quantize, cue, and selection of non-note data to be recorded (aftertouch, controllers.) Directly below the "transport" controls are tempo, elapsed time, and location counters. Switchable activity displays flash in time and indicate when tracks contain data. A single key brings up the Set Options screen where all global parameters are set. Many of these can be altered by key commands while recording. In fact, lots can be done while recording.

Track Mode is linear based, but all tracks can loop. Track one is the conductor track. Its length sets the length and loop point for all others. Recording is continuous, with a new track opening up as soon as the previous one is recorded. With the Mute New Tracks option on, each track will mute as the next goes into record, enabling multiple takes of the same material without stopping. Tracks can be recorded, erased, merged, punched in and out, named, and swapped by mouse or key commands.

Real time options include quantizing (correcting rhythmic mistakes) while recording, changing echo



channel (echo sends incoming data into memory and out to instruments on whichever of the sixteen MIDI channels is chosen,) track shifting (moving tracks ahead or behind in time,) editing, muting, and soloing. The lack of fast forward and rewind controls is a bit disconcerting at first. Cue takes over the function of both, however. It can be changed by mouse or from the keyboard, and makes it possible to set up a loop anywhere in a piece.

Once a track is recorded, it can be edited. F1 or a mouse-click leads to the Track Edit screen. There all data for a single track exists as a continuous text event list. Each MIDI event is listed by absolute location, time (in clock steps) from the previous event, MIDI channel, note, velocity, and duration.

Changes can be typed in directly, with one exception. The only way to change the absolute value of an event is to change its position relative to the previous note. When that position, or time, has been changed, it can be entered in two distinctly different ways. Pressing RETURN shifts all following events by a corresponding amount. Pressing ENTER attempts to adjust the next event so as to keep the rest of the track in its original place. Although flexible, this is confusing and makes it impossible to set the location of any note beyond that of the one following it without cutting and pasting. That and the fact that absolute time is annotated only in measures and clock steps (not beats) makes up the single least user friendly aspect of KCS. Get a handle on that one and you're on your way.

One great feature of Track Edit is the ability to play any track or portion of a track, either alone or in context, with mouse clicks. This enables you to zero in on a track and hear it while seeing the event list.

The standard global editing features are available on the Track Edit screen—transposing any type of data, scaling of velocity, auto-correcting (quantizing) to any clock amount, rechannelizing, track splitting, etc.

## About MIDI Sequencers

MIDI (Musical Instrument Digital Interface) is the "language" spoken by electronic instruments. And a sequencer is the device used to record and manipulate that language. Think of the sequencer as a word processor for music—but one that works in real time and edits data in many vastly complex ways.

Sequencers generally can be divided into two categories—linear or phrase-based. Data entry can be in either real time (just like playing an instrument) or step time (just like typing a script).

A linear sequencer operates much like a tape recorder. Musical notes and related information are spread out in time, much like tape on a reel. Tracks are parallel, playing in one direction from beginning to end. The concept of the linear structure is easy to grasp for many musicians. It functions like familiar recording techniques and traditional orchestral scores.

To compose music on a phrase-based (modular or chain) sequencer, data is recorded in small sections. These sections are then strung together or looped to create whole pieces. This method appeals to those comfortable with drum machine programming, as well as musicians used to traditional popular song format—repeating verses, bridges, etc.

Both systems have advantages and disadvantages. The linear method is best for flowing, ever-changing material. It tends to encourage variation and ease the musician into the topsy-turvy world of random access time. On the downside, it is memory inefficient, cumbersome when composing repetitive music and doesn't take full advantage of the computer's potential.

The phrase-based type of sequencer makes the best use of available memory, is perfect for song structure and highly patterned music, and pushes music recording more into the digital domain. At the same time, it can compartmentalize and fragment creativity, as well as making the realization of longer musical material more difficult.

So in order to gain the best of each world, a state-of-the-art sequencer should let you use both approaches at the same time. Dr. T to the rescue . . .

KCS's track editing ability puts it in the upper half, but not at the top, of the Amiga sequencer pack. That is, until you throw in the Master Editor and Programmable Variations Generator, now beta testing in Amiga Level II version of KCS and worthy of a review all their own. Weaknesses in VI.6A—cumbersome note splitting, lack of percentage of quantize effect, and inability to edit all tracks at once, are all corrected in Level II. Not that you should have any difficulty with this release—with a little thought, just about any edit operation can be accomplished.

As in all other parts of the program, pull-down menus are not used. This leaves all functions visible and the edit screens a bit more cluttered, but speeds up operations considerably. Additional functions include—Cut, Copy, Paste, Delete, Erase (differs from Delete in that events following erased data maintain their exact location in time,) Backup, Get Backup,

Find, Calc (a calculator utility with some nice twists,) Undo, Insert and Adjust (affects time like the ENTER and RETURN keys,) Text (calls a text storage area) Map (brings up a comprehensive map of everything in memory, status of tracks, etc. Hot!) and Print, which sends the Map, Text, and any track or sequence list to a printer.

Vary, a precursor to the Programmable Variations Generator, allows the introduction of randomness into a track or sequence. Next are a variety of ways to transfer data to and from the other parts of the program—tracks to Open Mode sequences, sequences to tracks, all tracks to a single sequence, and a sequence back to all tracks. Delete track and Clear all tracks follow, as well as Double all tracks and the requester for the Amiga Sounds screen.

The Amiga Sounds screen represents the only real difference between the Amiga and Atari ST or



Macintosh versions of KCS. From it, IFF sampled sounds can be loaded, assigned to MIDI channels and note ranges, transposed, given volume levels, and saved as instrument banks. The Amiga is no Fairlight, but this feature can be very helpful when more sounds are necessary—it's like getting a four voice sampler for free.

Also on the Edit screen are the NewCLI, Workbench, and disk operation requesters. The Set Options, Open Mode, and Song Mode Screens can be called from here, and a drag bar can be activated to rearrange Amiga screens when multi-tasking.

### **Step Time Record**

Step time recording allows you to input note data without the pressure of playing in real time. This is useful for complex passages, repetitive patterns, and machine-like precision.

The KCS Step Time Record function, accessed from Track Edit, takes a bit of sorting out, but is functional. Like many aspects of KCS that confuse at first, its features make sense after a bit of use.

In Step Time Record, note time values, durations, and velocity levels are chosen from on-screen lists. Notes are entered from a MIDI keyboard and echoed to whatever channel is chosen. When all keys are released, the sequencer advances to the next time step. Rests and Ties are put in with function keys or mouse clicks. There are various options for data input and for hearing the new track alone and in context.

### **Song Mode**

The basic unit of Song and Open Mode is the sequence. A sequence can consist of any number of tracks, or any type of data recognized by KCS—and it recognizes everything, having as complete a MIDI implementation as the authors have ever seen. Song Mode consists of a list of segments (sequences) arranged in whatever order is desired.

Just as with a drum machine, which this mode closely resembles, sequences cannot overlap. The list plays straight down. However, se-

quences can be looped, transposed, or delayed from the finish of the previous sequence. In addition, their tempos and volume level can be changed.

Muting is possible from the Song Mode Play screen (there are two screens in Song Mode—Edit and Play,) but it works differently than in Track Mode. Instead of muting by track or sequence, which would just shut off an entire segment and leave only silence, it mutes by MIDI channel. Clever.

Song Mode is good for quickly banging together and experimenting with song forms. The process is very simple. Once a song segment has been recorded in Track Mode, the ap-

**KCS never  
crashes! – and  
we tried  
everything,  
short of  
pouring beer  
on the computer.**

plicable tracks are combined into a sequence. That sequence is then available for use as a segment in Song Mode. Any track muted before the combination process can be left out of the resulting sequence, making it easy to re-use the same rhythm tracks, just muting and un-muting different upper structure tracks to create different song sections. When a song is in its correct form, it can either be returned to Track Mode, where it separates into different MIDI channels and can overdubbed in linear fashion. Or it can be converted to an Open Mode control sequence. And Open Mode is where the fun really starts.

### **Open Mode**

Open Mode is a cross between linear and phrase-based sequencing, allowing any combination of the two simultaneously. Sequence calls can

coexist with regular track-type note data which can follow systems exclusive data and be followed by tempo changes and controller data and sequences that call other sequences—and on and on. This aptly named beast can throw the unwary into a convoluted world of complexity and confusion. Or it can be the perfect vehicle for realizing exactly the music you envisioned. A little time spent learning Open Mode will pay off big dividends in sequencing power.

The Open Mode Edit screen is organized much like the Track Mode Edit screen, with all the same editing commands. One different function is Change Repeats, which sets the number of times a sequence will loop when called from the Open Mode Play/Record screen.

In Open Mode Play/Record, any of 128 available sequences can be called at any time—started, stopped, muted and unmuted. Meanwhile, more sequences can be recorded right along with them. So a long flowing musical part can be recorded along with a short repeating figure.

### **Coda**

Dr. T's Keyboard Controlled Sequencer is practically an institution in its many forms. It is a constantly evolving and improving product, completely tested and proven. It never crashes! We tried everything, short of pouring beer on the computer. And KCS is the embodiment of versatility and power. No matter how complex (or simple) the music you conceive, there will be some appropriate way to record and edit it with this program.

No matter what type of computer you might find in a professional or home studio—if they have KCS, you know the program. ■

### **KEYBOARD CONTROLLED SEQUENCER V1.6A**

**\$225**

Dr. T's Music Software, 220 Boylston Street, Chestnut Hill, MA 02167. (617) 244-6954. Copy-protected, requires minimum 512K memory, MIDI interface and synthesizer(s).

CIRCLE 217 ON READER SERVICE CARD



## Yamaha SHS-10 Digital Keyboard

The first time I laid eyes on the bright red Yamaha SHS-10 FM Digital Keyboard with MIDI, I knew it was going to be fun. This lightweight instrument is played like a combination of piano and guitar. Strap it around your neck, play a melody with your right hand on the 32 piano mini-keys (F2 to C5), use your left hand to slide the pitch wheel for flashy rock guitar blues-note effects. The SHS-10 has 25 voices—organs, horns, woodwinds, percussive sounds, etc.—generated by FM synthesis, the same method used by Yamaha's popular DX-7 family of synthesizers. You can tune up and down nearly a half-tone, or transpose keys up and down an octave. Buttons implement sustain, portamento and vibrato effects. The battery-powered (six AAs) SHS-10 has a built-in amplifier and speakers. It can also be plugged into an external sound system or headphones, and it can be powered from a 120-volt AC wall outlet by using a 9½ volt adapter.

The SHS-10 has 25 drum rhythm patterns, ranging through rock, jazz, classical, blues, pop, country and reggae. Tempo and volume of these rhythms can be varied. Three buttons add different fill-ins or variations to the rhythm pattern. There are all the usual programmed Synchro-Start/Ending accompaniment modes you'd expect on an electronic keyboard designed for non-professionals, including Auto-Bass, Auto-Chord—and Single-finger Auto Bass Chord, where one finger creates a major chord, while two or three fingers create minor, seventh, or minor-seventh chords. There's even a built-in sequencer that can remember three chord progressions. If you want to enter your own chord progression, it will hold a pattern of about 150 chords including rhythm, fills and endings.

### SHS-10 And The Amiga

Most important for Amiga users, it has a MIDI-OUT port. This makes it the lowest-price piano keyboard controller you can link to an Amiga!!! The SHS-10 is being sold by many Amiga dealers in a package with music software and a MIDI interface—or you can buy it alone for as low as \$80 at discount outlets.

MIDI (Musical Instrument Digital Interface) is similar to cable TV in that one MIDI cable can transmit several channels simultaneously. One TV cable coming into your house could be hooked up to several television sets—one tuned to NBC, another to CNN and a third to PBS.

Likewise, one MIDI cable going out of the SHS-10 could be connected to several MIDI devices, each playing an independent part. A drum machine can play the drum part, the Amiga can play the melody line using an internal voice, and the chord accompaniment can be played on a synth module like the Yamaha FB01 or the Roland MT-32. Melody notes can be sent on any channel.

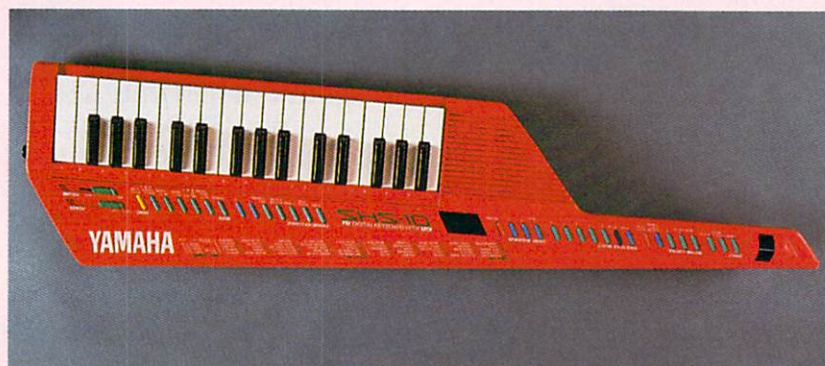
Accompaniment voices 1, 2, 3, and 4 are sent out on channels 12 through 15 respectively, and the drum part is sent out on channel 16. If you think the instrument looks like a toy, try crunching it out via MIDI to a drum machine and a multi-timbral (more than one voice at a time) synth module (like the Amiga) . . .

Admittedly the MIDI implementation of this keyboard is somewhat limited. The keys are not velocity-sensitive, nor will they transmit after-touch information (that is, how hard you press on the keys after you press them down). The rhythm part can be set to transmit at three volume levels and has a maximum of five drums—closed high-hat, cymbal, tom, snare and bass. The keyboard will transmit vibrato, sustain, portamento and pitch bend data for melody notes, but not for accompaniment notes.

The biggest limitation is that there is no MIDI-IN port, so the instrument can't receive MIDI data. This is unfortunate because many of the best MIDI programs for the Amiga don't use the internal sound generation of the computer chips, and must be "MIDled" to an external sound module.

For people who want to play around with MIDI on the Amiga without spending a huge amount of money, the SHS-10 is a good way to start. Apart from the keyboard, you will need a MIDI interface (you can get them for as low as \$60 or less) which plugs into the serial port of your Amiga. You will also need software which supports MIDI, and unless you have an external sound module, the MIDI software must be able to utilize the internal sound generating capabilities of the Amiga. Deluxe Music Construction Set, and Dr. T's MRS are two examples of inexpensive software that can do this. You will also need a MIDI cable, which costs \$10 or less.

The SHS-10 is a good time! The beginning hobbyist will be able to enjoy creating music without having much technical skill, but I have watched several of my friends who are advanced players pick the thing up and an hour later they are still fooling around with it!—  
ROB GRIFFITH ■



#### YAMAHA SHS-10 "GUI-BOARD" \$89.95

Yamaha Corp. of America, 6600 Orangethorpe Ave., Buena Park, CA 90622.  
(714) 522-9240.

CIRCLE 251 ON READER SERVICE CARD



# The Best.

No Matter  
How You  
Stack 'Em.



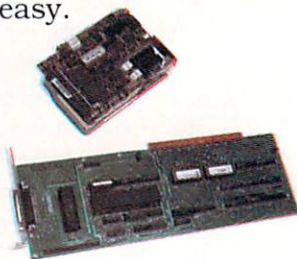
No matter how you stack 'em, SupraDrives are the best. The best performers. The best designs. The best fit for your system.

And frankly, the best choice you could make, no matter how you stack your options.

Only Supra offers you complete SupraDrive Hard Disk Systems for the Amiga 500, the Amiga 1000, and the Amiga 2000 in various capacities and forms. You can get external drives, internal drives, interface kits, and RAM expansion kits. You can get drives ranging in size from 20MB all the way up to 250MB. Whatever your system configuration and needs, you can get a Supra hard disk that's just right for YOU.

And if what you need is backup or unlimited storage, you can get the SupraDrive FD-10, a new concept in mass storage that combines the best features of hard disks and floppy disks. The SupraDrive FD-10 lets you store a full 10MB of data on one floppy disk and then easily take the disk with you anywhere. Your storage capacity is limited only by the number of disks you have, and backups are quick and easy.

When you buy your new disk drive from Supra, you'll be buying from a company that has years of experience to share with you and the stability to ensure that they'll be around when you need it. Only Supra Corporation offers you state-of-the-art, innovative technology plus experience and service you can count on.



SupraDrive Interface  
for the Amiga 2000

Call your local dealer or:



1-800-727-8772 (Orders Only) or 503-967-9075  
1133 Commercial Way, Albany, OR 97321  
Telex: 5106005236 (Supra Corp.)  
FAX: 503-926-9370

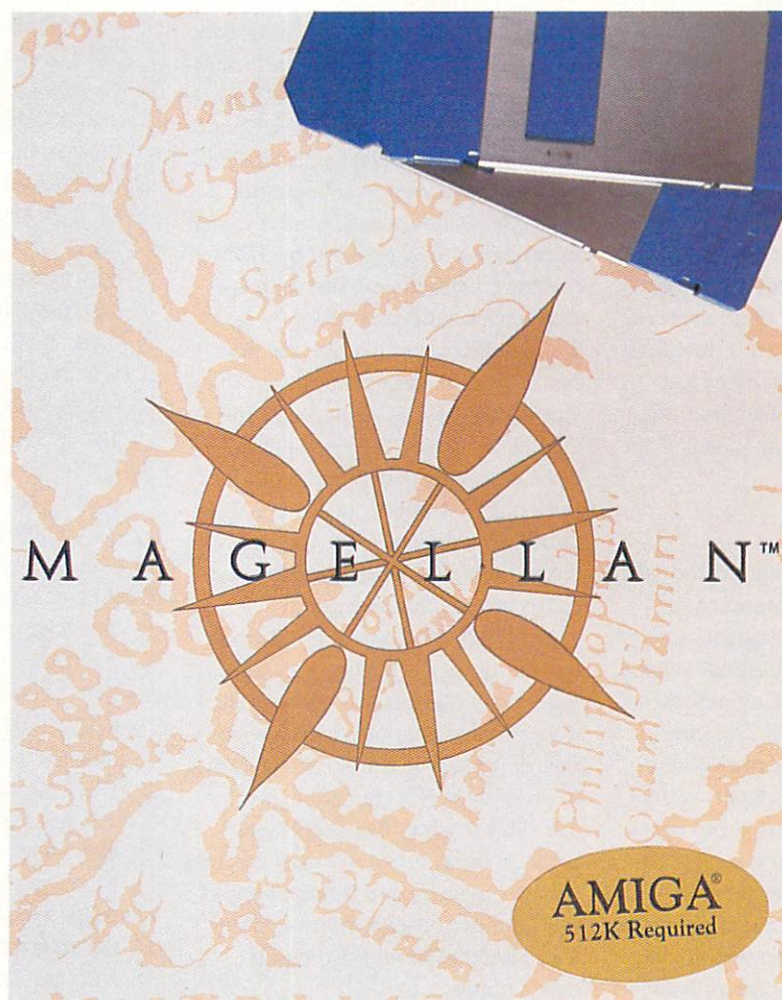
CIRCLE 029 ON READER SERVICE CARD



# Magellan

ARTIFICIAL INTELLIGENCE FOR THE REST OF US

Review by Michael Brown



**Magellan**, from Emerald Intelligence, is an intriguing new product for the Amiga which enables you to develop "expert systems" using artificial intelligence techniques. Magellan is a breakthrough product because both the developer and the end user of a Magellan expert system interact with the program in relatively plain English. You don't need to possess conventional programming skills in

order to develop an expert system with Magellan.

David Kennedy, president of Emerald Intelligence, says he selected the Amiga as the initial development platform for Magellan in the latter part of 1985 "because of the Amiga's multi-tasking operating system and the fact that it was the next generation of graphics computers. I thought it would be a good preliminary plat-

form, along the lines of being a baby VAX." Kennedy says that although Emerald Intelligence plans to develop versions of Magellan for other platforms, such as the Macintosh, IBM PC, and UNIX workstations, "it has worked out very well to develop Magellan first on the Amiga because we can do things, given the Amiga's multi-tasking capabilities, that we cannot do easily in the IBM or Macin-



tosh environments. The Amiga took us into the next generation of personal computers—in 1985—without bogging us down with the 640K memory limit of MS-DOS, or the black & white graphics of the original Macintosh.”

Although LISP and PROLOG are considered to be the traditional computer languages of artificial intelligence, they tend to require large amounts of memory. Magellan is written primarily in C, with some elements of the inference engine written in assembly language. C is known for its speed and portability. Assembly language is even faster, since the computer has to perform very little interpretation prior to the execution of commands, but programming in assembly language can be very laborious.

Emerald Intelligence has announced the first revision of Magellan, Version 1.1, a free upgrade to registered users of Version 1.0. It should be available by the time you read this. Please note, however, that this review is based only on Magellan Version 1.0.

### **Magellan Interface**

Magellan is divided into three components. First is the Inference Engine, which simulates logical human thought processes. (Inference refers to the process of deriving new facts from established facts). The Inference Engine interprets the knowledge contained in the expert system, asks questions of the user and derives conclusions from that information. Second is the Interface, an Intuition-based shell that connects the Inference Engine to the outside world. The third component is the Knowledgebase, which serves as the repository for the facts, experience and “rules of thumb” that comprise human expertise.

A Magellan expert system is created by establishing plain language IF-THEN rules. An expert system with less than 500 rules is considered to be a small expert system. A 512K Amiga can handle 50 to 100 rules, while a fully configured machine is capable

of handling several thousand rules. I tested Magellan on an Amiga 2000 with three megabytes of RAM and experienced no problems whatsoever. I ran Magellan on an Amiga 1000 with 512K of RAM and was soon paid a visit by the Guru. When working with less than one megabyte of RAM, it is recommended that Knowledgebases be constructed directly on disk, rather than in RAM.

When Magellan is first loaded, two CLI-like windows and a file requester open onto the Workbench screen. The first window is about four inches high and is labeled “Magellan 1.0—Dialog.” The second window is about two inches high and is labeled “Magellan 1.0—Control.” The Control window is a message interface between the system shell and the user. The Dialog window serves as an interactive message board between the expert system and the user. For example, whenever a new Knowledgebase is loaded, the number of rules read in from the Knowledgebase is displayed in the Dialog window. The file requester defaults to a display of a directory of the Amiga’s RAMdisk, including a default Knowledgebase file (named “Test”) which the program automatically creates upon execution.

Although the Control window is used only for displaying a few messages from Magellan to the user and does not accept input from the keyboard, it must be the active window in order to access the pull-down menus. This frustrated me repeatedly because the Control window was invariably inactive and hidden behind one or more other windows whenever I needed to access the pull-down menus.

I call the Control and Dialog windows CLI-like because they feature drag bars plus front-to-back and sizing gadgets. But they do not possess scroll bars. Messages, therefore, frequently scroll up and off the screen before you can read them, which forces you execute commands repeatedly if you don’t remember to freeze the display by pressing either the right mouse button or the CTRL-S

### **Artificial Intelligence and Expert Systems**

Webster’s defines *intelligence* as “the faculty of thought and reason.” Webster’s defines *artificial intelligence* as “the characteristics of a machine programmed to imitate human intelligence functions.”

Artificial intelligence (AI) is one of the newest and perhaps most fascinating fields of computer science. To date, most work in artificial intelligence has been related to research projects—exploring the idea of providing computers with intelligence, developing a better understanding of human thought processes, etc. Microcomputer languages designed for developing AI applications—most notably LISP and PROLOG—have been available for some time. But few practical applications of AI technology have been introduced to the personal computer market due to the limited power of microcomputers.

An expert is a person with a high degree of knowledge and skill in a specific subject. An “expert system” is an artificial intelligence application based on knowledge gained from experts in a given field. Expert systems simulate the reasoning process of a human expert by asking factual questions based on an original inquiry, drawing conclusions based on established rules of thumb, and then producing a final response. Expert systems are most effective when dealing with a limited and well-defined number of variables. An expert system only knows what it has been taught. It doesn’t possess the flexibility of a human expert, and it cannot automatically adapt to situations that don’t fit the model it has learned. Expert systems can, on the other hand, give the human expert the freedom to deal only with those situations that require that unique human ability.

keys. Other Magellan windows such as RuleBuild and CellEdit, which are more critical to building a Magellan expert system, feature a better design.



## Building Rules

The RuleBuild window divides and identifies each element of the IF-THEN rules that make up an expert system. IF-THEN rules can be definitional, for example: IF status IS married, THEN individual is a spouse. Or they can be heuristic, which means they are based on a "rule of thumb," such as: "IF Commodore's stock price > (is greater than) \$25, THEN stock IS at a new high." Each rule consists of four basic elements—Object, Attribute, Operator, and Value. An Object can be either a physical entity (as in Commodore's stock) or a concept (as in marital status).

Each rule can contain up to five different objects linked together with an AND or OR. The marital status example could, therefore, be expanded to cover additional criteria, such as: "IF status IS married AND sex is male, THEN individual IS a husband".

Attributes describe the property of objects. Price would be an attribute of Commodore's Stock. Values can take several forms, including—verbal descriptions, numeric values and mathematical relations related to the attribute of an object, with the form dependent on which Operator is used. In the stock example, \$25 is a value assigned to the attribute of price.

Operators characterize the relationship between the Attribute and the Value of an Object. Verbal Operators include IS, IS NOT, ARE, and ARE NOT. Mathematical operators include > (greater than), >= (greater than or equal to) and != (not equal to). Special Operators can be used in the result clause (THEN . . .), including EXECUTE (to execute an AmigaDOS command), SHOW (to display an IFF image) or SHOWANIM (to run an animation sequence). Referring once again to the marital status example, the result clause of this rule could be expanded to: THEN individual is husband AND SHOW df0:Husband.Pic. This would display the designated IFF image.

Each rule is assigned Threshold and Certainty values. Threshold values are associated with the Prem-

ise clause of the rule (IF . . .). They are considered to be the minimum degree of certainty a condition must possess before the related rule will be recognized by the inference process. Certainty values are associated with the Result clause of the rule (THEN . . .). Magellan features an option which automatically sets the default threshold and certainty values. These two values are an important feature

## The Threshold and Certainty values remind us that neither computers nor expert systems are all-knowing.

which gently reminds us that neither computers nor expert systems are all-knowing.

Each time a rule is created, words are entered into the dictionary of the Knowledgebase. Since different users of the expert system may use different words to express the same ideas, Magellan lets you create and store synonyms in the Knowledgebase dictionary. A Display option on the menu bar exhibits a list of known words and synonyms.

## Reasoning Methods

Magellan uses three different types of reasoning processes to derive a conclusion from its Knowledgebase—Backchaining, Forward Chaining and Synergistic. If Magellan is unable to derive the information it requires for arriving at the goal, it questions the user for input. If there is more than one possible solution, each solution is listed.

Backchaining is a goal-oriented inference method used when a specific answer to a question is desired. Forward Chaining is a data-driven inference mechanism. A "true" condition triggers the action part of a rule. In a

manufacturing environment, for example, a sensor could send a value to the system that would trigger an alarm. Synergistic inference uses both Backward and Forward Chaining to first arrive at a goal and then state all the conclusions resulting from the information inferred.

Magellan is necessarily a complex product that takes effort to learn, despite claims to the contrary in the user manual. The 132-page user manual is well-written and is stuffed with valuable information about the program and artificial intelligence concepts in general. Unfortunately, the manual is fragmented and poorly organized, with definitions and concepts scattered illogically throughout the book. Different explanations for the concept of Backchaining, for example, can be found in the explanation of menu options, in the Introduction, in the explanation of inference options and in the glossary of artificial intelligence terms.

They're all good explanations, but if they were combined in one place the concept would be far easier to grasp.

## Conclusion

Consultants, educators, trainers and hobbyists are only a few of the professionals who will find applications for Magellan. Despite the flawed user interface (which should be improved in Version 1.1) and the poorly organized (though well-written) user manual, Magellan is an impressive product which exploits the AI capabilities of the Amiga more thoroughly than any other software yet brought to market. I recommend Magellan to anyone who needs to capture, manipulate and disseminate expert knowledge, and to anyone interested in exploring the possibilities of artificial intelligence. ■

---

*Michael Brown wrote the Income Tax Spreadsheet template in the first issue of AMIGA Plus.*

---

**MAGELLAN** \$195  
Emerald Intelligence, Inc., 3915-A1 Research Park Drive, Ann Arbor, MI 48108.  
(313) 663-8757.

CIRCLE 249 ON READER SERVICE CARD



# Wayne Gretzky Hockey

Reviewed by Rick Teverbaugh

Just as Wayne Gretzky stands above the rink in his hockey abilities, this hockey game, which carries his extensive input and his attention to detail as well as his name, stands above the crowd as the best sports simulation I've seen on any computer for any sport.

Developed by Bethesda Softworks, the same folks who came up with Gridiron, **Wayne Gretzky Hockey** does everything and more for its sport that Gridiron did for football. Each player is rated from 0-9 in 11 individual traits: aggression, power, injury, skating, puck control, shooting, quickness, fatigue, penalty, passing and checking. Nothing is hidden. It is possible to create your own teams, save them to blank disks, and look into the ratings of the players that come with the game.

Perhaps the only negative aspect of the game is the choice of four teams that comes with it. The Stanley Cup finalists from both 1970 and 1971 are included. That means there is no Wayne Gretzky in his own hockey game, though you will get Phil Esposito, Bobby Orr, Guy LaPointe and Bobby Hull. But, by the time you read this, the 1987-88 season disk will be available at \$19.95. At the end of

**There's no Wayne Gretzky in his own game, though you will get Phil Esposito, Bobby Orr, Guy LaPointe and Bobby Hull.**

the current season, the 1988-89 disk will also be available. If there is sufficient demand, past seasons will be created for those who would like to relive great NHL moments from the past but don't have the knowledge to do their own ratings. Also in the works is a \$24.95 league calculator that will make it easier to put a team or teams through an entire season of play.

## **Four Choices**

There are four different ways to play Wayne Gretzky Hockey. The first is just to pick two teams and then sit back and watch them go at it, guided

by the very tough and sound decisions of Gretzky's computer chip persona. For those of us who love hockey and yet are stuck in the middle of the Midwest without even a cable system that offers hockey, this is a great way to get a fix.

You can also coach one of the teams, which involves calling special plays (there are five to choose from) and deciding on the proper time for line changes. You'll know real fear if you call for a change just as the puck goes onto the stick of an opponent now heading for your unprotected goalie.

You can also control any player on the ice, other than the goalie. An on-screen cursor guides the player, though you will soon learn that it is rarely possible to catch up to a speeding puck. You'll learn to anticipate where the puck will likely go next and head for that spot. You'll also learn that stopping, changing direction and getting back up to speed again is more difficult on the ice than it looks.

Shooting, passing and checking are done by moving the cursor in combination with the mouse buttons. Check too hard or hold too long and you'll find your team short-handed



with a player in the penalty box.

The final option has you competing both as player and coach. But take my advice, don't try that right away. It's a handful for even the most experienced player.

There are four skill levels, pro, college, junior and high school. This is a great way to learn the game or to handicap a superior player. There are numerous other options, like length of periods (5, 10, 15 or 20 minutes)—and this game is played in real time. You can also control the colors of each team's uniforms and the type of game to be played. A practice game is 4-on-4. A regular game means one overtime period and a tie if neither team scores. The playoff option means playing as long as it takes for somebody to win. Other features include pause and save game options as well as an option to center the rink on your screen.

### Instant Replay

One of my favorites is the ability to go back and look at the past eight seconds of the game in instant replay mode. You can run that backwards and forwards at varying speeds.

At game's end, a detailed array of stats are presented, either on screen or sent to your printer. These include breakdowns by shots, penalty minutes, goals, assists and points by individual players, as well as team scoring and penalty summaries with the times each occurred.

The graphics are at the head of the class in every regard. From an overhead view you can watch all 12 players move independently on the ice. You see the skates move under each player. The ice gets marked as each blade catches hold and propels the skater on his way. In fact, there is a Zamboni machine that comes out between each period and smoothes out the rink again. You don't have to watch that. You can hit the left mouse button and go immediately to the next period if you like. But I guarantee you'll watch it at least once. The same holds true for the astonishing digitized opening sequence—but



Wayne Gretzky Hockey brings N.H.L. action to your Amiga.

I don't want to spoil it for you. You have to see it for yourself.

The visual *coup de grace* is the digitized fight sequences. It takes 1 meg of memory to see those, but if you've been looking for an excuse to upgrade, this is it. The fights are born not out of some random number table, but from the high aggression and

**It's so realistic  
that several pro  
coaches are  
using the game  
to test  
strategies.**

low penalty ratings of the players involved. You can also turn off the fighting if you don't care for that part of the game or if you're playing college or amateur teams.

But good as the graphics are, the sound is better. It's not just the quality of the digitized sound effects, but also what sound effects were taken. "We took the sounds from practice at the Cap Center (home of the NHL's Washington Capitals)," said Chris

Weaver, who also played a part in the game design and the writing of the documentation. "We even rode around in the Zamboni. We had everything except a check into the boards. So we asked one of the Toronto players if he'd help us out. He took off to the other end, built up a head of steam, picked up a teammate on his stick and slammed him into the boards. Once his teammate figured out what was going on, he did the same thing back. They had a great time." So will you, as the sounds bring even more realism to a program that is already so realistic that several pro coaches are using it to experiment with different lines and test strategies.

This is probably the only sports game I've ever gotten that didn't make me wish for other features. Right now, I would strongly recommend buying Gretzky, the additional 1987 disk and the League Calculator. Then put Gretzky up against Pittsburgh's Mario Lemieux and enjoy the action. ■

**WAYNE GRETZKY HOCKEY** \$49.95  
Bethesda Softworks, 15235 Shady Grove Road, Suite 100, Rockville, MD 20850.  
(301) 926-8300.

CIRCLE 259 ON READER SERVICE CARD



# MICRODEAL

"Without a doubt the best of the soccer action games"

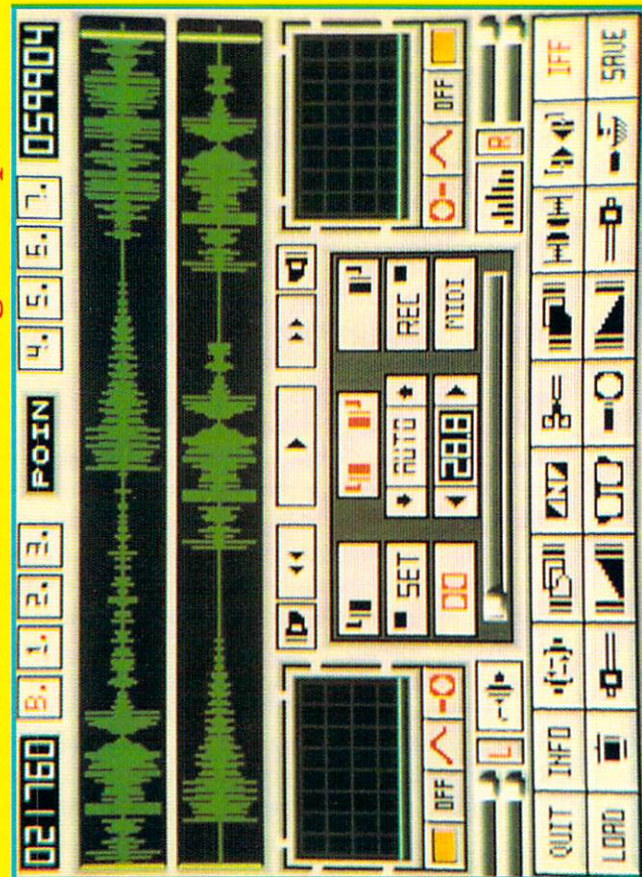
## Amiga Computing, October 1988

If you're a soccer fan, then Microdeal's International Soccer is the game for you. Superb graphics, plus the ability to select team colors, wind direction and speed, wet or dry weather, and day or night game conditions, make this one of the best simulations ever. You can have high caliber competition under any conditions. One or two players can take on the computer, or two players can play against each other. With the optional four player adapter from Microdeal you can pit three players against the computer, two players against two players, or two against one. You won't believe the action. The animated crowd, electronic scoreboard, and on screen refereeing keep the gameplay fast and furious. Don't be left out of bounds. International Soccer is playing now!

(Color only—1,2,3, or 4 joysticks required, optional 4 player adapter available)



## A.M.A.S. The Advanced MIDI Amiga Sampler



AMAS is a full featured Stereo audio digitizer complete with a full implementation MIDI interface, all built into a single stylish hardware unit that compliments your computer. There are no cumbersome extras needed. The digitizer accepts mono or stereo input via its line input sockets and is provided with an extra microphone socket for direct vocal input. The MIDI sockets consist of MIDI IN, OUT, and THRU. Hardware versions exist in A1000 and A500/2000 formats. The software employs the ultimate graphics/mouse user interface.

Features include:

- Left, Right or stereo digitizing
  - Sampling rates of up to 28KHz
  - Dual real time oscilloscopes (1 for each channel)
  - Real time spectrum analysis
  - Auto record trigger on input level
  - Up to eight banks on 2 meg machines (200-250k required per bank)
  - Up to 10 stereo samples per bank
  - Load and Save samples in RAW or IFF data formats
  - Filter ON/OFF where applicable
- All Editing functions are available including: Cut, Paste, Insert, Delete, Copy, Overlay, Mix, Reverse, Fade In/Out, Volume Up/Down, Sample Compress/Expand, Filter, Stereo "Bounce", and Channel Swap.

Why settle for less than the best? Ask your dealer for a demonstration today!

MICRODEAL • 576 S. Telegraph • Pontiac, Michigan 48053 • (313) 334-8729



# BackGammon

COMMERCIAL U.K. GAME SOFTWARE — EXCLUSIVE  
ON AMIGA *Plus* Disk

Backgammon has been played for centuries as a high-stakes board game and is now probably more popular than ever, especially with the jet set. (Just ask Hugh Hefner!) Your Amiga is ready to be a challenging opponent, thanks to the BackGammon program on this month's AMIGA *Plus* Disk. This software was originally a commercial release in England, but is no longer available except through this magazine.

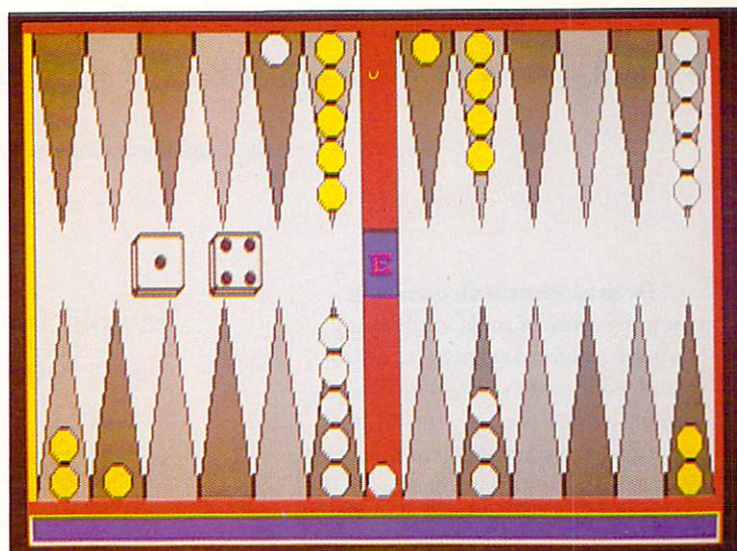
To begin playing BackGammon, simply double-click first on the Gammon drawer and then on the BackGammon icon inside. The opening screen gives you some starting instructions. Click anywhere on that screen and the playing board appears.

In this particular treatment of the game, the board is white, marked with grey triangles called points, and divided in the center by a red bar. Round playing pieces are laid out around the board. You always play white, moving clockwise around the board. The computer has the yellow pieces, and moves counterclockwise.

Click on the piece you want to move and then click on the point of destination. If you change your mind about moving a piece after you clicked on it, click on it a second time before picking another piece.

The object of any Backgammon game is to be the first player to remove all your pieces from the board. You'll jump your pieces according to rolls of the dice. When it's your turn,

Play Backgammon against your Amiga with the AMIGA *Plus* disk.



two dice appear on the left side.

You must move your pieces the number of spaces shown on an individual dice. For example, if the dice show a four and a five, you must move one piece four points, and another piece five. You can make both moves with one piece, but each move must be made separately. You can't just jump nine places. If you roll doubles, you get to take each move twice.

In this way, you jump from point to point until all your pieces are in your "inner table"—the last six points in the bottom left section of the board. Then you can start to "bear off", removing pieces when the dice allow.

So far so good, but your wily

Amiga opponent is also trying to move into its own inner table, in the upper left corner—and the two of you can't share points. If you have two or more of your pieces on one point, you've "made" that point, and the other player can't land there.

Any piece alone on a point is a "blot", vulnerable to attack. If your opponent can land a piece on that point, your piece is removed from the board and placed on the bar. You must remove that piece from the bar, into your opponent's inner table, before you can make any other moves.

If you can't make any moves, click on your dice to pass. As play progresses, an alert opponent will do everything possible to make it impossible for you to move. ■





# Deluxe PhotoLab Workshop

IMAGE PROCESSOR FOR MURAL-SIZE MONTAGES

Article and Illustrations by Prof. Lewis Tilley

**Deluxe PhotoLab** gives you a mighty array of tools for painting on a **vast** electronic canvas. Unlike Deluxe Paint and most other paint programs which use only the 512K of chip RAM for storing graphic images, PhotoLab uses whatever free RAM you might have. So your page size could be as much as 9,999 X 9,999 pixels—if you have the memory. An Amiga with one megabyte of RAM will give you a 800 X 800 page. My 2000 model is upgraded to three megabytes and provides a workable 1,280 X 1,600 page size while using HAM and interlace.

Deluxe PhotoLab's Paint program functions very much like Electronic Arts' own classic Deluxe Paint II—but with 4,096-color HAM capability added. However, PhotoLab also includes Colors, a pixel manipulator along the lines of Butcher or Pix-mate, plus a printing program called Posters that lives up to its name.

I had been getting more and more frustrated by the elaborate system of multiple programs I needed for creating Amiga images. But now PhotoLab is the perfect partner for combining all my good old friends—Deluxe

*My old training  
as a muralist  
may finally  
come in handy  
on the Amiga.*

Paint II will continue to execute perspectives, DigiPaint will tint like Titian and Photon Paint will spread a brush over cubes, cones and balls.

## POSTERS

PhotoLab's Posters program wipes away all other Amiga graphics printing software I have ever used. Since it was introduced to my modest Okimate 20 color printer, the Oki has started thinking it is one of the costlier big boys. The visual size chart shows you exactly what size you are printing and where the paper divisions are going to be. And what a range of sizes. The grid of 8.5 X 11 inch pages totals 176 pages—vertically or horizontally. The aspect ratio can be changed, so you may squeeze or stretch an image in printing. The

size of your printout ranges from a postage-stamp 1 X 1 inch up to 10 X 10 feet. My old training as a muralist may finally come in handy on the Amiga.

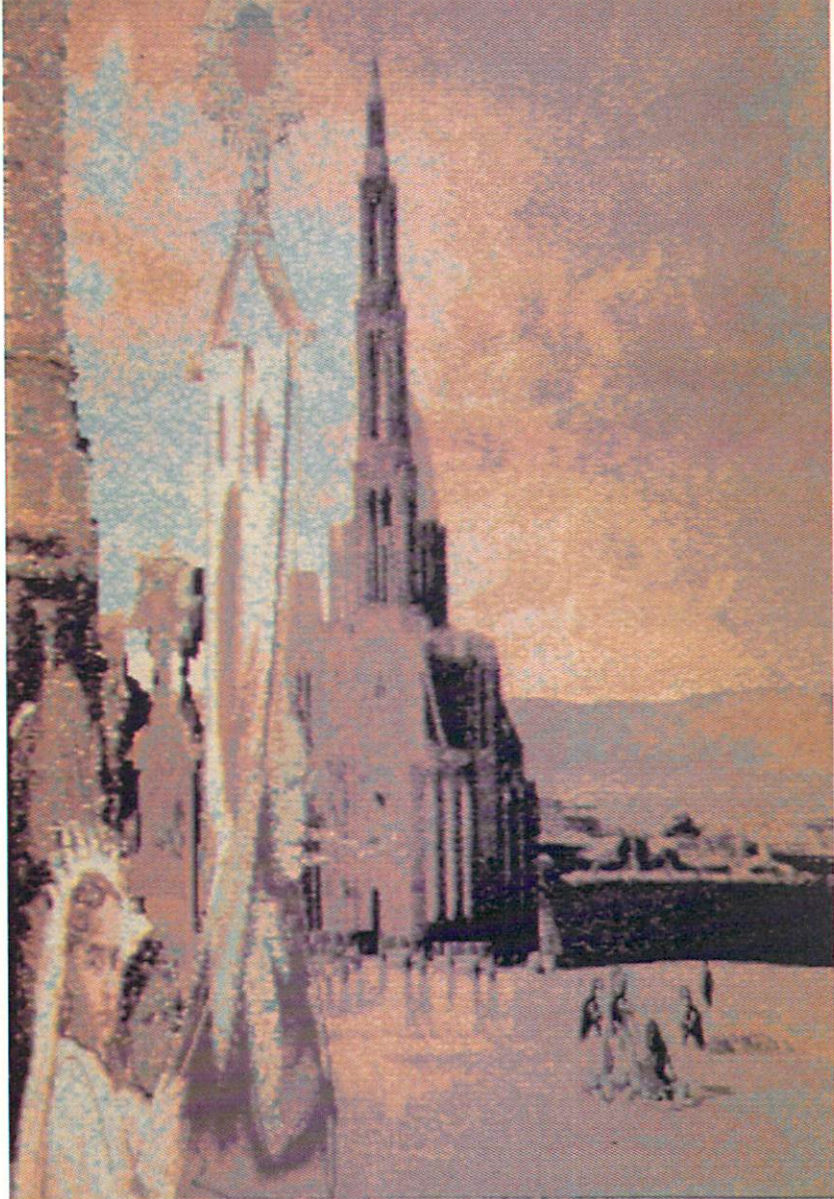
## COLOR

PhotoLab's Color program is the easiest tool I have ever used for converting HAM images to other formats. A control panel more than a half-screen high loads your HAM image behind itself, so you can move it up and down while you evaluate the changes about to be made. Stepping down works like a charm. I like the decisions for color modifications the program makes going from HAM down to Medium and Low resolution. Color manipulations are just as easy after you figure out that the charts of individual colors need to be locked down, leaving free only the color you wish to to increase or decrease by clicking the up-and-down triangle gadgets.

## SAVE & LOAD

I discovered the hard way that I could not save my whole page of 16 screens on one disk. I could save a





nine-screen page to a disk, in a file taking up 328,566 bytes plus 979 for the icon. But since the 320 X 400 full screens in HAM and interlace generally take up 50K each, while the icons and other little niceties on a disk eat away even more storage, I was lucky to receive just a warning when I tried to save 16 screens at once.

Loading saved images back into the program also gives a little problem if you stray from the expected normal page size, screen size and resolution/interlace. How to keep loading sweet and short? Underneath the cleanest icon replica of your image is saved the page size it loads into. However, since this information is

buried back there on the Workbench with the other icons, I never see it when I'm loading from within the program. Another trick is to always use the "Load at" command. It will tell you how much space you need.

## TOOLS

Deluxe PhotoLab tools are really not all that different from what you're using in Photon Paint and Deluxe Paint II—except for a curve-drawing tool which makes it downright sinful to draw the human body.

This tool does it like a French curve. First you set the two points at the beginning and the end of the straight line. Lift your left finger and slide the mouse to pull the first curve

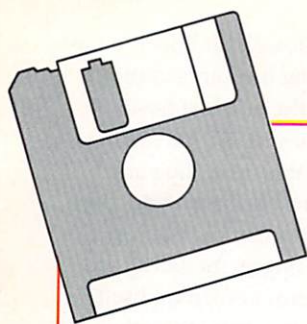
out. Now press down that finger again while sliding the curve at the opposite end of the line to a position which will please you. When you release the button this time, the curve draws itself to the placement you have selected. Between the raising and lowering of fingers, however, the double curve seems to feed on itself, pulling the line away from the other curve. You'd better get accustomed to this method of drawing for Laser printers and Postscript. Setting four or more points is the way they do it in Professional Draw.

One of the most difficult Deluxe Paint habits to break is swapping screens with the J key. PhotoLab's J, unfortunately, has not been programmed to swap screens. After you have brought up a screen, you can click anywhere on it to activate it. Sometimes it is very difficult to grab the right place at the top of a screen in order to pull it up or down. With a brush on the end of your pointer, it seems even more difficult.

The small row of colors at the top of the screen is inadequate for HAM. So click on the screen button at upper right. Whoops, did you get the Workbench screen? Sometimes I do, so take the safer way with me and touch the P (for palette) key on your keyboard. Here comes the BIG palette screen of 128 colors! It is half the size of a full screen and contains row after row of little pans of color. Sure, most pans are still black when you flip to this palette page. But by copying from the basic palette at the top, which duplicates the one on your main painting screen, you can transfer, manipulate and, most important, **spread** one color into another for an exciting blend accessible immediately from HAM mode.

ResizeDraw tool in the Brush menu saves a lot of time. You draw a rectangle in the size you want the brush, while the brush is still attached to the tip of your mouse-finger. The Menu at the top of your painting screen offers a very strong group of options. As a matter of fact, one menu entitled OPTIONS has my next favorite key. The R key repeats the last action for





## **EXCLUSIVE PROGRAMS ON DISKS!**

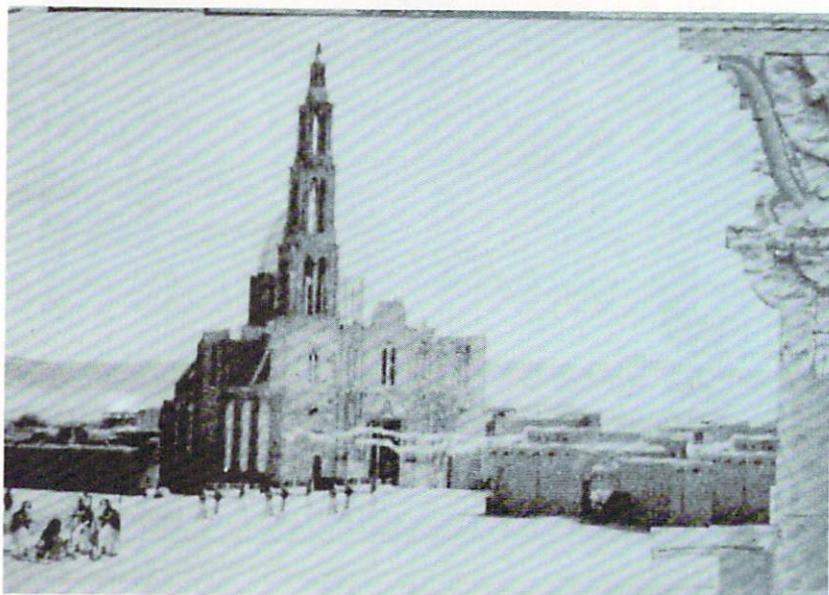
If you bought this issue of **AMIGA PLUS** without the disk, you're missing out! Order the companion disk full of great, enjoyable programs from top **AMIGA** experts. Order your disk by mail using the order card in this issue. For even faster service, call:

# **Toll-Free**

## **1-800-234-7001**

7 am-6 pm PST  
Visa/MasterCard orders only

Each disk is \$10.95 plus \$2.00  
handling & mailing.



Mexico Triptych is on the *AMIGA Plus* disk.



as many times as you choose to press it. Like a well-executed wash in an architectural rendering, you may slowly build up a darker tone by overlaying many lighter tones.

The pull-down submenu under Modes/Paint is very accurately calibrated for the amount of a selected color you wish to apply. Its listing is a little upside down, however. Solid color (full strength) is at the top. Below is Low Mix (faint glaze) followed in ascending strength order by Mix ( $\frac{1}{4}$  strength), Average ( $\frac{1}{2}$ ), and Blend ( $\frac{3}{4}$ ). Shade has a point to move where you want maximum density of a brush. The horizontal and vertical control bars are there in expanded form, which lets you determine which edges you want them relating to.

Some more of the many, many features found under the Paint Modes submenu include: Subtract, Add, Scale, Scale2, Max and Min, XOR, OR, and AND. Then there is HLF which grays down everything in the image by taking away half the saturation of the colors in the area selected, and B&W which takes away all color.

There are four fill-control selections—Solid Color, Brush Pattern, Trace Edges and Gradient (with dithering). You specify Brush Patterns and choose what pixels are to be changed by selecting Fill Offset and HAM Closeness respectively.

The Brush Menu enables you to do all those things you want a brush to do plus a Grab Last, which picks up the last drawing done on the screen. Hold down the SHIFT key while executing Grab Last and you get what was underneath the last object drawn. The Remap command adjusts color differences to let you take full advantage of the PhotoLab's ability to work between two different screens in different resolutions at the same time.

Ultimately I may decide that using PhotoLab's paint program slows the present rapid painting style I developed using Photon Paint, DigiView and Deluxe PaintII, but PhotoLab's Color module has become the image processor I call on first. Deluxe Pho-

## Notes on the Mexico Triptych By Lewis Tilley

You must choose the page size when prompted as you enter PhotoLab Paint. Since three pictures in HAM interlace are to be loaded, choose a page size of 960 X 400. Ready the individual pictures you are going to use. To load them into the correct position use the read-out of cursor position. If you work in a HAM interlace, the first image is loaded at 0, the second at 320 and the third at 640 (horizontal placement). If you choose to develop a double-wide image of six images, the second row of HAM interlace images should be positioned at the 400 mark.

PhotoLab's Show Page option lets you see a reduced representation of the entire image, in either Fast or Smooth mode. Fast gives you a rough approximation of the image, making it easy to check where you are locating your screens. The Smooth option gives you a better representation of the image, letting you take a slide of the completed oversize image.

The three Mexican pictures which make up the triptych are all photographs digitized with DigiView. Reading from left to right they are—Girl With A Banner, Plains Cathedral and Old Woman. The last is a photograph of a charcoal drawing done many years ago from a model in San Miguel de Allende, Guanajuato. The other two were live-action shots digitized in high resolution from 11 X 14 prints.

All three photos were extensively modified with the use of the Paint program of PhotoLab after converting them to HAM low resolution images with Color. The fancy column was created with the details of decoration available in the original photo of Girl With A Banner. Pieces of the pattern from elsewhere in the photo were lifted and copied, sometimes flopped vertically, sometimes horizontally as needed. Since the idea was to put together a frieze-like collage of things religious and Mexican, the column became more like Pre-Columbian architecture than the Chirigaresque style of Colonial Mexico. The second banner was added in the background, as were many of the women with their rebozos. The little boy perching on the ledge is not a fake but was really there.

In the central photo, all the tiny dancers in front of the cathedral were added. The paper decorations above their heads were lightened and duplicated a few times. The group in the middle ground was duplicated from two women who had just gotten off the train from which the picture was taken in northern Mexico. The group appears to be standing around a fire in a manner reminiscent of the Spanish painter Goya.

The most difficult part was matching the sky tones to achieve a smooth transition where the two photos met. New cloud patterns were formed, then matched to the existing cloudscape by using the select facility from the palette. Very little single-pixel noodling was done.

The evolution of the drawing in the Old Woman has been going on for a long time. The rebozo, the arms and the head were retouched. The Spread control on the palette smoothed the values on the shadows of the prayer-bench top, which had to be changed for a more natural perspective.

One of the greatest advantages PhotoLab gives you is the ability to easily move back and forth, sliding between the images as they relate in the final form. However, the cursor keys jerk the image when you scan between the images. You can easily choose the section to which you wish to return from the Show Picture option.

A final tip on printing, for those of you who own an Okimate 20. When you print your oversize picture in a multiple-sheet form with Poster, choose Halftone from Preferences (on the Graphics 2 screen). It seems to give a much cleaner rendition of the values. ■

toLab is at the leading edge of paint programs, pushing to the Amiga's outer limits. Its three outstanding programs in a single package makes it an Amiga graphics software value unmatched today. ■

### DELUXE PHOTOLAB \$99.95

Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (415) 571-7171. Requires 1 megabyte, not copy-protected.

CIRCLE 242 ON READER SERVICE CARD

*Lewis Tilley is an art professor emeritus who divides his residency between Colorado and Georgia.*



# Creative Computers

**CUSTOMER SERVICE  
OR ORDER STATUS**

\_\_\_\_\_

WE CAN BEAT ANY ADVERTISED PRICE! BUT WE SELDOM HAVE TO — OUR PRICES ARE THE LOWEST! (IF YOU SEE A LOWER PRICE ON AN ITEM, GIVE US A CALL.)



R.R. AESOP'S FABLES.....	19.95
RAW COPY 1.3.....	38.95
REACH FOR THE STARS.....	27.95
READ & RHYME.....	31.95
READ-A-RAMA.....	32.46
SEAM OF THE WARRIOR.....	27.74
REBEL CHARGE CHICKAMANGA.....	39.95
REEL FISHING-GONE FISHING.....	30.88
RETURN TO ATLANTIS.....	34.95
ROAD RAIDERS.....	25.95
ROADWARD 2000.....	27.47
ROADWARD EUROPA.....	29.95
ROADWARD.....	23.95
ROB READER UGLY DUCKLING.....	19.45
ROBBEARY.....	16.21
ROCK CHALLENGE.....	32.46
ROCKET RANGER.....	32.46
ROCKFORD.....	23.95
ROMANTIC ENCOUNTER.....	25.95
SAMPLEWARE-DIGITAL.....	16.95
SAMPLEWARE-GRAB BAG.....	16.95
SAMPLEWARE-ORCHESTRAL.....	16.95
SAMPLEWARE-ROCK.....	16.95
SANTA PARAVIA & FIUMACCIO.....	19.95
SARGON III.....	35.95

SUPERBASE.....	93.73
SUPERBASE PERI II.....	94.46
SUPERBASE PROOF 3.....	209.95
SUPERPLAN (SPREADSHEET).....	99.95
SUPERSTAR ICE HOCKEY.....	32.46
SWORDS OF SODAN.....	32.46
SYNTHSY SONGS (EACH VOL.).....	15.95
SYNTHSY.....	59.95
SYSTEMS MONITOR.....	28.95
T-SHELL.....	32.46
TAKE STOCK.....	32.46
TALES FROM ARABIAN NIGHTS.....	32.46
TALKING ANIMATOR.....	39.00
TALKING COLORING BOOK.....	18.95
TANGLE WOOD.....	25.95
TARGIS.....	35.95
TATE FORTS.....	45.95
TAX BREAK.....	32.46
TECHNOPOC.....	32.46
TELE EPIC.....	25.95
TELE WARD II.....	35.95
TELEGRAMS.....	23.95
TERA QUESTON.....	25.95
TERRAFOR TURBO SILVER.....	19.95
TERROPODS.....	25.95

## NEW FROM CENTAUR: THE SILENT DRIVE \$159

**FEATURES:** • C51 3200 • Clickless • Small compact design • Metal case  
• Compatible with all Amiga computers • Low power consumption • Hinged  
disc cover • Drive disengage • 1-year warranty.

**ALSO AVAILABLE:** C51 2200 internal drive for Amiga 2000—100%  
compatible with same mechanism as Commodore 2010..... \$149.00

SCARY MUTANT SPACE ALIENS.....	25.95
SCENERY DISK #11 EAST COAST.....	18.72
SCENERY DISK #7 EAST COAST.....	18.71
SCHEMATIC CAPTURE.....	19.95
SCRAMBLE.....	32.46
SCRIBBLE.....	62.32
SCRIPT 3-D.....	69.95
SCULPT ANIMATE 4-D.....	399.95
SEAS: CHINA/MAINE SEAS.....	34.95
SEASONS.....	19.46
SECONDS OUT.....	19.46
SECURITIES ANALYST.....	49.95
SEVEN CITIES OF GOLD.....	14.95
SEX VIKINGS.....	25.95
SHADOW GATE.....	32.46
SHAKESPEARE.....	146.95
SHANGHAI-STRATEGY GAME.....	27.46
SHERLOCK.....	27.00
SILENT SERVICE.....	25.95
SINBAD & FALCON.....	32.46
SKY BLASTER.....	19.95
SKY CHASE.....	26.95
SKYFOX II.....	27.45

SLAYTON.....	14.95
SMOOTH TALKER.....	32.46
SNAKE PIT.....	24.95
SOCIAL STUDIES.....	19.46
SOFTWARE FILE SG.....	78.21
SOLITAIRE ROYAL.....	22.71
SONIX (AES).....	49.95
SORCERER LORD.....	32.46
SOUND OASIS.....	64.95
SOUNDBLAB.....	209.95

SOUNDQUEST.....	92.95
S-10 MASTER.....	32.95
S-110 MASTER.....	92.95
S-50 MASTER.....	92.95
S-70 MASTER.....	109.95
S-80 MASTER.....	109.95
ESQ/50-80 MAST.....	92.95
GENERIC MASTER.....	77.95
K-1 MASTER.....	92.95
M-1 MASTER.....	92.95
MT-32 MASTER.....	92.95
TEXTURE.....	32.95
TX-802 MASTER.....	92.95
TX-812 MASTER.....	92.95
SOUNDSCAPE PATTERN SPLAT.....	32.95
SOUNDSCAPE UTILITIES I.....	42.95
SOUNDSCAPE UTILITIES II.....	42.95
SOURCE LEVEL DEBUGGER.....	49.95
SPACE CUTTER.....	19.95
SPACE HARRIER.....	32.46
SPACE MATH.....	29.95
SPACE PORT.....	32.46
SPACE QUEST II.....	32.46
SPACE RACER.....	19.46
SPACE SCHOOL SIMULATOR.....	22.95
SPACE STATION OBLIVION.....	32.46
SPARKQUEST.....	32.46
SPELLBOUND.....	25.95
SPELLER BEE.....	31.25
SPELLING IMPROVEMENT.....	25.95
STAR WARS EMPIRE STRIKES.....	30.25
STARFLEET I.....	29.95
STARGLIDER.....	30.95
STARGLIDER II.....	29.95
STARRAY.....	28.95
STELLAR CONFLICT.....	28.95
STELLARLY.....	25.95
STOCK MARKET-THE GAME.....	16.95
STRIP POKER.....	27.46
STRIP POKER DATA #4.....	12.95
STRIP POKER DATA #5.....	12.95
STRIP POKER II.....	25.95
STUDIO MARKET-THE GAME.....	28.95
STUDIO MAGIC.....	64.95
SUB BATTLE.....	24.95
SUMMER CHALLENGE.....	19.95
SUMPERBACK.....	51.95

TEST DRIVE.....	34.95
TRISTE QUEST.....	25.95
TETRIS.....	21.40
TEXT DRIFT PLUS.....	59.95
THUNDER.....	32.46
THINKER.....	38.95
THREE LITTLE PIGS.....	19.95
THREE STORIES.....	35.95

## GVP GREAT VALLEY PRODUCTS

<b>For Amiga 2000:</b>	
IMPACT HC/45—48 MB 28ms Hard Card.....	799.00
IMPACT HC/40Q—42 MB 11ms Hard Card.....	799.00
IMPACT HC/80Q—84 MB 11ms Hard Card.....	1199.00
<b>For Amiga 500:</b>	
IMPACT A500-SCSI/HDBO—20 MB HD.....	749.00
IMPACT A500-SCSI/HDBO—45 MB HD.....	995.00
IMPACT A500-SCSI/HDBO—42 MB.....	
11ms High-Speed Hard Drive.....	1049.00
IMPACT A500-SCSI/HDBO—84 MB.....	
11ms High-Speed Hard Drive.....	1449.00
Quantum 80S, 84 MB 11ms 3.5" HD.....	995.00
Shock mounted, 64KB cache (for 11ms speed); SCSI interface. Compatible with IMPACT or A2090 boards. Quantum 40S—42 MB version of above drive.....	599.00

THUNDERBOLT.....	22.95
TIME & MASH.....	26.95
TIME BANDITS.....	21.95
TOOL CADDY.....	23.95
TOWER TOPPLER.....	32.46
TRACERS.....	22.95
TRANSCONTINENTAL RAILROAD.....	25.95
TRANSFUTOR.....	22.95
TRUE BASIC TRUE STAT.....	32.46
TRIANGLE.....	36.95
TRIGONOMETRY.....	36.95
TRINITY.....	25.95
TRUE BASIC.....	68.95
COLOR SPLITTER.....	45.95
CPUS 500-POWER SUPPLY A500.....	74.95
CSA DRAGSTRIP RAM ACCEL.....	723.45
CSA FASTTRACK 68020 ACCEL.....	905.45
CS1 2200 INT DRIVE A2000.....	149.00
CS1 3200 AMIO EXT FLOPPY.....	159.00
DELUXE MIDI INTERFACE.....	59.95
DESKJET 128K RAM CART.....	117.95
DESKJET PRINTER (300 DPI).....	749.00
DISI VIEW BOLD A500/A2000.....	149.00
DIGI-VIEW.....	143.95
EASY 500 TABLET.....	369.00
EASY 1000 TABLET.....	369.00
EASY 2000 TABLET.....	369.00
EASY MIDI 500/2000.....	48.95
ECE MIDI 1000.....	48.95
ESCORT 48 MB HD DR A500.....	679.00
ESCORT 48 MB HD DR A1000.....	659.00
FLICKER FIXER (HARDWARE).....	479.00
FRAMETRABLER.....	539.95
FUTURE SOUND A500.....	93.95
FUTURE SOUND-AUDIOSAMPLER.....	142.00
GEN ONE GENLOCK.....	739.00
GOMF 3.0 W/BUTTON.....	48.95
GVP A2000 AUTOBOOT EPROM.....	29.95
GVP A500 RAM/ROM MODULE.....	69.95
HURRICANE 68030 ADAP. BRD.....	300.00
HURRICANE A1000 ACCEL. BRD.....	350.00
HURRICANE A1000 MEM. BRD.....	540.00
HURRICANE A2000 ACCEL. BRD.....	500.00
HURRICANE A2000 MEM. BRD.....	540.00
IMPRINT.....	399.00
INTRUDER ALERT.....	199.00
LASERJET II-D PRINTER.....	2995.00
LASERJET SERIES 2 PRINTER.....	1749.00
LASERJET 2-RAM 1 MB.....	419.95
LENS: 16 MM, WIRIS F1.6.....	21.85
LENS: 16 MM, WIRIS F1.8.....	68.25
LIFE 500.....	289.00
LIFE 1000.....	270.00
MAGNIA 4004 GENLOCK.....	1595.00
MICROBIT 4 X POP-SIMM BRD.....	74.50
MICROBIT 8-UP RAM BRD, OK.....	145.00

## M.A.S.T. PRODUCTS

**MINIMEGS:** Expandable,  
external FAST RAM (up to 2-  
MBs), low power—available  
for Amiga 500 or 2000 —  
• **MINIMEGS 512K.....\$299**  
• **MINIMEGS 1 MB.....\$449**  
• **MINIMEGS 2 MB.....\$749**  
**TINY TIGER:** Low cost, high  
performance, SCSI hard drives  
for all Amigas — complete —  
nothing else to buy —  
• **TINY TIGER 30 MB.....\$629**  
• **TINY TIGER 40 MB.....\$799**  
(Quantum)  
• **TINY TIGER 80 MB.....\$1129**  
**UNDRIVE.....\$159**  
**TWIN DRIVE.....\$249**  
(special price/limited time only)

MICROBIT: HARDFRAME SCSI.....	239.00
MIDI GOLD.....	64.20
MIDI GOLD 2000 (INT).....	68.47
MINIMETS MIDI INTERFACE.....	43.00
NERIK GENLOCK.....	1975.00
OKIMATE 20 W/PLUG N PRINT.....	249.00
OKIMATE PLUG N PRINT.....	79.95
OMEGA STR. SAMPLER A1000.....	79.95
PANASONIC WV1410 CAMERA.....	1095.00
PANASONIC WV1500 CAMERA.....	320.00
PEOPLE METER BIO FEEDBACK.....	39.95
PERFECT SOUND DIGITIZER.....	67.95
PERFECT SOUND.....	108.95
PRO RAM A2000 2/8 MB.....	119.95
PRO SOUND DESIGNER.....	119.95
PROCESSOR ACCEL CMI.....	159.00
PROGEN.....	399.00
QUANTUM 40 MB DRIVE, 11MS.....	599.00
QUANTUM 80 MB DRIVE, 11MS.....	995.00
ROLLAND MT-32 TONE W/.....	549.00
RUGGEDWRITER HP PRINTER.....	1395.00
SOUND SAMPLER.....	86.95
SPIRIT 0 MB FOR A1000.....	249.00
SPRINT DELUXE MIDI.....	114.95
STAR NX1000 PRINTER.....	199.00
STAR NX1000 RAINBOW.....	279.95
STARBOARD 2 SCSI MOD.....	100.00
STARBOARD 2 UPPER DECK.....	80.00
STARBOARD 2/AS500.....	699.00
STARBOARD 2/AT1000 OK.....	250.00
STARBOARD S82000 ADAPTER.....	42.00
STEREO SOUND SAMPLER STRV.....	87.95
SUPERSEN.....	699.00
SUPRA 2400 MOD.....	119.00
SUPRA DRIVE 20 MEG A500.....	699.00
SUPRA DRIVE 20 MEG A1000.....	699.00
SUPRA DRIVE 30 MEG A500.....	799.00
SUPRA DRIVE 30 MEG A1000.....	799.00
TOOL BOX: ESCORT FOR A500.....	170.00
TRUMP CARD SCSI CNTR 2000.....	169.95
TWIN-DRIVES EXT 3.5" FDD.....	269.00
UNDRIVE 3.5" EXT. DRIVE.....	159.00
VALT-30 HARD DRIVE 30 MB.....	CALL
VI 500 MIDI INTERFACE.....	59.95
VI 500 VIDEO/RF MOD.....	69.95
VI 2000 VIDEO INTERFACE.....	69.95
VI 2000 VIDEO/RF MOD.....	79.95
X-SPECS 3D.....	99.95
XEROX 4020 INK JET COLOR.....	1149.00
XEROX 4020 STARTER KIT.....	156.00

## ACCESSORIES

A1084 CARRYING CASE.....	51.95
A500 & MONITOR CARRY BAGS.....	69.95
AMIGA BAG.....	29.95
AMIGA BRASS KEY RING.....	3.95
AMIGA FASHION GOLF SHIRT.....	19.95
AMIGA FASHION JACKET.....	39.50
AMIGA MUG.....	6.95
AMIGA NOTE PADI.....	4.99
AMIGA PEN & PENCIL SET.....	19.95
AMIGA PINK VISION.....	4.95
AMIGA PLASTIC VISION.....	1.95
AMIGA SLEEVE TSHIRT.....	7.95
AMIGA TERRY CLOTH VISION.....	5.50
AMIGA TOWEL.....	15.95
AMIGA TWO CAP W/WORD.....	7.95
BOSS JOYSTICK.....	12.95
CABLE: 10' CAMERA.....	12.95
CABLE: 500/2000 IMAGE-1.....	19.95
CABLE: 500/2000 IMAGE-2.....	19.95
CABLE: 500 LINK A500.....	9.95
CABLE: A1000 TO A1000.....	19.95
CABLE: A1000 TO IMAGE-2.....	19.95
CABLE: AMIGA TO NEC II.....	24.95
CABLE: AMIGA TO SONY 1302.....	19.95
CABLE: AMIGEN TO 1084.....	19.95
CABLE: DB25M DB25F 8 FT.....	19.95
CABLE: DB5M TO DB9F 6 FT.....	16.95
CABLE: DRIVE EXT. 2 FT.....	19.95
CABLE: DRIVE EXT. 3 FT.....	27.95
CABLE: FLEX FIX TO NEC II.....	19.95
CABLE: FLEX FIX-SONY 1302.....	19.95
CABLE: M-CENTR TO M-CENTR.....	22.95
CABLE: MONITOR EXT 4 FT.....	21.95
CABLE: MOUSE EXTENSION.....	14.95
CABLE: PARALLEL A500/A2000.....	19.00
CABLE: SCSI RIBBON, 2 FT.....	15.95
CABLE: SERIAL A1000.....	19.00
CABLE: SERIAL A500/A2000.....	19.00
CLEANING KIT (ALSOPI).....	14.95
CLEANING KIT SM ALIEN.....	6.95
CONTROL CENTRE FOR A500.....	71.95
COPY/CAMERA STAND, LIGHTS.....	64.95
CURTIS DUMMID.....	33.95
CURTIS DUMMID PLUS.....	46.95
CURTIS EMERALD.....	40.95
CURTIS PHONE LINE SURGE.....	12.36
CURTIS RUBY.....	58.95
CURTIS SAPPHIRE.....	56.95
DESKJET BLACK CART.....	15.95
DESKJET COURIER UPGRADE.....	62.95
DESKJET DUTY.....	29.95
DESKJET EPSON FX-80 EMUL.....	62.95
DESKJET HELV 8 & 10 PT.....	79.95
DESKJET HELV ASCII FONTS.....	104.95
DESKJET LANDSCAPE FONT.....	79.95
DESKJET LANDSCAPE UPGRADE.....	79.95
DESKJET LETTER GOTHIC.....	79.95
DESKJET PRESENTATION FONT.....	79.95
DESKJET PRESTIGE ELITE.....	79.95
DESKJET RMN/HELV SOFT FONT.....	79.95

DESKJET STAND/ORGANIZER.....	84.95
DESKJET TMS RMN 8 & 10 PT.....	79.95
DESKJET TMS RMN ASCII.....	104.95
DIGI-DIGI.....	69.95
DISK FILE 3D.....	7.95
DISK FILE 8D.....	17.95
DUST COVER FOR A500.....	8.95
DUST COVER FOR A2000.....	11.95
DUST COVER, A1000 W/MON.....	13.95
EPYK 500K JOYSTICK.....	14.95
ERGO STICK.....	17.95
FLICKER MASTER.....	13.95
FLOPPY WALLET.....	7.95
FOUR PLAYER ADAPTER.....	11.95

PAINTJET CUT-SHEET PAPER.....	19.10
PAINTJET DUST COVER.....	19.95
PAINTJET PAPER CATCHER.....	23.95
PAINTJET PRINTER STAND.....	66.95
PAINTJET TRANSPARENCY FILM.....	54.05
PAINTJET 2-FOLD PAPER.....	14.95
POWERPLAYERS JOYSTICK.....	19.95
PRINT & WEAR.....	13.95
QUICKSHOT II JOYSTICK.....	12.95
RAM: 1 MEG X 1-10 CHIPS.....	340.00
RAM: 1 MEG X 8-12 SIMMS.....	12.00
RAM: 256K X 1-12 CHIPS.....	10.00
RAM: 256K X 8-12 SIMMS.....	88.00

## PROGRAMMERS BOX:

LATTICE C 5.0.....	\$195.00
LATTICE C++.....	\$345.00
AREXX.....	\$32.95
W-SHELL.....	\$32.95
GFA BASIC 3.0.....	\$90.95

RUGGED W/ 16KB X 4 FONTS.....	124.95
256K DISKETTES, COLORED.....	29.95
SONY DISKS 10 PACK.....	20.95
TAC-2 JOYSTICK.....	10.95
TEAK-TECH 150 DISKHOLDER.....	32.95
TEAK-TECH 60 DISKHOLDER.....	27.95
TRACKBALL (2 BUTTON MOUSE).....	39.95
TRANSVECTOR 1000.....	23.95
TRANSVECTOR 2500.....	41.95
WINNER JOYSTICK.....	23.50
XEROX 4020 4-PACK INK.....	19.95

## FREE SHIPPING!

**CREATIVE COMPUTERS** is both a mail order company with a store's support and three store showrooms with mail order prices. Visit one of our showrooms today. You'll be amazed!

### 3 RETAIL SHOWROOM LOCATIONS TO SERVE YOU

**SANTA MONICA & WESTSIDE:** 318 Wilshire Blvd., Santa Monica, CA 90401. Tues.-Sat. 11-7 p.m./Sun. 11-5 p.m./Phone: 213-344-7779

**LAWDALE & SOUTH BAY:** 4453 Redondo Beach Blvd., Lawndale, CA 90260. Mon.-Sat. 11-7 p.m./Phone: 213-542-2292

**VENTURA, OXNARD & SANTA BARBARA:** 2112 E. Thompson Dr., Ventura, CA 93001. Tues.-Sat. 11-7 p.m./Sun. 12-5 p.m./Phone: 805-652-0325

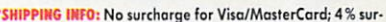


### THE CREATIVE COMPUTERS ADVANTAGE:

- Authorized Amiga Dealer
- The largest dealer of Amiga products in the World
- Three store locations means excellent support
- Amiga-specific—unlike the competition, we don't claim being Amiga specific while selling other brands under another business name
- Authorized service center
- Uniform low pricing and largest selection, no hidden costs or catches
- We don't charge your card until the product ships

### CUSTOMER SERVICE:

Call 213-542-2292 from 11 a.m. to 7 p.m. PST for technical questions.





# TrianGO

Review by Carolyn Cushman

The latest rage among the managers and executives at the offices of Antic Publishing is a new strategy game. Deceptively simple, **TrianGO** from California Dreams (LDW) requires the cunning of Go, and the patience and planning of Chess. The simple rules are deceptive. Involved strategy is required to actually win a game—particularly against the computer.

Reminiscent of a Chinese Checkers board, the playing field consists of a triangular grid in the shape of a six-

pointed star—with flat-ended arms. As in Go, players take turns placing their round, colored stones on the vertices of the grid, using simple point-and-click mouse movements. When one player's pieces cover all three points of a triangle, the triangle becomes that player's territory, outlined in the player's color. If an opponent's stone lies within this triangle, a new solid-color triangle appears, indicating that the opponent can "capture" the territory in the next move.

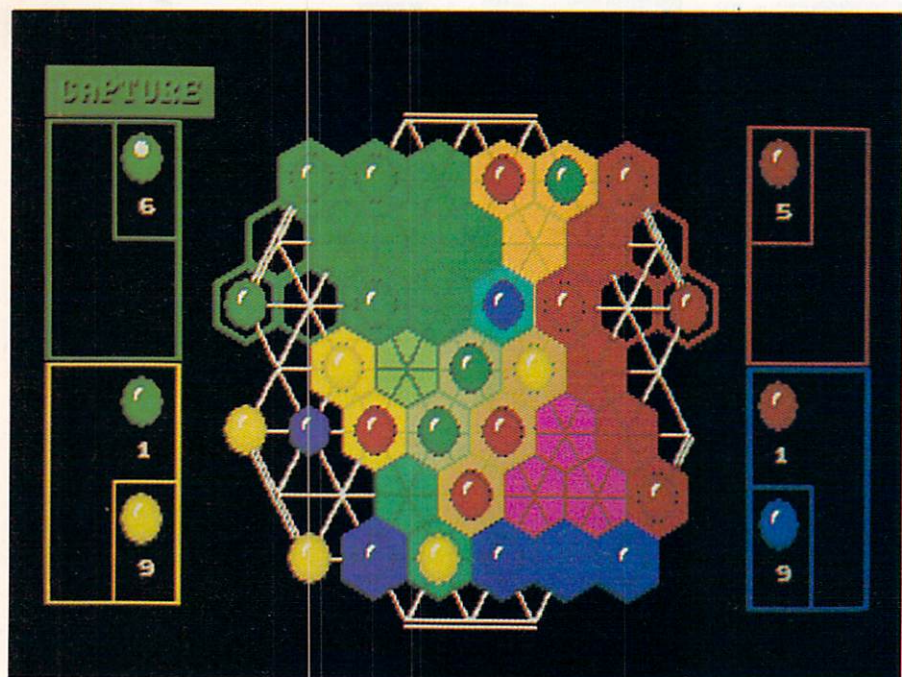
When captured, all the stones in

the triangle move to the capturing player's space at the side of the board. The player's own stones can be played again, while the opponent's pieces are out of play for the rest of the game. The object, however, is *not* to capture territory or pieces. To win, you must simply be the last player able to make a move—any move. But in the heat of battle, it's easy to get too wrapped up in trying to capture the enemy and forget that you can win simply by playing safe.

Further complicating matters, the game limits the number and positions of stones placed on the board's perimeter. The computer never forgets those limits, but it's all too easy for humans to set up a play that requires a piece on a forbidden vertex.

The graphics are rather stark. The playing field is a white grid on a black background. In two-player mode, stones in bright red and blue fill the boxes on either side. Though plain, the simplicity of the board becomes an asset to concentration, particularly as territories begin to overlap.

In three and four-player mode, yellow and green stones are added. As triangles are formed and intersect, the board fills with areas of color. Where colors overlap, new colors are formed, according to basic color mixing rules—blue plus red makes violet, red plus yellow makes orange, etc. If the overlapping colors become



Triango: California Dreams' new twist on an ancient game



too distracting, the Hide commands on the Edit menu turn off the shading selectively for each color.

Playing one-on-one against the computer, the five skill levels range from Novice Computer to Grand Master Computer. At Grand Master level, however, play proceeds *very* slowly, while the computer considers all possible moves. If you prefer human opponents, the program allows two to four-player games. Playing with four players gathered around the monitor, sharing one mouse between them, can get a little cozy, but not impossibly so. Like Chess, the game requires deep thought, not fast reflexes. Games can go so slowly that the Save Game feature comes in handy, letting players break off in mid-game and pick up later.

In single-player games, the human player always gets the first move, a distinct disadvantage. Fortunately, the game includes an Edit Board option that lets you force the computer to go first, or even set up handicaps, as in Go.

The Undo Move option comes in very handy—each time you choose it, the computer will take back one round of moves, for both players. (In four-player mode, only one player's move is undone.) You can undo your moves all the way back to the beginning, or just take back one or two. Trying alternative moves in a tricky situation provides much needed insight to the computer's strategy. The Hint option puts the computer to work for you, giving Expert, Master and Grand Master hints.

The manual also provides some useful tips and hints, as well as detailed explanations of the various options. The manual also serves as copy protection (the disk itself is not copy protected). Each time you run the program, you must enter a letter from the manual, in answer to questions like: "What is the 4th letter in line 5 on page 24?"

Most of the options are accessed through the drop-down menus at the top of the screen. A few of the most useful play options (Hint, Undo Move, Last Move) can also be acti-

vated from the keyboard.

The game has no gadgets and the window is not moveable, but it is possible to access the Workbench Screen (and other programs) using the AMIGA-M and AMIGA-N key combinations.

TrianGO is a pure strategy game, bound to appeal most to fans of other such games, like Go and Reversi. Around our offices, the best TrianGO players so far have been experienced Go players. Even so, most had to play several games before they

even came close to beating the computer at Novice level—and a few players, swearing "I *bate* this game," returned again and again to play many frustrating games before finally winning. If you like a challenging, brain-busting board game, TrianGO is definitely worth checking out. ■

**TRIANGO** \$39.95  
Logical Design Works, Inc., 780 Montague Expressway, #403, San Jose, CA 95131.  
(408) 435-1445.

CIRCLE 241 ON READER SERVICE CARD

## DATEL COMPUTERS

# 800-782-9110

ORDERS ONLY MON-SAT 8AM-6PM (PST)

CUST SERV / TECH

702-454-7700

TU-SA 10AM-6PM

CALL US FOR LOWEST PRICES ON OTHER SOFTWARE / HARDWARE

### AMIGA BURST NIBBLER - ONLY \$49.99

#### "THE ULTIMATE COPY PROGRAM"

\*Copies almost any commercial disk, 1 or 2 sides up to 85 tracks. \*Special "Strategy Files" cope with the most advanced protection schemes. \*Decrypts many encoded programs. \*Works with one drive or two. \*Multiple copy option - many copies from one original. \*Special format parameters for non standard formats. \*Full verify option. \*Updates available - we ship the latest.

### ROBOTARM - ONLY \$129.99

#### "FULL FUNCTION - 5 AXIS MOVEMENT"

\*Human like dexterity so versatile, it can manipulate small objects with amazing ability. \*Controlled using 2 Joysticks or connect to your Amiga with the Interface & Software supplied to give COMPUTER ROBOTIC CONTROL



\* Comes with Accessories: Finger Jaws, Magnetic Attachment, Scoop, and 2 Joysticks. \* Uses 4 D batt. (not supplied), no computer power to power motor movement

### ACCESSORIES

#### "DATA SWITCH BOXES"

\$34.95 A/B Switch - \$49.99 ABCD Switch

\*A/B type connects two printers or accessories to one computer or (vice-versa) \*ABCD type connects four devices to one computer (or vice-versa) \*Centronics or 25 pin 'D' type connections.

#### "PRINTER CABLES - ONLY \$14.99 6Ft. Length"

\*25 pin 'D' to 36 pin Centronics \*25 pin 'D' to 25 pin 'D'

### PRO SAMPLER STUDIO - ONLY \$119.99

\*100% machine code software for realtime functions. \*HiRes sample editing \*Realtime frequency display \*Realtime level meters \*Files saved in IFF format \*Adjustable manual/automatic record trig level \*Variable sample rate and playback speed \*Hardware/Software compatible with other packages \*Reverse, copy, mix,



clear plus other edit facilities \*Microphone and line input 1/4" Jack and Din connections \*3D shot of sound waveform \*Wave editor to design your own waveforms or adjust existing ones.

### DATEL 3.5" DISK DRIVE

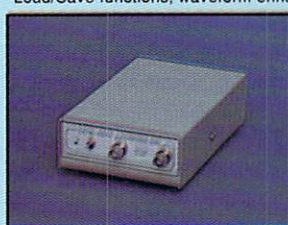
\$169.99 SINGLE DRIVE - \$299.99 DUAL DRIVE



\*Slimline extra low profile - 6" long \*Top quality drive mechanism \*Throughput allows daisy chaining other drives \*100% compatible \*1 meg formatted capacity per drive

### DATA ACQUISITION UNIT - ONLY \$179.99

\*Measure a wide range of data inputs. \*Sample and display events from microseconds to hours with amplitudes from millivolts to 50 volts. \*DIGITAL SCOPE DISPLAY - 2 channel inputs, manual or continuous display, timebase 500ms/div to 20 us/div - accurate to 5% \*6 bit latch conversion does 5 million samples/sec \*Adjustable trigger level \*5 x zoom function \*Memory scan



\*Load/Save functions, waveform enhancement, graph displays \*Hardware contains onboard RAM and Crystal dividers \*PLOTTER DISPLAY \*2 channel and memory recall display \*Timebase range 1 sec to 10 hrs per plot.

### 512K RAM CARD - NO MEMORY

ONLY \$39.99 card only - \$69.99 with CLK/CAL

\*Plugs internally into a A500 slot \*Switch RAM in/out with switch supplied \*With calendar/clock onboard time/date automatically booted \*Battery backed to retain time/date

\*CALL FOR PRICES ON BOARDS WITH MEMORY

### MIDI MUSIC MANAGER - ONLY \$59.99

\*8 realtime Midi tracks for record/playback. \*Works with standard IFF files. \*Adjustable track length - limited only by available memory. \*Play sampled sounds on Amiga from any Midi track. \*Full dubbing - listen to one track while recording another. \*Perfect companion for Pro Sampler Studio or any music application.

### MIDIMASTER - ONLY \$59.99

\*Full standard Midi Interface \*Compatible with leading Midi packages \*Midi In - Midi Out x 3 - Midi Thru \*Fully Opto Isolated

COMING SOON: 400DPI SCANNER - ONLY \$324.99 AND LOGIC ANALYZER - ONLY \$179.99

CALL FOR INFORMATION ON ORDERING

CALL US FOR THE BEST PRICES ON ALL YOUR SOFTWARE/HARDWARE NEEDS

### DATEL COMPUTERS

3430 E. TROPICANA #67  
LAS VEGAS, NV 89121

\*ADD: \$4.00 Shipping/ Handling in the Continental U.S. : \$7.00- PR, VI, AK, HI, FPO, APO: \$10.00- Canada / Mex: C.O.D. orders add \$3.00 to above shipping charges

SPECIFY COMPUTER MODEL WITH ORDER VISA/MC / Checks / Money Orders / C.O.D. Accepted - Please call for return authorization number - Returns subject to 20% restocking fee.

CIRCLE 007 ON READER SERVICE CARD



# Order Toll Free 800-558-0003 *Since 1982* **ComputAbility** *Consumer Electronics* Order Toll Free 800-558-0003

AMP-6-89

## Hard Drive Kits (A-2000)

Free delivery in the Continental USA

ST-138N 30 MEG	499 DEL
ST-157N 49 MEG	619 DEL
ST-225N 20 MEG	469 DEL
ST-251N 40 MEG	519 DEL
ST-277N 60 MEG	689 DEL
ST-296N 80 MEG	929 DEL

these kits include IVS Trumppack 8081 hard drive ctrl, cable, software and delivery in the contiguous USA. This is not an assembly kit! It is a package.

## Hard Drive Cards (A-2000)

Free delivery in the Continental USA

ST-138N 30 MEG	519 DEL
ST-157N 49 MEG	639 DEL

these cards include IVS Trumppack ctrl, mounting brkt, cbl, software, and delivery in the contiguous USA

## AMIGA 500 HARD DRIVE PACKAGES

FEATURING TRUMP CARD 500

ST - 138N - 30 MEG	559 Delivered
ST - 157N - 49 MEG	659 Delivered

These Packages Include Trumppack 500 enclosure, IVS Trumppack SCSI hd drive Ctrl, Software & free delivery in the contiguous USA

## Hard Drive Cards

For A-2000 equipped with Bridgecard  
Free delivery in the Continental USA

ST-138R 30 MEG	349 DEL
ST-157R 50 MEG	469 DEL

these hard cards are for an Amiga-2000 with a bridgecard. These drives will take up 1.5 IBM slots on the Amiga 2000 motherboard

## Tiny Tiger Hard Drives Call

### Modems

Amiga 1680 Modem	99
Avatex 1200E	69
Avatex 2400	139
Supra 2400 Baud	129

### Floppy Drives

Internal A.J.R. Drive (A-2000)	119
External A.J.R. Drive 3.5" (1010 Comp)	145
MAST 1010 Drive	149
MAST Twin External	259 Delivered

## PANASONIC Printers

1180 NEW NEW NEW	189
1191 NEW NEW NEW	239
1124 NEW 24 Pin	349

Supra 2400 Baud  
Modem & Cable \$149  
Free Delivery to the 48 Contiguous States

## MISC. HARDWARE

Video Toaster	CALL
Live (A-2000)	309
Live (A-500)	299
Frame Capture	CALL
GEN 1 (GENLOCK)	CALL
Ami GEN	135
Super GEN	669
Magnit 4004 Genlock	1399
Flicker Fixer	445
Perfect Sound	69
A.M.A.S.	119
Model-A-Midi Interface	62
Subsystem 500	CALL
IMG Scan	CALL
Perfect Vision	189
Color Splitter	75
Supra Hard Drive 500/1000	CALL
Mouse Master	35
Boing Mouse-SPECIAL	99

## STAR Printers

NX-1000	175
NX-1000 Rainbow (color)	229
NX-2400	289

MASTER 3A Disk Drive  
1010 Compatible \$139  
Free Delivery to the Contiguous States



Authorized  
Amiga Dealer  
CALL US!  
For All Your  
**AMIGA**  
Needs!

## Special

## VIDEO PACKAGE

PANASONIC 1410 CAMERA  
16MM LENS WITH VARIABLE IRIS  
COPYSTAND WITH LIGHTS  
DIGIVIEW GOLD  
\$419 DELIVERED!

## AMIGA SOFTWARE

1943	25.95	Phaser Guns	44.95	Empire	31.95	Interchange	28.95	Pageflippin Plus/Fx	87.95	Scribble	46.95	Three Stooges	31.95
4 x 4 Off Road Racing	14.95	Captain Blood	31.95	Evil Garden	25.95	IntroCard	46.95	Pen Pal	94.95	Sculpt 4-D	399.95	Time and Magic	26.95
4th and Inches	28.95	Captain Fltz	19.95	Excellence	158.95	Investors Advantage	59.95	Phantasm	22.95	Securities Analyst	49.95	Times of Lore	24.95
A-Talk 3	64.95	Carrier Command	28.95	Express Copy	28.95	Invasion	134.95	Phaser	57.95	Sex Vixens-Outer Space	25.95	Titan	28.95
A/C Basic	132.95	Centerfold Squares	18.95	Express Paint 3.0	79.95	JAN Nicklaus Golf	31.95	Photon Video: Cell Anim	87.95	Shadowgate	31.95	Tower Toppler	31.95
Adventures of Sinbad	28.95	Charon 5	21.95	F-40 Pursuit Sim.	21.95	JK Courses of 1989	14.95	Photon Paint 2.0	94.95	Shakespeare	130.95	Transputer	22.95
After Burner	31.95	Chessmaster 2000	28.95	FA/18 Interceptor	31.95	Jel	31.95	Photon Paint Surface	19.95	Shinobi	31.95	Trials of Honor	32.95
Alkball	24.95	Chessmaster 2100	31.95	Face II	20.95	Joe Blade	21.95	Photon Video Transport	180.95	Shinobi	31.95	Turbo Silver 3.0 1 Meg	121.95
Allen Syndrome	24.95	Chronoquest	32.95	Faery Tale Adven.	30.95	Joker Poker	31.95	Pioneer Plague	25.95	Silent Service	24.95	TV Show	64.95
Alternate Reality: City	26.95	City Desk	87.95	Falcon	31.95	Kampfgruppe	38.95	Planet of Lust	24.95	Silicon Dreams	19.95	TV Text	64.95
Amiga Tax	52.95	Clue Master Detective	25.95	Fantavision	38.95	Kara Fonts	49.95	Platoon	28.95	Sim City	28.95	Twilight Zone	24.95
AmigaDOS ToolBox	38.95	Colony	31.95	Fast Break	28.95	Kind Words V2.0	64.95	Police Quest 1 or 2	31.95	Sinbad	17.95	Twilight's Ransom	23.95
Analyze	59.95	Combat Setter	25.95	Fearful Formula 1	31.95	King of Chicago	17.95	Power Shy	21.95	Sky Blaster	31.95	Ultima 4	34.95
Android Decision	23.95	Comic Art Disks (each)	20.95	Final Assault	14.95	King's Quest IV	31.95	Power Windows 2.5	54.95	Sky Chase	24.95	Ultima III	24.95
Andromeda Mission	24.95	Contra	28.95	Final Mission	18.95	Kingdoms of England	31.95	Precisely	48.95	Sky Fox II	13.95	Ultra D.O.S.	35.95
Anim. Editor	39.95	Contra	28.95	Fire Print	32.95	Leathneck	26.95	Prime Time	25.95	Sky Shark	22.95	Undersea Commando	31.95
Animale 3-D	98.95	Cosmic Bounce	18.95	Fire and Forget	24.95	Leathneck duo pack	22.95	Prime Time	25.95	Sky Shark	22.95	Universal Military Simulator	31.95
Animation Multipane	52.95	Crazy Cars	24.95	FIRE ZONE	22.95	Leathneck	24.95	Pro Master Plus	24.95	Snake Pit	25.95	Vietnam Dat UMS	14.95
Animation Rotoscope	48.95	Curse Buster	19.95	Flight Simulator II	31.95	Leisure Suit Larry I	25.95	Pro Mid Studio	119.95	Softwood File II	62.95	Civil War Dat	14.95
Animator (Aegis)	81.95	Cyber Complex	21.95	Flow	59.95	Leisure Suit Larry II	31.95	Pro Script	28.95	Sorcerer Lord	23.95	Vampire's Empire	28.95
Animator Apprentice	174.95	Dark Castle	24.95	Form in Flight	69.95	Life and Death	31.95	Pro Sound Design	99.95	Space Harrier	31.95	Video Effects 3-D	113.95
Annals of Rome	23.95	Data Retrieve Pro	179.95	Front Page	74.95	Lights Camera Action	48.95	Pro Write 2.0	69.95	Space Quest 1, 2 or 3	31.95	Video Fonts	28.95
Architectural Design Disk	22.95	Defender of The Crown	31.95	Future Design Disk	22.95	Lords of the Rising Sun	31.95	Pro Draw	112.95	Space School Sim	22.95	Video Tiler	84.95
Arrex	29.95	Deja Vu: 1 or 2	31.95	Galactic Conqueror	29.95	Marble Madness	13.95	Professional Page	228.95	Spinwheel	18.95	VIP Protection	59.95
Arkanoide	18.95	Deluxe Music Constr.	61.95	Galileo II	42.95	Mavis Beacon Typing	31.95	Profants 1 & 2	21.95	Star Slider II	28.95	Virus Infection Protection	28.95
Artic Adventure	25.95	Deluxe Paint III	97.95	Games: Winter Ed	31.95	Maxi-Plan 500	92.95	Project D- Backup	28.95	Star Ray	29.95	Vista 3-D	87.95
Artura	25.95	Deluxe PhotoLab	97.95	Getysburg	38.95	Menace	19.95	Pub Games	25.95	Star Wars	31.95	W Shell	29.95
Attack on London	22.95	Deluxe Productions	128.95	GFA Basic 3.0	87.95	Michion Hill Disk #1	32.95	Publisher Plus	64.95	Street Fighter	25.95	War In Middle Earth	31.95
Audio Master 2	58.95	Deluxe Video V1.2	84.95	Gladiator	25.95	Micro Fiche Filer Plus	114.95	Puzzle Storybook	25.95	Strip Poker II	25.95	Warlock	21.95
Award Maker	32.95	Demon's Winter	26.95	GO	24.95	Micro Lawyer	34.95	Qlx	25.95	Studio Magic	59.95	Wayne Gretzky Hockey	21.95
Awesome Arcade Pack	32.95	Designastours	30.95	Gold Runner2	24.95	Microbot Design Disk	22.95	Quarter Back	42.95	Sub Battle Sim	14.95	Western Games	21.95
Axe of Rage	31.95	Destroyer	14.95	Gomf Button	49.95	Mid Magic	CALL	Questron II	32.95	Super Back	CALL	Willow	25.95
B.A.D.	29.95	Devon Aire Diamond Caper	31.95	Grabbl	18.95	Mid Rec Studio V1.1	39.95	Rastan	25.95	Super Star Basketball	CALL	WordPerfect	179.95
Baal	19.95	Digipaint	38.95	Grade Manager	52.95	Mission Con Bat	32.95	Real Copy	36.95	Superbase Personal	46.95	Works Platinum, The	CALL
Balance of Power 1990	31.95	Digipaint 3.0	CALL	Grand Prix Circuit	31.95	Modeler 3D	58.95	Reel Rishn	29.95	Superbase Personal 2	87.95	Works, The	115.95
Ballistic	22.95	Digiview Gold	134.95	Harpoon	25.95	Movie Setter	59.95	Renegade	25.95	Superbase Pro 3.0	189.95	World Class Leader Board	28.95
Bar's Tale	31.95	Dinosaur Discovery Kit	25.95	Harrier Combat Simulator	31.95	Movie Setter	59.95	Return To Atlantis	13.95	Superstar Ice Hockey	31.95	World Tour Golf	13.95
Bards Tale II	38.95	Disk 2 Disk	28.95	HEAVY METAL	28.95	Mountain on the Atlantic	39.95	Rhyming Notebook	26.95	Sword of Sodan	31.95	X-Specs	84.95
Battle Chess	31.95	Disk Master	28.95	Heros of the Lance	26.95	Musik Studio 2.0	49.95	Ring Slide	24.95	T.V. Sports Football	31.95	Zak McKracken	29.95
Battle Heroes 1942	31.95	Disk Mechanic	54.95	Hole In One	21.95	Musik X	184.95	Road Raider	24.95	Tanglewood	24.95	Zany Golf	26.95
BattleShip	19.95	Dive Bomber	14.95	Hole In One - Course Disk	13.95	My Paint	29.95	Roadwar 2000	26.95	Tax Plan Amiga	22.95	Zoetrope	67.95
BattleTech: The Cr Hk Inc.	31.95	Dix Music Const. Set 2.0	61.95	Hostage	29.95	Night Force	28.95	Rock Challenge	25.95	Technopop	31.95	Zoom	18.95
Berzerk 3	22.95	Dos 2 Dos	31.95	Human Design Disk	22.95	Novelty Fonts	48.95	Rocket Ranger	31.95	Temple of Doom	31.95	Zork Zero	38.95
Bionic Commando	24.95	DOUBLE DRAGON	25.95	Hunt For Red October	31.95	Off Shore Warrior	24.95	Roger Rabbit	28.95	Terrapods	25.95	Zumma Fonts 1,2,3 or 4	22.95
Black Jack Academy	24.95	Doug's Math Aquarium	46.95	Hybris	24.95	On Line Platinum	58.95	Roland D-50 or D 110	84.95	Tetraquest	24.95	Zynaps	22.95
Boomerang	25.95	Down Hill Challenge	22.95	Hyper Dome	22.95	Operation Clean Streets	25.95	Roland MT-32	84.95	Tetris	20.95		
Bride of the Robot	24.95	Dragon's Lair	33.95	I Ludicrous	22.95	Operation Wolf	25.95	Romantic Encd @ Dome	25.95	Text Ed Plus	48.95		
Broadcast Tiler	184.95	Draw A-2000 (Aegis)	159.95	Impossible Mission 2	14.95	Outrun	31.95	S.D.I.	17.95	Text Pro	49.95		
Bubble Bobble	25.95	Dungeon Master	24.95	Indoor Sports	30.95	P.O.W.	24.95	Savage	24.95	Test Drive 2 - The Duel	28.95		
Calamus	274.95	Dynamic Drums	46.95	Instant Music	13.95	Page Renderer 3-D	94.95	Scary Mutants	24.95	California Chall	14.95		
California Games	31.95	Earl Weaver Baseball	31.95	Intellotype	13.95	Page Setter	59.95	Scavenger	CALL	Supercars	14.95		
Calligrapher	74.95	Commissioners Disk	14.95	Inter Font	69.95	Page Stream	127.95	Scrabble	26.95	Texder	22.95		
Capone	24.95	MLBPA Stats	13.95							Three Demon	69.95		



*Since 1982*  
**ComputAbility**  
*Consumer Electronics*  
NO CREDIT CARD SURCHARGE

Order Toll Free  
**800-558-0003**  
WI ORDERS AND INFORMATION  
414-357-8181 FAX 414-357-7814  
P.O. BOX 17882 Milwaukee, WI 53217

ORDERING INFORMATION: Specify system. For fast delivery send cashiers check or money order. Personal and company checks allow 14 business days to clear. School P.O.'s welcome. C.O.D. charges are \$4.00. In Continental U.S.A. 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.A. are shipped first class insured U.S. mail. If foreign shipping charges exceed the minimum amount, you will be charged the additional amount. All goods are new and include factory warranty. We do not guarantee compatibility & version #s. 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. Shipping and handling are non-refundable. We ship the latest versions available to us, updates must be handled by and user directly with the manufacturer.



# Photon Paint II

AMIGA PAINTING EVOLVES BEYOND  
PROFESSIONALISM

Reviewed by Louis Markoya

***The first release of Photon Paint was a robust program with some limitations. Now Photon Paint II can produce results never before thought possible.***

The graphics power of the Amiga and the creativity of Amiga users has driven software companies to support features and capabilities not only unheard of, but not even dreamed of, for personal computers until now. So it is with the advent of **Photon Paint II**.

Photon Paint II is a HAM mode (4,096 onscreen colors) paint program that supports enough powerful features to please the most demanding artist—whether you're experienced in computer graphics or a traditional medium. And when you've exhausted those capabilities, there's animation support too!

In the first release of Photon Paint, MicroIllusions provided a robust



**God's Eye Paradox: HAM art from Louis Markoya and Photon Paint**

paint program, matching many features from both Deluxe Paint II and Digi-Paint, as well as adding some new ones. There were holes though. Drawing modes were limited, there was no ColorFont support, no free-form polygon tool, etc. I'm happy to report that these omissions and more

have been corrected in the new version, with yet another host of new features added.

To whet your appetite, the following is a *partial* list of new features: Multiple pages (as many as available memory will allow), anim loading and save, real-time operation of free-



hand drawing tools, numerous new drawing modes including hue and saturation tinting, three brush cutting techniques, fully definable airbrush, color cycling through draw operations, pantograph, separate drawing mode setups for both foreground and background color, brush (IFF) mapping on solids, with definable light source, full palette control with 64 definable colors and definable automatic drop shadows. All the popular brush functions are provided, including flip, size, rotating and tilting in perspective, sophisticated blending, rub through and stencils.

Photon Paint II's screen layout is very similar to the original version, allowing for continuity in design and a carryover of familiarity with the old version. The first obvious changes are in the tool bar. Clicking on the dotted line tool with the mouse button will now change the tool to an airbrush that can be used with any brush. By clicking the right mouse button you dynamically size the spray pattern as you draw. Clicking on the line tool will bring up the freeform polygon fill gadget, which allows you to define your polygon with elastic band mode and then fill it by pressing the SPACEBAR.

Photon Paint II offers a large variety of Brush operations.

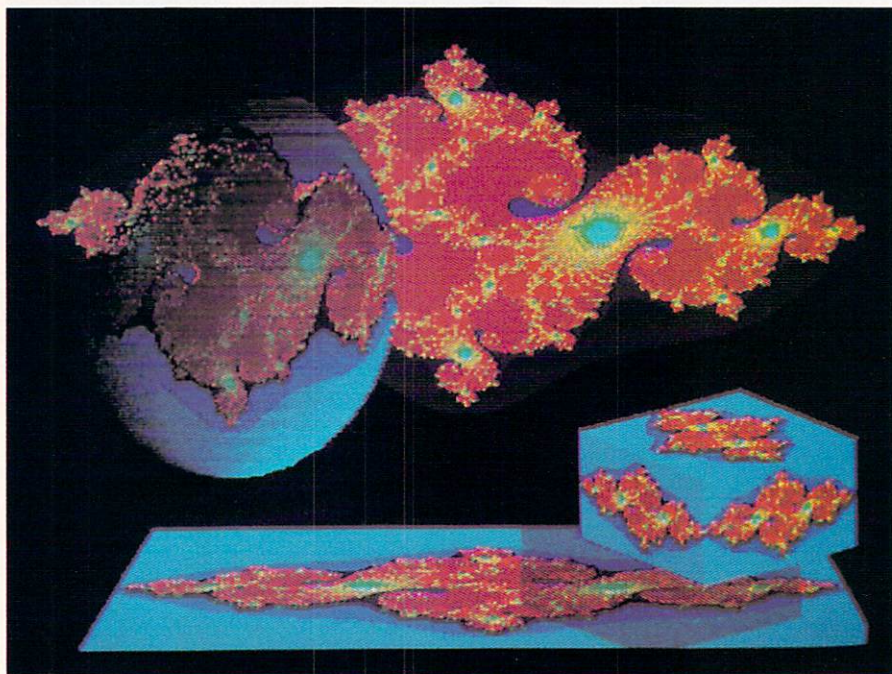


**The real power of the program is in the SPECIAL menu, and its four choices – Cycle Draw, Stencil, Grids and Shadow.**

Clicking on the fonts gadget with the right mouse button brings up the fonts requester. Photon Paint II automatically displays the fonts in the currently assigned fonts directory, and ColorFonts are displayed italicized, a nice touch. Of course all the "old" Photon Paint gadgets and features of the tools panel are there, such as three brush cutting tools (box/rectangular drag, freeform and freeform polygon), 64 color palette with definable spreads available in either RGB or HSV modes, a relocatable variable magnification window and foreground and background colors (controlled by left (foreground) and right (background) mouse buttons).

### Special Four

Large changes become apparent when you look in the menus. The fonts menu is gone, replaced by SPECIAL, FGMODE and BGMODE. There are some changes in the PROJECT, PREFS and BRUSH menus. But the real power of the program is in the SPECIAL menu, and within its four choices lies new realms of power for HAM painting. Cycle Draw, as its name implies, cycles the colors of your brush in realtime on a specified range of your palette. This is great for special effects such as neon glows and shaded trails. Stencil does not lock out specific colors as in Deluxe Paint, but allows you to define areas



Wrap images around objects and add shadows easily with Photon Paint II



of your drawing which will not be affected by any operations you perform over them. This is handy for producing 3-D effects by stamping brushes with objects, or by letting parts of objects remain in the forefront of the drawing. There is also a convenient reverse tool which swaps the stencil between defined and non-defined areas, allowing touch-ups without disturbing the new work.

Grids, the third choice under the SPECIAL menu allows for the definition of any size grid you can fit in the screen. When turned on, any drawing operation will automatically snap to the nearest grid, obviously useful in CAD, architectural, mechanical or any structured type of drawing. Shadow is a new and powerful feature of Photon Paint II. It allows you to create drop shadows for any brush, but that's not all, you can specify the direction in which the shadow is cast and its separation from the brush. You can even have the program automatically space the shadow as to the size of the brush, to make the 3-D effect more dramatic. The shadow is drawn in the Background mode, and the mode it is drawn in can be any of the many choices now offered in Photon Paint.

One of the weaknesses of Photon Paint I was a lack of drawing modes. This has been conquered in version II. By selecting either the FG or BG (Foreground or Background) menu one will see the drawing mode choices now almost scroll off the screen. First let it sink in that all the choices are available in both modes, then contemplate that the modes for FG and BG can be chosen independently, and used in some cases simultaneously. The possibilities are endless.

Amid the plethora of these new modes one also finds drawing SOURCE choices. These allow even more control over the paint capabilities of the program. The default COLOR mode works as one might expect, with the color chosen utilized for the draw tool. PATTERN utilizes the current brush as the source for any drawing operation, including

fills and perspectives. PANTO, another completely new feature, allows for the transfer of patterns elsewhere on the screen to whatever coordinates you desire by specifying a separation from the desired area. The last source choice is UNDER—or rub through as it is known in other programs—where you can load or draw a picture on a separate page and then swap pages, load or draw your new picture and rub through the sections you wish to expose the underlying picture. This is also great for special effects, I used it to paint in the Fractal lightning in the accompanying picture, God's Eye Paradox.

**Photon Paint II  
supports  
enough  
powerful  
features to  
please the most  
demanding  
artist.**

Any of the drawing modes could be used with any of the source modes, allowing again for incredible flexibility. Most significant new entries to the modes menu includes Hue, Hue and Saturation, the logical functions and in the Blend menu GRD or Gradient. Hue and Saturation, or Hue, allows for extremely accurate colorizing of objects. Choose the color you would like to tint an object and by utilizing these modes the color replaces the object color with identical Hue, or Hue and Saturation. The Gradient function found in the blend requester allows for even blends to occur between the FG and BG colors. A good example would be to make a shaded sphere, with a colored light source. To do this you simply select GRD in the Blend requester, set the highlight to the area you prefer and go out to the

drawing area. The sphere's color must be the BG color, so select the color you want. The highlight, or colored lamp is the FG color, so again choose the FG color you want. You can now, with a single operation draw a filled circle with its tool, and there's your shaded sphere. This works with all drawing tools and makes airbrush and smooth shaded transitions a breeze.

No Photon Paint II review would be complete without mentioning the Brush capabilities of the program. Sure there's the usual, (well . . . sometimes usual) Resize, Flip, Rotate, Tilt, Bend and Stretch. But what Photon Paint is known for is its brush wrapping capabilities. Again the program has advanced significantly in this area. Not only are there new wrap modes, but the LUM function, which allows for light source placement and highlights, has been refined to allow for more control and smooth shading. A few of these options are demonstrated in the accompanying screenshot of the Fractals, generated with Daniel Wolf's Ham-Mandel and wrapped on solids with Photon Paint II.

There's more, lots more . . . the anim capabilities are wonderful. The utilization of hotkeys is outstanding in this program and the color remapping and palette control is nothing short of marvelous. Even with all this I'm sure I've left great features out. Still I wish there were an "again" command, and I really wish there were a smoothing or blend mode, but Photon Paint II is impressive.

The HAM Paint Wars have paid off and the winners are us. Never before has such artistic power been available at a consumer level. Photon Paint II will not replace creativity as an essential ingredient to artwork. But it can make creativity a dynamic expanding process which leads to results not before thought possible. ■

**PHOTON PAINT II** \$99.95

Microlusions, 17408 Chatsworth Street,  
Granada Hills, CA 91344. (800) 522-2041;  
in California, (818) 360-3715.

CIRCLE 270 ON READER SERVICE CARD



**E**ach article in the magazine with a disk icon on its first page has accompanying files on the AMIGA Plus Disk. The disk is 99% full. Most of the programs can be run by just clicking their icons from the Workbench.

To use the AMIGA Plus Disk, **first make a copy** and store the original in a safe place. Boot your Amiga with your standard Workbench (version 1.2 or higher) and insert the AMIGA Plus Disk in any drive. Double-click on the AMIGA Plus icon to see the Instructions scroll and the Directories (in their spiffy new Chest of Drawers). Each drawer is actually an independent icon, so double-click on the drawers to open the directories.

The Drawer directory is empty—but the chest of drawers would look pretty silly without it. The "Chest of Drawers" icons (and others on the disk) were created by icon artist Gary Roseman. You can use them on your own disks. The chest of drawers can be made higher by copying the middle two drawer icons.

### Art Directory

The Art directory in this issue contains two spectacular pictures. Mex\_Triptych is a SuperBitMap (3 screens wide!) IFF picture created by Lewis Tilley for his Deluxe PhotoLab article. Unfortunately, this picture requires a lot of memory; users with only 512K may not be able to view it. WoodLand2 is a ray-traced picture by Louis Markoya, for his article.

To see both pictures, double-click on the Pictures icon depicting the

Mona Lisa with hairspray and mirror. Using the non-exclusive SuperView display program to show the Mexican Triptych lets you scroll sideways. Just hold the left mouse button down.

### BackGammon

In the Gammon directory drawer you'll find a Backgammon game and all the files that it needs to run. Just double-click on the BackGammon icon to play. Instructions appear on the first screen.

### Fonts Directory

The Fonts directory contains ColorText, Commodore's useful, non-exclusive program that lets you use ColorFonts on your Amiga.

Three versions of the Sherbert font are also on disk: Sherbert 48 (normal), Sherbert 61 (a ColorFont), and Sherbert.IFont (an InterFont in the Synthesis format). InterFonts are useful for structured drawing programs (like CAD or 3-D programs) because they can be scaled and rotated without distortion. To see what Sherbert 61 and 48 look like, double-click on the FontPic icon.

### Programming Directory

In the Programming directory, CalcFFP is the assembled executable code from Daniel Wolf's Math library assembly language programming article. It will do basic calculations using the Amiga floating point math rou-

tines, and is small enough to fit on a nearly-full Workbench disk.

### Utilities

The Utilities directory features three executable programs—Iff2Geo, FunPaint and VirusX Version 3.2. Instructions for all three are included on disk—just double-click on the .doc icons to read them.

Iff2Geo is a handy utility by Eric Cosky which will convert an IFF picture into a 3-D object (.geo) file for use with 3-D programs from Aegis and others. The program must be run from the CLI.

If you're interested in computer art, but aren't ready to invest in a full-scale paint program, FunPaint's for you. This extremely simple paint program by John Casasanta will create IFF pictures in *any* standard format—high-resolution, low-resolution, interlace, extra-halfbrite mode—even HAM! (Sorry, no overscan.)

VirusX and KV are both virus hunter-killer programs. We've included these non-exclusive utilities because we feel that every Amiga user should be protected from viruses.

The entire disk has been processed with Blitz A Disk (B.A.D.) from M.V. Micro (distributed by Centaur Software, Inc.) in order to speed up disk access. The format is the same as on all AmigaDOS disks, but the files have been reorganized so the icons can be found and displayed very quickly. ■

# Using Your AMIGA Plus Disk





# Amiga Floating Point Math: Part 1

*Valuable and hard-to-find information for Amiga programmers*

BY DANIEL WOLF Ph.D.

Floating Point is a tool for representing and manipulating numbers that may have a decimal point. For most things we might need to do with such numbers, Floating Point methods can do the job (multiplying, dividing, etc.) quickly and conveniently. Whole numbers (integers) can usually be manipulated more easily by other means. Fractional numbers, however, need special attention when we use paper and pencil methods—likewise they need special computer methods. Amiga computers have had an evolving family of “kernel” routines to handle Floating Point calculations. Until recently there were three libraries of Floating Point routines. (See *Figure 1*.)

With the arrival of the new Amiga Workbench 1.3 operating system, the last one of those has been improved and there's a new one. (See *Figure 1*.)

The first two libraries take care of a wide range of calculations using a 32-bit floating point number style published by Motorola. It's called FFP format (fast floating point). The Amiga's two libraries for FFP calculations use software methods to perform the arithmetic and scientific (sine, cosine, natural logarithm, etc.) calculations. The other two libraries both use a totally different number format which takes 64 bits (double precision). The extra 32 bits are mostly used to extend the precision of the fraction part of the number.

**Floating point math permits manipulation of a wide range of numbers, including fractions, in a compact, “coded” version.**

Calculations using 64-bit format are usually assured of much greater accuracy than with 32 bits. Since the operations use many more bits, they can take much longer to perform with software methods.

The IEEE part of the 64-bit library names stands for the Institute of Electrical and Electronic Engineers. Their standards organization devised the 64-bit IEEE double precision floating point number format. It is a worldwide standard and the methods for doing some calculations are part of the standard. The specification includes means for rounding or truncating answers so that no long term bias creeps into some calculations which must be repeated. The 64-bit IEEE format is completely different from the FFP format. It would be

nice if you could just tack on an extra 32 bits to an FFP number and call it an IEEE number, but things (of course) aren't that simple.

The IEEE format can have a special role with the Amiga. If the Amiga has a 68881 math coprocessor, the new `mathieeedoubbas` and `mathieeedoubtrans` libraries will automatically use it to do the calculations. The math co-processor chip has very fast hardware circuitry for double-precision calculations. The `mathieeedoubbas` routines have been speeded up software-wise as well. Until its 1.3 incarnation, the IEEE format software for Amiga was pretty slow and cumbersome. Now it's quicker and can automatically use the math chip.

IEEE format is now practical when the accuracy of calculations demands double precision methods. The principle of first things first demands we begin with an explanation of assembly language math and get over a couple of obstacles, like how to think about fractions in binary and then in floating point binary. We'll cover the FFP representation first, then the next article will cover the IEEE format.

There are two sources of information about the FFP format libraries for assembly language programmers: the “ROM Kernel Manual: Libraries and Devices” (pages 453—477) and “Compute's Amiga Machine Language Programming Guide” (pages 281—



mathffp.library	basic arithmetic calculations for 32-bit numbers
mathtrans.library	scientific calculations for 32-bit numbers
mathieeedoubbas.library	basic arithmetic calculations for 64-bit numbers
mathieeedoubtrans.library	scientific calculations for 64-bit numbers

Figure 1

292). The ROM Kernal Manual has lots of detail about the register and status flag results of each FFP library function.

## Scientific Notation

Let's take a look at numbers. For assembly language programming there's nothing tricky about whole numbers (integers). It's just the regular old binary system:

Decimal	4-Bit Binary
5	0101
9	1001
12	1100

Larger numbers may require more bits:

Decimal	8-Bit Binary
125	01111101

Simple arithmetic for whole numbers is easy. There are a number of specific 68000 instructions which can manipulate binary integers of various sizes. (See *Figure 2*.)

Reviewing your favorite 68000 programming manual will refresh your memory about the group of binary arithmetic instructions for various data sizes. Note that none of these instructions helps with fractional numbers. Another limit of the integer arithmetic instructions is the sizes of the data. A 32-bit number corresponds to a decimal number of about 4,294,967,295, but that's still a limit. If we multiply two 16-bit words, the result will be smaller than 4,294,967,295. What if we wish to work with larger numbers like 1,000,000,000,000? That number is too big even for a full 32 bits. The 68000 gives us no simple instructions

which help to manipulate such large numbers.

Floating Point representations help resolve this problem in two ways—by representing fractions and very large/small numbers in a compact form. Once the numbers are “compressed” into a floating point representation, a built-in family of routines is available to perform all routine arithmetic chores with them.

Looking at our big number another way, we can express it in “scientific notation”:

$$1,000,000,000,000 = 0.1 \times 10^{13}$$

That is, “one trillion equals one tenth times ten to the thirteenth power”. Now look at that scientific notation. It's much shorter than the big number, 11 characters versus 17. If we know that the power is always a power of 10, we can make that even shorter:

$$1,000,000,000,000 = 0.1 + 13$$

But even more useful is that if we enlarge the number (multiply it by 10) we get:

$$10,000,000,000,000 = 0.1 + 14$$

Scientific notation permits us to shrink down a huge number to a few characters. What's more, the number can grow very large and the scientific notation's size stays the same. This scientific notation is a form of Floating Point representation for decimal numbers.

Observe some fractions in our revised scientific notation:

$$\begin{array}{lcl} 0.01 & = & 0.1 - 1 \\ 0.0003205 & = & 0.3205 - 3 \end{array}$$

The power of ten is simply negative (the same as saying this number is smaller than 1, a fraction). It's easy to see that this simplified notation uses a power of ten (an exponent) to indicate the true size of the number. It permits us to write many numbers of vastly different sizes in a single compact form. The true position of the decimal point is concealed in the exponent. The decimal point “floats” away from its true position to a standard position for simplicity. We always write this type of scientific notation with a fraction between .1 and 1, then the exponent. Always set the exponent so the rest of the format is consistent.

To understand the FFP 32-bit format used in the Amiga it's only a short leap. The FFP format is a scientific notation for binary numbers, but it works in a way which is remarkably similar to the scientific notation we've used here for decimal numbers. FFP uses a fixed format fraction part and an exponent, along with one bit for a negative sign. The one remaining concept required to comprehend the FFP system is that of a

Figure 2

add.b	d0,d1	Adds 8-bit binary # in d0 to another in d1. The answer is an 8-bit sum in d1.
mulu.w	d0,d1	Multiplies a 16-bit # in d0 by another in d1. The answer is a 32-bit product in d1
sub.l	d0,d1	Subtracts a 32-bit # in d0 from another in d1. The answer is a 32-bit difference in d1.
divu.w	d0,d1	Divides a 16-bit # in d0 into a 32-bit # in d1. The answer is a 16-bit # in d1 (quotient—low bits) and a 16-bit # in d1 (remainder—hi bits).



Decimal numbers are represented with a “place notation” system. Each digit’s position is associated with a power of ten. For digits to the left of the decimal point (the integer part of a number) the powers 0, 1, 2, etc. represent 1, 10, 100 positions in the number. For digits to the right of the decimal point (the fractional part of the number) the powers -1, -2, etc. represent .1, .01, .001 and so on. The decimal number 432.14 is represented:

4	x	100	400.00
3	x	10	30.00
2	x	1	2.00
1	x	.1	.10
4	x	.01	432.14

Binary numbers are also represented with a familiar place notation system. Each digit's position corresponds to a power of 2 (rather than 10 in decimal). When we reach the "binary" point, the first position to the right corresponds to one half, the second position to one fourth, the third to one eighth, etc. The decimal number 3.25 can be represented in binary place notation as 11.01:

1	x	2	10.00
1	x	1	1.00
0	x	$\frac{1}{2}$	.10
1	x	$\frac{1}{4}$	.01
			11.01

Here are a few more examples which convey the nature of the world to the right of the binary point.

Decimal	Binary
0.5	0.1
0.25	0.01
0.75	0.11
0.125	0.001
0.0625	0.0001
0.1875	0.0011
5.1875	101.0011

We can now combine the concepts of scientific notation for decimal

numbers and binary fractions into a type of scientific notation for binary numbers. Take the last example from above, namely 5.1875 (decimal). That converts to 101.0011 in binary. So in scientific notation we get:

$$101.0011 = 0.1010011 \times 2^3$$

The exponent is 3 and since we're dealing with binary numbers here the base is not 10, but 2. This can be shortened to

$0.1010011 + 3$

Here our binary scientific notation will always give us a fixed format fraction between  $\frac{1}{2}$  and 1 (i.e. 0.100000 . . . to 0.11111111 . . . ) followed by an exponent. Another example (decimal) 0.1875 becomes 0.11-2 in our binary scientific notation.

In summary, the purpose of floating point math is to permit manipulation of a wide range of numbers in-

[illegible]

and we can only use 24 bits for the fraction part, then the part of the fraction where the digits alternate will not even be included in the FFP number. The FFP representation would include the first 24 bits to the right of the binary point. Since this number requires more than 24 bits to be exact, FFP can't represent it exactly. This binary number represents no problem:

0.000000000000000000000000000000  
000001

It simply becomes 0.1 and the exponent can account for the long string of zeros. Even though this number seems to need more than 24 bits for accuracy, it doesn't. FFP can represent this number exactly.

Now let's get a close look at exactly how FFP uses 32 bits to lay out a binary number in scientific notation. (See *Figure 3*.)

31	30	29	28	27	26	...	12	11	10	9	8	7	6	5	4	3	2	1	0
F	F	F	F	F	F		F	F	F	F	F	S	E	E	E	E	E	E	E

### Figure 3

cluding fractions in a compact size "coded" version. The floating point representation of binary numbers is a coded scientific notation applied to binary fractions. The FFP format is one particular way of making up such a code for the fraction and exponent required to represent the number.

### FFP Format

The Motorola Fast Floating Point format for 32-bit binary numbers uses 24 bits to represent the binary fraction, 7 bits for the exponent, and 1 bit for the positive/negative sign. Before going further, you should understand the 24 bit limit on the fraction part is a potential source of accuracy problems. If we have the following number (binary):

The highest 24 bits are the fraction part (bits 8—31). The 7th bit is the positive/negative sign (0—positive, 1—negative). The lower 7 bits (bits 0—6) represent the exponent. This representation has a couple of convenient features. The 32-bit format means an FFP number can be handled with the standard long-word size of data in the 68000 registers. You can move FFP numbers into and out of the registers easily with move.l instructions. Since the low 8 bits hold the exponent and sign, they are easily accessible by using move.b instructions with FFP numbers. The (imaginary) “binary” point is to the “left” of the number.

I skipped over the issue of positive and negative exponents in the FFP format. The sign bit (bit 7) only has



the overall sign of the number (positive or negative number). The exponent in FFP has one more twist. Since the exponent has 7 bits, it can range in size from (decimal) 0 to 127 (that is 0000000 to 1111111 binary). This size range is split in two so that half the values represent positive exponents (exponent values of 64—127) and half represent negative exponents (exponent values of 0—63). The exponent is said to possess an "offset" value of 64. The exponent of 0 is translated to 64. The exponent of 8 is translated to 72. Similarly, for negative exponents, just subtract the exponent value from 64. For a exponent of -2, the exponent becomes 62. Here are a few examples of the FFP exponent with offset. (See *Figure 4*.)

The number zero (0) is a special case. In FFP format, zero is a number with all bits cleared to 0 (0 = 00000000 00000000 00000000 00000000).

That's the complete specification for the 32-bit FFP format. It lets you represent a very wide range of binary numbers using the fraction/exponent format. Exponents can have a magnitude of 0 to 63 and can be positive or negative. The overall number itself has a single dedicated sign bit in bit 7. The leftmost (most significant) 24 bits are the fraction part. Note that the fraction part always has a 1 as its

most significant bit. That's just a result of the way we always represent the fractions in FFP format; the fractions always range from  $\frac{1}{2}$  to 1 (.1000 . . . to .11111 . . .). FFP never leaves any "leading zeros" on the right side of the binary point. The exponent takes care of them.

With this amount of knowledge of FFP we can do a couple of conversions in our heads (or with a little pencil and paper work). For example, one half ( $\frac{1}{2}$ , 0.5) becomes 10000000 00000000 01000000. The imaginary binary point is at the far left of our number. The 1 immediately to the right of the binary point means  $\frac{1}{2}$ . The exponent is 40 (Hex), meaning an exponent value of 0. This one was easy;  $\frac{1}{2}$  is just  $\frac{1}{2}$ . Here are a few more examples. (See *Figure 5*.)

Get a look at the few examples above before going on. Note that, for the last example, only the sign bit (bit 7) was changed. It should be easy to see that ordinary integer arithmetic instructions (add.l, mulu.w, etc.) are totally inappropriate for computing with this format of numbers. The FFP routines are designed to do all the proper accounting for fractions and exponents during arithmetic operations.

Now that we're prepared to use FFP binary scientific notation numbers, we can get a look at Amiga's

mathffp.library and do some programming to experiment with it. This library consists of only 12 subroutines, so the "jump table" (list of offsets from the library base address obtained by opening the library) follows. (See *Figure 6*.)

These operations use D0 to hold a single FFP number (when appropriate) and D0,D1 for two numbers (add, subtract, multiply, divide). Results are returned in D0 and various status flags (overflow, zero, etc.) reflect some of the consequences of the operation. The mathffp.library has all the basic arithmetic functions for a four-function calculator (this month's sample program). There is one function in particular which will be indispensable for our programming efforts: LVO.SPFLT. That function is the key to converting ordinary numbers into FFP format, as you'll see in the program source code. Nothing else is special about the mathffp.library. You can use the normal methods of opening, calling by JSR xxxxx(An), and closing.

## Converting Formats

When you work with numbers on the Amiga they're usually in the form of ASCII numerals, just like in the text of this article. The number pi, 3.14159 . . . , is really just a string of bytes with hexadecimal (binary) values plucked from the ASCII table: 33 2E 31 34 31 35 39 . . . For example, you might wish to have a program "read" a command line you type into a CLI and recognize a number to be converted to FFP format. In a calculator program you might wish to type:

CALC 3.14159\*2.5

to obtain the product of pi and 2.5. Somehow we need a way to read an ASCII string of digits (possibly including a decimal point and fraction) and get it transformed into FFP format. Likewise, to display the answer as an ASCII digit string (so we can "write" the answer out to the CLI window with a call to the AmigaDOS library write routine) we need a rou-

Actual Exponent	FFP Offset Exponent - binary (Hex)
6	1000110 (46)
1	1000001 (41)
0	1000000 (40)
-1	0111111 (3F)
-6	0111010 (3A)

Figure 4

Decimal	Binary	FFP
3	11.00	11000000 00000000 00000000 01000010
3.5	11.10	11100000 00000000 00000000 01000010
1	1.00	10000000 00000000 00000000 01000001
-1	-1.00	10000000 00000000 00000000 11000001

Figure 5



tine to "undo" a FFP format number.

Converting ASCII to FFP format may at first appear daunting, but we assembly language programmers have no choice. The "ROM Kernel Manual: Libraries and Devices" informs us that these functions do exist for C programmers, but, alas, there's no assembly language interface to them. Secret meditations of the Guru have revealed the problem is not as difficult as it seems. We perform the conversion:

Convert the ASCII string to a binary integer, ignoring the decimal point. Keep track of how many digits are to the right of the decimal point.

Use LVO.SPFLT to convert the binary integer to FFP format.

Divide the FFP number by 10 (using LVO.SPDIV) once for each digit to the right of the decimal point.

For example, we would convert 0.35 to 100011 (binary), noting that we will need later to divide by 10 two times. Then it's easy to use LVO.SPFLT to convert the binary integer 100011 to FFP format and divide the result by 10 twice (using LVO.SPDIV). The routine in the accompanying CALCFFP.ASM program has a short routine named ASC-TOFFP which implements the conversion for numbers with up to 7 digits on either side of the decimal point. The ASCTOFFP code is quite short and efficient, but could be improved and extended in several ways. You could add the ability to read ASCII strings which are already in decimal scientific notation and do complete FFP range checking to catch erroneous entries better.

Converting FFP numbers back to strings of ASCII digits is fairly easy if the numbers are within a known range. For our calculator program we're working with no more than 14 digits, so an easy means is at hand. To do the conversion we simply see how many times we can subtract various powers of 10. To begin, set a

ROUTINE	LIBRARY OFFSET	REGISTER	OPERATION
LVO.SPFIX	FFFFFFE2	D0	CONVERTS FFP TO BINARY INTEGER
LVO.SPFLT	FFFFFFDC	D0	CONVERTS BINARY INTEGER TO FFP
LVO.SPCMP	FFFFFFD6	D0,D1	COMPARISON OF TWO FFP NUMBERS
LVO.SPTST	FFFFFFD0	D0	COMPARE FFP NUMBER TO 0
LVO.SPABS	FFFFFFCA	D0	ABSOLUTE VALUE OF FFP NUMBER
LVO.SPNEG	FFFFFFC4	D0	NEGATIVE OF FFP NUMBER
LVO.SPADD	FFFFFFBE	D0,D1	ADD TWO FFP NUMBERS
LVO.SPSUB	FFFFFFB8	D0,D1	SUBTRACT TWO FFP NUMBERS
LVO.SPMUL	FFFFFFB2	D0,D1	MULTIPLY TWO FFP NUMBERS
LVO.SPDIV	FFFFFFAC	D0,D1	DIVIDE TWO FFP NUMBERS
LVO.SPFLOOR	FFFFFFA6		NOT DOCUMENTED
LVO.SPCEIL	FFFFFFA0		NOT DOCUMENTED

Figure 6

variable to 100,000,000 in FFP notation. Let a subtract loop determine how many times it can be subtracted from our FFP number. The count value of that loop becomes one digit (the most significant decimal digit) of our ASCII string result. Another (outer) loop can then divide the power variable by 10 and try the subtract loop again to obtain the next most significant digit.

### About The Program

The CALCFFP.ASM program accompanying this article is highly commented and should be easy to follow. It implements a 4-function calculator you can use from the CLI. Type in the program name and two floating point numbers separated by an operator symbol (+, -, /, \*). The program uses the FFP routines to convert the numbers and calculate the result. The dos.library has the LVO.WRITE and LVO.OUTPUT routines required to get the ASCII string answer back out to the CLI window. CALCFFP.ASM is a great way to explore the basics of Amiga floating point math and can be a source of ideas for your own number conversion routines.

With just a little trickiness in the

layout of the data (library names) and judicious use of all registers, this elegant little program assembled/linked down to an "object module" of only 572 bytes. CALC is small enough and useful enough to add to your C: directory. Assembly and linking should be easy. The code is "generic" assembler; all references are resolved in the source file and there are no macros. Your assembler may prefer the equates in -decimal form. If so, you'll find the negative decimal offsets in the comments. I use ASM68010 which has an "autolink" feature and optimizes branches automatically. You may need to link your assembled file with Alink or Blink to obtain an executable object module. To call CALC from the CLI, just type (no spaces in the numeric command part):

CALC -3./4444 (CR)  
Or  
CALC 12.25\*345.789 (CR) ■

*Daniel Wolf, PhD, is dedicated to popularizing assembly language for the Amiga. A two-time contributor to AMIGA Plus, he is an inventor and independent Amiga software developer from Santa Maria, on the central California coast.*



# AMIGA SPREADSHEET ROUND-UP

Review by Michael Brown

Spreadsheet programs are to accountants what word processors are to writers, but you don't need to be an accountant to appreciate a spreadsheet. Anyone who works with numbers—whether it's budgets, bank accounts, or bean counting—can simplify and improve their work with an electronic spreadsheet. These programs have become one of the most common and most important business applications for personal computers.

The Amiga is widely recognized for the uncommon power it brings to video and graphics applications. But the multi-tasking, multi-processor architecture that sets the Amiga apart from other personal computers brings as much power to mainstream business applications as it does to character generators and paint programs.

The electronic spreadsheet resembles the standard paper ledger pad used for accounting and financial analysis. Like the ledger pad, it consists of a grid of rows and columns which form rectangular "cells." Each cell can contain one piece of data—either information input by the user, or formulas built into the program.

Spreadsheets give the user a blank slate for entering and storing information, with an array of tools for manipulating that information. The information consists of numbers (sales, expenses, prices, etc.) with descriptive text (column headings, names, etc.). The tools consist of functions for calculating values.

Just about any spreadsheet package would be suitable for an application such as a personal or household budget. Complex accounting work, on the other hand, calls for a more powerful spreadsheet program. And the power of a spreadsheet is measured by the number and variety of tools and functions it offers.

Spreadsheet functions consist of equations for performing simple mathematics, logical operations, financial analysis, engineering and other types of calculations. Spreadsheet tools include special "macro" languages used for automating repetitive tasks, and graphics for the production of pie charts, bar graphs and other visual displays of numerical relationships.

This survey covers all six spreadsheet programs currently available for the Amiga. Some packages pro-

vide a complete system for information compilation, analysis and presentation, while others are designed for more modest assignments.

The following reviews begin with the simpler spreadsheets and end with the more sophisticated programs. Simplicity alone, of course, does not imply that the program is unworthy of consideration. Uncomplicated, easy-to-learn programs are often the most appropriate tools for simple accounting work.

## **Lotus Compatibility**

A number of these Amiga spreadsheets claim to read and write files in Lotus 1,2,3 format (the IBM PC standard). The Lotus 1,2,3 file format they claim compatibility with is Lotus 1,2,3, Version 1A, not the newer 2.01 version. Lotus 1,2,3, Version 1A adds the file extension .WKS, while Version 2.01 adds the file extension .WK1. All of the programs claiming Lotus compatibility were able to read and write Lotus 1,2,3, Version 1A files (.WKS), but none were able to read or write Version 2.01 files (.WK1)—when I transferred spreadsheet files back and forth between MS-DOS and





HAICALC, UNICALC, ANALYZE!,  
VIP PROFESSIONAL,  
PLAN/IT (MAXIPLAN), SUPERPLAN

AmigaDOS using a Commodore BridgeBoard. Lotus itself only converts files in one direction—1A to 2.01.

### **Haicalc**

**Haicalc, Version 1.7** (\$59.95, Haitex Resources, 512K, not copy-protected) can create gargantuan worksheets with a cell array of 9,000 rows by 9,000 columns. That's a total of 18 million cells! Of course, you would run out of memory and/or disk space before all the cells could actually be filled. Haicalc is not shipped on an Amiga Workbench disk, so it cannot be run unless you first boot your Amiga with a valid Workbench. Most of the disk space saved by the absence of AmigaDOS on the disk is utilized for the storage of dozens of Help files. Interactive, context-sensitive help, however, is not available from within the program.

Haicalc is the simplest of the six spreadsheets I reviewed. It offers only six functions: @AVG, @CELLS, @COUNT, @MAX, @MIN and @SUM. The other (more expensive) spreadsheets, by way of comparison, offer between 30 and 75 functions. True, few spreadsheet users find the

need to determine such values as the inverse cosine of X on a frequent basis, but there are many other practical functions, such as retrieving the date from the system clock and displaying it in a cell, that are not possible with the current version of Haicalc.

Haicalc commands can be selected and activated from pull-down menus, Amiga key combinations, function keys or with "slash" commands (typing /c, for example, activates the copy range command). Haicalc was the only spreadsheet program I reviewed that did not provide the option of performing automatic recalculation when worksheet data is added or changed. Manual recalculation is useful when working with very large spreadsheets with hundreds of formulas, since recalculation can take time. Small worksheets calculate fast enough that the risk in forgetting to have the program recalculate and producing an inaccurate report outweighs the advantage in entry speed.

Haicalc possesses only rudimentary pie chart and bar graph features which are executed as a separate task from the spreadsheet itself. Oddly, graphs cannot be saved to disk, nor can they be printed. The easiest

spreadsheet program for novices to use, Haicalc will prove a little too simple for many users.

### **Unicalc**

**Unicalc, Version 1.10** (\$79.95, Lattice, 512K RAM, not copy-protected) was one of the earlier products announced for the Amiga. The program provides a single worksheet on the Workbench screen with 8,192 rows and 256 columns. Unicalc does not generate charts or graphs, nor does it feature a macro language.

Unicalc provides two sets of menus. One is a horizontal, nested menu of key commands and the other is a pull-down menu bar. Unicalc does not have the pop-up menus and file requesters familiar to Amiga users, nor does it provide directory listings of files when performing saves and retrievals.

Unicalc also fails to make effective use of the Amiga's mouse and keyboard. Only one function key is utilized (it performs the same function as the HELP key). The mouse is used with the pull-down menus, cursor placement and window sizing, but it is not used for naming ranges.

Unicalc is not without redeeming



qualities. It features excellent on-line, context-sensitive help; it offers all the basic arithmetic, algebraic and logical functions required of a spreadsheet program; it has a database with query features; and it comes bundled with a set of 30 worksheet templates for performing business and personal financial analysis. Technical support is available by telephone or through Lattice's BBS. Compared to other Amiga spreadsheets at or near its price range, however, Unicalc just doesn't add up.

### **Analyze!**

**Analyze!, Version 2.11** (Micro-Systems Software, 512K RAM, not copy-protected, \$99.95) resembles Lotus 1,2,3 for the IBM PC. It provides a single worksheet on the Workbench screen with 8,192 rows and 256 columns. Analyze! features two different menu schemes—the horizontal, nested menu familiar to Lotus users, and the series of pull-down menus familiar to Amiga users. The program uses many of the same keystrokes, macros and commands as Lotus, but it is different enough to be mildly frustrating for users who work with both Lotus and Analyze! Analyze! saves files in either Analyze! format or Lotus 1,2,3 format.

Analyze! partitions a segment of the Amiga's memory and reserves it for the exclusive use of the program. The program partitions 16K of memory by default when it opens a blank worksheet. If that 16K is consumed, an "Out of Memory" requester appears. The worksheet must then be saved to disk, erased and re-opened with a larger memory partition. If a worksheet larger than 16K is loaded from disk, the program automatically creates a memory partition large enough for the worksheet plus a few modifications. If you only create small worksheets, you may never encounter this limitation, but it diminishes the overall quality of the program nonetheless.

Worksheet data can be displayed in chart or graph form with just a few clicks of the mouse. The process is extremely smooth and intuitive.

Four-color graphs are overlaid onto the spreadsheet, while eight-color graphs are displayed on a screen of their own. Charts and graphs can be stored in IFF format for use with Amiga graphics and video software.

Analyze! does not support multiple open worksheets unless the program is executed more than once. Information can be passed between worksheets by selecting an import/export utility from a pull-down menu. Simple database capabilities are provided, but without a query facil-

## **Any of these spreadsheets would be suitable for keeping a personal or household budget.**

ity. Records can be sorted, but the program cannot perform operations on criteria-based selections of those records.

Overall, Analyze! is a very solid program. The 200-plus page, spiral-bound manual is well organized and well written. The program itself has no online support, but telephone and BBS support is available. Analyze! could take better advantage of the Amiga's capabilities, such as supporting multiple worksheet windows and providing more intuitive mouse support. But the program scores well in the price/performance ratio category.

### **VIP Professional**

**VIP Professional** (\$79.95, VIP Technologies, 512K required, 1 megabyte recommended, not copy-protected) is as close as you can get to running Lotus 1,2,3 on the Amiga without a BridgeBoard. Keystroke for keystroke, including macros, VIP Professional functions exactly like

Lotus 1,2,3, Version 1A. The spreadsheet offers 8,192 rows and 256 columns, context-sensitive on-line help and a comprehensive and well written spiral-bound user manual. VIP Professional can read and write files in Lotus 1,2,3, Version 1A format.

If you are seeking absolute Lotus compatibility in your spreadsheet, VIP Professional is a better choice than Analyze!, but this compatibility comes at the expense of user-friendliness. The Amiga's interface, with its mouse support, pull-down menus, and resizable windows, is completely absent from the spreadsheet module of VIP Professional.

Like Haicalc, VIP Professional comes on a disk without AmigaDOS, so the Amiga must be booted with a Workbench disk before VIP Professional can be run. The spreadsheet, when started, requests the user to specify the amount of memory to be partitioned for worksheet storage. Selecting the default will partition all remaining memory. But this prevents the user from starting any other application, including VIP's own graph module. Regardless of how much memory is available, however, the program does not load itself entirely into RAM. The need to load various segments into memory from the disk slows down VIP considerably. Normally, this could be alleviated by running the spreadsheet from a RAM-disk, but the user manual states unequivocally that the program cannot be executed from a RAMdisk.

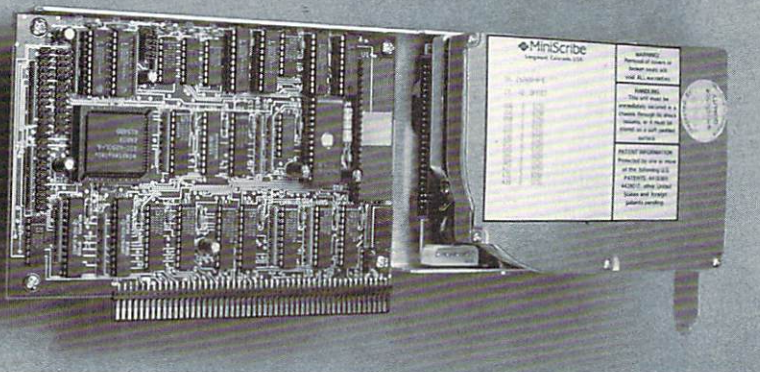
Graphs are defined from within the worksheet, but are printed using a separate module. It would be easier to print graphs directly from within the spreadsheet, but the GraphPrint module does provide several useful features. GraphPrint displays the graph either in eight colors or in black & white with patterns. This module supports pull-down menus and mouse support, and graphs can be customized with different colors and fonts for titles, numbers and legends. Graphs cannot be saved in IFF format.

VIP Professional is certainly a



# HardFrame/2000

## The Super-Speed, DMA, SCSI Hard Disk Interface for the Amiga® 2000



How fast is *fast*? HardFrame/2000 transfers data at Amiga bus speeds! It's actually faster than the hard disk mechanism itself! And even more important in the Amiga's multitasking environment, HardFrame/2000 has extremely efficient DMA circuitry to get on and off the bus in almost no time at all: 280ns to get on; 200ns to get off. And it's true, dedicated DMA, too! HardFrame/2000 autoboots and automounts directly into the AmigaDOS™ 1.3 Fast File System (old file system partitions are *not* needed!). The core of any DMA SCSI interface is in its SCSI protocol chip and DMA chip. MicroBotics has chosen the new, high performance Adaptec AIC-6250 SCSI chip, capable of up to 5 megabytes per second raw transfer speed, and the Signetics 68430 DMA chip running at 12.5 megahertz. Then we added additional FIFO buffering and enabled 16-bit wide data transfers for maximum throughput. The sophisticated design of HardFrame/2000 provides for automatic SCSI arbitration, selection and reselection. The hardware supports either synchronous or asynchronous data transfer. HardFrame/2000 can function as either the SCSI bus initiator or the target and can reside in a multiple master environment. Physically, HardFrame/2000 is optimally flexible: the compact, half-size card comes attached to a full length, plated aluminum frame. The frame has mounting holes positioned to accept standard, 3.5" SCSI hard disk units such as those manufactured by MiniScribe, Seagate, Rodime, and others (hard disk mechanisms must be supplied by the user or his dealer as a separate purchase item). Alternatively, you can cable-connect to a SCSI drive mounted in your Amiga's disk bay or in an external chassis. As many as seven hard disks may be connected to a single HardFrame/2000. There is no size limit on each disk. HardFrame/2000 includes a 50-pin SCSI cable and header connectors for either 50-pin or 25-pin cable connection. Also included is a current tap to power frame-mounted drives directly from the slot itself. HardFrame/2000 comes complete with driver, installation, and diagnostic software.

Available NOW! Suggested list price, \$329 (hard disk not included)  
Frameless version: \$299.00. See your Amiga Dealer.

The HardFrame/2000 photo shows the product with a MiniScribe twenty megabyte hard disk installed. Hard disks are *not* included in the purchase price of HardFrame. Note that if placed in the first slot, HardFrame uses only one slot even with a disk attached.



### MicroBotics, Inc.

Great Products Since the Amiga Was Born!

811 Alpha Drive, Suite 335, Richardson, Texas 75081 (214) 437-5330

Tell your dealer he can quick-order from MicroBotics directly - no minimum quantity - show him this ad!

\*Amiga\* is a registered trademark of Commodore-Amiga. \*HardFrame/2000\*, \*8-UP!\*, \*PopSimm\*, are trademarks of MicroBotics, Inc.

- **AutoBoots AmigaDOS 1.3**  
*(Price Includes HardFrame Eprom!)*
- **Directly Boots the New Fast-File System!**  
*(Doesn't Need Old FS!)*
- **Auto-mounts All Hard Disk Partitions**  
*(no Mount List Required!)*
- **Designed-in, Ultra Strong, Multitasking Performance**
- **High Quality Metal Frame for Stable, On-Card, Hard Disk Mounting**
- **Power Cabling Directly from Card to Disk**
- **50-pin Cable Included**
- **Supports up to seven SCSI hard disks of any size**

**New!**

## 8-UP! (DIP) FastRAM

Another great memory board from MicroBotics, 8-UP! (DIP) is the "brother" of the original 8-UP! (which uses SIMMs and PopSIMMs to fill its memory space). 8-UP! (DIP) uses conventional 1 megabit RAM chips in standard sockets to provide your Amiga 2000 with 2, 4, 6, or 8 megabytes of autoconfiguring FastRAM! 8-UP! (DIP) is a super efficient CMOS design for lowpower consumption and high reliability. Suggested list price, \$199 (0k installed)

Join MicroBotics  
ONLINE TECHNICAL SUPPORT  
CONFERENCE ON BIX  
(The Byte Information Exchange)  
-call 1-800-227-2983  
for BIX membership information!



powerful spreadsheet, but it doesn't offer any overwhelmingly important or innovative features other than its Lotus 1,2,3 compatibility. Its lack of window and mouse support is a significant deficiency, but if you already know Lotus and don't want to learn a new package, VIP Professional may be the right choice.

**VIP  
Professional is  
made for closet  
IBM PC users  
who believe  
real computer  
users don't use  
a mouse.**

### **MAXIPLAN PLUS (PLAN/IT)**

**MaxiPlan Plus 1.9—Plan/IT 2.0** (\$199, Intuitive Technologies, 512K, 1 megabyte recommended, not copy-protected) was developed by Intuitive Technologies, but until the end of 1988 it was marketed and distributed by Oxxi, Inc. Now Intuitive Technologies has improved MaxiPlan, renamed it Plan/IT 2.0 and switched distribution to B.E.S.T., Inc, a company that also distributes a line of business accounting software for the Amiga. At this writing, Plan/IT 2.0 was still in Beta testing, so this review will be based on MaxiPlan 1.9, which comprises the core of Plan/IT 2.0.

MaxiPlan exploits nearly all of the Amiga's innovative features. As many as three different worksheets can be displayed on a four-color or eight-color screen, and each worksheet can be as large as 512 columns by 32,760 rows (over 16 million cells). Data entered into the worksheets can be displayed in up to eight different pen colors. Functions are provided for utilizing the Amiga's speech synthesis routines and displaying IFF pictures (including charts and graphs). Reference notes can be at-

tached to individual cells to document and explain their purpose. MaxiPlan cannot read or write files in Lotus 1,2,3 format, but this is one of the features expected in Plan/IT 2.0.

The macro facility provides one of the highlights of MaxiPlan. Rather than recording macros on a specific worksheet, you enter them on separate macrosheets where they can be accessed by any worksheet. MaxiPlan's macro routines are particularly useful for creating data entry templates for worksheets and databases, because you can create customized pop-up input windows.

Another feature unique to MaxiPlan is its Zoom button. Clicking on the Zoom button displays over 2,500 cells of the worksheet in miniaturized form. A colored legend informs you which cells contain values and which contain formulas, and you can go to any cell in the worksheet just by clicking on it and zooming out again.

MaxiPlan features more than 70 functions, any of which can be selected from a pop-up file selector and entered directly into the worksheet with the mouse. If you are working in a macrosheet, the file selector lists the 95 macro functions available. These excellent features, which dramatically reduce the need to memorize a lot of commands, were not included in any of the other spreadsheets I reviewed. MaxiPlan also has database capabilities which can perform either quick and simple sorts, or extensive and complex sorts and queries.

MaxiPlan is one of the most powerful spreadsheets available for the Amiga. The program makes good use of the Amiga's function keys and mouse. But as a touch-typist, I found it a bit too dependent on the mouse for the selection of frequently used commands. A nested, keystroke-controlled menu option would be a welcome addition. The comprehensive manual is well organized and plenty of examples are provided to learn from. I highly recommend MaxiPlan for those requiring a comprehensive spreadsheet tool.

### **Superplan**

When I loaded **Superplan** (\$149.95, Precision Inc., 1 megabyte RAM, dongle copy-protection), I was struck by its resemblance to Lattice's Unicalc. Some of the program's code has, in fact, been licensed from Lattice. Precision, however, has not only remedied Unicalc's deficiencies but has produced a powerful spreadsheet that takes good advantage of the Amiga's capabilities.

Superplan provides a single worksheet on a custom eight-color screen with a cell matrix of 2,048 rows by 1,024 columns. Commands are displayed as single letter commands on a horizontal, nested menu and can be executed either with keystrokes or mouse clicks. A set of pull-down menus also provide a selection of the most common commands.

The trio of financial, database and graphics features found in most other spreadsheet programs is here, but what sets Superplan apart from the rest of the industry's offerings is its project management feature. With it,

**With  
Superplan's  
project  
management  
feature, you  
can create  
detailed project  
schedules that  
take bottle-  
necks into  
account.**

you can create detailed project schedules by defining the required resources, the length of the project and the interdependencies between the individual jobs that comprise the project. Facilities are included for taking into account the availability of labor, equipment, and holidays or week-ends when work would not be typically scheduled.



Package	Haicalc Version 1.7	Unicalc Version 1.10	Analyze! Version 2.11	VIP Professional Version 1.0	Maxiplan Plus Version 1.9	Super Plan Version 1.0
Manufacturer	Haitex Resources	Lattice	Micro-Systems Software	VIP Technologies	Intuitive Technologies	Precision, LTD.
Price	\$59.95	\$79.95	\$99.95	\$79.95	\$199	\$149.95
Memory	512K	512K	512K	512K	1 Meg.	1 Meg.
Graphics	+		+	+	+	+
Saves Graphs in IFF		N/A	+		+	+
Number of Functions	6	34	44	39	66	74
Reads & Writes Lotus 1,2,3 Files			+	+		+
Database functions		+	+	+	+	+
Macros			+	+	+	+
Maximum Number of Rows & Columns	9,000 x 9000	8,192 x 256	8,196 x 256	8,192 x 256	32,760 x 512	2,048 x 1,024
Number of worksheets open simultaneously	1	1	1	1	3	1
Telephone Tech Support Available	+	+	+		+	
Copy-Protected						+
On-line Help		+		+	+	+

On a construction project, for example, the plumber can install sinks and faucets while the carpenter plasters the walls, but the painter cannot start work until the carpenter's plaster has dried. The calendar portion of the worksheet can be linked to the financial portion, so that the impact of scheduling changes carries right through to the bottom line. This is an innovative and dynamic extension of the "what-if" analysis tools for which electronic spreadsheets have become famous.

I don't think Superplan is as intuitive as it could be, but it is a powerful program nonetheless. The program also uses a dongle for copy protection, requiring the small plug to be inserted in the Amiga's second joystick port whenever the program is running. Very small, the dongle doesn't get in the way unless you need to use the second joystick port for something else, like a joystick. There are a few other minor flaws with the package, and the graphics are unimpressive, but its unique project management features save the day.

## CONCLUSION

There is an Amiga spreadsheet package for every need. Those with desktop business presentation requirements may be best served by MaxiPlan Plus (Plan/It). If you perform project management and need a tool for managing and billing your time, Superplan is probably your best choice. VIP Professional is made for those closet IBM PC users who believe "real" computer users don't need a mouse, while the less expensive Haicalc, Analyze! and Unicalc would easily meet the requirements of most home computer users. ■

## Manufacturers

### ANALYZE!, Version 2.11 \$99.95

Micro-Systems Software, 12798 West Forest Hill Blvd., Suite 202, West Palm Beach, FL 33414. (407) 790-0770.

CIRCLE 243 ON READER SERVICE CARD

### HAICALC, Version 1.7 \$59.95

Haitex Resources, 208 Carrollton Park, Suite 1207, Carrollton, TX 75006. (214) 241-8030.

CIRCLE 244 ON READER SERVICE CARD

### PLAN/IT, Version 2.0 \$199

(Formerly MaxiPlan Plus, Version 1.9)  
B.E.S.T., Inc., 11525 S.W. Durham Road,  
Building D, Tigard, OR 97224. (503)  
684-6655.

CIRCLE 245 ON READER SERVICE CARD

### SUPERPLAN \$149.95

Precision Incorporated, 8404 Sterling  
Street, Suite A, Irving, TX 75063. (214)  
929-4888.

CIRCLE 246 ON READER SERVICE CARD

### UNICALC, Version 1.0 \$79.95

Lattice, Inc., 2500 S. Highland Avenue,  
Suite 300, Lombard, IL 60148. (800)  
533-3577.

CIRCLE 247 ON READER SERVICE CARD

### VIP PROFESSIONAL, Version 1.0 \$79.95

ISD Marketing, 2651 John Street, Unit 3,  
Markham, Ontario, Canada, L3R 2W5.  
(416) 479-1990.

CIRCLE 248 ON READER SERVICE CARD

*Michael Brown is a well-known Amiga journalist and is currently writing a book on desktop video for TAB.*



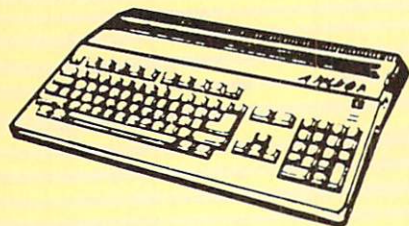
# COMPUTER DIRECT

Since 1979

**WE WON'T BE UNDERSOLD!\***

Expires 5/31/89

## AMIGA



### Amiga 500 Computer Sale

512K Computer  
Compatible with Amiga  
1000 Software  
Call For Low Low Price

**In Stock**

### Amiga 1010 External Drive Sale

3 1/2" Compact-Size  
Micro-Disk Drive  
Call For Low Low Price

**In Stock**

### Amiga 1084S Color Monitor Sale

13" RGB 80 Column x 25  
Row, 640 x 400 Pixel  
Call For Low Low Price

**In Stock**

## 5 1/4" Floppy Disks

Lifetime Guarantee  
100% Certified

Made  
in the  
USA



Qty. of 25 .....\$4.75  
Qty. of 25 w/sleeves.....\$5.25  
Qty. of 100 w/sleeves & labels.....\$24.00

**Double Density  
Double Sided**

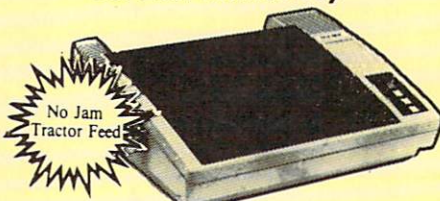
**For As Low As**

**19¢**  
ea.

No One Can Sell This Printer For Less

## 180 CPS Printer

Lifetime Warranty on Printhead  
Our Best Printer Buy



- 2yr. Immediate Replacement
- Dot Addressable Graphics
- High Speed Dot Matrix
- Italics, Elite, Condensed, Pica
- Centronics Parallel Port
- 8K Print Buffer
- Near Letter Quality from front panel
- Low Cost Adapters available
- Pressure Sensitive Controls

Our Low Sale Price

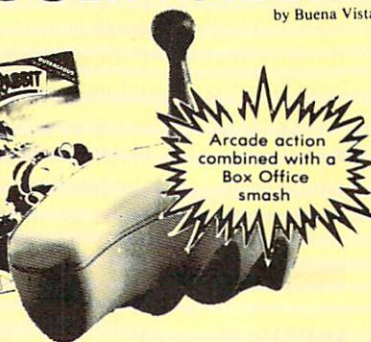
**\$149<sup>95</sup>**

List \$499

## Our Hottest Selling Combo!

**ERGOSTICK  
and  
ROGER RABBIT**

by Buena Vista



Arcade action  
combined with a  
Box Office  
smash

The Ergostick is the only true ergonomically designed joystick! Soft and pliable with microswitch technology, actually shortens the gap between reaction and action!

A \$70.00  
Value  
only!

**\$47<sup>95</sup>**

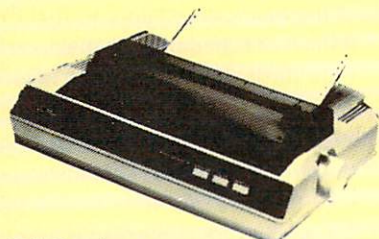
## FREE CATALOG



Call For Our Extensive List  
of AMIGA Software Titles!!  
Adding More Titles Daily

## 24-Pin Printer

Document Quality  
IBM And Epson Graphics



- 10" Carriage
- 135 CPS
- 32K Print Buffer
- Serial Impact Dot Matrix
- 24 Wires (12 x 2 staggered, diameter 0.2 mm)
- IBM and Epson Mode
- Adjustable Sprocket & Friction Feed
- Parallel Centronics Port

Our Low Sale Price

**\$319<sup>95</sup>**

List \$599

IMMEDIATE ANSWER

**800 - BUY - WISE ext. 16**

800 - 289- 9473 ext. 16

Outside Service Area call 312-382-5058

**We Love Our Customers!**

COMPUTER DIRECT

22292 N. Pepper Rd.  
Barrington, IL 60010

CIRCLE 006 ON READER SERVICE CARD



## BEST SERVICE IN THE USA

## PRICE IS NOT ENOUGH!

- 90 Day Immediate Replacement
- Experts in Customer Satisfaction

- Free Technical Assistance
- Bulletin Board Service

- Fast, Low Cost Delivery
- No Credit Card Fees
- 15 Day Home Trial
- Free Catalogs

### 3 1/2" DS-DD Micro Disks

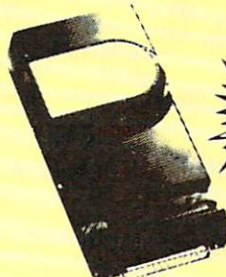


- 100% certified, error free
- Compact & easy to handle
- Hard plastic shell provides maximum media protection & safe handling
- Holds more data than a 5 1/4" floppy disk

Lots of 50 - 99¢  
Lots of 250 - 79¢  
**NO LIMIT**

Our Low Sale Price  
**79¢** each

### 1200 Baud Migent Pocket Modem 100% Hayes Compatible

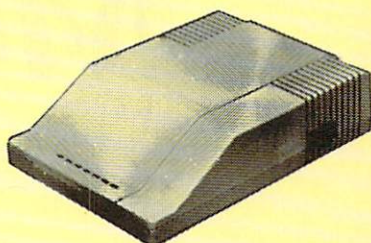


Over \$185  
in Free  
Software  
Included

- Runs on AC or Battery
- Turns on/off automatically
- Plugs directly into your serial port on many computers
- On-screen status lights show call progress
- RS232C Compatible
- \*Free Source with \$15 of on-line time
- \*Free official airline guide electronic edition
- \*Free compuserve with \$15 of on-line time
- \*Bit Com terminal modem software

Our Low Sale Price  
**\$79.95**  
List \$423

### 2400 Baud External Modem Made exclusively for you



- 7 System Indicator Lights
- Both Tone & Pulse Dialing
- Built-in Speaker with Volume Control
- For all Computers
- 100% Hayes compatible

Our Low Sale Price  
**\$99.95**  
List \$349

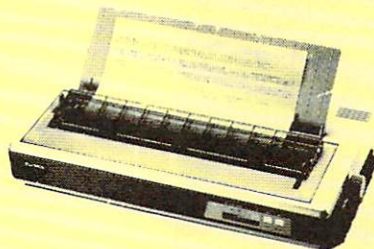
### Ultra Hi-Speed Printer 300 CPS Draft • 50 CPS NLQ With Color Printing Capabilities



- 300 CPS Draft - 50 CPS NLQ
- Download character setting
- Variety of characters & graphics
- Parallel & Serial interface ports • IBM & Epson mode
- Auto paper load & ejection
- Bottom feed & 10K buffer
- Optional 7-color print kit... \$99.95

Our Low Sale Price  
**\$299.95**  
List \$499

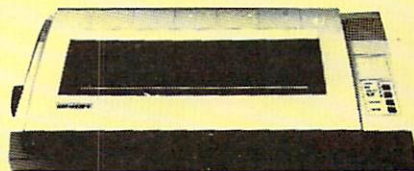
### 15" 24-Pin Letter Quality Printer



- 180 c.p.s. in draft pica mode
- 60 c.p.s. in letter quality mode
- 96 user definable characters
- 32K RAM Memory
- Tractor/Friction Feed
- Uni-directional/Bi-directional
- 15" Impact Dot Matrix
- 12K Buffer
- Parallel Centronics Port

Our Low Sale Price  
**\$479.95**  
List \$699

### 720 CPS 15" Printer Multi-Head Wide Carriage Printer With High Dot Resolution



- 720 CPS - 150 CPS NLQ
- 8K Print Buffer
- Print Speed of 214 LPM In Draft
- 6 Print Heads Achieve High Dot Resolution In Higher Speed
- NLQ Speed Of 47.4 LPM
- 136 Column Wide Carriage
- IBM \* and Epson \*
- Parallel Centronics Port

Our Low Sale Price  
**\$699.95**  
List \$1995

VISA  
MASTER CARD  
COD

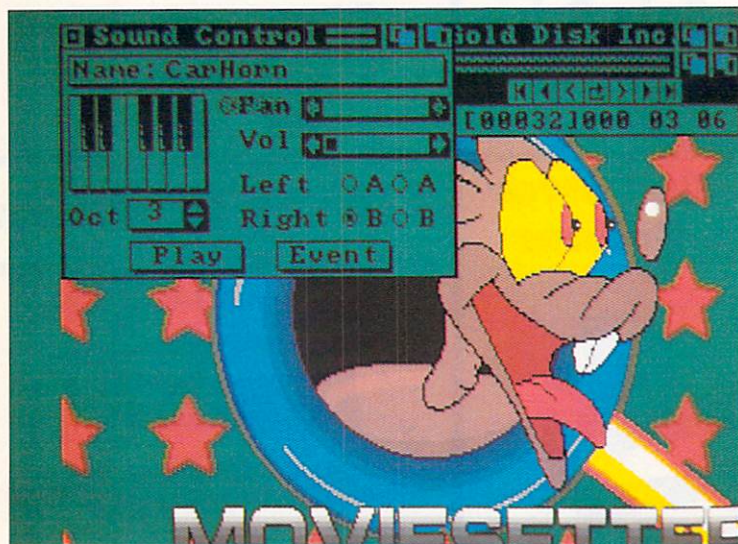
Prices do not include Shipping Charges. Call to get Your Lowest Delivered Cost. We insure all shipments at no extra cost to you! All packages are normally shipped UPS Ground. 2nd Day or Overnight delivery available. Minimum shipping charge per order is \$3.75. Illinois residents add 6 1/2 % sales tax. We ship to all points in the U.S; Canada, Puerto Rico, Alaska, Hawaii, Virgin Islands and APO-FPO. (Monitors only shipped in Continental USA) Prices and availability subject to change without notice.



# MovieSetter

TV CARTOON-SHOW QUALITY —  
FROM YOUR AMIGA

Reviewed by R.F. Noyes



Add sounds to "events" in your animations with MovieSetter.

which contains diagrams explaining the Control Windows and icons.

## Remember These Terms

Gold Disk's graphic programs tend to use terms that are a little different from other Amiga software packages. In MovieSetter, an animation is called a "production." You control your production with the Player Control Window which is set up to emulate a VCR remote control. A "scene" contains the action of the object, a background or lack of one, color control and sound, etc. The background is an IFF picture that is 352 X 240 pixels in overscan with 32 colors. A brush or IFF bitmap is called a "face." A collection of faces is a "set." The repositioning of a set is a "track"—called a path in most other animation programs. A change in color or activation of a sound is called an "event."

One of the two MovieSetter disks is crammed with clip art—tons of sets, a couple of productions and three backgrounds. One of the sets is a 3-D looking skull that spins around. You can use the track to make it bounce down the road (one of the included backgrounds) and on impact you can use the event feature to generate sound on any of the two channels and four voices. You could

**MovieSetter** is a powerful 2-D animation program that utilizes low resolution, overscan and sprite animation to give you first-rate control of object positioning and timing. With this new Gold Disk software you'll find it surprisingly easy to create sequences that look professional enough for a Saturday morning TV cartoon show.

The MovieSetter interface is similar to Gold Disk's interface for ComicSetter, which uses included clip art to make high-quality comic-book

panels. In fact, you could think of MovieSetter as a ComicSetter that adds the illusion of movement with consecutive frames.

MovieSetter's thin, stapled manual gives you a short tutorial that might be a little confusing for new Amiga users. But if you are experienced with Amiga graphic software, you should be able to get around after just scanning this documentation. The manual also includes an index and many informative appendices. Especially useful is Appendix E,



also have the bounce of the skull make a sound that pans from left to right. You could select the option to playback the production in interlace. And don't worry that no one will ever see your animation—a redistributable player program is included.

### **Creating Animations**

In the Set Editor, you make or select faces (brushes or bitmaps) and group them together in a set. Or you could load in an IFF image and touch it up. The Set Editor includes several basic drawing tools—free-hand dotted and continuous lines, ovals and rectangles, brushes, resize and rotate. The Set Editor has its own VCR control icon panel for manipulating and arranging faces in the order you want.

One downside of the Set Editor is that when you select a drawing tool, the icon does not change to that tool's image. For example, the Fill Tool does not give you any kind of indication it is selected except that the icon is ghosted. When you are whizzing through a production at

## **In the Scene Editor you have control of the timing, events, sound, color cycling and the track.**

midnight, it is very handy to have the pointer indicate which feature you have selected.

If you created your faces out of order, the Set Editor will let you rearrange them. And after you have created your set you can flip it horizontally or vertically.

The easiest and most powerful part of MovieSetter is the Scene Editor, which is where you create the track that your path will follow and reposition it over your background. In the

Scene Editor you have control of the timing, events, sound, color cycling and the track.

To begin with, load the background. You have the option to make it appear with a wipe. The wipes are predesigned, so you need only click on the one you want. Now you are ready to lay down a first track. Load your set and click the left mouse button to select where you want to place the first face of your set. MovieSetter will show each face of your set as you place it. Hold down the CONTROL key as you place your last face and you're done.

You can now play your track. If you discover that one of your faces is not where you want it, just go to that frame and move the face. One important and helpful feature of the track editing is that you have ellipse guides to help you to draw a line representing your track. In the Guide Control Window you can select what shape you wish the track to be and whether or not you want to have the object accelerate. You can also copy tracks, insert elements and lay new tracks over existing ones.

Events are what happen to the set in a given frame. Events could include loading a new background, scrolling or blanking a background. Events can also control the color of the production. You can have four different cycles running at the same time, each one at a different speed. Palette controls are easy and similar to most graphic programs.

### **Sound Effects**

The Sound Control Window is in the Event Menu. You can load a standard mono IFF or stereo sampled sound. Each sound can be played at "four octaves" of speeds. The clip disk has several sounds—ow, boing, thwack and orchestra. My favorite is orchestra, where the sound of the instruments all playing notes at once is blended with the sound of a locomotive pulling out of a station. If you select both channels to play a sound, you can get a richer output, especially for orchestra.

There is no music feature, so your

### **Sprite or Page Animation**

The two main types of Amiga animation are sprite animation and page-flipping. In sprite animation software (MovieSetter, Aegis Animator), the moving objects are controlled independently of the background. In page-flipping software (PageFlipper Plus, Zoetrope), the moving object and the background must be controlled as a single unit on each frame.

animation production is limited to sound effects. To get your sound to play, just select the event for any frame you wish. When you play it back, your sound will be there.

If the timing of your animations is not right, just go to the Timing menu and select any of the times per frame—from 1 to 60 frames a second. At 60 frames per second your animation must be in two colors. The manual does thoroughly explain how to get the right time rate. You can even loop your production or part of it.

Once I got the feel for MovieSetter I was able to do interesting things. With my 1-megabyte Amiga 1000 I managed to get eight different sets going on eight different tracks on one background before I quit. I'm sure I could have done a lot more before running out of memory. I loaded several IFF pictures into MovieSetter to try it as slideshow program and it worked fine.

Gold Disk is to be commended for bringing so much power to 512K Amiga owners. I do have quite a few things I hope will come out in later versions—such as high resolution, music, and a background larger than 352 X 240 that would allow you to scroll in any direction. MovieSetter is a strong sprite animation program that's a good package for intermediate users. ■

### **MOVIESETTER**

**\$99.95**

Gold Disk, 2175 Dunwin Drive, Unit 6, Mississauga, Ontario, Canada L5M 2C2. (415) 828-0913.

1Mb recommended, 512K required.

CIRCLE 275 ON READER SERVICE CARD



# Copyist™

For Atari ST,  
Amiga and IBM PC

The Copyist is the score-editing, transcription, and printing program of choice for over 3,000 musicians. Atari, Amiga, and IBM versions all support both the mouse and the computer keyboard for fast, flexible input. Place notes, text, symbols, and lines wherever you desire. Each can be separately moved, copied, or deleted.

The Copyist is the most intelligent music

transcription program available today. It automatically and accurately

transcribes data from most popular sequencers in treble, bass, alto, and percussion clefs. Copyist converts any of the supported formats to any other and it also supports standard MIDI files.

Copyist comes in three levels to match your needs and budget; Apprentice, Professional, and DTP. All versions on all computers are file-compatible and upgradable. Each level includes a full complement of musical symbols; Treble, Bass, Alto, Tenor, Soprano, and Percussion clefs; guitar chord grids (sizable for guitar or lute); and 16 stave capability.

The Copyist contains all of the tools necessary to allow you to communicate your most complex musical idea and to sculpt your score in an extremely personal manner.



**Dr. T's**  
MUSIC SOFTWARE

CIRCLE 010 ON READER SERVICE CARD

## Standard Features

- Slanted or horizontal beaming
- Smooth slurs and ties
- Smooth dynamics, and beams
- 4-point adjustment of slurs
- Read-in pages from other scores
- User-defined "clipboard" (Atari)
- User-defined Macros (Atari, Amiga)

- All key & time signatures supported

- Note placement anywhere desired

- Place, move, and edit text anywhere on page

- Use 6 different styles of text per page (dependent on printer).

- Cut, copy, paste, and move functions are via easy range highlight editing (Atari and Amiga versions only).

- Insert and delete notes, rests, symbols, text, bars, and pages, independently quantize timing and duration, each track separately, and 4 sections of individual tracks.

- Map any track to any stave.

- Extensive fully indexed manual

- Sequencers supported include:

- KCS and MRS (ST/Amiga)
- SMUS (Amiga)
- Steinberg Pro 24 (Atari ST)
- Texture (IBM)
- Sequencer Plus all (IBM)
- Mastertracks (IBM)
- Cakewalk (IBM)
- 48-track PC (IBM)
- Standard MIDI files

- Standard printers supported:

- Epson FX
- HP Deskjet
- HP Inkjet

- Apprentice** contains all standard features and allows 5 pages per score.

- Professional** contains all standard features plus:

- Score length is 50 pages

- Printer support:

- Atari laser printer
- HP Laserjet Plus
- HP Plotters (ST and IBM)

- User-editable Macros

- Symbol editor

- Part generator

- Scores to sequencer formats utility.

- DTP** contains all Apprentice and Professional features plus:

- Score length is 100 pages

- Imagen Ultrascript support

- Postscript printer support

- Includes Adobe Sonata

- music fonts

- Utility to convert files to TIFF

- and EPS formats.

**Dr. T's**

MUSIC SOFTWARE  
220 Boylston Street  
Chestnut Hill, MA. 02167  
U.S.A.

(617) 244-6954  
FAX (617) 244-5243



# Clearing Your Workbench

*Make room for that utility you just can't live without*

BY ARNIE CACHELIN

AMIGA Plus Technical Editor

Imagine this . . . You just picked up the utility program of your dreams. It does everything—and more. You don't even know how you and your Amiga lived without it! Maybe you finally have GOMF 3.0 or FacclI and you want to install it on your Workbench disk. You drag the icon over to the Workbench 1.3 disk, the drive lights go on. And voila—up pops the friendly requester with, "Volume Workbench 1.3 is full. RETRY or CANCEL."

Why not retry? Sometimes the RETRY gadget works! It won't squeeze an extra 30k onto your disk—but if it's close, give it a shot. However, this time miracles don't happen and the requester is back. Sound familiar?

One way to keep from filling up your disks with junk files is to copy files from CLI instead of the Workbench. If you try to copy to a full disk from the CLI (or Shell) you get this message:

Error while Writing  
Destination file "c:Nuke" removed

When copying via the Workbench,

## Avoid filling up your disks with junk files by copying files from CLI instead of the Workbench.

the Amiga doesn't give this message—because it *doesn't remove the partial file*. It may have actually copied the entire file but then run out of room before finishing the icon (the file ending with .info). So use LIST from the CLI to determine whether the file you tried to copy is taking up disk space in an unusable form.

Why not avoid these full-disk hassles entirely? Let's figure out how to make some room for new goodies on the Workbench disk.

### List, Info, Cd

In our exploration of the Workbench disk, our main tools will be three CLI commands. LIST tells us what files are in a given drawer (or

directory) and how big they are in bytes. INFO tells us how much space is available on our disk in blocks (1 block = 512 bytes = ½ kbyte). CD lets us set the path (disk:directory/subdirectory) that our commands will look at. This saves us the chore of retyping things like 'df0:fonts/sapphire'.

NOTE: Use a *backup copy* of your Workbench disk for the following alterations. And please read the *entire article* before you start to delete anything—you might want it back after you get all the information.

Open a CLI window—or preferably the Amiga shell. Type INFO. You will see that the Workbench 1.3 disk has 60 blocks free—about 30K. CD to your *backup copy* of the Workbench 1.3 disk (for example, type CD df0:) and then type LIST. You will see mostly directories and their icons, such as Utilities.info. These directories are easy enough to delete from the workbench. You can discard the Clock, Clockptr and Calculator utilities if you don't use them often. Notepad is especially large and ripe for deletion! If you really need room on the disk more than Graphicdump



and Say, you can just discard the entire Utilities drawer, freeing about 135K.

I personally like Graphicdump and Cmd which are small compared to Clock and Notepad. I also have in my c: directory a public domain version

## You can always keep infrequently- used utilities on another disk.

of More which is only 4K rather than 11K. This program can be found on the AMIGA Plus Disk! Type **LIST utilities** and decide for yourself which files are small enough or useful enough to keep. Remember, you can always keep these utilities on another disk.

There is not a lot to remove from the System drawer. Files like Merge-Mem and NoFastMem are rarely useful, but only take about 2K each. Similarly, deleting the Empty and Expansion drawers will only free about 4K. And if you have an Amiga 2000 with a Bridgeboard—or any expansion hardware on your Amiga—the expansion directory may be necessary. If you really need room, you can set your Preferences the way you like them and get rid of the Prefs drawer. That'll buy you another 66K. You can easily reset your Preferences from another disk later. Because the settings from Preferences are stored in the file `devs:system-configuration`, the SAVE option will write to the `devs` directory on your workbench disk (unless you have re-ASSIGNED `devs:`). If you do discard individual Preference files instead of the entire Prefs drawer, be sure to get rid of the printer, pointer and serial icons which just call the Preferences program anyway.

Now let's look at the `devs` directory (CD `devs:` then **LIST**). This direc-

tory contains information on devices and resources used by the system, such as the keyboard and the clipboard (which stores all the little things you cut and paste). If you don't have a printer you can reclaim about 27K by deleting `printer.device` and the `printers` directory (which contains drivers for specific printer models). Workbench 1.2 was filled with printer drivers—most of which were useless, unless you owned a computer store. Workbench 1.3 has only the "generic" driver, while the specific driver for your printer is on the Extras 1.3 disk. If you never want your Amiga to speak to you, you can get rid of the `narrator.device` file. But since you never know what new game will start talking, I'd recommend keeping this file. If you do decide to remove it, you may as well get rid of `libs/translator.library` and `l/speak-handler`. While we're in the `l` directory, the new `FastFileSystem` will only work with hard disks. If you don't have one or expect one, you can trade the file `l/fastfilesystem` for about 12K on your Workbench disk.

### **S, Fonts, C.**

Three more directories can be pared down: The `S` directory contains Script files and startup information for the CLI, the Shell, and the whole system. If the command **EXECUTE** can't find its script in the current directory, it searches `s:`. If you don't have a hard disk, you can delete the file `Startup.HD`. The `fonts` directory is composed of files like `xxx.font` and corresponding directories `xxx` containing the the different sizes of the font `xxx`. Since a variety of popular software will use different sizes of the Topaz font for different screen resolutions, I recommend keeping this font intact. All the other fonts can be deleted and stored on a separate disk. In order for your software to look for fonts on another disk, you must **ASSIGN** fonts: to the other disk (**ASSIGN** fonts: `dfl:myfontdir`). To delete an entire font, type something like **DELETE** `ruby#?` all. If you want to remove

only one size use **DELETE** `ruby/12` and then run the **FixFonts** program in the System drawer to update the file `ruby.font`.

The `C` directory contains commands used from the CLI and script files. You can delete many commands that you rarely use as long as you take care not to delete any files that are commonly used in script files or the startup-sequence. I rarely use **FILENOTE**, **SEARCH**, **SORT**, **CHANGTASKPRI**, **EVAL**, and **WHY**. So I can safely delete them. If you don't have a 5.25-inch drive, you will not need **DISKCHANGE**. If you have an Amiga 1000, you won't need **SETCLOCK**. And if you don't have any expansion hardware (like a Bridgeboard or a hard disk) then **BINDDRIVERS** is not needed. **ED** and **EDIT** take up a lot of disk space without being particularly useful. I

## As your activities grow more diverse, you'll likely want several versions of your Workbench disk to choose from.

have replaced these two with my favorite public domain editor **DME** (which I renamed to **ED**). Finally, files like **GETENV**, **SETENV**, and **REMRAD** can be deleted if you feel they won't be useful. However, note that these last three together barely take up 2K disk space.

As your Amiga activities grow more diverse and advanced, you will likely want several versions of your Workbench disk to choose from. Experiment with these hints and you should be able to enjoy your Amiga even more! ■



# Games Galaxy

SWORD OF SODAN, SOLITAIRE ROYAL,  
WESTERN GAMES, ZAK McKRACKEN,  
MENACE, FINAL MISSION

## Sword of Sodan

Discovery's **Sword of Sodan** action game impressed me all the way through—from the title screen that unfurls like a windblown banner, to the clouds that spell out "game over" when you die.

Amiga gamers have gotten used to arcade-quality sword fantasies with richly detailed graphics. *Sword of Sodan* boasts beautiful scrolling screen backgrounds with creative details just about everywhere you look—a thriving ant-hill in one woods scene, or your Amiga power light pulsing like the heartbeat of a dying hero while the game reloads (not a crashing Amiga). Digitized sound and music also add greatly to the magical atmosphere.

However, what sets *Sword of Sodan* apart from other games in this genre is the large size of the characters. All the villains and monsters are at least two-thirds of the screen height. And these creatures move effortlessly in combat.

The second unusual enhancement of *Sword of Sodan* is that you can choose to play the game as either a male or a female warrior. Your strength will be the same and your muscular body will be about half the height of the screen, whether you take on the role of the son or the



**Sword of Sodan:** You will need all the help you can get to defeat Evil

daughter of a king killed by evil Zoras the Necromancer.

Truly epic in scope, *Sword of Sodan* comes on three disks full of adventure. However, these three disks don't contain your normal 2.7 megs of data. Due to special compression routines, there's at least 4Mb worth of giant scorpions, graveyard spirits and other monsters to combat through 11 progressively harder

levels. If you have more RAM than the required 512K, you can watch game replay—up to two hours with 8Mb of RAM.

Keyboard commands are minimal here, although you can pause the game with the SPACEBAR and activate magic spells with FUNCTION KEYS. You cannot save the copy-protected game or load it onto a hard disk. However, the game runs with



one disk drive and swapping is minimal.

Your primary weapon is your joystick-controlled sword. Slashing and hacking at enemies will chip away at their strength until they die. Frankly, these deaths are sometimes rather gruesome. One character's head even pops right off with a gut-wrenching scream. Spells should also be gathered to help you along your dangerous journey. These handy spells include extra lives, magic zap-pers and extra hit-strength. Particularly important are the magic shields that protect you from all harm for a short period of time.

After you cross the forests and graveyards to Craggamoore Castle where you fight your way through the dungeon corridors to finally reach the chamber of Zoras, you'll find that the Necromancer is one tough customer. He needs to be hit many times and none of the spells work against him. If luck and skill aren't enough to get you through the game, try typing "nancy" at the title screen. This will put you into unlimited lives mode!

My only complaint about *Sword of Sodan* is that some of the two-thirds screen size characters are not well-

proportioned and in some places their animation could be better. But overall, *Sword of Sodan* is an excellent game with outstanding action and suspense.—TONY BARNES

#### **SWORD OF SODAN**

\$49.95

Discovery Software, 163 Conduit Street, Annapolis, MD 21401. (301) 268-9877. ■

CIRCLE 261 ON READER SERVICE CARD

#### **Solitaire Royale**

I like to play Solitaire. It is not competitive and I find it quite relaxing. Problem is, you need a deck of cards (now, where did I put it?) and a fair-sized empty space to play. And though I play Klondike often enough to remember the rules, I can never seem to remember how to play the many other variations of Solitaire that exist.

Enter *Solitaire Royale*, from Spectrum Holobyte. This program provides good graphics and an easy way to play no less than eight different types of solitaire, as well as a tournament, a tour, and three children's games.

Besides the classic Klondike, *Solitaire Royale* lets you play Pyramid, Golf, Canfield, Corners, Calculation,

3 Shuffles and a Draw and Reno. Most of these games simply keep score of how many cards you remove from play—but Reno is a betting game.

The online help is very good. You don't really need the manual. Not only will the program tell you about any selected pile of cards, but it will open a window and show you the rules of any of the card games. And you can restart the game with the same card layout at any time. *Solitaire Royale* even lets you cheat by peeking into a pile or taking back one move.

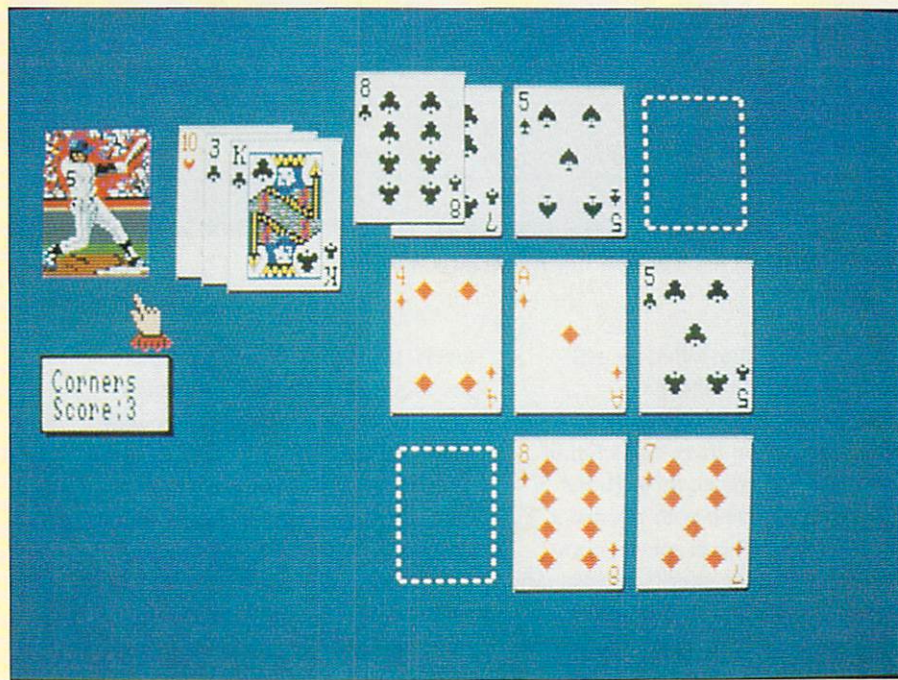
The eight different card backs and four card faces lend quite a bit of variety to the solitaire games, although the design of some of the cards is a bit "busy" for my tastes. Still, it is nice to have the option to change the cards. When you win a game, the whole deck is fanned out across the screen and you get a colorful message of congratulations. All in all, *Solitaire Royale* does a good job of computerizing solitaire, and is highly recommended if you enjoy this kind of card game.—DAVID PLOTKIN

#### **SOLITAIRE ROYALE**

\$29.95

Spectrum Holobyte, 2061 Challenger Drive, Alameda, CA 94501. (415) 522-3584. ■

CIRCLE 252 ON READER SERVICE CARD



#### **Western Games**

*Western Games* both is and isn't just what you think it's going to be. The title brings to mind images of shoot-outs, cattle rustling, or perhaps an Indian ambush, but in *these* Western Games you and your pardner (computer or human) will try your luck in such diverse activities as arm wrestling, milking, dancing, and tobacco spitting. Unfortunately, this isn't my idea of a good time. I find tobacco spitting particularly distasteful.

However, *Western Games* boasts some of the most impressive images I've ever seen in ANY computer game, commercial or otherwise. Cartoon-like characters perform against a highly detailed backdrop





## Western Games

the left button twice.

The text entry tools are located in the bottom window. A set of verbs (Pick Up, Use, Take, etc.) is displayed and you can select by simply pointing and clicking. A list of items that Zak is carrying also shows in this window. If the list overflows, you can click on arrows to scroll the window contents. By selecting verbs and nouns, you can automatically construct sentences, such as "Put the egg in the microwave." The extra words are automatically inserted by the program and it does a pretty good job. Although sometimes the software gets confused and you need to start the command over, this is still a lot more enjoyable than trying to guess what words the program "knows."

It is also possible to use items that are visible in the upper window, even if Zak is not carrying them. However, there is no limit to what Zak can carry, so it is best to pick up anything. You never know what may come in useful later.

The whole tone of Zak McKracken and the Alien Mind Benders is humorous. For example, the aliens disguise their oversized heads with hats and nose glasses—you know, those joke glasses with fake moustache and eyebrows. Incongruous, to say the least. Another example: When Zak needs to distract the stewardess on the airplane, have him put his raw egg in the microwave and turn it on.

filled with colorful and humorous cowpokes. The Amiga makes everything sound real, from the hootin' and hollerin' of the spectators to the sound of freshly drawn milk striking the bottom of an empty bucket. Even though the joystick controls are complex, most make some sort of sense and are easily learned.

The Western motif carries through the entire game, from shooting targets to make your opening option selections, to registering your name by shooting holes in a board. This attention to detail is probably the single most admirable quality of Western Games, and can make it worthy of consideration.—STEVE PANAK

come stupid. As the story starts, Zak is being sent off to write story about a two-headed squirrel, and in the process he stumbles across some of what he needs to defeat the aliens' dastardly scheme.

The screen is split into two windows. All the graphic action takes place in the top window, which scrolls Zak through the scenery of his immediate surroundings. Occasionally there is a "cut" (like in a movie) to another scene, to show something important going on at the same time. Controlling Zak is simplicity itself. The mouse pointer is used for everything. To get Zak to walk somewhere, simply place the mouse pointer where you want Zak to go, and press

**WESTERN GAMES** \$34.95

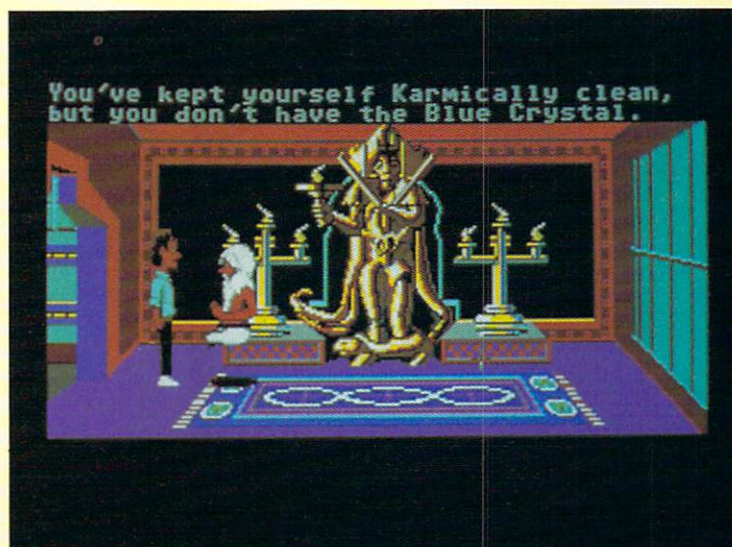
DigiTek Software, 8910 North Dale Mabry, Executive Center Suite 37, Tampa, FL 33614. (813) 933-8023. ■

CIRCLE 215 ON READER SERVICE CARD

## Zak McKracken

Lucasfilm's **Zak McKracken and the Alien Mind Benders** is a tongue-in-cheek animated graphic adventure that's easy to operate, full of fun and very forgiving.

Zak is a reporter for one of those sleazy newspapers you see at the checkout counter. But lately he's been having dreams about aliens who are using the phone company to cause the inhabitants of Earth to be-







# THE SOFTWARE SHOP

## International Showcase

### for

## Products in the AMIGA Marketplace

### HARDDRIVES AND HARDCARDS SPECIAL

Quantum 40mg 11ms	\$599.00	w/MB Hardframe 2000	\$759.00
Quantum 80mg 11ms	\$899.00	w/MB Hardframe 2000	\$1159.00
32mg 3.5 SCSI 40ms A2000	415.00	w/Hardframe 2000	670.00
20mg 3.5 SCSI 65ms A2000	279.00	w/Hardframe 2000	519.00
48mg 3.5 SCSI 28ms A2000	599.00	w/Hardframe 2000	799.00
48mg 3.5 SCSI 40ms A2000	549.00	w/Hardframe 2000	669.00
42mg 5.25 SCSI 40ms A2000	465.00		
63mg 5.25 SCSI 40ms A2000	515.00		
GVP Hardcard 45mg 40ms	799.00		
GVP Hardcard 80mg 11ms	799.00		
GVP Hardcard 80mg 11ms	1189.00		
20mg Prog. Periph. A500	599.00		
20mg Prog. Periph. A1000	599.00		
GVP Controller 1mg OK	275.00		
GVP Controller 2mg OK	299.00		
MB Hardframe 2000	265.00		
Overdrive Controller	175.00		
Supra Controller A2000	219.00		
2009A Controller A2000	325.00		
CLTD Controller A2000	185.00		

### Fonts

Calligrapher	\$65.00
Fancy 3d fonts	57.00
Font set I	24.00
Inter font	79.00
Kara fonts color	53.00
Lion fonts	57.00
Masterpiece fonts	165.00
News letter fonts	32.00
Studio font	32.00
3-Demon	71.00

### COMMUNICATIONS

Atreides profess. BBS	99.00
BBS pc	99.00
Digi	49.00
Online	45.00
Analytic art	40.00

### ACCESSORIES

A-B Switch cable	\$32.00
A/B/C/D Switchbox	65.00
Amiga mouse	79.00
Copy Stand	65.00
Ecc Midi 1000	52.00
Ecc Midi 500 2000	52.00
Epyx 500X	18.00
Ergo Joystick	18.00
Flicker Master	14.00
Gender changer	24.00
Gravis Joystick	39.00
MD120 3.5 Disk holder	35.00
MD60 disk holder	28.00
MD64 disk holder	31.00
Modem cable A1000	17.00
Modem cable A2000/500	17.00
Monitor stand w/outlets	60.00
Mouse holder	6.50
Mouse master	30.00
Mouse pad	9.00
Multisync cable 1-102M/F	20.00
Okimate black ribbon	5.00
Okimate color ribbon	9.00
Phaser gun	49.00
Power strip 6 outlets	17.00
Printer cable 2000/500	17.00
Printer cable A1000	17.00
Quick shot Joystick	15.00
Stick stick	8.00
Star NX black ribbon	8.00
Star NX color ribbon	12.00
Time saver	65.00
Trackball 1button	2.00
Trackball 2button/mouse	42.00
Video mt. A500	65.00
Xerox 4020 fluid	28.00
Xerox 4020 500 sheet	28.00
Xerox 4020 ink	30.00

### ACCOUNTING

BEST Accounting	\$310.00
Best general ledger	75.00
Financial plus	189.00
Investor advantage	65.00
Mamiga ledger	59.00
Micro lawyer	40.00
Nimbus record keeper	99.00
The Accountant	179.00

### CAD SYSTEM

Draw 2000	\$179.00
Home builder cad	129.00
Home builder choice	55.00
Intro cad	52.00
Logic works	65.00
X-Cad system	385.00

### A500/A2000/A2500 ACCESSORIES

A1010 drive 3.5 extnl	\$199.00
A10845 stereo monitor	325.00
A2000 HD 40mg 28ms w/out	call
A2058 2mg 8mg ram board	679.00
A20620/2mg 32bit	1449.00
A20620/4mg 32bit Mem	2169.00
A2090A HD controller	325.00
A2300 Genlock	325.00
A2500 HD40mg 28ms	call
68020 68881	call
Amiga 2000 Cpu	call
Amiga 500 CPU	call
Bridge card A2000	569.00
Memory expansion 512K A500	175.00
Atalk III	69.00

### HOME ACCOUNTING

Money mentor	\$69.00
Phaser	69.00

### GRAPHICS & VIDEO

Animate 3-D	\$100.00
Animate 4D	439.00
Animation editor	40.00
Animation effects	35.00
Animation Flipper	35.00
Animation multiplane	65.00
Animation stand	35.00
Animation w/mages	92.00
Animator apprentices	179.00
Animation	69.00
Architectural design	25.00
Art gallery I	22.00
Art gallery II	22.00
Art pak I	22.00
Art parts I	22.00
Art parts II	22.00
Art parts III	22.00
Art parts IV	22.00
Art parts V	22.00
Art parts VI	22.00
Art parts VII	22.00
Art parts VIII	22.00
Art parts IX	22.00
Art parts X	22.00
Art parts XI	22.00
Art parts XII	22.00
Art parts XIII	22.00
Art parts XIV	22.00
Art parts XV	22.00
Art parts XVI	22.00
Art parts XVII	22.00
Art parts XVIII	22.00
Art parts XIX	22.00
Art parts XX	22.00
Art parts XXI	22.00
Art parts XXII	22.00
Art parts XXIII	22.00
Art parts XXIV	22.00
Art parts XXV	22.00
Art parts XXVI	22.00
Art parts XXVII	22.00
Art parts XXVIII	22.00
Art parts XXIX	22.00
Art parts XXX	22.00

### CREATIVE PRODUCTIVITY

Gizmoz enhanced	\$45.00
Intellitype	35.00
Magellan	129.00
Master type	30.00
Mavis beacon typing	35.00
Typing tutor	30.00
Your family tree	34.00
Acquisition	199.00

### DATABASE MANAGEMENT

Data retrieve	\$52.00
Data retrieve Pro	199.00
Micro base	26.00
Micro fiche filer	65.00
Microfiche filer plus	123.00
Organize	55.00
Super base	99.00
Superbase plus II	99.00
Superbase Pro. 3.0	229.00

### DISKETTES

Fuji 3.5" ds/d color disks	\$22.00
Sony 3.5" ds/d	21.00
TDK 3.5" ds/d disks	21.00
Cen-tech 3.5" ds/d disks	21.00

### DESKTOP PUBLISHING

Citydesk	\$99.00
Citydesk companion	20.00
Citydesk companion II	20.00
Page setter	99.00
Professional page	259.00
Publisher plus	69.00
Shakespeare	139.00

### EDUCATIONS

Adventure of sinbad	\$33.00
Aesop's fables	33.00
All about America	38.00
Animal kingdom	33.00
Decimal dungeon	33.00
Discovery game math	29.00
Discovery game spell	35.00
First shapes	35.00
Fraction action	33.00
Grade manager	59.00
Great states	28.00
Kid Talk	35.00
Kindergarten	33.00
Learning curve	53.00
Link word French	22.00
Link word German	22.00
Link word Italian	22.00
Link word Russian	22.00
Link word Spanish	22.00
Math talk	35.00
Math talk fraction	35.00
Math wizard	33.00
Perfect score	53.00
Quiz master	53.00
Read & rhyme	33.00
Read-a-rama	33.00
Spell bee	35.00
Tales from Arabia	33.00
Wordmaster	33.00
4th and Inches	33.00

### HARDWARES

8Up Memory Exp. A2000	\$175.00
Accelerator	155.00
Air drive 3.5 external	179.00
Amgen	154.00
Color splitter	79.00
Easy A1000	399.00
Easy A2000	385.00
Easy A500	359.00
Flexible data drive	145.00
Flicker fixer	489.00
Framegrabber	535.00
Future sound	139.00
Internal 3.5drive A2000	99.00
Live framegrabber A1000	279.00
Live framegrabber A500	315.00
MC68881 Math Co-processor	199.00
Multifunction card	89.00
Perfect sound A1000	69.00
Perfect sound A500/A2000	69.00
Pop sims 2k 2pair	85.00
Pro ram 2000 2mg 2/4/6/8mg	699.00
Progen	369.00
Star board 2mg populated	1095.00
Starboard A1000 512K	499.00
Subsystem A500	210.00
Super Gen	695.00
Super mod 2400b	155.00
W11410 Panasonic Camera	211.00

### ENTERTAINMENT

4x4 off road race	\$35.00
Aaargh	27.00
Alien fires	29.00
Alternate reality	29.00
Andromeda	33.00
Annals of Rome	30.00
Azarak's tomb	29.00
Akanoid	22.00
Auto duel	29.00
Awesome arcade	34.00
Balance of power	35.00
Barbarian	29.00
Bard's tale	35.00
Bard's tale II	42.00
Battle chess	35.00
Battleship	22.00
Better dead than alien	27.00
Bionic command	30.00
Black cauldron	29.00
Black jack academy	29.00
Black shadow	27.00
Blackjack	17.00
Breach	29.00
Bridge 5.0	22.00
Buttle ghost	28.00
California games	29.00
Capone	29.00
Captain blood	35.00
Carrier command	33.00
Casino fever	29.00
Center quest	29.00
Championship baseball	29.00
Championship basketball	29.00
Championship football	29.00
Charon 5	27.00
Chess master 2000	35.00
Choro quest	34.00
Corruption	31.00
Cosmic relief	27.00
Crazy cars	29.00
Dark castle	29.00
Dark sword	18.00
Defcon 5	29.00
Defender of the crown	34.00
Deja vu	34.00
Destroyer	29.00
Dragons lair	42.00
Dungeon master	35.00
Earl weaver	35.00
Ebonstar	27.00
Empire	35.00
Fairy tale adv.	33.00
Falcon F-16	35.00
Fantavision	29.00
Ferrari formula one	35.00
Ferrari assault	33.00

Fire n forget	29.00
Fire power	18.00
Flight simulator	35.00
Flight path 737	18.00
Footman	20.00
Foundations waste	27.00
Frost byte	42.00
Galactic invasion	17.00
Galileo II	43.00
Garrison	33.00
Garrison II	33.00
Gettysburg	42.00
Gold runner	25.00
Golden path	30.00
Grand prix	18.00
Grand slam tennis	33.00
Grid start	18.00
Guild of thieves	30.00
Hard ball	30.00
Harrier combat sim	33.00
Head coach	33.00
Heroes of the lance	30.00
Hole in one mini golf	29.00
Hollywood poker	24.00
Hunt for Red October	30.00
Hybris	29.00
Impossible mission II	33.00
Indoor sports	33.00
Insanity fight	29.00
Interceptor F-18	35.00
Internt soccer	29.00
Into the eagles nest	29.00
Jet	36.00
Jimbo	29.00
Joker poker	33.00
Kamflgruppe	39.00
Karate kid II	29.00
Kikugi	22.00
King of Chicago	33.00
King quest	35.00
King quest II	35.00
King quest III	35.00
Knightrc	30.00
Leather neck	29.00
Leisure Suit Larry	29.00
Major melon	29.00
Maniax	19.00
Marble madness	35.00
Menace	22.00
Mission con-bat	34.00
Oblietator	29.00
Off shore warrior	29.00
Operation cleanstr	29.00
P.O.W.	30.00
Sex vikens	29.00
Shadow gate	29.00
Shanghai	29.00
Silent service	29.00

Sinbad	33.00
Sky chase	29.00
Skyfox II	29.00
Slay gun	29.00
Sorcerer lord	27.00
Space cutter	22.00
Space quest	35.00
Stars	30.00
Reel Fish'n	32.00
Road raiders	30.00
Road war 2000	29.00
Roadwar Europa	29.00
Robbery	18.00
Rocket ranger	33.00
Sargon III	33.00
Scenery disk 11	19.00
Scenery disk 12	19.00
Scenery disk Europe	19.00
Scenery disk Japan	19.00
Second out	22.00
Space quest II	35.00
Space racer	22.00
Space station oblivion	35.00
Starfield	39.00
Starglider II	34.00
Stellar conflict	29.00
Streets basketball	15.00
Strip poker	29.00
Sub battle	34.00
Summer challenge	15.00
Super star hockey	33.00
Sword of sodan	34.00
Tanglewood	29.00
Technopop	34.00
Tele-epic	30.00
Telegames	23.00
Televius II	30.00
Terrorpods	29.00
Test drive	33.00
Tetra quest	29.00
Tetris	27.00
The Pawn	25.00
Tracers	27.00
Tv Sports football	35.00
Ultima III	29.00
Ultima IV	42.00
Uninvited	33.00
Universal military sim	35.00
Vampire empire	29.00
Video Vegas	25.00
W.C. Leaderboard	32.00
Warlock	27.00
Wayne Gretzky hockey	27.00
Winter challenge	28.00
X-specs 3d	99.00
Zak McKracken	32.00
Zoo gravity	22.00
Zynapse	27.00
Asha's fonts	57.00

### SUPER SPECIALS

DIGI-VIEW Gold or 3.0. W11410 Camera w/lens	\$339.00
DIGI-VIEW Gold or 3.0. W11410 Camera w/lens & stand	\$339.00
Perfect Vision w/color Splitter	260.00
W11410 Camera w/lens	210.00

### PRINTERS

Alps Allegro 24 PIN	\$425.00
Okimate 20 color prt	145.00
Plug'n print	85.00
Star nx rainbow	26.00
Xerox 4020 ink jet	150.00
Xerox 4020 starter kit	49.00

### SOUND & MUSICS

4-op deluxe	\$99.00
Audio master	39.00
Audio master II	69.00
Back songbook	20.00
Copyist II	185.00
D-50	99.00
Deluxe music	69.00
Dr drums	20.00
Dr keys	20.00
Dr T's Keyboard	169.00
Dynamic drums	53.00
Dynamic studio	129.00
Hot cool jazz	21.00
Hot licks	34.00
Instant music	35.00
Matrix 6	99.00
Mid Magic	99.00
Mt-32	59.00
Pro sound designer	134.00
Promidi studio	134.00
Rock & roll	22.00
Sonix	53.00
Sound sampler	80.00
Studio magic	69.00
Synthia	59.00
Texture Haicall	35.00
Maxipian 500	99.00
Maxipian plus	129.00
VIP Professional	69.00

### UTILITIES

B A D disk optimizer .	\$35.
C.B. Tree	69.
Cynused Professional	69.
Disk 2 disk	35.
Disk master	35.
Dos 1.3	24.
Dos 2 dos	39.
Doug's math aquarium	55.
Encore	35.
File backup	35.
Facc II	25.
Fine print	35.
Gold spell	32.
Gomf	24.
29.00Grabbit	24.
Laser script	30.
Laser up fonts	30.
Laser up plot	30.
Laser up print	62.
Laser up utilities	30.
Lot preferences	15.
Nag Plus Schedule Assist	55.
Pro script	35.
Quarterback	47.
Raw copy 1.3	41.
Superback	55.
Texted plus	52.
V.I.P.	35.



Even after causing all kinds of trouble during the flight and constantly being chastised by the cabin attendant, she still tells him what a joy it was to have him on the flight.

Another unusual feature about this game is that you must mindlink and control four different people. You won't be able to solve the puzzle without using them all. Especially valuable is Annie, from the Society of Ancient Wisdom, who not only shows Zak how to build the machine which will thwart the aliens, but knows how to read ancient writings—a handy trait to have around.

Interestingly, three of the four characters (the smartest, too—Zak is no rocket scientist) are women. Zak can also briefly mindlink with animals, who can go where humans can't—another handy feature. But watch out, because if you stay linked too long, the aliens show up for another "stupidity treatment." Its actually worth seeing this treatment, which doesn't seem to do any permanent harm. As Zak loses his mind, his verbs disappear, one by one, until the only thing he can do is wander aimlessly until the words return.

Zak McCracken is a fairly complex adventure to solve. There are challenging mazes, tricky puzzles and many widely separated places to collect the clues and artifacts necessary for your plans. Retracing your steps to pick up something you missed will be a common occurrence. But the game is incredibly forgiving and it is actually hard to get killed. Almost none of the actions in the game are fatal, although some require extra efforts to extricate yourself from (as they should). Also, since you command four characters with different personalities, you can send someone else to do something for Zak. Try getting Melissa to pick up the Broom alien.

There doesn't seem to be any overall time constraint. You can take as long as you need and retrace your steps whenever necessary. In some places, you must execute a series of commands quickly, but these instances are limited.

The graphics are colorful although the animation is a bit crude. When Zak pulls on a switch, he doesn't actually reach up. He just stands in front of the switch and it pulls itself. The game also includes stereo sound such as jet engines, footsteps, and gas hissing. Nothing very special, but a nice touch nonetheless. A sample sleazy newspaper full of hints is part of the package.

Almost unbelievably in this day and age, the game disks are virtually unprotected. Zak McCracken runs from backups and can be installed on a hard disk. When you attempt an international flight, you must punch in five symbols from a dark red, non-photocopy sheet in the package, but this is a small price to pay.

Overall, Zak McCracken and the Alien Mind Benders is enjoyable to play. The humor, strange situations, and the fact that you don't die every two minutes reduces the frustration level that often accompanies adventure games. If you like adventure games that challenge you without being overly frustrating, check out Zak and you won't be disappointed.

#### **ZAK MCCRACKEN** \$44.95

Lucasfilm Games, P.O. Box 10307, San Rafael, CA 94912. (415) 662-1902. ■

CIRCLE 216 ON READER SERVICE CARD

### **Menace**

Psygnosis established its name in the Amiga community with highly detailed graphic fighting games including Barbarian, Obliterator and Terrorpods. Now the company is issuing arcade-style games under the Psyclipse label and its first release is a Defender adaptation titled **Menace**.

In this game, Draconia is the home base for six evil beings intent on taking over the entire galaxy. Instead of sending a whole fleet of ships to destroy this "Menace," just a lone ship is sent—yours, of course!

As you move through six levels, aliens attack you in various patterns. When an alien collides with your ship, it drains some of your shield strength. Enough hits and the galaxy

is doomed. If you're lucky enough to shoot every ship in the attack formation, a metal block will appear and move quickly to the left side of the screen. If you catch it, you can get anything from bonus points to extra shield strength. These extra weapons help even the overwhelming odds.

At the end of each level is one of the six evil beings to be destroyed, before you can go on to the next level. The "being" must be shot many times and this is very hard, because it is shooting at you the whole time and the shots are hard to dodge.

The graphics are fair and the sound effects fit the game, but I noticed that the scrolling scenery, attack formations and ships repeated many times during each level. Also, your extra weapons can run out after a while, which makes the game considerably more frustrating. But if you are a die-hard Defender fan, Menace still might appeal to you.—TONY BARNES

#### **MENACE** \$29.95

Psygnosis Ltd., distributed by Computer Software Services, 2150 Executive Drive, Addison, IL 60101. (312) 620-4444. ■

CIRCLE 213 ON READER SERVICE CARD

### **Final Mission**

**Final Mission** is basically a variation on the search, collect and survive theme, like Donkey Kong, Pac Man, and dozens less memorable. But this game offers a fine blend of action and challenge, delivered with a level of sophistication not seen in many commercial arcade games. You'll be running for your life in a dazed and frantic chase where dangers lie around every corner and down every chute or ladder.

There are nine levels to the game, and seemingly countless screens on each level. Invulnerable to falls that would cripple Donkey Kong, you'll find yourself plunging through two or three screens, suddenly landing in uncharted territory. Dropping through chutes shortens your lifeline. Stepping on a mine or falling on a skull eliminates you completely. Picking up hearts increases your lifeline,



while capturing a Psionic-biodynamic energy being adds an additional life.

Final Mission is frustrating and unforgiving. For instance, it could take days to learn the layout of a given level. Abundant dead-end traps increase the frustration. You'll find yourself sitting by and helplessly watching as each of your remaining lives are snuffed.

Technically brilliant, the program has state-of-the-art sound and graphics rivaling the best arcade games I've ever played. Joystick control is precise, the display layout logical and well thought out. Despite all odds, Final Mission makes an over-worked arcade theme seem fresh again. Give me a few more like this and I may never leave my home again.—STEVE PANAK

**FINAL MISSION** \$29.95

DigiTek Software, 8910 North Dale Mabry, Executive Center, Suite 37, Tampa, FL 33614. (813) 933-8023. ■

CIRCLE 214 ON READER SERVICE CARD



Get an answer fast:

**Call:**

(415) 372-6002

**Write:**

AMIGA Plus

Customer Service

P.O. Box 1569

Martinez, CA 94553.

## ABSOLUTELY THE BEST PRICES!

**We Believe We Have the Best Prices in the Country!  
CHECK OUR COMPETITION...Then Call Us!**

### GRAPHICS & VIDEO

<b>DIGIVIEW 3.0</b> .....	<b>\$128</b>	<b>PANASONIC WV1410</b> .....	<b>185</b>
DIGIDROID.....	62	C-VIEW.....	36
16mm LENS FIXED IRIS.....	Call	AMIGA LIGHT PEN.....	89
16mm LENS VAR. IRIS.....	Call	VI500 VIDEO INTERFACE.....	59
COPY STAND.....	55	EASYL 500/1000/2000.....	from 299
PRO GEN.....	379	FLICKER FIXER.....	470
GEN 1.....	670	PERFECT VISION.....	168
SUPER GEN.....	670	ELEC. COLOR SPLTR.....	74
AMIGEN.....	149	LIVE 500.....	280
AMIGA GENLOCK 1300.....	150	LIVE 1000.....	228
FRAME GRABBER.....	520	LIVE 2000.....	329
MAGNI GENLOCK.....	Call	AUTO DROID.....	\$50
BOING MOUSE.....	\$100	X-SPECS 3D GLASSES.....	\$95
MY-T MOUSE.....	\$42		

### ★ BEST MONITOR & DISK PRICING

#### MONITORS

<b>AMIGA 1084Sd</b> .....	<b>\$300</b>
MAGNAVOX 515.....	268
EGA's.....	CALL

#### DISKS

<b>GENERIC 3.5 DS/DD</b> .....	<b>\$1.00(100)</b>
3.5 DS/DD SONY-FUJI-MAXELL-3M-TDK.....	18
GENERIC 5.25 DS/DD.....	\$25(200)
GENERIC 3.5 color.....	\$1.50(30)

**OR LESS!!**

### ★ BEST MODEM & DRIVE PRICING

#### MODEMS

<b>SUPRA 2400</b> .....	<b>\$138*</b>
AVATEX 2400.....	148*
AVATEX 1200E.....	70*
AVATEX 1200HC.....	90*
MINI MODEMS.....	From 79
*W/Cable Purchase Add \$10 Alone	

#### DISK DRIVES

<b>PHOENIX 3.5 EXT</b> .....	<b>135</b>
<b>FLEX DATA-3.5 EXT</b> .....	<b>\$138</b>
MASTER 3A 3.5 EXT.....	150
3.5 DUAL DRIVES.....	from 250
PHOENIX 3.5 INT.....	130
UNI-DRIVE.....	Call

**OR LESS!!**

**OR LESS!!**

### ★ BEST RAM EXPANSION PRICING

#### RAM EXPANSION

<b>512K OK</b> .....	<b>\$60</b>	<b>Minimeg 500/1000 OK</b> .....	<b>160</b>
512K POPULATED.....	from 160	EXP1000 1mg POP.....	New Low Price
256K CHIPS(1mg).....	350	PRORAM 2000 8MG/OK.....	248
1 MG CHIPS(1mg).....	from 280	AMIGA 2058 8MG/2MG.....	678
HARDFRAME.....	238	INSIDER 1000 OK.....	180
SUBSYSTEM 500.....	210	INBOARD 500/1000 OK.....	238
SUBSYSTEM w/3.5 Drive.....	360	INBOARD 500/1000 512K.....	Call
STARBOARD 2 500/1000 OK.....	235	INBOARD 500/1000 1mg.....	Call
STARBOARD 2 w/512K.....	Call	INBOARD 500/1000 1.5mg.....	Call
STARBOARD 2 w/1mg.....	Call	C LTD AMEGA OK.....	248
STARBOARD SB2000 ADAPTER.....	45	Mega Board 2000 (2mg).....	545
STARBOARD 2 UPPER DECK.....	Call	Mega Board 2000 (1mg).....	455
EIGHT-UP BOARD 2000.....	Call	Proram 2000 (2mg).....	640
EXP1000 1mg OK.....	209	Inboard (2 mg).....	Call
<b>OR LESS!!</b>		Minimeg (500/1000)512K to 2 mg.....	Call
		Bill's Boards-Bussespander.....	Call

### ★ BEST PRINTER PRICING

#### PRINTERS

<b>STAR RAINBOW</b> .....	<b>219*</b>
STAR NX1000.....	170*
STAR NB2410.....	400*
STAR NX2400.....	310*
PANASONIC 1180.....	New Low Price

<b>OKIMATE 20w/PNP</b> .....	<b>180*</b>
PANASONIC 1191.....	Call
PANASONIC 1124.....	319*
PANASONIC LASER.....	\$1500*
*w/2 Ribbon Purchase Add \$10 Alone	

**Or LESS!!**

### ★ BEST BOARD/CONTROLLER/HARD DRIVE PRICING

#### BOARDS/CONTROLLERS

<b>I.V.S. Trump Card</b> .....	<b>158</b>
C LTD Amiga Cont.....	New Low Price
Phoenix Amiga HD Cont.....	Special Price
Supra SCSI 500/1000 Card.....	from 185
Microbotics SCSI.....	Call
C LTD SCSI 1000.....	210
Supra 2000 DMA.....	218
Impact SCSI 1mg OK.....	270
Impact SCSI 2mg OK.....	295
Impact SCSI 512K Populated.....	Call
Impact SCSI 1mg Populated.....	Call
GVP 500/20mg/Ram/Subsystem.....	695
Overdrive HD Controller.....	198
Starboard 2 SCSI Module.....	95
TrumpCard 500.....	Special
Midget Racer 68020.....	Special
Vidtech Scanlock.....	Special

#### HARD DRIVES

<b>Phoenix 22 mg(500/1000)</b> .....	<b>\$540</b>
Phoenix 32 mg(500/1000).....	Call
Phoenix 48 mg(500/1000).....	\$800
Seagate SCSI 20mg/3.5.....	330
Seagate SCSI 30mg/3.5.....	420
Seagate SCSI 48mg/3.5.....	560
Seagate SCSI 65mg/5.25.....	515
Exp Tech 32mg 500/1000.....	from 725
Exp Tech 48mg 500/1000.....	from 850
Supra 20 mg 500/1000/2000.....	from 699
Supra 30 mg 500/1000/2000.....	from 729
Supra 60 mg 500/1000/2000.....	from 1299
CLTD 33mg 500/1000/2000.....	from 819
CLTD 44mg 500/1000/2000.....	from 819
CLTD 50mg 500/1000/2000.....	from 929
GVP 2000/40mg 11ms.....	780
GVP 2000/80mg.....	1150
Impact 30mg.....	550
Overdrive 30 mg.....	640
Overdrive 50mg.....	780
Phoenix Subsystems.....	Call
The Vault.....	Super prices!

#### EXPANSION CHASSIS

Phoenix-A1000.....	\$160
Phoenix-A100 W/Power.....	\$220
Phoenix-A500.....	\$160
Phoenix-A500 W/Power.....	\$220

**OR LESS!!**

CIRCLE 017 ON READER SERVICE CARD



# WE SELL THE BEST - FOR LESS!

## ★ TOP 50 SELLERS

<b>ABACUS</b> Amiga Dos Tool Kit \$36 Assempro \$60 Becker Text \$90 Data Retrieve \$48 Pro Data Retrieve \$177 Text Pro \$48 <b>ABACUS BOOKS</b> Disk Drives Inside/Out \$27 Amiga Tricks & Tips \$24 Amiga C \$24 Amiga Dos Inside/Out \$18 Amiga Machine Lang \$18 Amiga C for Beginners \$15 Amiga Sysprog Guide \$33 Amiga Basic Inside/Out \$23 Amiga for Beginners \$15 Amiga 3D Graphics \$18 More Tricks & Tips \$18 <b>ABSOFT</b> AC/Basic 1.3 \$117 AC/Fortran \$180 <b>ACCESS</b> Echelon \$27 Heavy Metal Land Combat \$27 Leader Board Dual Pk \$12 Tournament Disk \$27 World C's Lr Board \$12 <b>ACTIONWARE</b> Capone \$24 Phaser Gun \$46 P.O.W. \$24 <b>ACCOLADE</b> Fugitive Ghost \$21 Famous Courses Vol 2 \$12 Fight Night \$27 4th and Inches \$27 Hard Ball \$27 Jack Nicholas Golf \$30 Mean 18 \$27 Mini Putt \$27 Pinball Wizard \$27 Team Construction disk \$9 Test Drive \$27 Test Drive II \$27 <b>ACTIVISION</b> Battletech \$30 Game \$30 Basketball \$30 Game \$30 Golf \$30 Game \$30 Football \$30 Infocom Titles \$40% Off Shanghai \$24 <b>ADDISON-WESLEY</b> Hardware Manual \$20 Intuition Manual \$20 Rom Kernel Manual \$24 Rom Manual Exec \$16 Includes & Audio Docs \$11 <b>AEGIS</b> Animator/Images \$60 AniMagic \$60 Audiomaster 2.0 \$60 Diga \$48 Draw 2000 \$168 Lights Camera Action \$48 Modeler 3D \$48 Ports of Call \$30 Sonix \$48 Videoscape 3D 2.0 \$120 Video Titrer \$90 <b>AMIGA</b> 13 Enhancer \$20 <b>ANTIC</b> Architectural Design \$21 Future Design \$21 GFA Basic \$21 Human Design \$21 Microbot Design \$21 Pioneer Plaque \$24 Phasar 3.0 \$60 Zoetrope \$84 Crash Garrett \$24 Bobo \$21 <b>AROCK COMPUTER SOFTWARE</b> Masterpiece Pro Fonts \$150 <b>ARTWORX</b> Bridge 5.0 \$21 Centerfold Squares \$18 Linkword Languages \$18 Strip Poker 2 \$24 Strip Pkr Data #4 \$12 Strip Pkr Data #5 \$12 <b>ASDG</b> FACC II \$21 Cygnus Ed \$60 <b>AVANTE GARDE</b> Benchmark Module 2 \$120 <b>BAUDVILLE</b> Award Maker Plus \$30 Sports Library \$18 Education Library \$18 <b>B.E.S.T.</b> Business Mgmt. \$290 General Ledger \$117 <b>BETHESDA</b> Wayne Gretzky Hockey \$30 <b>BRODERBUND</b> Downhill Challenge \$18 Fantavision \$36 Sky Chase \$24 Star Wars \$24 Operation Clean Streets \$24 Space Racer \$18 <b>BROWN WAGH</b> Express Paint 3.0 \$84 Midi Major \$60 Publisher Plus \$60 TV Show \$60 Word Flex \$60 Zuma Fonts (1-4) \$24 Zuma Fonts 4pk(1-4) \$60 Pen Pal \$117 Midi Magic \$180 <b>BUENA VISTA</b> Roger Rabbit \$27 <b>BYTE BY BYTE</b> Sculpt 3-D \$95 Sculpt/Animate 4D \$390 Sculpt/Animate Jr. \$30 Sculpt/Animate Pro \$30 3D Cookbook \$20 Tate Fonts 1 \$42 Tate Fonts 2 \$42 <b>CAPCOM</b> Bionic Commando \$24 <b>CAPILANO</b> Logic Works \$60 <b>CENTAUR SOFTWARE</b> Forms in Flight II \$72 B.A.D. \$30 My Paint \$30 Pro Net \$30 Pro-Board \$30 Midi-Vu \$30 <b>CENTRAL COAST</b> Disk to Disk \$30 DOS 2 DOS \$33 Quarterback \$42 Quarterback tools \$48 <b>CINEMAWARE</b> King of Chicago \$18 Lords of Rising Sun \$30 Rocket Ranger \$18 S.D.I. \$18 Sinbad \$430 3 Sluggos \$430 Defender of the Crown \$30 T.V. Sports Football \$30 <b>COMMAND SIMULATIONS</b> Blitzkrieg \$30 <b>DATA EAST</b> Platoon \$30 <b>DESIGN LABS</b> Fine Print \$30 <b>DIGITAL CREATIONS</b> Gizmos 2.0 \$48 <b>DIGITAL SOLUTIONS</b> LPD Writer \$42 <b>DIGITEK</b> Amegas \$21 Drum Studio \$30 Extra Courses \$12 Chess \$21 Hole 1 Mini Golf \$21 Power Styx \$21 Vampires Empire \$27 Western Games \$21 Hollywood Poker \$21 <b>DISCOVERY</b> Arkanoid \$20 Better Dead/Alien \$21 Hybris \$18 Gabyris \$24 S.W.O.R.D. \$24 Sword of Sodan \$30 Zoom \$18 <b>DISK CO.</b> Critics Choice \$150 Publishers Choice \$120 Superback \$48 Kind Words 2.0 \$60 Pagesetter 1.2 \$30 Headline Font Pack \$30 Artists Choice \$30 <b>DR. T MUSIC SOFTWARE</b> Copyist 1 \$60 Copyist 2 \$150 Copyist 3 \$240 K.C.S. \$150 Midi Recording Studio \$42 <b>EASEWARE</b> Home Builders Cad \$120 Home Builders Ch \$49 Home Builders Print \$49 <b>ELAN DESIGN</b> Invision \$120 Performer \$36 <b>ELECTRONIC ARTS</b> AARGH \$23 Alternate City(city) \$26 Awesome Arcade Pk. \$32 Bard's Tale \$32 Battle Droid \$26 Black Cauldron \$23 ChessMaster 2000 \$29 Commissioners Disk \$29 Cosmic Relief \$29 Deluxe Music \$62 Deluxe Paint III \$92 Deluxe Paint II \$80 Deluxe Photo Lab \$92 Deluxe Print II \$122 Deluxe Video 1 2 \$32 Double Dragon \$26 Earl Weaver \$32 Empire \$32 FA/18 Interceptor \$32 Ferrari Formula 1 \$32 Intellitype \$32 King's Quest \$32 Life and Death \$29 Lounge Lizards \$32 Marble Madness \$32 Master Ninja \$26 Mavis Beacon \$29 Monopoly \$29 Mother Goose \$32 Power Play Hockey \$32 Pub Games \$32 Return to Atlantis \$32 Road Wars \$32 Rockford \$23 Rubican Alliance \$32 Scrabble \$32 Skyfox 2 \$24 Skyfox \$32 Space Quest \$32 Starflight 1 \$35 Wizard Wars \$26 Reach for the Stars \$26 World Tour Golf \$26 Zany Golf \$26 <b>EMERALD INTELLIGENCE</b> Magellan \$117 <b>EPYX</b> California Games \$20 BattleShip \$24 Death Sword \$12 Destroyer \$30 Dive Bomber \$24 Final Assault \$24 Games Winter Edition \$20 Impossible Mission 2 \$20 Street Cat \$15 Street Sport Basketball \$24 Sub Battle \$20 Summer Games \$24 Technopop \$30 Trials of Horror \$20 Winter Games \$20 World Games \$20 4x4 Road Racing \$20 Space Station Oblivion \$30 <b>FIRST BYTE</b> First Letters & Words \$26 First Shapes \$26 Kid Talk \$26 Math Talk \$26 Math Talk Fractions \$26 Smoothtalker \$26 Speller Bee \$26 <b>FIRST ROW</b> Prime Time \$26 Twilight Zone \$26 Homemooons \$26 <b>FREE SPIRIT</b> Securities Analyst \$48 Sex Vixens from Space \$24 <b>FTL</b> Chaos Strikes Back \$18 Dungeon Master \$24 <b>FULLER COMPUTER</b> Project D \$30 <b>GOLD DISK</b> Color Separator \$42 Desk Top Budget \$42 Design 3D \$60 Comic Setter \$60 Font Set 1 \$25 Funny Data \$21 Goldspelt 2 \$27 Laser Script \$27 Movie Setter \$60 Page Setter \$90 Pg. Setter Prof 1.2 \$240 Prof Color Separatr \$117 Prof Draw \$120 <b>GRAMMA SOFTWARE</b> NAG \$48 <b>HASH</b> Animator Apren 3.2 \$177 Animator Editor \$36 Animator Effects \$36 Animator Flipper \$36 Animator Libraries \$36 Animator Multipane \$54 Animator Rotoscope \$48 Animator Stand \$30 Animator Jr. \$24 <b>HYPERTEC</b> GOMI 3.0 \$48 GOMI Button \$27 <b>IMPLUSE</b> Turbo Silver \$120 <b>INFINITY</b> Galileo II \$42 Shakespeare \$135 <b>INNOVATION</b> Broadcast Titrer \$180 Video Effects 3D \$120 <b>INOVATRONICS</b> Power Windows 2.5 \$54 <b>INTERACTIVE SOFTWARES</b> Calligraph W/Fnt Mvr \$78 Lion Fonts \$36 Newsletter Fonts \$18 Studio Fonts \$21 <b>INTERPLAY</b> Battle Chess \$30 Chess \$30 Neomancer \$24 <b>JDK IMAGES</b> Font Library 1 \$65 Font Library 2 \$65 Pro Video CGI \$120 Pro Video Plus \$180 <b>KARA</b> Kara Fonts \$48 <b>KFS</b> Accountant \$180 <b>KING SOFT</b> Emerald Mines II \$24 <b>KONAMI</b> Contra \$24 Rush-N-Attack \$24 <b>LATTICE</b> Compiler Companion \$80 Lattice 5.0 \$180 Lattice C Plus \$30 <b>MANX</b> Aztec C Developers \$195 Aztec C Professional \$130 Library Sources \$180 Source Level Debugger \$49 <b>MASTERTRONIC</b> Feud \$15 Ninja Mission \$15 Space Ranger \$15 <b>MELBOURNE HOUSE</b> War in Middle Earth \$30 Magic Johnson B-ball \$30 <b>METACOMCO</b> Macro Assembler \$60 Pascal 2.0 \$78 Shell \$42 Toolkit \$30 <b>MICRO DEAL</b> 4 Player Adapt \$30 Major Motion \$24 International Soccer \$24 Tetra Quest \$24 Zero Gravity \$30 <b>MICROILLUSIONS</b> Black Jack Academy \$24 Craps Academy \$24 Data Disks \$12 Discovery Mathor Spell \$24 Dungeon Construction \$24 Fairy Tale \$30 Main Frame \$24 Photo Vid Cel Animator \$90 Photo Vid Trans Conf. \$180 Romantic Encounters \$24 Shrine Demon Soul \$180 Music X \$180 Photon Paint II \$90 Photon Paint Expansion \$30 Planetarium \$30 <b>MICROMASTER</b> Our Family Tree \$30 <b>MICROPROSE</b> Gunship \$33 Silent Service \$24 <b>MICROSEARCH</b> City Desk \$30 Head Coach 2.0 \$30 <b>MICROSMTHS</b> Tred Plus \$48 <b>MIMETICS</b> 3 Demon \$125 Pro Midi Studio 1.4 \$125 Utilities 1 \$34 Utilities 2 \$34 Framebuffer \$48 Midi Interface \$48 Sound Sampler \$80 <b>MINDSCAPE</b> Balance of Power \$30 Captain Blood \$30 Combat Course \$30 Harrier Combat \$30 Hostage \$27 Indoor Sports \$27 Into Eagle's Nest \$30 Joker Poker \$30 Outrun \$30 SAT Preparation \$48 Shadowgate \$30 Space Harrier \$30 Superstar Ice Hockey \$30 Uninvited \$30 Alien Syndrome \$30 RoadRader \$30 Deja Vu \$30 <b>MINDWARE</b> Aunt-Artic Adventure \$24 Charon 5 \$18 Descartes \$30 Page Flipper \$30 Pg Flipper Plus F/X \$96 Page Sync \$96 PAGErender 3D \$80 <b>MSI</b> Raw Copy \$36 <b>M.S.S.</b> BBS-PC \$90 Excellence \$180 Flipside \$180 On-Line \$42 Organize \$60 Scribble \$60 Scribble Platinum Ed. \$60 The Works \$90 Works Platinum Ed. \$177 <b>NEW HORIZONS</b> Flow \$60 Postscript \$21 Pro Fonts 1 \$21 Pro Fonts 2 \$21 Pro Video 2.0 \$75 <b>NEWTEK</b> A500 Adapter \$20 Digiprod \$62 Digipaint \$36 Digiview 3.0 \$128 Digiview 3.0 Upgrade \$128 Digiview Gold \$128 <b>NEW WAVE SOFTWARE</b> Dynamic Drums \$48 Dynamic Studio \$120 Sound Oasis \$80 <b>OMNITREND</b> Breach \$24 Operation Wolf \$24 Qix \$24 Renegade \$24 Rastan \$24 <b>ORIGIN SYSTEMS</b> Autoduel \$24 Moebius \$36 Ogre \$18 Times of Lore \$24 Ultima III \$36 Ultima IV \$36 <b>OTG</b> DSM Disassembler \$30 <b>OXI</b> A-talk 3 \$60 Maxiplan 500 \$90 Maxiplan Plus \$120 Nimbus \$90 Star Trek \$48 <b>POLYGLOT SOFTWARE</b> Crossword Creator \$30 <b>PRECISION SOFTWARE</b> SuperBase Personal \$48 SuperBase Personal II \$90 SuperBase Pro 3.0 \$210 Super Plan \$90 Pro Sound Designer \$30 <b>PROGRESSIVE</b> CLI-mate \$24 Disk Master \$30 Dr. Term Prof. \$42 IntroCad 2.0 \$48 Mathamotion \$36 MicroLawyer \$42 Pixmap \$42 Ultra Cad \$180 <b>PSYGNOSIS</b> Aquaventure \$24 Baal \$18 <b>Ballistix</b> Barbarian \$24 Captain Fizz \$18 Chrono-Quest \$18 <b>Menace</b> Obliterator \$24 Terror Pods \$24 <b>RAINBIRD</b> Guild of Thieves \$27 Garner Command \$27 Space Cutter \$18 Starglider 2 \$27 Universal Military Simu \$30 Virus \$18 UMS Vietnam \$15 UMS Civil War \$15 <b>READY SOFT</b> Dragon's Lair \$36 ECE-500/1000/2000 \$55 Max \$30 <b>RGB</b> Deluxe Help-Digipaint \$30 D.H.-Photopaint \$30 D.H.-Calligrapher \$30 D.H.-Pagesetter \$30 D.H.-Deluxe Paint II \$30 <b>RIGHT ANSWERS GROUP</b> Director \$42 Director Tool Kit \$24 <b>SEDONA SOFTWARE</b> Money Mentor \$60 <b>SOFTLOGIC</b> Page Stream \$120 <b>SOFTWARE ADVANTAGE</b> Investors Adv 2.0 \$60 <b>SOFTWARE VISIONS</b> Business Designer \$36 Home Designer \$24 MicroFiche Filer \$180 MicroFiche Filer Plus \$108 <b>SPECTRUM HOLOBITE</b> Solitaire Royal \$30 Falcon \$30 Tetris \$21 <b>SSI</b> Gettysburg \$38 Heroes of the Lance \$38 Kampfrufte \$38 Phantasia \$26 Queston 2 \$32 Roadwar Europa \$26 Road War 2000 \$26 Wrath of Nicodemus \$26 <b>SUBLOGIC</b> Flight Simulator II \$32 Jet \$32 Scenery Disks \$17 Scenery #9 \$20 <b>SUNRISE INDUSTRIES</b> Elctric Color Splitter \$74 Perfect Vision \$170 Studio Magic \$60 <b>TAITO</b> Bubble Bobble \$24 Operation Wolf \$24 Qix \$24 Renegade \$24 Rastan \$24 <b>TAURUS</b> Acquisition \$180 X-Cad Designer \$360 <b>THE OTHER GUYS</b> Synthia \$60 Synthia Prof \$180 <b>THREE SIXTY INC.</b> Dark Castle \$27 Harpoon \$27 Thunder Ridge \$24 Warlock \$21 <b>TIGRESS</b> Diskwiz 2.0 \$30 <b>TITUS</b> Crazy Cars \$24 Fire and Forget \$24 Off Shore Warrior \$24 <b>TRUE BASIC</b> True Basic \$60 TB Writetime & 3D \$90 9 Libraries (each) \$30 Developers Tool Kit \$30 <b>UNICORN</b> Aesop's Fables \$36 All About America \$30 Decimal Dungeon \$30 Fraction Action \$30 Ghostly Grammar \$30 Kindergarten \$30 Land of the Unicorn \$38 Read & Rhyme \$30 Read-A-Rama \$30 Word Master \$30 Animal Kingdom \$30 <b>Arabic Nights</b> Logic Master \$30 Math Wizard \$30 Adv. of Sinbad \$30 <b>UNISON WORLD</b> Art Gallery 1 & 2 each \$18 Fantasy \$18 Fonts & Borders \$21 Printmaster Plus \$30 <b>WILLIAM HAWES</b> Ares \$30 W-Shell \$30 <b>WORD PERFECT INC.</b> Library \$78 Word Perfect \$15 <b>MUSIC</b> Labtech Stereo Spkrs \$79 ECE-500/1000/2000 \$48 Midi Disk \$55 Midi Cables \$7 Mmrics Midi Interface \$48 Pro Midi Studio \$125 Sound Sample \$78 Midi-Star \$30 <b>MISC</b> AMIGA 1000's in STOCK \$55 Timesaver \$42 Processor Acc \$148 Mouse Pads \$6 EXPY 500 Joy Stick \$17 WICO 3 Way \$20 Amiga Mouse \$42 Trackball \$38 Flicker Master \$12 Surge Suppressor \$20 64 Emulator-2 \$50 Classic Covers from \$7 Switch Box AB/25 Pin \$30 Cables \$15	<b>ABACUS</b> Amiga Dos Tool Kit \$36 Assempro \$60 Becker Text \$90 Data Retrieve \$48 Pro Data Retrieve \$177 Text Pro \$48 <b>ABACUS BOOKS</b> Disk Drives Inside/Out \$27 Amiga Tricks & Tips \$24 Amiga C \$24 Amiga Dos Inside/Out \$18 Amiga Machine Lang \$18 Amiga C for Beginners \$15 Amiga Sysprog Guide \$33 Amiga Basic Inside/Out \$23 Amiga for Beginners \$15 Amiga 3D Graphics \$18 More Tricks & Tips \$18 <b>ABSOFT</b> AC/Basic 1.3 \$117 AC/Fortran \$180 <b>ACCESS</b> Echelon \$27 Heavy Metal Land Combat \$27 Leader Board Dual Pk \$12 Tournament Disk \$27 World C's Lr Board \$12 <b>ACTIONWARE</b> Capone \$24 Phaser Gun \$46 P.O.W. \$24 <b>ACCOLADE</b> Fugitive Ghost \$21 Famous Courses Vol 2 \$12 Fight Night \$27 4th and Inches \$27 Hard Ball \$27 Jack Nicholas Golf \$30 Mean 18 \$27 Mini Putt \$27 Pinball Wizard \$27 Team Construction disk \$9 Test Drive \$27 Test Drive II \$27 <b>ACTIVISION</b> Battletech \$30 Game \$30 Basketball \$30 Game \$30 Golf \$30 Game \$30 Football \$30 Infocom Titles \$40% Off Shanghai \$24 <b>ADDISON-WESLEY</b> Hardware Manual \$20 Intuition Manual \$20 Rom Kernel Manual \$24 Rom Manual Exec \$16 Includes & Audio Docs \$11 <b>AEGIS</b> Animator/Images \$60 AniMagic \$60 Audiomaster 2.0 \$60 Diga \$48 Draw 2000 \$168 Lights Camera Action \$48 Modeler 3D \$48 Ports of Call \$30 Sonix \$48 Videoscape 3D 2.0 \$120 Video Titrer \$90 <b>AMIGA</b> 13 Enhancer \$20 <b>ANTIC</b> Architectural Design \$21 Future Design \$21 GFA Basic \$21 Human Design \$21 Microbot Design \$21 Pioneer Plaque \$24 Phasar 3.0 \$60 Zoetrope \$84 Crash Garrett \$24 Bobo \$21 <b>AROCK COMPUTER SOFTWARE</b> Masterpiece Pro Fonts \$150 <b>ARTWORX</b> Bridge 5.0 \$21 Centerfold Squares \$18 Linkword Languages \$18 Strip Poker 2 \$24 Strip Pkr Data #4 \$12 Strip Pkr Data #5 \$12 <b>ASDG</b> FACC II \$21 Cygnus Ed \$60 <b>AVANTE GARDE</b> Benchmark Module 2 \$120 <b>BAUDVILLE</b> Award Maker Plus \$30 Sports Library \$18 Education Library \$18 <b>B.E.S.T.</b> Business Mgmt. \$290 General Ledger \$117 <b>BETHESDA</b> Wayne Gretzky Hockey \$30 <b>BRODERBUND</b> Downhill Challenge \$18 Fantavision \$36 Sky Chase \$24 Star Wars \$24 Operation Clean Streets \$24 Space Racer \$18 <b>BROWN WAGH</b> Express Paint 3.0 \$84 Midi Major \$60 Publisher Plus \$60 TV Show \$60 Word Flex \$60 Zuma Fonts (1-4) \$24 Zuma Fonts 4pk(1-4) \$60 Pen Pal \$117 Midi Magic \$180 <b>BUENA VISTA</b> Roger Rabbit \$27 <b>BYTE BY BYTE</b> Sculpt 3-D \$95 Sculpt/Animate 4D \$390 Sculpt/Animate Jr. \$30 Sculpt/Animate Pro \$30 3D Cookbook \$20 Tate Fonts 1 \$42 Tate Fonts 2 \$42 <b>CAPCOM</b> Bionic Commando \$24 <b>CAPILANO</b> Logic Works \$60 <b>CENTAUR SOFTWARE</b> Forms in Flight II \$72 B.A.D. \$30 My Paint \$30 Pro Net \$30 Pro-Board \$30 Midi-Vu \$30 <b>CENTRAL COAST</b> Disk to Disk \$30 DOS 2 DOS \$33 Quarterback \$42 Quarterback tools \$48 <b>CINEMAWARE</b> King of Chicago \$18 Lords of Rising Sun \$30 Rocket Ranger \$18 S.D.I. \$18 Sinbad \$430 3 Sluggos \$430 Defender of the Crown \$30 T.V. Sports Football \$30 <b>COMMAND SIMULATIONS</b> Blitzkrieg \$30 <b>DATA EAST</b> Platoon \$30 <b>DESIGN LABS</b> Fine Print \$30 <b>DIGITAL CREATIONS</b> Gizmos 2.0 \$48 <b>DIGITAL SOLUTIONS</b> LPD Writer \$42 <b>DIGITEK</b> Amegas \$21 Drum Studio \$30 Extra Courses \$12 Chess \$21 Hole 1 Mini Golf \$21 Power Styx \$21 Vampires Empire \$27 Western Games \$21 Hollywood Poker \$21 <b>DISCOVERY</b> Arkanoid \$20 Better Dead/Alien \$21 Hybris \$18 Gabyris \$24 S.W.O.R.D. \$24 Sword of Sodan \$30 Zoom \$18 <b>DISK CO.</b> Critics Choice \$150 Publishers Choice \$120 Superback \$48 Kind Words 2.0 \$60 Pagesetter 1.2 \$30 Headline Font Pack \$30 Artists Choice \$30 <b>DR. T MUSIC SOFTWARE</b> Copyist 1 \$60 Copyist 2 \$150 Copyist 3 \$240 K.C.S. \$150 Midi Recording Studio \$42 <b>EASEWARE</b> Home Builders Cad \$120 Home Builders Ch \$49 Home Builders Print \$49 <b>ELAN DESIGN</b> Invision \$120 Performer \$36 <b>ELECTRONIC ARTS</b> AARGH \$23 Alternate City(city) \$26 Awesome Arcade Pk. \$32 Bard's Tale \$32 Battle Droid \$26 Black Cauldron \$23 ChessMaster 2000 \$29 Commissioners Disk \$29 Cosmic Relief \$29 Deluxe Music \$62 Deluxe Paint III \$92 Deluxe Paint II \$80 Deluxe Photo Lab \$92 Deluxe Print II \$122 Deluxe Video 1 2 \$32 Double Dragon \$26 Earl Weaver \$32 Empire \$32 FA/18 Interceptor \$32 Ferrari Formula 1 \$32 Intellitype \$32 King's Quest \$32 Life and Death \$29 Lounge Lizards \$32 Marble Madness \$32 Master Ninja \$26 Mavis Beacon \$29 Monopoly \$29 Mother Goose \$32 Power Play Hockey \$32 Pub Games \$32 Return to Atlantis \$32 Road Wars \$32 Rockford \$23 Rubican Alliance \$32 Scrabble \$32 Skyfox 2 \$24 Skyfox \$32 Space Quest \$32 Starflight 1 \$35 Wizard Wars \$26 Reach for the Stars \$26 World Tour Golf \$26 Zany Golf \$26 <b>EMERALD INTELLIGENCE</b> Magellan \$117 <b>EPYX</b> California Games \$20 BattleShip \$24 Death Sword \$12 Destroyer \$30 Dive Bomber \$24 Final Assault \$24 Games Winter Edition \$20 Impossible Mission 2 \$20 Street Cat \$15 Street Sport Basketball \$24 Sub Battle \$20 Summer Games \$24 Technopop \$30 Trials of Horror \$20 Winter Games \$20 World Games \$20 4x4 Road Racing \$20 Space Station Oblivion \$30 <b>FIRST BYTE</b> First Letters & Words \$26 First Shapes \$26 Kid Talk \$26 Math Talk \$26 Math Talk Fractions \$26 Smoothtalker \$26 Speller Bee \$26 <b>FIRST ROW</b> Prime Time \$26 Twilight Zone \$26 Homemooons \$26 <b>FREE SPIRIT</b> Securities Analyst \$48 Sex Vixens from Space \$24 <b>FTL</b> Chaos Strikes Back \$18 Dungeon Master \$24 <b>FULLER COMPUTER</b> Project D \$30 <b>GOLD DISK</b> Color Separator \$42 Desk Top Budget \$42 Design 3D \$60 Comic Setter \$60 Font Set 1 \$25 Funny Data \$21 Goldspelt 2 \$27 Laser Script \$27 Movie Setter \$60 Page Setter \$90 Pg. Setter Prof 1.2 \$240 Prof Color Separatr \$117 Prof Draw \$120 <b>GRAMMA SOFTWARE</b> NAG \$48 <b>HASH</b> Animator Apren 3.2 \$177 Animator Editor \$36 Animator Effects \$36 Animator Flipper \$36 Animator Libraries \$36 Animator Multipane \$54 Animator Rotoscope \$48 Animator Stand \$30 Animator Jr. \$24 <b>HYPERTEC</b> GOMI 3.0 \$48 GOMI Button \$27 <b>IMPLUSE</b> Turbo Silver \$120 <b>INFINITY</b> Galileo II \$42 Shakespeare \$135 <b>INNOVATION</b> Broadcast Titrer \$180 Video Effects 3D \$120 <b>INOVATRONICS</b> Power Windows 2.5 \$54 <b>INTERACTIVE SOFTWARES</b> Calligraph W/Fnt Mvr \$78 Lion Fonts \$36 Newsletter Fonts \$18 Studio Fonts \$21 <b>INTERPLAY</b> Battle Chess \$30 Chess \$30 Neomancer \$24 <b>JDK IMAGES</b> Font Library 1 \$65 Font Library 2 \$65 Pro Video CGI \$120 Pro Video Plus \$180 <b>KARA</b> Kara Fonts \$48 <b>KFS</b> Accountant \$180 <b>KING SOFT</b> Emerald Mines II \$24 <b>KONAMI</b> Contra \$24 Rush-N-Attack \$24 <b>LATTICE</b> Compiler Companion \$80 Lattice 5.0 \$180 Lattice C Plus \$30 <b>MANX</b> Aztec C Developers \$195 Aztec C Professional \$130 Library Sources \$180 Source Level Debugger \$49 <b>MASTERTRONIC</b> Feud \$15 Ninja Mission \$15 Space Ranger \$15 <b>MELBOURNE HOUSE</b> War in Middle Earth \$30 Magic Johnson B-ball \$30 <b>METACOMCO</b> Macro Assembler \$60 Pascal 2.0 \$78 Shell \$42 Toolkit \$30 <b>MICRO DEAL</b> 4 Player Adapt \$30 Major Motion \$24 International Soccer \$24 Tetra Quest \$24 Zero Gravity \$30 <b>MICROILLUSIONS</b> Black Jack Academy \$24 Craps Academy \$24 Data Disks \$12 Discovery Mathor Spell \$24 Dungeon Construction \$24 Fairy Tale \$30 Main Frame \$24 Photo Vid Cel Animator \$90 Photo Vid Trans Conf. \$180 Romantic Encounters \$24 Shrine Demon Soul \$180 Music X \$180 Photon Paint II \$90 Photon Paint Expansion \$30 Planetarium \$30 <b>MICROMASTER</b> Our Family Tree \$30 <b>MICROPROSE</b> Gunship \$33 Silent Service \$24 <b>MICROSEARCH</b> City Desk \$30 Head Coach 2.0 \$30 <b>MICROSMTHS</b> Tred Plus \$48 <b>MIMETICS</b> 3 Demon \$125 Pro Midi Studio 1.4 \$125 Utilities 1 \$34 Utilities 2 \$34 Framebuffer \$48 Midi Interface \$48 Sound Sampler \$80 <b>MINDSCAPE</b> Balance of Power \$30 Captain Blood \$30 Combat Course \$30 Harrier Combat \$30 Hostage \$27 Indoor Sports \$27 Into Eagle's Nest \$30 Joker Poker \$30 Outrun \$30 SAT Preparation \$48 Shadowgate \$30 Space Harrier \$30 Superstar Ice Hockey \$30 Uninvited \$30 Alien Syndrome \$30 RoadRader \$30 Deja Vu \$30 <b>MINDWARE</b> Aunt-Artic Adventure \$24 Charon 5 \$18 Descartes \$30 Page Flipper \$30 Pg Flipper Plus F/X \$96 Page Sync \$96 PAGErender 3D \$80 <b>MSI</b> Raw Copy \$36 <b>M.S.S.</b> BBS-PC \$90 Excellence \$180 Flipside \$180 On-Line \$42 Organize \$60 Scribble \$60 Scribble Platinum Ed. \$60 The Works \$90 Works Platinum Ed. \$177 <b>NEW HORIZONS</b> Flow \$60 Postscript \$21 Pro Fonts 1 \$21 Pro Fonts 2 \$21 Pro Video 2.0 \$75 <b>NEWTEK</b> A500 Adapter \$20 Digiprod \$62 Digipaint \$36 Digiview 3.0 \$128 Digiview 3.0 Upgrade \$128 Digiview Gold \$128 <b>NEW WAVE SOFTWARE</b> Dynamic Drums \$48 Dynamic Studio \$120 Sound Oasis \$80 <b>OMNITREND</b> Breach \$24 Operation Wolf \$24 Qix \$24 Renegade \$24 Rastan \$24 <b>ORIGIN SYSTEMS</b> Autoduel \$24 Moebius \$36 Ogre \$18 Times of Lore \$24 Ultima III \$36 Ultima IV \$36 <b>OTG</b> DSM Disassembler \$30 <b>OXI</b> A-talk 3 \$60 Maxiplan 500 \$90 Maxiplan Plus \$120 Nimbus \$90 Star Trek \$48 <b>POLYGLOT SOFTWARE</b> Crossword Creator \$30 <b>PRECISION SOFTWARE</b> SuperBase Personal \$48 SuperBase Personal II \$90 SuperBase Pro 3.0 \$210 Super Plan \$90 Pro Sound Designer \$30 <b>PROGRESSIVE</b> CLI-mate \$24 Disk Master \$30 Dr. Term Prof. \$42 
---	---



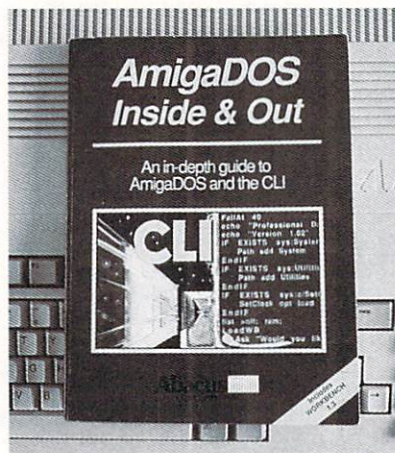
# AmigaDOS Inside & Out

Reviewed by Arnie Cachelin

As the title suggests, **AmigaDOS Inside & Out** has something for everyone. This useful book looks at the Amiga's operating system from several perspectives. The first chapter is written for the novice computer user and gives slow, clear explanations of the fundamental concepts of DOS, directories, files, and CLI commands.

The second chapter discussing CLI commands groups them in four sections according to their general functions—disk and file management, CLI system commands, script files and the editors. Individual commands are presented in order of complexity. Each command is listed with its syntax and a discussion of the various arguments and options available. There is also a description of the Workbench 1.3 implementation of the command. And examples of typical or particularly interesting uses are provided for many commands. The third chapter talks about the Amiga's use of devices and details each of the Workbench 1.2 devices. The fourth chapter is devoted entirely to the Workbench 1.3 enhancements with coverage of the new devices and CLI (or Shell) commands.

Chapters five and six make use of the DOS knowledge gained in the previous sections. The Tricks and Tips section covers topics ranging from copying your commands to a RAMdisk, to redirecting command output and sending escape codes to your printer. Finally, there is an interesting exploration of uses of the console device, both as a command I/O path and as a remote connection for another Amiga connected to the



serial port. Chapter six is devoted to script files and is packed with samples of them. Although most of the scripts are not that exciting in themselves, the ensemble provides a wealth of examples for "programming" with AmigaDOS.

Chapter seven goes over the fundamentals of multi-tasking operation on the Amiga using the Workbench, the NEWCLI command and the RUN command. The reader is then treated to an explanation of tasks and task priorities within the Amiga operating system.

Chapter eight goes into depth on the operation of the actual CLI program and its interaction with the commands it calls. Although the authors say that the reader should be familiar with both C and 68000 assembly language, this chapter contains only assembler code. There is a nice little explanation of the BCPL/BPTR vestiges of AmigaDOS and their importance to the programmer.

The stand-alone programs are provided in chapter nine—Creating CLI Commands. After giving the bare

necessities of CLI commands, the book presents a series of C programs which show the basic elements of most CLI commands (i.e. argument parsing, templates, use of stdio). The programs range from the simple and useless evaluation.c which tells you what arguments you gave it, to the fascinating and rather useful delay.c and taskstop.c which slow or lock out lower priority tasks with a keypress. We are introduced to the system's task list with task.c which lists all the tasks in operation along with their priorities, and taskpri.c which allows you to reset the priority of an arbitrary task. Also useful is replace.c, a companion to the SEARCH command which will replace strings in a file and write the output to a different file. This program will work with either text strings or the ASCII codes for characters, allowing you to swap carriage returns for CR/line-feeds or vice versa. The programs are written in Manx Aztec C. They appear to be pretty straightforward and portable, so Lattice users should not have much trouble compiling them.

The final chapter is a quick reference guide with sections on ED and EDIT and an alphabetical list of the commands from both 1.2 and 1.3 releases of the operating system. Each command is listed with a brief description, its argument template and useful definitions of its various options.

<b>AMIGADOS INSIDE &amp; OUT</b>	<b>\$19.95</b>
<b>Each optional program disk</b>	<b>\$14.95</b>

Abacus, 5370 52nd Street SE, Grand Rapids, MI 49508. (616) 698-0330. Orders: (800) 451-4319.

CIRCLE 237 ON READER SERVICE CARD



# NEW AMIGA PRODUCTS

BY CAROLYN CUSHMAN  
AMIGA Plus ASSISTANT EDITOR

## Graphics/Animation Software

Working with Gold Disk, ASDG has developed **ASDG-Resep** (\$59.95), a new utility program that will automatically insert 24-bit color images scanned with ASDG's Professional ScanLab into PostScript color separations generated by Gold Disk's **Professional Page, Version 1.2** (\$395). ASDG-Resep replaces the HAM separations used by Professional Page with 24-bit, 16-million-color images, separated and saved as PostScript files from which color films for process printing may be developed.

Gold Disk's **Design 3D** (\$99.95) promises to be a modeling package of unmatched speed and ease of use, with support for 3-D text—including a built-in font editor. Wire frame models offer six line types and 16 colors, with dithering to simulate additional colors—and the fastest flat shading on the Amiga.

Create sophisticated, timed interaction between Amiga-based graphics and professional-quality audio, including MIDI, with Mindware International's **PageSync** (\$100). PageSync allows external MIDI events and computer animation to control each other, keeping animations and music in perfect time, or synchronizing graphics with digitized sound samples.

**Digi-Paint 3** (\$99.95) from New-Tek is a completely new version of the best-selling 4096+ color paint program. Faster and more compact, it includes such new features as full Amiga font support, anti-aliasing of



The Canon scanner interface from Gold Disk

text, elaborate dithering routines and user-controllable 3-D texture mapping. New display features include support for pictures up to 1024 by 1000 pixels, user-definable overscan, and changing screen resolutions on the fly. Upgrades are available, not only for Digi-Paint owners but also for owners of Deluxe Paint II, Photon Paint, or Deluxe PhotoLab—call (913) 354-1146 for prices and proof of ownership requirements.

MicroIllusions adds **Photon Video: Edit Decision List Processor (EDLP)** (\$499.95) to their Photon Video Line of desktop production software. With EDLP, you can make your video-editing decisions, then quickly and efficiently transfer them to an online video editing machine.

The **HAMandel AutoMAG** cell animator module lets you create se-

quences of up to 100 Mandelbrot Set fractal images, with up to 256 colors in each. These images can be assembled into smooth, zoom-magnification animations. MegageM sells HAMandel alone for \$39.95, AutoMAG module \$20 (for registered HAMandel owners), HAMandel with AutoMAG Module \$59.95, and HAMandel DEMO Disk (requires 1 Meg) \$5.

**LaserUp! Draw** (approximately \$120) is a PostScript drawing program that's ideal for producing graphics for high-quality desktop publishing. Images may be printed in gray tones on PostScript printers, or turned into color separations. The program also matches PMS colors on the screen.

**ProFonts I: Professional and ProFonts II: Decorative** (\$34.95 each) from New Horizons Software provide fonts designed specifically for quality output on even the least expensive dot-matrix printers. However, ProFonts work with any non-PostScript device, producing excellent results on inkjet, paintjet or laser printer.

With **Elan Performer** (\$59) from Elan Design, you can open and display your graphics and animations instantly, in any sequence. With each file assigned to a separate key on the keyboard, images can be displayed individually with just a keypress, making this an excellent tool for presentations or animation design.

## Applications Software

**Transcript** (\$69.95) is a new, incredibly fast word processor from



# GO AMIGO!

THE WORLD'S LARGEST DISTRIBUTOR OF AMIGA™ PRODUCTS

## HARDWARE SPECIALS

### GVP

GREAT VALLEY PRODUCTS

**A2000 Hard Cards**

**42MB: \$799**

**80MB: \$1239**

Other size/brands/models available

## TOOL BOX

A2000 Chassis for  
your A500 or A1000

**In Stock Now!**

## Deluxe Paint III

Introductory Special

**\$99** until 4/15/89

## Turbo Silver!

Hot Ray Tracing

**\$109** until 4/30/89

## My-T Mouse

Replacement Mouse  
for all Amiga models

**Still \$42!**

## Midget Racer By CSA

68020 Accelerator for  
all Amiga models.

from **\$369**

## Retail Showroom Opens!

- Hundreds of products on display
- Thousands of products in stock
- Same great prices and service
- 2682D Middlefield Road, Redwood City, CA 94063
- Note our new Customer Service and Fax numbers
- Now available on CompuServe: 71230, 2412

## HARDWARE... HARDWARE... HARDWARE... HARDWARE

<b>A-SQUARED</b> Live — A1000 ..... \$259 Live — A500 ..... \$345 Live — A2000 ..... Call <b>ACCESS ASSOCIATES</b> Alegra 512K ..... Call <b>AMICORE</b> Transvestor 2500 ..... \$44 <b>AMINETICS</b> People Meter ..... \$53 <b>ANAKIN</b> Easy! — A1000 ..... \$369 Easy! — A500 ..... \$359 Easy! — A2000 ..... \$399 <b>APPLIED VISIONS</b> FutureSound (A1000) ..... \$135 Future Sound (A500) ..... \$95 <b>AVATEX</b> 1200e Modem ..... \$85 1200HC Modem ..... \$115 2400 Modem ..... \$199 <b>C. LTD.</b> C View 1 (NTSC) ..... \$39 C View 2 (C/L) ..... \$39 Timesaver (A1000) ..... \$55 <b>CALIFORNIA ACCESS</b> CA-880 3.5" Drive ..... \$159 <b>COMMUNICATION SPECIALTIES</b> Gen One ..... Lowest! <b>CREATIVE MICROSYSTEMS</b> Processor Accelerator (A500/A2000) ..... \$174 (A1000) ..... \$179 Video Interface/RF (A500) ..... Call (A2000) ..... Call <b>CSA</b> Over 30 Board ..... Sale! 68020 Boards ..... Call Midget Racer ..... HOT <b>DIGITAL CREATIONS</b> SuperGen ..... Call <b>ECE</b> MIDI — A500 ..... \$58 MIDI — A1000 ..... \$58 MIDI — A2000 ..... \$58 <b>EPSON</b> EX-800 w/Color ..... \$499 (Other Models Available) <b>EPYX</b> 500 XJ Joystick ..... \$17 <b>EXPANSION TECHNOLOGIES</b> A1000 Hard Drives: 48MB ..... \$879 32MB ..... \$749	<b>A500 Hard Drives:</b> 48MB ..... \$859 32MB ..... \$729 Escort 1 3.5" Floppy ..... \$149 Tool Box ..... In Stock! <b>GO AMIGO!</b> Disk Head Cleaner ..... \$15 30 Disk Case ..... \$10 ImageWriter II Cable ..... Call Printer Cable ..... \$20 Modem Cable ..... \$20 Mouse Pad ..... \$10 Sony Cables ..... Call Custom Cables ..... Call <b>GREAT VALLEY PRODUCTS</b> Impact SCSI/RAM ..... Call A2000 Hard Cards ..... Call A500 Products ..... Call <b>HAITEK</b> X-Specs 3D ..... \$97 <b>HYPERTEC</b> Deluxe MIDI ..... \$74 <b>INKWELL</b> Light Pen ..... \$99 <b>KETEK</b> Command Center ..... Sale! <b>MAGNI</b> Magni 4000 Genlock ..... In Stock! <b>M.A.S.T.</b> Unidrive ..... \$169 Twin Drive ..... \$279 <b>MICROBOTICS</b> Starboard II (All Sizes) ..... Call Multifunction Module ..... \$75 SCSI Module ..... \$103 8 Up (A2000) ..... Call Hard Frame ..... In Stock! Pop SIMMs ..... Call We have SIM Modules for 8 Up! <b>MICROWAY</b> Flicker Fixer ..... \$469 PAL version available! <b>MIMETICS</b> Amigen Genlock ..... \$149 Audio Digitizer ..... \$85 MIDI Int. (A500/2000) ..... \$45 <b>MOTOROLA</b> 68881 Co-Processors ..... Call Speeds from 12Mhz to 20Mhz <b>NERIKI</b> Neriki Genlock ..... Call <b>OKIDATA</b> Okimate 20 with Plug n' Print ..... \$199	Black Ribbon ..... \$6 Color Ribbon ..... \$7 <b>PAGE</b> Carrying Bags for A1000/500/1084 ..... Call <b>PACIFIC PERIPHERALS</b> Overdrive ..... Call Subsystem 500 ..... \$219 Subsystem 500 w/3.5" ..... \$365 <b>PANASONIC</b> WV 1410 Camera/Lens ..... \$239 Variable Iris Lens ..... \$79 1080i Printer ..... Call 1091i Printer ..... Call 1124 Printer ..... Call <b>PHOENIX</b> CPS 500 Power Supply ..... \$84 Sonic Speakers ..... \$89 <b>PRACTICAL SOLUTIONS</b> Mouse Master ..... \$31 <b>PROGRESSIVE PERIPHERALS</b> Frame Grabber ..... Call Pro Gen Genlock ..... \$349 <b>RONIN</b> Hurricanes! ..... Best Price! <b>SAFESKIN</b> Clear Keyboard Covers ..... \$19 <b>SPIRIT TECHNOLOGY</b> 1.5MB for A1000 ..... Call Hard Disk Interfaces ..... Call <b>STAR MICRONICS</b> NX1000 Rainbow ..... \$264 <b>SUNRISE INDUSTRIES</b> Perfect Sound ..... \$69 Perfect Vision ..... \$199 Color Splitter ..... In Stock! <b>SURFSIDE</b> Master 3A 3.5" ..... \$155 <b>SUPRA</b> 2400 Modem ..... \$154 Hard Drives ..... Call <b>SYNERGY</b> A500 Hard Drives ..... Call New Low Prices! <b>TECHNICOVER</b> Cover for A500 ..... \$14 Cover for A1000 ..... \$17 Cover for A2000 ..... \$17 <b>WICO</b> Trackball ..... \$39 <b>VISUAL AURALS</b> Mindlight 7 ..... \$178 <b>XEROX</b> 4020 InkJet Printer ..... Call
--	---	--

## ELECTRONIC ARTS SOFTWARE

Aaargh! ..... \$25 Alien Fires ..... \$29 Alternate Reality ..... \$29 <b>Annals of Rome</b> ..... In Stock! Artura ..... Call Awesome Arcade Pak ..... \$36 Bard's Tale ..... \$32 Bard's Tale II ..... \$43 Battle Droidz ..... \$26 Black Cauldron ..... \$29 Chessmaster 2000 ..... \$30 Chessmaster 2100 ..... Soon! Commissioner's Disk ..... Call Cosmic Relief ..... \$27 Deluxe Music ..... \$63 Deluxe Paint II ..... \$84 Deluxe Paint III ..... Soon! Deluxe PhotoLab ..... \$104 Deluxe Productions ..... \$129 Deluxe Video 1.2 ..... \$84 Dinosaur Discovery Kit ..... Call <b>Double Dragon</b> ..... In Stock! Earl Weaver Baseball ..... \$35 Empire ..... \$36 Ferrari Formula 1 ..... \$36 First Letters and Words ..... \$36	First Shapes ..... \$34 Gettysburg ..... \$42 Global Commander ..... \$29 <b>Heroes of the Lance</b> ..... In Stock! Hot & Cool Jazz Disk ..... \$19 Hunt For Red October ..... \$36 Instant Music ..... \$32 Instant Music Data ..... \$19 Intellitype ..... \$35 <b>Interceptor</b> ..... \$35 Kid Talk ..... \$46 Kampfgruppe ..... \$46 Kid Talk ..... \$34 <b>Lancelot</b> ..... \$29 Leisure Suit Larry ..... \$35 Mad Libs ..... \$16 Marble Madness ..... \$32 Master Detective ..... Call <b>Master Ninja</b> ..... \$21 Math Talk ..... \$34 Math Talk Fractions ..... \$34 Mavis Beacon ..... \$33 Phantasia ..... \$31 <b>Police Quest</b> ..... In Stock! Pub Games ..... \$26 Puzzle Storybook ..... Call <b>Question II</b> ..... \$38	Quizam ..... \$25 Reach For The Stars ..... \$33 <b>Rebel Charge</b> ..... In Stock! <b>Reel Fish'n</b> ..... \$32 Return To Atlantis ..... \$36 Roadwar 2000 ..... \$32 Roadwar Europa ..... \$31 Roadwars ..... \$26 Rockford ..... \$26 Rubicon Alliance ..... Call Scrabble ..... \$29 Seasons & Holidays ..... \$19 Skyfox II ..... \$29 Smooth Talker ..... \$36 Sorcerer ..... Call Speller Bee ..... \$34 Thexder ..... \$26 <b>Time &amp; Magic</b> ..... In Stock! Wizard Wars ..... Call Wrath of Nicodemus ..... \$29 <b>Zany Golf</b> ..... In Stock! This section includes products from First Byte, SSI, and other companies whose products are distributed by Electronic Arts!
--	---	--

# SHOWROOM NOW OPEN!



# FREE SHIPPING!\*

<b>ABACUS</b> AssemPro ..... \$72 Becker Text ..... \$114 DataRetrieve ..... \$159 DataRetrieve Professional ..... \$49 TextPro ..... \$59 Amiga Machine Lang ..... \$24 Amiga Traps & Tips ..... \$17 Many other books with disks available! <b>ABSOFT</b> A/C Basic (v1.3) ..... \$134 A/C Fortran ..... \$199 <b>ACCESS SOFTWARE</b> Echelon ..... Call Leader Board Dual Pack ..... \$26 Heavy Metal Land Combat ..... \$31 Tenth Frame ..... \$28 World Class Leader Bld ..... \$29 <b>ACCESS TECHNOLOGY</b> A Card ..... \$146 Fancy 3-D Fonts ..... \$55 <b>ACCOLADE</b> Bubble Ghost ..... \$29 Famous Course Disk ..... \$17 Fight Night ..... \$34 4th & Inches ..... \$31 Graphics Studio ..... \$42 Hardball ..... \$37 J Nicklaus Golf ..... \$27 Mean 18 ..... \$37 Mini Putt ..... \$27 Pinball Wizard ..... \$29 Test Drive ..... \$31 Test Drive II ..... \$30 The Train ..... \$31 <b>ACS</b> Font-Works ..... Call Grade Manager ..... \$69 Learning Curve ..... \$55 Music Student I ..... \$43 <b>ACTIONWARE</b> Capone ..... \$28 Creature ..... \$45 Phaser Gun ..... \$45 P.O.W. ..... \$28 <b>ACTIVISION</b> Battlehawks 1942 ..... \$34 Beyond Zork ..... \$35 Fish ..... \$31 Gamestar Titles ..... Call Greedier Air Rally ..... \$28 Shanghai ..... \$29 Sherlock ..... \$29 <b>ADDISON WESLEY</b> Amiga Manuals (Now w/1.3) ..... \$24 Puppy Love ..... \$24 <b>AEGIS</b> Animagic ..... \$32 Animator/Imagines ..... \$27 Arizona's Tomb ..... \$32 Art Pak 1 ..... \$24 Audio Master 2.0 ..... \$63 Diga ..... \$56 Draw 2000 ..... \$54 Impact ..... \$54 Lights Camera Action ..... \$58 Modeler 3D ..... \$64 Ports of Call ..... \$36 Sonic ..... \$45 Sound Trax 1 or 2 ..... \$36 Video Titrer v1.1 ..... \$99 Videoscape 3D 2.0 ..... \$122 <b>ALPHA</b> Alpha Fonts (each) ..... \$15 <b>AMIGO BUSINESS</b> Kicwork 1.3 (A1000 Only) ..... In Stock! <b>ANCO</b> Art Of Chess ..... In Stock! Face Off ..... \$18 Flight Path 737 ..... \$19 Harrier Mission ..... \$19 Karting Grand Prix ..... \$19 Las Vegas ..... \$19 Micro Base ..... In Stock! Micro Text ..... In Stock! Mike The Magic Dragon ..... \$19 Robbery ..... In Stock! Sky Fighter ..... \$19 XRG5 ..... \$19 <b>ANTIC</b> Bibo ..... \$24 Crash Garrett ..... \$27 Human Design ..... \$24 Future Design ..... In Stock! Architectural Design ..... \$24 PHASAR 3.0 ..... \$61 Pioneer Plague ..... \$27 Zetropolis ..... \$29 <b>AROCK</b> Masterpiece Fonts ..... \$165 <b>ARTWORKS</b> Bridge 5.0 ..... \$27 Centerfold Squares ..... \$24 Linkword Languages ..... \$24 Strip Poker ..... \$28 Strip Poker II ..... In Stock! Strip Poker Data (each) ..... \$15 Thru Boxing ..... \$17 <b>ASBO</b> Cube Master ..... \$26 CygnusEd ..... Call FACC II ..... \$25	<b>AVANTE-GARDE</b> Benchmark Modula-2 ..... \$134 Benchmark C Library ..... \$71 Benchmark IFF Library ..... \$71 Benchmark Simplified ..... \$71 <b>BAUDVILLE</b> Award Maker Plus ..... In Stock! Award Maker Sports Disk ..... \$20 Business Payroll ..... \$31 <b>B.E.S.T. INC.</b> General Ledger ..... \$65 Business Budgeter ..... Call Business Mgmt. 2.0 ..... \$319 Business Payroll ..... Call <b>BETHESA</b> Gridiron ..... In Stock! Wayne Gretzky Hockey ..... In Stock! <b>BLANK SOFTWARE</b> Sound Lab Amiga ..... \$239 <b>BRITANNICA</b> Designasaurus ..... \$34 <b>BRODERBUND</b> Downhill Challenge ..... \$24 Fantavision ..... \$41 Operation Clean Streets ..... \$28 Sky Chase ..... \$28 Space Racer ..... \$21 <b>BROWN WASH</b> Express Paint (New Version) ..... Call MidMagic ..... \$98 Pen Pal ..... Call Softwood File II sg ..... \$74 Stellar Conflict ..... \$29 TV Show ..... \$74 TV-Text ..... \$69 Wordplex ..... \$25 Write and File ..... \$79 Word Manager ..... Call <b>BUENA VISTA</b> Roger Rabbit ..... \$31 <b>BYTE BY BYTE</b> Animate 3D ..... Call Creature ..... \$45 Sculpt-Animate 4D ..... \$419 Tite Fonts ..... In Stock! <b>C.L.T.O.</b> Jet Set ..... \$35 Jet Set Font Sets ..... \$35 <b>CAPCOM</b> Bionic Commando ..... \$28 <b>CENTRAL COAST SOFTWARE</b> Disk 2 Disk (New Version) ..... \$37 Dos 2 Dos ..... \$37 Quarterback ..... \$54 <b>CINEMARE</b> Defender of the Crown ..... \$31 King of Chicago ..... \$31 Lords of the Rising Sun ..... Call Rocket Ranger ..... \$31 SDI ..... \$31 Sinbad ..... \$31 TV Sports ..... \$33 Three Stages ..... \$33 <b>COMMAND SIMULATIONS</b> Blitzkrieg / Ardennes ..... \$42 <b>CONSTELLATION</b> All Titles ..... On Sale! <b>COSMI</b> Defcon 5 ..... \$28 President is Missing ..... In Stock! Super ..... \$17 <b>CREATIVE SOLUTIONS</b> Multi-Font ..... \$77 <b>CRYSTAL ROSE</b> Analytic Art ..... \$42 <b>DATA EAST</b> Platoon ..... In Stock! <b>DATA RESEARCH</b> Key to C (V. 2.02) ..... \$25 <b>DELTA RESEARCH</b> J-Forth (New Version) ..... Call <b>DESIGN LABS</b> Fine Print ..... \$36 <b>DIGITAL CONCEPTS</b> Torch 2081 ..... \$18 <b>DIGITEK</b> Amegas ..... \$24 Clever & Smart ..... \$24 Cyber Complex ..... Call Drum Studio ..... \$35 Final Mission ..... In Stock! Gunshot ..... \$24 Hole In One ..... \$25 Hollywood Poker ..... Call Paranoia Complex ..... Call Power Stocks ..... In Stock! Sky Blaster ..... In Stock! Spin World ..... Call Thunder Boy ..... \$26 Vampire's Empire ..... \$20 <b>DISC COMPANY</b> Critic's Choice ..... \$178 Kind Words 2.0 ..... Call Publisher's Choice ..... \$139 SuperBack ..... Call <b>DISCOVERY SOFTWARE</b> Arkanoid ..... \$23 Better Dead Than Alien ..... \$23 GrabIt ..... \$24 Hybris ..... \$24 Marauder II ..... \$25 Sword of Sodon ..... In Stock! <b>VIRUS INFECTION PROTECTION</b> ..... \$32 <b>Zoom</b> ..... \$20 <b>DISC COUNT SW</b> Spelling Tutor ..... \$21 Vocabulary Tutor ..... \$21 <b>DONAR</b> Star Wars ..... In Stock! <b>DR. T.</b> Patch Editors ..... Call Photo ..... \$177 MIDI Recording Studio ..... In Stock! The Copyist ..... \$149 <b>EAGLE TREE SOFTWARE</b> Butcher 2.0 ..... \$25 Distant Armies ..... Call <b>EASEWARE</b> Home Builder's Cad ..... \$139 Home Builder's Choice ..... In Stock! <b>EASTWEST</b> Take Stock ..... \$34 <b>EIDERSOFT</b> Amiga Karate ..... \$24 Casino Fever ..... \$29 Pro Sound Designer ..... Call <b>ELAN</b> Invasion (Req. Live! / New Ver.) ..... Call Performer ..... Call <b>ELIPSY</b> Encore ..... \$45 <b>EMERALD INTELLIGENCE</b> Magellan ..... \$129 <b>EPYX</b> Battleship ..... In Stock! California Games ..... In Stock! Devonaire ..... Call Dive Bomber ..... \$37 Four By Four ..... \$31 Games, Winter Edition ..... \$34 Mind Roll ..... \$22 Skate Wars ..... Call Space Station ..... In Stock! Street Cat ..... Call Sub Battle ..... \$34 Techno Cops ..... In Stock! Under Sea Commando ..... Call <b>ESCAPE SEQUENCE</b> Protosystem ..... \$108 <b>EZ Soft</b> EZ Backup ..... \$36 <b>FINALLY</b> Animation ..... In Stock! B Paint ..... \$27 <b>FIRST ROW</b> HoneyMothers ..... Call Prime Time ..... In Stock! Twilight Zone ..... Call <b>FREE SPIRIT</b> Media Line Fonts ..... In Stock! Securities Analyst ..... \$56 Sex Visions From Space ..... \$29 Ultimate Dos Utils ..... \$46 <b>FTL</b> Dungeon Master ..... Call <b>FULLER COMPUTING</b> Project D (New Version) ..... \$37 <b>GIMPEL SOFTWARE</b> \$65 <b>GOLD DISK</b> Comic Setter ..... \$74 Comic Setter Data Disks ..... Call Design 3D ..... Call Desktop Budget ..... Call Font Set 1 ..... \$34 Gold Spell 2 ..... \$34 Movie Setter ..... In Stock! Page Setter ..... \$94 Professional Draw ..... Call Transcript ..... Call <b>GRANDMA SW</b> Nag Plus ..... \$54 <b>GRAPHIC EXPRESSIONS</b> Mastering CLI ..... \$29 <b>HATTEX</b> A Drums ..... Call Amic Term ..... Call Haicall ..... \$44 <b>HASH ENTERPRISES</b> Animation: Effects ..... \$40 Animation: Flipper ..... \$40 Animation: Multiplane ..... In Stock! Animation: Rotoscope ..... In Stock! Animation: Stand ..... \$35 Animation: Apprentice ..... Call Apprentice Libraries ..... Call <b>HILTON ANDROID</b> Aesop's Fables ..... \$19 Chicken Little ..... \$19 Little Red Hen ..... \$19 Three Little Pigs ..... \$19 Ugly Duckling ..... \$22 <b>HI SOFT</b> DevPac Amiga ..... In Stock! <b>HYPERTEK</b> GCMF (Latest Version) ..... In Stock! GCMF 3.0 w/Buttons ..... \$54 <b>IMAGE TECHNOLOGY</b> King ..... \$20 <b>IN COGNITO</b> Atreides Prof BBS ..... \$99 Kingdoms of England ..... Call <b>Realms of the Warlock</b> ..... \$25 Snake Pit ..... In Stock! Tarps ..... In Stock! <b>IMPULSE</b> Turbo Silver ..... \$124 Terrain Disk ..... Call <b>INFINITY SOFTWARE</b> Galileo 2 ..... \$49 Grand Slam Tennis ..... \$38 Hot Licks ..... \$34 Shakespeare v1.1 ..... \$99 <b>INNOVATION</b> Broadcast Titrer ..... Call Video Effects 3D ..... \$142 <b>INOVATIONS</b> CAPE 68K ..... \$65 InovaTools ..... \$57 Power Windows 2.5 ..... \$63 <b>INTELLIGENT MEMORY</b> Emnetic Skimmer ..... Call Garrison ..... \$36 Garrison II ..... \$38 <b>INTELLIGENT MUSIC</b> M ..... \$149 <b>INTERACTIVE SOFTWARES</b> Calligrapher 1.0 ..... \$69 Lion's Calligraphers ..... \$32 Newsletter Fonts ..... \$32 Studio Fonts ..... \$32 <b>INTERPLAY</b> Battle Chess ..... \$34 <b>INTRACORP</b> Trump Castle ..... \$28 <b>JDK IMAGES</b> Pro Video Plus ..... \$199 Font Libraries for PV+ (ea.) ..... \$79 <b>JHM SOFTWARE</b> Easy Titrer ..... \$34 <b>KARA</b> Karafonts ..... \$54 <b>KFS SOFTWARE</b> The Accountant ..... \$189 <b>KINGSOFT</b> Emerald Mines ..... \$18 Emerald Mines II ..... In Stock! Fortress Underground ..... \$16 <b>KONAMI</b> Boot Camp ..... \$31 Contra ..... \$31 Jaxal ..... \$31 Rush'n Attack ..... Call <b>LAKE FOREST LOGIC</b> Disk Mechanic ..... \$60 <b>LAMPLIGHTER</b> Amix ..... Call Amix Professional ..... In Stock! <b>LATTICE</b> C++ ..... \$349 Compiler Companion ..... \$78 Other Products ..... Call <b>LYNN'S LUNA C</b> WB Extras ..... \$25 <b>MAGIC BYTES</b> Pink Panther ..... \$34 <b>MAGNETIC IMAGES</b> Clip Art Disks 1-8 (Each) ..... \$15 <b>MANX</b> Library Source ..... \$199 Aztec C-Dev ..... \$199 Aztec C-Pro ..... \$149 Source Level Debugger ..... \$57 <b>MASTERTRONIC</b> Feud ..... \$18 Kickstart 2 ..... \$17 Metropolis ..... \$31 Ninja Mission ..... \$18 Sidewinder ..... In Stock! Space Ranger ..... \$18 War In Middle Earth ..... In Stock! <b>MERIDIAN SOFTWARE</b> Demonstrator ..... \$27 Zing! Keys ..... \$49 Zing! Spells ..... \$57 <b>METACOMC</b> ISO Pascal (New Version) ..... Call Macro Assembler ..... \$79 Shell ..... \$45 Toolkit ..... \$35 <b>METADIGM</b> Metascope ..... \$79 <b>METRON</b> T Shell ..... \$34 <b>MICHTRON</b> AB Zoo ..... In Stock! Airball ..... \$28 Cashman ..... \$24 Karate Kid II ..... \$28 <b>MICRODEAL</b> AMAS ..... In Stock! Hit Disk! ..... In Stock! Insanity Fight ..... \$29 International Soccer ..... \$29 Leatherheads ..... \$29 Major Motion ..... Call Ringside ..... \$27 <b>Staylong</b> ..... \$29 Tetra Quest ..... \$27 Time Bandits ..... \$28 Turbo Gravity ..... \$21 <b>MICRO ENTERTAINMENT</b> Golden Pyramid ..... Call <b>MICRO ILLUSIONS</b> Black Jack Academy ..... \$29 Craps Academy ..... \$26 Discovery Data Disks ..... In Stock! Ebonstar ..... \$29 Faery Tale ..... \$34 Galactic Invasion ..... \$19 Land of Legends ..... \$29 Music X ..... \$219 Photon Paint ..... \$69 Photon Paint Expansion ..... \$23 Photon Vid. Transporter ..... Call Photon Vid. Cel Animator ..... \$51 Planarium ..... \$29 Romantic Encounters ..... \$29 Tracers ..... \$19 TurboPrint ..... \$27 <b>MICRO MAGIC</b> Forms in Flight 2.0 ..... \$80 <b>MICRO MASTER</b> Family Tree ..... \$34 <b>MICROPROSE</b> Silent Service ..... \$24 <b>MICROSERVICE</b> City Desk ..... \$110 Head Coach ..... \$39 <b>MICROSIMITHS</b> TxDed Plus ..... \$57 <b>MICRO SYSTEMS SOFTWARE</b> Analyze! 2.0 ..... \$74 BBS-PC ..... \$106 Excellence! ..... \$31 Risperd ..... \$31 Online! ..... \$42 Organizer! ..... \$63 Scribble! ..... \$125 The Works! ..... \$161 <b>MIMETICS</b> 3 Demos ..... \$72 Pattern Splatter ..... In Stock! SoundScape ..... \$130 Utilities I ..... \$40 Utilities 2 ..... In Stock! <b>MINOSCAPE</b> Balance of Power 1990 ..... In Stock! Blockbuster ..... \$27 Blocker ..... Call Captain's Hood ..... Call Combat Course ..... In Stock! Deja Vu ..... \$32 Harrier Combat ..... \$35 Hostage ..... In Stock! Ice Hockey ..... \$33 Indoor Sports ..... \$35 Into Eagle's Nest ..... \$33 Joker Poker ..... \$33 Perfect Score SAT ..... \$52 DeluxeHeld ..... \$33 Shadowgate ..... \$31 Uninvited ..... \$31 Willow ..... \$28 <b>MINDWARE</b> Charon 5 ..... In Stock! Holmes ..... Call Des Cartes ..... \$24 PageFlipper F/X ..... \$101 PageRender 3D ..... \$101 PageSync ..... Call <b>MSI</b> New Copy 1.3b ..... \$39 <b>MY MICRO</b> BAD ..... In Stock! <b>NEW HORIZONS SOFTWARE</b> Flow ..... \$69 ProWrite 2.0 ..... \$75 ProWrite (each) ..... \$26 ProScript ..... \$33 <b>NEWTEK</b> Dig-Paint ..... \$45 Dig-Droid ..... \$74 Dig-View 3.0 ..... Call Dig-View Gold ..... In Stock! <b>NEW VUE</b> Sound Oasis ..... In Stock! Dynamic Drums ..... \$59 Dynamic Studio ..... \$144 <b>OMNITRON</b> Breach ..... \$29 Breach Scenario ..... \$19 Paladin ..... \$19 Paladin Scenario ..... \$19 <b>OPCODE SYSTEMS</b> Music Mouse ..... \$49 <b>ORIGIN SYSTEMS</b> Auto Del ..... In Stock! Moebius ..... \$38 Ogre ..... \$29 Ultima III ..... \$35 Ultima IV ..... \$29 <b>OTO</b> DSM Disassembler ..... \$44 <b>OXIX</b> A-Talk III ..... In Stock! MaxPlan 500 ..... \$99 MaxPlan Plus ..... \$127 Nimbus 1 ..... \$99 Tax Break! ..... In Stock! <b>PEACOCK SYSTEMS</b> DB Tree ..... \$79 <b>POLYLOFT SOFTWARE</b> Crossword Creator ..... \$35 Dominos ..... \$18 Four In One ..... \$22 <b>PRECISION SOFTWARE</b> Pro Sound Designer ..... In Stock! Superbase Personal II ..... \$99 Superbase Professional 3 ..... \$229 <b>PROFESSIONAL SOFTWARE</b> Fleet Check ..... \$30 <b>PROGRESSIVE PERIPHERALS</b> Access 64 ..... Call CLIMATE ..... \$25 CLIMATE ..... \$40 DR Term Pro ..... \$69 IntroCAD ..... \$73 Mathomation ..... \$42 MicroLaywer ..... \$42 Pymat ..... \$54 <b>PROLIFIC SOFTWARE</b> ProASIM ..... Call Pro Board ..... \$425 Pro Net ..... \$425 <b>PSYGNOSIS</b> Aquaventure ..... Call Arena ..... \$15 Baal ..... In Stock! Ballistic ..... \$22 Barbarian ..... \$27 Captain Ez2 ..... In Stock! Chrono Quest ..... \$34 Deep Space ..... \$21 Fire Brigade ..... \$33 Menace ..... \$24 Obliterator ..... In Stock! Star Ray ..... Call Terrapods ..... \$28 <b>QUESTREK</b> Mission Conbat ..... In Stock! <b>RAINBIRD</b> Black Lamp ..... \$19 Carrier Command ..... \$33 Corruption ..... In Stock! Silicon Dreams ..... \$25 Space Cutter ..... \$20 StarGlider II ..... \$33 StarGlider II ..... In Stock! Univ. Military Sim. ..... In Stock! UMS Data Disks ..... Call VMS Data ..... \$21 <b>READYSOFT</b> 64 Emulator 2 ..... \$61 Bomb Busters ..... \$23 Cosmic Bouncer ..... In Stock! Dragon's Lair ..... In Stock! Ganymed ..... \$22 Rock Challenge ..... In Stock! Scary Mutants ..... In Stock! <b>RIB VIDEO CREATIONS</b> Available for Deluxe Paint II, Digipaint, Pagesetter, Photon Paint, and Calligrapher! <b>RIGHT ANSWERS GROUP</b> The Director ..... \$49 <b>SCORPION</b> Black Shadow ..... \$25 Foundation Waste ..... \$24 Ludosious ..... \$24 Phantasm ..... \$24 Space School Simulator ..... \$24 Synapse ..... In Stock! Transputer ..... \$24 <b>SEDONA SOFTWARE</b> Money Mentor ..... \$74 <b>SEGA</b> Alien Syndrome ..... In Stock! Out Run ..... In Stock! Shinobi ..... Call Space Harrier ..... In Stock! <b>SEVEN SEAS SOFTWARE</b> Color Commander ..... \$21 Doug's Math Aquarium ..... \$19 <b>SILVER SOFTWARE</b> DNA Music ..... \$55 Fractal Music ..... \$17 Primal Music ..... \$15 <b>SLIPPED DISK</b> Loto Magic ..... \$19 <b>SOFT CIRCUITS</b> I Debug ..... \$76 <b>SOFTLABS</b> Final Trip ..... \$18 Power Pack (3 Games) ..... \$18 Space Fight ..... \$18 Vader ..... \$18 <b>SOFTLINK</b> MultiPrets ..... \$23 Opa ..... \$28 <b>SOFT LOGIC</b> PaperStream ..... In Stock! <b>SW ADVANTAGE</b> Investor's Advantage ..... \$79 <b>SW INTEGRATIONS</b> Oriental Art ..... \$29 <b>SOFTWARE TERMINAL</b> Tele Epic ..... In Stock! Telegrams ..... \$26 Telemar ..... \$29 Telemar II ..... In Stock! <b>SOFTWARE VISIONS</b> Microfiche Filer Plus ..... \$115 <b>SOUND QUEST</b> Patch Editors ..... Call Texture (For Real!) ..... Call <b>SPECTRUM HOLOBYTE</b> Falcon - HD! ..... In Stock! Solitaire Royale ..... \$22 Tetris ..... \$25 <b>STAR SOFT</b> Formula One ..... \$21 Frost Byte ..... \$21 Seconds Out Bowling ..... \$21 Stock Market Game ..... \$19 Santa Paravia ..... In Stock! <b>SUBLOGIC</b> European Scenery ..... In Stock! Flight Simulator 2 ..... \$32 Japan Scenery ..... In Stock! Scenery Disk 7 or 11 ..... \$18 Scenery Disk 9 ..... Call <b>SUNRISE INDUSTRIES</b> Desktop Artist ..... \$23 Desktop Artist ..... \$75 <b>SUNSMILE SOFTWARE</b> Extend ..... \$29 Home Inv Manager ..... \$27 <b>SYNOPSIS</b> Interchange ..... \$40 Interchange Object ..... \$15 Interact ..... \$82 <b>TAURUS</b> X Cad ..... \$425 Acquisition ..... Call <b>TDI SOFTWARE</b> Modula-2 ..... Call <b>THE OTHER GUYS</b> Match It ..... \$29 Reason ..... \$39 Synthia ..... \$75 <b>THREE SIXTY</b> Dark Castle ..... \$29 Dark Castle ..... \$24 <b>TIGRESS</b> Diskwork ..... \$36 <b>TITUS</b> Crazy Cars ..... \$27 Fire & Forget ..... \$27 Off Shore Warrior ..... In Stock! <b>TRUE BASIC</b> Developer's Toolkit ..... \$30 Runtime Package ..... \$109 True BASIC ..... \$74 Libraries (each) ..... \$39 <b>TSB MEDIA</b> Bomber-Ad ..... In Stock! <b>UNICORN</b> Adv. of Simbad ..... \$35 Aesop's Fables ..... \$33 All About America ..... \$42 Animal Kingdom ..... \$35 Arabian Nights ..... \$35 Fraction Action ..... \$33 Kiderama ..... \$33 Logic Master ..... \$33 Magical Myths ..... \$36 Math Wizard ..... \$35 Read & Rhyme ..... \$33 Read-A-Rama ..... \$33 Word Master ..... \$35 <b>UNISON WORLD</b> Art Gallery 1 or 2 ..... \$20 Fonts & Borders ..... Call Print Master Plus ..... \$33 <b>VEGA</b> Amikit ..... \$29 <b>VIDEO VISIONS</b> Data Disks for PageFlipper ..... Call <b>WILLIAM HAWES</b> AReX ..... \$39 W-Shell ..... \$39 <b>WORDPERFECT CORP.</b> WordPerfect ..... \$179 WordPerfect Library ..... Call	Our objective is to carry every product for the Amiga — and sell them at the best prices. Our policy is to be as competitive as possible on all product prices. If you find a lower price, please give us a call. It is no longer closer to possible for us to list all the products we carry. If you don't see it listed, please call. Products are new and in stock. Products have not been released at press time. All other products are normally in stock (as well as hundreds more).
--	--	--

Orders Only:

In California:

Customer Service:

Facsimile (FAX):

**800-BE-AMIGA™**

**800-843-2842**

**415-364-9714**

**415-365-2073**

MasterCard

VISA

Now on CompuServe:

**71230, 2412**

Send Mail Orders to: **GO AMIGO** 2682D Middlefield Road, Redwood City, CA 94063  
 (Money Order, Cashier's Check, or Qualified P.O. only. California residents add sales tax.)

\*FREE SHIPPING on all Software Orders over \$100. OTHER SHIPPING INFO: Software Shipping rates are \$2.50/item using UPS Ground service (max. \$7.50) or \$4.50/item using UPS 2nd Day Air Service (max. \$13.50). Other shipping methods available. Call for hardware rates. APO, Mail, foreign shipping extra. Call for more info. RETURN & REFUND POLICY: All returns must have an RMA-#. Call Customer Service to request an RMA-#. Defective merchandise under warranty will be repaired or replaced. Returned product must be returned postage pre-paid with all original packaging. We do not offer refunds for defective products or products that do not perform satisfactorily. We make no guarantees for product performance. Any money back guarantee must be handled directly with the manufacturer. OTHER POLICIES: We do not charge your card until the product actually ships. Purchase order customers must have credit application on file. No surcharge for VISA and MasterCard. When ordering with credit card, PLEASE include exp. date and name of bank! Call Fridays for unannounced specials.

Amiga is a trademark of Commodore-Amiga. Go Amigo is in no way associated with Commodore-Amiga. Delivery subject to product availability • Prices subject to change

CIRCLE 012 ON READER SERVICE CARD



Gold Disk. The package includes TransEdit, a stripped-down version for editing only, and TransSpell, a 90,000-word spelling checker that works alongside Transcript or as a stand-alone program.

Abacus' **AmigaDOS Toolbox** (\$59.95) has all the tools you need to make your Amiga computing easier and more productive. Tools include eleven new fonts, DeepCopy (disk copier), BTSnap screen grabber deluxe, the Diskmon disk-editor and Speeder, a data speedup utility. The package also includes the **AmigaDOS Quick Reference** book.



Gramma Software presents **Nag Plus 3.0** (\$79.95), a handy new schedule assistant with the unique ability to verbally remind you of up to 99 events per day—and “nag” you about them. Features include a Note Pad text editor and a Perpetual Calendar—and Nag Plus 3.0 can even dial the phone for you via modem. Gramma's **FreD the Speedialer** (\$49.95) will store as many phone numbers for you as memory permits, then dial the telephone for you with one click. Also in the works is **NoMo**, a small, inexpensive piece of hardware that lets you dial the phone *without a modem*, using the Amiga's audio-out port. **Gramma's Story Teller** displays pictures as Mom and Dad read the text—and Gramma's digitized voice encourages children to interact with the story.

**Mastering CLI, Version 2.0** (\$39.95) from Graphics Expressions provides beginners with interactive AmigaDOS tutorials. Two additional programs, Assistant and tinyAssist, supply the new CLI user with online

help with the most commonly used commands and a quick reference list of the AmigaDOS commands.

**Desktop Budget** (\$69.95) is the first product in Gold Disk's new Home Office Series of personal productivity software. A personal finance management program, Desktop Budget handles complex budgeting in an intuitive, icon-based manner. Budgeting and bookkeeping becomes as simple as point and click!

For use with Award Maker Plus, Baudville's new **Sports Award Library** (\$29.95) lets you create awards with hundreds of professionally designed award styles honoring both male and female achievers. Ten new border styles and four new fonts are also included on the disk. A second library, the **Education Award Library**, should also be available this spring.

The latest releases from Meggido Enterprises are **Desserts Cookbook** and **Variety Cookbook** (\$14.95 each). Both products are packed with over 150 tantalizing recipes, complete with nutritional analyses, in either the Home (standard) version or the Quantity version, for large-quantity institutional cooking.

A greatly improved Amiga printer driver for the Hewlett-Packard DeskJet, Creative Focus' **Super\_DJ** (\$25) eliminates muddy graphics, speeds up graphic dumps, allows users to change fonts at will and eliminates the resetting of cartridge fonts with every change of Preferences.

**ExpressCopy** (\$44.95) from Express-Way Software is a hard disk backup and file copy utility, capable of copying files from hard disk to floppy at a rate of up to 1Mb per minute, 600K bytes per minute with verify of backup disks. Backup disks have the same directory structure and file attributes as the original files, and can be used normally.

Software Visions, Inc. introduces their **Designer Database** series of ready-to-use databases for their Microfiche Filer line with two disks. **Home I** (\$39) includes database formats for videotape, audio recording, stamp, and recipe catalogues, a home

budget and personal inventory. **Business II** (\$59) includes a daily calendar, mail merge (with macros), expense report, general ledger, and a sophisticated invoicing/inventory application.

MicroEd's **Computerized Lesson Authoring System Version 1.2** (\$99) uses straightforward English commands to let parents and teachers without programming experience develop custom learning programs. Developed with CLAS, the **Beginning German** disk (\$69.95) uses the Amiga's voice to instruct users in German. **Image Spinning** (\$49.95) encourages users to play with words, creating interesting word combinations, and then putting them into a poem.

## New Games Galore!

**Lost Dutchman Mine** (\$49.95) from Magnetic Images is actually several games in one. Journey to the Old West and try your hand at cards, fishing, hunting bandits in the desert—or search through over 100 mines and caves for the legendary



lost gold mine. For more golden adventures, **Gold of the Realm** (\$39.95) offers three levels of challenges as you explore castles and countryside, looking for keys, clues and magic items to help you in your quest.

New games from Mindscape Inc. include **Balance of Power: The 1990 Edition** (\$49.95), an updated and expanded version of the classic geopolitical simulation. Now, non-superpower countries pursue active foreign policies, adding realism to the game. **Willow** (\$39.95) combines an adventure game with arcade sequences, for an adventure-fantasy based on the popular George



Lucas/Ron Howard movie. **Combat Course** (\$39.95) puts you in a top-secret training camp, where you face dynamite, grenades, dogs, trenches and an unrelenting drill sergeant.

Mindscape will also be releasing Amiga versions of several Sega arcade hits: **Out Run** (\$49.95) brings Sega's top arcade car-racing game to the Amiga. Choose the music on your car radio and test your driving skills on the hottest courses around. **Thunder Blade** (\$49.95) lets you pilot the ultimate attack helicopter through startlingly real landscapes, fighting the enemies of freedom. In **Space Harrier** (\$49.95) you're an astral exterminator charged with blasting invading aliens off the face of an endangered planet.

From Great Britain come two new Microdeal games to be released by MichTron. In **Airball** (\$39.95), you've been turned into a leaky rubber ball, and must search through 300 hazard-filled rooms for the magic spells that will return you to your proper form. **Slip Stream** (\$24.95) sends you flying on a mission to destroy nine alien power crystals. Each of the nine Streams of the Slip-Stream is filled with new and different obstacles for you to blast and dodge.

Liberate the galaxy in Titus Software's **Galactic Conqueror** (\$44.95), a fast-action strategy game that pits you and your space fighter against unknown invaders. You choose which planets are strategically vital—then go there for fast arcade action as you meet the enemy in the air and in outer space.

Free Spirit Software, Inc. announces **The Last Inca** (\$39.95), a graphics/text adventure that takes you back to the days of the Incan Empire. You play a young warrior chosen to seek the Crown of Power and oppose the evil wizard Zulphosi.

If you're looking for classic fantasy adventure, Melbourne House (Mastertronic) presents **War in Middle Earth** (\$49.95), a multiple-disk adventure that brings the drama and excitement of Tolkien's epic "Lord of the Rings" trilogy to the computer.

You alternately take on the role of such characters as Frodo, Gandalf, Faramir and Aragorn as you seek to destroy the One Ring of the Dark Lord Sauron, in a mix of fantasy role-playing, animated adventure and military strategy.

Data East USA, Inc. brings three action-adventure games to the Amiga. Based on the movie (and the coin-op arcade game), **Robocop** (\$44.95) sets you in the corrupt underworld of Old Detroit, where you



shoot, kick, punch and jab your way through the streets, parks—and even City Hall. Or, liberate a country and rescue your fellow guerrillas in **Guerilla War** (\$44.95). This arcade hit features tank battles, air raids and plenty of enemy soldiers for you to battle with bazookas, flamethrowers and grenades. Foil the Penguin and rescue Robin from the Joker in **Batman, the Caped Crusader** (\$44.95). In keeping with the upcoming movie, the game returns Batman to his gritty vigilante roots, and you'll go from rooftop to sewer as you collect the clues and weapons you need.

Take the controls with **Gunship** (\$54.95), the popular 3-D combat helicopter simulation from MicroProse Software—now with improved graphics and sound that take advantage of the Amiga's capabilities. Your AH-64A Apache's arsenal includes Hellfire and Sidewinder missiles, Folding Fin Aerial Rockets and a 30mm cannon, all useful for missions that range from training flights to

thoroughly documented missions in Southeast Asia, Central America, the Middle East and Western Europe.

Rescue scientists trapped by hostile aliens aboard a derelict spaceship in **Charon 5** (\$34.95), a challenging new arcade/strategy game from Mindware International.

Mixing humor and horror, **Manhunter: New York** (\$49.95) from Sierra On-Line presents a sci-fi tale that takes you to New York—two years after an alien invasion and takeover. You work for the aliens, visiting unusual places as you track down subversive human agitators, in this Sierra 3-D Animated Adventure.

## Hardware Arrivals

Now you can speed up your computer with an affordable 68020 accelerator—the **Midget Racer** (\$399) from CSA (Computer System Associates, Inc.). Easily installed in any Amiga 500, 1000 or 2000, the Midget Racer is ideally suited for processor-intensive applications such as desktop presentations, video, animations, spreadsheets and CAD. According to CSA, spreadsheet operations are up to 60% faster than on a standard Amiga.

Communications Specialties introduces **Gen/One** (\$895) a genlocking encoder for the Amiga, featuring Super-VHS Y/C, RS-170A outputs and full control over RGB input and video output levels. Gen/One operates in three different modes, with two overlay capabilities, and includes a self-contained power supply.

From VidTech, the **Scanlock VSL-1** genlocking system allows the Amiga to integrate VCR and video camera images with the Amiga's own video signal. Two models are available—the NTSC broadcast format compatible VSL-1N (\$995) and the PAL (European standard) compatible VSL-1P (\$1,095).

Turn images into black and white IFF files with Gold Disk Inc.'s hardware/software interface for the **Canon IX12** black-and-white, 300 dot-per-inch scanner. Complete with Amiga parallel port hardware and software interface, the scanner retails for \$1,095.



For Amiga 500 owners, **MicroMegs** (\$199, chips included) from Memory and Storage Technology (M.A.S.T.) is an alternative to the Amiga A501 internal expansion RAM. No simple clone, MicroMegs is half the size of the Amiga card and, with only four CMOS RAM chips, MicroMegs saves significant power. MicroMegs also includes a battery-backed real-time clock.

For Amiga 2000 owners, Supra Corporation's **SupraModem 2400** (\$179.95) internal modem is an easy-to-install half-card that supports asynchronous operation at 2400, 1200 and 300 baud. Fully Hayes-compatible, the modem includes non-volatile memory for storing your own easily-created custom configurations.

## MANUFACTURERS

Abacus, 5370 52nd Street SE, Grand Rapids, MI 49508. (616) 698-0330.

CIRCLE 276 ON READER SERVICE CARD

ASDG Incorporated, 925 Stewart Street, Madison, WI 53713. (608) 273-6585.

CIRCLE 277 ON READER SERVICE CARD

Baudville, 5380 52nd Street SE, Grand Rapids, MI 49508. (616) 698-0888.

CIRCLE 278 ON READER SERVICE CARD

Communications Specialties, 89A Cabot Court, Hauppauge, NY 11788. (516) 273-0404.

CIRCLE 279 ON READER SERVICE CARD

Computer System Associates, (CSA), 7564 Trade Street, San Diego, CA 92121. (619) 566-3911.

CIRCLE 280 ON READER SERVICE CARD

Creative Focus, Box 580, Chenango Bridge, NY 13745.

CIRCLE 281 ON READER SERVICE CARD

Data East USA, 470 Needles Drive, San Jose, CA 95112. (408) 286-7074.

CIRCLE 282 ON READER SERVICE CARD

Elan Design, P.O. Box 31725, San Francisco, CA 94131. (415) 621-8673.

CIRCLE 283 ON READER SERVICE CARD

Express-Way Software, P.O. Box 10290, Columbia, MO 65205. (314) 474-2984.

CIRCLE 284 ON READER SERVICE CARD

Free Spirit Software, P.O. Box 128, Kutztown, PA 19530. (215) 683-5609.

CIRCLE 285 ON READER SERVICE CARD

FTL Games, 6160 Lusk Blvd., Suite C206, San Diego, CA 92121. (619) 453-5711.

CIRCLE 286 ON READER SERVICE CARD

Gold Disk, P.O. Box 789, Streetsville, Mississauga, Ontario, Canada L5M 2C2. (416) 828-0913.

CIRCLE 287 ON READER SERVICE CARD

Gramma Software, 17730 15th Avenue NW, Suite 223, Seattle, WA 98155. (206) 363-6417.

CIRCLE 288 ON READER SERVICE CARD

Graphic Expressions, P.O. Box 110028, Nutley, NJ 07110. (201) 661-0408.

CIRCLE 289 ON READER SERVICE CARD

LaserUp! Software, S. Anthony Studios, 889 De Haro St., San Francisco, CA 94107. (415) 826-6193.

CIRCLE 290 ON READER SERVICE CARD

Magnetic Images, P.O. Box 17422, Phoenix, AZ 85011. (602) 265-7849.

CIRCLE 291 ON READER SERVICE CARD

MegageM, 1903 Adria Street, Santa Maria, CA 93454. (805) 349-1104.

CIRCLE 292 ON READER SERVICE CARD

Meggido Enterprises, P.O. Box 3020-191, Riverside, CA 92519. (714) 683-5666.

CIRCLE 293 ON READER SERVICE CARD

Melbourne House/Mastertronic, 711 West 17th Street, Suite G9, Costa Mesa, CA 92627. (714) 631-1001.

CIRCLE 294 ON READER SERVICE CARD

Memory and Storage Technology (MAST), 3881 Benatar Way, Chico, CA 95928. (916) 342-6278.

CIRCLE 295 ON READER SERVICE CARD

MichTron, 576 S. Telegraph, Pontiac, MI 48053. (313) 334-5700.

CIRCLE 296 ON READER SERVICE CARD

MicroEd, P.O. Box 24750, Edina, MN 55424. (612) 929-2242.

CIRCLE 297 ON READER SERVICE CARD

MicroIllusions, 17408 Chatsworth Street, Granada Hills, CA 91344. (800) 522-2041, (818) 360-3715.

CIRCLE 201 ON READER SERVICE CARD

MicroProse Software, 180 Lakefront Drive, Hunt Valley, MD 21030. (301) 771-1151.

CIRCLE 202 ON READER SERVICE CARD

Mindscape, 3444 Dundee Road, Northbrook, IL 60062. (312) 480-7667.

CIRCLE 203 ON READER SERVICE CARD

Mindware International, 110 Dunlop Street W., Box 22158, Barrie, Ontario, Canada L4M 5R3. (705) 737-5998.

CIRCLE 204 ON READER SERVICE CARD

New Horizons Software, P.O. Box 43167, Austin TX 78745. (512) 328-6650.

CIRCLE 205 ON READER SERVICE CARD

NewTek, 115 West Crane Street, Topeka, KS 66603. (913) 354-1146.

CIRCLE 206 ON READER SERVICE CARD

Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614. (209) 683-6858, (800) 344-7448—orders only.

CIRCLE 207 ON READER SERVICE CARD

Software Visions, P.O. Box 3319, Framingham, MA 01701. (617) 875-1238.

CIRCLE 208 ON READER SERVICE CARD

Supra Corporation, 1133 Commercial Way, Albany, OR 97321. (503) 967-9075.

CIRCLE 209 ON READER SERVICE CARD

Titus Software, 20432 Corisco Street, Chatsworth CA 91311, (818) 709-3693.

CIRCLE 210 ON READER SERVICE CARD

VidTech International, 2822 NW 79th Avenue, Miami, FL 33122. (305) 477-2228.

CIRCLE 211 ON READER SERVICE CARD

**AMIGA Plus cannot assume responsibility for the accuracy of advance information provided by the makers of products announced in the New Products notices.**



# HiSoft BASIC Professional

FAST, FRIENDLY COMPILED BASIC

Review by David Plotkin

**HiSoft BASIC Professional** from MichTron is a fast, compiled BASIC that supports many of the Amiga's special features. While it does not permit direct access to Intuition, it provides a friendly, structured programming environment. Coupled with the excellent manual, it definitely merits a close look from both advanced and beginning programmers.

HiSoft provides a complete programming environment—from the editor to the included libraries. The editor is used for entering text, but since the files are simply ASCII files, you can use your favorite text editor, although you give up the interactive nature of the compiler if you do.

The editor functions as a rudimentary word processor. Its pull-down menus also include keyboard shortcuts for most commands (many are the same as those used in Amiga-BASIC). Besides being able to enter, edit, save and load text, you can search and replace, move to the top and bottom of the file, and perform cut and paste operations on blocks of text. You can even cut a block of text from one file, close the file, open a new file, and paste the block into the new file. The editor can be set to perform auto-indenting, making nested loops easier to find.

You have the choice of running your program immediately or com-

piling the program to disk. If you choose to run your program, it will actually be compiled to memory, then executed. Compiling to disk produces an executable file and optional icon, so the program can be run from either the Workbench or the CLI.

The HiSoft compiler is capable of producing two types of files. The first requires that various libraries be available in the LIBS: Directory, and thus is not truly "stand-alone." However, these files can be quite a bit smaller than the truly stand-alone files, where any necessary library calls are built into the compiled code. The non-stand-alone files make more sense if there are several HiSoft programs on a disk, and each one can call the common libraries. But if you want to just put one program on a disk and have it run without requiring anything else, then you should select the second type of compiler output.

There is no syntax checking whatsoever in HiSoft when you are entering your source code. All errors are caught during the compile stage. When an error is found, the compiler stops and gives an error message, then gives you the option of continuing the compile. If you don't continue, the editor is reloaded and your program appears, with the cursor on the offending line. You can then cor-

rect the error and attempt to recompile the program.

## Full Of Features

HiSoft includes many of the features that have come to be expected in modern BASICs. It supports integer, long integer, string, and single and double precision floating point variables. HiSoft also supports arrays with dimensions limited only by available memory, as well as string arrays. These arrays are dynamic—you can redimension them (with retention of data, if you want) and erase them, freeing their memory for other uses.

HiSoft does not require line numbers, although they can be used to stay compatible with older BASICs. Labels are available to mark important places in the program in lieu of line numbers, and the two can be combined.

Among the most important features of any language are its loop structures. In addition to FOR/NEXT (with an EXIT FOR option to jump out of the FOR loop), HiSoft provides WHILE/WEND, DO/LOOP and REPEAT/END REPEAT. The most general form is DO/LOOP since the modifiers WHILE and UNTIL can be used at both ends of the loop. Thus, the loop can begin with a condition such as DO UNTIL X=Y and end with something like LOOP WHILE



$Z + Q = 5$ . You may use DO/LOOP with no modifiers at all, in which case the loop will execute forever, unless the EXIT LOOP option is used. A condition is placed after the WHILE statement in the WHILE/WEND loop, and the loop executes while that statement is true. The REPEAT/END REPEAT differs from the REPEAT/UNTIL norm, however, because no conditions may be specified, and the only way to exit the loop is with the EXIT.

Another important aspect of a programming language is the decision process. HiSoft supports the multiline IF statement, along with ELSE and ENDIF. It also supports SELECT CASE, where a series of results can be specified based on the value of a variable. An exact match to the variable, a range of values for the variable, or a logic test (greater than, less than, etc.) can be used to specify which block of statements to execute. There is even a block which can be executed if none of the other conditions are met (ELSE).

### **SubPrograms And Functions**

HiSoft supports the elements of structured programming with subprograms and functions. The subprograms differ from what is referred to as a "subroutine" in most BASICs (entered typically with a GOSUB), although these can be used as well. The HiSoft subprogram has its own set of variables, and parameters can be passed either by value or reference. Variables from the main program can only be used in the subprogram if they are declared as SHARED (also known as global variables). Variables within a subprogram can be either LOCAL (initialized every time the subprogram is called) or STATIC. Subprograms can be called recursively (they can call themselves) as well as call other subprograms. A subprogram must be declared before it is used, either by placing the subprogram itself in the code before it is called, or using the DECLARE statement to let the compiler know that the subprogram is going to be defined further along. Subprograms can

be called either with the CALL command or just by stating their name as a command.

User-defined functions are largely similar to subprograms. However, they return a value and can be used in an equation, just like system functions such as SIN, COS or LOG. The value you want returned by the user-defined function is equated to the function name within the function definition. All kinds of decisions can be made within a function, making this a very powerful construct.

### **Pictures & Sound**

Graphic support in HiSoft extends to lines, boxes, circles and areas. Any of these can be filled, and user-defined patterns and lines are available. POINT returns the color under the cursor, and single points can be turned on (PSET and PRESET). Menus can be built in the program by specifying the menu titles and items. The mouse position and condition of the mouse buttons can also be read. Joystick support (both the stick position and the fire button position) is provided, although if you attempt to read the condition of a joystick plugged into the mouse port, the mouse will no longer respond.

HiSoft also supports "interrupt programming," that is, it interrupts its current task to perform another one when a specified condition occurs. Interrupts are available for ON ERROR, ON BREAK, ON COLLISION, ON MENU, ON MOUSE and ON TIMER, along with the standard ON GOSUB and ON GOTO.

HiSoft handles both random access and sequential files. For random access files, all input and output to the disk must be in string format, but a full set of functions to convert numbers to strings and back again are provided. Also supported is the complete set of OBJECT commands—to create objects, specify their starting positions, velocity, acceleration, priority and collision detection. These commands work exactly as they do in Amiga BASIC.

Sound support allows you to specify the voice, frequency, duration

and volume. You can even synchronize multiple sound statements by delaying execution until all the voices you want to use have been set, and then turning on all the sounds to play together. For windows, you can set the window title, which gadgets you want, resolution and number of colors, and even specify that you want a window automatically redrawn when it is uncovered by another window. Intuition will maintain a buffer that contains the contents of any covered window. This is handy, since HiSoft essentially has no way to receive a message that a window has been uncovered so that the program can redraw it.

### **Manual Labor**

The manual which comes with HiSoft is very, very good. It opens with a tutorial, then provides an alphabetical listing of all the commands, complete with snippets of code to illustrate uses. Appendices cover such things as error messages, compiler options, and machine language.

I have two quibbles with the manual. First of all, the example programs (Towers of Hanoi) are excessively complex for an introduction. More important, the OBJECT commands are not documented. Instead, you are referred to the AmigaBASIC manual. While everyone has an AmigaBASIC manual, it is annoying to have to go dig it out when the OBJECT commands could have been documented in the HiSoft manual.

In my opinion, HiSoft BASIC is an excellent language, combining a good manual, structured constructs and powerful loop commands with blazingly fast results. This language is definitely worth investigating if you want to program your Amiga in BASIC with near-professional results. ■

**HISOFT BASIC PROFESSIONAL \$159.95**

Distributed by MichTron, 576 South Telegraph, Pontiac, MI 48053. (313) 334-5700. 1 meg recommended.

CIRCLE 258 ON READER SERVICE CARD



# The BEST AMIGA DISKS

Quality User Supported Software works with all Amiga systems

**\$7** Each  
Buy 1-4 Disks

**\$6** Each  
Buy 5-14 Disks

**\$5** Each  
Buy 15 or more Disks

## So easy to Use

- ▼ No Computer Experience Necessary
- ▼ Instructions for each Order
- ▼ FREE Phone Support

## So Easy to Order

- ▼ FREE Membership ▼ FREE 800-# for Orders
- ▼ FREE Same-day Shipping
- ▼ UPS 2nd Day Air Service when you need it Now!
- ▼ FREE Catalog ▼ Your Satisfaction Guaranteed

## THE TOP 10

- ❑ #131 PacMan '87 - Great sound and graphics. Adds new elements to PacMan. Saves Top 10.
- ❑ #127 Wheel of Fortune - A great computer version for multiple players. It even talks.
- ❑ #23 Monopoly - Enjoy great graphics and sound while playing three tough computer opponents.
- ❑ #37 Business Programs - Included are an address book, an amortization program, a talking mail manager, and a label printer.
- ❑ #27 Amoeba Invaders - A better Space Invaders!
- ❑ #140 Virus Killer - Everyone needs this! Makes it easy to detect and eliminate known viruses.
- ❑ #115 Word Processor - Lots of features.
- ❑ #134 Applications - Label maker/printer, grocery list maker, and AMIGazer - a star viewing program.
- ❑ #142 Q-Bert - Like the popular arcade version.
- ❑ #139 Bull Run - Great Civil War strategy board game, with impressive graphics and sound.

1-800-444-5457 for Orders

## THE BEST OF THE REST

503-664-5953 - Foreign Orders

### BUSINESS/HOME

- ❑ #116 Business II - VC-Spreadsheet, HP-10c calculator, and several diversions for when the boss isn't looking!
- ❑ #117 Business III - DataBase, a bunch of great new fonts, RSLClock-great clock utility, AmigaSpell.

### LANGUAGES

- ❑ #9 FORTH - Two versions of the FORTH programming language.
- ❑ #50 XLISP - A version of LISP, the artificial intelligence language. Includes documentation.

### COMMUNICATIONS

- ❑ #4 Communications - Starter and Aterm are both included. Both run from Workbench or CLI and are comparable to communications packages selling for \$50+. Full control of baud rates, phone directory, all protocols, auto chop of files, and many other extras. Works well with the Avatex 1200 modem and others. Source code included.
- ❑ #90 Modem Madness! - Terminals include StarTerm, Aterm, and Kermit. Telecommunication utilities such as Archive are also here. Other types of programs and utilities are also included in the price of admission.

### UTILITIES/APPLICATIONS

- ❑ #60 AmigaBasic - Two programs that are truly of commercial quality. Cell-Animate and Graphit. Some Deluxe Paint picture files are also included.
- ❑ #97 Tutorial Disk1 - A disk full of information and programs to instruct Amiga Programmers and users. Several C & ASM source files are included.
- ❑ #98 Tutorial Disk2 - More of the best of Amiga Information.
- ❑ #101 Utilities - Many new utilities like Timeset - a time setting utility and DirCopy-a great copier (very quick), and about a dozen more. Some new fonts are also included on this disk.
- ❑ #105 Potpourri I - This disk contains several different kinds of programs, some of the highlights are: PopCLI2-evokes a new CLI window at the press of a button; PSound-sample sound recorder and editor; 3-D Breakout; DiskCat-catalogs and organizes disk files; IconMaker-makes icons for most programs so that they can run from Workbench; FKey-template maker.
- ❑ #129 Amiga Utilities II - A hard disk backup; Target-sounds a gunshot whenever the left mouse button is pressed; Dpaint Tutor; WinSize-change window size from CLI easily, and lots more.
- ❑ #132 Videomaker Utilities - This disk is packed with utilities to make your desktop videos easier to produce and more professional looking.

- ❑ #133 DOS Helper - A program designed to help you with the AmigaDOS commands. Can be activated from icon of the CLI. Supports multitasking, so that you can refer to it when you need it. As usual, there are other good programs included on the disk.
- ❑ #135 Applications II - Long Movie-plays several IFF pictures in fast succession, creating animation. QuickBase-a mail manager DBase. Persmail-a DataBase for keeping records of friends, family, associates, customers or employees. MORE.
- ❑ #146 Calendar - A very good personal calendar for birthdays, holidays, meetings, bills and other events. Excellent graphics. Calendar program also has a diary. Other programs include some graphics and Checkbook.
- ❑ #150 Textcraft+ Demo - A demo of a very good word-processing program of high quality. Menu driven. Has a lot of help to show you how. Textcraft+ also has a Speller Check available.

### SOUND/MUSIC

- ❑ #18 Future Sound Demo - Another great sound demo of digitized sound. Includes the wicked witch of Oz, breaking dishes, sea gulls, car crash, ducks, others.
- ❑ #30 Super Sounds - Great digitized sounds from movies like Star Trek, 2001, James Bond movies, Star Wars, and Starman, Is it real or is it the Amiga?!!!
- ❑ #77 Instruments - Turn your keyboard into 25 different musical instruments.

### SLIDE SHOWS

- ❑ #1 Norman Rockwell - 17 beautiful digitized Rockwell paintings in this self-running slideshow presentation. You've got to see these!
- ❑ #55 EA Demo and Polyscope - More great graphics for your enjoyment.
- ❑ #67 DPSlide8 - Over 30 slides of all sorts on this self-running slideshow.
- ❑ #94 Diga-View - This one shows the digitizing process in stages. Several good pictures are included. Other programs also included.
- ❑ #95 DigaSlide11 - Another in the great series of slideshows with great artwork. Self-running with over 25 pictures.
- ❑ #108B Juggler - Famous demo that shows the beautiful graphics of the Amiga and just how powerful this program is. It is easier to run than 108A, but only has the one demo on it.

### GAMES

- ❑ #38 Basic GrabBag2 - Around 25 programs of various types. Many of these are must-haves. At less than \$20 each, you can't go wrong!
- ❑ #44 Games3 - More great games including Life, Vegas Slot Machine, Reversi, others.

- ❑ #52 Basic Games - Tons of ABasic games - discover some treasures!
- ❑ #61 Abasic GrabBag1 - Only about 100 of all types!!!!
- ❑ #102 Sinking Island - Return to Sinking Island is an excellent adventure game. Well worth the price - hours of enjoyment!!!!
- ❑ #114 Potpourri X - Othello, A key-shortcut program for AmigaDos. Various new tools, automatic printer-driver generator, much more.
- ❑ #118 Great Graphic Games - Includes Missile Command, 2-D Triclops, Cosmo-asteroids clone, BrakeOut, Yatzee, Hack and more.
- ❑ #121 Backgammon - A great game from David Addison.
- ❑ #122 Solitaire - Two versions by David Addison.
- ❑ #123 Cribbage - Take on the computer or a friend.
- ❑ #124 Milestone - A great computer version of Miles Bourmes by the author of Monopoly for the Amiga, David Addison.
- ❑ #125 Othello - A great 3-D version of this popular game.
- ❑ #128 Space Games - Cosmoroids (like asteroids) and Gravity Wars highlight this disk just full of games.
- ❑ #137 Blackjack - A full-featured game which allows pair-splitting, double-down, etc. Bandit-play the slot machines without going to Vegas!!! More.
- ❑ #141 Dominoes - Dominoes game with great graphics. Also Tic Tac Toe, Drawing and Molecules programs.
- ❑ #147 Jackland/Graphics - Adventure clue game. Also some great pictures (graphics), a useful utility called Quickbase, and a fun program called Thingies which you will enjoy!!!
- ❑ #148 Boulder Dash - Very popular game with excellent graphics and has several challenging levels. This disk is full-it has Othello, Life3 and many useful utilities.
- ❑ #151 4 in a Row - A fun, but challenging game you play against the computer. There is an excellent Demo "MandFXP-D3", a utility or 2 and the fun TARGET - A weirdo thingy.

### MISCELLANEOUS

- ❑ #88 Amiga Basic Programs - Over 50. Games, utilities, applications, entertainment, and finance. Also included is a program that allows you to use IFF files in your Amiga Basic programs.
- ❑ #119 mCAD - A full-featured computer-aided design program.
- ❑ #136 Graphics2 - Border Set-useful for desktop publishing and video, making cards, coupons or menus, and your own artwork. Xicon-allows you to run AmigaDOS commands or programs from Icon.
- ❑ #144 Christmas Animations - 10 beautiful scenes and graphics with sound. Great scenes include: Lit Candle, Elves, The Christmas Tree, The Manger, Season's Greetings, Holly Wreath, Chimney Smoke, Church Bells, and Walking Home.
- ❑ #145 Animations 3 - More Great Animations. 3 very good demos plus 3 workbench pictures and Blobs.

Name _____	Disks Ordered _____ x _____ \$ _____
Address _____	❑ SHIPPING Free U.S. \$ _____
City _____ State _____ Zip _____	Canada - 25¢ per disk Foreign - 50¢ per disk
Phone (_____) _____	❑ COD \$ _____
Visa/MC _____	(add \$4 if you require COD)
Sig. _____	❑ U.P.S. 2nd Day Air (Add \$3) \$ _____
Exp. Date _____	TOTAL \$ _____
❑ Send Catalog	❑ Check/MO ❑ Visa/MC ❑ COD

**Software Excitement!**

P.O. Box 5069 • Central Point, OR 97502



**ORDER TODAY**



**1-800-444-5457**



You can only

# FREE THE PING

## FREE SHIPPING ON SOFTWARE ORDERS OVER 100!

Via UPS 2nd Day Air, US Only  
(Alaska & Hawaii excluded). COD add \$3.00

### TELECOMMUNICATIONS

A-Talk III	\$69
Atredes BBS	\$69
Atredes w/SkyPaint	\$99
BBS-PC!	\$99
Dr. Term Pro	\$69
Online! v2.0	\$45

### PRODUCTIVITY

The Accountant	\$189
Analyze! 2.0	\$69
Data Retrieve	\$59
Data Retrieve Pro	\$199
Desktop Budget	\$49
Excellence!	\$175
Investor's Advantage	\$69
Kind Words	\$65
Maxiplan Plus	\$129
Microfiche Filer Plus	\$129
Money Mentor	\$65
Phasar	\$65
Pro Write 2.0	\$79

### ENTERTAINMENT

Alien Syndrome	\$27
Arkanoïd	\$19
Baal	\$21
Balance of Power 1990	\$32
Battle Chess	\$32
Blitzkrieg Ardennes	\$39
Boot Camp	\$27
Breach	\$27
Breach Seryachi	\$19
California Games	\$32
Capone	\$27
Captain Blood	\$32
Captain Fizz	\$21
Carrier Command	\$29
Contra	\$27
Creature	\$27
Devonaire	\$32
Distant Armies	\$29
Dragon's Lair	\$42
Dungeon Master	\$27
Elite	\$29
Emerald Mine II	\$27
Faery Tale Adventure	\$32
Falcon	\$32
Firepower	\$19
Flight Simulator II	\$32
FS II Scenery (ea)	\$18
Harpoon	\$27
Hole in One Mini Golf	\$23
Hole in One Courses 1	\$15
Hostage	\$29
Hybris	\$27

Impossible Mission II	\$15
Jackal	\$27
Jet	\$32
King of Chicago	\$32
Kybos	\$23
Lords of Rising Sun	\$32
Mean 18	\$29
Mean 18 Courses 2	\$15
Neuromancer	\$29
Operation Wolf	\$27
Outrun	\$32
P.O.W.	\$27
Paladin	\$27
Paladin Scenario Disk	\$19
Pioneer Plague	\$27
Prime Time	\$27
Qix	\$27
Rastan	\$27
Realm of the Warlock	\$23
Renegade	\$27
Rocket Ranger	\$32
Roger Rabbit	\$29
Rush'n Attack	\$27
Shanghai	\$15
Silent Service	\$27
Skate Wars	\$32
SkyChase	\$27
Sky Shark	\$27
Starglider II	\$29
Street Cat	\$21
Street Fighter	\$27
Sub Battle	\$15
Superstar Ice Hockey	\$32
Sword of Sodan	\$32
Techno Cop	\$32
Terrorpods	\$27
Test Drive II	\$29
Test Drive II Cars	\$15
Test Drive II Scenery	\$15
Three Stooges	\$32
TV Sports Football	\$32
Twilight Zone	\$27
Universal Military Sim.	\$32
Ums Scenarios 1 or 2	\$15
War in Middle Earth	\$32
Wayne Gretzky Hockey	\$32
W.C. Leaderboard	\$29
Zak McKracken	\$29
Zoom!	\$21
Zork Zero	\$42

### ELECTRONIC ARTS

Aaargh!	\$25
AD&D Heroes	\$25
Annals of Rome	\$23
Artura	\$25
Awesome Arcade Pak	\$32
Bard's Tale	\$32
Bard's Tale II	\$39
Bard's Tale Clue Book	\$11
Bard's II Clue Book	\$11
Chessmaster 2100	\$32
Clue: Master Detective	\$25
Deluxe Music	\$65
Deluxe Paint III	\$85
Deluxe PhotoLab	\$95
Double Dragon	\$25
Earl Weaver Baseball	\$32
EWB Commissioner Disk	\$15
EWB MLBPA Stats	\$15
Empire	\$32
Ferrari Formula One	\$32
Firezone	\$23
Gettysburg	\$39
Global Commander	\$25
Interceptor	\$32
Kampfgruppe	\$39
Life and Death	\$32
Marble Madness	\$15
Mavis Beacon Typing	\$32
Pub Games	\$25
Questron II	\$32
Reach for the Stars	\$25
Rebel Charge	\$39
Reel Fish'n	\$32
Roadwar 2000	\$25
Roadwars	\$25
Rockford	\$25
Scrabble	\$25
Sorcerer Lord	\$23
Time & Magik	\$25
World Tour Golf	\$15
Zany Golf	\$25

## THE LIGHTSPEED ADVANTAGE:

- Three years Amiga market experience.
- Excellent Technical Support from experienced Amiga users.
- Authorized Amiga Dealer!
- Up-front policies.
- Our team is comprised entirely of Amiga owners and enthusiasts.
- Competitive prices.
- Toll-Free Customer Service!

Amiga is a trademark of  
Commodore-Amiga.

Superbase Personal 2	\$89
Superbase Professional	\$189
Super Plan	\$99
Tax Break	\$59
Transcript	\$49
Word Perfect	\$159
Word Perfect Library	\$85
Works Platinum	\$195
Your Family Tree	\$35

Falcon	\$32
Firepower	\$19
Flight Simulator II	\$32
FS II Scenery (ea)	\$18
Harpoon	\$27
Hole in One Mini Golf	\$23
Hole in One Courses 1	\$15
Hostage	\$29
Hybris	\$27

Shanghai	\$15
Silent Service	\$27
Skate Wars	\$32
SkyChase	\$27
Sky Shark	\$27
Starglider II	\$29
Street Cat	\$21
Street Fighter	\$27
Sub Battle	\$15
Superstar Ice Hockey	\$32
Sword of Sodan	\$32
Techno Cop	\$32
Terrorpods	\$27
Test Drive II	\$29
Test Drive II Cars	\$15
Test Drive II Scenery	\$15
Three Stooges	\$32
TV Sports Football	\$32
Twilight Zone	\$27
Universal Military Sim.	\$32
Ums Scenarios 1 or 2	\$15
War in Middle Earth	\$32
Wayne Gretzky Hockey	\$32
W.C. Leaderboard	\$29
Zak McKracken	\$29
Zoom!	\$21
Zork Zero	\$42

Interceptor	\$32
Kampfgruppe	\$39
Life and Death	\$32
Marble Madness	\$15
Mavis Beacon Typing	\$32
Pub Games	\$25
Questron II	\$32
Reach for the Stars	\$25
Rebel Charge	\$39
Reel Fish'n	\$32
Roadwar 2000	\$25

Roadwars	\$25
Rockford	\$25
Scrabble	\$25
Sorcerer Lord	\$23
Time & Magik	\$25
World Tour Golf	\$15
Zany Golf	\$25

## POLICIES:

**Shipping Info:** Software is \$2.50/item (\$5 max) via UPS Ground. For UPS 2nd Day Air add \$1.50 to the Ground rate. COD add \$3.00. Next Day Service available. Other carriers, Hardware, and Foreign rates may be extra.

**Other Policies:** No charge to Credit Card until shipping date, and no surcharges. Exchanges only for defective items, and for same item only. We cannot guarantee product satisfaction.

## AUTHORIZED AMIGA DEALER

Call for prices on Amiga 500 & 2000 Systems.

Amiga 2500 & 2000 HD in stock!

System Shipping Rates: (CPU w/Monitor)

	Ground	Air
Amiga 500	\$30	\$45
All 2000 Models	\$45	\$60

(Rates for US Only, Alaska & Hawaii excluded)

### DESKTOP PUBLISHING

Award Maker Plus	\$32
City Desk 2.0	\$129
Comic Setter	\$69
Fine Print	\$32
JetSet Laser Utility	\$29
PageStream	\$129
Professional Draw	\$129
Professional Page	\$249
Pro Fonts 1 & 2 (ea)	\$25
Pro Script	\$32

War in Middle Earth	\$32
Wayne Gretzky Hockey	\$32
W.C. Leaderboard	\$29
Zak McKracken	\$29
Zoom!	\$21
Zork Zero	\$42

B.A.D.	\$32
Cygnus Ed Professional	\$69
Disk Master	\$45
GOMF!	\$25
Project D	\$32

Quarterback	\$45
Raw Copy	\$39
TxEt Plus	\$55
Workbench Extras	\$27
WShell	\$32

ORDERS & CUSTOMER SERVICE

# 1-800-525-4428



# AT LIGHTSPEED

## MUSIC & MIDI

AudioMaster II	\$69	M for Amiga	\$159
Dr. T's Copyist Pro	\$165	Midi Magic	\$99
Dr. T's KCS V1.6a	\$169	Pro Midi Studio	\$129
Dr. T's Level II	\$219	Pro Sound Designer	\$119
Dr. T's Midi Studio	\$45	Sonix	\$49
Dr. T's Editors (ea)	\$99	Sound Oasis	\$75
Dynamic Studio	\$129	Texture	\$99

## GRAPHICS & ANIMATION

Antic 3D Design Disks	\$23
Broadcast Titler	\$199
Butcher 2.0	\$25
Digi Paint	\$49
Director	\$49
Draw 2000	\$179
Fantavision	\$45
Grabbit!	\$23
Homebuilder's CAD	\$139
InterFont	\$79
Invision	\$139
Modeler 3D	\$65
MovieSetter	\$69
Photon Paint II	\$99
Pro Video Plus	\$189
Pro Video Fonts (ea)	\$99
Sculpt-Animate 4D	\$439
Turbo Silver 3D	\$124
Turbo Silver Terrain	\$23
Video Effects 3D	\$129
Videoscape 3D	\$124
X-CAD Designer	\$385
Zoetrope	\$99

## APRIL SPECIALS!

<b>BOING! OPTICAL MOUSE</b>	<b>\$99</b>
Mast Uni-Drive	\$139
Mast Twin Drive	\$259
50 Mb Drive w/ANY "Hard Card" Controller, still only \$769!	

## "SPOTLIGHT ON..."

### Antic Software

**3D Design Disks:**  
Architectural Future  
Human Interior MicroBot  
**Only \$23 Each**

GFA Basic	\$89
Phasar	\$59
Zoetrope	\$89
Crash Garrett	\$27
Pioneer Plague	\$27
Stir Crazy	\$23

## PROGRAMMING

AC Basic	\$139	Innovatools I	\$59
AC Fortran	\$199	Lattice C 5.0	\$199
ARexx	\$32	Lattice C ++	\$359
Benchmark Modula 2	\$129	Magellan	\$125
C Library	\$65	Manx Aztec C Devel	\$189
IFF Library	\$65	Manx Aztec C Pro	\$135
Simplified Lib.	\$65	Manx Source Debugger	\$55
C.A.P.E. 68k Assem.	\$65	Metacomco Assembler	\$89
DSM (Disassembler)	\$49	Metacomco Pascal 2.0	\$89
DevPac Amiga (HiSoft)	\$69	PowerWindows 2.5	\$69
Extend 1.2	\$29	True Basic	\$69
G.F.A. Basic	\$89		
HiSoft Basic	\$99		

If you don't see it listed...  
**...Just ask!**

## HARDWARE & ACCESSORIES

### MISC. HARDWARE

Chinon 3.5" Int. DD	\$115
CPS-500 Power Supply	\$79
flickerFixer	\$479
Master 3A-1 Drive	\$139
Supra 2400 Baud Modem	\$139

### GRAPHICS HARDWARE

AProDraw 12x12 Tablet	\$499
Color Splitter	\$79
Digi-View 3.0	\$145
Digi-View Gold	\$145
Easy! (All Models)	\$369
FrameGrabber	\$565
Live 2000	\$349
Panasonic Camera/Lens	\$249
Perfect Vision	\$179
Polaroid Palette	\$2295

### MUSIC HARDWARE

CMI Midi External	\$65
ECE Midi	\$49
Midi Gold 500	\$59
Midi Gold 2000	\$65
Perfect Sound	\$69
Pro Sound Designer	\$119
Spirit Midi Star	\$229

### HARD DRIVES

Quantum 42Mb 3.5"	\$599
Quantum 80Mb 3.5"	\$969
Quantum 105Mb 3.5"	\$1069
Quantum 160Mb 3.5"	CALL!
Seagate 48Mb 3.5"	\$549
Seagate 65Mb 5.25"	\$519
Seagate 80Mb 5.25"	\$649
Supra 20Mb 500/1000	\$699
Supra 30Mb 500/1000	\$799

### CONTROLLERS

GVP SCSI 2000	\$249
GVP Impact 1Mb/0K	\$299
GVP Impact 2Mb/0K	\$329
HardFrame 2000	\$249
Overdrive 2000	\$199
Supra 500/1000	\$185
Supra 2000	\$219

### GREAT VALLEY PRODUCTS

<b>A2000 Hard Cards:</b>	
GVP 20Mb Seagate	\$575
GVP 30Mb Seagate	\$699
GVP 42Mb Quantum	\$799
GVP 48Mb Seagate	\$799
GVP 80Mb Quantum	\$1195

**Call for hardware shipping rates.**

### GENLOCKS

Amigen	\$149
Gen One	\$729
Magni 4004	\$1595
ProGen	\$379
SuperGen	\$649

### SYSTEM/RAM EXPANSION

8-Up! 8Mb/0K 2000	\$149
8-Up! PopSIMMs (4)	\$75
GVP 500 0k RAM Module	\$69
GVP Module w/2Mb RAM	\$579
Kickstart Eliminator	\$99
KwikStart 1.3	\$155
MegaBoard 2Mb 2000	\$579
MiniMega 512k	\$335
Phoenix Card Cage	\$225
ProRAM 2000 8Mb/0K	\$249
Starboard II w/512K	\$459
Spirit Inboard 1000	\$249
Spirit Inboard 500	\$179
Sub-System 500	\$259

### ACCESSORIES

Boing! Optical Mouse	\$99
Copy Stand	\$55
Epyx 500XJ Joystick	\$16
GOMF! Button	\$49
Mouse Master	\$29
PowerPlayer Joystick	\$24
Trackball Mouse	\$45
X-Specs 3D Glasses	\$99

### BOOKS

AmigaBASIC In & Out	\$19
AmigaDOS In & Out	\$16
AmigaDOS Manual	\$19
C for Beginners	\$16
C for Advanced	\$19
Sybex Handbook Vol 1	\$19
Sybex Handbook Vol 2	\$19
System Prog Guide	\$26

## ORDERS & CUSTOMER SERVICE

**1-800-525-4428**

Hours: Monday-Friday 9-6 (PST)

## INTERNATIONAL TOLL-FREE ORDERING!

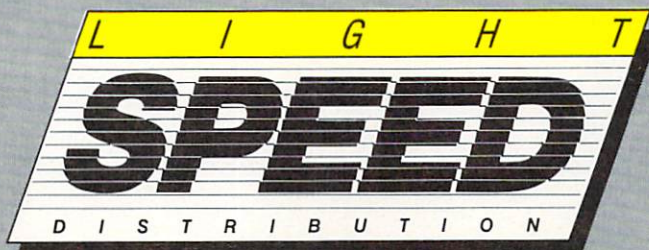
### AUSTRALIA:

Overseas Freephone Toll-Free: 0014-800-12-5632

### CANADA:

Toll-Free Service Call: 1-800-843-2555

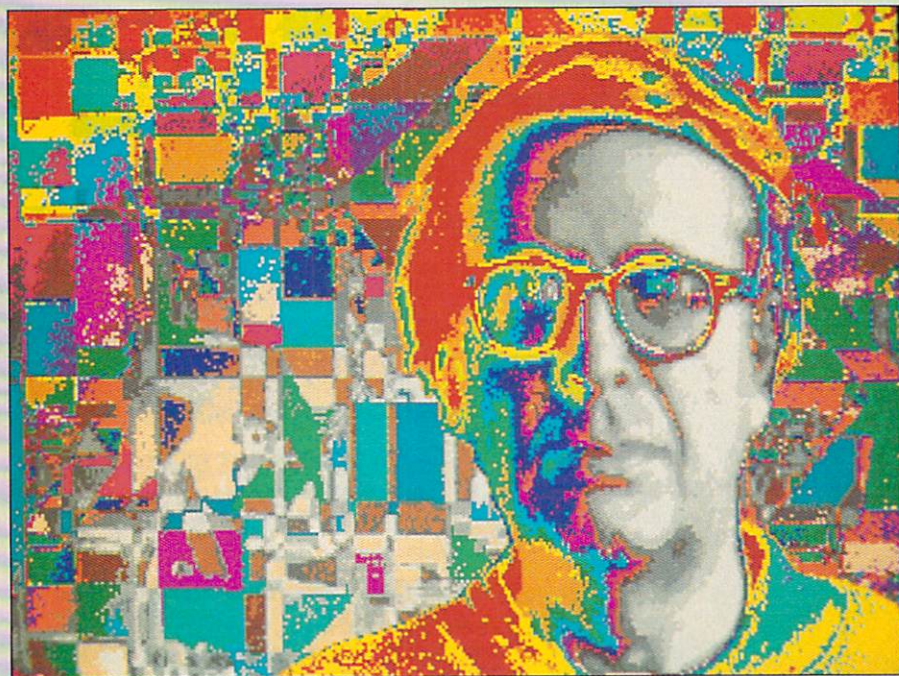
■ **Australia & Canada:** Please use Toll-Free lines for Orders Only! (Minimum Order \$100 US) for Info, or Orders under \$100 US, call 503-777-1008. Thank You!



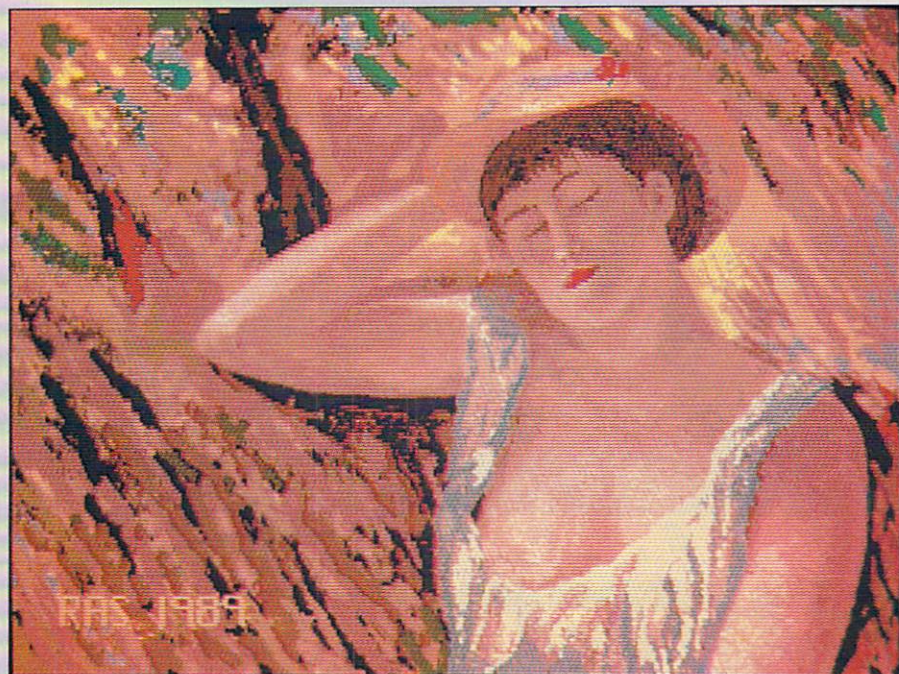


# READER ART GALLERY

*A flood of high-quality reader graphics has arrived at AMIGA Plus since the premiere issue came out.*



Alex



Sleeping

Alex, by professional New York Amiga artist Ilene Astrahan, is one of a series of portraits of her husband. For each portrait, she used Digi-View to input one of her original photos or video-camera images into an Amiga 1000 and then enhanced the picture with Deluxe Paint II and Butcher.

Sleeping, by Robert A. Smith of Santa Rosa, California is a homage to Renoir's impressionist masterpiece, *La Dormeuse* (1880). Smith writes, "My Amiga picture is not meant to be an exact copy of the Renoir painting, nor was it digitized. The work was done primarily in low resolution on Deluxe Paint II and then finished in non-interlaced HAM on Deluxe PhotoLab."

## Rules

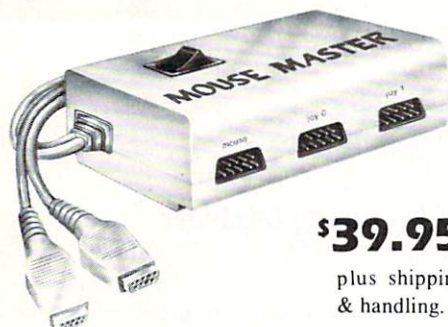
AMIGA Plus pays \$50 for each image published in this section. Single pictures or short animations are both eligible for consideration. Graphics files from the Gallery may be included on the AMIGA Plus Disk, as space permits.

Images published in the Reader Art Gallery must be the original creations of the artist, produced on an Amiga computer. Digitized adaptations of other persons' works are not eligible. Gallery submission disks will not be returned, unless you include a stamped, self-addressed mailer. On each *disk label*, please legibly print your name, address and phone number. Also enclose a short letter listing your picture titles and filenames, credits for the graphics software you used and any other noteworthy technical information about the picture. If a special "show" program is needed for viewing your pictures, please include it on the disk. Mail your entries to Reader Art Gallery, AMIGA Plus, 544 Second Street, San Francisco, CA 94107.



## Now For The Amiga!

Are you tired of fumbling under or behind your computer to swap your mouse and joystick cables? Are your cable and computer connectors worn out from all the plugging and unplugging? Then Mouse Master is a must for you!



**\$39.95**

plus shipping  
& handling.



(602) 322-6100

**Practical  
Solutions®**

1135 N. Jones Blvd., Tucson, AZ 85716

CIRCLE 019 ON READER SERVICE CARD

**MOUSE MASTER**

# Templicity™

## 60 Ready-made Templates For Your Spreadsheet!

*Available for Analyze!, Logistik,  
MaxiPlan, and VIP Professional*

- Income Tax Forms w/upgrades
- Personal Financial Planning
- Real Estate Decisions
- Bookkeeping
- Try for 30 days on our no-risk money-back guarantee.

**Complete pkg.-60 templates-\$29.95**

**The Sterling Connection**

**Box 4850**

**Berkeley, CA 94704**

Specify which spreadsheet you have.

To order by phone:

**Call (415) 655-2355**

Mastercard and Visa accepted.

California res. add 7% sales tax.

CIRCLE 027 ON READER SERVICE CARD

## ANTIC'S **AMIGA** MAGAZINE *plus* **Public Domain Library**

The Amiga Plus Public Domain Library presents DevDisks by DevWare. DevDisks are the public domain library of choice for serious Amigaphiles. Each disk contains 7-10 of the best public domain programs available, source code included whenever available. Some programs included are shareware, we strongly encourage you to support these authors. If the name of your tune is fun and games, try one of the FunDisks listed below (i.e. FD3).

**DD15:** Bison - Yacc equivalent, MidiPanel1.2 - MIDI patch handler, SuperHop - Graphics program, V100v2.6 - An excellent VT100 terminal emulator and telecommunications program. Features include XMODEM and KERMIT file transfer protocols, scriptfiles, and 48 lines of text in hi-res mode.

**DD17:** DBWRender - Ray tracing, RayTracedPics, C source.

**DD21:** Arc023 - file archiver and compressor. Many bulletin board system files are stored in Arc format. CSDBMS - simple database, DME1.22 - programmer's editor, DosCommands2 - Three great CLI commands: "alist", "ask", "cls". MakeBoth1.2 - create Kickstart-Workbench, Mod2Gadgets - Gadgets, Intuition, and Workbench programming examples, NewZap3 - editing binary files, PDMake - A must have for compiling large programs, PersMail - powerful personal/personnel file manager, And More

**DD24:** Backup - Hard disk backup, Cookie - Fortune cookie program, PrinterDrivers - over 40 printer drivers, PriController - Modify printer parameters, Shell - Unix-like command interpreter, Splines - curve-fitting, UtiliDir - directory utility program, Zap2Icon - convert IFF pictures to icons, And more.

**DD26:** AutoPoint - "Sun" mouseable windows, Bezier - Bezier curves fitting, BSpline - BSpline explores beta spline curves, ConMan0.98 - replacement console handler that provides line editing and command line histories, DiskX - explore the format of a floppy disk, DLabel - disk label printer, MCad1.2.5 - computer-aided design program. MCad is an object-oriented drawing program, making the creation of diagrams, charts, floor layouts, etc. much easier, PriDrvGen2.2 - generate printer drivers (shareware), StructBrowser - explore Intuition, And Others.

**DD28:** 3dTerraIn - 3D terrain generating, AudioTools2 - Rob Peck's subroutines for using the audio device, Claz2 - covert IFF to PostScript, Icons - 100's of icons, HeliosMouse - "Sun" mouseable windows, KeyLock - keyboard lockout, Modula - Four Mod2 examples, PCCpomm1.34 - A version of the great modem program Comm1.34

**DD28 continued:** modified for optimal use with PC Pursuit, Undelete - recover a file that has been deleted, UnixDirFuncts - Several Unix functions, WindowUtil - A collection of window related routines, And More.

**DD43:** ARP - The AmigaDos (1.3) Replacement Project version 34.1 command replacements for AmigaDos. Arp commands are smaller, and faster, BIK - Takes special format text files and creates C source code for requester declarations, DiskLib - organizes software into libraries, RunBack - RunBack executes a CLI task in the background

**FD3:** Asteroids - A very good version of Asteroids. You can redefine all the shapes in the game and/or change the sound, Dominoes - Play the computer. The speech option talks and gloats when it is winning, Gravity\_War\_2.0 - Gravity Wars is played on in a gravity field. "The object of the game is for one player to hit the other with a missile before being hit yourself. All the planets have gravity, so the missiles bend and twist, even reverse, MissileCommand - very fast and has good sounds, Nuke - strategy game played against the computer. During the peace phase you build offensive and defensive weapons and plant spies. While at war you launch your weapons and protect your cities, if you can, Trix - Trix is a clone of the old Qix game. Try and capture more than 60% of the screen.

**FD4:** Amazing - create, store, and solve mazes using 3-D Graphics, Egypt - "It seems the pyramids have come alive and are out to take over the world! Can you get in range to fire your guided missile at the control pyramid?", Nakamoto - similar to Jumpman Donkey Kong, Miner2049er etc. The game has 55 screens, Tetrix - Tetrix is a fast action puzzle. Geometric pieces fall one at a time into a container, while they are falling they may be rotated or moved horizontally. The object of the game is to keep the box from filling in the commercial equivalent is available for \$39.95). Wander - Great game! Like boulderdash. Direct from the Unix port of the same name. Wonderful color graphics and sound give the game a more stylish and useful look.

Please send me the following for \$7.00, plus \$1.00 S&H each.  
**DISK ID (Ex DD28, FD3 ...)**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Total Disks: \_\_\_\_\_ x \$7.00 each \$ \_\_\_\_\_  
Disk based Catalog (add \$2.50) \$ \_\_\_\_\_  
CA residents add 6.5% sales tax \$ \_\_\_\_\_  
Ship/Handling @ \$1.00 each \$ \_\_\_\_\_  
Total Due \$ \_\_\_\_\_

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please allow 4-6 weeks for delivery. Foreign orders, please add \$2.00 per disk for Air Mail Delivery. Payment in US Funds, DVS0

**Amiga Plus Public Domain Library, P.O. Box 215, La Jolla, CA 92038**

Dealer Inquiries Welcome

CIRCLE 020 ON READER SERVICE CARD



# Advertisers Index

	READER SERVICE NO.	PAGE NO.
A SQUARED DISTRIBUTORS	001	29
ANTIC SOFTWARE	002,003	22,27
AMIGA PLUS		18
BEST, INC.	004	25
BROWN WAGH PUBLISHING	008	7
CENTAUR	009	IBC
COMMUNICATION SPECIALTIES	011	37
COMPUTABILITY	005	62
COMPUTER DIRECT	006	78,79
CREATIVE COMPUTERS	013	58,59
DATL	007	61
DR. T'S	010	82
DISCOVERY	014	IFC
DEVWARE	020	105
GO AMIGO	012	94,95
LIGHT SPEED DISTRIBUTION	022	102,103
MICHTRON	015,016	52,BC
MICROBOTICS	023	73

	READER SERVICE NO.	PAGE NO.
MICROCOMPUTER SERVICES	017	90,91
NEW HORIZONS	018	3
PRACTICAL SOLUTIONS	019	105
REDMOND CABLE	032	37
SOFTWARE ADVANTAGE	031	37
SOFTWARE EXCITEMENT	024	101
SPECTRUM HOLOBYTE	026	12
SUPRA	029	46
THE SOFTWARE SHOP	025	88
THE STERLING CONNECTION	027	105

## Advertising Deadlines

### DON'T FORGET!

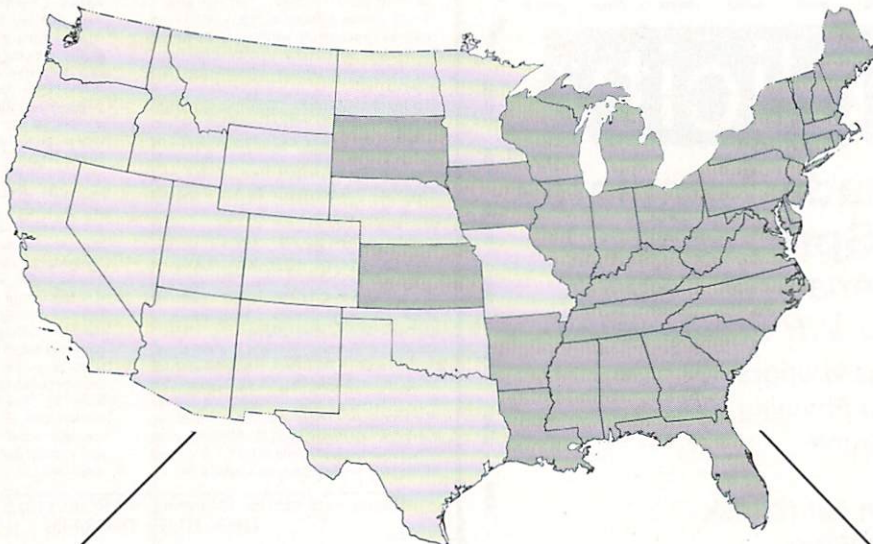
Advertising Deadlines for the August/September Issue of Amiga Plus

Insertion Orders Due: May 12

Ad Copy Due: May 19

On Sale: First week of July

# Advertising Sales



Western Region  
Advertising Sales Representative:  
**AUSTIN HOLIAN**  
544 Second Street  
San Francisco, CA 94107  
(415) 957-0886

Address all advertising materials to:  
**KATE MURPHY**  
Advertising Production Coordinator  
**Amiga Plus**  
544 Second Street  
San Francisco, CA 94107  
(415) 957-0886

Eastern Region  
Advertising Sales Representative:  
**DENNY RILEY**  
544 Second Street  
San Francisco, CA 94107  
(415) 957-0886



# MISSING SOMETHING?

You've bought the magazine. Now, get the disk.

**AMIGA PLUS DISK**—Full of the exclusive programs from top Amiga experts that you've read about in this issue!

For only \$10.95 (plus \$2 shipping/handling), we'll rush you this issue's disk.

## ASK FOR PDS0789

☐ Check enclosed ☐ Visa ☐ MasterCard

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Credit Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

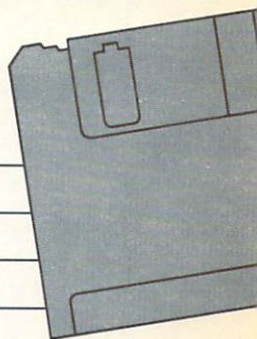
Signature \_\_\_\_\_

Get the disk in your hands even faster

**CALL TOLL-FREE 1 (800) 234-7001**

(7am-6pm M-F, PST) VISA/MasterCard orders only

ANTIC'S  
**AMIGA+**  
MAGAZINE



# MISSING SOMETHING?

You've bought the magazine. Now, get the disk.

**AMIGA PLUS DISK**—Full of the exclusive programs from top Amiga experts that you've read about in this issue!

For only \$10.95 (plus \$2 shipping/handling), we'll rush you this issue's disk.

## ASK FOR PDS0789

☐ Check enclosed ☐ Visa ☐ MasterCard

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Credit Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

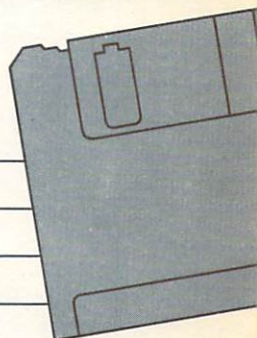
Signature \_\_\_\_\_

Get the disk in your hands even faster

**CALL TOLL-FREE 1 (800) 234-7001**

(7am-6pm M-F, PST) VISA/MasterCard orders only

ANTIC'S  
**AMIGA+**  
MAGAZINE



# AMIGA PLUS PRODUCT INFORMATION

## FOR PRODUCT INFORMATION

### A. What Amiga equipment do you own?

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Amiga 1000        | 9. <input type="checkbox"/> Extra floppy disk |
| 2. <input type="checkbox"/> Amiga 500         | 10. <input type="checkbox"/> Hard disk        |
| 3. <input type="checkbox"/> Amiga 2000        | 11. <input type="checkbox"/> Printer          |
| 4. <input type="checkbox"/> 1 meg memory      | 12. <input type="checkbox"/> Synthesizer/MIDI |
| 5. <input type="checkbox"/> 512K memory       | 13. <input type="checkbox"/> Genlock          |
| 6. <input type="checkbox"/> Over 1 meg        | 14. <input type="checkbox"/> Video digitizer  |
| 7. <input type="checkbox"/> 3rd-party monitor | 15. <input type="checkbox"/> Video board      |
| 8. <input type="checkbox"/> Modem             | 16. <input type="checkbox"/> Bridgeboard      |

### B. How much do you plan to spend on software over the next 6 months?

- |  |  |
|--|--|
| 1. <input type="checkbox"/> \$1-29.95  | 5. <input type="checkbox"/> \$100-149.95 |
| 2. <input type="checkbox"/> \$30-59.95 | 6. <input type="checkbox"/> \$150-199    |
| 3. <input type="checkbox"/> \$60-79.95 | 7. <input type="checkbox"/> \$200-300    |
| 4. <input type="checkbox"/> \$80-99.95 | 8. <input type="checkbox"/> Over \$300   |

### C. What are the three main uses of your Amiga?

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Word Processing       | 6. <input type="checkbox"/> Desktop Publishing |
| 2. <input type="checkbox"/> Education             | 7. <input type="checkbox"/> Databases          |
| 3. <input type="checkbox"/> Games/Recreation      | 8. <input type="checkbox"/> On-line            |
| 4. <input type="checkbox"/> Spreadsheets/Business | 9. <input type="checkbox"/> Graphics/CAD       |
| 5. <input type="checkbox"/> Programming           | 10. <input type="checkbox"/> Music/MIDI        |

### D. What do you plan to buy in the next 6 months?

- |  |   |
|--|---|
| 1. <input type="checkbox"/> Printer (Dot-Matrix) | 7. <input type="checkbox"/> Synthesizer/MIDI    |
| 2. <input type="checkbox"/> Modem                | 8. <input type="checkbox"/> Video digitizer     |
| 3. <input type="checkbox"/> Monitor              | 9. <input type="checkbox"/> Laser printer       |
| 4. <input type="checkbox"/> Extra floppy drive   | 10. <input type="checkbox"/> Color printer      |
| 5. <input type="checkbox"/> Hard disk            | 11. <input type="checkbox"/> Genlock            |
| 6. <input type="checkbox"/> Memory upgrade       | 12. <input type="checkbox"/> New Amiga computer |

### E. Household income?

- |  |   |
|--|---|
| 1. <input type="checkbox"/> Less than \$25,000 | 4. <input type="checkbox"/> \$50,000-74,999 |
| 2. <input type="checkbox"/> \$25,000-34,999    | 5. <input type="checkbox"/> \$75,000-99,999 |
| 3. <input type="checkbox"/> \$35,000-49,999    | 6. <input type="checkbox"/> Over \$100,000  |

### F. Send me a subscription to AMIGA Plus magazine with disk for \$39.95. Bill me later. Circle 300 on Reader Service Card.

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone ( ) \_\_\_\_\_

## CIRCLE NUMBERS FOR MORE INFORMATION:

1	2	3	4	5	26	27	28	29	30	51	52	53	54	55	76	77	78	79	80
6	7	8	9	10	31	32	33	34	35	56	57	58	59	60	81	82	83	84	85
11	12	13	14	15	36	37	38	39	40	61	62	63	64	65	86	87	88	89	90
16	17	18	19	20	41	42	43	44	45	66	67	68	69	70	91	92	93	94	95
21	22	23	24	25	46	47	48	49	50	71	72	73	74	75	96	97	98	99	100
101	102	103	104	105	126	127	128	129	130	151	152	153	154	155	176	177	178	179	180
106	107	108	109	110	131	132	133	134	135	156	157	158	159	160	181	182	183	184	185
111	112	113	114	115	136	137	138	139	140	161	162	163	164	165	186	187	188	189	190
116	117	118	119	120	141	142	143	144	145	166	167	168	169	170	191	192	193	194	195
121	122	123	124	125	146	147	148	149	150	171	172	173	174	175	196	197	198	199	200
201	202	203	204	205	226	227	228	229	230	251	252	253	254	255	276	277	278	279	280
206	207	208	209	210	231	232	233	234	235	256	257	258	259	260	281	282	283	284	285
211	212	213	214	215	236	237	238	239	240	261	262	263	264	265	286	287	288	289	290
216	217	218	219	220	241	242	243	244	245	266	267	268	269	270	291	292	293	294	295
221	222	223	224	225	246	247	248	249	250	271	272	273	274	275	296	297	298	299	300

Issue date: June / July 1989. This card not valid after August 31, 1989



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 22047 SAN FRANCISCO, CA 94107-9989

POSTAGE WILL BE PAID BY ADDRESSEE



544 Second Street  
San Francisco, CA 94107

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 22047 SAN FRANCISCO, CA 94107-9989

POSTAGE WILL BE PAID BY ADDRESSEE



544 Second Street  
San Francisco, CA 94107

PLACE  
25¢  
STAMP  
HERE



P.O. Box 394  
Reader Service Dept.  
Dalton, MA 01227-9990



# YES!

Get my subscription clicking. Sign me up for 6 issues of **AMIGA PLUS** including disk for the low price of **\$39.95**.

- ☐ Bill Me  
☐ Payment Enclosed  
☐ Check   ☐ Visa   ☐ MasterCard

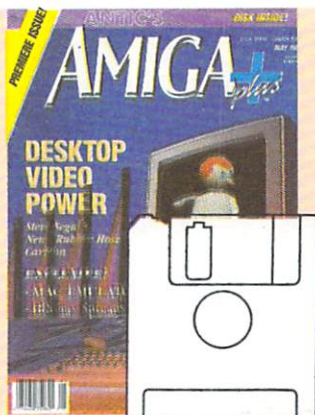
Credit Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ EG9S



**SAVE 55%**  
off the Newsstand Price

Please allow 6-8 weeks for delivery of first issue. Canada & Mexico residents add \$9.00 per year. Other foreign add \$13.00. Foreign Subscribers (not including Canada) must send full payment. Payment in U.S. funds. California residents add 6 1/2% sales tax.

# YES!

Get my subscription clicking. Sign me up for 6 issues of **AMIGA PLUS** including disk for the low price of **\$39.95**.

- ☐ Bill Me  
☐ Payment Enclosed  
☐ Check   ☐ Visa   ☐ MasterCard

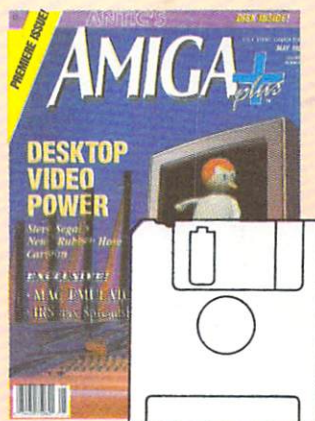
Credit Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ EG9S



**SAVE 55%**  
off the Newsstand Price

Please allow 6-8 weeks for delivery of first issue. Canada & Mexico residents add \$9.00 per year. Other foreign add \$13.00. Foreign Subscribers (not including Canada) must send full payment. Payment in U.S. funds. California residents add 6 1/2% sales tax.

# YES!

Get my subscription clicking. Sign me up for 6 issues of **AMIGA PLUS** including disk for the low price of **\$39.95**.

- ☐ Bill Me  
☐ Payment Enclosed  
☐ Check   ☐ Visa   ☐ MasterCard

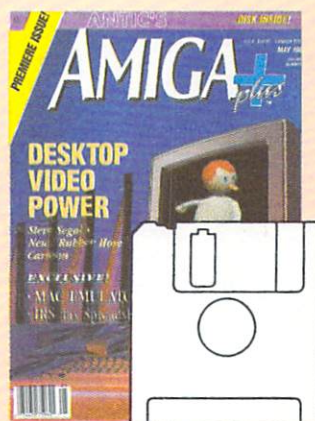
Credit Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ EG9S



**SAVE 55%**  
off the Newsstand Price

Please allow 6-8 weeks for delivery of first issue. Canada & Mexico residents add \$9.00 per year. Other foreign add \$13.00. Foreign Subscribers (not including Canada) must send full payment. Payment in U.S. funds. California residents add 6 1/2% sales tax.





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

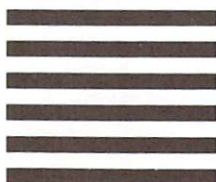
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 22047 SAN FRANCISCO, CA 94107-9989

POSTAGE WILL BE PAID BY ADDRESSEE

***Amiga Plus***

P.O. Box 1569  
Martinez, CA 94553



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

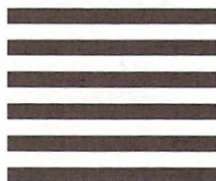
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 22047 SAN FRANCISCO, CA 94107-9989

POSTAGE WILL BE PAID BY ADDRESSEE

***Amiga Plus***

P.O. Box 1569  
Martinez, CA 94553



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

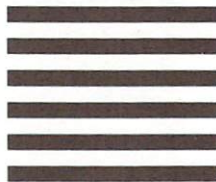
**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 22047 SAN FRANCISCO, CA 94107-9989

POSTAGE WILL BE PAID BY ADDRESSEE

***Amiga Plus***

P.O. Box 1569  
Martinez, CA 94553

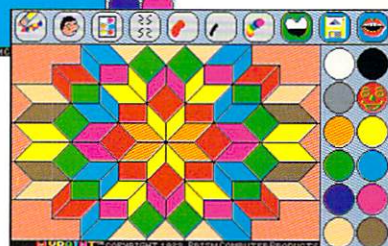




# MyPaint™

Educational Paint Program & Coloring Book

- Easy to Understand
- Animated icon menus
- Fill Mode
- Various brush modes
- Color cycle effects
- No reading skills required
- 28 Drawings included
- Kids can draw their own pictures
- More "coloring book" diskettes available
- Educator approved
- Sampled sounds for each picture mode



**\$49.95** retail

**Make Your Disks Fly with.....**

# B.A.D.

**Centaur Software Inc.**

14040 Tahiti Way, suite 528  
Marina Del Rey  
CA 90292

- The Ultimate Disk Optimizer
- Decrease Disk Access Time Up To 500%
- Restore Smooth Disk Operation
- Designed For Use On Floppies AND HardDrives
- Supports Multiple Partitions
- FAST CLI Directory Access
- Incredible Workbench[tm] Performance
- 100% AmigaDOS Compatible
- Works with the FAST FILING SYSTEM

**B.A.D. analyzes, restructures, and processes ANY AmigaDOS disk such that permanent speed increases will be realized. This is NOT a RAM cache based system!**

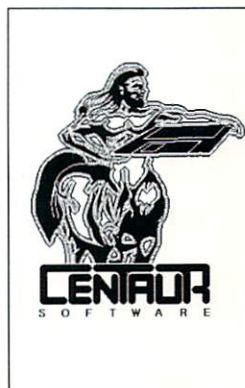
**\$49.95** retail

M.V. Micro

## Other Centaur Software Products

<b>C-Zar</b>	Patch Editor/Librarian for the CZ series of Casio Synthesizers	<b>\$195.00</b>
<b>MidiVU</b>	MIDI Signal Monitor and 1 Channel Sequencer	<b>\$39.95</b>
<b>Pro-Net</b>	Schematic Capture CAD program.	<b>\$495.00</b>
<b>Pro-Board</b>	Professional PCB (Printed Circuit Board) layout program.	<b>\$495.00</b>
<b>NTF Fonts</b>	Comix, Roman, Fancy, Sans Serif	<b>\$79.95</b>

To order products, order direct from us by calling (213) 821-5995, or see your nearest Amiga dealer.





# The Power to Create

**HiSoft BASIC Professional** is a fully-integrated compiler and editor that makes it easy to convert all your AmigaBASIC programs into fast-running machine code; in fact, it is so simple and quick to use that you will soon find that you no longer need the AmigaBASIC interpreter, you can do everything you want with **HiSoft BASIC Professional**.

Full support of the Amiga is included as standard, with extensive window, screen and graphics commands. Amiga libraries can also be accessed as if they were built-in statements allowing complete machine access.

**HiSoft BASIC Professional** includes full MENU support, with event trapping and powerful sprite routines, using the OBJECT keywords.

Compiled programs can execute in their own window(s) or use the CLI window for minimum size.

For larger programs and for those with strong editor preferences we also supply an editor-less compiler for traditional disk-to-disk compilation methods.

**HiSoft BASIC Professional** is a no-limits language; string variables may be up to 16Mbytes in length and there are no limits on array sizes either (subject to available memory). Code generated is fully 68010/020/030 compatible.

Compiled programs have no run-time overhead. Compiled programs multi-task, of course, but as they all share the same library, memory usage and disk space is kept to a minimum. There is also an option to produce com-

pletely stand-alone programs which include only as much of the library as they need.

Features include:

✓ Compatible with Microsoft QuickBASIC 3 on the PC, Atari ST BASIC, AmigaBASIC and most other BASICs.

✓ Full structured programming.

✓ Optional line numbers, lots of compiler and run-time options allowing tremendous flexibility both at compile & execution time.

✓ Full recursion in sub-programs and functions plus local and global variables, arrays as parameters.

**HiSoft BASIC Professional** - now BASIC programming on the Amiga has come of age.

*Order your Copy Today at \$159.95, and take a look at Devpac Amiga, the best Assembler available for the Amiga. Together they make an unbeatable programming team!*

## DevPac Amiga: The Assembler of choice

**HiSoft Devpac Amiga Version 2** is the latest version of the acclaimed assembly language development tool for the Commodore Amiga. It combines a full 68000 macro assembler coupled with a full screen editor, **GenAm**, and a powerful disassembler and debugger, **MonAm**. Devpac is designed to give you maximum power and flexibility, while remaining easy to use.

**GenAm** includes a full screen editor, running under *Intuition* and using the window- and mouse-oriented environment. The editor features a file requester, dynamic block handling (including delete, copy, save and insert from disc) a comprehensive range of Search and Replace commands and edit-time tab handling. It has a powerful, fast 68000 macro assembler that can assemble source code at a maximum speed of 75,000 lines per minute (on a standard A500). A stand-alone version of the assembler is supplied for users with strong editor preferences or who use batch files.

**MonAm** is a comprehensive, highly advanced symbolic monitor, disassembler, and debugger. It is multi-tasking, and you can set breakpoints in your code while it executes and stop runaway programs.

To make program development fast and easy, both the assembler and the debugger are available instantly from within the editor.

Order today, and pay just \$99.95 for the best Assembler/Debugger for the Amiga!

	HiSoft Professional™	AC BASIC™
<b>SIEVE</b>		
Compile time (secs)	7	20
File size (bytes)	868	2228
Run time (secs)	1.0	2.7
<b>CALC</b>		
Run time	1.6	4.9
<b>BSPREAD</b>		
Compile time	55	80
File Size	35816	56036

**MichTron**  
576 S. Telegraph, Pontiac, MI 48053  
Orders and Information (313) 334-5700

CIRCLE 016 ON READER SERVICE CARD